

PICC the Right Choice: Eliminating Central Line Placement Infections

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Define

The purpose of this project was to decrease the prevalence of central line-associated bloodstream infection (CLABSI), within our interventional radiology practice at a large Radiology Department, from six to zero infections per year.

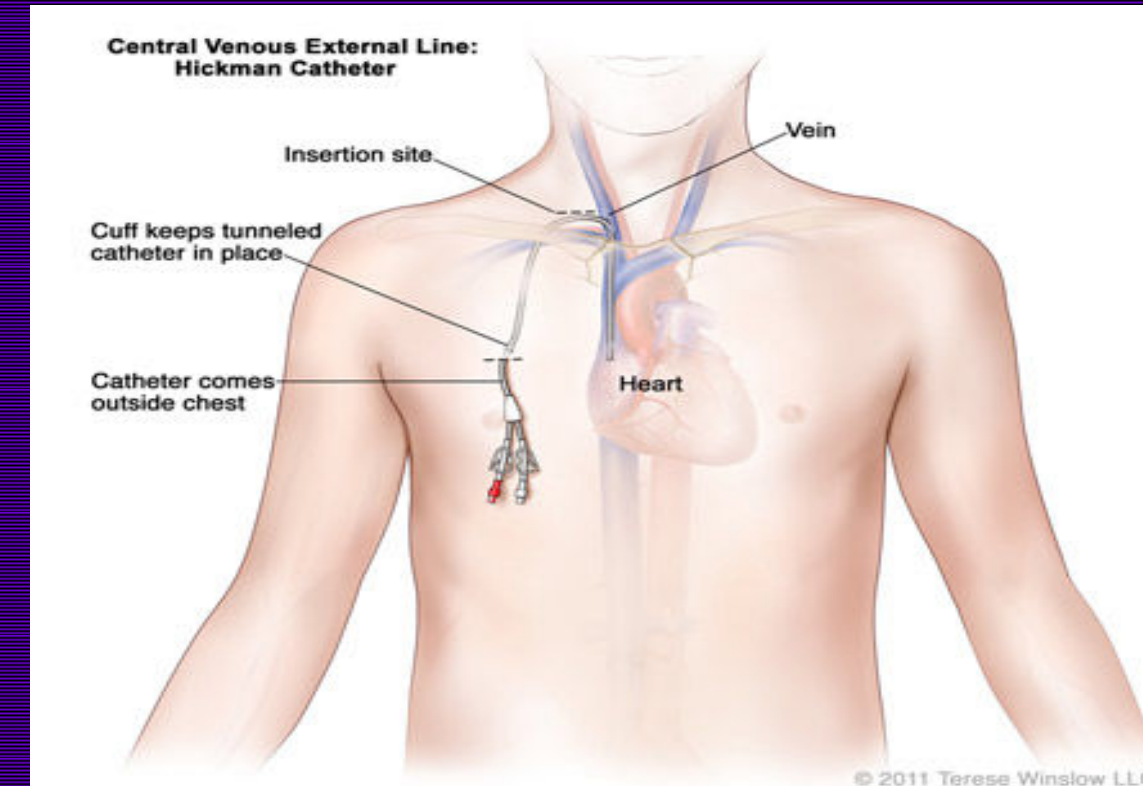
Central line-associated bloodstream infections occur in an estimated 250,000-500,000 patients annually. These cases have a 10-30% mortality rate and burden the healthcare system with an unnecessary \$300 million to \$2.3 billion a year. In 2007, our interventional radiology practice incurred six such infections within a 48-hour window of line placement. We surmised that changes to our practice should be implemented to decrease the loss of lives and reduce the financial burden associated with these preventable infections.



Methods

Our team met over several days to discuss potential sources and preventions of central line infections. We had a nurse from our surgical services department perform aseptic technique audits which resulted in additional education and hands-on training to increase adherence to aseptic technique guidelines. Looking for the root cause of these infections, through brainstorming sessions, reviewing the Centers for Disease Control and Prevention (CDC) guidelines, and discussions with our institution's Infection Prevention and Control unit we came up with a four-fold solution.

First, we changed our surgical prep solution from Betadine to Chlorhexidine to aid in the elimination of prevalent bacteria. Second, we changed to a surgical hand antiseptic containing Chlorhexidine Gluconate 1% Solution and Ethyl Alcohol 61% at the same time. Third, we adopted the use of an electric clipper instead of a straight blade razor. This reduced the razor surface area on skin contact while simultaneously reducing patient skin nicks. Finally, we developed a central line placement antibiotic administration protocol and Central Venous Catheter Insertion Checklist. This is based on the Institute of Healthcare (IHI) Central Line Bundle. The bundle is a group of evidence-based interventions for patients with intravascular central catheters that, when implemented together, result in better outcomes than when implemented individually.



Key Components

- Hand Hygiene
- Maximal Barrier Precautions upon Insertion
- Chlorhexidine Skin Antisepsis
- Optimal Catheter Site Selection - with Avoidance of the Femoral Vein for Central Venous Access in Adult Patients
- Central Venous Catheter Insertion Checklist - currently observable in all procedure rooms and is referenced both during and after all line placements.
- Simulation Center - Residents and fellows have access to a simulation center, wherein aseptic techniques are taught and practiced. The implemented changes to these procedures are demonstrated to the medical staff and allows for a streamlined and standardized technique.

Ongoing Training

We have focused our attention on proper training for new residents and fellows to assure proper sterile technique is followed. We have implemented a Simulation Center where new trainees learn our sterile techniques and processes. We have implemented a training module through our Simulation Center whereby new trainees learn sterile techniques and processes.



Results

These processes, although still in their infancy, were implemented in 2009. The infection prevalence for that year was reduced to one central line placement related infection. In the following four-year period from 2010 to 2013, of the 5200 central lines placed, the number of central line placement blood infections within the aforementioned 48-hour window was reduced to zero.



Conclusion

Our department continues to practice these aseptic techniques and guidelines; hopefully we are able to maintain our current streak of perfect practice in the future.

Infection Rate for Central Venous Catheters (CVC) and Peripherally Inserted Central Catheters (PICC)

