

ACTINOMYCES ODONTOLYTICUS CATHETER RELATED BLOODSTREAM INFECTION IN A HEMODIALYSIS PATIENT - FIRST REPORTED CASE

Tze Jian Ng¹, Christopher Thiam Seong Lim², Bak Leong Goh¹

¹Nephrology Department, Hospital Serdang, Jalan Puchong, 43000 Kajang, Selangor, Malaysia

²Unit of Nephrology, Department of Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor Malaysia

ABSTRACT

Actinomyces odontolyticus is a gram-positive bacillus, usually found in oropharynx, gastrointestinal tract and urogenital tract as human commensal flora. Infection caused by this organism is rare but may occur in an immunocompromised patient. This organism has been known as difficult to be cultured. We reported a case of 60 years old woman, on regular hemodialysis for the past 3 years, who had *Actinomyces odontolyticus* bacteremia due to catheter-related bloodstream infection. She was treated with antibiotics for 3 weeks and was referred to the dentist for dental clearance.

We believe this is the first case report of *Actinomyces odontolyticus* bacteremia in a hemodialysis patient. This case report highlighted the importance of looking for the primary source (in this case oral cavity) as this is usually an endogenous infection arising most frequently from the mucosal membrane. Early eradication of the primary source may help to fasten the recovery and prevent it re-occurs in the future.

Keywords: *Actinomyces odontolyticus*, bacteremia

INTRODUCTION

Actinomyces odontolyticus is an anaerobic, gram-positive bacteria. Other characteristics include facultative capnophilic, nonsporulating, non-motile and usually stained irregularly (1). It was first discovered by Batty (2) in 1958, where he isolated this organism from a person with advanced dental caries. *Actinomyces odontolyticus* infections are rare, presenting an endogenous infection arising commonly from mucous membranes (3). Other reported sources included soft tissue, lung, abdomen and pelvic region (1). Although the prognosis of the infection caused by this organism is generally good with medical therapy, it still can lead to death if proper treatment is not initiated early (3). Here we reported a case of *Actinomyces odontolyticus* bacteremia due to catheter-related bloodstream infection, which is yet to be reported in the literature.

CASE REPORT

This is a 60 years old woman, diagnosed to have End-stage renal disease (ESRF) since 2016, on regular hemodialysis via right brachiocephalic fistula (BCF). In May 2019, her BCF was thrombosed and temporary right internal jugular catheter (IJC) was inserted for hemodialysis on 9th May 2019. Since then she had multiple hospital admissions mostly due to catheter malfunction and multiple catheter exchanges were done throughout the hospitalizations. On 9th September 2019, she was again admitted to hospital. This time she complained of fever for 1 day associated with chills and rigours during hemodialysis. During the physical examination, pus discharge was noted from the catheter insertion site. A swab from the exit site and blood culture were taken and ceftazidime and cloxacillin were started. The previous catheter was taken out and a femoral catheter was inserted as temporary dialysis access. Her blood investigations showed leucocytosis with predominantly neutrophils (66% of total white cell counts). Her fever settled down the next day. Gram staining for swab culture showed numerous gram-negative rods but blood culture showed gram-positive cocci in a cluster.

*Correspondence: Christopher Lim (FRCP Edinburgh)
 Nephrology Unit, Department of Medicine,
 Faculty of Medicine and Health Sciences,
 Universiti Putra Malaysia 43400, Serdang, Malaysia.
 Tel: +6-03-89472568 | E-mail: drchrislim@gmail.com



Cloxacillin was stopped and switched to cefazolin due to difficult venous access, but ceftazidime was continued. She remained well throughout the hospitalization. Swab culture showed no growth after 3 days of incubation though initial gram staining able to identify gram-negative rods organism. After 5 days of admission, her aerobic blood culture showed methicillin-resistant coagulase-negative Staphylococcus (MRCONS) whereas both peripheral and central anaerobe blood culture, which was released after 10 days, showed *Actinomyces odontolyticus*. MRCONS was not treated as the patient responded well to the antibiotics. The antibiotic was subsequently changed to Intravenous (IV) Augmentin after discussion with the microbiologist. She was then referred to the dentist for dental clearance as this organism commonly colonized the oral cavity. She was diagnosed to have chronic generalised periodontitis. Full mouth scaling and filling was done for the cervical abrasions of right upper canine, left upper central incisor, left lower central incisor, left lower first premolar and right lower central incisor of teeth. Teeth extraction were done for left upper first molar and right lower first premolar. She was remained well and afebrile since started antibiotics. Her white cell counts and C-reactive protein coming down eventually throughout the admission. We continued the IV Augmentin for another 11 days with total of 3 weeks duration of antibiotics.

Due to the patient's poor vascular access, counselling was done for conversion to peritoneal dialysis. A peritoneal dialysis catheter was inserted after completed antibiotics for 3 weeks and she was currently well receiving peritoneal dialysis treatment.

DISCUSSION

Actinomycosis is a rare chronic disease caused by *Actinomyces* spp which normally colonize the human mouth and digestive and genital tracts. More than 30 species of *Actinomyces* have been described so far. The most common *Actinomyces* spp isolated in human infections is *Actinomyces israelii*, and is found in most clinical forms of actinomycosis (4). Whereas *Actinomyces odontolyticus* is mostly found in mouth, oropharynx and upper gastrointestinal tract. This organism is one of the most prevalent *Actinomyces* spp that take part in forming a biofilm on teeth at all ages (5). Infections caused by *Actinomyces odontolyticus* are rarely found, more frequently affecting middle-aged males and immunocompromised patients (3). Clinical features of actinomycosis can be varied, depends primarily on the site/organ involvement. Cervicofacial and abdominopelvic location will be the commonest site, followed by pulmonary and digestive tract. Even central

nervous system actinomycosis was reported before (4).

The culture of *Actinomyces* is quite difficult as *Actinomyces* infections are likely to be polymicrobial due to previous exposure to antibiotic therapies. More time is usually needed to culture *Actinomyces* in an anaerobic environment (5). It usually appears in blood culture after at least 5 days and sometimes may take up to 15–20 days. Thus, incubation of at least 10 days is required before confirmation of a negative culture (4). Small, irregular, whitish colonies that are smooth to slightly granular will be seen in blood agar and dark red pigment will appear when mature (2–14 days). *Actinomyces odontolyticus* shows negative catalase and oxidase tests. It reduces nitrates to nitrites and does not grow at pH 5.5 (1). As for treatment, *Actinomyces* spp is usually extremely susceptible to beta-lactams antibiotics as it does not produce beta-lactamase. Thus, penicillin G or amoxicillin is the recommended initial therapy for the treatment of actinomycosis (4). Nevertheless, prolonged therapy with high doses of antibiotic is usually required to ensure adequate antibiotic penetration of the primary source of infection. Surgical intervention may be needed, especially those with abscess or widespread necrotic tissue (5).

In our case report, we think that the most likely source of bacteremia is from the chronic periodontitis as this patient had poor oral hygiene. Although this organism is a commensal in the oral cavity, it might still cause bacteremia especially in an immunocompromised patient like ours. However, we were not able to identify the exact mode of transmission to the catheter. The possible postulation is that the bacteria might colonize the catheter through blood transmission. We referred her to the dentist immediately once the blood culture result was released and dental clearance was done promptly in an attempt to eradicate the source of infection.

CONCLUSION

Actinomycosis is a rare disease caused by *Actinomyces* spp, and it can be easily missed as it is not easy to be cultured. While actinomycosis is easily treatable with common broad-spectrum antibiotics, it may still cause a fatal outcome if it is not recognized early or treated with an inadequate dose or duration of antibiotics. Eradication of the primary source is the cornerstone of the treatment. In our case, treatment with appropriate antibiotics and prompt referral to look for primary source fasten the recovery of this patient. This case high lightened the importance of knowing the common source of rare organism and thorough oral cavity examination must be carried out whenever actinomycosis is suspected.

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