Case Report

Peripheral Smear as a Diagnostic Lifesaver: A Case Report of Candida Pelliculosa Fungemia in an Infant

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Abstract

Invasive fungal infections pose a serious clinical challenge, contributing considerably to illness and death among high-risk groups, especially newborns and patients with compromised immunity. While Candida albicans is the most frequently identified species, emerging pathogens such as Candida pelliculosa are increasingly reported. We report the case of a 6-month-old infant with cholestasis and persistent thrombocytopenia unresponsive to broad-spectrum antibiotics. Peripheral smear examination revealed budding yeast cells suggestive of fungemia, later confirmed as Candida pelliculosa by culture and Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS). Intravenous fluconazole led to significant clinical and hematologic recovery. This case highlights the diagnostic utility of peripheral smear for early detection of rare fungal pathogens, particularly in resource-limited settings lacking rapid diagnostics. High clinical suspicion and timely antifungal therapy are critical for favorable outcomes in infantile candidemia.

Keywords: candida pelliculosa; peripheral smear; fungemia; infant; thrombocytopenia

Introduction

Invasive fungal infections (IFIs) are increasingly recognized as major contributors to complications and mortality in infants and immunocompromised hosts. [1] Among fungal pathogens, Candida species predominate, with C. albicans being the most common.[2] However, infections caused by non-albicans species such as C. glabrata, C. tropicalis, and the rare C. pelliculosa are rising. [3] Risk factors in infants include low birth weight, central venous catheters, total parenteral nutrition, and prolonged antibiotic use. [4, 5] Given the nonspecific clinical presentation and delayed fungal culture results, early diagnosis remains challenging. In such scenarios, basic tools like peripheral smear examination can provide critical initial clues.

Case Report

A 6-month-old female infant (weight: 6.8 kg) presented with abdominal distension and jaundice. She had a prior diagnosis of cholestatic jaundice and received cefotaxime and gentamicin at a peripheral center. Upon arrival at our tertiary care center on Day 0, clinical examination revealed hepatomegaly. Initial laboratory investigations are summarized in Table 1.

C-reactive protein and lactate dehydrogenase levels were elevated. Liver function tests demonstrated hyperbilirubinemia with mildly elevated transaminases. Imaging demonstrated mild hepatomegaly.

Blood cultures were drawn on Day 0 using BACTEC™ aerobic and anaerobic bottles (Becton Dickinson) and incubated in an automated blood culture system. A complete infectious disease workup, including viral serologies and malaria testing, was negative. The child initially improved with rising platelet counts but deteriorated by Day 18, developing hard palate bleeding and oral thrush. Repeat complete blood count revealed the parameters shown in Table 2.

Despite escalation to meropenem and linezolid on Day 19, and transfusion with packed red blood cells, there was no clinical improvement. On Day 20, peripheral smear review using a Sysmex XN-1000 automated hematology analyzer followed by manual examination of Leishman-stained smears (pH 7.2, staining time: 15 minutes) demonstrated budding yeast-like forms consistent with blastoconidia (Figures 1-3). This finding was confirmed on repeat smear examination.

A Gram stain from a swab of the oral lesion showed budding yeast forms. Blood cultures became positive on Day 21 (time to positivity: 48 hours) and grew white, smooth, convex colonies on Sabouraud dextrose agar. The isolate was identified as Candida pelliculosa using VITEK 2 Compact system (bioMerieux) and confirmed by MALDI-TOF MS (Bruker Daltonics). Antifungal susceptibility testing was performed using broth microdilution method according to Clinical and Laboratory Standards Institute (CLSI) M27-A3 guidelines with quality control strain C. parapsilosis ATCC 22019. Results are presented in Table 3.

Intravenous fluconazole was initiated on Day 21 at 12 mg/kg loading dose followed by 8 mg/kg/day maintenance dose. The patient showed steady clinical improvement over the next 7 days with normalization of platelet counts. Repeat blood cultures drawn on Day 25 and Day 28 showed no growth, confirming clearance of fungemia. She completed 14 days of antifungal therapy and was discharged on Day 35 in stable condition. She remained well at 3-month follow-up with normal complete blood count and liver function. Written informed consent was obtained from the patient's parents for publication of this case report and accompanying images.

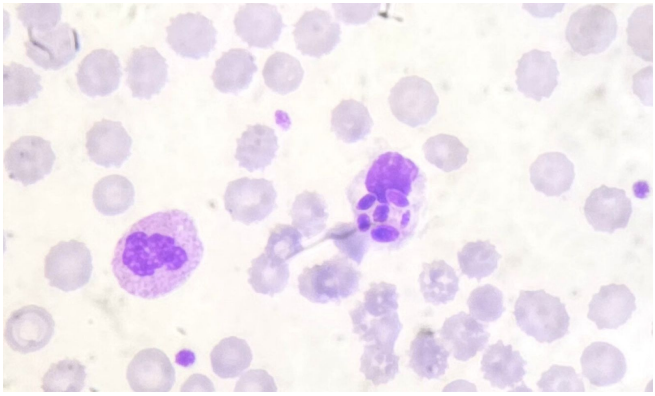

Figure 1: Peripheral blood smear showing round to oval yeast cells engulfed by a monocyte (arrow) (Leishman stain, ×1000 magnification).

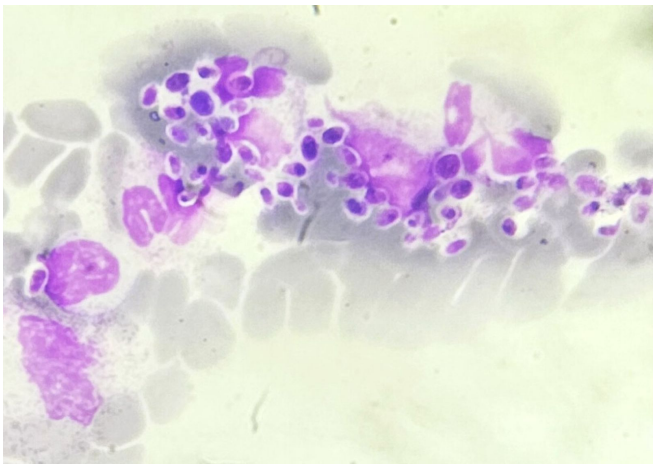

Figure 2: Multiple intracellular and extracellular yeast forms of Candida pelliculosa in peripheral smear (arrows indicate representative yeast cells) (Leishman stain, ×1000 magnification).

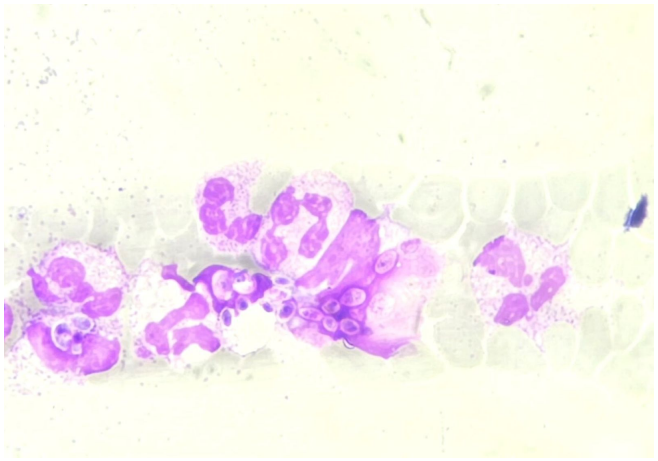

Figure 3: Peripheral blood smear showing intracellular (white arrow) and extracellular (black arrow) yeast cells with budding forms (Leishman stain, ×1000 magnification).

Table 1: Initial hematological parameters (Day 0).

Parameters	Findings	Reference range (6 months)
Hemoglobin	6.5 g/dL	11.1-14.1 g/dL
WBC	64.7 $\times$ $10^3/\mu$L	6.0-18.0 $\times$ $10^3/\mu$L
Absolute neutrophil count	50.4 $\times$ $10^3/\mu$L	1.0-6.0 $\times$ $10^3/\mu$L
Platelets	17 $\times$ $10^3/\mu$L	220-550 $\times$ $10^3/\mu$L

Table 2: Hematological parameters on Day 18.

Parameters	Findings	Reference range (6 months)
Hemoglobin	6.4 g/dL	11.1-14.1 g/dL
WBC	14.7 $\times$ $10^3/\mu$L	6.0-18.0 $\times$ $10^3/\mu$L
Platelets	79 $\times$ $10^3/\mu$L	220-550 $\times$ $10^3/\mu$L

Table 3: Antifungal susceptibility testing (CLSI M27-A3 broth microdilution method).

Antifungal Agent	MIC (μg/mL)	Interpretation
Amphotericin B	0.5	Susceptible
Fluconazole	2.0	Susceptible
Micafungin	0.06	Susceptible
Voriconazole	0.12	Susceptible

Discussion

Candida pelliculosa (Wickerhamomyces anomalus) is an emerging pathogen, particularly in pediatric intensive care settings. [6, 7] Though rarely reported, its isolation is increasingly documented in cases of bloodstream infections in premature infants and immunocompromised hosts. [8] This case is noteworthy for the early recognition of fungal elements on peripheral smear on Day 20, preceding culture confirmation on Day 21.

Manual peripheral blood smear review remains underutilized despite its diagnostic value. High fungal burden can cause pseudo-leukocytosis and artifacts in automated complete blood count analyzers. [9] Yeast forms within or outside leukocytes strongly suggest true fungemia, particularly when accompanied by persistent thrombocytopenia and antibiotic non-response. [10, 11]

Delayed initiation of antifungals is a known contributor to poor outcomes in candidemia. Early clinical suspicion, even in the absence of culture results, can be life-saving. This patient had multiple risk factors: prolonged hospitalization, prior antibiotic exposure, and evidence of mucocutaneous candidiasis. Peripheral blood smear, in this context, proved to be an invaluable adjunct to early diagnosis and allowed for the initiation of appropriate antifungal therapy before culture confirmation.

Conclusion

This case underscores the critical role of peripheral smear examination in the early detection of candidemia, especially when dealing with rare species like Candida pelliculosa. In low-resource settings where access to rapid diagnostics is limited, microscopic examination remains a powerful tool. Clinicians must maintain a high index of suspicion for fungal sepsis in infants presenting with unexplained cytopenias and poor response to antimicrobials. Early identification and targeted antifungal therapy can significantly improve recovery outcomes.

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