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Case report

An unusual cause of bilateral scrotal abscess in a preterm infant: *Candida albicans*

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ABSTRACT

Acute scrotal abscess is a rare condition in neonates. Most of these abscesses were reported to be unilateral and caused by *Staphylococcus* and *Salmonella* spp. Herein, we report a bilateral scrotal abscess in a preterm infant and *Candida albicans* was isolated from the scrotal fluid culture. To our knowledge, this is the first bilateral scrotal abscess in a preterm infant caused by *C. albicans*. Therefore, this organism must be suspected in differential diagnosis of acute scrotal abscess in neonates, especially in preterm infants.

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Introduction

Scrotal abscess is rare and uncommon in children and especially in neonates.¹ Neonatal cases with scrotal abscess were reported to be unilateral and most of them were caused by *Staphylococcus* and *Salmonella* spp.² However, there are also case reports with other microorganisms such as beta hemolytic *Streptococcus*, *Bacteroides*, *Escherichia coli*, *Klebsiella* spp. which caused scrotal abscess.^{3–7} Scrotal abscess was suggested to develop secondary to intraperitoneal infection via patent processus vaginalis. The bacteria may usually enter the skin through any cracks or injury of the skin.^{1,2}

Herein, we report a preterm infant who was admitted with neonatal sepsis and developed bilateral scrotal abscess caused by *Candida albicans* during hospitalization. To the best of our knowledge, this is the first report of a scrotal abscess

accompanied by neonatal sepsis caused by *C. albicans* in a premature infant.

Case presentation

A premature male infant was born to a healthy mother by cesarean-section delivery at 32 weeks of gestation with a birth-weight of 2250 g. As he developed lethargy and feeding intolerance after 24 h of birth, he was hospitalized in a neonatal care unit. On admission, physical examination revealed poor activity with no other abnormal findings. On laboratory investigation, a slight leukocytosis with a white blood cell count of 19,200/mm³ (76% polymorphonuclear leukocytes) was determined. His C-reactive protein (CRP) level was elevated as 14 mg/dL (normal range, 0–5 mg/dL). Serum biochemistry, urine and cerebrospinal fluid analysis were found

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to be normal. After blood culture was obtained, he was given ampicillin–sulbactam and cefotaxime intravenously for neonatal sepsis. Abdominal and scrotal examination had always been unremarkable, until the 9th day of life, when bilateral scrotal swelling was noted. On physical examination, bilateral scrotum was detected to be swollen and indurated. The generalized edema and erythema on scrotum also suggested an infectious and inflammatory process. On the same day, laboratory data included a white blood cell count of 25,200/mm³ and a CRP level of 72 mg/dL. In the light of these data, scrotal abscesses and/or bilateral testicular torsion were suspected. Therefore, scrotal ultrasonography (US) was performed with a high-frequency linear probe and also scrotal vascularity was assessed with color Doppler US. The US showed increased heterogenous echogenicity including internal septas of the testicular parenchyma, thickened testicular capsule that suggested the possibility of scrotal abscess. Color Doppler scan revealed a high peripheral and testicular vascular flow. After consultation with pediatric surgeons, urgent surgical exploration through separate hemiscrotal transverse incision was performed.

In surgery, both tunicae vaginalis containing pus were seen as markedly thickened. The testes and epididymis appeared to be enlarged and hyperemic. They were covered with a necrotic, fibrinous exudate. No torsion of the spermatic cords was determined by inspection. A biopsy was taken of the right testis, the purulent tunical fluid was drained and a sample was cultured. The collected pus during surgery was put into a sterile screw capped bottle and transported immediately for culture to the laboratory. The sample was cultured on blood agar, chocolate agar, and Sabouraud's dextrose agar (SDA). After 24 h of incubation at 37 °C, abundant tiny yeasty colonies were observed on the SDA and blood agar. Then, the fungus was confirmed to be *C. albicans* by the germ tube test. Local debridement and irrigation were performed on both sides, and metronidazole was added to his antibiotic therapy. Resolution of the scrotal swelling occurred in the following 5 days. Although his initial blood, urine and CSF cultures were sterile, *C. albicans* was isolated from the scrotal fluid culture that was obtained during surgery. Therefore, his antibiotic therapy including ampicillin–sulbactam, cefotaxime and metronidazole was changed to fluconazole. The pathological examination of the resected samples and abscess material also showed evidence of focal suppuration and was consistent with abscess formation.

The maternal history was re-evaluated. The mother had a history of itching and thick white vaginal discharge during the third trimester of pregnancy. No culture was obtained during that time as she did not admit to a physician. She had used only topical therapy. The mothers' initial urine and vaginal smear cultures were negative. Nonetheless, vaginal, cervical and urinary cultures of the mother were obtained again. However, they were again found to be negative for *C. albicans*. The infant was evaluated for a possible immune deficiency by performing lymphocyte subset and the nitroblue-tetrazolium (NBT) tests which were found to be normal. He was discharged after 21 days of fluconazole therapy and is now being followed by the Divisions of Pediatrics and Pediatric Surgery.

Discussion

Herein, we describe a male premature infant who developed scrotal abscesses caused by *C. albicans* during hospitalization and under antibiotic therapy for neonatal sepsis. To our knowledge, this is the first case of bilateral scrotal abscess caused by fungi in a preterm infant.

Scrotal abscess is a rare condition in neonates. In the largest serie, Raveenthiran and Cenita² reported 9 cases of scrotal abscess in which the most common organism isolated was *Staphylococcus* spp. Huang and Chuang⁸ described a scrotal infection caused by *Salmonella enteritidis*, and in their review they reported 5 other cases in infants younger than 3 months with the same pathogen. As stated above, beta hemolytic *Streptococcus*, *Bacteroides*, *E. coli*, *Klebsiella* spp. were also reported to cause scrotal abscess in neonates.^{3–7} However, our case is the first premature infant who developed scrotal abscess due to *C. albicans* during antibiotic treatment for neonatal sepsis.

In conditions of acute scrotal swelling in neonates and infants, it is often difficult to differentiate infectious pathologies of the scrotum from testicular torsion, either by clinical examination, imaging, and surgical exploration as the initial symptoms are quite similar.^{2,3} Although scrotal US is the preferred screening tool, it has low sensitivity and specificity for accurate diagnosis.^{1,9} Therefore, surgical exploration may be necessary for a better differential diagnosis and this may help to avoid missing other conditions such as testis torsion or strangulated herni.^{3,9} The differential diagnosis was made by using laboratory and screening tools in combination with surgical exploration in our case.

In scrotal abscesses, scrotal contamination might occur from urinary tract infections or bacteriemia by hematogenous spread. Another possible route for infection is from peritoneal cavity in case of intraabdominal infections through a patent processus vaginalis.⁶ These risk factors were not present in our patient. As our patient was admitted to our neonatal care unit due to clinical findings of sepsis and he was started on antibiotics, the most likely causation of the abscess was thought to be hematogenous spread. The source seems to be his mother with her clinical findings during antenatal period. However, blood culture has a low and limited sensitivity.¹⁰

Therefore, we could not identify the microorganism in blood culture. Although neonatal candidal colonization is most commonly the result of vertical transmission, both vertical and horizontal transmissions contribute to neonatal colonization.¹¹ Therefore, although the vaginal cultures of the mother were negative, the history and clinical findings of the mother might suggest the vertical transmission in a preterm infant. The mothers' blood culture may be negative due to a localized infection and her vaginal smear culture may be negative because of topical treatment during antenatal period.

Over the last two decades, the incidence of candidal infections has increased with advancements in the care of premature infants, especially extremely low and very low birth weight infants.¹² The clinical manifestations of *Candida* infection in the neonate vary ranging from localized infections to life-threatening systemic infection with multisystem organ failure. Infants, especially premature infants who are

admitted to the neonatal intensive care unit, are at increased risk for candidal infections because of the immaturity of their immune system and host epithelial protection, compromise of their epithelial protection with invasive procedures, and administration of broad-spectrum antimicrobial agents. Although our patient was not an extremely premature infant and had no major risk factor for candidal infection, we suggest that early sepsis and further bilateral scrotal abscess might have occurred due to possible vertical transmission of maternal *Candida* infection.

In conclusion, to the best of our knowledge, this is the first report of bilateral scrotal abscess caused by *C. albicans* in a preterm infant. Therefore, we suggest that *Candida* spp. must be suspected in scrotal abscess in hospitalized neonates, especially in preterm infants.

Conflict of interest

The authors declare to have no conflict of interest.

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