CASE REPORT

Persistent Community-acquired *Ochrobactrum anthropi* Bacteremia in Severe Dengue Infection: A Case Report

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ABSTRACT

We report a rare case of *Ochrobactrum anthropi* bacteremia in a previously healthy young man who was admitted for severe dengue. *O. anthropi* is a rarely encountered Gram negative organism which is resistant to commonly used beta-lactam antibiotics. This organism is usually interpreted as a contaminant as it is ubiquitous in the environment. Isolation of this organism upon admission suggested a community-acquired infection. He had persistent bacteremia and had to be treated with a prolonged course of meropenem and ciprofloxacin. This case report highlights the importance of early diagnosis and prompt treatment of this otherwise contaminant as previous reports showed this organism can be an opportunistic pathogen which may lead to severe infection.

Keywords: *Ochrobactrum*, Bacteremia, Community-acquired, Severe dengue

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INTRODUCTION

Ochrobactrum anthropi previously classified as *Achromobacter* Centers for Disease Control and Prevention (CDC) group Vd is an aerobic, oxidase-positive Gram-negative organism (1). Apart from its wide distribution in water and soil, it also has been identified as part of normal flora of the human intestine (2). Most of the *O. anthropi* bacteremia cases were associated with severe immunosuppression and indwelling medical device (3). Recent study has found that majority of cases were hospital-acquired contrary to previous earlier studies (2). The organism is low virulent and often leads to a favorable prognosis (2–4). Recurrence and persistence have also been reported (2,5).

CASE REPORT

A 24-year-old Nepali gentleman with no known premorbid conditions presented to our hospital's emergency department with complaints of fever for five days associated with arthralgia, vomiting, diarrhea, abdominal pain and gum bleeding. He stays in a dengue prone area. He has been living in Malaysia for the past five years and works in an ice factory.

On physical examination, he was alert, normotensive but tachycardic; with a pulse rate of 100 beats per minute, and temperature of 38⁰C. Other systemic review was unremarkable. Full blood count showed hemoglobin 20.3 g/dL, hematocrit 60.9%, platelet 14×10^9/L and white cell count (WCC) 6.5×10^9/L. His renal and liver profiles were deranged; creatinine 130 umol/L, alanine transaminase 360 U/L, aspartate transaminase 617 U/L. C-reactive protein (CRP) were raised at 8.49 mmol/L. Dengue NS1 antigen and dengue IgG were both positive at day 5 of illness, while dengue IgM was negative. Blood culture was drawn during admission.

He was treated for severe dengue with pre-renal acute kidney injury. Despite treatment his general condition worsened. He showed signs of plasma leakage with pleural effusion and ascites. Biochemically, he showed worsening of high anion gap metabolic acidosis and transaminitis. Hence, he was electively intubated and admitted to the intensive care unit.

Despite appropriate management and being in the recovery phase of dengue infection (i.e. on the fourth day of admission; the eighth day of illness), he was still having temperature spikes and WCC and CRP showed an increasing trend; up to 40.5×10^9/L with neutrophils predominant at 80% and 288 mg/L respectively. He was subsequently treated for nosocomial infection with intravenous piperacillin-tazobactam. No obvious source of infection was found.

The blood culture which was taken within 12 hours of admission isolated *Ochrobactrum anthropi* (Vitek2, bioMerieux) and identification was confirmed by 16S rRNA. It was sensitive to ciprofloxacin, gentamicin, imipenem, meropenem, trimethoprim-sulfamethoxazole and tigecycline; but was resistant to amoxicillin-clavulanate, ampicillin, ampicillin-sulbactam, piperacillin-tazobactam, cefuroxime, ceftazidime, cefepime and cefotaxime. The blood culture result was informed to the clinician on the fourth day of admission. As the patient's condition continued to deteriorate, antimicrobial agent was escalated to meropenem on the seventh day of admission.

Despite this, he still had intermittent fever during the second week of admission and repeated blood cultures isolated the same organism. He subsequently showed clinical and biochemical improvement with one negative blood culture after 5 days of meropenem. The patient subsequently developed recurring fever despite being on meropenem for about two weeks. Repeated blood culture at this time again isolated *O. anthropi* with the same antimicrobial susceptibility pattern. His condition rapidly deteriorated with GCS of seven. Transthoracic echocardiogram excluded infective endocarditis and CT brain was normal. The attending team subsequently added on intravenous ciprofloxacin. He finally responded to treatment clinically and biochemically and was able to be extubated. In summary, a total of 25 days of dual antibiotics (i.e. meropenem for 15 days and ciprofloxacin for 10 days). He was discharged at the 35th day of admission after two consecutive negative blood cultures.

DISCUSSION

This is a case of *O. anthropi* bacteremia in a previously healthy man with debilitating illness which probably become the contributing factor for him acquiring the infection. Literature review has revealed that this environmental organism rarely causes disease in immunocompetent humans (3).

Blood culture taken upon admission isolated *O. anthropi* which was identified by the automated Vitek system and later confirmed by 16S rRNA. This primary *O. anthropi* bacteremia suggested a community-acquired infection as the culture was taken within 12 hours of admission. Repetitive isolation of identical organisms from different days of blood culture taken excluded the possibility of blood culture contamination, warranting thorough clinical evaluation.

Other most important factor is the presence of indwelling medical device due to the organism's ability to adhere to silicon; which was absent in this patient upon initial organism isolation (3). The organism may be contracted from his workplace (i.e. ice factory) as it is widely distributed in water sources (2). Being a part of normal flora of the human intestine, there is also a possibility that the bacteremia is secondary to bacterial translocation across the mucous membrane of the gastrointestinal tract (2,3). The most common underlying disease reported to have association with *O. anthropi* bacteremia was malignancy, although that is not the case in this patient (2).

Ochrobactrum anthropi was infrequently described as a human pathogen with the first case reported in Malaysia was in 2013 (1). Most reported cases were catheter-related bacteremia, while others were infective endocarditis, abdominal abscess, endophthalmitis, urinary tract infection, meningitis and osteomyelitis (1,2). A study in China reported the main clinical picture in patients with *O. anthropi* bacteremia was fever, disorders of consciousness and headache (2). In our case, the dengue fever phase progressed as expected, except for the persistence of fever. He also experienced one episode of altered consciousness, which resolved after ciprofloxacin commencement. There was no definite focus of infection seen in this patient.

Ochrobactrum anthropi infection often has favorable prognosis due to its low pathogenicity. However, it should not be underestimated as this opportunistic pathogen can lead to severe infection in immunocompromised and debilitated patients (2). In contrast, some organ transplant recipients experienced resolution of *O. anthropi* bacteremia without treatment; therefore it is important to justify clinically the need for treatment in a case to case basis (3).

This organism has been shown to be resistant to β-lactam antibiotics except carbapenem owing to the presence of bla_{OCH-1} gene (4). As this patient was treated for nosocomial infection, the empirical antibiotic of choice was piperacillin-tazobactam; dooming the patient for failure of treatment.

A study has recommended empirical monotherapy with quinolones or carbapenems without preference, or both in severe cases; with adjustment following the antimicrobial sensitivity test, due to its variability and unpredictable multiple antibiotic resistance (2). Our patient initially showed clinical improvement with bacterial clearance became febrile and bacteremic while on treatment with meropenem, suggesting incomplete eradication (2,5). Only after ciprofloxacin was added to his antimicrobial regime did his blood culture turned out negative. Therefore, this patient

was treated with meropenem and ciprofloxacin for a total of 25 days. To date, there is no established treatment duration for *O. anthropi.* However, catheter removal has been suggested to be essential in management of *O. anthropi* (2).

CONCLUSION

Although *O. anthropi* bacteremia is rare, it needs to be thoroughly evaluated as it can result in severe infection in debilitated patients. Repeatedly obtaining similar organisms may exclude contamination and relapse should be considered. Correct identification with susceptibility testing and prompt treatment with antimicrobial agents together with catheter removal are the mainstay of management although the organism is of low virulence and often with favorable prognosis.

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