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Case Report

Candida intermedia induced central line infection in an infant: A case report

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ABSTRACT

Background: Central venous catheter (CVC) carries a risk of infection, particularly with prolonged use of antibiotics and parenteral nutrition (PN). The most common causative agent is Staphylococcus aureus but other bacteria and fungi can cause infection as well.

Case Presentation: This is a case of an 11-month-old male PN-dependent infant with a complex medical history who developed a fungal infection of the central line due to Candida intermedia. Despite displaying in-vitro sensitivity to Fluconazole, the infection ultimately required treatment with Caspofungin and the removal of the venous catheter for successful clearance and full recovery.

Conclusion: This case underscores the importance of tailoring treatment based on both anti-fungal sensitivity and clinical response, emphasizing the importance of CVC removal in achieving infection clearance.

Keywords: Central venous catheter, Staphylococcus aureus, Infection.

INTRODUCTION

Infection is a common complication of Central Venous Catheter (CVC), especially in pediatric patients reliant on parenteral nutrition (PN). Despite efforts to reduce the risk, it cannot be eliminated. Infections can be bacterial or fungal, and while some remain localized to the CVC, others can spread to the bloodstream and potentially other organs.

CVC infections are mostly caused by bacteria. Common culprits are gram-positive bacteria like Staphylococcus aureus and Enterococcus faecalis, while gram-negative bacteria such as Klebsiella species and Escherichia coli are less common. [1] Fungal infections in CVCs are uncommon but should be considered when antibiotic treatment proves ineffective, and yeast is isolated from either the CVC or the peripheral bloodstream. Candida albicans and Candida glabrata are frequently associated with fungal CVC infections, necessitating the use of antifungal medications alongside the challenging task of potentially removing the CVC, which may not always be feasible. [1] Candida intermedia is an infrequent cause of CVC infection, with rare reported cases. [2,3] Herein, we report a case of CVC infection and fungemia caused by Candida intermedia in an 11-month-old Arabic male.

CASE REPORT

An 11-month-old boy with Human Rhino Virus infection was admitted to the PICU for severe asthma exacerbation. He required intubation and mechanical ventilation. A blood culture from his tunneled CVC revealed the presence of Pantoea species, which necessitated a 14-day treatment course with Ceftriaxone. Additionally, the CVC was replaced with a non-tunnelled catheter in a different peripheral vein.

A multi-disciplinary team was involved in his care due to his several complex medical problems. He has been diagnosed with both distal trisomy 16q and Axenfeld-Rieger syndrome. During the neonatal period, he experienced the development of Necrotizing Enterocolitis (NEC), which subsequently led to Short Bowel Syndrome

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(SBS). As a result of these conditions, he currently relies on PN for his nutritional needs and is experiencing signs of Intestinal Failure-Associated Liver Disease (IFALD), which is evident through hepatosplenomegaly and thrombocytopenia. Additionally, being a carrier of Alpha Thalassemia, he faced challenges with anemia, requiring frequent blood transfusions. Moreover, he has recently been diagnosed with Exposure Keratopathy.

Following his transfer to the ward, he experienced a fever spike three weeks after the new catheter insertion. Meropenem and Vancomycin were initiated empirically, and blood cultures were obtained from both peripheral and CVC samples. After two days with no signs of improvement, additional blood samples were collected for repeat blood cultures. The preliminary result of the blood culture obtained from the CVC indicated yeast growth after 13 hours of incubation. Consequently, IV Caspofungin was administered. Subsequently, the final results of the culture reported the growth of Candida Intermedia, which was found to be susceptible to both Caspofungin and Fluconazole. The decision was made to switch the antifungal treatment to Fluconazole due to its more favorable side effect profile compared to Caspofungin, particularly regarding myelosuppression concerns. The patient's fever persisted despite the administration of the antifungal drug, and daily blood cultures consistently showed the growth of the same organism. During this time, a thorough investigation was conducted to explore other potential causes of the fever. This included chest X-ray, urine analysis and culture, stool viral PCR panel, respiratory viral PCR panel, and blood film tests. However, all of these tests yielded unremarkable results. Fungal dissemination was ruled out through a series of diagnostic tests, including ultrasonography, echocardiogram, and ophthalmological examination. Blood tests showed: White blood cells (WBC) 16.19x109/L (4.5 - 11.0×109/L) with absolute neutrophilia, Haemoglobin (Hb) 10.4 g/dl (11.3-14.1 g/dl), Platelets (PLT) 37x109/L (150 to 400×109/L), C-reactive protein (CRP) 71.83 mg/L (<5mg/L), Procalcitonin (PCT) 3.36 ng/mL (0.10-0.49 ng/mL).

Initially, CVC removal was postponed due to the patient's dependency on parenteral nutrition, as well as symptoms of abdominal distension and bilious vomiting. However, when there was no improvement and the infection proved resistant to treatment, the decision was made to replace the catheter with another one at the same site. His antifungal medication was reverted to Caspofungin. There was a temporary improvement initially, but it was followed by recurrent fever, and yeast growth was detected in the CVC blood culture again. Finally, a combination of CVC removal, replacement with a peripherally inserted venous line (PVL), and Caspofungin treatment led to a resolution of the fever and a full recovery. Negative blood cultures were observed, and as a result, the patient was discharged after completing the Caspofungin treatment.

DISCUSSION

The incidence of candidemia varies with age, and the risk is heightened by several risk factors, such as the use of broad-spectrum antibiotics, the presence of a CVC, and dependence on PN. [4] Additionally, other factors contributing to the risk of candidemia include stays in the PICU, the presence of hematological malignancies, the use of glucocorticoids, and prior candida colonization. [4]

In our case, the patient developed a CVC infection despite the meticulous aseptic handling of his catheter. He had several risk factors that made him more susceptible to this infection. Notably, his dependence on parenteral nutrition (PN) exposed him to a rich environment containing lipids, amino acids, and various vitamins, which can serve as abundant nutrients for the multiplication of microorganisms.

Following the initial management and the absence of a positive response to empirical treatment, the possibility of a non-bacterial infection or one caused by resistant bacteria was considered. The isolation of Candida intermedia in the blood culture justified the initial treatment failure and necessitated a transition to antifungal medication.

Candida intermedia is rarely a pathogenic species, and it is usually found in the oropharyngeal cavity of human beings as part of the normal flora. It can be isolated from cheese as well. [3] Only a few cases have been reported. [2,3].

The isolated Candida intermedia strain exhibited susceptibility to several antifungal medications, including Caspofungin, Micafungin, Fluconazole, and Voriconazole. However, Fluconazole failed to effectively clear the infection, indicating a potential disparity between in-vitro and in-vivo sensitivity. Attempts to salvage the current CVC or immediately replace it with a new line were unsuccessful, indicating a potential risk of bloodstream dissemination and re-infection of the new catheter. Consequently, the decision was made to remove the CVC for a minimum period of 48 hours. This procedure allows for thorough blood disinfection and sterilization before the insertion of a new catheter, effectively reducing the potential for recontamination and infection of the replacement line.

Candida intermedia is an infrequently encountered pathogenic fungus, with only a handful of documented cases. Here, we present a rare pediatric case involving a CVC infection and Candidemia attributed to Candida intermedia. It underscores the importance of considering both antifungal sensitivity results and clinical response when making treatment decisions. Furthermore, our

experience highlights that while efforts to salvage the central venous catheter may be attempted, they can prove unsuccessful in some instances, necessitating its removal

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