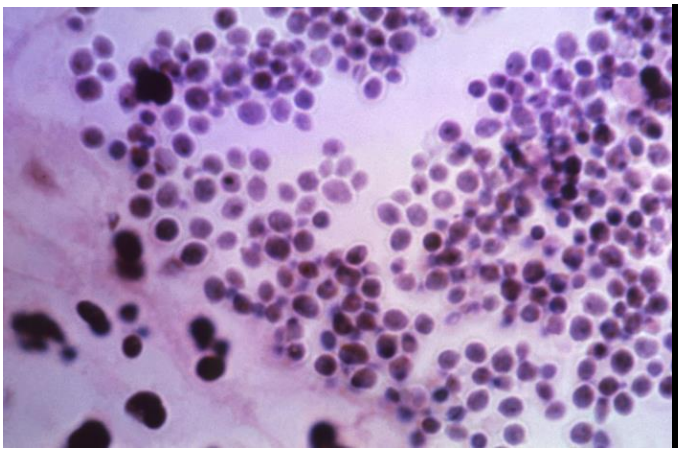
Bug du Jour

Candida

Candida is a common yeast, a type of fungus, that is found on various surfaces of the human body. It is a part of the normal flora of the skin, mouth, throat, gut, and vagina. Most Candida infections do not cause invasive disease, but if they do, the five most common species that cause disease are *C. albicans*, *C. glabrata*, *C. tropicalis*, *C. parapsilosis*, and *C. krusei*. These species account for >90% of invasive infections. Other species that are clinically significant include *C. stellatoidea*, *C. guilliermondii*, *C. lusitaniae,* and *C. auris*. Resistance is a growing concern for *C. glabrata*, *C. auris*, and *C. krusei* species.

Under a microscope, candida are unicellular, thin walled, oval shaped cells. They reproduce by budding and this can sometimes be described in the pathology report. Clinical specimens may also be described as yeast forms, hyphae, or pseudohyphae. On an agar plate the species look like smooth, white, creamy colonies and have a “yeasty” odor at room temperature. When a gram stain is performed, candida will stain gram positive.



Candidemia, a blood stream infection with candida, is the most common invasive candida infection (termed candidiasis). Invasive candidiasis can also present as endocarditis, meningitis, osteomyelitis and in many other forms. The majority of infections are caused by the host’s own flora, but candida infections can also be caused by contaminated devices. Risk factors for developing an invasive candida infection are being critically ill, the presence of a central venous catheter, use of antibiotics or TPN, immunocompromised state (cancer, stem cell transplant, neutropenic), injection drug use, and being a pre-term infant with a low birth weight. Ideally, sterile cultures should be obtained to diagnosis candidiasis, but this is not always achievable. Other useful diagnostic tests include antigen, antibody, Beta-D glucan, and PCR tests.

In general *C. albicans*, *C. tropicalis*, and *C. parapsilosis* are susceptible to all antifungals (triazoles, echinocandin, amphotericin), but susceptibilities should be performed and reported

Rachel Elston, PharmD
April Yarbrough, PharmD, BCPS

because of emerging resistance. *C. krusei* is resistant to most triazoles and requires treatment with an echinocandin or liposomal amphotericin until susceptibilities are confirmed. *C. glabrata* can be treated with -azole antifungals such as fluconazole or voriconazole, but empiric coverage with micafungin or liposomal amphotericin is recommended until susceptibilities are available. *C. lusitaniae* can be resistant to amphotericin but can be treated with the other antifungals. Similar to bacterial infections, de-escalation to the narrowest spectrum antifungal should occur once you have identification of species (*albicans, tropicalis, parapsilosis, lusitaniae)* and/or susceptibilities for *C*. *grabrata* and *kruseii*.

Empiric treatment for candida infections should be based on the location of the suspected infection, patient risk factors, and the species of candida most likely to cause the infection. The following chart are the recommendations from the IDSA 2016 Candidiasis guidelines. Of note, growth of candida from respiratory secretions does not usually need to be treated because it indicates colonization from normal flora. Also, treatment of asymptomatic candiduria is not recommended unless the patient is at high risk (neutropenic, very low birth weight infants, and those who will undergo urologic manipulation) for dissemination.

Infection	**Empiric Treatment**	**Alternative**	**Duration**
Candidemia in Nonneutropenic Patient	Echinocandin	Fluconazole (not critically ill or previous azole exposure)	2 weeks after documentation of clearance of infection and no metastatic complications
Candidemia in Nonneutropenic in Critically Ill or Neutropenic Patients	Echinocandin	Liposomal amphotericin	2 weeks after documentation of clearance of infection and no metastatic complications
Neonatal Candidiasis	Amphotericin deoxycholate	Fluconazole if no previous exposure	2 weeks after documentation of clearance of infection and no metastatic complications
Neonatal Candidiasis involving CNS	Amphotericin deoxycholate	Liposomal amphotericin Flucytosine can be added to either formulation as salvage therapy	Until all s/s, CSH, and radiological abnormalities have resolved
Intra-abdominal Candidiasis	Echinocandin	Liposomal amphotericin	Determined by source control and clinical response

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Infection	Empiric Treatment	Alternative	Duration
Candida Endocarditis	Lipid AmB +/- Flucytosine OR High dose echinocandin	**Step down therapy**: fluconazole, voriconazole, or posaconazole	Native- valve replacement and 6 weeks after. If no replacement long term suppression Prosthetic valve-chronic suppression
Candida Osteomyelitis	Fluconazole or echinocandin followed by fluconazole	Lipid AmB followed by fluconazole	Fluconazole (6-12 months) Echinocandin (2 weeks) then fluconazole (6-12 months) Lipid AmB (2 weeks) then fluconazole (6-12 months)
Symptomatic Candida Cystitis	Fluconazole	AmB deoxycholate or flucytosine for fluconazole resistant species	2 weeks
Oropharyngeal Candidiasis	Mild: clotrimazole troches or miconazole buccal tablets Moderate to severe: Oral fluconazole	Mild: nystatin suspension or pastilles	7-14 days
Esophageal Candidiasis	Oral fluconazole	IV fluconazole or echinocandin	14-21 days

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