Case Report

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Candida pelliculosa sepsis in a neonate: a case report

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Abstract

Candida pelliculosa is a rare fungal cause of neonatal sepsis. Premature and very low birthweight infants are at especially high risk of neonatal fungal infections. There have been no reports of *C. pelliculosa* infection in Anhui Province, China. Here, we report a case of *C. pelliculosa* fungemia in a newborn boy admitted 30 minutes after delivery with grunting, cyanosis, and asphyxia. *C. pelliculosa* was identified as the causative organism using blood culture, DNA sequencing, and mass spectrometric analysis. After 20 days of fluconazole therapy, the patient's symptoms stabilized. Together with other relevant literature, this report provides evidence that premature neonates are at increased risk of fungal infections and that *C. pelliculosa* fungemia should be diagnosed early using blood cultures to enable effective treatment. Fluconazole may be effective for treating neonates with *C. pelliculosa* infection.

Keywords

Candida pelliculosa, neonatal sepsis, premature birth, fluconazole, mass spectrometry, case report

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Introduction

Sepsis is associated with high mortality among newborn infants. The most common causes of sepsis in the neonatal period are staphylococci (especially *Staphylococcus aureus*) and Gram-negative bacilli.[1] Previous surveys have documented hospital-acquired *Candida pelliculosa* infections in nurseries, pediatric intensive care units, hematology wards, and surgical intensive care units, suggesting that low gestational age, low birth weight, prolonged

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hospitalization, sustained blood alkalosis, inappropriate use of antibiotics, and invasive surgeries may increase the risk of *C. pelliculosa* infection.[2,3] In neonatal wards, various antibiotics and other interventions are used to treat these conditions in premature infants who develop sepsis following fungal infections. A case-control study showed that handling infants with unsterilized hands or leaving them in the interventional radiotherapy room were risk factors for *C. pelliculosa* fungemia.[2] Herein, we report a case of neonatal sepsis caused by *C. pelliculosa* in Anhui Province, China.

Case report

A newborn male infant was hospitalized 30 minutes after delivery on 2 March 2019 with grunting, cyanosis, and asphyxia. The baby was the product of assisted reproduction and was born at a gestational age of 29^{+6} weeks. After admission, the infant was immediately treated with biphasic positive airway pressure-assisted ventilation, vitamin supplementation, and intravenous fluid. On 8 March, the infant developed a fever. The results of laboratory tests were as follows: white blood cells 11.76×10^9/L (52.60% neutrophils, 26.70% lymphocytes), hemoglobin 165 g/L, and platelets 117×10^9/L. Renal function, C-reactive protein levels, and electrolyte levels were all within normal ranges. After 1 week of supportive treatment, the infant was in critical condition. His blood oxygen level decreased several times and his hemoglobin level dropped sharply to 132 g/L. His condition did not improve with stimuli and he was managed for suspected late-onset neonatal sepsis. Continuous positive airway pressure-assisted ventilation (positive-end respiratory pressure, 3 cmH_2O; fraction of inspired oxygen, 30%) was applied to support respiration. Meropenem and fluconazole were administered for suspected bacterial sepsis and fungal prophylaxis, respectively. Because of recurrent apnea and worsening symptoms, vancomycin was added to the regimen 1 hour later. On 26 March, the patient's blood cultures showed spore growth and he was diagnosed with fungemia. The pathogenic organism was identified as *C. pelliculosa* (Figure 1). After several weeks of treatment, the results of laboratory tests were as follows: white blood cells 5.98×10^9/L (18.50% neutrophils, 55.40% lymphocytes), hemoglobin 83.0 g/L, and platelets 124×10^9/L. To exclude central nervous system infection, cerebrospinal fluid examination was performed. Following 20 days of fluconazole therapy, blood culture results were negative. On 22 April, the infant was discharged from hospital in generally stable condition. Two weeks after the patient was admitted to the hospital, another female neonate developed the same fungal infection during the third week of admission. We suspected that this represented a hospital-acquired infection. Both infants were healthy 3 weeks after discharge.

The Ethics Committee for Clinical Medical Research of The First Affiliated Hospital of Anhui Medical University approved this study and its publication (PJ2019-15-29). Informed consent was obtained from the child's parents for publication of the case.

Discussion

C. pelliculosa is a rare fungal pathogen that is mainly found in soil, lakes, fermented fruits, and industrial pollutants.[4] Recently, *C. pelliculosa* has been identified as an opportunistic pathogen causing sexually transmitted infections. *Candida* species have also been reported to cause dacryocystitis via penetrating keratoplasty,[5] fungal infections after cardiac surgery,[6] and fungal hemorrhagic pancreatitis.[7] Preterm infants with extremely low birth weights account for a majority of *C. pelliculosa*

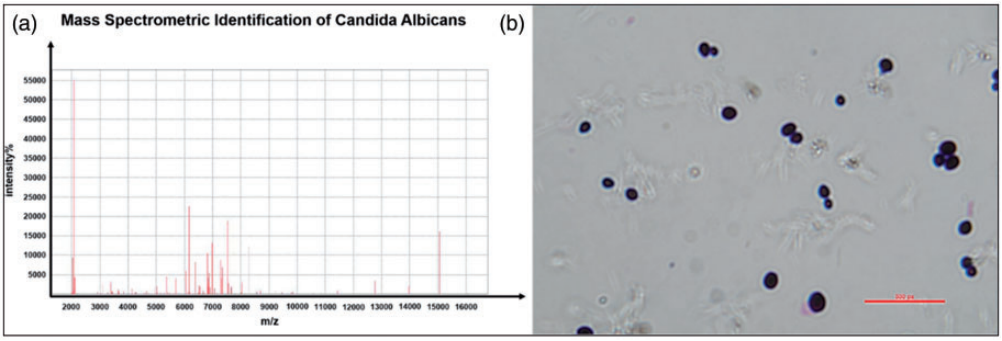

Figure 1. (a) Mass spectrometric identification of *Candida albicans* (b) Optical microscope image of *Candida pelliculosa* with Gram staining under 1000× magnification. Image size is 500 pixels (500 px).

infections. Lin et al.[4] further showed that the mean infection time was 18.5 days after hospitalization. Previous studies showed that outbreaks in pediatric and surgical intensive care units have been increasing in frequency, and the lack of effective treatments may significantly increase the mortality rate among children.[8,9] Many reports did not identify a confirmed source of infection. However, the longer a broad-spectrum antibacterial drug is administered, the more likely fungal infections are to manifest, especially in immunocompromised patients.[10,11] Some newer treatments, such as bone marrow transplantation and chemotherapy, are considered risk factors for systemic fungal diseases including candidiasis.[12] In this report, we described a case of *C. pelliculosa* sepsis in a neonate. The patient was successfully treated with fluconazole. The infant's clinical features resembled those described in other reports. Generally, *C. pelliculosa* infection presents with recurrent apnea often accompanied by thrombocytopenia.[7] In conventional mycology laboratories, it can be difficult to identify yeast clinical isolates using common biochemical assays. However, DNA sequencing and mass spectrometric analysis can help to identify fungal species efficiently. API 20 C Aux and 16-disc carbon auxanogram tests showed that this organism was sensitive to amphotericin B, 5-fluorocytosine, and ketoconazole.[13,14] Therefore, we recommend fluconazole as a prophylactic and therapeutic agent for fungal infections caused by *C. pelliculosa*.

Ethics

The Ethics Committee for Clinical Medical Research of The First Affiliated Hospital of Anhui Medical University approved this study and its publication (PJ2019-15-29).

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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