

CLABSI

A plain-English guide for you and your family

WHAT IS HAPPENING

Normally, the blood flowing inside your veins is completely germ-free (sterile). A central line is a thin, flexible tube (catheter) that doctors thread through your skin into a large vein near your heart so they can give medicine, fluids, or nutrition directly into your bloodstream. The moment that tube passes through your skin, it creates a highway for bacteria—germs that normally live harmlessly on your skin—to sneak into the blood. Over days or weeks, bacteria can also build a slimy film (biofilm) on the outside or inside of the line, like algae coating a garden hose. When bacteria from the skin, the line connector, or the biofilm get into your bloodstream, your body sounds the alarm: you spike a fever, shake with chills, and your heart races because your immune system is fighting back. If bacteria multiply faster than your body can kill them, the infection spreads through the blood (sepsis), and your blood pressure can drop dangerously low (septic shock). Every symptom you feel—shaking chills, confusion, fast breathing—is your body desperately trying to keep your brain and heart alive while fighting the invaders. Removing the infected line and giving antibiotics through the vein stops the bacteria at their source and lets your body win the fight.

What you might feel

- Fever (temperature $\geq 38.0^{\circ}\text{C}$ or $\geq 100.4^{\circ}\text{F}$)
- Rigors (severe shaking chills)
- A fast heart rate (Tachycardia) (heart rate >90 beats per minute)
- Low blood pressure (Hypotension) (systolic blood pressure <90 mmHg or drop ≥ 40 mmHg from baseline)
- Altered mental status (confusion, drowsiness, agitation)
- Redness (Erythema) (redness), warmth, or pus at catheter insertion site
- Low urine output (Oliguria) (urine output <0.5 mL/kg/hour)
- Fast breathing (Tachypnea) (respiratory rate >20 breaths per minute)
- Hypothermia (temperature $<36.0^{\circ}\text{C}$ or $<96.8^{\circ}\text{F}$)
- Thrombophlebitis (hard, cord-like vein, tender to touch)

Call the doctor right away if...

- Low blood pressure (Hypotension) (systolic BP <90 mmHg) despite giving IV fluids—sign of septic shock
- Altered mental status (confusion, extreme sleepiness, or no response)—brain is not getting enough blood
- Low urine output (Oliguria) or no urine output (anuria) (urine output <0.5 mL/kg/hour or zero urine)—kidneys are failing
- Positive blood cultures still growing bacteria 72 hours or more after removing the line and starting antibiotics—may mean endocarditis (infection stuck to a heart valve) or a hidden abscess
- New heart murmur or embolic events (stroke, dead fingers or toes from clots)—bacteria may have seeded the heart valves (endocarditis)

What the care team will do

- Obtain two sets of blood cultures—one set drawn from the central line and one set from a peripheral vein in the arm—before any antibiotics are given.
- Start IV antibiotics within 1 hour: vancomycin to cover MRSA (methicillin-resistant *Staph aureus*) and coagulase-negative staph, plus an anti-pseudomonal beta-lactam like cefepime, piperacillin-tazobactam, or meropenem to cover gram-negative bacteria and *Pseudomonas*.
- Assess blood pressure, heart rate, respiratory rate, temperature, oxygen saturation, and mental status every 15 to 30 minutes until stable, and notify the physician immediately if systolic BP drops below 90 mmHg or patient becomes confused.
- Measure urine output every hour using a Foley catheter (bladder tube) and report if output falls below 0.5 mL per kilogram per hour.
- Prepare for central line removal if blood cultures grow *S. aureus*, *Candida* (yeast), or if the patient has septic shock, tunnel infection, or port-pocket infection; coordinate with the physician and have a peripheral IV ready before the line comes out.
- Give IV fluid boluses as ordered—typically 30 mL per kilogram of crystalloid (normal saline or lactated Ringer's) over the first 3 hours—and reassess blood pressure, heart rate, and lung sounds after each liter.
- Inspect the central line exit site or port pocket daily for redness (erythema) (redness), warmth, tenderness, swelling, or pus-filled (purulent) drainage, and document findings with measurements and photos if available.
- Monitor blood-culture results daily and notify the physician immediately if cultures remain positive after 72 hours of appropriate antibiotics and line removal.

Medicines you may be given — and why

Vancomycin plus a broad-spectrum beta-lactam (such as cefepime or piperacillin-tazobactam)

Vancomycin sticks to the building blocks of bacterial cell walls in Gram-positive bacteria (the bacteria that turn purple under a microscope, like Staph and Strep). It blocks the bacteria from linking these blocks together, so the wall gets weak and the cell pops like a balloon. The beta-lactam drug sticks to the construction enzymes (called penicillin-binding proteins, or PBPs) that Gram-negative bacteria (bacteria that turn pink, like E. coli and Pseudomonas) and some Gram-positive bacteria use to build their walls. When the enzyme is blocked, the bacteria cannot finish building their wall, and they die. Together, these two drugs kill the most common bacteria that sneak into the bloodstream through a central line—Staph from the skin, Strep, Enterococcus, Pseudomonas, and gut bacteria like E. coli and Klebsiella.

Where this information comes from

- IDSA Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection, 2009 (updated 2021)
- CDC Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011 (updated 2017)
- Surviving Sepsis Campaign International Guidelines for Management of Sepsis and Septic Shock, 2021
- Cochrane Database of Systematic Reviews

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