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Sterile Tubing Changes to Prevent CLABSIs in the NICU



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Purpose Statement

NICU patients have a decreased risk of CLABSI infections when two-person sterile central line changes are implemented into central line maintenance bundles compared to bundles that only use one-person clean line change techniques.

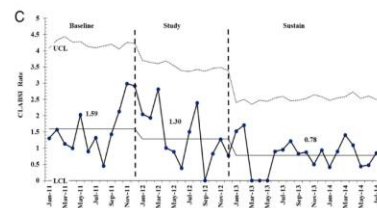
Background

Neonates admitted to the neonatal care intensive care unit (NICU) often require the placement of central lines for the administration of medications, fluids, parental nutrition, and hemodynamic monitoring. Despite their many advantages, central lines can lead to serious infections, known as central line associated bloodstream infections (CLABSIs). These infections are not related to an infection from another site and develop within forty-eight hours of placement of a central line or within forty-eight hours of removal. CLABSIs are a major contributor to morbidity and mortality in the NICU population and are costly to hospital systems. According to Mobley & Bizzarro, infants who develop CLABSIs can cost up to an additional \$50,000 and add as many as ten days to their hospital stay when compared to other infants without CLABSIs (2017). An evidence-based approach that has shown to improve patient outcomes and reduce CLABSIs is the use of a bundle, which is utilized upon insertion and during maintenance of the central line. Based on the available research, the most common CLASBI bundle elements include: using maximum standard barrier precautions, using a specific skin preparation & line dressing protocol, daily central line need assessments, a two-person line change technique, specific education and training for staff, and quarterly audits (Payne et al., 2018). The St. Cloud Hospital NICU currently utilizes these practices expect for a two-person line change with sterile technique.

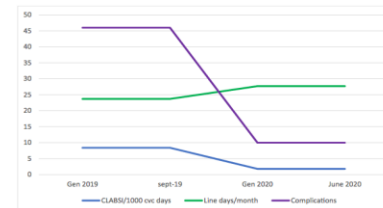
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Synthesis of Evidence

Based on a literature review of multiple sources: evidence suggests that incorporation of sterile central line changes along with two-person line changes into central line maintenance bundles decreases CLABSI rates in NICU settings. In the article by Bierlaire and team, it was discovered that the implementation of a new CLABSI bundle in their NICU, which included requiring nurses to wear sterile gloves and masks when preparing any drug or infusion, resulted in a significant decrease in CLABSIs (8.4 to 1.8 infections per 1000 central venous catheter days) and decreased catheter-related complications (2020). Mobley & Bizzarro found maintaining aseptic technique is crucial when changing central line tubing as it minimizes risk for contamination and infection. Sterile tubing line changes in combination with special training and education were seen to reduce CLABSI rates in the neonatal population. The implementation of an access team to educate staff on standardizing central line changes is shown to reduce variability in nursing practice and to overall decrease the risk of line-related complications (2017). Neill et al. recommends including sterile technique in central line maintenance bundles. Their bundle includes: hat, mask, sterile gloves, sterile towels and bedside curtains closed for all tubing changes and recommends using hat, mask, and bedside curtains closed for all fluid changes (2017). In the systematic review completed by Payne and her colleagues, analysis revealed a 60% reduction in CLABSI rates following the introduction of care bundles. Of the twenty-four studies included in the review, seven articles incorporated two-person sterile line techniques as a part of their CLABSI reduction projects (2018). Evidence compiled in the article by Pallotto et al., shared their CLABSI reduction project. After incorporating sterile line tubing changes into their central line maintenance bundles, not only were CLABSI rates reduced, but also sustained for 19 months. After the study and sustain phase, four of the participating NICU facilities transitioned from clean central line tubing changes to sterile central line tubing changes. These four facilities had a 64% decrease in CLABSI rates from their baseline (2017). The article by Stroever and colleagues highlights how collaboration of all personnel leads to success in infection prevention. Participants in the study felt that a designated line team is critical in the prevention of CLABSIs. Line team members acted as extra support to bedside nurses, provided guidance on unit protocols, and served as educators. Nurses are expected to be diligent, highly consistent, and focused when using sterile technique (2020). Overall, these articles show a positive correlation in CLABSI outcomes when two-person sterile line changes are added to CLABSI prevention bundles.



(Bierlaire et al., 2017)



(Pallotto et al., 2017)

EBP Practice Change

Based on the evidence, we would like to implement sterile central line set-up and two-person sterile line changes into our practice. When preparing the equipment for line changes, disinfect counter space with a sani-cloth wipe, allow to dry and place sterile drape. Open all product packages needed and drop sterile contents onto sterile drape. Perform hand hygiene and don sterile gloves. Assemble tubing on the sterile drape to create a closed system while maintaining sterility of all connection sites. When changing the central line tubing set-up, obtain assisting RN and supplies. Open alcohol swabs and open second sterile drape. RN 1 places sterile drape under central line catheter as RN 2 lifts current infusion tubing connection and places it in center of sterile drape. Don sterile gloves. RN 1 holds current catheter and uses alcohol swab to scrub junction of current catheter for 15 sec. RN 2 scrubs the new tubing junction for 15 sec. RN 1 disconnects old tubing from the central line and RN 2 attaches the new tubing set-up to align connections and assuring fluid to fluid interface without any air bubbles (Mayo Clinic, 2020).

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