



INTERNATIONAL
SOCIETY
FOR INFECTIOUS
DISEASES

GUIDE TO INFECTION CONTROL IN THE HOSPITAL

CHAPTER NUMBER 30:

Bloodstream Infections

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DEFINITION

A bloodstream infection (BSI) is defined as one or more positive blood cultures associated with systemic signs of infection such as fevers, chills, and/or hypotension. BSIs can be divided into primary and secondary. Primary BSIs occur without another defined nidus of infection. Secondary BSIs develop from a detectable area of infection as the source of the bacteremia. An example of such a secondary BSI is a urinary tract infection with subsequent bacteremia.

KEY ISSUE

- BSI often are iatrogenic owing to invasive procedures or devices such as the placement of a central venous catheter.
- Vascular catheter-related BSIs are the most common cause of healthcare-associated bacteremia.
- In contrast, peripheral venous catheters less commonly cause BSI.
- Prevention of catheter-related BSIs is a high priority infection prevention initiative

KNOWN FACTS

- An estimated 250,000 cases of BSIs occur annually in the U.S.
- 80,000 of these are catheter-related BSIs that occur in ICUs.
- BSIs greatly increase hospital cost and length of stay.
- The estimated BSI attributable mortality rate is between 12-25%.
- Catheter-related bloodstream infections account for 11% of healthcare-associated infections.

- Most frequently isolated BSI organisms include coagulase-negative staphylococci (31%), *Staphylococcus aureus* — either methicillin sensitive or resistant (20%), enterococci (9%), *Escherichia coli* (6%), *Klebsiella* species (5%), and *Candida* species (9%).
- Independent risk factors for central line associated BSIs include:
 1. Prolonged hospitalization before catheterization.
 2. Prolonged duration of catheterization.
 3. Heavy microbial colonization at the insertion site and/or catheter hub.
 4. Femoral catheterization in adults.
 5. Neutropenia.
 6. Reduced nurse-to-patient ratio in the ICU.
 7. Total parenteral nutrition.
- Implementation of proven infection reduction techniques is associated with 60% decrease in catheter-related BSI rates in U.S. intensive care units.

SUGGESTED PRACTICE

- Education and training of healthcare workers.
- Hospital infection control policies with surveillance for intravascular device-related infection
- The placement and use of central line involves five key components:
 1. Appropriate hand hygiene involving the use of alcohol-based waterless hand cleaner or antibacterial soap and water with adequate rinsing.
 2. Use of maximal barrier precautions: strict adherence to hand hygiene; wearing surgical cap, mask, sterile gown, and sterile gloves; and use of sterile drapes.
 3. Skin preparation with 2% chlorhexidine in 70% isopropyl alcohol.
 4. Use of an optimal catheter site such as the subclavian area and avoidance of a femoral site.

5. Ongoing daily reviews of central line necessity with removal as soon as possible.
- Disinfect injection ports prior to use and stopcocks should be capped when not in use.
 - Use Teflon or polyurethane catheters instead of polyvinyl chloride or polyethylene catheters.
 - Change sterile gauze dressings every 2 days with transparent dressing changes every 7 days.
 - Placing chlorhexidine-impregnated sponges (Biopatch) at catheter sites is associated with significant reduction in BSI rates.
 - Daily skin cleansing with 2% chlorhexidine wash reduces BSI rates.
 - Using antimicrobial-coated catheters should be considered if duration of device use is longer than 5 days.
 - Replace tubing used for blood products, lipid emulsions, and propofol infusions.
 - Use sutureless securement devices.
 - Use peripheral catheters as opposed to central venous catheters whenever possible, although peripheral catheters can also be associated with BSI.
 - Tunneled central venous catheters should be preferentially employed for long term use (>7 days of catheterization).

PRACTICES CURRENTLY NOT RECOMMENDED

- Do not use topical antimicrobials at insertion sites except when with dialysis catheters
- Do not use in-line filters for infection prevention.
- Do not use antibacterial lock solutions routinely. Antimicrobial locks should only be used under special circumstances such as patients with history of multiple catheter related bloodstream infections despite adequate precautions

- Do not use guidewire catheter exchanges to change out suspected infected catheters.
- Do not routinely use anticoagulant therapy to reduce catheter-related infection risk.

SUGGESTED PRACTICE IN UNDER-RESOURCED SETTINGS

The hand-washing catheter insertion and care bundles outlined above can be used in under-resourced settings and have been shown to decrease catheter-associated bloodstream infections in South America and Asia as well as they have in the United States and Western Europe. These interventions not only are successful in regard to decreasing the number of bloodstream infections but are associated with substantial savings to the hospital.

SUMMARY

The most common cause of healthcare-associated bacteremia is catheter-related bloodstream infection. These infections increase morbidity, mortality, length of stay, and hospital costs. Implementing the practices above has been shown to decrease these rates and improve quality of care for our patients.

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