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8th National Healthcare Group (NHG) Annual Scientific Congress 2009

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	A/Prof Suresh Sahadevan	Tan Tock Seng Hospital
	Dr Richard Sim	Tan Tock Seng Hospital
	Dr Teoh Stephen	Tan Tock Seng Hospital
	Mr Wee Seng Kwee	Tan Tock Seng Hospital
	Dr Wu Huei Yaw	Tan Tock Seng Hospital

Panel of Judges

(in alphabetical order, according to Institutions)

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Dr Kenneth Mak	Alexandra Hospital	A/Prof Paul Tambyah	National University Health System
Clin A/Prof Pang Weng Sun	Alexandra Hospital	Ms Tan Chwee Eng	National University Health System
Dr Sum Chee Fang	Alexandra Hospital	Prof Yong Eu Leong	National University Health System
Ms Gladys Wong	Alexandra Hospital	Asst Prof Chan Moon Fai	National University of Singapore
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Dr Liu Jian Jun	Genome Institute of Singapore, A*STAR	A/Prof Hooi Shing Chuan	National University of Singapore
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Dr Heng Bee Hoon	National Healthcare Group HQ	A/Prof Ding Yew Yoong	Tan Tock Seng Hospital
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Dr Sophia Ang	National University Health System	Ms Susan Niam	Tan Tock Seng Hospital
A/Prof Chng Wee Joo	National University Health System	A/Prof Tan Say Beng	Singapore Clinical Research Institute
Dr Goh Boon Cher	National University Health System	A/ Prof Au Eong Kah Guan	Singapore International Eye Cataract Retina Centre
A/Prof Goh Lee Gan	National University Health System		University of New South Wales
A/Prof Krishnakumar Madhavan	National University Health System	Dr Henry Brodaty	

Satellite Conference Organisers/Scientific Programme Track Leaders

Satellite Conferences

NHG Eye Institute 2nd International Ophthalmology Congress

Organising Chairpersons	A/Prof Goh Kong Yong	Tan Tock Seng Hospital
	Dr Wong Hon Tym	Tan Tock Seng Hospital

The Singapore Disease Management & Primary Care Forum 2009

Organising Chairpersons	Dr Matthias Toh	National Healthcare Group Polyclinics
	Dr Chong Phui-Nah	Primary Care Academy

TTSH-JHSIMC Clinical Oncology Symposium 2009

Organising Chairpersons	Dr Chan Chung Yip	Tan Tock Seng Hospital
	Dr Gilberto Lopes	Johns Hopkins Singapore International Medical Centre

Infectious Diseases Symposium 2009

Organising Chairpersons	Dr Lee Cheng Chuan	Tan Tock Seng Hospital
	A/Prof Leo Yee Sin	Tan Tock Seng Hospital

ASC Scientific Programme Track Leaders

(in alphabetical order, according to institutions)

Members	Dr Lee Jer En	Alexandra Hospital	Dr Chao Siew Shuen	National University Health System
	A/Prof Lim Su Chi	Alexandra Hospital	A/Prof Chng Wee Joo	National University Health System
	Prof John Rush	Duke-NUS Graduate Medical School Singapore	A/Prof Chong Yap Seng	National University Health System
	Mr Peter Clough	Efamol Ltd / Wassen International	A/Prof Mahesh Choolani	National University Health System
	A/Prof Chong Siow Ann	Institute of Mental Health	Prof James Hui Hoi Po	National University Health System
	Dr Thomas Lee	Institute of Mental Health	A/Prof Jimmy So Bok Yan	National University Health System
	Mr Seth Chow	National Medical Research Council	A/Prof Thai Ah Chuan	National University Health System
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	Ms Adeline Lu	National Healthcare Group HQ	Prof Cheung Yin Bun	Singapore Clinical Research Institute
	Ms Sim Ee Ling	National Healthcare Group HQ	A/Prof Chin Jing Jih	Tan Tock Seng Hospital
	Ms Joanna Teo	National Healthcare Group HQ	Dr Bernard Ho	Tan Tock Seng Hospital
	Dr Martin Chio	National Skin Centre	Dr Eric Hong Cho Tek	Tan Tock Seng Hospital
	Dr Melvin Ee	National Skin Centre	Ms Kala Narayanasamy	Tan Tock Seng Hospital
	Dr Colin Theng	National Skin Centre	Dr Kong Keng He	Tan Tock Seng Hospital

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(B) 2nd TTSH-JHSIMC	Covidien
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Message by Mdm Kay Kuok Oon Kwong

The NHG Annual Scientific Congress (ASC) is the largest scientific congress to be held annually and locally.

Since its inception in 2002, the Annual Scientific Congress has developed into an important forum for clinicians and healthcare professionals in Singapore to share best practices, discuss pertinent healthcare issues and showcase research achievements. Last year, we saw a record attendance of 3,800 delegates with over 50 scientific and healthcare tracks presented.

Organising this year's Congress has been a challenge from the start. The world was first struck by an economic downturn earlier this year. Before we could recover, we are now facing a pandemic caused by the H1N1 virus. The Organising Committee faced a very difficult decision. Should we still proceed with the Annual Scientific Congress?

Despite the challenges, I am heartened to learn that our organising healthcare institutions, namely National University Health System, Alexandra Hospital, Tan Tock Seng Hospital, Institute of Mental Health, National Skin Centre and NHG Polyclinics came together very strongly with many supporting organisations to organise this largest scientific event. This testifies the importance of this Congress to our clinicians, researchers and healthcare professionals, and the result of collective commitments and collaborations that made this Congress yet another successful one this year, despite the economic downturn and the H1N1 pandemic.

This spirit of collaboration is imperative for the successful pursuit of medical excellence and improvement in healthcare delivery. In this area, NHG will continue to establish collaborations with key partners to achieve excellence in research, and good health outcomes for our patients.

In September 2008, NHG, together with EDB, signed a Memorandum of Understanding with AstraZeneca, Christie Hospital NHS UK and University of Manchester UK to establish collaborations in pre-clinical and early clinical trial research as well as research training. The aim is to establish Asia as a premier location for Liver Cancer research. Under this collaboration led by A/Prof Goh Boon Cher from NUHS, investigators in NHG and NUHS will conduct early phase clinical trials on 3 to 4 compounds per year provided by AstraZeneca to screen for activity in in-operable liver cancer patients undergoing novel anti-cancer treatment. In addition, clinicians or investigators in NHG and NUHS will also undertake an advanced training program at Christie Hospital NHS Trust, University of Manchester, Manchester Cancer Research Centre or AstraZeneca premises in oncology research.

This international collaboration involving both the public and private sector will strengthen and improve the quality of research through the assembly of key champions to challenge the status quo, and shorten the path to translate research into tangible care for our patients.

As with all talent intensive sectors, human capital is the key pillar to ensure success for Singapore's drive in Biomedical Research. Not only do we need clinician investigators as our research talent, we also need clinical research coordinators to provide the necessary support for research projects. In this area, NHG will continue our efforts to nurture new talents for Translational and Clinical Research, and elevate the standard and quality of the research support team. Under the NHG Investigator-Clinician Career Track Program which was officially launched at the last Congress, we have emplaced 4 aspiring and passionate clinicians on this program to support their pursuit of research as their primary career. We are confident that they will excel in their areas of expertise and translate their research into best care for our patients. In addition, we have also developed a comprehensive training curriculum for our clinical research coordinators. I am pleased to share that we have also partnered with the Society for Clinical Research Associates (SoCRA) in the US to conduct the first international certification exam for our clinical research coordinators in June 2009. We are committed to continue enhancing these programs to nurture and elevate the standard and quality of our investigators and research coordinators.

The reputation of our accredited high quality research ethics framework, the Domain-Specific Review Boards (DSRBs) has also spread far beyond NHG. DSRBs will provide ethics review services to Health Services Authority, St Luke's Hospital and Dover Park Hospice. Apart from MOUs forged with HSA and St Luke's Hospital at the last ASC, we have also received numerous requests from countries in the region like Vietnam, Shanghai and Taiwan to share our DSRB model and success with them. This is a strong testimony of our high quality and standard in our research. For this, we owe it to the commitment and effort of our DSRB members and Institutional leadership.

To achieve medical excellence and deliver best care to our patients, we need to collaborate with all stakeholders and create an environment of free exchange of best ideas and practices. I am very glad that we have come together again for the "eighth" time to organise the NHG Annual Scientific Congress. The ASC is our hallmark of collaboration and a platform for intellectual exchange. I am confident that we will continue this spirit of collaboration. May I extend my warmest welcome to all of you to the 8th NHG Annual Scientific Congress 2009.



Chairman

National Healthcare Group

Message by Dr Lim Suet Wun

Welcome to the 8th National Healthcare Group Annual Scientific Congress (ASC) 2009!

The theme for this year's congress is "Medicine in Asia – Transforming Global Healthcare, Empowering Lives". This theme is timely as the world shifts its focus towards Asia. The Congress aims to discuss the emerging role of Asia in advancing medical practices around the world, and highlight the importance of empowering the communities to manage their health and involve in the effort of integrating care.

The journey of innovating medicine will never end. Asia will have an important role to play to offer scientific innovation and knowledge that are globally applicable. More importantly, we are well positioned to develop the full spectrum of innovation, starting from an idea that are tested in the laboratory, pass it through rigorous translational research, applied into real world clinical practice, and continue to evolve through health services research and quality improvement. This entire journey must be enabled by new technologies, and empowered by the spirit of collaboration.

In this light, we shall have the honour of hearing from Professor Edison Liu, Executive Director of Genome Institute of Singapore, on the journey of Genomic Medicine in Asia during his keynote address. We will also have the opportunity to learn from some of our top researchers who were awarded the Translational and Clinical Research (TCR) Flagship Programmes last year on their achievement in research and how they would collaborate to achieve success in their research program. A/Prof Chong Yap Seng of the National University Health System will share on the lessons from his landmark clinical trials for diabetes mellitus and developmental pathway to metabolic disease, and A/Prof Leo Yee Sin of Tan Tock Seng Hospital Communicable Disease Centre will bring together groups from the Infectious Diseases TCR flagship programme to discuss the development of translational and clinical research in Adult Dengue Diseases in Singapore. Last but not least, we will also hear from our Health Service and Outcome Research (HSOR) expert, Prof Alan Pearson of Joanna Briggs Research Institute in Australia on transformation of healthcare with evidence and how we can bridge the gaps between research and clinical practice.

This year's Congress continues to see greater collaboration among our organising healthcare institutions, namely National University Health System, Alexandra Hospital, Tan Tock Seng Hospital, Institute of Mental Health, National Skin Centre and NHG Polyclinics. We have also expanded the collaboration with other organisations like A*STAR, National Medical Research Council and Singapore Clinical Research Institute. This extensive cross disciplinary and cross industry collaboration network that was fostered through ASC is instrumental to ensure success in our Biomedical Research drive, and ultimately translating innovation to useful clinical application.

Collaboration in healthcare delivery system is equally important to deliver best care to our patients. NHG continues to strengthen this approach to design the most seamless and integrated system with patient as our primary focus. The collaboration between TTSH and Ren Chi Community Hospital will allow patients to navigate the healthcare system easily and obtain better holistic and long term continuing care. In addition, this collaboration will also enable a faster and hassle-free transfer of patients from TTSH to Ren Chi Community Hospital. The merger of Geriatric Medicine, Palliative Care, Continuing & Community Care departments to form the new Division of Integrative & Community Care in TTSH is another initiative to better integrate care in order to improve continuity of care to our patients. Specialist doctors were deployed to community hospitals and nursing homes under this new division, and providing resources to nursing homes for primary disease prevention measures, such as flu vaccination and containment.

As our healthcare landscaping is changing, with an ageing population and rising chronic disease burden, we need to develop new paradigms to provide the best care. We need to train a group of new future doctors that will be equipped with the advanced knowledge, skills and values to care for our population with rapid changing demographics. We will also need to develop new pedagogy to better train our doctors. TTSH will partner with Nanyang Technological University and Imperial College of London to set up the third medical school in Singapore and develop the new curriculum that will train more doctors with relevant skill sets to provide the best care for our ageing population.

ASC has evolved into the largest scientific event in Singapore and each year, the organising committee has always managed to come up with a very enriching program that is relevant to the current healthcare and research agendas. I congratulate A/Prof Daniel Fung of the Institute of Mental Health, Chairman of the 8th ASC Organising Committee and his team for putting together this event successfully.

My warmest welcome to all the delegates and may this event motivates you to challenge the status quo to add more years of healthy life to our patients.

**Chief Executive Office
National Healthcare Group**



Message by A/Prof Daniel Fung

The development of the practice of evidence based medicine (EBM) has been pivotal in driving healthcare delivery systems over the last 20 years. A definition of EBM from the Centre for EBM is that it is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. It is the pragmatic use of research findings in real world settings and provides accountability to the work that we do as clinicians. The underlying ethos for the NHG Annual Scientific Congress has always been to allow the flow of scientific knowledge through rigorous research to reach the practicing clinician which improves patient care. The congress has evolved over the last 8 years from independent meetings catering to specialist groups to its present multidisciplinary forums.

Our theme for 2009 is Medicine in Asia: Transforming Global Healthcare, Empowering Lives. Healthcare is undergoing a global transformation in the way it is being practiced. Medicine in Asia has the opportunity to design systems and services that are financially sustainable, yet affordable and accessible to everyone. At the same time, the practice of medicine in Asia has much to offer in terms of scientific innovation and expertise that is locally developed, yet globally applicable. From practice innovations and clinical quality improvements to advances in ethnopharmacology in cancer treatment, Asia can and should take the lead.

The meeting will have 3 main objectives: (1) Focus on Asia and the advances in medical science related to this; (2) Be environmentally conscious and strive to reduce, recycle and reuse in all of the meeting's activities; (3) Have Asian and International speakers coming together to share their experiences about clinical work, research and teaching.

Invited Speakers at the ASC

Besides providing the opportunity for our clinicians and researchers to showcase their work, leading international authorities and local experts have been invited to speak at the wide-ranging plenary sessions and symposia.

Professor Edison Liu, Executive Director, Genome Institute of Singapore (A*STAR) is our Keynote Speaker for this year's ASC. Prof Liu will deliver his keynote lecture at the Opening Ceremony and will cover the subject on "Genomic Medicine: Meaning, Promise and Concerns".

NHG's Distinguished Speaker, **Dr Robert Kamei**, will be presenting the NHG Lecture at the Congress Dinner. The Vice Dean (Education) of the **Duke-NUS Graduate Medical School Singapore** will share with the dinner guests, the topic on "Building an Evidence Based Learning Program in Singapore".

Three plenary speakers have been invited for this year's Congress. They are **Dr David Colin-Thomé OBE**, National Clinical Director for Primary Care Medical Advisor, Commissioning and System Management Directorate Department for Health, UK; **Professor Sir George Radda**, Chairman, Biomedical Research Council, A*STAR, Singapore, Chairman, Singapore Bioimaging Consortium, A*STAR, Singapore Emeritus Professor of Molecular Cardiology, University of Oxford; **Dr Henry Brodaty**, Professor Of Ageing And Mental Health and Director Of Dementia Collaborative Research Centre, University Of New South Wales.

We have also a strong list of other overseas & local speakers who have been invited to conduct seminars and workshops at this year's ASC. More information of these speakers and their presentations can be found in our Scientific Programme.

Special Event Highlights at the ASC

This year, the Committee has put together a spread of satellite conferences and special events that will bring unique flavours to the Congress.

Four satellite conferences will be held in conjunction with our 8th NHG Annual Scientific Congress and they are: (1) **The NHG Eye Institute 2nd International Ophthalmology Congress**; (2) **The Singapore Disease Management & Primary Care Forum 2009**; (3) **TTSH-JHSIMC Clinical Oncology Symposium 2009**; and (4) **Infectious Diseases Symposium**.

Updates to the four Translational Clinical Research (TCR) programmes, awarded the National Medical Research Council, will be presented in the respective symposium tracks of: (1) **Psychiatry (TCR & Neuroscience)**; (2) **Gastric Cancer**; (3) **TCR in Diabetes & Metabolic Diseases**; and (4) **Infectious Diseases Symposium**. The NMRC will also be holding the **NMRC Plexus Series** at the ASC, covering the topic on "Adult Dengue Diseases".

In its third year of running, the NHG-NUS Clinician Leadership in Research (CLR) programme will showcase the progress of its second batch of clinician researchers as well as unveil its third intake of promising researchers. The NHG will also be



awarding the first cohort of Clinical Research Coordinators who successfully passed the CCRP (Certification in Clinical Research Professional) examination, an internationally recognised certification administered by the Society of Clinical Research Associates (SoCRA). These two award ceremonies will be held at the **Research Career Development Symposium**.

For those who are interested to pursue a research career, Dr John Rush, CEO Duke-NUS Graduate Medical School, will be addressing this and more at the **Career Development Workshop (Clinical Research)**.

Responsible conduct in research is a key component of research ethics and this year, the NHG Research & Development Office has put together a half-day symposium to cover the importance of **Professionalism in Clinical Research**.

On behalf of the 2009 NHG ASC Organising Committee, I welcome all our participants and look forward to the engagement of our minds, the nourishing our spirit and the enrichment of our world.

Organising Chairman

8th NHG Annual Scientific Congress 2009

NHGD – 01

The Novel Use of a Human Cord Blood Serum-Supplemented Culture Medium for the Ex Vivo Expansion of Conjunctival and Limbal Epithelial Cells

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¹The Eye & Cornea Transplant Centre, ²Ophthalmology, Yong Loo Lin School of Medicine, National University Health System, ³Singapore National Eye Centre, ⁴Singapore Eye Research Institute, ⁵Ophthalmology, Tan Tock Seng Hospital, ⁶Obstetrics and Gynaecology, Singapore General Hospital, Singapore

Background: The most established method of epithelial cell culture requires the use of fetal bovine serum (FBS). Our aim was to develop a safer xenobiotic-free culture system. We describe a novel human cord blood serum (CBS)-supplemented culture system for cultivating ocular (conjunctival and limbal) epithelial cells.

Methods: Human conjunctival and limbal epithelial cells were cultivated in a 1:1 mixture of DMEM and Ham's F-12 medium supplemented with various concentrations of CBS, ranging from 0.05% to 2.5%. This was compared with conventional FBS-supplemented media. The Bromodeoxyuridine (BrdU) ELISA proliferation assay, colony-forming efficiency (CFE), and number of cell generations were analysed. Cultured cells were evaluated for specific cytokeratin expression by immunocytochemistry. We evaluated the profile of cytokines and growth factors in CBS and adult serum (AS) using antibody arrays.

Results: The proliferation assays, CFEs and cell generations were highest in 0.25% CBS and 0.5% CBS medium, which was comparable to that of 5% FBS-supplemented medium. CBS-cultivated conjunctival and limbal cells demonstrated the respective normal phenotypic expression of differentiation markers. Serum analyses revealed that several cytokines (BDNF, GRO and Leptin) and growth factors (IGF-1, EGF, FGF-6, HGF, PDGF, IGFBP) had higher concentrations in CBS compared to AS.

Conclusion: CBS-supplemented culture medium supported the proliferation and normal differentiation of conjunctival and limbal epithelial cells. This safer xenobiotic-free culture system has significant advantages over conventional FBS-supplemented culture systems because of its lower risk of transmission of zoonotic infection and xenograft rejection. This novel culture method has important clinical applications, and is particularly useful when bioengineering tissues for clinical transplantation.

NHGD – 02

Liver Stem Cells for Cellular Transplantation

YY DAN¹, H HUNG¹, L AMER¹, PC WONG², N FAUSTO³, SG LIM¹

¹Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, NUHS ²Department of Obs/Gyn, Yong Loo Lin School of Medicine, National University of Singapore, NUHS ³Department of Pathology, University of Washington, USA

Background/Hypothesis: Liver stem cells hold tremendous promise for the purpose of cellular transplantation into liver failure patients who are unsuitable or may not be in time for liver transplant. As there are no readily available liver stem cells to date, we hypothesise that the human fetal liver would contain physiological unadulterated progenitor cells that may be useful in treating animal models of liver injury.

Methods: Enriched human fetal liver progenitor cells were isolated using magnetic sorting against EPCAM. Progenitor cells were cultured on artificial niche environment simulating the regenerative

signals in liver injury. Cells were transplanted in Rag -/- mice pretreated with retrosine/CCl4. Survival, integration and function of these cells were determined up to 9 months post-transplant.

Results: Fetal liver progenitor cells were EPCAM+/ CD44+. Cells expanded with >100 population doublings and maintained morphology and immunophenotype on cultures with laminin and, hyaluronic acid. They differentiate into hepatocytes and biliary cells with signal manipulation. After transplantation, clusters of functional human cells were detected up to 9 months. These cells had human chromosome by in-situ hybridisation, secreted human albumin mRNA and protein and integrated with mouse hepatocytes. No tumour formation or nuclear aneuploidy was noted. Proliferation was highest in those with worst liver injury.

Discussion: Human fetal liver stem cells can expand in-vitro and in-vivo into liver and bile duct cells. These cells can proliferate, integrate and function in regenerating injured livers. They may potentially be useful for cellular transplantation and open the door to future human trials for patients with end stage liver disease.

NHGD – 03

Final Results of a Phase II Study of nab-Paclitaxel, Bevacizumab, and Gemcitabine as First-line Therapy for Patients with HER2-negative Metastatic Breast Cancer (MBC)

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Background: Standard first-line therapy options for HER2-negative metastatic breast cancer (MBC) show only limited efficacy. Frequently, taxanes, such as Paclitaxel are included in the treatment of MBC but response rates are not satisfactory and duration of response is only a few months. In a phase III study in patients with MBC, nab-paclitaxel demonstrated nearly double the overall response rate and significantly longer time to tumour progression versus solvent-based paclitaxel. Additionally, improvement in progression-free survival (PFS) and response rates were demonstrated when solvent-based paclitaxel was combined with gemcitabine or bevacizumab compared to its use as a single agent. Based on preliminary data from our pilot study; this trial is the first to examine the efficacy and safety of combination therapy with nab-paclitaxel, bevacizumab, and gemcitabine for first-line treatment of patients with MBC.

Methods: Patients (≥ 18 years with untreated HER2-negative MBC or with metastases diagnosed ≥ 6 months after primary systemic treatment) received gemcitabine 1,500 mg/m² BSA, nab-paclitaxel 150 mg/m² BSA, and bevacizumab 10 mg/kg per body weight (each administered intravenously over 30 minutes) on days 1 and 15 of a 28-day cycle. PFS was the primary endpoint; secondary endpoints included rates of complete response (CR) or partial response (PR), overall survival, safety, and toxicity. Overall, 29 patients (96.6% female, 34 to 69 years, median 54) were enrolled and received treatment. The patient population included 17 (58.6%) patients of Hispanic descent, 8 (27.6%) African Americans, 3 (10.3%) non-Hispanic Caucasians, and 1 (3.4%) Asian. Twenty-nine patients received ≥ 1 cycle (median, 6.5; range, 2.5 to 23) and were evaluated for efficacy; 1 patient was deemed ineligible and was not included in analysis for efficacy or toxicity. All patients were HER2-negative; 55.2% and 24.1% were ER+ and PR+, respectively (PR status was unavailable for 3 patients). Specifically, 13 (44.8%) patients had triple negative MBC. The most common sites of metastases were bone (37.9%),

liver (37.9%), and lung (37.9%).

Results: Eight (27.6%) patients achieved CR, 14 (48.3%) patients achieved PR, 5 (17.2%) had stable disease, and 2 (6.9%) had progressive disease. Eight (27.6%) patients had grade 3 or 4 toxicity. There was one episode of grade 4 neutropenic fever, and 13 grade 3 toxicities consisting of 6 episodes of infection and one each of leukopenia, thrombocytopenia, peripheral neuropathy, seizure, shortness of breath, haematuria, and tamponade. The most commonly reported ≤ 2 side effects were alopecia (in 65.5% of patients), fatigue (37.9%), bone pain (31%), nausea (31%), and skin rash/lesion (27.6%).

Conclusion: In this final analysis, first-line combination therapy with nab-paclitaxel, bevacizumab, and gemcitabine demonstrated a 75.9% overall response rate and 8 months (95% CI, 5.6-15.2) median PFS in patients with MBC. These data suggest that this triplet regimen may represent an important new first-line option for the treatment of patients with MBC.

Disclaimer: this study has been partly presented as a poster at the 2008 American Society of Clinical oncology annual meeting and has been submitted for presentation at the 2009 San Antonio Breast Meeting

NHGD – 04

Impact of Glutamate Genes on Neuroanatomy – Association between GRIN2A Genetic Polymorphisms and Cerebral White Matter Integrity in Schizophrenia

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Background/Hypothesis: Glutamatergic neurotransmission is crucial for neuronal development and neuroplasticity, which are disrupted in schizophrenia. Genetic animal models that use knockdown of glutamate GRIN2A receptors support a model that NMDA hypofunction results in schizophrenia-like behaviour and some studies have found genetic association of schizophrenia with the GRIN2A gene. In this imaging-genetics study, we hypothesise that reduced white matter integrity in subcortical and cortical brain regions would be associated with specific single nucleotide polymorphism (SNP) of glutamate related GRIN2A candidate gene.

Methods: One hundred and twenty-nine patients with schizophrenia were compared with 75 age-, gender- and handedness-matched healthy controls using diffusion tensor imaging and genotyped data. Genetic data of SNPs within the GRIN2A gene surrounding sequences were obtained through an ongoing genetic association study where SNPs were genotyped in the subjects by using the Infinium HD Illumina BeadChips (San Diego, USA).

Results: Comparing patients with controls, SNP1548808 genotype AA was significantly associated with reductions in fractional anisotropy (FA) in cortical regions such as medial and inferior frontal gyrus, cingulate gyrus. G carriers (AG and GG genotypes) were significantly associated with reductions in FA within subcortical brain regions such as bilateral anterior, medial dorsal thalamic nuclei.

Discussion & Conclusion: This is the first study which found that different genotypes of GRIN2A polymorphism were associated with disturbances of white matter integrity within specific cortical and subcortical brain regions. Understanding these regional white matter disturbances and their particular genetic correlates can provide potential neurobiological predictors, prognostic factors and treatment targets for this disabling psychiatric condition.

NHGD – 05

A Prospective Randomised Clinical Trial of Manual Sutureless Small-incision Cataract Surgery vs. Phacoemulsification

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Background/Hypothesis: Cataract is the most common cause of treatable blindness in developing countries. Phacoemulsification cataract surgery produces excellent results but requires expensive equipment and consumables. In developing countries, limited healthcare resources and funding require alternative low-cost and safe methods of cataract surgery. This study aimed to compare the safety and efficacy of manual sutureless small-incision cataract surgery with phacoemulsification in eyes with advanced cataracts.

Methods: A prospective, randomised, controlled interventional trial involving 270 consecutive patients with advanced cataracts who underwent manual sutureless small-incision (Group 1, 137 patients) or phacoemulsification (Group 2, 133 patients) cataract surgery. Visual outcomes and complications were compared 1 day and 6 weeks post-operatively.

Results: Both groups were comparable in terms of demographics, preoperative visual acuity and cataract grade. The mean surgical time for Group 1 was 28% shorter than Group 2 (8.8 min vs. 12.2 min, $P < 0.001$). Group 1 had lower rates of postoperative oedema compared to Group 2 (10.2% vs. 18.7%, $P = 0.047$) and there were no sight-threatening complications in either group. At six weeks, the final visual outcomes were comparable, with best-corrected visual acuity of 20/60 or better achieved in 115 patients (98.2%) in Group 1 and 112 patients (99.1%) in Group 2 ($P = 0.594$).

Discussion & Conclusion: Manual sutureless small-incision cataract surgery is a good alternative to phacoemulsification and can be performed at lower cost and in a significantly shorter time, allowing a greater volume of cataract surgery in developing countries. Both techniques achieve excellent visual outcomes with low complication rates.

YIA – BS 01

Human Gene Polymorphism and Response to Bacillus Calmette-Guerin Immunotherapy for Superficial Bladder Cancer

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Background/Hypothesis: To determine the predictive value of NRAMP1 and hGPX1 gene polymorphisms in superficial bladder cancer recurrence and response to BCG therapy.

Methods: Peripheral blood DNA was prospectively obtained from 99 high-risk superficial bladder cancer patients, who underwent post-resection intravesical regimes of BCG (81 mg, n = 50 or 27 mg, n = 19) or BCG (27 mg) with interferon alpha (IFNa) (n = 30), and followed-up for a mean of 4.5 years. The (GT)n and D534N polymorphisms in the NRAMP1 gene, and the Pro198Leu polymorphism in the hGPX1 gene were tested with restriction fragment length polymorphisms and DNA sequencing following PCR amplification. Data was analysed using chi-square analysis, multiple logistic regression and Kaplan–Meier curves.

Results: The (GT)n 2:3 genotype had shorter progression-free survival (PFS) ($P = 0.002$) overall and in the BCG only group. The presence of allele 3 in (GT)n gene polymorphism correlated with shorter recurrence-free survival (RFS) ($P = 0.024$) and PFS ($P = 0.005$) in the BCG plus IFNa group. The D534N G:G genotype had higher recurrence and shorter RFS ($P = 0.033$) in the BCG only group, while A:G genotype was protective. Overall, the D534N G:G genotype had increased cancer-specific mortality (CSM) ($P = 0.036$). Overall, the hGPX1 CC genotype was protective, while the CT genotype had increased recurrence and decreased time to recurrence ($P = 0.03$) after BCG therapy. The CT genotype also had shorter RFS ($P < 0.001$), PFS ($P < 0.001$) and higher CSM in the BCG plus IFNa group.

Discussion & Conclusion: NRAMP1 and hGPX1 gene polymorphisms correlate with response to BCG therapy in bladder cancer patients. They may serve as molecular markers to predict BCG failure and cancer recurrence.

Conflict of Interest: nil

Source of Funding: NUS Leadership In Academic Medicine Program, National University of Singapore

YIA – BS 02

A Novel Metabonomics Approach for Early Diagnosis of Epithelial Ovarian Cancer

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Background/Hypothesis: Epithelial ovarian cancer (EOC) is a leading cause of death in women with gynaecological malignancies. We used mass spectrometry (MS) based methods to look at proteins/peptides and metabolites which were expressed during different stages of EOC. We hypothesised that proteins and metabolites such as

lipids could identify early cancer with high sensitivity and specificity.

Methods: A total of 123 plasma (13 early EOC, 34 late EOC, 41 BOC, 35 healthy controls) and 101 serum samples (7 early EOC, 18 late EOC, 41 BOC, 35 healthy controls) were used in this study. Hydrophobic proteins were fractionated using organic solvents on H4 protein chip and were subjected to SELDI-TOF MS. Using electrospray ionisation MS we quantified the plasma concentrations of 360 lipid species (glycerophospholipids and sphingolipids) in a case-control study of 158 women with ovarian cysts and 53 healthy control women.

Results: Using multivariate statistics and supervised learning based on SVM, we were able to differentiate controls from patients. Using a minimal set of 21 protein markers (2–20kDa range) all the test samples could be diagnosed accurately. Using metabolomics platform mainly choline-lipids and ceramides as classifiers malignancy could be distinguished with specificity and sensitivity of 88% and 92%, and benign from malignant forms at 95% and 83% respectively.

Discussion & Conclusion: We have successfully developed a metabolomics platform to diagnose ovarian cancer at an early stage in a semi-clinical setting and differentiate controls from patients, and importantly benign from malignant forms of tumours, with sensitivities and specificities well above those of CA-125.

YIA – BS 03

Late Gestation Intrauterine Gene Therapy with Self-Complementary Adeno-Associated Vectors achieves Long-term Transgene Expression in New-Born Cynomolgus Macaques

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Background: Monogenic diseases that cause severe fetal damage may be corrected with intrauterine gene transfer (IUGT). We evaluate the sequelae of IUGT with recombinant adeno-associated vectors (rAAV) and demonstrate for the first time therapeutic levels, stability and immunological consequences in a non-human primate paradigm of IUGT, with self-complementary rAAV encoding human coagulation factor IX (hFIX) as a marker gene.

Method: Cynomolgus macaques were time-mated, and at 0.9 gestation, 4×10^{12} vg of scAAV-LP1-hFIXco were injected into the fetal intrahepatic vein under ultrasound guidance. Maternal viraemia was analysed. Offspring were delivered by caesarean-section and transgene levels were serially quantified. Tissue biopsies of infants and mothers were analysed for vector biodistribution and transgene expression.

Results: Ten macaque fetuses received scAAV-LP1-hFIX (1.3×10^{13} vg/kg). Maternal viraemia (42–377 vg/ μ L) was detected up to 48 hours post-injection. Mothers did not express hFIX despite widespread tissue transduction. Transplanted offspring expressed hFIX in the range of 10–633% of normal at birth and expression remained stable at 5 μ g/mL (100% of normal) up to 11 months of age despite a 4-fold weight gain. Proviral DNA was detectable in all tissues examined. Transcription of hFIX was restricted to the liver. A robust anti-AAV antibody response was observed confirming immunological maturity of the macaque fetus. However this did not

diminish transgene expression.

Conclusions: Long-term stable transgene expression is achievable with IUGT of scAAV in a non-human primate model without significant toxicity. This holds promise for the treatment of several hereditary disorders, although biological mechanisms need to be established, the focus of ongoing work.

YIA – BS 04

Development of a Novel Cell-based Platform for the Rapid Detection of Human Enterovirus 71 Infection using Fluorescence Resonance Energy Transfer

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Background/Hypothesis: Fluorescence resonance energy transfer (FRET) involves the non-radiative transfer of energy from an excited donor fluorophore to a proximal acceptor fluorophore. The replication of Human Enterovirus 71 (HEV71) requires the functionality of viral proteases 3C and 2A. The main objective of this study is to generate a cell line that expresses a recombinant protein consisting of a FRET pair flanking a cleavage motif of 3C. Cleavage at the motif

during infection will lead to separation of the FRET pair, enhanced cyan fluorescent protein (ECFP) and enhanced yellow fluorescent protein (EYFP), resulting in a FRET decrease.

Methods: Human rhabdomyosarcoma cells were transfected with plasmids coding for the FRET protein pair with HEV71 3C cleavage motif. FRET efficiency was recorded at 5 timepoints from 4 to 20 hours post-infection (h.p.i.) for infected and mock-infected cells. Drug inhibition was also carried out using ribavirin at concentrations of 30 to 120 µg/mL on HEV71-infected cells with FRET efficiency detected at 12h.p.i.

Results: HEV71-infected cells displayed a time-dependent decrease with average FRET efficiency decreasing from 75.4% at 4h.p.i. to 46.8% at 16 h.p.i. In contrast, mock-infected cells showed 100% FRET efficiency. Inhibition of HEV71 by ribavirin is dose-dependent with FRET efficiency restored to 85% at 120 µg/mL of ribavirin.

Discussion & Conclusion: Traditional methods used in determining HEV71 replication, e.g. plaque assay, require days to detect any increase in HEV71 activities. In contrast, a distinct decrease in FRET efficiency can be detected in FRET cells by 8h.p.i. The rapid and sensitive cell-based FRET system can potentially be developed into a high-throughput assay for the screening of drug libraries for novel anti-HEV71 agents.

FINALIST: Young Investigator Award – Clinical Research

YIA – CR 01

Singapore Childhood Cancer Survivors Study (SIN-CCSS): A Multi-Institutional Collaborative Study on Long-Term Survivors of Childhood Cancer

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Background: Worldwide, survival rates among childhood cancer patients are increasing. Thus assessing the risks of late effects and complications are ever more important.

Methods: Singapore Childhood Cancer Registry (1981-2005) captured 704 patients were from KK Women's and Children's Hospital and 626 from National University Hospital (NUH). The Singapore Childhood Cancer Survivor Study (SIN-CCSS) consists of all individuals who survived at least two or more years after treatment for cancer diagnosed during childhood or adolescence.

Results: A total of 1043 (72.4%) of 1440 patients are alive, of which 839 (80.4%) are long term survivors. Hematological malignancies was 58.6% (n = 492) of survivors whilst 41.4% (n = 347) were diagnosed with various solid tumours. To date, 79 survivors have enrolled onto the study at NUH. Mean age was 14.9 (range, 4.9–31.8 years), 55.7% were male, 11.4% were the only child in the family, 58.2% were Singaporean, and 74.4% were Chinese. HDB was the main residence type in 58.2% and 25.3% owned their own home. Only 5.1% used Traditional Chinese Medicine (TCM). Oncology center was the primary provider in 32.9% whilst 55.7% of them still used the hospital as the care provider. 27.8% of them continued to see the doctor 1 to 2 times per year with 12.7% of the times related to previous illness. Preliminary analysis reveals that <5% of the

participants had health problems related to previous diagnosis of cancer and therapy received.

Conclusions: At least 58% of those diagnosed with childhood cancer are long-term survivors. This is the first of its kind study in Singapore looking at long-term survivors of childhood cancer with the multi-cultural and multi-ethnic Singapore cohort providing a unique opportunity, a dynamic framework and resource for epidemiologists and researchers. Future direction is to focus on aetiological (genetic and environmental) and outcomes research, and survivor education.

The study was funded by Singapore Cancer Syndicate (POU-097; NHG FY09 RIS; NHG FY09 SIG I.

YIA – CR 02

The Associations between low-HDL Cholesterol, Adiponectin and Cardiovascular Risk Factors – Results From a Cross-sectional Study in Female Healthcare Workers

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Background: High-density lipoprotein cholesterol (HDL-C) independently predicts cardiovascular disease. Although low-HDL-C in women is defined as <1.3 mmol/L, few receive treatment unless HDL-C<1.0mmol/L. Adiponectin is an adipocytokine, with anti-atherogenic, insulin-sensitizing properties, involved in the pathophysiology of metabolic syndrome. We hypothesise that women with low-HDL-C have increased burden of traditional and novel cardiovascular risk factors, including low adiponectin levels. The aim is to study the associations of low-HDL-C with traditional and

novel cardiovascular risks in women.

Methods: In annual health-screens in our institution, all female healthcare workers were invited to participate in this cross-sectional study. Anthropometric data, fasting blood lipids, glucose, novel markers (adiponectin, hs-CRP), random urine for albumin obtained. We use SPSS 17.0 for analysis.

Results: The cohort comprised 432 women, mean age (standard deviation) was 37 (12) years, 7.5% had diabetes mellitus, 17.5% had hypertension. Low-HDL-C prevalence was 14.1% (95% CI, 11.2-17.7); 6.9% in Chinese, 18.8% in Malays, 32.8% in Indians. Compared to the Chinese, Indians had increased prevalence of low-HDL-C (OR, 3.9; 95% CI, 1.7-8.9; $P < 0.005$). Significantly higher ($P < 0.05$) systolic pressure (124.8 vs. 117.0) mmHg, glucose (6.0 vs. 5.1) mmol/l, body-mass index (BMI) (27.6 vs. 23.2) kg/m², hs-CRP (0.869 vs. 0.288) mg/L, triglycerides (1.69 vs. 1.03) mmol/L, HOMA-IR for insulin resistance (3.97 vs. 1.96) and lower adiponectin levels (4.9 vs. 9.1) ug/ml was associated with low-HDL-C. Multiple logistic regression, adjusting for age, ethnicity, diabetes status, BMI, showed reduced adiponectin levels independently associated with low-HDL-C ($P < 0.001$).

Conclusion: Low-HDL-C in women is associated with increased traditional and novel cardiovascular risk factors. Our data supports a multi-pronged management of women with low-HDL-C to reduce risk of cardiovascular disease.

YIA – CR 03

Discrepancy in Prognostic Utility of Normal TC-Tetrofosmin Myocardial Perfusion SPECT Among Different Asian Ethnic Groups

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Background: The excellent prognostic utility of a normal Tc-99m tetrofosmin SPECT study has been well-documented in Caucasian populations. However, it is not known if the low event-rate is equally applicable to different Asian ethnic groups.

Methods: Five thousand, seven hundred and thirty-four consecutive Asian patients underwent Tc-99m tetrofosmin stress studies at a single center in Singapore between 28 April 1999 and 30 April 2003. Four thousand, three hundred and forty-three (76%) had normal stress studies defined as a score of 0-2 using a 20 segment/5 point visual scale. Uniform methods of data collection and standardised epidemiologic methods for follow-up were employed. Follow-up was complete with duration of 19 ± 5 months in 94% of patients.

Results: The mean age was 58 ± 13 years, and 41% were females. More Malays had hypertension or diabetes (48% versus 40%, $P = 0.028$). Prior history of myocardial infarction, coronary intervention and bypass surgery was comparable among the groups. Forty-eight percent of patients underwent exercise testing, among whom 3254 (77%) Chinese, 515 (66%) Malays and 574 (70%) Indians had normal studies. At 24 months of follow-up, 0.8% of Chinese with a normal study experienced cardiac death or myocardial infarction, yielding an annualised event rate of 0.4%. The figures for Malays and Indians were 1.0% and 0.3% respectively ($P = 0.033$). This discrepancy in event rates remained significant after correction for diabetes and age ($P = 0.03$). Of patients with abnormal studies, considerably fewer Malays (9%) compared to Chinese (14%) and Indians (15%) underwent angiography within 3 months of the index study ($P = 0.06$ between Chinese and Malays).

Conclusions: The negative predictive value of a normal Tc-99m tetrofosmin stress test was unequal among Asian ethnic groups. In particular, Malays had higher annualised hard event rates. Disproportionately fewer Malays than other ethnic groups underwent follow up angiography after an abnormal SPECT study. Cultural and socioeconomic factors may have contributed to this.

YIA – CR 04

A Low Level of Self-perceived Susceptibility and Cost Concerns are Important Barriers to the Uptake of Colorectal Cancer Screening

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Background/Hypothesis: Colorectal Cancer (CRC) is a disease on the ascent worldwide, and is now the commonest cancer in Singapore. As it is treatable in its precancerous or early stages, screening and early detection are vital. Our study investigates factors that would promote or hinder screening, amongst eligible members of the population.

Methods: A community-based survey was conducted on a proportional stratified random sample of 1880 household units, stratified by housing type, from a sampling frame of all households in Singapore. A questionnaire evaluating screening behavior, attitudes and knowledge on CRC was conducted by face-to-face interviews on subjects who were aged 50 years and above.

Results: One thousand, eight hundred and one eligible subjects were interviewed. The average age was 61.3 years (62.2% females). 21.2% (381) had a stool occult blood test within the last year, 11.3% (203) a sigmoidoscopy within the last 5 years and 14.6% (263) a colonoscopy within the last 10 years. 65.3% correctly identified CRC as one of the 3 commonest cancers, and 62.3% (1122) had heard about CRC screening. 88.3% agreed that screening would help in early detection and cure of CRC, with 54.7% (986) recognizing that endoscopy is a screening tool. About two-thirds (64%) believed they can prevent CRC, but only 35.4% felt they had any chance of contracting the disease and 21% erroneously believed they did not need medical help in diagnosing CRC. Reasons for not participating in screening included perceived barriers to endoscopy (pain 45%, embarrassment 24.6% and risk 23.5%), cost of screening (64%), fear of finding out if they had CRC (30.7%) and fatalistic attitudes (45% believed it was fated if they contracted CRC). Subjects believed that CRC would have a significant impact on work, family life and, cause morbidity and mortality. 23% were advised by their personal physician to go for screening, while 19.1% were encouraged by family and 15.3% by friends to do likewise.

Discussion & Conclusion: There is good disease awareness and recognition of screening benefits, but acceptance of CRC screening amongst eligible members of our population remains poor. Low self-perceived susceptibility, misconceptions, fatalistic beliefs and various barriers act as impediments. Strategies to increase CRC screening uptake should include not only reducing barriers by targeting popular misconceptions, but also influencing attitudes and beliefs both through public health education and involving family/friends and primary care doctors.

YIA – QHSR 01

Preliminary Results of a Multidisciplinary Falls Evaluation Programme for Elderly Fallers Presenting to the Emergency Department

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Background/Hypothesis: We determine if an on-site, multidisciplinary assessment of elderly fallers in an emergency department (ED) reduces further falls, ED reattendance and hospitalisation.

Methods: This is a pre-/post-prospective study in a busy ED from 16 June to 12 November 2008. Patients 60 years and above presenting with a fall during office hours, and able to ambulate before and after were recruited. Nursing home residents, those on geriatric follow-up, and patients with severe cognitive impairment were excluded. All patients were assessed by a doctor, nurse and physiotherapist. Fall risk factors were addressed through advice, immediate intervention and onward referrals. At six months, the number of future falls, ED reattendance and hospitalisations were obtained via phone follow-up and electronic medical records. Patients were compared against pre-study controls who received standard ED care.

Results: There were no difference baseline characteristics between the 179 patients in the control and the 142 patients in the intervention group. Common risk factors included improper footwear (59.9%), visual impairment (37.3%), balance (28.9%) and gait (25.4%) disturbance. One hundred and four (73.2%) of patients in the intervention group required risk-factor modification. Five (3.5%) did not need any intervention, while 33 (23.2%) refused. At six months, there were 15 (8.7%) fallers in the control and 20 (14.2%) in the intervention group. There was a reduction in ED reattendance (28.0% vs. 26.1%) and hospitalisation (17.7% vs. 15.5%). However, none of these six-month end points were statistically significant.

Discussion & Conclusion: A multidisciplinary falls assessment program for elder ED fallers show an early trend towards reduced ED reattendance and hospitalisation rates.

YIA – QHSR 02

A Non-Laboratory-based Risk Score for the Early Detection of Individuals with Undiagnosed Type 2 Diabetes in Singapore

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Background/Hypothesis: In Singapore, more than 50% of those with type 2 diabetes mellitus (T2DM) are undiagnosed. A simple risk score comprising readily measured parameters would help to identify asymptomatic individuals who are at high risk of undiagnosed T2DM.

Methods: We studied 4411 participants, aged 18-69 years without a history of diabetes or on diabetes medication from the 1998 Singapore National Health Survey (NHS). Logistic regression analysis was used to identify clinical predictors of undiagnosed T2DM. The coefficients from the analysis were transformed into a risk score. The performance of the risk score was tested using the area under the receiver operating characteristics (AUROC) curve and validated using data from the 2004 Singapore NHS.

Results: The prevalence of undiagnosed T2DM was 6.9%. Age, BMI, ethnicity, family history of diabetes, history of hypertension and current employment were significant predictors of undiagnosed T2DM. A risk score was constructed representing a risk ranging from 1% to 60% for undiagnosed T2DM. The risk score provided good discrimination [AUROC 0.833 (95% CI, 0.812-0.855)]. A cut-point of 6 provided optimal sensitivity of 70.8% and specificity of 80.1%, positive predictive value (PPV) 20.9% and negative predictive value (NPV) 97.4%. When tested on the validation cohort, the AUROC of the risk score was 0.811 (95% CI, 0.787-0.835). The cut-point of 6 provided sensitivity of 73.7%, specificity 69.8%, PPV 11.4% and NPV 98.1%.

Discussion & Conclusions: We developed a non-laboratory based risk score to identify individuals at risk of undiagnosed T2DM for the multi-ethnic population in Singapore. This risk score might serve as an inexpensive tool to screen asymptomatic individuals at high risk of undiagnosed T2DM.

YIA – QHSR 03

Central Obesity and Low HMW Adiponectin Predict Glucose Intolerance in Individuals with Family History of Diabetes

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Background/Hypothesis: Individuals with a family history of type 2 diabetes mellitus (T2DM) are at greater risk of developing diabetes. Although genetic predisposition and environmental factors might explain this increased risk, certain clinical characteristics would assist preventive interventions in these individuals. The aim of the present study was to identify putative predictors of glucose intolerance in individuals with a family history of T2DM.

Methods: We performed 75-gm oral glucose tolerance test (OGTT) in 74 individuals with family history of T2DM. Anthropometric and metabolic variables were measured. Insulin resistance (IR) and β -cell function were determined using the homeostasis model assessment method. They were compared with 26 individuals who have no family history of T2DM. Area-under-the-curve of plasma glucose (AUCg) was calculated using trapezoidal method.

Results: Individuals with a family history of T2DM were characterised by IR, poor glucose tolerance, low HDL-cholesterol, low high-molecular-weight (HMW) adiponectin concentrations and a right-ward shift in the OGTT curve. Multiple regression analysis identified waist circumference, IR and HMW adiponectin as significant predictors of AUCg ($\beta = 0.461$, $\beta = 0.399$, and $\beta = -0.421$ respectively, all $P < 0.05$). There was also a significant correlation between waist circumference and AUCg ($r = 0.328$, $P = 0.034$) independent of BMI.

Discussion & Conclusions: Central obesity and low HMW adiponectin concentrations are helpful features to identify individuals with a family history of T2DM who might develop diabetes. We observed that screening with OGTT is more discriminating of glucose intolerance in these individuals. IR appears to be the more prevailing defect and interventions to promote normal waist would reduce the burden of diabetes in these individuals.

YIA – QHSR 04

Significant Predictors of Gleason Sum Upgrading in Potential Candidates for Active Surveillance of Presumed Low-risk Prostate Cancer: Refinements to Contemporary Selection Criteria

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Background: Gleason sum (GS) upgrading occurs in up to 40% of contemporary series of men with presumed low-risk prostate cancer managed with active surveillance (AS). These patients have significantly worse pathologic features and earlier biochemical failure following radical prostatectomy. We sought to identify further predictive factors for Gleason upgrading in AS-eligible men, for better risk-stratification of this patient subset.

Methods: We retrospectively analysed records of 413 of 897 men who underwent robotic-assisted radical prostatectomy by a single

surgeon which could have otherwise qualified for AS based on current selection criteria consisting of Gleason sum ≤ 6 , clinical stage $\leq T2a$ disease, PSA ≤ 10 ng/ml, ≤ 3 positive cores and $\leq 50\%$ cancer present in a single core. We compared clinicopathologic parameters including number of cores at initial biopsy, biopsy cancer volume, preoperative PSA, number of cancer-positive cores, obesity, and prostate volume of patients with and without final GS upgrading using univariate and multivariate models. One hundred and eighty-two consecutive prostatectomy specimens were externally validated by an off-site uropathologist to ameliorate inter-observer variability with an overall 89% concordance rate.

Results: One hundred and sixty-nine of 413 AS-eligible patients (40.9%) had Gleason upgrading at final pathology following radical prostatectomy. Prostate volume < 45 gm, PSA density > 0.1 ng/ml/cm³, maximal percentage of cancer $> 13.5\%$ in any core, and BMI > 29 kg/m² are all significant independent predictors for GS upgrading, their optimal cut-off values determined from their ROC curves.

Conclusions: Prostate size, PSA density, BMI and biopsy-core cancer density are significant predictors of aggressive pathology, and should be incorporated as exclusion criteria for contemporary AS protocols.

BO – AH 01

Validation of Mid-arm Muscle Circumference and Triceps Skinfold Thickness With Subjective Global AssessmentSL LIM¹, CY TONG¹, RCS SEET², WC LOKE³, M FERGUSON⁴, L DANIELS⁴¹Dietetics Department, National University Hospital, Singapore, ²Department of Medicine, National University Hospital, Singapore, ³Health & Wellness Programme Office, Ministry of Health-Economic Development Board, Singapore, ⁴Institute of Health and Biomedical Innovation, Queensland University of Technology, Australia

Background: The use of triceps skinfold thickness (TST) and mid-arm muscle circumference (MAMC) to estimate malnutrition has not been validated in an Asian population. This study aims to determine whether a correlation exists between MAMC and TST when compared to subjective global assessment (SGA) and also to validate MAMC and TST against their standard cut-offs amongst malnourished hospitalised patients in Singapore.

Methods: In this prospective study, 818 newly-admitted patients aged above 18 years were assessed using SGA, TST and MAMC. Patients from pediatric, intensive care unit, psychiatric and maternity wards were excluded. Spearman's Correlation was used to investigate the relationship between TST, MAMC and SGA. The sensitivity and specificity of TST and MAMC were established against SGA using the Receiver Operator Characteristics (ROC) curve.

Results: Mean age of the subjects was 51.9 ± 15.4 years. SGA identified 4% of the patients as severely malnourished, 25% mild to moderately malnourished and 71% well nourished. MAMC and TST were correlated with SGA ($r = 0.503$, $P < 0.001$ and $r = 0.426$, $P < 0.001$ respectively). The optimal cut-off to identify malnutrition was 10th-25th percentile for MAMC (sensitivity 76%, specificity 69%) and TST (sensitivity 60%, specificity 77%). The optimal cut-off point for severe malnutrition was <5th percentile for MAMC (93% sensitivity, 85% specificity) and 5th-10th percentile for TST (80% sensitivity, 85% specificity).

Conclusion: MAMC is a better surrogate measure of malnutrition in an Asian population. We suggest cut-off values specific to the Asian population to identify hospitalised patients in Singapore for malnutrition.

BO – AH 02

Do Abdominal Binders Improve Peak Expiratory Flow During Chest Wall Vibration in Ventilated Adult Patients?PRAJOO^{1,2,3}, G NTOUMENOPOULOS³, H SHANNON², E MAIN²¹Physiotherapy, Tan Tock Seng Hospital, Singapore, ²University College London, Institute of Child Health, London, United Kingdom, ³Physiotherapy, Guy's and St. Thomas' National Health Service Foundation Trust, St. Thomas' Hospital, London, United Kingdom

Background/Hypothesis: Chest wall vibrations (CWV) are used by physiotherapists in the intensive care unit (ICU) to remove airway secretions by increasing peak expiratory flow (PEF). Abdominal binders (AB) splint the abdomen, preventing the force applied during CWVs from being dissipated abdominally. The aim of this study was to investigate if using an AB during CWVs improved PEF in ventilated adults.

Methods: A randomised cross-over trial in which patients received two chest physiotherapy treatments, in random order, with at least

four hours between them. Only one of these treatments involved the application of an AB. The CO₂SMO® Plus Respiratory Monitor was used to measure PEF, peak inspiratory pressure (PIP), tidal volume (V_T) and positive end expiratory pressure (PEEP). Force applied by the physiotherapist was measured using a flexible force mat (Novel pliance®).

Results: Eight patients were recruited for the study. Force applied during CWV was not significantly different between treatments ($P = 0.43$). A random effects regression analysis was used to identify the unique effects of AB on PEF during physiotherapy. Once V_T , PIP and PEEP had been accounted for (collectively explaining 30% of the variance in PEF), use of an AB increased PEF by an average of 3.5 L/min ($P = 0.001$).

Discussion & Conclusion: In this small study, the use of an AB did contribute significantly to the increase in PEF ($P = 0.001$), but its contribution was relatively small. Therapists should consider whether the small increment in PEF using an AB would justify the expense and inconvenience of application in the ICU.

BO – AH 03

The Effect of Visual Field Loss on Balance PerformanceLJR WELLER^{1,2}¹School of Physiotherapy, University of Nottingham, Nottingham, England, ²Physiotherapy Department, Tan Tock Seng Hospital, Singapore

Background: Visual impairment increases with age and results in reduced balance performance. There are a limited number of studies assessing the influence of visual field loss on balance ability and falls. A greater awareness of the effect of impaired vision on balance performance will improve treatment and prevention of falls.

Aim: To determine the effect of visual field loss by homonymous hemianopia and tunnel vision simulating glasses on postural sway.

Hypothesis: The Null hypothesis states that there will be no increase in postural sway when wearing visual field loss simulating glasses.

Methods: The study was a randomised cross-over trial. Balance ability was measured using the balance performance monitor. Outcome measures taken were sway area (mm²), sway path (mm), sway number anterior-posterior and sway number medial-lateral. Baseline measurements were taken with the eyes open and closed. The two interventions were homonymous hemianopia and tunnel vision simulating glasses. Data were collected for 30 seconds, three times for each intervention. There was a one-minute rest period between wearing the two different glasses.

Results: Analysis of variance concluded that there was a significant increase in all outcome measures for the two interventions when compared to baseline, with the exception of sway number anterior-posterior in homonymous hemianopia.

Conclusion: A decrease in visual field significantly increases postural sway and reduces balance performance. It has been reported that a decrease in visual field is associated with increased falls in the elderly, highlighting that vision should not be neglected from assessment and treatment of falls.

BO – BS 01

Neurone Glial-related Cell Adhesion Molecule (NrCAM) Overexpression is an Independent Predictor of Poor Prognosis in Colorectal Cancer

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Background: NrCAM is a downstream target of the canonical Wnt signalling pathway that has recently been implicated in human cancer development. However, its roles in colorectal cancer (CRC) pathobiology and its relation to clinical outcome remain unknown.

Methods: In this study, we examined the clinical significance of NrCAM protein expression in CRC (n = 428) using immunohistochemistry and tissue microarrays. Kaplan-Meier estimates were used to analyse survival outcome. Multivariate Cox proportional hazards models were used to compute Hazard Ratios (HR) of disease-specific mortality.

Results: All 428 CRC samples were immunoreactive for NrCAM expression, compared to matched normal tissue ($P < 0.001$). 75/428 (17.5%) of CRC samples exhibited high NrCAM expression, which was significantly associated with lymph node metastasis ($P = 0.015$). Among the 428 patients included in the study, there were 194 colon cancer-specific deaths. Kaplan-Meier analysis revealed that patients with high NrCAM expression were associated with increased disease-specific mortality compared to those with low NrCAM expression (log-rank $P = 0.0088$). Subgroup analysis showed that high NrCAM expression was associated with increased disease-specific death in both local (Duke's A/B) and advanced (Duke's C/D) stage disease ($P < 0.0001$). In a multivariate model adjusted for other clinicopathologic predictors of survival, high NrCAM expression was associated with a significant increase in disease-specific mortality (HR 1.57; 95% CI 1.11-2.20; $P = 0.01$).

Conclusions: NrCAM expression is upregulated in CRC tissues. High NrCAM expression is associated with lymph node metastasis and is an independent prognostic marker of disease-related mortality among colorectal cancer patients.

BO – BS 02

Involvement of SPARC in the Tissue Invasiveness of Pterygium

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Background: Pterygium is an ocular surface disease of unknown etiology characterised by tissue invasion and matrix remodeling. The secreted protein, acidic and rich in cysteine (SPARC) is a protein involved in extracellular matrix modification. The aim of this study is to investigate the involvement of SPARC in pterygium.

Methods: Paired control or un-involved conjunctival and pterygium tissues from six patients were examined. Quantitative PCR (qPCR), Western blotting and immunofluorescence analysis were used to examine SPARC expression. Scratch wound assay was used to determine the effect of exogenous SPARC on migration of IOBA-NHC cells derived from normal human conjunctiva. The xCELLigence system was used to study the effect of SPARC on cell proliferation. Expression of matrix metalloproteinases (MMPs) was examined by qPCR.

Results: SPARC expression was strikingly upregulated in pterygium compared to normal conjunctival epithelium. Immunofluorescence analysis showed strong signal for SPARC in the pterygium epithelium relative to the unaffected conjunctival epithelium. Scratch wound assay revealed that SPARC induces more rapid wound closure in IOBA-NHC cells. As SPARC did not alter cell proliferation, the effect on wound closure is likely to arise from an increase in cell migration. Interestingly, treatment with SPARC induced a corresponding increase in MMP-3 expression while MMP-1 and MMP-9 expressions were unperturbed.

Discussion & Conclusion: Increased SPARC expression in pterygium may potentially result in more rapid cell migration via the upregulation of MMP-3, thus accounting for the tissue invasion and matrix remodeling characteristic of pterygium. We therefore hypothesise that SPARC is involved in the pathogenesis of pterygium.

BO- BS 03

Generation of Human Foetal Mesenchymal Stem Cell Mediated Tissue Engineered Bone Graft for Large Defect Healing

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Background/Hypothesis: The generation of large voluminous tissue engineered grafts which can be modeled into different shapes and sizes are useful for healing of critical sized bone defects. However, the lack of osteogenicity and difficulties in maintaining mass transfer of nutrients results in high cellular death in the necrotic interior, and hence graft failure. We have recently reported that the use of highly osteogenic human fetal bone marrow derived MSC (hfMSC) seeded unto high porosity scaffolds and matured in a novel biaxial rotating bioreactor demonstrated enhanced osteogenic differentiation and cellular viability over a standard static culture system. We now test this bioreactor-enhanced hfMSC-scaffold's ability to heal a critical size bony defect in an orthotopic rat femoral defect.

Methods: hfMSC were seeded to polycaprolactone-tricalcium phosphate (PCL-TCP) high-porosity bioactive scaffolds, and cultured in our bi-axial bioreactor, and predifferentiated for 2 weeks before transplantation into a 7 mm rat femoral segmental defect. Vascularisation was studied through microfil vascular contrast on microCT, and bone healing monitored through serial microCT, histological analysis and mechanical testing.

Results: Compared with empty defect, bioreactor enhanced hfMSC/PCL-TCP scaffolds can induce the larger vasculature network forming in the defect area after 1 month's implantation and regenerate greater new bone in the defect area after 3 months demonstrated by microCT analysis and histological study, resulting in repair femur with significantly higher mechanical strength.

Discussion & Conclusion: This proof-of-principle experiment demonstrates the superior bone forming capacity of a bioreactor-enhanced cellular-scaffold, with improved vascularisation and osteogenic capacity of value to all large voluminous defects.

BO – M 01

Detection of Pre-Neoplastic Gastric Lesions in a High Risk Chinese Cohort Using Endoscopic Autofluorescence Imaging followed by Narrow Band Imaging versus Standard White Light Endoscopy – Prospective Randomised Double Blind Cross-over Study

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Background: Autofluorescence Imaging (AFI) and Narrow Band Imaging (NBI) are new endoscopic techniques that may improve the detection of pre-neoplastic gastric mucosal changes and early gastric cancer.

Objective: Prospective randomised double blind cross-over study using combined AFI and NBI modalities vs. standard white light endoscopy (WLE) to improve the detection of pre-neoplastic gastric lesions, such as intestinal metaplasia and mucosal atrophy and in high risk cohort.

Methods: Informed consent was obtained from all subjects enrolled prospectively in study. Sixty-five Chinese patients age >50 years with dyspepsia were examined by both standard WLE and combined AFI/NBI techniques consecutively in a randomised sequence at the same setting by two independent endoscopists blinded for the results of different endoscopic modality used. In the combined technique, the stomach was first examined by AFI followed by NBI. All identified lesions were documented in systematic order and biopsied. Lesional and two random biopsies from antrum, body, incisura and cardia were examined by two expert pathologists in a blinded fashion.

Results: Of 65 patients recruited, 1 patient was excluded for advanced gastric cancer diagnosed by both methods. In the remaining 64 patients, 228 lesions were identified and confirmed by histopathology, of which 146 (64%) lesions were identified by AFI/NBI technique and 82 (36%) by WLE. For the AFI/NBI technique 43/95 (45.3%) were false positives and 20/51 (39.2%) were false negatives whereas for WLE it was 13/34 (38.2%) and 13/48 (27.1%) respectively. In total, 30/63 (47.6%) subjects had intestinal metaplasia, of which 26 (86.7%) were correctly identified by AFI/NBI technique (sen = 83.9%, spec = 31.9%) and only 12 (40%) by WLE (sen = 54.5%, spec = 71.0), $P = 0.004$. For mucosal atrophy, it was 10/12 (83.3%, sen = 58.8%, spec = 65.1%) for AFI/NBI and 4/12 (33.3%, sen = 50.0%, spec = 80.0%) for WLE, $P = 0.109$. The overall sensitivity and PPV to identify any abnormal mucosal changes for AFI/NBI was 72.2% and 41.9% respectively compared to WLE 61.8% and 72.9% respectively. Random biopsies analysis showed that from 11 subjects, 15/82 (18.3%) sites were missed by WLE compared to only 7/146 (4.8%) for AFI/NBI, $P = 0.001$. For intestinal metaplasia, from 8 subjects, 10 (12.2%) sites were missed by WLE compared to 3 (2.1%) by AFI/NBI, $P = 0.002$. There were no differences in the sites missed mucosal atrophy, from 6 subjects, by WLE (6.1%) and AFI/NBI (2.7%), $P = 0.211$.

Conclusion: This study confirms that AFI/NBI technique increases the detection of intestinal metaplasia which is a pre-malignant gastric lesion of clinical significance.

BO – M 02

Retinal Arteriolar Narrowing Increases the Likelihood of Chronic Kidney Disease in Hypertension

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Background/Hypothesis: Retinal arteriolar narrowing is a marker of chronic microvascular damage from hypertension. We hypothesised that the presence of retinal arteriolar narrowing increases the likelihood of chronic kidney disease (CKD) associated with hypertension.

Methods: We examined 3602 persons of Chinese, Malay and Indian ethnicities, aged ≥ 24 years residing in Singapore. CKD was defined as an estimated glomerular filtration rate < 60 mL/min/1.73 m². Hypertension was defined as systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg or self-reported physician diagnosed hypertension. Retinal arteriolar caliber was measured from retinal photographs and summarised. The narrowest arteriolar caliber quartile was defined as retinal arteriolar narrowing.

Results: Both hypertension and retinal arteriolar narrowing were associated with CKD ($n = 185$), independent of major confounders, with multivariable odds ratio (OR) of 2.10 (95% confidence intervals [CI], 1.46-3.02) for CKD associated with hypertension and OR 1.68 (95% CI, 1.04-2.71) for retinal arteriolar narrowing. The association between hypertension and CKD was stronger in the presence of retinal arteriolar narrowing (p -interaction = 0.09), and joint exposure to both hypertension and retinal arteriolar narrowing was associated with a 3-fold odds of having CKD (multivariable OR, 3.61; 95% CI, 1.88-6.93, compared with absence of hypertension and arteriolar caliber in the widest quartile).

Discussion & Conclusion: These findings show that the presence of microvascular disease in the retina increases the likelihood of CKD associated with hypertension, and suggest that examination of the retinal vasculature may aid in stratification of CKD risk in hypertensive individuals.

BO – M 03

Novel Multimodal Examination of Thalamic Shape, Volume and White Matter Integrity in Patients with Early Onset Schizophrenia

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Background/Hypothesis: The thalamus has been considered to be integral to the pathophysiology of schizophrenia. We aimed to determine whether thalamic anatomical abnormalities may be associated with the onset of schizophrenia and hypothesised that abnormalities of thalamic volume, shape, white matter integrity and relevant neurocognitive correlates were found in patients with first-episode schizophrenia (FES).

Methods: Structural and diffusion tensor (DT) images were collected from 49 healthy comparison controls (CON) and 32 patients with FES. Large deformation diffeomorphic metric mapping algorithms were used to assess the thalamic shape from magnetic resonance imaging (MRI) scans. The thalamic white matter integrity was quantified using fractional anisotropy (FA) and mean diffusivity (MD).

Results: Our analysis revealed that FES did not differ from CON in FA and MD but did differ markedly from them in the thalamic volume and shape. Patients with FES also performed poorly in spatial working memory and executive tasks. The correlation study found that regional thalamic shapes highly correlate with the two cognitive

scores in the entire sample and healthy comparison controls but not in patients with FES.

Discussion & Conclusion: Our findings suggest that thalamic volume and shape abnormalities are evident at the onset of FES prior to thalamic abnormal white matter integrity. Cognitive deficits related to spatial working memory and executive functioning in FES were observed in the context of loss of their normal relationship with the thalamic shapes, that is, regionally specific thalamic shape compression was associated with poor performance in executive functioning and spatial working memory.

FINALIST: Best Oral – Nursing

BO – N 01

Use of Targeted Risk Factor Reduction Interventions to Reduce the Number of Falls in Acute Hospital – A Randomised Controlled Trial

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Background/Hypothesis: Patient falls constitute 38% of all adverse events occurring in hospitals that may cause physical injury and undesirable emotional and financial outcomes. The high susceptibility of injury supports the need to focus on patient safety. Prevention of patient falls becomes a high priority in hospitals in Singapore. This study seeks to evaluate the effectiveness of targeted risk reduction nursing interventions versus the current generic multifaceted fall prevention interventions in reducing falls incidences.

Methods: Patients who scored 5 and above on the Hendrich II falls assessment tool were recruited. Patients in the intervention arm received targeted risk reduction interventions from the research nurse. Both research arms received the standard fall prevention interventions from the ward nurses.

Results: There were 912 and 910 patients in the control and intervention groups respectively. The demographic and characteristics of both groups were comparable. There were 14 fallers in the control group and 4 fallers in the intervention group with an incidence rate of 1.5% (95% CI, 0.9-2.6) and 0.4% (95% CI, 0.2-1.1) respectively and p value of 0.018. The relative risk estimate of 0.29 (95% CI, 0.1-0.87) favours the intervention group. The study also revealed a significant relative risk reduction of 73%.

Discussion & Conclusion: This study found targeted risk reduction nursing interventions is effective in reducing falls in the acute care setting. The Hendrich II fall risk assessment tool and targeted interventions were implemented hospital-wide in April 2009 after being piloted in four wards with encouraging results.

BO – N 02

Efficacy of Ketogenic Diet in Children

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Background: Ketogenic diet (KD) is a high-fat, low-protein, low-carbohydrate dietary therapy used in the management of intractable epilepsy in children. In this study, we reviewed the efficacy of the diet therapy in National University Hospital pediatric department.

Methods: A prospective study of the change in frequency of seizures in 19 children with intractable seizures that were treated with the ketogenic diet between November 2004 and September 2008 were enrolled. Nineteen children, aged 1 to 15 years, had refractory seizures despite taking at least 2 appropriate anti-epileptic drugs. The children were hospitalised, fasted, and a 4:1 ketogenic diet was initiated and maintained using a KD protocol. Frequency of seizures was documented from parental entries into the seizure diary and efficacy was compared with pre-diet baseline after 3 months, 6 months, 12 months and 2 years. The children were categorised as free of seizures, greater than 50% reduction, or lower than 50% reduction in frequency of seizures.

Results: The results showed 31.6% of the children had more than 50% seizure reduction within 3 months, 15.8% of them remained seizure-free more than 2 years with KD. The reasons for diet discontinuation included less than 50% seizure reduction (42.0%), diet restrictiveness (21%), and intercurrent illness or diet side effects (5.2%).

Conclusion: For many children with difficult to control seizures, the diet presents an alternative approach after trying multiple medications. Our study revealed that KD is safe and efficacious for a select population. It also highlighted the important role of the Epilepsy Nurse in KD diet implementation. Future observational studies should aim for long-term follow-up and improved seizure type characterisation.

BO – N 03

Acute Management of Disturbed, Aggressive and Violent Behaviour in Inpatient Psychiatric Setting – Evidence-based Project

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Background: Violence is a common and imminent problem in a mental health setting. Disturbed, aggressive and violent behaviour displayed by patients poses serious risk to themselves, other patients and staff, causing harm to physical and psychological health. This threat has become increasingly recognised as a significant problem in a psychiatric setting. A review of the incidence rates of assaults in the Institute of Mental Health, a psychiatric hospital in Singapore, found 403 cases of assault incidents against patients and staff. Two hundred and sixty-seven cases involved patients being assaulted and 136 involved staff being assaulted, highlighting the urgency and clinical importance of this issue.

Aim: This paper aims to systematically appraise the best available evidence for management of aggression and violence in a psychiatric setting.

Methods: The databases MEDLINE, CINAHL, Embase, Cochrane and gateway Ovid were searched using keywords such as 'violence', 'aggressive', 'disturbed', and 'psychiatric inpatient settings'. The search was limited to the English language. The inclusion criteria was 18 years and above. The setting was limited to the acute inpatient psychiatric wards setting.

Results: Findings from the literature search recommended the use of risk assessment tools and structured clinical judgment to assess aggression. The author and a team comprising APN and nurses implemented the following to manage DAV patients. They designed a one page algorithm with 3 protocols merged into one evidenced-based nursing protocol and used the Modified Fremantle Acute Arousal Scale for assessment. Evidence-based interventions were implemented such as de-escalation, ventilation, redirection, time-out and a PRN regime of rapid tranquilisation and physical restraints aimed to prevent disturbed behaviours and reduce the risk of violence. There was a significant reduction in the number of assaults from 8.9 per 10,000 patient days to 3.5 per 10,000 patient days. The use of restraints also decreased from 35 to 15 per month and the duration decreased from 8 to 6 hours. The outcome of using an evidence-based approach to change current practice in the management of DAV patients has been positive.

Conclusion: The synthesis of the evidence from the articles will highlight the recommendations for practice with regards to reducing the incidences of violence in psychiatric settings. The findings suggest that the strategies to manage aggression in adult inpatient psychiatric setting are multi-faceted ranging from assessment to the use of injection, de-escalation, restraint or social interventions. It is imperative to introduce such evidence-based interventions to bring about a reduction of the incidences of violence.

BO – PC 01

Sleepless in Singapore – Prevalence and Factors Associated with Insomnia among Primary-Care Patients

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Background: Insomnia has been commonly described as a sleep disorder. Positive associations with chronic medical illnesses have been established in studies. Insomnia affects chronic illnesses in a bidirectional relationship, contributing to increased healthcare utilisation rates. We aim to determine the prevalence of insomnia among primary-care patients, proportion of respondents with insomnia who sought/received treatment and investigate its association with various medical and psychiatric illnesses.

Methods: We performed an anonymous, interviewer-administrated questionnaire-based cross-sectional study among patients attending five National Healthcare Group (NHG) polyclinics. Insomnia was assessed by self-reporting and the Insomnia Severity Index (ISI). Information on medical and psychiatric co-morbidities, treatment seeking behaviour and pharmacological intervention were also obtained.

Results: Our response rate was 82.6% (624/755). One-third (33.7%) self-reported having sleep problems and 7.1% had ISI score ≥ 15 (clinically moderate/severe insomnia). The following were found to be positively associated with insomnia: depression [PRR: 4.32 (1.93-9.65)], asthma/chronic respiratory conditions [PRR: 3.50, (1.70-7.23)] and musculoskeletal disorders [PRR: 1.91 (1.07-3.40)]. For treatment-seeking behaviour and pharmacological interventions, only 25.2% of people with self-reported sleep problems sought treatment and 14.9% of them were on medication. For those with ISI ≥ 15 , only 27.3% sought treatment and less than 1 in 5 (18.6%) were on medication.

Conclusion: We found a higher rate of insomnia among primary-care patients, identified associations with various chronic diseases and discovered a significant proportion of insomnia sufferers being under-treated. Since insomnia negatively impacts chronic disease management, routinely identifying insomnia in clinical practice with proper treatment and advice, especially in evaluating chronic illnesses would lead to improved patient care.

BO – PC 02

Prevalence and Risk Factors for Myopia in an Elderly Asian Population – The Singapore Longitudinal Ageing Study

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Background/Hypothesis: Myopia is a common cause of visual impairment and has significantly higher prevalence in Asian compared to Western populations. There are few studies on the epidemiology of myopia in the elderly in Asia and variations between ethnic groups. This study aimed to determine the prevalence rates and risk factors for refractive errors in a multi-ethnic elderly Asian population.

Methods: In a prospective, cohort, population-based study of 2804 Singaporeans aged 55 to 85 years, potential risk indicators for myopia were evaluated by questionnaire and systemic clinical examination.

Results: The age-adjusted prevalence of myopia was 30.0% (95% confidence interval: 29.6, 30.4), and was significantly higher in the Chinese (30.8%) compared to Malays (18.2%) and Indians (22.6%) ($P = 0.04$). Multivariate risk factors for myopia were males ($P = 0.02$), age >75 years ($P = 0.033$) and higher education ($P < 0.001$). The prevalence of myopia had a bimodal distribution, decreasing from 32.0% (age 55 to 64 years) to 26.4% (65 to 74 years) and increasing to 32.6% for those aged >75 years. The initial decrease in prevalence of myopia correlated with decrease in axial length of the eye across successive age groups ($P < 0.001$).

Conclusions: There is a higher prevalence of myopia in elderly Singaporeans compared to Western populations, which suggests that the higher rates of myopia in Asians compared to Caucasians may be a longstanding phenomenon. There is significant inter-ethnic variation in the prevalence of myopia. The prevalence of myopia demonstrates a bimodal distribution, which may be due to a longitudinal or cohort effect and related to ocular risk factors.

BO – PC 03

Colorectal Cancer Screening: Barriers and the Efficacy of Individual Education on its Adoption

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Background: Colorectal cancer is the most common cancer among Singaporeans. However, despite the availability of effective screening methods, screening rates in the general population remain low. In this study, we aim to identify the barriers toward colorectal cancer screening, and determine if they can be overcome by means of a 10 minute face-to-face standardised educational package.

Methods: This study involved qualitative and quantitative phases. For the qualitative phase, we conducted interviews of 72 subjects and analysed their responses thematically. We then used the qualitative results to generate a validated questionnaire to quantify the barriers to colorectal screening, which was administered on 580 randomly selected subjects in the community. We also staged participants according to the precaution adoption process model (PAPM) before and after a standardised education package. We used Chi-square analysis to determine associated factors for barriers and McNemar's test to test for change in stages in PAPM with education.

Results: Based on thematic analysis, knowledge, financial and social reasons were identified as common barriers to colorectal cancer screening. The awareness of colorectal cancer screening remains low (51.9%), although having a regular primary-care doctor was associated with higher levels of awareness. The most prevalent barrier is the belief that screening is unnecessary if one is asymptomatic. The barriers most resistant to change despite education were those of a fatalistic attitude (100% for fecal occult blood testing [FOBT] and 93.3% for colonoscopy) and a fear of diagnosis (81.8% for FOBT and 88.2% for colonoscopy).

Conclusion: Our data demonstrates the need for colorectal cancer screening programmes to address this knowledge, financial and social barriers, and to involve the primary-care doctor. A prominent feature of this programme should be the correction of the misconception that screening is only necessary if one is symptomatic.

BO – QHSR 01**Is the Current Treatment of Patients with Hypertension and Multiple Coronary Artery Disease Risk Factors Optimal Among Malays in Singapore?****C KURUMBIAN¹, M TAN², TY WONG^{3,4}, ES TAI¹**¹Medicine, National University Hospital, Singapore, ²Singapore Health Services, Singapore, ³Center for Eye Research Australia, University of Melbourne, Australia, ⁴Singapore Eye Research Institute, National University of Singapore, Singapore

Background/Hypothesis: In patients with hypertension and multiple coronary artery disease (CAD) risk factors, the Anglo-Scandinavian Cardiac Outcomes Trial (ASCOT) showed that the use of calcium channel blockers (CCB)/angiotensin converting enzyme inhibitors (ACE-I) instead of beta-blockers (BB)/diuretics, and the use of statins reduced CAD event rates. In this study, we assessed the prevalence of hypertension and multiple CAD risk factors (as defined by the inclusion criteria for ASCOT) and described the pattern of antihypertensive agents used and the rates of statin use in these individuals.

Methods: We conducted a cross-sectional study of 3280 Malay adults in Singapore, aged 40-80 years. All subjects completed a questionnaire and physical examination including measurement of LDL-cholesterol, HDL-cholesterol and urine albumin:creatinine ratio.

Results: Three hundred and ninety-five subjects (12.5%) had hypertension and three or more risk factors. The prevalence of CAD was higher in these individuals than in those without hypertension (14.9% vs. 8.6). 48.9% were not on treatment, 30.6% on monotherapy, 13.4% on 2 drugs and 7.1% on 3 or more drugs for hypertension. BB (32%) were the most commonly used drugs, followed by ACE-I (23%), CCB (9.9%) and diuretics (7.4%). The most common combination was CCB & BB (43.4%), followed by ACE-I & BB (17%). Only 21.5% of them were on a statin.

Discussion and Conclusions: A high proportion of this population had hypertension with multiple risk factors. Many were not on treatment for hypertension. Beta-blockers were the most commonly used drug class, either as mono- or combination therapy. Statin use was low. Changes to current practice may improve clinical outcomes in these patients.

BO – QHSR 02**Infection Control Response to the Threat of an Epidemic Respiratory Virus – A Cost-Benefit Analysis****YY DAN¹, PA TAMBYAH¹, J SIM², J LIM³, LY HSU¹, WL CHOW³, DA FISHER¹, YS WONG³, KY HO¹**¹Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, ²National University Hospital, National University Health System, Singapore, ³Singapore General Hospital, Singapore

Background: The outbreak of novel influenza A (H1N1) of swine origin prompted World Health Organization (WHO) to declare a global pandemic alert. Asian countries previously ravaged by SARS responded with stringent measures, particularly for preventing outbreaks in hospitals. We studied the cost-benefit of these measures and the interplay between viral and hospital factors.

Methods: Markov modelling was performed with a cost-benefit analysis simulating outbreaks with SARS, (H1N1) and 1918 Spanish flu. Measures studied were Alert Green, Yellow, Orange and no containment measures. Outcomes were cost/infection and incremental cost/death averted.

Results: Simulated H1N1 outbreaks in the National University Hos-

pital will result in 2580 infected cases and 10 deaths at 30 days with no containment. Alert green measures yielded the lowest incremental cost/death averted of USD23K. Enforced protection in high-risk areas (Yellow) and full protection (Orange) averted any deaths but came at an incremental cost of USD400K and 2.5 million respectively. Viruses like SARS and Spanish flu with high case fatality rates saw favourable cost-benefit for more stringent measures. Key viral and hospital factors that affected outcomes were case fatality rates, number of subjects exposed per index case and attack rate.

Discussion: Viruses with high case fatality rates, virulence and high proportion of atypical presentations would benefit from stringent measures from the outset. A nuanced targeted protection only against infected cases shows reasonable outcomes for viruses such as novel H1N1. A calibrated step up or step down approach in accordance with viral characteristics and community risks, may help refine how we respond to future epidemics.

BO – QHSR 03**Epidemiology of Bacteremia among Adult Febrile Neutropenia Patients in National University Hospital****J JIN¹, Y DING², YM LEE³, LP KOH⁴, R LIM⁴, LY HSU²**¹Office of Biomedical Research, National University Hospital, Singapore, ²Medicine, National University Hospital, Singapore, ³Nursing, National University Hospital, Singapore, ⁴Haematology Oncology, National University Hospital, Singapore

Background: European and US data suggest a shift towards Gram-positive bacteremias in patients with febrile neutropenia (FN) in the past two decades. Relatively little has been published about the epidemiology of bacteremia in FN patients in Asia and Singapore. We performed a prospective observational single-center study to bridge this gap.

Methods: Demographic, clinical and microbiological data from all FN episodes occurring at our Hematology/Oncology service between October 2008 and May 2009 were collated and analysed.

Results: One hundred and sixty-three episodes of FN occurred in 123 patients. Sixty-two (50.4%) patients were male. Median age of all patients was 53 years (19 to 80 years). The majority of FN episodes occurred among patients with hematological malignancies (118/163; 72.4%). Forty-seven episodes (28.8%) revealed a positive blood culture in the initial blood tests. Gram-negative bacilli (GNB) predominated (21 episodes; 44.7%), of which 11 (52.4%) were resistant to 3rd and 4th generation cephalosporins. These included 10 Enterobacteriaceae with extended-spectrum beta-lactamases (5 *Escherichia coli* and 5 *Klebsiella pneumoniae*) and one carbapenem-resistant *Pseudomonas aeruginosa*. Gram-positive bacteria were mainly coagulase-negative staphylococci (12 episodes; 25.5%) and *Bacillus* spp (5 episodes; 10.6%). There were 2 cases of methicillin-resistant *Staphylococcus aureus* bacteremia.

There were 8 deaths directly associated with FN during the study period. Risk factors for bacteremia on univariate analysis included: Indian ($P = 0.029$, <0.05), hematological malignancy ($P = 0.012$, <0.05), quinolone prophylaxis ($P = 0.024$, <0.05), high risk FN ($P = 0.023$, <0.05). According to multivariate binary logistic regression, only high risk FN ($P = 0.034$) was significant.

Conclusion: Unlike Western countries, GNB remain more common as a cause of bacteremia among FN patients. A substantial proportion is resistant to cephalosporins, which are first-line agents for empirical therapy of FN.

BO – QHSR 04

Economic Analysis of Pandemic Influenza Vaccination Strategies in Singapore

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Background: Influenza pandemic plans include pandemic vaccination. However, few studies have evaluated the cost-effectiveness of vaccination strategies. This paper compares the economic outcomes of vaccination against treatment with antiviral agents only, in Singapore.

Methods: We analysed the economic outcomes of pandemic vaccination (immediate vaccination and vaccine stockpiling) compared with treatment-only in Singapore using a decision-based model to perform cost-benefit and cost-effectiveness analyses. We also explored the annual insurance premium (willingness to pay) depending on the perceived risk of the next pandemic occurring.

Results: The treatment-only strategy resulted in 690 deaths, 13,950 hospitalisation days, and economic cost of SGD\$708 million. For immediate vaccination, at vaccine effectiveness of >55%, vaccination was cost-beneficial over treatment-only. Vaccine stockpiling is not cost-effective in most scenarios even with 100% vaccine effectiveness. The annual insurance premium was highest with immediate vaccination, and was lower with increased duration to the next pandemic. The premium was also higher with higher vaccine effectiveness, attack rates, and case-fatality rates. Stockpiling with case-fatality rates of 0.4-0.6% would be cost-beneficial if vaccine effectiveness was >80%; while at case-fatality of >5% stockpiling would be cost-beneficial even if vaccine effectiveness was 20%. High-risk sub-populations warrant higher premiums than low-risk sub-populations.

Discussion: The actual vaccine effectiveness and time to pandemic is unknown; the vaccine strategy is based on perception of severity. Immediate vaccination is most cost-effective, but necessitates having a vaccine effective against future influenza strains. Vaccine stockpiling as insurance against worst-case scenarios is cost-effective. Research and development is therefore required to develop effective and cheap vaccines.

FINALIST: Best Oral – Surgical Disciplines

BO – S 01

Pneumatic Retinopexy – A Minimally Invasive Treatment For Retinal Detachment

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Background/Hypothesis: The treatment of retinal detachment usually requires extensive surgery with associated systemic and ocular complications and morbidity. Pneumatic retinopexy is a low-cost alternative that can be performed as an outpatient clinic procedure. This study aimed to evaluate the efficacy, safety and complication rates of pneumatic retinopexy in the treatment of rhegmatogenous retinal detachments.

Methods: A review of 32 consecutive eyes with rhegmatogenous retinal detachment treated with pneumatic retinopexy by a single vitreoretinal surgeon over a 7-year period. Perfluoropropane gas was injected into the vitreous to tamponade the retinal detachment, allowing adhesion formation. Single operation success was defined as retinal reattachment with a single attempt.

Results: The mean age of the patients was 50.1 years. The mean duration of symptoms was 11.5 days (range, 0 to 60, SD ± 17.6). One-procedure success rate was 90.6% (29 of 32 eyes). In 3 eyes, the retina was successfully reattached with a second operation. The success rate was significantly higher in eyes with 2 or fewer tears ($P = 0.003$). There was no significant association between a successful outcome and the age, duration of symptoms, lens status, or size of tear. Patients with retinal detachments involving the macula had a poorer final visual acuity (mean 0.44, ± 0.25) compared to those who presented with the macula attached (0.19, SD ± 0.13) ($P = 0.002$). There were no severe complications such as endophthalmitis, central retinal artery occlusion or vitreous haemorrhage.

Discussion & Conclusion: Pneumatic retinopexy is a safe treat-

ment for retinal detachment with lower morbidity and success rates comparable to more extensive surgery.

BO – S 02

Bilateral Sagittal Split Osteotomies Versus Mandibular Distraction Osteogenesis: Which is Better?

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Background: Bilateral sagittal split osteotomies (BSSO) and mandibular distraction osteogenesis (MDO) have both been applied in the surgical treatment of Class II mandibular hypoplasia. This randomised-controlled trial aims to compare the stability and morbidities of both techniques.

Methods: Fourteen Class II mandibular hypoplasia patients requiring mandibular advancement of 6-10 mm were randomised into 2 groups for either BSSO or MDO. Serial lateral cephalographs were taken at postoperative periods 2 weeks, 6 weeks, 12 weeks, 6 months and 12 months to assess skeletal stability using specific cephalometric landmarks. Objective and subjective neurosensory evaluation were performed and intra-operative or postoperative complications were recorded. The paired t-test was used to analyse stability and neurosensory scores with statistical significance set at $P < 0.05$.

Results: The mean mandibular advancement was comparable for both groups, 7.50 mm in the BSSO group and 7.46 mm in the MDO group. The BSSO group reported a greater mean percentage relapse of 20.30% at B-point when compared to 5.36% in the MDO group at 1 year. However, there was no significant difference ($P > 0.05$) in horizontal skeletal stability between the two groups. Objective neurosensory evaluation showed no significant differences between the two groups ($P > 0.05$) although the MDO group reported slightly

lower light touch (LT) and 2-point discrimination (2PD) scores in the early postoperative period. Postoperative complications included wound infection and condylar resorption.

Conclusions: Skeletal stability and postoperative complications seem to be comparable between BSSO and MDO. MDO appears to report lower LT and 2PD scores in the early postoperative period. A greater sample size is required to ascertain which technique is better.

BO – S 03

Early Return of Potency and Orgasmic Function Following Aggressive Bilateral Intrafascial Nerve-Sparing During Athermal Robotic Radical Prostatectomy: A Prospective Cohort Study

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Background: We hypothesise that early return of sexual function is possible following aggressive bilateral intrafascial nerve-sparing without cautery during robotic prostatectomy in younger patients with a low risk of extraprostatic extension of cancer and full baseline potency.

Methods: From January to September 2008, 61 men met selection criteria for aggressive bilateral nerve-sparing during athermal

robotic prostatectomy: PSA <10 ng/dl, clinical stage ≤T2, primary Gleason grade <4, cancer volume <5% in all cores, and absence of cues suggestive of EPE on endorectal MRI and during surgery. Patients completed baseline IIEF questionnaires before surgery and were prospectively followed up at regular intervals over a 9-month period. Data collected included the use of erectogenic aids (PDE5i, PGE-1 (alprostadil) etc). Potency was defined as erections sufficient for penetrative intercourse. Partial erections were defined as engorgement of the penis not sufficient for penetration.

Results: Complete follow-up data was available for 59 out of 61 patients receiving aggressive nerve sparing. Mean age was 55.1 years. Mean PSA 5.51 ng/dl. At a mean follow-up of 26 weeks, 56 men (95%) had partial erections with and without the use of PDE5i, and 51 (86%) had erection sufficient for penetrative intercourse and 54 (91.5%) reported return of orgasmic function. Return of potency occurred at 10.2 %, 59.3%, 74.6%, 83.1% and 86.4% at 1 week, 6 week, 12 week, 24 week and 36 week follow-up. Overall positive surgical margin rate was 8.5%.

Conclusion: Aggressive bilateral nerve-sparing in carefully selected patients delivers early return of sexual and orgasmic function without compromising cancer control.

BP – AH 01

Psychometrically Equivalent Bisyllabic Word List for Speech Recognition Testing in Singaporean Mandarin

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Background/Hypothesis: Speech recognition tests form part of the standard audiometric test battery in the evaluation of hearing. In order for speech audiometry to be valid and accurate, individuals must be tested in their native language. The aim of this study is to formulate record and evaluate a set of Mandarin bisyllabic words for the use for the Singapore population.

Methods: One hundred and eight familiar bisyllabic words were selected from a list of 1000 commonly used words and digitally recorded by a native speaker of Singaporean Mandarin. The words were then presented to 20 normal-hearing subjects at 16 intensity levels (-10 to 20 dB HL with 2 dB increments) to obtain the speech reception threshold. Psychometric function slopes were calculated for each word using logistic regression. The individual words were assigned into four 27-word lists based on a psychometric balancing protocol.

Results: Single factor ANOVA analysis showed no significant difference in both the mean thresholds and regression slopes between the 4 word lists ($f = 0.99$, $df = 3$, $P = 0.40$) and ($f = 0.006$, $df = 3$, $P = 0.99$). To further increase the auditory homogeneity, the intensity of each word was digitally adjusted to match the mean subject pure-tone average (8.0 dB HL). The mean slopes for the word lists were 9.23%/dB (list 1), 9.23%/dB (list 2), 9.25%/dB (list 3) and 9.28%/dB (list 4), respectively.

Discussion & Conclusion: The results have been used to create a compact disk of digitally recorded materials for word recognition testing of Mandarin-speaking Singaporeans. This study forms part of a collaborative project between the Audiology Department of Alexandra Hospital, DGMS of NUS and Temasek Polytechnic to develop Singapore's first speech audiometry material. This material, known as the TAN test, is currently being clinically validated at Alexandra Hospital.

BP – AH 02

Retrospective Analysis of Cytogenetic Abnormalities in Chinese, Malays and Indians with Multiple Myeloma (MM) in Singapore
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Background/Hypothesis: Cytogenetics is an important prognostic factor in MM, but has not been well-established in Asians. We aim to describe and compare the cytogenetic abnormalities among the Chinese, Malay and Indian MM patients in Singapore.

Methods: Retrospective analysis of cytogenetic data of MM patients from NUH from 1999 to 2009 was conducted. Whole chromosome or interstitial gains or losses, breakpoints and specific transloca-

tions were catalogued. The data were summarised using descriptive statistics and compared between different ethnicities.

Results: Ninety-four (56%) out of 168 confirmed cases of MM had an abnormal chromosomal karyotype. A total of 40% of the karyotypes showed hyperdiploidy. The most common aberrations were loss of chromosomes 13 (38%), 14 (19%), 22 (18%), X (18%), Y (16%) and gain of chromosomes 19 (32%), 7 (28%), 3 (28%), 5 (28%), 15 (28%), 9 (26%), 1 (20%), 11 (20%), 21 (19%). Chromosomes 1 (26%), 11 (11%) and 14 (8%) account for the common structural aberrations. Ethnic differences in numerical abnormalities revolved around the loss of chromosome 13 (50%) in Indians, chromosome 14 (23%) and X (20%) in Chinese as well as gain of chromosome 7 (44%) in Malays. Structurally, common breakpoints were gains of 14q32 (7%) while common translocations included t(11;14)(9%) as well as t(4;14)(3%) seen across all ethnicities.

Discussion & Conclusion: Cytogenetic abnormalities were detected in more than half of the patients. Our results were comparable to data of Caucasian patients. We noted interesting differences between the ethnic groups, which may have important clinical implications.

BP – AH 03

The Unmet Needs of Mentally Ill Inmates

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Background: The study sought to examine the unmet needs of mentally ill inmates in the Singapore Prison System.

Methods: Three hundred and thirteen inmates who had contact with the prison psychiatric service were recruited. The subjects were assessed by trained interviewers using the Composite International Diagnostic Interview which established the 1-year prevalence rate of psychiatric disorders. The Camberwell Assessment of Need-Forensic Short Version which covers 25 domains was utilised for the appraisal of needs.

Results: Inmates who were identified as having some form of mental illness in the past year reported a significantly higher number of unmet needs than inmates without any diagnosis [$Mean (M) = 3.54$, $Standard Deviation (SD) = 2.56$ and $M = 2.52$, $SD = 2.03$; $P < .05$], inmates with anxiety disorders reported the most number of unmet needs [$M = 4.0$, $SD = 3.28$]. Inmates with mental illness in the past 1 year were more likely to report an unmet need than those without any diagnosis on 4 out of 25 domains of need, namely, psychotic symptoms [$\chi^2 = 20.01$, $P < .05$], information about condition and treatment [$\chi^2 = 8.34$, $P < .05$], psychological distress [$\chi^2 = 12.20$, $P < .05$] and safety to self [$\chi^2 = 6.13$, $P < .05$].

Conclusion: Inmates with mental illness reported a greater number of unmet needs particularly in mental health-related domains. Ascertainment of such unmet needs is crucial for the programs and services to be developed to address these needs.

BP – BS 01

Global Micro RNA and Messenger RNA Changes in PterygiumSL CHEN¹, E TAP², TTL WONG³, J CHEW⁴, L TONG⁵¹Singapore National Eye Centre, ²Wound Healing and Ocular Inflammation Group, Singapore Eye Research Institute, Singapore

Background: Pterygium is a relatively common ocular surface fibroproliferative disease that may threaten vision. Endogenously produced micro(mi)RNA regulates gene expression in various diseases of wound healing, possibly including pterygium. We aimed to investigate the role of miRNA in pterygium.

Methods: Human pterygium and conjunctiva tissues were obtained from the ongoing Pterygium Aetiology and Conjunctival Evaluation Study. Comprehensive profiling of miRNA in pterygium was performed using the Exiqon miRNA chip, and transcript level changes were evaluated using the Affymetrix human U133A Genechip (>22000 genes). Analysis was performed using the GeneSpring GX10.0 platform. Statistically significant miRNA changes were matched to reciprocal significant changes in the target transcripts of these miRNA on the geneChip study.

Results: Eight miRNAs were elevated in pterygium compared to control. The hsa-miR138, 518b, 1236, Plus-E1258 and 766 were up-regulated 3.02-, 1.75-, 1.69-, 1.66- and 1.58-fold respectively. Three miRNAs, including hsa-miR215 at 0.54 fold, were down-regulated. The transcript of early growth response-1 and nuclear receptor subfamily-4A1, predicted targets of miR518b were downregulated in pterygium, 4.61- and 2.35-fold respectively, compared to conjunctiva. In addition, the transcripts CD93, collagens-3A1, -4A2 and the secreted protein-rich-in-arginine-and-cysteine (SPARC), all targets of miR215, were upregulated in pterygium, 2.33-, 2.05-, 2.02- and 2.09-fold respectively.

Conclusion: Derangement of a few miRNA can cause widespread changes in transcripts that regulate wound healing. Since miRNA-215 can influence SPARC and collagen molecules, cell adhesion, migration and matrix modulation can be dysregulated to result in pterygium formation. Targeting miRNA may be possible to treat pterygium.

Grant support: R617/38/2008TCR

BP – BS 02

Association between *in vitro* Cord Blood Mononuclear Cytokine Responses and Infants with Eczema and Viral Induced WheezingPL QUAH¹, CH HUANG¹, IC KUO¹, LPC SHEK¹, M AW¹, KY CHUA¹, BW LEE¹¹Department of Paediatrics, Yong Loo Lin School of Medicine National University of Singapore, Singapore

Background/Hypothesis: This study aims to evaluate immune responses of cord blood mononuclear cells (CBMCs) associated with viral wheezing and eczema in a birth cohort at high risk of allergic disease.

Methods: This study involved infants with 1st degree relatives with allergic disease. Clinical follow-up till the age of 2 years identified infants with eczema (n = 34) and viral induced wheezing (n = 41). Infants that did not develop any allergic disease were used as controls. CBMCs of these subjects were co-cultured *in vitro* either alone or with TLR4 agonist lipopolysaccharide (LPS) or T cell mitogen phytohemagglutinin (PHA). Cytokine responses were assessed in relation to clinical outcome. Binary logistic regression analysis was performed to adjust for possible confounding factors.

Results: CBMC from subjects with eczema only (n = 28) showed

differential cytokine responses induced by LPS compared to healthy controls. The high IL-6/low IL-10 phenotype was significantly associated with development of eczema ($P = 0.005$). Similarly, subjects with viral wheeze showed high IL-6 responses to LPS compared to controls ($P = 0.001$). IL-8 production was significantly lower in eczema subjects but higher in wheezing subjects compared to control in response to both LPS ($P = 0.016$ and $P = 0.004$ respectively), and PHA ($P = 0.033$ and $P = 0.002$ respectively). CBMC from the infants with wheezing only (n = 34) showed increased production of T cell-derived IL-2, IL-5 and TNF- α stimulated with PHA ($P = 0.02$, $P = 0.007$ and $P = 0.002$, respectively), accompanied by attenuated IL-10 responses ($P = 0.009$) compared to controls. Cytokine IL-12/IL-23p40 induced by LPS were significantly higher in wheezing subjects ($P = 0.001$). These differences were not observed in infants with eczema.

Discussion & Conclusion: Differential cytokine production profiles of CBMCs induced by LPS in eczema and viral induced wheezing, and PHA in wheezing indicate the presence of pre-existent differences in immunological responses compared to controls. These differences may be used as predictive markers for these early childhood disorders.

BP – BS 03

Association of Cytotoxic T-Lymphocyte Antigen-4 Gene Polymorphisms with Increased Likelihood of Recurrence in Superficial Bladder CancerWJ WONG¹, N KESAVAN², YH CHAN², K ESUVARANATHAN^{3,4}, R MAHENDRAN⁴¹Yong Loo Lin School of Medicine, National University of Singapore, ²National University of Singapore, ³Department of Urology, National University Hospital, ⁴Department of Surgery, National University of Singapore, Singapore

Background/Hypothesis: Superficial bladder cancer (SBC) is characterised by frequent recurrences and Mycobacterium bovis, Bacillus Calmette Guerin (BCG) immunotherapy following transurethral resection of the bladder tumour (TURBT) is the gold standard therapy. However some patients do not respond to therapy. Polymorphisms in immune related genes may be responsible for this. Cytotoxic T-lymphocyte antigen-4 (CTLA-4) is a co-stimulatory molecule expressed on T-lymphocytes that provides inhibitory signals when bound to B7 ligands, inhibiting T-lymphocyte activation and clonal expansion. Thus, polymorphisms that regulate production of CTLA-4 could influence the response to therapy.

Methods: DNA was obtained from peripheral blood from 98 high risk SBC patients, who had received either BCG (81 mg, n = 50 or 27 mg, n = 19) or BCG (27 mg) with interferon alpha (IFNa) (n = 30) therapy. Patient follow-up data was available for approximately 4.5 years. A single nucleotide polymorphism at -1661 (A/G) was analysed by PCR and restriction enzyme digestion. The results were correlated with recurrence-free survival and were analysed using chi-square analysis.

Results: Of the patients, 80.8% have CTLA-4 -1661 AA genotype (n = 80), whereas 18.2% have AG genotype (n = 18). Recurrence is more likely with the AA genotype (Odds Ratio = 4.5, $P = 0.038$). Mean recurrence-free survival time is shorter with the AA genotype than AG genotype (80.9 ± 6.03 vs 121 ± 9.15 months, $P = 0.036$).

Discussion & Conclusion: The CTLA-4 -1661 AA genotype is associated with increased likelihood of recurrence and a shorter recurrence-free period. Such patients would benefit from more frequent and earlier follow-ups to pick up recurrences to facilitate timely intervention.

BP – BS 04

Quantitative Proteomic Analysis of the Effect of Chronic Topical Anti-glaucoma Medications on Tear Protein Profile

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Background: Glaucoma, an optic neuropathy characterised by elevated intraocular pressure (IOP) is normally treated in the first instance with eyedrops to lower the IOP, and filtration surgery reserved for individuals refractory to eyedrops alone. Chronic use of eyedrops has been implicated in the exacerbation of ocular surface disease, which not only increases morbidity but also adversely affects surgical outcomes due to prolonged inflammation and post-op scarring. The aim of the study is to describe the effect of chronic use of topical medication on changes in the tear profile.

Methods: Tear samples were collected from 18 patients on anti-glaucoma medications and 10 age-matched, healthy unmedicated controls. Tears were collected using Schirmer strips. Tear proteins

were analysed using iTRAQ (Isobaric tags for relative and absolute quantification) based quantitative proteomics.

Results: There was a 1.5-fold increase of S100 A8 calcium-binding protein in the medicated versus non-medicated group ($P = 0.0001$). S100 A8 belongs to the S100 calcium-binding protein family and is an inflammation-associated protein and reflects the inflammatory status of the ocular surface. In addition, 14-3-3 delta protein also increased 1.5-fold in the medicated group compared to control, ($P = 0.0006$). 14-3-3 delta isoform is specifically involved in epithelial signaling pathways in inflammation.

Discussion & Conclusion: The chronic use of eyedrops induces an alteration in tear protein profile to a more pro-inflammatory one. The use of proteomics to identify inflammatory biomarkers in the tears will be a useful diagnostic tool to help identify individuals who may be at risk of increased post-operative inflammation and therefore surgical failure.

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FINALIST: Best Poster – Medical Disciplines

BP – M 01

Transcranial Direct Current Stimulation Enhances the Effect of Upper Limb Functional Training in Neurorehabilitation

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Background: Transcranial direct current stimulation (tDCS) is a novel neuromodulatory technique that enhances motor recovery post-stroke. It modifies spontaneous activity and membrane resting thresholds, modulating cortical excitability and influencing motor learning. Cathodal tDCS decreases cortical excitability. Anodal tDCS increases it. Modest improvement of hand function in chronic stroke has been reported. We present results of pilot feasibility studies of tDCS combined with functional arm training using different training paradigms and different neurorehabilitation populations.

Methods: In the first study, we conducted a double-blind randomised sham-controlled study of tDCS combined with repetitive functional training of the arm using a gravity-supported, computer-enhanced arm exercise system in chronic survivors of traumatic brain injury. In the second study, we examined the effect of anodal versus cathodal tDCS to the affected hemisphere, combined with functional training in stroke subjects. In both studies, functional outcomes were measured before, immediately after, and 2 weeks after the completion of the 2-week training.

Results: In our first study, we found significant difference in functional ability between the 2 groups (real- vs sham-tDCS) at 2-week follow-up. The real-tDCS group demonstrated better performance in the Jebsen-Taylor Hand Function Test (improvement in time of 49.8s vs 3.21s, $P = 0.05$), and a significant improvement in the Fugl-Meyer score (6.67 vs 3, $P = 0.046$). We describe the preliminary findings of the second study.

Conclusion: tDCS can enhance the effect of functional training to facilitate motor recovery following both stroke and traumatic brain injury. This is the first known study of tDCS in traumatic brain injury and demonstrates the feasibility and safety of its use in this population.

BP – M 02

New-Onset Diabetes after Transplantation, Cardiovascular Outcomes and Renal Outcomes amongst Tacrolimus-treated Renal Transplant Recipients

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Background: New-onset diabetes after transplantation (NODAT) is a well-known complication in tacrolimus-treated renal transplants. The present study evaluated cardiovascular and graft outcomes amongst patients who developed NODAT amongst tacrolimus-treated renal transplants on follow-up at National University Hospital, Singapore.

Methods: Retrospective study of 66 renal transplants receiving tacrolimus-based immunosuppression between November 2000 and July 2008 on follow-up at National University Hospital, Singapore. All patients had minimum 6 months' follow-up. Data were collected on patient demographics, body mass index, cardiovascular comorbidities, pre- and post-transplant echocardiograms and nuclear perfusion scans, biochemical data on lipids, creatinine, albumin, calcium, phosphate, haemoglobin and proteinuria.

Results: A total of 26 patients (39.4%) developed NODAT over a mean follow-up duration of 45.8 ± 33.7 months. Three patients developed ischaemic heart disease, of which only 1 patient had developed diabetes post-transplantation. Elevated creatinine, mild proteinuria (0.3-1 g/d) and significant proteinuria (>1 g/d) were found in 15/26 (55.7%), 6/26 (23.1%), 2/26 (7.7%) patients with NODAT, and 24/40 (60%), 14/40 (35.0%), 3/40 (7.5%) patients

without NODAT respectively ($P = \text{NS}$). There were no graft losses in either group, except 1 patient who died with a functioning graft due to non-cardiovascular event.

Conclusion: Previously, we have shown high incidence of NODAT amongst Tacrolimus-treated transplants. Other studies have suggested the benefit of Tacrolimus in reducing allograft rejection may be outweighed by cardiovascular morbidity associated with NODAT. This study shows a low incidence of new ischaemic heart disease amongst our tacrolimus-treated transplants. Also, development of NODAT was not associated with a higher incidence of allograft dysfunction over a mean follow-up period of 45 months.

BP – M 03

Dermatan Sulphate Modulates Chemosensitivity of Breast Cancer Cells to Cisplatin

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Background/Hypothesis: Dermatan sulphate, a sulphated glycosaminoglycan, is known to bind to signalling molecules and regulate cancer cell behaviour. In this study, we aimed to evaluate our hypothesis that dermatan sulphate is able to modulate the sen-

sitivity of human breast cancer cells to cisplatin, a commonly used chemotherapeutic agent in cancer treatment.

Methods: Human breast cancer (MDA-MB-231) and non-tumorigenic breast epithelial (MCF-12A) cells were cultured for 48 hours and treated with either exogenous dermatan sulphate or chondroitinase-B, an enzyme that degrades endogenous dermatan sulphate. The effects of these treatments on cellular chemosensitivities to cisplatin were then measured using the MTS assay.

Results: MDA-MB-231 breast cancer cells treated with an LD_{50} dose of cisplatin showed 50% cell death. By itself, dermatan sulphate treatment did not result in death of the cancer cells. Interestingly, when cisplatin was administered together with dermatan sulphate, the cytotoxic effect of cisplatin was significantly enhanced, resulting in an increase in the number of cancer cells that were killed. Conversely, degradation of endogenous dermatan sulphate by chondroitinase-B led to a decrease in cancer cell sensitivity to cisplatin. Chondroitinase-B had no effects on cisplatin-induced cell death in non-tumorigenic breast epithelial cells.

Discussion & Conclusion: The results suggest that dermatan sulphate is able to specifically sensitise breast cancer cells to the cytotoxic effect of cisplatin without affecting non-cancerous breast cells. These properties make dermatan sulphate an attractive and promising target to be developed for breast cancer treatment.

FINALIST: Best Poster – Nursing

BP – N 01

Evaluation of 3 Fall-Risk Assessment Tools in an Acute Care Setting

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Background/Hypothesis: Patient falls in hospitals has considerable impact on patients, staff, and institution. While the risk of falling cannot be eradicated, it can be significantly reduced through the implementation of an effective fall prevention programme. However, no single fall risk assessment tool has been conclusively validated. This study aims to evaluate 3 falls risk assessment tools in identifying patients at high risk for falls.

Methods: Inter-rater reliability of the Morse Fall Scale (MFS), St Thomas Risk Assessment Tool in Falling Elderly Inpatients (Stratify), and Hendrich II Fall Risk Model (HFRM) were tested with 2 research nurses completing the assessment tools concurrently. Validity of the 3 assessment tools were conducted on all patients admitted during the study period.

Results: Inter-rater reliability of the assessment tools were conducted on 144 patients. The probabilities of disagreement were between 2.8% and 9.7% and these values were all lower than 20% signifying good inter-rater reliability of all 3 tools. In the validity study, 5489 patients were recruited to observe for 60 falls. Only the MFS at cut-off score = 25 and HFRM had good sensitivity of 88% and 70% respectively. However, in comparison with the MFS (specificity = 48.3%), only the HFRM has an acceptable specificity of 61.5%.

The areas under the curve, for all 3 tools were above 70% signifying good accuracy at the optimal cut off points.

Discussion & Conclusion: The HFRM gave the best balance of sensitivity and specificity and is a potentially useful assessment tool in identifying patients at high risk for falls in acute care facilities.

BP – N 02

Utilisation of Dementia Daycare Services by Dementia Patients Attending a Tertiary Memory Clinic in Singapore

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Background/Hypothesis: Dementia day care centres play an important role in dementia care as they keep the patients active, reduce institutionalisation and alleviate caregiver stress. We wanted to examine daycare utilisation and the reasons for acceptance or refusal of daycare in patients seen at a tertiary Memory Clinic in Singapore.

Methods: We studied 100 consecutive newly diagnosed dementia patients in 2007 who underwent nurse counselling after diagnosis. We retrospectively reviewed case histories for patient's demographics, diagnosis and severity of dementia [using clinical dementia rating (CDR)], functional factors (ADL, instrumental ADL), behavioural symptoms (depression, agitation/aggression, anxiety, hallucinations, delusions, suspiciousness/paranoia, quiet/withdrawn, sleep disturbance, wandering, repetition, mood swings, resisting help, sundowning, hoarding) and causal factors of caregiver stress. We reviewed patients' dementia daycare attendance after counselling and possible reasons for accepting/refusing daycare.

Results: We found that only 20% (n = 20) of patients attended dementia daycare. Most of the daycare attendees had mild to moderate dementia (90%) with a global CDR score of 1.4 ± 0.72 . They had significantly more depressive symptoms, sleep disturbances and mood swings compared to non-daycare attendees ($P < 0.05$). Of the daycare attendees, 50% had no daytime caregiver. A total of 50% of the daycare attendees' carers reported being depressed by patient's care and in need of a break, 45% said their own health suffered and 75% expressed frustration with the patient's behaviour, which was independent of functional status. Among the non-daycare attendees, majority (50%) had mild dementia and reasons given for daycare refusal included ability to cope with care (62.5%) and caregiver preference to have loved ones remain at home (48.8%).

Discussion & Conclusion: Dementia daycare utilisation has increased from an earlier 2001-2002 study (9%). Behavioural problems, caregiver stress and coping abilities determined dementia daycare utilisation. The lower uptake among mild dementia patients highlight the need for setting up appropriate programmes to cater to this specific group.

BP – N 03

The Use of Glucometrics in Evaluating the Quality of Inpatient Glycaemic Control

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Background: While outpatient glycemic control is easily assessed by the HbA1c test, no such equivalent exists for inpatients. Glucometrics is a mathematical analytical process that has been created

to fulfil this function. It utilizes time-averaged glucose readings of which the patient-day glucose (average glucose for each patient's hospital day) is the most reasonable metric that allows fair patient-to-patient comparison.

Aim: The primary aim of this study is to show the hypothesis that glucometrics can be used as a tool to evaluate the quality of inpatient glycemic control in a general medical ward. A secondary aim is to study the glucose sampling characteristics of a particular ward.

Methods: Capillary blood glucose readings from a general medical ward over a 1-month period were collected using the hospital Cobas-IT system. The readings were converted into patient-day average values using the glucometrics software developed at Yale University.

Results: Six thousand two hundred and forty-five samples were collected over the study period with 324 patient-days. The median patient-day glucose was 7.3 mmol/L. A total of 60.5% of patients had a median ≤ 8.3 mmol/L, while 3.4% and 6.8% had a median < 4 mmol/L and > 16.6 mmol/L respectively. The median duration of glucose monitoring was 1.3 days and the median number of glucose samples per patient day was 20.

Conclusion: Using glucometrics, we are able to show that more effort and resources are required to achieve the ADA recommended target of all glucose readings in inpatient diabetic patients of less than 11.1 mmol/L. The high median number of samples per patient-day may be due to the presence of patients with hyperglycemic emergencies in the ward during the study period requiring insulin infusion and thus frequent glucose sampling. In conclusion, glucometrics can be used to evaluate inpatient glycemic control and provide useful information for decision making on policy-making and resource allocation.

FINALIST: Best Poster – Primary Care

BP – PC 01

Prevalence and Factors of Functional Dependence in Community-dwelling Elderly Persons in Singapore

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Background/Hypothesis: Singapore's elderly need to be functionally independent to reduce hospital admissions and nursing home placement. We sought to determine the prevalence and factors of functional dependence of the community-dwelling elderly in Singapore.

Methods: A cross-sectional study was performed with 2300 households randomly selected from a matured residential estate of approximately 9,000 households with an elderly (65 years and older) prevalence of 11%. A total of 231 households and 265 elderly participated (household response rate: 13.9%). The questionnaire assessed basic (BADL) and instrumental activities of daily living (IADL), living conditions, social and medical history. Functional dependence in BADL and IADL was defined as needing help in at least 1 BADL and IADL task respectively.

Results: Subjects (mean age 72.7 ± 6.1 years) were mostly women (57%). Prevalence of BADL and IADL dependence were 27.5% (95% CI, 22.1-33.0%) and 37.4% (95% CI, 31.5-43.2%) respectively. To compare with other countries, prevalence of dependence in 5 BADL

items was determined and was 9.8%. Older age, diabetes mellitus, and lack of exercise were positively associated while a good sense of health and a good relationship with family were negatively associated with BADL and IADL dependence (all $P < 0.05$).

Discussion & Conclusion: Functional dependence among Singapore's elderly is comparable to that in other countries such as the United States and China. This is likely to increase as Singapore's population ages rapidly. It is important to continue the present programmes aimed at promoting healthy lifestyle and reducing chronic disease and looking into elderly-friendly facilities for the elderly.

BP – PC 02

Determinants of Childhood Immunisation in the Poorly Performing Lalmonirhat District in Bangladesh

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Background: In order to control and eliminate vaccine preventable diseases, the status of vaccination coverage and reasons for incomplete and invalid vaccination are important. The objective of the study was to determine the vaccination coverage in Lalmonirhat

district, Bangladesh, where valid vaccination rates used to be low, i.e. 56% in 2006. In addition, we aimed to identify predictors of and reasons for incomplete and invalid vaccination among the children.

Methods: We conducted a cross-sectional survey from December 2008 to January 2009, using an interviewer-administered structured questionnaire to collect socio-demographic information of parents and to ascertain vaccination coverage. The World Health Organisation (WHO) recommended '30 x 7' cluster sampling methodology was used. Seven children aged 12-23 months were selected randomly from each cluster of approximately 100 households there by generating a sample size of 210. Univariate and multivariate analyses were performed.

Results: Between 2006 and 2008, valid immunisation coverage (defined as proportion of all recommended vaccines received at the recommended age and interval between the doses) increased from 56% to 79% and fully vaccinated coverage (defined as proportion of all recommended vaccines received) from 89% to 94%. Incomplete and invalid immunisations were associated with illiteracy of parents, large family size and parents' occupation. Reasons for incomplete vaccination were: mothers being too busy, unawareness of vaccination schedule, and long distance to vaccination centre.

Conclusion: Although child vaccination coverage in Bangladesh has improved substantially over the past years, invalid immunisation coverage can still be improved. The result of this study may be useful to undertake suitable interventions, and targeting the groups at high risk of incomplete or invalid immunisation, in order to maintain the high vaccination coverage rates.

BP – PC 03

Screening and Treatment of Depression for Diabetic Patients by Primary Care Physicians in Singapore

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Background/Hypothesis: Depression is under-diagnosed and under-treated in busy primary care clinics. This study investigates the attitude and confidence of primary care physicians (PCP) towards the screening and treatment of depression in diabetic patients.

Methods: An anonymous self-administered questionnaire was distributed to all physicians working in the NHG Polyclinics in December 2007. PCPs were asked if they screened patients for depression and rated their own confidence in treating patients with diabetes and depression. PCPs' confidence level was compared with their post-graduate training or work experience in psychiatry and family medicine.

Results: Response rate was 81.2% (112/138). Although the majority (75%) agreed that treatment of depression in patients with diabetes improved glycaemic control, only 58.4% agreed that depression was common and patients should be screened. PCPs with family medicine training or who had previously attended psychiatry short course were significantly more likely to regard the screening for depression in diabetic patients as important, adjusted OR 2.57 (95% CI, 1.02-6.56) and 15.85 (95% CI, 1.95-128.79) respectively. PCPs expressed more confidence managing diabetes than depression (91.9% vs 24.3%, $P < 0.05$). Those who worked 5 years or more had significantly higher confidence in managing diabetes, adjusted OR 6.47 (95% CI, 1.2-34.8).

Discussion & Conclusion: PCPs were more confident to treat diabetes than depression. Although they were aware that depression and diabetic control were related and understood the importance of screening diabetic patients for depression, their low confidence remained a barrier to screening and treating patients for depression. The family medicine training curriculum should be enhanced to increase the confidence of PCPs in depression management.

FINALIST: Best Poster – Quality, Health Services Research

BP – QHSR 01

Self-Monitoring of Blood Glucose in Type 2 Diabetes: A Systematic Review of Economic Evidence

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Background: Good control of blood glucose is crucial to the prevention and delay of diabetes-related illnesses. Self-monitoring of Blood Glucose (SMBG) is purported to improve glycaemic control measured by glycosylated haemoglobin (HbA1c). Economic evidence surrounding the use of SMBG in T2DM is lacking. A systematic review of economic evaluations of SMBG in T2DM patients was performed.

Methods: Inclusion criteria: Studies which compared, in terms of costs and outcomes, strategies involving SMBG and those with no SMBG in the management of T2DM, were included. The main outcomes were in terms of cost-effectiveness and cost-utility. Search strategy: Electronic searches were conducted between January 1990 and January 2009 to identify published reports. Critical appraisal:

Methodological quality was assessed by 2 reviewers using the standard Joanna Briggs Institute (JBI) critical appraisal tools. Data extraction and synthesis: Included studies were extracted using the JBI extraction tool. Studies were grouped by outcome measure and summarised using tabular and narrative formats.

Results: Five studies met the review criteria. Three were model-based analyses assessing the long-term cost-effectiveness of SMBG. All concluded SMBG was cost-effective within their various settings. Two further economic evaluations assessed short-term cost-effectiveness. Conversely, their results found SMBG to be associated with no significant reduction in HbA1c (at increased cost).

Conclusion: Economic evidence surrounding SMBG in T2DM remains unclear. Generally, the review found SMBG to be cost-effective though analyses are extremely sensitive to relative effect sizes, time-frame of analyses and model assumptions. The current evidence-base should, therefore, be viewed as hypothesis generating rather than as conclusive evidence.

BP – QHSR 02

Patients' Willingness to Pay at a Subsidised National Healthcare Group (NHG) Polyclinic

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Background/Hypothesis: The amount of subsidy for consultations at NHG Polyclinics depends on the patient's age and residency status in Singapore. While some patients enjoy subsidies of up to 75%, waiting time has been a challenging area for improvement because of the high patient load that polyclinics face. Aside from optimising operational efficiency, strategies to increase the availability of resources may help reduce waiting time. This comes with a cost. This study describes Singaporeans' willingness to pay for guaranteed appointments at an NHG polyclinic.

Methods: A survey was done at an NHG polyclinic using a modified version of the Consumer Assessment of Healthcare Providers and Systems Clinician & Group Survey from October 2007 to January 2008. The 66-questions tool collected information on patient demographics, appointment preferences and amount that patients were willing to pay for a guaranteed appointment. Patients were chosen through systematic sampling.

Results: One hundred and seventy-one Singaporean patients were included in the analysis, comprising 156 patients aged 18-64 years and 15 aged 65+ years. Over half (51.3%) of those aged 18-64 years, and 46.7% of those aged 65+ years were willing to pay at least SGD10 for a guaranteed appointment. Among those aged 18-64 years, patients with higher educational levels and who consulted for chronic conditions were more willing to pay at least SGD10, although results were not statistically significant.

Discussion & Conclusion: Results suggest that patients may be willing to pay a premium for time saved. This can be a strategy to rationalise the demand; however, its feasibility and implications should be further studied.

BP – QHSR 03

Site Analysis Using Geographical Information System for Identification of Services Gaps and Planning of Resources

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Background: To study polyclinic services gaps and identify the best location with site analysis using Geographical Information System (GIS) as an aid for future planning.

Methods: A national database containing 3 million polyclinic consultations in 2006 were geo-analysed using ArcView GIS. Residential postal codes of each patient and 18 polyclinics were mapped by geographical zones. Patients' residences with Euclidean distance of more than 3 km from polyclinics were selected. Central sites with the minimum accumulated distance impedances to the selected residences in different geographical zones were identified using GIS as optimal locations for future new polyclinics.

Results: Geographical catchment of every polyclinic was highly localised. The overall mean distance between patients' residence and their nearest polyclinic was 2.4 km. There were about 285,000 patients who had to travel more than 3 km for polyclinic services. Of these, Sembawang and Jurong West DGPs constituted 21.1% and 35.3% respectively, which signaled the existence of service gaps. Site analysis using GIS identified optimal sites with the minimum accumulated distance impedances to this under-served population. About 100,000 and 135,000 patients would benefit if new facilities were set up at these optimal sites at Sembawang and Jurong West respectively.

Conclusion: GIS offers location intelligence and it could be applied to suggest optimal sites for future new healthcare facilities to minimise patients' travelling costs, and identify number of under-served patients to aid planning of polyclinic capacities and resources allocation.

FINALIST: Best Poster – Surgical Disciplines

BP – S 01

Predictors of the Risk of Androgen-independent Progression after Salvage Radical Prostatectomy for Locally Recurrent Prostate Cancer following Initial Radiation Therapy

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Background/Hypothesis: To determine the androgen-independent progression (AIP) rate after salvage radical prostatectomy (SRP) and its predictive factors.

Methods: We reviewed 53 consecutive patients who underwent SRP for locally recurrent prostate cancer (PC) following initial radiation therapy (RT). Patients with biochemical relapse after SRP were treated with hormonal therapy (HT). Two different definitions of AIP were used: 1. ASTRO (3 PSA rises) or 2. PSA \geq 2 ng/ml, from the time of SRP. Multivariate proportional hazards models were explored for factors that predict AIP.

Results: The median follow-up was 139 months. Biopsy gleason

grade prior to SRP: \leq 7: n = 23, 8: n = 14, $>$ 8: n = 9, unknown: n = 7. Using AIP definitions 1 and 2, 15 and 16 patients had HT for BCR, of which 8 and 7 had AIP respectively. Significant predictors of AIP were biopsy gleason grade prior to SRP ($P = 0.014$, $P = 0.015$), adjuvant HT after RT ($P = 0.035$, $P = 0.017$), pathological lymph node status ($P = 0.023$, $P = 0.01$), number of pathological cancer positive lymph nodes ($P = 0.012$, $P = 0.004$), PSA after SRP ($P = 0.006$, $P = 0.001$), local-regional failure ($P = 0.007$, $P = 0.005$) and distant metastases ($P = 0.0002$, $P = 0.0003$) after SRP on univariate analysis using both definitions 1 and 2 respectively. On multivariate analysis, significant predictors of AIP were biopsy gleason grade prior to SRP ($P = 0.05$, definition 1) and distant metastases ($P = 0.003$, definition 2) after SRP.

Discussion & Conclusion: AIP rate (up to 15%) following SRP after initial RT is low, suggesting that SRP may protect patients from developing androgen independence. Gleason grade following RT is predictive of AIP, strongly suggesting its use for prognosis other than at diagnosis of PC.

Conflict of interest: LL Pisters (Endocare), others: Nil

Source of Funding: Nil

BP – S 02

A Comparison of Emergency and Elective Inguinal Hernia Repair, Can they have Equally Good Outcome? A Review of 300 Patients

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Background/Hypothesis: We aim to evaluate the pattern of inguinal hernia operations performed locally and hypothesise that outcome may be worse in emergency operations.

Methods: A retrospective review was performed from 2006 to 2007 for a consecutive number of operated unilateral inguinal hernia cases (inclusion criteria). Exclusion criteria included any synchronous condition that required surgery and age less than 18 years. End points were length of hospital stay, complication rate and 1-year recurrence.

Results: A total of 300 candidates fitted the criteria as defined (10.8% emergency). There was no difference between comparisons of age, body mass index (BMI), gender, race, American association of anaesthesiologist grading (ASA) or duration of symptoms. Emergency cases tend to stay longer (mean 2.19 vs 0.58 days, $P < 0.001$) and had a longer duration of surgery (mean 1 hour 43 minutes vs 1 hour 13 minutes, $P = 0.012$). All emergency cases were performed open, 11.8% were darned. In both arms, there was no difference in complication rates, which was very low, or 1-year recurrence rates.

Discussion & Conclusion: A homogeneous sample of elective and emergency unilateral inguinal hernia demonstrated that despite a lengthened operative duration and length of stay, short-term outcome was similarly excellent. Selection of patients for emergent treatment rather than early elective surgery and choice of surgical technique are the likely explanations.

BP – S 03

External Ventricular Drain infections: Successful Implementation of Strategies to Reduce Infection Rates

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Background: We present the results of a completed audit loop following introduction of evidence-based protocols for External Ventricular Drain insertion and its subsequent management to minimise infection rates.

Aim: To reduce the incidence of External Ventricular Drain (EVD) infection in neurosurgical patients in the National University Hospital, Singapore.

Methods: We performed an Audit loop of EVD infections in our institution over a period of 1 and a half years. There were 3 phases of the audit cycle lasting 6 months each. Phase 1 is baseline infection rates, Phase 2 is introduction of below protocols, and phase 3 is after the use of silver impregnated EVDs.

Neurosurgery Doctors:

- a. Additional meticulous surgical techniques to minimise intraoperative infections were used (hand washing for 2 minutes enforced, limiting number of personnel in the Operating Room, reducing operative time).
- b. Educating ward doctors on strict aseptic techniques of CSF sampling only when EVD infection suspected
- c. Minimising the number of days the EVD is used
- d. The use of silver impregnated EVD in NUH

Neurosurgery Nurse Clinicians:

- a. Developed Standard Operative Procedure (SOP) on nursing management of patients with EVDs
- b. Conduct EVD care workshop for all nurses working in Neuro surgical wards
- c. Competency skill checks on the management of patient with EVD for nurses working in Neurosurgical wards

Results: In Phase 1, there were 5 patients with EVD infection (6.1%). The average duration of EVD used was 8.6 days. In Phase 2, the EVD infection rate was 3.8% (3 out of 79 patients). The average EVD duration was reduced to 7.4 days. In Phase 3, EVD infection rates were 0%. Results are statistically significant.

Conclusion: The combined efforts of doctors in the operating room, ward as well as nursing staff, plus the usage of silver nanoparticles-impregnated EVD catheters have shown success in reducing EVD infection rates to nil. We will continue striving to maintain infection-free rates in our institution with close adherence to proven protocols.

YIA – BS 05

Podocin Promoter Polymorphisms are Associated with Susceptibility to Sporadic Primary Nephrotic Syndrome in Singapore Chinese Children.

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Background: Podocin (*NPHS2*) mutations are common in Caucasian patients with sporadic primary nephrotic syndrome (NS), but are uncommon in Asians. This study examined *NPHS2* variants and their associations with NS in Singapore Chinese children.

Methods: Direct sequencing of the 5' promoter and eight exons of *NPHS2* was performed on 58 patients with primary sporadic NS, of which 30 (51.7%) were steroid-resistant, and 55 healthy controls. Statistical correlation of genotype with disease was performed using SNPStats (<http://bioinfo.iconcologia.net/index.php?module=Snpstats>).

Results: We identified 5 *NPHS2* single nucleotide polymorphisms (SNPs) in the patients and controls. Three were located in the 5' promoter region (-670C/T, -116C/T and -51G/T) and two in exon 8 (954T/C and 1038A/G). No mutations were found. The SNPs in the promoter region were associated with NS under different model fits (-670C/T, recessive model, $P = 0.042$; -116C/T, over-dominant model, $P = 0.019$; -51G/T, additive model, $P = 0.039$). No association with NS was observed for the SNPs in exon 8. Haplotype analysis showed the 3 promoter SNPs were weakly linked (-670C/T and -116C/T: $r^2 = 0.346$, $P = 0$; -670C/T and -51G/T: $r^2 = 0.215$, $P = 0$; -116C/T and -51G/T: $r^2 = 0.098$, $P = 7e^{-4}$). Of the four haplotypes (TCG, CTG, CCT and CCG) observed, CCT, which was present in 20% of NS patients and 9% of controls, was significantly associated with NS (OR, 2.4; 95% CI, 1.05-5.50; $P = 0.04$). Further analysis revealed that this CCT haplotype was present in 25% in steroid-resistant patients, 2-fold that of steroid-dependent patients (14%).

Discussion/Conclusion: The promoter CCT haplotype of *NPHS2* may confer susceptibility to sporadic NS. Functional studies are needed to validate this hypothesis and elucidate possible disease-causing mechanisms.

YIA – BS 06

Defining Cataract Based on the Clinical and Photographic Assessment

JL LI, WL WONG, E LAMOUREUX, JJ WANG, P MITCHELL, A TAN, SM SAW, TY WONG

Background/Hypothesis: Cataract is the leading cause of blindness, estimated to affect between 15 to 20 million people worldwide. Despite its importance, there is no globally acceptable method to diagnose and define cataract. Two commonly used systems are clinical lens assessment and photographic grading. In this study, we aimed to determine appropriate cataract cut-offs from clinical assessment based on the Lens Opacification Classification (LOCS) III and from grading of lens photographs following the Wisconsin system.

Methods: We examined a population-based sample of 3,280 Malays adults aged 40-80 years in Singapore. Clinical assessment for nuclear, cataract was performed using LOCS III scale for the 3,280 pairs of eyes. Lens photographs were captured for 3,269 subjects and were graded following the Wisconsin system. We used novel statistical

approaches to determine optimal cut-offs and evaluate the accuracy measures accordingly. We also assess the validity of standard cut-offs.

Results: The optimal cut-points for detecting nuclear cataract is LOCS III ≥ 4 (84.89% sensitivity, 72.02% specificity, and AUC 0.706); for cortical cataract is LOCS III ≥ 0.5 (60.96% sensitivity, 64.47% specificity, and AUC 0.645); for posterior subcapsular cataract is LOCS III ≥ 0.5 (31.14% sensitivity, 88.76% specificity, and AUC 0.606). Using the Wisconsin system, the optimal cut-points for detecting nuclear cataract is \geq standard 4 (38.27% sensitivity, 96.25% specificity, and AUC 0.719); for cortical cataract is $\geq 1.3\%$ of lens area (49.23% sensitivity, 72.37% specificity, and AUC of 0.615); for posterior subcapsular cataract is $\geq 0.3\%$ of lens area (20.34% sensitivity, 95.13% specificity, and AUC 0.579).

Conclusion: Our data support the use of traditional nuclear cataract cut-point of LOCS III ≥ 4 and Wisconsin \geq standard 4. Cortical cataract had optimal cut-points of LOCS III ≥ 0.5 and Wisconsin $\geq 1.3\%$, which is lower than the commonly used cut-point of LOCS III ≥ 2 and Wisconsin $\geq 25\%$. Posterior subcapsular cataract had optimal cut-points of LOCS III ≥ 0.5 and Wisconsin $\geq 1.3\%$, again lower than the commonly used cut-point of LOCS III ≥ 2 and Wisconsin $\geq 5\%$. However, the AUC had better discriminating power for nuclear cataract than for cortical and posterior subcapsular cataract for both is LOCS III and Wisconsin system. These data have implications in the assessment and definition of cataract using LOCS III and Wisconsin system.

YIA – BS 07

Eating Disorders Mental Health Literacy in Singapore

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Background/Hypothesis: This research examines the eating disorders "mental health literacy" of young adult women in Singapore.

Methods: A self-report questionnaire was completed by 255 females recruited from University campuses. A vignette of a fictional (female) person exhibiting the characteristic features of bulimia nervosa was presented, followed by a series of questions about the treatment and outcome of the problem described. A measure of eating disorder symptoms was also included in the questionnaire.

Results: Consulting a primary care practitioner, counsellor or psychologist, seeking the advice of a (female) family member or friend, getting advice about diet and nutrition, and taking vitamins and minerals, were the interventions most often considered helpful, whereas seeing a psychiatrist and using antidepressants were viewed less favourably. Participants' mothers were most often considered helpful as an initial source of help. Among participants with high level of eating disorder symptoms, recognition of an eating problem was poor.

Discussion & Conclusion: Aspects of the eating disorders mental health literacy of young Singaporean women may be conducive to low or inappropriate treatment-seeking. Health promotion programs designed to improve eating disorders mental health literacy need to target not only at-risk individuals, but also their family and immediate social environment.

YIA – BS 08

Transduction Efficiency of a Lentiviral Vector in an In-vitro Model of Thalassemia, and its Application for Intrauterine Gene Therapy

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Background: Ex-vivo intrauterine gene therapy (IUGT) may be a useful approach to monogenic disorders that cause irreversible end-organ damage in the developing fetus. The aim is permanent gene correction of autologous cells harvested from the immunologically-naïve fetus, transduced in-vitro and re-transplanted in utero. Towards that aim, we investigate the effectiveness of in-vitro haemopoietic stem cell (HSC) transduction with a novel lentiviral vector (LV), UCOE-eGFP. We will eventually use this to interrogate ex-vivo IUGT to rescue a murine fetal model of thalassemia major.

Methods: Vectors were generated using a 3-plasmid packaging system with *E coli* as the packaging cell. Titration was carried out against 293T cells. Human HSC were isolated from umbilical cord blood by density centrifugation and magnetic-affinity cell selection for CD34. Single-round transduction was performed at various multiplicities-of-infections. Transduced cells were subjected to haematopoietic differentiation assays to confirm retention of HSC properties. Flow cytometry was employed to determine transduction efficiency.

Results: We generated lentivirus concentrates containing 1.5×10^8 transducing units/mL. CD34⁺ HSC were isolated from umbilical cord blood mononuclear cells at frequencies of 10^5 /mL. Transduced cells retained HSC properties and generated various haematopoietic progeny. Finally, transduced HSC demonstrated GFP expression, indicating successful integration of the transgene.

Conclusions: We will now focus on in-vitro transduction of murine HSC using LV to deliver the β -globin transgene, and will examine IUGT in a murine model of perinatally-lethal thalassemia major, as proof-of-concept of the ex-vivo approach. If this paradigm is successful, it will be applicable to other perinatally lethal diseases, including α -thalassaemia major.

YIA – BS 09

Elevated Plasma Interleukin-5 and Tumour Necrosis Factor-alpha Concentration in Children with Minimal Change Nephrotic Syndrome in Relapse

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Background/Hypothesis: Minimal change nephrotic syndrome (MCNS) is thought to be a Th2 cytokine disease. Our previous studies have shown that *interleukin-13* (*IL-13*) gene expression and intracellular production was upregulated in T-cells from patients with relapse MCNS. This study aimed at investigating the cytokine profiles in MCNS patients during relapse and remission, in order to enhance our understanding of disease pathogenesis.

Methods: Plasma cytokine profiles were analysed using multiplex suspension bead array system in 9 nephrotic children aged 4 to 21 years with steroid-sensitive nephrotic syndrome in relapse and

remission. Nine age-matched healthy controls were included for comparison.

Results: Of the 27 cytokines analysed, plasma platelet-derived growth factor-BB (PDGF-BB), interleukin (IL)-1 receptor antagonist (IL-1Ra), IL-4, IL-5, IL-7, IL-6, IL-8, interferon-gamma (IFN- γ) and tumour necrosis factor- α (TNF- α) were significantly increased in MCNS relapse compared to controls ($P < 0.05$). However, age-adjusted pairwise comparison showed that only plasma levels of IL-5 and TNF- α were significantly higher in patients in relapse (12.03 ± 2.08 pg/mL and 64.54 ± 12.93 pg/mL) compared to remission (6.16 ± 0.90 pg/mL and 29.40 ± 5.23 pg/mL) respectively ($P < 0.03$). Additionally, there was no significant difference between MCNS remission and controls.

Discussion & Conclusion: This novel finding of increased IL-5 production during relapses in children with MCNS further support Th2 polarisation in this disease. *IL-4*, *IL-5* and *IL-13* are found in a gene cluster, regulated coordinately by GATA-3. Increased TNF- α levels could be explained as an epiphenomenon of infection that triggers relapse in MCNS. Drugs inhibiting nuclear translocation of GATA-3 could potentially improve clinical efficacy of disease treatment.

YIA – BS 10

A Novel TRPC6 Gain-of-function Mutation May Cause Focal Segmental Glomerulosclerosis through altered interactions with Podocin and Nephrin

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Background: Focal segmental glomerulosclerosis (FSGS) is an important cause of end-stage renal disease (ESRD). Studies have demonstrated mutations in the Transient Receptor Potential Cation Channel 6 (*TRPC6*), a receptor-operated cation-selective ion channel, as a cause of FSGS. *TRPC6* interacts with *podocin* and *nephrin* at the podocyte slit diaphragm.

Methods: We sequenced *TRPC6*, *podocin* and *nephrin* genes in FSGS patients, and performed functional studies on the *TRPC6* mutation found. Full-length human *TRPC6* cDNA was amplified and fused with Green Fluorescence Protein. Plasmid DNA with wild-type or mutant *TRPC6* was transiently co-transfected with human M1 muscarinic receptor into Human Embryonic Kidney 293 cells. *TRPC6* currents were recorded using whole-cell patch clamp method before and after activation by carbachol.

Results: In a Chinese family with hereditary FSGS, we found a novel highly conserved *TRPC6* missense mutation R68W, not present in 96 healthy controls. Of six family members with the mutation, two had FSGS, one had proteinuria, while the rest were non-penetrant. Current amplitudes at both -100 mV and 100 mV were significantly higher in cells expressing R68W mutant channels than in cells expressing wild-type channels ($P < 0.05$), indicating a gain-of-function mutation. Interestingly, only the three penetrant members had a homozygous 954T>C *podocin* gene polymorphism, while only the two with FSGS had a homozygous 2289 C>T *nephrin* gene polymorphism.

Discussion & Conclusion: A novel gain-of-function *TRPC6* missense mutation was found in a local family. Concomitant *podocin* and *nephrin* polymorphisms may explain variable penetrance in this family. This can be helpful for prognostication of FSGS patients at risk of ESRD.

YIA – BS 11

Effects of mTOR Inhibitor Everolimus (RAD001) on Bladder Cancer Cells**E. CHIONG^{1&2}, I LEE³, A DADBIN³, AL SABICHI⁴, L HARRIS³, D MCCONKEY³, HB GROSSMAN³**¹Surgery, National University of Singapore, Singapore, ²Urology, National University Hospital, Singapore, ³Urology, The University of Texas M.D. Anderson Cancer Center, USA, ⁴Clinical Cancer Prevention, The University of Texas M.D. Anderson Cancer Center, USA**Background/Hypothesis:** We investigated the effect of the mTOR inhibitor everolimus (RAD001) on human bladder cancer cells in vitro and in vivo.**Methods:** The UM-UC-3, UM-UC-6, UM-UC-9 and UM-UC-14 cell lines were treated at different concentrations of everolimus. Growth effect was assessed by crystal violet assays, with or without everolimus re-dosing. Flow cytometric cell cycle analyses, propidium iodide exclusion and annexin V assays were performed. Tritium radiolabeled leucine incorporation and western blot assays were also performed. In vivo experiments using nude mice subcutaneously implanted UM-UC-3, UM-UC-6, and UM-UC-9 tumour models, treated with prolonged repeated orally gavaged everolimus or placebo, were performed. Tumours were harvested for immunohistochemistry.**Results:** The everolimus treated bladder cancer cells showed transient growth inhibition in a dose-dependent manner, with growth inhibition augmented by re-treatment. UM-UC-14 was most sensitive to everolimus therapy while UM-UC-9 was least sensitive. Everolimus showed G1 growth phase arrest, only after prolonged treatment in sensitive cell lines. There was no evidence of significant apoptosis. Significant tumour growth inhibition compared to controls was shown in murine subcutaneous tumours from UM-UC-3, UM-UC-6, and UM-UC-9 cell lines. Protein synthesis inhibition via S6K and 4EBP1 pathway appears to be the main mechanism of bladder cancer cell growth inhibition by everolimus. However, inhibition of angiogenesis was the predominant mechanism for UM-UC-9 cells.**Discussion & Conclusion:** The mTOR inhibitor everolimus inhibits bladder cancer cell growth in vitro. Everolimus is efficacious in treating bladder cancer cells in vivo, in spite of tumour response heterogeneity seen in vitro. mTOR inhibition is a potential novel therapeutic strategy for bladder cancer.*Conflict of interest: Nil**Source of Funding: The University of Texas M.D. Anderson Cancer Center, USA*

YIA – BS 12

Expression of Neural Receptors in Mouse Meibomian Gland**HY ZHU^{1,2}, AK RIAU¹, ROGER W. BEUERMAN^{1,2}**¹Singapore Eye Research Institute, ²Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore**Background:** To investigate gene and protein expression profiles of neural receptors found in the mouse Meibomian gland. RNA and protein levels were determined for neuropeptide Y (NPY) receptor, vasoactive intestinal peptide (VIP) receptor, substance P (SP) receptor and muscarinic receptor (MR) subtypes m1–m5 in the mouse Meibomian gland.**Methods:** Frozen sections of Balb/c mouse eyelids were subjected to laser capture microdissection (LCM) to isolate pure samples of Meibomian gland ductal and acinar cells. Real-time PCR, immunolabelling and western blot analysis for SP receptor, VIP receptor, NPY receptor and m1–m5 were performed on Meibomian gland ductal and acinar cells.**Results:** Expression of NPY1 receptor, VIP receptor 1, SP receptor and all 5 MR subtypes was found in all Meibomian gland ductal and acinar cells analysed by immunolabelling. M1 and SP receptor transcripts were not detectable in Meibomian gland ductal cells by real-time PCR. Immunolabelling and western blot analysis confirmed the presence of NPY1 receptor, VIP receptor 1, SP receptor and all five MR subtypes in the Meibomian gland.**Conclusion & Discussion:** VIP receptor 1, SP receptor, NPY1 receptor and muscarinic cholinergic receptor maybe involved in the regulation of Meibomian gland secretion. LCM in conjunction with gene expression analysis provides an excellent approach for studying Meibomian gland ductal cells about which relatively little is known at the molecular level.

YIA – BS 13

MYC Activation is a Common Transformation Event in Myeloma and Associated with Poor Prognosis**WJ CHNG¹, G HUANG¹, R FONSECA²**¹Department of Haematology-Oncology, National University Health System, National University of Singapore, Singapore, ²Comprehensive Cancer Center, Mayo Clinic, Arizona, USA**Background and Hypothesis:** Multiple myeloma (MM) is an incurable bone marrow cancer. Events mediating transformation from the pre-malignant monoclonal gammopathy of undetermined significance (MGUS) to MM is unknown.**Methods:** We analysed 2 gene expression datasets generated on the Affymetrix U133 platform. The test set consisted of 22 MGUS and 101 MM and the validation set 50 MGUS and 351 MM. The gene expression profiles of MM were compared to MGUS using gene-set enrichment analysis. Additional cell line datasets were used to validate specific oncogene signature. Protein validation was with immunohistochemistry (IHC) on tissue microarray (TMA). Survival was compared using the log-rank test.**Results:** Genes over-expressed in MM were enriched for cell cycle, proliferation and MYC activation gene-sets. We dissected the relationship between MYC and cell cycle, and identified a MYC activation signature dissociated from proliferation. We validated our MYC signature in a mouse and human cell line GEP dataset, showing specific expression of our MYC signature in cell lines forced to express MYC. Applying this signature to the test dataset, we showed that MYC is activated in 60% of myeloma but none of MGUS. This pattern is reproduced in an independent validation dataset. Nuclear expression of MYC by IHC, a marker of MYC activation, correlated strongly with the MYC signature. Furthermore, MM patients with higher MYC expression have significantly shorter survival.**Discussion:** MYC activation is a common transforming event in MM associated with poor prognosis. MYC nuclear staining by IHC can be a useful clinical surrogate. Targeting MYC can be a chemoprevention strategy.

YIA – BS 14

Intermediate Filaments and Galectin-1 are Early Mechanosensory Cues in Reinnervation of Regenerating Lacerated Skeletal Muscle**HC HAN, BL TAN, Y ZOU, S S NATHAN, BP PEREIRA***Musculoskeletal Research Laboratories, Department of Orthopaedic Surgery, National University of Singapore, Singapore***Background/Hypothesis:** Reinnervation at the intramuscular level can accelerate the recovery process in lacerated skeletal muscles.

Intermediate filaments and galectin-1 are involved in myofibers reinnervation during the 12-week repair of lacerated rat skeletal muscles.

Methods: The localisation of the intermediate-filaments and galectin-1, a marker for peripheral nerve regeneration was investigated by immunohistochemistry and western-blot in 2 lacerated skeletal muscle groups: intramuscular-nerve preserved intact (NP) and intramuscular-nerve cut and not repaired (NNR), both observed up to 12-weeks.

Results/Discussion: After 2-weeks, progressive muscle atrophy characterised by myofibers size reduction and increase fibrous tissue area was noted. Desmin and vimentin were weakly expressed in NNR, but strongly expressed by myoblasts and young myotubes in NP. The expression of desmin was up-regulated but vimentin ceased completely after 12-weeks. Nestin, a neural stem-cell marker, was mildly expressed in both NNR and NP after 2-weeks. Nestin co-localised with the expression of desmin and vimentin in myoblasts, and progressive had a reduced expression by 12-weeks. Galectin-1, was strongly expressed by regenerating myoblasts and immature myotubes at 2-weeks. In NP, Galectin-1 was expressed in organised diagonal rows of large spots, whilst in NNR, random spots in the extrasynaptic and perisynaptic regions were noted. NNR demonstrated fiber sizes variation with more interstitial connective tissue and a large fibrotic zone, while NP had more mature myofibers with minimal fibrosis.

Conclusion: The orchestrated expression of the different intermediate filaments and galectin-1 are early cues to reinnervation of the intramuscular-nerve, resulting in improved rate of myofiber and axonal regeneration in lacerated muscles.

YIA – BS 15

PI3K/Akt activated B7-1 Transcription in Regulation of Glomerular Podocyte Effacement in an *IL-13* Overexpression Rat Model of Minimal Change Nephrotic Syndrome (MCNS)

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Background/Hypothesis: We have previously demonstrated that interleukin-13 (*IL-13*) overexpression in rats resulted in MCNS. This was associated with downregulation of podocyte molecules, nephrin, podocin and dystroglycan, and upregulation of glomerular B7-1 expression. This study therefore examined the differentially regulated B7-1 signaling pathways in the glomeruli of the *IL-13* overexpression model.

Methods: RNA from glomeruli of 6 control and 6 *IL-13* transfected rats with MCNS was reverse transcribed and hybridised into Illumina Rat Ref12 microarray chips. Preprocessed data from BeadStudio were normalised by cross-correlation method. Differentially expressed genes were selected based on criteria of >1.5-fold change and coefficient of variance <0.2. Gene ontology and pathway analysis were carried out using MetaCore™.

Results: 14,497 genes were differentially expressed, 1120 genes showed >1.5-fold change in expression. Genes involved in *B7-1*

transcription, *JAK3*, *PIK3cd* and *Rel* were significantly upregulated in the *IL-13* overexpression nephrotic rat model. Several genes involved in podocyte cytoskeleton remodelling (*ITK*, *LCP2* and *vav1*) were also highly upregulated. This was associated with downregulation of podocyte slit diaphragm molecules *NEPH2*, *nephrin*, *podocin*, *JAM4*, *cadherin-1*, *cadherin-11*, and *cadherin-16* and actin cytoskeleton molecules *ZO-1*, *Nck2*, *Synpo*, *MAGI-2*, *α-catenin* and *α-actinin-4* in the *IL-13* transfected MCNS rats. Additionally, downregulation of podocyte basal and apical membrane domain protein complex molecules, *dystroglycan*, *α3β1 integrin*, *GLEPP1* and linkage molecule *Ezrin*, were demonstrated.

Discussion & Conclusion: Our results suggest that podocyte effacement in our *IL-13* overexpression rat model of MCNS could involve activation of *B7-1* transcription via PI3K/Akt pathway and its downstream effect on cytoskeleton and slit diaphragm molecules.

YIA – BS 16

Synergistic Anti-leukemic Effect of Combination of ABT-869 and HDAC Inhibitor

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Background/Hypothesis: Combination with other small molecule drugs represents a promising strategy to improve therapeutic efficacy of FLT3 inhibitors in the clinic. Small molecule HDAC inhibitors (HDACi) have proven to be a promising new class of anticancer drugs. We tested the combinatory effect of ABT-869, a FLT3 inhibitor, and SAHA, a potent HDAC inhibitor.

Methods: Cell proliferation and apoptosis assay were used to assess the synergism. Microarray was employed to identify the core gene signature and use shRNA technology for functional studies.

Results: We demonstrated that combining ABT-869 with SAHA led to synergistic killing of AML cells with FLT3 mutations in both conventional cell culture and stromal cell coculture models. Using gene expression profiling, we identified a core gene signature that is uniquely induced by the combination in 2 different leukemia cell lines, MV4-11 and MOLM-14, which could provide molecular insight into this synergistic therapeutic effect. Among the genes modified, PTP4A3 (PRL-3), ORC1L, IFI16 are particularly interesting. Modulation of PRL-3 expression level using genetic approaches or the PRL-3 inhibitor, Pentamidine, demonstrated that PRL-3 plays an essential role in the synergism resulting from the combination of ABT-869 and SAHA. The expression of PRL-3 is higher in FLT3-ITD positive than FLT3-ITD negative AML.

Discussion & Conclusion: Our results suggest such combination therapies may significantly improve the therapeutic efficacy of FLT3 inhibitors in the clinic and a potential role of PRL-3 in FLT3-ITD leukemogenesis and drug resistance.

YIA – CR 05

Profile and Early Outcomes of Late-Preterm Infants Managed in a Tertiary Neonatal Unit in Singapore

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Background/Objective: Globally, the incidence of late-preterm births (births at 34, 35 and 36 weeks of gestation) is increasing and their morbidity often underestimated. We aimed to study the profile and early outcomes of late-preterm infants born in National University Hospital.

Methods: Late-preterm births from 1 January to 31 December 2008 were identified from the delivery-suite register. The demographic profile, risk factors for preterm births and their outcomes were retrospectively obtained from patient records.

Results: Out of 2507 live births, 205 (8.2%) were late-preterm births. The incidence of late-preterm births among Chinese, Malays and Indians were 6.3%, 12.7% and 5.1% respectively. Compared to non-Malays, the incidence in Malays was significantly higher (Chi-square = 31, $P < 0.001$). There were one or more risk factors in 150/205 (73.2%), the commonest being preterm premature rupture of membranes (24.4%), diabetes in pregnancy (14.1%) and antepartum hemorrhage (9.3%). Twenty-seven infants (13.2%) had potentially preventable risk factors (maternal anaemia, maternal age >40 and smoking). These preventable risk factors were significantly higher in Malays (22%) compared to non-Malays (4.8%) (Chi-square = 13, $P < 0.001$).

Mortality was 1% with 2 unpreventable deaths (complex cyanotic heart, pulmonary hypoplasia). The main morbidities were neonatal jaundice requiring phototherapy (45%), respiratory distress (16%), hypoglycaemia (14.6%), congenital abnormalities (3.4%) and culture-proven sepsis (2.9%).

Conclusion: The incidence of late-preterm births is comparable to the reported incidence in recent literature. Identification of modifiable risk factors early, especially in Malays, may reduce the incidence of late-preterm births. Although mortality was low, there were significant morbidities in late-preterm infants.

YIA – CR 06

Basal Cell Carcinoma in Singapore: A Review of Epidemiology and Clinical Characteristics

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Background/Hypothesis: Basal cell carcinoma (BCC) is the most common malignancy in Caucasians. This study aims to identify significant trends and associations in epidemiology and clinical characteristics of BCC in a multiracial Singapore population, with the secondary aim of a comparative analysis between Singapore Chinese and Caucasians.

Methods: This is a prospective study of patients with newly diagnosed, histologically confirmed BCC at the National Skin Centre over a four-year period from May 2004 to July 2008. Clinical and histological data were collected according to a data set. A total of 274 BCCs from 257 patients were studied, with 11 patients having two or more tumours.

Results: 54.7% of the study group were male and 45.3% female, with a mean age of 67.0 years. The racial distribution was 77.7% Chinese, 15.7% Caucasians, 2.9% Malay, 1.1% Indian and 2.6% others. Caucasians were more likely than Chinese to be younger (3.6 fold, $P < 0.001$), possess a personal/family history of BCC (8 fold, $P < 0.001$), develop multiple, non-pigmented tumours (4 fold, $P < 0.001$) of superficial (53.5%) and morphoeic (18.6%) subtypes on the trunk/upper limb. Chinese were 3 times more likely to develop nodular (76.1%) and pigmented BCC in the head and neck region. BCC was more common in males across all age groups except in elderly more than 80 years ($P = 0.002$).

Discussion & Conclusion: Compared to the Chinese, BCC occurs in younger Caucasians with a predilection for the trunk and upper limbs, suggesting a greater role for recreational sun exposure as a risk factor. The aggressive morphoeic BCC is more likely to develop in Caucasians.

YIA – CR 07

Correlating High-Sensitivity C-Reactive Protein with Metabolic Risk Factors in an Asian Cohort

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Background: High-sensitivity C-reactive protein (hsCRP), a novel inflammatory biomarker, is an independent predictor of cardiovascular disease (CVD), even among healthy subjects. Little data has been published regarding hsCRP and metabolic syndrome in Asians. We hypothesise that hsCRP profiles vary according to different metabolic parameters, cumulatively contributing to the cardiometabolic risk profile. The aim is to study the relationship between hsCRP and metabolic risk factors in working Asian adults.

Methods: Asian healthcare workers were consented and consecutively enrolled. Anthropometric parameters and fasting blood were collected. Metabolic syndrome was defined using the American National Cholesterol Education Program (NCEP) guidelines (waist circumference modified for Asians). Data was analysed with SPSS software.

Results: Among the 616 subjects, 58% were Chinese (C), 25% Malays (My) and 17% Indians (I); 71% were females. hsCRP (\pm standard deviation, in mg/L) was highest among Indians (I: 0.73 (0.92); C: 0.22 (0.28); My: 0.38 (0.50), $P < 0.001$) with no significant gender differences. Metabolic syndrome was identified in 41 (6.7%) subjects, who had higher hsCRP (0.80 ± 0.97 vs. 0.32 ± 0.47 , $P < 0.0001$) than those who did not. Multivariate analysis revealed waist circumference, diastolic blood pressure (DBP) and fasting blood glucose (FPG) as significant positive predictors of hsCRP, whereas systolic blood pressure (SBP) and high density lipoprotein cholesterol (HDL-C) were negatively correlated (all $P < 0.05$).

Discussion & Conclusions: Dysmetabolic risk factors are significantly correlated to inflammation, which in turn may contribute to CVD. In apparently healthy working Asians, this may represent a new dimension to cardiometabolic risk profiling.

YIA – CR 08

Pediatric Renal Transplantation: 20-Year Experience in Singapore
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Background: Renal transplantation is the preferred treatment for children with end-stage renal failure. Paediatric renal transplantations were initiated in Singapore in 1989. We aimed to examine outcomes over 20 years from 1989 to 2009.

Methods: We retrospectively examined the renal registry database at the Shaw-NKF-NUH Children's Kidney Centre. Crude patient and graft survival rates were calculated using Kaplan-Meier survival analysis and log-rank test used to determine survival differences.

Results: Forty-four renal transplants were performed at our centre. Another 4 local patients with overseas transplants were included. The proportion of living donor (LD) transplants was 64.6%. Structural abnormalities (41.6%) were the commonest aetiologies. Median age at transplant and waiting time were 14.3 and 2.3 years respectively. LD transplant recipients were younger (12.7 years vs. 15.8 years) and had a shorter waiting time (1.8 years vs. 5.8 years) than deceased donor (DD) recipients. Overall patient survival rates were 95.7%, 92.7%, 85.6%, and 74.9% at 1, 5, 10, and 15 years respectively. There were 4 deaths, of which 3 were infection-related. Graft survival rates at 1, 5, 10, and 15 years for LD and DD transplants were 100%, 89.7%, 75.9%, 75.9% and 87.8%, 70.3%, 56.2%, 37.5% respectively, and were significantly higher in LD transplants. The main cause of graft loss was rejection following non-adherence. Multivariate analysis showed male gender, acute tubular necrosis and late acute rejections as predictors of graft failure.

Conclusion: Graft survival rates for LD transplants in Singapore were comparable to North American rates, although DD transplant rates were slightly worse, probably a reflection of the prevailing transplant policies.

YIA – CR 09

Preliminary Results of a Multi-center Phase II Study of Neo-adjuvant Docetaxel and Capecitabine in the Treatment of Gastric Cancer in Singapore

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¹Singapore Gastric Cancer Consortium

Background: In the west, neo-adjuvant chemotherapy has been shown to increase survival in patients with resectable gastric cancer. We aimed to study the efficacy and toxicity of docetaxel and capecitabine in the neo-adjuvant treatment of Asian patients with stomach cancer and to identify prognostic and predictive biomarkers.

Methods: We designed a multicenter Phase II clinical trial. Eligible patients had a pathologic diagnosis of adenocarcinoma of the stomach and/or gastroesophageal junction. Staging evaluation included computed tomography scans of the abdomen and pelvis, endoscopic ultrasound and staging laparoscopy. Patients without distant or peritoneal metastasis were eligible for neo-adjuvant treatment with 2 cycles of docetaxel 60 mg/m² on day 1 and capecitabine 950 mg/m² BD on days 1-14 every 21 days. D2 surgery and adjuvant treatment with a fluoropyrimidine and radiation were recommended. Primary

objective was the rate of complete pathologic response and secondary objectives were time to progression (TTP), survival, toxicity and correlative studies.

Results: Twenty-six patients have been approached to participate, 22 consented and were enrolled. Five were ineligible (due to: peritoneal metastasis at laparoscopy, 4 patients; progressive dysphagia and inability to start capecitabine treatment, 1 patient). Seventeen patients have started treatment. Sixteen have completed treatment. Median age was 62.5 years. Men/Women: 11/5. Fourteen had T3 and 2 had T4 lesions. Nine patients had N0, 4 had N1 and 3 had N2 disease. There were no complete pathologic responses. Two patients had a partial response, 9 had stable disease, 4 progressed, and 2 were not evaluable due to adverse events. With a median follow-up of 28 months, 7 patients have died and 9 have had documented disease progression. Median overall survival has not been reached and the median time to disease progression is 19 months (95% CI, 11 to infinity). Serious adverse events were as follows: grade 3 myocardial infarction, one patient; non-neutropenic fever, one patient.

Conclusion: Docetaxel and capecitabine is a well tolerated regimen in Asian patients at the doses used in this trial. Preliminary results seem promising in this high risk population. Accrual and follow-up continue. Paired samples of normal gastric mucosa and tumour tissue are available for correlative studies.

Funding Source: Singapore Cancer Syndicate, Agency for Science Technology and Research (A-STAR)

YIA – CR 10

Clinical Performance of Combined Use of Canadian CT Head Rule with Serum S100 Protein in Evaluation of Minor Head Injury Patients in the Emergency Department

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Background: Cranial Computed Tomography (CCT) is often used as a screening test in patients with minor head injury (MHI), although the results are often normal. Reliance on clinical decision rules as an initial screen remains controversial and recent studies have supported the complementary use of serum S100 (a biochemical marker of brain injury) to select patients requiring CCT. In this prospective study, we assess the clinical performance and CCT burden of the Canadian CT Head Rule (CCHR), S100 and its combination in our population of MHI patients.

Methods: Seventy-six patients with MHI were assessed using the CCHR and S100 level. The gold-standard was CCT or follow-up at 6 months for clinically important brain injury performed on all patients. The test results were assessed in a blinded fashion. Test sensitivity, specificity and the S100 receiver operating characteristics curve were evaluated.

Results: CCHR sensitivity and specificity were 66.7% (95% CI, 41.7%-84.8%) and 44.3% (95% CI, 32.5%-56.7%) respectively. Parallel testing with CCHR and S100 (cut-off > 0.10 microgram/L) was 93.3% sensitive (95% CI, 70.2%-98.8%) and 8.2% specific (95% CI, 3.6%-17.8%) with CCT usage increased (over CCHR alone) by 38%. But using a different S100 cut-off of 0.2 microgram/L resulted in better performance with 93.3% sensitive (95% CI, 70.2%-98.8%),

29.5% specific (95% CI, 19.6%–41.9%) and a smaller CCT burden of 22%.

Conclusion: Combined use of S100 (cut-off 0.2 microgram/L) with CCHR is the best strategy in ensuring high sensitivity without excessive CCT usage in our local population of MHI patients.

YIA – CR 11

Postoperative Outcomes and Hospital Length of Stay in 2756 Patients with Hip Fractures: A Comparison of Operative and Non-operative Management

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Background: Hip fractures in the elderly are associated with considerable risk of morbidity and mortality. There are a limited number of studies that have compared the clinical outcomes following operative and non-operative treatment in patients with hip fractures. The purpose of this study was to compare the different post-operative outcomes in hip fracture patients who are either treated with surgery or non-surgical treatment.

Methods: A retrospective study was conducted on 2756 hip fracture patients who had been admitted over a 6-year time period. Patient bio-data, complications, ambulatory status at discharge and hospital length of stay were collated.

Results: There were 2029 (73.6%) patients who underwent surgical intervention; the remaining 727 (26.4%) refused surgical intervention. The overall complication rate in the operated cohort was 6.6% as opposed to 12.5% in the non-operative cohort ($P < 0.001$). The mean length of stay (LOS) in the operated and non-operative cohort was 15.7 days and 22.4 days respectively ($P < 0.001$).

Discussion & Conclusion: Literature comparing operative and non-operative treatment of hip fractures is sparse and there is a lack of objective comparisons. This study provides clinical data regarding the different postoperative outcomes that exist between conservative and surgical treatment from a sizeable study population. The physician is able to validate the respective immediate postoperative complications and advice the patients accordingly as part of an informed consent. Operative management of hip fractures in the elderly is associated with a decreased complication rate with more optimal ambulatory status and a reduced hospital LOS.

YIA – CR 12

Left Ventricular Hypertrophy is Associated with Subclinical Arterio-atherosclerosis in Pediatric End-Stage Renal Failure Patients

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Background: Cardiovascular events are important causes of death in children with end-stage renal disease (ESRD). Early diagnosis of preclinical arterio-atherosclerosis may improve cardiovascular outcomes. Early arterio-atherosclerosis can be shown sonographically by increased artery intima-media thickness (cIMT), diminished artery distensibility, increased artery stiffness and endothelial dysfunction by means of reduced flow-mediated vasodilatation (FMD). This

study aimed at evaluating the correlation between asymptomatic arterio-atherosclerosis and left ventricular hypertrophy (LVH) in a young ESRD cohort.

Methods: Two-dimensional echocardiography and carotid artery ultrasound were performed on 16 ESRD patients on peritoneal dialysis (mean age 17.76 ± 3.52 years; mean ESRD duration 3.98 ± 1.96 years). Fractional shortening (FS), interventricular septal thickness (IVSd), posterior wall thickness (LVPwd) and left ventricular mass index (LVMI) were obtained on echocardiography. Carotid artery intima-media thickness (cIMT), artery stiffness parameter and FMD were obtained. IVSd and LVPwd were considered abnormal if they are more than 90th centile of age-specific normative data. The arterial ultrasound parameters were correlated with the echocardiography parameters using Spearman's correlation analysis.

Results: Two (12.5%) subjects had abnormal IVSds; another two (12.5%) had abnormal LVPwd. Four patients (25%) had cIMT more than 2SD from the height-adjusted mean. cIMT was inversely related to FS ($r = -0.519$, $P < 0.05$) but not IVSd, LVPwd or LVMI. Additionally, the stiffness parameter correlated strongly with IVSd ($r = 0.743$, $P < 0.01$) and LVPwd ($r = 0.768$, $P < 0.01$). FMD was inversely correlated with LVMI ($r = -0.725$, $P < 0.01$).

Conclusion: Young ESRD patients who have diminished cardiac function or LVH are likely to have subclinical arterio-atherosclerosis. An aggressive approach in controlling cardiovascular risk factors is necessary in such patients.

YIA – CR 13

Racial Variation in Multi-ethnic Singapore Patients with Heart Failure

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Background: Limited data exist regarding racial differences among the multi-ethnic Singapore heart failure population. This study aims to identify any racial differences in the baseline profile, management and outcomes in patients with heart failure in Singapore.

Methods: We evaluated 345 consecutive patients admitted with a primary discharge diagnosis of heart failure. Records for patients were reviewed with respect to patient profiles, diagnostic testing, treatment and clinical outcomes. The primary outcome measure was a composite of heart failure readmissions and all-cause mortality at 1 year.

Results: Our study included 211 Chinese (61.2%), 69 Malays (20.0%), 45 Indians (13.0%) and 20 patients of other races (5.8%). A higher proportion of Chinese patients were older in age while the Malay patients were younger ($P = 0.005$). Indian patients had a higher prevalence of diabetes mellitus ($P = 0.003$) and ischemic heart disease ($P = 0.034$). There were no significant differences among all races in terms of utilisation of diagnostic testing and receiving of evidence based medication. At 1 year, 41.7% of the entire cohort had an event (28.2% heart failure readmissions and 19.2% all-cause mortality). Chinese patients had significantly lower 1-year event rate compared to Malay patients (51.5% vs. 36.4%, $P = 0.002$). Indian patients had an intermediate event rate of 45.5%.

Conclusions: In this racially diverse Singapore heart failure population, significant racial differences exist with regard to age, co-morbid condition, etiologic factors and clinical outcome. Chinese patients appear to have lowest heart failure readmissions and death from any causes than similarly treated patients from other cohorts.

YIA – CR 14

Good Control in Nocturnal Blood Pressures May Lead to Better Cardiac Outcomes in Paediatric Renal Failure Patients

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Background/Objective: Hypertension is a common complication in patients with end-stage renal disease (ESRD), and is associated with left ventricular hypertrophy (LVH) and cardiovascular mortality. We aimed to determine the value of ABP-guided hypertension treatment in optimizing echocardiographically-determined cardiac outcomes in paediatric ESRD patients.

Methods: Monthly ABP and clinic BP were obtained for six months in 41 patients with ESRD (mean age 16.61 ± 5.20 years; mean ESRD duration 3.76 ± 3.72 years). The ABP results were used to guide hypertension treatment monthly according to a standardised treatment protocol. Two-dimensional echocardiography was performed at baseline and after the 6-month period. LVH was defined as left ventricular mass index (LVMI) $>51.0 \text{ gm}^{-2.7}$. A favorable cardiac outcome was defined as absence of severe LVH. Multivariate logistic regression was conducted to determine the mean BP parameters that predicted a favorable cardiac outcome, after adjustment for age, body mass index and ESRD duration.

Results: At baseline, 34% (14/41) of patients had hypertension based on casual BP, while all had at least one ABP parameter of hypertension. Additionally, 17% (7/41) had severe LVH. A favourable cardiac outcome after 6-months of hypertension control was predicted by attenuation in mean sleep diastolic BP (OR, 0.899; 95% CI, 0.813-0.994, $P = 0.038$), and augmentation of systolic BP dipping (OR, 1.284; 95% CI, 1.011-1.630, $P = 0.040$). Improvement in systolic BP dipping was superior to improvement in mean sleep diastolic BP in predicting a favourable cardiac outcome. Clinic BP was not predictive of cardiac outcome.

Conclusion: ABP monitoring may be potentially useful in guiding hypertension management to achieve better cardiac outcomes in paediatric ESRD patients.

YIA – CR 15

Selective Mutism in Singapore: A Review of 21 Children with Selective Mutism

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Background: Selective mutism (SM) is a complex psychological disorder characterised by persistent failure to speak in some social situations where speaking is expected (e.g. in school) and normal speaking in others (e.g. at home). It is considered a rare disorder among children. In 2007 a study was carried out to evaluate the efficacy of a cognitive behaviour therapy protocol on 21 children with SM admitted to a child psychiatric clinic. This present study aims to describe the clinical presentations and risk factors associated with SM in Singapore. It is hypothesised that the results should be consistent with records from previous research where a young age of onset is expected; family issues and marital problems might be present at the

family of the SM patients; and there should be comorbidity of other psychological disorders such as anxiety and social phobia.

Discussion: After analysing the database using descriptive statistic methods, we found that SM of this group of children tended to present at a later age, and was correlated with various forms of anxiety even though there was no clue showing its association with family or marital problems. These findings could help future studies on local selective mutism studies, even though the significance of the results was limited due to the small sample size of the research and lack of control group analysis.

YIA – CR 16

Efficacy and Mechanism of a Probiotic VSL#3 in the Treatment of Irritable Bowel Syndrome: A Randomised Double-Blind Placebo-controlled Study

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Background/Hypothesis: There has been an increased interest in the use of probiotics for the treatment of irritable bowel syndrome (IBS), but a paucity of trials evaluating its effects on symptoms and the possible mechanism. The current study aimed to evaluate the effects of a probiotic, VSL#3, on symptoms and rectal sensitivity in patients with IBS. The underlying mechanisms are also investigated in the correlation of these effects with the changes of salivary melatonin in IBS subjects.

Methods: Thirty-one IBS patients were randomly assigned to receive 4 capsules of either VSL#3 ($n = 15$) or matching placebos ($n = 16$), twice daily, for 6 weeks. Prior to and post-treatment, subjects completed bowel and psychological questionnaires, and underwent rectal sensitivity study as well as saliva melatonin test.

Results: Data from 23 patients was available for per-protocol analysis (10 VSL#3 and 13 placebo). After the treatment, both placebo and VSL#3 significantly decreased the mean IBS Severity Score from 236.2 to 183.5 and from 239 to 158 respectively ($P < 0.05$). The VSL#3 subjects had a larger improvement with a change of -81.0 vs. -52.7 in the placebo group, although it did not reach statistical significance. Within the VSL#3 arm, there was a significant improvement in days (out of 10 days) with pain (5.0 to 2.3, $P < 0.03$), abdominal distension sub-score (34.0 to 12.5, $P = 0.03$) and satisfaction with bowel movements sub-score (72.5 to 57.5, $P < 0.03$). No significant changes following treatment were observed in psychological indices (Hospitalization Anxiety Depression Scores, Perceived Stress Scale) and sleep parameters (Epworth Sleep Scale, Pittsburgh Sleep Quality Indices) between VSL#3 and placebo subjects. There was no difference in rectal sensation thresholds. Of the 20 subjects whose salivary assays were available, the positive correlation between the increase in the night saliva melatonin levels and the improvement of IBS Severity Scores were seen in VSL#3 treated subjects ($R^2 = 0.45$, $P = 0.046$). Further correlation were evident in the change in the sleep quality (Epworth Sleep Scale), psychological index (Perceived Stress Scale) and rectal pain tolerance with the change of morning salivary melatonin negatively ($R^2 = 0.49$, 0.50, 0.52, $P = 0.036$, 0.030, 0.042 respectively). However, No such correlation was seen in IBS patients with treatment of placebo.

Discussion & Conclusion: Our data showed a trend towards a greater improvement in severity of IBS symptoms amongst VSL#3 vs. placebo subjects. The initial data on correlations of melatonin

salivary levels and effects of the probiotic suggests an increase in melatonin production at night and a decrease in production in the morning by VSL#3 as a possible mechanism for its clinical effects in IBS. A larger sample size is needed in order to confirm our pathophysiological hypothesis.

YIA – CR 17

Preliminary Evidence for the Effectiveness of the REACH Community Mental Health Programme

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Background/Hypothesis: The Response, Early Intervention and Assessment in Community Mental Health (REACH) for Schools programme is a funded government initiative under the National Mental Health Blueprint. The REACH team is a multi-disciplinary team of nurses, social workers, occupational therapists, psychologists, and doctors. The objective of this programme is to improve emotional and social wellbeing of children and adolescents in schools by collaborating and training school counselors to identify and manage students at risk or who have developed mental health disorders. School counselors are given access to the REACH Helpline to seek advice on managing students with mental health issues and to refer students whom they suspect may have a mental health disorder. When a referral is accepted, the student is typically assessed in the school or home and a management plan for the student is put in place in collaboration with the school counselor.

Methods: In order to measure the effectiveness of the programme, each of these students is rated at the time of the assessment and six months later on the Strengths and Difficulties Questionnaire, the Teacher's Report Form, and the Clinical Global Impressions Scale by the student's teacher(s) and school counselor. Data were collected from the start of the project on July 2007 till December 2008 from 13 schools involved in the programme.

Results/Conclusion: Six months after REACH intervention, there was a statistically significant reduction in the Total Difficulties, Emotional, and Hyperactivity subscales scores for students on the SDQ (N = 26). On the other hand, the TRF (N = 26) showed a decrease in Total Difficulties scores but this did not reach statistical significance. In terms of the CGI (N = 31), ratings of the severity of problems were significantly lower after 6 months compared to at the point of the first assessment. These results provide some preliminary evidence for the effectiveness of the REACH programme.

YIA – CR 18

Accuracy of Preoperative CT for Local Staging in Colorectal Carcinomas

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Background: To determine the accuracy of CT in evaluation of local tumour invasion and regional lymphadenopathy in colorectal carcinomas.

Methods: Ninety-nine consecutive patients who had a contrast enhanced CT within 2 weeks prior to surgery with histopathological confirmation of colorectal carcinoma were selected. Intravenous contrast enhanced CT was performed with 5 to 7 mm collimation. Axial scans were retrospectively and independently reviewed by two radiologists (R1 and R2) blinded to surgical findings and histopathology. The readers assessed primary tumour according to conventional

TNM criteria, transmural thickness and adjacent organ involvement. Radiological assessment was then compared with surgical findings and histopathology for accuracy and interobserver agreement.

Results: At histopathology, the T-stage of tumours was T2 in 5, T3 in 62 and T4 in 32 patients and the N-stage was N0 in 36, N1 in 28 and N2 in 35 patients. Adjacent organ involvement was found in 12 patients. The accuracy of CT for T-stage and N-stage for the two readers was 45.5% and 60.6% (interobserver agreement, $k = 0.30$) and 33.3% and 45.4% (inter-observer agreement, $k = 0.23$) respectively. The accuracy for serosal involvement (tumour perforates visceral peritoneum or directly involves adjacent organs) was 63.6% and 66.7% (interobserver agreement, $k = 0.51$). The understaging and overstaging by R1 and R2 for serosal invasion was 24.1%, 12.1% and 20.1%, 12.1% respectively.

Conclusion: Our study results show that the accuracy for CT staging of colorectal carcinomas for T-stage and in particular serosal invasion is moderate but relatively low for N-stage.

YIA – CR 19

Adjuvant Gefitinib in Hepatocellular Carcinoma: A Pilot Study by the Singapore Hepatocellular Carcinoma Consortium

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Background: The epidermal growth factor pathway may play an important role in hepatocellular carcinoma. We intended to study the feasibility of adjuvant gefitinib and to identify prognostic and predictive biomarkers.

Methods: We designed a multicenter pilot study. Patients with a clinical diagnosis of potentially resectable hepatocellular carcinoma who were willing to give informed consent prior to surgery and who had adequate end-organ function were eligible for screening. Patients with macroscopically resected disease (at least R1 resection or better) and pathologically confirmed hepatocellular carcinoma were eligible for adjuvant therapy. Treatment consisted of gefitinib 250 mg orally daily for 6 months. Patients had follow-up with imaging studies every 3 months for the first 2 years, every 6 months for years 3-5 and yearly thereafter. Main endpoints were progression-free survival, toxicity and correlative studies.

Results: Sixty-two patients have been approached to participate; 40 have consented and enrolled. Fifteen were ineligible (due to diagnosis other than HCC, 4 patients; poor post-operative recovery, 4 patients; unresectable disease, 3 patients; withdrawal of consent, 2 patients; 1 patient was diagnosed with bladder cancer and another developed metastatic disease before adjuvant treatment started). Twenty-seven patients have started gefitinib. Twenty-six have completed treatment. Median age was 62 years, Men/Women 23/2. Twenty-three patients had single lesions (mean size, 62.8 mm). Eighteen individuals had cirrhosis and 23 had hepatitis B. Three patients had Child-Pugh B disease, none had child C. All patients had R0 resections and 16 had vascular invasion. With a median follow-up of 18 months (range, 2 to 40 months), 8 patients have had disease recurrence. Median progression-free survival is 22 months (95% CI, 19 months to infinity). Three patients have died. One patient had grade 3 toxicity (skin rash) and discontinued the study drug. Another patient had grade 2 skin rash and chose to discontinue treatment before completion. No other patient has required treatment discontinuation or dose reduction because of toxicity.

Conclusion: Adjuvant treatment of HCC with gefitinib is feasible and carries mild toxicity. Preliminary results seem promising in this

high-risk population. Accrual and follow-up continue. Tissue samples are available for correlative studies.

Funding Source: Singapore Cancer Syndicate, Agency for Science Technology and Research (A-STAR)

YIA – CR 20

Optimisation of Ambulatory and Clinic Blood Pressures is Important in Pediatric Dialysis Patients to Prevent Premature Arteriosclerosis

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Background: Cardiovascular disease is a significant cause of mortality in children with end-stage renal disease (ESRD). This study aimed at assessing the correlation of 24 hour-ambulatory blood pressure (ABP) parameters and carotid artery ultrasonographic features of early arterio-atherosclerosis, defined by increased artery intima-media thickness (cIMT), diminished distensibility and increased stiffness.

Methods: Monthly ABP and clinic blood pressures (BP) were obtained for three months in 16 dialysis patients (mean age 17.76 ± 3.52 years; mean ESRD duration 3.98 ± 1.96 years). Carotid artery ultrasound was performed to assess cIMT, augmentation indices (distensibility) and pulse wave velocities (stiffness). BP index was calculated as mean BP divided by 95th centile of age-, height- and gender-specific normative data. BP load referred to percentage of BP readings that exceeded the 95th centile of normative data. The carotid arterial ultrasound findings were correlated with the mean ABP parameters using Spearman's correlation analysis.

Results: cIMT correlated more strongly with clinic BP (clinic SBP and DBP indices $r = 0.732$, $P < 0.01$ and $r = 0.793$, $P < 0.01$) compared to ABP (24h SBP and DBP indices $r = 0.441$, $P > 0.05$ and $r = 0.504$, $P < 0.05$). However, arterial distensibility correlated with 24h DBP index ($r = 0.671$, $P < 0.01$), but not with clinic DBP index ($r = 0.347$, $P > 0.05$). It also correlated well with wake pulse pressure (PP) ($r = -0.572$, $P < 0.05$) and clinic PP ($r = -0.528$, $P < 0.05$). Mean arterial stiffness correlated negatively with wake PP ($r = -.520$, $P < 0.05$).

Conclusions: High diastolic BP and narrow PP on ABP monitoring as well as high clinic BP were associated with preclinical arterio-atherosclerosis in paediatric dialysis patients. Hypertension management in these patients should therefore be guided by both ABP and clinic BP.

YIA – CR 21

Biomechanics-based Paradigm of Anatomic Restoration for Accelerated Continence Recovery and Improved Vesicourethral Anastomosis Healing after Robotic-assisted Radical Prostatectomy

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Background: We hypothesise that delayed return of urinary continence following radical prostatectomy results from biomechanical instability of the newly-fashioned vesicourethral anastomosis. We developed an approach of restoring circumferential dynamic

suspensory anatomic supports for the urethral sphincter complex, which attenuates bladder prolapse and minimises tension on the healing anastomosis.

Methods: Between 1 January 2005 to 30 July 2008, 1294 consecutive patients underwent robotic-assisted radical prostatectomy by a single experienced surgeon. Two hundred and fourteen men underwent conventional vesicourethral anastomosis (CA); 303 underwent anterior reconstruction (AR) only; and 777 underwent total anatomic restoration (TR). Continence was defined as zero pad usage. All patients' functional outcomes data was collected prospectively using the Expanded Prostate Cancer Index Composite (EPIC) survey. Patients were followed up at 1, 6, 12, 26 and 52-week intervals. Primary endpoints for our analysis were time to return of continence, clinically significant anastomotic leaks, and bladder neck strictures. Chi square and Fischer exact tests were used for analysis of categorical variables.

Results: Continence rates at 1, 6, 12, and 26 weeks following robotic assisted radical prostatectomy was 15.2% vs. 29.9% vs. 30.8%, 40.8% vs. 64.9% vs. 70.0%, 58.2% vs. 84.7% vs. 91.8%, and 72.30% vs. 95.2% vs. 99.1% in the CA, AR and TR groups respectively ($P < 0.001$). Clinically significant leaks occurred in 2.3% vs. 1.0% vs. 0.3%, and anastomotic strictures occurred in 3.7% vs. 1.3% vs. 0.6% in the CA, AR and TR groups respectively.

Conclusions: Total anatomic restoration of the continence mechanism delivers superior anastomotic healing and augments early continence recovery after radical prostatectomy.

YIA – CR 22

Paraspinal Muscle Magnetic Stimulation Evoked Cerebral Potentials Evaluation: A Novel Non-Invasive Quantitative Assessment for Functional Recovery after Low Back Surgery

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Background/Hypothesis: Magnetic stimulation applied to paraspinal muscles can elicit reproducible cerebral evoked potentials recordings from the scalp. Previous studies have demonstrated that attenuation of the early components recorded from the symptomatic side of patients with low back pain was shown to be related to paraspinal muscle spasm. Efficacy of surgery for back pain is difficult to evaluate due to the lack of objective measures. We evaluate the use of magnetic stimulation evoked potentials (pSEPs) in outcome measurement of low back surgery by correlating pSEPs with pain assessments before and after surgery.

Methods: In a prospective study, Visual Analogue Score (VAS), Oswestry Disability Index (ODI) scores, pSEPs were recorded pre-operatively and at 1, 3 and 6 months postoperatively. We consider a >50% reduction in VAS scores or an improvement of >20 in ODI scores post-operation as good outcomes. An amplitude increase of 15% in the early component P30/N40 of pSEPs post-operation is considered significant improvement.

Results: Eight patients with 13 symptomatic sides were examined. All patients reported significant improvement of VAS ($P < 0.001$) after surgery. A significant improvement in ODI scores ($P < 0.001$) was seen in 6 (75%) of eight patients after surgery. A significant increase in pSEPs amplitude P30/N40 ($P < 0.01$) was seen in 10 (91) of 11

sides that showed improvement of ODI scores. Significant increase in pSEPs amplitude P30/N40 was also seen in one patient who did not have improvement in ODI scores.

Discussion & Conclusion: Magnetic stimulation pSEPs is investigated for the first time in quantitative evaluation of muscle functional recovery after spine surgery. Our study shows that pSEPs can be an objective measure of low back pain due to paraspinal muscle spasm, and may be used in future in conjunction with clinical assessment.

YIA – CR 23

Multiphoton Microscopy Imaging of Periprosthetic Tissue Architecture in *ex vivo* Rat and Human Prostatectomy Models: Promising Technique for Improving Outcomes of Nerve-Sparing Radical Prostatectomy

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Background: Multiphoton microscopy (MPM), combined with second harmonic generation (SHG), is a novel technology that permits bioimage acquisition using several low-energy photons to induce autofluorescence of cellular components without use of exogenous stains nor damage to live tissue. We explore its potential for improving real-time visualisation of periprosthetic nerves and tissues during nerve-sparing radical prostatectomy.

Methods: From January 2008 to May 2009, the prostate, cavernous nerves, seminal vesicles and periprosthetic tissue was excised from 15 euthanised adult male Sprague-Dawley rats and imaged under an Olympus X61WI upright fluorescence microscope. 28 *ex vivo* human prostatectomy specimens were also imaged immediately after robotic-assisted radical prostatectomy. Benign and malignant human prostate glandular and cellular architecture were similarly assessed from freshly procured tissue dedicated for institutional tissue banking. A femtosecond pulsed Titanium/sapphire laser at 780 nm wavelength was used to excite the cellular tissue. SHG signals were collected at 390 (+/-35) nm and autofluorescence registered at 380-530 nm. Tissues were labeled and correlated with H&E images at final histopathology.

Results: High-resolution MPM images of the prostatic capsule, periprosthetic vessels and neural scaffold, underlying acini and the individual cells were documented in both rat and human prostatectomy specimens. Histopathologic confirmation with H&E for harvested tissue were closely congruent with obtained MPM images.

Conclusions: MPM with SHG delivers superior real-time high-resolution bioimages. Integration of this technology with laparoscopic/robotic platforms during nerve-sparing radical prostatectomy will provide surgeons with augmented real-time visualisation of vital structures and their unique cellular autofluorescent signatures, for optimizing potency and cancer clearance outcomes.

YIA – QHSR 05

Interpreting In-hospital Mortality among Older Hospitalised Persons: Do We Need to Adjust for Physical Function and Social Support?

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Background/Hypothesis: In-hospital mortality is an important performance measure for quality improvement. To ensure equitable comparison across healthcare providers, proper risk adjustment is necessary. This study aims to test whether functional status and social support are important predictors of in-hospital mortality for older patients.

Methods: Patients (aged 65 and older) admitted to the General Medicine department of an acute care hospital between April and October 2008 were studied. Data entered into the baseline in-hospital mortality risk model included patient demographics, primary and comorbid diagnoses, and admission to intensive care or high dependency units. Physical function and social support indicators collected during a prospective survey were added independently. Multivariate logistic regression analysis was performed. C-statistics were calculated to evaluate model performances.

Results: A total of 1402 patients were studied. In-hospital mortality rate was 6.0%. Significant risk-adjustors in the baseline model included age, primary diagnoses (acute myocardial infarction, pneumonia, sepsis and renal failure) and the Charlson Comorbidity scores. Compared to fully independent patients, patients who required moderate assistance (OR, 2.6; 95% CI, 1.3-5.3) and those who were totally dependent were at greater risk of in-hospital mortality (OR, 9.0; 95% CI, 4.5-17.9). C-statistics were 0.772 for the baseline model and 0.832 for the model that included functional status. A 10-fold cross validation showed stable results (C-statistic 0.815). Social support variables such as marital status, nursing home residency and co-residence with family caregivers were not significant.

Conclusion: The inclusion of physical functional status at admission substantively improves the prediction of in-hospital mortality for older patients.

YIA – QHSR 06

Outpatient Medication Reconciliation: A Study to Assess its Impact and Benefits

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Background: Medication reconciliation (MR) at every transition of care has helped reduce medication errors. In Singapore, MR involves both reconciling medication information and physically sorting patient's medication. At Alexandra Hospital (AH), MR was implemented in the inpatient setting but not at the outpatient pharmacy. The objectives of MR were to implement outpatient medication reconciliation (OMR) and to determine the financial and safety impact of OMR and which patient group benefited most from OMR.

Methods: Pre-OMR survey was done to determine patients' awareness of OMR and ways to remind them to bring medications from home for OMR. Brochures and posters were used to publicise OMR and a work process was set up to facilitate OMR. The number of physical OMR for patients from the medical, geriatric, orthopedic and

surgical disciplines, cost savings from sorting home medications and number of medication-related interventions made with doctors were monitored to determine the impact of OMR (August to December 2008). Post-OMR survey was done to determine patients' satisfaction and willingness to pay for OMR service.

Results: Pre-OMR survey (N = 100) showed 98% were unaware of OMR and most preferred reminder via handphone messaging (28%). The number of OMR increased with publicity over time, with medical and geriatric patients requiring most OMR. Direct cost savings from OMR was \$13,699 over 5 months or \$18.39 per patient per month, but the indirect costs of preventing harm associated with medication confusion (averted through OMR sorting of patient's medications) was not calculated. There was no significant reduction in the medication-related interventions made with doctors. Post-OMR survey showed more than half the patients (N = 55) were very satisfied with OMR and 45% wanted the service for free.

Discussion & Conclusion: OMR has been implemented in AH, benefiting the medical and geriatric patients most. It has resulted in \$18.39 direct cost savings per patient per month. Most patients were satisfied with OMR service.

YIA – QHSR 07

Prevention of Medication Errors in Tan Tock Seng Outpatient Pharmacy

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Background: In spite of the efforts to reduce medication errors in Tan Tock Seng Hospital (TTSH), there are still reports of near misses and actual medication errors. One likely attribute is human factor. The primary objective of this study is to reduce medication errors as a result of performance lapses through the education of staff. A secondary objective is to observe for vulnerable areas of the workflow which may contribute to medication errors and to propose recommendations to rectify the problems.

Methods: A prospective study was conducted in TTSH Outpatient Pharmacy between July 2008 and January 2009. During the course of which, analysis of past medication error reports, conduction of continual educations (CEs), pre- and post CE surveys and monthly bin checks were carried out.

Results: Typing and packing were the two most common contributing factors to medication errors as shown in the pre-CE survey. Post-CE survey showed that more than 50% of the respondents felt there were some improvements in medication errors. In addition, analysis of the monthly error reports illustrated a steady decrease in the number of dispensed medication errors after the implementation of CEs in August 2008.

Discussion & Conclusion: Factors contributing to medication errors include high turnover rate of staff, large volume of sorting and returning of medication, topping up of bins with wrong drug, complacency, noisy environment and miscommunication with patients. Medication errors due to human performance lapses are not totally avoidable. However, this study has shown that the incidence can be reduced through CEs. Other recommendations were also proposed.

BO – AH 04

Effects of Two Taping Techniques on Scapular Rotator Muscles Activity in Individuals with Suspected Subacromial Impingement

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Background/Hypothesis: Shoulder taping is commonly applied to improve proprioception and to realign muscle activation patterns when shoulder instability or impingement is present. It has been reported that taping the upper trapezius will lengthen it and inhibit its activity while taping of the shortened lower trapezius will facilitate the muscles. This study examined the effects of these two taping techniques, the Upper Trapezius taping (UT) and the Upper-Lower Trapezius taping (ULT) on the muscle activities of scapular rotators among subjects with suspected subacromial impingement.

Methods: The surface electromyography (EMG) recorded the muscle activity of the upper trapezius, middle trapezius, lower trapezius and serratus anterior of 5 subjects with suspected shoulder impingement as they performed scapular plane abduction. Readings were taken in the 3 randomised conditions: no-tape, UT taping and ULT taping.

Results: There was a significant decrease in upper trapezius muscle activity compared with no tape when both UT taping ($z = -2.613$, $P = 0.009$) and ULT taping ($z = -2.642$, $P = 0.008$) were applied. ULT taping also significantly decreased the activity of middle trapezius compared with no taping ($z = -2.045$, $P = 0.041$). There was no significant change in middle and lower trapezius, and serratus anterior muscle activities with UT taping. ULT taping did not change the activity patterns of the lower trapezius or serratus anterior muscle activities.

Discussion & Conclusion: The results confirm that taping does inhibit the overactive upper trapezius and middle trapezius. UT and ULT taping may be used in conjunction with scapular muscle training to strengthening weak muscles and improve overall scapular kinematics.

BO – AH 05

Association Between Functional and Laboratory Test to Determine Dynamic Postural Ankle Instability

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Background & Aim: Seventy percent of those who have previously sustained an ankle sprain experience recurrent bouts of postural ankle instability and sprains commonly known as Chronic Ankle Instability (CAI). Functional tests performed to quantify these deficits for treatment purposes lack sensitivity against laboratory tests such as the Dynamic Postural Stability Index (DPSI) and Pro-balance. The purpose of this study was to evaluate the association between various functional tests with DPSI and Pro-balance results.

Methods: Subjects with unilateral CAI and healthy matched controls underwent a randomised order of DPSI, Pro-balance and 4 functional tests; the modified Star Excursion Balance Test (SEBT), figure-of-eight hop, crossover hop and lateral hop.

Results: Significant differences ($P < 0.05$) were found for DPSI, SEBT (posterior-medial component) and figure-of-eight hop for comparisons between and within subjects groups. A significant difference was also found for lateral hop when compared within subjects. Only

the figure-of-eight hop demonstrated a significant association ($P < 0.05$) with DPSI, with a sensitivity of 50-56% and specificity of 0%.

Conclusion: The figure-of-8 hop is a sensitive test to identify dynamic postural ankle instability. Further research with larger sample sizes needs to be done to investigate the cut-off values of these tests.

BO – AH 06

Modified Hold-Relax Proprioceptive Neuromuscular Facilitation Stretching on Hamstring Flexibility

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Background: Research suggests proprioceptive neuromuscular facilitation (PNF) stretch techniques are one of the most effective methods for increasing joint range of movement (ROM). However, there is limited knowledge on the duration of improved ROM with such stretching. The aim of this study was to investigate the duration of modified hamstring flexibility following a one-time hold-relax PNF stretching session whilst undergoing a period of comfortable exercise.

Method: The study followed an experimental, randomised cross-over trial with repeated-measures design. Fifteen subjects (11 females, 4 male) completed a 5-minute active warm up on a treadmill, following which the experimental group received a session of 5 modified hold-relax PNF stretches. Both the control group, whereby no stretching occurred, and the experimental group then returned to the treadmill for a further 20 minutes. Hamstring muscle length was tested at 2-minute intervals by the active knee extension test during this period.

Results: Carrying out a one-time hold-relax PNF stretching session, which is followed by continued activity significantly increases hamstring muscle length for 12 minutes ($P = 0.01$). Knee joint ROM significantly increased by an average of 3° across the whole sample following the five minute warm up period ($P \leq 0.001$), and further increased by 8° immediately post stretch ($P \leq 0.001$).

Conclusions: Hamstring muscle flexibility significantly increases following the cessation of a sequence of 5 modified hold-relax PNF stretches, and was maintained for 12 minutes when followed by continued activity. This would contribute towards designing warm up protocols and institution of stretches during physical activities to maximise the effects of the increase in joint ROM.

BO – AH 07

Prevalence of Silent Aspiration in Dysphagic Patients: Implications for Management in the Acute Healthcare Setting

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Background/Hypothesis: Aspiration is a serious symptom of dysphagia with potentially dire health consequences. Silent aspiration has also been described in many patient groups, with a prevalence of 25% to 30% in acute healthcare settings. This study aimed to investigate the prevalence of silent aspiration in dysphagic patients who were selected by clinicians to undergo Videofluoroscopic swallowing examination (VFS) to further examine the nature of their patients' swallowing problems.

Methods: Dysphagic patients who underwent VFS over a 6-month period were considered ($n = 97$). The presence of silent and non-silent aspiration were examined against medical diagnostic groups

of stroke/traumatic brain injury (TBI), Parkinson's disease (PD), dementia, and nasopharyngeal cancer (NPC). Patients with pneumonia were considered separately irrespective of other medical history.

Results: Aspiration was detected in 64% of the patients ($n = 62$), of which 74% was silent ($n = 46$). Within the medical diagnostic groups, the prevalence of silent aspiration was highest in patients with stroke/TBI (41%) and pneumonia (71%).

Discussion & Conclusion: The findings suggest that dysphagic patients referred for VFS have a high likelihood of aspiration. The prevalence of silent aspiration in patients with stroke/TBI or pneumonia was also much higher than that reported of patients in acute care. This suggests that dysphagic patients with stroke/TBI or pneumonia have a relatively higher chance of developing pulmonary complications, despite no clinical signs of aspiration. Silent aspiration can be difficult to identify using standard bedside examinations and clinicians should routinely refer high risk patients for swallowing examinations, and to proceed with instrumental examinations to make better clinical decisions. The accurate identification of high risk patients may help to contain escalating healthcare costs.

BO – AH 08

Parenteral Nutrition Support Team – A 6-month Service Evaluation

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Background/Hypothesis: The Parenteral Nutrition Support (PaNS) team is a multidisciplinary service that manages patients receiving parenteral nutrition (PN). PN is an expensive nutrition therapy requiring appropriate prescription and monitoring to maximise benefit and minimise complications. We evaluated the service 6 months after the team was started in April 2008.

Methods: This retrospective study compared data on PN 3 months before (pre group) and 6 months after (post group) PaNS team service commenced. Epidemiology data, clinical outcome, nutritional status, PN administration and biochemistry monitoring were analysed statistically.

Results: Both groups (pre: 25 subjects, post: 77 subjects) had similar epidemiology data and nutritional status. Duration of PN, length of stay and incidence of line sepsis were not statistically different. Mortality of post group was 18% lower but not statistically significant. Both groups met an average 86% of the estimated energy requirement. Forty percent of pre group met less than 80% of the estimated protein requirement (EPR) whilst 88% of post group achieved above 80% EPR ($P < 0.01$). There was significant improvement in biochemistry monitoring in post group ($P < 0.01$). The PaNS team also managed to correct most electrolyte abnormalities. (pre vs. post: calcium 8% vs. 76%, magnesium 4% vs. 90%, potassium 24% vs. 86%, phosphate 24% vs. 85%, all with $P < 0.01$). Refeeding syndrome was prevented (pre: 40%, post: 7%, $P < 0.01$) and PN was better tailored off according to enteral nutrition tolerance (pre: 28%, post 68%, $P < 0.01$) via PaNS team management.

Discussion & Conclusion: The PaNS team demonstrated effectiveness in achieving nutritional adequacy and preventing metabolic complications of patients receiving PN in hospital.

BO – AH 09

The Effect of Myofascial Release on Hamstring Length

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Background/Hypothesis: Hamstring length may have implications for posture, low back pain and injury. Despite inadequacies in current techniques for increasing hamstring length and preventing injury, there has been little further research into the alternatives. Myofascial release has been identified as an alternative. A number of theories have been proposed to explain its workings but there is a lack of empirical evidence to support these ideas. Therefore the study hypothesised that a myofascial release to the hamstrings of healthy subjects will significantly alter the hamstring length of these subjects.

Methods: Twelve healthy volunteers, 18 to 35 years old, were recruited. The study utilised a randomised control cross-over design with a 24-hour wash out period in between. The intervention was a myofascial release performed in prone to the medial and lateral portions of the hamstrings for 90 seconds on each. The control consisted of 5 minutes rest in supine. The active knee extension test was used to produce the popliteal angle both pre and post intervention and control.

Results: Analysis of results revealed significant ($P = 0.00$) increase of popliteal angle (mean 22°) following myofascial release. The difference between the control and intervention cohorts was also significant ($P = 0.02$).

Conclusion: Myofascial release had a significant effect on increasing hamstring length. Additional research is now needed to further validate these findings with larger and more varied cohorts. Clinically, myofascial release may affect tissue length and therefore could have an effect on reducing pain, injury and recurrence of injury.

BO – AH 10

Raman Spectroscopy for Early Diagnosis and Typing of Gastric Adenocarcinoma

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Aim: Raman spectroscopy is a vibrational spectroscopic technique capable of probing molecular changes associated with malignancy transformation. The aim of this study was to evaluate the feasibility of applying near-infrared (NIR) Raman spectroscopy for the early diagnosis and typing of intestinal and diffuse adenocarcinoma gastric tissues.

Methods: A total of 100 gastric tissue samples were collected from 62 patients who underwent endoscopy investigation or gastrectomy operation for this study. A rapid-acquisition dispersive-type NIR Raman system was utilised for tissue Raman measurements at 785 nm laser excitation. The histopathological examinations showed that 70 tissue specimens were normal, 30 were cancerous (18 intestinal-type adenocarcinoma; 12 diffuse-type adenocarcinoma). Multivariate statistical techniques, including principal components analysis (PCA) and multinomial logistic regression (MNL), together with the leave-one sample-out cross-validation method, were employed to develop effective diagnostic algorithms for tissue classification.

Results: High-quality Raman spectra ranging from 800-1800 cm^{-1} can be acquired from gastric tissue within 5 seconds. Significant

spectral differences in Raman spectra are observed between normal and gastric adenocarcinoma, and also between the intestinal and diffuse adenocarcinoma subtypes, particularly in the spectral ranges of 850-1150 cm⁻¹, 1200-1500 cm⁻¹, and 1600-1750 cm⁻¹, which contain signals related to proteins, nucleic acids, and lipids. PCA-MNLR classifications of tissue Raman spectra achieve diagnostic accuracies of 88%, 92.0% and 94.0%, respectively, for classification of normal, intestinal-type, and diffuse-type adenocarcinoma gastric tissues.

Conclusion: This work demonstrates the diagnostic potential of NIR Raman spectroscopy to detect malignant tumours and also identify the subtypes of adenocarcinoma gastric tissues at the molecular level.

BO – AH 11

Cardiovascular Risk Reduction with a Home-Delivered Portion-controlled Meal Plan

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Background/Hypothesis: Although diet is the cornerstone of managing cardiovascular disease, intervention studies amongst free-living individuals have reported poor outcomes to diet therapy. It is hypothesised that home-delivered meals (to replace self-selected diets) can improve cardiovascular risk factors. This study assessed the outcomes of a 12-week home-delivered meal programme among subjects at higher risk of Coronary Heart Disease (CHD), using meals that meet nutritional principles advocated by Singapore Heart Foundation and Health Promotion Board.

Methods: This non-randomised cross-over trial recruited 32 subjects between 25 to 70 years, with Body Mass Index (BMI) of 25 to 42, hypertension, dyslipidaemia or/and non insulin-dependent diabetes mellitus (NIDDM). The dietary intervention comprised of 3 meals and 3 mid-meal snacks a day that are portion-controlled and home-delivered. The meals provided the optimum level of nutrients recommended for cardiovascular risk reduction. A 1-week baseline preceded the 12-week intervention. After Week 12, subjects resumed their self-selected diet for another 12 weeks. Weight (kg), blood pressure (mmHg), lipid and glycated haemoglobin (HbA1c) were measured at Week 0, Week 12 and Week 24. Means and standard deviations were calculated for all data. Paired t-tests were used to compare means and chi square to compare proportions.

Results: Weight, blood pressure, triglycerides, LDL cholesterol, and HbA1c reduced significantly ($P < 0.05$) after 12 weeks of intervention. Mean differences (\pm standard deviation) between Week 0 (baseline) and Week 12 were -2.34 (± 1.04) for systolic blood pressure, -1.31 (± 1.01) for diastolic blood pressure, -0.36 (± 0.4) for triglycerides and -0.23 (± 0.10) for LDL cholesterol, and -0.28 (± 0.16) for HbA1c. Weight loss between baseline and Week 12 was -4.33 (± 0.65) kg. After returning to self-selected meals, there were non-significant ($P > 0.05$) changes in weight, blood pressure, lipid, and HbA1c from Week 12 to Week 24.

Discussion & Conclusion: The home-delivered, portion-controlled meal plan produced improvements in weight loss, lipids, blood pressure, and HbA1c. Although never before done in Singapore, this home-delivered meal programme of heart-healthy foods can be useful and practical for patients at high risk of cardiovascular disease, particularly with history of noncompliance to self-selected diets.

BO – AH 12

Preliminary Study of Nutritional Intake and Anthropometric Data of Children and Adolescents with Attention Deficit Hyperactivity Disorder in Singapore

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Background: Attention deficit and hyperactivity disorder (ADHD) is characterised by a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than typically observed in children at a comparable level of development. Low levels of long-chain polyunsaturated fatty acids, specifically omega-3 fatty acids in blood measures, have been linked to several behavioural and mood disorders including ADHD. This study therefore examined the nutritional intake and anthropometric data of a group of children with ADHD in Singapore.

Methods: A preliminary study involving 13 participants with ADHD aged 9-16 years was conducted. A seven-day food diary was completed by participants in order to examine their typical daily intake of nutrients and fatty acids. Intake of nutrients and fatty acids was compared with Singaporean and Australian dietary recommendations respectively. A daily average nutritional analysis was performed using Foodworks 2005. Anthropometric data was also recorded and compared with the national height/weight chart from the Singapore School Health Service.

Results: In the study, 46% (6) of participants were below the healthy weight range, 31% (4) were above the healthy weight range, and 23% (3) were within the healthy weight range. 77% (10) children had nutritional intake below dietary recommendations. 77% of the participants did not meet the Australian recommendations of adequate intake (AI) of fatty acids.

Conclusion: The preliminary findings of this study might suggest an association between local children diagnosed with ADHD and low nutritional intake, particularly essential fatty acids. These findings build on existing empirical data positing a link between essential fatty acids and certain mood and behavioural disorders.

BO – AH 13

Establishment of Gender Match Norms for P300 Auditory Evoked Potentials

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Background/Hypothesis: The P300 is a far field electrophysiological recording of the electrical activity of the cortex in response to a novel auditory stimulus. Current methods of auditory processing evaluations still rely on linguistically dependent behavioural tests. The investigation of the use of P300 could be of value as it offers the possibility of an objective identification of disorders in cognitive functioning and auditory processing. Its application, however, is limited by the inherent variability of the response. Some studies also report gender differences due to variations in the processing strategies between males and females. The aim of this study is to investigate the influences of gender on the P300 response and establish a clinic specific normative database.

Methods: Forty subjects with normal hearing, no history of psychiatric illness and who passed auditory processing disorder (APD) screening tests were evaluated using the "oddball" paradigm. The

averages and standard deviations of the latency of the P300 waveform were then obtained.

Results: The average P300 latency was calculated to be 319.4 ms with a standard deviation of 42.6 ms. No significant gender effects were found.

Discussion & Conclusion: While taking into account the differences in test protocols, the results obtained in this study are consistent with other extensive research found in the literature. These differences also validate the need to obtain clinic specific data. The results from this study can be used to further explore the relationship between P300 latencies and other known APD behavioural test results.

BO – AH 14

An Evaluation of the Anatomical Basis of a Clinical Test for Superior Labrum Anterior to Posterior (SLAP) Lesion

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Background/Hypothesis: The Resisted Supination External Rotation (RSER) test detects SLAP lesions by placing maximal tension on the tendon of biceps long head in order to stress the unstable bicipital labral complex. The aim of this study was to evaluate the anatomical basis of the RSER test in shoulders with a suspected SLAP lesion.

Methods: Eight patients with a suspected SLAP lesion and eight gender and age-matched controls were recruited. Electromyographic (EMG) activity levels of biceps long head and short head, brachialis, supinator, middle deltoid, subscapularis and infraspinatus were detected using surface and intramuscular electrodes to provide an indication of active tension. The RSER test is conducted in supine with a starting position of 90° shoulder abduction, 70° elbow flexion and forearm mid-prone. The participant supinates his forearm against an examiner's resistance maximally and moved passively into full shoulder external rotation. Mean EMG activity were normalised to the maximal voluntary contractions (MVC) and compared between patient and control groups.

Results: Biceps long head activity was moderately strong to marked (40-64%MVC). Biceps short head and supinator muscles were also moderately strongly active, while all other muscles demonstrated lower levels of activity. There was no significant difference between patients and controls in activity for biceps long head ($P = 0.74$) or any of the surrounding muscles.

Discussion & Conclusion: These results provide evidence of the anatomical validity of the RSER test in a clinically relevant population. However, further studies are needed to confirm the diagnostic accuracy of the test.

BO – AH 15

The Khoo Teck Puat Hospital (KTPH) Approach for the Detection of Beta-Lactamases in Enterobacteriaceae

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Background: Alexandra Hospital (AH) is a 365-bed acute general hospital that is soon to be renamed KTPH. Beta-lactamases are increasingly found in *Enterobacteriaceae* resulting in severe treat-

ment limitation. Also, emerging metallo-beta-lactamase (M β L) which mediates resistance to carbapenem may not be detected using conventional methods and warrants evaluation and application of recommendations suggested by other investigators.

Aims: The types of beta-lactamases in *Enterobacteriaceae* are determined to capture the trends of resistance mechanisms and to detect carbapenem resistance, if present. **Methods:** The Otago Diagnostic Laboratories Method (Han CT *et al*, Pathology 2005) is merged with the double-disc synergy and combination disc tests (Galani I *et al*, J Antimicro Chemother 2008). More than 100 non-duplicate patient isolates are tested alongside known positive and negative controls for M β L that is proven by PCR for the *bla*_{IMP} gene. The modified Hodge Test is also added to rule out KPC which is another carbapenemase. **Results:** There is no M β L or KPC detected. Beta-lactamases that are found are SHV/TEM, CTX-M, derepressed AmpC, inducible AmpC and isolates with derepressed AmpC plus SHV/TEM / or CTX-M.

Conclusion: The KTPH Approach is successfully applied routinely at AH for all *Enterobacteriaceae*. The multitude of enzymes per resistance mechanism makes molecular approach impossible for detection from the routine laboratory point of view and reliance on the functional expression of these enzymes is preferred which is demonstrated in this study.

BO – AH 16

Caregiver Self-coping and Management Strategies Affect Outcomes in Dementia Caregiving

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Background/Objective: The negative effects of dementia caregiving have been the focus of caregiver research and intervention. Although relatively less is spoken about positive outcomes that emerge from caregiving, it is a real phenomenon as borne out by ground experience and published literature. This study examines factors that impact negative and positive outcomes in dementia caregiving.

Methods: One hundred and seven family caregivers of persons with dementia (PWD) attending a tertiary hospital geriatric outpatient clinic completed a custom-designed questionnaire that captured the following information in the caregiver: bio-demographic data, caregiving duration, dementia care strategies, caregiver self-coping strategies, religiosity and spirituality, negative (burden) and positive (gain) appraisals. Information on illness characteristics (dementia severity and behavioural disturbance) in the PWD was also obtained. Bivariate and subsequent multivariate analyses were performed to identify the variables most associated with the experience of caregiver burden and gain.

Results: Hierarchical multiple regressions revealed that behavioural disturbance and dementia severity, use of self distraction and behavioural disengagement in caregiver self-coping, and employing criticism as a care strategy were significant predictors of negative appraisals in caregivers accounting for 51% of variance in burden. The primary significant predictor of caregiving gain was use of encouragement as a care strategy, explaining 18% of the variance. Religiosity and spirituality predicted gain indirectly through "encouragement".

Conclusion: Care strategies and coping responses adopted by caregivers have independent effects on caregiving outcomes beyond

patient illness characteristics and situational factors. These findings point to the need for interventions that teach caregivers appropriate self-coping and management strategies in dementia care.

BO – AH 17

Music Therapy as a Non-pharmacological Adjunct to Pain Treatment in an Acute Hospital in Singapore

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Background: Music therapy, the evidence-based use of music interventions within a therapeutic relationship, has been shown to be a helpful adjunct in the management of pain in overseas centres. We report our local experience in this retrospective analysis of music therapy for patients referred for pain in an acute hospital in Singapore.

Methods: Over one year, patients with persistent pain while on optimal standard medical treatment were referred for music therapy. Music therapy interventions were individualised to the patient's physical and mental condition, energy level, mood, prior music experiences and cultural background. Assessments of pain before and after treatment were completed with tools appropriate to patient's ability.

Results: Of the 44 patients (M = 17, F = 27; aged 26-92 years) referred for music therapy, 37 accepted participation, five declined and two were asleep. The primary diagnoses for 24 (51%) of the patients were cancers, 5 (11%) had musculoskeletal conditions, and 6 (13%) were patients with advanced organ failures. All 37 (100%) patients in this study appeared to show positive improvement after one session: Twenty-five (53%) patients verbally reported relief, 5 (11%) patients completed the body coloring tool depicting pain relief, and 7 (14%) reflected lowered scores on the Doloplus-2 scale. Music therapy was also well received by caregivers where present.

Discussion and Conclusion: The encouraging results suggest music therapy to be promising as an allied health adjunct to standard medical treatment for pain in the local context. Further studies are awaited to further evaluate the generalizability of the results and the cost-effectiveness of this new therapy.

BO – AH 18

Needs Assessment for an E-Nutrition Portal Targeted at Parents

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Background/Hypothesis: NHG Polyclinics (NHGP) plans to develop an electronic portal to improve the access to nutrition resources for parents of children. A survey was conducted to seek their interest and suggestions for this e-Nutrition portal.

Methods: A survey questionnaire was developed by a student dietitian on community placement with NHGP. The questionnaire was pre-tested by NHGP dietitians. The target group were parents of infants and children who attended the child development and immunisation clinics at Jurong Polyclinic. One hundred parents were approached to participate in the survey. The study was conducted over 2 weeks in August 2008 and results were analysed using Microsoft Excel program.

Results: Eighty parents agreed to participate in the survey. Seventy-seven (96%) were computer literate while 73 (91%) had access to the internet. The parents were between 17-40 years old. Six (7.5%) had primary & ITE education, 36 (45%) had 'N' & 'O' levels and

38 (47.5%) had either 'A' levels, diploma or degree qualifications. All the parents who had internet access (91%), were interested to use the e-Nutrition portal. The survey also revealed that parents wanted the e-portal to include information on common childhood illnesses (16%) and child development (5%).

Discussion & Conclusion: The majority of parents who participated in the survey were computer literate and interested to use an e-Nutrition portal. Parents also wanted the e-portal to include basic medical information on childhood health and development. The e-Nutrition portal could package relevant nutritional and health information for parents to care for their children's nutritional and health needs.

BO – AH 19

An Evaluation of a Structured Psychoeducation Programme for Case-managed Patients

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Background: Medication compliance, regular follow-up treatment and good emotional support are important factors for psychiatric patients to maintain their stable mental states. The case manager (CM) at an outpatient clinic can provide structured psychoeducation programme to patients who lack these factors. This paper evaluates the outcomes of such a programme.

Methods: A psychoeducation manual was designed by the CM and the consultant psychiatrist. Other members of the clinic multidisciplinary team were also informed of the programme. All patients who fulfilled the criteria were referred. Psychoeducation was conducted in English, Mandarin, Malay and dialects. The topics discussed were based on the problem identified. Each individual session lasted 30 minutes. A pre- and post- survey was also conducted for English speaking patients to monitor their level of psychoeducation knowledge. Clinical outcomes, readmission and default rates were monitored. Data mining was done and results analysed using Microsoft Excel program.

Results: From February 2008 to April 2009, 214 patients were referred. 50.5% were males and 49.5% females. 87% were Chinese, 7% Malay, 4.2% Indian and 1.8% others. The main diagnosis was schizophrenia. 432 sessions (216 hours) of psychoeducation and counselling were conducted. There was a reduction of readmission rate (46%) and default rate (9%). There was also an improvement in knowledge level of psychoeducation in 21 patients (before 66%, after 92%).

Conclusion: CM will continue to promote this programme as the increased psychoeducation knowledge and the reduction in both readmissions and default rates indicated the success and need of such a programme.

BO – AH 20

Existential Concerns in Isolation during Initial Outbreak of H1N1 Influenza

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Background: No known attempt was made to study existential concerns of healthcare professionals isolated during the outbreak of infectious diseases. This paper highlights existential challenges

of the first author when he was isolated during the initial outbreak of the H1N1 influenza and suggests strategies to support healthcare professionals isolated during a pandemic.

Methods: Four ultimate concerns, 1) Death, 2) Freedom, 3) Isolation and 4) Meaninglessness, developed by Irvin Yalom, a world-renowned scholar and practitioner in existential psychotherapy, were used as the guiding framework for analysis. Autoethnography, a research method that is used to analyse and interpret personal experiences within the broader sociocultural context, was adopted as the research strategy for this paper.

Results: During isolation, death anxiety often co-existed with hope for life. Freedom to roam in the community was constantly weighed with adherence to rules and regulations. Pleasure of solitude was often mixed with the joy of maintaining connection with loved ones over the phone. A lack of meaning and constant search for meaningful activities was dominant.

Discussion & Conclusion: Healthcare professionals isolated during the outbreak of an infectious disease would benefit from attempts to 1) address their death anxiety while reinforcing hope for life, 2) appreciate them for risking their freedom to stick to rules and regulations, 3) encourage them to maintain connection with loved ones and 4) help them engage in meaningful activities in the isolation ward. These strategies would enhance occupational health among healthcare professionals and prevent premature resignations that would worsen the existing acute shortage of healthcare professionals.

BO – AH 21

A Demographic Profile and Analysis of Outcomes in a Cohort of Case-managed Female Dementia Patients

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Background/Hypothesis: The 38-bed acute psychogeriatric female ward in IMH caters to the psychiatric needs of elderly patients. The case manager (CM) on the ward, a member of the multidisciplinary team (MDT), ensures the continuity and coordination of care for these patients on admission and upon discharge. This paper analyses the demographic profile and outcomes of dementia patients for service improvement.

Methods: Data mining of patients admitted to the ward from April 2008 to March 2009 was done and results analysed using Microsoft Excel program.

Results: 259 patients were assessed and 251 accepted for case management. Fifty-three of these patients (20%) were diagnosed with dementia. The majority of patients were Chinese (83%) and 72% were widowed. Seventy-nine percent were first admissions, 11% were second, 8% third and 2% fourth admissions. An overwhelming 96% were found to have behavioural and psychological symptoms of dementia as the main reason for admission. However other contributing factors included caregiver stress (52%), social issues (4%), physical causes (4%), respite care (4%) and some were admitted for cognitive assessment (11%). Average length of stay was 26.3 days. Twenty-two were discharged to nursing homes, 19 patients discharged home, 10 to their relatives' home and one to the long stay ward. One patient died of physical illness. With the input of the MDT and CM interventions, which included psychoeducation, telephonic case management and nursing home visits upon discharge, only one unplanned readmission was recorded.

Discussion & Conclusion: CMs play a significant role in the MDT in providing the coordination and continuity of care for elderly patients.

BO – AH 22

The Influence of Self-efficacy on Levels of Physical Activity in Physiotherapy Students

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Background: Physical activity plays an important role in maintaining good health. Studies have shown that during a transitional phase from college to university, confidence to exercise usually declines. This cross-sectional survey study was designed to determine the influence of self-efficacy on levels of physical activity in physiotherapy students.

Methods: Ninety-seven full-time physiotherapy students aged 18 to 29 years from Curtin University of Technology participated in this study. The survey consisted of three validated questionnaires; short version of the International Physical Activity Questionnaire (IPAQ), Confidence to Exercise Scale (CTE) and the Exercise over Time Scale (EOT).

Results: Data was analysed using SPSS®Base11.0 for Windows®. About 14%, 28% and 58% of subjects participated in low, moderate and high levels of physical activity respectively. There was a significant difference in CTE scores ($F(2,94) = 4.249, P = 0.017$) with post-hoc tests indicating that self-efficacy was lower in low levels of activity as compared to high levels ($P = 0.040$). CTE scores were similar for moderate and high levels of activity ($P = 0.091$) and for low and moderate levels of activity ($P = 0.743$). There was a significant difference between the EOT score and the IPAQ category [$F(2,94) = 18.587, P < 0.001$]. Post-hoc tests showed a significant difference between the low and high IPAQ category ($P < 0.001$) and the moderate and high IPAQ category ($P < 0.001$). There was no significant difference between the low and moderate IPAQ category ($P = 0.161$). There was a moderate correlation between the CTE and EOT scores ($r_s = 0.539; P < 0.001$).

Conclusion: Higher levels of self-efficacy relate to higher levels of physical activity in physiotherapy students. Self-efficacy and confidence are important aspects to consider when planning an effective rehabilitation programme.

BO – AH 23

A Case of Bacteremia Caused by an Uncommon Vancomycin-resistant *Enterococcus gallinarum* from Alexandra Hospital (AH)

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Background: Over the past 5 years, vancomycin-resistant *Enterococcus gallinarum* bacteremias are increasingly reported and the sources are: USA, Argentina, Korea, Brazil, Japan, Columbia and Italy. This represents a major change from previously when it was just regarded as a mere intestinal colonisation and of less clinical significance compared to *E. faecalis* and *E. faecium*.

Discussion: An 86-year-old woman was admitted to AH on 1 June 2009 with fever and loss of appetite. She had rheumatoid arthritis treated with prednisolone and sulfasalazine since 2002 and had 6 previous admissions for recurrent urinary tract infections due to ESBL-producing *Klebsiella* spp. Recent ultrasound of the hepatobiliary tree demonstrated multiple gall stones. Blood culture on admission yielded enterococcus which was pigmented, motile and API identification was presumptively *E. gallinarum*. Vancomycin MIC was at 6 mg/L. This transient bacteremia may have arisen from

the hepatobiliary tract and treatment was not required.

Conclusion: Three of the above studies concur with AH's finding of biliary sepsis. Other associations were prior treatment with corticosteroids, neutropenia, haematologic malignancy, longer duration of hospital stay, prior vancomycin therapy and invasive procedures. Another concern from these reports is that besides the known intrinsic VanC resistance, *E. gallinarum* has also acquired high-level resistance through VanA genes. Like the commonly known enterococci, *E. gallinarum* posed therapeutic challenges and stringent infection control measures are required. The routine clinical laboratory has to review such uncommon enterococci with more care as they may be clinically significant.

BO – AH 24

A Review of Clinical Outcomes in Case-managed Patients from Acute to Outpatient Setting

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Background: This paper describes the clinical outcomes of patients case-managed in an acute psychiatric ward at Institute of Mental Health (IMH) and subsequently followed up at the outpatient clinic. The tools used for measurement included the Clinical Global Impression scale (CGI) and Global Assessment of Functioning scale (GAF). A psychiatrist from the research department provided training in the use of these scales.

Methods: Data mining of 103 clients managed in 2008 was conducted. The socio-demographic profile of patients, admissions before and after case-management, length of hospital stay, CGI and GAF scores were captured into a database. Data was analysed using Microsoft Excel program.

Results: Patients were aged between 23 and 61 years (mean: 42 years). Thirty-two percent were single, 60% married and 8% widowed/divorced. The majority (61%) had schizophrenia. Length of stay ranged from 2 to 182 days with an average length of stay (ALOS) of 26.7 days. Only 16 patients (15.5%) were readmitted within 3 months of discharge and their ALOS reduced to 12.8 days. On admission, 89.4% of patients scored 3-6 on the CGI scale. This improved to 2-4 for 93.2% upon discharge and 100% at 3 months. Patients also improved on the GAF scale with 78.6% scoring 30-50 on admission and 80.5%, 70-80 upon discharge.

Conclusion: Patients showed improvement in the CGI and GAF scores from their admission to their discharge and subsequently at their third month of outpatient follow-up. Case management services had significant impact on clinical improvements and reduced readmissions. Assessment tools are useful for case managers to monitor patients' improvement.

BO – BS 04

Impact of Laminin on Airway Smooth Muscle Cell Survival Signaling in Asthma

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Background: Increased mass of contractile phenotype airway smooth muscle (ASM) cells and fibrosis (resulting from increase in proteins like laminin) are two prominent changes observed in asthmatic airways. The mechanism behind the increase in mass of contractile ASM cells is still unclear. We hypothesise that capacity

for laminin-induced ASM contractile phenotype is linked with concomitant promotion of ASM cell survival.

Methods and Results: Under the same 7-day serum deprivation conditions, which we use to induce ASM contractile phenotype, we observe an increase in cell survival marker proteins (Akt and Bcl-2), and a reduction in pro-apoptotic proteins (caspase 3, caspase 9 and cleaved PARP); by western blotting analysis. Incubation of ASM cells with laminin-selective competing peptide, YIGSR, significantly reduces Bcl-2 protein, suggesting laminin is required for ASM cell survival. Moreover, addition of laminin enhances Bcl-2 protein abundance and reduces caspase 3 activity. siRNA knockdown of laminin-binding integrin $\alpha 7 \beta 1$ suppresses Bcl-2 protein and enhances caspase 3 activity, suggesting that binding of laminin to integrin $\alpha 7 \beta 1$ not only mediates ASM cells towards the contractile phenotype but also increases ASM cell survival, which can in part explain the increase in mass of contractile ASM cells. Importantly, compared with healthy controls, ASM cells from asthmatic airways express higher Bcl-2 protein abundance and lower caspase 3 and cleaved PARP protein abundance.

Conclusion: Targeting the laminin-integrin $\alpha 7 \beta 1$ signaling pathway may offer new avenues for the development of therapies that can reduce the increase in contractile phenotype ASM cells observed in patients with asthma.

BO – BS 05

Ocular Surface Disease And S100 Proteins

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Introduction: The calcium binding S100 proteins are found only in vertebrates and have intracellular and extracellular roles in the regulation of many diverse processes such as protein phosphorylation, cell growth and motility, cell-cycle regulation, transcription, differentiation and cell survival. Several of the members of this protein family are strongly associated with inflammatory diseases such as rheumatoid arthritis.

Methods: We have analysed the tears of patients with pterygium, and dry eye disease. Tears from patients with pterygium (n = 12, contralateral normal eyes as controls) were collected by glass capillary just prior to surgery and analysed by SELDI and proteins identified by nano-LC and tandem mass spectrometry. For pterygium tissue immunohistochemistry was carried out and compared with non-involved conjunctival tissue from normal eyes. Tear samples from patients with dry eye (n = 28) and controls (n = 20) were collected by Schirmer's strip. We have used a quantitative proteomic approach, iTRAQ coupled with 2D nanoLC-nanoESI-MS/MS to compare the relative changes of tear protein profiles from controls and patients with dry eye.

Results: The tears from the pterygium patients showed significant levels of S100 A8 and A9 compared to the contralateral eyes. Immunoprecipitates showed that S100 A6, A8 and A9 were upregulated in pterygium tissue compared to non-involved conjunctiva. The results from the dry eye study showed that S100 A4, A8, A9 and A11 were significantly upregulated in tears from patients with dry eye compared to normals.

Conclusions: These results suggest that S100 proteins have an important role in ocular surface inflammatory disease. Pharmacological control of these proinflammatory proteins would likely have significant benefits to modulate inflammation.

BO – BS 06

Injectable Cell Transplantation System for Cytokine-based Cancer Immunotherapy

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Background: Cancer therapy using systemic injection of anti-cancer cytokines shows significant toxic side-effects. We propose a system for targeted delivery of cytokines into tumour tissues, which provides high cytokine dose inside tumour tissues while limiting systemic dose. Cytokine-secreting immunocytes are encapsulated in hydrogel microspheres, suspended in carrier gel and injected into tumour tissues, where the solution gelifies, and the immunocytes release anti-tumour cytokines *in situ*. We sought to explore the feasibility of this concept using an *in vitro* model.

Methods: Murine macrophages were encapsulated in agarose microcapsules, activated with lipopolysaccharide (LPS), suspended in agarose solution, and moulded into constructs. The constructs were co-cultured with various target cells for 2-4 days. The target cells were subjected to viability (Live/Dead, WST-1) and apoptosis (Annexin-V) assays, and compared with cells not co-cultured with constructs (control). Subsequently viability assays were also performed on the macrophages; PCR and ELISA were used to measure their cytokines expressions.

Results: Two malignant cell lines (MCF-7 and HepG2) co-cultured with constructs underwent apoptosis and had significantly reduced viability compared to control ($P < 0.01$). Toxic effect to two normal cell lines, mesenchymal stem cells and fibroblasts, was minimal as showed by viability assays. Macrophages remained viable in microcapsules for at least a month, but did not proliferate. PCR array, quantitative PCR, and ELISA showed several anti-tumour cytokines (TNF- α , IFN- β 1, IL-10, and M-CSF) were significantly up-regulated (>13 folds) in microencapsulated, LPS-activated macrophages, compared to untreated macrophages.

Conclusion: Preliminary *in vitro* studies demonstrated this novel system effectively induced apoptosis in two malignant cells and had minimal toxicity to two normal cells lines, confirming the promise of the concept. The technology has a potential to be a platform for local, targeted delivery of tumouricidal cytokines into malignant tissues.

BO – BS 07

Small Interfering RNA Profiling of Host Factors Essential for Human Enterovirus 71 Infectious Entry into Cells

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Background/Hypothesis: Human Enterovirus 71 (HEV71) is most frequently presented as a childhood disease known as hand, foot and mouth disease (HFMD). Some HEV71 infected children could also develop neurological complications that could result in death. Currently, there is still no approved vaccine and anti-viral agents for HEV71 and little is known about the initial interaction of HEV71 with host cells. By understanding the entry pathway of HEV71, it will provide an important avenue for the identification of anti-viral agents and the development of anti-viral strategies against this medically important viral disease.

Methods: In this study, the infectious entry mechanism of HEV71 into human rhabdomyosarcoma (RD) cells was determined through high throughput siRNA library screening, drug inhibition assays and bio-imaging studies.

Results & Discussion: From the interesting results obtained from this study, it can be concluded that the infectious entry process of HEV71 into cells required the binding of HEV71 viral particles to the cell surface and subsequent entry via the clathrin-mediated endocytosis pathway. Furthermore, a number of endocytotic genes such as AP2A1, ARRB1, CLTC, CLTC1, SYNJ1, ARPC5, PAK1, ROCK1 and WASF1 are shown to be important for the infectious entry of HEV71 into cells. The results also suggested that low endosomal pH is required for the successful entry of HEV71 into host cells. These novel insights into the infectious entry mechanism of HEV71 into cells could provide us with important implications on the development of effective anti-viral strategies against this viral pathogen.

BO – BS 08

Upregulation and Growth-promoting Activities of C/EBPalpha in Hepatocellular Carcinomas

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Background: C/EBPalpha is a putative tumour suppressor in several different cancers. However its role in hepatocellular carcinoma (HCC) is yet unclear.

Methods: We analysed 53 pairs of HCC and matched adjacent non-tumour tissues by qRT-PCR and immunohistochemistry. We knocked down C/EBPalpha in HCC cell lines to determine its function.

Results: We found that both C/EBPalpha mRNA (*cebpa*) and protein were upregulated in a subset (about 55%) of human HCC compared to adjacent non-tumour tissues. The expression of C/EBPalpha in HCC cell lines recapitulated the pattern of expression in HCC, with Hep3B and Huh7 expressing high, PLC/PRF/5 intermediate, HepG2 and HCC-M low levels of C/EBPalpha. The difference in C/EBPalpha expression among the different cell lines may be explained by epigenetic regulatory mechanisms. The CEBPA upstream promoter was hypermethylated and hypomethylated in low- and high-expressing cells, respectively. Treatment of low-expressing cells with tumour-specific antigen (TSA) and 5-aza deoxycytidine increased *cebpa* expression while TSA treatment of high-expressing cells reduced *cebpa*. C/EBPalpha was functional in the high-expressing cells. The CEBPA gene in high-expressing cells was free of mutations and the cells showed high C/EBPalpha transcriptional activity. Knocking-down C/EBPalpha expression using specific siRNAs and shRNAs resulted in a reduction in colony formation and cell growth, associated with a decrease in cyclin A and CDK4 concentrations and E2F transcriptional activity.

Conclusion: The study shows that C/EBPalpha is upregulated in a subset of HCCs and has growth-promoting activities in HCC cells. Novel mechanisms involving C/EBPalpha may promote hepatocarcinogenesis and may be amenable to therapeutic interventions to improve treatment outcomes.

BO – BS 09

The Release of High Mobility Group Box 1 (HMGB1) Released from Dengue Virus Infected K562 Monocytic Cells: Its Possible Role in Mediating the Pathogenesis of Vascular Permeability

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Aim: HMGB1 is a cellular protein that is released from activated macrophages/monocytes. Being a late potent cytokine mediator, HMGB1 activates the release of proinflammatory cytokines from macrophages/monocytes, upregulates endothelial adhesion molecules and stimulates the breakdown of epithelial cell barrier. As Dengue Hemorrhagic Fever (DHF) or Dengue Shock Syndrome (DSS) is characterised by immune mediated manifestation of dengue virus (DV) infection, HMGB1 may play a role in the progression of DHF/DSS. Hence, in this study we examine the role of HMGB1 in the pathogenesis of DHF/DSS.

Methods: Monocytic cell line K562 infected with DV at a multiplicity of infection (MOI) 0.1 to 10. Immunofluorescence analysis was done to examine the release pattern of HMGB1 from K562. The amount of HMGB1 released from the infected K562 into the cell culture media was detected using Western blot. Mock infected K562 cells were used as a negative control.

Results: HMGB1 was observed to migrate from nuclei to cytoplasm upon DV infection. Western blot analysis showed that all four DV serotypes were able to induce the release of HMGB1 from cells into the cell culture media at a MOI independent manner. In addition, specific structural and non-structural viral proteins have been identified to be the important inducers for HMGB1 release from K562.

Conclusion: This novel study has identified specific viral proteins as an inducer of HMGB1 released from monocytes during DV infection. This allows us to further establish the connection between viral proteins, HMGB1 release and vascular leakage during in the pathogenesis of DHF/DSS. This will in turn enable us to identify potential therapeutic leads and better clinical management of patients suffering from DHF/DSS.

BO – BS 10

Increased SPARC Expression is Necessary for Wound Contraction

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Background/Hypothesis: To investigate SPARC (secreted protein acidic and rich in cysteine) expression in Tenons fibroblasts following stress induction using an *in vitro* collagen 3D stress model and its requirement in developing the myofibroblast phenotype.

Methods: Human Tenons fibroblasts were cultured in relaxed (control) and stressed 3D collagen I gels for 5 days. mRNA and protein expression for SPARC and alpha smooth muscle actin (ASMA) were determined for relaxed and stressed fibroblasts by RTPCR and western blotting respectively. Since SPARC signals through integrin- β 1, we also determined integrin- β 1 expression by western blotting. In addition, the culture medium was analysed for collagen I secretion using enzyme-linked immunosorbent assay (ELISA). The experiments were replicated using SPARC knockout mouse fibroblasts.

Results: SPARC expression was increased in the stressed Tenons fibroblasts relative to the relaxed ones. Corresponding increases in ASMA and integrin- β 1 expression as well as collagen I secretion were also detected. There was no increase in ASMA, integrin- β 1 and collagen I expression in the SPARC knockout mouse fibroblasts under stress, whereas the wild type fibroblasts responded in a similar manner to the human Tenons fibroblasts under both relaxed and stressed conditions.

Discussion & Conclusion: SPARC is elevated under stress conditions generated in the 3D collagen stress model. Induction of SPARC is necessary for the expression of ASMA and collagen I, both of which are markers for the myofibroblast phenotype. Increased integrin- β 1 expression under stress conditions corroborates the role of SPARC in the development of the myofibroblast phenotype which is required for wound contraction.

BO – M 04

Corneal Arcus and Intraocular Pressure: The Singapore Malay Eye Study

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Aim: To examine the relationship of corneal arcus with intraocular pressure (IOP) in Malay adults in Singapore.

Methods: The study population was selected using an age-stratified random sampling procedure of 40- to 80-year-old Malays living in Singapore. Participants had a standardized interview, laboratory investigations, systemic and ocular examinations. Corneal arcus was assessed under slit-lamp and IOP was measured by Goldmann applanation tonometry.

Results: Of the 3280 (78.7% response) participants, data of IOP were collected on 3028 right eyes without history of any ocular surgery or ocular hypotensive medication. IOP was normally distributed, with a mean of 15.42 mm Hg. Corneal arcus were found on 1751 (57.8%) persons. After controlling for age and gender, IOP was significantly higher in persons with corneal arcus than in those without corneal arcus (15.87 mm Hg vs. 14.77 mm Hg, $P < 0.001$). In multiple linear regression models adjusting for age, gender, blood pressure, blood total cholesterol, central corneal thickness (CCT) and other factors, persons with corneal arcus had, on average, IOPs 1.14 mm Hg higher than those of persons without corneal arcus.

Conclusions: This population-based study among Malays showed that corneal arcus is associated with a higher IOP, independent of age, CCT, corneal curvature and axial length of the eyeball. These findings may have implications in the IOP assessment in persons with corneal arcus.

BO – M 05

Heidelberg Retina Tomograph II Machine Learning Classifiers for Glaucoma Detection: The Singapore Malay Eye Study (SiMES)

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Background: Early diagnosis of glaucoma remains a challenge. We evaluated the performance of machine classifiers trained on Heidelberg Retina Tomograph II (HRT II) parameters for discrimination between healthy and glaucomatous eyes.

Methods: A population-based cross-sectional study of Malay persons aged 40 to 80 years living in Singapore was conducted from 2004 to 2006. Of these, 373 ophthalmologically normal subjects (373 eyes) and 112 glaucomatous subjects (112 eyes) were included. Glaucoma was defined according to the International Society for Geographical and Epidemiological Ophthalmology criteria. Machine classifiers were trained on 95 HRT II parameters and small subsets created with backward elimination. The area under the receiver operating char-

acteristic (AUC) curves for four types of classifiers (Support Vector Machine with radial basis [SVM-radial], Recursive Partitioning and Regression Trees [RPART], Generalized Linear Model with Gaussian error [GLM-Gauss] and with binomial error [GLM-bin]), the linear discriminating function by Mikelberg *et al.* (Mikelberg-LDF), and the Moorfields Regression Analysis with “borderline” outcomes as positive (MRA) were compared.

Results: The SVM-radial with all parameters provided the highest AUC (0.844; 95% confident interval [CI], 0.795-0.892), followed by the GLM-gauss with all parameters (AUC = 0.822; 95% CI, 0.777-0.868) and the GLM-bin with selected parameters (AUC = 0.821; 95% CI, 0.771-0.871). The Mikelberg-LDF and the MRA yielded the lowest AUC (0.741; 95% CI, 0.680-0.802, and 0.726; 95% CI, 0.677-0.775, respectively). The SVM-radial provided substantial improvement of AUC over the Mikelberg-LDF ($P < 0.001$) and the MRA ($P < 0.001$).

Conclusion: Machine learning classifiers of the HRT II data yielded a significant improvement over the current methods (Mikelberg-LDF and MRA) for detection of glaucoma. These may be useful for refining early glaucoma detection using the HRT II.

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BO – M 06

Downregulation of Low Density Lipoprotein Receptor (LDLR) Transcription by Oncostatin M (OSM) in the Genesis of Hypercholesterolemia in an IL-13 Overexpression Rat Model of Minimal Change Nephrotic Syndrome (MCNS)

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Background/Hypothesis: We have previously shown that rats overexpressing IL-13 developed MCNS with hypercholesterolemia, which correlated with serum IL-13 levels. This study aimed to examine the molecular pathways affecting cholesterol metabolism in this model.

Methods: RNA was isolated from liver tissue of 6 control rats and 6 IL-13 transfected rats with MCNS, whose serum cholesterol > 3.10 mmol/L. This was reverse transcribed and hybridised into Illumina Rat Ref12 microarray chips. Preprocessed data from BeadStudio was normalised by Cross-Correlation method. Differentially expressed genes were selected based on criteria of > 2 -fold change and coefficient of variance < 0.2 . Pathway analysis was carried out using MetaCore™. Real-time PCR was used to validate the microarray studies.

Results: Of 13,517 genes that were differentially expressed, 778 genes showed > 2 -fold change in expression. Pathway analysis of hepatic gene expression in the 6 IL-13-transfected rats with hypercholesterolemia showed down-regulation of *JAK2*, *STAT5*, *OSM* and downstream molecules like *LIFR*, *SHP-2*, MAP kinases and *LDLR*. Additionally, there was significant up-regulation of key molecules in cholesterol metabolism like *SREBP*, *ACLY*, *HMGCoAR*, *CYP7A1* compared to controls. Real-time PCR confirmed the increase in expression of *CYP7A1*, and *HMGCoAR*, and downregulation of *LDLR* in the IL-13-transfected rats.

Discussion & Conclusion: This study suggests that in the *IL-13* overexpression model of MCNS, diminished clearance of cholesterol from serum could result from inhibition of *LDLR* transcription, a key molecule in the hepatic uptake of cholesterol, following downregulation of *OSM* expression via the JAK2-STAT5 pathway. This was associated with increased hepatic gene expression of *SREBP*, *CYP7A1* and *HMGCoA*, suggesting that intracellular cholesterol was depleted.

BO – M 07

Risk Factors for the Development and Progression of Diabetic Retinopathy in Asians

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Background/Hypothesis: The prevalence of diabetes mellitus in Singapore is high and diabetic retinopathy is a major cause of blindness. There is limited local information on its prevalence and progression. We aimed to study the risk factors associated with pre-existing diabetic retinopathy, the factors affecting the development of diabetic retinopathy and its rate of progression in a multi-ethnic population.

Methods: A review of 500 consecutive eyes of patients with diabetes mellitus over a 5-year period. Standard ophthalmic history and examination was performed. Diabetic retinopathy was graded using the Early Treatment of Diabetic Retinopathy Study classification. Risk factors were assessed using univariate and multivariate analyses.

Results: Of 500 eyes, 272 (54.4%) had pre-existing diabetic retinopathy. Risk factors were younger age (mean 63.6 vs. 68.6 years, $P < 0.001$), duration of diabetes (14.6 vs. 12.5 years, $P = 0.004$) and insulin dependence (64.2% vs. 49.9%, $P < 0.05$). Of 228 eyes with no initial diabetic retinopathy, 35.8% developed diabetic retinopathy within five years. The mean time to progress between different stages of diabetic retinopathy were – none to mild: 3.7 years; mild to moderate: 2.9 years; moderate to severe: 1.4 years. Fast progression of diabetic retinopathy was associated with younger age (57.8 vs. 67.5, $P < 0.001$) and Malay race (19% vs. 4.6% other races, $P < 0.001$). Macular edema was a risk factor for pre-existing diabetic retinopathy and subsequent progression.

Conclusions: The rate of progression of diabetic retinopathy accelerates with severity. Younger age and duration of diabetes are important risk factors. This knowledge helps in planning the frequency of review and allocation of healthcare resources.

BO – M 08

Value of Echocardiography Parameters as Predictor of Cardiovascular Death in Dialysis Patients: A Single Centre Study

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Background: As cardiovascular death (CD) is the leading cause of mortality in dialysis patients, we evaluated the role of Echocardiography in predicting CD in this population.

Methods: Of 402 patients initiating dialysis at our centre between 2005 and 2007 [Mean age 59 ± 13 ; 50% male; 61% Chinese; comorbidities: 62.0% diabetic, 34.3% Ischaemic Heart Disease (IHD), 17.4% Stroke and 13.2% Peripheral Vascular Disease (PVD)], CD occurred in 10.4% till May 2009. Within 3 months of dialysis, 284

(70%) had undergone Echocardiography. Relationship of echocardiographic parameters [left ventricular mass index (LVMI)/body surface area (BSA), left atrial dimension (LAD; anterior-posterior dimension) and ejection fraction (EF)] to CD were examined.

Results: Among echocardiographic parameters, LVMI/BSA (Mean 126 ± 36), LAD (Mean 41 ± 7) did not correlate with CD, only EF (Mean 55 ± 14) was associated with increased CD. By univariate analysis, each strata of EF $< 50\%$ was significantly associated with CD (EF $\leq 25\%$ HR 4.7, EF 26–40% HR 2.2, EF 41–50% HR 1.4). By cox analysis, hazard for CD were EF $< 25\%$ (HR 4.9; 95% CI, 1.24–19.6), IHD (HR 2.3; 95% CI, 1.16–4.76), PVD (HR 2.97; 95% CI, 1.36–6.49), age (HR 1.05; 95% CI, 1.02–1.09) and serum albumin (HR 0.92; 95% CI, 0.87–0.97).

Conclusions: These results demonstrate the value of echocardiography in predicting CD in dialysis patients. Both LVMI/BSA and LAD were not predictive of CD; as weight may be inaccurate in fluid overload state, LVMI and LA-volume, indexed by height might be more predictive of CD in dialysis population. Daily dialysis with resultant reduced hemodynamic instability in patients with EF $\leq 25\%$ and reversal of hypoalbuminaemia by correction of malnutrition and/or inflammation may reduce CD.

BO – M 09

Association of Retinal Vascular Caliber and C-reactive Protein in a Multi-ethnic Asian Population

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Background/Hypothesis: To investigate the relationship of retinal vascular caliber with high-sensitivity C-reactive protein (hsCRP) and the effect of standard cardiovascular disease (CVD) risk factors (smoking, hypertension, diabetes and obesity) on this relationship in a multi-ethnic Asian population of Chinese, Malay and Indian persons.

Methods: A population-based study of 3248 Chinese, Malay and Indian participants aged 24 to 95 years residing in Singapore. Retinal arteriolar and venular calibers were measured using a validated computer programme from digital retinal photographs. The level of hsCRP was obtained from laboratory investigation.

Results: Wider retinal venular caliber was associated with higher levels of hsCRP in the population (linear regression coefficient $\beta = 2.05$, $P < 0.001$). This association was significant in Chinese ($\beta = 2.04$, $P < 0.001$) and Indians ($\beta = 2.07$, $P = 0.006$) but not in Malays ($\beta = 0.60$, $P = 0.398$) after controlling for current smoking, mean arterial blood pressure, diabetes status, alcohol consumption, body mass index, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides. Retinal arteriolar caliber was not related to hsCRP. Smoking modified the relationship of retinal venular caliber and hsCRP; persons who were smokers and had high levels of hsCRP had the largest retinal venular caliber (mean difference = $12.61 \mu\text{m}$, $P < 0.001$).

Discussion & Conclusion: Retinal venular caliber was associated with hsCRP in this Asian population, consistent with studies in Caucasian populations. Current smoking additively affected the

association between retinal venular caliber and hsCRP. These data further support the concept of retinal venular caliber as a marker of systemic inflammation.

BO – M 10

Multifrequency Bioimpedance Analysis for Extracellular Fluid Volume is Accurate in Chronic Kidney Disease Patients

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Background: Patients with chronic kidney disease (CKD) have increased extracellular fluid volume (ECFV) from salt and water retention. ECFV is determined by non-invasive multifrequency bioimpedance analysis (BIA) or radio-isotope clearance measurements (GFR). GFR-ECFV is limited by time, blood sampling, and radiation; whereas BIA-ECFV is calculated from proprietary data. We hypothesize that BIA-ECFV will be biased when compared to GFR-ECFV in patients with CKD.

Methods: We prospectively recruited 90 participants with CKD (53.3% males; means: age 58.0 ± 13.5 years; height $160 \pm$ cm, weight 67.2 ± 14.4 kg). GFR and GFR-ECFV were measured simultaneously by plasma clearance of 99mTc-DTPA . BIA-ECFV was measured by multi-frequency BIA using Bodystat Quadscan 4000 (Isle of Man, British Isles). The results were compared across gender and GFR above and below 50 mL/min. Statistical analyses were performed with JMP 7 (Cary, NC, USA). We determined bias by Bland-Altman analysis of agreement.

Results: The overall mean GFR was 59.6 ± 34 mL/min, BIA-ECFV 15.2 ± 2.8 L, and GFR-ECFV 15.9 ± 4.3 L. There was no difference in ECFV by BIA or GFR (mean difference = -0.645 ± 4.1 L, $P = \text{NS}$). There was no difference in ECFV by gender (male = 0.0012 ± 3.3 L, female = -1.38 ± 4.7 L, $P = \text{NS}$), and when GFR < 50 mL/min (0.86 ± 3.2 L, $P = \text{NS}$). However, mean GFR-ECFV was greater than BIA-ECFV by 1.9 ± 4.3 L when GFR was greater than 50 mL/min ($P = 0.0032$).

Conclusions: BIA-ECFV determination is similar to invasive GFR-ECFV overall. There is greater bias at earlier stages of CKD (GFR > 50 mL/min). When GFR is < 50 mL/min, BIA-ECFV can potentially be used to adjust diuretic doses thereby averting potential complications of fluid overload. Longitudinal variability and accuracy needs to be determined in future studies.

BO – M 11

Melanocortin 3 Receptor Gene Variants are Associated with Greater Adiposity but Higher Insulin Sensitivity in Severely Obese Children, Possibly Mediated by Higher Adiponectin Activity

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Background: Adiponectin is inversely related to insulin resistance, lower in obese individuals, and circulates in three forms. The high molecular weight (HMW) multimers, and together with the HMW to total adiponectin ratio (HMW:T), are better determinants of insulin sensitivity. The melanocortin 3 receptor (MC3R) is a critical neuronal mediator of weight regulation, and the gene variants T6K/V81I (in linkage disequilibrium) are associated with increased adiposity.

Aim: To study relationship between MC3R variants T6K/V81I and

adiponectin in severely obese children.

Methods: We screened MC3R of 195 severely obese children. Serum HMW adiponectin was measured by radioimmunoassay (LINCO). Total adiponectin was measured by Bio-Plex (Bio-Rad).

Results: There were 125 boys; 104 Chinese, 64 Malays, 21 Indians. Mean (SD) age was 11.1 (3.0) years, BMI SDS $+2.30$ (0.28), percentage body fat (%BF) 45.8 (9.1)%. Total and HMW adiponectin were negatively correlated with age, fasting insulin, and homeostasis model assessment (HOMA), but no significant correlation with adiposity. There were significant ethnic differences, but not gender. One hundred and eighteen subjects were homozygous for the wildtype (WT) allele, 70 heterozygous (Het), and seven homozygous for 6K/81I. 6K/81I were associated with lower HOMA, and higher %BF, leptin, and HMW:T (mean[SD] WT 0.117 [0.129] vs. Het 0.132 [0.143] vs. 6K/81I 0.256 [0.191]; $P = 0.034$). The association remained significant after adjustment for ethnicity, gender and age. These were supported by an additive effect, where heterozygotes had intermediate phenotype.

Conclusion: Finding increased insulin sensitivity despite increased adiposity supported the MC3R variants as insulin resistance modulators which ameliorates metabolic risk in severely obese children, possibly mediated by adiponectin.

BO – M 12

Cerebellar Vermis Dimensions for the Estimation of Gestational Age in Neonates in a Singaporean Population

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Background/Aim: Cerebellar size has been shown to correlate well with gestational age (GA) in newborns, but data in our local population of mixed ethnicity are lacking. We aimed to determine the association between cerebellar vermis dimensions and GA in Singaporean neonates.

Methods: In this prospective study from March 2006 to February 2009, 175 neonates born between 24 and 41 weeks of gestation were recruited after obtaining written informed consent. Infants with uncertain GA, head circumference below the 10th percentile and those with congenital anomalies or intrauterine infections were excluded. Vermis dimensions were measured by cranial ultrasonography performed using an 8 MHz probe (LOGIC 7 scanner, GE Medical Systems, USA) through the anterior fontanelle within the first 3 days of life. Three dimensions of the vermis, namely, the central vermian area (Cva), the superior-inferior (Vsi) and the anterior-posterior distances (Vap) were measured in triplicate in the midsagittal plane.

Results: All three dimensions strongly correlated with the GA. The Cva and Vsi were superior to the Vap in the prediction of GA. The linear regression equations relating to GA and the three dimensions were as follows:

1. GA (weeks) = $3.7313 \times \text{Cva (cm}^2) + 20.238$ ($R^2 = 0.7983$, $P < 0.0001$)
2. GA (weeks) = $12.529 \times \text{Vsi (cm)} + 7.1279$ ($R^2 = 0.7939$, $P < 0.0001$)
3. GA (weeks) = $11.394 \times \text{Vap (cm)} + 14.368$ ($R^2 = 0.7098$, $P < 0.0001$)

Conclusion: This study documents the validity of cerebellar vermian dimensions as objective tools in the gestational age assessment in neonates in the local population.

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BO – M 13

Targeting Secreted Protein Acidic and Rich in Cysteine (SPARC) in Reducing Fibrotic Ocular Wound HealingTT WONG^{1,2}, R SU², SJ YU², A BARATHI², M WEAVER³, HE SAGE³, LF SEET²¹Department of Glaucoma, Singapore National Eye Centre, Singapore, ²Ocular Wound Healing Research Group, Singapore Eye Research Institute, Singapore, ³Benaroya Research Institute, Virginia Mason, Seattle, Washington, USA

Background: SPARC is an important matricellular protein involved in tissue repair. The aim of the study is to evaluate SPARC in fibroblast wound healing *in vitro*, and *in vivo* using a mouse model of glaucoma filtering surgery, described for the first time.

Methods: *In vitro* model of wound healing was evaluated by cell-mediated 3D collagen gel contraction, 2D scratch wound model and cell proliferation (xCELLigence). Markers of fibrosis were evaluated by Western blot, quantitative PCR and zymography on human Tenons fibroblasts, SPARC siRNA knockdown fibroblasts (siSPARC), SPARC knock-out (-/-) and wild type (WT) mouse fibroblasts. The effect of SPARC deficiency in conjunctival wound healing was further assessed *in vivo* by performing a modified glaucoma surgery in the SPARC-/- mouse.

Results: TGF- β 2 treatment failed to increase collagen I and fibronectin mRNAs and protein expressions in siSPARC fibroblasts. Delayed cell migration from loss of SPARC was not due to an inhibition of cell proliferation. Cell-mediated contraction was reduced in siSPARC fibroblasts. This is likely to be due to decreases in matrix metalloproteinase-2 (MMP) and MT1-MMP activity and expression respectively. The above effects were recapitulated in corresponding SPARC-/- mouse fibroblasts. In our mouse model, the subconjunctival bleb was flat in the WT mice by Day 10 whereas the bleb remained elevated and filtering in the SPARC-/- mice on Day 14.

Conclusion: Loss of SPARC attenuated the fibrotic response following conjunctival wounding in both *in vitro* assays and in our *in vivo* model. Hence, inhibition of SPARC has therapeutic potential as an antifibrotic agent.

BO – M 14

Asian Diabetic Patients Have Greater Kidney Function Declines Than Non-diabetics When Treated in a Chronic Kidney Disease Management ProgrammeBW TEO¹, H XU¹, YM CHUA², J LI², CK HO², EJC LEE¹¹Medicine, National University of Singapore, Singapore, ²Statistics and Applied Probability, National University of Singapore, Singapore, ³Medicine, National University Hospital, Singapore

Background: Chronic kidney disease (CKD) progression is retarded by reducing hypertension and proteinuria (UPER), administering angiotensin receptor blocker, and good diabetes control. Renal disease retardation programs (RDRP) implement these measures but kidney function (GFR) changes of enrolled patients are unknown. We analysed GFR changes in Asians treated in a CKD programme.

Methods: RDRP enrolled patients at higher risk of CKD progression for treatment using lifestyle modifications, education, social support, and subsidised medications. Patients had abnormal serum creatinine (females ≥ 1.2 , males ≥ 1.5 mg/dL), or proteinuria > 1 g/day. The targets were systolic and diastolic blood pressures reduction (SBP < 130 and DBP < 80 mmHg), UPER reduction to 50% of initial or < 1 g/day, and HbA1c $< 7\%$ in diabetics. GFR was estimated using the MDRD equation. We used mixed models with repeated measures for analysis (SAS PROC MIXED).

Results: There were 572 patients (male 57%). Enrolment means: age 61.1 ± 11.6 years, creatinine 1.7 ± 0.65 mg/dL, UPER 2.42 ± 2.73 g/day, SBP 142 ± 19 , DBP 80 ± 9 , HbA1c $8.2 \pm 1.8\%$, GFR 45.9 ± 21.7 . Final visit means: creatinine 2.3 ± 1.5 mg/dL, UPER 1.9 ± 2.67 g/day, SBP 140 ± 22 , DBP 78 ± 11 , HbA1c $7.8 \pm 1.6\%$, GFR 38.3 ± 24.2 . The estimated mean GFR decline: overall -0.50 ± 0.47 , diabetic* -0.55 ± 0.46 , non-diabetic* -0.35 ± 0.47 per month (difference, * $P = 0.0004$). Mean GFR decreased at a reduced rate per unit decline in UPER (0.03959 ± 0.01033 , $P < 0.001$), and UPER was the most important factor in the model ($P < 0.001$).

Conclusions: UPER was the most important factor predictive of GFR performance. In a CKD programme, Asian diabetic patients had a more rapid decline in GFR.

BO – M 15

Remission of Metabolic Syndrome Following a Six-month Weight Management Programme in Obese PatientsRML NARAYANAN¹, BH TEY¹, KH LEW², MS WONG³¹Department of Medicine, Alexandra Hospital, Singapore, ²Health of Life, Alexandra Hospital, Singapore, ³Department of Laboratory Medicine, Alexandra Hospital, Singapore

Background: Individuals with metabolic syndrome (MS) are at high risk of coronary heart disease and type 2 diabetes and may benefit from aggressive lifestyle modification.

Objective: To evaluate the rate of remission of metabolic syndrome (MS) among patients undergoing a brief, lifestyle change weight loss intervention and to compare the baseline characteristics of patients with metabolic syndrome.

Methods: Seventy consecutive obese adults who were enrolled in an outpatient six-month weight management programme were recruited for the study. Participants went through the programme which included four reviews by dietician as well as exercise therapists apart from review by doctors. Participants were assessed on key MS parameters (waist circumference, blood pressure, triglycerides, high-density lipoprotein (HDL) cholesterol and fasting blood glucose) at pre- and post-treatment.

Results: Out of 70 individuals enrolled for the programme, 20 (28.2%) met the NCEP criteria of MS. Those with metabolic syndrome had higher triglycerides (1.98 vs. 1.98, $P = 0.023$), lower HDL Cholesterol (1.10 vs. 1.39, $P = 0.044$), higher glucose levels (5.13 vs. 4.69, $P < 0.05$), higher systolic (131.1 vs. 120 mm of Hg, $P = 0.05$) and diastolic blood pressure (88 vs. 80, $P < 0.001$). At the end of the programme, 11/20 (55%) had reversal of the metabolic syndrome. Mean weight loss in the group which had reversal of MS was higher at 3.02 ± 2.24 kg compared to those who did not have reversal of MS who had a mean weight loss of 2.28 ± 3.26 kg, $P = 0.044$.

Conclusions: Metabolic syndrome is prevalent in a significant proportion of patients (28%) with obesity. A structured weight management programme producing a modest weight loss had a positive effect on the prevalence of metabolic syndrome.

BO – M 16

Anxiety and Depression in Patients with Psoriasis in the National Skin Centre, SingaporeSI TEE¹, CTS THENG¹, KL CHAN², YC GIAM¹¹National Skin Centre, Singapore, ²Alexandra Hospital, Singapore

Background/Hypothesis: Advances have been made towards the medical treatment of psoriasis. However, less emphasis has been

placed in understanding its implications on quality of life issues. In this study, we evaluate the psychological impact of psoriasis on patients.

Methods: Between March 2008 and March 2009, patients with psoriasis were asked to participate in the study. The severity of psoriasis was determined by measuring the Psoriasis Area Severity Index (PASI), while psychological burden was measured by the Hospital Anxiety and Depression Scale (HADS). Data was collected via a self-administered questionnaire.

Results: 68 males and 32 females were recruited. The mean PASI was 8.673 (range, 0-41.5). The mean anxiety score was 6.89 (range 0-18) and the mean depression score was 5.68 (range, 0-20) according to the HADS. 41% met the criteria for anxiety while 27% met the criteria for depression (both indicated by a respective score of 8 or above on the HADS). A weak association (Spearman's Rank Correlation Coefficient, $r = +0.07$) was found between psoriasis severity and anxiety which was not statistically significant. However, the association between psoriasis severity and depression was stronger ($r = +0.29$) and statistically significant ($P < 0.05$).

Discussion & Conclusion: There is a significant association between disease severity and depression as indicated by the PASI and HADS scores. Psychosocial issues should be explored in patients with psoriasis and those at risk for psychiatric mortality should be identified. Co-management with a psychiatrist might be beneficial in the holistic management of psoriasis.

BO – M 17

New Endoscopic Approach to High Dose-Rate Intraluminal Brachytherapy in the Management of Malignant Biliary Obstruction

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Background: High dose-rate intraluminal brachytherapy (HDR-ILBT) for treatment of inoperable malignant biliary obstruction was previously described using the percutaneous approach. HDR allows better and more precise targeting of the desired area of irradiation than low dose-rate brachytherapy. The aim of this study was to determine the feasibility, safety and outcome of novel endoscopic approach for management of malignant biliary obstruction using HDR-ILBT through self-expandable metal biliary stents.

Methods: Ten patients with unresectable hilar ($n = 2$) and extra-hepatic ($n = 8$) biliary carcinomas were treated with intraluminal HDR-Ir¹⁹² inserted endoscopically through metal stent. Satisfactory biliary drainage using 1-3 self-expandable metal stents was achieved in all patients before ILBT. One patient had combined endoscopic and transcutaneous approach in view of previously inserted percutaneous biliary drainage.

ILBT was delivered by an HDR-Ir¹⁹² source using the Micro-Selectron afterloading system Nucletron and the dose was calculated within 10 mm from the centre of the source. Fractional doses of 5 Gy were given at daily intervals for 4-5 consecutive days in total dose of 20-25 Gy.

Results: Nine patients completed treatment. In 1 patient, the last dose of radiotherapy was not delivered due to poor compliance. The median time of stent patency was 6 months (range, 4-20). There was no technical problem with regard to Ir¹⁹² source migration and source entrapment within the catheter. The source of HDR was continuously

moved within the endoscopically placed catheter according to pre-programmed coordinates during each treatment session. Cholangitis occurred in one patient and hemobilia in one. Overall median survival was 11 months, (range, 4-26).

Conclusion: HDR ILBT through endoscopically inserted self-expandable metal stents is a novel technique that appears feasible with no documented technical problems with HDR-Ir¹⁹² source and acceptable toxicity.

BO – M 18

Visualisation of Cough Airflows for Infection Control

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Background/Hypothesis: The airborne transmission of certain infections, such as tuberculosis, measles, chickenpox and influenza may occur when coughing. This study aims to visualize the airflows produced when coughing to assess the potential for transmitting airborne infections. The effectiveness of wearing masks during coughing to reduce or prevent such transmission will also be tested.

Methods: Schlieren optical imaging is a well-known technique in engineering that uses diffracted light to visualise temperature differences in airflows. Exhaled air generated by a coughing human volunteer is warmer than ambient air. This temperature difference is used to visualise induced air movements to assess the risk for onward transmission of any potential airborne infection. The effectiveness of wearing surgical and N95 masks to limit such airflows was also tested.

Results: An average cough from an adult may generate air velocities as high as 8 m/s. High-speed photography shows that the coughed plume may extend as far as 0.80 m away within 0.5 seconds. Wearing surgical and N95 masks are both effective in preventing face-to-face transmission of airborne infection during coughing. Although there is some leakage around the edge of both masks during coughing, this leakage is carried upwards, harmlessly, in the rising human thermal plume.

Discussion & Conclusion: Schlieren imaging is useful to visualize airflow patterns, like those produced during coughing. Airflow movement is a surrogate marker for the potential for the transmission of airborne infection. Potentially infectious coughed aerosols can be effectively contained using either a surgical or a N95 mask.

BO – M 19

Diphencyprone Versus Cryotherapy in the Treatment of Viral Warts

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Background: Warts are extremely common, and to date, no direct comparison between cryotherapy and contact immunotherapy for the treatment of viral warts has been done on the same patient.

Methods: A prospective comparative trial was carried out to compare the efficacy of Diphencyprone (DCP) contact immunotherapy with cryotherapy in the treatment of viral warts on the upper and lower limbs. Patients with bilateral palmar or plantar warts of comparable size were eligible for the study, with each patient serving as his own control.

Results: Twenty-three patients were recruited. Twelve patients completed the study. Six patients defaulted and five patients were

withdrawn because of intolerable adverse effects. Eight (66.7%) of the patients achieved clearance with DCP, and 11 (91.7%) achieved clearance with cryotherapy. The difference was not statistically significant ($P = 0.317$). The mean time taken to achieve clearance was 5.88 weeks for the DCP arm and 6.64 weeks for the cryotherapy arm. Nineteen patients (82.6%) experienced adverse effects as a result of DCP, ranging from sensitisation site reactions (39.1%), local application reactions (39.1%) and remote reactions (17.4%). The mean time taken to develop local eczematous reactions was 4.33 weeks and usually occurred as the DCP concentration was being stepped up. Remote reactions tended to occur later (mean of 8 weeks) and involved sites like the dorsum of the feet, forearms and abdomen where no DCP had been applied. In contrast, only 2 patients (8.7%) had adverse effects from cryotherapy (local erythema). The difference between both groups in terms of adverse effects was highly statistically significant ($P < 0.001$).

Conclusion: Cryotherapy is efficacious, inexpensive and safe, and should be the first line of treatment for warts. DCP has also been shown to be effective and is an alternative in patients who have failed cryotherapy. It is a potent contact sensitizer and patients need to be warned about the expected adverse effects.

BO – M 20

Retrospective Review of Management of Spontaneous Primary Pneumothorax in the Emergency Department in Tan Tock Seng Hospital from May 2008 to April 2009

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Background/Hypothesis: The management of spontaneous primary pneumothorax (SPP) remains controversial. In this study, we aim to review the clinical outcome of patients treated with needle aspiration versus tube thoracostomy.

Methods: This is a retrospective review of patients presenting with SPP at the Emergency Department of Tan Tock Seng Hospital from 1 May 2008 to 30 April 2009. These data will be obtained from computerised records of patients' consultation at the Emergency Department. The data analysed includes patients' demographics, previous episodes of pneumothorax and history of smoking. The success rate of needle aspiration and further interventions during patients' admissions in the ward were reviewed. These data are obtained from the computerised discharge summary generated when patients are discharged. The recurrence rate of pneumothorax is obtained by reviewing patients' reattendance to the Emergency Department.

Results: One hundred and thirty-five patients presented to the Emergency Department with primary spontaneous pneumothorax. 90.4% (122) of the patients were male. The mean age of these patients was 25.38 years. 25% of the patients were smokers. 41.5% of these patients were initially treated with aspiration. 55.4% of these aspirations were successful. There was no increased rate of recurrence between those treated with needle aspiration versus tube thoracostomy.

Conclusion: Needle aspiration is an option in the treatment of SPP. It is better tolerated and decreases the need for admissions with no increase in recurrence rate. However, a randomised control trial needs to be carried out to determine actual success rate of needle aspiration.

BO – M 21

Qualities of a Psychiatric Mentor: A Quantitative Singaporean Survey

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Background/Hypothesis: Psychiatric mentors are an important part of the new seamless training programme in Singapore. There is a need to assess what the qualities of a good psychiatric mentor are vis-à-vis that of a good psychiatrist.

Methods: An anonymous survey was sent out to all psychiatry trainees and psychiatrists in Singapore to assess quantitatively the relative importance of 40 qualities for a good psychiatrist and a good mentor.

Results: The response rate was 48.7% (74/152). Factor analysis showed four themes among the qualities assessed (personal values, professional, relationship, academic-executive). There was a large overlap of both highly and lowly ranked qualities for a good psychiatrist and a good mentor, with the former being defined by personal values and professional qualities. The latter was defined by personal values, professional and relationship qualities. Mentors had more qualities ranked higher than that for a good psychiatrist. Mentors had significantly higher scores than psychiatrists for two themes (relationship and academic-executive).

Discussion & Conclusion: Being a good mentor in Asia means being a good psychiatrist first and foremost but also requires additional relationship and academic-executive skills. Mentors should be formally trained in these additional skills that were not part of the psychiatric curriculum.

BO – N 04

The Surveillance of Extended Spectrum β -lactamase (ESBL) producers in *Enterobacteriaceae* carried out by Alexandra Hospital commencing January 2009

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Background: The prevalence of ESBL in Alexandra Hospital (AH) is high as borne out by the AH Antibigram 2008 and the Network for Antimicrobial Resistance Surveillance Singapore (NARSS) data.

Aims: The infection prevention and control team in AH investigates the factors associated with ESBL so that intervening measures may be found to arrest this trend and the disturbing sequelae associated with it, such as infections and increasing use of carbapenems.

Methods: An Excel spreadsheet is developed to capture data on a cumulative basis. The biodata of each patient, location, type of specimen, speciation of organism, mechanism of third generation cephalosporins resistance, antibiotic exposure, urinary catheterisation, treatment and outcome were entered by means of 'drop-down' listing for many of the categories outlined above. These data are transported into the SPSS for multivariate analysis. The criteria for community and nosocomial acquired infections will be taken from CDC of USA.

Results: Urine accounted for majority of the specimens and bacteremic ESBLs were also noted (10 out of 133 specimens). *Escherichia coli* and *Klebsiella* spp accounted for about 60% of enterobacteria that harbored ESBL. More than 50% of patients infected with ESBLs were either inmates from nursing homes or had been admitted into AH with Community Acquired Infection (CAI). Patients with have no history of contact with intermediate or acute hospital setting is 52 (39.1%). Imipenem was the mainstay of treatment.

Discussion & Conclusions: The preliminary findings suggest that AH has to work closely with nursing homes to bring down the ESBL infections there and the focus will be urinary catheter management. Antimicrobial stewardship will also be required to address the increasing use of imipenems. Proper hand hygiene practices have to be reinforced to lower nosocomial ESBL rates in AH. This completes a comprehensive approach to bring down ESBL prevalence in the hospital.

BO – N 05

Preliminary Study to Evaluate the Risk of Raised Serum Creatinine and Potassium among Type 2 Diabetes Patients with Albuminuria and/or Hypertension who are Treated with ACEIs or ARBs

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Background: Hypertension and microalbuminuria are common co-morbidities in patients with type 2 diabetes mellitus. Blood pressure control is critical in the overall prevention and reduction of progression of the microvascular and macrovascular complications of diabetes. Both ACEIs and ARBs are recommended for use as primary anti-hypertensive agent in patients with diabetes, and specifically in

the presence of albuminuria. Hyperkalaemia and serum creatinine elevation are two common concerns associated with its use.

Aim: To evaluate the risk of raised serum creatinine and potassium among diabetic patients with albuminuria or hypertension who are treated with ACEIs or ARBs.

Methods: This is a 1-year on-going prospective study being conducted in the Diabetes Centre (July 2008 to June 2009). Patients with diabetes who require ACEIs or ARBs for treatment of hypertension or albuminuria are assessed at baseline on their serum potassium, creatinine, GFR and other clinical variables. Repeat serum evaluation of creatinine and potassium are performed and reviewed by the diabetes nurse educators and pharmacist within 4 weeks after initiation or upward titration of ACEIs or ARBs. Assessment of patients on their well-being, use of potassium supplements, diuretics, NSAIDs, traditional Chinese medicine, and co-morbid condition changes were recorded. Preliminary data is analysed using SPSS.

Results: Fifty-two patients with type 2 diabetes who were treated with ACEIs (51%) or ARBs (49%) were included in the analysis. Mean age was 57.9 (± 12.7) years, duration of diabetes 11.8 (± 9.7) years and hypertension 7.0 (± 9.0) years. Mean HbA1c was 8.0% (± 1.2), systolic BP 141 (± 21) mmHg, diastolic BP 75.4 (± 10) mmHg and LDL cholesterol of 2.75 (± 0.89) mmol/L. 17% had medical history of CAD and 9.4% had PVD. Estimated GFR at baseline was 81 (± 28) ml/min. 32.7% did not have microalbuminuria and 28.8% had macroalbuminuria. Percent of creatinine change over the baseline ranged from -22% to 39%. On average there was an increase of 2% over the baseline. This difference was not significant (paired t-test, $P = 0.72$; 95% CI, -3.9 to 2.7). Potassium levels change was -1.1 mmol/L to 0.8 mmol/L, with average of -0.04 mmol/L ($P = 0.54$; 95% CI, -0.09 to 0.17). Only 1.9% (1 participant) registered a serum creatinine elevation of more than 30%. This same patient had serum potassium of 5.3 mmol/L on follow-up. He was noted to have TCM therapy concurrently. His creatinine and potassium had returned to baseline after TCM was discontinued.

Conclusion: Preliminary results based on this sample of 53 participants do not show any evidence of a significant change in creatinine and potassium levels warranting intervention after ACEI or ARB initiation or dose titration. This would however need to be verified by a larger sample with adequate power for a more valid analysis.

BO – N 06

Arterial Stiffness as an Independent Predictor for Renal Impairment in Type 2 Diabetes Patients

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Background/Hypothesis: Patients with diabetes have accelerated ageing of the aorta resulting in increased stiffness and reduction of arterial compliance. It results in wider fluctuations in pressure and higher central aortic pulse pressure, which may be transmitted deeper into circulation and cause small vessel injury. This premature stiffening of the aorta can be reflected by increase in central aortic systolic pressure (CASP). We tested the hypothesis that arterial stiffness is an independent predictor for renal impairment.

Methods: A pilot study (N = 30) was done from March 2009 to June 2009 in Diabetes Centre, Alexandra Hospital. Patients with type 2 diabetes with or without concomitant renal diseases were recruited. A B-PRO device was applied over each patient's wrist, which allowed the central aortic systolic pressure (CASP) to be calculated using A-

PULSE CASP pulse wave application software. Linear regression was employed in the analysis using SPSS version 16.

Results: Among these subjects, 70% were male and 30% female. There was 77% Chinese, 20% Malays and 3% Indians. The mean (SD) age was 62 (11) years, mean HbA1c was 8.1 (1.5)% and mean creatinine 150 (80) $\mu\text{mol/L}$. Univariate analysis suggested significant correlation between age and estimated glomerular filtration rate (eGFR) ($r = -0.42$, $P = 0.019$). After adjustment for age, CASP was found to be an independent predictor for eGFR ($\beta = 0.518$, $P = 0.019$).

Conclusion: Arterial stiffness as reflected by CASP is related to impairment of renal function. Therapy targeted at CASP may ameliorate renal dysfunction.

BO – N 07

Evaluating the Effects of WOW Programme in Enhancing Inpatients' Satisfaction

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Background: Therapeutic nurse patient relationship (TNPR) has been a concept of great importance in the field of psychiatric nursing. In September 2005, a WOW programme was implemented in a local psychiatric hospital. The WOW programme is designed based on the concept of TNPR. It comprises a variety of patient-oriented in-flight services, especially devised to enhance the comfort of inpatients. It also provides guidelines and roadmaps for nurses to incorporate TNPR into their daily practices.

Aim: This study aims to evaluate the effects of WOW programme in enhancing inpatients' satisfaction.

Methods: This study used a post-test only survey design. A total of 89 patients were recruited over a period of 6 months. Of which, 40 participated in the WOW programme, while 49 received the usual nursing care. A self-administered 45-item, 4-point likert-type questionnaire, modified from the Newcastle Satisfaction with Nursing Scale (NSNS), was used to measure participants' level of satisfaction after they had experienced the nursing care provided in their respective wards for a week.

Results: Independent-samples T-test was used to compare the means. The T-test was significant, $t(87) = -1.53$, $P < 0.05$. Participants in the WOW programme had a higher mean satisfaction score (M 53.75, SD = 11.92), as compared to those receiving usual nursing care (M = 49.82, SD = 12.93). 72.5% of those in the WOW programme were satisfied with the nursing care, while only 56% of those receiving usual nursing care were satisfied. Participants in WOW programme also expressed higher satisfaction level in four nursing attributes, namely: nurses' approachability, availability, helpfulness and nurses' treatment of them as individuals.

Conclusion: The findings highlighted that TNPR enhances inpatients' satisfaction with nursing care and their hospitalisation experiences. These findings provide evidence-based support for the incorporation of TNPR into the development of future patient care delivery services.

BO – N 08

Patients' Perceptions of Aggression in the Acute Psychiatric Ward Setting: A Qualitative Study

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Background: The qualitative study attempts to elicit patients' perspectives on the triggers of aggression in acute ward settings and to understand their coping measures.

Methods: Twelve patients from the four acute psychiatric wards at the Institute of Mental Health were recruited for an in-depth individual interview consisting of 4 main descriptive questions, and to discuss their views about their most recent aggressive episode in the ward. The recorded interviews were then transcribed and analysed using 'thematic content analysis'.

Results: There were 9 Chinese and 3 Malays. The mean age of this group of patients was 43 years, with a range from 23 to 63 years. In this study, some patients expressed feelings of fear, anxiety and anger because they were unsure of the length of hospital stay. Most of the patients identified lack of meaningful activities and boredom as a source of frustration. They also reported negative personal experiences while being restrained physically. All the patients used different and various coping strategies to handle their frustrations ranging from taking a drink to other recreational activities in the ward. More than half of the patients advocated the use of smoking.

Discussion & Conclusion: Staff factors, the need to smoke and the unpleasant experiences of physical restraints were highlighted by the patients in this study. Aggression could stem from several factors including patient, staff and environmental factors. Thus patient factors (diagnosis, previous history of assaultive behaviour, young patients), staff factors (work experience, educational level of staff, training in assault control, and unfamiliarity with the staff) and environmental factors (patient/nurse ratio, and enclosed space) are most often linked to assaultive behaviour.

BO – N 09

Family Carers and Their Health: An Australian Study

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Background: In Australia, 14% of people have limitations from disability or ageing with many receiving care at home. Major reasons for home care are: perceived family responsibility and/or emotional obligation, and/or no available alternative. Early discharge policies have increased the need for family caring. International studies on family carers indicate poor levels of physical and mental health and wellbeing.

Methods: This longitudinal comparative multi-method study examines the effectiveness of nurse-led models of care in chronic disease management in general practice. Participants have diabetes mellitus, hypertension and/or ischemic heart disease. Two hundred and forty-nine patients are participating. Clinical, economic and quality of life data are collected at randomisation, 6 and 12 months. This paper presents the quality of life pre-intervention data from 53 participants who self-identified as a current or previous carer.

Results: Previous carers are more likely: to visit the Emergency Department and/or doctor; to have felt down ($P = 0.013$); to indicate anxiety/depression ($P < 0.001$); to have accomplished less due to emotional problems ($P = 0.006$); and report a lower health-related quality of life. They are less likely to feel calm and peaceful ($P = 0.031$). All carers: were more likely to have accomplished less due to emotional problems ($P = 0.006$), to feel down ($P = 0.042$); have a lower health-related quality of life ($P = 0.06$).

Discussion & Conclusion: These findings indicate a difference between previous and current carer's mental health. Further work is required to confirm these findings. However, primary health care

professionals should be mindful of the difference in the mental health of current and previous carers.

BO – N 10

Using Music to Produce Effective Chest Compressions When Teaching Basic Cardiac Life Support

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Background/Hypothesis: It has been widely suggested that effective cardiopulmonary resuscitation (CPR) improves survival rates. The aim of this study was to evaluate the effectiveness of using music, a song from Bee Gees; *Stayin' Alive*, to improve the quality and timing of chest compressions during the Basic Cardiac Life Support (BCLS) training programme and if the recommended guideline of hundred beats per minute was an achievable standard.

Methods: A total of 108 students were randomly selected to participate in this study during the BCLS training programme between December 2008 and May 2009. After 4 hours of training, the students performed one-man CPR and their performance was recorded on a printout strip. After the song was played, chest compressions were demonstrated synchronising with the beat of the song. The participants then performed one-man CPR with the song. A sequence of two-man CPR without music was also recorded. This study was approved by the National Resuscitation Council.

Results: Although participants completed 5 cycles of chest compressions and ventilations within the stipulated time frame, they most often did not meet the guidelines of achieving 100 beats per minute. The participants were compressing too fast and were delayed during the ventilation interruptions. Participants with no musical inclination found it disruptive.

Discussion & Conclusion: This study finds the usage of music in producing effective chest compression in the student population still debatable but for students with fast and no-relaxation compressions; music intervention can be an effective teaching strategy. Two-man CPR produces quality compressions and ventilations, concluding that training centres should advocate two rescuers when feasible.

BO – N 11

Patient Centred Counselling: Understanding the Processes

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Background/Hypothesis: A new process, patient centred counselling (PCC), for eliciting change by helping patients to explore, resolve ambivalence and pursue goals, was introduced in the care management of chronic disease patients. As part of service improvement, the study aimed to understand how nurse care managers (CMs) applied PCC in their practice and the barriers for implementation.

Methods: Three focus group sessions, involving 15 CMs from nine primary care clinics were conducted, tape recorded and transcribed. A grounded-theory approach was applied for analysis.

Results: CMs expressed a unanimous feeling of fulfillment with PCC as it facilitated patient rapport and self-management. CMs attended different training sessions due to logistical reasons. This may have led to variations in time taken to implement PCC, from almost immediately to a year. A need for a structured and standardised

training session was expressed. While younger and educated patients responded well towards PCC, elderly patients often felt resigned and preferred CMs to tell them what to do rather than make their own decisions. Patients in denial, depression, or shock were not motivated to make lifestyle changes while ambivalent patients understood the need for change but were not motivated enough to act. Barriers for PCC included language and duration of clinic sessions.

Discussion & Conclusion: Despite some initial challenges, CMs found PCC beneficial in improving patients' health. A better training structure for continuous learning and sharing will ensure consistent delivery of care. PCC may not be as applicable in some subgroups such as the elderly and uneducated.

BO – N 12

Nurses' 'Fear Factor': Maggot Debridement Therapy?

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Background/Hypothesis: Recently, Maggot Debridement Therapy (MDT) was introduced in Tan Tock Seng Hospital as an alternative method for debriding chronic non-healing wounds. Studies suggested that it is superior when compared to conventional methods. However, nurses' fear and revulsion towards the therapy might pose a deterrent towards its acceptance. This study aimed to explore nurses' perceptions of MDT.

Methods: This was an exploratory study using convenience sampling. We gathered data using a structured close-ended 28-item questionnaire. We used descriptive statistics and Chi-square test to analyse the data. Statistical significance was set at $\alpha \leq 0.05$.

Results: Two hundred and ten nurses participated in the survey. The majority saw MDT as an alternative therapy for non-healing wound. However, many perceived the maggots as dirty and associated them with decayed food and poor hygiene. Only two-thirds considered MDT as a safe treatment. About half were concerned about maggots escaping and how to properly dispose the dressings. Some also lacked the confidence in performing dressings and hesitate to do them. The results were similar across the different nursing designations.

Discussion & Conclusion: This study provided an insight into nurses' perceptions of MDT. The lack of knowledge and fear that nurses exhibited is not surprising given that most have not undergone MDT training nor performed maggot dressing. The availability of MDT as an alternative treatment is of considerable importance. For it to be successful, it must be accepted by nurses so that they can reassure their patients. The findings can be used to guide MDT training so that nurses can have the proper knowledge, skills and confidence in allaying patients' fear and in performing the therapy.

BO – N 13

Piloting a Methicillin-resistant *Staphylococcus aureus* (MRSA) Registry at Alexandra Hospital (AH)

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Background: Since 2002, the incidence of MRSA infections at AH has been low when compared to the aggregated public acute care hospitals in Singapore. However the burden of MRSA cases is increasing at AH and it is necessary to find out more about the characteristics of patients who are colonised or infected with these pathogens.

Methods: Patient biodata, premorbid conditions, risk factors, source of the specimens, principal manifestation of MRSA, vancomycin

MIC in selected cases and types of wounds are captured in the Excel spreadsheet. Statistical analysis will be carried out using the SPSS software.

Results: Patients had many risk factors and the majority was colonised with MRSA. The source of many of the specimens was not determined and this has to be further studied to obtain clearer and more accurate information. Information on wounds was lacking for many of the patients as well. MRSA with reduced susceptibility to vancomycin (MRSA-RSV) had emerged in several cases.

Discussion & Conclusion: The work will focus on determining the prevalence of MRSA in the community such as nursing homes and community hospitals. Are there more wound-related MRSA in these settings as well? And is the emergence of MRSA-RSV a growing problem in public acute hospitals? The registry is important because it will capture these data and provide direction to finding the solutions to these problems.

BO – N 14

Patient Assessment of a Nurse-led Chronic Illness Care Programme in Primary Care

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Background: In February 2007, nursing care management practice in National Healthcare Group (NHG) polyclinics was restructured to incorporate elements of self-management support focused on collaboration between patient and provider in goal setting and problem solving. This study evaluated patients' perceptions of the extent to which the service was congruent with these elements.

Methods: The study was carried out in 8 NHG polyclinics with care managed patients between October and December 2008. An adapted version of the Patient Assessment of Chronic Illness Care (PACIC) survey was used. Questions assessing patient satisfaction were also included. PACIC survey items were aggregated into categories premised upon the Chronic Care Model (CCM): patient activation, delivery system design, goal setting, and problem solving.

Results: Respondents included 126 patients. Mean age was 58.2 years, 54.7% were female, and 59.0% were Chinese. Hypertensive and diabetic patients comprised 53% and 37% of all respondents respectively. Patients reported high levels of satisfaction with care managers and thought the service improved their ability to achieve their health goals. The category of CCM congruent care reported most often was problem solving and system design. Patient activation and goal setting, which involved asking patients to contribute and to talk about their goals, were reported to occur less frequently.

Conclusion: The results suggest opportunities for service improvement. Self management education can be challenging with patients of low health literacy. A tailored programme using appropriate communication tools to educate these patients will be needed.

BO – N 15

Practical Knowledge Of Drugs: How Do Nurses Fare?

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Background/Hypothesis: Medication administration errors are a persistent challenge and inevitably linked to nursing practice and nurses' level of drug knowledge. We set out to evaluate the level of

drug knowledge among nurses in Alexandra Hospital.

Methods: A cross-sectional, exploratory study was employed. Two hundred and thirty-eight inpatient nurses were recruited to sit for a 40-item test. The test consisted of pharmacist-validated drug-related questions within 6 knowledge domains. These included 1) oral/non-parenteral drug administration, 2) parenteral drug administration, 3) correlation of common brand names with generic names and understanding of prescribing abbreviations, 4) indications and 5) side effects of commonly administered medications and 6) mathematical calculations.

Results: Mean score obtained was 60.2% (95% CI, 58.8%-61.6%). 34 out of 238 nurses (14%) failed the test. The mean scores obtained for each of the 6 knowledge domains were as follows: 1) 58.8%, 2) 61.8%, 3) 56.1% 4) 62.1% 5) 61.2% 6) 61.8% respectively. In general, nurses' drug knowledge level was positively correlated with years of experience and rank ($P < 0.05$). Comparing nurses recruited from different countries, there was significantly higher level of drug knowledge in nurses trained in Singapore than in the Philippines.

Discussion & Conclusion: To date, no such study has been published in Singapore. Our findings concur with overseas studies. It has identified weaker areas and will contribute towards tailoring targeted training programs, even in nursing schools. This may enhance nurses' knowledge and confidence in drug administration and translate to optimal medication management.

BO – N 16

Survey on Enteral Feeding Practices

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Background: Enteral feeding is a common nursing practice. It is important that nurses are diligent in performing it as unsafe practices can lead to adverse outcomes. We aimed to examine if the practices of our nurses were guided by the hospital's guidelines.

Methods: We administered a survey to all nurses and healthcare assistants on duty, for two weeks. The survey consisted of protocol and scenario-based questions and was divided into 3 sections: 1) checking of tube placement, 2) management of patients in distress during feeding, and 3) management of high gastric residual volume. We analysed data using descriptive statistics.

Results: 1203 nurses participated in the survey with only 63% of them reporting that they based their practices on hospital guidelines. 88% used pH indicator as their first choice for checking tube placement. 98% would not feed when they are in doubt and would either confirm the placement with an experienced colleague, change the tube or suggest an X-ray. Wider variations were noted in management of high gastric residual volume. When patients showed signs of distress during feeding, 27% would stop feeds but not attempt to aspirate the feeds or recheck tube placement.

Discussions & Conclusion: The majority of the nurses performed enteral feeding according to the recommended hospital guidelines. However, it is of great concern that there are some who do not. The survey reflected that variation in practice exists. The findings highlighted the need for reinforcement on safe enteral feeding practices. It also suggested using scenario or problem-based learning during training to enhance critical thinking. Future research can be qualitative in nature to gain more insight on enteral feeding practices.

BO – PC 04

Association Between Insomnia and Quality of Life: A Cross-sectional Study in Patients Visiting National Healthcare Group Polyclinics

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Background: Quality of Life (QoL) is gaining importance in our modern society as an indicator of an individual's perceived physical and mental health. Several studies have shown that QoL is negatively correlated with the degree of insomnia. However, limited studies on this have been performed in Singapore. Our study aims to assess the relationship between QoL and insomnia among primary-care patients in Singapore.

Methods: We performed a cross-sectional study using an anonymous, interviewer-administered questionnaire involving patients visiting five National Healthcare Group (NHG) polyclinics. Severity of insomnia was assessed using the Insomnia Severity Index (ISI), a validated brief insomnia screening tool (seven items on a 5-point Likert scale). QoL was measured by the Short-Form 36 Health Survey (SF-36), a validated multi-purpose health survey. We obtained summary measures for physical (PCS) and mental health constructs (MCS).

Results: Six hundred and twenty-four out of 755 (82.6%) patients participated in our study. About one-third (33.7%) self-reported having sleep problems and 7.1% had ISI score ≥ 15 (clinically moderate/severe insomnia). Respondents with self-reported sleep problems had lower mean scores on both the PCS (48.0 vs. 51.6) and MCS (49.0 vs. 53.0) compared to those without. Those with ISI score ≥ 15 also had lower mean scores on PCS (44.6 vs. 50.8) and MCS (45.3 vs. 52.2, all P values < 0.01).

Conclusion: The study shows that primary healthcare patients with insomnia experienced lower QoL when compared to those without. However, due to the cross-sectional nature of our study, a temporal relationship cannot be ascertained between insomnia and poor QoL.

BO – PC 05

Determinants of Screening Uptake for Hyperlipidaemia: A Community-based Study in a Singaporean Residential Estate

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Background: Hyperlipidaemia has been implicated in the pathogenesis of coronary heart disease, with a positive linear relationship between serum cholesterol and 10-year cardiovascular risk. Early detection and intervention may therefore decrease the burden of disease in the population. In this study, we investigated the determinants of screening uptake for hyperlipidaemia.

Methods: We conducted a community-based cross-sectional study involving 708 randomly-selected subjects aged 40 and above in a Singaporean residential estate using an interviewer-administered questionnaire. For each subject, demographic characteristics, lifestyle and health practices, knowledge of hyperlipidaemia and its complications, and screening uptake were assessed. Descriptive and analytical data analyses were done.

Results: The response rate was 42.7% ($n = 302$). Among the responders, 49.3% were male; 68.9% were Chinese, 18.7% Malay, 12.4% Indian, and 1.0% others. The mean age was 53.5 ± 10.1 years. One hundred and seven (35.4%) of the responders were diagnosed with hyperlipidaemia, and the screening rate amongst the non-diseased population was 66.5%. Factors associated with uptake of screening for hyperlipidaemia include a good knowledge score compared to an average or poor one (78.7% vs. 63.9% vs. 37.0%, $P < 0.001$), having a regular doctor (75.0% vs. 58.5%, $P = 0.019$), and obtaining information from healthcare professionals as opposed to the media or informal sources (78.6% vs. 66.3% vs. 52.6%, $P = 0.05$). Certain demographic characteristics, such as higher incomes ($P = 0.008$), larger apartments ($P = 0.005$), or having an acquaintance with hyperlipidaemia ($P = 0.005$) were associated with improved screening uptake. In addition, a non-significant trend ($P = 0.078$) was observed between being more highly-educated and screening uptake. The asymptomatic nature of hyperlipidaemia as well as the lack of time (40.0% and 32.9% respectively) were cited by responders as the main barriers to screening, while convenience and affordability (55.7% and 42.6% respectively) were cited as the main motivating factors.

Conclusions: The severe consequences of hyperlipidaemia, in addition to its lack of symptoms, are of grave public health concern in developed societies. Screening uptake was associated with increased knowledge, having a regular doctor, and certain demographic characteristics. Healthcare professionals should play a central role in public education and raising awareness. Through this study, we hope that a more targeted approach may be taken by public health authorities in promoting the uptake of screening amongst the general population.

BO – PC 06

Health Literacy in Primary Care Patients in Singapore

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Background/Hypothesis: Health literacy (HL) refers to the capacity to obtain and understand basic health information and services to make appropriate health decisions. Limited HL has been independently associated with poorer understanding of chronic diseases, increased hospitalisations, higher healthcare costs and worse self-reported health in Western countries. This study investigates HL in English-speaking patients attending public primary-care clinics in Singapore and its relationship with socio-demographic factors and self-reported health status.

Methods: A cross-sectional, interviewer-administered survey was conducted to test patients' HL at 3 polyclinics in October 2008 using 2 HL measures: the Newest Vital Sign (NVS), a nutrition label with 6 questions, and the Health Literacy Screening Test for Singapore which was adapted from the Short Test of Functional Health Literacy Assessment.

Results: Of the 302 eligible English-speaking participants, 231 (76.5%) scored ≥ 4 (out of a total possible score of 6) on the NVS indicating adequate HL. On multivariate analysis, housing type and ethnicity were significantly associated with adequate HL. Occupants of 4-5-room HDB-flats were 2.17 times (95% CI, 1.06-4.46) more likely than those of 1-3-room HDB-flats and Chinese were 2.31 times (95% CI, 1.12-4.76) more likely than Indians to have adequate HL. Respondents with adequate HL were more likely than those with limited literacy to report good or excellent health status (adjusted

OR 2.06; 95% CI, 1.13-3.78).

Discussion & Conclusion: Most English-speaking Singaporean patients have adequate HL. Higher HL is associated with staying in a larger home, being Chinese, and having good health. Identifying patients with limited HL and tailoring patient education to patients' HL levels may improve patient care and public health.

BO – PC 07

A Comparative Study on Awareness and Barriers of Colorectal, Breast and Cervical Cancer Screening Among the Underscreened in the Community

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Background: Colorectal (CRC), breast (BrCA) and cervical cancer (CVC) are the three leading cancers with validated cost-effective screening tools but their screening rates remain suboptimal. We compared awareness and prevalence of barriers to screening of these three cancers among residents in the community who had not followed nationally-recommended starting ages and frequencies.

Methods: We conducted 1) a qualitative survey of 72 respondents to identify barriers and 2) a quantitative survey of 712 randomly-selected residents from a housing estate in Singapore to determine awareness levels and prevalence of identified barriers to screening of the three cancers.

Results: Of 333 and 180 female respondents non-compliant to BrCA and CVC screening, 65.2% and 69.4% had never heard of mammography and Pap smear respectively. Of 580 respondents non-compliant to CRC screening, 88.1% and 84.1% of respondents had never heard of fecal occult blood testing (FOBT) or colonoscopy as CRC screening modalities. Unawareness of CRC (PRR = 1.80 [1.26, 2.57]), BrCA (PRR = 1.14 [0.988, 1.32]) and CVC (PRR = 1.51 [1.16, 1.98]) screening was more prevalent among the non-Chinese. The most prevalent barrier to screening for all three cancers was the belief that cancer screening was unnecessary if one was asymptomatic.

Conclusion: Among the under-screened, unawareness of BrCA, CVC and especially CRC screening modalities are very prevalent. Cancer screening education should target the under-screened (especially the non-Chinese) and correct the misconception that screening is only needed when symptomatic.

BO – PC 08

Clustering of Cardiovascular Risk Factors in Patients with Psoriasis: The Importance of Screening

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Background: Psoriasis is a prevalent skin disorder. Recent epidemiological studies have shown that patients with psoriasis are at increased risk of metabolic syndrome, its component cardiovascular risk factors and myocardial infarction. Limited information is available regarding metabolic disorders in Asian psoriatic patients. We determined the prevalence and characteristics of metabolic disorders in psoriasis patients in a tertiary dermatology referral centre.

Methods: Psoriasis patients who attended the National Skin Centre psoriasis and phototherapy clinics from October 2007 to February

2009 were recruited. Fasting glucose, lipids, blood pressure, Psoriasis Area and Severity Index (PASI) and body mass index (BMI) were measured. Non-diabetic patients and diabetics on diet therapy were subjected to a 2-hour oral glucose challenge.

Results: Two hundred and nineteen patients were studied. This comprised 155 Chinese, 24 Malays and 40 Indians, with a mean age of 49.2 ± 11.1 years and PASI of 9.5 ± 8.3 . The prevalence of diabetes, hypertension, hyperlipidaemia and obesity by Asian criteria in our study population was 24.7%, 51.6%, 37.0% and 34.2% respectively. Metabolic syndrome was present in 38.4% by the modified Asian NCEP-ATP III criteria. 32.1% of the patients who denied a history of hypertension were found to have occult hypertension. More severe psoriasis ($P = 0.013$), age ($P < 0.001$) and elevated BMI ($P < 0.001$) were significantly associated with the components of metabolic syndrome (regression model $R^2 = 0.297$, $P < 0.001$).

Conclusion: Our findings indicate that there is a high prevalence of metabolic disorders in Asian patients with psoriasis. Screening for cardiovascular risk factors is warranted, particularly for older patients with more severe psoriasis and obesity.

BO – PC 09

The Knowledge, Attitude and Practice of Primary-Care Physicians in the Public Sector in Singapore with Regards to Promotion of Physical Activity

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Background: There is overwhelming evidence that regular activity promotes health and has beneficial effects on many chronic diseases. Many overseas studies have looked into the knowledge, attitude and practice of primary care physicians with regards to promotion of physical activity. However, no local (Singapore) data is available. This study aims to obtain this data from primary care physicians working in the public sector.

Methods: A questionnaire survey was conducted on 175 eligible practicing primary-care physicians working in the National Healthcare Group Polyclinics (NHGP), Singapore. This questionnaire survey is designed specifically to assess four areas, namely, the demographics and profile of the primary-care physicians, the physicians' knowledge of the beneficial effects of physical activity, the attitude and practice towards promoting physical activity. The questionnaire uses a 4-point Likert-type scale for assessment. Data from the returned survey forms was entered in Microsoft Excel (version 2000) and analysed using a software package (SPSS Version 13).

Results: A high response rate was obtained and the result showed a good level of knowledge of the health benefits of physical activity and also highlighted the overall positive attitude of physicians towards promotion of physical activity in their patients. In addition, the study showed that physicians generally practice promotion of physical activity in patients with hypertension, non-insulin dependent diabetes mellitus, overweight/obesity problems, stable ischemic heart disease and hyperlipidaemia, where strong evidence of benefits exist. Verbal counseling is often the method used for exercise promotion.

Discussion & Conclusion: Our findings on the knowledge level and attitude of physicians are comparable to studies done overseas. Use of written exercise prescription for promotion of physical activity is only practiced by a small percentage of physicians, indicating an opportunity for further expansion of its usage in our primary-care setting.

BO – PC 10

Screening for Depressive Symptoms in Diabetic Patients in Primary Care

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Background/Hypothesis: Depressive disorders are common and costly. Studies have also shown that the presence of diabetes doubles the odds of co-morbid depression. However detection and treatment in the primary care setting have been sub-optimal mainly because we lack a simple tool to screen for depression in primary care. In this study, the PHQ-9 was used as a depression-screening tool in a primary care setting.

Methods: The PHQ-9, which is a 9-item simple questionnaire, was administered to diabetic patients at Jurong Polyclinic. This was done

for six weeks from November 2008 till mid January 2009.

Results: A total of 825 questionnaires were collected and analysed. The prevalence of depression was 4.49% in this study. Ratio of males to females was 2:3. 14 patients scored more than 15 on the PHQ-9 and 12 of them fulfilled the DSM-IV criteria for depression. In the group who scored 10-14, 23 fulfilled the depression criteria. No patients with depression were found in the groups that scored less than 10 on the PHQ-9 and this correlated very well with studies done overseas. However, not many of the patients were keen for intervention or treatment for their depression.

Discussion & Conclusion: The results show that the PHQ-9 can be very reliably used to pick up depressive symptoms in primary care. It is simple to do and can be easily administered by a doctor, nurse or even a trained non-medical staff. The PHQ-9 can also easily be incorporated into our electronic medical records.

Abstracts: Best Oral – Quality, Health Services Research

BO – QHSR 05

Smoking, Socioeconomic Status and Cataract Prevalence: the Singapore Malay Eye Study

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Purpose: To assess associations between smoking, socio-economical status and the prevalence of cataract in the Singaporean Malay population.

Methods: In a population-based, cross-sectional study, 3,280 Malay adults aged 40-80 years were included. All participants had and interview, systemic examination and laboratory investigations to determine smoking, socio-economical status (SES) and systemic disorders. A standardised ocular examination was performed and lens capacity was graded from photographs following Wisconsin Cataract Grading System.

Results: Out of 2927 (89.2%) participants had gradable lens photos in at least one eye, 1338 (45.7%) had any cataract in at east one eye. After adjusting for age, gender and other SES factors, current smokers had a higher prevalence of nuclear cataract (odds ratio, OR, 2.10; 95% confidence interval, 95% CI, 1.50-3.10) and any cataract (OR, 1.35; 95% CI, 1.01-1.81). Primary or lower educational level (OR, 1.59; 95% CI, 1.01-2.50) and low monthly income (OR, 1.41; 95% CI, 1.08-1.85) were associated with nuclear cataract, while 1-2 rooms public housing was linked with posterior subcapsular cataract (OR, 1.66; 95% CI, 1.26-2.20) prevalence. In addition, after adjusting for age, gender, diabetes, hypertension and body mass index, heavy smokers (≥ 5 packs of cigarettes per week) was also associated with the prevalence of posterior subcapsular cataract (OR, 1.89; 95% CI, 1.16-3.01).

Conclusions: Smoking and low SES (including educational level, monthly income and housing) are associated with a higher cataract prevalence in Malays, which is consistent with the findings from other studies in white, Indian and Chinese populations.

BO – QHSR 06

Measuring Comorbidities in Older Patients: Can Administrative Data Replace Medical Records Data in Outcomes Research?

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Background/Hypothesis: Comorbidity information is important for risk adjustment when comparing health outcomes. Collection of this information from medical records is resource-intensive. Administrative databases provide a ready alternative, but their validity for comorbidity identification has not been determined in Singapore. We sought to compare comorbidity measures obtained from both sources, and to observe their performance in a real world example of risk adjustment.

Methods: We conducted a retrospective review of patients aged 55 years and older, hospitalised for pneumonia at 3 acute hospitals in 2007. For 32 comorbidity measures, we quantified agreement of administrative and medical records data with kappa values. We performed logistic regression to compare 30-day mortality for community-acquired pneumonia (CAP) adjusted for pneumonia severity index (PSI) using comorbidity information from both data sources.

Results: For 3987 hospital admissions, kappa values for individual comorbidities ranged from 0.003 to 0.785. Uncomplicated diabetes ($\kappa = 0.785$), complicated diabetes ($\kappa = 0.675$) and metastatic cancer ($\kappa = 0.708$) achieved good agreement. Eight others (including chronic pulmonary disease, congestive heart failure, hypertension, liver disease, peripheral vascular disorders, and dementia) showed fair agreement ($\kappa = 0.406-0.542$). Among patients with CAP at 2 hospitals (H1 and H2), expected mortality using administrative and medical records data was very similar (H1: 20.1% and 20.3%; H2: 21.9% and 21.7%, both respectively).

Discussion & Conclusion: Administrative data may be used to identify selected comorbidities on account of reasonable agreement with medical records data, thereby making data collection less cumbersome. Comorbidity information generated from either data source did not result in significant differences in risk-adjusted CAP mortality.

BO – QHSR 07

Clinical Observations of Those Who Were Screened for Influenza A (H1N1)

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Background: The influenza A (H1N1) virus infection remains a potential major threat to global public health. As the designated screening center in Singapore, Tan Tock Seng Hospital's Emergency Department (TTSH ED) serves not only its own patient population but also all patients referred to them from the borders and primary-care centres. This study aims to summarize the clinical features of patients seen at TTSH ED for H1N1 screening.

Methods: In this prospective observational study, we screened all patients between 27 April and 31 May 2009, who presented with influenza-like symptoms and positive travel history to H1N1 affected regions.

Results: Preliminary analysis showed that the mean age of patients (N = 500) screened for H1N1 infection was 34.7 (SD 14.3) years. Four hundred and eight (81.6%) were travellers, 434 (86.8%) had exposure to persons from affected regions and 103 (25.2%) had contact with suspected cases. The median time from exposure to symptom onset was 5 days (range, 2 to 9). Presenting manifestations have included fever (65.8%), cough (60.6%), sore throat (45.8%), rhinorrhea (40%) and myalgia (20.4%). As of 11 June 2009, 21 patients with a mean age of 26.3 (SD 8.5) years tested positive for H1N1. Twenty had travelled to an affected region and one had contact with a confirmed case. The median time from exposure to symptom onset was 7 days (range, 4 to 11). Fever (85.7%), cough (71.4%), rhinorrhoea (42.9%) and sore throat (33.3%) were the more common presenting symptoms. All were in stable condition.

Conclusion: Most cases appeared to have uncomplicated and typical influenza-like illness, similar to results documented overseas.

BO – QHSR 08

A Pure Loss Queueing Model for Endoscopy Recovery Bed Planning

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Background: With increasing patient workload, the Endoscopy Centre of Tan Tock Seng Hospital planned to expand the number of Endoscopy theatres from four to six. Patients given sedation during the procedures would require post-recovery beds and close monitoring. Hence sufficient bed capacity would be essential for patient safety. This study aimed to compute the number of post-recovery beds needed.

Methods: Five days of data (318 records) were studied to analyse endoscopy patients' arrival rates, procedure and recovery time, and percentages of patients on sedation. A series of "M/G/s/s pure loss" queueing models were constructed to compute the probability that a patient could not find a bed post-procedure. This model was also validated using current data.

Results: On average, 60% of patients were on sedation, and varied by day of week due to department scheduling. Average procedure duration was 32 minutes and post-procedure recovery took 75 minutes. With 6 fully operating endoscopy theatres, a model without considering randomness would suggest 8.4 beds ($75/32 \times 6 \times 0.6$). The queue model showed that 15 beds were needed to ensure most

patients (>99%) would have a recovery bed post-procedure. When the percentage of patients on sedation varied from 30% to 80%, the number of beds needed changed from 10 to 19.

Discussion & Conclusion: The queueing model allows one to address the randomness aspects, or else the true demand would be underestimated and patient safety compromised. Furthermore, the study also revealed that one way to reduce peak demand was via levelling of workload.

BO – QHSR 09

Prevention of Unplanned Postoperative Hypothermia in Elective Major Operations

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Background/Hypothesis: Hypothermia may result in increased risk of intraoperative blood loss, myocardial ischemia, coagulopathies and surgical wound infection. We discovered half of our patients undergoing gastrointestinal operations were hypothermic postoperatively during our Surgical Site Infection CPIP project from 2006 to 2008. Our objective is to reduce unplanned postoperative hypothermia for elective major operations by 50% in 6 months.

Methods: The team studied the gaps and implemented standardised interventions from August 2008 to January 2009. Temperature monitoring was standardised for data consistency. Interventions included increasing operating room temperature from 18-19°C to 20-24°C, use of warm irrigation, intravenous, cleansing fluids and Bair Hugger warming blankets throughout the operations.

Results: Over 6 months, 362 patients (183 males and 179 females) were recruited. Eighty-eight percent of these patients had gastrointestinal operations while 9% had hernia operations, 2% breast and 1% endocrine operations. The medium age of the patients was 61 (17 to 89) years. The medium ASA score was II (I-IV). When benchmarked against historical data, our unplanned postoperative hypothermia rate reduced from 51% to 20%, giving an overall improvement of 61%. This result exceeded our target of 50% reduction over 6 months.

Discussion & Conclusion: This project demonstrated the successful prevention in unplanned postoperative hypothermia through gap identification using reliable data collection and subsequent interventions. When these interventions were embedded into our workflow, good results could be achieved and sustained. As this practice improved patient outcomes and safety, we have spread the use of the protocol to all other major operations in the department.

BO – QHSR 10

Improving the Referral Process between Jurong Polyclinic and National University Health System (NUHS) Cardiac SOC for the Exclusion of Ischaemic Heart Disease

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Background: Referrals to the Cardiology specialist outpatient service for exclusion of ischemic heart disease (IHD), while important to diagnose suspect cases and optimize management of confirmed ones, form the bulk of new cases in the Cardiac clinic with a large percentage of patients discharged after a normal exercise treadmill test. This resource of Cardiac appointments is stretched, with long waiting times for appointments. The aim of this project was to reduce

new case referrals from Jurong Polyclinic (JP) to NUHS Cardiac department for the exclusion of IHD, hence opening up appointments for patients to be seen expediently by the Cardiac SOC.

Methods: JP and NUHS Cardiac department embarked on a Rapid Improvement Experiment as part of the Lean concept to identify areas for improvement. JP was empowered to make exercise treadmill appointments directly with NUHS Cardiac department allowing patients to undergo the test quickly. Patients were reviewed at the polyclinic 1 week after the stress test, the bulk of those with normal tests were discharged or further evaluated for their symptoms, and those with abnormal results fast-tracked into the direct access clinic in the Cardiac SOC.

Results: Over a period of 2 months, 26 patients were referred for a direct treadmill test at NUHS Cardiac department, with 20 normal tests performed. This translated to a saving of 46 SOC visits in total and \$4154.70 savings for the hospital. Under this project, 6 patients were also fast-tracked into the direct access clinic within 2 weeks based on abnormal treadmill results, saving time, medication cost and anxiety for the patient.

Conclusion: IHD continues to be the most frequent reason for referral from the polyclinic to the Cardiac SOC. By opening up treadmill tests as an available investigation in the primary-care setting, unnecessary referrals to the Cardiac SOC can be avoided and resources freed up for more urgent cases.

BO – QHSR 11

A Two-year Review of Clinical and Demographic Outcomes of Patients on Clinical Pathways in an Addiction Medicine Department

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Background/Hypothesis: The Institute of Mental Health (IMH) introduced clinical pathways (CPs) in 2002 to ensure standardised, quality and safe care for patients. Twelve CPs are available in IMH of which, four are used in the Addiction Medicine Department (AMD). This paper profiles the clinical and demographic outcomes of patients placed on Alcohol, Opiate, Drug and Benzodiazepine Dependence CPs for a two-year period.

Methods: Data mining of patients placed on the four CPs in the AMD from 2007 to 2008. The results were then analysed using Microsoft Excel program

Results: All (100%) patients admitted with the diagnosis of Alcohol, Opiate, Drug and Benzodiazepine dependence were placed on CPs. There was an increase in patients on the Opiate Dependence pathway - 217 in 2008 and in 2007, 161. However patients admitted and placed on the other CPs decreased, Alcohol 118 (2007) 101 (2008), Drug 29 (2007) 4 (2008) and Benzodiazepine 47 (2007) 29 (2008). The majority of patients were male and had a previous admission.

Their age range was 27 to 75 years for Alcohol Dependence and 21 to 64 years for Opiate, Drug and Benzodiazepine Dependence. Their length of stay was Alcohol 12.7 (2007) 11.5 (2008), Opiate 11.5 (2007) 8.1 (2008), Drug 13.3 (2007) 8.6 (2008), Benzodiazepine 12.4 (2007) 8 (2008).

Discussion & Conclusion: CPs in the AMD can assist in understanding the demographic and clinical profile of patients with a view to tailoring programmes to meet their needs.

BO – QHSR 12

Project Omega – Improving End-of-Life Care through the Use of an EOL Bundle

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Background/Hypothesis: Care at the end of life (EOL) in acute hospitals is deemed unsatisfactory. The aims of the project were to: 1) improve nursing confidence 2) improve assessment and management of patients and (3) improve bereaved family's satisfaction in EOL care.

Methods: Quality improvement methodology was used. Perceived challenges accounting for 80% of the reasons for poor EOL care were 1) communication problems 2) lack of training 3) manpower shortage and inadequacy of time and 4) difficulty in EOL medical decision making. Before and after-intervention reviews were undertaken. Interventions included 1) helping staff to identify patients at risk of death with 'dangerously ill' (DIL) and 'do not resuscitate' (DNR) status 2) introducing 'nodal' point checklists on care of patients, discharge of patients, deaths and 3) education. Nursing questionnaire, chart reviews based on standards of EOL care derived from Delphi-consensus and Joint Commission International (JCI) and telephone interviews of bereaved families were used to monitor changes.

Results: Post intervention, confidence of nurses in EOL care increased from 30.2% to 60.9% ($P < 0.001$). Management plans for pain, dyspnea, agitation and nausea/vomiting were in place (100% from 90.3%, 96.0%, 75.0%, 97.8% respectively) during chart audit of 100 consecutively eligible cases. In the patient's last 24 hours, there were fewer laboratory investigations (60.1% to 69.0% without) and 51.6% to 63.9% of confused patients were not requiring restraint use. Audit against JCI standards demonstrated above 90% compliance compared to about 50% before intervention. There is also an improvement in bereaved family's satisfaction in communication (mean of 5.8 to 6.3, on a scale of 10), symptom control (6.0 to 6.3), emotional support (3.5 to 4.7) and overall care (6.3 to 6.8).

Conclusion: There is increased confidence in nursing staff, compliance to standards and improved bereaved family member's satisfaction which may be due to the interventions.

BO – S 04

Myringoplasty: Analysing Factors That Impact Surgical Outcomes and Hearing Results

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Background/Hypothesis: Myringoplasty is a common procedure to repair tympanic membrane perforations. The main indication for carrying out myringoplasty is chronic suppurative otitis media. The objectives of this study are to determine the factors that affect the success of myringoplasty, and also the evaluation of postoperative hearing.

Methods: Retrospective study of 86 myringoplasties from July 2003 to October 2008 in the Department of Otorhinolaryngology, Head and Neck Surgery, Alexandra Hospital. Variables noted were: size of perforation, location of perforation, grade of surgeon, history of previous myringoplasty on the operated ear and presence of postoperative infection on the operated ear.

Results: The graft success rate was 80.2%. The mean improvement in air conduction was 12.33 dB, and the mean air-bone gap closure was 13.41 dB. The presence of postoperative infection had a statistically significant impact on graft success ($P = 0.049$). Other assessed variables, including size of perforation, were not statistically significant in determining graft success. However, size of perforation was found to influence the improvement in air conduction ($P = 0.006$) and air-bone gap closure ($P = 0.050$). Of the successful myringoplasties, 55.0% achieved postoperative mean air conduction of less than 30 dB, and 60.3% achieved interaural mean air conduction of less than 15 dB.

Discussion & Conclusion: The presence of postoperative infection was significant in influencing the success of myringoplasty. Although size of perforation did not seem to have a significant impact on surgical outcome, it appeared to influence the improvement in air conduction threshold and closure of air-bone gap. Successful closure of tympanic membrane perforations, however, did not necessarily result in postoperative binaural hearing.

BO – S 05

A Seven-Fold Decrease in Postoperative Infection after Cataract Surgery

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Background/Hypothesis: Endophthalmitis is a devastating postoperative ocular infection which may result in significant visual impairment or blindness. We aimed to study the long-term trends of postoperative endophthalmitis and the effect of a new antibiotic treatment (intracameral injection of cefazolin) on the rates of the infection.

Methods: A review of 40,737 cases of cataract surgery performed at Tan Tock Seng Hospital over a 9-year period (1999 to 2008), identifying all cases of postoperative endophthalmitis. From 1999 to June 2006, standard subconjunctival postoperative antibiotics were given. From July 2006, cefazolin (1 mg/0.1 mL) injected directly into the eye (intracameral injection) was added to the standard antibiotic treatment.

Results: Over 9 years, there were 20 cases of postoperative endophthalmitis. The mean age of the patients was lower than those without infection (72.3 vs. 67.0 years). After the introduction of intracameral antibiotics, there was a 7-fold decrease in the rate of postoperative endophthalmitis from 64.3/100,000 to 8.9/100,000. There was a

higher rate of gram negative organisms cultured 6/20 (30%) compared to gram positive 5/20 (25%). The left eye was more commonly affected (68.4% vs. 31.6%, multivariate odds ratio 2.86, $P = 0.045$).

Discussion & Conclusion: The introduction of a new antibiotic treatment (intracameral cefazolin) resulted in a 7-fold decrease in the rate of postoperative endophthalmitis. The higher proportion of gram-negative cultures in this and earlier Asian studies compared to Caucasian populations suggests possible differences in microbial flora and resistance among different populations.

BO – S 06

Clinical Comparative Outcome Study of Unipolar and Bipolar Arthroplasties for Neck of Femur Fractures: A Minimum 8-Year Follow-up

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Background: Conventionally unipolar hemi-arthroplasty has been recommended for patients with neck of femur (NOF) fractures. For latter patients bipolar arthroplasty has been increasingly advocated due to its alleged durability due to the presence of biplanar motion within the prosthesis. The purpose of this study is to compare the clinical outcomes of these two procedures at a tertiary institution after a minimum duration of follow-up of eight years.

Methods: A retrospective study was performed from 1996 to 2000, reviewing all NOF patients who were treated with either unipolar or bipolar arthroplasty. Both Oxford hip score and modified Barthel's score were used to assess their pain, mobility and functional status. Clinical variables were compared using *t*-test, Mann-Whitney test, and Chi-squared test with *P* value at 5%.

Results: A total of 203 patients' data were reviewed. The mean age of patients in the study was 74.9 years. Though patients who underwent unipolar arthroplasty were older, there was no significant difference between the two cohorts in terms of fracture grade or co-morbidities. However, postoperative functional hip status was significantly much better ($P < 0.001$) for patients undergoing bipolar arthroplasty. Moreover, the risk of acetabular protrusion was five times greater in the unipolar arthroplasty group (odds ratio:0.19).

Conclusion: Bipolar arthroplasty is superior to unipolar arthroplasty for patients with NOF fractures. Unipolar arthroplasty has a greater risk for postoperative complications, with a possible need for revision. Therefore, bipolar arthroplasty should be the preferred choice for patients with NOF, regardless of patient's age and preoperative functional status.

BO – S 07

Minimally Invasive Versus Open Procedures in Surgical Management of Unstable Thoracolumbar Fractures

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Background: Unstable thoracolumbar burst fracture is generally treated with open posterior instrumentation. There has been recent increasing interest in minimally invasive surgery (MIS) in all fields including spine trauma. This study was to assess the safety and additional benefit associated with MIS compared to the open technique for management of thoracolumbar burst fractures.

Methods: Thirty-seven patients with single level unstable thoracolumbar fractures treated surgically from 2004 to 2008 were retrospectively reviewed. Twenty-four operations were done using open technique and 13 using minimally invasive method. Degree of deformity correction, neurological status, complications and pain score were compared between the two groups.

Results: 37.5% and 38.5% of patients had preoperative neurological deficits in open and MIS group, respectively. The average lengths of stay were 17.0 days (open) and 17.3 days (MIS). The average blood loss were 382 mL (open) and 146 mL (MIS) ($P < 0.05$). The average degrees of kyphotic angle correction were 13.1° (open) and 14.2° (MIS). The anterior vertebral heights were corrected by 10.0 mm (open) and 7.9 mm (MIS). 33.3% (open) and 15.4% (MIS) of patients had medical complications. Surgical complications occurred in 12.5% (open) and 7.7% (MIS). There were no neurological complications in both groups. The median of VAS on discharge were 2.5 (open) and 2 (MIS).

Conclusions: MIS technique for thoracolumbar fracture posterior instrumentation is safe. The benefits of MIS technique include less blood loss, fewer medical and surgical complications and better VAS score with comparable degree of deformity correction.

BO – S 08

East-West Cross-Cultural Validation of Survival Prognostication Normogram to Decide on Most Appropriate Surgical Procedure in Bone Metastasis

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Background: The near terminal patient with a metastatic deposit may suitably be palliated with an intramedullary nail whereas another patient with good survival potential may benefit from a more extensive resection and reconstructive procedure. In a previous study by the senior author, life expectancy in patients operated on for bone metastases was shown to correlate with certain clinical and haematological parameters in a normogram. We sought to perform a cross-cultural comparison to validate this normogram.

Methods: We reviewed 73 patients who had undergone surgery for metastatic bone disease. Age, primary diagnosis, ECOG score, presence of visceral metastasis, presence of single or multiple bone metastasis, site of surgery, haemoglobin, leucocyte count and albumin level were evaluated. The time to death was recorded from hospital records and telephone interview.

Results: At time of analysis there were 40 deaths (55%). Kaplan-Meier analysis showed that multiplicity of metastatic bone disease ($P = 0.003$), presence of nodal metastases ($P = 0.00007$) and haemoglobin level ($P = 0.0000004$) were statistically significant predictors of survival. Primary diagnosis ($P = 0.10$) and ECOG performance status ($P = 0.07$) were near significant. The readings were superimposed onto the previous normogram and found to be similar. Independent blinded use of the normogram allowed good prediction of survival. Interestingly, patients with resectional reconstructive procedures (e.g. joint replacements) survived better than those with expedient procedures (e.g. nails).

Conclusions: Our findings are similar to that of the previous study in showing relationship between the above-mentioned parameters and survival. This is despite differences in patient population characteristics and management protocols. Use of the tools may allow better siting of most appropriate care in metastatic bone disease.

BO – S 09

Micropapillary Bladder Cancer: Analysis of Outcomes with Radical Cystectomy and Neoadjuvant Chemotherapy

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Background/Hypothesis: Micropapillary bladder carcinoma (MPBC) is an aggressive variant of urothelial carcinoma and requires aggressive treatment. Here we compare the outcomes of patients with MPBC, who underwent radical cystectomy (RC), with or without neoadjuvant chemotherapy (NC).

Methods: We performed a review of the clinical presentation and outcomes of 63 consecutive patients who underwent RC for surgically resectable (\leq cT4a) MPBC. Data was analysed using Fisher's Exact test or t-test analysis, proportional hazards models and Kaplan-Meier survival analyses.

Results: The mean patient age was 67.2 years with average follow-up of 45.4 months. Stages at presentation were Ta: 0, T1: 21, T2: 37, T3: 3, and T4a: 2 patients. Neoadjuvant chemotherapy (comprising various platinum based regimens) was administered to 32% patients overall, including 29.3% of patients with clinical stage \leq T2, and 60% of patients with clinical stage \geq T3. Overall, there was no difference in survival outcomes: estimated 5-year values of overall, cancer-specific and recurrence-free survival for the radical cystectomy alone group was 63.3%, 74.3% and 62.9%, and for neoadjuvant chemotherapy was 52%, 60.8% and 60.8% respectively. Even when patients were stratified into risk groups based on factors such as clinical stage, lymphovascular invasion and hydronephrosis, survival with RC alone was equal to NC+RC. The finding of "pT0" in cystectomy specimens did not confer survival advantage.

Discussion & Conclusion: RC remains the treatment of choice for patients presenting with surgically resectable MPBC. Existing regimens of cisplatin based neoadjuvant chemotherapy do not seem to provide demonstrable benefit for these patients and newer regimens need to be studied.

Conflict of interest: Nil

Source of Funding: Nil

BO – S 10

Comparison of Onlay and Underlay Myringoplasties in the Management of Subtotal Tympanic Membrane Perforations

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Background/Hypothesis: Onlay and underlay myringoplasties have been employed in treatment of subtotal tympanic membrane perforation. However, there are still controversies as to most suitable technique for such perforations. Our study aims to compare the outcome of onlay and underlay myringoplasties in the management of subtotal tympanic membrane perforations.

Methods: This is a retrospective review of all myringoplasties from January 2004 to March 2009. Those with subtotal perforations

(defined as perforations involving >70% of the area of the tympanic membrane) were analysed separately. The patient's age, technique of repair, outcome of myringoplasty is determined. All patients were followed up for at least 3 months postoperatively.

Results: We had a total of 45 patients with subtotal perforation. Twenty-two (48.9%) of them underwent an onlay and 23 (51.1%) of the underwent an underlay myringoplasty. There was a higher success rate (defined as total closure of perforation) of with onlay compared with underlay myringoplasties (86.4% and 56.5% respectively) ($P < 0.05$). All patients who underwent myringoplasties had an improvement in their postoperative audiograms (mean 11.3 dB improvement) and there was no significant difference in the hearing improvement with either technique. There were no complications for all the patients. Onlay myringoplasties took a longer time compared with underlay myringoplasties (118 and 94 minutes respectively, $P < 0.05$).

Discussion & Conclusion: Onlay myringoplasties seem to have a higher success rate in subtotal tympanic membrane perforations as compared to the underlay technique. In view of the complexity of the onlay technique, the longer time taken is expected compared to the underlay myringoplasty. However, there is no difference in the other outcome measures (e.g. hearing loss and complications).

BO – S 11

Applicability of P-POSSUM in Prediction of Mortality and Morbidity for Pancreaticoduodenectomy in a Specialised HPB Unit.

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Background/Hypothesis: The Physiological and Operative Severity Score for the Enumeration of Mortality and Morbidity (POSSUM) uses a physiological score and an operative severity score to calculate risks of mortality and morbidity (M&M). We aim to evaluate the applicability of the pancreatic Portsmouth-POSSUM in predicting M&M in our patients.

Methods: Sixty patients undergoing pancreaticoduodenectomy from 2001-2008 were studied. Data on their physiological and operative scores were collected, and keyed in a P-POSSUM calculator. M&M was analysed.

Results: Sixty patients, 37 male, with a median age of 65 (29-79) years underwent the operation. The M&M was 1.7% ($n = 1$) 35% ($n = 21$) respectively; morbidity Grade 1 47.6%, Grade 2 42.8%, Grade 3 4.8% and Grade 4 4.8%. The median length-of-stay (LOS) was 10 days (7-76), and 40% ($n = 24$) exceeded the median LOS. The mean POSSUM Score (PS) was 57.46%. Patients without morbidity had a mean PS of 52.7%, while those with morbidity had PS of 66.3%. The difference in PS was 13.7% ($P = 0.11$, $CI: 3.2-24.1$). Subgroup analysis showed patients with PS 0-39% had no morbidity, PS 40-59% had 15% morbidity, PS 60-79% had 28% morbidity and PS 80-99% had 33% morbidity.

Discussion & Conclusion: The P-POSSUM is applicable as a predictor for morbidity but not mortality and LOS for our patients. Although PS over predicts morbidity, it correlates with our morbidity rate. When PS was applied to our patients, risk prediction was

downscaled. Patients with PS 0-39% had no morbidity risk. For PS within 40-59%, low morbidity risk is expected (15%). PS 60-79% carries moderate morbidity risk (28%) and PS 80-99% carries high incidence of morbidity (33%).

BO – S 12

Preventing Local Recurrence in the Patient Afflicted With Musculoskeletal Oncological Disease Using Cryosurgery

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Background: Cryosurgery involves the use of hyperfreezing techniques to kill tumours. It is a useful adjunct which extends the zone of tumoral ablation beyond that which can be appreciated clinically. We explored the hypothesis “a novel device to effect cryosurgical ablation was able to reduce relapse in bone tumours.”

Methods: MOH provided a grant to evaluate the Cryohit System (Galil Medical, Israel) in 2006. This is the only device of its kind in South East Asia and relies on the use of high pressure circulated argon to effect a hyperfreeze effect down to -200°C . We targeted all patients with primary and secondary (metastatic) disease of the bone.

Results: Between March 2007 and May 2009, we performed 19 procedures. Mean age was $50 \pm \text{SD} 15$ years. There were 12 female and 7 male patients. Follow up was $11 \pm \text{SD} 8$ months. In this time there had been 2 deaths and 4 radiological relapses including 2 clinical relapses. We performed the procedure on 4 patients with benign disease, 6 with primary malignant disease and 9 with metastatic disease to the bone. We intended cure for only primary disease. Kaplan Meier evaluation showed a statistically significant tendency for relapse only in metastatic disease versus primary disease (benign and malignant) $P = 0.03$. Median time to local radiological relapse was 13 months with clinical relapse requiring revision surgery in only one metastatic patient. In 2 patients the technique was able to obviate the need for preoperative embolisation in an otherwise highly vascular tumour (cryohemostasis).

Discussion & Conclusion: Cryoprobe administered cryosurgery has proven as effective as liquid nitrogen with better control and more versatile applications in the field of musculoskeletal oncology. The procedure is presently being adapted to a minimally invasive option that may allow the treatment of tumourous deposits percutaneously using radiological guidance. The technique offers good local control while limiting patient morbidity.

BO – S 13

Transanal Endoscopic Microsurgery: An Initial Experience

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Background: Transanal endoscopic microsurgery (TEM) was first introduced in 1983 for local resection of rectal adenomas and subsequently to include early rectal T1 carcinomas. TEM offers an alternative to radical resection for early carcinomas and provides an advantage over transanal or trans-sphincteric excision for high rectal lesions. The adoption of TEM worldwide has been slow due to stringent patient selection, steep learning curve and high equipment costs

Aim: This paper aims to present our initial surgical experience and postoperative follow-up of 14 patients who underwent TEM between 2005 till 2009.

Methods: All 14 patients who underwent TEM at our institution were operated on by either of two TEM-trained surgeons. Data were collected pre- and postoperatively. There was no randomisation of patients into different treatment groups for this study. The preoperative histological diagnosis, imaging findings, intra-operative findings and postoperative follow-up are hereby reported.

Results: The preoperative histological diagnoses were 5 adenomas, 5 adenocarcinomas, 3 carcinoid tumours and 1 GIST tumour. Five patients had preoperative endoscopic ultrasounds (EUS) done. The postoperative histological diagnoses were 4 adenomas, 4 adenocarcinomas, 1 GIST tumour, 1 carcinoid tumour and 4 normal results. Among the adenocarcinomas excised, there was 1 T1, 1 T2 and 2 T3 tumours. There were three complications – intraoperative anterior perforation, dehiscence of suture line and secondary bleeding. There were no mortalities related to the operation.

Conclusion: TEM has proven to be useful for resection of rectal tumours, especially for high rectal tumours that may prove difficult with other local excision techniques. Patient selection with preoperative imaging is paramount to ensure good long-term results for TEM. The traditional indications of rectal adenomas and T1 carcinomas have been expanded in our experience to include T2 and T3 for patients who are surgically unfit or decline radical surgery.

BO – S 14

Single Incision Laparoscopic Surgery: Case Series

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Background: Since surgery has become less invasive, techniques using only a single incision have begun. Our aim is to ascertain whether this approach is feasible and acceptable in laparoscopic surgery.

Methods: From May to June 2009, patients underwent single incision laparoscopic surgery and were prospectively analysed. Patient demographics, operating time, postoperative pain, intra- and postoperative complications, hospital stay, incision size and patient satisfaction were analysed.

Results: Ten patients underwent 12 procedures. Six preperitoneal hernias and one transabdominal hernia approach. Three cholecystectomies, 1 gastric wedge resection for gastrointestinal stromal tumour and 1 diaphragmatic hernia. Two patients had combined procedures. The mean age of patients was 51 years (7 males, 3 females). A single port device was used in nine patients, one patient had single incision with multiple trocars. The mean operating time was 90.42 minutes for hernias, 102.5 minutes for cholecystectomies. In the diaphragmatic hernia case a 5 mm port was added for suturing. No complications intra- and postoperatively noted. The average pain score at 24 hours is 2.57 and 1 after 1-week follow-up. The average incision size is 2.35 cm. Eight patients were ready for discharge within 24 hours. All the patients were very satisfied.

Discussion and Conclusion: Single incision surgery has the advantage of less port site herniation and better cosmesis. Challenges encountered are decreased internal and external working space. With our series it is feasible and patient acceptance is very high. However, further evaluation with a larger sample population and comparison with conventional laparoscopy is needed.

BO – S 15

Long-term Follow-up of Salvage Cryotherapy for Locally Recurrent Prostate Cancer Following Initial Radiation Therapy

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Background/Hypothesis: To determine the efficacy and study the long term outcomes (including androgen-independent progression (AIP) rate) of salvage cryotherapy (SCT) for locally recurrent prostate cancer (PC) following initial radiation therapy (RT).

Methods: We performed a review of 111 consecutive patients who underwent SCT for locally recurrent PC following initial RT. Patients with biochemical relapse (BCR) after SCT were treated with hormonal therapy (HT). AIP is defined using 2 different definitions of rising PSA after HT: 1. ASTRO (3 rises) or 2. PSA ≥ 2 ng/mL. Only 101 patients were evaluable for AIP. Data were analysed using proportional hazards models and Kaplan-Meier survival analyses.

Results: The median follow-up was 170 months, median overall survival and cancer-specific survival were 144.6 months and undefined respectively. BCR rate was 66.7% after SCT, of which 60 (54%) received HT. Among those patients evaluable for AIP, of 53 who had HT for BCR, 25 and 22 had AIP using definitions 1 and 2 respectively. Median time to AIP was 111 months and 110.3 months using definitions 1 and 2 respectively. Biopsy gleason grade at diagnosis: ≤ 7 : n = 76, 8: n = 8, > 8 : n = 3, unknown: n = 14. On univariate analysis, significant predictor of AIP was biopsy gleason grade at diagnosis using definitions 1 ($P = 0.04$) and 2 ($P = 0.036$) respectively.

Discussion & Conclusion: With long-term follow-up, approximately half of patients undergoing SCT receive salvage HT, and approximately 25% develop AIP, suggesting that SCT may alter the natural history by delaying or preventing AIP in up to 75% of patients. Gleason grade at initial diagnosis is predictive of AIP.

Conflict of interest: LL Pisters (Endocare), others - Nil
Source of Funding: Nil

BO – S 16

A Five Year Audit of Post-Tonsillectomy Haemorrhage: National University Hospital's Experience

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Background/Hypothesis: Tonsillectomy is one of the commonest surgical operations in Otolaryngology practice. We aim to examine our 5-year result as a form of internal audit as well as to examine if

smoking is a risk factor for post-tonsillectomy haemorrhage.

Methods: A retrospective review of all tonsillectomies done in the department from January 2004 to December 2008. Total number of tonsillectomies during the study period was determined using surgical codes for tonsillectomy, adenotonsillectomy and uvulopalatopharyngoplasty, and cross-checked with each patient's electronic case records. The record of all patients complicated by post-tonsillectomy haemorrhage is examined. Primary haemorrhage was defined as bleeding occurring during the first 24 hours after surgery and secondary haemorrhage that occurred thereafter.

Results: There were a total of 1172 tonsillectomies done in the National University Hospital during the study period. Of these, 585 patients (49.9%) had tonsillectomy only, 433 patients (36.9%) had adenotonsillectomy, 147 (12.5%) had tonsillectomy as part of uvulopalatopharyngoplasty (or similar) surgery. The incidence of postoperative haemorrhage was 5.5% ($n = 64$), with the primary haemorrhage rate at 0.5% and the secondary haemorrhage rate at 5%. Among the 716 (61.1%) patients with available smoking history, smokers seemed to have a higher postoperative haemorrhage rate than non-smokers (odds ratio = 3.88).

Discussion & Conclusion: The post-tonsillectomy haemorrhage in our department from January 2004 to December 2008 is 5.5%. This is in accordance to the published norms in many other countries. There is a higher incidence of post-tonsillectomy haemorrhage in smokers, even after correcting for all other significant factors. Patients who smoke should be counseled on this aspect of postoperative risks.

BO – S 17

The Epidemiology and Surgical Outcomes of Patients Undergoing Primary Total Hip Replacement: An Asian Perspective

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Background: The number of total knee replacements far exceeds primary total hip replacements (THR) in Singapore. There is a paucity of data regarding patients who undergo THR in Singapore. This paper aims to study the epidemiology and early postoperative outcomes of patients receiving primary total hip replacement in a single tertiary institution.

Methods: This is a retrospective study of all patients undergoing primary THR between January 2003 to December 2006. The following variables were analysed: patient demographics, surgical approach, mode of implant fixation, postoperative complications and functional outcomes using D'Aubigne and Postel scoring. Generalised estimating equations (GEE) with linear link function and unstructured correlation patterns were applied to analyze the hip scores over time. Sign rank tests, Fisher exact tests and Spearman correlation were applied in univariate analyses.

Results: There were a total of 115 patients who underwent primary THR over 36 months. The mean age of patients is 55 years (23-80 years). The male to female ratio was 1:2. The most common diagnosis in descending order is as follows: inflammatory arthritis, osteoarthritis, avascular necrosis, hip dysplasia and post-traumatic osteoarthritis. Patients were evaluated at a mean follow-up of 41 months with 90.8% having excellent and good outcomes. There were

no statistical differences between the surgical approach and implant fixation with regards to postoperative outcome.

Conclusion: In Asian patients, the three commonest etiologies for degenerative hip arthritis are inflammatory arthropathies, primary osteoarthritis and avascular necrosis. Regardless of diagnosis the patient groups have comparable functional outcomes following total hip replacements.

BO – S 18

Early Experience in Single Site Laparoscopic Cholecystectomy

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Background: In recent years, single incision surgeries have been performed in limited number of centers in the world. We report our early experience of laparoscopic cholecystectomy performed via the umbilicus port access.

Methods: Four patients, who underwent laparoscopic cholecystectomy via the single port technique at the National University Hospital, Singapore in 2009, were retrospectively reviewed. Patient demographics, operation technique, operation duration, complications of operation, pain score, type and duration of analgesia as well as the duration of hospital stay was collected and analysed.

Results: The mean age of patients was 42.5 years (27.8 to 62.3), and the mean operation duration was 122.8 minutes (72.0 to 199.0). One conversion (with the addition of 1 epigastric port) was performed due to bleeding from the post branch of cystic artery during surgery. The average hourly postoperative pain score was 2 (1st hour), 1 (2nd hour), 0.7 (3rd hour), 1.3 (4th hour), and 0.3 (5th hour). The mean duration of hospital stay was 1262.8 minutes (311.0 to 4015.0). Three patients had the procedure performed as a day surgery; 1 patient was discharged on post-operative day 3 due to vomiting which could be due to the use of intravenous Morphine and Fentanyl post-operation.

Discussion and Conclusion: Our initial result for single port laparoscopic cholecystectomy is promising. We have no complications in this early series. However, further evaluation will be required to access the risks and benefits of this approach compared to conventional laparoscopic cholecystectomy.

BO – S 19

Voice Problems Amongst Primary School Teachers in Singapore

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Background/Hypothesis: Teachers are often cited to be at high risk of vocal disturbances. Numerous studies have been performed in the West but none locally. Anecdotally, many local teachers report voice problems but the prevalence remains unknown.

Aim: To uncover the prevalence of voice problems amongst primary school teachers in Singapore and the associated risk factors.

Methods: A cross-sectional study was conducted across six primary schools in 2008. All full time teachers were recruited to answer a 49-item questionnaire. Teachers who report having current voice problems were invited for videolaryngostroboscopy.

Results: 214 teachers were recruited. The point prevalence was 13.1% (CI 9.3-18.3%). The past year prevalence and career prevalence were 25.4% (CI 20-31.6%) and 32.1% (CI 26.2-38.6%) respectively. Out of the 29 teachers who have current voice problems, 16 teachers underwent videolaryngostroboscopy. Multi-variate analyses using stepwise logistic regression showed that microphone usage and hypothyroid symptoms are risk factors for current voice disorders. Allergic rhinitis symptoms, reflux symptoms and microphone use; reflux symptoms, allergic rhinitis symptoms and the teaching of arts and theatre studies are risk factors for voice problems in past one year and throughout the career respectively.

Discussion & Conclusion: The surveyed teachers have very similar age and gender compositions compared with the national census and are hence representative. The prevalence rates are consistent with previous similar studies, and support the hypothesis that teaching is a high risk occupation. The risk factors uncovered are statistically and clinically significant and biologically plausible. There is clearly a need for further focal studies into the characteristics of these voice disorders and indicate a necessity for the government and healthcare providers to develop effective prevention and education programmes for teachers.

BO – S 20

Neovascular Age-Related Macular Degeneration and *Chlamydia pneumoniae* Antibodies in Asian Patients

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Background/Hypothesis: The mechanisms initiating and promoting age-related macular degeneration (AMD) still remain ill defined. There are several risk factors that share with atherosclerosis, and there is likelihood that even the pathogenic mechanism could be inflammation. *Chlamydia pneumoniae* (*C. pneumoniae*), a prokaryotic pathogen, which causes chronic inflammation, is now emerging as a risk factor in the development of cardiovascular diseases. Our aim was to investigate the relationship between neovascular AMD and *C. pneumoniae* antibodies in Asian patients.

Methods: Prospective case-control study. All consecutive cases of neovascular AMD and their age- and sex-matched controls had their demographic and systemic illness data collected and analysed. Blood samples were also collected for lipid profile and estimation of serum *C. pneumoniae* antibodies (IgA and IgG).

Results: There were 28 cases and 28 controls. The majority of the subjects were Chinese with a mean age of 69.6 years. There were six smokers and 13 non-smokers in each group. The mean IgG titre was higher in cases (70.7 RU/mL) compared to controls (34.67 RU/mL) ($P = 0.002$). There was, however, no significant association between IgA or IgG titres seropositivity with mean lipid levels and history of smoking, diabetes mellitus, cardiac disease or hypercholesterolemia within the two groups.

Conclusion: Asian patients with neovascular AMD have higher mean *C. pneumoniae* IgG titres than age- and sex-matched controls. However, the IgA or IgG seroprevalence was not statistically different between cases and controls in this pilot study with a small sample size.

BP – AH 04

Calling the Bluff on Mislabelled Drug Allergies

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Aims: 1) To assess patient's knowledge of drug allergies (DA) and 2) To examine the accuracy and completeness of DA reporting in the nationwide database, Critical Medical Information Store (CMIS)

Methods: A survey of 165 outpatients was conducted in Alexandra Hospital (AH) to assess patients' knowledge. A retrospective medical record review of AH patients in CMIS (N = 3066) and AH Pharmacy system, iPharm (N = 1688), was conducted. DA alerts were inbuilt into iPharm as visual cues to healthcare professionals (HCP). A review of DA alerts which were ignored was conducted and the results were correlated with the DA reports in CMIS to assess the accuracy of the CMIS reports.

Results: Sixty per cent (n = 99) of the patients surveyed had inadequate knowledge regarding DA. Female gender and secondary or higher education was associated with better knowledge ($P < 0.05$). Age and allergy status did not correlate well with better knowledge. Of the patients surveyed, 19.5% (n = 32) perceived drowsiness and 29.9% (n = 49) perceived stomach discomfort as DA reactions. Of the patients who had DA (n = 47), 23% (n = 11) could not identify the name of the drug they were allergic to.

CMIS records revealed that patients (76.1%) were the main source of reported DAs. Of the reported DAs, 14.2% (n = 435) did not report the type of allergic reactions encountered. Correlation with iPharm showed that 83.2% (n = 1404) of DA alerts were ignored despite recommendations in CMIS to avoid the same drug and drugs in the same class. Amongst which, in 12.6% (n = 213) of cases, the exact same drug was prescribed.

Discussion & Conclusion: Patients were the main source of DA information, but they may not have adequate DA knowledge. Incomplete data in CMIS makes it difficult for HCP to ascertain the accuracy of a DA. Correlation of CMIS and iPharm data revealed possible inaccuracy in CMIS. Future studies to address additional issues related to DA may be required. These issues include pharmacoeconomic impacts of mislabelled DA, improving public's knowledge of DA and ensuring the accuracy and completeness of DA reports updated in CMIS.

BP – AH 05

Technical Evaluation of Myeloperoxidase

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Background/Hypothesis: Myeloperoxidase (MPO) is a haemoprotein released by macrophages, and is known to be a marker of plaque instability. It has the potential to predict myocardial infarction events even before markers of myocardial necrosis such as Troponin T (TnT) and creatinine kinase (CK) are elevated in blood. We evaluated MPO on ARCHITECT-i System (Abbott USA).

Methods: ARCHITECT MPO is a chemiluminescent microparticle immunoassay. Precision studies were conducted using 4 specimens over 10 days. Interference studies were conducted by using triglyc-

erides and haemoglobin spiked samples. Recovery studies using high and low pooled plasma and reference interval were performed. MPO was measured in discard-samples with TnT and CK values.

Results: Precision studies data performed on 4 levels of MPO (60.5-3732.3 pmol/L) shows intra-day (n = 40) %CV mean = 4.8% (2.6%-5.2%) and inter-day (n = 40) %CV mean = 8.8% (3.8%-15.1%). Recovery and linearity data shows recovery range of 100% to 107% (131.6-4738.6 pmol/L) with linearity equation: y (measured MPO) = 1.01 (calculated MPO) + 40.51. Samples spiked with triglycerides and haemoglobin interfered at 1182 mg/dL and 6825 mg/dL respectively. Reference interval validation (n = 5) is 36.2-205.1 pmol/L. In discard-samples (n = 27) MPO assayed were: a) TnT <0.3 ug/L (n = 12), MPO mean = 1768.1 pmol/L (range 414.2-6808.5 pmol/L), b) TnT 0.03-0.62 ug/L (n = 15), MPO mean = 1490 pmol/L (range 122.7-3572.7 pmol/L), and c) CK 20-992 U/L (n = 27), MPO mean = 1613.8 pmol/L (range 122.7-6808.5 pmol/L).

Discussion & Conclusion: The ARCHITECT-i MPO is precise, easily measured and available on STAT (assay 15 minutes). High levels of MPO in samples with TnT <0.03 ug/L and correlation of MPO levels with cardiac markers CK and TnT suggest possible clinical utility at triage point for management of cardiac events that require further collaborative studies.

BP – AH 06

A Highly Sensitive Norovirus Detection Assay

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Background: A highly sensitive reverse transcription-polymerase chain reaction (RT-PCR) assay targeting the highly conserved overlapping region of ORF1 and ORF2 was developed to detect norovirus in stool samples before genotyping for the surveillance of circulating norovirus strains in Singapore. We compared the efficacy of our method with that of Vinje et al (2004), which was primarily developed for genotyping the norovirus strains and which targets the highly variable capsid VP1 region. Both assays are able to discriminate the GI and GII norovirus subgroups.

Methods: Both assays were performed on 100 stool samples collected from food handlers (surveillance samples) or patients with diarrhoea (clinical samples). Amplified products from both assays were detected by 3% agarose gel electrophoresis. Positive bands, identified by concurrently run GI and GII controls, were excised from the gel and sequenced for confirmation of identity. Serial dilutions of the cloned plasmids constructed with GI and GII inserts were used to determine the lower detection limit of the in-house assay.

Results: Our method detected 21 positive cases: 1 with GI and 20 with GII strains, and these results were confirmed by DNA sequencing (100% sensitivity and 100% specificity). This assay was able to detect down to 10 copies/reaction using cloned plasmid. By comparison, the Vinje method detected 14 GII cases only.

Discussion & Conclusion: Our clinical validation using 100 samples denotes that the gel-based RT-PCR method we had developed is highly sensitive, with a cut-off lower detection limit of 10 copies/reaction in stools, and is able to differentiate GI and GII norovirus subgroups.

BP – AH 07

Gene and Protein Expressions of Visfatin and its Isoform in Human Cell Lines

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Background: Adipocytokines secreted by adipose tissues have been suggested to be associated with different metabolic diseases. The recent discovery of an adipocytokine, visfatin which is reported to be predominantly secreted by visceral adipose tissues has been shown to be associated with glucose uptake and insulin secretion in diabetes. Therefore, the expression of visfatin may serve as a potential biomarker for metabolic diseases and the aim of this study is to evaluate the expression of visfatin and its isoform in different human cell lines.

Methods: Total RNA and protein extracts were isolated from 7 human cell lines (293T, CLEC, HepG2, Huh7, Jeg3, MCF7 and Panc1) and 1 mouse cell line (3T3L1). The total RNA was subjected to Reverse Transcription-Polymerase Chain Reaction (RT-PCR). Primers for visfatin and its isoform were designed based on nucleotide sequences retrieved from NCBI database (U02020.1 and BC020691.1) using Primer3 program. Beta-actin expression was included as positive control. Western Blot was performed through probing of cell lysates with N-terminal PBEF antibody and GAPDH was included as positive control. Overexpression of visfatin was carried out through infection of 293T cells with lentiviral vector containing visfatin and its isoform sequence. Overexpression of infected cells was checked through fluorescence emitted by the Green Fluorescence Protein (GFP) reporter gene.

Results: All the 7 human cell lines and 1 mouse cell line tested showed gene and protein expression of visfatin (U02020.1). The cell lines also showed gene expression of the shorter isoform, while the 293T cell line infected with the isoform showed protein expression of visfatin isoform.

Discussion & Conclusion: Visfatin and its isoform have been shown to be ubiquitously expressed in all the cell lines tested. The ubiquitous expression may indicate an important and essential role of visfatin in different cell types. In addition, the expression of the shorter isoform of visfatin may suggest a differential regulatory role of visfatin and its isoform in different metabolic diseases.

BP – AH 08

Activity Participation Patterns of Stroke Patients Undergoing Early Supported Discharge in Singapore

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Background/Hypothesis: This study aimed to investigate the activity participation patterns of stroke patients enrolled in home-based therapy termed Early Supported Discharge (ESD) programme.

Methods: One hundred and twenty-five patients (male 58.4%, female 41.6%; mean age 66.4 years, SD 11.4 years, range 38 to 96 years) were enrolled into the ESD programme from July 2007 to March 2009. Basic activities of daily living (BADL) function was assessed using the Functional Independence Measure (FIM) before and after

the ESD programme. Instrumental activities of daily living (IADL) and social participation were assessed with the Frenchay Activities Index (FAI) at 3 intervals: pre-stroke, immediately post-stroke, and post-ESD.

Results: Using the FAI, there was a significant decrease in activity participation levels immediately post-stroke ($P < 0.001$), followed by a significant increase ($P < 0.001$) post-ESD. The top 3 activities performed by male patients [(1) "Walking outside > 15 minutes", (2) "Social occasion", (3) "Travel outing/car rides"] and female patients [(1) "Walking outside > 15 minutes", (2) "Washing up", (3) "Light housework"] post-ESD were the same as those performed pre-stroke, but at a significantly lower frequency ($P < 0.05$). Post-ESD FAI scores were also correlated with that of the FIM (Pearson $r = 0.47$, $P < 0.01$) and negatively correlated with age (Pearson $r = -0.23$, $P < 0.05$).

Discussion & Conclusion: Stroke patients who underwent ESD demonstrated significant resumption in IADL and social participation but many did not return to their pre-stroke activity levels. Older age and lower BADL function were also related to a lower level of IADL participation. Future research on factors influencing participation post-stroke is recommended.

BP – AH 09

A Review of Use of Granulocyte Colony-stimulating Factor (G-CSF) at a University Cancer Centre

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Background/Hypothesis: Prophylactic G-CSF use has been shown to reduce the incidence, duration, and severity of chemotherapy-induced febrile neutropenia (FN). The objectives of this study were: (1) to review the indications of use of pegfilgrastim and filgrastim in cancer patients from National University Health System (NUHS), and (2) to evaluate their efficacy and safety, as measured by the incidences of breakthrough FN and adverse events in patients who received them after chemotherapy respectively.

Methods: Study commenced upon DSRB approval. Data were retrospectively obtained from medical records of cancer patients 21 years or older, who received either pegfilgrastim or filgrastim in NUHS over a period of 2 months.

Results: Twenty-three patients undergoing 96 chemotherapy cycles were studied. Out of 56 and 24 patient-chemotherapy cycles in which filgrastim and pegfilgrastim were used respectively, 55.4% and 87.6% were indicated for primary prophylaxis, while 16.1% and 12.5% were used for secondary prophylaxis of chemotherapy-induced neutropenia. Breakthrough FN occurred in 3.2% and 19.0% patient-chemotherapy cycles for filgrastim and pegfilgrastim respectively when received for primary prophylaxis, while none occurred for secondary prophylaxis. Adverse events were observed in 38.9% and 12.5% of filgrastim and pegfilgrastim cohorts respectively. No patient discontinued the use of G-CSF due to adverse events.

Conclusion: This study shows that primary prophylaxis with filgrastim appears to be associated with a lower incidence of breakthrough FN as compared to pegfilgrastim. However, adverse events were more common with filgrastim. Collection of data would be continued for 24 months for significant conclusions to be drawn for the above observations.

BP – AH 10

Validation of Estimated Glomerular Filtration Rate using Standardised Creatinine in Chinese Patients with Chronic Kidney Disease

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Background: Using serum creatinine to estimate the glomerular filtration rate (eGFR- mL/min/1.73m²) is the most commonly used method in laboratories. A new standard, SRM967 was introduced in 2007 to standardised creatinine by isotope dilution mass spectrometry (IDMS). We aim to validate eGFR using standardised creatinine (SSC) in Chinese patients with chronic kidney disease (CKD).

Methods: SSC was measured in 94 Chinese adults with CKD (mean age = 58±13, female = 46, male = 48) using enzymatic method (Siemens-ECRE₂, creatininase/creatinase) traceable to SRM967 (Advia® 2400 Chemistry System). Reference GFR (rGFR) was measured using ^{99m}Tc-diethylenetriaminepentaacetic acid plasma clearance and compared with eGFR: 30849xSSC^{-1.154}xAge^{-0.203}x0.742(if female)x1.212(if African-American).

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Results: Mean rGFR = 53±29 (range, 10-152), mean eGFR = 50±29 (range, 10-153). The correlation was good (r²=0.8074; eGFR = 0.92 (rGFR)+1.01). 53%, 76% and 98% of eGFR were within 15%, 30% and 50% accuracy of the rGFR respectively. Female and male eGFR correlated (r²=0.80, mean = 58±35, range = 10-152; r²=0.82, mean = 46±21, range = 13-105). Overall, eGFR and rGFR had significant difference (*P* = 0.02) but not when eGFR <60 (*P* = 0.15) and >60 (*P* = 0.07) were grouped separately.

Discussion/Conclusion: eGFR determined using standardised creatinine correlated well with rGFR but accuracy within 30% was less than 90%. Further studies on newer markers (cystatin C), alone or in combination with SSC, to improve eGFR are required.

BP – AH 11

Subjective Global Assessment is Clinically More Useful Than Mini-Nutritional Assessment in Hospitalised Older Adults

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Background/Hypothesis: Malnutrition is prevalent among hospitalised older adults. None of the nutritional assessment tools had been evaluated for use in Singapore. The study aimed to compare the use of Subjective Global Assessment (SGA) and Mini-Nutritional Assessment (MNA) on hospitalised older adults.

Methods: Newly admitted patients aged ≥60 years, who were not critically or terminally ill, were recruited from the geriatric medicine unit in Tan Tock Seng Hospital. Nutritional status was assessed using SGA and MNA upon admission, and analysed against clinical outcomes using regression analysis, before and after adjustment of covariates such as age, gender, race, comorbidities, severity of illness, and admission modified Barthel Index (MBI).

Results: The sample comprised 281 participants with mean age 81.3 ± 7.6 years; 44% male; 83% Chinese; median length of stay

(LOS) 9 days. SGA and MNA were completed in 100% and 84% of the participants; 35% and 23% were identified as malnourished, respectively. SGA-determined malnutrition was associated with LOS ≥11 days (OR 1.94), readmission at 3-month (OR 2.42), mortality at 6-month (OR 4.30), and MBI <50 at 6-month (OR 2.08, all *P* <0.05). MNA-determined malnutrition was associated with readmission at 3-month (OR 2.15), mortality at 6-month (OR 2.97), and MBI <50 at 6-month (OR 5.80, all *P* <0.05). After adjustment for covariates, only SGA-determined malnutrition remained predictive of LOS ≥11 days (OR 2.45, *P* <0.05).

Discussion & Conclusion: SGA has a higher completion rate and is better associated with clinical outcomes than MNA. Therefore SGA is a more useful nutritional assessment tool for hospitalised older adults in Singapore.

BP – AH 12

Cerebral Laterality in Early Onset Schizophrenia: Loss of Left Hemisphere Advantage in Word Imageability on a Lexical Decision Task as a Function of Length of Illness

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Background/Hypotheses: Anomalies of functional asymmetry have been observed in schizophrenia for over 30 years. Prospective follow-up studies suggest that these anomalies might be accounted for by changes in the brain during the early part of the illness as progressive morphological changes implicating Left Hemisphere (LH) structures have been observed in several imaging studies in the last decade. Language-processing abilities, specifically, LH language processes are hypothesised to be implicated in Schizophrenia. Specifically, greater loss of LH Advantage (LHA) for linguistic processing is hypothesised to be observed with longer Length of Illness (LOI).

Methods: A Lexical Divided Visual Field (DVF) Task for word imageability was administered to 19 controls, 18 Short LOI (SLOI; <1 y) and 19 Long LOI (LLOI; >1 y) patients. Right Visual Field Advantage (RVFA) for processing Low Imageability (LI) words, and unilateral LH activation for LI word processing, makes the DVF a choice task for studying cerebral asymmetry in schizophrenia.

Results: Findings revealed no overall group differences between patients and controls on both response times and accuracy. However, LLOI patients demonstrated an absence of LHA in responding to abstract words between visual fields (*P* = .978), as compared to SLOI patients (*P* = 0.06), and controls (*P* = 0.001). SLOI patients made significantly more RVF/LH errors for LI words, while LLOI patients made significantly more RVF/LH errors on both LI and high imageability words.

Conclusion: Findings are consistent with theories for neurocognitive and language processing decline in schizophrenia as hypothesised. The results suggest that there is a downward neuropsychological trajectory as the illness progresses. Further longitudinal studies should be conducted to further understand the course of schizophrenia and its implications for neuropsychological and linguistic processes associated with the illness.

BP – AH 13

The Effects of Nicotinic Acid on Monocyte Adhesion and Gene Expression Profiles in Endothelial Cells

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Background/Hypothesis: Monocyte adhesion to endothelium is a crucial step in atherogenesis. Nicotinic acid (niacin) causes plaque regression, reduces cardiovascular events and mortality. We hypothesise niacin reduces monocyte adhesion by modifying expression of genes in adhesion pathway.

Methods: HUVEC were grown to 90% confluence before treatment with niacin. In selected experiments, TNF- α was used to elicit the expression of adhesion molecules. Monocytes were freshly isolated using density-gradient centrifugation of blood, before CD14⁺ magnetic beads separation. HUVEC were incubated with monocytes for 1 hour. Non-adhered monocytes were collected by 1 ml-PBS wash and estimated using Trypan blue with observer blinded to treatment conditions. In separate experiments, RNA from niacin-treated HUVEC was isolated and converted to cDNA before gene expression in extra-cellular matrix/ adhesion pathways was quantified by RT-profiler® PCRArray.

Results: Mean (1SE) % from 5 to 8 experiments was analysed. Compared to control media, monocyte adhesion was reduced 8.3 (2.4)%, 25.7 (1.6)% by 1 mM, 3 mM niacin respectively ($P < 0.01$). TNF- α increased adhesion 2.5-fold, while niacin at 1 mM, 3 mM reduced this increase by 6.6 (2.3)%, 9.9 (2.9)% respectively ($P < 0.05$). Interestingly, 10 mM niacin caused no significant reduction in adhesion compared to control media in basal and TNF- α stimulated control.

Niacin 3 mM and 10 mM were associated with greater than 2-fold down-regulation of genes coding for contactin-1, collagen-types VIII- α 1, integrins (α -L, β 3, β 4), matrix-metalloproteinases (MMP1, 2, 12), TIMP-3 VCAM-1, thrombospondin-3, with up-regulation in TIMP-1 and integrins (α 1, α 4, β 2). Genes for integrin- α 8, hyaluronan-synthase-1 and laminin-3 were only up-regulated by 10 mM, while MMP-13 was down-regulated by 10 mM, not 3 mM.

Discussion & Conclusion: Increasing niacin concentration reduces monocyte adhesion to endothelial cells in a U-shaped manner. Gene expression patterns may provide mechanistic insights on its role in reduction of cardiovascular events.

BP – AH 14

Comparison of Customised Versus Standardised Peripheral Parenteral Nutrition in an Asian Tertiary Hospital

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Background/Hypothesis: Peripheral parenteral nutrition (pPN) can be used for patients who cannot be sufficiently fed enterally. Currently, patients in Tan Tock Seng Hospital (TTSH) are placed on customised pPN, ranging from dextrose infusions to a combination of lipids, amino acids and dextrose infused through separate intravenous (IV) lines. Alternatively, pPN can be administered via standardised pre-mixed bags, in which nutrients are mixed in 1 bag and infused via a single vein.

The primary objective of this study is to determine the adequacy

of nutrient provision, safety and cost-effectiveness of the type of pPN in TTSH.

Methods: Patients admitted under general surgery department who were nil-by-mouth and required pPN were recruited prospectively. Their case notes were reviewed and relevant information recorded. Time for pPN administration was translated into costs.

Results: Fifty-one patients were given customised pPN, corresponding to a median 21.8% of calories required, for an average of 5.5 days. On the other hand, 18 patients were given standardised pPN for an average of 4.5 days and received significantly more calories of 57.5%. The most common complications in patients on customised pPN were erythema at the plug site (18%) and hypophosphatemia (8%), while raised triglycerides (11%) was common in patients on standardised pPN. Standardised pPN costs \$13 more per day to hospital compared to customised pPN.

Discussion & Conclusion: Standardised pPN was more nutritionally adequate, and reduced complications such as hypophosphatemia and erythema. However, raised triglycerides were a common complication. Despite shorter nursing time with standardised pPN, cost-savings to hospital was not attained.

BP – AH 15

Impact of Prolonged Participation in Psychosocial Rehabilitation Programs on Community Reintegration of Patients with First-Episode Psychosis

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Background/Hypothesis: Psychosocial treatments play a critical role in the rehabilitation of patients with psychosis. However, as patients attend such programs, they may have decreased motivation to reintegrate into the community.

Objective: To examine if there is a change in level of community integration of patients with first-episode psychosis who have prolonged duration of psychosocial intervention.

Methods: We included patients with first-episode psychosis according to DSM-IV criteria, and who attended more than 100 hours of psychosocial rehabilitation at Club EPIP (drop-in centre) over a period of 12 months (May 2008 to April 2009). Their sociodemographic details, as well as their scores on the Positive and Negative Symptoms Scale (PANSS) and Global Assessment of Functioning (GAF), were examined.

Results: Ten patients were included in our sample. Of these, 50% ($n = 5$) were male. Mean age was 25 years old (standard deviation 7.3). A total of 80% ($n = 8$) had a diagnosis of schizophrenia spectrum disorders, 10% ($n = 1$) with bipolar disorder, and 10% ($n = 1$) with brief psychotic disorder. Median duration of untreated psychosis (DUP) was 12 months (range, 0.5 to 120). All were single, 90% ($n = 9$) had at least secondary school education, while 10% ($n = 1$) had primary school education. At baseline, 1 was gainfully employed, 1 was undergoing national service and 8 were unemployed. At baseline, their mean PANSS score was 71.9, and their mean GAF score was 37.6. The PANSS and GAF ratings assessed closest to April 2009 were 35.6 and 64.8 respectively. As of April 2009, 90% ($n = 9$) patients were gainfully employed, or attending job training or sheltered workshop. One was still unemployed.

Discussion & Conclusion: Our results show that patients made improvements in psychotic symptoms and level of functioning, and

the majority of them also became involved in vocational pursuits. The results seem to indicate that patients who have prolonged participation in psychosocial rehabilitation programs still continue to be motivated for employment. However, as the sample size is very small, the results may not be conclusive. Other factors that should be considered in future studies are the patient's level of social support, pre-morbid employment history and cognitive functioning. We also want to measure other forms of community engagement, such as volunteerism and social activities.

BP – AH 16

Nutrition Status and Hospitalisation Outcomes of Patients Receiving Tube Feeding in a Tertiary Hospital In Singapore

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Background: The prevalence of malnutrition in hospitalised patients has been studied previously. However there is paucity of worldwide data on nutrition status and hospitalisation outcomes of patients receiving tube feeding. This study aims to determine the prevalence of malnutrition and hospitalisation outcomes of inpatients referred for tube feeding in a tertiary hospital in Singapore.

Methods: We retrospectively reviewed the records of patients aged ≥ 21 years referred to National University Hospital's dietitians for tube feeding in the year 2008. Nutritional status was assessed using Subjective Global Assessment (SGA). Patients were classified as malnourished if SGA < 6 . Univariate analysis was used to determine the prevalence of malnutrition and multivariate analysis to compare the nutritional status and hospitalisation outcomes.

Results: Seven-hundred and thirty-five patients with a mean age of 69.6 ± 16.9 years (range, 21 to 102) were included in this study. Fifty-three per cent (95% CI, 49.4-56.7) of the patients were malnourished. Malnourished patients had significantly higher mortality compared to well-nourished patients (32.6% vs 15.7%; $P < 0.001$; OR = 2.6; 95% CI, 1.8-3.7). The median survival time of malnourished patients was significantly shorter compared to well-nourished patients (39 vs 96 days, log rank test $P < 0.001$). Incidence of hospital-acquired infection was also significantly higher in malnourished patients compared to well-nourished patients (50.8% vs 40.6%; $P < 0.05$; OR = 1.5; 95% CI, 1.1-2.0).

Conclusion: Malnutrition is prevalent amongst hospitalised patients on tube feeding and is a predictor of poor outcomes. Early identification and prevention of malnutrition is important in reducing the high mortality and morbidity.

BP – AH 17

Influence of Carbonyl Reductase (CBR3 730G >A and 11G >A) Polymorphism on Doxorubicin Toxicity in Childhood Acute Lymphoblastic Leukemia (cALL): A Pilot Study

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Background: Doxorubicin, an important anthracycline in treatment of cALL, has been associated with hematologic toxicity and cardiomyopathy. Carbonyl reductase reduces doxorubicin into its less toxic

metabolite, doxorubicinol. Previous studies had shown that CBR3 730G >A, and 11G >A modulates the enzyme activity and may have an impact on its biotransformation. Here, we investigated the association of CBR3 730G >A and 11G >A with doxorubicin toxicity.

Methods: Genotyping was carried out using PCR-RFLP on 72 patients, with treatment-related toxicity graded according to National Cancer Institute (NCI) toxicity criteria (v3.0). Statistical analyses were performed using chi-square tests based on genotypic frequencies.

Results: The 730 GG genotype is significantly correlated with a reduced frequency of fever compared to those without this genotype (GA/AA), $P = 0.05$ ($n[\text{no fever}] = 28$; $n[\text{fever}] = 44$). The incidence of GG in the no fever and fever group is 39% and 18% respectively. When examined in a neutropaenic fever group, the 730 GG genotype confers greater protection, $P = 0.04$ ($n[\text{No neutropaenic fever}] = 31$; $n[\text{neutropaenic fever}] = 41$). The incidence of GG in the no neutropaenic fever and neutropaenic fever group is 39% and 17% respectively. In contrast, the 11 GG genotype showed a positive trend towards an increased incidence of fever particularly neutropaenic fever, albeit not statistically significant. The frequency of GG in the no fever ($n = 28$) and fever ($n = 44$) group is 36% versus 41%. Comparing no neutropaenic fever and neutropaenic fever group, the incidence of GG is 35% versus 42%.

Conclusion: CBR3 730 GG genotype confers protection against fever, neutropaenic fever whilst 11 GG genotype showed increased predisposition towards doxorubicin toxicity.

BP – AH 18

Impact of a Pharmacist's Medication Review in a Singapore Nursing Home

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Background/Hypothesis: Pharmacist's medication review (PMR) is shown to aid in rational use of medication in nursing homes (NHs). The study aims to quantify PMR in a Singapore NH by calculating cost-savings from reducing inappropriate drug use and associated cost-savings. The reduction of the use of potentially inappropriate medication in the Beers criteria was also calculated.

Methods: A point-prevalence, comparative study was carried out for 2 NHs, 1 intervention (NH 1) and the other control without PMR service (NH 2). Medication and laboratory test costs, number of unscheduled physician consultations, incidence of inappropriate drugs use, rate of hospitalisation due to uncontrolled medical conditions (namely epilepsy), and number of cases of polypharmacy were compared.

Results: Medication costs were similar between the 2 NHs ($P = 0.91$), whereas laboratory test costs were higher in NH 1 ($P = 0.004$). There was more non-conformance to Beers' criteria in NH 2 ($P = 0.012$). Occurrences of polypharmacy (5 or more routine medications; $P = 0.955$) and major polypharmacy (10 or more routine medications; $P = 0.174$) were similar. The incidence of breakthrough seizures (BTS) was higher in NH 2 (nil in NH 1, 3 in NH 2; $P = 0.06$). NH 1 and NH 2 have mean unscheduled physician's consultation rate per resident of 3.80 and 6.08 per year respectively.

Discussion & Conclusion: PMR in NH resulted in increased laboratory test cost. This could be due to pharmacists' active participation in tighter control of the residents' medical conditions. PMR in NH has also subsequently appears to reduce hospitalisation caused by

inadequate control (shown by BTS) and number of unscheduled doctor's consultation.

References: 1. Singapore Ministry of Health Hospital Bill Size Statistics 2007

BP – AH 19

Incidence of True and Apparent Leg Length Discrepancy in Male Adolescents Involved in Asymmetrical and Symmetrical Sports: A Cross-sectional Study

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Background/Hypothesis: Leg length discrepancies are reported to be a predisposing factor to the development of musculoskeletal injuries. It is hypothesised that adolescent male participants involved in asymmetrical sports such as field hockey may have a higher likelihood to develop true or apparent leg length discrepancy compared to symmetrical sports such as long distance running. This may be due to the imposed stress from the nature of their sports causing possible factors such as asymmetrical muscle tightness, shortening, imbalance and spinal scoliosis.

Methods: Two groups (hockey and long distance running) of 40 male adolescents aged between 16 and 18 years were recruited from tertiary institutions. Two blinded investigators measured the true and apparent leg lengths in supine and standing positions. The Fisher Exact Test was used to look at the significance level.

Results: There was a significantly higher incidence of true and apparent leg length discrepancy ($P < .001$) observed in the asymmetrical group of hockey athletes compared to the symmetrical group of long distance runners.

Discussion & Conclusion: There is a significant level of higher incidence of leg length discrepancy in male adolescent athletes involved in asymmetrical sports. The findings of this study has provided valuable information to doctors, physiotherapists, massage therapists, coaches, physical education teachers, podiatrists and young athletes to take the necessary steps to avoid structural imbalance. This can be in the form of modifying their exercise, training and recovery programs to incorporate specific massage, stretches or strengthening exercises. The findings also add further testimony for the various practitioners addressing asymmetrical problems in their daily clinical practice.

BP – AH 20

Do Meal Replacements have a Role in Weight Management? A 2 Year Case Study from the Experience of a Singapore Hospital

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Background: Growing concerns of an obesity epidemic indicate a pressing need for new and comprehensive strategies for weight management. Alexandra Hospital has an evidence based, multi-disciplinary Weight Management Programme where meal replacements are offered to suitable patients. Although these are widely used as a weight loss strategy, their effectiveness beyond controlled clinical trial environments, particularly in a local setting, is unknown.

Aims:

1. To investigate the safety and effectiveness of using partial or full meal replacements as a means of achieving weight loss in a free living, overweight/obese population at increased cardio-

vascular risk.

2. To identify the qualities of individuals and aspects of intervention which determine success.

Methods: Data were collected retrospectively for the period from January 2007 to 2009 from 22 patients (Full Replacement: 19; Partial Replacement: 3). Patients on the full replacement program consumed 5 sachets of Optifast® LCD (Nestle) everyday for up to 12 weeks during the active phase (800 calories, 70 g protein). Food was gradually reintroduced during the subsequent 6-week transition phase. During maintenance phase, some patients continued with 1 to 2 partial meal replacements daily, in the context of a nutritionally adequate, low calorie diet. Participants were reviewed at least once every fortnightly during the active and transition phases. Data on body weight, body composition, diet and exercise were collected at each review. Where available, data on blood pressure and biomarkers such as lipids, HbA1c and blood glucose levels were collected.

Results: Although real weight loss was modest at 7.8 ± 3.2 kg (mean \pm SD), $P < 0.01$ (mean percentage weight loss $8.2 \pm 3.1\%$, $P < 0.01$) for patients who underwent the full replacement program, 40% of patients produced $\geq 10\%$ weight loss after the transition phase. Patients on partial replacement for durations from 3 to 5 months lost a comparable 4.5 ± 0.8 kg, $P < 0.01$ ($5.3 \pm 1.0\%$, $P < 0.01$). During the maintenance phase, weight change ranged from -0.5 kg to $+2.2$ kg for a period of follow-up from 1 week to 7 months. Metabolic benefits were indicated by significant improvements in chronic disease markers. Three patients reported significant reduction in their blood pressure and 1 patient reported a reduction in lipid levels. At least 3 patients reported improvement in their HbA1c levels, with 2 patients managing a reduction in their insulin doses. Other indications of success include self-reported improvements in exercise fitness, self-perception, physical appearance and self-esteem. Mild diarrhoea or constipation was the most commonly reported side effects. These usually resolved in the first week when patients increased their fluid and fibre intake.

Discussion & Conclusion: Meal replacements can safely and effectively produce significant and sustainable weight loss, with associated improvements in cardiovascular disease risk factors in compliant and committed individuals who are able to afford them. Regular follow-up and professional guidance are useful in reinforcing compliance. The long-term maintenance of weight loss is dependent on patients making sustained improvements to their lifestyle and diet. Structured dietary interventions (including professional advice on nutrition, practical meal plans and the simplicity of instructional messages) are helpful in this aspect.

BP – AH 21

Evaluation of Flocked Swab versus Dacron Swab for Sample Collection

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Background/Hypothesis: The Flocked swab is a product of Copan Diagnostic Inc. which claims to be able to collect more cells than other nasopharyngeal swabs due to its unique characteristics.

The aim of this study is to evaluate Flocked Swab on its ability to collect cells from a prepared sputum sample by comparing it with the Dacron Swab.

Methods: Copan Flocked swab (Catalogue no. 503CS01.us) and Copan Dacron swab (Catalogue no. 175KS01) were placed and

twirled in a 5 ml sputum sample. They were then put into normal saline individually, held for 10 minutes, vortexed for 10 seconds and centrifuged for 5 minutes at 2500 rpm. They were decanted and the sediment was resuspended with 1 drop of sterile saline before being smeared onto a glass slide to be Gram stained. The slides were viewed under the light microscope at oil immersion and the number of white blood cells was counted. This was done for 10 pairs of Flocked Swab and Dacron Swab to give an average number of cells.

Results: The Flocked Swab and Dacron Swab collected an average of 11.41 and 5.38 cells respectively. The Flocked Swab was able to collect an average of 6.03 more cells (31%) than the Dacron Swab.

Discussion & Conclusion: Proper and sufficient cell collection is necessary for virology investigation. With this experiment giving a significantly better result in collection of cells than Dacron Swab, it is shown that the Flocked swab is a better tool for the collection of cells for virology investigation.

BP – AH 22

Functional Outcomes for Stroke Patients Following Early Supported Discharge

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Background/Hypothesis: Studies have shown positive functional outcomes for stroke patients receiving home-based rehabilitation services following early discharge from hospital. The aim of this study was to determine the functional outcomes of stroke patients who participated in home-based therapy termed as the Early Supported Discharge (ESD) programme in the National University Hospital.

Methods: One hundred and twenty-five patients (male 58.4%, female 41.6%; mean age 66.4 years, SD 11.4 years, range 38 to 96 years) were recruited into the ESD programme from July 2007 to March 2009. Functional outcome measures used were the Functional Independence Measure (FIM), Frenchay Activities Index (FAI), Motricity Index and Modified Rankin Scale, measured before and after the ESD programme.

Results: Improvement in all the functional outcomes was found to be statistically significant. Patients showed significant improvement ($P < 0.001$) on the Motricity Index of the arm and lower limb on the hemiplegic side. There was also a reduction from 'moderate' to 'slight' disability ($P < 0.001$) on the Modified Rankin Scale. Functionally, there was a mean improvement of 15 points ($P < 0.001$) on the FIM and 9 points ($P < 0.001$) on the FAI, suggesting that patients were better able to carry out their basic and instrumental activities of daily living. Improvement on the Motricity Side Index was also found to be correlated with improvement in the FIM ($P < 0.05$) and FAI scores ($P < 0.01$).

Discussion & Conclusion: ESD after stroke results in good functional outcomes and a reduction in disability levels. Motor gains also appear to be related to a greater degree of functional independence and participation in activities.

BP – AH 23

Change in Nutritional Status of Older Adults during Hospitalisation

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Background/Hypothesis: The study aimed to determine the nutritional status of older adults upon admission to and discharge from a tertiary hospital in Singapore, and the impact of hospitalisation weight loss on clinical outcomes.

Methods: Newly admitted patients aged ≥ 60 years were recruited from an acute geriatric medicine unit. All patients were assessed using Subjective Global Assessment (SGA), weight, mid-arm circumference (MAC), and triceps skinfold thickness (TSF) on admission and discharge. Weight loss $\geq 1\%$ per week of hospitalisation was analysed against the outcomes before and after adjustment for age, gender, depression, dementia, functional status, comorbidity and illness severity using regression analysis.

Results: The sample comprised 281 patients with mean age 81.3 ± 7.6 years; 44% male; 83% Chinese; median length of stay 9 days. Of the patients, 35% were malnourished on admission, and 4% experienced decline in SGA status upon discharge. MAC and TSF were significantly lower at discharge (mean difference MAC: 0.17 cm; TSF: 0.28 mm, $P < 0.05$). A total of 27% had weight loss of $\geq 1\%$ per week during hospitalisation. Weight loss $\geq 1\%$ per week was predictive of discharge to higher level care (adjusted OR 2.64, $P < 0.05$).

Discussion & Conclusion: The decline in nutritional status of hospitalised older adults is significant. Hospitalisation weight loss is predictive of discharge to higher level care.

BP – AH 24

Low Socioeconomic Status, Social Isolation and Challenging Behaviours are Risk Factors of Institutionalisation in Dementia Patients in an Acute Care Setting

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Background: Prevalence of dementia in Singapore is projected from 22,000 in 2005 to 187,000 in 2050. Challenging behaviours, caregiver stress and psychosocial issues are possible reasons for institutionalisation in dementia patients. Fifty per cent of dementia patients referred to medical social worker (MSW) for nursing home (NH) placement were institutionalised. No local data is available so this study aims to examine behavioural and psychosocial factors that predict institutionalisation in dementia patients in acute care.

Methods: We retrospectively reviewed case histories of 40 dementia patients admitted to the Geriatric Medicine Department during October 2006 to March 2007. Demographics, socioeconomic status, behavioural factors and psychosocial issues were collected and analysed using chi-square test and t-test. We grouped reasons for NH placement into specific descriptive themes.

Results: Twenty patients were discharged to NH while 20 were discharged to their own homes or rehabilitation facilities. Institutional-

ised patients were significantly older (mean age $84 \text{ y} \pm 6.9$, $P=0.035$), widowed (70%, $P=0.004$), fewer married (10%, $P=0.006$) and lived apart from family (45%, $P=0.01$) with no identified caregiver (25%, $P=0.08$). They were also staying in 2-room or smaller public housing units (56%, $P=0.02$). There was no difference in significant behavioural disturbances between the 2 groups (35% in each group). Six descriptive themes were identified for institutionalisation: challenging behaviours (55%), distant or strained relationship (55%), financial difficulty (45%), family constraints (40%), caregivers' stress (25%) and patient as caregiver (5%).

Discussion & Conclusion: Dementia patients living alone with lower socioeconomic status, challenging behaviours, family conflicts and caregiver stress predict eventual NH placement. These should be addressed in care of dementia patients in community.

BP – AH 25

Evaluation of Universal Transport Medium versus Viral Transport Medium for Virology Investigation

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Background/Hypothesis: The aim of this study is to evaluate the Copan Universal Transport Medium (UTM) on their ability to sustain the viability of viruses (Herpes Simplex Type II) for up to 48 hours at 4°C by comparing it to Viral Transport Medium (VTM).

Methods: Herpes Simplex Type II viral suspension was inoculated into the UTM and VTM (Hank's Balanced Salt Solution, 1% Foetal Calf Serum and 5% Antibiotics Mixture). They were serially diluted 5-fold and kept at 0, 4, 8, 24 and 48 hours at 4°C. At each time interval, 0.5 mL of UTM and VTM were inoculated into Mink Lung shell vials then centrifuged at 1800 rpm for 30 minutes. They were refed with maintenance medium and incubated at 37°C for 24 hours. Direct immunofluorescence was done and the number of positive infected cells patches was counted.

Results: UTM showed a consistent higher number of infected patches at 4, 24 and 48 hours compared to VTM. The decrease in the number of infected patches within the first 4 hours showed no difference between UTM and VTM. However, UTM has an average of 10% more infected cells than VTM across all time.

Discussion & Conclusion: It is necessary that the transport medium is able to sustain the viability of viruses for virology investigation. With this experiment, it was shown that the UTM is able to preserve larger proportion of viable viruses than VTM.

BP – AH 26

Documentation of Pharmacists' Interventions in Singapore Nursing Homes – A Collaboration Study with National Healthcare Group (NHG) Pharmacy

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Purpose: To identify and investigate the drug-related problems and errors based on pharmacists' interventions made in 4 Singapore nursing homes (A, B, C and D), over a period of 1 year.

Methods: All pharmacists involved in nursing homes medication re-

view under National Healthcare Group (NHG) Pharmacy documented the pharmacist interventions that were accepted by physicians and nursing staff, and entered the data into a spreadsheet on a weekly basis between 1 August 2007 and 1 July 2008. Interventions made included dosage adjustment due to sub-therapeutic dose or overdose, initiation of medications due to untreated conditions, changes in medication therapy due to allergy, drug duplication, drug interaction, discontinuation of drug therapy due to inappropriate duration, contraindications, inappropriate drug selection and adverse drug reactions. There was also a category on "others". The intervention data were classified as administrative errors, prescribing errors and administration errors. Quality Control Charts (QCC) over a year were plotted.

Results: During the study, 22,058 drug orders were reviewed and 770 pharmacist interventions were documented. The pharmacists' interventions contributed 3.49% of the total drug orders reviewed. Nursing home B had the highest percentage of administrative, prescribing and administration errors, 70%, 74% and 89% respectively.

Conclusion: The most commonly documented interventions made by pharmacists in the 4 nursing homes included administrative errors (mainly transcription errors), prescribing errors (drug-drug interactions and therapeutic duplication) and administration errors (administration of unstable drugs due to inappropriate storage). QCC reflected a reduction in the number of errors over a year in nursing home B.

BP – AH 27

Development of Time-in Therapeutic Range Calculator as an Additional Key Performance Indicator of the Anticoagulation Clinic

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Background: Our Anticoagulation Clinic uses incidence rates of INR more than 5 as one of the key performance indicators. Time-in therapeutic range (TTR), defined as the percentage of time spent within therapeutic International Normalised Ratio (INR) range, is the gold standard to measure anticoagulation control. Time-in therapeutic range $\geq 60\%$ is considered as good control.

Methods: A TTR calculator was developed using Microsoft Excel 2007. Verification was done manually to ensure reproducibility and reliability. Patients who were first seen at the clinic in 2008 and had follow-up visits were included in this study. Medical records and all measured INRs till November 2008 were analysed.

Results: The TTR calculator has been validated to be accurate. Forty-four patients were studied. Nineteen per cent ($N=8$) had achieved TTR of at least 80%, thirty-four 34% ($N=15$) had attained TTR of at least 60% whilst 41% ($N=18$) had obtained TTR of less than 30%. The median TTR was 49%.

Discussion & Conclusion: The development of the TTR calculator has resulted in a novel and reliable way of assessing the performance of anticoagulation clinic. This tool is used in the United States and United Kingdom but requires paid dues. This is the first such calculator to be developed and used in Singapore. Moving forward, we will adopt this tool in our routine reporting of KPIs for our clinic and for quality improvement. Further studies will be done to characterise patients with poor TTR.

BP – AH 28

Demographic and Clinical Features of Adolescent Inhalant Abusers

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Background /Hypothesis: Inhalant abuse among adolescents is a concern worldwide. Research points to an increased prevalence of mental health problems, impulsivity and anti-social behaviour among inhalant users. This paper describes the demographic and clinical characteristics of inhalant abusers treated at CAMP, Singapore, April 2008-2009.

Methods: Clinicians administered a semi-structured interview to elicit data on demographic characteristics, substance use behaviour and history, co-morbid diagnoses and substance-related problems.

Results: Inhalants were used by 65% (75/120) of adolescents seeking treatment for addictions, of whom 85% were diagnosed with inhalant abuse/dependence. Inhalant users were predominantly male (77%), Chinese (51%) or Malay (40%), studying (83%), living at home (70%) and averaged 15.1[±1.3] years of age. Adhesives were most commonly abused (91%) followed by ethylchloride (6%) and toluene (3%). Other polysubstance use included benzodiazepines (n = 10), stimulants (n = 6), hallucinogens (n = 4), opiates (n = 3) and alcohol (n = 10). Mean onset of substance use was 13.7 [±1.4] years. One-fifth (20%) had a co-morbid psychiatric disorder and 17% had a physical health problem (mainly asthma). Despite this the mean score on the GAS was 61.0 (range, 45 to 79) indicating some difficulty but generally functioning well.

Discussion & Conclusion: Inhalant use is extremely common among adolescents attending addiction treatment in Singapore. Supporting earlier studies, it often occurs in the context of poly-substance use and psychiatric morbidity. Research is needed to determine the neurotoxic effects of inhalants on the developing adolescent brain and cognitive functioning. Treatment and preventative efforts need to educate adolescents of the associated harms and restrict its widespread availability to this vulnerable population.

BP – AH 29

Return to Home and Its Impact on Functional Independence Measure – An Early Supported Discharge Approach

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Background/Hypothesis: The home is a less confined and rigid environment compared to the hospital. Studies have shown positive functional outcomes for stroke patients receiving home-based rehabilitation following early discharge. The aim of this study was to investigate the functional outcomes following discharge from hospital and after home-based rehabilitation. It was hypothesised that an early discharge would be more conducive to rehabilitation, encouraging greater functional independence.

Methods: One hundred and twenty-five patients (male 58.4%, female 41.6%; mean age 66.4 years, SD 11.4 years, range 38 to 96 years) were recruited into the Early Supported Discharge (ESD) programme from July 2007 to March 2009. The first ESD session was on the next working day after discharge. The Functional Independence Measure (FIM) was scored on the day of discharge, as well as on the first and last ESD session.

Results: There was a statistically significant improvement of 12 points on the FIM between the day of discharge and the first ESD session ($P < 0.001$). Patients displayed most improvement in the motor component, with a statistically significant improvement of 10.2 points ($P < 0.001$). There was also a significant improvement of 15.1 points between the first and last ESD session ($P < 0.001$), within which there was a significant improvement of 13.1 points on the motor component ($P < 0.001$).

Discussion & Conclusion: Early discharge home seems to be conducive to rehabilitation and encourages functional independence, as evidenced by significant improvements in FIM between the day of discharge and first ESD session. Home-based rehabilitation then further enhances motor recovery with a greater level of independence.

BP – AH 30

Gender Difference in Age of Onset of Schizophrenia in Singapore

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Background: Differences in clinical course of schizophrenia have been suggested to be due to gender difference. Studies from Caucasian populations have consistently found that male patients have an earlier age of onset. Few studies have been conducted in the Chinese ethnic group. We conducted a cross-sectional study to investigate the effects of gender on age of onset of schizophrenia among Chinese patients in Singapore.

Methods: Nine hundred and three subjects diagnosed with schizophrenia based on the Structured Clinical Interview for DMS-IV-TR were recruited from the Institute of Mental Health between 2005 and 2008. A standardised form was used to gather data such as age, gender, age of onset of illness and psychiatric family history. Information was gathered from medical records and patients.

Results: In general, males developed schizophrenia 1.6 years earlier than females. When stratified by family history of psychiatric disorder, females in the group with no family history demonstrated a bimodal distribution in age of onset of illness, and had a significantly later onset of illness compared with males. For patients with psychiatric family history, no significant gender differences were found in age of onset of illness, and no bimodal distribution was observed.

Discussion & Conclusion: There were gender differences in age of onset of illness in Chinese schizophrenia patients in Singapore. We report the influence of family history of psychiatric disorder in age of onset of illness. These findings highlight the impact of genetic over hormonal influences, and have important implications for subsequent research in this field.

BP – AH 31

A Study on Tardive Dyskinesia in Chinese Patients with Schizophrenia

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Introduction: Tardive dyskinesia (TD) is a potentially irreversible side effect of long-term antipsychotic use. An earlier study on 537 Chinese patients reported age and current antipsychotic dosage as significant risk factors in the development of this disabling condition.

Aims: The objective of this study was to identify risk factors for

TD in an independent and larger sample of Chinese patients with schizophrenia.

Methods: Seven hundred and ninety Chinese patients with schizophrenia were recruited for this study. The diagnosis of schizophrenia was ascertained by a semi-structured diagnostic interview. Data collected included age, duration of antipsychotic and their current daily dosage measured in chlorpromazine equivalents. Dyskinesia was assessed by the Abnormal Involuntary Movement Scale (AIMS), and a case definition of TD was defined with the Schooler and Kane criteria.

Results: One hundred and sixty-six (21.1%) patients were assessed as suffering from TD. Patients with TD were older, had a longer duration of exposure to antipsychotic medications, and a higher proportion of diabetes mellitus. There were no differences in distribution of gender and current smokers, and in the current dose of antipsychotic medication. There was also no difference in the prescription of other psychotropic medications. In the multiple logistic regression model, we found that age, current antipsychotic dose and anticholinergic continued to be significant risk factors for TD.

Conclusion: We discovered fairly similar findings as the smaller sample reported earlier. The contrary finding that a lower dose of antipsychotic medication reported in the group with TD could reflect a limitation of a cross-sectional design. This lowered dose could have occurred after discovery of TD, and was associated with an increased dose of anticholinergics.

BP – AH 32

Pain and Functional Score for Patients with Distal Radius Fracture **SS ONG, LL TAN**

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Background: Distal radius fracture (DR#) is a common hand injury. This study aims to evaluate functional outcomes of DR# patient following Occupational Therapy intervention with incorporation of daily activities and standard home program, and to explore variations related to fracture severity (AO classification) and complications.

Methods: A prospective study of 46 patients with distal radius fracture was conducted at 3 months. Outcome measure was Patient Rated Wrist Evaluation questionnaire (PRWE). Descriptive analysis was used for patient demographics and outcome results.

Results: Average PRWE score was 19.37%, with higher score indicates more pain and functional disability. A total of 51.1% of patients had none~minimal, 44.4% had mild~moderate, and 4.4% had severe~very severe pain. Sixty per cent of the patients had none~minimal and 40% had mild~moderate functional limitations. Patients had the most difficulty with carrying 10-pound objects and cutting meat with a knife. No consistent differences were noted in the PRWE score for different fracture severity levels. However, PRWE scores for AO type C patients (17.1%, n = 27) were better than type A patients (27.9%, n = 13). For AO type C patients, result for operative management (15.8%, n = 19) was better than conservative management (20.3%, n = 8). Finger and shoulder stiffness (7.7% each) are the most common complications. PRWE score was 33.7% for patients with complications, and 14.4% for patients with no complications.

Conclusion: Most DR# patients who had undergone Occupational Therapy intervention have relatively good recovery, minimal~moderate pain and activity limitation at 3 months. Functional outcome is not directly related to fracture severity, but is affected by complications. Early identification of complications will be a crucial part in DR# management.

BP – AH 33

Urinary Proteomes in Non-albuminuric Diabetic Nephropathy Patients

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Background: Diabetic Nephropathy (DN) is a leading cause of end-stage renal disease. Antibody-based detection of urinary albumin excretion screening for DN is the standard of care. However, a sizeable subgroup (estimated ~30%) of DN subjects may be non-albuminuric. We employed highly sensitive technology – 2-dimensional fluorescence differential gel electrophoretic analysis (2D DIGE) to identify novel urinary biomarkers in non-albuminuric DN subjects.

Methods: Spot urine samples collected from 12 Chinese, age-matched, male subjects (from a sampling frame of 1,192 subjects) with long standing type 2 diabetes mellitus (≥ 10 years) and DN. Six subjects were non-albuminuric (urinary albumin-to-creatinine ratio [ACR] ≤ 30 mg/g but persistently elevated serum creatinine); 6 were macro-albuminuric (ACR ≥ 1000 mg/g). Urinary proteome was analysed by DeCyder software. Protein identification was performed by Matrix Assisted Laser Desorption/Ionisation time-of-flight mass spectrometry.

Results: Sixty protein spots revealed significant differential regulation between the non- and macro-albuminuric subjects (differential abundance > 1.5 fold change and $P < 0.05$), with 22 up- and 38 down-regulated in the non-albuminuric samples. Of these, 7 up-regulated and highly abundant discrete spots represented 3 unique proteins: $\alpha 1$ -microglobulin (marker of renal tubular injury); Glycosylated Chain-A, Apo-Human Serum Transferrin (marker of increased vascular permeability); Chain-B, Human Zinc- $\alpha 2$ -glycoprotein (novel adipose-cytokine associated with glomerular injury). The latter protein was replicated in an independent sample of female DN subjects.

Conclusion: Our data suggested dual-site (i.e. glomerular and tubular) injury in non-albuminuric DN subjects. These polypeptides may become novel urinary biomarkers for the screening of non-albuminuric DN (which will be missed by conventional albumin-based screening method).

BP – AH 34

Clinical Carepath Maximises Appropriate Prescription of Angiotensin Converting Enzyme Inhibitors/Angiotensin Receptor Blockers and Beta-blockers for Heart Failure Patients Admitted to Hospital

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Background: Angiotensin Converting Enzyme Inhibitors/Angiotensin Receptor Blockers (ACE-I/ARB) and Beta-blockers (BB) improve survival and quality of life, and reduce readmissions in Heart Failure (HF) patients. Current international guidelines and performance measures recommend them in all HF patients unless contraindicated. In practice, a substantial proportion of HF patients who should be prescribed these medications, are not.

Methods: We used a Continuous Practice Improvement Project

(CPIP) approach to improve existing processes. We reviewed all patients placed on the HF Clinical Carepath in Tan Tock Seng Hospital (TTSH) in 2007 as a baseline. We prospectively identified all HF Carepath patients from April 2008 to March 2009, and followed them from admission to discharge. ACE-I/ARB and BB use was recorded, as were the reasons for non-prescription. Based on interim data, the CPIP team engaged the inpatient teams to prioritise appropriate prescription. An aide-memoire was added to the Carepath. Full implementation of interventions was from September 2008.

Results: ACE-I/ARB and BB utilization in 2007 ($n = 794$) were 94% and 79% respectively. After full implementation in 496 patients, appropriate usage was 100% for both medications. 30-day readmission rate was 7.4% in patients on ACE-I/ARB and/or BB, versus 21.1% for those on neither. Interim 6-month readmission rates were 14.9% and 29% respectively.

Conclusion: The intensive application of a Clinical Carepath can maximise the appropriate use of evidence-based medications in HF patients, thereby improving outcomes.

BP – AH 35

Physiotherapy for Acute Back Strain in Emergency Department: A First in Singapore

TS NG

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Background/Hypothesis: In Singapore, patients with acute back strain in Emergency department who are non-ambulant after analgesics are admitted to inpatient wards. In November 2007, early physiotherapy for these patients was introduced in National University Hospital Emergency Department's 23-hour extended diagnostic treatment unit (EDTU). The aims of this study are: (1) to assess patients' satisfaction with early physiotherapy, and (2) to compare the length of inpatient stay of these patients in 2008, with the previous 3 years.

Methods: A retrospective telephone survey was conducted in May 2009 on patients who received early physiotherapy from November 2007 to December 2008. Patients' satisfaction was measured using the 7-point numeric global rating scale of change (Ostelo & de Vet 2005). Length of inpatient stay of acute back strain patients from 2005 to 2008 was obtained from the hospital's management information services.

Results: Twelve of the 15 patients (median age, 37 years) who received physiotherapy participated in the survey. The median numeric global rating scale of change was 2 (much improved), a clinically important change. In 2008, 72% of acute back strain patients had inpatient stay of 1 day or less, 28% stayed between 2 and 5 days. From 2005 to 2007, 37% to 40% of such patients stayed for 1 day, with the majority staying between 2 and 15 days.

Discussion & Conclusion: A large sample size is needed to assess the effectiveness of early physiotherapy, its impact on inpatient stay and bed-days saved. Currently, the patients' improvement with early physiotherapy supports the continuation of this service.

BP – AH 36

A Comparison of Radiation Dose for Videofluoroscopy Patients in Singapore with International Standards

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Background/Hypothesis: Videofluoroscopy (VFS) has become a routine procedure used in the objective study of abnormal swallowing function. There are no readily available international reference levels for radiation dose in VFS, but 2 recent studies in the UK and Hong Kong reported median Dose Area Products (DAPs) of 1.40 Gy cm² and 2.42 Gy cm² respectively. This study compared the experience in Singapore with these findings.

Methods: VFS patients from a large Singapore tertiary hospital over a 1-year period were considered ($n = 255$). A speech therapist and radiologist worked together to control radiation exposure. DAP, which is used for comparing radiation dosage, was recorded directly by the imaging system set up in the fluoroscopy suite.

Results: The median DAP of our population was 3.80 +/- 4.93 Gy cm² [99% CI = (3.00; 4.59)]. Eleven per cent ($n = 27$) were found to receive doses 10 Gy cm² and above.

Discussion & Conclusion: The UK national reference doses were highest for biliary drainage (54 Gy cm²) and small bowel enema (50 Gy cm²). Doses for barium swallow, barium meal and barium follow through were 11 Gy cm², 13 Gy cm², and 14 Gy cm². Our median radiation dosage was lower than these. However, direct irradiation to the thyroid gland routinely occurs for VFS compared to fluoroscopy studies to lower parts of the body. As the thyroid gland is a radiation-sensitive organ, it is noteworthy that our patients generally received higher radiation doses compared to published reports and a number in fact had much higher doses. Clinical protocols that work towards reducing and minimising radiation exposure to our patients should be further explored.

BP – AH 37

The Comparison of Violent and Non-violent Offenders among the Mentally Ill Inmates in the Singapore Prison Service

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Aim: The study examined whether the violent offenders differed from non-violent offenders with respect to Axis I disorders and Axis II disorders, prior criminal offending, and consumption of illicit drugs.

Methods: Three hundred and thirteen inmates within the Singapore Prison System were assessed with the Composite International Diagnostic Interview (CIDI) for the presence of Axis I disorders in the past 1 year. Presence of personality disorders was assessed with the Personality Diagnostic Questionnaire (PDQ-4) and Structured Clinical Interview for DSM-IV disorders (SCID-II). Information on the current and prior criminal offending was abstracted from the prison records. The sample was categorised into violent and non-violent offenders based on the current offence which led to the most recent imprisonment.

Result: Axis II personality disorders ($\chi^2 = 4.04$, $P = .044$) and prior offending ($\chi^2 = 4.66$, $P = .031$) were significantly more prevalent in the non-violent offenders than violent offenders. Non-violent offenders were also significantly more likely to report illicit drug consumption ($\chi^2 = 20.05$, $P < .001$) than the violent offenders. No significant differences were identified between the 2 groups of offenders on the Axis I mental disorders and socio-demographic variables.

Conclusion: The findings suggested that the non-violent offenders were more likely to have personality disorders and higher tendencies of criminal recidivism and drug consumption. On the other hand, the presence of mental illness does not appear to be associated with violent offences.

BP – AH 38

Translation of the World Mental Health-Composite International Diagnostic Interview (WMH-CIDI) into Bahasa Melayu

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Background: A nationwide survey initiative to establish the prevalence of mental disorders in Singapore necessitates translation of the diagnostic instrument into Bahasa Melayu, in order to reach the Malay-speaking community. The challenge of translating such an instrument is compounded further by the complexity and length of the selected instrument, the World Mental Health-Composite International Diagnostic Interview (WMH-CIDI). This paper describes a vigorous multi-staged translation process, the aim of which was to produce a version of the CIDI in Bahasa Melayu that would perform in a comparable manner to the original instrument.

Methods: The translation procedure was an adaptation of the guidelines outlined by the World Health Organization: 1) A composite translation was derived from 2 independent forward translations. 2) An expert panel comprising the translators, content experts and a lay person was convened to identify and resolve inadequate expressions in the translation and discrepancies between the translation and the original version. 3) Pre-testing and cognitive interviewing are currently being conducted with individuals who represent the target population to assess whether the translated version is understood in the manner that is intended and to address the items that are commonly misinterpreted.

Results: Issues surrounding the initial translation that were identified and resolved by the expert panel could be classified under the following categories: a) grammatical errors, b) inconsistent use of terms, c) unnatural language, d) misinterpretation, and e) overly literal translations. Interim analysis of pre-testing and cognitive interviewing data indicated that the revised translations were generally comprehended appropriately. Qualitative data in the form of feedback and suggestions regarding problematic items enabled alternative terms and expressions that would better suit the local Malay-speaking community to be identified.

Conclusion: An instrument, particularly a diagnostic one, is far from ready after initial translation due to translation errors that could severely threaten the validity of the data. Expert panel review in addition to pre-testing and cognitive interviewing has been immensely helpful in addressing these errors. The implementation of such procedures in translating research or clinical instruments is strongly advocated to attain a version of an instrument that would perform comparably to the original version.

BP – AH 39

Cytogenetically-identified Interesting Variant Translocations t(V;9;22) in 10 Patients with Chronic Myeloid Leukemia Over a Period of 9 Years at NUH

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Background: Chronic myeloid leukemia (CML) results in the formation of a Philadelphia (Ph) chromosome, associated with the BCR/ABL1 fusion oncogene. At diagnosis, most cases have the characteristic translocation t(9;22)(q34;q11.2); 5% to 10% carry a variant Ph chromosome translocation. Presence of BCR/ABL1 fusion oncogene is reported to have comparable prognosis to those with classic Ph translocations treated with imatinib.

Methods: Only newly diagnosed CML patients were considered for this study. Bone marrow aspirate samples were cultured for 24 and 48 hours using routine cytogenetic protocols and 20 GTL banded metaphases were analysed for each patient.

Results: Over a period of 9 years, 138 patients were diagnosed with CML. Of these, 123 were positive for t(9;22). Ten patients (8.1%) with variant t(V;9;22) were identified. The variant chromosomes involved were 1, 3, 5, 7, 12, 17, 18 and 20. The following karyotypes were present in the 10 patients:

46,XX,t(1;9;22)(p22;q34;q11)[25]	46,XY,t(3;9;22)(p21;q34;q11.2)[20]
46,XX,t(3;22;9)(q26;q11;q34)[25]	46,XX,t(5;9;22)(q?11.2;q34;q11.2)[20]
46,XY,t(9;22;17)(q34;q11.2;q25)[20]	46,XY,t(7;9;22)(q32;q34;q11)[24]/46,XY[1]
46,XY,t(9;22;18)(q34;q11;q21)[50]	46,XX,t(9;22;12)(q34;q11.2;q24.1)[2]/46,XX[98]
46,XX,t(20;22)(p13;q11.2)[20]	46,XY,t(20;22)(q13.3;q11.2)[20]

The presence of the BCR/ABL1 fusion oncogene was confirmed either by PCR or by FISH.

Discussion & Conclusion: All the variant chromosomes involved have differing breakpoints. This accounts for 8.1% of the total number of CML patients who proved to harbour the t(9;22) BCR/ABL1 oncogene fusion and this is in keeping with various other international studies done. Four patients were diagnosed less than 12 months ago and are currently still being treated, 3 patients achieved cytogenetic remission within 12 months, 1 patient was not treated due to age and 2 patients were lost to follow-up.

BP – AH 40

Advance Care Planning Outcomes for Advanced COPD, End-stage Renal Failure and Heart Failure in a Home-based End-of-Life Care programme in Singapore – Preliminary Findings

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Aim: To report the preliminary results of Advance Care Planning in a home-based end-of-life care programme for patients dying from

advanced chronic obstructive pulmonary disease (COPD), end-stage heart failure (ESHF) and end-stage renal failure (ESRF).

Methods: Advance care planning is conceptualised and operationalised as an on-going discussion of a patient's preferences that takes place at the patients' homes, facilitated by a counsellor or a medical social worker. Four outcomes from the discussions were documented: a) preferred place of care, b) preferred place of death, c) preferred choice of caregiver, and d) identification of the proxy decision-maker. The discussion outcomes provided the doctors and nurses in the end-of-life programme information to support the patient's care preferences and medical needs. Final outcomes of concurrence of care with the patient's wishes were measured after death.

Results: One hundred and seventy-nine patients were accepted into the programme between May 2008 and April 2009. Of the patients, 46% were males and 54% were females. The mean age was 76 years with 69% Chinese, 26% Malay, 4% Indian and 1% from other racial groups. A total of 17% of the patients had COPD as their primary diagnosis while ESRF and ESHF constituted 43% and 40% respectively. Seventy-eight per cent of patients were rated as having average or good family support. More than one-third of the patients (40%) died within 1 year of enrolment. ACP were completed for 70% while the remaining 17% were patients found unsuitable because of dementia, communication issue or language barrier. The preferred caregiver was immediate family member (78%), followed by domestic helper (18%). The majority of patients (99%) chose their immediate family member to be their proxies in making end-of-life decisions. A total of 70% fulfilled their wish to die at home, 83% were cared for by their preferred caregiver with 76% in their preferred place of care.

Conclusion: ACP discussions were successfully completed in 70% of the multiracial Singaporean population of patients suffering from advanced COPD, ESHF and ESRF. With good family support, the majority in this cohort chose to be cared for and die at home by family member. Therefore, a home-based programme supported by palliative medical and nursing expertise allowed the fulfillment of end-of-life wishes in 78% of deceased patients.

BP – AH 41

To Decreased Unscheduled Readmission (within 30 Days) Rate to 5% of Patients on Diabetic/Ischaemic Foot with/without Procedure Clinical Pathway within 6 Months

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Background/Hypothesis: The infected ulcers and Ischaemic of foot are the main causes of hospitalisation of diabetic patients. Most of these patients turn up at the emergency department or outpatient clinic with chronic foot ulcers or severe peripheral vascular disease, which may need inpatient treatment. From July 2007 to November 2007, there was an increased rate from 7.2% to 17% for patients on Diabetic/ Ischaemic Foot with/without procedure Clinical Pathway in Tan Tock Seng Hospital. The aim of the project is to decrease unscheduled readmission rate to 5% with referral to Podiatrists for patients on the Clinical Pathway.

Methods: Patient survey was done to determine the actual cause of increasing trend of readmission. The survey revealed 55% of the patients were unaware of proper foot care and foot wears. Matched with the podiatrist inpatient list, we discovered, only 12% of the patients on CP were referred to podiatrists. Four-week pilot project

(10/12/07 to 6/01/08) was initiated in an orthopedic ward. 19 patients admitted with the relevant diagnosis were referred and assessed by inpatient podiatrist. Only 1 patient was unscheduled admitted after the pilot project. Case Mangers will refer the cases to podiatrists as inpatients and given outpatient appointment if needed.

Results: When the projects were spread to include all patients on Diabetic/Ischaemic Foot CP, the readmission rates has significantly dropped from 12.2% (November 2007) to 3.7% (March 2009). Our 5% target was achieved with the 6 months period.

Discussion & Conclusion: Continuous patient education, focusing on foot care, has proven to decrease their unscheduled readmission rates. The team learned that continuous reinforcement of care to these patients encourages them to be the captain of their health and life.

BP – AH 42

Surveillance of Asymptomatic Adenovirus Shedding in Healthy Volunteers

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Background/Hypothesis: Adenovirus is a double-stranded DNA virus that causes a wide variety of clinical manifestation including respiratory infection. Found in both symptomatic and asymptomatic individuals, this can represent either a present infection or viral latency from a previous infection. Healthy volunteers asymptotically shedding may have an impact on the immunocompromised hosts with whom they come into contact. This surveillance enhances our understanding of adenovirus epidemiology in otherwise healthy individuals.

Methods: Urine and saliva swab samples were collected from 40 healthy volunteers (aged 19 to 30 years and 30 to 65 years, with 10 males and 10 females from each group). Qualitative Gel-based Polymerase Chain Reaction (PCR) was used to detect the presence of adenovirus in these samples. Adenovirus DNA extraction was performed using the QIAGEN EZ1 Virus Mini Kit v2.0 and amplified using using an ABI thermocycler. The adenovirus PCR primers used were designed to target the adenovirus hexon gene. Positive PCR products were detected using 3% agarose gel electrophoresis.

Results: Interim results at this stage show that no adenovirus was detected in any of the saliva specimens from either age group. Results of urine testing are still pending and will be presented later.

Discussion & Conclusion: The negative results demonstrate no adenovirus shedding in saliva in this study group. Results from urine testing are required before a full interpretation is possible. However, this small study suggests that adenovirus shedding (at least in saliva) in otherwise healthy individuals may be quite rare.

BP – AH 43

An Audit of Adherence to the Antibiotic Prophylaxis Guidelines in Hysterectomy in National University Hospital

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Background/Hypothesis: The effectiveness of antibiotic prophylaxis in preventing infections in obstetrics and gynecological procedures has been well-established. The National University Hospital guideline recommends antibiotic prophylaxis in both abdominal and

vaginal hysterectomy. Despite evidence of effectiveness and availability of guideline, it is not clear whether the hospital guideline has been adhered closely. The objective of this study is to evaluate the adherence to hospital guideline for antibiotic prophylaxis in hysterectomy.

Methods: Medical records of 94 patients who had undergone hysterectomy from January to December 2007 were evaluated. Criteria of evaluation were based on the hospital antibiotic prophylaxis guideline. Adherence to guideline was assessed according to antibiotic prophylaxis use, choice of agent, dosage of first injection, time from first dose to incision, and total duration of antibiotic prophylaxis.

Results: Antibiotic prophylaxis was used in 95.7% of the patients. Antibiotic agents consistent with guideline were administered to 88.9% of the patients. Dosage of the first injection was appropriate in all patients who received the recommended antibiotic. Timing of first dose to incision was appropriate in 87.4% of the patients. Only 12.2% of the patients received the recommended single dose of antibiotic. The overall rate of adherence was 10.6%.

Discussion & Conclusion: Surgeons seemed to be aware of the risk of infection as antibiotic prophylaxis was ordered in majority of the patients. Nevertheless, the overall adherence rate was low. Dissemination of evidence-based guideline and the results of this study to surgeons can help to increase awareness and improve clinical practice.

BP – AH 44

Caregivers' Psychoeducation Programme in the Early Psychosis Intervention Programme in Singapore: Improving Knowledge of Psychosis, its Treatment and Caregiving

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Background/ Hypothesis: Family psychoeducation is an evidence-based practice that has shown to promote recovery of patients with first episode psychosis. This abstract describes the development, objectives and outcomes of a caregivers' psychoeducation workshop for clients of the Early Psychosis Intervention Program (EPIP) in Singapore. The aim of this educational group was to improve families' knowledge of psychosis, its treatment and caregiving.

Methods: The caregivers' psychoeducation workshop is conducted by a case manager on a 3-month basis. The workshop is conducted in English and Mandarin separately. The content of the workshop includes psychosis, etiology, medication, side effects, relapse, role of caregiver, and community resources. A Likert scale questionnaire was developed to address the core topic areas of the workshop. The questionnaire was administered at the beginning (pre-test) and after the completion (post-test) of the workshop. Participants were asked to indicate their perceived levels of knowledge on each of the topic areas identified using 4 multiple-choice answers.

Results: The English Workshop achieved an 80% increase in knowledge in core topic areas such as psychosis, etiology and side effects of medication. Other core topics such as medication, relapse, role of caregiver and community resources revealed a 40% increase in knowledge. The Mandarin Workshop achieved a 100% increase in knowledge in core topic areas such as psychosis, etiology, relapse, role of caregiver and community resources. Other core topics such as medication and side effects revealed a 66.67% increase in knowledge.

Discussion & Conclusion: This evaluation demonstrates the efficacy of improving caregivers' perceived levels of knowledge of psychosis,

its treatment and caregiving. With the improved knowledge, future studies can be done to explore its correlations to families' involvement in illness management and relapse prevention.

BP – AH 45

Comparison of Faecal Microbiota Signatures of Infants at Risk for Atopy between the Singapore and Indonesia Cohorts

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Background: Associations between lifestyle, allergy prevalence (immune system development) and the composition of the infant faecal microbiota have been suggested. In Asia, certain faecal microbial counts were higher in rural children compared with urban children in Asia. The study aims to evaluate the composition of the faecal microbiota in infants of 2 Asian cohorts with contrasting socio-economic development, and its possible association with eczema.

Methods: Fluorescence *in situ* hybridisation combined with flow cytometry (FISH-FC) was applied to quantify and monitor the composition of the faecal samples collected from infants at risk of atopy from Singapore and Indonesia with a larger sample size. Seven phylogenetic DNA probes targeting dominant members of the human faecal bacterial community were used. Analysis of faecal samples and clinical examination were monitored at 3 days, 1 month, 3 months and 1 year.

Results: At 1 year, more Indonesian infants (n = 30) harboured *Atopobium* (Indo vs S'pore: 84.00% vs 42.31%, *P* = 0.004) and *Lactobacilli - Enterococci* (80.00% vs 30.77%, *P* = 0.001) than Singaporean infants (n = 30). Further, quantitative analysis showed that *Clostridium leptum* (8.81% vs 3.72%, *P* = 0.029), *Atopobium* (8.80% vs 3.16%, *P* = 0.008) and *Lactobacilli - Enterococci* (10.32% vs 2.00%, *P* = 0.004) were in higher abundance in Indonesian infants, while *Bifidobacterium* (18.74% vs 33.83%, *P* = 0.027) was higher in Singaporean infants at the age of 1 year. Eczema infants were least likely to harbour *Bifidobacterium* at 3 days but more likely for *E. rectale - C. coccoides* and *Enterobacteriaceae* at 1 month and 1 year, respectively. The bifidobacterial population increased in the Singapore and Indonesia cohorts until 3 months. In the first year, the *E. rectale - C. coccoides* population showed an increasing trend whilst the *Enterobacteriaceae* population decreased in both cohorts.

Conclusion: Significant differences in the bacterial colonisation pattern were observed between Singaporean and Indonesian infants at risk of atopy. The higher frequency of *Erectale - C. coccoides* and *Enterobacteriaceae*, and low incidence of *Bifidobacterium* were associated with eczema.

BP – AH 46

A Novel Mutation in the KIT Gene Associated with Piebaldism in a Family from Singapore

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Background: Human piebaldism is a rare autosomal dominant genetic disorder of melanocyte development characterised by a

congenital white forelock and multiple symmetrical depigmented patches. Recent studies have associated mutations in the KIT proto-oncogene, which encodes the tyrosine kinase receptor for stem cell growth factor, with piebaldism.

Aim: To evaluate KIT gene mutations in patients with piebaldism in our population.

Methods: Mutation detection was carried out on genomic DNA by PCR amplification of all 21 exons of KIT prior to cycle sequencing. All sequences were aligned using Sequencher software and compared with control DNA to identify heterozygous changes. Findings were confirmed by screening ethnically matched controls.

Results: Two families with piebaldism, 1 Chinese and 1 Indian, were screened for mutations in KIT. The 2 affected cases in the Indian family harboured a missense mutation in exon 12 (c.1833A >C). This resulted in a leucine to phenylalanine change at codon 611 (p.Leu611Phe). Restriction digestion with enzyme *Tsp509I* confirmed the presence of this mutation in the cases compared with ethnically match controls. No mutation was identified in the Chinese family.

Conclusion: To date more than 16 mutations in KIT have been identified in human piebaldism from various populations worldwide. We have identified a novel missense mutation in exon 12 of KIT extending the spectrum of mutations observed in this depigmenting genodermatosis.

BP – AH 47

Demographic and Clinical Features of 350 Pathological Gamblers in Treatment

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Background: The continued growth of gambling activities, particularly online, makes gambling wider reaching than ever – thus the demographic characteristics of those seeking help for pathological gambling (PG) could change over time. This paper describes the characteristics of PG's attending treatment at CAMP, Singapore 2001-2008.

Methods: Clinicians administered a semi-structured interview to 350 consecutive patients to elicit data on demographic characteristics, gambling behaviour and history, co-morbid diagnoses and gambling-related problems.

Results: The mean age was 40.6 [± 11.8] years and mean onset of gambling behaviour was 22.3 [± 8.9] years. Patients were predominantly male (87.7%), Chinese (95.1%) and married (58.9%). Co-morbidity was high (28%); depression (11.7%), alcohol abuse/dependence (10%) and drug abuse/dependence (6.3%), with 15.1% reporting past suicide attempts. Soccer (51.7%), 4D (45.7%) and casino (31.4%) were the most common activities. Almost all (96%) had some debt and 10.6% reported earlier gambling-related offenses. Females were older at gambling onset ($P < 0.01$), first treatment ($P < 0.001$), had less debt ($P < 0.01$) but higher rates of unemployment ($P < 0.001$) and co-morbidity ($P < 0.05$). Females were less likely to bet on horse-racing ($P < 0.001$) or soccer ($P < 0.001$) but more likely to play Majhong ($P < 0.001$) and jackpot ($P < 0.001$).

Discussion & Conclusion: These findings mirror those of earlier studies and provide further evidence for both gender differences and the complex needs of PG's. Whilst only one-third reported gambling in a casino, this figure could change following the opening of Singapore's Integrated Resorts. The alarming co-morbidity rates suggest treatment services should undertake routine screening/assessment of alcohol misuse and suicide risk, offering brief interventions where necessary.

BP – AH 48

Surveillance of Genogroups I and II Norovirus Circulation in Singapore

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Background: An outbreak involving the epidemic GII.4 norovirus genotype occurred locally in October 2006. We have conducted an epidemiological survey to determine persistence of the GII.4 norovirus amongst subsequent infected patients, and to monitor for presence of other norovirus genotypes in Singapore. In all, 414 surveillance and clinical samples were processed between January 2008 and June 2009.

Methods: RNA extracted from the stools of either patients with diarrhoeal symptoms (clinical samples) or from food handlers (surveillance samples) were first screened with a sensitive reverse transcription-PCR (RT-PCR) method we developed in-house, which detects both norovirus genogroups I and II. Positive cases were then genotyped using a published method. For genotyping, amplicons from the viral capsid VP1 region were purified and sequenced. These sequences were then subjected to phylogenetics analysis using ClustalX (sequence alignment), Bioedit (sequence-editing), Modeltest3.7 and PAUP4.0 (phylogeny analysis), with DNA sequences of all known genotypes downloaded from the NCBI nucleotides database serving as reference sequences in the phylogeny construction.

Results: We found 1 GI- and 9 GII-positive cases among the 414 screened (2.42%). Only 7 of the GIIs detected were successfully genotyped, due to the lower sensitivity of the genotyping assay. Phylogeny analysis showed 5 GII.4 and 2 GII.3 genotypes.

Discussion and Conclusion Our results showed that there are other norovirus genotypes circulating in Singapore other than the GII.4 genotype. Excluding the 2 untypable GII samples, GII.4 strain had a dominance of 62.5% amongst the remaining 8 norovirus-infected cases, and the proportion of GI to GII genogroups is 1:9 in our study population.

BP – AH 49

Use of Short-Form Physiological Profile Approach (PPA) for Falls Risk Assessment in Community Dwelling Elderly in Singapore: A Pilot Study

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Background: Lord (2003) developed the Physiological Profile Assessment (PPA). It has been shown to be reliable and valid, with an accuracy of 75% in predicting multiple falls. However, there are no studies on using the PPA for falls risk assessment in Singapore. The aims of this observational study are to evaluate: (1) whether the short-form PPA is able to differentiate between elderly who are

fallers from non-fallers, and (2) whether there is any correlation to the Activities-Specific Balance Confidence (ABC) scale.

Methods: Sixty independent community-dwelling elderly aged 60 to 82 years underwent PPA falls risk assessment by a physiotherapist and completed the Activities-specific Balance Confidence (ABC) questionnaire.

Results: Mann Whitney U test shows a significant difference between “fallers” and “non-fallers” in their ABC scale ($P = 0.041$). The PPA results are analysed by chi-square test, showing no significant difference in their performance for both “fallers” and “non-fallers” ($P = 0.123$). Receiver operating characteristic (ROC) analysis determines the optimal cut-off score for ABC scale to be 92, hence score less than 92% would be at risk of falls. Using Spearman’s rho analysis, there is no correlation between the PPA and ABC scale (-0.234).

Conclusion: We conclude that the short-form PPA fall risk assessment is unable to differentiate between “fallers” and “non-fallers” in Singapore and there is no correlation with the ABC questionnaire. Future study needs to look into a larger sample size and extend the falls risk assessment PPA to the more comprehensive long-form.

BP – AH 50

Genetic Polymorphisms of Calcitonin Like Receptor (CLR) for Adrenomedullin and Diabetic Nephropathy Secondary to Type 2 Diabetes

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Background: Diabetic nephropathy (DN) is the leading cause of end-stage renal failure. Genetic determinants are important in the pathogenesis of DN. However, the exact genetic architect of DN is not fully understood. We reported that plasma Adrenomedullin (ADM), an endothelium derived vasoactive factor, is elevated in DN. The clearance of ADM is receptor (i.e. Calcitonin-like receptor [CLR]) dependent. We hypothesise that CLR is a candidate gene for DN.

Methods: Located in chromosome 2, the CLR gene spans 103.15 kb. We assembled a set of 23 non-redundant haplotype tagSNPs ($r^2 = 1.0$) covering the whole of CLR gene (including exon-1 5' 10kb putative regulatory elements) based on HapMap Phase 3 database. In this abstract, 72 case and control pairs of Singapore Chinese with long standing type 2 diabetes (>10 years) but discordant for nephropathy status were subjected to multiplexing genotyping using GoldenGate Genotyping Assay (Illumina).

Results: Cases and controls were similar in distribution of gender, age, duration of diabetes and HBA1c. Single locus analysis revealed a borderline significant intronic SNP- rs2030976 A >G, (Minor allele frequency [MAF] = 0.158) conferred increase susceptibility to DN (OR 1.81 [95%CI 0.98-3.34], $P = 0.056$). Haplotype analysis revealed a common haplotype (ACGGAAAGAAA- formed by 11 intronic SNPs including rs2030976, MAF = 0.153) appeared to confer risk for DN (OR 1.73 [0.94-3.20], $P = 0.08$). Omission of the above rs2030976 did not affect the results ($P = 0.097$), suggesting that rs2030976 may be tagging for an un-typed causative allele embedded within the above haplotype.

Conclusion: Our preliminary data suggested that common CLR haplotype may confer increased susceptibility to DN. Further study in a larger sample is needed to confirm the findings.

BP – AH 51

Development of a Multiplex PCR Assay for the Detection and Differentiation of *Salmonella enterica* Serovar Typhi and Paratyphi A

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Background: Enteric (typhoid or paratyphoid) fever is a systemic infection caused by *Salmonella enterica*, including *S. enterica* serotype Typhi and serotype Paratyphi (Paratyphi A, B and C) and can result in serious public health problems especially in developing countries. Symptomatically, paratyphoid fevers resemble typhoid fever but are usually less severe. Culture-based diagnostics and identification of *Salmonella* serovars is time-consuming, often taking several days for a result. In this project, we are developing a multiplexed polymerase chain reaction (mPCR)-based test that could offer a highly specific, sensitive and rapid differentiation of typhoid and paratyphoid fevers, hence allowing prompt clinical treatment of the infection.

Methods: PCR primers targeting *Salmonella* genus-specific and serovar-specific gene regions were selected from several published sources and their reliability was confirmed in our lab. For development of the mPCR, 5 primer sets were used. These included 1 primer set for amplification of the internal control and the 4 other sets for the differentiation between *S. Paratyphi A* and *S. Typhi*.

Results and Conclusion: Our preliminary results with the mPCR showed that when tested against ATCC strains, the *Salmonella* genus-specific, *S. typhi*-specific and *S. paratyphi A*-specific primers achieved specific amplification with their respective serovars. The assay would be further evaluated using 90 *S. enterica* clinical isolates. Other serovar-specific primers will also be assessed in order to enable differentiation of other clinically important serovars such as *S. typhimurium*, a close genetic relative of *S. typhi*.

BP – AH 52

Risk Factors for Institutional Misconduct among Mentally Ill Inmates

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Background: This study aims to show the association between institutional misconduct and the various putative risk factors in a group of prison inmates identified as mentally ill in Singapore Prison System.

Methods: Two hundred and fifty-two inmates participated in a diagnostic interview for mental disorders and personality disorders using the Composite International Diagnostic Interview for Axis I disorders (CIDI) and the Structured Clinical Interview for DSM-IV Personality Disorders for Axis II disorders (SCID-II). Information on institutional misconduct was obtained from the prison records of these inmates.

Results: We explored the risk factors for institutional misconduct by entering age, sex, marital status, mental disorders and personality disorders into a multiple logistic regression model. Inmates who attained post-secondary education (Adj. OR 0.2; 95% CI, 0.0, 0.9) had slightly lesser risk of perpetrating institutional misconduct compared to those without any education. In addition, inmates with

antisocial personality disorder (Adj. OR 2.1; 95% CI, 1.2, 3.4) were twice more likely to perpetrate institutional misconduct than those with no antisocial personality disorder. Age, sex, marital status, educational level, mental disorders and personality disorders were entered into the model for the perpetration of violent institutional misconduct. Inmates with antisocial personality disorder (Adj. OR 2.4, 95% CI, 1.1, 5.2) had slightly more than twice the incidence of perpetrating violent institutional misconduct compared to inmates with no antisocial personality disorder. Age, having mood disorders and antisocial personality disorder were associated with direct assault on another individual, non-contact violence and intentional hurt to self. No significant risk factors were found for intentional destruction of property and sexual offences committed on another individual. Compared to those aged between 31 and 50 years, those 30 years old and younger had a higher risk for self-harm. The presence of mood disorders was also implicated in the perpetration of self-harm. Having antisocial personality disorder increased the risk for direct assault on another individual.

Conclusion: While antisocial personality disorder is a risk factor in the commission of any sort of institutional misconduct, mental disorder per se was not found to be a risk factor in this particular sample.

BP – AH 53

The Relationship between Parental Stress and Childhood Depression in Singapore

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Background: This study aims to examine gender differences in childhood depression and parental stress and the relationship of parental stress on childhood depression in Singaporean children aged 7 to 15 years.

Methods: The Children's Depression Inventory (CDI) (Kovacs, 1992) is a child-report of depressive symptoms, with 27 items measuring 5 subscales: negative moods, interpersonal problems, ineffectiveness, anhedonia and negative self-esteem. It was administered to a sample of primary school children aged 7-15 years (n = 1935). The Parenting Stress Index/Short Form (PSI/SF) (Abidin, 1995) is a parent report that consists of 36 items measuring 3 subscales, parental distress, parent-child dysfunction interaction, and parental stress from a difficult child. It was administered to 178 consenting parents of the children in the sample.

Results: Analyses from t-tests revealed that girls reported significantly higher levels of: i) total depression score compared to boys, ii) interpersonal problems, iii) ineffectiveness, and iv) anhedonia, compared to boys. Mothers also reported significantly higher levels of: i) parental stress total scores, and ii) parental stress from difficult child, compared to fathers.

Discussion/Conclusion: Findings from this study were in concurrence with existing studies that found gender differences in childhood depression and parental stress (Deater-Deckard, 1998; Keenan and Hipwell, 2005). Interpretation of the findings and implications of this study will be discussed.

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BP – AH 54

Evaluation of Point-of-Care Testing Compared to Standard Laboratory Methods in Determinations of International Normalised Ratio (INR)

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Background/Hypothesis: Point-of-care testing (POCT) is used in anticoagulation clinic for warfarin titration. It saves time but there are concerns that correlation with standard laboratory testing is poor when INR is high. Amount of time saved by POCT was to be determined. Blood results were evaluated to predict likelihood of INR deviation between the 2 testing methods, with POCT INR >3.5 and Laboratory INR ≤3.5.

Methods: Time data of 582 cardiovascular anticoagulation clinic (CVM ACC) patient visits were collected and analysed. Full blood count, HbA1c, total bilirubin and lipid panel results from 7 months of 2008 were recorded, and correlation with INR deviation between the 2 testing methods was determined by logistic regression.

Results: POCT group spent less time at clinic (mean = 74.21 minutes, SD = 40.2) compared to Laboratory group (mean = 130.6 minutes, SD = 43.4), determined by time lag between arrival and completion of counseling by the pharmacist ($P < 0.001$). Among 3548 patients from 9 May 2008 to 31 December 2008, 270 patients (7.6%) had POCT INR >3.5. Logistic regression showed no statistically significant correlation between blood parameters and predictability of deviation between POCT and laboratory method.

Discussion & Conclusion: POCT is time-saving. However, demographics or clinical characteristics were not found to predict INR deviation between the 2 testing methods. A prospective study is required to determine any possible correlation.

BP – AH 55

Survey of Physiotherapists' On-call Experience and Preceptorship Programme

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Background/Hypothesis: Emergency on-call duties have been highlighted as a key stress factor in newly qualified physiotherapists whose job performance may be affected (Australian and New Zealand studies). There exist no data on local physiotherapists. The purpose of this study is to identify some key areas which contribute to the stress level of physiotherapists during on-call duty, their attitude and perception towards on-call duties and preceptorship programme.

Methods: A questionnaire was administered to 27 physiotherapists who had completed at least 2 on-call duties in the National University Hospital. Results were analysed using descriptive statistics and the identity of respondents was kept anonymous.

Results: A fair response rate was achieved (62.96%, n = 17), with half (52.98%) finding on-call duty to be significantly stressful. Seventy-six per cent felt they were given adequate orientation. Almost all respondents would prefer not to do on-call duty, stating stress to be the main deterrent (94.12%). However, a majority (64.7%) agree

that on-call physiotherapy treatment is valuable for the critically ill patient. Inability to determine which patient benefit most from additional chest physiotherapy treatment during on-call duty was also expressed (17.65%). Forty-seven per cent were not confident in treating patients with head down tilt while 58.82% felt that school training was inadequate for on-call work. The key areas contributing to increased stress with on-call duty were the high workload, nature of patients referred, increased therapist movement, physical exhaustion as well as unfamiliarity to the Intensive Care Unit and High Dependency settings.

Discussion & Conclusion: This survey highlights the importance of preceptorship and clinical guidance for junior physiotherapists in this area.

BP – AH 56

Reducing Clotted Specimens: A Collaboration between IMH Nursing and NHG Diagnostics

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Background: We aim to reduce the number of FBC (full blood count) specimen rejections due to presence of clot or platelet clumps. A joint collaboration between NHGD and IMH was initiated to hire an experienced nurse with phlebotomy skills to solely perform venepunctures. The staff was re-trained adequately by IMH nursing training department and certified competent by the institution for her role as phlebotomist. With reduction in repeated blood collections, pain inflicted on patients will be reduced, time and cost will be saved, and results will be timely for better patient management and care.

Methods: A retrospective study was carried out to assess the rejection status on FBC specimens collected by the trained phlebotomist. The study group involves patients requiring for FBC investigations during their hospitalisation stay from September 2008 to February 2009. The laboratory and nursing staff monitored FBC specimens that have been rejected during the study period. The data was then compared with specimens rejected during the same period from the previous year (September 2007 to February 2008).

Results: The rejection rate was 0.38% (6/1563) during the study period compared to 0.80% (13/1635) in the previous year. A reduction from 0.80% to 0.38% on rejected specimens by the trained phlebotomist showed an improvement of 52.5%.

Conclusion: Having a phlebotomist with specialised collection skills has shown to significantly reduce the specimen rejection rate on FBC specimens. Alternatively, healthcare assistants can be equipped with adequate training on blood collection procedures to perform the job efficiently.

BP – AH 57

Family Dynamics Impacts the Recovery of Young Adults Suffering from Early Psychosis: A Descriptive Study of Young Singaporeans Admitted to Woodbridge Hospital

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Background/Hypothesis: Numerous studies have shown that family relationship could impact individuals' mental health. The Early Psychosis Intervention Programme emphasises early treatment and working closely with patients and family. Case managers have the op-

portunity to witness family dynamics, which include family members' relationship, communication pattern, ways of coping with conflicts, and expectations of one another. It is hypothesised that patients' family dynamics impact their recovery significantly.

Methods: Patients who were readmitted within 3 months of discharge from the hospital from July 2007 till June 2008 were studied. Their respective case managers were interviewed to provide an in-depth understanding of each patient's family. The descriptive information was studied to extract common themes.

Results: There were 26 patients readmitted within this period. Average mean age of this group was 27. The common themes of these readmissions include long-term family conflict due to inconsistent parenting style (23.1%), high expressed emotion (38.5%), and a family member who was suffering from a mental illness (11.5%). However, 15.4% had good family support and 11.5% were non-family related.

Discussion & Conclusion: From the results, we could see that family members who have high expressed emotion and conflicting parenting style constituted 61.6% of the sample size. It is not certain why the 15.4% of patients, who seemingly have good family support, had readmission within 3 months of discharge. There could be some underlying family issue that workers were not aware of. Hence, further research looking from the patients' perspective is useful to improve treatment plan for patients.

BP – AH 58

Correlation of 24-Hour Urinary Citrate Excretion in Asian Chronic Kidney Disease patients and Nephrolithiasis

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Background/Hypothesis: We aim to investigate the relationship between total daily urinary citrate excretion and concentration (TUCE–mg/day; TUCEC–mg/dL/day) with chronic kidney disease (CKD). CKD is classified by glomerular filtration rate (GFR – mL/min/1.73m²) into 4 stages; 1) ≥90, 2) 60-89, 3) 30-59, and 4) ≤29, respectively. Low TUCE (≤350 mg/day) in normal populations was associated with nephrolithiasis. In a multi-ethnic Asian CKD population, the association is unknown. We hypothesise that in CKD patients low TUCE is associated with nephrolithiasis.

Methods: We recruited 190 (93 male) CKD patients (46% Chinese, 19% Indian, 31% Malay) by estimated GFR stratified enrolment. GFR was measured by Tc^{99m}-DTPA plasma clearance. 24-hour urine collections were stored at -80°C until analysis. Stone formation status was determined by history. Citric acid was measured using Enzytec™ kit (Germany) by spectrophotometry (Shimadzu UV-1601, USA).

Results: The overall TUCE was 157±142 mg/day (mean±SD), TUCEC was 88±97 mg/dL/day, and urine volume was 1.79±0.79 L; and 22/190 (12%) had nephrolithiasis. In CKD stages 1 to 4, the TUCE was 244±202 mg/day, 281±199, 116±112 and 50±56; with nephrolithiasis in 1/18 (6%), 3/26 (12%), 10/85 (12%) and 19/51 (16%), respectively. TUCE was associated with GFR (-2.83+2.97xGFR; $P < 0.001$). Mean TUCE was similar: by stone status (129±121 vs 142±165), by gender (male = 150±158, female = 134±158), and by ethnicity ($P = NS$). Mean volume declined with increasing CKD stage ($P = 0.0017$), and was lower (0.43 L) in stone formers ($P = 0.006$).

Discussion/Conclusion: Urinary citrate excretion declined with

reduced GFR. There is no correlation between stone formers and non-formers with TUCE or TUCEC in a multi-ethnic Asian CKD population.

BP – AH 59

Computer-assisted Pathological Immunohistochemistry Scoring is more Time-effective than Conventional Scoring, but provides no Analytical Advantage

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Background: Interpretation of immunohistochemistry (IHC) staining is primarily done through human visual scoring while computer-assisted scoring is relatively uncommon. Our study aims to examine: a) the level of agreement between human visual and computer-assisted pathological scoring of IHC expression in colorectal cancers, b) if computer-assisted scoring affects the prognostic significance of biomarkers, and c) if computer-assisted pathological scoring provides any time-saving or reproducibility advantages.

Methods: Tissue microarray blocks were constructed from the primary colorectal adenocarcinoma specimens of 486 patients. Scoring of the 6 markers (Ck7, Ck20, Cox-2, Ki-67, p27 and p53) was done independently by a qualified pathologist, a trained-scientist and the Ariol SL-50 (Applied Imaging).

Results: Univariate analysis showed that human visual and computer-assisted scoring was strongly correlated (all kappa values >0.8). Both human visual and computer-assisted pathological scoring identified the same set of biomarkers with significant association with survival. Computer-assisted pathological scoring was shown to be a time-effective means of scoring larger amount of slides (for high throughput studies).

Conclusion: Our results suggested that computer-assisted pathological scoring can be a viable alternative to pathologists scoring in a manner that is more practical and time-effective, but, interestingly, providing no analytical advantage.

BP – AH 60

Prevalence and Risk Factors for MRSA Colonisation in HIV-Positive Outpatients in a Tertiary care hospital, Singapore

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Background: HIV-positive patients tend to be at higher risk of acquiring methicillin-resistant *Staphylococcus aureus* (MRSA). A previous local study had reported a 3% prevalence of MRSA colonisation amongst HIV-positive outpatients from nasal swabs.

Methods: Cross-sectional study to determine the current prevalence of MRSA colonization, and to evaluate risk factors for MRSA colonisation, amongst HIV-positive patients attending the outpatient clinic of Tan Tock Seng Hospital, from 12 November to 1 December 2008. Swabs were taken from 296 patients from the nares, axilla, groin, throat and peri-anal region. Data was collected via interviewer-administered questionnaire and medical records review. A binary logistic regression model was used to examine the factors associated with MRSA colonisation.

Results: Of the 296 patients, 5% (15) were positive for MRSA, of

which 1% (3) was contributed by throat and peri-anal swabs. Variables significant only in univariate analysis: recent ICU admission, corticosteroid use, and previous MRSA colonisation. Independent risk factors found significant on multivariate analysis were: exposure to household member hospitalised more than twice in the last 12 months (OR, 7.6; 95% CI, 1.7-33.8); β -lactam usage in the last 6 months (OR, 5.2; 95% CI, 1.2-22.4); use of percutaneous device in the last 12 months (OR, 9.7; 95% CI, 2.6-35.8); recent CD4 count less than 200 cells/ μ l (OR, 7.9; 95% CI, 1.8-35.2).

Conclusion: Compared to the previous study, we reported a higher prevalence of MRSA colonisation among HIV-positive outpatients, with 20% increased sensitivity contributed by throat and peri-anal swabs. The risk factors identified for MRSA colonisation will guide future pre-emptive isolation of inpatients, at point of admission.

BP – AH 61

Molecular Evaluation of *Bifidobacterium* species in Gut Microbiota of Infants with Eczema Using Hierarchical Oligonucleotide Primer Extension

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Background: Studies have suggested that certain species of *Bifidobacteria* prevail in the faecal microbiota of allergic infants. This study aims to evaluate and compare quantitatively the *Bifidobacterium* spp. signatures in gut microbiota of infants with eczema using newly established Hierarchical Oligonucleotide Primer Extension (HOPE) and Fluorescence In Situ Hybridisation-Flow Cytometry (FISH-FC).

Methods: Faecal samples were collected from 10 infants (4 infants with eczema, 6 healthy infants) at birth, 1, 3, and 12 months. HOPE and FISH-FC were employed to monitor faecal microbiota signatures focused on 6 major *Bifidobacterium* species. The abundances of the *Bifidobacterium* spp. as determined, respectively, by HOPE and FISH-FC were compared by non-parametric Spearson correlation analysis to validate the use of HOPE as a quantitative method, as it is time- and cost-effective and less labour-intensive.

Results: *B. catenulatum* group and *B. bifidum* were consistently detected at all sampling times and at relatively high abundances. In contrast, *B. adolescentis* was only detected in the faecal microbiota at 12 months sample, whereas *B. breve* was only detected in the faecal microbiota of infants with eczema at 1 and 3 months after birth. The relative abundances of the genus *Bifidobacterium* by HOPE and FISH-FC exhibited good statistical correlation ($\rho = 0.829$; $P = 0.042$). Good statistical correlations were demonstrated from the comparison of relative abundances of *B. adolescentis*, *B. breve* and *B. bifidum*, as determined by both methods ($\rho = 0.920$; $P = 0.009$; $\rho = 0.857$; $P = 0.029$ and $\rho = 0.783$; $P = 0.066$ respectively). In contrast, the relative abundances of *Bifidobacterium longum* and *B. catenulatum* as determined respectively, by both molecular methods had a poor correlation ($\rho = 0.257$; $P = 0.623$ and $\rho = 0.600$; $P = 0.208$ respectively). The discrepancy may be due to different specificities of the HOPE primers and FISH-FC probes and the difference between hybridisation stringencies of 2 methods.

Conclusion: Based on this result, HOPE can be used as a potential method to achieve high-throughput quantitative determination of bacterial targets.

BP – AH 62

Laboratory Diagnosis of *Streptococcus anginosus* Group

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Background: *Streptococcus anginosus* group, usually considered part of the normal flora, is frequently involved in serious pyogenic infections. Isolate identification involves differentiation from non-pathogenic viridans streptococci. In this study, we aim to differentiate *S. anginosus* group from other streptococci using simple, rapid, accurate and cost-effective conventional enzymatic tests.

Methods: Part 1: Test panel performance testing was done using 45 suspected *S. anginosus* group isolates. Tests used were acetoin production, arginine and esculin hydrolysis, acid production from sorbitol, lactose and mannitol. These results were compared with API 20 Strep (API) and Vitek 2 (V2) identification systems.

Part 2: Test panel versus API trial was performed on clinical isolates for evaluating panel effectiveness.

Results: Part 1: Ninety-seven per cent of isolates were identified as *S. anginosus* group based on the acetoin, arginine and sorbitol test reactions. Thirteen strains (29%) were further identified as *S. constellatus* with esculin and lactose tests. Test panel and API are agreeable (100%) but V2 shows only 50% agreement with identification. Test panel may be read confidently at 5 hours for the first 3 tests. An additional 5 hours is needed for the rest. API is read at 18 hours and V2 at 8 hours. Minimum isolate volume is required as test media are prepared in microtitre wells. Part 2: Fifteen random isolates were tested, 3 were identified as *S. constellatus* within 12 hours by test panel and confirmed by API. More strain testing is in progress.

Conclusion: The conventional test panel is a reliable, simple, rapid, accurate and cost-effective way of identifying *S. anginosus* group.

BP – AH 63

Formulation of Aspirin Oral Disintegrating Tablets

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Background/Hypothesis: Over the past 3 decades, orally disintegrating tablets (ODTs) have gained much attention as a preferred alternative to conventional oral dosage forms. These may be attributed to advantages such as the ease of administration and swallowing, along with improved safety and at times, efficacy. In addition, business needs for expanded product lines, improved life-cycle management, extended patent life, and marketing advantages have made ODTs a growing focus in this industry. The challenges of formulating an ODT is to make it dissolve readily but yet not be too friable to impair handling and packaging. Another challenge will be the ability to mask the unpleasant taste of certain active ingredients while still able to deliver the right amount of medication to patients, in this case, aspirin, used as an anti-platelet agent at the dose of 100 mg once a day was studied.

Methods: Formulations containing aspirin 100 mg with varying amounts of excipients were used to make ODT via the direct compression method using a tablet press. The ODTs were then subjected to physical testings such as hardness, friability, disintegration and dissolution in order to optimise the formulation.

Results: Results showed that 400 mg was the smallest weight pos-

sible for the formulation of ODT containing 100 mg aspirin while maintaining the desired physical properties to pass USP standards. The optimal formula contains the following excipients: Ludiflash® (Mannitol, Kollidon®CL-SF and Kollidon®SR30D), PEG 6000 and PVP.

Discussion & Conclusion: There were problems with getting consistent disintegration times for the ODT made. This problem was solved by sieving all the ingredients to enable more uniformed mixing. The PVP proved to be necessary to ensure a suitable hardness to withstand handling. There was an optimal amount of PVP to be used. This ODT formulation containing 100 mg aspirin can be potentially used in patients who need anti-platelet therapy and require the ease of administration of an ODT.

BP – AH 64

Profile of Inpatients Receiving Tube Feeding in a Tertiary Hospital in Singapore

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Background: There are limited data on the characteristics of patients receiving tube feeding. The aim of this study is to determine the demographic and related clinical profile of in-patients referred to dietitians for tube feeding in a tertiary hospital in Singapore.

Methods: We retrospectively reviewed 735 records of patients aged ≥ 21 years old referred to the National University Hospital's dietitians for tube feeding for the year 2008. Patients' demographic data, which includes age, gender, ethnic group, medical specialty, average length of hospital stay, mortality rate, and percentage of patients discharged with tube feeding and discharged to nursing home were analysed using univariate analysis.

Results: Mean age of patients was 69.6 ± 16.9 years (range, 21 to 102). Sixty-nine per cent were Chinese, 17% were Malay, 9% were Indian and 5% were of other ethnicities. Fifty-four per cent were male and 46% female. The top 3 medical specialties to which the patients were admitted were general medicine (21.5%), neurology (20.1%) and respiratory (16.5%). Inpatient mortality rate was 25% and average length of hospital stay was $18.4 + 19.7$ days (range: 1 to 170 days). Fifty-eight per cent were discharged with tube feeding and 32% were discharged to nursing homes.

Conclusion: The understanding of the profile of this group of patient enables us to better plan our services, coordinate with medical and other ancillary teams such as medical social work, and facilitate nutrition and discharge planning of patients.

BP – AH 65

Validating a Modified Medication Error Outcome Severity Grading Scale – A Preliminary Study

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Background: Hospital pharmacists perform interventions daily to prevent the adverse outcomes of prescribing errors. The primary objective is to validate a modified medication error outcome severity grading scale for grading prescribing errors. The secondary objective is to study the trend of prescribing errors identified by the inpatient pharmacists.

Methods: A medication error outcome severity grading scale was established based on modifications of the NCC MERP scale and this was used to grade the outcome severity of inpatient prescribing errors identified in November and December 2008. Grading was done separately by the ward pharmacist and the pre-registration pharmacist conducting the study, based on a pre-defined algorithm. Data collected were evaluated for the extent of agreement between the 2 pharmacists.

Results: The percentage of interventions with agreement in grading between the 2 pharmacists was 73.95%. The intra-class correlation coefficient was 0.41, showing poor to moderate correlation. One possible explanation is that the pre-registration pharmacist was able to follow up on the patients after discharge and may sometimes have a different assessment of outcome. Therapeutic duplications and transcribing errors were found to be the more common prescribing errors. This study also showed that more than 80% of the interventions made were accepted by the physicians.

Discussion & Conclusion: The agreement rate of 73.95% for the outcome severity grading can only be treated as a crude estimate of the extent of agreement. Further study is warranted to complete the validation of the grading scale.

BP – AH 66

Evaluation of Outpatient Antimicrobial Use by the Surgical Division in a Tertiary Care Hospital

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Background & Objective: Antimicrobial use is recognised as a cause of emerging antimicrobial resistance. Antimicrobial use surveillance is important to evaluate appropriateness of antimicrobial use and is necessary to enhance antimicrobial stewardship. Surveillance studies on outpatient antimicrobial use shows shift of use from narrower spectrum antimicrobials to that of broader spectrums, but this has not been determined in Singapore. This study aims to describe the trend of antibiotics prescribed by the surgical division in the outpatient setting in TTSH, and to evaluate their appropriateness of use.

Methods: A retrospective study, consisting of both longitudinal and cross-sectional analysis was conducted. Longitudinal analysis: Outpatient oral-antibiotic prescriptions pertaining to the surgical division from January 2007 to June 2008 were obtained. Antibiotic consumption was trended using Defined Daily Doses (DDD) per 100 total prescriptions and Drug Utilisation 90%. Cross-sectional Analysis: Eighty-two prescriptions containing Ciprofloxacin by Urology in June 2008 were reviewed and their appropriateness of use evaluated.

Results: In the surgical division, Amoxicillin/Clavulanate (39.96%), Ciprofloxacin (21.63%), Clarithromycin (7.29%), Cefuroxime (5.70%), Amoxicillin (3.17%) and Cloxacillin (2.76%) accounted for 90% of all antibiotics prescribed; Ear Nose Throat (ENT) and Urology were the top antibiotic prescribers. A high amount of broader spectrums was used in the study period, with no shift in antibiotic usage observed. Ciprofloxacin use was deemed appropriate in 25.6% to 72.0% of the cases reviewed. Ciprofloxacin was also overprescribed in surgical prophylaxis.

Conclusion: Continued surveillance of antibiotic use is required. Prescribing of Ciprofloxacin for treatment and surgical prophylaxis can be improved.

BP – AH 67

Adapting the World Health Organisation-Composite International Diagnostic Interview (WHO-CIDI) Chinese Instrument in Singapore

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Background: The WHO-CIDI instrument is a comprehensive structured interview that is meant to assess the prevalence, health-seeking behaviour and service utilisation of people with mental disorders. This instrument has been adapted for use in many different countries and translated into different languages. The present study aimed to adapt the Beijing-developed WHO-CIDI Chinese instrument for use among the Chinese-speaking population in Singapore as part of a subsequent nationwide study on the mental health status of the Singapore population. Cognitive interviewing techniques were used on the instrument to assess if response errors would arise due to wording and expressions that may be culturally inappropriate in Singapore.

Methods: Forty cognitive interviews (CIs) were conducted among patients and healthy participants. We recruited respondents from both genders, different age groups and diverse educational backgrounds. The “think aloud” interview and verbal probing technique were used for the CIs. Questions were read to the respondent and they were encouraged to “think out loud”. In the verbal probing technique, study team members conducted discussions to form scripted probes prior to the CIs. Examples of scripted probes are:

“What did you think about when you answered the question?”

“How did you decide on your answer?”

The techniques were used to elicit participants’ thought and cognitive processes in answering the questions. The CIs were then recorded on audiotape and transcribed into a table format for evaluation.

Results: Findings from the data showed that expressions and concepts used in the questionnaire were appropriate for use in the local Chinese speaking population. In questions where respondents had problems understanding certain phrases or words, they were still able to comprehend the intent of the question as a whole. Participants were able to rephrase questions accurately when probed, which indicated their ability to comprehend the questions.

Conclusion: Overall, the cognitive testing has effectively helped to evaluate response errors that might occur in the WHO-CIDI Chinese instrument. It has also ascertained the quality of the survey questionnaire design.

BP – AH 68

Macroprolactin Detection on Hyperprolactinaemic Specimens

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Background/Hypothesis: Macroprolactin can cause an increase in measured prolactin concentration and misdiagnosis in the investigation for hyperprolactinaemia. To reduce any interference from macroprolactin, polyethylene glycol (PEG) can be used to precipitate the macroprolactin, allowing just the unbound prolactin to be measured. The percentage recovery of prolactin can be calculated to determine whether the patient is truly hyperprolactinaemic or macroprolactinaemic.

Methods: 250 µL of patient's serum and 250 µL of PEG 8000 (250 g/L in phosphate buffered saline) are aliquoted into the same tube. The tube is covered with a tube stopper, vortexed gently and then incubated for 10 minutes at room temperature. After incubation, the tube is centrifuged at 2400 g for 15 minutes. After centrifugation, the supernatant is straightaway aliquoted into a cup and loaded onto the Beckman Coulter DxI 800 for prolactin analysis. Recovery is calculated by comparing prolactin concentrations before and after PEG treatment.

Results: This method proved to be easy, quick and reliable with an analytical CV of 5.5. Calculation of percentage recovery allowed good separation of macroprolactinaemic patients (<40% recovery) from truly hyperprolactinaemic patients (average recovery 50.1%). In our preliminary study, 2 out of 18 hyperprolactinaemic samples (11%) were due to macroprolactin.

Discussion & Conclusion: PEG treatment is a simple and economical approach that can be used to check for the presence of significant macroprolactin concentration in hyper-prolactinaemic specimens. Its routine use in the laboratory can ensure unnecessary investigation for hyperprolactinaemia is avoided.

BP – AH 69

Characteristics of Adverse Drug Reaction Reports

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Background: The Critical Medical Information Store (CMIS), first deployed in January 2006, is a central repository of patients' lifetime records for medical alerts and adverse drug reactions (ADR), which includes drug allergy. The objective of this study was to determine the characteristics of ADR reports in CMIS over a 3-year period by AH, IMH, NHG Polyclinics, NSC, NUHS and TTSH.

Methods: All ADR reports from January 2006 through December 2008 were reviewed. Invalid data including test records, migrated data, wrong entries, duplicate records and records that were subsequently updated were removed prior to data analysis.

Results: During the 3-year period, 60,951 ADRs were reported, with 16,660 reports in 2006, 18,343 reports in 2007 and 25,948 reports in 2008. An average of 6 and 12 reports/FTE/year were contributed by pharmacists and doctors/dentists respectively. There were more ADRs reported in females (57%) than in males (43%). Majority of ADRs were reported to occur in patients between 40 and 59 years of age (34%). Chinese patients constituted the highest proportion (71%), followed by Malays (12%) and Indians (9%) patients. Analgesics, antibiotics, antipyretics and cardiovascular drugs were the drug classes most commonly involved.

Discussion & Conclusion: The increase in ADR reports over the past 3 years reflects the effectiveness of an ADR reporting system linked to electronic clinical applications. Frequent and active participation of ADR reporting by our healthcare professionals reduce the risk of patients being exposed to drugs that they should avoid in future, unless the benefits outweigh the risks.

BP – AH 70

A Novel Method of Team-based Management Involving Physiotherapy and Occupational Therapy of 3 Lymphoedema Patients who Underwent Liposuction-assisted Excision and Lymphatico-venous Anastomosis (LVA)

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Background/Hypothesis: Manual Lymphatic Drainage (MLD), compression bandaging (CB) and pressure garments (PG) are utilised in treating lymphoedema. Surgical techniques such as liposuction and lymphatico-venous anastomosis have also been developed to treat lymphoedema.

Methods: Three women who underwent liposuction-assisted excision and LVA were referred by the Plastics and Aesthetics surgeons to the Physiotherapist and Occupational Therapist for management post-surgery.

Combined physiotherapy and occupational therapy involving MLD, CB and PG were administered intensively post-surgery. Initial therapy sessions ranged from 1 to 4 times a week and frequency of follow-up sessions varied according to patients' clinical presentation. Instead of off-the-shelf pressure garments, all 3 patients had tailor-made pressure garments that were re-assessed and modified accordingly. Patients were encouraged to don PG for 24 hours. MLD was administered for all patients. When extra compression was required, CB was done in addition to the PG.

Circumferential measurements at 4-cm intervals were taken using a tape measure. Limb volume was calculated using the formula of a truncated cone.

Results: Results reported were taken from a period of 8 to 10 weeks although reviews are ongoing. All 3 patients had reduction in circumferential and volumetric measurements.

Conclusion: Patient's compliance to attending therapy sessions, the strict regime of wearing PG and the patient's level of activity are factors that may affect the results. Although results so far have shown reduction in volumetric measurement, this novel method of intensive team-based approach following surgery for chronic lymphoedema requires more investigation of its efficiency. Long-term follow-up is also required.

BP – AH 71

Positive Mental Health in Singapore: A Conceptual Framework

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Background: Mental Health is an emerging area of importance in public health policy and research as it is associated with individuals' well-being and productivity. Various interventions have been implemented in Singapore to promote positive mental health (PMH) in the population. However, constructs of PMH have been largely developed in Western societies. This study examined the conceptual framework of PMH in the multiethnic community in Singapore.

Methods: A structured protocol for focus group discussions (FGDs) was designed. Ten FGDs, with 6-8 participants each, were conducted among Chinese, Malay and Indian participants. A mix of age, gender and education was represented among the participants to elicit rich qualitative data. FGDs were conducted in the English, Mandarin and Malay languages. Discussions were audio taped and transcripts were translated into English for analysis. Constructs were identified through thematic and grounded theory approach using the method of pile sorting.

Results: Constructs of PMH ranged from core individual characteristics (e.g. being optimistic and confident) to environmental aspects (e.g. political factors, religious tolerance, etc). Although statistical tests were not conducted, informal observation suggested that no ethnic differences in concepts were identified. Five key domains representing personal growth and autonomy, relationships, spiritual beliefs and practices, coping strategies and personal characteristics were identified. These included 56 sub-domains covering attributes, attitudes and behavioural characteristics of mentally healthy persons. Distinctive traits of an Asian community were evident with much importance given to family and respect for collective values. Individualistic traits, such as need for solitude and personal space were less endorsed by the groups.

Conclusion: Socio-cultural influence on domains of mental health should be considered in the designing of instruments to assess PMH.

BP – AH 72

A Prospective Study of the Management of Bacteriuria in Tan Tock Seng Hospital

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Background: The objectives are to describe the management of bacteriuria in Tan Tock Seng Hospital, to evaluate the appropriateness of treatment given and to determine the effect of management on morbidity and mortality as well as length of stay.

Methods: Inpatients with positive urine cultures in October 2008 were identified using the Antimicrobial Resistance and Utilisation Surveillance (ARUS) programme. Their case notes were reviewed and pertinent information was recorded from the day of index positive urine culture until 30 days later or until discharge or death, whichever was earlier. No attempt was made to influence patient management. Data collected were keyed into Microsoft Access and analyses were done using Microsoft Excel and SPSS.

Results: ESBL-negative *Escherichia coli* was the most common micro-organism isolated in the urine. Among patients with symptomatic urinary tract infection (UTI), 91% were treated. Fever was the most common symptom. Among patients with asymptomatic UTI, 82% were treated. Morbidity developed in 25% of symptomatic untreated patients, 10% of symptomatic treated patients, 0% of asymptomatic untreated patients and 4% of asymptomatic treated patients. There were 8 treated patients who progressed to mortality within 30 days. None of the untreated patients progressed to mortality. Median lengths of stay of symptomatic untreated, symptomatic treated, asymptomatic untreated and asymptomatic treated patients were 10, 15, 14 and 10 days respectively.

Discussion & Conclusion: Current practice varies from recommended clinical guidelines. In both symptomatic and asymptomatic patients, antibiotic treatment had no statistically significant effect on the development of morbidity and mortality.

BP – AH 73

Diagnosis of Deep Venous Thrombosis as a Cause for Suspected Pulmonary Embolism: Can Indirect Computed Tomography Venography Replace Lower Extremity Venous Sonography? Analysis of Current Literature

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Background/Hypothesis: Lower extremity venous sonography (LEVS) is the current and widely accepted standard for diagnosis of lower extremity deep vein thrombosis (DVT). With the development of Multislice Computed Tomography (MSCT), indirect Computed Tomography venography (iCTV) has been proposed as an accurate alternative for diagnosis of DVT. The aim of this essay is to compare the accuracy, safety and cost-effectiveness of iCTV with that of LEVS and to determine whether iCTV can replace LEVS, for the diagnosis of DVT as a cause for suspected PE.

Methods: A literature search using various database platforms, for English language publications was performed from September 2008 to December 2008. Only studies and meta-analyses evaluating the roles of iCTV, LEVS, or comparing iCTV in the overall detection of DVT with LEVS from the year 1998 to 2008 were included. Only MSCT was considered. The specificity, sensitivity, positive predictive value (PPV), negative predictive value (NPV) and interobserver agreement of iCTV were evaluated by comparing with LEVS.

Results: Compared with LEVS, iCTV has high sensitivity and PPV, very high specificity and NPV. iCTV also has moderate to good interobserver agreement. However, iCTV is believed to be more costly than LEVS, and it requires patients to undergo more radiation exposure.

Discussion & Conclusion: The use of iCTV can replace LEVS for most patients undergoing CTPA to detect DVT as a cause for suspected PE.

BP – AH 74

Self-Administration of Medication (SAM)

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Background: In inpatient setting, medication is served fully by nurses and patients may not know what medication they are taking and what side effects to monitor for. Self-administration of medication (SAM) is a programme that will allow selected patients to administer medication on their own, under the supervision of staff nurses.

Objectives: The study aims to develop a standard protocol for SAM and to implement a feasibility study in Alexandra Hospital.

Methods: A standard protocol consisting of working instructions for pharmacy and nursing was developed. A pilot study was then carried out in 2 wards for 9 weeks. Only inhalers, topical and oral medication were allowed to be self-administered. Recruited patients were counseled on their medication by pharmacists before proceeding to self-administration. Patient reassessment was carried out by nurses after each administration round to record the number of reiterations that patients needed. Feedback was gathered from patients and staff nurses through feedback forms.

Results: A total of 27 patients were identified based on the preset criteria and 21 (78%) consented to participate. The median age of the participants was 50, with 43% aged 50 years and above. A total of 95% of the patients had new medication added during their stay; only 3 patients needed reiteration from the nurses during self-

administration. From patients' feedback, more than 90% of them agreed or strongly agreed that SAM had helped to improve their knowledge on medication and increased their familiarity with their medication regimen. Of the patients, 90% also felt more confident to self-administer and were thus more likely to comply when they returned home.

Conclusion: Our study has shown that selected patients were capable of self-administration and had benefited from the programme. Based on the findings, we plan to expand this initiative to empower selected patients to self-administer without supervision, with their own medication cupboard under lock and key by their bedside.

BP – AH 75

A Retrospective Medication Use Evaluation of Atorvastatin in Alexandra Hospital

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Background: Usage of Atorvastatin (non-formulary) has increased compared to approved drugs like Rosuvastatin and Simvastatin. Substituting Atorvastatin 20 mg with equipotent doses of Rosuvastatin 5 mg or Simvastatin 40 mg translates to savings of \$34.65 and \$63.90 per month. We aim to study the prescribing pattern of Atorvastatin, evaluate its effectiveness and present the incidence of adverse drug reactions (ADRs) to Atorvastatin.

Methods: Ninety-four patients prescribed Atorvastatin between June 2008 and August 2008 were stratified to their target Low Density Lipoprotein-Cholesterol (LDL-C) based on NCEP ATP III¹. The frequency of monitoring LDL-C, Creatine Kinase (CK), Alanine aminotransferase/ Aspartate aminotransferase (ALT/AST) were noted. Critical indicators like caution in patients with thyroid, kidney or liver problems, contraindications and ADRs were recorded.

Results: All the patients had Atorvastatin prescribed in observance to the critical indicators. Six per cent (N = 6) developed complications. After switching to Atorvastatin, patients who reached their target LDL-C increased from 10% to 37%. Median time between switching to Atorvastatin and LDL-C evaluation was 15.5 months (interquartile range, 6 to 28 months). The recommended LDL-C levels and ALT/AST monitoring frequencies were fulfilled in 87% (N = 82) and 85% (N = 80) of the patients. CK was monitored in 73% (N = 69). 31% (N = 29) had documented intolerances to other statins as reason for the switch.

Conclusion: Atorvastatin was effective in 37% of the patients. A total of 69% who did not have previous documented intolerances to statins can benefit from substitution to approved statins. A therapeutic interchange program could result in savings of \$803 (subsidised patients) or \$741 (private patients) for Simvastatin and \$549 per year for Rosuvastatin.

Reference: 1. National Cholesterol Education Program Adult Treatment Panel 2004 <http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm>

BP – AH 76

Cognitive Testing on World Mental Health-Composite International Diagnostic Interview (WMH-CIDI)

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Background: The World Mental Health Composite International Diagnostic Interview (WMH-CIDI) is a diagnostic instrument used in large-scale psychiatric epidemiological surveys. Developed in the United States, this instrument has been used in 28 countries and translated into 30 languages. The current study aims to conduct cognitive interviews to evaluate the comprehension and obtain feedback of the WMH-CIDI questionnaire among the Singapore population.

Methods: A total of 40 cognitive interviews were conducted with 36 participants, including 18 patients with mental illness; recruited through purposive sampling. All participants were Singaporeans or Permanent Residents and proficient in English language. Thirteen domains of WMH-CIDI to be used in the national survey were each assessed by at least 3 cognitive interviews. Questions were read to the participants and the participants were instructed to think aloud as they answered each question. Ambiguous items and responses were further probed using standardised probes to the questionnaire. All the interviews were audio-taped, documented and evaluated.

Results: Participants were able to comprehend and provide relevant answers to the WMH-CIDI questionnaire. Although participants were aware that certain terms and expressions were not commonly used in Singapore context, they commented these factors did not hinder their overall comprehension of the questions and decision-making on the options.

Conclusion: Cognitive interviews are crucial to pre-test all new instruments or instruments being used in a novel setting. Overall, we observed consistency in respondents' answers and understanding of the questionnaire, thereby suggesting that the WMH-CIDI questionnaire can be administered on the Singapore population without major adaptations.

BP – AH 77

Methadone Maintenance Treatment (MMT) for Elderly Opium Users in Singapore

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Background: The international literature supports the use of MMT for the treatment of opiate dependence, however few studies have examined its effectiveness with the elderly. The present study examined the impact of MMT on clinical outcomes among elderly opium addicts attending CAMP, Singapore.

Methods: The study used a cross-sectional design. Methadone was titrated until stable dose was achieved, prescribed monthly and supervised by caregivers. Forty patients completed a semi-structured interview and information on opiate use, withdrawal symptoms, psychological health and quality of life was elicited. Objective measures included urine drug screen and blood test.

Results: The sample who had received MMT for a mean of 3 years, with a current mean dose of 9.2 mg/day, were predominantly male (80%) and averaged 74.8 years. Opium use spanned on average 43 years. Mean quality of life, anxiety and depression scores were in the average range. Although only few/minor withdrawal symptoms and side effects were reported, 6 provided a positive urine screen for illicit opiates in the preceeding 6 months. There were no reports of methadone diversion and both families and patients expressed treatment satisfaction.

Discussion & Conclusion: In Singapore, MMT is only available for use among elderly opium addicts. The well-retained family sup-

port structure may facilitate monthly home dose methadone regime. The expectation that they would not resort to illicit opiates use was tenuous, since 15% had actually done so. It should also be noted that elderly opium addicts are a dying breed, and differ markedly from younger opiate users who will eventually grow old.

BP – AH 78

Observatory Prospective Study on Effectiveness and Safety of Continuous Intravenous Infusion of Esomeprazole in Acid-Suppressive Therapy for Peptic Ulcer Bleeding in NUH

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Background: Intravenous formulation of esomeprazole has shown superior gastric acid suppression, faster action onset and lower pharmacodynamic response variability than intravenous pantoprazole and omeprazole. Moreover, there is no observatory report on predefined parenteral doses of esomeprazole given over 72 hours, and its effects in Asian patients have been reported.

Methods: Thirteen patients admitted to National University Hospital with peptic ulcer bleeding and endoscoped were prospectively analysed over 2 months. They were given or omitted a loading dose of 40 mg or 80 mg of intravenous esomeprazole followed by an esomeprazole intravenous infusion of 8 mg/h, for ideally 72 hours or until end point was reached. Subsequently, they were reviewed on day 7, day 14, day 21, and day 30 to monitor for signs of rebleeding and side effects.

Results: For the 31 patients (n = 31) observed, 21 (67.7%) patients were absent of signs of gastrointestinal bleeding during and after 8 mg/hr intravenous esomeprazole infusion, while 10 (32.3%) patients bled or rebled. A total of 17 out of 21 (80%) responders had ulcers with lower risk of recurrent bleeding, whereas 6 of 10 (60%) non-responders had actively bleeding ulcers. The incidence of not responding to the treatment was higher in patients who drank and smoked. The side effects reported were mainly local injection site injury, which occurred in 6 of the 31 (19.4%) patients.

Conclusion: Intravenous esomeprazole infusion over 72 hours may be effective in the prophylaxis of recurrent bleeding after endoscopy for oozing, flat spot and clean base ulcers. Furthermore, it is well-tolerated in all studied patients.

BP – AH 79

Obese Subjects with Family History of Diabetes have more Cardiovascular Risk

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Background/Hypothesis: Obesity is associated with an increased risk of insulin resistance and type 2 diabetes mellitus. In this pilot study, we studied the lipid profiles and inflammatory marker in lean versus obese subjects. We hypothesised that abnormalities in both lipid metabolism and inflammation is associated with insulin resistance.

Methods: Thirteen non-diabetic subjects (6 lean vs 7 obese) were recruited. Fasting blood for total cholesterol, HDL-cholesterol, and triglycerides (Tg), plasma insulin and hsCRP were collected. LDL-

cholesterol was calculated using the Friedewald formula. Body mass index >23 kg/m² was defined as obese.

Results: When compared to the lean subjects, the obese subjects (mean BMI = 26 kg/m²) had higher Tg and lower HDL-C. The other cardiovascular risk factors (LDL-C and hsCRP) were also greater. The plasma insulin, a surrogate of insulin resistance was higher in the obese subjects. Obese subjects with family history of type 2 diabetes had greater abnormalities in the lipid profiles. There was no significant difference in the lean subjects with or without history of type 2 diabetes.

Discussion & Conclusion: Obese cohort had higher cardiovascular risk factors (elevated Tg and LDL-C, low HDL, elevated plasma insulin and hsCRP) especially in subjects with the family history of diabetes mellitus.

BP – AH 80

Chikungunya Outbreaks in Singapore, January and August 2008

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Background/Hypothesis: The first local chikungunya outbreak (virus without A226V mutation) was reported in Singapore in January 2008. A second and larger outbreak, (E1-226V mutation) occurred in August 2008. We compare the clinical features of chikungunya patients from these 2 outbreaks.

Methods: We conducted a retrospective case-notes review and collated clinical data on all PCR-confirmed chikungunya fever patients who were admitted to Communicable Disease Centre/Tan Tock Seng Hospital during these 2 periods, 14–29 January 2008 and 1 August–10 November 2008.

Results: In the first and second outbreaks respectively, 10 (aged 22 to 69 years) and 117 (aged 20 to 70 years) patients with PCR-confirmed chikungunya infection were hospitalised. Male-to-female ratio was 12:1 and 3.3:1 respectively. The most common presenting features were fever (100% in 1st outbreak vs 89.7% in 2nd outbreak), arthralgia (90% vs 86.3%) and rash (60% vs 60.7%). Median duration of fever was similar in both outbreaks (4.5 days, range 3–10 vs 4 days, range 1–13). Compared to the first outbreak, patients from the second outbreak had a lower mean nadir leukocyte count (3.5±1.9 vs 4.0±1.4 x 10⁹/L, *P* = 0.424), a higher mean nadir platelet count (168±53 vs 159±45 x 10³ cells/mm³, *P* = 0.592), a lower peak alanine aminotransferase (median 28, range 9–177 vs median 47, range 16–132 U/L, *P* = 0.010) and a lower peak aspartate aminotransferase (median 35, range 17–163 vs median 47, range 34–114 U/L, *P* = 0.023).

Conclusion: Fever, arthralgia and rash were the 3 main clinical features in both outbreaks. Patients in the second outbreak recorded statistically significant lower peak alanine aminotransferase and a lower peak aspartate aminotransferase.

BP – AH 81

The Impact of EGFR Inhibitor-Induced Cutaneous Toxicities on Patients' Quality Of Life (QOL)

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Background/Hypothesis: Patients treated with EGFR inhibitors (EGFRIs) often develop a characteristic spectrum of cutaneous tox-

icities (CTs) which may affect patients' QOL. The main objective is to evaluate this. Other objectives include investigating the incidence of cutaneous toxicities, the difference of toxicity grading between patient and healthcare professionals (HPs) and the relationship between clinical outcomes and reaction severity.

Methods: This observational study enrolled EGFR-naïve patients on cetuximab, erlotinib, gefitinib or lapatinib at NUH Cancer Centre. Consented patients filled the Dermatology Life Quality Index (DLQI) at baseline. At subsequent visits, HPs evaluated patients for cutaneous toxicities and graded them using NCI toxicity criteria and Lynch gradation. Patients graded their cutaneous reactions and filled the DLQI upon observation of cutaneous toxicities and at weeks 2, 4, 6, 8 and 12. If EGFR was discontinued before week 12, patients filled forms until 2 weeks post-discontinuation.

Results: Ten patients were recruited over 17 weeks. By week 4, 90% presented with cutaneous toxicities - 100% (n = 3) in cetuximab and erlotinib (n = 3) cohorts, and 75% (n = 4) in gefitinib cohort. Mean maximum DLQI score was 1.7. HPs and patients had different NCI toxicity grading 33% of the time versus 25% using Lynch gradation. At present, the relationship between clinical outcomes and severity of cutaneous toxicities is unevaluable.

Discussion & Conclusion: Cutaneous toxicities from EGFRIs had a small effect on patient's QOL. More differences in toxicity grading were observed between HPs and patients using NCI criteria as compared to Lynch gradation. Of the patients, 90% developed cutaneous toxicities. This study provides useful information on how cutaneous toxicities from EGFR treatment affect patients' QOL.

BP – AH 82

A Study of Prescribing and Monitoring Pattern of Parenteral Nutrition in Paediatrics and Neonates in National University Health System (NUHS)

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Background/ Hypothesis: Parenteral nutrition (PN) for neonates and paediatrics is prescribed by doctors with minimal involvement from the dietitians, pharmacists and nurses in NUHS. The aim of this study is therefore to study the prescribing and monitoring pattern of PN regimes for neonates and paediatrics in NUHS and identify areas for improvement.

Methods: Neonatal and paediatric patients who received PN from October 2008 to February 2009 were included in the study after written informed consent was obtained from their parents. Data was collected from patients' case notes, CPSS and PN order form.

Results: Only 11 out of 26 patients on PN were included in this study. Indications of PN were valid in all but 1 patient. There were 6 neonatal and 5 paediatric patients, 64% and 45% of the subjects met 80-120% of the estimated energy requirement (EER) and estimated protein requirement (EPR) respectively. Carbohydrates were infused below the maximum glucose oxidation rate in all subjects. Lipids content contributes >30% of non-protein energy in 2 paediatric subjects. Monitoring of serum sodium, serum potassium, blood glucose and input/output was done in more than 95% of the subjects. However, monitoring of phosphorus, magnesium, liver function and triglycerides was done in less than half of the subjects.

Discussion & Conclusion: Prescribing and monitoring pattern of PN in neonates and paediatrics can still be improved. To optimise nutrient content, improve monitoring pattern and prevent complications of PN, pharmacists and dietitians need to play a more active role in the care of PN patients.

BP – AH 83

A Retrospective Study to Describe the Demographic Data of Patients who came for Dietitian's Session in Toa Payoh Polyclinic

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Background: The aim of this survey is to study the demographic of patients who came for dietitian's session with and without other appointments on a single day visit in Toa Payoh polyclinic.

Methods: We conducted a retrospective study to collect the demographic data of patients who came for dietitian's sessions during May 2009. We analysed the data by using MS Excel to determine the mean age, weight and Body Mass Index (BMI) of patients, and their medical conditions.

Results: A total of 93 patients attended dietitian's session. There were 40 (43%) males and 53 (57%) females; 73 (78.5%) Chinese, 8 (8.6%) Malays, 6 (6.5%) Indians and 6 (6.5%) Eurasians. The mean age was 60.9 years, mean weight was 65.3kg and mean BMI was 25.5kg/m². One (1.1%) case was underweight, 37 (39.8%) cases had normal weight, 47 (50.5%) cases were overweight or obese, and weight was not obtained for the remaining 8 cases (8.6%). Seventy-one (76.3%) of 93 cases were referred as new case to see dietitian. 56 (60.2%) cases are diabetic with co-morbidities. The number of patients who came for dietitian's session with the other services' appointment on a single day visit was 3 times higher than those with dietitian's appointment only.

Conclusion: Most patients with chronic diseases referred to see dietitian are Chinese, above middle-age and they prefer to come for dietitian's session with other appointments on a single day visit in Toa Payoh polyclinic.

BP – AH 84

Analysis of Glycemic Index of Muffins among Healthy Subjects and Type 2 (Non-Insulin Requiring) Diabetics

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Background: With the rising rates of obesity and chronic diseases, there is a growing demand among consumers for novel products with health benefits. Healthy low Glycemic Index (GI) foods that are preservative-free will provide additional benefits over conventional low-calorie foods in the management of diabetes mellitus. This led us to formulate and test 2 types of low GI muffins.

Methods: Two varieties of muffins, 1 using the traditional method and the other incorporating sourdough were developed. The GI of the 2 muffins was clinically tested among 10 healthy and 10 Type 2 Diabetes (Non-Insulin Requiring) subjects using the internationally accredited FAO/WHO protocol supported by AS 4694-2007 Standards Australia. Capillary blood samples were drawn at specified intervals after the consumption of the reference food (dextrose, anhydrous) and test foods (muffin) and GI was analysed. Satiety score card was used to test the satiety rating of the muffins.

Results: The in-vivo test results confirmed that the muffins were low in GI (0-55). Unlike commercially similar or alternative muffins, our muffins are preservative-free. Satiety rating showed that the low GI

muffins offered satiety, indicating that they are metabolised more slowly in the gut.

Discussion & Conclusion: The low GI muffins are intended to benefit consumers by providing a preservative-free, ready-to-eat snack or meal replacement food item. Apart from diabetics, it will also benefit special groups like the National Service men, athletes, obese individuals, and health-conscious consumers.

BP – AH 85

Effectiveness of Medication Reconciliation in Reducing Medication Errors in a Hospital Inpatient Setting

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Background: Medication errors at the time of hospital transactions are common and can lead to adverse events. The objectives of this study were to reduce medication errors from the point of admission to discharge through medication reconciliation (MR) and to formulate a workflow that enables MR to be carried out as part of daily ward responsibilities.

Methods: A prospective, non-randomised study was carried out in a 50-bed inpatient ward over 82 days. The inclusion criteria were:

1) patients above 21 years old, 2) newly admitted patients, 3) high risk patients (elderly above 65 years old; poly-pharmacy patients; stroke, renal or transplant patients). Written informed consent was obtained for all patients. Data collected included information providers, discipline, types of intervention and time taken for MR.

Results: Seventy patients were recruited in the study. Forty-three per cent of patients had at least 1 medication error. Information sources included patients (88%), in-house computerised record (78%), patients' own medications (40%), external hospital databases (20%) and caregivers (9%). The average number of medications per patient was 8.8 and the average time was 15 minutes per patient. Fifty per cent of the interventions were due to drug omission, 18% wrong dose, 12% wrong drug and 6% drug duplication.

Discussion & Conclusion: MR is a useful method for identifying and rectifying medication errors upon admissions and discharges. Computerised medication records play complementary role in MR but only detailed interview can determine a patient's active medications. We would like to propose an electronic MR tool to minimise task duplication and to prevent transcribing errors.

BP – BS 05

Accelerated Wound Healing Using Human Mesenchymal Stem Cell-Derived Conditioned Medium: A Novel and Effective Treatment

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Background/Hypothesis: Mesenchymal stem cells (MSCs) are versatile cells from which tissue regeneration can occur. Recent reports suggest that some of its reparative effects are mediated by MSC-secreted paracrine factors. Our analysis of a medium conditioned by human ESC-derived MSC cultures revealed >200 proteins. We hypothesise that this conditioned medium (CM) can accelerate wound healing in a murine excised-wound model.

Methods: For CM preparation, 80% confluent HuES9.E1 cultures were washed 3 times with PBS and cultured overnight in DMEM. The cultures were washed 3 times with PBS, and fresh medium added. The medium was collected after 3 days and concentrated using a 100-kDa molecular weight cut-off machine and the CM derived following 0.22-mm filtration. Wounds measuring 15 mm in diameter were excised from the dorsum of Black6 mice. Three micrograms of CM were administered via peri-lesional subcutaneous injections or topically applied and sealed over with Tisseel glue®. Wound areas were measured daily. Comparison arms consisted of untreated mice, and non-conditioned medium (NCM) treated mice.

Results: On the 3rd post-treatment day, the percentages of the remaining wound sizes were 100.0%, 82.1% and 72.5% for the control, NCM and CM arms respectively, while on the 7th day, they were 52.0%, 35.5% and 18.7% ($P < 0.05$). Mean time to complete wound healing was shortest in the CM-treated group ($P < 0.05$). Perilesional subcutaneous CM injection was more effective than topical application and Tisseel® glue, although this was not statistically significant.

Discussion & Conclusion: Application of CM results in accelerated wound healing in the murine excised-wound model. CM shows great potential in treating patients with massive wounds or burns whilst avoiding problems of immunological rejection associated with most current-day stem cell therapies.

BP – BS 06

Cytokeratin 19 Negatively Regulates Cell Invasion and Transformation in Breast Cancer Cells

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Background: High expression of CK19 was mostly found in the primary breast tumours with lower histologic grade and mitotic index, indicating a potential suppressive role in breast cancer progression. This study aims to investigate its function in cell invasion/transformation and its downstream signals.

Methods: CK19-expression vector was transfected into breast cancer BT549 cells with lipofectamine and stable clones were selected in medium with G418. Cell invasion and transformation were assayed using the CytoSelect Cell Invasion/Transformation method. Gene expression profiling was performed using a real-time PCR array. Other methods included RNA interference, Western blotting and

immunofluorescent imaging.

Results: Expression of CK 19 in BT549 cells significantly reduced the cell invasion and transformation compared to the mock-transfected control cells ($P < 0.01$, t-test). However, silencing of CK19 by shRNA in MDA-MB-231 cells only resulted in 1.4-fold increase of cell invasion. Gene expression analysis revealed a significant transcriptional change of genes involved in ECM degradation, cell proliferation and survival, transcription and tumour suppression. Among them, MMP2, MMP3 and MMP9 were downregulated, whereas ECM protein COL4A2 was upregulated in the CK19-transfected BT549 cells, leading to the decreased cell invasive capacity. Importantly, several tumour/metastasis suppressors, e.g., CD82, Kiss-1 and MTSS-1, were highly upregulated by CK19, thus suppressing cell transformation in soft agar. Furthermore, CK19 upregulated PI3KC and Raf1/MAPK10/MAPKAPK3 pathways which modulate cell survival under stress conditions.

Discussion & Conclusion: CK19 is a negative regulator of cell invasion/transformation by reprogramming molecular portrait. Our *in vitro* study indicates that loss of CK19 facilitates tumour progression and micrometastasis in breast cancer.

BP – BS 07

Transglutaminase-2 in Hyperosmolarity Induced Corneal Epithelial Cell Death

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Background: Hyperosmolarity is the major mechanism for ocular surface damage in dry eye disease. Hyperosmolar stimulation has been shown to increase transglutaminase (TGM) 1 and 2 proteins and transamidase activity. We aim to evaluate the role of TGM2 in this model of cell death and whether the mitochondria play a role in TGM2-mediated death.

Methods: Cultured human corneal epithelial cell line (HCE-T) was used. Sodium chloride was added to induce hyperosmolarity (550-560 mOsm). Stable cell lines expressing either shRNA targeting TGM2 (TG2-KO) or scrambled shRNA were constructed. Over-expression of human full length TGM2 was done by electroporation. An impedance-based cell assay (Xcelligence) was used for cell proliferation, flow cytometric assessment of JC1 dye for mitochondrial depolarisation, cell-based assays for caspase activities and a colorimetric microassay for TGM activity were used.

Results: HCE-T viability was reduced in hyperosmolar medium, showing 27.5% reduction in mitochondrial potential 24 hours after stimulation. TGM2 overexpression increased transamidase activity in cells and reduced cell viability, compared to control vector. TG2-KO has increased cell proliferation, compared to control shRNA. TGM2 overexpression increased caspase 3/7 and 9 activity, which was inhibited by general caspase inhibitor Z-vad-fmk, and this also induced significantly more mitochondrial depolarisation compared to control.

Conclusion: Hyperosmolar stimulation reduced cell viability, involving a mitochondrial mechanism. Increased TGM2 and transamidase activity has a detrimental effect on HCE-T death, which occurred in a caspase 3/7 and 9 dependent fashion. Protection against mitochondrial stress in the ocular surface may be useful in treatment of dry eye.

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BP – BS 08

Non-invasive Nanoprobes Based on Nanochemistry of Gold Nanoparticles for Glucose Quantitation in Urine

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Background/Hypothesis: The commonly used glucose dip stick for semi-quantitative measurement of glucose in urine samples is based on glucose oxidase, which often suffers from the lack of stability due to the intrinsic nature of enzyme. This study aims to develop a non-invasive glucose sensor that is stable and allows for quantitative determination of glucose level through the use of metallic nanomaterials.

Methods: The assay is based on the reduction reaction of gold salts by glucose in alkaline media which generates gold nanoparticles (GNPs) at room temperature to give a visibly red colloidal solution. The formation of GNPs was characterised by their UV-Vis absorption spectrum.

Results: The results show that the optical properties of the resulting GNPs are correlated to the total glucose content of the samples analysed. With increasing glucose concentration, the absorption intensity displays a linear response with glucose content over the range from 5.5 to 111.0 $\mu\text{mol l}^{-1}$. Thus, a novel glucose assay is established with the limits of determination (3σ) being 0.21 $\mu\text{mol l}^{-1}$, and the detection of glucose could be made easily in the urine samples of diabetic sufferers. Furthermore, the formation of GNPs is shown to be very stable by this method.

Discussion & Conclusion: The formation of GNPs makes it easy to presumably judge without the help of any apparatus whether glucose is present in urine by observing the colour change of the reaction solution. The ease of development of such inexpensive disposable and non-invasive nanoprobes could find clinical applications in rapid and efficient glucose screening in urine of suspected diabetic sufferers.

BP – BS 09

A Recurrent Frameshift Mutation in Keratin 5 Associated with Dowling-Degos Disease in a Singaporean Family

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Background: Dowling-Degos disease (DDD) is an autosomal-dominant genodermatosis characterised by reticulate pigmentation of the flexures with a KRT5 gene association first documented in 2 large German families. Keratin mutations have long been associated with skin fragility disorders with the relatively recent association of aberrant pigmentation a surprising finding.

Methods: Direct sequencing from genomic DNA of a Singaporean Chinese family with DDD was used for mutation detection. From a patient skin biopsy, electron microscopy was conducted to study melanocyte-keratinocyte interactions and keratin network integrity. Protein expression and localisation patterns were studied with a number of protein markers by immunohistochemistry.

Results: A 2-base pair deletion mutation (c.442delAG) in exon 1 resulting in a premature termination codon in the V1 domain of Keratin 5 (p.S148fsX30) was identified in affected family members. This was previously reported and confirms the disease association with this mutation. The keratin intermediate filament network appeared to be intact by electron microscopy with no obvious differences in the melanocytes or keratinocytes. Immunohistochemistry showed a

normal expression pattern of keratin markers indicating normal epidermal differentiation. No dominant-negative effects on the keratin network was observed suggesting that the truncated protein is not interfering with network assembly and the disease is resulting from haploinsufficiency as previously suggested.

Conclusion: This study further confirms the role of keratin intermediate filaments in pigment biology. Currently the mechanism of disease is unclear but it is postulated that keratins could play an important role in melanosome trafficking as well as maintaining the structural integrity of epidermal keratinocytes.

BP – BS 10

The Effect of Prostatic Channel Diameter in Benign Prostatic Hyperplasia: A Computational Flow Dynamics Simulation Study

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Background/Hypothesis: The anatomical and functional factors affecting urinary flow in bladder outlet obstruction has yet to be understood. The aim of this study is to investigate the efficacy of prostatic channel diameter in benign prostatic hyperplasia using computational flow dynamics simulation.

Methods: Three-dimensional computational fluid dynamics models comprising a bladder, prostatic channel and urethra were developed. We define prostatic channel diameter as a reduction of cross-sectional area compared to unobstructed urethra. Next, the detrusor pressure is varied from 10 cmH_2O to 100 cmH_2O with intervals of 10 cmH_2O , mimicking low to high pressure voiding. The maximum flow rate was calculated by multiplying the maximum flow velocity through the mid-prostatic channel and its cross-sectional area. A total of 50 simulations were conducted and results were plotted in the format of the International Continence Society nomogram. **Results:** The maximum urinary flow rates are found to increase exponentially with increased detrusor pressure. When the cross-sectional area is reduced by half, the reduction of flow is about 18%. Similarly, when the cross-sectional area is reduced by 72.5% and 82.5%, the flow rate is reduced by about 55% and 69% respectively. Worst, for a very constricted prostatic channel where the cross-sectional area is reduced by 90%, the reduction of flow is about 87%.

Discussion & Conclusion: Our findings have shown that prostatic channel diameter greatly affects the maximum flow at voiding stage. More importantly, prostatic channel diameter measurements may potentially improve the accuracy of Q_{max} as a non-invasive measure of bladder outlet obstruction.

BP – BS 11

Gold Nanoshells as a Contrast Agent for Optical Coherence Tomography Imaging of Mouse Xenograft Tumour

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Background/Hypothesis: Optical coherence tomography (OCT) is an emerging clinical imaging modality that can be used to image superficial cancers. As with other imaging modality, a good contrast between suspicious lesions and surrounding normal tissue can be

achieved with the use of an external contrast agent. In this study, the *in vivo* control of optical contrast in a mouse tumour model using gold nanoshells as a contrast agent for OCT is examined.

Methods: Gold nanoshells were synthesised, pegylated and administered into mice via intravenous (i.v.) delivery. The injected dosage and particle surface parameters were further varied and the level of gold nanoshells localisation in tumour under these variations were determined using a non-invasive theoretical OCT modeling technique.

Results: The i.v. delivery of passively targeted pegylated gold nanoshells delivers a moderate amount of gold nanoshells into the tumour to achieve a good enhancement to OCT signal. Further increases in the i.v. dosage reveal a corresponding nonlinear increase in their tumour localisation as well as a nonlinear reduction in the percentage of injected gold nanoshells that localise in the tumour. Furthermore, this percentage is improved with the use of appropriate antibody surface functionalisation, which not only facilitates a more specific active targeting to the cancer marker of interest, but also simultaneously reduces the time required for effective tumour delivery from 6 to 2 hours.

Discussion & Conclusion: We have demonstrated the effective use of gold nanoshells to enhance the optical contrast of tumour and conclude that appropriate gold nanoshells surface functionalisation with cancer specific markers could potentially further improve the clinical imaging outcome with OCT.

BP – BS 12

Inhibition of Constitutive STAT3 Activity by Andrographolide Enhances Chemo-Sensitivity of Cancer Cells to Doxorubicin

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Background: Andrographolide (Andro), a diterpenoid lactone isolated from a traditional herbal medicine *Andrographis paniculata*, is known to possess anti-inflammatory and anticancer activity. In this study, we sought to examine the effect of Andro on STAT3 pathway and evaluate whether suppression of STAT3 activity by Andro could sensitise cancer cells to a chemotherapeutic drug doxorubicin.

Methods: We utilised MTT assay to detected cell viability; the colony formation assay was used to investigate the long-term effect of Andro and doxorubicin on cell proliferation; the luciferase assay was used to evaluate the STAT3 activity; cell sub-fraction and western blot were used to determine protein expression and cellular translocation; immunofluorescence and confocal microscopy were used to detect the nuclear translocation of STAT3; and co-immunoprecipitation was used to detect the protein-protein interaction.

Results: First, we found that Andro significantly suppresses constitutively activated STAT3 and abolishes IL-6-induced STAT3 phosphorylation and nuclear translocation in cancer cells. We further explored the underlying mechanism and found that Andro inhibits JAK1/2 phosphorylation and subsequently disrupts the interaction between STAT3 and gp130. Meanwhile, constitutive activation of STAT3 was found to contribute the resistance of cancer cells to doxorubicin-induced apoptosis. Therefore, Andro-mediated STAT3 inhibition dramatically promotes doxorubicin-induced apoptosis in cancer cells.

Conclusion: These observations collectively suggest that Andro could be a promising anti-cancer agent via its potent inhibitory effect on STAT3. Inhibition of STAT3 activity by Andro enhanced chemosensitivity of tumour cells to doxorubicin, suggesting a potential

therapeutic strategy using Andro in combination with conventional agents for treatment of cancer.

BP – BS 13

Genotyping and Expression Analysis of Adiponectin +45T>G in Human Adipocytes

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Background: Adiponectin is an adipo-cytokine that powerfully modulates insulin actions. We previously reported that a common coding synonymous single nucleotide polymorphism (SNP) at +45T>G (rs2241766) conferred increase risk (RR = 1.89) for type 2 diabetes (T2DM) in Chinese. We tested the hypothesis that the SNP (though preserving the coding of synonymous amino acid) may exhibit allele-specific differential efficiency in adiponectin gene expression.

Methods: Subcutaneous adipose tissues were obtained during bariatric surgery from obese Asian subjects (N = 38). Peripheral leucocytes from these anonymised subjects were genotyped for rs2241766. Adipocytes isolated from these individuals were then classified according to genotype (TT, TG and GG) and cultured *in vitro*. Total RNA was extracted and reverse transcribed to cDNA. TaqMan[®] RT-PCR expression assay (normalised against endogenous 18S) was used to quantify the constitutional efficiency of mRNA transcription. Fold change in gene expression was calculated using $2^{-\Delta\Delta Ct}$. Technical triplicates were performed for each genotype.

Results: Efficiency of transcription was recorded at cycle threshold (Ct) over the geometric phase of the RT-PCR melting curve. ΔCt was defined as Ct (genotype) – Ct (endogenous). Transcription efficiency differed according to genotype was consistently observed, ΔCt for genotype TT, TG and GG were 19.58 ± 0.4 , 20.21 ± 0.6 and 14.03 ± 0.5 respectively (P = 0.001). Therefore, $\Delta\Delta Ct$ ($\Delta Ct[GG]$ or $\Delta Ct[TT] - \Delta Ct[TG]$ calibrator) was -6.175 and -0.627, giving rise to a ~26-fold difference in transcriptional efficiency between TT and GG (P = 0.002).

Conclusion: Our results showed allele-specific differential transcriptional efficiency of adiponectin +45T>G rs2241766. This may provide molecular mechanistic insights of its association with increased risk for T2DM.

BP – BS 14

Isolation and Characterisation of Endothelial Progenitor Cells from Mid-gestation Fetal Blood

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Background/Hypothesis: Endothelial Progenitor Cells (EPC) can be found in the peripheral circulation and suggested to contribute to angiogenesis and vasculogenesis, particularly at sites of tissue injury. Similar populations of EPC are found in cord blood at higher frequency with greater proliferative capacity. We hypothesise that EPC can be found and isolated from the fetal circulation, and may play a crucial role in vasculogenesis during development. Here, we present data on the characterisation of fetal blood-derived EPC, compared against their umbilical cord blood (UCB) derived counterparts.

Methods: EPC were isolated from umbilical cord blood and mid-gestation fetal blood by adhesion selection in endothelial growth media. Following expansion, the cells were assessed by immunocytochemistry (ICC) for expression of endothelial markers. Matrigel differentiation assay was carried out to compare the vasculogenic potential of the cell sources. Colony forming capability was assessed. Finally, a genome-wide microarray analysis was carried out to compare the expression profiles of both cell populations.

Results: Fetal EPC (fEPC) and UCB-EPC were found to be capable of generating endothelial-like progeny as assessed by ICC. However, marked differences could be found in the expression patterns and fEPC are found to be morphologically diverse. When plated on Matrigel, fEPC demonstrated more extensive network formation. Colony forming assays demonstrate that 29.3% of fEPC were capable of generating colonies. In spite of 92.3% of these colonies being capable of taking up acetylated LDL (suggesting endothelial nature) the cells appear to transdifferentiate following extended culture, adopting a fibroblastic morphology. This was not observed in UCB EPC

Discussion & Conclusion: This study demonstrates that EPC can be isolated from the fetal circulation. fEPC are phenotypically and functionally different from UCB-EPC, suggesting a unique role for circulating EPC during the fetal stage.

BP – BS 15

Corneal Incision and Early Effects on Innervation

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Aim: To determine if the depth of a stromal pocket incision would have differential effects on the corneal nerves.

Methods: New Zealand white rabbits of either sex (3 kg) were prepared for corneal surgery. Cornea incisions were developed using a femto-second laser so that the incision depth was set at either 120 microns or 300 microns (n = 8). Prior to sacrifice, the incisional depth was verified by OCT. At 3 days the animals were sacrificed. Tissue was collected for either TEM or immunohistochemistry. Antibodies for GFAP or beta tubulin were applied to alternate cryostat sections.

Results: Immunostaining with GFAP, which stains Schwann cells, showed numerous neural structures at all depths of the cornea up to the epithelium, but only outside of the volume of the incision. Stromal lamellae over the incision failed to show GFAP staining. Similarly for beta tubulin, which stains the intra-axonal cytoskeleton, neural structures were peripheral to the incision and over the intact stroma some intra-epithelial nerve terminals also stained. However, the stroma and epithelium over the incision failed to show staining. TEM of large stromal nerves peripheral to the incision showed some oedema, loss of Schwann structure and unmyelinated axons filled with mitochondria.

Conclusion: Although nerve degeneration proceeds slowly in the cornea due to the lack of vascularisation, it does appear that the trauma of the incision has a rapid effect on the innervation but only in the stromal volume anterior to the incision and at this stage there is little difference between a shallow and deep incision.

CR: None

Support: NMRC/TCR/002SERI/2008

BP – BS 16

Viral Quasispecies Evolution Pattern in Chronic Hepatitis B Patients Treated with Lamivudine

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Background: We have recently demonstrated that hepatitis B virus (HBV) quasispecies diversity is higher in spontaneous and IFN induced seroconverters than non-seroconverters. However, it is unknown if this is similar in lamivudine-treated chronic hepatitis B patients. In this study, we aimed to evaluate the evolution pattern of HBV quasispecies in lamivudine induced seroconverters.

Methods: Ten seroconverters and 10 non-seroconverters during lamivudine treatment were selected. Nested PCR of the precore/core gene were performed followed by cloning and sequencing for 4 time-point samples per patient. Twenty clones per sample were sequenced. Sequences were aligned using ClustalX and sUPGMA phylogenetic trees were constructed using Pebble 1.0 following maximum likelihood estimates of pairwise distances under a GTR+I+G model testing the viral diversity and evolution.

Results: Lamivudine induced HBeAg seroconverters had a viral diversity of 1.38×10^{-2} (substitutions/site, median) and evolutionary rate 5.97×10^{-4} (substitutions/site/month, median) which were 3.2-fold and 5.2-fold higher respectively, than those of non-seroconverters. The viral diversity increased significantly after starting lamivudine treatment (from baseline 7.25×10^{-3} to 1.93×10^{-2} substitutions/site, $P = 0.01$) and reached a plateau just before and after HBeAg seroconversion (2.06×10^{-2} and 2.07×10^{-2} substitutions/site) in seroconverters. Non-seroconverters showed no alteration in viral diversity over time. Seroconverters showed more complex phylogenetic trees than non-seroconverters. Positive selection was similar in seroconverters and non-seroconverters.

Conclusion: High viral diversity is also a feature of lamivudine induced seroconversion supporting the hypothesis that viral diversity plays a key role in pathogenesis of HBeAg seroconversion.

BP – BS 17

Formulation of Cream with Natural Ingredients

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Background/Hypothesis: The objective of this study is to formulate face cream with natural ingredients such as jojoba oil, sweet almond oil, grapeseed oil, grapefruit seed extract and vitamin E oil. The effects of varying ingredients in the cream formulations on the texture and stability were investigated.

Methods: Creams were formulated using Carbopol ETD 2020, 18% sodium hydroxide, Tween 80, jojoba oil, sweet almond oil, grape seed oil, grapefruit seed extract, vitamin E oil, methyl and propyl paraben. Carbopol content, emulsifying wax content, Cetareth 10 and 20 contents were varied. The textures of the formulated creams were then investigated using the texture analyser. Stability of the cream was evaluated using a stability analyser LUMiFuge®.

Results: Increasing the Carbopol content resulted in more gel-like texture in the final cream. Varying the emulsifying wax, Cetareth

10 and 20 contents in the formulations affected the thickness of the cream. The creams were found to be stable over a period of time.

Discussion & Conclusion: Final cream formulation with desired texture was obtained by optimising the various ingredients in the formulations. The cream was stable over a period of time. These creams could be used as a base to incorporate natural extracts with anti-acne properties.

BP – BS 18

Down-regulation of uPAR/ β -integrin/EGFR Signaling Involves in ERp29-mediated Tumour Suppression in Invasive Breast Cancer **S XU¹, D ZHANG²**

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Background: Endoplasmic reticulum protein 29 (ERp29) is a novel tumour suppressor by causing cell cycle arrest at G0/G1 in the proliferative MDA-MB-231 cells (Bambang et al., submitted for reviewing). Gene expression profiling analysis revealed that urokinase receptor (uPAR) and EGF receptor (EGFR) were significantly down-regulated in the ERp29-transfected breast cancer cells. However, it is unknown whether the reduced expression of these receptors is functionally associated with the ERp29-mediated tumour suppressive capacity.

Methods: The main methods used in this study include siRNA treatment, RT-PCR and Western blotting, and immunohistochemical staining.

Results & Discussion: In the ERp29-transfected MDA-MB-231 cells, the levels of fibronectin (FN), uPAR, β 1-integrin and EGFR were highly reduced, compared to that in the mock-transfected control cells. Furthermore, overexpression of ERp29 increased phosphorylation of p38, but decreased phosphorylation of ERK. Silencing of ERp29 in MCF-7 cells reversed this phosphorylation pattern. These data indicated that ERp29 could switch on the cell dormancy-related p38 signaling and attenuate the proliferation-related Ras/p-ERK signaling. Comparing to the mice tumours formed by the mock-transfected control cells, the immunohistochemical staining intensity of p-p38 was enhanced whereas that of p-ERK and proliferation marker Ki-67 was reduced in the tumours formed by the ERp29-transfected cells.

Conclusion: These findings demonstrated that the attenuated uPAR/ β -integrin/EGFR signaling and activated p-p38 signaling play an essential role, at least in part, in ERp29-induced tumour suppression in invasive breast cancer.

BP – BS 19

Quantitative Analysis of 7 Ginsenosides and Total Polysaccharides in a Herbal Ginseng Tonic

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Background/Hypothesis: The active ingredients in herbs are strongly influenced by factors such as climate, water source, soil and harvest time. These often led to a variation in herb quality that cannot be easily assessed by visual inspection. Herb quality can be ascertained by quantifying its bioactive ingredient content. However, it is increasingly evident that single-ingredient quantification is an inaccurate indicator of efficacy and hence should not be used as an

indicator of the herb quality. In this poster, we report our work on the chromatographic quantification of Ginsenosides and colorimetric determination of total polysaccharides of a herbal Ginseng tonic. Such a multianalyte approach would allow a more thorough investigation of ginseng quality.

Methods: The non-polar and less polar components were removed from the Ginseng sample using Soxhlet extraction with chloroform. The residual Ginseng powder was refluxed for 1 hour with water-saturated n-Butanol to extract the Ginsenosides followed by heating to dryness with water for polysaccharide extraction. The n-Butanol extract was quantitatively analysed by High Performance Liquid Chromatography with Photodiode Array Detector (HPLC-PDA) using acetonitrile aqueous solution as mobile phase and octadecyl-bonded silicon as stationary phase under high pressure gradient elution model. The polysaccharides in the water extract were determined spectrophotometrically.

Results: The content of 7 Ginsenosides including Rg₁, Re, Rf, Rb₁, Rc, Rb₂ and Rd were found to be 0.345%, 0.162%, 0.073%, 0.370%, 0.184%, 0.124% and 0.045%, respectively. Polysaccharides were found to constitute 18.29% of the sample.

Discussion & Conclusion: The above-mentioned HPLC-PDA method was found to be precise, accurate, stable and reproducible. The colorimetric method for Ginseng polysaccharide determination was also found to be stable and accurate. Our method is therefore suited for evaluating Ginseng quality.

BP – BS 20

Methylation Pattern of Cancer-related Genes in Respond to 5-Fluorouracil (5FU)-Based Chemotherapy and Clinical Outcomes

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Background & Hypothesis: Gastric cancer is the fourth most common cause of death in Singapore with high mortality rates contributed by late or advance stages at initial clinical presentation. Epigenetics alterations in selected genes have been reported to have prognostic relevance in 5-fluorouracil (5FU)-based chemotherapy. DNA methylation status can be used as predictive markers for 5FU therapy in gastric cancer.

Methods: IC₅₀ of 5FU was determined in 43 gastric cell lines. Illumina goldengate methylation assay was used to identify methylation patterns in 6 gastric cell lines and 13 pre-treated to 5FU matched gastric tumours.

Results: Sensitive cell lines had lower IC₅₀ (1.5 μ M), compared to resistant cell lines (>100 μ M). Gastric cell lines revealed 135 CpG loci that were differentially methylated between resistant and sensitive groups. Interestingly, 5FU sensitive cell lines had 127 CpG loci that were heavily methylated compared to 5FU resistant cell lines, suggesting that hypomethylation may play an important role in the resistance to 5FU in vitro. Methylation profiling of pre-treated 5FU gastric tumours revealed 31/807 genes predictive of treatment outcome, while non-cancer gastric tissue showed no difference in methylation pattern in both groups. By coupling in vitro sensitivity assay with the 31 genes derived from clinical samples, we identified 6 overlapping methylation markers.

Discussion & Conclusion: We have identified methylation markers

that may be predictive of patient outcome to 5FU therapy. Presently, these methylation markers are being validated in a separate cohort of 50 matched gastric tumours. Methylation markers may have potential applications for individualised 5FU therapy in patients with gastric cancer.

BP – BS 21

Self-emulsifying Pellets Prepared by Extrusion-Spheronisation Technology for the Oral Delivery of Omega-3 Oils

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Background/Hypothesis: A self-emulsifying system (SES) is a mixture of oil-surfactant that forms an oil-in-water emulsion spontaneously with gentle agitation when introduced into water and has been used to enhance bioavailability of lipophilic compounds. The purpose of this study is to formulate omega-3 oil such as flaxseed oil into SES which can be processed into pellets by extrusion-spheronisation.

Methods: Self-emulsifying systems (SESs) were prepared using Tween 80, Span 80 and flaxseed oil (FO) at varying ratios. The self-emulsifying efficiency was characterised using the emulsification time. The SES mix, microcrystalline cellulose (MCC), and water were then subjected to extrusion-spheronisation to produce pellets. Mixer Torque Rheometer (MTR) was used to study the amount of water and mixing time to produce rheologically suitable wet masses for extrusion-spheronisation. The spheroniser speed and residence time were optimised by comparing the pellet size distribution, sphericity and friability of the pellets formed.

Results: High amount of surfactants resulted in viscous mixture which lowered the spontaneity in emulsification while low amount of surfactants resulted in poor self-emulsification. With optimal water content and mixing time as determined by the MTR, satisfactory pellets can be prepared with extrusion-spheronisation. Low spheronisation residence time and speed such as 1 minute at 600 rpm, resulted in dumbbell-like pellets. In contrast, higher spheroniser speeds tended to cause agglomeration resulting in huge pellets.

Discussion & Conclusion: In conclusion, the extrusion-spheronisation technology is applicable for the production of SES pellets with omega-3 oils provided the water content, spheroniser speed and residence time are optimised.

BP – BS 22

Methylation Profiling of Gastric Biopsies

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Background & Hypothesis: Gastric cancer biopsies consist of heterogeneous populations where stromal and inflammatory cells intermingled with cancerous tissue. As heterogeneity is thought to decrease sensitivity and tumour specificity, most studies selectively chose whole tumour biopsies that had greater than 70% tumour content to represent tumour population. We hypothesise that methylation patterns can help validate tumour content cutoff for accurate representation of tumour population.

Methods: Illumina goldengate methylation assay was used to quantify 1,505 CpG-sites in 98 matched tumours with ranging tumour content (5% to 90%).

Results: Higher tumour content biopsies (40% to 90%) clustered together and had more methylated genes compared to those with lower tumour content (<40%). No clustering was observed in matched non-cancer gastric tissue. Supervised clustering according to biopsies of highest tumour content revealed 518 differentially methylated CpG-loci across gastric biopsies, where 78% of CpG loci were hypermethylated, and 18% CpG loci were hypomethylated, suggesting the involvement of specific CpG loci hypermethylation in gastric cancer rather than global hypomethylation. We found that the lowest number of CpG-loci lost were in biopsies that had 50% tumour content while biopsies that had tumour content of 40% or lower had higher loss of methylated CpG-loci. Supervised clustering of biopsies with 50% to 90% tumour content found 58 differential genes between stages 1 and stage 4, indicating distinct differences in the methylation patterns in early and late stage gastric cancer.

Discussion & Conclusion: Tumour content does interfere with the sensitivity of methylation pattern in gastric cancer where tumour content $\geq 50\%$ can accurately represent the cell population in gastric biopsies.

BP – BS 23

CD14 Promoter Polymorphisms are not Associated with Atopic Phenotypes

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Background: A single nucleotide polymorphism (SNP) at C159 in the promoter region of CD14 has been reported to be associated with atopic phenotypes in several studies. However, conflicting results from association studies in different populations have been reported. This study aimed to investigate the relationship between CD14 promoter polymorphisms and atopic phenotypes in Singaporean Chinese and the subsequent biological characterisation of the polymorphisms.

Methods: One hundred and sixty-nine atopic patients and 68 non-atopic controls were included and their serum soluble CD14 (sCD14) and total IgE (tIgE) levels were measured. Screening of SNPs in the CD14 promoter was performed using direct PCR-sequencing and RFLP methods. The functional significance of SNP was investigated using reporter assay system.

Results: Three previously reported SNPs (CD14/-159, -1145 and C1359) and novel SNP (CD14/-550) were detected. A significant linkage disequilibrium was found among these 4 loci of CD14 gene. However, no significant difference was found in the genotype frequencies of these SNPs between non-atopy and atopy groups. Furthermore, no transcriptional activities of these SNPs were detected using reporter gene assay in 3 cell-lines (THP-1, U937 and HepG2).

Conclusion: In conclusion, this study confirms 3 reported and 1 novel SNP in the CD14 promoter in our local population. However, these SNPs do not play any decisive role in the development of atopic phenotypes.

BP – BS 24

Proteomic Analysis of Secretory, Cell Surface and Periplasmic Proteins from the Nosocomial Pathogen *Stenotrophomonas maltophilia*

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Background/Hypothesis: *Stenotrophomonas maltophilia* is an emerging nosocomial bacterial pathogen of immuno-compromised and severely debilitated patients, especially those with extended hospital stays and who have been on broad-range antibiotics. In this poster, we report our work in using developing proteomics protocols to identifying bacterial secretory, cell surface and periplasmic proteins that could have potential as therapeutic targets or which could help reveal the pathobiology of the pathogen.

Methods: *S. maltophilia* ATCC 13637 strain was cultured at 28°C (simulating environmental temperature) and 37°C (simulating human body temperature). Secretory and periplasmic proteins were obtained by trichloroacetic acid precipitation and chloroform extraction respectively. Cell surface proteins were identified using Cy-Dye fluorescent labeling. The proteins were separated using 2D gel and the gels analysed using PDQUEST to identify 37°C-overexpressed proteins. These were excised and identified using MALDI TOF/TOF.

Results: The study was done using biological triplicates and analytical triplicates. Only those spots that were consistently overexpressed 2X or more at 37°C as compared to 28°C were excised for analysis. We identified 4 secretory proteins, 2 periplasmic and 5 cell surface proteins. Some of these proteins (e.g. superoxide dismutase) were already implicated as virulence proteins in other pathogens, hence lending credence to our data.

Discussion & Conclusion: In this study, we have developed methods for extracting cell surface, secretory and periplasmic proteins from *S. maltophilia* and used it successfully to identify overexpressed proteins. We believe that these methods can be generically used for other Gram-negative bacteria. We will continue by using higher protein concentrations followed by data validation.

BP – BS 25

Ethnic Variation of IL-4/-590 Polymorphism among Chinese, Malays and Asian Indians in Singapore

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Background: The polymorphisms of IL-4 have been considered as a risk factor for atopic phenotypes, but results from various studies are controversial. This study aimed to investigate the association of IL-4/-590 polymorphism with atopy and atopic diseases (i.e., allergic rhinitis and asthma) in ethnic groups of Chinese, Malays and Asian Indians in Singapore.

Methods: A total of 357 unrelated Singapore residents (219 Chinese, 45 Malays and 93 Asian Indians) were investigated. Among them, atopy was found in 233 subjects, 189 with allergic rhinitis, and 73 with asthma. The serum total IgE (tIgE) and specific IgE (sIgE) to common local house-dust mites were tested by the UniCAP system. The IL-4/-590 C-T polymorphism was genotyped by restriction frag-

ment length polymorphism (RFLP) analysis.

Results: The T allele frequency at IL-4/-590 was significantly higher in Chinese (non-atopic 90.2% and atopic 87.3%) and Malays (non-atopic 83.3% and atopic 77.1%) than Asian Indians (non-atopic 38.1% and atopic 44.1%). There was no significant association between IL-4/-590 polymorphism and serum tIgE levels and atopic diseases, as well in individual ethnic group.

Conclusion: There is no association between IL-4/-590 polymorphism and levels of serum tIgE and atopic diseases. This study confirms a significant ethnic variation of allelic distribution at the IL-4/-590, which could be an explanation of discrepant results among association studies between this polymorphism and atopic phenotypes.

BP – BS 26

Effects of Thermo-Cycling on Full Range of Dental Restoratives

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Background/Hypothesis: This study aimed to investigate the effects of thermo-cycling on the full spectrum of dental restoratives. Surface hardness of the materials may decrease after prolonged thermo-weathering simulation using an automatic robot arm.

Methods: The materials studied were a micro-filled composite (GC Solare [SL]), a nano-hybrid restorative (Voco-Grandio [GD]), a compomer (Compoglass F [CF]), a nano-ionomer (Ketac N100 [KT]) and a glass ionomer restorative cement (GC GC gold label strength posterior [GC]). Nine specimens (30 mm x 30 mm x 30 mm) for each material were produced according to manufacturers' instructions. The specimens were subjected to surface hardness measurement before and after thermo-cycles in water at 10±5°C and 55±5 °C, which was simulated by a customised robotic arm. Each of 3 cycles was 1 hour for all the materials, during which the immersion time in water was 9 seconds. Data were subjected to ANOVA/Scheffe's test at 0.05 significance level.

Results: With exception of SL, all materials showed significant increase in surface hardness over time, from 18.22±0.83 to 71.30±3.50. For SL, its hardness increased significantly after the first cycle of thermal fatigue simulation. Amongst all materials, GD had the highest hardness for all cycles, followed by GC, CF, SL and KT. No significant difference was found between SL and KT.

Discussion & Conclusion: Within the limitation of this study, the materials generally showed increase in surface hardness, which were different from the hypothesis stated above. This could be due to the heat fluctuation that possibly encouraged further post-polymerisation reaction.

BP – BS 27

TNFα Autocrine is Required for zVAD-induced Necrotic Cell Death in L929 Cells

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Background: It is known that some caspase inhibitors (such as zVAD) are capable of inducing non-apoptotic/necrotic cell death in certain type of cells including L929 murine fibrosarcoma cells. In this study, we provide evidence that this cell death depends on TNFα autocrine.

Results: First, we found that zVAD-induced necrosis can be completely blocked by CHX and Act D, indicating that de novo pro-

tein synthesis is required for cell death. Second, it was found that TNFR1 blocking antibody, TNF α neutralising antibody and TNF α knockdown offered good protection against zVAD-induced cell death. Consistently, zVAD was found to promote TNF α autocrine, evidenced by an increased TNF α protein level and mRNA level. Next, we investigated the regulatory mechanisms for TNF α autocrine and found that suppression of either the canonical or non-canonical NF - κ B pathway sensitised zVAD-induced cell death, suggesting that NF - κ B generally serves as a cell survival mechanism in zVAD-induced cell death. Interestingly, our data indicate the critical role of AP-1 in TNF α autocrine. Finally, we identified the involvement of PKC in promoting TNF α autocrine and cell death via activation of the MAPKs and AP-1 pathway in cells treated with zVAD.

Conclusion: Taken together, data from this study reveal a novel mechanism responsible for zVAD-induced necrosis by promoting TNF α autocrine via AP-1 pathway.

BP – BS 28

A Gold Nanoparticle-based Protein Assay for the Quantitation of Protein in Urine Samples

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Background/Hypothesis: Proteinuria is commonly associated as a sign of kidney disease or other serious diabetic condition. This excessive amount of protein can be qualitatively measured by a traditional dipstick protein test or existing protein assays, e.g. Bradford and BCA, which are usually costly and require long incubation time up to hours due to their inherently slow chemical reaction. This study aims to develop a cost-effective protein assay that can provide instantaneous and yet accurate quantitation of proteins in urine samples based on metallic nanomaterials.

Methods: Small gold nanoparticles were synthesised and incubated with various concentrations of proteins. The gold nanoparticles were then induced to aggregate using common salt solution and the resulting colour changes were characterised by UV-Vis absorption spectrum. The colour changes were calibrated against known concentration of proteins. The performance of our developed assay was also evaluated and compared with other commonly used protein assays.

Results: The results indicate that different concentrations of protein are able to produce a range of colours in this colorimetric assay. The concentration calibration curve suggests a linear range of 0- 60 μ g/mL of protein which is comparable to existing commercial assays. The quantitative reading is instantaneous and stable even after 60 minutes and the accuracy is also comparable to existing commercial assays.

Discussion & Conclusion: The protein assay developed based on gold nanoparticles is able to quantitate proteins in urine samples instantaneously and accurately and thus provide a cost-effective initial screening of suspected proteinuria in patients.

BP – BS 29

The Status of HBV Core Deletions in Chronic Hepatitis B Patients with HBeAg Seroconversion

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Background: Hepatitis B virus core deletions have been thought to play an important role in HBeAg seroconversion. However, it is

unclear if it is true in the seroconversion with different causes. We therefore aimed to determine the relationship between core deletions and seroconversion occurred spontaneously, induced by interferon or lamivudine.

Methods: Three groups of chronic hepatitis B HBeAg seroconverters (spontaneous, interferon and lamivudine induced) and 3 corresponding groups of non-seroconverters were involved. Ten patients/group and 3 time points/patient were included. Nested PCR of precore/core gene was performed followed by cloning and sequencing of ≥ 20 clones/sample. Sequences were aligned with ClustalX2.0 and BioEdit7.0.9. Frequencies of patient and sequence with core deletions were calculated.

Results: Spontaneous seroconverters showed more sequences bearing core deletions than untreated non-seroconverters (22% vs 1.5% baseline, 16.4% vs 2.9% before seroconversion, both $P < 0.001$; 3% vs 0% after seroconversion, $P < 0.05$). Interferon seroconverters had more sequences with core deletions than interferon non-seroconverters only before seroconversion (22.3% vs 2%, $P < 0.001$). Lamivudine seroconverters and non-seroconverters showed similar low frequency of sequences bearing core deletions all the time. The frequency of sequences with core deletions decreased after seroconversion in spontaneous and interferon seroconverters (16.4% to 3% and 22.3% to 3% respectively from before to after seroconversion). Large core deletions occurred usually before seroconversion in spontaneous and interferon seroconverters with $\geq 50\%$ of them being in-frame.

Conclusions: The core deletions may play an important role in spontaneous and interferon but not lamivudine-induced seroconversion. Different mechanisms could be involved in the HBeAg seroconversion with different causes.

BP – BS 30

Correlation between Micro-hardness and Wear Resistance of Dental Restorations

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Background/Hypothesis: This study aimed to examine the correlation between micro-hardness and wear resistance of a spectrum of dental restorative materials.

Methods: The materials studied were GC Solare (SL), Voco Grandio (GD), Compoglass F (CF), Ketac N100 (KT) and GC gold label strength posterior (GC). Two specimens for each material were produced according to manufacturers' instructions, and divided into 2 groups: 1) coke (CK) and 2) distilled water (DW). All specimens were conditioned in the media for a week prior to wear simulation. Fresh liquid media were replaced every 2 days to maintain acidity of media. The specimens were subjected to brushing and mastication simulation for 4 cycles, where each cycle consisted of 5-minute brushing before and after 45-minute mastication. 200 mg of Darlie double action toothpaste was used with brushing. Surface roughness (R_a and R_y) was measured using a surface tester. Surface hardness was examined with a Vickers Hardness tester. Data were subjected to ANOVA/Scheffe's test at 0.05 significance level. Correlation between hardness and surface roughness was tested using Bivariate/Pearson at 0.05 significance level.

Results: For GC conditioned in DW, the hardness values showed positive correlation with R_a ($r = 0.75$) and R_y ($r = 0.6$). In DW, GD and SL showed negative correlation with R_a ($r = -0.64$) and R_y ($r = -0.65$). With exception of CF conditioned in DW, no significant difference in hardness was found in the materials.

Discussion & Conclusion: Within the limitation of this study, the correlation between micro-hardness and wear resistance was material-dependent.

BP – BS 31

Effects of Food-Simulating Liquids on Surface Roughness of Dental Hybrid Restoratives

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Background/Hypothesis: This project aimed to study the effects of food-simulating liquids on surface roughness of 5 dental hybrid restoratives over different time periods.

Methods: The materials studied were a giomer (Beautifil II [BF]), 2 compomers (Compoglass F [CF] and F2000 [F2]), a resin-modified light-cured glass ionomer cement (Photac Fil Quick Aplicap [PH]) and a glass-ionomer cement (FX-II, [FX]). The materials were produced according to manufacturers' instructions. They were then conditioned in distilled water (DW, control group), citric acid of pH 3 (CA), 50% ethanol-water solution (ES) and heptane (HP) at 37°C for 1, 7, 14, 28 and 60 days. After conditioning, the materials were subjected to surface roughness (Ra & Ry) measurement using surface roughness tester (Mitutoyo, SJ-400). The mean roughness values were subjected to ANOVA/Scheffe's test at 0.05 significance level.

Results: Significantly higher Ra was found in FX after conditioning in CA for 14 ($1.24 \mu\text{m} \pm 0.92$) and 60 days ($1.38 \mu\text{m} \pm 0.81$). Ra of CF significantly increased after conditioning in ES ($13.53 \mu\text{m} \pm 13.79$). Ry of CF increased significantly after 60 days immersion in CA ($10.83 \mu\text{m} \pm 10.40$). Little effect of HP and DW on the materials was found over time.

Discussion & Conclusion: The effects of food-simulating liquids on surface roughness were material-dependent. CA showed an adverse effect on FX, which may influence bacterial plaque retention in oral environment.

BP – BS 32

To Evaluate the Time and Mechanical Properties of POP Fractions in Order to Simulate the Properties of CPC for Various Orthopaedic Applications *in vitro*

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Background: Biological bone cement, calcium phosphate (CPC), has been introduced in fracture fixation application however it is very costly when a huge amount is used. It would be economical if POP can be used to simulate CPC in the *in vitro* experiment. Unfortunately, the compressive load of POP varies widely. The aim of this project is 2-fold, to evaluate (1) the preparation timing in the different fractions of POP mixture and (2) the mechanical properties of different fractions of POP.

Methods: The POP weight is fixed at 12 grams and the volume of water varies according to its ratio. This preparation time include mixing, waiting and pouring processes. The waiting time is important as it affects the mechanical properties. The specimens were cut to size of 8 mm (diameter) and 16 mm (length) for compressive testing. The rate of compressive test is 0.5 mm/min.

Results: POP fractions of 1:1, 1:2, 2:1, 3:4 and 4:3 have average waiting time (seconds) of 97, 393, 0, 187, and 92 as well as average compressive load (Newton) of 153.10, 18.33, 988.01, 54.11 and 456.54 respectively.

Discussion and Conclusion: The high value of compression can be due to the high composition of POP in the specimen and the waiting time during preparation. The results show that 2:1 POP fraction has the closest average compressive load as compared to CPC of 1805.33N. POP ratio of 2:1 ($t = 4.373$) shows no significant difference (at 0.005, $t = 6.869$) and therefore it seems to be the best ratio to simulate CPC in the study.

BP – BS 33

Dual Cytotoxic and Demethylating Effects of Phenethyl Isothiocyanate (Peitc) in Estrogen Receptor-negative Breast Cancer Cell Lines

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Background: Estrogen receptor (ER) determines hormonal therapy resistance or response, and disease prognosis in breast cancer. Hormone-receptor negative breast cancer is limited to chemotherapeutic options, therefore more effective agents in this subtype is needed. Phenethyl isothiocyanate (PEITC) has been shown to prevent breast cancer by altering the metabolism of estrogens, resulting in decreased concentrations of 17 β -estradiol.

Aims: To investigate the anti-proliferative and epigenetic roles of PEITC in breast cancer cell lines.

Methods: Cell proliferation assays was used to measure cytotoxic activity of PEITC in 3 ER+ and 5 ER- breast cell lines, and methylation assays were carried out in 2 ER+ and 2 ER-, pre and post- PEITC (3 μM) treatment. Transcriptional expression of selected genes was carried out with RT-PCR.

Results: IC₅₀ for ER-positive cell lines were higher (8.78 μM , 10.52 μM and 9.05 μM), compared to ER- negative cell lines (2.19 μM , 0.73 μM , 0.93 μM , 0.98 μM and 0.69 μM). IC₅₀ for normal mammary epithelial cell lines were found to be sensitive to PEITC (0.83 μM and 1.11 μM). Methylation studies in 4 breast cancer cell lines revealed differential methylation pattern dependent on estrogen receptor status, where Axin, TFDP and KRT13 were demethylated in ER-negative cell lines upon PEITC treatment, but remained methylated in ER-positive cell lines. Re-activation of gene expression corresponded to the demethylation status in ER-negative cell lines treated with PEITC.

Discussion & Conclusion: Cytotoxic effects and demethylating properties of PEITC in ER- negative breast cancer cell lines may be of significance as an addition to the armamentarium of agents used in this cancer subgroup.

BP – BS 34

An *In-vitro* Study on Resistance of Dental Restoratives to Toothbrush

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Background/Hypothesis: This study aimed to examine 5 dental restoratives' wear resistance to toothbrush, weight change and interaction with brushing media using Fourier Transform Infrared Spectrometer (FTIR).

Methods: The materials studied were AElite All-Purpose Body [AE], Beautifil II [BF], Compoglass F [CF], Filteck Z250 [FZ] and Inten-S, [IS]. Three specimens for each material were produced according to manufacturers' instructions. The customised wear machine was a reciprocating compression-sliding system where the materials were

moved and worn back-and-forth against a toothbrush at 180 mm/min in both distilled water [DW] and toothpaste (Darlie, [TP]). Roughness Ra and Ry of the wear tracks were measured by a surface roughness tester (Mitutoyo, SJ-400) after 1620, 3240, 4860 and 6480 cycles. Data were subjected to ANOVA/Scheffe's test at 0.05 significance level. FTIR (PerkinElmer, Spectrum 100) was used to examine chemical changes on the materials' surface.

Results: No significant difference of Ra and Ry was found in AE, BF, CF & FZ after various cycles of wearing in either DW or TP. For IS, it showed significant increase in Ry after 1620 cycles in DW ($4.33 \mu\text{m} \pm 1.15$), as well as increase in Ra ($0.18 \mu\text{m} \pm 0.04$ and $0.46 \mu\text{m} \pm 0.99$) after 1620 and 3240 cycles in TP. For each material, no difference was found in the FTIR spectrums between each cycle except that the peak of C=C became less distinguished.

Discussion & Conclusion: Within the limitation of this study, the materials showed little chemical change after wear but increased surface roughness. The effects of brushing media on wear resistance were material-dependent.

BP – BS 35

Analysis of the Interaction of Intestinal Dendritic Cells with Gram Positive *Lactobacillus* and Gram Negative *Escherichia coli*

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Background/Hypothesis: The detailed mechanism of the immunomodulation ability of the probiotic bacteria *Lactobacillus*, which can confer beneficial effects at the effective sites distant from the administering site, is unclear. We proposed that subsets of intestinal dendritic cells (DCs) play an important role in processing *Lactobacillus* and priming the T cell-mediated immune response.

Methods: C57BL/6 mice were intragastrically fed with recombinant *Lactobacillus rhamnosus* GG (LGG) expressing green fluorescence protein or the wild type LGG stained with red fluorescent molecule or GFP-expressing recombinant *E. coli* as control. Eight or 16 hours post feeding, cryosections or single cell suspensions, prepared from Peyer's patches (PP) and mesenteric lymph nodes (MLN) were examined under fluorescence microscope or in flow cytometry respectively.

Results: We first traced the bacteria uptake and found that at the 2 time points, LGG was visualised inside CD11c⁺ cells in the cryosections of PP and MLN. LGG-loaded CD11c⁺ cells were also detected in the single cell suspensions from these tissues. Similar results were found for *E. coli*. We further dissected the subsets of DCs up-taking bacteria using CD4, CD8, CD11b and CD103 markers, which would reveal the differential responses to LGG and *E. coli*.

Discussion & Conclusion: Our preliminary results demonstrated that under the physiological condition, LGG and *E. coli* are present mainly in DCs in PP and MLN. It is suggested that specific subsets of DCs that process LGG and *E. coli* are probably responsible for the different immune response to these 2 bacteria.

BP – BS 36

Involvement of the Akt-GSK3 β -Cyclin D1 Pathway in Luteolin-induced G1/S Arrest in Human Nasopharyngeal Carcinoma

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Background: Luteolin, a plant flavonoid, is known to possess multiple biological properties such as being an anti-inflammation, anti-allergy, anti-oxidant as well as anti-cancer agent. At present the anti-cancer potential of luteolin has not been fully understood. In this study, we focused on the effect of luteolin on cell cycle regulation in a nasopharyngeal carcinoma cell line, HK1.

Results: First, we found that luteolin inhibited cell proliferation by induction of cell cycle arrest at G1/S phase in a time- and dose-dependent manner. In search of the underlying molecular mechanisms, it was found that luteolin is capable of suppressing Akt phosphorylation and activation, leading to de-phosphorylation and activation of GSK3 β . Activated GSK3 β then targets cyclin D1, causing cyclin D1 phosphorylation at thr286 and subsequently proteasomal degradation. As a result, the cyclin D1-cdk4-Rb-E2F signalling axis was suppressed by luteolin, as evidence by the significant reduction of Rb phosphorylation and the expression of cyclin E and cyclin A. The above findings are reinforced by the findings that luteolin is able to reverse the effect of insulin on the Akt-GSK3 β -Cyclin D1 pathway and eventually abolish cell proliferation by insulin.

Conclusion: Data from this study thus reveal a novel mechanism in the anti-cancer mechanism of luteolin.

BP – M 04

Hearing Loss – A Significant Morbidity in Very Low Birth Weight Infants

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Background: Universal Newborn Hearing Screen (UNHS) has been in force in National University Hospital (NUH) from 2002 using the 2-staged Otoacoustic Emission (OAE)/Automated Auditory Brainstem Response (AABR) strategy. Babies at high risk for hearing impairment including all infants with very low birth weight (VLBW) are screened with both OAE and ABR. In Singapore, about 1 in 1000 newborns have severe to profound hearing loss.

Aim: This review evaluates the incidence of hearing loss (HL) of all severity and laterality in our VLBW population from January 2003 to December 2008.

Methods: Demographic, clinical and hearing screening outcome data from the VLBW babies are prospectively collected and stored in a computerised database. A retrospective review of the results was performed.

Results: Over the 6-year period, there were 257 VLBWs and 236 survivors. In the 236 VLBW survivors, the HL incidence was 2.1% (95% CI 0.77–5.0). In extremely low birth weight (ELBW) babies – under 1000 g – the incidence was 4.3% (95% CI, 0.98–12.3). The HL incidence was 8.3% (95% CI, 2.1–22.6) for those less than 27 weeks and only 1.0% (95% CI, 0.04–3.8) for those who are more mature. This difference was significant ($P = 0.026$). All had profound sensorineural hearing loss (SNHL).

Conclusion: The incidence of SNHL is significantly higher in VLBW, especially those aged less than 27 weeks. In addition, these patients are commonly exposed to other risk factors for HL. Hence, we advocate universal screening and also close monitoring of hearing in all VLBWs.

BP – M 05

Factors Associated with Number of Readmissions in First-episode Psychosis Patients in Singapore

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Background/Hypothesis: Frequently readmitted ‘revolving door’ patients result in high healthcare resource consumption. This study aims to examine factors associated with number of readmissions in first-episode psychosis inpatients of which service-default and medication non-compliance are hypothesised to be significant factors.

Methods: A naturalistic database study was conducted on consecutive inpatients from April 2001 to May 2007 meeting inclusion criteria of first-episode psychosis, age 18 to 40 years, and completion of 2-years of follow-up with the Early Psychosis Intervention Programme (EPIP). Sociodemographic data, default and medication compliance were collected using semi-structured questionnaires. Clinical diagnosis, symptom severity and social functioning assessments were conducted using Structured Clinical Interview for DSM-IV Axis I Disorders (SCID), Positive and Negative Syndrome

Scale (PANSS) and Global Assessment of Functioning (GAF) scale respectively. Duration of untreated psychosis (DUP) was defined as time period between onset of first psychotic symptom to initiation of antipsychotic drug treatment. Remission was defined as 20% or more reduction in PANSS score. Patients were divided into 3 groups: no readmissions, no more than 2 readmissions, and 3 or more readmissions.

Results: The 298 patients studied had a mean age of 28.8 years (SD = 6.5). Of the patients, 50% (n = 149) were males, 74.8% (n = 223) Chinese, 18.1% (n = 54) Malays, 6% (n = 18) Indians, 1% (n = 3) belonged to other races. Only lower age ($\chi^2 = 12.46$, $P = 0.002$), male gender ($\chi^2 = 7.22$, $P = 0.027$), shorter length of first admission ($\chi^2 = 4.70$, $P = 0.049$), service-default ($\chi^2 = 20.81$, $P = 0.002$) and medication non-compliance ($\chi^2 = 17.21$, $P = 0.028$) were significantly associated with increased readmissions.

Discussion & Conclusion: This study has identified significant factors associated with increased readmissions. Early psychosis intervention needs to address service default and medication compliance to decrease readmissions in order to promote better reintegration into community.

BP – M 06

Anxiety and Depression in Patients with Atopic Dermatitis in the National Skin Centre, Singapore

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Background: Atopic dermatitis (AD) is a common dermatological disease which may have considerable psychological morbidity. A study was conducted to assess the psychological burden of patients with atopic dermatitis.

Methods: One hundred patients with AD were recruited. Demographic data was obtained via a self-administered questionnaire. The SCORAD (SCORing Atopic Dermatitis) grading was determined, which objectively measures AD severity. The patients’ psychological burden was measured by the Hospital Anxiety and Depression Scale (HADS).

Results: Seventy-nine males and 21 females were recruited. Of these, 92% were Chinese, 4% were Malays and 4% were Indians. Their average age was 25.7 +/- 10.1 years, and most (58%) had AD for more than 5 years’ duration. A total of 15% had a positive history of respiratory atopy. The majority (65%) used topical steroids of mild-to-moderate potency, and 14% had previously taken oral prednisolone for the control of disease flares. Of the patients, 20% were on systemic immunosuppressants, which included cyclosporine (10%), azathioprine (7%) and methotrexate (3%). The mean SCORAD of the patients was 55.2 +/- 16.2, with a mean anxiety score of 7.21 +/- 3.69 and a mean depression score of 5.03 +/- 3.35 on the HADS. Of the patients, 99% had moderate or severe AD, 44% had borderline or confirmed anxiety and 24% had borderline or confirmed depression. There was a weak association ($r = +0.175$) found between AD severity and anxiety. The association between AD severity and depression was stronger ($r = +0.213$) and statistically significant ($P < 0.05$).

Conclusion: Patients with AD have a wide range of psychosocial states which may be correlated to disease severity. Clinicians should incorporate a psychological assessment in their evaluation and holistic management of these patients.

BP – M 07

Cognitive, Behavioural and Functional Factors influence Eventual Institutionalisation in Geriatric Patients following Acute Hospitalisation

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Background/Hypothesis: Requests for nursing home placement usually result from interactions between medical co-morbidities, functional impairments and psychosocial factors. Only a proportion of geriatric inpatients referred to the medical social worker requesting institutionalisation ended up in nursing homes. This study examined which factors predicted eventual institutionalisation in geriatric inpatients requesting nursing home placement.

Methods: We retrospectively reviewed case histories of patients admitted to Geriatric Medicine Department between October 2006 and March 2007 referred to the medical social worker for nursing home placement. We collected demographic data, medical co-morbidities (acute illness, falls, incontinence, delirium and dementia), illness severity, functional factors, caregiver factors (caregiver stress and conflicts), psychosocial factors (prior institutionalisation) and eventual discharge status (nursing home, rehabilitation facility and home). Differences between those eventually institutionalised and those not were analysed using chi-square test and t-test.

Results: Of 72 geriatric inpatients assessed for nursing home placement, 31 (43%) were institutionalised. Those institutionalised were significantly older (mean age 84.4 ± 7.1 , $P = 0.008$), fewer married (9.7% $P = 0.01$), more widowed (71.0%, $P = 0.01$) and lived apart from family (45.0%, $P = 0.46$). They were functionally (impaired in 3 or more Activities of Daily Living 93.5%, $P = 0.01$) and cognitively more impaired (Abbreviated Mental Test 3.8 ± 2.9 , $P = 0.08$) with significant caregiver stress (93.8%, $P = 0.01$) and family conflicts (93.5%, $P = 0.04$). No differences were found for medical co-morbidities, illness severity and behavioural problems.

Conclusion: Geriatric inpatients eventually institutionalised were older, widowed, single, more functionally dependent, and cognitively impaired with psychosocial difficulties. Cognitive and functional impairments should be addressed as early intervention could reduce institutionalisation and maintain community living.

BP – M 08

Risk Predictors and In-hospital Clinical Outcomes in Patients undergoing Emergency Percutaneous Coronary Intervention for ST-segment Elevation Myocardial Infarction

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Background: We aim to examine the risk predictors and in-hospital clinical outcomes in our patients with ST-segment elevation myocardial infarction (STEMI) undergoing emergency percutaneous coronary intervention (PCI) and to identify any racial differences in outcomes.

Methods: This is a cohort study of 375 consecutive patients of multi-racial make-up with STEMI undergoing PCI between December 2006 and November 2007 in our hospital. The main outcome measures were in-hospital major adverse cardiac events (MACE) defines as

death, reinfarction and target vessel revascularisation (TVR).

Results: The patient cohort (mean age was 55.7 ± 11.3 years old, 88.0% males, 29.1% diabetic, 52.5% current smokers, 2.7% with chronic renal failure, 54.9% with anterior STEMI) consists of 60.5% Chinese, 16.8% Malays, 16.0% Indians and 6.7% belonging to other races. A total of 306 (81.6%) patients underwent PCI within 12 hours of STEMI. The PCI procedural success rate was 97.6%. The in-hospital mortality rate was 7.7% (Chinese 6.6%, Malays 11.1%, Indians 10.0% and others 4.0%). There was no incidence of reinfarction and TVR. There was a significant association between in-hospital mortality and ischemic time duration to treatment (mortality rate of 2.9%, 8.3 %, and 14.5% for ischemic times of ≤ 3 hours, >3 to ≤ 6 hours, and >6 to ≤ 12 hours respectively; P for interaction = 0.043). Multivariate analyses identified cardiogenic shock (OR = 56.5, 95% CI 20.0-160.0, $P < 0.001$) and female gender (OR = 3.9, 95% CI 1.6-9.1, $P = 0.002$) to be independent predictors of in-hospital MACE. There was no significant interaction between racial groups and clinical outcomes.

Conclusion: Cardiogenic shock and female gender are major independent clinical risk predictors of in-hospital MACE in patients with STEMI undergoing emergency PCI in our racially diverse population. Race is not a significant determinant of clinical outcomes.

BP – M 09

Metabolic Side Effects in Psychiatric Patients on Second Generation Antipsychotics

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Background/Hypothesis: Second generation antipsychotics (SGAs) are more efficacious and with fewer side effects. However the landmark CATIE Study provided information on the metabolic risks associated with SGA use. This confirms clinical findings which include obesity, insulin resistance, impaired glucose tolerance/type 2 diabetes, dyslipidemia and hypercholesterolemia.

Methods: All schizophrenia patients newly started on SGAs had baseline and regular (4 weeks, 8 weeks, 12 weeks, 6 months and a year) biochemical monitoring of fasting plasma glucose, triglyceride and cholesterol levels.

Results: In 252 patients without medical history, SGA use was as follows: Risperidone 152 patients (60.3%), Olanzapine 45 patients (17.9%), Clozapine 29 patients (11.5%), Quetiapine 22 patients (8.7%), Aripiprazole 3 patients (1.2%) and Ziprasidone 1 (0.4%). There were 34.4% males and 65.5% females. The mean \pm SD age was 41.2 ± 13.8 (range 14 to 84) years. Hyperglycaemia was found in 85 patients (33.7%) with a maximum increase in glucose levels of 4.9%. An increase in cholesterol levels was found in 73 patients (28.9%) with an average increase of 0.23 mg % and a maximum increase of 2.9 mg%. An increase in triglyceride levels was noted in 50 patients (19.8%). Significantly, the majority of increases in triglyceride and cholesterol levels occurred at 12 weeks. Hyperglycemia mostly occurred at 4 weeks when it was 1.37 mg% above baseline ± 1.25 .

Discussion & Conclusion: Patients on SGAs experienced metabolic changes that need attention. Metabolic complications could contribute to significant morbidity in psychiatric patients already facing the burden of disease and reduced quality of life. There is an SGAs guideline in place now.

BP – M 10

To Improve the Uptake of Annual Eye Screening in the Diabetic Population of Yishun Polyclinic

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Background/Hypothesis: Using a direct sampling method, the rate of annual diabetic eye screening among diabetic population aged less than 75 years of age in Yishun Polyclinic was found to be about 69.4% to 69.7% (November 2008 to December 2008). The 4 important contributing factors on the low rate were: (i) lack of a tracking/reminder system for patients and practitioners, (ii) patients have no time, or have already waited too long for consultation with the doctor, (iii) practitioners had no time to convince, or were not confident in counselling patients to go for screening, and (iv) lack of public awareness about diabetic retinal photography and its importance. This project aims to improve on the rate of annual diabetic retinal photography (DRP).

Methods: Three interventions were implemented from January 2009. These include: (i) publicity posters placed in high patient flow areas, (ii) development of a visual education tool with DRP photos to aid the practitioner, and (iii) use of a A5-sized yellow-coloured prescription form, attached to the appointment card to facilitate manual tracking of next DRP due date.

Results: Post-intervention, the rate of DRP was 83.2% in February 2009, and 75.8% in March 2009.

Discussion & Conclusion: The 3 interventions proven to be useful in increasing the rate of DRP. However, more data is needed to monitor the sustainability of these measures.

BP – M 11

Utility of Simultaneous Bilateral Inferior Petrosal Sinus Sampling in the Differential Diagnosis of Patients with Adrenocorticotropin-dependent Cushing's Syndrome

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Background: Bilateral inferior petrosal sinus sampling (BIPSS) is a useful diagnostic test in patients with ACTH-dependent Cushing's syndrome (CS). We report our experience with this invasive test.

Methods: We reviewed the records of patients with CS who underwent BIPSS between 2003 and 2009. Blood was simultaneously collected from each petrosal sinus and a peripheral vein before, and 5, 10, and 15 minutes after intravenous injection of 100 mcg corticotropin releasing hormone (CRH).

Results: Six patients (age range, 11 to 57 years) with ACTH-dependent CS underwent BIPSS. CRH stimulation and high-dose dexamethasone suppression tests suggested Cushing's disease in 2 patients, but MRI failed to demonstrate a pituitary adenoma in them. Although both tests suggested ectopic ACTH secretion in 1 patient, MRI revealed a 2.5-cm pituitary macroadenoma. The tests were discordant in the remaining 3 patients. One patient developed contrast extravasation, and as a consequence, BIPSS result was inconclusive. In the remaining 5 patients, BIPSS identified a pituitary source of ACTH secretion [peak central/peripheral (C/P) ACTH ratio range:

6.6-45]. All 5 underwent transsphenoidal surgery; 3 were cured, CS improved in the fourth patient with a macroadenoma, and the fifth patient [(C/P ACTH ratio: 13.25), (inter-sinus ratio suggestive of left-sided lesion)], failed to achieve cure following left hemihypophysectomy. BIPSS successfully lateralised the lesion in 3 patients.

Discussion & Conclusion: BIPSS is a safe procedure in our clinical setting, and its selective use in patients with ACTH-dependent CS without a clear pituitary adenoma on imaging and/or with discordant dynamic biochemical tests, provides useful information to guide further management.

BP – M 12

A Case Series of Allopurinol Induced Toxic Epidermal Necrolysis: Revisiting the Indications of using Allopurinol in Gout

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Background: Allopurinol, a xanthine oxidase inhibitor is an effective and widely used uric acid lowering agent and has been used for decades. Cutaneous adverse reactions to allopurinol are common affecting 2% of prescribed patients. Amongst these adverse reactions the most dreaded is toxic epidermal necrolysis which can be fatal. It has become a rampant practice for allopurinol to be used to treat hyperuricemia without clinical evidence of gout.

Discussion: We report a case series of 4 patients with asymptomatic hyperuricemia who were prescribed allopurinol. As a result all 4 developed toxic epidermal necrolysis and 3 eventually died. Our aim is to highlight the grave consequences of using allopurinol in an indiscriminate manner especially when not indicated and reinforce the need for using it judiciously and adhering to the stipulated guidelines in order to prevent unnecessary morbidity and mortality.

BP – M 13

The Detection of Novel Influenza A (H1N1) Virus

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Background: A novel strain of influenza recently emerged in April 2009 from Mexico. A polymerase chain reaction (PCR) assay was designed to detect this new influenza A (H1N1/2009) virus in any cases appearing in Singapore.

Methods: Primers targeting nucleoprotein (NP) and hemagglutinin (HA) were designed based on A (H1N1/2009) sequences from NCBI's Genbank. This PCR assay was performed on patient samples sent for influenza screening, together with a positive influenza A (H1N1/2009) control (kindly supplied by Dr Ian Barr, WHO Collaborating Laboratory, Melbourne, Australia). The PCR was first validated with 24 positive patient samples (in pairs, 1 spiked with positive control: 19 H3, 5 H1), before testing 56 unknown samples. Gel (2% agarose) electrophoresis was used to detect the presence of any positive PCR products after 40 cycles of amplification. A positive result was indicated by the presence of bands: 102 bp (for NP) and 169 bp (for HA). In addition, the lower limit of detection was determined using serial dilutions of the positive control RNA.

Results: In the assay validation, all 24 spiked samples were positive and all 24 non-spiked samples were negative, giving a sensitivity and specificity of 100%. None of the 56 unknown samples tested were positive for A (H1N1/2009), though the positive control was detected. The lower detection limit of our assay was 5 copies/reaction.

Discussion & Conclusion: On this limited sample size, based on the testing of the positive control RNA only, this assay was sensitive and specific for detecting the novel influenza A (H1N1/2009) virus.

BP – M 14

BP180 Antibody Levels in monitoring Disease Activity and Outcome in Asian Patients with Bullous Pemphigoid

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Background: Bullous pemphigoid (BP) is characterised by circulating IgG autoantibodies targeting BP180 and BP230 hemidesmosomal proteins. While anti-BP180 NC16A IgG levels have been found in small series to correlate with disease activity, its usefulness as a predictor of disease outcome in BP remains unknown. This study aims to determine if anti-BP180 NC16A IgG levels correlate with disease severity and outcome in Asian patients with BP.

Methods: Thirty-five new patients with BP were recruited from National Skin Centre over a 3-year period. BP was diagnosed based on clinical, histological and immunofluorescence criteria. Disease activity was assessed using a standardised scoring system and anti-BP 180 NC16A IgG levels measured using enzyme-linked immunoassays at diagnosis, monthly for first 3 months, during disease flares and at first clinical remission.

Results: A total of 166 serum samples were analysed. Correlation between disease activity and anti-BP180 NC16A IgG levels at enrolment ($r = 0.53$, $P = 0.001$), week 4 ($r = 0.38$, $P = 0.033$) and week 8 ($r = 0.44$, $P = 0.011$) were weak. A moderately strong correlation between disease activity with anti-BP180 NC16A IgG levels was observed during disease flares ($r = 0.84$, $P = 0.000$). Correlation between cumulative prednisolone at clinical remission and anti-BP180 antibody levels at time points other than disease flares, was not significant. No significant correlation between anti-BP180 antibody levels at baseline and time needed to achieve clinical remission was observed.

Conclusion: While it may be useful in the initial diagnosis of BP, anti-BP180 NC16A IgG is not a useful tool for predicting the risk of disease flares, time needed to achieve clinical remission and amount of prednisolone needed to achieve clinical remission.

BP – M 15

G71R Mutation of the UGT1a1 Gene is Common in Breastfed Singaporean Chinese Infants with Prolonged Neonatal Jaundice

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Background: The aetiology of prolonged (>14 days) neonatal jaundice (PNNJ) in breastfed infants is unknown. Previous studies have suggested that mutations in the UGT1a1 gene may lead to delayed bilirubin conjugation and excretion and also with raised gamma-glutamyl transpeptidase (GGT). We aim to determine the prevalence of the common UGT1a1 mutations and clinical profile of term Singaporean infants with PNNJ. We also hypothesise that serum GGT is a predictor of the UGT1a1 mutation.

Methods: Term babies with PPNJ were recruited and the total serum bilirubin, GGT level were measured and the UGT1a1 gene was sequenced for common mutations in the promoter and exon 1 regions.

Results: Sixty infants were recruited (mean age = 30 days), of which 72% had received prior phototherapy. Their mean total bilirubin was 196 $\mu\text{mol/L}$, 82% were exclusively breastfed and 83% were Chinese. Of the babies, 45% had UGT1a1 mutations, 10% were heterozygous for the A(TAA)7TAA mutation in the promoter, 28% were heterozygous for the G71R mutation in Exon 1, 3.3% were homozygous for the G71R mutation while 3.3% were compound heterozygous for both mutations. The mean serum GGT is uninterpretable (148 IU/ml vs 139 IU/ml, normal vs mutant). Clinical resolution of jaundice occurred in all babies by 3 months of age.

Conclusion: The UGT1a1 mutations in term Chinese breastfed infants are common in our population and may be associated with prolonged NNNJ. However the GGT may not be a good predictor. Larger studies will be required to determine the genetic association.

BP – M 16

Accurately Stratifying Surgical Site Infection Rates – Is the National Nosocomial Index Score (NNIS) Useful in Patients Undergoing Coronary Artery Bypass Graft Surgery Or is There an Alternative?

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Background/Hypothesis: Accurate risk stratification of surgical site infections (SSI) is critical when comparing across health systems. The US CDC NNIS risk index has been used for this but its relevance to Coronary Artery Bypass Grafting (CABG) is unclear.

Methods: All CABG patients from January 2006 to June 2008 in National University Hospital were prospectively studied for 1 year post surgery to compare the NNIS risk index with individual comorbidities for stratification of SSI risk. SSI was strictly defined using CDC criteria based on surgeon-treated infections with positive cultures.

Results: Out of 1221 patients (80.3 % male, mean age 61 \pm 9.4 years) in the study, 104 (8.5%) and 148 (12.1%) developed SSI within 30 days and 1 year of surgery respectively. The independent risk factors for SSI by multivariate logistic regression analysis were Diabetes (OR, 1.8; 95% CI, 1.2-2.9), Renal Impairment (OR, 2.1; 95% CI, 1.3-3.2), Exsmoker (OR, 0.4; 95% CI, 0.2-0.8), Hyperlipidemia (OR, 1.9; 95% CI, 1.0-3.7), Age (OR, 1.5; 95% CI, 1.0-2.4), Obesity (BMI >27.5) (OR, 1.9; 95% CI, 1.2-3.1). A receiver operating curve (ROC) was plotted comparing the comorbidities model with the NNIS risk index. The area under the curve (aRoc) for comorbidities was 0.69 versus 0.52 for NNIS ($P < 0.001$) for SSI in 30 days, 0.69 versus 0.51 for comorbidities and NNIS respectively ($P < 0.001$) for SSI in 1 year.

Discussion & Conclusion: In comparing SSI rates of CABG, risk stratification is essential but the NNIS index is inadequate. A model using multiple comorbidities is a better alternative for predicting SSI at both 30 days and 1 year.

BP – M 17

Hepatitis B Infection in Differentiated Liver Cells from Progenitor Cells

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Background: Hepatitis B (HBV) is endemic in Asia and is a major cause of liver disease. Current treatment options suppresses the virus but does not eradicate it and development of new drugs are hampered

in part by lack of in-vitro model for hepatitis B infection. We sought to determine if differentiated liver cells from fetal progenitor cells in vitro may provide a viable model for HBV infection.

Methods: Human fetal liver were dissociated and hepatoblasts were cultured in differentiating medium. Cells were serially infected with natural hepatitis B virus (HBV). Lamivudine and Adefovir were tested for antiviral effects. Infection was confirmed with quantitative HBV DNA, ccc DNA as well as electron microscopy.

Results: Differentiated hepatocytes can be infected with HBV with progressive increase in HBV DNA production in culture supernatant. Infection can be serially transmitted to fresh batches of hepatocytes indicating continuous viral replication. Consistent in-vitro viral suppression was demonstrated with addition of antivirals. cccDNA was detectable in cell extracts confirming true infection and HBV particles can be seen under electron microscopy.

Conclusion: Fetal progenitor cells provide a viable source of in-vitro cells that can be infected with natural HBV and demonstrate continuous replication in vitro. This may prove invaluable for understanding HBV infection as well as the development of new drugs for treating HBV.

BP – M 18

Intravenous Thrombolysis is Feasible and Safe in Multiethnic Asian Stroke Patients in Singapore

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Background: Treatment rates with intravenously-administered tissue plasminogen activator (IV-TPA) in acute ischemic stroke (IS) remain low in Asian populations. Apart from logistical obstacles, higher anticipated bleeding risk in Asians remains a major concern. We present feasibility, safety and efficacy of IV-TPA therapy at our tertiary-care centre from January 2000 to May 2008.

Methods: Consecutive acute IS patients eligible for thrombolysis were treated within 3 hours of symptom-onset with low-dose (max 50 mg) from January 2000 to September 2006 and standard-dose (max 90 mg) of IV-TPA from October 2006 to May 2008. Efficacy of IV-TPA was assessed by modified Rankin Scale (mRS) at 3 months and absolute changes in NIH Stroke Scale (NIHSS) scores at hospital-discharge and 3 months. Symptomatic intracranial haemorrhage (SICH) was defined as imaging evidence of intracranial bleeding with NIHSS score increase of ≥ 4 points.

Results: One hundred and thirty consecutive IS patients were included (mean age 60 ± 13 years, males 60%, median NIHSS 14 points). A total of 48 patients received low-dose IV-TPA while standard-dose was used in 82 patients. Median onset-to-treatment time was 160 minutes. Of the patients, 59% achieved functional independence (mRS 0-1) at 3 months with standard-dose TPA compared to 35% in low-dose group ($P = 0.011$). SICH occurred more frequently with low-dose TPA (14.5%) than the standard dose (1.2%, $P = 0.004$). In multivariate logistic-regression model, lower admission-NIHSS (OR 0.78 per 1 point increase; 95% CI, 0.70-0.88), lower pre-treatment blood glucose (OR 0.76 per 1 mmol/L increase; 95% CI, 0.60-0.95), shorter time from symptom-onset to TPA-bolus (OR 0.97 per 1 minute increase; 95% CI, 0.94-1.0) and standard-dose TPA (OR, 12.49; 95% CI, 2.9-53.89) were associated with a higher likelihood for functional-independence at 3 months.

Conclusion: IV-TPA in standard-dose (0.9 mg/kg) is feasible and safe in the treatment of acute ischemic stroke in our multi-ethnic Asian population in Singapore.

BP – M 19

C-reactive Protein Levels (a Marker of Inflammation) in the Diabetic and Non-diabetic Multi-ethnic Population of Singapore

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Background: To determine whether highly sensitive C-reactive protein (hs-CRP) levels differ between people of Indian, Chinese and Malay origin in patients with and without diabetes mellitus and to look for an association with respect to sex, age, BMI, Hbaic, lipid profile, smoking, use of aspirin, ACE/ARB or statins.

Methods: Phase 1: We retrieved records of 168 individuals (51 Malays, 50 Chinese and 67 Indians) who had undergone a routine health screening. The hs-CRP, fasting lipids, fasting glucose, and their body mass index were analysed.

Phase 2: Prospectively, we recruited 246 individuals with diabetes mellitus (68 Malays, 111 Chinese, 67 Indians) and added a hs-CRP test to their regular annual screening.

Results: Phase 1: The median hs-CRP was 0.6 mg/dL (0.2-6.2) in Chinese, 1.2 mg/dL (0.2-9.9) in Malays and 1.9 mg/dL (0.2-10) in Indians. Multivariate linear robust regression analysis showed that the Indians had higher hs-CRP levels when compared to Chinese ($P < 0.05$) when adjusted for age, sex, BMI, lipid profile and smoking status. A significant correlation was also seen between the BMI, female gender, triglycerides levels, smoking status and hs-CRP in all 3 ethnicities when adjusted for other variables. Phase 2: The median hs-CRP was 1.2 mg/dL (0.2-9.9) in Chinese, 2.2 mg/dL (0.2-9) in Malays and 2.3 mg/dL (0.2-9.8) in Indians. Again, the Indians had higher hs-CRP levels when compared to the Chinese ($P < 0.05$) when adjusted for age, sex, BMI, lipid profile, smoking status and use of aspirin, ACE/ARB or statins. A clinically significant correlation was seen between BMI, female gender and hs-CRP in all 3 ethnicities when adjusted for other variables ($P < 0.05$). A combined analysis showed that the hs-CRP levels was higher in the diabetic group when compared to the non-diabetic group after adjusting for age, sex, BMI, ethnicity, lipid profile and smoking status.

Conclusion: Hs-CRP levels are statistically significantly different between the Indians and the Chinese (diabetic and non-diabetic population). The higher hs-CRP levels in the Indians mirror their higher risk of ischemic heart disease. Hence, Indians may need more intensive control of cardiovascular risk factors.

BP – M 20

Correlating the Audiometric and Genotypic Profile of Connexin 26, Connexin 30 and A1555G Hearing Loss In Singapore

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Background: To determine the prevalence and audiometric profile of connexin 26, connexin 30 and A1555G sensorineural hearing loss (SNHL) in Singapore. Connexin 26 mutation is the leading cause of congenital SNHL worldwide, but has not been characterised in Singapore.

Methods: A prospective translational study was done on 94 SNHL and 98 hearing (Control) patients. Genetic testing for connexin 26, connexin 30 and A1555G, audiometry and clinical evaluation was performed.

Results: The prevalence of Connexin 26 SNHL was 23% and the carrier rate for mutations 66.5% amongst the SNHL group. V37I is the leading pathologic mutation (26.6%, 50/188) in the SNHL group. Scrape loading dye transfer assay confirmed V37I to be pathologic. No 35 delG or 235 delC deafness common to the West and China was found. Four novel mutations I30V, 282(C-T), E120K, 558(G-A) were identified. I30V was further studied in a family with SNHL and evaluated to be pathologic. There was a high prevalence of compound heterozygote polymorphisms V27I/ E114G compared to the West (11.7% amongst SNHL). V27I/E114G polymorphisms with a pathologic mutation like V37I were associated with SNHL. V37I/V37I SNHL was usually bilateral, down-sloping, and mild-moderate in severity. No connexin 30 or A1555G mutations were found.

Conclusion: There was a high prevalence of connexin 26 deafness (23%) among patients with congenital SNHL in Singapore. V37I is the leading pathologic mutation. A novel pathologic mutation I30V was found. V27I/ E114G with a pathologic mutation was associated with SNHL. This novel finding warrants further functional studies.

BP – M 21

Patient Preferences in Selection of Hepatitis B Therapy

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Background: Little is known about patient preferences for selection of chronic hepatitis B treatment that have an important impact on the health of these patients.

Methods: All patients attending hepatology clinic at National University Hospital between January 2008 and January 2009 were asked to fill in the self-administered questionnaire that obtained demographic details, knowledge of existing antiviral agents, current treatment status, preference for route of administration, frequency of administration, duration of treatment, cost, adverse events, viral resistance and efficacy. Patients were asked to rank their priorities in selection. Finally patients were asked their willingness to pay threshold and expectations of treatment.

Results: A total of 421 patients completed the survey. The results showed that lamivudine was the best known drug. Majority of patients preferred oral therapy (79.7%), once daily (80.2%) with a fixed duration of therapy (83.9%). Patients ranked efficacy as the most important factor in drug selection. After the profiles of the different drugs (cost, efficacy, resistance, and side effect) were given known to patient, entecavir was the preferred choice of therapy, choose by 45.6% of patients. Patients willingness to pay threshold was ≤\$10 per day, but the expectation was that of a cure of the disease. Bearing these findings in mind, 92% of patients still would follow the recommendations of their doctor.

Conclusion: patients' preferences on treatment choices for chronic hepatitis B provides insights into concerns of patients, and while doctors have the final say, they should be mindful of the patient's concerns in selecting therapy.

BP – M 22

Bronchoalveolar Lavage Galactomannan Testing in the Diagnosis of Invasive Pulmonary Aspergillosis

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Background: Delayed diagnosis and treatment of invasive pulmonary aspergillosis (IPA) in allogenic stem cell recipients (SCT) and neutropenic patients with hematological malignancies may result in poor outcomes. The diagnosis of IPA remains difficult due to the inadequacies of conventional diagnostic tests. The Platelia *Aspergillus* enzyme immunoassay detects cell wall galactomannan (GM), and is FDA-approved for use in serum specimens. However, the sensitivity is low (40-70%). Recent data suggest that higher sensitivity might be achieved from bronchoalveolar lavage (BAL) specimens, although the optical density (OD) cut-off is uncertain. Therefore, we investigated the role of GM detection in BAL specimens in a prospective case-control study.

Methods: In total, 56 patients were recruited. There were 10 proven/probable IPA cases following EORTC guidelines (excluding BAL GM results) and 46 non-IPA controls (with alternate pulmonary diagnoses). All cases and 18 controls had SCT/hematologic malignancies. BAL was performed following a local bronchoscopy protocol. The amount of GM in each sample was measured using the Platelia assay.

Results: Cases had BAL GM results with OD >1.0 (range, 1.1–7.7). Controls had lower BAL GM results (range, 0.1–1.1). All cases had been empirically prescribed agents active against *Aspergillus* spp. prior to bronchoscopy (duration, 1–15 days). Using a cutoff OD index of 1.1, the overall sensitivity for BAL GM testing was 100% while specificity was 97.8%. Higher specificity was achieved with a cutoff above 1.1 (100%) but sensitivity was compromised (90%). The optimum OD index on ROC analysis is 1.1. The corresponding sensitivity of serum GM for cases using an OD cut-off of 0.5 was only 30.0%.

Conclusion: BAL GM testing may be a useful tool in establishing or excluding the diagnosis of IPA. It demonstrates higher sensitivity and specificity than serum GM. Based on our results, an optimum GM OD index for BAL specimens is 1.1. Further testing is required to validate these results.

BP – M 23

End-of-Life Care in Non-Cancer Patients in an Acute Hospital

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Background: End-of-life care in non-cancer patients is required as much as in cancer patients. Chronic illnesses such as heart failure, chronic obstructive pulmonary disease and dementia have been proved to have symptoms comparable to those in cancer patients towards the end-of-life. We aimed to study the symptoms in non-cancer patients near the end-of-life and the quality of the end-of-life care they received under internal medicine disciplines in a tertiary hospital.

Methods: We retrospectively studied case notes of the first 40 patients who died since 1 January 2008 under general medicine and respiratory medicine. Each case was documented to include whether the death was expected, whether the patient was for 'Do Not Resuscitate' order or likewise and whether the stay in hospital was at least 24 hours prior to death. Cases which fulfilled all 3 criteria were noted further on assessment for terminal symptoms, the presence or absence of them in the last 24 hours before death, prescription of symptom relief medications, route of administration, cessation of non-essential medications and laboratory tests and lastly communication regarding the diagnosis and prognosis of the dying illness.

Results: Twenty-four cases fulfilled the above 3 criteria. Among them, 58% of patients were breathless and nearly 30% had respiratory tract secretion in the last 24 hours. Symptomatic medications

for breathlessness were not written as stand-by in two-third of the cases. Non-essential medications were not held of in 33% and blood tests were still ordered in 54%.

Discussion & Conclusion: Significant proportion of patients suffered from terminal symptoms and only some of them received measures to control them. End-of-life care in non-cancer patients in the hospital studied had significant room to improve. Education, establishing guidelines and protocols are urgently needed.

BP – M 24

Predicting the Risk of Stroke after a TIA: Application of the ABCD² Score in a Local Emergency Department

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Background: Patients with Transient Ischemic Attack (TIA) have a substantial short-term risk of recurrent stroke. This study aims to evaluate the usefulness of the ABCD² scoring system in a local setting.

Methods: A retrospective medical records review was conducted at an Emergency Department (ED) of a 1,500-bed tertiary adult hospital. All patients diagnosed with TIA at the ED were recruited. The ABCD² score that assigns 0 to 7 points based on Age, Blood pressure at presentation, Clinical features, and Duration of symptoms and Diabetes were used for stratification. Our main outcome measure was the short-term occurrence of stroke after a TIA.

Results: From 1 June 2006 to 30 April 2007, there were 365 patients with a mean age of 60.2 (SD 13.4) years diagnosed with TIA at the ED. Two hundred and six (56.4%) were males and majority were Chinese (80.3%). When applied, the ABCD² score stratified (57) 15.6% of the patients as high risk (6–7), 137 (37.5%) as moderate risk (4–5) and 171 (46.8%) as low risk (≤ 3). Overall, stroke after a TIA occurred in 21 (5.8%) of our TIA patients, 11 (52.4%) in 90 days, 5 (23.8%) in 7 days and 3 (14.3%) in 2 days. The 2 days incidence of stroke post TIA in the high-, moderate- and low-risk groups were 2 (3.5%), 1 (1%) and none, respectively.

Conclusion: The probability of short-term stroke occurrence after a TIA increases with ABCD² score. A conclusion of the score's predictive utility awaits further study.

BP – M 25

Increase in the Percentage of Diabetic Patients with Desirable Low-density Lipoprotein Cholesterol (LDL-c) Level in Yishun Polyclinic

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Background/Hypothesis: Raised level of LDL-C is a major risk factor for coronary heart disease (CHD). The aim was to increase the percentage of DM patients in Yishun Polyclinic with LDL-C level of less than or equal to 2.6 mmol/L from 25.8% to 50% in 6 months.

Methods: 1) Active auditing of all casenotes for patients who did not meet the target level for LDL-C; and convert the medication from lovastatin to simvastatin; 2) Provide easy to follow practical clinical guidelines within each consultation room and constantly remind doctors about the LDL targets; 3) Reinforce the use of pre-existing

'Chronic Disease Management Registry' program for identification of undesirable LDL-C control through use of message alert; 4) Regular monitoring of LDL-C outcomes and audits on treatment adherence to the protocol; and 5) Regular tutorials for new medical officers to equip them with good LDL-C management practices.

Results: There has been an improvement in the level of LDL-C control amongst the DM patients, from 25.8% in April 2008 to 43.2% in November 2008.

Discussion & Conclusion: The strategies that have been implemented have improved the percentage of DM patients with desirable LDL-C level. In order to sustain and further improve the percentage, the strategies used must continue to be practised by all healthcare providers in the polyclinic.

BP – M 26

Treatment-related Late Effects in Paediatric CNS Germ Cell Tumours: Experience of National University Hospital (1989-2005)

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Background : Germ cell tumours of central nervous system (CNS) comprising less than 5% of childhood brain tumours are sensitive to both radiation and chemotherapy but treatment-associated late effects are common.

Methods: A retrospective cohort study consisting of 11 patients with CNS germ cell tumours was diagnosed and treated at NUHS between 1989 and 2005.

Results: Median age was 13.1 years (range, 5.8 to 16.9). Sites included supracellar region (3), pineal gland (5), basal ganglia (1), midbrain (1) and hypothalamus (1). Treatment included surgery only in 2 and surgery followed by chemotherapy (carboplatin, etoposide and bleomycin) and radiation in 6. Three underwent surgery followed by radiation without chemotherapy. Five underwent craniospinal irradiation and 4 received cranial irradiation (dose range, 36 to 54 Gy). The median duration of follow-up since diagnosis was 8.41 years. All 11 patients survived and are disease-free. Late effects of treatment according to NCI Common Toxicity Criteria – Version 2 included endocrine problems in 8 patients: diabetes insipidus (grade 2), growth hormone deficiency (grade 2), panhypopituitarism (grade 2-3), hypothyroidism (grade 2) and precocious puberty (grade 2), neurological sequelae in 4: epilepsy (grade 4), intellectual deficit (grade 2-3), cerebellar symptoms (grade 3) and decerebrate rigidity (grade 4) and other complications like deep vein thrombosis (grade 3), shunt infection (grade 3) and short stature (grade 2).

Conclusion: A balance between cure and late toxicity is paramount in determining treatment in CNS germ cell tumours.

BP – M 27

Low Risk of Multiresistant Hepatitis B Virus in a Follow-up Study of Lamivudine with Adefovir Switch Strategy

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Background: A cohort of chronic hepatitis B clinic patients who were treated with lamivudine and switched to adefovir after developing lamivudine resistance was followed for clinical and virological outcomes over time.

Methods: Patients were enrolled in a treatment program of lamivudine (LAM), switching to adefovir (ADV) with one-month overlap upon resistance. Durable HBeAg seroconversion, HBVDNA suppression, drug resistance, clinical outcomes and their predictors were evaluated by multivariate analysis (Multiple logistic regressions, Kaplan Meier and Cox regression).

Results: There were 313 lamivudine-treated patients (HBeAg-positive 155, HBeAg-negative 158) with a mean follow-up of 37.5 months. The durable HBeAg seroconversion rate was 37.4% at 5 years, with no difference in LAM-monotherapy compared to ADV-rescue. LAM breakthrough and resistance occurred at 92.9% and 86.1% (HBeAg-positive) 61.3% and 47.7% (HBeAg-negative) respectively at 5 years. ADV breakthrough and resistance was 27.9 and 3.6% (HBeAg-positive), 19.6% and 17.7% (HBeAg-negative) respectively at 4 years. Risk factors for LAM resistance were high baseline HBVDNA, HBeAg-positive status and had long duration of lamivudine treatment. ADV rescue was more successful if HBV DNA was <6 log at the time of breakthrough. In total 5 patients developed ADV resistance and all were successfully rescued with add-on therapy to ADV. No cases of multiresistant HBV were found.

Conclusion: ADV resistance was low in patients with lamivudine resistance who were switched to ADV making add-on ADV an expensive option when the risk of multi-resistant HBV remains poorly defined. Further studies are needed to define this risk.

BP – M 28

Bilateral Spontaneous Anterolateral Compartment Syndrome in a Patient with Newly Diagnosed Hypothyroidism

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Background: Acute compartment syndrome (ACS) is a surgical emergency that occurs in any condition that results in an increase in intra-compartment pressures of typically greater than 30 mmHg. Though most commonly occurring after trauma, burns and prolonged limb compression, cases of spontaneous compartment syndrome associated with severe hypothyroidism have been reported.

Discussion: We report a case of bilateral antero-lateral compartment syndrome in a 39-year-old Chinese lady with newly diagnosed hypothyroidism, who subsequently went on to develop rhabdomyolysis and bilateral compartment syndrome. She required extensive muscle debridement and to date has residual bilateral foot drop. To our knowledge, this is the only locally reported case so far. Our study highlights the importance of constant vigilance on the part of physicians in considering ACS as a cause for lower limb pain in a hypothyroid patient as delay in diagnosis has been shown to be the most important determinant of a poor outcome.

BP – M 29

Age & PT as Prognostic Factors of Acute Liver Failure (16 Years of National Liver Transplant Program in Singapore)

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Background: Acute liver failure (ALF) is rare condition with devastating consequences. We assessed the KCH, MELD and other clinical prognostic indicators at predicting adverse outcome in our cohort of ALF patients.

Methods: Adult patients with ALF referred to national liver trans-

plant program (January 1992 to December 2008) were included. Adverse outcome was defined as mortality without transplant or undergone liver transplantation. Factors associated with adverse outcome and KCH criteria were compared using area under receiver operative characteristics curve (AUROC).

Results: There were 101 patients with ALF between study periods. Major aetiologies were hepatitis B, 45 (44.5%) and drug induced liver injury (DILI), 37 (36.6%). Traditional Chinese Medicine accounts for 42% of DILI. 13 patients underwent liver transplantation and only 3 (23%) of them died. Among 88 patients without liver transplant, 74 (84%) died. Age and PT were the independent factors significantly related to adverse outcome ($P = 0.009$ & 0.012). AUROC (sensitivity, specificity) for age ≥ 37 years, PT ≥ 30 seconds, age & PT combined, and MELD ≥ 33 are 0.641 (78%, 50%), 0.759 (77%, 64%), 0.727 (60%, 86%), 0.722 (59%, 86%) respectively. KCH criteria has only AUROC of 0.616 (52%, 71%) for detecting patients with adverse outcome.

Conclusion: Age & PT were significantly related to adverse outcome and higher AUROC compare to KCH criteria. Aetiology of ALF in Singapore is different from the west and some part of Asia because of endemic of chronic hepatitis B and widely use of TCM. New prognostic model is needed for this group of patients.

BP – M 30

IDMS-Traceable Population-based Reference Values for Serum Creatinine in Singapore

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Background/Hypothesis: The National Kidney Disease Education Programme in the US and other international bodies have been overseeing global restandardisation of serum creatinine calibration to improve intermethod agreement and ensure all results are traceable to the isotope dilution mass spectrometry (IDMS) reference method. This recalibration necessitates re-establishment of the local population-based reference intervals. This study describes 2.5 and 97.5 centiles for serum creatinine measurement in a Singaporean population.

Methods: Left-over serum from 240 samples (120 men, 120 women) on individuals undergoing health screening were anonymised and analysed for serum creatinine measurement (Jaffe rate method, Beckman Coulter LX20 Pro) before and after introduction of IDMS-traceable calibration. Outliers were identified using Dixon's criterion.

Results: The reference population had a median age of 40 years (20-82). One point was excluded as an outlier from the female group. The distributions were visually Gaussian. There were no significant differences between Chinese, Malay and Indian groups. The parametric 2.5 and 97.5 centiles (and 95% confidence intervals) in $\mu\text{mol/L}$ were: female 38.8 (36.0-41.7), 74.4 (72.6-78.3); and male 59.7 (56.2-63.3), 105.2 (101.6-108.7). Comparison of results before and after standardisation showed an average of 4.3 (95% CI: 4.1-4.6) $\mu\text{mol/L}$ drop across the range tested. Linear regression analysis gave the following equation: Creat (IDMS) = $0.9861 \times \text{Creat (Conventional)} - 3.33$, $r^2 = 0.99$.

Discussion & Conclusion: This study provides population-based reference values for serum creatinine concentrations in Singapore following IDMS standardisation. It is suggested that the following reference intervals be used: female 40-75 $\mu\text{mol/L}$, male 60-105 $\mu\text{mol/L}$.

BP – M 31

Lymphomatoid Papulosis: A Case Series from the National Skin Centre

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Background/Hypothesis: Lymphomatoid papulosis (LyP) is a chronic relapsing papulonecrotic eruption. It is part of the spectrum of CD30+ cutaneous lymphoproliferative disorders and is associated with other forms of lymphoma in up to 20% of cases. We carried out a 20-year retrospective analysis of all patients diagnosed with LyP from 1987 to 2007 at the National Skin Centre (NSC).

Methods: Patients were identified through a search of NSC's clinical and histological databases.

Results: Thirteen patients were diagnosed with LyP based on clinico-pathological criteria. Mean age at diagnosis was 41 years, male:female ratio was 2.3:1 and 84.6% were Chinese. All patients presented with recurrent papulonecrotic lesions for a mean of 3 years before diagnosis. Treatment of LyP comprised monotherapy (n = 6) or combination treatments (n = 7) using topical corticosteroids, oral antibiotics, phototherapy and/or methotrexate. Mean duration of follow-up was 6.4 years. Eight patients (61.5%) were diagnosed with other lymphomas. The malignancy preceded LyP in 2 cases, while 5 patients developed malignancy a mean of 6.8 years post diagnosis of LyP. One patient had concurrent diagnoses of mycosis fungoides (MF) and LyP. There was 1 death (mortality rate 7.7%) in a patient who had developed Stage IIa MF, 7 months after diagnosis of LyP, with subsequent evolution into non-Hodgkin's peripheral T cell lymphoma.

Discussion & Conclusion: LyP is an uncommon, chronic relapsing disease with considerable morbidity but an overall good prognosis. However, we found a higher than reported prevalence of associated malignancies, especially MF. This underscores the importance of close lifetime surveillance of all LyP patients.

BP – M 32

Active Case Surveillance for Novel Influenza A/H1N1-2009

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Background: On 26 April 2009, with the emergence of the novel influenza A/H1N1-2009 virus in Mexico and the United States, Tan Tock Seng Hospital initiated active case detection among patients presenting with influenza-like illnesses.

Methods: We conducted a case-control study to evaluate the epidemiological and clinical factors associated with influenza infection, for the 4-week period, 27 April through 24 May 2009. Data were collected as part of the active case surveillance for the novel influenza A/H1N1-2009.

Results: Three hundred patients (median age, 35 years; range, 2 to 94 years) were screened for the novel influenza virus. None was identified with influenza A/H1N1-2009. Almost 30% were positive for influenza on PCR (24.0% influenza A/H3N2, 1.7% seasonal influenza A/H1N1, 2.7% influenza B). Patients who fulfilled the Centres for Disease Control and Prevention's influenza surveillance criteria were significantly more likely to have a positive influenza result than those who did not (OR 8.14, 95%CI 4.64-14.29). The odds of a positive influenza test in patients who had a recent travel history to North America was 21.4% that of those who had not

(OR 0.21, 95%CI 0.11-0.40). Among influenza patients, reported symptoms included fever (93%), cough (82%), coryza (62%), sore throat (58%), and gastrointestinal symptoms (9%). MOH's case definition for a suspected case of influenza A/H1N1-2009 had a high specificity of 97%, but a sensitivity of merely 13%, in detecting influenza A in our patients.

Conclusion: Seasonal influenza (30% prevalence) should not be overlooked, as we conduct active surveillance for the novel influenza A/H1N1-2009.

BP – M 33

Cerebral Vasodilatory Reserve in Patients with Severe Steno-occlusive Disease of Internal Carotid or Middle Cerebral Artery: Assessment with Acetazolamide-Challenged HMPAO SPECT and Transcranial Doppler

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Background: Circle of Willis provides collateral pathways to perfuse the affected vascular territories in patients with severe steno-occlusive disease of major arteries. Collateral perfusion may become insufficient in certain physiological circumstances due to failed vasodilatory reserve and intracranial steal phenomenon, known as 'Reversed Robin Hood syndrome'. Measurement of cerebrovascular reserve may help in assessing the need for acute intervention for stroke prevention. We evaluated cerebral haemodynamics and vasodilatory reserve in patients with symptomatic distal internal carotid (ICA) or middle cerebral artery (MCA) severe steno-occlusive disease.

Methods: Diagnostic transcranial Doppler (TCD) and TCD-monitoring with voluntary breath-holding according to a standard scanning protocol were performed in eligible patients. Steal phenomenon was detected as transient, spontaneous, or vasodilatory stimuli-induced velocity reductions in affected artery at the time of velocity increase in normal vessels. Patients with exhausted vasomotor reactivity (VMR) and intracranial steal phenomenon were further evaluated with acetazolamide-challenged HMPAO-SPECT.

Results: A total of 18 patients (age 30 to 74 years, 16 males) fulfilled our TCD criteria for exhausted VMR and intracranial steal phenomenon. Acetazolamide-challenged HMPAO-SPECT demonstrated significant hypoperfusion in 16 patients in affected arterial territories, suggestive of failed vasodilatory reserve. A breath-holding index of less than 0.3 on TCD was associated with an abnormal acetazolamide-challenged HMPAO-SPECT.

Conclusion: Acetazolamide challenged HMPAO SPECT is reliable in the assessment of intracranial vasodilatory reserve in patients with severe steno-occlusive disease of ICA or MCA. Identification and quantification of failed vaso-dilatory reserve, coupled with cerebrovascular ultrasonography helps in identifying a target group of patients for non-invasive ventilatory support in stroke prevention as well as selecting patients for possible revascularisation procedures.

BP – M 34

Dermatological Disorders Encountered at the Emergency Department of a Tertiary Hospital in Singapore

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Background/Hypothesis: Skin disorders pose a frequent diagnostic challenge for doctors in the emergency department (ED). This study aims to report the epidemiology, clinical assessment and disposition of adult patients presenting with a primary dermatological disorder at the ED of a tertiary hospital, which will contribute to improved management by ED physicians.

Methods: We performed a retrospective review of all adult patients presenting to the ED at the National University Hospital for a primary dermatological problem over a 1-year period in 2007. The data was collected by searching for all dermatological disorders by ICD-9 code and reviewing the patients' ED records and outpatient dermatology case notes. Cases of cellulitis/abscess were excluded.

Results: Of a total of 89,792 ED attendances in 2007, 934 patients presented with a primary dermatological complaint. Of the patients, 60.0% were male and the mean age was 35.2 years. The most common conditions encountered were urticaria/angioedema (39.0%), dermatitis/eczema (19.4%), fungal infections (8.8%) and nail disorders (8.5%). A total of 7.9% of cases had severe dermatological presentations such as Steven Johnson's syndrome and erythrodermic psoriasis that required hospitalisation. Of the patients, 34.2% were referred for outpatient specialist dermatological review, of which 54.2% defaulted their appointment. The diagnostic concordance between the ED physician and dermatologist was 57.5%.

Discussion & Conclusion: Although dermatological disorders are uncommon presentations in the ED, serious dermatological emergencies constituted up to 10% of cases. They are often diagnostically challenging to the ED physician due to time constraints and limited exposure. As dermatological emergencies are potentially life-threatening, dermatology education and training for ED physicians is vital to improve diagnosis and outcome.

BP – M 35

Application and Verification of University of Southern California–Van Nuys Prognostic Index (USC-VNPI) in 178 Asian Women with DCIS: A Retrospective Study with Long-term Follow-up from a Single Institution

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Background: The rapid increase in the incidence of ductal carcinoma in situ (DCIS) of the breast in Singapore has been associated with the widespread adoption of screening mammography. As our knowledge of DCIS evolves, the treatment and decision-making process has become more complex and controversial. Treatment of DCIS and use of radiotherapy based on USC-VNPI has been widely studied and reported in the West. However, local data on both incidence of DCIS and utility of USC-VNPI in treatment of DCIS have been relatively limited. The aim of our study is to attempt a validation and the clinical utility of the USC-VNPI using a modern cohort of Asian patients subject to contemporary standards of mammographic, pathologic, and surgical processing.

Methods: Two hundred and eighty-seven patients with DCIS, seen and treated from April 2002 to December 2008, were identified through a prospective database by the Breast Division, Department of Surgery, Tan Tock Seng Hospital (TTSH), Singapore. Of the 287 patients, we applied USC-VNPI to 178 (62%) patients who were treated with breast conserving surgery with or without radiotherapy (RT). The Patient demographic features and clinical and tumour characteristics according to the types of surgical treatments were analysed and summarised. All patients were subject to a multi-

disciplinary review and those with high grade DCIS greater than 1 cm were referred to an oncologist for discussion regarding the potential benefits and side effects of RT.

Results: Of 178 patients, 25.8% had a low USC/VNPI score, 63.4% intermediate and 10.8% had a high score. There were 6 (3.33%) local recurrences with a mean follow-up of 136 months and of these 3 (15.8%) patients had a high USC/VNPI score and it was statistically significant ($P = 0.033$). The 4 prognostic variables were analysed individually. Local Relapse rate after Conservative Surgery with or without radiotherapy, increased with tumour size, margin width, and age ($P < 0.05$), while pathological grade was not found to be a significant factor. There was 1 local recurrence in the low score group (2.1%), 2 in the intermediate risk group (1.7%) and 3 in the high risk group (15.8). All the 6 patients had not received radiotherapy due to various reasons.

Conclusion: Although in our series there is not a significant difference in local recurrence rates by the parameter of pathological grade, the USC/VNPI is still a simple and reliable scoring system for therapeutic management of DCIS. The USC/VNPI score is a useful aid in deciding which patients are at increased risk of local recurrence and who may benefit from adjuvant radiotherapy. However, only prospective randomised studies can precisely predict the risk of local recurrence of conservatively treated DCIS.

BP – M 36

Population-based Reference Values for 25-Hydroxyvitamin D₃ Concentrations in Singaporeans

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Background/Hypothesis: Serum 25-hydroxyvitamin D measurement is the best estimate of vitamin D status. More than 95% of circulating 25-hydroxyvitamin D is vitamin D₃ with 25-hydroxyvitamin D₂ only present in measurable amounts in individuals on vitamin D₂ supplements. This study was designed to determine the 2.5 and 97.5 centiles for 25-hydroxyvitamin D₃ concentrations in a Singaporean population.

Methods: Left-over serum from 120 samples on individuals undergoing health screening were anonymised and analysed for 25-hydroxyvitamin D₃ concentration (Roche Cobas e601). Samples were chosen to reflect the racial makeup of the Singapore population. Outliers were identified using Dixon's criterion.

Results: The reference population comprised 67 men and 53 women, median age 43 years (20-73). The distribution was Gaussian with no outliers. The mean and median 25-hydroxyvitamin D₃ concentrations were 23.9 and 24.0 ug/L respectively. The non-parametric 2.5 and 97.5 lower and upper reference limits were 13.6 and 34.3 ug/L. Using a 25-hydroxyvitamin D₃ concentration of <20 ug/L to define vitamin D deficiency, 29% (95% confidence limits: 21-37) of the total population were vitamin D deficient, 18% (9-27) of males and 43% (30-55) of females.

Discussion & Conclusion: This study provides population-based reference values for serum 25-hydroxyvitamin D₃ concentrations in Singapore. However given that 29% of the population tested was deficient in vitamin D, it is recommended that laboratories use health-based reference values instead of local population-based reference values on laboratory reports to allow correct identification of vitamin D deficiency.

BP – M 37

Comparative Effects of Captopril and Amlodipine on Blood Pressure, Serum Glucose Concentrations and Kidney Function in Type 2 Diabetic Hypertensive Patients

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Background/Hypothesis: Hypertension is twice as prevalent in diabetic as in non-diabetic individuals. It greatly increases the risk for macro and microvascular complications. Patients with a confirmed BP $\geq 140/90$ mmHg are candidates for immediate pharmacological treatment. The choice of antihypertensive drug should be determined by the drug's capacity to lower BP, to protect the diabetic patient's kidney from ongoing injury and has no metabolic adverse effects. There are limited data in the world comparing the efficacy of captopril and amlodipine in type 2 diabetic hypertensive patients, thus the present study was designed to compare the effects of captopril and amlodipine on elevated BP, serum glucose concentrations and kidney function parameters in hypertensive, type 2 diabetic patients.

Methods: A total of 100 type 2 diabetic, newly diagnosed hypertensive patients participated in the study. They were divided into 2 groups of 50 patients each. Group 1 kept on captopril therapy and group 2 on amlodipine therapy. Blood pressure, serum glucose, creatinine, urea concentrations and creatinine clearance were measured at baseline and every 2 weeks after treatment with captopril or amlodipine for 8 weeks. Goal blood pressure after treatment was $<130/85$ mmHg.

Results: Both systolic and diastolic BP were significantly reduced after therapy with captopril or amlodipine ($P < 0.001$). Serum glucose, creatinine and urea concentrations were significantly reduced after therapy with captopril or amlodipine ($P < 0.001$). Creatinine clearance was significantly elevated after therapy with captopril or amlodipine ($P < 0.001$). The number of patients achieved normal BP after therapy with captopril or amlodipine were 35 (70%) patients and 33 (66%) patients, respectively. The reduction of systolic and diastolic blood pressure, serum glucose concentrations, serum creatinine concentrations and urea concentrations, and the elevation of creatinine clearance did not differ significantly for both groups ($P > 0.05$).

Discussion & Conclusion: Captopril or amlodipine are effective drugs for the treatment of hypertension in type 2 diabetic patients. They have comparable effects. They reduce elevated BP significantly, achieve a goal BP in the majority of the patients and have no deleterious effects on serum glucose concentration and kidney function as shown by their beneficial effects on serum glucose concentration and kidney function parameters.

BP – M 38

Preliminary Experience with Body Weight Support Robotic Device in Incomplete Spinal Cord Injured Individuals

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Background: The use of body weight supported treadmill (BWST) robotic exoskeletal devices, the Lokomat, aims to tap into the nervous system's ability to restore itself via passively guided gait consistent with physiological patterns. Improvement in overground walking has been reported in spinal cord injured (SCI) individuals undergoing this therapy. We report our experience with 6 incomplete SCI individuals.

Methods: All SCI individuals who were ASIA impairment scale of

C and above who were non-functional walkers undergoing rehabilitation at the centre were included. Exclusion criteria included intolerance of upright posture and significant osteoporosis. Subjects were put on a daily or every other day walking program on the device, between 10 and 15 sessions.

Results: There were 4 tetraplegics and 2 paraplegics. The mean Lower Extremity Motor Score was 28.4. In terms of Lokomat training parameters, there was improvement in mean body weight support post training (43.8 kg to 11.3 kg), speed of treadmill (1.8 km/hr to 2.6 km/hr), orthosis guidance force (98% to 55%), distance covered without fatigue (583.6 m to 1352.2 m) and duration of ambulation (21.4 minutes to 38.9 minutes). For overground walking ability, there was improvement in FIM locomotor score in 2 subjects and improvement in WISCI in 1 subject (8 to 14). Two subjects improved in overground 6-minute walk test. There was no change in FIM or WISCI scores in 3 subjects.

Discussion & Conclusion: The use of the Lokomat is promising in improving walking ability in subjects with incomplete SCI. The optimal duration, intensity and degree of training has yet to be determined.

BP – M 39

Dramatic Response to Infliximab in a Chinese Patient with Severe Flare of Generalised Pustular Psoriasis of Von Zumbusch associated with Intrahepatic Neutrophilic Cholangitis

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Background/Hypothesis: Generalised pustular psoriasis of von Zumbusch is an unstable, inflammatory form of psoriasis, with the hallmark of neutrophil infiltration in cutaneous as well as extracutaneous lesions. It is often recalcitrant, making treatment difficult. TNF-alpha antagonists including infliximab have been used with success in treating recalcitrant cases.

Methods: We report a case of a 48-year old female Chinese patient with a long-standing history of poorly controlled generalised pustular psoriasis, which was resistant to multiple therapies.

Results: During a severe flare, a single dose of Infliximab resulted in rapid clearing of cutaneous lesions, together with resolution of liver abnormalities that are likely secondary to neutrophilic cholangitis. Subsequent maintenance therapy with acitretin allowed remission of pustular disease for 7 months.

Discussion & Conclusion: This demonstrates the efficacy of single-dose Infliximab for both cutaneous lesions and systemic hepatic involvement in generalised pustular psoriasis.

BP – M 40

Vesiculobullous Chikungunya Fever with a Severe and Atypical Clinical Course

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Background: Chikungunya is an alphavirus transmitted by the *Aedes* mosquito. Severe atypical cases, defined as requiring the maintenance of at least 1 vital function or demise during the course of the disease, are now increasingly recognised since the 2005-2006 outbreak in

Reunion. Vesiculobullous chikungunya is rarely described in adults and is associated with a poor clinical prognosis.

Discussion: We report a case of severe chikungunya in an adult with an extensive blistering dermatoses, who progressed to develop septic shock, rhabdomyolysis and Guillain-Barre syndrome. Initial laboratory investigations revealed mild leukocytosis, a low normal platelet count of 143 000/L (normal range 140 to 440 $\times 10^9$ /L), markedly elevated creatinine kinase and creatinine. Histological examination revealed a subepidermal blister with a few mononuclear cells and some fibrin strands. Direct immunofluorescence of perilesional skin was negative. The serum chikungunya reverse transcription real time polymerase chain reaction (RT-PCR), serology for chikungunya IgG and IgM were positive; dengue PCR was negative. Blister fluid and paraffin-block section of the blister for chikungunya RT-PCR were positive. While little is known about vesiculobullous chikungunya, this entity may herald a more severe clinical course of illness and mortality. Our patient featured an array of rare manifestations of chikungunya, including blistering dermatoses, rhabdomyolysis, acute renal failure, hypotension, autonomic neuropathy of the bladder and Guillain-Barre syndrome. Clinicians should have a high index of suspicion for this entity in epidemic, endemic areas and the returning traveller.

BP – M 41

Pulmonary Hypertension in Chronic Kidney Disease in a Multi-ethnic Asian Population

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Background: Pulmonary hypertension in patients with chronic kidney disease (CKD) has important implications on long-term survival. Factors leading to pulmonary hypertension among CKD patients in a multi-ethnic Asian population have not been examined critically. We studied possible factors affecting the incidence of pulmonary hypertension among CKD patients in an academic medical centre in Singapore.

Methods: We analysed a prospectively collected database of 210 Stage 5 CKD patients with echocardiograms done in 2005 and 2006 (mean age = 60.5 ± 13.3 , 60.5% diabetics, 58.1% Chinese, 26.2% Malay, 7.6% Indian, and 8.1% others). We defined pulmonary hypertension as pulmonary arterial systolic pressure (PASP) >35 mmHg. Microsoft Office Excel 2003 and SPSS version 15.0 were used for data analysis. Chi-Square test was performed where appropriate and significance was taken at 0.05.

Results: Pulmonary hypertension was found in 54.8% of Stage 5 CKD patients. More HD patients (58.1%) had pulmonary hypertension compared to 40.9% of PD patients and 54.7% of CKD patients not on RRT, but this was not statistically significant ($P = \text{NS}$). Prevalence of pulmonary hypertension was not different by gender or ethnicity. More diabetic patients had pulmonary hypertension. (56.7% vs 51.8%) ($P = \text{NS}$). Among patients on haemodialysis, there was no difference in prevalence of pulmonary hypertension among patients with arteriovenous access compared to patients who were on temporary central venous catheters (57.7% vs 58.2%) ($P = \text{NS}$).

Conclusion: There is an unexplained high prevalence of pulmonary hypertension among CKD patients. Treatment modalities in Stage 5 CKD patients don't seem to influence the prevalence of pulmonary hypertension. Presence of arterio-venous accesses was not associated with increased prevalence of pulmonary hypertension in our study population. Prevalence of pulmonary hypertension was also not different by age, gender, ethnicity or diabetic status.

BP – M 42

Giddiness in Elderly Patients Presenting to the Emergency Department: Patient Profile, Clinical Outcomes and High-risk Predictors

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Background: We examine the profile of the elderly patient presenting to the Emergency Department (ED) with the triage complaint of 'giddiness', and determine if there are any clinical features that predict a high-risk outcome.

Methods: This is a retrospective medical records review evaluating patients aged 65 and above who presented with a triage symptom of 'giddiness' at an ED from 4 June to 1 July 2006. Our study population was sub-divided into high and non-high risk groups. Patients were considered high risk if the following were present: imaging evidence of cerebral infarct or haemorrhage, intensive care unit or high dependency admission, in-hospital death, change in discipline during admission and re-attendance within 2 weeks.

Results: During the study period, 257 elderly patients with a mean age of 76.2 years complained of 'giddiness' at triage. Of these, 57.6% were female. Of the 63.4% who required admission, the median length of stay was 4 days. A definitive ED diagnosis could not be made in 21.4%, of which 47.3% were discharged, none of whom re-attended ED within 2 weeks. A total of 42 (16.3%) patients fell in the high-risk group. Univariate analysis showed that elderly patients with BP $\geq 170/90$ were 3.8 times more likely to be classified as high-risk compared to normotensive patients.

Conclusion: 'Giddiness' is a common symptom, present in 9% of all elderly ED. Even though a definitive diagnosis is not made in one-fifth of the cases, such patients were safely discharged without re-attendance. Apart from elevated blood pressure, there are no other useful clinical predictors of the high-risk giddy elderly.

BP – M 43

Systemic Adverse Events after the Use of Alternative Medicine Presenting to an Emergency Department

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Background: Alternative Medicine (AM) is commonly employed by our patients for various ailments. We report a series of 7 cases of systemic complications after the use of AM that were encountered in our department over a 6-month period.

Results: The ages of our patients ranged from 27 to 67 years. There were 3 males and 5 females. All of them were Chinese except for an Indian lady. All of them used their own form of ethnic medicine. Two patients developed severe anti-cholinergic poisoning. They presented with altered sensorium, dilated pupils and decreased gastric mobility. Both patients were admitted and their poisoning resolved after 24 hours. The Indian lady took AM for constipation for a few weeks and later presented with lead poisoning. She had to be admitted twice and required chelation therapy and prolonged out-patient follow-up. One patient developed severe vomiting and required admission for intravenous hydration. Two patients had minor complaint of non-specific chest pain and giddiness; they were observed and discharged well. One patient developed angioedema, he was discharged well.

Discussion: In the literature, there had been reports of serious and life-threatening adverse events after use of AM. Apart from these cases of systemic complications, we suspect that many other cases of systemic complications and minor complications were not detected. The numbers of patients using AM are likely to increase with time

and we anticipate that the rate, complexity and severity of complications will increase. As healthcare workers, we need to be vigilant and mindful of this.

Conclusion: Healthcare providers should remain vigilant of adverse complications arising from use of AM by our patients.

BP – M 44

Two Unusual Cases of Non-scarring Anti-epiligrin Cicatricial Pemphigoid without Mucosal Involvement

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Background: Cicatricial pemphigoid is an autoimmune subepidermal blistering disease predominantly involving mucous membranes, with a tendency for scarring. Patients with anti-epiligrin cicatricial pemphigoid have serum autoantibodies directed against laminin-332. AECP is associated with an increased relative risk for cancer.

Discussion: We report 2 unique cases of anti-epiligrin cicatricial pemphigoid without mucosal involvement or scarring. Case 1 was a 46-year-old lady with a generalised bullous eruption. Case 2 was a 78-year-old man with bullae on the trunk and lower limbs. Histopathological examination in both patients revealed subepidermal bullae with a predominantly neutrophilic infiltrate. Direct immunofluorescence of perilesional skin revealed linear bands of IgG and C₃ at the dermoepidermal junction. Sera of both patients showed negative reactivity for IgG against BP180 using the enzyme linked immunosorbent assay. Immunoblotting demonstrated the presence of circulating autoantibodies against laminin-332. There were no associated malignancies, and both patients responded well to treatment with systemic corticosteroids. These cases demonstrate the role and importance of immunoblotting in distinguishing this subtype of subepidermal immunobullous disease, which is crucial given the association of anti-laminin-332 with malignancies.

BP – M 45

Physiology of the Female Pubic and Genital Skin: A Prospective Study across Ages and the Menstrual Cycle

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Background: Little is known about the baseline characteristics and physiology of female pubic and genital skin, including the effect of menstruation and age.

Methods: Twenty-eight female patients were recruited in this prospective observational study. Non-invasive objective measurements (skin pH, transepidermal water loss, sebum, hydration) and quantitative measurements (participant rating of skin irritation, gynaecological inspection) were undertaken at midcycle, before and after menstruation. Parameters were assessed at the mons, labia, groin, thigh and forearm.

Results: Transepidermal water loss in pubic and genital skin was lower compared to the thigh and forearm, but remained unchanged throughout the menstrual cycle. Sebum production at the labia increased during midcycle, while hydration at the mons rose before menstruation. Women above 30 years of age had higher pH, lower sebum secretion and marginally lower hydration at the mons compared to their younger counterparts.

Conclusion: While cutaneous adaptations permit the insults of menstruation to be withstood, we postulate that genital skin is not

immune to senescence. We discuss the implications of these findings.

BP – M 46

Cardiogenic Seizures in Children

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Background: Not all seizures are epileptic in origin. The simultaneous electrocardiogram (ECG) on routine electroencephalogram (EEG) is useful in recognising cardiogenic seizures in patients.

Methods: Retrospective analysis of cases

Results: Case 1: A healthy 2-month-old boy presented with afebrile seizure. He had normal electrolytes and no medication. No epileptiform discharges were detected on the EEG but premature ventricular complexes were seen on simultaneous ECG. With the impression of supraventricular and polymorphic ventricular tachycardia, he was started on Propranolol and remained seizure-free up to present. Case 2: An EEG was done on a 15-year-old female with first episode of generalised tonic clonic seizure. She had no history of palpitations, angina, exertional symptoms or drug intake. No epileptiform activity was seen on EEG but the simultaneous ECG revealed frequent ventricular ectopics. The diagnosis of intermittent bundle branch block was made on cardiology consult and further cardiac work-up was put in place.

Discussion & Conclusion: The ECG during EEG study can detect conduction disorders that require critical cardiac interventions, as in case 1. ECG tracing can also prompt cardiac monitoring and timely work-up as in case 2. Cardiac dysrhythmias resulting in anoxic seizures should be a differential diagnosis for seizure aetiology in children. Careful analysis of the ECG tracing is valuable in preventing lethal arrhythmias that may result from unrecognised cardiogenic seizures.

BP – M 47

Community-acquired Methicillin-resistant *Staphylococcus aureus* in Singapore Outpatient Dermatology Centre

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Background: To evaluate the cases of community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) infections, seen at the National Skin Centre, a tertiary dermatology outpatient centre.

Methods: In this retrospective study, we reviewed the case notes of all patients with culture positive MRSA skin infections seen at National Skin Centre between 1 January 2007 and 31 December 2007 from the medical records. Data on clinical presentation, antibiotic sensitivities and treatment outcomes were analysed.

Results: Twenty-four patients were diagnosed to have MRSA skin infections, of which 10 patients were hospital-acquired. Community-acquired MRSA was found in 5 males and 9 females, with the mean age at onset was 38.6 years. Folliculitis and furunculosis were the most common presentation in 35.7% of the cases. The most common sites of infection were on the face and buttocks. Culture and sensitivity testing demonstrated sensitivity to Vancomycin (100%), Cotrimoxazole (93%), Tetracycline (71%), Gentamicin (64%), Clindamycin (57%) and Erythromycin (43%). Susceptibility testing showed that all cultures were resistant to Penicillin, Ampicillin, Cloxacillin and Cephalothin in all patients.

Conclusion: Community-acquired MRSA is encountered in our

tertiary outpatient dermatology centre. The actual prevalence of community-acquired MRSA among patients diagnosed to have community-acquired MRSA is likely to be lower as we were limited by insufficient documentation in the case notes.

BP – M 48

Multi-disciplinary Infectious Diseases and Critical Care Rounds in Surgical and Neuroscience ICUs in Tan Tock Seng Hospital: Catching Up and the Way Forward

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Background/Hypothesis: To tackle multi-drug resistant organisms within ICUs and evolving infectious diseases issues among the critically ill patients, a multi-disciplinary initiative was commenced in the surgical and neurosurgical intensive care since January 2009.

Methods: This consisted of a bi-weekly round with primary managing teams, the infectious diseases physician, infectious diseases pharmacist and microbiologist. A workflow is in place to assist primary teams with management of patients with infectious diseases issues; this allows them to have early access to significant microbiology results and expedited Infectious diseases service. Only patients with Infectious diseases issues were discussed during the rounds. A registry has been set up permanently for data collection and surveillance.

Results: To date, 47 patients were followed up, with 22 types of Infectious diseases conditions addressed. Commonly encountered infections involved the respiratory and gastrointestinal systems and sepsis syndrome of unknown origin. APACHE II scores for these patients ranged from 13 to 40. The duration of follow-up with the multi-disciplinary team ranged from 1 to 70 days. Over the past 5 months, we have optimised anti-microbial therapy and management with the following interventions: 1) de-escalation of antibiotics for 13 patients, 2) cessation of unnecessary antibiotics for 20 patients, optimisation of antibiotic doses in 12 patients, 3) improving antibiotics choice in 26 patients and 4) affirming antibiotic regimen in 25 patients.

Discussion & Conclusion: The above measures have brought about improved antibiotic prescribing habits within ICU and greater collaboration between the various departments involved. Outcome measures of mortality, morbidity and change in antibiotic resistance will be ascertained following 1 year of data collection.

BP – M 49

Medical Comorbidity in Patients with Schizophrenia

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Background/Hypothesis: Schizophrenia is hallmarked by a chronic course with significant individual functional impairment. Epidemiologic data suggests that Schizophrenia patients are at greater risk of medical disorders such as diabetes mellitus and obesity, placing them at serious risk of morbidity and mortality. They are also less likely to seek treatment and maintain compliance, resulting in a poorer prognosis. This paper examines the prevalence of medical co-morbidities in a selected group of Schizophrenia patients.

Methods: This was a cross-sectional study of 266 schizophrenia

patients at IMH/Woodbridge Hospital (2005 to 2007). Family and current medical history were self-reported in patient interviews.

Results: The study was carried out on 91 males (34.2%) and 175 females (65.8%), mean age 41.2 years. A total of 20.7% had medical co-morbidities such as Hypertension (8.6%), Diabetes Mellitus (5.3%), Hyperlipidemia (5.3%) and Ischaemic Heart Disease (0.4%). Three patients (1.1%) had a past Cerebrovascular Accident. Of the patients, 18.4% had significant family history of medical problems. Of these, Hypertension was most prevalent, followed by Diabetes and Obesity.

Discussion & Conclusion: The Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study revealed 13% of Schizophrenia patients had Diabetes and 27% had Hypertension. Locally, the prevalence of Diabetes is 8.2% and 13.6% for Hypertension (2004 National Health Survey). In comparison, the much lower prevalence in this study could possibly be attributed to a younger age of distribution and the subjective self-reports amongst other factors. However, significant findings amongst Western populations warrant objective investigations and close monitoring of schizophrenia patients for medical co-morbidities which is crucial in quality and holistic care of this group.

BP – M 50

Cicatricial Pemphigoid: A Series of 5 Cases from Singapore

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Background: Cicatricial pemphigoid (CP) is a rare subepidermal blistering disease with a spectrum of clinical manifestations. Our aim is to document the demographic data, clinical features and treatment outcomes of CP in Singapore.

Methods: A retrospective review of all cases diagnosed as CP from 1988 to 2004 at the National Skin Centre was conducted and evaluated for their clinical history, histological and immunofluorescence findings, as well as treatment outcomes.

Results: The study included 5 patients, 2 with predominantly mucosal involvement, 2 with disseminated CP and 1 with the Brunsting Perry variant. All the patients were of Chinese descent. The mean duration of the disease before consultation was 4.5 months while the mean period between the appearance of skin lesion and diagnosis was 5.2 months. All cases showed subepidermal bullae filled with a mixed infiltrate of variable intensity; of either neutrophils or eosinophils predominance. Direct immunofluorescence studies showed a linear band of IgG and C3 at the basement membrane zone in all cases while indirect immunofluorescence was positive in 3 out of 5 cases. No malignancy has been reported so far. Ankylosing symblepharon was seen in 1 case and required cyclophosphamide treatment while disseminated cutaneous disease required azathioprine.

Conclusions: CP affecting the conjunctiva is sight-threatening and should be treated aggressively with prednisolone and cyclophosphamide. Disseminated CP would warrant non-steroid immunosuppression if corticosteroids fail to control the disease activity, so as to prevent widespread cutaneous scarring. Brunsting Perry variant responds well to standard doses of prednisolone used in the treatment of bullous pemphigoid.

BP – M 51

A Case of Adult-onset Still's Disease Presenting with Acute Myopericarditis

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Background: Adult onset Still's disease (AOSD) is a systemic inflammatory disorder of unknown aetiology characterised by spiking fever, evanescent skin rash, arthralgia or arthritis, involvement of various organs and predominantly neutrophilic leucocytosis. We report a case which illustrates the typical features of AOSD, which was treated with steroids and azathioprine.

Methods: A 23-year-old male was admitted for acute viral myopericarditis with heart failure in which he presented with chest pain associated with dyspnoea, persistent spiking fever, sore-throat, productive cough and arthralgia. In addition, he developed transient non-pruritic rashes over the neck, axillae and limbs. Clinical examination revealed a febrile patient who was in heart failure. He had cervical lymphadenopathy, hepatosplenomegaly and non-scaly orange red plaques and papules were noted over the neck, axillae and limbs.

Results: Laboratory investigations revealed raised cardiac enzymes, positive Troponin I, ECG changes consistent with pericarditis, marked leukocytosis with neutrophil predominance, hyperferritinaemia and elevated erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). Histopathological examination of the skin biopsy revealed features of a neutrophilic dermatosis. He was diagnosed with Adult onset Still's disease (AOSD) and commenced on steroids and azathioprine.

Discussion & Conclusion: AOSD, although uncommon, has characteristic constellation of clinical and laboratory features and should be considered in the differential diagnosis of pyrexia of unknown origin associated with a rash and arthralgia. The diagnosis is one of clinical suspicion and it is essential that infections, malignancy and other rheumatic diseases are excluded.

BP – M 52

Demographics, Clinical Presentation, Management and Outcome of Primary Hyperparathyroidism in a Tertiary Centre

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Background: The aim is to characterise the demographics, clinical presentation, biochemical features, management and outcome of primary hyperparathyroidism in a tertiary centre in Singapore.

Methods: Retrospective records of patients on follow-up at the Endocrinology clinic for primary hyperparathyroidism from September to December 2008 were scrutinised.

Results: Seventy-three patients (11 males, 62 females) between the ages of 29 and 98 years were found to be on follow-up for Primary Hyperparathyroidism. On presentation the mean calcium level was 2.87 mmol/L, mean PTH level was 18.9 pmol/L. The calcium creatinine clearance ratio was determined in 45 patients and only 21 of them had a calcium creatinine clearance ratio of ≥ 0.02 . The average 25 hydroxy Vitamin D level was 19.2 ng/dl (5.2 to 31). Only 51.3% (38/74) patients had symptoms of hypercalcemia. Of the 38 patients who underwent a sestamibi scan, 28 patients had a parathyroid adenoma localised on the scan. Of the 12 patients who underwent a parathyroidectomy, 10 had a single adenoma, 1 had double adenomas and 1 had a mediastinal thymic cyst. About 83% (10/12) of patients achieved normocalcemia after surgery. The rest of the patients were given medical therapy: 24 patients were given IV bisphosphonates and 37 patients were treated conservatively.

Conclusion: Primary Hyperparathyroidism is a relatively common cause for referrals to a tertiary endocrine centre in Singapore. Although surgical management is curative in most cases, most patients are treated conservatively or medically. Alternative forms of treatment such as alcohol ablation of parathyroid adenomas need to be explored to improve outcomes in the medical and conservative group of patients.

BP – M 53

Actinic Prurigo in Asian Skin

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Background: Actinic prurigo (AP) is a chronic, pruritic skin disease caused by an abnormal reaction to sunlight. An Asian variant of actinic prurigo has previously been described. The aim of this study is to determine the clinico-epidemiology of actinic prurigo in patients attending the National Skin Centre, Singapore, from 1999 to 2008.

Methods: Cases of actinic prurigo diagnosed between 1999 and 2008 were retrieved from the electronic medical records and analysed.

Results: Eleven patients were diagnosed to have Actinic Prurigo from 1999 to 2008. The mean age at diagnosis was 52 years, with a racial distribution of 9 (82%) Chinese and 2 (18%) Malays. Nine (82%) patients were males and 2 (18%) were females. The face, forearms and hands (72%) and legs (64%) were most often affected. The phototest showed reduced MED to ultraviolet (UVA) in 5 (46%), UVA and UVB in 4 (36%) and UVB in 1 (9%) patient. Seven (64%) patients reported partial improvement with a combination of topical steroid and sunscreens as the main modality of treatment. Four (36%) patients received systemic therapy with partial response.

Conclusion: Actinic Prurigo is an uncommon photodermatosis. Our data suggest an adult-onset similar to studies from Singapore and Thailand. The prognosis for AP is not good, and the disorder may run a chronic course.

BP – M 54

Chronic Leg Ulcers in patients with Rheumatoid Arthritis – A Case Series

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Background/Hypothesis: Leg ulcerations occur in up to 9% of patients with Rheumatoid Arthritis (RA) and can be associated with significant morbidity.

Methods: A retrospective analysis of patients with RA with chronic leg ulcers seen at the Wound Clinic, National Skin Centre, was carried out between 2004 and 2009.

Results: There were 6 patients, with a male: female ratio of 1:2, mean age of 65 years (range, 54 to 78 years) and mean duration of RA of 15 years (range, 9 to 20 years). Two patients had a single ulcer and 4 had multiple ulcers. Ulcers were located on the shin or calf (3 patients), ankle (3 patients) and foot (2 patients). Ulcer size ranged from 0.5 cm to 16.2 cm at greatest length. Underlying aetiologies were venous (1 patient), vasculitis (2 patients), mixed venous and vasculitis (1 patient), pyoderma gangrenosum (1 patient) and ischemic microangiopathy (1 patient). Complications included local wound infection, cellulitis and pain. *Pseudomonas aeruginosa* was isolated in 5 patients and *Staphylococcus aureus* in 3 patients. All patients received antibiotics and aggressive wound bed preparation. Recalcitrant ulcers were treated with hyperbaric oxygen therapy

(2 patients) and cellular skin grafting (1 patient). Time taken for re-epithelisation ranged from 6 to 13 months (mean 8.5 months), 2 patients had persistent ulcers and 1 patient was lost to follow-up.

Discussion & Conclusion: The management of chronic leg ulcers in RA is challenging. The importance of careful clinicopathological correlation to determine and treat the underlying cause cannot be overemphasised. Key strategies include sustained immunosuppression, broad spectrum antibiotics, compression therapy and aggressive wound bed preparation.

BP – M 55

A Case of Discoid Lupus Erythematosus-like Cutaneous Sarcoidosis

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Background: Sarcoidosis is a multisystemic granulomatous disease of unknown aetiology that involve multiple organs. The frequency of skin involvement in patients with systemic sarcoidosis is between 20% and 35%. Cutaneous sarcoidosis has protean clinical manifestations. We present a case of a lady with discoid lupus erythematosus (DLE)-like cutaneous sarcoidosis who was treated with hydroxychloroquine.

Methods: A 47-year-old lady presented with a 4-month history of painless non-pruritic scaly papules and plaques over the lower limbs and back. There was no history of photosensitivity, mouth ulcers or systemic symptoms. Physical examination revealed scattered erythematous papules and plaques mainly over the lower limbs and back. Some of the lesions had a scarred, atrophic centre. The rest of the physical examination was unremarkable. A diagnosis of DLE was made based on the clinical findings.

Results: Histopathological examination of the skin lesion was consistent with the diagnosis of cutaneous sarcoidosis. Chest radiography revealed bilateral perihilar nodular shadows suggestive of sarcoidosis. An assessment by a respiratory physician confirmed pulmonary involvement. A diagnosis of discoid lupus erythematosus (DLE)-like cutaneous sarcoidosis with systemic involvement was made. She was treated with hydroxychloroquine which resulted in improvement of her cutaneous signs.

Conclusion: Discoid lupus erythematosus (DLE)-like cutaneous sarcoidosis is one of the specific manifestations of sarcoidosis. This case highlights the need to consider sarcoidosis in the differential diagnosis of DLE especially if the cutaneous lesions occur on atypical sites such as the back or lower limbs with sparing of the sun-exposed areas.

BP – M 56

Providing Acupuncture for Patients with Chronic Knee Pain in Yishun Polyclinic

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Background: Acupuncture, is among the best known of complementary and alternative therapies that originated more than 3,000 years ago in China. It is part of the therapeutic methods used in Traditional Chinese medicine (TCM) and its theories are based on the doctrine of channels. It has gained popularity and wide usage locally in recent years, especially in the management of acute and chronic pain. Yishun

Polyclinic started its Acupuncture clinic on 13 October 2008. It offers acupuncture therapy as a complementary modality to patients with painful musculoskeletal conditions.

Results: Twenty-three patients with chronic knee pain of more than 6 months were selected. They were all referred by polyclinic doctors with the diagnosis of Osteoarthritis of the knees. All 23 patients were treated with 8 sessions of acupuncture, at an interval of at least once every 4-7 days. Using the Wong-Baker Faces Pain Rating Scale, 55% of the patients achieved 50% improvement in the pain score after completion of all the sessions.

Discussion & Conclusion: This unique complementary health model of using both scientific medicine and acupuncture can be highly popular in the evolving model of integrative medicine in the coming years. This is especially important in the polyclinics which provide primary healthcare services and at the same time plays a significant role in pain management.

BP – M 57

Profile of Paraoxonase 1 (PON1) Gene 192Q/R Polymorphism in a Predominantly Chinese Cohort of Alzheimer's Disease and Mixed Dementia

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Background: Paraoxonase 1 (PON1) has multiple biological activities including cholinesterase inhibition (ChEI). Its polymorphism at 192 Q/R has been found to have associations with Alzheimer's disease (AD); with the R allele having higher activity compared to Q allele and has been reported to be protective against AD. The aim is to examine the profile of Paraoxonase 1 (PON1) gene and its polymorphism (192Q/R) amongst patients with Alzheimer's disease (AD) and mixed dementia (AD with stroke).

Methods: Whole blood Deoxyribonucleic acid (DNA) was extracted from 255 patients. Real time polymerase chain reaction (PCR) used for genotyping of single nucleotide polymorphism rs662 (Chromosome 7). Based on Glycine (Gln) [for Q allozyme] -> Arginine (Arg) [for R allozyme] substitution at residue 192, 3 genotypes are derived: QQ, QR, RR.

Results: Subjects were divided into 2 groups: Non-QQ (containing at least 1 R allele) and QQ R allele was predominant. While the Non-QQ group showed trends towards higher mean Mini-mental state examination (MMSE) and Bristol Activities of Daily Living (BADL) scores compared to the QQ group; surprisingly the Non-QQ group fared worse in overall function on Clinical Dementia Rating Total Scores (CDR Total) ($P = 0.01$), had more neuropsychiatric symptoms on Neuropsychiatry Inventory Scores (NPI) ($P = 0.028$) and higher levels of caregiver distress on Neuropsychiatry Inventory Caregiver Distress Scores (NPICD) ($P < 0.01$).

Conclusion: While the R allele of PON1 has been hypothesised to be protective against AD, patients with R allozyme may present with poorer function overall and more neuropsychiatric symptoms. This has hitherto not been shown previously and warrants future research.

BP – M 58

Labile Hypertension in Patient with Nasopharyngeal Carcinoma Post-radiation Therapy

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Background: Baroreflex failure is an uncommon cause of labile hypertension which has been previously reported as a late complication of radiation therapy in patients with nasopharyngeal carcinoma (NPC). This was strongly suspected in this patient as he had radiotherapy for NPC more than 10 years ago after extensive investigations failed to reveal any other secondary cause. The diagnosis, management and clinical progression of the index case will be described. Case reports in the literature will also be reviewed.

Discussion: This 65-year-old man first presented with labile hypertension ranging from 70/50 to 240/120 mmHg associated with headache, dizziness, palpitations and diaphoresis. Work-up for secondary hypertension including phaeochromocytoma was negative. He was treated with various antihypertensive classes including beta blockade with unsatisfactory control of the upswings and unpredictable hypotensive spells. Subsequently, he was referred to the psychiatrist who diagnosed him with panic disorder. However, despite anxiolytic treatment, his symptoms were only partially abated, and his blood pressure readings remained volatile. Autonomic function testing was performed which showed borderline blunted parasympathetic response. Ultrasound of the carotids showed bilateral plaques. Further, there was evidence of target organ damage in the form of mild left ventricular hypertrophy (on echocardiogram). Magnetic resonance imaging of the brain also showed gliosis in bilateral lobes and chronic lacunar infarcts. Invasive pharmacological testing for baroreceptor dysfunction was not performed in view of the risk profile of the patient. More studies are needed to explore treatment regimens for such cases of hypertension which are difficult to manage.

BP – M 59

Very High Central Aortic Systolic Pressures (CASP) in a Young Hypertensive Patient on Telmisartan – Should We Target to Optimise CASP in All Hypertensive Patients?

AASULE

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Background: Central Aortic Systolic Pressure (CASP) is a very well-recognised tool to access the end organ damage in patients with Hypertension and is now considered superior to peripheral brachial pressure. CASP is measured by B-pro (watch) machine, non-invasively in our department of General Medicine. It is known that ACE inhibitors, angiotension receptor blockers, Calcium channel blockers reduce CASP much more compared to some anti-hypertensives like beta blockers. We describe a patient on Telmisartan with a very high CASP even though the brachial pressures were moderately well-controlled on 24 hours BP monitoring.

Discussion: Mr AB was a young 24-year-old gentleman with hypertension diagnosed 18 months ago on 24 hours ambulatory BP monitoring. He had a strong family history of hypertension. He was investigated for secondary causes of hypertension. His renin-angiotension, renal doppler ultrasound, and pheochromocytoma screen were negative. Further testing showed that there was no evidence of end-organ damage. He was diagnosed as having primary hypertension and started on Telmisartan 40 mg once a day. After 6 months,

the dosage of anti-hypertensive was stepped up to 80 mg per day. He was fairly well controlled on Telmisartan 80 mg per day with BP ranging from 125/80 mm Hg to 130/85 mm Hg. He underwent routine CASP and ambulatory BP measurement in our clinic on B-pro watch machine. For his age, the CASP pressures recommended were between 90-105 mm Hg. He had CASP pressure of 130 mm Hg. His ambulatory pressures were around 130/90 mm Hg. Hence, hydrochlorthiazide was added for further control. He was advised a repeat CASP on follow-up in 6 weeks (follow-up till end June 09).

Conclusion: Angiotension receptor blockers may not reduce CASP in all patients. In future, optimising the brachial as well as CASP may be useful when treating hypertensive patients.

BP – M 60

Atypical Ocular Presentation of Tuberculosis of the Brain – A Discussion of 2 Unusual Cases

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Background: Tuberculosis (TB) is still a prevalent disease globally, in both developing and developed countries. There were 9.27 million new cases in 2007 globally. TB of the brain accounts for 1% of all TB cases. TB of the brain has a variety of clinical symptoms, both systemic and neurological. We present 2 patients with unusual presenting ocular symptoms in 1 swollen disc with macular stellar exudates and complete 3rd nerve palsy in the other.

Methods: Both patients underwent a complete neuro-ophthalmology examination. Fundoscopy of the first patient showed bilateral discs swelling and macular exudates in a stellate pattern which was initially misdiagnosed as neuroretinitis. Visual fields with Goldmann Perimetry showed enlarged blind spots with small targets and barring of these blind spots along with narrowed peripheral fields with large targets. CT brain scan showed a left frontal mass. The second patient presented with a complete 3rd nerve palsy. MRI brain showed multiple areas of dural thickening in left cavernous sinus, left parasagittal midline falx and floor of right anterior cranial fossa.

Results: The first patient underwent a left frontal craniotomy and excision of the frontal lobe mass. The second patient underwent a left temporo-parietal mini craniotomy with excision biopsy of the most thickened dura. The biopsy results were positive for TB complex DNA in both patients. Anti-TB medication was started post-operatively.

Conclusion: TB has a great variety of presenting clinical signs and symptoms which can masquerade as other diseases. This case discussion emphasises the importance of keeping TB as an important differential when seeing patients in a neuro-ophthalmology clinic as TB is still a prevalent disease locally.

BP – M 61

Adequacy of Psychiatric Training: A Singaporean Perspective

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Background/Hypothesis: The specialty training program for psychiatry in Singapore is transiting to a seamless 5-year training program. It is timely to assess the perceived adequacy of current psychiatric speciality training.

Methods: An anonymous survey was sent out all psychiatry trainees

and psychiatrists in the public sector to assess the current adequacy and perceived importance of 11 aspects of psychiatric specialist training.

Results: A total of 49% (54 of 110) of the respondents replied to the survey. The current adequacy of training was less than the perceived importance of training for all 11 aspects of training. The most important aspects of training were disorder and diagnosis, pharmacological treatment, clinical interview and treatment skills. Psychiatrists rated most aspects of training as being more important than trainees except for cultural aspects, research and basic neuroscience. Psychiatrists rated adequacy of training better than trainees except for research. The difference between psychiatrists and trainees rating for psychotherapy treatment knowledge adequacy was statistically significant ($P < 0.05$).

Discussion & Conclusion: There were perceived deficiencies in all 11 aspects of training. Psychiatrists and trainees have different perceptions of adequacy and importance of training.

BP – M 62

A Carbon Monoxide Poisoning Patient with Decerebrate Rigidity Who Survived without Neurological Deficit

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Background: Carbon monoxide poisoning (COP) is one of the leading causes of death from poisoning worldwide. Patients who present with decerebrate rigidity following COP have a very adverse outcome.

Methods: Case report

Results: A 33-year old Chinese male was discovered lying unconscious in the toilet with a bowl of burning charcoal beside him. He was comatose with decerebrate rigidity, frequent myoclonic jerks and bilateral extensor planter response. Blood pressure was 118/62 mm Hg, heart rate 119/ minute, temperature 37.6 °C and SpO₂ was 99% on room air. Pupils were normal in size and reaction. Carbon monoxide level done at emergency department (ED) was 36.8%. Blood gas analysis revealed pH 7.44, pCO₂ 31 mm Hg, pO₂ 301 mm Hg, HCO₃ 21mmol / L, BE – 2 mmol / L and SaO₂ 100%. He was intubated in ED and admitted to intensive care unit (ICU). Full blood counts, renal and liver panels, chest X-ray and ECG were within

normal limits. Toxicology screen revealed no other drug, alcohol or substance poisoning. His stay in ICU was complicated by upper gastrointestinal bleeding, pneumonia, and frequent myoclonic jerks. He was extubated after 3 days of ventilation and discharged after 5 days of hospitalisation without any neurological deficit. He was well when reviewed in psychiatry outpatient department 2 weeks after discharge.

Conclusion: Treatment of patients with severe COP should be optimistic as they may still survive without any residual neurological or psychiatric deficit.

BP – M 63

A Case of Symmetrical Drug-related Intertriginous and Flexural Erythema (SDRIFE) after Administration of Cloxacillin

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Background/Hypothesis: We report an otherwise healthy male who developed a symmetrical, well-demarcated erythema over the inguinal, thigh and gluteal areas after treatment with cloxacillin.

Methods: The patient was started on a course of cloxacillin for infected insect bites 3 days before the onset of the rash. The erythema was symmetrical, well-demarcated and localised to the inguinal, thigh and gluteal areas. No vesicles, erosions or targetoid lesions were observed. All other body regions and mucosal surfaces were spared.

Results: His clinical presentation is consistent with Symmetrical Drug-related Intertriginous and Flexural Erythema (SDRIFE).

Discussion & Conclusion: Symmetrical Drug-related Intertriginous and Flexural Erythema (SDRIFE) is used to describe the clinical entity in which, the patient, after exposure to administration of systemic drugs, develops a clinical picture of erythema affecting the intertriginous or flexural folds or the gluteal areas resembling the buttocks of baboons. The original term Baboon Syndrome was initially coined to describe a clinical presentation of systemic contact dermatitis with pruritic maculopapular eruption, localised in the gluteal area and the major flexures, developing several hours or days after drug or agent contact. SDRIFE is the new term to specifically describe cases associated with systemic drugs.

BP – N 04

Preoperative Antiseptic Bath/Shower (POAB/S) Study

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Background: The Centres for Disease Control and Prevention (CDC) has recommended pre-operative antiseptic bath or shower to the preoperative site preparation regimen as it had been shown to decrease the skin microbial colony counts 9-fold, resulting in lower postoperative infections for clean or Surgical Wound Class 1. The introduction of POAB/S is carried out by means of patient education with the aim of reducing surgical site infections.

Methods: The surgical site infection data collected monthly, formed the baseline for comparison following POSA/S addition to the pre-operation preparation regimen. An antiseptic skin preparation agent and surgery codes were selected. Patient's education form and checklist were designed for both inpatients and outpatients. A box containing POAB/S was placed in the surgical wards for easy access by the nurses. Both the compliance rates and infection rates were monitored and analysed.

Results: 1. Nurses' co-operation in providing patient education concerning the POAB/S was achieved in 85% of cases. 2. Reduction in SSI (Knee and Hip Implants) rates were as follows:

May 2008 to September 2008: 2.50 (5/200);

September 2008 to January 2009: 0.96 (1/104)

Conclusion: Prior to the introduction of POAB/S, there were increasing cases of SSI in the post hip cases (trauma) for the past 8 months. POAB/S is part of an overall strategy to improve SSI rates resulting in reduction of sequelae such as morbidities and mortalities.

BP – N 05

Predictors for Central Aortic Systolic Pressure in Type 2 Diabetes Patients

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Background: Central Aortic Systolic Pressure (CASP) has been shown to predict cardiovascular outcome independent of peripheral arterial pressure measured by conventional Sphygonomanometer. However, little is known on factors affecting CASP especially in high risk population, e.g. individuals with type 2 diabetes (T2DM) and renal dysfunction. We hypothesise that metabolic factors and ectopic (extra-osseous) calcifications are important in predicting CASP.

Aims: We aim to explore the predictors for central aortic systolic pressure in a cohort of T2DMenriched with nephropathic subjects.

Methods: A pilot study (N = 30) was conducted from March 2009 to June 2009 in Diabetes Centre, Alexandra Hospital. Information on extra-osseous calcification was obtained from whole body bioimpedance analysis (InBodyS20). CASP was calculated using A-PULSE CASP pulse wave application software through a B-PRO device which was applied over patient's wrist. Linear regression was employed in the analysis using SPSS version 16.

Results: The subjects consisted of 70% male and 30% female. There was 77% Chinese, 20% Malays and 3% Indian. The mean (SD) age was 62 (11) years, mean HbA1c was 8.1 (1.5)% and mean creatinine 150(80) umol/L. Univariate analysis suggested significant correlation

between total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), extra-osseous calcification and spot urinary albumin over creatinine ratio with CASP. Multivariate analysis shows that TC (standardised b = 0.22), HDL-C (0.33) and extra-osseous calcification (4.55) remained significant predictors of CASP (all $P < 0.01$).

Conclusion: Dyslipidemia and extra-osseous calcification are significant predictors of CASP in patients with type 2 diabetes. Therapy targeted at these factors may ameliorate CASP.

BP – N 06

Effectiveness of Portable Bladder Ultrasound Protocols

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Background/Hypothesis: The aim of review was to determine the effectiveness and safety of portable bladder ultrasound (PBU) protocols to guide decision for short-term catheterisation in hospitalised patients. Protocols were considered effective if they resulted in a reduction in rate of catheterisation, and safe if they did not increase the risk of complications associated with urinary retention (UR) or bladder over-distension.

Methods: A systematic review was done. Four databases (PubMed, CINAHL, CRD databases and the Cochrane Library) were searched using the MeSH keywords "urinary catheterisation" and "ultrasonography" to identify primary studies evaluating the effectiveness of PBU protocols. **Results:** Only 3 studies met the inclusion criteria and were selected for this review. All have shown that using a PBU protocol to guide decision for catheterisation was more effective than usual care in post-operative orthopaedic and neurosurgical patients. None of the studies reported on complications associated with UR or bladder over-distension, though 1 study reported a higher incidence of UR but a lower volume of urine retained per patient in the study group.

Discussion & Conclusion: This systematic review has revealed a paucity of high quality research evaluating the effectiveness of PBU protocols to guide decision for short-term catheterisation in hospitalised patients. Despite this limitation, using PBU protocol appears to be more effective compared to usual care. However, safety of the protocols was not well addressed in the studies reviewed.

BP – N 07

Characteristics of Elderly Patients Receiving Care Coordination: The Role of Telephonic Review and Home Visit

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Background: Care coordination is an important aspect of nursing care especially for elderly patients admitted to an acute care setting. In Singapore, care coordination and transitional care nursing is a new concept of care nevertheless important but unexplored. The objective of this paper is to explore the characteristics of elderly patients receiving care coordination, determine care gaps and intervention during home visit and telephonic review

Methods: A designed questionnaire was used to collect information on the patient's demography, social and clinical profile and determine post discharge activities using Eric Coleman's 4 pillars tool. A pilot study of 10 questionnaires was conducted. The retrospective data

from the patient's index admission from the last 6 months (November '08 to April '09) were analysed using SPSS version 16

Results: A total of 517 patients were recruited from October 2008 to March 2009. Majority (69%) were above 70 years old [57% female and 76% lived with their children]. Clinical information demonstrates that 53% had 3 to 6 co-morbidities and 58% were taking more than 5 medications. The abbreviated mental test score was 6.2, 6% were depressed and delirium was present in 14% of patients. Only 65 patients (0.1%) had home visits and telephone review done whilst 97% of the remaining had only telephone review done. Those who had both telephone and home visit review, medications advice and compliance were checked only in 0.8% (at 1 week) and 1.6% (at 1 month) whilst during home visit this was done in 12.2% of patients as medication discrepancy were apparent at home. As for appointment compliance and compilation were done in 0.8% at 1 week and 51% at 4 weeks of telephone review compared to during home visit only 4.8%. Caregivers education was emphasised in 14% of patients at home visit, 2% at 1 week and 4% at 1 month of telephone review.

Discussion & Conclusion: The results showed that home visit is effective in exploring medication compliance, advice and emphasising caregiver education, managing appointments can be effectively done through telephone review. This study demonstrate the vital role of home visit for elderly patient to safely transit between hospital to home.

BP – N 08

Nurses Perception of the Benefits of Patient Education

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Background: Patient education (PE) is one of the core responsibilities of the nurses. The nursing shortage and healthcare resources constraint have increased the challenge for nurses to cope with patient/family expectations. The organisation needs to discharge patients quicker to optimise bed utilisation. Thus it is crucial that nurses actively participate in patient education to help patient/family understand their condition and make decisions for self-directed care. The purpose of the study is to follow up on the 2004 study, with the aim to promote, encourage and empower nurses to practice patient education by exploring ways to overcome barriers.

Methods: Questions drawn from literature reviews were added to questions used in the 2004 study. Convenience sample of 500 nurses from different disciplines participated.

Results: Findings on participants' perception on benefits of patient education are as follows: The response rate was 93.6%. All participants rated patient education as important, and 97.4% agreed that health education is helpful to patients. A total of 97.6% agreed that PE is part of the nursing role and 83.2% of them were prepared to provide PE. Of the participants, 91.9% felt that protected time will encourage participation in PE. The barriers in patient education were lack of communication skills (26%), knowledge (24.1%), teaching tools (16.2%), training (15.9%), time (17.8%) and distractions of other work. Patient factors that hinder effective education were language barrier (17.7%), emotional barriers (42.6), low education level (14.1%), beliefs (13.9%) and pain (11.7%)

Conclusion: Participation in patient education improved from 42.5% to 56.8% compared to 2004. More nurses are taking on the role in health teaching and will actively participate if protected time and training is provided.

BP – N 09

Severity of Neuropsychiatric Symptoms and Related Caregiver Distress, and Not Caregiver Knowledge Contribute to Caregiver Burden in Mild to Moderate Dementia Patients Attending a Tertiary Memory Clinic: An Asian Experience

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Background: Caregivers of dementia patients often experience high stress levels and caregiver burden especially if there are attendant behavioural problems. The stress of caregiving may also be related to caregiver knowledge of the disease process and coping strategies. In this study we wanted to find out whether caregiver knowledge, neuropsychiatric symptoms and caregiver distress contributed to caregiver burden in dementia patients.

Methods: We recruited consecutive newly diagnosed dementia patients attending a tertiary Memory Clinic. The caregivers had to spend minimum of 15 caregiving hours/week. Caregiver demographics were captured. We administered a caregiver knowledge questionnaire, the Neuropsychiatric Inventory Questionnaire (NPI-Q) and Zarit Burden Interview (ZBI) to caregivers. Descriptive analysis was performed and associations between neuropsychiatric symptoms, ZBI score and caregiver knowledge scores studied using Pearson correlation.

Results: Thirty-three patient-caregiver dyads were studied. Patients had mainly mild (39.4%) and moderate (60.6%) dementia. Majority of caregivers interviewed were the main carer (87.9%) living with the patient (84.8%). Most caregivers spent 58.09 hours/week in caregiving. The total knowledge score was 69.57% (± 11.34). The mean ZBI score was 24.55 (± 12.22). The common neuropsychiatric symptoms reported were apathy (45.5%), depression (36.4%), irritability/liability (36.4%), disinhibition (30.3%) and aberrant motor behaviour (30.3%), of which aberrant motor behaviour had the highest symptom severity. Disinhibition caused the most caregiver distress. Significant correlations were found between ZBI score and NPI total caregiver distress score ($r = 0.55$, $P < 0.05$) and ZBI score and NPI total severity score ($r = 0.42$, $P < 0.01$).

Discussion: Our study showed that the common neuropsychiatric symptoms in mild to moderate dementia outpatients were apathy, depression, irritability/liability, disinhibition, and aberrant motor symptoms. Disinhibition caused the most caregiver distress. Caregiver burden was related to severity of the neuropsychiatric symptoms and resultant caregiver distress, evidencing need for good behaviour management.

BP – N 10

NUH In-patient Education for Chronic Disease Management Programme – Collaboration for Optimised Patient Outcome

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Background: NUH In-Patient Education for Chronic Disease Management Programme is a 4-year collaborative project with the Health Promotion Board that commenced on 1 August 2008. The programme aims to integrate self-management of chronic diseases into the existing clinical management of in-patients. It equips individuals with chronic diseases (e.g. Diabetes, Hypertension, Hyperlipidaemia) with skills to control and better manage their conditions. It also aims to educate them on the importance of healthy eating, regular physical

activity and smoking cessation, thus empowering them to manage and take charge of their conditions, which can help to prevent long-term complications and hospitalisation.

Methods: Patients are screened according to selection criteria. Identified patients received standardised education in the ward and telephonic follow-up on the 1st, 3rd, 6th and 12th months after discharge to check on their adherence to medication, medical follow-up, and lifestyle changes. Patients' personal health control targets (HbA1c, cholesterol level, and blood pressure) were monitored in the 6th and 12th months.

Results: In the first 8 months, 1607 patients received in-patient education. Of whom, 61% were in their 60s and 70s. The ratio of male to female was 1:1. The prevalence of hypertension, diabetes and hyperlipidaemia were 45%, 24% and 31%, respectively. At sixth month monitoring, the personal health targets achievements for patients with hypertension, diabetes and hyperlipidaemia were 92%, 81% and 76%, respectively.

Discussion & Conclusion: These preliminary findings suggest optimised patient outcome is achievable when patients are enrolled early to receive health education and take an active role in managing their own health.

BP – N 11

Twelve Months' Retrospective Study of Viruses and Infection Prevention in Alexandra Hospital Carried Out by the Infection Control Team (ICT)

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Background: Viruses are important source of nosocomial pathogens because they can easily spread through faeco-oral route, airborne or direct contact as well as through needle stick injuries. The ICT retrieves data on virus notifications including needle stick injuries over the past 12 months. The corresponding works carried out by the ICT are also reviewed.

Methods: Cumulative data is collected using an excel spreadsheet and it captures the incidences and trends of viral infections based on alert reports. Policies and processes have also been developed to handle these infection events, with ongoing education of 'link nurses' to facilitate their implementation.

Results: Viral infections found in the past 12 months are reported below. *April 2008:* 15 cases of pneumonia in foreign workers were due to Influenza A and/or B with bacterial secondary infections. *May 2008:* 15 cases in a cluster were admitted from IMH with viral fever. *October 2008:* 14 cases of Hand Foot Mouth Disease (HFMD) occurred in a Childcare Centre. *November 2008 and January 2009:* 10 healthcare workers contracted chickenpox through close contact with colleagues. *December 2008:* 18 cases of dengue fever cluster; Ward 7 cluster of nurses with syndromes of respiratory viruses resulting in hospitalisations, and sick leave. There were 37 cases of chikungunya and 47 cases of needle stick injuries in 2008. Eight of these injuries were in contact with high risk cases of hepatitis and 3 with HIV infection. The compliance with standard precautions can be further improved for many of these viral outbreaks and needles stick injuries.

Conclusion: The ICT has to work closely with their colleagues to manage these viral transmissions and infections. A greater awareness about contagious viruses will avert serious sequelae to the index patient as well as the inevitable nosocomial transmission to others in the vicinity. The year 2008 was very eventful for viruses,

but more viruses may surface in 2009 with higher level of suspicion and improved laboratory support in detection.

BP – N 12

Outcome of Gastrointestinal Surgery Using Clinical Carepath

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Background: We review the outcome of gastrointestinal surgery using Carepath Protocol over 3 years in Department of Surgery.

Methods: A standardised colorectal, biliary and gastrectomy pathway protocol was developed by Carepath Committee. The protocol details the fluid management, medication, physiotherapy, nutrition, surgical drains & tubes management, laboratory investigations, discharge planning and patient & family education. Prospective data from January 2006 to December 2008 on patient length of stay (LOS), morbidity rate, mortality rate and readmission were analysed.

Results: Over 3 years, colorectal, biliary and gastric operation carepath were used in 1019, 263, and 154 patients, respectively. Using the protocol, 75.5%, 84% and 57% of the patients' LOS met the benchmark, respectively. The mean morbidity and mortality rates were 26.3% and 2.2% for colorectal operation; 13.6% and 0% for biliary operation; and 34.4% and 3.2% for gastric operation, respectively. The readmission rates were 9%, 11.2% and 6.7%, respectively. The year-on-year improvement for colorectal operation was 7% reduction in LOS and 9% in morbidity. As for biliary operation, the LOS and morbidity decreased by 8% and 9% respectively while the readmission rate reduced by 8%. Although gastric operation reported 11% drop in LOS not meeting the benchmark, morbidity and mortality rates reduced by 9% and 1.5%, respectively.

Conclusion: Overall, pathway protocol has a positive impact on the post-operative care. It reduces LOS, morbidity and mortality rate of colorectal and biliary operations. Although LOS increased in gastric operation, the overall morbidity and mortality rates improved. The protocol ensures an efficient and consistent post-operation care and thus minimising complications and discharging patients early.

BP – N 13

The Prevalence of Geriatric Syndromes and the Risk of Vulnerability in Elders Staying in One-room Flats in Singapore

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Background: The primary objective is to estimate the prevalence of vulnerability amongst a sample of elderly residing in 1-2 room flat using the Vulnerable Elders Survey (VES-13). The secondary aim was to estimate the prevalence of geriatric syndromes and healthcare barriers in this group of elderly.

Methods: We surveyed the elderly staying in a block of 1-room flats in Toa Payoh. Residents aged 65 years and above, who were cognitively intact and with intact communication abilities, were included. Those with mental disorders and were uncommunicative were excluded. Data captured included demographics, and the Vulnerable Elders Survey (VES-13) which is a 13-item self-report questionnaire. Scoring more than 3 puts one at increased risk of hospitalisation or institutionalisation. We also performed a screening questionnaire for geriatric syndromes, healthcare services utilisation and barriers to healthcare use.

Results: There were 170 eligible residents, of which 99 completed the interview. Of them, 51% were females, and they were predominantly between 65 and 75 years old. A total of 54.6% of residents had a VES-13 score of 3 and above. Of the residents, 62.7% had 2 or more geriatric syndromes. The most prevalent geriatric syndromes were visual impairment (50.5%), memory impairment (44.4%), hearing impairment (30.3%), depression (24.4%) and falls risk (23.2%).

Conclusion: Despite being apparently healthy, these groups of elderly have a high prevalence of geriatric syndromes and were vulnerable to adverse events.

BP – N 14

ACPIPA Approach to Post-opportunistic Health Screening Fasting Glucose Defaulters

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Background/Hypothesis: Opportunistic Health Screening (OHS) is a service provided to detect medical conditions such as diabetes, hypertension, heart disease and so forth. Between October and December 2007, the average percentage of patients who required but defaulted follow-up fasting venous blood glucose test following OHS was 57%. Of those who returned, 23% were diagnosed to have diabetes. Hence, great effort must be made to ensure that this group of individuals who are 40 years of age are followed up, diagnosed and managed appropriately to prevent complications. The project aimed to reduce the percentage of defaulters among patients requiring fasting venous blood glucose after OHS, from 57% to 10% in Yishun Polyclinic within 6 months.

Methods: A telephone survey and root cause analysis were conducted to find out why patients did not return for a fasting venous glucose test as advised. Both findings from the survey and root cause analysis were compared and similarities were found among the causes. The following interventions were implemented: (1) attaching a reminder slip onto laboratory form indicating expected date of test, (2) riding on the revised follow-up recommendations post-OHS and asking patients to have their test on same day (fasted) or 1-2 weeks later (random or fasted), (3) standardising OHS counselling by using a structured health counseling script, and (4) reiterating the importance of repeat blood test based on the structured health counselling.

Results: After 3 PDSA cycles, the defaulter rates showed a significant decline from the average of 57% to 28.4%.

Discussion & Conclusion: There is a decline in the defaulter rate although the project did not achieve its reduction target of 10%. Considerations are required when advocating the timeframe for patients to return for recommended investigations. There is a need for periodic review on how patients are counselled and how instructions are communicated when they are required to return for further investigations.

BP – N 15

Oral Hygiene for Critically Ill Patients: A Survey

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Background/Hypothesis: Oral hygiene among critically ill patients has a positive impact on their clinical outcomes. Despite this, it is frequently relegated a low priority when caring for these patients. We conducted a survey to determine nurses' attitudes, knowledge

and practice on oral care for the critically ill.

Methods: We developed a 31-item questionnaire based on the literature, existing questionnaires and feedback from the nurses. The questionnaire included open and close-ended questions as well as case scenarios. We administered the survey to all nurses working in the intensive cares and high dependency units. We analysed data using descriptive statistics. Differences among groups based on the type of ward and nursing education were analysed with chi-square. Statistical significance was set at $\alpha \leq 0.05$.

Results: A total of 244 nurses participated in the survey. Almost all respondents perceived oral hygiene as a high priority for mechanically-ventilated patients. The majority stated that cleaning the oral cavity was difficult, although few found it to be unpleasant. Comprehensive assessment of the mouth was rarely done. Some nurses lack the knowledge of appropriate oral care tools to use. Of the participants, 80% needed more information on research-proven oral care standards and wanted training. Interestingly, significantly fewer nurses from the surgical intensive care are satisfied with their care.

Discussion & Conclusion: Oral hygiene is a fundamental nursing practice. Undertaking this practice in the intensive cares, however, can be challenging. To achieve optimal oral hygiene for the critically ill patients, we need to address these challenges. Specifically, the study emphasised the need for ongoing research and specific training for nurses who care for this group of patients with special needs.

BP – N 16

A Randomised Control Trial on Use of Text Messaging to Improve Asthma Control: A Pilot Study of Short Messaging Service (SMS)

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Background: Singapore has good accessibility to technology like hand phones. We explored the use of an SMS system as a means of an alternative to traditional telephone calls. The primary objective was to evaluate the feasibility of using SMS. The secondary objectives were to evaluate patient compliance with SMS monitoring, to compare clinical outcomes.

Methods: All consecutive patients admitted for asthma from August 2007 to June 2008 were screened using inclusion and exclusion criteria. Patients were randomised into a control and an intervention group. Patients in the intervention group received SMS messaging system following a structured workflow while patients in the control group had no SMS support.

Results: Four hundred and ninety-seven patients were screened, and 377 (76%) subjects were excluded from the study. The demographic analysis revealed age and race difference ($P < 0.001$) to be deemed to be pertinent for successful implementation of the SMS service. The mean response rate per patient was 81.7%. There was improvement in the ACT scores to greater than 20 in 36 (62.1%) subjects in the intervention group ($P = 0.113$), reduction in number of nebulisations in 54 (94.4%) subjects in the control group ($P = 0.053$) and reduction in ED visit in 57 (95%) subjects in the control group ($P = 0.063$). However subjects in both groups did not show reduction in admission rates ($P = 0.5$).

Conclusion: The results suggest that the SMS service may not be suitable for certain types of patients. We believe that SMS monitoring may be more effective than the conventional nurse telephone call.

BP – N 17

Comparison of 3 Different Modes of Teaching Enrolled Nurses about Asthma Management at Tan Tock Seng Hospital

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Background: At TTSH the nurse clinician and educators created their first online asthma management program for in-house education to enrolled nurses. The aim was to measure the effectiveness of Traditional Class room lecture (TCL), E-learning (EL) and combination of E-learning and traditional class room lectures (EL + TCL of an asthma program for enrolled nurses.

Methods: Enrolled nurses (EN) were enrolled for the asthma management course through their learning need analysis. The subjects were recruited over a period from October 2007 to January 2009 and assigned to a mode of teaching by the nurse clinician. The enrolled nurses were not aware of the mode of teaching till the day of the course. Subjects were assessed on asthma knowledge prior to, post-teaching and at 3 months post-teaching using 20-item questionnaire.

Results: One hundred and sixty-two enrolled nurses were recruited, 59 were assigned to TCL, 55 to EL and 48 to combination of EL+TCL. A total of 145 (89.6%) completed the 3-month follow-up study. There was a significant difference in the mean score for pre- and 3-month post-knowledge assessment for all 3 modes of teaching $P < 0.001$. A total of 86 (53.1%) subjects stated they had used e-learning for training prior to this class and 101 (99%) subjects assigned to combination and EL stated that the computer was easy to use. However, only 36 (22.2%) subjects would like to choose asthma management course using EL compared to 100 subjects (61.7%) preferring EL + TCL and 26 (16.1%) preferring TCL. Of the subjects, 156 (96.3%) stated that the training program was useful for caregivers and 138 (95.2%) were able to apply what they had learnt to the practice setting on 3-month follow-up.

Conclusion: The results indicated that there were no significant differences in retention of knowledge with the 3 modes of teaching. There seems to be an increase in preference for combination mode of teaching compared to TCL.

BP – N 18

Evaluation of Children with Rhabdomyosarcoma

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Background: The aim of this study is to evaluate demographic data, treatment and outcome, of children with rhabdomyosarcoma (RMS) in National University Hospital, Singapore.

Methods: A retrospective descriptive study was carried out, utilising data from patients' medical records.

Results: Eleven children (M:F 10:1) with a histopathological diagnosis of RMS, were evaluated between May 2002 and February 2009. The median age was 11.9 years (range, 0.9 to 17.1). Of the children, 5 were Chinese, 1 Malay, 2 Indians and 3 belonged to other races. Primary tumour site on presentation were 7 head and neck (1 parameningeal), 3 genitourinary (GU) tract, and 1 lumberspine. Metastasis to lung and bone marrow were seen in 2 children with primary tumour in GU and Lumberspine respectively. Pathologically 5 had the alveolar RMS, 6 were embryonal RMS. According to the Intergroup Rhabdomyosarcoma Study Group (IRSG) clinical grouping system: 1 was in group I, 2 in group II, 6 in group III, and 2 in group IV. According to the IRSG staging system: 5 were in stage I, 1 in stage II, 3 in stage III and 2 in stage IV. All 11 children received chemotherapy, 9 as per IRSG, 1 as per SIOP, and 1 with unknown protocol. Eight children received radiation therapy for local control whilst 7 children underwent surgery. Four children underwent both radiation therapy for local control and surgery. Medium follow-up was 3.2 years (range, 1.0 to 6.8). Ten are alive and 1 dead with disease. Out of the 10 children alive, 2 had evidence of disease, while 8 had no evidence of disease. One child with stage II, group II nasopharynx alveolar RMS relapsed locally at 0.5 years from end of completion of treatment. One patient with metastatic disease at diagnosis is still alive without disease at 2.7 years from diagnosis.

Conclusion: RMS of head and neck is presented at a younger age compared with RMS of other sites. In our experience, children with both intermediate and high risk RMS have good prognosis. However, due to our small cohort, further analysis and studies to improve outcome in these children is needed.

BP – PC 04

Health Practices and Language Proficiency of Medical Students in Singapore

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Background: The health practices and language proficiency of medical students (MS) are important because it may affect their patient counselling practices in future, especially in a multi-cultural society such as Singapore.

Objective: To assess MS of NUS on personal health related practices and self-reported language proficiency.

Methods: An anonymous self-administered questionnaire was completed by first and third year MS (n = 431) in the class of 2008 in YLL School of Medicine with a response rate of 88.6%.

Results: Almost all respondents (98.4%) reported never having smoked cigarettes. A total of 83.5% had drunk alcohol previously but most (57.3%) drank less than once a month. Compared to National Health Survey (NHS) in 2004, less than 1% of respondents were current smokers (NHS = 2.7%); 7.5% drank 1 to 4 times per week (NHS = 7.5%); 74.8% had healthy BMI range within 18.5 to 24.9 kg/m² (NHS = 59.7%); more respondents (30.2%) exercised 3 times or more per week (NHS = 24.9%). Of the respondents, 51% exercised 1-2 times per week. Respondents reported a median sleep duration of 6 hours on a normal school day (compared to 6.5 hours in another study conducted in 2004). Besides English, 65.2% of respondents are confident in using 1 of the other 3 official languages (Mandarin, Malay and Tamil) to interact with patients in future and about half (47.1%) can speak at least 1 other local Chinese dialect.

Conclusion: MS in Singapore have reported good health practices. However, about one-third were not confident of using other languages to communicate. Increasing language proficiency of MS should be considered in the medical curriculum.

BP – PC 05

Prevalence of Vascular Complications in Type 2 Diabetic Patients At Public Primary Care Clinics in Singapore

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Background/Hypothesis: Coronary artery disease (CAD), stroke and nephropathy are preventable complications of Type 2 diabetes mellitus (T2DM). This paper studies the prevalence rates of these complications in T2DM patients attending public primary care clinics.

Methods: We conducted a cross-sectional study using data from the NHG Diabetes Registry (CDMS). The prevalence rates of CAD, stroke and nephropathy (glomerular filtration rate <60 mL/min/1.73m²) of all T2DM patients attending the 9 NHG Polyclinics (NHGP) in January 2009 were compared by age groups, gender and ethnicity.

Results: There were 18,118 T2DM patients. The prevalence rates of CAD, stroke and nephropathy were 18%, 9% and 19% respectively. Overall, 35% of patients had at least 1 condition with prevalence increasing with age from 4.3% (<35 years) to 68.4% (85+ years). With each additional year, the odds of having a complication increased by

7.4% (95% CI, 7.1-7.8%). The prevalence rates of CAD and stroke were higher in males than females (21% vs 15%; 9% vs 8% respectively) while nephropathy prevalence was higher in females than males (20% vs 17%). The prevalence of these complications differed amongst the ethnic groups with highest prevalence of CAD in Indians (22%), stroke in Chinese (10%) and nephropathy in Malays (23%).

Discussion & Conclusion: The prevalence rates of CAD, stroke and nephropathy in T2DM patients differed with ethnicity and increased with age. Screening for vascular risk factors early and optimising the management of diabetes especially in younger diabetics may reduce the development of these complications and reduce the morbidity associated with these complications.

BP – PC 06

Attitudes toward Preventive Health among Medical Students in Singapore – Have We Made the Difference?

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Background: Healthcare providers need positive attitudes toward preventive health to achieve national healthcare goals. Studies on attitudes of medical students toward preventive health are limited in Singapore.

Objective: To compare attitudes toward preventive health between first- (Y1MS) and third-year medical students (Y3MS) in YLL School of Medicine Singapore.

Methods: Data were obtained from an anonymous self-administered questionnaire of Y1MS and Y3MS, assessing attitudes toward preventive health using a 6-point Likert-Scale. Y1MS had just started university 3 months before, with minimal clinical exposure. Y3MS had experienced both hospital-based teaching and a community-based posting.

Results: More Y1MS agreed that disease prevention is the responsibility of MOH/HPB rather than individual doctors (46.9% vs 19.4%, $P < 0.001$) and also felt that housing (19.6% vs 8.8%, $P = 0.001$) and education status (8.4% vs 2.4%, $P < 0.05$) have an impact on patient's health. However, more Y1MS disagreed that doctors need more training on skills to get their patients to adopt healthier lifestyle behaviour (25.3% vs 14.7%, $P < 0.05$). More Y3MS disagreed that there is an insufficient teaching of preventive health issues (38.2% vs 11.1%, $P < 0.001$). Both groups agreed that a family physician's major responsibility is to counsel patients on preventive health (99%), more resources should be spent on health promotion (88.9%) and it is useful for doctors to persuade patients to adopt a healthier lifestyle (85%).

Conclusion: Y3MS generally demonstrated more positive attitudes toward preventive health. This could be attributed to a greater exposure to community-based teaching.

BP – PC 07

Assessment of Diabetes Mellitus Status in Singaporean Patients

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Background: The DIMES Project is an ongoing collaborative

study with School of Computing, National University of Singapore. Semantic understanding of diabetes mellitus using ontologies text field of diabetes patient's check-up records at NUH during 2005-2008 were assessed.

Methods: Each patient from 76718 records was assigned a unique number in encryption java program. Microsoft Excel and SPSS 16.0 were used for cleaning and statistical analysis. DSRB approved the database use. Assessment using Descriptive Modelling on diabetes parameters and Predictive Modelling is based on the first visit at NUH and analysis on changes over the subsequent visits of 193 patients extracted from Medical-Record-Office.

Results: Descriptive Modeling results (mean \pm Sd): fasting glucose = 9.8 ± 3.2 mmol/L (n = 8208); HbA1c = $8.2 \pm 1.9\%$ (n = 2925); LDL-cholesterol = 3.2 ± 1.0 mmol/L (n = 5332); HDL-cholesterol = 1.2 ± 0.3 mmol/L (n = 5563); total cholesterol = 5.2 ± 1.3 mmol/L (n = 5652); and triglycerides 1.9 ± 1.4 mmol/L (n = 5648). Diabetes ethnicity composition is Chinese:Malay:Indian = 66%:19%:15% with male:female ratio = 1.2:1 and majority aged 40-60 years old. For Predictive Modelling significant findings, monthly change rate of fasting plasma glucose and HbA1c related that with positive monthly change rate of systolic blood pressure, smoking behaviour correlated with the progression of HbA1c and LDL-cholesterol, and parameters e.g. older age, family history and ethnicity (Malay female had higher monthly change rate of HbA1c compared to reference group - Chinese Male) resulted in higher increase in monthly change rate of fasting plasma glucose and HbA1c.

Conclusion: Descriptive Modelling assesses the current diabetic Singaporeans' status and predictive Modelling predicts a patient's future progression of diabetes conditions (as shown by monthly change rate of fasting plasma glucose, HbA1c and LDL-cholesterol). Similar to the UKPDS finding, tighter control on the systolic blood pressure will result in decreasing monthly change rate of fasting plasma glucose and HbA1c.

BP – PC 08

To Investigate the Prevalence of Endometrial Cells If Pap Smears are Done Out of the Day 10-20 Period

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Background/Hypothesis: At NHG Polyclinics, patients have their Pap smears done between Day10-20 from the start of their menses. This is to minimise the chance of finding endometrial cells which may complicate reporting and management (the presence of benign endometrial glandular cells on cervical screening tests may reflect physiologic shedding or shedding in response to a pathological process). The aim is to investigate if Pap smears done out of this period increase the prevalence of endometrial cells detected.

Methods: The study was conducted in Jurong Polyclinic from 2 January 2009 to 31 March 2009. Pap smears were done as long as patients were not having their menses. The number of Pap smears done, menstrual status, date of last menses and number of smears with endometrial cells, were captured. The results were analysed using Microsoft Excel & SPSS.

Results: During these 3 months, 555 Pap smears were done. In 321 cases (58%), the last menstrual period (LMP) was known. i.e. patients were able to calculate when the D10-20 day of menses were. The LMP was unknown in the other 42% (e.g. menopause, irregular menses, etc.). Seven (1.3%) of the smears had endometrial cells in the report.

Discussion: This D10-20 rule was not relevant in 42% of the patients since they had either attained menopause or had irregular menses. Only 1.3% of the smears had endometrial cells. The prevalence of endometrial cells was 1.7% and 2.4% in those done within the D10-20 period and out of the D10-20 period respectively. The difference between the prevalence in these 2 groups was not significant ($P = 0.651$).

Conclusion: Doing Pap smears out of the D10-20 period does not increase the prevalence of endometrial cells detected.

BP – QHSR 04

A Simulation Analysis of Satellite Pharmacy Setup in Tan Tock Seng Hospital

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Background: Tan Tock Seng Hospital planned to set up a satellite pharmacy on each level of specialist outpatient clinics to better serve its patients. The aim of this study is to evaluate the impact, through simulation, various scenarios of satellite pharmacy setup on patient waiting time and manpower requirements to aid in the planning.

Methods: Discrete event simulation models were constructed using Simul8 2008 to simulate various scenarios: pack at centralised pharmacy vs pack at satellite pharmacy, pack upon confirmation versus pre-pack before confirmation. Data collected to input into the model include daily prescription load; time of receiving prescriptions, confirmation, picking and packing, checking, dispensing, billing; timing of pneumatic tube system; and rework rate. Different manpower configurations were tested to ensure that the 95th percentile patient waiting time was within 15 minutes.

Results: Simulation results show that in the scenarios of packing at centralised pharmacy versus packing at satellite pharmacy, additional staff needed in the satellite pharmacy in order to meet the target waiting time will be 3 versus 5. Pre-packing significantly reduces the average patient waiting time but increases rework rate. Sensitivity analysis shows that pre-packing performs better when rework rate is less than 25%. The 95th percentile patient waiting time increases significantly when rework rate is high.

Discussion & Conclusion: More manpower is needed in satellite pharmacy if the same level of patient waiting time under status quo is desired. Pre-packing is suggested to streamline the process only if the rework rate is relatively low.

BP – QHSR 05

Combination Strategies for Influenza Pandemic Preparedness and Response

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Background: Individual strategies in pandemic preparedness plans may not be effective in reducing the pandemic's impact. It is therefore important to examine the usefulness of combination strategies to increase the effectiveness of preparedness programs.

Methods: We explored available modelling publications through PubMed searches using the search terms ("influenza", "pandemic", "preparedness", "pandemic", "strateg*", "modeling" or "modelling") from 1990 to April 2009. Inclusion criteria were modelling papers that showed the quantitative effectiveness of combination strategies including pharmaceutical and non-pharmaceutical strategies.

Results: Nine modelling papers on combination strategies were selected. Two studies suggested a high probability of success for rapid containment of an influenza epicentre if combination strategies are used under favourable conditions. During the pandemic itself, several studies found that combination strategies delayed the virus' spread, reduced overall number of cases, and delayed and reduced peak attack rate more than individual strategies which may

be ineffective. However, the effectiveness of combination strategies is highly dependent on the virus' reproductive number. Global cooperative strategies, including redistribution of limited resources such as anti-virals, are also effective in reducing the global impact and attack rates.

Discussion: Combination strategies increase the effectiveness of individual strategies, guard against individual failures, and reduce socio-economic impact. They should include pharmaceutical interventions (anti-viral agents, antibiotics, and vaccination against influenza and bacterial infections) and non-pharmaceutical interventions (personal hygiene measures, social distancing, and travel restrictions). It is important to determine their effectiveness and feasibility through local epidemiological and modelling studies.

BP – QHSR 06

The National Healthcare Group Diabetes Registry – Stock-Taking Type 2 Diabetes Mellitus

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Background: The National Healthcare Group (NHG) developed a Diabetes Registry in 2006 to improve its quality of care.

Aim: To describe the characteristics of type 2 diabetes in NHG, prevalence of concomitant diabetes-related comorbidities and complications, drug treatment and glycaemic control.

Methods: Diabetes patients with encounters in NHG from 2005 were identified using a surveillance system applied to various application systems (administrative, financial, laboratory, pharmacy) across all disciplines and all NHG institutions. Data extracted for analysis included demographics (age, gender and ethnic group), diabetes-related comorbidities and complications, most recent anti-hyperglycaemic agents dispensed, and glycaemic control using the most recent glycated haemoglobin (HbA1c) measurement.

Results: For the period of 2005 to 2008, the registry grew 32% from 129,183 patients to 170,513 patients; and the proportion of males and patients aged 75 years and above increased steadily. In 2008, over 95% of type 2 patients had at least 1 diabetes-related comorbid condition. The rate of diabetes-related complications also showed an increasing trend during the period, led principally by renal and cardiovascular complications. Among patients on pharmacotherapy, majority were on oral anti-hyperglycaemic agents; however, the rate of insulin treatment has been increasing progressively. Overall glycaemic control has improved during the period, with better glycaemic control with increasing age.

Conclusion: This is the first cluster-wide attempt at stock-taking diabetes in Singapore. The registry goes beyond its original goal of data integration, decision support, audit, data access at the point of care, to provide critical 'evidence' for planning and funding at the national and cluster levels.

BP – QHSR 07

Improving Gout Care: A Clinical Practice Improvement Project

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Background: Poor clinical outcomes in gout are not uncommon. We piloted a project to improve gout care based on data from 30 patients (2005-2007) showing suboptimal results in lowering serum uric acid (SUA) to 360µmol/L (target).

Aim: To reduce SUA to target in patients with normal renal function or by 30% baseline in chronic kidney disease (CKD) [calculated glomerular filtration rate GFR ≤ 60 ml/min] within 6 months, if allopurinol was indicated.

Methods: Two focus group discussions identified poor understanding of gout and treatment variation as the main causes of failure in managing gout. A nurse clinician provided patient education highlighting lifestyle, diet and gout management. Risk factors and comorbidities were addressed. An algorithm was devised to guide diagnosis and management.

Results: The total number of enrolled patients was 116. Allopurinol commenced or increased in 94, and 51 had 1 SUA post allopurinol initiation/dose increment (SUA_i). Patient demographics were as follows: age, mean 57 years, 86% male; 60% Chinese, 40% Malay. Comorbidities: CKD 60.7%, diabetes mellitus 29.4%, hypertension 68.6%, hyperlipidemia 56.8%, stroke 11.7% and coronary artery disease 21.6%. Baseline SUA $\mu\text{mol/L}$, mean \pm SD 562 ± 107 and SUA_i $\mu\text{mol/L}$, mean \pm SD 447 ± 61 . Allopurinol therapy duration at SUA_i, mean \pm SD 70 ± 51 days. There was 23.1% SUA change in CKD versus 16.9% in normal renal function. A total of 25.5% achieved the target.

Conclusion: Although Stage 3/4 CKD (60%) complicated gout management, SUA was lowered by 20% over 2.3 months in all patients with 25% achieving target, comparable with randomised controlled study. SUA was lowered to a similar extent in CKD patients without increase in adverse events.

BP – QHSR 08

Are Provisional On-call Scan Reports Given by Radiology Trainees Accurate?

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Background/Hypothesis: Scans (CT, MRI, Ultrasound, and Fluoroscopy) performed after office hours are currently provisionally interpreted by advanced radiology trainees (senior medical officers and registrars) on site and reviewed by a consultant radiologist the following morning except in situations where there is uncertainty in diagnosis requiring urgent consultant review. This project studies the accuracy of these provisional reports.

Methods: The reviewing consultant reads all on-call scans and provisional reports. Any major discrepancy between the consultant's opinion and the provisional report is recorded. Major discrepancies are missed or misinterpreted findings that alter patient management. The discrepancies are analysed and discussed during monthly meetings for educational purposes. Analyses of discrepancy rates are separately performed for trainees based on their year of training. Each new intake of trainees is also given a series of "survival" lectures targeting problems they are likely to encounter while reporting on-call studies.

Results: Results for the first 13 months show 28 situations with major discrepancy in 5343 studies (0.52%). This includes 8/1346 (0.59%) for second-year medical officers, 13/1393 (0.93%) for third-year medical officers and 7/2604 (0.27%) for registrars (fourth and fifth year trainees who have obtained a recognised post-graduate qualification in radiology).

Discussion & Conclusion: Our trainees are able to provide provisional on-call scan reports with 99.5% accuracy. The results surpass internationally published data with discrepancy rates from 1% to

2%. We have therefore integrated this process into our department's routine workflow.

BP – QHSR 09

Factors Predicting Revisit at an Emergency Department (ED) within 7 Days and within 1 Year Following an Initial Visit

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Background: Emergency department (ED) visits are increasing in Singapore and revisits contribute a significant proportion of these visits. Understanding the causes and predicting ED revisits can help plan interventions to reduce them.

Aim: To identify significant factors on predicting ED revisits within 7 days and 1 year respectively and their importance on prediction.

Methods: Patients who visited the TTSH ED in year 2006 and with no ED visit in the preceding year, were followed up for 1 year. Data was extracted from administrative database, the EDWeb. Variables included were demographics and clinical characteristics of patients. Factors associated with revisits were identified using sequential logistic regression using SPSS v. 12.

Results: Out of 82,172 patients who visited ED, 5.5% re-visited the ED within 7 days, 25.2% revisited the ED within 1 year. Primary diagnosis and time of initial ED visit were most important predictors for revisits within 7 days, while age, primary diagnosis, nationality and disposition status were most important predictors for revisits within 1 year.

Conclusions: This study indicates the importance of factors on predicting short-term and long-term revisits and the differences between them. Interventions targeted for reducing revisits need to consider these differences.

BP – QHSR 10

Factors influencing Colonoscopic Caecal Intubation and Follow-up of Patients with Failed Caecal Intubation at a Tertiary Hospital in Singapore

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Background: Colonoscopy is the gold standard diagnostic and screening tool for colonic disease but caecal intubation is not achievable at all procedures. Although caecal intubation rates provide a quality indicator for the performance of colonoscopy, limited data are available from gastroenterology practices in Southeast Asia.

Methods: We aim to audit caecal intubation rates, identify the factors leading to failed caecal intubation and to follow-up patients who failed colonoscopic caecal intubation. All patients who underwent colonoscopy from 1st March 2007 to 29th February 2008 and failed caecal intubation were followed up.

Results: In a total of 2149 colonoscopies, 84.0% meet ASGE indication guidelines. Ninety-four colonoscopies failed to reach caecum (4.4%). The overall caecal intubation rate was 2055 (95.6%). The mean age of patients who had complete colonoscopy was 57.1 years compared to 64.5 years in patients with incomplete colonoscopy ($P < 0.05$). There were 94 colonoscopies examination which failed to reach caecum (4.4%). The reasons for caecal intubation failure were poor bowel preparation (35 patients, 37.2%), presence of

suspected stricture (20 patients, 21.3%), technical difficulty (16 patients, 17.0%), patient intolerance to pain (4 patients, 4.3%) and previous surgery (2 patients, 2.0%). No immediate major complications and death were encountered post colonoscopy examination. Of the 35 patients who had poor bowel preparation, 28 patients had repeated colonoscopies. A total of 24 patients (86%) had successful caecal intubation but 4 patients failed. Eleven had normal findings on colonoscopy, 4 patients were found with diverticulosis, 4 patients with colon polyps, 3 patients with haemorrhoids and 1 patient had confirmed colonic carcinoma. Of the 20 patients who had suspected strictures which resulted in failed caecal intubation, 7 (35%) underwent colonoscopy again and 3 patients had normal findings, 2 patients found with colon cancer, 1 patient had colon polyps, 1 patient has diverticulosis. 4 patients who did not repeat colonoscopy underwent CT abdomen which demonstrated colonic cancer. Of the 16 patients who failed caecal intubation due to technical difficulty, 13 patients (81.3%) were lost to follow-up. One patient underwent barium enema, which demonstrated diverticula. The 2 patients who repeated colonoscopies continue to have unsuccessful caecal intubation. Of the 4 patients who failed caecal intubation due to intolerance to the pain, 2 patients underwent repeat colonoscopy; 1 patient demonstrated confirmed colonic cancer and the other failed caecal intubation again.

Conclusion: Poor bowel preparation is a major factor for failed caecal intubation. Therefore, ensuring good bowel preparation will influence better caecal intubation rates. Patients who failed caecal intubation should repeat colonoscopic examination because there is still a high success rate and the possibility of significant findings (e.g. colon cancer). However, barium enema or CT colonography may be a reasonable alternative for patients who failed caecal intubation due to technical difficulties and pain intolerance.

BP – QHSR 11

Patient Containment in Designated Wards and Targeted Early Discharge – Revisiting Work Flows Leading to Improved Patient Care

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Background: Inpatient discharges are often delayed due to inefficient workflows, leading to non-availability of beds for new admissions during working hours with resultant late admissions and scatter of patients to non-designated wards.

Methods: In May 2008, a team of stakeholders reviewed the root causes for delayed emergency patient admissions and their scatter to numerous wards. A gap analysis facilitated the implementation of solutions including modified work flows, coordinated multidisciplinary rounds, early determination of estimated discharge dates and improved communication. A strategy for discharges before 12 noon was to allow new admission priority to target wards and the use of progress boards was proposed as a visual management tool.

Results: Prior to this project, just 6.6% of discharges occurred before 12 noon. By February 2009 the number was over 60%. This translated to an increase in patients admitted during working hours from 13% to 53%. Discipline containment within designated wards also significantly improved (from 50% to 90%) with reduced patient scatter across wards.

Conclusion: The results show that improved discharge processes can enable efficient care delivery to subsequent admissions with reduced waste, enhanced patient experience and improved staff satisfaction. It would be expected that more timely and right-sited inpatient care will result in improved patient safety. With a smooth discharge workflow, discipline containment within designated wards is possible, allowing best use of medical and nursing skill sets. The project will need to be continuously monitored to ensure that it is sustainable and becomes ingrained in the organisation's culture.

BP – QHSR 12

Factors Associated with Frequent Emergency Department Attendance at Tan Tock Seng Hospital

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Background: The aim is to determine factors associated with frequent emergency department (ED) attendance at Tan Tock Seng Hospital.

Methods: The study cohort comprised patients who attended ED from 1 January to 31 December 2006, without prior attendance in the preceding 12 months (index attendance), who were tracked for 12 months. Variables included in the analysis were age, gender, race, date and time of attendance, patient acuity category scale, mode of arrival, distance to ED and diagnosis based on ICD-9CM code. Frequent attenders were patients who attended the ED 5 times or more for any diagnosis within 12 months.

Results: There was a total of 82,172 patients in the study cohort, who accounted for a total of 117,868 visits within 12 months, of which 35,696 (30.3%) were repeat attendances. A total of 1,595 (1.9%) patients were frequent attenders responsible for 26.4% of all repeat attendances. Stepwise multivariate logistic regression found patients 75+ years, male, non-Chinese ethnic groups; Sunday and Monday, time of the attendance from 16 hours to midnight, distance to ED, COPD, heart failure and acute respiratory infections were significantly associated with frequent attendances.

Conclusion: With the aging population and their complex healthcare needs, the elderly patients with chronic medical conditions are expected to make up an increasing proportion of the workload of ED in the future. A systems approach and disease and case management programmes are interventions recommended to stem this.

BP – QHSR 13

Teaching of Geriatric Assessment Skills: The Case for Earlier Exposure

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Background: Currently, medical students undergo the geriatric medicine (GRM) rotation only in the final year of the undergraduate curriculum. We aim to ascertain the impact of a pilot module introduced to teach geriatric assessment skills to preclinical medical students.

Methods: Second-year medical students (n = 59) undergoing the Clinical Skills Foundation Course at Tan Tock Seng Hospital were taught communication skills, cognitive testing, functional assessment and measurement of postural blood pressure through a multi-modal teaching approach comprising an overview lecture, teaching video, bedside practicum and bedside test. We administered a 10-item questionnaire that examined self-reported perception of importance

and competence in the assessment skills on a 7-point Likert scale. We compared pre- and post-module results using student's t-test and Pearson's correlation.

Results: Factor analysis of the questionnaire yielded 3 factors: confidence, attitudes and communication (mean scores: 3.5 vs 6.3 vs 3.5 respectively). In the pre-module survey, there was a poor correlation between attitude and the domains of communication ($r = 0.02$, NS) and confidence ($r = 0.15$, NS). After undergoing the GRM module, there was an improvement in all 3 domains [Pre- vs post-results: Confidence: 3.5 vs 6.0; Attitude: 6.3 vs 6.7; Communication: 3.7 vs 4.6, all $P < .01$]. There was a statistically significant correlation between attitude with both confidence ($r = 0.36$) and attitude ($r = 0.24$). The students felt that the skills they acquired would be useful in future [mean score (SD): 6.4 (0.6)].

Conclusion: The introduction of a pilot GRM module to second year medical students was effective in addressing the discrepancy between attitudes with confidence and communication.

BP – QHSR 14

Validity of the Personality Diagnostic Questionnaire-4 (PDQ-4) among Mentally Ill Prison Inmates in Singapore

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Background/Hypothesis: We examined the validity of the Personality Diagnostic Questionnaire-4 (PDQ-4) as a screening instrument for personality disorder among mentally ill prison inmates in Singapore.

Methods: During the period from 2006 through 2008, a total of 313 prison inmates in Singapore completed the PDQ-4 and the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II). The subjects comprised 303 (96.8%) males and 10 (3.2%) females with a mean (SD) age of 40.7 (8.8) years.

Results: Diagnostic agreement between PDQ-4 and SCID-II for the presence or absence of personality disorder was fair ($\kappa = 0.43$). It has a sensitivity of 92% and specificity of 48.1%, respectively. For specific personality disorders and clusters, the specificities diagnoses generated by the PDQ-4 were greater than 0.70. Similarly, we found the PDQ-4 diagnosed more subjects as having each of the personality disorders than SCID-II, generated high negative predictive values and low positive predictive values.

Discussion & Conclusion: Our findings suggest that the PDQ-4 could be used as a potential screening instrument for the presence or absence of personality disorders in prison inmates.

BP – QHSR 15

To Reduce Default Rates at a Fast Track Asthma Clinic (FTC) in TTSH

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Background: The aim is to reduce the default rate of referrals from ED to the Fast Track asthma Clinic (FTC)* from the current 50% to less than 10% in 6 months.

Methods: FTC was initiated in 2004 for patients seen at ED with poor asthma control to be fast-tracked (expedited) to this clinic to stabilise and optimise asthma control quickly. At FTC patients are reviewed within 2 weeks instead of waiting for 4-7 weeks to be seen at respiratory specialist clinic. The mean default rate at the FTC was 50%. Using Clinical Practice Improvement methodology, we identified the main causes to be "patient forgets appointments", "patient doesn't call to cancel or change appointment" and "not being able to contact patient to confirm their attendance". We reinforced on updating telephone numbers at different contact points at ED. We called patients 1 day prior to their appointments to confirm show and arranged for call centre to contact patient that were not contactable during office hours.

Results: With these interventions, our default rates were below 10%. There were significant reduction in ED visit (1.23 to 0.41) and hospitalisation (0.27 to 0.04) 3 months prior to and post FTC visit ($P < 0.001$). However the gross cost incurred in ED visit (\$ 489 to \$1028) and hospitalisation (\$489.1 to \$1028.6) 3 months prior to and post-FTC was not significant ($P = 0.51$; $P = 0.25$).

Conclusion: Frequent communication and creating partnership with patients and providers are vital to reduce default rates and demonstrated improved outcomes for patients and the healthcare system.

BP – QHSR 16

Suboptimal Compliance with Surgical Site Infection Bundle

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Background: Evidence-based measures reduce surgical site infections: prophylactic antibiotic according to guideline, hair removal by clipping, avoidance of hypothermia (except cardiac surgery) and glycaemic control for diabetic patients.

Methods: Selected elective surgery was retrospectively audited from 1 January to 31 March 2008 for type, timing (within 1-2 hours of skin incision for vancomycin and ciprofloxacin, and 1 hour for other antibiotics) and duration of prophylactic antibiotic; hair removal; hypothermia ($<35.3^{\circ}\text{C}$ till 6 hours postoperatively); and glycaemia control (<4 mM or >11 mM till 48 hours postoperatively). Clinical surgical site infections (SSI) occurred with local inflammation and antibiotic use.

Results: Overall, 99 orthopaedic, 69 neurosurgical and 54 colorectal surgeries were audited. Antibiotic type was appropriate in 69% orthopaedic, 93% neurosurgical and 19% colorectal surgeries. Timing was correct in about 80% of all surgery. Prophylactic antibiotic was given beyond 24 hours in 85% orthopaedic, 16% neurosurgical and 46% colorectal surgeries; median duration of surgical drain was 2.8 days in hip and 3.1 days in knee surgery. Hypothermia occurred in 7% orthopaedic, 29% neurosurgical and 35% colorectal surgeries. Glycaemic control was achieved in 20% orthopaedic, 38% neurosurgical and 40% colorectal surgeries. Clinical SSI occurred in 11% of orthopaedic, 2% neurosurgical and 11% colorectal surgeries. Data on hair removal was unavailable.

Conclusion: Prophylactic antibiotic type and duration was inappropriate in orthopaedic and colorectal surgery, and other effective preventive measures of SSI were not well-adopted.

All authors have no conflict of interest to declare.

BP – QHSR 17

To Determine the Relation of Back Muscle Strength and Scapula Position with the Rate of Depression in 15- to 18-year-old Kyphotic Girls in High Schools of Iran

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Background/Hypothesis: The purpose of this research was to determine the relation between back muscle strength and scapula position with the rate of depression in 15-18-year-old kyphotic girls. So, 150 kyphotic girls selected who were studying in high schools in Iran in the years 2008 to 2009. The researcher wanted to determine whether there was any relation between the back muscle strength and scapula situation with the rate of depression in 15-18-year-old kyphotic girls.

Hypothesis: There is a significant relation between back muscles strength and the level of depression. There is a significant relation between scapula space and the level of depression.

There is a significant relation between upward rotation of the scapula and the level of depression. There is a significant relation between angle of scapulas' upward rotation and the level of depression.

Methods: The research method was a case study and the researcher collected the data from students in a high school's sport complex in 1 week. Random cluster sampling was the method for choosing the sample size. Firstly, the rate of kyphosis was measured with specific tools. A dynamometer to measure the back muscles strength, and a standard ruler was used to measure the scapula space to the vertebra column. The upward rotation of scapula was measured with a goniometer. Finally the researcher gave the Aaron Beck standard questionnaire to the students in order to determine the level of their depression. In addition to descriptive statistic such as frequency, frequency percentage, tables and charts, the researcher also used Pearson's correlation coefficient to find out the relation between body posture and depression variables.

Results: There was depression in 81% of kyphotic girls, and 8% had severe depression. The significance test showed that there was no positive correlation between the back muscle strength, scapula space to vertebra column, upward rotation and angle of upward rotation, and depression.

Discussion & Conclusion: As 81% of kyphotic girls were depressed in this age group it seems that paying attention to their body posture and their daily standard of living can be effective for their health. Also, different opinions about the relation between back muscle strength and scapula position, or the lack of relation can have many reasons like age, gender of samples, race, economical and social situation, level of education, having chronic disease and mental health of parents and family. Therefore, the level of both physical and mental health should be promoted in order to provide the best lifestyle for people. Further research for the measuring of depression in schools, universities, and health clubs, and more advanced instruments are needed to find out more about the relation between mental and physical health, particularly depression and kyphosis.

BP – QHSR 18

Diagnostic Methods for Vancomycin-resistant Enterococci Identification

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Background/Hypothesis: Vancomycin-resistant enterococci (VRE) are epidemiology highlighted organisms in hospitals. Separating *E. faecium* and *E. faecalis* VRE (acquired vancomycin resistant) from other enterococcal strains (intrinsic low level resistance) is important for patient management and infection control. This study aims to work out a rapid, accurate, simple and cost-effective identification protocol for fast presumptive reporting of *E. faecium* and *E. faecalis* VRE.

Methods: One hundred and fifty-one vancomycin-resistant enterococci collected from various sample sources were tested using in-house panel of phenotypic and biochemical tests (panel) and compared with the API 20 Strep (API) and Vitek 2 (V2) identification systems. *E. faecium* and *E. faecalis* VRE were further confirmed by molecular testing. The panel consisted of colony morphology, pigmentation, motility, bile esculin and pyrrolidonyl- β -naphthylamide (PYR) hydrolysis, acid production from sorbitol, arabinose and methyl- α -D-glucopyranoside.

Results: The panel shows 87% result homology with V2 and 43% with API in identification of *E. faecium*, *E. faecalis*, *E. casseliflavus* and *E. gallinarum*. The 3 systems agree on 36% of the cases. API correctly identifies *E. faecium* and *E. faecalis* but wrongly identifies *E. casseliflavus* and *E. gallinarum* as *E. faecium* (92%). The panel and V2 correctly identify all 51 *E. faecium* and *E. faecalis* VREs while API was correct for 78% of the strains. Panel results were available as soon as 5 hours post inoculation compared with API (18-24 hours) and V2 (8 hours).

Discussion & Conclusion: The panel is rapid, reliable, simple to perform and inexpensive for identifying VRE. V2 is a good alternative if the panel fails to produce results.

BP – QHSR 19

Profile of Early Psychosis Patients attending Club EPIP (Drop-in Centre)

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Background: The objective is to examine the profile and level of functioning of patients attending Club EPIP, a drop-in centre run by EPIP, Institute of Mental Health, in order to better cater to the needs of our patients.

Methods: Attendance and socio-demographic details of patients attending Club EPIP from January to May 2009 were collected. In addition, Structured Clinical Interview for DSM-IV Axis I Disorders

(SCID), Becks Depression Inventory (BDI), Positive and Negative Symptoms Scale (PANSS) and Global Assessment of Functioning (GAF), were administered at baseline to assess diagnosis, level of depression, severity of psychotic symptoms and level of functioning respectively. Duration of untreated psychosis (DUP) is assessed through interview with patient and/or family.

Results: Eighty-seven patients were included in our sample. Of these, 51% (n = 45) were male. Median age was 26 years (range 15-40). A total of 80.5% (n = 70) were diagnosed with schizophrenia spectrum disorders, 4.6% (n = 4) with bipolar disorder, 4.6% (n = 4) with brief psychotic disorder, 3.4% (n = 3) with psychosis not otherwise specified and 1.1% (n = 1) with delusional disorder. Median DUP was 6 months (range 0.25-120). Of our patients, 86.2% (n = 75) were single, 8% (n = 7) were married or divorced, 37.9% (n = 33) had primary and secondary school education, 56.2% (n = 49) had post secondary education and above, 50.6% (n = 44) were unemployed, 18.4% (n = 16) were gainfully employed, 14.9% were students and 3.4% were homemakers. Of the patients, 62.1% (n = 54) were inpatients when they attended Club EPIP. Baseline assessments showed that mean BDI was 18.34 (SD = 13.66), mean PANSS (Total) was 69.74 (SD = 14.42) and mean GAF total was 38.81 (SD = 12.61).

Discussion & Conclusion: Our results show that majority of the patients attending Club EPIP are young and unemployed, assessed to be moderately ill with some impairment in reality testing or communication or major impairment in work or school, or family relations. They are also likely to be mildly depressed. Given the above profile, Club EPIP programmes should continue its focus on psycho-education, life and social skills, employment, and healthy lifestyle. For a more comprehensive study, collation of the profile of the entire 2009 cohort of patients attending Club EPIP is recommended.

BP – QHSR 20

Quality of Life in Untreated Age Related Hearing Loss

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Background: Hearing loss commonly impacts quality of life in the elderly, yet is often neglected. Objectives: 1) To investigate impact of untreated age related hearing loss on QOL using generic and disease specific instruments. 2) To determine usefulness of QOL questionnaires and audiometry in guiding management.

Methods: Eighty patients, 50 years and above, with untreated hearing impairment were recruited from the audiology clinic over 2 months' duration. Hearing impairment was defined as the pure-tone average of air-conduction hearing thresholds >25 decibels (dB) hearing level for four frequencies (0.5 to 4.0 kHz) in the better ear. Short Form 36 Health Survey (SF-36) and Hearing Handicap for the Elderly-Screening version (HHIE-S) were administered. Data were analysed using StataV10.2.

Results: There was no significant association between severity of hearing impairment and SF-36 scores. Dose graded correlation was however observed between severity of hearing loss on audiometry and self-reported (HHIE-S) hearing impairment. (Coef. = 9, $P < 0.001$). Applying HHIE-S cut off >8 to denote hearing handicap yielded 72.8% sensitivity and 71.4% specificity in detecting clinically significant hearing loss of at least 40dB (ROC = 0.83).

Discussion/conclusion: SF36, a generic measure, lacked specificity and sensitivity in assessing for impairment on QOL solely attributed by hearing loss. Significant impairment on QOL was reflected in HHIE-S, suggesting the importance of instituting screening programs and intervention for hearing loss. HHIE-S is a good disease specific screening tool. Combined administration of functional (HHIE-S) and physiologic (audiometric) measures is recommended for interventional purposes.

BP – S 04

Atypical Adenocarcinoma of Scrotal Skin – A Case Report

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Background: Scrotal lesions are not uncommon. There have been reported cases of extramammary Paget's disease of the scrotum, as there have been cases of colonic metastasis to the testis and scrotum. However, here we present a case of a primary atypical adenocarcinoma with pagetoid features of the scrotum.

Methods: A single case report of primary atypical adenocarcinoma of the scrotum with pagetoid features and signet ring cells was used. Pre- and post-resection, post-flap coverage and histology slides were presented.

Results: We have successfully treated the disease by complete wide excision and pedicled gracilis muscle flap coverage of the wound defect.

Discussion: In addition to the uncommon occurrence of a primary adenocarcinoma of the scrotum with pagetoid mimicry, histology also revealed signet ring features, which suggested a likely gastrointestinal primary tumour. No gastrointestinal primary tumour was found on endoscopy, a computed tomography scan, laparotomy with bowel run-through or a positron emission tomography scan. This case report serves to illustrate the possibility of atypical scrotal adenocarcinoma mimicking extra-mammary Paget's disease.

BP – S 05

Use of Osteoplug® Polycaprolactone Implants as Burr-hole Covers – Outcomes

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Background: To evaluate the outcome of Osteoplug® (a novel biodegradable polymer burr-hole cover implant), used in patients with burr-holes done for drainage of chronic subdural hematoma.

Methods: Twelve patients with chronic subdural hematoma had Osteoplug® implants inserted into their burr-holes after evacuation of the haematoma. Osteoplug® is a biodegradable polycaprolactone implant with a mushroom button shape that is designed specifically to fit into a 14-mm diameter burr-hole. It has an upper rim 16 mm in diameter and a body diameter of 14 mm, with a honey-comb like architecture of 400 to 600 µm pore size. The Osteoplug® snaps onto the 14-mm diameter burr-hole snugly after evacuation of the liquefied haematoma is done. All 12 patients were followed up to for a period ranging from 10 months to 2 years (mean 16 months) post-operatively. They were evaluated for their clinical, radiological and cosmetic outcomes.

Results: Osteoplug® provided good cosmesis by preventing unsightly depressions over the skull postoperatively in all the 12 patients. Postoperative CT scans done at 1 year showed signs of good osteo-integration into the surrounding calvarial bone, with multi-foci mineralisation throughout the scaffold in 1 patient. There were no cases of infection or any adverse systemic reaction noted. Patient satisfaction was high.

Conclusion: The Osteoplug® polycaprolactone burr-hole covers are suitable biodegradable implants with good medium term results. They provide an ideal scaffold for osteogenesis and excellent cosmesis. There were no adverse events in all 12 patients with a mean follow-up of 16 months.

BP – S 06

Is it Necessary to Clamp Chest Tubes before Removal in Trauma Patients?

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Background: There is no uniform consensus whether it is necessary to clamp chest tubes (CT) or not before removal. The benefits of clamping CT are unproven.

Aim: The aim of study is to determine if clamping of CT before removal decreases the incidence of recurrent pneumothorax after removal of CT.

Methods: A retrospective review of patients who had CT insertion for traumatic pneumothorax over the past 2 years was carried out. Patients were divided into 2 groups: Group A was those who had their CT clamped before removal and Group B was those who did not have their CT clamped before removal. The incidence of recurrence of pneumothorax after CT removal, need for 2nd CT insertion, and duration of chest tube insertion were studied for the 2 groups.

Results: Fifty-five patients were studied with 66 CTs removed. There were 30 CTs in Group A and 36 CTs in Group B. The incidence of recurrent pneumothorax in Group A was 7 out of 30 (23.3%) and 5 out of 36 (13.9%) in Group B. Eleven of the 12 recurrent pneumothorax were treated conservatively and resolved on follow-up, with 1 of the 12 from Group A requiring a reinsertion of CT. There was no recurrent pneumothorax discovered after clamping in Group A patients prior to removal. Median duration of chest tube insertion was 12 days in Group A compared to 6 days in Group B.

Conclusion: Clamping of CT before removal did not show benefit in decreasing the number of recurrent pneumothoraces and prolonged hospital stay.

BP – S 07

Developing a More Cost-effective Skin Prick Test Panel for Allergic Rhinitis

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Background: Allergic rhinitis has a high prevalence of over 10%, accounting for substantial healthcare morbidity and cost. A skin prick test identifies the allergens. For more cost-effective skin prick testing, we aim to determine the leading allergens for adults versus children, and Singaporean versus foreign patients.

Methods: A database of skin prick tests of 954 patients with allergic rhinitis symptoms managed at the Otolaryngology Department in 2008 was accessed. Of the patients, 53.9% were >18 years old, and 86.9% were Singapore residents. First Panel A test showed 3 house dust mites, cat, dog and American cockroach allergens. The additional Panel B test showed 3 mould, 3 grass and 2 tree allergens.

Results: Testing with only Panel A missed identifying allergens in 10.3% of patients. The leading allergens were *D. farinae* (90.5%), *D. pteronyssinus* (86.6%), *Blomia tropicalis* (67.6%), American cockroach (31.4%), cat (12.8%), and Bermuda grass (10.3%). With the exception of mould allergy, prevalence of allergy increased with age. Allergies developed from different ages: house dust mite and animal dander (1 year old), cockroach (3 years old), mould and grass

(4 years old), and tree pollen allergy (7 years old). Blomia allergy was 18.6% higher and grass allergy 11.2% lower amongst Singapore versus foreign residents.

Conclusions: We recommend a revised first panel of skin prick test: 1) Patients above age 4, for Singaporeans: *D. farinae*, American cockroach, cat, dog, Bermuda and Melaleuca; For Foreigners: Bahia to substitute dog, 2) Patients aged 4 years and below: existing Panel A. Other allergens are tested if dictated by exposure history.

BP – S 08

A Pilot Study to Investigate the Effects of Submucous Turbinoplasty and Posterior Nasal Neurectomy in Patients with Allergic Rhinitis

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Background: Vidian neurectomy was previously described as a treatment for persistent rhinitis. However, this is no longer performed because of its risks of serious ocular complications. Modification of this technique, posterior nasal neurectomy whereby neural bundles from the sphenopalatine foramen are selectively cut, was recently described.

Aim: The aim of this study was to investigate the effects of submucous turbinoplasty and posterior nasal neurectomy in treating persistent allergic rhinitis.

Methods: Prospective pilot study conducted on adult patients with symptoms of persistent allergic rhinitis unresponsive to standard medical treatment. All had chronic nasal obstruction from inferior turbinate hypertrophy as well as other symptoms of rhinorrhoea, sneezing and/or nasal itch. Submucous turbinoplasty was performed with posterior nasal neurectomy. Nasal symptom score (NSS) and Rhinoconjunctivitis Quality of Life Questionnaires (RQLQ) were administered pre- and postoperatively.

Results: Six patients were recruited. Total NSS was lower at 1 month postoperatively in all except 1 (mean NSS preoperatively 7.7, improved to 4.3 postoperatively ($P = 0.008$). At 1 month, there were significant improvements in nasal obstruction, rhinorrhoea, nasal itch and sneezing by 83%, 50%, 67% and 67% respectively. Mean RQLQ score was significantly reduced from 3.5 preoperatively to 1.6 postoperatively ($P = 0.0025$). At 6 months, 2 of 3 patients maintained significantly lower NSS and RQLQ scores.

Conclusion: Results from this pilot study are encouraging. Submucous turbinoplasty combined with posterior nasal neurectomy appears to reduce symptoms of nasal blockage, rhinorrhoea, sneezing and nasal itch in patients who have previously failed medical treatment. Further research with randomised controlled blinded studies is necessary to further elucidate its effects.

BP – S 09

Early Resolution of T2 Diabetes Mellitus after Gastric Bypass

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Background: Roux-en-Y gastric bypass (RYBG) has been reported to result in early resolution of type 2 diabetes (T2DM) and other obesity related co-morbidities. We report our initial experience with RYBG and early resolution of T2DM

Methods: Alexandra Hospital introduced laparoscopic RYBG for morbid obesity in 2008. In 2 T2DM patients, we monitored their

DM status before and immediately after surgery. Apart from the usual post-surgical biochemical monitoring, 75 g oral glucose tolerance test (OGTT) was performed to ascertain glycemic status and insulin action.

Results: The first patient was a 51-year-old Malay man, with BMI of 39 kg/m² and T2DM for 15 years, who was on 3 oral hypoglycaemic agents, and had a pre-op HBA1c of 10%. His 2-hour post OGTT serum glucose and insulin levels fell from 12.8 mM pre-op to 9.8 (i.e. converted to impaired glucose tolerance), and 78.7 mU/L to 18.8 on day POD5, respectively. The second patient was a 19-year-old Malay man, with BMI of 57 kg/m² and T2DM for 5 years, who was on monotherapy. Although his 2-hour post OGTT serum glucose varied minimally, 5.2 mM (pre-op) to 5.3 mM (POD5), serum insulin concentrations fell from 115.5 mU/L to 42.7 mU/L suggesting substantial improvement in insulin action. Both patients recorded insignificant weight reduction (~1 kg) upon discharge. Neither of them has required any more anti-diabetic medication since surgery.

Conclusion: T2DM remission occurred early (before any significant weight reduction) after RYBG in morbidly obese individuals. This phenomenon appears to be the same in Singaporeans as it was reported in the world literature.

BP – S 10

EVLT is an Effective Method to Deal with Recurrent Varicose Veins and Venous Ulcers

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Background: Recurrent varicosities and venous ulcers present a therapeutic challenge years after initial varicose vein surgery. Re-do surgery is difficult owing to scar tissue entrapping tributaries in the operative field. Endovenous laser therapy (EVLT) can potentially offer a solution to the chronic problems that many of these patients suffer from.

Methods: Three patients who consulted our vascular unit earlier this year for recurrent varicose veins were treated using EVLT. All had recurrent long saphenous veins (LSVs) or accessory LSVs evident on ultrasound duplex.

Results: There were no complications in all 3 cases other than mild bruising on the thigh skin. One patient who had presented with venous ulcers demonstrated complete healing of the ulcers 6 weeks post procedure. All cases will undergo a follow-up ultrasound duplex scan at 6 months postoperatively.

Discussion: EVLT offers an attractive option to tackle the problem of recurrent varicosities or venous ulcers post initial open surgery. It is much more expeditious and less risky than a repeat operation. The minimally-invasive nature and the obviation of the need for general anaesthesia make it more acceptable to patients, many of whom have suffered intermittent symptoms for years in their reluctance to undergo another operation. EVLT has already shown efficacy similar to open surgery for primary varicose veins to justify its use in recurrent cases. Preliminary results in our small series are encouraging and we now await the results of long term outcomes to evaluate if there is any difference in the behaviour of recurrent varicosities.

BP – S 11

The Role of Staging Laparoscopy in Gastric Malignancies – Our Institutional Experience

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Background: Peritoneal metastasis is the commonest site of metastasis in patients with gastric cancer. Intra-abdominal tumour deposits are difficult to detect by conventional imaging techniques and often result in under-staging and unnecessary laparotomy. The aim of our study was to investigate the value of staging laparoscopy with laparoscopic ultrasound (LUS) and peritoneal lavage cytology in patients with newly-diagnosed gastric tumours.

Methods: Retrospective review of prospectively-collected data was conducted in all patients with newly-diagnosed gastric tumours on oesophagogastrroduodenoscopy (OGD) between December 2003 and July 2008. Computed tomography (CT) scan was performed to assess for local tumour infiltration and presence of metastasis. Staging laparoscopy was subsequently performed in selected patients and staging by both modalities was compared.

Results: Thirty-one patients were included. Majority of patients (90%) had gastric adenocarcinoma. Thirteen patients (42%) were upstaged following staging laparoscopy and 1 patient was downstaged (3%). None of the patients had procedure-related complications. None of the patients with metastasis detected at laparoscopy underwent laparotomy. Gastrectomy after staging laparoscopy was performed in 15 patients (11 R0 resections, 3 R1 resections and 1 R2 resection). Only 1 patient did not have gastrectomy at laparotomy because of extensive local invasion. Three patients were subjected to neoadjuvant therapy following laparoscopy but only 1 patient subsequently underwent gastrectomy.

Discussion & Conclusion: In this small series reflecting our institutional experience, staging laparoscopy appears to be safe and more accurate in detecting peritoneal and omental metastases as compared to conventional imaging. Peritoneal cytology provided additional prognostic information although there appeared to be a high false negative rate.

BP – S 12

Surgical Management of Diaphragmatic Rupture After Blunt Trauma – An Institution's Experience Over 6 Years

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Background: We reviewed our institution's management of patients with blunt diaphragmatic injuries.

Methods: We reviewed the medical records of patients treated for blunt diaphragmatic injuries in Tan Tock Seng Hospital from March 2002 to October 2008. We recorded the age, mechanism of injury, haemodynamic status at admission, GCS, ISS, imaging studies, location of diaphragmatic injuries, associated injuries and outcome.

Results: Fourteen patients, with a median age of 38 years formed the study group. Vehicular-related incidents accounted for 71.4% of the injuries. The median GCS score on admission was 14 (3-15), while the median systolic BP and HR were 94 (50-164) mmHg and 110 (76-140) beats per minute respectively. The median ISS was 41 (14-66). All had chest X-ray done in the Emergency Department. Six (42.9%) had CT scans done before surgery while the remaining 8 (57.1%) were sent straight to the operating theatre from the emergency department. There were 5 (35.7%) right-sided and 9 left-sided (64.3%) diaphragmatic ruptures. The mortality rate was 35.7%. Twelve patients (85.7%) underwent repair of the diaphragmatic rupture using interrupted polypropylene suture while the remaining 2 (14.3%) were too haemodynamically unstable to undergo definitive treatment then. Advanced age, haemodynamic instability and raised ISS are associated with mortality.

Discussion & Conclusion: Accurate diagnosis of diaphragmatic rupture in trauma patients is difficult and a thorough examination of both hemi-diaphragms is mandatory during emergency laparotomy. Those with more severe injuries and decreased physiological reserves usually fare worse.

BP – S 13

Review of Unstable Thoracolumbar Fractures over a 6-year Period from 2003 to 2008

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Background: Thoracolumbar fractures are common injuries associated with neurological deficits and permanent disability. This study aims to review the degree of deformity correction and outcomes of patients with thoracolumbar fractures who were treated surgically.

Methods: Twenty patients (16 males, 4 females) aged between 15 and 66 years (mean 35.6 years), with single level unstable thoracolumbar fractures treated surgically from 2004 to 2008 were retrospectively reviewed.

Results: Patients' vocation was classified into manual-heavy (55%), manual-light (25%) and sedentary (20%). The mechanisms of injury included fall from height (75%), road-traffic accident (5%) and others (20%). The mean time to surgery was 5.45 days, mean duration of admission was 19.7 days. Preoperatively, 10% were ASIA A, 25% ASIA B-D and 65% ASIA E. Postoperatively, 10% were ASIA A, 15% ASIA B-D and 75% ASIA E. Postoperatively, the kyphotic and vertebral angles were corrected by 12.3° and 11.9° on average, respectively. The anterior vertebral height increased by 9.1 mm. The average increase of kyphotic and vertebral angles were 4.6° and 1.9° at the end of the follow-up. Average loss of anterior vertebral height was 2.9 mm. At the end of the follow-up, 75% were independent ambulators, 5% ambulated with aid and 20% were wheel-chair bound. 35% had medical complications, e.g. urinary tract infection. A total of 10% had surgical related complications e.g. superficial wound infection (no cases of deep wound infections).

Conclusions: Improvement of neurological deficits, kyphotic and vertebral angles and anterior vertebral height were observed in unstable thoracolumbar fracture patients after posterior stabilisation. However, there was loss of correction to some degree with time.

BP – S 14

Single Centre Experience of Traumatic Popliteal Artery Injuries in an Urban Asian Population

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Background: Popliteal artery injury is uncommon but remains among the most challenging of all extremity vascular injuries. Blunt trauma and knee dislocations are associated with higher chances of popliteal arterial injuries (32%) and higher amputation rates up to 16%.

Methods: A retrospective review of 7 patients with popliteal artery injury from a single institution from 2004 to 2009 was performed. Their demographic data, clinical presentations, investigations, primary operative procedures, amputation rates and mortality were determined.

Results: There were 6 male patients and 1 female patient with a median age of 30 (19-59) years. Blunt trauma from road traffic ac-

cidents was the most common cause of injury (85.7%). Five of the patients (71.4 %) had an associated skeletal injury with 5 of them (71.4%) associated with posterior dislocations of the knee. The mean ischaemic time was 5 (2.5-9) hours. All arterial injuries were confirmed with an on-table angiogram. Five repairs were performed with vein grafts and 1 bypass was performed with ePTFE graft. All but 1 patient (85.7%) had external fixation of fractures. Four patients (57.1%) had 4 compartment fasciotomies at the same setting. Post-operatively, 28.6% of the patients required graft revision and the amputation rate was 15.3%. There were 2 deaths, caused from severe cerebral injury and multiple organ dysfunction syndrome (MODS).

Conclusion: Popliteal arterial injury is frequently associated with posterior knee dislocations in the setting of blunt trauma. A high index of suspicion will reduce the ischaemic time and increase limb salvage rates. Though uncommon, popliteal artery injury is a cause of major morbidity.

BP – S 15

Better Outcomes following Early Surgical Treatment of Retained Lens Fragments after Cataract Surgery

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Background: Retained lens fragments are a complication of cataract surgery which can adversely affect visual outcomes and cause significant ocular morbidity. Surgical intervention (pars plana vitrectomy) is often required, but the optimal time interval to intervention is debatable. This study aims to evaluate the visual outcomes and complications following intervention for retained lens fragments after cataract surgery.

Methods: A review of 24 consecutive eyes with retained lens fragments following cataract surgery, over a 3.5-year period in Tan Tock Seng Hospital. The time to surgical intervention, post-operative visual acuity and complications were analysed. Surgical intervention was classified as early if performed within 24 hours and late if performed >24 hours later.

Results: Mean follow-up period was 13.7 months. Surgical intervention was instituted in 22 eyes, with 2 managed conservatively. Of these, 18 had early surgical intervention while 4 had late intervention. Eyes receiving late surgical intervention had a higher rate of complications and poorer visual outcomes than those with early intervention. Retinal detachment occurred in 25% of cases with late intervention compared to 5.6% with early intervention. By 3 months post-surgery, 89.5% of patients had achieved visual acuity of 6/12 or better. Of those with late intervention, visual acuity worse than 6/12 occurred in 33.3% of patients compared to 6.3% for those with early intervention.

Discussion & Conclusion: Early surgical intervention within 24 hours is beneficial for patients with retained lens fragments after cataract surgery, resulting in a lower occurrence of complications such as retinal detachment, and achieved better visual acuity.

BP – S 16

The Prevalence of Hearing Loss in Medical Students

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Background/Hypothesis: Studies show that the prevalence of

hearing loss in youths increases with age, indicating the need for early intervention. Audiometry testing is not widely available and there is a need for a simple and reliable screening tool. The Hearing Handicap Inventory for the Elderly-Screening version (HHIE-S) has been widely validated for screening in the elderly. Our aim is to estimate the prevalence and attitudes towards hearing loss in young adults in Singapore, and to evaluate HHIE-S in the screening of hearing loss in youths.

Methods: A total of 234 medical students from Yong Loo Lin School of Medicine were asked to do an online questionnaire of 45 questions which included demographic data, lifestyle habits and HHIE-S followed by audiometry. The results of the survey and audiometry were then compared.

Results: Thirty-six students completed the study. The prevalence of hearing loss (≥ 25 dBHL) in these 36 students is 25%. Eight out of 9 subjects have high frequency hearing loss. Taking a HHIE-S score of >8 as a cut-off, the sensitivity is 22.2% with a specificity of 70.3%. Of the subjects, 45% would consider wearing hearing protection to a club/concert. A total of 78% of subjects were not able to answer all 6 questions correctly.

Discussion & Conclusion: A substantial proportion of the sample population has hearing loss of ≥ 25 dBHL mostly in high-frequency sounds, suggestive of noise-induced damage. The HHIE-S ability seems to be limited in youths. Knowledge regarding hearing loss is lacking, even in a well-informed medical student population. Efforts should be taken to emphasise the importance of hearing protection.

BP – S 17

Solid Organ Angio-Embolisation: A 90-day Post Procedure Follow-up

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Background: Angio-embolisation (AE) has become part of our trauma armamentarium in the management of trauma patients. Majority of AEs are done in pelvic trauma. However, although solid organ AEs have been done, they are not as common nor has there been a follow-up study.

The aim of our study is to describe the use of AEs in the management of solid organ injury in trauma and the subsequent 90-day follow-up. We studied the incidence of target organ function post-AE, complications, success of the procedure in arresting haemorrhage, mortality and duration for target organ to return to normal function (based on history and laboratory investigations).

Methods: A retrospective review of all solid-organ AEs done between 2005 and 2007 was carried out. Inclusion criteria were: Injury Severity Score >9, completed AEs, and post-AE check angiography confirming successful embolisation. Exclusion criteria were those who had incomplete data sheets, no embolisation done, those who had conversion to surgery or died prior to completion of AE. A total of 12 patients were admitted into the study.

Results: The small sample size reflected the limited use of AE for solid organ injury during the period studied. There were 7 hepatic, 3 spleen and 2 renal AEs done successfully. Majority of AEs were done with coils. Selective AE was done for the main branches of the bleeding vessels. Mean number of transfusions were 4.9 units of packed cells. All patients had normalisation of biochemical end

organ function within 85 days of follow-up. None had end organ failure post AE.

Conclusion: Solid organ AEs in trauma patients is a feasible option in arresting haemorrhage. Even when non biodegradable coils are used, or when main branches of the end organs are angio-embolised, there is neither end organ failure nor abnormal end organ function within 90 days of the procedure.

BP – S 18

Rapid Reversal of Coagulopathy in Warfarin-related Intracranial Haemorrhages with Prothrombin Complex Concentrates

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Background: Anticoagulation-treated patients presenting with intracranial haemorrhage, require emergent reversal of their coagulopathy to limit haematoma growth and to facilitate neurosurgical intervention when indicated. The aim is to report early experience using *Proflin* SD, a 3-Factor Prothrombin Complex Concentrate (PCC) to achieve rapid normalisation of international normalised ratio (INR) in patients with oral anticoagulation therapy (OAT)-related intracranial haemorrhage.

Methods: This is a case series based on retrospective data collected on the use of *Proflin* SD. The key steps needed to formulate an early INR reversal algorithm for such patients are also reviewed.

Results: Seven consecutive patients admitted to the study hospital with OAT-related intracranial haemorrhage was treated with PCC in combination with fresh frozen plasma and Vitamin K for rapid INR reversal between January and June 2008. Four patients (57%) presented with subdural haematomas (SDH); 3 had intracerebral hematomas. Six of 7 patients had admission INR in the appropriate therapeutic range for OAT. The mean dose of PCC administered was 32.4 IU/kg body weight (range 14.9–63.8 IU/kg). All 4 patients with SDH underwent surgical evacuation once INR was <1.5. Median time from CT diagnosis to surgery was 4.6 hours (range 102–420 minutes). The median time to INR normalisation post-PCC administration was shorter at 85 minutes (range 50 minutes to 7 hours) for the 4 patients that survived, in contrast to the 3 patients that died (median time 10 hours, range 9–44 hours)

Conclusion: PCC should be considered for use in the urgent reversal of OAT-related intracranial haemorrhage, potentially halting haematoma expansion and expediting urgent neurosurgery, although randomised trials are lacking.

BP – S 19

Patients' Expectation and Experience of Visual Sensations during Cataract Surgery Under Retrobulbar Anesthesia

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Background/ Hypothesis: Cataract surgery is usually performed under local or regional anaesthesia (retrobulbar nerve block). While pain relief is adequate, visual function may be incompletely blocked, resulting in a spectrum of visual sensations during the surgery. In

some series, up to 19% of patients reported frightening experiences, possibly precipitating systemic complications and compromising patient cooperation, leading to adverse surgical outcomes. We aimed to investigate patients' expectations and actual experiences of visual sensations during cataract surgery under retrobulbar anesthesia and to determine factors influencing the impact of such experiences.

Methods: One hundred and fifty-two consecutive patients undergoing routine cataract extraction under retrobulbar anesthesia were interviewed preoperatively on what they expected to see during the surgery. They were interviewed again postoperatively on their actual intraoperative visual experiences.

Results: Preoperatively, 49 patients (32.2%) expected to be able to see at least some light during surgery. Thirty-two patients (21.1 %) felt that they might be frightened by what they see during surgery. Postoperatively, 127 patients (83.6 %) had experienced at least light perception. Thirteen patients (8.6 %) were frightened by what they saw during the cataract operation. Patients who had frightening experiences were more likely to have had a longer operation (28.8 vs 23.6 minutes, $P = 0.006$ on multivariate analysis).

Discussion and Conclusion: The occurrence of intraoperative visual sensations under retrobulbar block is very much higher than expected by patients and possibly even physicians. Most patients experienced some sort of visual sensations and 8.6% find the experience frightening. Appropriate preoperative counselling may alleviate fear, promote patient cooperation and consequently better outcomes.

BP – S 20

Accuracy of Computed Tomography Scans in Diagnosing Acute Appendicitis

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Background/Hypothesis: Non-invasive preoperative imaging has been demonstrated to improve diagnostic accuracy in the diagnosis of appendicitis. This retrospective study was performed to assess the accuracy of computed tomography (CT) scans within each score group of the Modified Alvarado Score.

Methods: This is a 1-year retrospective study on a public hospital (Tan Tock Seng Hospital, Singapore) database of 262 consecutive patients (121 males, mean age = 41.49 years, SD = 18.10 and 141 females, mean age = 46.03 years, SD = 18.16) admitted for suspected appendicitis and appendectomy who underwent CT. Laboratory, imaging, intra-operative and histopathological reports were obtained together with demographic information, clinical presentation and comorbid conditions and recorded on a database sheet designed for the purpose of this research. Microsoft Excel and Statistical Package for the Social Sciences (SPSS) programmes were used to collate data.

Results: Sensitivity of CT scans for the entire cohort was calculated to be 96.7%. Additionally, a sensitivity of 97.5% of CT scans was calculated for the mid-range group (4-6) of the Modified Alvarado Score.

Discussion & Conclusion: The authors observe a strong corroboration between the results of the CT scan and the accurate diagnostic outcome of appendicitis, pointing towards the possible role of non-invasive CT in diagnosing appendicitis. A more definitive conclusion however would require broader sampling frame that involves data collection at point of ED presentation.

BP – S 21

Minor Blunt Abdominal Trauma: Utilisation of 24-hour Emergency Department Observation Ward

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Background: Some patients with blunt abdominal trauma present to the Emergency Department (ED) without initial signs of abdominal injury. We examine the ability of our 24-hour Emergency Diagnostic and Treatment Centre (EDTC) to detect late presentations of visceral injury.

Methods: We reviewed the records of patients who presented to our ED with blunt abdominal trauma from May 2006 to March 2009. Haemodynamically unstable patients and those with confirmed abdominal injury were excluded. Demographic data, mechanism of injury, Focused Abdominal Sonography in Trauma (FAST) results, CT results, ED disposition and the length of stay were recorded.

Results: A total of 52 patients met the inclusion criteria. Of these, 82.7% were men. The mean and median age was 38.7 and 36.5 years respectively. Motor vehicle collision was the commonest mechanism of injury (53.8%) followed by fall from height (25%) and assault (6%). FAST was performed for all patients. Of the 52 patients, 31 (59.6%) were admitted to EDTC. All 31 had negative initial FAST scans but 1 turned positive on repeat FAST (renal laceration, managed conservatively) and another had worsening of symptoms, with CT confirmation of jejunal perforation requiring surgical repair. All EDTC patients had a mean of 2 FAST scans. The mean and median length of EDTC stay was 1 day for the remaining 29 (93.5%) patients.

Conclusion: In 2 of 31 (6.5%) patients, 24-hour observation and repeat FAST scans detected late presentation of intra-abdominal injury. EDTC offers cost-effective management of abdominal trauma patients without signs of injury who had negative initial FAST scans.

BP – S 22

Computed Tomography Scan for Acute Appendicitis: More Females and Elderly?

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Background/Hypothesis: Preoperative imaging has been demonstrated to improve diagnostic accuracy in the diagnosis of appendicitis. This descriptive study was performed to compare the demographics (age and gender) of patients with suspected appendicitis, who underwent computed tomography (CT) scans against those who did not.

Methods: This is a 1-year retrospective descriptive study on a public hospital (Tan Tock Seng Hospital, Singapore) database of 564 consecutive patients (341 males, 223 females) admitted for suspected appendicitis and appendectomy. Imaging and histopathological reports were obtained together with demographic information, clinical presentation and co-morbid conditions and recorded on a database sheet designed for the purpose of this research. Microsoft Excel and Statistical Package for the Social Sciences (SPSS) programmes were used to collate data.

Results: Of the 223 female patients, 141 (63.2%) were sent for CT scans as compared to 121 (35.5%) of 341 male patients. The mean age of the CT group was 43.93 years (SD = 18.239) while the mean of the other group was 31.74 years (SD = 11.559). The differences were statistically significant ($P < 0.05$).

Discussion & Conclusion: The authors observed that a higher proportion of females are sent for CT scans as compared to males and that the group sent for CT scans had a higher mean age. This could be due to the increased possibility of other pathology in these groups with similar presentation as acute appendicitis, leading the clinician to send these 2 groups of patients for CT scans. The authors recommend future studies to further evaluate the value of routine CT scans in these 2 groups for the diagnosis of acute appendicitis.

Junior Category

Basic Specialist Trainees, Senior House Officers & Junior Residents

IOC – JC 01

Transplantation of a Bioengineered Oral Epithelial Equivalent for the Treatment of Contracted Sockets and Forniceal Shortening
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Background/Hypothesis: To investigate the novel use of autologous cultivated oral epithelial transplantation for the treatment of eyes with contracted sockets and forniceal shortening.

Methods: Seven eyes of 7 subjects with contracted sockets or shortened, contracted fornices underwent this procedure. An oral biopsy was first performed 3 weeks prior to the definitive surgery. Oral epithelial cells were cultivated on human amniotic membranes (HAM). At the time of transplantation, the area of scarring was released and the surface was reconstructed with transplanted cultured oral epithelium-HAM grafts. Postoperatively, the epithelial integrity, retention, anatomical and functional success of the transplanted grafts were evaluated.

Results: Ex-vivo expansion of oral epithelial cells formed a confluent stratified epithelial sheet within 3 weeks. The transplanted cultured epithelial sheets allowed large areas to be reconstructed. The mean postoperative follow-up was 7 months (range, 2-12). The grafts were retained in all eyes after surgery, with 86% of patients having successful deepening of the fornices and improvement in the lid position. One patient developed recurrence of the contracted fornix 4 months post-surgery, which was subsequently successfully reconstructed after a second operation. A final good functional was achieved in all eyes. No significant complications were noted.

Conclusion: Cultivated oral epithelial transplantation was successfully used for the treatment of contracted sockets and shortened fornices. This represents a promising novel method of ocular surface epithelial replacement in patients with significantly damaged or deficient conjunctiva, and has significant advantages over conventional buccal mucosal transplantation.

IOC – JC 02

Comparison of Influence of Cataract and Small Pupil on Retinal Nerve Fibre Layer Thickness Measurements between Time Domain and Spectral Domain Optical Coherence Tomography
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Background/Hypothesis: To investigate the effect of cataract and small pupil on retinal nerve fibre layer (RNFL) thickness measurements using spectral domain optical coherence tomography (SD-OCT) and compare the measurements with time domain optical coherence tomography (TD-OCT).

Methods: Twenty-five eyes from 25 normal subjects undergoing cataract surgery were analysed. RNFL thickness was measured 3 times before and after dilation in a single sitting, preoperatively and 1-month after surgery, using TD-OCT (Stratus Fast RNFL 3.4 acquisition protocol) and SD-OCT (Cirrus 200 x 200 Optic Disc Scan).

Results: Mean RNFL thickness measured by TD-OCT was thicker compared to SD-OCT and the difference was significant ($P < 0.001$). Pupil dilatation caused RNFL measurements to increase in both modalities but the mean differences were not significant ($P > 0.05$). Removal of cataract caused significant increase in RNFL measurements in both modalities ($P < 0.02$). Reproducibility for both machines showed marked improvement with pupil dilatation and further improvement after removal of cataract. The intraclass correlation coefficient (ICC) at 95% confidence interval (CI) for preoperative undilated, dilated, and postoperative dilated global measurements were 0.69, 0.87, and 0.95 for TD-OCT, and 0.74, 0.90, 0.91 for SD-OCT respectively. This pattern was reflected in the quadrants except in the nasal quadrant for TD-OCT, which remained poor (< 0.75).

Conclusion: Cataracts, not pupil size, appear to have significant influence on RNFL measurement in both modalities. The effect on each modality does not seem to be different except in the nasal quadrant. This could be due to poor reproducibility of RNFL measurements in the nasal quadrant with TD-OCT. Reproducibility is otherwise good with dilated pupil and clear media. RNFL thickness measurements are generally higher in TD-OCT than with SD-OCT and cannot be directly compared.

IOC – JC 03

Elevated MCP-1 in Tears is an Indicator of Early Postoperative Scarring Following Trabeculectomy

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Background/Hypothesis: To compare the cytokine profile in the tears of normal subjects with chronically medicated glaucoma patients and determine if this is associated with surgical failure in post-trabeculectomy patients.

Methods: Tear samples were collected using Schirmer strips from 61 patients on anti-glaucoma medications due to undergo trabeculectomy, and 29 age-matched, healthy unmedicated controls. Multiplex bead assay was then used to analyse the level of 17 pro-inflammatory cytokines in tears. Glaucoma patients were followed up for 6 months post-trabeculectomy to record if any intraocular pressure (IOP) lowering intervention was started.

Results: Of the 17 cytokines assayed, only MCP-1 was significantly elevated ($P < 0.05$) in the medicated group relative to control subjects. MCP-1 levels in the tears of medicated glaucoma patients were significantly elevated in comparison with tears from controls ($P < 0.01$). Tears of the 18 patients who subsequently required IOP-lowering intervention within 6 months of trabeculectomy also showed higher levels of MCP-1 compared to patients who did not ($P < 0.01$).

Conclusion: Chronic topical IOP-lowering medication increases MCP-1 expression in tears and is associated with higher failure rates of filtration surgery.

IOC – JC 04

Case Series of Amniotic Membrane Transplantation: UKMMC Experience

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Background/Hypothesis: To report on 18 cases (14 patients) of amniotic membrane transplantation done in UKMMC: types, indications and outcome.

Methods: Case series.

Results: A total of 18 cases (14 eyes of 14 patients) of amniotic membrane transplantation (AMT) with various types of amniotic membrane (AM) were performed in UKMMC between January 2007 to May 2009. We had utilised all 3 types of preparations of AM, namely air-dried (gamma radiated), wet (glycerol preserved, gamma radiated) and fresh frozen types. The AMT were performed either as single procedure or as combined procedure. We had combined AMT with penetrating keratoplasty, limbal stem cell transplantation, pterygium excision in recurrent pterygia, superficial keratectomy and sequential sectoral conjunctival epitheliectomy. The commonest indication for our AMT is persistent epithelial defect, in which most cases are diabetics. Other indications of AMT include limbal stem cell deficiency, anticipated poor epithelial healing in penetrating keratoplasty (PK) high risk PK, corneal perforation (corneal melting post glueing and perforated descemetocoele) and patch graft for exposed drainage device.

Conclusion: AMT provides a satisfactory outcome in most of the cases including good corneal epithelialisation and providing scaffold for conjunctival growth. It is also a good temporary measure while awaiting for PK. It seems that fresh frozen AM is better than wet or dry AM, but further study is required to confirm this observation.

IOC – JC 05

Correlating Preoperative Biometry and Postoperative HVF Changes with Phaco-Trabeculectomy Outcomes – A Retrospective Analysis of Primary Angle Closure and Primary Open Angle Glaucoma Patients in an Asian Population

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Background/Hypothesis: To compare preoperative axial lengths (AL) and average keratometry (AK) between primary angle closure glaucoma (PACG) and primary open angle glaucoma (POAG) patients requiring combined cataract and glaucoma surgery. To analyse the relationship of preoperative AL, AK and postoperative HVF changes with survival outcomes.

Methods: Patients were selected from the 2004 to 2006 database of Tan Tock Seng Hospital's Glaucoma service. Inclusion criteria comprised patients who had undergone phaco-trabeculectomies with the use of anti-metabolites. Retrospective data collection was done for the first, third, sixth month and subsequent half-yearly follow-ups, for a total of 24 months.

AK was computed as the average of the steep K and flat K values and logistic regression analysis was performed to describe the relationship between preoperative AL and AK for the different thresholds of complete success, taken as failure if IOP >15, >18, >21 or if glaucoma drops were initiated.

MD-slopes were constructed using means of the first and final postoperative MD values for each glaucoma group to describe mean annual postoperative HVF changes. Patients with clinically documented HVF progression were further analysed to describe the relationship between time of HVF progression and the time of failure for each IOP threshold.

Results: 294 eyes (263 patients) fulfilled the inclusion criteria. Randomisation was done and only a single eye was used in our analysis. POAG formed the majority with 134 eyes (51.0%), while PACG comprised 35.7% with 94 eyes. 19 eyes (7.2%) had normal tension glaucoma (NTG) with the rest (6.1%) diagnosed with other glaucomas.

POAG eyes were longer with a mean AL of (23.79 ± 1.21) mm compared to PACG eyes with a mean (22.96 ± 0.88) mm, $P < 0.05$. POAG eyes had flatter corneas with mean AK of (43.82 ± 1.99) Dioptres compared to PACG eyes with mean AK of (44.26 ± 1.50) Dioptres, $P < 0.05$. Only 18 eyes had preoperative anterior chamber depth (ACD) measured. Numbers were too small for statistical significance, but mean ACD of POAG eyes was larger at (2.83 ± 0.39) mm compared to PACG eyes with mean (2.41 ± 0.41) mm. MD-slopes for POAG eyes were -0.62 decibels/year and PACG eyes were 0.43 dB/year, with difference not statistically significant. The time lag between clinical HVF progression and failure was found to be shorter with higher IOP thresholds.

Conclusion: The average Asian PACG eye is shorter with a steeper mean anterior corneal curvature compared to POAG. Taking the type of glaucoma into account, longer AL and steeper AK appear to be related to better prognosis for complete success at IOP thresholds of 15 and 18 at 24 months, though not statistically significant. Finally, the time lag between clinical HVF progression and failure appeared to decrease for complete success taken at higher IOP thresholds.

IOC – JC 06

Binasal Visual Defect Secondary to Space Occupying Lesion

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Background/Hypothesis: Binasal visual field defect secondary to Space Occupying Lesion (SOL).

Methods: Case report.

Results: A 34-year-old Malay man presented with a year's history of intermittent, tolerable, gradual-onset, localised throbbing occipital headache associated with giddiness and bilateral blurring of vision. There was no other symptoms of increased intracranial pressure or other ocular complaints. Ocular examination revealed best-corrected visual acuity of 6/24 on the right eye with left eye vision 6/18, with no presence of relative afferent pupillary defect. Anterior segments were normal. Binasal visual defect noted during confrontation visual field, which later reproducible and confirmed with perimetry visual field. Fundus examination showed bilateral hyperaemic optic disc swelling. Other neurological investigations were unremarkable. MRI revealed left high parietal tumour, most likely primary brain tumour. Tumour mass with it surrounding extensive white matter edema in the frontoparietooccipital region giving rise to compressive effect over the optic chiasma laterally.

Conclusion: This is one of the variants of visual field defects, which can occur in patient with SOL.

IOC – JC 07

Significance of Optical Coherence Tomography Findings in Limited Central Retinal Artery Occlusion

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Background/Hypothesis: This article describes the optical coherence tomography (OCT) findings in a patient with atypical central retinal artery occlusion (CRAO) where the cherry red spot is not obvious and can aid in the prompt diagnosis and treatment of CRAO.

Methods: A case of atypical CRAO was retrospectively reviewed. Information on the patient's clinical presentations, physical findings, investigations and management were obtained together with the color fundus photos, fundus fluorescein angiogram (FFA) (Visupac version 4.3 system) and OCT (Stratus-OCT3 and fourier domain Cirrus-OCT SW Ver:2.0) findings.

Results: It was observed that OCT demonstrated intraretinal changes not clinically evident. Stratus OCT revealed a thickened, hyper-reflective inner retinal layer accompanied by a prominent hyporeflective band just above the RPE-Bruch's layer. Cirrus-OCT showed similar changes albeit with differences in macular thickness as expected. Aided by the OCT findings of inner retinal involvement, a diagnosis of CRAO was made and early treatment was instituted. The patient had a good visual outcome.

Conclusion: OCT findings of a thick and hyper-reflective inner retinal layer both with Stratus and Cirrus OCT in CRAO may aid the diagnosis of atypical CRAO even before the typical clinical appearance, thus facilitating prompt treatment.

IOC – JC 08

Transscleral Diode Cyclophotocoagulation for Glaucoma: An Evaluation of Optimal Energy Parameters

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Background/Hypothesis: In transscleral diode cyclophotocoagulation (TCP), treatment parameters are modifiable variables which may impact clinical outcome. We aim to evaluate the correlation between energy parameters in TCP and treatment efficacy and complications.

Methods: This was a retrospective longitudinal study of consecutive TCP procedures between January 2000 and April 2009. Treatment parameters of a single TCP session were considered. Main outcome measures were IOP reduction at 1, 3, 6 and 12 months, requirement for retreatment and incidence of hypotony or phthisis.

Results: 77 eyes of 77 patients were included. The mean follow-up period was 20.6 months (range, 0.3 to 110.9), with neovascular glaucoma constituting the majority of cases (45.5%). Hypotony defined as (≤ 5 mmHg) occurred in 14.3% and phthisis in 7.8% of eyes. Mean total energy was 156.1 ± 71.3 J and mean energy per shot 3.8 ± 1.1 J. Mean IOP decreased from 41.3 ± 11.5 mmHg at baseline to 29.4 ± 19.2 mmHg at the final index visit. Multivariate analysis showed that greater IOP reduction correlated with higher power at 1 month ($P = 0.02$) and 3 months ($P = 0.01$), longer exposure time at 1 month ($P = 0.02$) and 3 months ($P = 0.03$), and a higher number of shots at 3 months ($P = 0.02$).

Conclusion: Power, exposure time and number of shots correlate well with IOP reduction up to 3 months. The lack of correlation between treatment parameters and later IOP outcomes may be attributed to the unsustained IOP-lowering effect of TCP.

IOC – JC 09

Spectrum of Toxoplasma Ocular Infections at a Tertiary Hospital

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Background/Hypothesis: To describe the clinical and demographic features and outcome of ocular toxoplasmosis (OT) at a tertiary hospital.

Methods: A retrospective case review of patients with ocular toxoplasmosis were identified from the hospital database between 2003 and 2009

Results: There were 14 patients (11 females) identified. The mean age of patients was 31.4 years and followed up for mean of 37.7 weeks. 85.7% (12 patients) were primary disease. The most common symptom was blurring of vision (85.7%) and 13 patients were treated with specific anti-toxoplasmic medications. Amongst those who were treated, the mean time to resolution was 5.1 weeks. Complications included macular scar (3 patients) and exudative retinal detachment (1 patient). 3 patients had final visual acuity poorer than 6/12, 66.7% of these were due to macular scar.

Conclusion: The disease was more common in females than males (11:3) in our series. Blurring of vision and floaters were the main presenting symptoms of the disease. Treatment did not seem to have an effect in time to resolution among our immunocompetent patients. In our case series, there was no recurrence of disease during the follow-up period. Most patients achieved good visual outcome. Those who have poorer visual outcome were due to macular involvement.

IOC – JC 10

Idiopathic Intracranial Hypertension (IIH) with Tunnel Vision Field Defect in a Child

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Background/Hypothesis: To report a case of idiopathic intracranial hypertension with bilateral tunnel vision in a child.

Methods: A case report.

Results: An 8-year-old girl, emmetropic and not known to have any previous medical illness, presented with 3 months history of tolerable intermittent, localised, non-radiating frontal headache. She did not have any other symptoms to suggest increased intracranial pressure or other ocular complaints.

Her best-corrected visual acuity was 6/6 bilaterally. There was no relative afferent pupillary defect. Colour vision was normal. Visual field on confrontation test showed tunnel vision bilaterally, which later confirmed and reproducible with serial perimetry visual field test. Anterior segment examination was normal. Funduscopy revealed bilateral optic disc swelling. Central Nervous System (CNS) examination was unremarkable. Serial perimetry visual field test showed reproducible tunnel vision bilaterally. Radiological investigations consist of CT scan, MRI, MRA and MRV of the brain were normal. She was then subjected for lumbar puncture (LP). LP revealed opening pressure more than 300 mmH₂O with closing pressure of 180 mmH₂O. 30 mL of CSF was drained out. Studies on CSF sample revealed no abnormalities. Her symptoms markedly improved after LP. Currently, she is on oral acetazolamide 250 mg bd with close monitoring of her renal profile.

Conclusion: This is a typical presentation of a very rare neuro-ophthalmology case, which affects children. In this case, the diagnosis was confirmed by exclusion after various investigations performed. Acetazolamide is also effective in children with IIH.

IOC – JC 11

Characteristic of Glaucoma Patients in Sanglah Hospital Denpasar Bali

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Background/Hypothesis: To report the characteristics of patients diagnosed with glaucoma including age, sex, visual acuity and type of glaucoma in Sanglah Hospital from 1 January 2006 to 31 December 2008.

Methods: A descriptive retrospective study from 1 January 2006 to 31 December 2008 was conducted and data from new glaucoma patients that were admitted to the hospital were collected. Glaucoma is defined as a group of diseases that have in common characteristic optic neuropathy with associated visual field loss for which elevated intraocular pressure (IOP) is one of the primary risk factors. **Results:** One hundred and twenty-eight eyes were glaucoma adverse on admission in Sanglah hospital. The mean of LogMAR visual acuity was 1.36 ± 0.68 . Glaucoma prevalence in male (69.3%) was higher than in female (30.7%). The mean age was 57.46 years and the most common glaucoma was Primary Open Angle Glaucoma (59.4%).

Conclusion: The glaucoma patients who came to Sanglah Hospital were mostly in the productive age with worse visual acuity and Primary Open Angle Glaucoma type.

IOC – JC 12

Blepharoptosis after Lower Facial Nerve Palsy – A Lesson for the Unwary

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Background/Hypothesis: Synkinetic ptosis (Marin-Amat's syndrome) resulting from recovered lower facial nerve palsy is an uncommon form of ptosis. The management is different from conventional form of ptosis. We present 2 such cases.

Methods: Case report of 2 patients.

Results: Two women, aged 76 and 53 years, complained of ptosis on the same side after recovering from a left and right facial palsy respectively. The ptosis occurred during movement of the mouth such as eating and talking. Examination revealed normal levator functions and the ptosis was successfully treated with Botox.

Conclusion: Marin-Amat's syndrome or otherwise known as inverse Marcus Gunn jaw-winking syndrome is an uncommon form of ptosis. It is important for the ophthalmologist to recognise this type of ptosis to avoid unnecessary ptosis operation.

IOC – JC 13

An Unusual Cause of Intraorbital Mass

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Background/Hypothesis: Orbital myxomas are extremely rare tumours with only a few reported in medical literature. We report a rare case of orbital myxoma causing facial disfigurement and severe vertical diplopia.

Methods: A 23-year-old woman who has ventricular septal defect, presented with a non-axial proptosis of the left eye of 9 years' duration. The patient underwent extensive preoperative, clinical and radiological evaluation before surgery was performed.

Results: Clinically the mass was firm, well circumscribed, non-pulsatile nor reducible and displaced the eyeball superonasally. Examination of the eyes revealed normal optic nerve, retina and intraocular pressure. Orbital CT delineated a well circumscribed encapsulated homogenous mass at the inferotemporal quadrant with extension to the left orbital apex. The mass was removed en-bloc via a subciliary skin incision with a split skin approach. It was rubbery and worm like tapering towards the end measuring 9 cm. It had a shiny gelatinous cut surface. Histopathological examination revealed hypocellular myxoid stroma containing scattered spindle cells, in keeping with myxoma.

Conclusion: Orbital myxomas are extremely rare benign tumours. Histological diagnosis is required. Surgical endpoint is to remove the mass completely and Carney syndrome needs to be ruled out in all patients with myxomas.

IOC – JC 14

The Prevalence of Pseudoexfoliation Syndrome in a Singapore Eye Clinic

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Background/Hypothesis: To study the demographics and ocular morbidity of pseudoexfoliation syndrome in a Singapore hospital eye outpatient clinic.

Methods: We conducted a retrospective study of 93 consecutive patients (146 eyes) with pseudoexfoliation syndrome (PXF) encountered by a single ophthalmologist over a period of 37 months (1 July 2006 to 31 July 2009).

Results: The major ethnic origins among the 93 PXF patients were Chinese (n = 58, 62.4%), Malay (n = 9, 9.7%) and Indian (n = 23, 24.7%). The prevalence of PXF among our patients were 1.8% (58/3204) for Chinese, 3.4% (9/264) for Malay and 7.8% (23/293) for Indian. An overall PXF prevalence of 2.4% (93/3896) was reported within our local eye clinic patient population. There was an increasing prevalence of PXF with advancing age as the majority of these PXF patients (57/93 = 61%) were above 70 years old. Overall, no gender predisposition associated with PXF was found.

Glaucoma was present in 21.9% (32/146) of the PXF eyes. The major causes of visual impairment with best-corrected vision acuity of less than 6/18 among the PXF eyes were cataract (35/146 = 24.0%) and glaucoma (9/146 = 6.2%).

Conclusion: PXF is not an infrequent encounter among the elderly Singapore eye clinic patients, being more common in the Indian and least common among the Chinese. It is important for ophthalmologists to diagnose PXF early and monitor these patients regularly for cataracts and glaucoma.

IOC – JC 15

Blunt Trauma as a Red Herring of Optic Nerve Glioma

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Background/Hypothesis: To describe a case of 14-year-old boy who presented with right blurring of vision after being hit in the right eye by a fellow classmate. His father lodged a police report to prosecute the culprit. The vision of the involved eye was counting finger with a dense relative afferent pupillary defect. However, the eye examination including the optic nerve was normal.

Methods: Case report.

Results: A CT scan of the right orbit was requested which showed the presence of an intraconal mass consistent with optic nerve glioma. Biometry showed the right eye has a smaller axial length than the left eye as a result of the compression.

Conclusion: Optic nerve glioma is an uncommon intraconal tumour which usually present insidiously. Occasionally, patient may not notice the vision blurring effect of the tumour, as in our case. Patient may only notice the defective vision after trivial injury and attribute the blurring to injury- “Red Herring” However, dense RAPD gives a clue to the diagnosis. CT scan orbit findings eventually confirm the diagnosis. In summary, one should try to look for underlying aetiology in cases where the extent of blurred vision is not consistent with the degree of trauma.

IOC – JC 16

Post-viral Neuroretinitis Mimicking as Segmental Optic Disc Swelling

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Background/Hypothesis: To report an interesting case of post viral neuroretinitis presented as segmental optic disc swelling with incomplete macular star.

Methods: Case report.

Results: A 22-year-old male presented with acute painless blurring of vision in the right eye for 5 days preceded by history of influenza-like flu. There were no other constitutional symptoms; history of tuberculosis; or contact or injury due to pets e.g. cats. On examination, the best-corrected vision was 6/24 in the right eye and 6/6 in the left eye. The right eye revealed a hyperaemic optic disc with blurred infero-temporal margin and adjacent linear shaped exudates at the macula-papillary bundle. The rest of the retina was normal. There was right optic nerve dysfunction as the color vision was impaired and visual field testing revealed a centrocaecal scotoma. However relative afferent pupillary defect was not demonstrated. The left eye was unremarkable. The remaining neurological and others systemic examination of the patient was normal. The results of all blood test, including serological tests for syphilis and tuberculosis workout were normal. Post-viral neuroretinitis was diagnosed. He was managed conservatively with serial OCT and visual field monitoring. 1 month after the onset, his right eye vision improved to 6/6 with complete resolution of optic disc swelling, but the incomplete macular star still persist without causing significant visual field defect.

Conclusion: This case highlighted an atypical presentation of neuroretinitis presented as segmental optic disc swelling with incomplete macular star, following influenza-like flu. Neuroretinitis can be funduscopically confused with papillitis, ischemic optic neuropathy, optic

neuritis and compressive lesions. Familiarity with the fundus finding and awareness of infective neuroretinitis may enable a prompt clinical diagnosis, avoidance of expensive brain imaging studies and early referral for appropriate therapy. In the post-viral neuroretinitis, the patient usually made full recovery as demonstrated in this case report.

IOC – JC 17

Intraductal Breast Carcinoma Presenting as Orbital Apex Tumour

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Background/Hypothesis: To report a case of left orbital apex tumour from metastatic intraductal breast carcinoma.

Methods: Case report.

Results: A 34-year-old Malay housewife presented with a month's history of gradual onset left eye blurring of vision, associated with lethargy and significant weight loss. Of significance, she had history of multiple incision and drainage for right breast abscess. Left eye visual acuity was hand motions with relative afferent pupillary defect and red desaturation of 20%. Anterior chamber and vitreous was quiet and left optic disc was slightly pale but not swollen. Extraocular muscle movements were full. MRI brain suggested tumour of 2 x 2 x 0.5 cm in size occupying left orbital apex. Following craniotomy and excision biopsy, malignant cells was seen, suggestive of metastases. CT scan of thorax, abdomen and pelvis showed bony, liver and lung infiltrations. The right breast was hard with multiple scars, and distorted- looking nipple. Axillary lymph node was palpable. A tru-cut biopsy confirmed intraductal breast carcinoma. Left eye vision remained the same following excision of tumour. Patient was referred to Oncology for further management. However, her conditions deteriorated rapidly, and patient opted for conservative management.

Conclusion: This is an interesting case of intraductal breast carcinoma presenting as orbital apex tumour. There are multiple causes of space occupying lesion, but in patient with history of breast abscess, possibility of breast carcinoma should be foremost in mind.

IOC – JC 18

Surgical Induced Necrotising Scleritis: A Case Report

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Background/Hypothesis: To report a case of surgically induced necrotising scleritis.

Methods: A case report.

Results: A 45-year-old Indonesian lady with history of left eye pterygium excision 3 years ago presented with chronic left eye pain since postoperative. Her condition worsen over 1 month with acute left eye pain and decreased vision. Ocular examination of left eye showed ischaemic sclera necrosis nasally and thinning of sclera extending 6-11 o'clock position thinning at nasal limbus and cornea with underlying pigmented uveal tissue can be seen. No perforation. Laboratory investigations revealed no abnormalities except Rheumatoid Factor positive.

Conclusion: Surgically induced necrotising scleritis should be highly suspected in patient with relevant history of eye surgery. However, systemic causes must be investigated to rule out other causes. This patient is still receiving treatment and planned for sclera or pericardium patch later.

IOC – JC 19

Clinical Outcome of Pan Retinal Laser Photocoagulation Done Using the PASCAL Machine for the Treatment of Diabetic Retinopathy

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Background/Hypothesis: To evaluate the clinical outcome of pan retinal laser photocoagulation (PRP) done using the PASCAL® (Optimedica) photocoagulator.

Methods: A retrospective review of 30 eyes in 19 patients with severe non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) that underwent PRP during the period from February 2008 to June 2009. The patients' demographic information and laser parameters used during treatment sessions were recorded. Main outcome measures were number of laser sessions to stabilisation of retinopathy, pain score, and complications arising from treatment.

Results: Sixteen (53.4%) eyes had severe NPDR while 14 (46.6%) eyes had PDR. 9 (30%) eyes had co-existent clinically significant macular edema (CSME). The average laser settings (number of spots, power, duration, spot size) used per session were 1487 spots, 420 milliwatts, 30 milliseconds, 200 microns respectively. The mean number of sessions to retinopathy stabilisation was 2. The mean pain score was 2 during treatment. Except from new-onset macular edema in 1 eye, there were no other documented complications such as non-improvement in activity of retinopathy after 4 months, arising from treatment with the PASCAL® laser photocoagulator.

Conclusion: The PASCAL® system is demonstrated to be effective and safe, and causes minimal pain in the treatment of diabetic retinopathy requiring laser pan retinal photocoagulation.

IOC – JC 20

Comparative Analysis between Primary Open Angle Glaucoma and Chronic Angle Closure Patients who have Undergone Combined Phacoemulsification with Trabeculectomy Augmented with Mitomycin C

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National Healthcare Group Eye Institute @ Tan Tock Seng Hospital, Singapore

Background/Hypothesis: To compare the survival between primary open angle glaucoma (POAG) and chronic angle closure (CACG) patients who have undergone combined phacoemulsification and trabeculectomy augmented with mitomycin C.

Methods: Retrospective, non-randomised, comparative analysis. 325 eyes which underwent combined phacoemulsification with trabeculectomy and mitomycin C between January 2004 and December 2006 with up to 54 months of follow-up were identified from the NHGEI operations database. Intraocular pressure (IOP) measurement by Goldmann Applanation Tonometry (GAT) preoperatively and postoperatively at 1, 3, 6 and every subsequent 6 months were recorded. Other measures were use of anti-glaucoma medications pre- and postoperatively, best corrected visual acuity (BCVA) and complications were recorded. Complete success was defined as IOP less than 21 mmHg, 18 mmHg and 15 mmHg without the use of adjuvant anti-glaucoma medications. Qualified success included the same IOP definitions but with the use of adjuvant anti-glaucoma medications. The Kaplan-Meier survival analysis was used to evaluate survival of both POAG and CACG patients. The Mann-Whitney test was used to compare medial survival times between POAG and CACG groups.

Results: Patient demographics were as follows: 52.9% males, 47.1% females, 84.5% Chinese, 7.6% Malays, 7.3% Indians, 0.6% others. POAG n = 168, CACG n = 116. There was significant difference ($P = 0.012$) in the proportion of Chinese between POAG (80.5%) and CACG (91.4%) groups. There was significant difference ($P < 0.001$) in axial lengths between POAG (mean = 23.87 sd 1.29) and CACG (mean = 22.94, sd 0.88). There was significant difference in medial survival times between POAG and CACG at level of 0.05, except for complete success with IOP <21 mmHg.

Conclusion: There was a statistically significant difference for qualified success at IOP <15, IOP <18 and IOP <21 mmHg and statistically significant difference for complete success at IOP <15 and IOP <18 mmHg between POAG and CACG patients.

IOC – JC 21

Iatrogenic Visual Field Defect

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Background/Hypothesis: To report a case of iatrogenic visual field defect.

Methods: Case report.

Results: A 20-year-old Malay college student with a background history of temporal lobe epilepsy (TLE) presented with 3-week history of insidious onset, painless blurring of vision in both eyes which was progressively worsening. Of significance, the symptoms occurred immediately after she underwent right hippocampectomy for hippocampal sclerosis.

Her best-corrected visual acuity was 6/6 bilaterally. There was no relative afferent papillary defect. Colour vision was normal. Visual field on confrontation test showed left homonymous superior quadrantanopia. Anterior segment examination was normal. Funduscopy revealed pale optic disc temporally with cup to disc ratio of 0.4. Central Nervous System (CNS) examination was unremarkable.

Conclusion: This is an example of a visual field defect secondary to surgical procedure.

IOC – JC 22

Intracameral Injection of Ranibizumab (Lucentis) to Treat Iris Neovascularisation and Hyphaema in a Non-diabetic Patient with Anterior Proliferative Vitreoretinopathy in a Silicone Filled Eye

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Background/Hypothesis: To report the efficacy of intracameral injection of ranibizumab in patient with iris neovascularisation (INV).

Methods: Case report.

Results: A 66-year-old non-diabetic gentleman presented with left eye pain and redness. Visual acuity was hand motions OS and 6/9 OD. The left eye had undergone multiple vitreoretinal surgeries due to recurrent rhegmatogenous retinal detachment and was pseudophakic. Anterior segment examination showed left circumcorneal congestion, hyphaema, INV, hyperoleon and seclusio pupillae with iris bombe. Intraocular pressure had risen to 17 mmHg from a baseline of 8 mmHg. Fundus examination revealed an attached posterior pole under oil and proliferative vitreoretinopathy anterior to an inferior retinectomy. The patient was pre-treated with topical steroids, homa-

tropine and laser peripheral iridotomy. Removal of intraocular lens and silicone oil and laser to residual retina was facilitated by giving an off-label intracameral injection of 0.05ml of ranibizumab 1 week prior to surgery to cause regression of INV. There were no local or systemic complications of the injection. On day 1 post-injection, there was a marked disappearance of INV. By day 4, hyphaema had resolved. After 1 month of treatment, there was no recurrence of INV and the patient was asymptomatic. IOP returned to baseline values and vision was counting fingers.

Conclusion: This case demonstrates the use of intracameral ranibizumab on causing regression of INV in the setting of retinal ischaemia from anterior proliferative vitreoretinopathy in an oil filled eye.

IOC – JC 23

Characteristic of Toxic Optic Neuropathy (TON) Patients Affected by Methanol Consumption in Sanglah Hospital Denpasar Bali

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Background/Hypothesis: To report the characteristics of patients diagnosed with toxic optic neuropathy (TON) caused by methanol consumption, based on age, sex, and visual acuity in Sanglah Hospital during May 2009.

Methods: A descriptive study during May 2009 data taken from Sanglah Hospital medical record.

Results: Twenty-seven patients were referred to Sanglah Hospital for consumption methanol found in a traditional Balinese liqueur (Arak). Eight died and 17 patients were hospitalised for several days. Fifteen of them were males and 1 female with a mean age of 33.5 years (range, 18 to 49). All patient received hemodialysis procedure with high-dose steroid and methylcobalamin administration. Fifteen patients showed visual acuity improvement after 1 week of followed-up treatment.

Conclusion: Hemodialysis, steroid and methylcobalamin administration can improved visual acuity for TON patients.

IOC – JC 24

Comparison of Retinal Nerve Fibre Layer Thickness Measurements between 2 Spectral-Domain Optical Coherence Tomography Machines in Normal Subjects

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Background/Hypothesis: To evaluate and compare the retinal nerve fibre layer (RNFL) thickness reproducibility and repeatability using 2 different spectral-domain optical coherence tomography (SD-OCT) machines in normal subjects.

Methods: A prospective, clinical trial. 50 normal subjects were randomised to have either eye (left or right) undergo 3 RNFL thickness OCT scans each with the Cirrus SD-OCT (Carl Zeiss Meditec; software version 3.0) and Spectralis OCT (Heidelberg Engineering; software combining SD-OCT with confocal scanning laser ophthalmoscopy (CLSO) technology) at a single sitting. RNFL measurements were taken of the 50 eyes and these included global mean RNFL thickness and RNFL thickness in all four quadrants (temporal, superior, nasal and inferior). A comparison was made between the RNFL thickness measured between the 2 SD-OCT machines as well as the repeatability of the measurements.

Results: Bland-Altman plots generally showed good agreement

between the 2 SD-OCT machines. The Spectralis OCT provided thicker RNFL measurement than Cirrus OCT in global mean RNFL thickness [mean difference of 6.041 with 95% CI (4.706, 7.375)], as well as in all four quadrants. Repeatability of RNFL measurement for both machines was good, with Interclass Correlation (ICC) ranging from 0.879 to 0.985.

Conclusion: Good agreement was found between RNFL thickness measurement taken by Spectralis and Cirrus OCT, although the Spectralis OCT provided thicker measurement than Cirrus OCT in all parameters assessed. Both instruments also showed high levels of repeatability in the measurement of RNFL thickness in all parameters assessed.

IOC – JC 25

Living with Uveitis – How Much Does it Affect our Patients?

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Background/Hypothesis: To determine visual function and quality of life (QOL) in patients with uveitis and investigate the association between clinical parameters of uveitis and visual functioning.

Methods: A prospective cross-sectional study. Consecutive adult patients attending the uveitis outpatient clinic were enrolled over a 2-month period. The 25-item National Eye Institute visual function questionnaire (VFQ-25) was administered by a single trained interviewer. Scores on the VFQ-25 were analysed and converted to a 100-point scale in which 100 represents the best possible score and 0 represents the worst. Sociodemographic and clinical data was also collected. Subgroup differences were compared using t-tests and Kruskal-Wallis tests.

Results: Forty-one patients participated. The VFQ-25 scores for uveitic patients for all domains were significantly lower than scores for normal age-matched controls. ($P < 0.05$). QOL was also generally poorer among patients with bilateral ocular involvement. The group differences were statistically significant for the domains of distance vision, mental health, role limitations and dependency ($P < 0.05$). Significantly lower VFQ scores were noted in the domains of general vision and mental health for patients with poorer visual acuity of the affected eye. Patients with chronic uveitis tended to report worse QOL in all domains as compared to patients with acute or recurrent disease, though these differences did not attain statistical significance.

Conclusion: Patients with uveitis reported markedly poorer visual functioning than normal subjects. Patients with bilateral disease, poor visual acuity and chronic uveitis patterns have poorer visual functioning. The VFQ-25 can provide complementary information when performed in uveitic patients to assess the impact of disease and its therapy on their quality of life.

IOC – JC 26

Postoperative Complications after Phacotrabeculectomy for Subjects with Primary Angle Closure Glaucoma Compared to Primary Open Angle Glaucoma

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Background/Hypothesis: To investigate the incidence of postoperative complications and re-operations within the first year after phacotrabeculectomy for primary angle closure glaucoma (PACG),

as compared to primary open angle glaucoma (POAG).

Methods: Data was obtained from an audit of all phacotrabeculectomies done at the Singapore National Eye Centre over a 4-year period from 2001 to 2004. We retrospectively analysed the charts of patients with postoperative complications within the first year after surgery. All cases of phacotrabeculectomies were performed with anti-metabolites (Mitomycin-C or 5-fluorouracil). Main outcome measures include incidence of postoperative complications and re-operations required.

Results: Out of the 1137 subjects (738 POAG patients and 399 PACG patients) studied, postoperative complications occurred in 39 (3.4%) patients overall, with 21 (2.8%) in the POAG group (95% CI, 1.8-4.2) and 18 (4.5%) in the PACG group (95% CI, 2.8-6.9). The higher rate of complications in the PACG group as compared to the POAG group was statistically significant ($P = 0.004$). The commonest complication reported in our study was overfiltration with shallow anterior chamber (14 [1.2%] cases). Malignant glaucoma was found to be very rare in our series and occurred in only 1 POAG eye that underwent phacotrabeculectomy. Of the 39 eyes that encountered complications post-surgery, 24 eyes (61.5%) required a second operation or procedure.

Conclusion: In this large sample of 1137 Asian subjects, the rates of postoperative complications after phacotrabeculectomy were found to be higher for PACG eyes compared to POAG. The incidence of re-operations was however not significantly different between the 2 groups.

IOC – JC 27

Comparison of Postoperative Outcome between Patients Undergoing Ahmed Tube Implantation with and without Use of Adjunctive Mitomycin-C

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Background/Hypothesis: To review and compare postoperative outcome in patients who had undergone Ahmed tube implantation with and without adjunctive mitomycin-C (MMC).

Methods: We performed a non-randomised retrospective review of 68 patients (78 eyes) who had undergone Ahmed tube implantation performed by 4 different surgeons in Tan Tock Seng Hospital from September 2001 till January 2009. We compared postoperative outcome with and without use of MMC, specifically looking at intraocular pressure (IOP) outcome, use of anti-glaucoma medication post surgery and complications of surgery.

Results: A total of 68 patients (78 eyes) underwent Ahmed tube implantation between September 2001 and January 2009. 44 out of 78 eyes (56.4%) did not receive adjunctive MMC whilst 34 out of 78 eyes (43.6%) did. At 18 months, patients who received MMC required less anti-glaucoma medication compared to patients who did not receive MMC ($P = 0.042$). There was no statistically significant difference in reduction of IOP and postoperative IOP between both groups. Patients receiving MMC were more likely to suffer postoperative hypotony ($P = 0.045$).

Conclusion: Whilst the use of MMC does not increase the amount of IOP reduction when used adjunctively in Ahmed tube implantation, at 18 months, its application decreases the number of postoperative anti-glaucoma medications required for IOP control. However, there is a higher risk of post operative hypotony in patients who undergo Ahmed tube surgery with adjunctive use of MMC.

IOC – JC 28

An Uncommon Orbital Cystic Schwannoma in a Neurofibromatosis Patient – A Case Report

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Background/Hypothesis: Primary orbital schwannoma is a rare orbital tumour. We report a case of orbital schwannoma which shows spontaneously enlargement as a result of cystic changes.

Methods: A case report.

Results: A 25-year-old woman with type 2 neurofibromatosis presented with a 2-week history of acute onset left proptosis and reduced vision. The ocular movements were restricted in all directions. CT scan showed a left orbital intraconal mass compressing the optic nerve. The lesion contains hyperdense regions. She was started on oral prednisolone which showed only slight improvement. Orbitotomy was performed and the lesion was found to contain blood and yellowish fluid. Histopathology revealed schwannoma with degenerative changes.

Conclusion: Orbital cystic schwannoma, though rare, should be included in the differential diagnosis of acute onset proptosis especially in patients with a history of neurofibromatosis.

IOC – JC 29

A Case of Recurrent Endogenous Klebsiella Endophthalmitis

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Endogenous Klebsiella endophthalmitis (EKE) is a visually devastating disease. There is a paucity of literature describing the recurrence of this entity. We report a rare case of recurrent EKE in a 58-year-old male with a background history of diabetes mellitus and intravenous drug use. The first episode was successfully treated with a combination of intravenous, intravitreal and topical antibiotics. The eye remained quiescent for 5 months before recurring as a culture proven Klebsiella Endophthalmitis. Clinical progression was relentless and refractory to conservative treatment. Eventually, the decision was made for evisceration of the eye.

IOC – JC 30

Neuroendocrine Tumour, a Case of Parasellar Origin with Orbital Extension

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Background/Hypothesis: To report an atypical case of neuroendocrine tumour originating from the sellar area and extending into orbital spaces bilaterally via superior orbital fissures.

Methods: Case report.

Results: A 54-year-old lady presented with a 3-year history of progressive right eye proptosis, diplopia with blurring of vision. Examination revealed right axial proptosis of 6mm difference via exophthalmometer, presence of relative afferent pupillary defect, and limited extraocular muscle movement in all gaze of the right eye. Serial magnetic resonance imaging showed a parasellar mass extending anteriorly into orbital spaces involving extra and intraconal

region which progressively increase in size over 4 years duration. Transfrontal open biopsy and transorbital biopsy performed confirmed neuroendocrine tumour by immunohistochemical staining of synaptophysin, chromogranin and neuron specific enolase. The patient refused removal of the tumour and radiotherapy since initial diagnosis, hence after 5 years of follow-up, her right eye vision worsened to counting finger, with severe proptosis and exposure keratopathy whereas her left eye vision remained with superonasal visual field only with best corrected visual acuity of 6/24, N18.

Conclusion: This unusual case illustrates the natural history of an atypical benign neuroendocrine tumour which originated from the parasellar area, however caused devastating outcome to the vision due to encroachment of tumour into orbital spaces causing an orbital apex syndrome.

IOC – JC 31

Routine Bone Marrow Biopsy (BMB) May Not be Necessary for Patients with Radiologically Early Stage Orbital Mucosal Associated Lymphoid Tissue (MALT) Lymphoma

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Background/Hypothesis: 1) To examine the clinical characteristics and patterns of dissemination of orbital MALT lymphomas. 2) To determine the incidence of bone marrow involvement (BMI) in patients (pts) with orbital MALT.

Methods: A total of 33 pts with orbital MALT lymphoma referred to our institution from 1992 to 2008 were included. Four pts were excluded due to incomplete staging information, which included computed tomography (CT) imaging of neck, thorax, abdomen and pelvis, BMB and central pathology review. We further accrued data pertaining to baseline characteristics, treatment, progress and outcome.

Results: The median age was 52 years and majority (82%) had low or low intermediate risk disease according to the international prognostic index. Twenty-one pts (72%), had disease confined to the orbit(s) alone (16 unilateral and 5 bilateral). Among them, all had negative BMB (0/21). Thus, the negative predictive value of orbital involvement alone on CT scan imaging for BMI is 100%. 8 pts had distant involvement (7 with nodal involvement and 1 with disseminated involvement). Among them, only 1 with radiologically stage III nodal involvement had BMI. Overall, with a median follow-up of 32 months, only 1 patient passed away from an unrelated cause.

Conclusion: In our series, majority of pts with orbital MALT lymphomas are young (69%) and have localised disease (72%). It is associated with an excellent overall survival, even among those with disseminated disease. The overall incidence of BMI was 3% and all pts with radiologically isolated orbital MALT had no BMI, suggesting that BMB may be safely omitted in this subgroup of patients.

IOC – JC 32

Opacification of Intraocular Lens Implant after Uncomplicated Cataract Surgery

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Background/Hypothesis: To report 3 cases of total opacification (optic) of intraocular lens (IOL) implants followed by successful IOL exchange.

Methods: Case series.

Results: Two patients who underwent phacoemulsification presented to our clinic with poor vision and were initially misdiagnosed as vitreous haemorrhage. The third case presented with progressive reduction of vision 1 year post-cataract surgery. Ocular examination found the presence of opacified intraocular lenses, which contribute to poor vision in all 3 cases. The intraocular lenses were noted to be hydrophilic and hydrogel in nature. Incidentally, all patients were diabetic. These patients underwent successful intraocular lens explantation with secondary intraocular lens implantation and have satisfactory visual recovery.

Conclusion: Hydrophilic and hydrogel lenses have tendency to opacify postoperatively. A thorough investigation of these materials looking into the reason of opacification is warranted.

IOC – JC 33

Comparing Factors Affecting Surgically Induced Astigmatism Post Phacoemulsification

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Background/Hypothesis: The corneal wound in phacoemulsification affects the astigmatism postoperatively, the extent of which varies with surgical technique, incision type and size, and wound location. We aimed to study the surgically induced astigmatism during phacoemulsification and correlate it with these factors.

Methods: A review of phacoemulsification performed by a single surgeon. The surgically induced astigmatism was calculated using vector analysis.

Results: A total of 50 patients (53 eyes) were studied, of which there were 26 males (52%) and 24 females (48%). The mean surgically induced astigmatism (SIA) was 0.72D. The mean SIA for was higher for females compared to males (0.75D vs. 0.61D, $P = 0.15$). There was no significant difference in SIA between incisions made along the steep meridian (25/53) or incisions made elsewhere (28/53) [0.71D vs. 0.73D, $P = 0.91$]. In patients with low preoperative astigmatism (> -1.5 D), a 2-plane corneal wound had a higher mean SIA than a 3-plane incision (1.07D vs. 0.49D, $P = 0.003$). In patients with high preoperative astigmatism (< -1.5 D), there is a similar trend (0.67D vs. 0.57D, $P = 0.81$). Eyes with sutures had a higher mean SIA than eyes with no sutures [1.61D vs. 0.68D, $P = 0.01$]. SIA was higher in the left eye compared to the right eye [0.84D vs. 0.53D, $P = 0.08$]

Conclusion: A 2-plane corneal incision resulted in a higher mean SIA than a 3-plane incision. Other factors associated with a higher mean SIA include females, left eye and presence of a stitch.

IOC – JC 34

Correlation between Optical Coherence Tomographic Features and Clinical Outcomes in Diabetic Macular Oedema

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Background/Hypothesis: To correlate optical coherence tomographic (OCT) features in diabetic macular oedema with visual outcomes and treatment response to laser photocoagulation.

Methods: Review of patients with newly-diagnosed clinically significant macular oedema undergoing laser photocoagulation over a 3-month period in Tan Tock Seng Hospital. Pre-treatment OCT features were categorised into 3 types: type I (sponge-like retinal swelling), type II (macular oedema with cystic changes) and type III (serous retinal detachment, with or without vitreo-macular traction).

OCT features and their association with retinal thickness, treatment response to laser photocoagulation, and visual acuity after 1 year of follow-up were evaluated.

Results: Of 46 eyes (42 patients), 73.9% were OCT type I, 23.9% type II and 2.2% type III. Eyes with OCT type II had a significantly higher mean central macular thickness compared to OCT type I (358 μm vs. 232 μm , $P < 0.001$) and mean inner subfield thickness (346 μm vs. 287 μm , $P < 0.001$) at presentation. Following laser photocoagulation and at 1 year of follow-up, 51.4% of eyes showed resolution of macular oedema, with persistent oedema in 48.6%. In eyes with OCT type I, 64% resolved compared to only 18.2% with OCT type II ($P = 0.025$). Visual acuity after 1 year remained unchanged or improved from baseline in 73% of eyes but deteriorated in 27%. All eyes with worsening visual acuity were those with persistent oedema. Of these, 70% were of OCT type II and 30% OCT type I ($P = 0.003$).

Conclusion: Diabetic macular oedema with cystic features on OCT was associated with reduced response to laser photocoagulation and poorer visual outcomes.

IOC – JC 35

Clinical Characteristics and Visual Outcomes of Sellar and Parasellar Masses

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Background/Hypothesis: The aims of this study are to: (1) evaluate the clinical characteristics of patients with sellar and parasellar masses, and (2) assess visual outcomes post-surgical resection in cases with optic nerve compression.

Methods: This is a retrospective study of 31 consecutive patients with sellar and parasellar masses presenting to the ophthalmology department from September 1999 to October 2008. Patients without radiographic imaging were excluded. Clinical data obtained include demographic details, age of presentation, type and duration of symptoms, time to operation, pre and postoperative visual acuities and visual fields, tumour characteristics and requirement for post-surgical hormonal replacement.

Results: The ethnic distribution was comparable with Singapore's general population. There were 13 (38.7%) male and 19 (61.3%) female patients. Mean age at presentation was 52.4 years. 87.1% ($n = 27$) patients were symptomatic, with blurring of vision (67.7%, $n = 21$) and headache (16.1%, $n = 5$) the most common symptoms. The most common tumour was pituitary adenoma (48.4%, $n = 15$) followed by meningioma (19.4%, $n = 6$). Sixteen patients underwent surgical resection and 75% had improvement in visual acuity ($P = 0.021$). Improvement in mean deviation of the overall visual fields and temporal visual fields obtained P values of 0.077 and 0.063 respectively. Eleven patients (78.6%) required hormonal replacement after surgery.

Conclusion: Blurring of vision and headaches should alert clinicians towards the diagnosis of sellar and parasellar masses, where surgical resection is shown to be effective in improving visual acuity and potentially an improvement in visual fields.

IOC – JC 36

Atypical Ocular Presentation of Tuberculosis of the Brain – A Discussion of 2 Unusual Cases

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Background/Hypothesis: Tuberculosis (TB) is still a prevalent disease globally, in both developing and developed countries. There were 9.27 million new cases in 2007 globally. TB brain accounts for 1% of all TB cases. TB brain has a variety of clinical symptoms, both systemic and neurological. We present 2 patients with unusual presenting ocular symptoms in one swollen discs with macular stellar exudates and complete 3rd nerve palsy in the other.

Methods: Both patients underwent a complete neuro-ophthalmology examination. Fundoscopy of the first patient showed bilateral discs swelling and macular exudates in a stellate pattern which was initially misdiagnosed as neuroretinitis. Visual fields with Goldmann Perimetry showed enlarged blind spots with small targets and baring of these blind spots along with narrowed peripheral fields with large targets. CT brain scan showed a left frontal mass. The second patient presented with a complete 3rd nerve palsy. MRI brain showed multiple areas of dural thickening in left cavernous sinus, left parasagittal midline falx and floor of right anterior cranial fossa.

Results: The first patient underwent a left frontal craniotomy and excision of the frontal lobe mass. The second patient underwent a left temporo-parietal mini craniotomy with excision biopsy of the most thickened dura. The biopsy results were positive for TB complex DNA in both patients. Anti-TB medication was started postoperatively.

Conclusion: TB has a great variety of presenting clinical signs and symptoms which can masquerade as other diseases. This case discussion emphasises the importance of keeping TB as an important differential when seeing patients in a neuro-ophthalmology clinic as TB is still a prevalent disease locally.

IOC – JC 37

Visual Outcomes in Diabetic Retinopathy

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Background/Hypothesis: To describe visual outcomes of patients with severe non-proliferative diabetic retinopathy (NPDR) or proliferative diabetic retinopathy (PDR) presenting with mild/no initial visual impairment (Visual acuity [VA] 6/18 or better) before laser photocoagulation.

Methods: A review of 148 cases with diabetic retinopathy, presenting at a tertiary hospital over a 2-year period, who underwent laser photocoagulation.

Results: Of the 148 cases with severe NPDR or PDR, 132 (89.2%) presented with VA $\geq 6/18$. Within this group, 116 (89.2%) maintained mild/no visual impairment at 1 year and 87 (86.1%) at 2 years. At 1 year, 6 (4.6%) had VA of $\leq 6/60$ and 2 (2%) at 2 years. Of the patients with $\leq 6/60$ at 1 year, vitreous haemorrhage was the most common reason, followed by maculopathy. The presence of PDR at presentation was not associated with VA $\leq 6/60$ at 1 or 2 years. Despite treatment, 33 (25.8%) had severe NPDR or PDR at 1 year and 18 (18.4%) at 2 years. During follow-up, 19 (14.5%) developed maculopathy requiring focal/grid laser during the first year and 8 (9.47%) during the 2nd year.

Conclusion: Most patients with severe diabetic retinopathy presenting with mild/no visual impairment maintain their VA at 1 and 2 years (89.2% and 86.1% respectively). A small percentage developed severe visual impairment (VA 6/60 or worse) at 1 and 2 years (4.6% and 2% respectively) due to maculopathy and vitreous haemorrhage.

Intermediate Category

Clinical Fellows, Advanced Specialist Trainees, Registrars & Senior Residents

IOC – IC 01

Prognostic Factors for Open Globe Injuries – Analysis of 669 Eyes

Five Year Study

RAGRAWAL

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Background/Hypothesis: One of the important components in management of open globe injury is counselling of trauma victim and family. Even though, with advent of new modalities management of ocular injuries has changed, we need to prognosticate any patient with ocular trauma before and even after repair of open globe injury. In this study we aimed to evaluate factors affecting visual outcome after surgical repair of open globe injuries.

Methods: Retrospective case analysis of 669 eyes of open globe injuries wherein preoperative variables were correlated with final visual outcome. Exclusion criteria were patients with less than 4 months follow-up, previous ocular surgery, presence of intraocular foreign body, endophthalmitis.

Results: Factors influencing final visual outcome were relative afferent pupillary defect, length of laceration, presence of vitreous loss, laceration extending posterior to rectus muscle and retinal detachment. Preoperative visual acuity and time lag between the injury and surgery were not found to be statistically significant poor prognostic factor in our study.

Conclusion: Poor preoperative visual acuity in open globe injuries in isolation should not be considered as the determinant of poor postoperative visual outcome as total hyphaema, traumatic cataract, vitreous haemorrhage and/or retinal detachment can be the cause of initial poor visual acuity and all of this are surgically treatable. Similarly, in absence of infection, time lag between the injury and surgery is not statistically significant for poor postoperative visual outcome, hence open globe injury without any evidence of infection need not be operated at odd hours.

IOC – IC 02

Surgical Repair of Selected Cases of Open Globe Injuries under Topical Anaesthesia

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Background/Hypothesis: Several recent articles address the use of local and topical anesthesia for the repair of open globe injuries. While general anesthesia remains the preferred technique for open globe repair, for selected cases topical or local may be employed by the experienced surgeon. In the present study we aimed to report safety and efficacy of topical anaesthesia for surgical repair of selected cases of open globe injuries.

Methods: In this non-comparative interventional case series, out of 669 eyes of open globe injuries, 63 eyes with open globe injury were repaired under topical anaesthesia over a period of 5 years.

Results: No patient had surgical or anaesthesia related adverse effects. Pre- and postoperative clinical photographs document the prototype cases for which wound repair was done.

Conclusions: Traditionally, GA has been preferred for open globe injuries repair because it provides absolute immobility, puts no time

limit on surgery, does not require a peri-/retrobulbar injection causing further tissue extrusion. In the above series of surgical repair of open globe injuries under topical anaesthesia no intraoperative or perioperative complications attributable to anesthetic agent or patients uncooperation were identified. However the technique is best used by the experienced surgeon and with careful patient selection. Topical anaesthesia is safe, effective and could be reasonable alternative for less severe open globe injuries. Surgical training & patient preparation are the keys to safe use of this technique.

IOC – IC 03

Interesting Neuro-Ophthalmic Presentation of a Case of Bickerstaff Brainstem Encephalitis

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Background/Hypothesis: To present and discuss the neuro-ophthalmic features of a case of Bickerstaff brainstem encephalitis (BBE).

Methods: Case report with literature review.

Results: A 67-year-old Chinese woman presented with progressive dizziness, asymmetrical periorcular numbness and altered taste sensation over 1 week. There was upbeat nystagmus and esotropia at distance with full ocular movement. Pin-prick sensation was reduced over bilateral trigeminal distribution, involving the ophthalmic with later progression to all branches. The lesion was localised to the brainstem. Magnetic resonance imaging (MRI) showed a T2-weighted hyperintensity at central posterior pons extending to medulla and midbrain. It was enhanced at the FLAIR sequences. However, she later developed diplopia demonstrating external ophthalmoplegia with bilateral decreased adduction and truncal ataxia affecting walking. Follow-up examination a right internuclear ophthalmoplegia was noted. Though the patient refused anti-GQ1b antibody testing, she was treated as BBE with a course of intravenous immunoglobulin in view of typical clinical and imaging features. Her gait and facial paresthesia improved but her ocular features remained. Notably her consciousness and tendon reflexes were unaffected.

Conclusion: BBE, Guillain-Barre syndrome, Fisher syndrome and acute ophthalmoplegia without ataxia comprise the ‘anti-GQ1b syndrome’ with overlapping clinical features. This case demonstrates an array of brainstem signs in the evolution of disease. Neuro-ophthalmic features can be the first manifestation of the underlying systemic autoimmune process. Ganglioside serology and MRI are helpful in the diagnosis. BBE is typically a monophasic illness and prognosis is good, however a few deaths have been reported. As to date, there is no trial showing the efficacy of immunotherapy.

IOC – IC 04

Evaluation of Scanning Protocols for Imaging of the Anterior Chamber Angle with Anterior Segment Optical Coherence Tomography

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Background/Hypothesis: To assess the performance of different anterior segment-optical coherence tomography (AS-OCT) scanning protocols in detecting eyes at risk for angle closure.

Methods: This cross-sectional observational study enrolled 2104 subjects from a community clinic in Singapore. Gonioscopy was performed by a single masked examiner, and AS-OCT imaging was performed using the commercially-available Visante-OCT. To compare the ability of different AS-OCT protocols in detecting eyes found on gonioscopy to have angle closure, the sensitivity/specificity values and area under the receiving operating characteristic curve (AUC) were calculated. Separate analyses were performed by considering at least one, two, or three quadrants of angle closure on gonioscopy.

Results: The right eyes of 1853 subjects were included. The number of eyes found on gonioscopy to have closed angles in at least one, two, or three quadrants were 522 (28.2%), 380 (20.5%) and 303 (16.4%) respectively. A horizontal protocol, imaging only the nasal-temporal quadrants, had the lowest AUC of all the scanning protocols evaluated, due to the low sensitivity in identifying eyes at risk for angle closure (41-49%). Conversely, imaging only the superior-inferior quadrants had the highest sensitivity (89-95%), but a low specificity (51-57%). Imaging the inferior quadrant alone had the best AUC, regardless of the criteria used to define angle closure on gonioscopy.

Conclusion: The diagnostic performance of AS-OCT varied according to the scanning protocol used, and none had both a high sensitivity and specificity. The inferior quadrant scan may offer the best compromise as a first pass evaluation in the detection of angle closure with AS-OCT.

IOC – IC 05

Postoperative Complications after Trabeculectomy Surgery for Primary Angle Closure and Primary Open Angle Glaucoma

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Background/Hypothesis: To investigate the incidence of postoperative complications and re-operations within the first year after trabeculectomy surgery.

Methods: Data were obtained from an audit of all trabeculectomy surgeries, all with anti-metabolites (Mitomycin-C or 5-Fluorouracil), done at the Singapore National Eye Centre over a 4-year period from 2001 to 2004. In this retrospective, comparative case series, we analysed the charts of patients with postoperative complications within the first year after surgery. The incidence of postoperative complications and re-operations were recorded.

Results: Out of the 386 trabeculectomies performed, 131 were for primary angle closure glaucoma (PACG) and 255 for primary open angle glaucoma (POAG). Postoperative complications occurred in 27 (7.0%) patients overall, with 18 (7.1%) [95% CI, 4.4-10.7%] in the PACG group and 9 (6.8%) [95% CI, 3.4-12.2%] in the POAG group, ($P = 1.000$). The commonest complication reported in our study was overfiltration with shallow anterior chamber (9 [3.5%] cases). There were no cases of malignant glaucoma. Of the 27 eyes that encountered complications post-surgery, 15 eyes (5.9%) required a second operation or procedure.

Conclusions: Within the first year after surgery, the incidence of postoperative complications after trabeculectomy was 7.0%, with 5.9% requiring a second procedure. There was no difference in incidence of complications between PACG and POAG patients.

IOC – IC 06

Outcome of Customised and Standard Laser In situ Keratomileusis in Eyes with Mild to Moderate Compound Myopic Astigmatism

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Background/Hypothesis: To evaluate the efficacy, predictability and safety of Customised laser in situ keratomileusis (LASIK) and Standard LASIK. Setting: LASIK Centre, National Healthcare Group Eye Institute @ Tan Tock Seng Hospital, Singapore.

Methods: A retrospective analysis of 687 eyes of 344 patients who were treated with Customised or Standard LASIK using Technolas 217z100 platform (Bausch & Lomb). Their LASIK flaps were created with femtosecond laser (IntraLase, AMO) or microkeratome (Hansatome, Bausch & Lomb). The main outcome measures were unaided visual acuity (UAVA), best spectacle-corrected visual acuity (BSCVA) and manifest refraction.

Results: At 3 months, 100% of eyes in the microkeratome Standard LASIK group and 98.4% in the microkeratome Customised LASIK group had UAVA of 6/12 or better; 100% of eyes in the femtosecond Standard LASIK group and 100% in the femtosecond Customised LASIK group had UAVA of 6/12 or better. At 3 months post-operation, 100% of eyes in all 4 groups were within ± 1.00 D of target spherical equivalent refraction. No eye lost 2 or more lines of BSCVA.

Conclusion: LASIK with standard and customised algorithm for mild to moderate compound myopic astigmatism had excellent success rate, high predictability and safety levels.

IOC – IC 07

EyeCam™ for Angle Imaging in Asian Eyes

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Background/Hypothesis: To evaluate the use of EyeCam™, a novel wide field digital imaging modality, for angle imaging and to compare this with gonioscopy for detecting angle closure. To evaluate the effect of laser peripheral iridotomy on the angle width using EyeCam™.

Methods: Subjects recruited from a glaucoma clinic underwent gonioscopy by a single observer, and EyeCam™ imaging by a different operator. The EyeCam™ images were then graded by 2 glaucoma specialists working together who were masked to gonioscopy data. Twenty-four subjects underwent laser peripheral iridotomy (LPI) and EyeCam™ was used to study the angle widening in clock hours.

Results: Of the 152 subjects analysed, 48% were female and the majority (82%) was Chinese. The agreement between EyeCam™ and gonioscopy in detecting angle closure in the superior, inferior, nasal and temporal quadrants based on AC1 statistics was good (0.81, 0.82, 0.81 and 0.86 respectively). Overall, EyeCam™ imaging had 76% sensitivity, 81% specificity and AUC 0.79 for detecting eyes with gonioscopic angle closure. Inter and intra observer variability for detecting angle closure were moderate ($k = 0.43$; 95% CI, 0.13-0.74 & 0.49; 95% CI, 0.20-0.79 respectively). The mean number of clock-hours of angle closure decreased significantly from 8.15 ± 3.47 clock hours before LPI to 1.75 ± 2.27 clock hours after LPI ($P < 0.0001$, Wilcoxon signed-ranked test) in 24 subjects.

Conclusion: EyeCam™ was able to image the angle structures clearly in majority of the eyes, and showed good agreement with gonioscopy for detecting quadrants with angle closure. Significant angle widening was demonstrated using EyeCam™ documentation after LPI.

IOC – IC 08

Pontine Glioma in a Child Presented with Upbeat Nystagmus

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Case Report: An 8-year-old Malay boy presented with diplopia and abnormal head position for 1 month duration. There was no symptom of neurological deficit. There was no family history of malignancies. Visual acuity was normal and there was no Relative Afferent Pupillary Defect. He had left convergent squint with limited abduction (6th nerve palsy). There was upbeat nystagmus, otherwise funduscopy examination revealed cup disc ratio of 0.3, and no papilloedema in both eyes. However, there was cerebellar sign present and right plantar upgoing and reflexes were brisk. Urgent MRI was done showed an expansile brainstem (pontine) tumour most likely glioma. Surgical exsion was not an option as it was an expansile tumour. He was referred to the paediatric-oncologist planned for chemotherapy but parents were not keen for intervention.

Conclusion: Pontine glioma can have devastating outcome in a child.

IOC – IC 09

Ocular Response Analyzer (ORA) Parameters in Chinese Subjects with Glaucoma

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Background/Hypothesis: To evaluate ocular response analyzer (ORA; Reichert Ophthalmic Instruments, Buffalo, NY) parameters in Chinese subjects with glaucoma and compare their biomechanical profiles.

Methods: 328 Chinese subjects diagnosed to have glaucoma [Open angle glaucoma (OAG), n = 219; primary angle closure glaucoma (PACG), n = 109] were recruited. 102 normal subjects were enrolled as controls in the study. Apart from a comprehensive eye examination that included intraocular pressure by Goldmann tonometry (GAT), gonioscopy and central corneal thickness (CCT), 1 eye of each subject had 4 measurements with the ORA and the ORA parameters of corneal hysteresis (CH) and corneal compensated IOP (IOPcc) were documented in each subgroup for a comparative analysis.

Results: Bland-Altman plots indicated a positive mean difference between IOPcc and GAT in all glaucoma subtypes ($P < 0.001$) in comparison to controls where the parameters of IOPcc and GAT were noted to be similar. Mean CH was noted to be the lowest in eyes with PACG (8.9 ± 1.6 mmHg; $P < 0.05$) followed by OAG (9.4 ± 1.4 mmHg) and controls (10.5 ± 1.5 mmHg). IOPcc was poorly correlated with CCT in all groups.

Conclusion: IOPcc values in Chinese subjects with glaucoma were consistently higher than GAT. Chinese subjects with glaucoma were noted to have a lower CH in comparison to controls. Subjects with PACG demonstrated lowest CH.

IOC – IC 10

Epidemiology and Management of Culture Positive Canaliculitis in Tan Tock Seng Hospital, Singapore and a Review of Current Literature

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Background/Hypothesis: To illustrate the epidemiology and compare management of patients with microbiological culture positive canaliculitis presenting to a Tock Seng Hospital from January 2004 to August 2009 with current standards of care.

Methods: A retrospective case sheet analysis of all culture positive cases was conducted via keyword database extraction from the Aurora system (for requesting microbiology samples) was cross-referenced with the Microbiology Department database entries for positive eye cultures.

Results: Fifteen patients were identified; 2 were Malays, the remaining 13 were Chinese. Average age was 66 years. Symptom duration was 7 days to 1 year; 130.8 days on average. 80% had presentations strongly suggestive for canaliculitis. 20% were either mimicking meibomianitis or partial nasolacrimal duct obstruction (NLDO). Common symptoms were discharge (60%), tearing (46.7%), pain (26.7%) and swelling (26.7%). All were unilateral with 7 right and 8 left eyes. Microbiology culture results only had 1 swab positive for actinomyces. 11 positive cultures were sensitive to standard broad spectrum antibiotics, others showed resistance. 14/15 patients had lacrimal surgeries performed, 1 case resolved with topical antibiotic drops alone. On average, 11 patients took 68.4 days for complete resolution.

Conclusion: Canaliculitis is rare in our Singapore TTSH population. Usually it presents classically although some are insidious in nature. Although actinomyces israeli is generally considered to be the common pathogen it was only identified in 1 case. Resistance to conventional broad spectrum antibiotics is common. It remains a difficult condition to manage medically and almost always needs surgical intervention.

IOC – IC 11

Vitreous Haemorrhage after Trabeculectomy – Beware of Pseudophakic Patients

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Background/Hypothesis: To describe the complications of trabeculectomy in 2 patients who had previous limbal incision for extracapsular cataract extraction and implant (ECCE+IOL) and possible ways to avoid such complications.

Methods: Retrospective case study.

Results: Case 1: A 52-year-old woman who had had a right ECCE+IOL 10 years ago presented with uncontrolled primary open angle glaucoma in both eyes despite multiple topical medications. She was unaware of any complications during the cataract surgery. She underwent an uneventful trabeculectomy. However, her vision dropped to counting fingers the next day because of vitreous haemorrhage and hyphaema. She was later found to have sulcus fixated IOL because there was posterior capsule rupture during the previous ECCE +IOL.

Case 2: A 70-year-old man with left advanced POAG underwent uneventful left trabeculectomy with MMC. He had had a left ECCE +IOL performed 15 years earlier and was unaware of any complications. The left preoperative VA was 6/12, the pupil was round and there was no vitreous seen in the anterior chamber. During the trabeculectomy, there was excessive hypotony during sclerotomy and the lens was noted to be in the sulcus. The next day, the IOP was low at 6 mmHg but the vision was reduced to hand movement because of vitreous haemorrhage. The vitreous haemorrhage resolved spontaneously and his vision improved.

Conclusion: It is important to exclude posterior capsule rupture or zonulysis in patients who had had ECCE + IOL prior to trabeculectomy. Failure to detect these may result in vitreous haemorrhage during peripheral iridectomy because of direct communication between the vitreous and the iris. We suggest performing UBM prior to trabeculectomy in these cases to outline the angle and possibility of PC ruptures. In patients who had had PC rupture or zonulysis, it is important to diligently stop any bleeding or to defer iridectomy.

IOC – IC 12

Association of Quantitative Iris Parameters and Anterior Chamber Width with Narrow Angles

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Background/Hypothesis: To investigate the relationship between quantitative iris parameters (iris curvature, area and thickness) and anterior chamber width (ACW) with the presence of narrow angles.

Methods: A community based cross-sectional study of 2047 subjects aged over 50 years without ophthalmic symptoms. All participants underwent gonioscopy and anterior-segment OCT (ASOCT) imaging. Narrow angles were diagnosed if the posterior trabecular meshwork was not visible for at least 180° degrees on non-indentation gonioscopy. Customised software was used on horizontal ASOCT scans to measure ACW, iris curvature (I-Curv), iris area (I-Area) and iris thickness at 750 µm (IT750) and 2000 µm (IT2000) from the scleral spur.

Results: Data on 1465 subjects were available for analysis. Of these, 315 (21.5%) had narrow angles on gonioscopy. Mean I-Curv (0.366 ± 0.259 mm, $P < 0.001$), IT750 (0.476 vs 0.453 mm, $P < 0.001$) and IT2000 (0.491 vs 0.482 mm, $P = 0.010$) were greater, whereas ACW (11.60 vs 11.80 mm, $P < 0.001$) was smaller in persons with, compared to those without narrow angles. Stronger associations of ACW and most iris parameters with narrow angles were seen in women and older subjects. After adjusting for age, gender, anterior chamber depth and axial length, odds ratio (OR) for the highest quartile compared to the lowest quartile of I-Curv, I-Area, IT750, IT2000 and ACW, with the presence of narrow angles were 2.5 (95% CI, 1.3-5.1), 1.3 (95% CI, 0.8-2.1), 3.0 (95% CI, 1.9-4.7), 3.7 (95% CI, 2.2-6.3), and 1.5 (95% CI, 0.9-2.6) respectively.

Conclusion: Quantitative iris parameters (iris curvature, area and thickness) and ACW are independently associated with narrow angles, particularly in women and older subjects. These data provide further insights into the pathogenesis of angle closure in Singaporeans.

IOC – IC 13

Flap-On Versus Flap-Off Epilasik: 6 Months Results

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Background/Hypothesis: To compare the visual recovery, pain and visual results of patients who underwent epithelial laser keratomileusis (epi-LASIK) Flap-ON versus Flap OFF.

Methods: Prospective, comparative, subject-masked clinical study. Forty-eight eyes of 24 patients with myopia of up to 9.00 diopters were underwent wavefront-guided epiLASIK using the Bausch and Lomb Epi-separator. After randomisation, the epithelium was removed in 1 eye (flap-off) and repositioned in the other eye (flap-on). A questionnaire was used to compare and evaluate the postoperative pain and visual recovery in each eye during the first week post-op. Visual results were analysed at each postoperative visit.

Results: Mean pain scores were significantly lower in the flap-off group [day 3 ($P = 0.020$), day 5 ($P = 0.037$)]. During the first week post-op, vision was perceived to be better in the flap-off group. ($P < 0.05$). 79% in the flap-off group and 21% in the flap-in group saw 20/20 or better UCVA. At 6 months, UCVA was 20/20 in 83% of eyes in the flap-off group, and 86% in the flap-on group. BCVA was 20/20 in 100% of eyes in both groups. Spherical equivalent was within ± 0.50 in 95% of eyes in both groups. Contrast sensitivity tests at day and night conditions with and without glare did not show any statistical difference between the 2 groups.

Conclusion: Eyes that underwent flap-off epiLASIK had less pain and faster visual recovery compared to those wherein the flap was retained. Visual results at 6 months showed comparable results between the 2 groups.

IOC – IC 14

Neovascular Age-related Macular Degeneration and Serum Carotenoids in Asian Patients – A Pilot Study

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Background/Hypothesis: To investigate the relationship between neovascular age-related macular degeneration (AMD) and serum carotenoids (lutein/zeaxanthin).

Methods: Prospective case-control study. All consecutive cases of neovascular AMD and their age- and sex-matched controls had their demographic and systemic illness data collected and analysed. Blood samples were also collected for serum carotenoids. High Power Liquid Chromatography was used to extract the carotenoids.

Results: There were 28 cases and 28 controls. The majority of the subjects were Chinese with a mean age of 69.6 years. There were 6 smokers and 13 non-smokers in each group. Comparisons of mean serum carotenoids with all continuous data variables and carotenoids in quartiles were analysed. Chi-square test did not show any association between AMD and quartiles of lutein/ zeaxanthin. T-test did not show any significant difference between mean serum carotenoids levels between AMD and their controls. There was no association between mean serum carotenoids and diabetes, hypertension, cardiovascular disease and smoking status.

Conclusion: Asian patients with neovascular AMD have no relationship with serum carotenoids than age- and sex-matched controls.

IOC – IC 15

Anterior Chamber Angle Imaging with the Optovue Spectral Domain Optical Coherence Tomography

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Background/Hypothesis: To assess the ability of spectral domain optical coherence tomography (SDOCT) in detecting anterior chamber angle morphology.

Methods: In this prospective case series, consecutive phakic subjects were enrolled. All subjects underwent gonioscopy and were imaged with SDOCT (Optovue) and anterior segment OCT (Visante). Two observers concurrently evaluated quadrant wise images for detection of Schwalbe's line, scleral spur and anterior chamber angle (ACA) status. A quadrant was defined as closed if there was irido-trabecular contact.

Results: Eighty-two eyes (82 patients) were enrolled. Overall, Schwalbe's line was detected in 143/324 quadrants (44.1 %) using Optovue; quadrant wise analysis showed that it was seen in 14.7% of inferior, 12.6% superior, 41.3% of nasal and 31.5% of temporal quadrants; Schwalbe's line could not be identified using Visante images. The scleral spur was visible in 26.9% (56/324) quadrants, in comparison to Visante where it could be marked in 69.1% (224/324) quadrants. Using the Optovue, the ACA was classified as closed in 8.1% (26/324) quadrants (compared to 31.5%, 102/324 quadrants with Visante), open in 33.6% (109/324) (39.8%, 129/324 quadrants with Visante) and was indeterminate in 58.3% (189/324) quadrants (28.7% with Visante). The agreement for identifying angle closure using Optovue compared to gonioscopy was 0.44 (95% CI, 0.3-0.86), whereas it was 0.85 (95% CI, 0.57-1.13) using Visante.

Conclusion: The ability of Optovue to discriminate ACA landmarks was less than that of Visante. Visante had better agreement with gonioscopy than Optovue.

IOC – IC 16

Efficacy of Combined Static and Dynamic Eye-Tracker for the Correction of Astigmatism during LASIK

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Background/Hypothesis: To evaluate the efficacy of a combined static and dynamic eye-tracker [Active Control Eye-tracker®, Bausch & Lomb (ACE, B&L)] during LASIK.

Methods: This is a retrospective analysis of the first 50 eyes which underwent Intralase®-LASIK for myopic astigmatism using the Zyoptix® (B&L) Tissue-Saving Treatment algorithm combined with ACE between December 2007 and April 2008. All patients had refraction, unaided and best corrected visual acuity preoperatively, and up to 3 months postoperatively. Postoperative outcomes were evaluated for efficacy, safety and predictability. Efficacy of astigmatic correction was analysed using Alpin's vector analysis.

Results: Fifty eyes with mean myopia of -5.95 ± 1.51 D, astigmatism of -1.29 ± 0.93 D and manifest spherical equivalent (MSE) of -6.59 ± 1.55 D underwent uneventful surgery. Intraoperatively, the mean supine and dynamic cyclotorsion was $-0.96 \pm 3.43^\circ$ and $-1.17 \pm 3.89^\circ$ respectively. At 1 month postoperatively, MSE was -0.02 ± 0.29 D. The mean magnitude of error was -0.06 ± 0.24 D; angle of error was $-0.70 \pm 12.7^\circ$; difference vector was 0.26 ± 0.23 D and index of suc-

cess for astigmatic correction was 0.30 ± 0.46 . No eye lost BCVA and all achieved UAVA of 20/40 or better at 1 month.

Conclusion: Significant supine and dynamic cyclotorsion can be encountered during LASIK. Using ACE, excellent outcomes for astigmatic correction could be achieved.

IOC – IC 17

A Study on Corneal Endothelial Cell Morphology of Corneal Arcus Patients in Universiti Sains Malaysia Hospital

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Background/Hypothesis: To determine the central corneal endothelial morphology among patients with corneal arcus in Universiti Sains Malaysia Hospital.

Methods: A total of 152 participants without any previous history of intraocular surgery, intraocular trauma, glaucoma, corneal diseases and history of contact lens wear were recruited. The clear cornea group showed absence of corneal arcus while the corneal arcus group showed presence of arcus that was graded into mild, moderate and severe under slit-lamp biomicroscope. A noncontact specular microscope Topcon SP2000P was used to measure the corneal endothelial morphometric value using a "centre-dot" method and was then analysed by the machine-based algorithm.

Results: The mean central corneal endothelial cell density (ECD) among the corneal arcus group was 2390 cells/mm² (2336-2444 cells/mm² 95% CI) which was statistically lower than the clear cornea group of 2507 cells/mm² (2413-2600 cells/mm² 95% CI) after adjustment to the demographic factors. However, the adjusted mean central ECD among the different grades of corneal arcus was statistically insignificant. The adjusted mean cell size among the corneal arcus patients (422 μm², 412-431 μm² 95% CI) was also statistically higher than the clear cornea patients (403 μm², 387-420 μm² 95% CI). When the corneal arcus was graded, only the mild-severe grade of corneal arcus showed statistically significant result. However, the adjusted means of coefficient variation of cell size, minimum and maximum cell size were statistically insignificant.

Conclusion: This study had shown that the corneal arcus patients had a lower endothelial cell density and higher mean endothelial cell size than the clear cornea patients. The mild-severe grades of corneal arcus were also statistically different in the mean endothelial cell size.

IOC – IC 18

Retrospective Case Series of the Adjunctive Use of Anti-Vascular Endothelial Factor Agents in the Management of Rubeosis at a Tertiary Referral Hospital in Malaysia

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Background/Hypothesis: To investigate the role of anti-vascular endothelial growth factor (anti-VEGF) agents: ranibizumab (Lucentis™), bevacizumab (Avastin™) and pegaptanib sodium (Macugen™) in patients with rubeosis.

Methods: Retrospective case series.

Results: Eight eyes of 8 patients received injection of 0.5 mg of Lucentis (n = 6), 1.25 mg of Avastin (n = 1) or Macugen (n = 1) for rubeosis and rubeosis related conditions. Seven eyes were injected

intravitreally and 1 eye received intracameral injection of Lucentis. Indications for injection were rubeosis secondary to proliferative diabetic retinopathy with glaucoma (n = 6), ischemic central retinal vein occlusion (n = 1) and secondary to anterior proliferative vitreo-retinopathy in non diabetic eye (n = 1). There were no local complications post-injection. One patient with diabetes, hypertension and hyperlipidaemia but no history of stroke developed left hemiparesis on day 1 post-injection. All cases showed regression of rubeosis. Two cases had recurrence of rubeosis at 6 weeks and 4 months post-injection. Preoperative visual acuity (VA) was 6/36 to hand movement. Three eyes received anti-VEGF prior to surgical procedures and 1 eye received anti-VEGF intraoperatively. All eyes had minimal to moderate intraoperative bleeding. Two cases had hyphaema at day 1 post-operation. Postoperative VA was unchanged (n = 2) (50.0%), improved (n = 2) (50.0%).

Intraocular pressure (IOP) prior to anti-VEGF injection ranged from 7-45 mmHg (mean = 25.3 mmHg). Mean IOP at 1 week post-injection was 20.4 mmHg (6-33 mmHg). At post-injection 1 month, the mean IOP was 18.3 mmHg (4-32 mmHg).

Conclusion: Intravitreal or intracameral anti-VEGF agents are safe and effective in causing regression of iris neovascularisation and appear to help with perioperative bleeding.

Senior Category

Consultant Ophthalmologists, Ophthalmology Lecturers & Above

IOC – SC 01

The Novel Use of a Human Cord Blood Serum-Supplemented Culture Medium for the Ex Vivo Expansion of Conjunctival and Limbal Epithelial Cells

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Background/Hypothesis: The most established method of epithelial cell culture requires the use of fetal bovine serum (FBS). Our aim was to develop a safer xenobiotic-free culture system. We describe a novel human cord blood serum (CBS)-supplemented culture system for cultivating ocular (conjunctival and limbal) epithelial cells.

Methods: Human conjunctival and limbal epithelial cells were cultivated in a 1:1 mixture of DMEM and Ham's F-12 medium supplemented with various concentrations of CBS, ranging from 0.05% to 2.5%. This was compared with conventional FBS-supplemented media. The Bromodeoxyuridine (BrdU) ELISA proliferation assay, colony-forming efficiency (CFE), and number of cell generations were analysed. Cultured cells were evaluated for specific cytokeratin expression by immunocytochemistry. We evaluated the profile of cytokines and growth factors in CBS and adult serum (AS) using antibody arrays.

Results: The proliferation assays, CFEs and cell generations were highest in 0.25% CBS and 0.5% CBS medium, which was comparable to that of 5% FBS-supplemented medium. CBS-cultivated conjunc-

tival and limbal cells demonstrated the respective normal phenotypic expression of differentiation markers. Serum analyses revealed that several cytokines (BDNF, GRO and Leptin) and growth factors (IGF-1, EGF, FGF-6, HGF, PDGF, IGFBP) had higher concentrations in CBS compared to AS.

Conclusion: CBS-supplemented culture medium supported the proliferation and normal differentiation of conjunctival and limbal epithelial cells. This safer xenobiotic-free culture system has significant advantages over conventional FBS-supplemented culture systems because of its lower risk of transmission of zoonotic infection and xenograft rejection. This novel culture method has important clinical applications, and is particularly useful when bioengineering tissues for clinical transplantation.

IOC – SC 02

Steroid Induced Severe Bilateral Cataract and Glaucoma – A Case Report

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Background/Hypothesis: To report a case of severe steroid induced bilateral cataract and glaucoma in a young female patient.

Methods: A 30-year-old female patient, diagnosed as bilateral total cataract, BCVA only HM on both eyes and was noted also to have high intra ocular pressure of 30 mmHg. Phaco emulsification and IOL implantation had been performed, OCT revealed almost total enlargement of optic disc cupping, CD ratio 0.9. Campimetry revealed the presence of extensive peripheral field defect on both eyes. Moonface appearance of the patient and history of topical steroid intake for the irritation caused by wearing soft contact lens making it possible to consider the cause of the cataract and glaucoma development in this case.

Results: The visual acuity improved to 0.8 RE, 0.5 LE after cataract surgery but the peripheral vision deterioration that had been happening due to undetected, untreated glaucoma could not possibly be very much improved even after anti glaucoma therapy in such a late stage.

Conclusion: Cataract and glaucoma associated with the use of steroids is well known but in this case the condition is so severe and rather uncommon complications of steroid intake, or may be juvenile cataract and primary glaucoma are existing long before her presentation. This case underlies the importance of periodic eye check up for early detection of glaucoma and public information on the use of steroids.

IOC – SC 03

The Effect of Coenzyme Q₁₀ and Curcumin on Chronic Methanol Intoxication Induced Retinopathy in Rat

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Background/Hypothesis: To investigate the effect of co-enzyme Q₁₀ and curcumin on chronic methanol intoxication causing retinopathy in rat.

Methods: We designed an experimental study of chronic methanol intoxication in rat depleted of folates with methotrexate (MTx). The studied group received methanol (MeOH; 2 mg/kg body weight in saline intraperitoneal injection) and MTx (0.1 mg/kg body weight in saline subcutaneous injection) every other day for 10 weeks to induce chronic methanol intoxication, while other groups of rats received saline as vehicle and served as control. The studied rats were confirmed to develop significant retinopathy after 10 weeks and then assigned to 3 treatment arms: either corn oil (as control) or coenzyme Q₁₀ (20 mg/kg/day) or Curcuma longa extract (2.5 mg/kg/day) for 4 weeks. The animals were sacrificed by an overdose of pentobarbital. Eyes were enucleated and the retinal tissue was prepared for histological examination. The sections were evaluated by an experienced pathologist blinded to the experimental conditions.

Results: Histologic studies revealed that animals treated with both MeOH and MTx showed vacuolation of photoreceptor inner segment and disaggregation of cells in outer nuclear on the retina compared to normal histologic findings of control animals. The retinal histology in the animals with administration of Coenzyme Q₁₀ or Curcuma longa extract almost appeared as normal retina and this was not found in animals with administration of corn oil.

Conclusion: Coenzyme Q₁₀ and curcumin administrations improve retinal histology by reversed pathological changes due to chronic methanol intoxication back into normal retina.

IOC – SC 04

Optical Coherence Tomography to Measure Retinal Nerve Fibre Thickness in Normal Children of North Indian Population

M GANDHI

Dr Shroff's Charity Eye Hospital, India

Background/Hypothesis: To measure retinal nerve fibre layer thickness in normal children of north Indian population with Optical Coherence Tomography (OCT).

Methods: Observational cross-section study. One hundred eligible subjects, amongst those reporting to the hospital for refraction, were randomly selected. Subjects with BCVA 20/40 or better, with normal optic discs and no other ocular pathology were included. OCT Stratus 4.0.7 (0132) was used and an average of 3 fast RNFL scans was recorded. One eye per child was randomly selected for statistical analysis.

Results: Age group was 8 to 17 years. OCT was possible in 97%. The mean average thickness was $103.11 \pm 9.72 \mu\text{m}$. RNFL was thickest superiorly ($133.82 \pm 17.9 \mu\text{m}$) and inferiorly ($128.3 \pm 15.43 \mu\text{m}$), thinner nasally ($83.5 \pm 16.82 \mu\text{m}$), and thinnest temporally ($67.98 \pm 9.74 \mu\text{m}$). The average time taken was $2.5 \pm 0.9\text{min}$. Univariate regression analysis to analyze effect of age, gender and refraction, Comparisons by ANOVA F test was done. Unpaired student's t-test was used for comparisons of variables between genders and paired t test for comparison between right and left eyes.

Conclusion: Optical coherence tomography can be used to measure RNFL thickness in children. OCT holds promise in being able to evaluate glaucoma as effectively as VFA and is less time consuming and less difficult, as it requires less patient cooperation. The normative data provided by this study may assist in identifying changes in RNFL thickness in children in various ocular conditions.

IOC – SC 05

Glaucoma Blindness is a Disease of Poverty and Ignorance in India **P GOGATE**

H V Desai Eye Hospital, Pune, India

Background/Hypothesis: To identify the social risk factors for late presentation of primary glaucoma in newly diagnosed cases.

Methods: A case control study was conducted in a tertiary eye-care center in Maharashtra, India. Patients were presented with a questionnaire to get information regarding symptoms, travel time, travel expenses, occupation and education of head of family, type of housing, number of household members, per capita income, earning status, family history of glaucoma, relation with head of family, visit to ophthalmologist in past 2 years, difficulty in navigation, affordability of treatment, awareness about glaucoma, and willingness for compliance. Travel time and expense were noted. Cases (late presenters) had no PL / absolute glaucoma or severe visual field loss affecting area within 5 degrees of fixation or C:D ratio >0.8 in the worse eye. Controls (early presenters) had visual field having no absolute scotoma within 20 degrees of fixation or C:D ratio <0.8 in the worse eye.

Results: Two hundred newly diagnosed patients with primary glaucoma at first visit were considered to a comprehensive eye care center in Maharashtra. Travel time and expenses were a risk factor for late presentation of glaucoma. ($P = 0.01$). Unemployed patients or unskilled workers and patients who were less educated were more likely to have late presentation of glaucoma ($P = 0.003$), ($P = 0.000$). Those of highest socioeconomic status were at lowest risk of late presentation. Awareness of glaucoma was very poor irrespective of sex, occupation, education and socioeconomic status. In 26% cases glaucoma diagnosis was missed on previous eye check up by ophthalmologists (6%) or optometrists (20%).

Conclusion: Poor socioeconomic status and lack of awareness about glaucoma among population and medical personnel were major risk factors for late presentation.

IOC – SC 06

Residual Neurovascular Function and Retinotopic Organisation in a Case of Hemianopia after Visual Restoration Therapy

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Background/Hypothesis: To assess the neurophysiological correlates with visual field improvement due to visual restoration therapy (VRT) in a case of homonymous hemianopia.

Methods: Retinotopic mapping was performed using an angular paradigm simultaneous with blood oxygen level-dependent (BOLD) functional MRI, and the integrity of white matter tracts was assessed using diffusion tensor imaging (DTI). The patient had had a stroke resulting in a large right occipital cortex infarct 1 year prior to therapy. He was assessed before, midway and after therapy, which lasted 9 months.

Results: Prior to therapy, the patient showed residual extrastriate retinotopic representation in the surviving cortex around the infarcted area, while DTI tractography failed to find right-hemisphere

optic radiation connections to the thalamus. Scans done midway through treatment were disregarded due to excessive movement artefacts. After therapy, although there was no apparent re-growth of right-hemisphere white matter tracts, there was a small but clear enlargement of the retinotopic representation around the lesion, in and superior to the calcarine sulcus, supporting the improvement in the high resolution perimetry results that were acquired as part of the clinical assessment for VRT.

Conclusion: In this case study, in the absence of obvious optic radiation regeneration there was enhancement of the residual retinotopic representation associated with therapy. A possible processing route could be via 'blindsight' pathways, with the implication that partially restored visual representation may not always result in conscious visual perception.

IOC – SC 07

Ocular Ischemic Syndrome

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Regional Institute of Ophthalmology, PGIMS, Rohtak, Haryana, India

Background/Hypothesis: The poster depicts ocular ischaemic syndrome (OIS) in a 25-year-old man. The aim is to describe the clinical features and raise awareness of this severe and progressive disorder.

Methods: The patient presented with ocular pain and diminution of vision in right eye. The BCVA Grade I RAPD was observed in the right eye. The rest of the anterior segment examination of both eyes was within normal limits. IOP was 18 mmHg (bilateral). Fundus examination revealed attenuated arterioles in both eyes; however, disc neovascularisation and collateral formation in superotemporal quadrant were seen in the right eye only. Fundus fluorescein angiography demonstrated delayed filling. Late leaking as well as staining of disc neovascularisation was observed. Complete cardiovascular status was evaluated. The patient was found to have right carotid stenosis, hypertension and hyperlipidaemia. Treatment was instituted promptly.

Conclusion: It is imperative that physicians know the symptoms and signs of carotid disease so that prompt diagnosis and instant referral may be made. Otherwise, OIS would become the presenting sign of hazardous cerebrovascular and ischaemic heart disease.

IOC – SC 08

A Comparative Study of VEP in Optic Neuritis and Traumatic Optic Neuropathy

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Background/Hypothesis: This study was conducted to evaluate pattern VEP in unilateral optic neuritis (ON) cases compared with traumatic optic neuropathy (TON).

Methods: Ten patients with traumatic optic neuropathy and 23 patients with unilateral ON were analysed. Single channel midline scalp electrodes were used for recording of PVEP.

Results: The recordings could be done in 40% of TON patients and 54.5% of ON patients. In 4 patients with recordable PVEP, the mean amplitude (affected/fellow eye) was 0.31 ± 0.03 and the mean peak latency delay was 16.8 ± 2.1 ms. In the 12 patients with ON and recordable PVEP, the mean amplitude ratio was 0.42 ± 0.04 (SE) and the mean peak latency delay was 22.4 ± 2.2 . The amplitude ratio was lower in patients with TON than in those with ON. These patients were followed-up with monthly readings.

Conclusion: VEP studies were helpful in diagnosis, differential diagnosis and follow-up of ON and TON. The study may be used to prognosticate the visual outcome.

IOC – SC 09

Water Tight Conjunctival Closure Technique for Trabeculectomy

H OENTORO

Oentoro Eye Clinic, Indonesia

Background/Hypothesis: This retrospective study showed that water tight conjunctival closure helps increase the success rate of trabeculectomy.

Methods: Retrospective study of 74 cases of trabeculectomy operation from 2002 to 2007.

Results: Out of the 74 cases, 71 cases have maintained IOP below 17 mmHg without treatment (96%). Three cases of absolute glaucoma failed to get IOP below 17 mmHg, but 2 were without pain and 1 remained unchanged.

Conclusion: Water tight conjunctival closure technique helps to increase the success rate of trabeculectomy without further medication and prevents complication.

IOC – SC 10

Change in Optic Nerve Morphology Following Reduction in Intraocular Pressure – An SD-OCT Study

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Background/Hypothesis: To determine if lowering intraocular pressure (IOP) induces changes in optic nerve morphology detectable by spectral domain optical coherence tomography (SD-OCT).

Methods: Subjects undergoing glaucoma surgery were enrolled after informed consent was obtained. The subjects underwent a complete ophthalmic examination and Spectralis SD-OCT imaging of the optic nerve before surgery, then at 1 week and 1 month after surgery. Optic cup depth was determined from SD-OCT images as the maximum vertical distance between the plane of Bruch's membrane and the inner surface of the optic cup. The fellow eyes of all subjects were also enrolled as controls. Descriptive statistics were computed for all variables at each visit and for change from the preoperative visit.

Results: Seventeen eyes of 17 patients who underwent glaucoma surgery were enrolled in the study. The mean age was 67.2 years (range, 51 to 84). Following glaucoma surgery, the mean reduction of IOP was 13.92 (SD 13.75) and 8.92 (SD 6.24) at the first and second postoperative visits. Correspondingly, the optic cup depth decreased by 79.3µm (SD 86.88) ($P = 0.014$) and 122.8µm (SD 116.26) ($P = 0.004$) at the first and second postoperative visits. There was no significant change in IOP or optic nerve depth in fellow eyes.

Conclusion: In this study, we found that there was a statistically significant decrease in optic cup depth following the reduction in IOP after glaucoma surgery. This suggests that a reduction of IOP may produce a corresponding movement of the lamina cribrosa.

IOC – SC 11

Classification of the Vascular Patterns of Polypoidal Choroidal Vasculopathy and its Relation to Clinical Outcomes

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Background/Hypothesis: To propose a diagnostic criteria for polypoidal choroidal vasculopathy (PCV), describe a classification system based on its vascular patterns on indocyanine green (ICG) angiography, and to compare the clinical outcomes of various vascular subtypes.

Methods: Interventional longitudinal study of 53 consecutive patients with PCV seen in a retina subspecialty clinic over an 18-month period. The ICG vascular subtypes were assessed independently by 2 ophthalmologists, and compared with the clinical presentation and visual acuity (VA).

Results: Three distinct ICG patterns were seen: Type I (interconnecting channels with no leakage) – 10 patients (20.8%); Type II (branching vascular network with no active leakage) – 17 patients (35.4%); Type III (branching vascular network with active leakage) – 21 patients (43.8%). A higher proportion of patients with Type III PCV experienced moderate visual loss (loss of ≥ 3 lines of VA) after 3 years of follow-up, as compared with Type II and Type I (36.4% vs. 15.4% vs. 0%). More patients with Type I PCV had final VA better than 20/40 (75%) compared to Type II (50%) and Type III (18.2%). Comparing Types I and III, the mean LogMAR VA at 3 years was 0.34 vs. 0.85 ($P = 0.041$) and the mean improvement in LogMAR VA was 0.25 vs. -0.18 ($P = 0.036$).

Conclusion: The rates of visual loss and final visual acuity of PCV differ according to ICG vascular features. Therefore, PCV may consist of distinct clinical subtypes characterised by specific ICG vascular patterns and differences in clinical outcomes, as opposed to being a uniform disease entity as previously believed.

Open Category 1

Optometrists, Orthoptists, Opticians, Ophthalmic Diagnostics Imaging Specialists, Nurses & Medical Students

IOC – OC1 01

The Relationship between Retinal Thickness on Optical Coherence Tomography (OCT) and Visual Acuity in Patients with Diabetic Macular Edema

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Background/Hypothesis: To determine the relationship between optical coherence tomography (OCT) measurements of macular thickness and visual acuity (VA) in patients with diabetic macular edema.

Methods: A review of 46 eyes with newly diagnosed macular edema which underwent laser photocoagulation. The OCT readings of central macular thickness (CMT) and mean inner subfield thickness (MIST) at the point of diagnosis and after the first laser treatment were correlated with the VA assessed on the same day. The absolute

change and relative change in CMT were then compared to the change in VA at diagnosis and after laser photocoagulation. Absolute change in CMT was defined as the difference in thickness between the 2 measurements. Meanwhile, relative change in CMT is the absolute change in thickness as a percentage of the baseline thickening.

Results: The mean age of the 42 patients was 61.5 years, (range, 47 to 88; SD ± 9.123). Visual acuity correlated with CMT, (correlation coefficient 0.322; $P = 0.004$) but its correlation with MIST was of borderline significance (correlation coefficient 0.221; $P = 0.050$). Change in VA also correlated with the absolute change in macular thickness (correlation coefficient 0.416; $P = 0.016$) and relative change in macular thickness (correlation coefficient 0.398; $P = 0.022$).

Conclusion: Visual acuity correlates with CMT in patients with diabetic macular edema. The absolute and relative change in CMT between baseline and the first laser photocoagulation has a stronger correlation with VA compared to retinal thickness taken at a single time point.

IOC – OC1 02

The Magnitude and Determinants of Intentional and Non-intentional Adherence to Glaucoma Medication in Individuals with Glaucoma

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Background/Hypothesis: To identify the magnitude of intentional and unintentional non-adherence in glaucoma patients receiving tertiary ophthalmic care in Singapore.

Methods: A cross-sectional study. 201 patients, who had been using topical eye-drops for at least 6 months, were recruited for the interviewer-administered surveys. Their adherence and beliefs about glaucoma and its treatment were assessed using the Reported Adherence to Medication scale, the Brief Illness Perception Questionnaire and the Beliefs about Medicines Questionnaire-specific Questionnaire Self-reported reasons for taking or avoiding eye drops were assessed using open-ended questions.

Results: Overall, 99 (49.3%) participants reported some degree of non-adherence of which 84 (85.9%) reported unintentional non-adherence (e.g. forgetting), 1 (1.0%) reported intentional non-adherence (deliberate non-adherence) and 14 (13.1%) reported both forms of non-adherence. Compared with adherers, non-adherers have higher education level, and reported higher concern about their glaucoma ($P < 0.05$). Increasing degree of unintentional non-adherence was associated with younger age, higher education level and greater belief about expected effects and outcomes of glaucoma (consequences) whereas degree of intentional non-adherence was associated with younger age, lesser personal control, greater treatment control and lower belief in necessity of eye drops for glaucoma compared to concerns about their usage.

Conclusion: Strategies aimed at improving adherence in glaucoma patients need to address both intentional and unintentional dimensions. Interventions focused on eliciting and addressing patients' beliefs and concerns about their eye drops require evaluation.

IOC – OC1 03

Risk Factors for the Development and Progression of Diabetic Retinopathy

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Background/Hypothesis: To study the prevalence and risk factors associated with pre-existing diabetic retinopathy at presentation, the factors affecting the development of diabetic retinopathy and its rate of progression in a multi-ethnic population.

Methods: A review of 500 consecutive eyes of patients with Type II diabetes mellitus over a 5-year period. Standard ophthalmic history and examination were performed for all patients. Diabetic retinopathy was graded using the Early Treatment of Diabetic Retinopathy Study classification. The results were analysed using univariate and multivariate analyses.

Results: Of 500 eyes, 272 (54.4%) had pre-existing diabetic retinopathy. Risk factors for diabetic retinopathy at presentation were younger age (mean 63.6 vs. 68.6 years, $P < 0.001$), duration of diabetes (14.6 vs. 12.5 years, $P = 0.004$) and insulin dependence (64.2% vs. 49.9%, $P < 0.05$). Of the 228 eyes with no initial diabetic retinopathy, 35.8% developed diabetic retinopathy within 5 years. The mean time taken to progress between different stages of diabetic retinopathy were: none to mild: 3.7 years; mild to moderate: 2.9 years; and moderate to severe: 1.4 years. Fast progression of diabetic retinopathy was associated with younger age (57.8 vs. 67.5, $P < 0.001$) and Malay race (19% vs. 4.6% other races, $P < 0.001$). Of 500 eyes, 44 (8.8%) had clinically significant macular oedema at presentation. Clinically significant macular edema was a risk factor for preexisting diabetic retinopathy and subsequent progression.

Conclusion: The rate of progression accelerates with severity of retinopathy. Younger age and longer duration of diabetes were risk factors for both pre-existing diabetic retinopathy and its progression.

IOC – OC1 04

Endogenous Endophthalmitis in an Asian Population

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Background/Hypothesis: To describe the demographics, microbiology and visual outcomes of patients diagnosed with endogenous endophthalmitis in a tertiary hospital.

Methods: Review of all patients presenting with endogenous endophthalmitis at the Department of Ophthalmology, Tan Tock Seng Hospital, over a 9-year period between 1998 and 2006. The main outcome measure was final visual acuity (VA).

Results: Of a total of 50 endophthalmitis cases identified over 9 years, there were 16 cases of endogenous endophthalmitis. The mean age of these patients was 65 years (range, 48 to 87), with an equal proportion of males and females. There was a higher proportion of Chinese (68.8%) compared to non-Chinese (31.2%), and a higher proportion of patients with diabetes mellitus (56.3%) compared to non-diabetics (45.7%). Of the vitreous samples cultured, 62.5% yielded positive results. The most common organism cultured was coagulase negative *staphylococcus* (18.8%) followed by *Klebsiella*, *Pseudomonas* and fungi (each 6.3% respectively). Final visual acuity was worse than 6/12 in 93.8% of patients, with 87.6% having VA of counting fingers or worse.

Conclusion: Endogenous endophthalmitis is a potentially devastating condition with very poor visual prognosis. A high proportion have diabetes mellitus. The most common organism cultured was coagulase negative *staphylococcus*.

IOC – OC1 05

Investigating the Genetic Basis of Glaucoma – Role of Toll-Like Receptor 4 (TLR4) Gene Polymorphisms in Normal Tension Glaucoma

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Background/Hypothesis: Toll-like receptor 4 (TLR4) is a trans-membrane receptor that mediates immune responses to exogenous and endogenous ligands and interacts with heat shock proteins, which are reportedly involved in normal tension glaucoma (NTG). A recent study reported the association of multiple single nucleotide polymorphisms (SNPs) in the TLR4 gene with risk of NTG, with SNP rs7037117 most strongly associated with NTG. This study aims to determine if this SNP in the TLR4 gene is associated with NTG in the Singapore Chinese population.

Methods: One hundred and thirty Singaporean Chinese patients diagnosed with NTG and 90 Singaporean Chinese healthy control subjects were recruited. SNP rs7037117 in the TLR4 gene was genotyped, and allelic and phenotypic diversity was assessed between cases and control subjects.

Results: Of the 130 NTG patients, 49 (37.7%) have the minor allele of SNP rs7037117, compared to 32 of 90 (35.6%) in normal controls. In NTG patients, the odds of having the allele is 1.10 times (95% CI, 0.63-1.92; $P = 0.75$) that of normal controls.

Conclusion: The results show that NTG patients have slightly higher odds of having the minor allele of SNP rs7037117 in the TLR4 gene but this was not statistically significant. More extensive studies with a larger pool of patients and controls, as well as other SNPs should be performed to confirm this finding.

IOC – OC1 06

Myopic Choroidal Neovascularisation – Factors Affecting Treatment Outcomes

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Background/Hypothesis: To evaluate the treatment outcomes of choroidal neovascularisation (CNV) secondary to pathological myopia and the factors affecting visual outcome.

Methods: Non-randomised, interventional case series of 18 patients with pathological myopia treated with photodynamic therapy (PDT) or anti-vascular endothelial growth factor therapy (anti-VEGF). Inclusion criteria were spherical equivalent $\geq -6D$ or features of pathological myopia on retinal photography. Main outcome measure was final visual acuity (VA).

Results: Of 19 eyes, 15 (78.9%) were treated with PDT only, and 4 (21.1%) with PDT combined with anti-VEGF. The mean number of PDT treatments was 1.7. At 12 months, 13 of 18 eyes (72.2%) avoided moderate visual loss (≥ 3 lines of VA) and 5 eyes (27.8%) improved by at least 1 line. Patients with VA ≤ 0.4 (Snellen equivalent 6/12) at 1 year were younger than those with VA > 0.4 (mean age 39

vs. 61.6 years, $P = 0.001$). A higher proportion of eyes with greatest linear dimension (GLD) of $\leq 1000 \mu\text{m}$ avoided moderate visual loss (100% vs. 44.4%, $P = 0.034$). The mean improvement in LogMAR VA of those with GLD $\leq 1000 \mu\text{m}$ was +0.12 compared to -0.55 for those with GLD $>1000 \mu\text{m}$ ($P = 0.02$). A higher proportion of eyes receiving reduced duration of PDT avoided moderate visual loss compared to those receiving full duration PDT (83.3% vs. 66.7%). Visual outcomes were not associated with gender.

Conclusion: After PDT treatment, 72.2% of eyes avoided moderate visual loss at 1 year. Good visual outcomes were associated with younger age, smaller lesion size, and reduced duration of PDT treatment.

IOC – OC1 07

Outcomes of Scleral Buckle in the Treatment of Rhegmatogenous Retinal Detachment

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Background/Hypothesis: To describe the safety, efficacy, visual outcomes, and complications of scleral buckle in the treatment of rhegmatogenous retinal detachment in an Asian population.

Methods: A review of 29 consecutive patients with rhegmatogenous retinal detachment who were treated with scleral buckle at Tan Tock Seng Hospital.

Results: The mean age of the patients was 46.6 years (range, 14 to 81; SD ± 18.6) with 18 females (62%) and 11 males (38%). The mean duration of symptoms was 11.8 days (range, 2 to 60, SD ± 13.5). Single operation reattachment rate was 96.6% (28 of 29 eyes). No re-detachments occurred over the follow-up period. There was no significant association between a successful outcome and age, gender, number or size of retinal tears. At the 1-year follow-up, 13 patients (48.1%) achieved visual acuity (VA) $\geq 6/12$. The median VA was 6/15. Eyes with macula-off detachment had significantly poorer VA (median VA 6/45) at 6 months than those with macula-on detachments (median VA 6/12) ($P = 0.015$). Complications occurring within the follow-up period included proliferative vitreoretinopathy (6.9%), diplopia (6.9%), anisometropia (10.3%), metamorphopsia (6.9%) and raised intraocular pressure (17.2%).

Conclusion: Surgical treatment of rhegmatogenous retinal detachment with scleral buckle achieves good anatomic and visual outcomes. Visual recovery after retinal reattachment is dependent on macular involvement.

IOC – OC1 08

Neonatal Conjunctivitis – The NUH Experience

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Background/Hypothesis: To describe the incidence of neonatal conjunctivitis in a tertiary hospital in Singapore and to determine its incidence, aetiological agent involved, demographics and clinical characteristics of affected neonates. To evaluate current clinical practice guidelines on the prevention of neonatal conjunctivitis in Singapore.

Methods: A retrospective review of the medical records of all neonates diagnosed with neonatal conjunctivitis in the National University Hospital (NUH), Singapore during a 4 year period (from 2005-2008) was done.

Results: There were 67 identifiable cases of neonatal conjunctivitis from 2005-2008. The incidence of neonatal conjunctivitis in NUH was 6.94/1000 live births. Microbial growth was detected in 63 cases. The most common aetiological agent was *Chlamydia trachomatis* (35.8%), followed by *Staphylococcus aureus* (29.8%); of which 25% were methicillin-resistant *E. coli* (10.4%), *Klebsiella pneumoniae* (4.5%) and *Candida* (4.5%). There were no cases where gonococcus was isolated. Of the 24 cases of Chlamydia conjunctivitis, 2 also had pneumonia. The most common empirical treatment given was erythromycin and tobramycin. There was one complication of sclerocornea.

Conclusion: Our study reports an incidence of neonatal conjunctivitis of 6.94/1000 live births, which is higher than some other developed countries. We have shown that the main aetiological agent involved is Chlamydia trachomatis, which is similar to other studies done in developed countries. No cases of gonococcal conjunctivitis were found, indicating its declining importance as an aetiological agent. With the high incidence of Chlamydia conjunctivitis, there is a role for introduction of maternal screening for Chlamydia trachomatis in the prevention of Chlamydia conjunctivitis.

Open Category 2

Scientists and Collaborators in Basic Science Research

IOC – OC2 01

Biocompatibility of a Novel Interpenetrating Hydrogel Polymer in Rabbit Model

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Background/Hypothesis: To examine the biocompatibility of 2 different novel interpenetrating hydrogel polymers (IPN) in rabbit cornea.

Methods: Implant 1 had a PEG-Diacrylate monomer, implant 2 PEG-Diacrylamide. They were lathed to 30 micron thickness. 22 NZ white rabbits underwent corneal inlay surgery. The contralateral eye served as a control, 2 rabbits had sham procedure. Implants were inserted using a manual pocket incision. Rabbits ($n = 22$) were followed up by anterior segment optical coherence tomography (ASOCT), slit lamp photography, keratometry and in vivo confocal microscopy. Rabbits were sacrificed at 3, 6 and 9 months. Histological examination and electron microscopy was performed on the cornea.

Results: Following surgery, ASOCT confirmed that implants were placed at a mean depth of 75% of total corneal thickness. There was swelling of anterior lamella, which settled by 1 month postop. There was thinning of the anterior lamella on ASOCT up to 3 months postop for implant 1 but none for implant 2. Slit-lamp photography showed no stromal inflammation or implant vascularisation for implant 2, but melting and haze for implant 1. Histological examination showed normal stromal and epithelial architecture for implant 2 but abnormal epithelialopathy for implant 1. Electron microscopy showed activated keratocytes at 3 months that settled by 6 and 9 months for implant 2 but epithelial ingrowth and keratocyte degeneration for implant 1.

Conclusion: Implant 2 IPN showed good biocompatibility in an animal model of corneal inlay surgery. There was no stromal thinning or inflammation up to 9 months follow-up. IPN hydrogel polymers may be considered as a biomaterial for corneal inlays.

IOC – OC2 02

A Model to Measure Fluid Outflow in Rabbit Capsules Post Glaucoma Surgery**AC HOW¹, L XIANG², K BROMELow², J CROWSTON², M COOTE²**¹Singapore National Eye Centre, Singapore, ²Centre for Eye Research Australia, University of Melbourne, Australia

Background/Hypothesis: To establish a model to measure tissue hydraulic permeability in rabbit capsules post experimental glaucoma filtration surgery to evaluate the influence of biomechanics on the wound healing response following glaucoma surgery.

Methods: This was a study of 9 rabbits with single-plate paediatric Molteno implant inserted in their left eyes and their right eyes were used as controls. There were 2 test groups. The first group would have measurements done at 1 week after surgery (n = 5) and the second would have measurements at 4 weeks (n = 4). The drainage tube within the anterior chamber was cannulated ostium in-situ with a needle attached to a pressure transducer and fluid column at 15mmHg and the drop in the fluid column was measured every minute for 5 minutes. For the control group (n = 6), the anterior chamber of the unoperated fellow eyes was cannulated and similar measurements were performed on the same day as that of the other eye.

Results: At 1 week after surgery, the outflow through the tube was 1.76 +/-0.54 microL./min at 15mmHg (mean +/-SEM) whereas at 4 weeks, it was 0.13 +/- 0.05microL/min (*P* = 0.03, Pair-t test). The control eyes had an outflow of 2.03 +/-0.10 microL/min.

Conclusion: Fluid outflow in rabbit capsules post glaucoma filtration surgery can be quantified reliably and consistently with this model. A 4-week post-surgery capsule in the rabbit has reduced tissue permeability as compared to that at 1 week post-surgery.

IOC – OC2 03

Optimisation of Culture Conditions for Human Corneal Endothelial Cells and Tissue Engineering of Human Corneal Endothelium Using Collagen Sheet as Carriers**T LANG¹, RW BEUERMAN^{1,3}, D TAN^{1,2}, JS MEHTA^{1,2}**¹Singapore Eye Research Institute, Singapore, ²Singapore National Eye Centre, Singapore, ³Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Background/Hypothesis: To optimise primary culturing technique for human corneal endothelial cells and to evaluate the feasibility of producing tissue-engineered human corneal endothelium using collagen type I sheet as cell carriers.

Methods: Human corneal endothelial cells from scleral-corneal rims following cornea transplantation were cultured. The effect of 2 culture media (A: Opti-MEM rich growth factor medium containing OptiMEM-I, 8% FBS, EGF 5ng/mL, NGF 20ng/mL, pituitary extract 100µg/mL, ascorbic acid 20µg/mL, calcium chloride 200mg/L, 0.08% chondroitin sulphate, primocin 100µg/ml and B: DMEM poor Growth factor containing DMEM-low glucose, 10% FBS, 2ng/mL bFGF, primocin 100µg/ml) and the applicability of Rho kinase in-

hibitor Y-27632 was evaluated by colony forming efficiency, phase contrast image analysis and functional protein expression study. Histology and cell morphology of tissue-engineered human corneal endothelium was studied by H&E staining and alizarin red staining.

Results: Opti-MEM with rich growth factor (GF) medium significantly improved the attachment and colony growth rate compared to DMEM with poor GF medium (3.5 folds). Colony area of the culture in presence of Y-27632 was larger than control. H&E and alizarin red staining of tissue-engineered human corneal endothelium revealed that cultured human corneal endothelial cells formed a uniform hexagonal mono-cell layer on collagen type I sheet and cell density is about 2233 cells/mm².

Conclusion: Opti-MEM with rich GF medium is an effective medium in promoting clonal growth, functional protein expression and morphology maintenance of HCECs. The inhibition of Rho/ROCK signaling pathway by specific Rock inhibitor Y-27632 promoted the adhesion of HCECs. Tissue-engineered human corneal endothelium using collagen type I sheet as carriers had morphology and cellular density similar to human corneal endothelium in vivo.

IOC – OC2 04

Development of Biological Cornea Glue**MS LIEW¹, GT SALAZAR¹, P PANENGAD², M RAGHUNATH², JS MEHTA¹, RW BEUERMAN¹, D TAN¹**¹Singapore Eye Research Institute, Singapore, ²Department of Bioengineering, National University of Singapore, Singapore

Background/Hypothesis: To elucidate optimisation of a new adhesive formulation and method of delivery, its properties and biocompatibility in different target tissues especially the cornea.

Methods: The ability of the enzyme delivery system to precisely deliver the active enzyme without tissue damage was tested by contact transfer of dry enzyme to corneal cryosections, followed by an assay of enzyme activity. The ability of the enzyme to achieve adhesion in corneal tissue was studied by incising corneal tissue to produce flap wounds, incubation then mechanical testing after contact-transferring dry enzyme to the tissue interface. The degradation of the enzyme activity with time at room temperature was studied by assaying the enzyme activity of the contact transfer spots at increasing time points after the delivery of the dry enzyme on human skin cryosections.

Results: Precise transfer of active enzyme was demonstrated. In initial mechanical testing, the enzyme adhesive increased the breaking stress of cut and glued corneal tissue to about 40% and 60% of a control whole cornea. The activity of the delivered enzyme spots was observed to degrade with time; activity was low at 4 hours and disappeared completely at 16 hours after the delivery.

Conclusion: The new delivery method confines the adhesive activity of the enzyme to the tissue interface where the adhesion is needed, for an appropriate duration. The enzyme adhesive may serve as an effective biological glue for use in ophthalmic surgeries; further studies are in order to demonstrate test performance with respect to currently available ophthalmic glues.

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