

Implications of Morbid Obesity and Surgery for the Obese

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Since the dawn of mankind, the survival of the species theory mandates the adaptation of complex mammalian bodies to harsh climates and unfavourable environments. With abundant nutrition, sedentary lifestyle and modern transportation amongst many other comforts of urbanisation, many of the overweight and obese men today would be unrecognisable from the common man in the days of Socrates, Leonardo Da Vinci and even Thomas Edison.

Modern healthcare facilities are plagued with diseases of the metabolic syndrome as the rate of obesity in Singapore and most developed countries rises unchecked. This is now a global public health problem, a pandemic plaguing the rich and the poor, the young and the old, the movers and shakers and even the downtrodden. According to the Ministry of Health, Singapore, the overall prevalence of obesity in 2010 is 11%, with 1.7 million of Singaporeans being at risk of obesity-related health problems.¹

Body mass index (BMI) is commonly used to objectively measure the status of weight. BMI is calculated as weight in kilograms divided by the height in meters squared (m²). According to the WHO classification of overweight and obese in Asian countries, an overweight individual has a BMI between 23 and 27.5 kg/m². In Singapore and Asia-Pacific countries, an obese person is defined as a person with BMI of 27.5 kg/m² or more.² Obesity is classified by WHO as a chronic disease, a multisystemic disease resulting from complex interaction between the human genotype and the environment. Morbid obesity is defined as patients whose weight is more than twice their ideal body weight and/or 100 pounds or more overweight.

As part of the 1998 National Health Survey in Singapore, a study by Deurenberg-Yap et al from the Ministry of Health was published. It showed that for the same amount of body fat as Caucasians, the BMI in Chinese, Malays or Indians would be lower. For example, the BMI cut-off points for obesity would have to be about 27 kg/m² for Chinese and Malays and 26 kg/m² for Indians compared to the BMI of 30 kg/m² in Caucasians (cut-off for obesity as defined by WHO). This is the paradox of low BMI and high body fat percentage among Chinese, Malays and Indians in Singapore.³

Morbid obesity may affect every organ system such as the cardiovascular, respiratory, metabolic, musculoskeletal, gastrointestinal, urological, endocrine and reproductive, dermatological, neurological and psychological systems, thus increasing the risks of developing many diseases. High BMI is on average associated with about 30% higher overall mortality — 40% increased mortality rate for vascular mortality, 60% to 120% for diabetic, renal, and hepatic mortality, 10% for neoplastic mortality and 20% for respiratory and for all other mortality.⁴

Various comorbid conditions coexist or are common in the obese such as:

- hypertension, atherosclerotic heart and peripheral vascular disease with myocardial infarction and cerebral vascular accidents, peripheral venous insufficiency, thrombophlebitis, pulmonary embolism
- asthma, obstructive sleep apnea, obesity-hypoventilation syndrome
- type 2 diabetes, impaired glucose tolerance, dyslipidemia
- cholelithiasis, gastroesophageal reflux disease
- non-alcoholic fatty liver disease or steatohepatitis, hepatic cirrhosis
- hepatic carcinoma, colorectal carcinoma, cancer of the endometrium, breast, ovary, prostate, pancreas
- back strain, disc disease, osteoarthritis of the hips, knees, ankles, feet
- polycystic ovary syndrome, increased risk of pregnancy and foetal abnormalities, male hypogonadism
- intertriginous dermatitis
- pseudotumour cerebri
- carpal tunnel syndrome
- depression, eating disorders, body image disturbance.

Without medical intervention, average efficacy of a very strict, rigorous but unsupervised weight-loss programme results in weight loss of about 20 kg per year. Commercial

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options cost billions of dollars worldwide and the results are often times transient and unpredictable. In the past, most prescription pharmacological agents are not licensed for bariatric patients and could not be used in this population of patients.⁵

Numerous pharmaceutical giants are running trials on various novel agents in the field of weight management. Orlistat, a pancreatic lipase inhibitor, could result in weight loss of 3 to 4 kg per year in addition to diet and exercise programmes. However, they may cause significant side effects such as diarrhoea, cramping, flatulence and steatorrhoea.⁵

Other upcoming medications include Contrave, Empatic™, Qnexa, and an injectable combination of leptin and pramlintide. The only United States (US) Food and Drug Administration (FDA)-approved medication is Qnexa which is a combination of phentermine and topiramate. Contrave is a combination of bupropion and naltrexone and it is in Phase 3 clinical trial to prove its cardiovascular safety profile. Meanwhile the Phase 2b trial for Empatic™ has just been concluded and it is a combination of bupropion and zonisamide, awaiting start of Phase 3 trial.⁶

Bariatric surgery remains the cornerstone of the management of obesity, with proven safety, efficacy and durability.⁷⁻⁹ The latest consensus statement from the American Society for Bariatric Surgery and the American Society for Bariatric Surgery Foundation published in 2005 concluded that bariatric surgery is the most effective treatment available for complete resolution or improvement in co-morbidities associated with obesity.⁶

Critical events since the American 1991 NIH Consensus Conference included the rapid advancements in laparoscopic bariatric surgery with acceptable morbidity, mortality and long-term complications, increased experience with multi-disciplinary team-based management, increasing numbers of bariatric surgery in the adolescent and elderly and cost-effectiveness.⁶

Most importantly, data has now been established in randomised controlled trials comparing bariatric surgery and intensive medical therapy. For example, the Cleveland Clinic group has reported improvements in co-morbidities related to obesity including reversal or improvement in diabetes mellitus. This is especially with regards to mean levels of glycated haemoglobin, dyslipidemia, hypertension, metabolic syndrome with significant reduction in the use of diabetic and hypertensive medications.⁹

Selection of candidates for bariatric surgery starts with meeting the NIH Consensus guidelines including weight criteria. In Asian countries, this includes BMI of more than 37 kg/m² in those without concomitant co-morbid diseases or BMI of more than 32 kg/m² in the presence of severe comorbidities.¹⁰

High-risk co-morbid conditions that can justify reducing the BMI to 32.5 kg/m² include type 2 diabetes, life-threatening cardiopulmonary problems (eg. severe sleep apnea, obesity-related cardiomyopathy, etc), obesity-induced physical problems interfering with a normal lifestyle and body size problems severely interfering with employment, family function, and ambulation. These patients are also screened for co-existing mental disorders that preclude compliance to treatment and lifestyle advice post-surgery.

Various surgical options available in all major hospitals in Singapore include sleeve gastrectomy, Roux-en-Y gastric bypass, gastric banding and biliopancreatic diversion with duodenal switch operation.¹¹⁻¹⁴ Indications, risks and benefit ratio and patients' preference would be considered in making the final decision on the best surgical approach for the individual patient during each consultation with the weight management team. This multi-disciplinary team usually consists of bariatric surgeons, bariatric specialist nurses, dieticians, physiotherapists and even counsellors.

Therefore, intense public health momentum on preventive measures, together with current advances in weight management and bariatric surgery offer realistic hope of remission in many medical conditions in obese patients.

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