Peripherally Inserted Central Catheters

Most babies admitted to intensive care nurseries require vascular access for prolonged intravenous (IV) therapy. Extremely-low-birth-weight and critically ill neonates usually have umbilical lines placed for access right after birth. A peripherally inserted central catheter (PICC) may be considered in place of or before removing the umbilical venous line (UVC) to reduce stress and pain at repeated attempts to place a peripheral IV.

PICC insertion is considered an expanded practice role for nurses, and therefore is intended for nurses who are experienced in intravenous therapy and in the care of central lines. Some intensive care units use nurse practitioners or physicians to insert PICCs while other insertion teams consist of both staff nurses and advanced practice nurses.

Informed Consent

The infant's parents may be asked to sign an additional consent form prior to PICC insertion. You or a member of the heathcare team will review with the parents the procedure and risks/benefits for their infant.

Pain Management

The infant may be given medications to manage any procedural pain and provide sedation during the PICC line placement. This is to ensure that the baby is comfortable during the procedure. You may notice that the infant is sleepy after the procedure is completed. This is a common side effect of the medications and not concerning.

Care and Maintenance of the PICC

Each nurse caring for a patient with a PICC is able to identify potential complications and knowledge of care and maintenance strategies. The PICC will be assessed by the nurse at least once each shift.

Post-Insertion Complications

Although there are many benefits to the use of PICCs in neonatal patients, there are some risks and potential complications, including

- cellulitis (localized site infection that may present as pain, tenderness, and redness at the entrance site of the catheter)
- edema (swelling) of the extremity (may be due to many factors such as the size of the catheter relative to the size of the vein, a restrictive dressing, a bend in the extremity, dependent positioning, or decreased movement)
- thrombus-thrombosis (may be caused by endothelial injury from local trauma or inflammation of the vessel wall). Catheter occlusion and thrombosis can result in significant problems and inability to use the device.
- phlebitis (defined as an inflammation of the vein and seen as edema or erythema surrounding the vein, a visible red streak along the vein and/or a palpable cord of vein). Phlebitis is the result of vessel wall irritation due to a mechanical irritant (i.e., the catheter), a chemical irritation due to medication or hyperosmolar solution, or a poorly secured catheter with movement in and out of the vessel.

Catheter Tip Migration

Malposition occurs because of misdirection on catheter insertion, perforation, curling, knotting, or spontaneous migration after initial placement.

Blood Sampling and Administration

Once placement is verified, the PICC line may be used for blood sampling and blood product administration based on the facility's policies and practice guidelines.

Dressing Changes

PICC dressings provide a protective environment for the catheter entrance site and help prevent catheter migration. Transparent dressings should be changed when the catheter is replaced; when the dressing becomes damp, loosened, or soiled; or when inspection of the site is necessary.

All facilities involved with insertion of PICCs have formal organizational policies and procedures in place that provide clear lines of responsibility for insertion, care

and maintenance, and outcomes monitoring. While PICCs have become a common practice in neonatal intensive care units, continued education and research are crucial to ensure the best outcomes for neonatal patients.

Bibliography

Intravenous Nurses Society. (2016). Infusion nursing standards of practice. *Journal of Intravenous Nursing, 39*(1S), S1-S159.

Nadroo, A. M., Glass, R. B., Lin, J., Green, R. S., & Holzman, I. R. (2002). Changes in upper extremity position cause migration of peripherally inserted central catheters in neonates. *Pediatrics, 110*(1):131–136.

O'Grady N. P., Alexander, M., Burns, L. A., Dellinger, E. P., Garland, J., Heard, S. O., … Saint, S. (2011). Guidelines for the prevention of intravascular catheter-related infections. *Clinical Infectious Diseases, 52*(9), e162-e193.

Pettit, J. (2002). Assessment of infants with peripherally inserted central catheters: Part 1. Detecting the most frequently occurring complications. *Advances in Neonatal Care, 2*(6), 304–315.

Pettit, J. (2003). Assessment of infants with peripherally inserted central catheters: Part 2. Detecting less frequently occurring complications. *Advances in Neonatal Care, 3*(1):12–26.

Walden, M., & Gibbons, S. (2012). Newborn pain assessment and management: Guideline for practice. Glenview, IL: National Association of Neonatal Nurses.

Wyckoff, M. M. & Sharpe, E. I. (2015). Peripherally inserted central catheters: Guideline for Practice, 3rd Edition. Chicago: National Association of Neonatal Nurses.

Peripherally Inserted Central Catheter Lines: Information for Parents

A peripherally inserted central catheter (PICC) is a very thin intravenous (IV) catheter that is inserted in a vein in the arm, leg, or scalp of an infant. A PICC line is used in infants who will need total IV nutrition or medication for more than 7 days. It is usually placed within the first week after birth. A PICC can remain in place for weeks or for as long as the baby needs it.

When your baby is having a PICC inserted, the procedure consists of placing a very slim, soft catheter into an arm, leg, or scalp vein, and then advancing the catheter into a larger vein close to the heart. Once the line is in place, an X ray is done to make sure the position is correct before it is used. Having a PICC line alleviates the need for frequent IV insertions, reducing the number of sticks your baby will receive. Insertion of a PICC line is usually based on the needs of your baby. It is not an emergent procedure and parental consent is necessary.

Procedure

Most neonatal intensive care units (NICUs) have a neonatal PICC team who will insert the PICC lines. A physician, nurse practitioner, or a nurse from the PICC team will explain the risks and benefits of the procedure as part of obtaining parental consent.

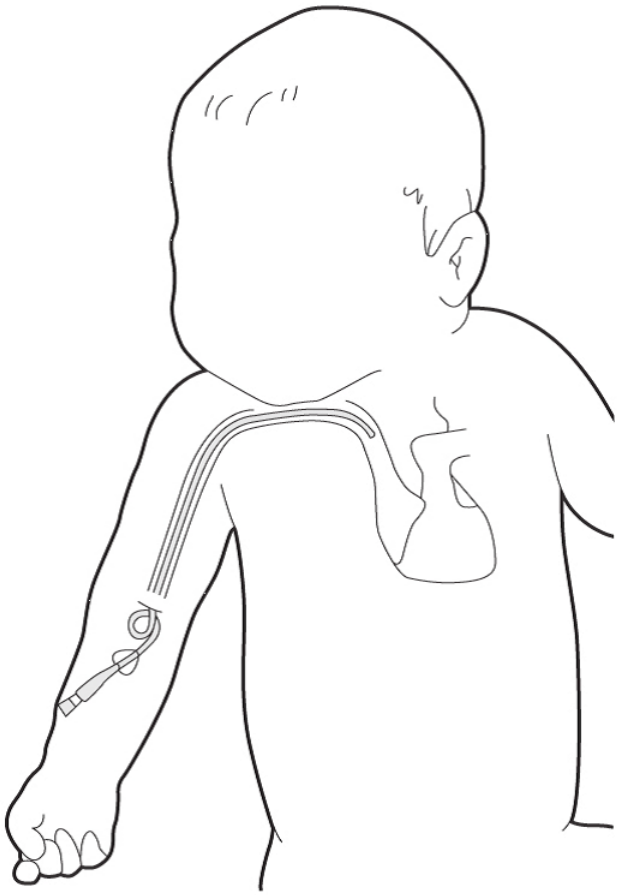
The entire process of inserting a PICC line may take 30 minutes to 1 hour, but it may take longer to make sure the catheter is in the correct position. The procedure is done under sterile (free from germs) technique and placement is usually done at your baby's bedside. Prior to the start of the procedure, your baby will be swaddled or wrapped snuggly in a blanket and given sucrose (sweet water), a pacifier, and other pain medicines to keep your baby comfortable during the procedure. After the initial skin stick, your baby should not experience any pain. Your baby will be draped from head to toe with sterile towels/drapes with only the arm/leg/scalp site exposed. Your baby's skin will be washed with a solution to prevent infection. Once the catheter is in place, an X ray will be done to make sure the tip is in a good location. Then, a sterile dressing will cover the line on your baby's skin to help prevent infections.

Alternatives to PICC Lines

For babies who need total IV nutrition, the only alternative to a PICC line is having frequent or repeated IVs inserted. While the staff can make sure your baby has pain control with IV sticks, frequent sticks can increase your baby's risk of infection.

PICC Line Removal

Removal of a PICC line usually is a simple procedure and does not cause much pain to your baby. A PICC line will be removed as soon as your baby no longer needs it. Usually, this is when a baby no longer needs IV medications or when the infant is receiving full nutrition from either mom's breast milk or formula (by bottle or a feeding tube). Once the line is removed, pressure will be applied to the site and the site will be monitored for bleeding.



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