

Keeping needleless connectors clean, part 1

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MORE THAN 360 MILLION I.V. catheters are used in the United States each year, and all carry some risk of bloodstream infection (risk depends on insertion site, dwell time, number of lumens on central venous access devices [CVADs], and catheter management techniques).¹

Some experts consider central line-associated bloodstream infections (CLABSIs) universally preventable if clinicians follow best practices meticulously.² And as of January 1, 2010, the Joint Commission requires healthcare providers to use a standardized protocol to disinfect all catheter hubs and injection ports before accessing the ports. This article will review the pathophysiology of CLABSIs. A future article will describe two protocols for hub disinfection.

Bloody nuisance

CLABSIs typically occur from two main sources:

- The manipulation and accessing of the catheter hub and needleless connectors. The access port or needleless connector that screws onto the catheter hub is the most common site of CLABSIs that occur 7 days or more after catheter insertion.³⁻⁶ This article focuses on this source of infection.
- The skin-catheter junction, also known as the insertion site. This is the primary site for CLABSIs that occur within 7 days of catheter insertion.³⁻⁵

CLABSIs can be prevented, and all clinicians are responsible, no matter who inserts or maintains the catheter.⁷ The increased length of stay associated with healthcare-

associated infections (specifically those related to CVADs) has led to rising healthcare costs and higher mortality, making this a national health issue.⁸

All needleless connectors require proper disinfection before opening or accessing the septum or valve for sterile I.V. fluid entry. But in most facilities, needleless connector disinfection is frequently overlooked because of the immense workload in providing standardization and surveillance of practice. According to observation and survey response, needleless connector disinfection is inconsistent and variable at best—and typically consists of a cursory wipe of the cap with 70% isopropyl alcohol.^{9,10}

Disinfection consists of three key elements: solution or disinfectant, contact time, and technique used.

Finding a solution

Three solutions are commonly used to disinfect needleless connectors: 70% isopropyl alcohol (alcohol), chlorhexidine gluconate mixed with 70% isopropyl alcohol (CHG+alcohol), and 10% povidone-iodine. All three solutions are accepted as skin disinfectants, and have been shown in studies to be effective in reducing microbial contamination of needleless connectors. But because alcohol is the only FDA-approved disinfect-

ant for use on nonorganic surfaces such as medical equipment, using any solution other than alcohol for hub disinfection would be considered off-label.

However, recent guidelines recommend considering the CHG+alcohol solution acceptable, and the CDC and Infectious Disease Society of America recommend either 70% alcohol or CHG+alcohol for connector disinfection.^{11,12} A 10% povidone-iodine solution, which requires a longer (2-minute) drying time, may still be used for dialysis equipment, although guidelines recommend using 2% chlorhexidine with 70% alcohol.¹³

Each solution has to be applied for a specified amount of time, and that time may change with friction or scrubbing action. For example, one study found that alcohol and CHG+alcohol were equally effective in the wipe method of application (using a packaged pad soaked with antiseptic) if clinicians apply friction and scrub for 15 seconds.¹ Another study showed that the wipe method wasn't effective if the clinician scrubbed for only 3 to 5 seconds. An antiseptic barrier cap (also called a disinfecting cap) containing a CHG+alcohol solution was very effective at killing microbes when it was twisted onto the needleless connector and left in place for 10 minutes.⁵

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In short, each solution appears to be effective if used with the appropriate method and contact time. More studies are required to directly compare efficacy of each solution with the same methods and contact times. ■

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RESOURCE

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