

Wickerhamomyces anomalus blood stream infection in a term newborn with pneumonia

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The incidence of invasive candidiasis is high in neonates admitted to neonatal intensive care unit and is associated with significant morbidity and mortality rates. *Candida albicans* is the most common fungal agent pathogenic to neonates but invasive fungal infections caused by uncommon fungi have increased in recent years. *Wickerhamomyces anomalus* is a very rare pathogen causing blood stream infection in neonates, which has reportedly caused only few cases in the literature.

Here we report a case of blood stream infection caused by a fungal agent *Wickerhamomyces anomalus* in a term male infant.

Key words: *wickerhamomyces anomalus*, candidiasis, newborn.

The incidence of invasive candidiasis is high in neonates admitted to neonatal intensive care unit (NICU) and is associated with significant morbidity and mortality rates¹. *Candida albicans* is the most common fungal agent pathogenic to neonates but invasive fungal infections caused by uncommon fungi have increased in recent years^{2, 3}. *Wickerhamomyces anomalus* (*W. anomalus*) is the teleomorph stages of several *Candida* species and is a very rare pathogen causing blood infection in neonates, which has reported caused only few cases of fungemia and a case of endocarditis in literature⁴. In this report we describe a case of an invasive *W. anomalus* infection in a term neonate in a tertiary NICU.

Case Report

A 3800 g term male newborn, at the 28th day of life, with the diagnosis of sepsis and pneumonia was admitted to the NICU. The participation of this case involved parental informed consents. He had had a cough, fever (38-39.3 °C) and respiratory distress for three days. His laboratory results revealed white blood cell 49,900/mm³, hemoglobin 6.8 g/dl, hematocrit 20.7%, platelets 1,084,000, C-reactive protein

271.87 mg/dl, procalcitonin 4.03 ng/ml. He required erythrocyte suspension transfusion once. Pediatric hematology department evaluated blood smear and leukocytosis and thrombocytosis, associated with infection, were noted. In spite of ampicillin and gentamycin therapy for seven days he had no clinical or laboratory recovery so his therapy was converted to teicoplanin and cefotaxime. He had both sonorous rhonchi and crepitant rales so salbutamol and budesonide nebulas were added. Chest X-rays showed atelectasis of right upper lobe and bilateral diffuse infiltrations of the lungs (Fig. 1). After three days the neonates body temperature returned to normal. His first blood culture was reported as sterile. As the respiratory distress continued, the patient was consulted to the pediatric pulmonologist; high resolution computerized tomography (hrCT) was performed. hrCT showed us atelectasis and pneumonic infiltrations at left lung's inferior lobe and right lung's posterior segment of superior lobe (Fig. 2). At 9th day of the antibiotics, *Candida pelliculosa* (recognized as *W. anomalus* later) was isolated from blood cultures. As the isolated *Candida* was found to be sensitive to all - fluconazole,

flucytosine, caspofungine, voriconazole and amphotericin, the patient was started on intravenous fluconazole therapy with a dose of 6 mg/kg/day. In the direction of clinical and laboratory recovery fluconazole therapy ended at the 14th day. After 14 days of intravenous fluconazole, blood culture was negative. On the grounds of unexpected causative agent, pediatric immunology consultation was performed. Immunoglobulines were all normal and lower B lymphocyte accounts were thought to be related to overconsumption. The neonate was discharged from hospital in good health and was planned to be followed.

Discussion

Neonatal candidiasis has been reported to have crude mortality rates of 30%–60%, and increases in rates with decreasing birth weight^{5,6}. Although *Candida albicans* is the organism most often associated with serious fungal infections, other *Candida* species have emerged as clinically important pathogens associated with opportunistic infections⁷. When the literature was evaluated, it was seen that *W. anomalous* fungemia causes outbreaks in pediatric wards, while most of the adult cases were sporadic case reports⁸. *W. anomalous* is a yeast frequently found in various fruits, tree exudates, soil, vegetables and other organic compounds⁹. It has occasionally been reported

as a causative agent of fungaemia in both immunocompetent and immunocompromised patients, including those with AIDS¹⁰⁻²⁰. *W. anomalous* has also been reported as a causative agent of nosocomial cerebral ventriculitis in low-birth-weight neonates, endocarditis in an intravenous drug abuser and urinary tract infection in a renal transplant recipient^{18, 21-23}. Particularly, in the pediatric population *W. anomalous* is known to be responsible for serious nosocomial bloodstream infections of immunocompromised mostly as outbreaks in pediatric intensive care units⁸. In this report, we describe an invasive *W. anomalous* infection in a term neonate who was admitted because of pneumonia and respiratory distress. Our patient was given multiple courses of antibacterial antibiotics and parenteral nutrition for his severe enteral nutrition intolerance. However, he had no invasive operation or mechanical ventilation support. Before these symptoms, he had normal growth and nutrition. His hematologic and immunologic evaluation was completely normal. Risk factors were noted as prolonged NICU stay, prolonged parenteral nutrition and multiple antibiotic usages. Due to the patient's enteral feeding intolerance, gastroesophageal reflux might thought to be a risk factor also. In a recent study carried out to analyze the antifungal susceptibility of clinical isolates belonging to seven uncommon species of *Candida*, of 15 *W. anomalous* strains, eight were shown to be fluconazole resistant, six were itraconazole and ketoconazole resistant

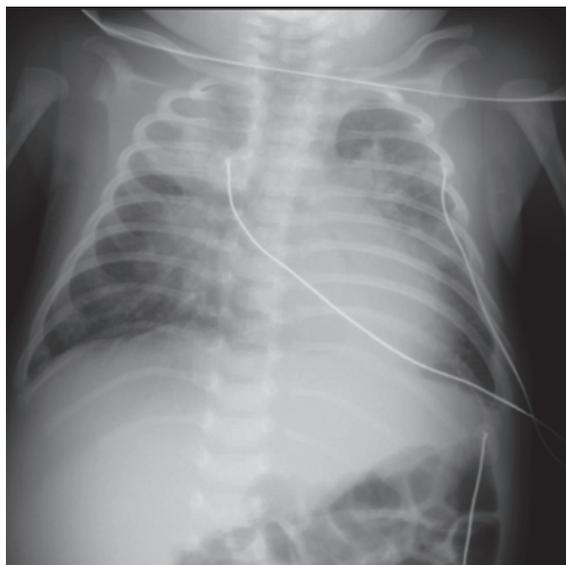


Fig. 1. Chest X-ray demonstrates atelectasis of right upper lobe and bilateral diffuse infiltrations of the lungs

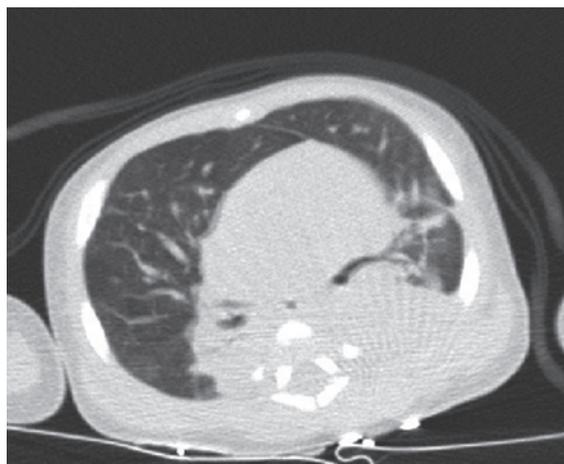


Fig. 2. HRCT shows atelectasis and pneumonic infiltrations at left lung's inferior lobe and right lung's posterior segment of superior lobe

and one was flucytosine resistant²⁴. This finding is particularly worrying, since, besides amphotericin B, few therapeutic options are currently effective against this fungal infection. Fortunately, in our case, *W. anomalus* was treated successfully with fluconazole therapy for 14 days. Our patient further allows us to study *W. anomalus* and its ability to cause invasive infection. Since *W. anomalus* has not been included in widely used commercial yeast diagnostic kits (API 20C AUX, ID32C and Vitek-2), it is difficult for clinicians to properly identify and thus has been commonly misidentified as *P. anomala* or *C. utilis* only using commercial kit. In our patient, the pathogen was identified as *W. anomalus* by Vitek-2 kit. Identification and verification were provided by the hospital's clinical microbiology and infectious diseases laboratory.

As a conclusion, our case alerts us to be more suspicious about the fungal infections not only in preterm, also in term infants in NICU. An antifungal prophylaxis may be necessary for these patients when one or more risk factors exist. Non-albicans *Candida* species may rarely be an etiologic agent and they have not been included in widely used commercial yeast diagnostic kits. We must keep in mind these fungal pathogens as an infectious agent in neonates with risk factors.

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