

Heparin versus Normal Saline Flush of Central Lines in the Pediatric Population

Jennifer Napolitano BSN, RN

Lehigh Valley Health Network, Jennife_L.Napolitano@lvhn.org

Lindsey Smeltzer BSN, RN

Lehigh Valley Health Network, Lindsey_A.Smeltzer@lvhn.org

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Heparin versus Normal Saline Flush of Central Lines in the Pediatric Population

By Jennifer Napolitano, BSN-RN and Lindsey Smeltzer, BSN-RN

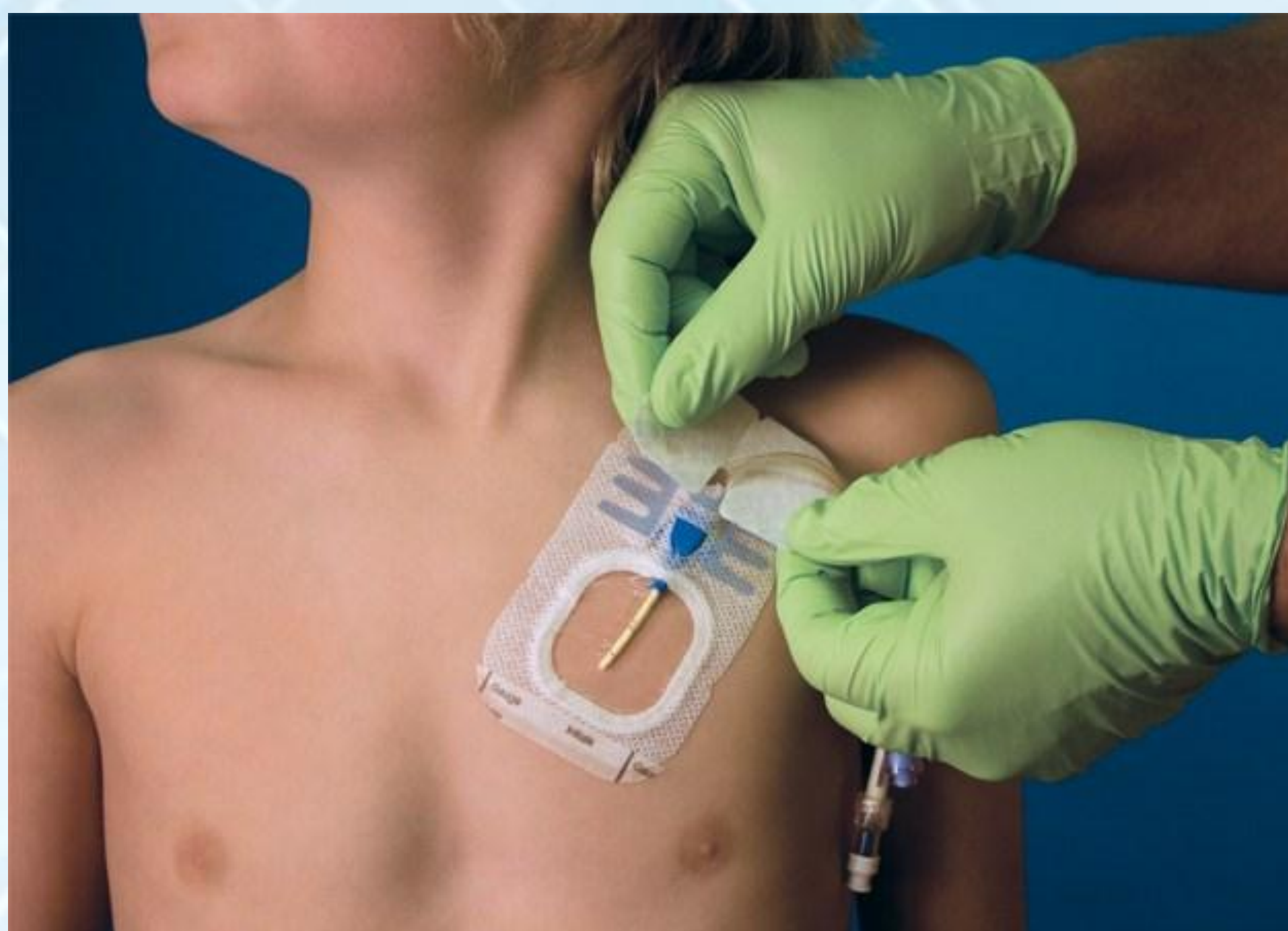
Lehigh Valley Health Network, Allentown, Pennsylvania

Background

- ❖ Clinical practice guidelines for the prevention of complications associated with implantable ports or external Broviac/Hickmans vary greatly in the pediatric population.
- ❖ Institutions such as LVHN use either heparin, NSS, or a combination of both to flush implantable ports or external Broviac/Hickmans including the pediatric population.
- ❖ There is debate regarding the cost, quality of line patency and care, and associated incidence of complications of using NSS versus using a heparin flush in implantable ports or external Hickman/Broviac.
- ❖ LVHN has moved to only using NSS flushes in adult patients unless otherwise ordered by provider.

PICO Question

- ❖ In pediatric patients with implantable ports and external Broviac/Hickmans, how does the administration of NSS flushes compared to heparin flushes influence hospital cost and the quality of line patency and care?
 - P – Pediatric patients with implantable ports and external Broviac/Hickmans
 - I – Administration of NSS flushes
 - C – Administration of Heparin flushes
 - O – Hospital cost and quality of line patency and care



<https://incrediblenews24.com/20180104/global-pediatric-implantable-port-market-2017-fresenius>

Evidence

- ❖ 9 Pediatric-Specific Reviews/Studies
 - 3 in support of normal saline solution
 - 1 in support of heparin
 - 5 suggest more research is needed
- ❖ Broviac/Hickman product manual suggests a combination of NSS and heparin use: (*Nursing Procedure Manual*, p. 7)
 - When CVAD not in use, flush 1x daily-1x weekly. Heparin after IV TPN, IV fluids, and IV meds
 - When CVAD in use at least q8h, flush 10mL NSS without heparin between infusions
 - No change in maintenance stated for adults/children
- ❖ According to a 2011 randomized control trial in adults, there are statistically significant findings stating that NSS is as effective as heparin as flush solutions (Goh, Teo, & Masagoes, 2011).
 - However, this data is dangerous to generalize to children.
- ❖ A 2014 retrospective cohort study found that there is a statistically significant association with central venous catheter lumen size and line patency (Buchini, et al., 2014).
- ❖ A prospective observational study was performed between June 2006 and March 2007 that included all children admitted to the PICU with a central line. Statistically insignificant findings stated that continuous fluids are more effective than intermittent heparin flushes for central line maintenance (Stoltz, Krieger, Raykov, & Carroll, 2008).
 - More research needs to be completed
- ❖ LVHN Costs:
 - NSS 10mL - \$0.44
 - Heparin 10 units/mL 3mL - \$0.34
 - Heparin 10 units/mL 5mL - \$0.50(Only 5mL Heparin syringes are stocked in Pediatrics Pyxis)

Methods

- ❖ Completed a pediatric-specific literature review.
- ❖ Collected data on the Inpatient Pediatric Unit. Implemented a form for nurses caring for patients with implantable ports or external Broviac/Hickmans to track how often saline is used compared to how often heparin is used to flush the lines.
- ❖ Researched the cost of NSS versus the cost of heparin and how much money is spent on the use of either one with consideration to how often each is used.
- ❖ Reviewed central line guidelines shared by other children's hospitals.

Results

- ❖ Out of 182 total flushes recorded:
 - 178 NSS flushes = \$78.32
 - 4 Heparin flushes = \$2.00
- ❖ Infrequent heparin flush administration. RNs are administering heparin flushes as per provider orders.
- ❖ Per lack of Heparin use, comparative costs of NSS and Heparin use is insignificant.
- ❖ No reported indicators of occlusion during all 182 flushes
- ❖ Limitations:
 - RN participation
 - High incidence of patients with continuous fluids
 - Incomplete data; data collection form changed mid-survey to include fluid order data
 - PICCs excluded from data collection

Next Steps

- ❖ Collaborate with Lehigh Valley Children's Hospital Patient Care Specialists to develop a pediatric-specific central line policy and flush guideline
- ❖ Initiate collaboration with pediatric specialty providers to review central line policy and flush guideline once created

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