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Professionals Evolving Through Education and Research

How You Can Help Prevent Bloodstream Infections from Intravenous Catheters

Just how common are bloodstream infections from intravenous catheters?

We use them every day. Intravenous catheters, whether peripheral or central, provide healthcare professionals with the means for providing medications, nutrition, fluids, and blood products as well as the means for monitoring and assessing. They are so commonplace and necessary, that we may not always think about the down side to their use. One relatively common and serious complication of using intravenous catheters is bloodstream infection. Bloodstream infections can occur with peripheral lines, but are more common with central lines. The Centers for Disease Control and Prevention (CDC, 2002) has reported annual estimates of 250,000 blood stream infections in the US attributable to central venous catheters. Mortality for each infection is estimated at 12% to 25% and the financial cost for each infection has been estimated to be $25,000. The true mortality and morbidity of intravenous catheter use is even higher when bloodstream infections due to peripheral catheters are considered.

How do they occur?

According to the CDC (2002), most bloodstream infections attributed to peripheral, short term catheters occur through migration of skin microorganisms from the catheter insertion site to the catheter tip. Bloodstream infections related to long-term central or peripheral lines usually occur through contamination of the catheter hub leading to intraluminal colonization. In an attempt to reduce the ability of microorganisms to migrate along the catheter, most catheters today are made of materials such as Teflon, silicone, or polyurethane. Although this strategy can help, it is not the only approach taken to reduce the risk of blood stream infections.

What can we do to prevent them?

Once again, there is ample evidence available demonstrating that through evidence-based prevention strategies, bloodstream infections related to intravenous catheter use can be nearly eliminated. The Institute for Healthcare Advancement has published a list of 5 interventions that should be implemented to effectively reduce bloodstream infections related to **central venous catheters**. This "central line bundle" consists of:

1. **Hand Hygiene**: According to the CDC, hands should be washed before and after any patient contact. Gloves should be worn for palpation of insertion sites, after inserting, replacing, accessing, repairing, or dressing an intravascular catheter. Ha nds must alwayws be washed following glove removal. Unless hands are visibly soiled (or the patient has C. diff), waterless hand hygiene (ie, Purell) is the preferred method of skin antisepsis.
2. **Maximum Barrier Precautions:** This is a key factor in reducing central line infections. It means that during insertion of the central line, all healthcare providers inserting and assisting with the procedure

need to follow strict hand hygiene and wear a cap, sterile gown, sterile gloves and mask. Patients need to be covered from head to toe with a drape that has a small opening for insertion.

3. **Chlorhexidine Skin Asepsis:** Skin should be cleaned with a chlorhexidine product before catheter insertion and during dressing changes. When cleansing the skin for catheter insertion, use a back and forth friction rub for at least 30 seconds. Allow the chlorhexidine to dry completely before inserting the catheter. Chlorhexidine is also utilized for site cleansing at dressing changes.
4. **Optimal Catheter Site Selection:** Whenever possible, the subclavian line is preferred over the jugular as the optimal site for placing central lines in adults. The subclavian site is also preferred over the femoral site for optimal placement of temporary dialysis catheters.
5. **Daily Review of Line Necessity:** Daily review of the need for the central line will prevent unnecessary delays in removing lines that are no longer clearly needed for the care of the patient. Many times, central lines remain in place simply because they provide reliable access and because personnel have not considered removing them. However, it is clear that the risk of infection increases over time as the line remains in place and that the risk of infection decreases if the line is removed.

What can be done to decrease infections related to peripheral lines?

The IHI has not created a strategy for preventing bloodstream infections related to peripheral lines. However, the CDC (2002) identified several strategies to reduce them. The strategies are:

1. Use excellent hand hygiene and gloves when handling any intravenous catheter or insertion site for medical devices.
2. Chlorhexidene is the preferred agent for site preparation due to its extended antibacterial activity.
3. Use the most appropriate intravenous catheter for the task at hand.
4. Use optimal site selection for the intravenous device inserted.
5. Evaluate the insertion site daily. Remove the IV catheter if there are any signs of phlebitis, infection, or if the catheter malfunctions. Replace peripheral IV catheters every 96 hours.
6. Do not routinely apply antibiotic ointment to the insertion site.

How is Methodist Hospital Responding?

A team was recently formed to address the problem of blood stream infections related to central lines and peripheral catheters. This team is led by Deb Mansfield and team members include representatives from Nursing Operations, IV Team, Med/Surg (each campus), Critical Care (each campus), Cath Lab, MCH, ED, Specialty Health, and Nursing Practice. The team has 4 primary goals and they are to:

- Standardize and use appropriate products. Products include: catheter kits for triple/double lumen, Swan-Ganz, PICC, peripheral, and temporary dialysis catheters; chlorhexadine prep for all starts; Bio-Patch and Tegaderm for all sites; and central line dressing kits.
- Ensure that everyone follows Policies and Procedures related to post insertion care. Practices to be addressed include: Documenting a description of the site every shift; dating site, tubing, and IV bag; changing peripheral sites every 96 hours and documenting; changing peripheral site dressings every 96 hours; changing central line dressings every 7 days; changing PICC line dressings every 7 days; changing needleless caps every 7 days; and changing IV tubing every 96 hours (TPN every 24 hours).
- IV Team to assess all new admissions for appropriate site selection, need for a PICC line, and appropriate dressing & documentation.
- Educate RN's to start IV's & monitor compliance with Policy & Procedures

This team will be laying the groundwork for initiating best practices to decrease blood stream infections related to central and peripheral lines. They'll need the help of every nurse to achieve this important outcome. Please watch for developments and future changes.

References:

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