Chryseobacterium meningosepticum (Flavobacterium meningosepticum)—A Report of Five Cases in a Local Hospital

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Abstract

Chrysobacterium meningosepticum (Flavobacterium meningosepticum) ***is a known cause of meningitis in premature and newborn infants. Infection due to this organism in adults is uncommon. We report 5 cases of*** **Chrysobacterium meningosepticum** ***in adult patients. Most of these patients were elderly and had underlying co-morbidities.***

Ann Acad Med Singapore 1999; **28:858-60**

Key words: Meningitis, Nosocomial infection, Organism, Septicaemia

Introduction

Chryseobacterium meningosepticum has been known to be a causative agent of meningitis particularly in the premature and newborn infants. The first case of human infection with this organism was reported by King in 1959.[1] Since then, numerous cases of neonatal meningitis caused by this agent have been described. However, only lately has it been described in adult patients among whom the incidence is relatively lower.[2] Among these cases, most had significant underlying systemic disorders such as tuberculosis, leukaemia or other immunocompromised state such as that following renal transplantation. *C. meningosepticum* meningitis has also been described in a previously healthy adult with no discernible underlying disorder.[2]

C. meningosepticum is a Gram-negative rod with no fermentative activity on glucose. Most of the species are motile and oxidase positive. Recently *Flavobacterium meningosepticum* has been renamed as *C. meningosepticum.* We present here 5 cases of adult patients with *C. meningosepticum* septicaemia which were detected in Alexandra Hospital over the past one year. These patients were mainly debilitated and elderly patients who presented in various ways.

Case Reports

The first case was NSH, an 82-year-old Chinese lady with a background history of hypertension, who was admitted following a road traffic accident. She sustained a stable head injury and fractures of the left superior and inferior pubic rami. At admission, she was hypotensive secondary to hypovolaemia from blood loss. She was quickly stabilised with intravenous fluids and was treated conservatively. A week later, she became septic and febrile. Concomitantly she was found to have a left hemiplegia while a computed tomographic (CT) scan of the brain showed a fairly recent right corona radiata infarct. Blood and cerebrospinal fluid (CSF) cultures grew *C. meningosepticum.* Thus a diagnosis of meningitis from this organism was made. She responded to 2 weeks' treatment with intravenous piperacillin. Post treatment CSF culture revealed no bacterial growth. She improved minimally in terms of her neurological status following the stroke and became totally dependent in her activities of daily living.

Our second patient was also in the geriatric age group. LKT was a 76-year-old lady with multiple medical problems. She was first diagnosed to have systemic lupus erythematosus (SLE) in 1993 when she presented with a longstanding history of arthralgia. Investigations done showed her to be pancytopenic and the autoimmune markers for SLE were positive. She had thereafter been on corticosteroids and consequently developed Cushing's syndrome with its attendant complications of osteoporosis with compression fractures of T11 and T12 vertebrae and hypertension. Her past history included a gastrectomy performed for a perforated gastric ulcer and an old left corona radiata infarct, which was diag-

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nosed in September 1992. She had repeated admissions for recurrent urinary tract infection. In June 1998, she presented again with a classical history of urinary tract infection, i.e. dysuria and suprapubic pain for 2 days prior to admission. There was no history of fever but there was evidence of pyuria. She was empirically started on oral ciprofloxacin. She was switched to cefuroxime after 2 days of ciprofloxacin due to a persistent low-grade fever. Subsequent urine culture grew *Escherichia coli* sensitive to cephalexin, ceftriaxone, gentamicin and nitrofurantoin. After a week of cefuroxime with no remarkable improvement, nitrofurantoin was finally started. Throughout this period, she was not toxic.

A week later, however, she developed a sudden spike of temperature and went into septicaemic shock. Septic workup was carried out and intravenous ceftazidime and gentamicin was started. Blood culture grew *C. meningosepticum* and she was started on intravenous piperacillin. In view of the patient's poor functional status, the relatives decided on a conservative approach to management. They therefore did not consent to a lumbar puncture. Unfortunately, the patient did not respond to the antibiotics and expired 2 weeks later.

Our third patient, PSH, was a 60-year-old Chinese lady with systemic lupus erythematosus since 1990. She had problems of immune thrombocytopenia, which unfortunately led to an intracerebral haemorrhage with resultant seizures. Subsequently, a splenectomy was done in February 1991. The patient was also on long-term corticosteroids and had multiple admissions, namely for lobar pneumonia, herpes zoster infection, septic arthritis and recurrent urinary tract infections on several different occasions.

In the latest admission, she presented with generalised oedema and was worked up for nephrotic syndrome due to active lupus. A renal biopsy could not be performed as she was not cooperative. Her condition was complicated by sepsis with multiresistant *Klebsiella* urinary tract infection, cellulitis and gastroenteritis. In view of her immunocompromised state and the previous splenectomy which could have made her susceptible to pneumococcal infection, she was given intravenous imipenam and penicillin empirically. In addition, her condition was complicated by thrombocytopenia resulting from the sepsis and active lupus. This predisposed her to developing a retroperitoneal haematoma which was confirmed by a CT scan of the abdomen. Unfortunately, she died on the day of her acute deterioration, before any culture results were made available. Retrospectively, the blood culture that was done during the time when her condition suddenly took a change for the worse grew *C. meningosepticum* and *Klebsiella* species.

Our next patient, CTF, an 84-year-old man, was admitted following a fall secondary to postural hypotension, anaemia and proximal myopathy secondary to chronic corticosteroids usage. He had been ambulant prior to this and had no significant past medical history apart from hypertension and an old left thalamic infarct in 1994. He had been on long-term corticosteroids for chronic eczema. A week into admission, he came ill suddenly and was found to have developed *Klebsiella* urinary tract infection. He was started on intravenous imipenam. The blood culture results came back showing *C. meningosepticum*. As the family did not want any aggressive intervention, antibiotics was finally taken off when he did not show any response. The patient finally expired.

The last patient, CT, 88 years old, had multiple medical problems of ischaemic heart disease, hypertension, diabetes mellitus with nephropathy as well as carcinoma of the ascending colon with right hemicolectomy done in 1988. He had a problem of bladder outlet obstruction and was put on prazosin. An indwelling urinary catheter was inserted during this admission because of urinary retention. Subsequently he developed *Proteus* urinary tract infection and was started on oral ampicillin/sulbactum following a spike of temperature. Blood cultures that were obtained grew *C. meningosepticum* and intravenous piperacillin was instituted immediately. The patient, however, remained non-toxic and was fully alert with no signs of meningism. Lumbar puncture was withheld. He remained fairly well and successfully completed a 2-week course of antibiotics. He was discharged from the hospital subsequently.

Discussion

C. meningosepticum is an uncommon cause of adult nosocomial infection. Though they are known to be ubiquitous organisms, no definite environmental source has been identified. *Chryseobacterium* species is free living in soil and surface water. In hospital, it readily colonises moist inanimate environments such as respiratory equipment, medication or disinfectants and other solutions.[3] Infections are invariably nosocomial in origin. The above mentioned patients were ill and required intensive or high dependency care except for the last patient. Two of them had required intubation and ventilatory support. A *C. meningosepticum* outbreak had been described in Presbyterian University Hospital, Pittsburgh, involving intensive care patients.[4] More than 90% of the patients in the outbreak had been on ventilators that had used pasteurised tubing. A deficiency in the pasteurisation process had led to the colonisation of the ventilated patients by the bacteria. No definite source was identifiable in our patients but the infection was in all likelihood nosocomial in origin.

C. meningosepticum has low pathogenicity but may become clinically important in immunocompromised host. Due to its unusual susceptibility patterns and predilection for debilitated or immunocompromised

hosts, it can be a dangerous pathogen. A few interesting observations can be made of the cases we report. They are as follows:

- All of the patients except one belonged to the frail elderly (more than 75 years of age) group.
- All the patients were quite ill and debilitated from multiple medical problems. Three of them were actually on long-term corticosteroids.
- Most of them had another underlying gram-negative infection and the source of these infections was mainly from the urinary tract. Concomitantly, most of the patients had been on broad-spectrum antibiotics.

In a description of respiratory infection caused by *C. meningosepticum* at the Department of Internal Medicine, Kagawa Medical School between June 1988 and June 1989, *C. meningosepticum* was detected in the sputum and throat swabs of the 17 patients reported.[5] The primary diseases for the 17 patients were namely leukaemia, myelodysplastic syndrome, malignant lymphoma, stomach cancer, lung cancer and diabetes. These patients had also received antibiotics such as imipenam, amikacin, piperacillin and ceftazidime prior to detection. Two of our patients similarly had been receiving broad spectrum antibiotics. The second patient had received ciprofloxacin, cefuroxime and nitrofurantoin successively followed by intravenous ceftazidime and gentamicicn. The last patient had multiresistant *Klebsiella* urinary tract infection and was receiving imipenam and penicillin. This observation could lead us to conclude or infer that the use of broad-spectrum antibiotics could have led to an increase in colonisation by the *Chryseobacterium* bacteria. This is largely a result of selection for resistant strains and elimination of other competing but more susceptible bacteria.

C. meningosepticum is an uncommon pathogen with unusual susceptibility patterns. Most of the penicillins, cephalosporins and aminogycosides are usually ineffective. Recovery has been reported with the use of erythromycin, azlocillin or vancomycin. Ciprofloxacin, trimethoprim-sulfamethoxazole, piperacillin have also been used with success.[6] Two of our patients responded to the use of intravenous piperacillin. In a recent review of the antimicrobial susceptibilites of *Chryseobacterium* by Fraser and Jorgensen,[7] it was found that most of the isolates were susceptible to minocycline, levofloxacin, sparfloxacin and rifampicin. None was susceptible to vancomycin. In another review by Bloch,[8] sensitivity testings revealed effective antibiotics to be minocycline, ciprofloxacin, rifampicin, trimethoprim sulfamethoxazole. Similarly vancomycin was not found to be effective. It is important to stress that identification of the organism and proper susceptibility studies are essential in designing antibiotic therapy and this in turn will help in the selection of a regimen that can prove curative for the patient. However, one of the authors noted that the disk dilution technique could be notoriously unreliable for antibiotic sensitivity testing."

Conclusion

The 5 cases we have presented implicate *C. meningosepticum* as a significant pathogen causing disease in mainly immunocompromised adults. *Chryseobacterium* septicaemia is not exclusively confined to the paediatric age group. In a patient with any significant underlying disorder who fails to respond to first line antimicrobial therapy, the possibility of unusual but potentially fatal group of organisms such as *Ckryseobacterium* has to be considered. Conversely, cultures that grow unusual organisms such as *C. meningosepticum* should not be ignored completely or assumed to be merely contaminants. Repeat cultures must be carried out promptly and antibiotic susceptibility studies performed. Vancomycin has been recommended by some as the antibiotic of choice for treatment of infections caused by this organism. It would be prudent to also consider using alternatives such as minocycline, fluoroquinolones or trimethoprim-sulfamethoxazole if *Chryseobacterium* infection is suspected, till culture sensitivity results are known. However, it is important to note that *Chryseobacterium* is one of those organisms where *in vitro* susceptibility to antibiotics may not correlate with the latter's clinical efficacy. We are already seeing an increasing incidence of this infection and of other new strains of organisms as the use of newer antibiotics becomes more widespread in the hospitals. The judicious and proper use of antibiotics is important and cannot be overemphasised. The emergence of new resistant strains of organisms such as *Chryseobacterium* will pose new challenges in time to come.

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