EDITORIAL

Central line associated blood stream Infections and how to prevent it

A central line associated blood stream infection (CLABSI) is a laboratory confirmed infection not related to an infection at another site that developed within 48 hours of central line placement.

Of all healthcare associated infection central line associated blood stream infection are associated with high cost burden accounting for approximately $46,000 per case.

Most cases are preventable with proper aseptic technique, surveillance and management strategies.[1,2]

According to a study National Health care safety Netowork from January 2006 to October 2007 pathogens associated with CLABSI are as follows Gram positive organisms coagulase negative staphylococci 34.1%, Enterocooci 16% and Staph aureus 9.9% are the most common organism followed by Gram negative organisms Kleibsiella 5.8%, enterobacter 3.9%, Pseudomonas 3.1%, E.coli 2.7%, Acinetobacter 2.2%, Candida species 11.8% and others 10.5%.[3-5]

Catheter related blood stream infections (CRBSI) is associated with tunneled hemodialysis catheter approximately 40-80% are caused by gram positive organisms, coagulase negative staphylococci, staph aureus and Enterococcus are the most common organisms. Methicillin resistant staphylococcus is frequently seen.

Central line associated blood stream infection lead to a prolonged hospital stay and increased health care cost and results in increased mortality.

An estimated 250,000 blood stream infections occur annually and most are related to intravascular devices

In USA the CLABSI rate in ICU is estimated to be 0.8 per 1000 central line days.[3] International Nosocomial Infection Control Consortium (INICC) surveillance data from January 2010 till December 2015 (703 ICU in 50 countries) reported a CLABSI rate of 4.1 per 1000 central line days. 70% of hospitalized patients with central venous catheter are outside the ICU.[6]

In recent years peripherally inserted central lines (PICCs) have increased significantly given some inherent advantages these devices offer.[7]

The rate of CLABSI associated with PICC are statistically similar to conventional Central venous catheter in the hospital setting.[8,3]

In order to prevent CLABSI related infections we have to strictly follow hand hygiene by washing hands with soap, water or alcohol based gels or foams.

Gloves do not prevent the need for hand hygiene, strict aseptic technique using maximal sterile barrier precautions including a full body drape when inserting central venous catheters, use of chlorhexidine skin preparations for disinfecting the skin before insertion of central line, ultrasound guidance by an experienced provider for placement will help to avoid mechanical complications and reduce the number of attempts.

It is advisable not to use femoral veins as a choice for central line placement. We should prefer the subclavian vein for non-tunneled catheter. It is also advisable to remove central line promptly when it is no longer required. We should replace central line placed during an emergency (asep

sis not assured as soon as possible or within 48 hours.

We prefer to use a checklist to avoid central line associated infection. Many guidelines have been established; some hospitals have a policy that for long-term access, the line can only be inserted by a dedicated team comprise of the surgeon, nurses, and a pharmacist. When administering total parentral nutrition, one port is dedicated to nutrition. Some hospitals, only nurses with training in central lines are allowed to infuse medications and other solutions. Adhering to this protocol can reduce the rate of CLABSI.[10]

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References:

1. Hallam C, Jackson T, et al. Establishing catheter-related bloodstream infection surveillance to drive improvement. J Infect Prev. 2018 Jul;19(4):160-166. [PMC free article] [PubMed]
2. Aloush SM, Alsaraireh FA et al . Nurses' compliance with central line associated blood stream infection prevention guidelines. Saudi Med J. 2018 Mar;39(3):273-279. [PMC free article] [PubMed]
3. Yazan Habbadin, Pavan Annamaraju et al. http://www.ncbi.nlm.nih.gov/books/NBK430891. 1-7, Central line-associated blood stream infections
4. Farrington CA, Allon M, et al. Management of the Hemodialysis Patient with Catheter-Related Bloodstream Infection. Clin J Am Soc Nephrol. 2019 Apr 05;14(4):611-613. [PMC free article] [PubMed]
5. Atilla A, Doğanay Z, et al. Central line-associated blood stream infections: characteristics and risk factors for mortality over a 5.5-year period. Turk J Med Sci. 2017 Apr 18;47(2):646-652. [PubMed]
6. Wright MO, Decker SG, et al. Healthcare-associated infections studies project: An American Journal of Infection Control and National Healthcare Safety Network data quality collaboration: Location mapping. Am J Infect Control. 2018 May;46(5):577-578. [PubMed]
7. Gibson C, Connolly BL, et al. Peripherally inserted central catheters: use at a tertiary care pediatric center. J Vasc Interv Radiol. 2013 Sep;24(9):1323-31. [PubMed]
8. Ziegler MJ, Pellegrini DC, et al. Attributable mortality of central line associated bloodstream infection: systematic review and meta-analysis. Infection. 2015 Feb;43(1):29-36. [PubMed]
9. Chopra V, O'Horo JC, et al. The risk of bloodstream infection associated with peripherally inserted central catheters compared with central venous catheters in adults: a systematic review and meta-analysis. Infect Control Hosp Epidemiol. 2013 Sep;34(9):908-18. [PubMed]
10. Govindan S, Snyder A, et al. Peripherally Inserted Central Catheters in the ICU: A Retrospective Study of Adult Medical Patients in 52 Hospitals. Crit Care Med. 2018 Dec;46(12):e1136-e1144. [PMC free article] [PubMed].