

# Candidemia

Candidemia means the yeast *Candida*—which normally lives harmlessly on your skin and in your mouth—has gotten into the bloodstream where it does not belong, and the source matters as much as treating it.

## THE ONE-LINE TRUTH

*Candida* in the bloodstream is a serious fungal infection that requires immediate antifungal treatment, usually with an echinocandin drug.

## The chain — how it unfolds

1. *Candida* enters the bloodstream through a central line, leaky gut, or other breach in the body's barriers. — why: The yeast is now in a place it does not belong—sterile blood—and begins to multiply and travel throughout the body. This is the upstream event that triggers everything else.
2. Fever and chills develop, often spiking high and suddenly (rigors—shaking chills). — why: The immune system detects foreign yeast cells in the blood and releases chemicals (cytokines like IL-1, IL-6, TNF-alpha) that reset the body's thermostat in the brain (hypothalamus), raising temperature to slow yeast growth and rev up immune defenses.
3. Sepsis develops: blood pressure drops, heart rate climbs, breathing gets faster, and the patient may become confused or sleepy. — why: The immune system's response to *Candida* in the blood is so strong that it causes widespread inflammation. Blood vessels dilate and become leaky, fluid shifts out of vessels into tissues, and blood pressure falls. The heart races to compensate, but organs begin to suffer from poor blood flow and oxygen delivery (hypoperfusion and low oxygen (hypoxia)).
4. *Candida* seeds itself in the eye (endophthalmitis), causing blurry vision, floaters, or eye pain. — why: Yeast cells travel through the bloodstream to the tiny blood vessels in the retina (back of the eye) and start growing there. The eye is rich in blood flow and relatively protected from the immune system, making it a common target. Without treatment, this can cause permanent blindness.

5. Candida grows on heart valves (endocarditis), especially in people with artificial valves, damaged valves, or central lines near the heart. — why: Yeast cells stick to the rough or damaged surface of a heart valve and form a clump (vegetation) of yeast, immune cells, and blood clot material. This vegetation can break off and travel to the brain (stroke), block blood flow through the heart, or destroy the valve, causing heart failure.
6. Abscesses (pockets of pus) form in the liver, spleen, kidneys, brain, bones, or muscles. — why: Candida lands in these organs through the bloodstream, and the immune system tries to wall it off by forming a thick capsule of inflammatory tissue and pus around the yeast. These abscesses can grow large, press on nearby structures, and are hard to penetrate with antifungal drugs, often requiring weeks of treatment or surgical drainage.
7. Despite antifungal treatment, fever persists or the patient worsens—this often means the central line is still in place, an abscess has formed, or the yeast is resistant to the antifungal drug. — why: Candida in a biofilm on a central line is protected from both the immune system and antifungal drugs—removing the line is essential. Deep abscesses may need surgical drainage. Some Candida species (like *C. glabrata* or *C. auris*) can be resistant to fluconazole or even echinocandins, requiring a switch to a different drug based on lab testing (antifungal susceptibility).
8. If untreated or treatment is delayed, candidemia leads to septic shock, multi-organ failure, and death. — why: The ongoing inflammation and infection exhaust the body's compensatory mechanisms. Blood pressure cannot be maintained even with fluids and vasopressors. Kidneys fail (acute kidney injury), lungs fill with fluid (ARDS), the liver stops making clotting factors (coagulopathy), and the brain shuts down (encephalopathy). Mortality for untreated candidemia is 40–60%, but early source control (line removal) and appropriate antifungal therapy (echinocandin first-line per IDSA guidelines) can reduce this to 20–40%.

## Spot it — what you see, and why

---

- Fever that does not go away even when the person takes antibiotics: Candida is a fungus, not a bacterium, so antibiotics (which kill bacteria) cannot stop it. The body keeps fighting the yeast in the blood, which keeps causing fever.
- Chills and shaking: When yeast enters the bloodstream, the immune system releases chemicals called cytokines (alarm proteins) to fight the invader. These chemicals reset the body's thermostat higher, causing shaking chills as the body tries to warm up quickly.
- Low blood pressure (the person may feel dizzy or confused): The yeast and the body's strong immune response can damage the walls of blood vessels, making them leak fluid. This drops the pressure inside the vessels, like a garden hose losing water through tiny holes.

- **Fast heart rate:** When blood pressure drops or the body is fighting an infection, the heart pumps faster to try to deliver enough oxygen and nutrients to all the organs.
- **Breathing faster than normal:** The body needs more oxygen during a serious infection, and the lungs work harder to bring it in. Also, the blood may become more acidic (like lemon juice instead of water), which makes the breathing center in the brain speed up breathing to blow off extra carbon dioxide and balance the acid.
- **Confusion or being less alert than usual:** The brain needs a steady supply of oxygen and sugar. When blood pressure is low or the body is very sick, the brain may not get enough fuel, so thinking becomes foggy or the person may seem sleepy or disoriented.

## Red flags — act now

---

- Blood pressure drops suddenly (shock), meaning organs may not be getting enough blood
- The person becomes very confused, hard to wake up, or unresponsive
- White spots appear in the eyes (endophthalmitis), which can cause blindness if not treated quickly
- Signs of infection spreading to the heart valves, such as a new heart murmur or worsening heart failure
- Kidneys stop making urine or urine output drops sharply, a sign the kidneys are failing

## Treat it — in this order

---

1. Start an echinocandin antifungal (caspofungin 70 mg loading dose then 50 mg daily, micafungin 100 mg daily, or anidulafungin 200 mg loading then 100 mg daily) immediately when blood culture grows yeast → Echinocandins punch holes in the cell wall of *Candida*, killing the fungus and stopping it from multiplying in the blood and seeding organs like the eyes, heart, and brain. They work faster and more reliably than fluconazole, especially against resistant species like *C. glabrata* and *C. auris*.
2. Remove or replace all central venous catheters (central lines, PICC lines, dialysis catheters) within 24 to 48 hours → The plastic surface of a catheter is like a playground for *Candida* — the fungus sticks to it and forms a biofilm (a slimy coating) that protects it from antifungals and immune cells. Removing the line cuts off the main entry point and source of ongoing infection. Studies show patients whose lines are removed quickly are more likely to survive and clear the bloodstream faster.

3. Ophthalmology exam (dilated fundoscopy) within the first week of diagnosis, repeated weekly if neutropenic or if candidemia lasts more than a few days → Finding Candida in the eye early allows treatment with intravitreal antifungals (medicine injected directly into the eye) or vitrectomy (surgery to remove infected fluid) before it destroys the retina and causes blindness. About 5 to 10 percent of candidemia patients develop eye involvement, and symptoms (blurry vision, floaters) may not appear until damage is already done.
4. Continue echinocandin for at least 14 days after the last positive blood culture and resolution of symptoms, then consider switching to fluconazole 400 to 800 mg daily if the patient is stable and the Candida species is susceptible → Extended treatment kills any remaining yeast hiding in tissues and organs, preventing relapse. Switching to fluconazole after the critical phase allows easier dosing (oral pill or IV once daily) and is cheaper, but only works if the Candida is not resistant. For resistant species like *C. glabrata* or *C. auris*, you must stay on an echinocandin the whole time.
5. Image and drain any abscesses (pockets of pus) found in the liver, spleen, kidneys, or other organs, especially if larger than 3 cm → Draining an abscess removes the thick pus and fungus that antifungals cannot reach. Without drainage, the infection will keep smoldering even with months of medicine. Drainage can be done with a needle guided by ultrasound or CT (percutaneous drainage) or with surgery if the abscess is in a hard-to-reach spot.

## Your top priorities at the bedside

---

1. Notify the provider immediately to start echinocandin antifungal within 1 hour of yeast growing in blood culture, and make sure the first dose is not delayed waiting for species identification. — why: Candida doubles mortality (death rate) every 12 hours treatment is delayed; echinocandins like caspofungin kill Candida faster than fluconazole and work even when the yeast is resistant, so early treatment saves lives and prevents organ damage.
2. Check blood pressure, heart rate, and mental status every 15 to 30 minutes until stable, watching for systolic BP below 90 or confusion, which signal septic shock requiring immediate fluid boluses and possible ICU transfer. — why: Candidemia causes systemic inflammation (whole-body reaction) that dilates blood vessels, dropping pressure so low that organs like the brain and kidneys do not get enough oxygen; catching shock early prevents multi-organ failure and death.
3. Coordinate with the provider and vascular access team to remove or replace all central lines, PICCs, and dialysis catheters within 24 to 48 hours of diagnosis, even if the line looks clean. — why: Candida forms biofilm (a slimy protective layer) on catheter surfaces that antifungals cannot penetrate; the yeast keeps seeding the bloodstream from this reservoir, so the infection will not clear until the line is removed.