

Case Report: Management of Invasive Fungal Infection with Antifungal Therapy

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Case Report

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ABSTRACT

Invasive fungal infections (IFIs) are a significant cause of morbidity and mortality, particularly among immunocompromised patients. Early recognition and appropriate antifungal therapy are critical for favorable outcomes. This report describes a case of invasive candidiasis in a 56-year-old patient with diabetes mellitus and chronic kidney disease. The patient presented with persistent fever, hypotension, and signs of systemic infection. Blood cultures identified *Candida albicans*, and antifungal susceptibility testing guided therapy. The patient was successfully treated with intravenous echinocandin followed by step-down therapy with fluconazole. This case highlights the importance of timely diagnosis, susceptibility-guided therapy, and individualized antifungal treatment strategies in managing IFIs.

KEYWORDS

Antifungals, invasive fungal infection, candidiasis, echinocandin, fluconazole

INTRODUCTION

Invasive fungal infections are increasingly recognized as critical complications in hospitalized and immunocompromised patients. Risk factors include prolonged hospitalization, central venous catheterization, broad-spectrum antibiotic use, neutropenia, diabetes mellitus, and chronic organ dysfunction. Among the spectrum of pathogens, *Candida* species, *Aspergillus* species, and emerging multidrug-resistant fungi such as *Candida auris* pose significant therapeutic challenges.

Management of IFIs requires early identification, appropriate antifungal therapy, and monitoring for drug efficacy and toxicity. Antifungal agents include polyenes

(e.g., amphotericin B), azoles (e.g., fluconazole, voriconazole), echinocandins (e.g., caspofungin, micafungin), and newer agents targeting specific fungal pathways. Selection depends on pathogen identification, site of infection, host factors, and susceptibility patterns.

This case report illustrates the clinical decision-making process for antifungal therapy in an adult patient with invasive candidiasis, emphasizing timely intervention and evidence-based management.

Case Presentation

Patient History

A 56-year-old male with a history of type 2 diabetes mellitus, hypertension, and chronic kidney disease (CKD stage 3) was admitted with fever, chills, and hypotension of five days duration. He had recently undergone a minor gastrointestinal procedure and had been receiving broad-spectrum antibiotics for suspected bacterial infection.

Clinical Examination

On examination, the patient was febrile (38.9°C), hypotensive (BP 88/56 mmHg), and tachycardic (HR 112 bpm). Physical examination revealed mild pallor, no obvious localizing signs, and a healed surgical incision without erythema or discharge. Laboratory

investigations showed leukocytosis ($14,500/\text{mm}^3$), elevated C-reactive protein (CRP 122 mg/L), and mild elevation of liver enzymes. Blood cultures were obtained, and empiric broad-spectrum antibiotics were continued while evaluating for sepsis.

Investigations

Blood cultures: Positive for *Candida albicans* after 48 hours.

Antifungal susceptibility testing: *Candida albicans* sensitive to echinocandins and azoles, resistant to fluconazole intermediate levels.

Imaging: Chest X-ray and abdominal ultrasound showed no focal abscess or invasive fungal lesions.

Renal function: Serum creatinine 2.1 mg/dL (baseline 1.8 mg/dL), estimated GFR 38 mL/min/1.73 m².

Management

Therapeutic Approach

Given the diagnosis of candidemia in a patient with CKD and intermediate fluconazole susceptibility, intravenous echinocandin therapy was initiated (micafungin 100 mg/day). Central venous catheters were removed to reduce the fungal load and prevent persistent infection.

Clinical Course

The patient showed gradual defervescence within 72 hours of antifungal therapy initiation. Repeat blood cultures after five days of therapy were negative for *Candida albicans*. Renal function remained stable with dose adjustment of micafungin as per CKD guidelines. After 10 days of intravenous therapy, step-down oral fluconazole (400 mg/day) was initiated based on susceptibility testing and clinical improvement.

Monitoring

Throughout the therapy, liver enzymes and renal parameters were monitored to detect drug-induced toxicity. Echocardiography was performed to rule out fungal endocarditis, which was negative. The patient was discharged after 14 days of combined therapy with continued outpatient follow-up.

DISCUSSION

Invasive candidiasis remains a challenging infection, particularly in patients with multiple comorbidities. Early recognition and targeted antifungal therapy are essential for reducing mortality. Several key points are highlighted in this case:

Risk Factors: The patient's diabetes, CKD, recent surgery, and prior broad-spectrum antibiotic use predisposed him to candidemia. Awareness of such risk factors is critical for early clinical suspicion.

Choice of Antifungal Therapy:

Echinocandins are recommended as first-line therapy for critically ill patients or those with renal impairment due to efficacy and lower nephrotoxicity.

Step-down therapy with fluconazole is appropriate once the patient is clinically stable and susceptibility is confirmed.

Role of Susceptibility Testing: Antifungal resistance, especially fluconazole resistance in *Candida* species, is an emerging concern. Susceptibility-guided therapy ensures optimal treatment and prevents resistance development.

Adjunctive Measures: Removal of indwelling catheters and optimization of comorbid conditions are essential to improve outcomes.

Monitoring and Safety: Regular monitoring of renal and hepatic function is necessary when using antifungals, particularly in patients with underlying organ dysfunction.

This case underscores that individualized therapy based on patient factors, microbial identification, and susceptibility data is critical in managing invasive fungal infections.

CONCLUSION

Invasive fungal infections such as candidemia present a significant challenge in immunocompromised or medically complex patients. Timely diagnosis, targeted antifungal therapy, and management of underlying risk factors are essential for favorable outcomes. Echinocandins offer effective first-line therapy, particularly in patients with renal impairment, while step-down therapy with azoles can consolidate treatment. This case highlights the importance of antifungal stewardship, individualized treatment planning, and diligent monitoring to optimize patient care.

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