

# Fungal Infections in the Hospitalized Patient



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## KEYWORDS

- Fungemia • Candidemia • Nosocomial infection • Candiduria • Histoplasmosis
- Blastomycosis • Coccidiomycosis • Cryptococcus

## HOSPITAL MEDICINE CLINICS CHECKLIST

1. Empiric fluconazole is appropriate in a stable fungemic patient before a species is identified. However, an echinocandin is preferred in an unstable patient.
2. Candiduria does not always need antifungal treatment. Removal of an associated bladder catheter is often adequate.
3. Most endemic fungal infections are asymptomatic, and disseminated disease may present as a chronic illness.
4. Mild pulmonary histoplasmosis in an immune-competent patient does not require treatment.
5. All cases of cryptococcosis should be treated and continued on maintenance treatment for up to 1 year.

## FUNGEMIA

The general term fungemia describes the presence of a fungal species in the blood. A positive culture may indicate a widespread infection or, commonly, the infection of an intravenous catheter. Often the term fungemia is used synonymously with candidemia because *Candida* species are more prevalent. This section primarily discusses fungemia caused by *Candida* species.

### *Epidemiology*

*What are the risk factors for candidemia in a hospitalized patient?*

The risk factors associated with fungemia are similar, but not identical, to those associated with other nosocomial bloodstream infections.<sup>1</sup> Colonization plays a larger role, as the risk for nosocomial infection in patients colonized with *Candida* species is 38%

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compared with only 25% of those colonized with vancomycin-resistant enterococci.<sup>1,2</sup> Risk factors for candidemia include known *Candida* colonization and use of numerous broad-spectrum antibiotics.<sup>3</sup> For additional risk factors, see **Box 1**.

#### *Does a patient's length of stay increase the risk for fungemia?*

A longer hospitalization is a risk for fungemia according to research by Wisplinghoff and colleagues.<sup>4</sup> The average time interval between hospital admission and onset of *Candida* bloodstream infection was nearly 22 days, which was similar to that for *Enterobacter* and *Klebsiella*. Combined infections, candidemia with a bacterial infection, are also common, with a higher risk for septic shock and a trend toward higher mortality.<sup>5</sup> The presence of abdominal infection, hospitalization for more than 4 weeks, and the prior presence of bacteremia appear to increase the risk for a combined infection and should increase clinical suspicion.<sup>5</sup>

#### *How deadly is it?*

The mortality rate of fungal infections ranges from 30% to 49% in all hospitalized patients.<sup>6,7</sup> Mortality from fungemia in non-intensive care unit (ICU) patients was higher than all other nosocomial infections, at 29%,<sup>4</sup> despite newer treatments, higher clinical suspicion, and more rapid diagnosis.

*Candida* species are the most common cause of fungemia in hospitalized patients and the fourth most common nosocomial bloodstream infection, representing 9% of all hospital-acquired infections.<sup>4,8</sup> *Candida albicans* is the predominant species, representing 42% to 54% of all isolates.<sup>4,9,10</sup> Studies have described a 200% increase in the incidence of fungemia as a cause of sepsis over a 20-year period.<sup>11</sup> Of the *Candida* species, mortality appears to be highest with *Candida krusei* at 59%, but this species represents only 2.4% of isolates reported at major medical centers in the United States.<sup>4</sup> *C. albicans*, *C. krusei*, and *Candida tropicalis* are isolated more in postsurgical, oncologic, and transplant patients.<sup>12-14</sup> *Candida parapsilosis* bloodstream infection originates more frequently in the urinary tract,<sup>15</sup> but also is commonly seen in catheter-associated candidemia.

#### *Does a healthy immune system improve mortality in fungemic patients?*

Although in isolation candidemia is a fatal disease, the susceptibility of a patient to become fungemic is directly linked to the patient's overall condition. Candidemia

#### **Box 1**

##### **Risk factors for candidemia**

- Known fungal colonization
- Current or recent use of multiple broad antibiotics
- Recent bowel surgery
- Dialysis
- Use or presence of central venous catheters
- Use of parenteral nutrition
- Prolonged stay in intensive care unit
- Severe illness

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