Ochrobactrum Anthropi Catheter-Related Bloodstream Infection: The First Case Report In Malaysia

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SUMMARY

A 60-year old Malay man presented with an intermittent low-grade fever for 3 days and worsening of right ankle ulcers. He was known to have ischaemic heart disease, diabetes mellitus type 2, hypertension and end stage renal failure and was on regular haemodialysis. The organisms isolated from the peripheral and central blood specimens were identified as *Ochrobactrum anthropi,* a rarely encountered gram-negative bacillus with a unique antibiotic susceptibility profile. His condition improved after removal of the catheters and administration of antibiotic therapy. This case report highlights the importance of being wary of such rare, opportunistic pathogens and good communication between the microbiologists and the clinicians.

KEY WORDS:
Ochrobactrum, catheter-related bloodstream infection

INTRODUCTION

Ochrobactrum anthropi is a gram-negative, non-lactose-fermenting, oxidase-positive bacillus formerly known as Achromobacter Centres for Disease Control and Prevention (CDC) group Vd [1]. It is found in hospital and environmental water sources and is an emerging pathogen in immunocompromised patients. However so far, there has been no published report of *Ochrobactrum anthropi* infection in Malaysia.

CASE REPORT

A 60-year-old Malay man presented with an intermittent low-grade fever for 3 days and worsening of right ankle ulcers. He has a background history of ischaemic heart disease with small vessel disease (angioplasty done 8 years ago), diabetes mellitus type 2, hypertension and end stage renal failure (ESRF). He is on regular haemodialysis 3 times per week done via a Permcath inserted on the right internal jugular vein in February 2012. In January 2012, he was admitted to orthopaedic ward at Universiti Kebangsaan Malaysia Medical Centre (UKMMC) for having right leg cellulitis and later was discharged with oral amoxycillin-clavulanic acid. He has been moving about on wheelchair since 6 months ago due to cerebrovascular accident.

On examination, the patient had a temperature of 38.2°C, heart rate of 94 beats per minute, blood pressure of 150/92 mmHg and respiratory rate of 18 breaths per minute. His right leg appeared swollen, erythematous and tender. There were multiple purulent ulcers noted on his right ankle with slough at the base of the ulcers.

His total white cell count was 22.3×10^9/L with neutrophil predominance (19.8 µL), suggesting a bacterial infection. His C-reactive protein (CRP) was also elevated. He was given intravenous (IV) amoxycillin-clavulanic acid 1.2g 12-hourly during the first 24 hours of ward admission and later was changed to IV ampicillin-sulbactam 1g 8-hourly. Initial wound debridement was done during 48 hours of admission and tissue culture from the right ankle grew extended-spectrum beta-lactamase (ESBL)-producing *Enterobacter* sp. mixed with non-ESBL-producing *Escherichia coli*. Instead of starting a carbapenem to cover for ESBL-producing organisms, for unknown reasons, the physician decided to change the antibiotic to IV cefepime 2g 12-hourly.

Five days post wound debridement, the patient still had a fever with poor glucose control, thus a below knee amputation (BKA) was performed on his right leg. He was still on IV cefepime until he developed a fever with temperature of 38.8°C on day 4 post-BKA. Concurrent blood cultures were sent at this time from 3 different sites (peripheral vein, permcath at the right internal jugular vein, and from triple lumen catheter at the left femoral vein that was inserted on 15th February 2012, i.e. after 4 days in situ).

All 3 sites of blood cultures were positive for *Ochrobactrum anthropi,* identified using API®20NE (BioMérieux, France). The central line cultures were positive for more than 2 hours earlier than the peripheral vein culture, suggesting a catheter-related bloodstream infection. The antibiotic susceptibility testing showed that the isolate was sensitive to imipenem, meropenem, cefepime, amikacin, gentamicin, ciprofloxacin and trimetroprim-sulfamethoxazole, and resistant to ceftazidime, piperacillin-tazobactam and polymyxin-B. Intravenous imipenem 500mg with cilastatin 500mg 12-hourly was commenced for 2 weeks and both central catheters were removed. Only the triple lumen catheter tip was sent for culture and the results were released as mixed growth. The patient's fever settled and his general conditions improved since then.

DISCUSSION

Organisms formerly called CDC group Vd and Achromobacter groups A, C, and D were renamed *Ochrobactrum anthropi* (from the Greek word ochros, meaning 'pale yellow') [1]. This organism is an oxidase-positive, non-

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lactose-fermenting gram-negative bacillus that grows readily on MacConkey agar. It resembles the *Pseudomonas* species in that it is water borne and may cause nosocomial infection.

Ochrobactrum anthropi appears to be an infrequent but widely distributed opportunistic pathogen; occurring in blood, respiratory tract specimens, urine, faeces, wound, ears, abscesses, and even on hospital and environment surfaces. In a review by Vaidya *et al.*[2], *O. anthropi* infections have often been associated with nosocomial infection in debilitated patients, most commonly catheter-associated bacteremia. Although less common, infections among immuocompetent individuals also occur which were associated with trauma, endophthalmitis, osteomyelitis, prosthetic valves, venous catheter, and contaminated pharmaceuticals. Other risk factors include previous antibiotic therapy, prior surgical procedure with allografts, accidental wound, and coinfection with other bacterium[3].

The Infectious Diseases Society of America (IDSA) Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection[4] state that "A definitive diagnosis of catheter-related bloodstream infection (CRBSI) requires that the same organism grow from at least 1 percutaneous blood culture and from a culture of the catheter tip (A-I), or that 2 blood samples be drawn (one from a catheter hub and the other from a peripheral vein) that, when cultured, meet CRBSI criteria for quantitative blood cultures or differential time to positivity (DTP) (A-II)." In our case, the catheter tip that was sent for culture was only from the triple lumen catheter and the results were released as mixed growth. Further identification was not pursued when there are more than 3 different bacteria present, according to our laboratory protocol. Therefore, the diagnosis of CRBSI in this case was made based upon DTP of more than 2 hours between the central line blood culture (first) and the peripheral blood culture (second).

Ochrobactrum anthropi are usually susceptible to trimethoprim-sulfamethoxazole and fluoroquinolones. Other than that, they are variably susceptible to gentamicin, amikacin, netilmicin, imipenem and tetracycline. Unlike most gram-negative bacteria, they are generally resistant to β-lactams, including most cephalosporins and penicillins such as amoxycillin-clavulanate, piperacillin-tazobactam, cefotaxime, ceftriaxone and aztreonam[5]. In this case report, the isolate was sensitive to imipenem, meropenem, cefepime, amikacin, gentamicin, ciprofloxacin and trimetroprim-sulfamethoxazole, and resistant to ceftazidime, piperacillin-tazobactam and polymyxin-B. The patient responded well to IV imipenem and removal of the central catheters. Since *O. anthropi* have different antibiotic susceptibility profiles than other more commonly encountered gram negative bacteria like *E. Coli* and *Klebsiella spp.*, early communication is vital to inform the clinicians regarding choice of antibiotics i.e. to switch from an empiric antibiotic to a more appropriate one based on the results of antibiotic susceptibility tests.

It is also important for the microbiologists to remind the clinicians regarding the possibility of removing the central catheters to aid recovery, and to send the catheter tips for culture to aid diagnosis. In addition, microbiologists, together with clinicians should ensure that infection control measures are implemented and adhered to and to be wary of possible outbreak. The IDSA has developed very comprehensive guidelines[4] in the management of CRBSI and it is beyond the scope of this case report to detail every aspect of the guidelines. However in summary, the IDSA guidelines in managing CRBSI involve 4 main issues: catheter removal, antibiotic therapy, antibiotic lock therapy if catheter is to be salvaged and catheter care. We strongly recommend the readers to have a look at these guidelines.

CONCLUSION

This is the first reported case in Malaysia of catheter-related bloodstream infection caused by *Ochrobactrum anthropi* in a patient with underlying diabetes and ESRF. Although the case shows a typical presentation of the infection, it illustrates the importance of rapid isolate identification and susceptibility testing, and prompt treatment with the right antibiotic and catheter removal. This case also highlights the importance of effective communication between microbiologists and clinicians in managing the infection, in view of *O. anthropi* unique antibiotic susceptibility profiles.

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