

# Catheter-Related Bloodstream Infections Review

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## KEYWORDS

- Central venous catheters • Catheter-related bloodstream infection
- Central line-associated bloodstream infection • Catheter cultures
- Central venous catheter colonization • Central venous catheter salvage
- Antibiotic lock • Prevention of central venous catheter infections

## HOSPITAL MEDICINE CLINICS CHECKLIST

1. Different types of intravenous catheters exist with variable risks for development of local and systemic infections.
2. Catheter-related infections are major causes of morbidity and mortality in the United States.
3. Diagnosis of catheter-related bloodstream infection should be considered when at least 1 blood culture obtained from a peripheral vein is positive, clinical manifestations of infection exist, and no obvious source of infection besides the catheter is identified.
4. Most common clinical presentations for catheter-related bloodstream infections are signs and symptoms of sepsis.
5. When obtaining blood cultures, paired blood samples from both peripheral vein and intravenous catheters before initiation of therapy are recommended.
6. Decisions about management, catheter salvage, and choice of antibiotics depend on the type of microorganisms detected and type of catheter used.

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7. Transesophageal echocardiography (TEE) should be performed in patients with *Staphylococcus aureus* bacteremia to rule out infective endocarditis. Dilated eye examination should be performed in patients with candidemia to rule out *Candida* retinitis.
8. In patients with catheter-related bloodstream infections, close monitoring for complications, including sepsis, suppurative thrombophlebitis, endocarditis, persistent bloodstream infection, osteomyelitis, local catheter site, and other metastatic infections, is important.
9. Use of good hand hygiene and aseptic techniques are important steps in the prevention of catheter-related infections.

**DEFINITIONS***1. What are the different types of catheters?*

A wide variety of catheters are used daily in hospitals, particularly intensive care units (ICUs), for infusion of fluids, antibiotics, nutrition, blood products, medications, and dialysis usage. The most common types of catheters are summarized in [Table 1](#).

*2. What are the different types of catheter-related bloodstream infections?*

Colonization: localized growth of microorganisms on quantitative or semiquantitative culture of the catheter tip, hub, or subcutaneous segment.

Phlebitis: induration, tenderness and warmth along the tract of a catheterized vein.

Exit site infection: erythema, induration, and tenderness within 2 cm of a catheter exit site. Can be associated with fever and purulent drainage.

Tunnel infection: tenderness or induration along the subcutaneous tract of a tunneled central line.

Pocket infection: erythema, tenderness, drainage/fluctuance over the subcutaneous implanted device related to infected subcutaneous fluid.

Blood stream infection: infusate or catheter related. Infusate related has concordant growth of a microorganism from infusate and percutaneous blood cultures. Catheter related blood stream infections definition is discussed under diagnosis below.

**EPIDEMIOLOGY***1. What is the incidence of CRBSIs?*

Although estimates for the incidence of CRBSIs have varied, data from the Agency for Healthcare Research and Quality estimate that 34,990 (3.04 per 100,000 US residents) events occur yearly.<sup>1</sup> The risk of bloodstream infection varies with the type of catheter, the experience of the operator inserting the line, the intended use, frequency of access, duration of use, patient factors, and strategies used for prevention of CRBSIs.<sup>2-4</sup>

*2. What are the most common microorganisms recovered with CRBSI?*

For percutaneously inserted, noncuffed catheters, the most common organisms are coagulase-negative *Staphylococcus*, *Staphylococcus aureus*, *Candida* species, and

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