

CADTH Reference List

# Heparin Lock Dosages and Saline Flush Frequency for Intravascular Access Devices

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## Key Messages

- No literature was identified regarding the clinical effectiveness of heparin locking intravascular access devices with 100 U/mL of heparin versus 10 U/mL of heparin in pediatric patients.
- No literature was identified regarding the clinical effectiveness of frequency of saline flushing plus heparin locking of non-continuous use intravascular access devices (i.e., not currently administering medication).
- One evidence-based guideline was identified regarding dosage for heparin locking intravascular access devices and frequency of saline flushing plus heparin locking of non-continuous use intravascular access devices in pediatric patients.

## Research Questions

1. What is the clinical effectiveness of heparin locking intravascular access devices with 100 U/mL of heparin versus 10 U/mL of heparin in pediatric patients?
2. What is the clinical effectiveness of frequency of saline flushing plus heparin locking of non-continuous use intravascular access devices (i.e., not currently administering medication)?
3. What are the evidence-based guidelines regarding dosage for heparin locking intravascular access devices in pediatric patients?
4. What are the evidence-based guidelines regarding frequency of saline flushing plus heparin locking of non-continuous use intravascular access devices in pediatric patients (i.e., not currently administering medication)?

## Methods

### Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the international HTA database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were heparin or saline for intravascular access devices (IVAD). No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2016 and July 5, 2021. Internet links were provided, where available.

### Selection Criteria and Summary Methods

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information

**Table 1: Selection Criteria**

Criteria	Description
<b>Population</b>	Pediatric patients with intravascular access devices (e.g., central venous access devices, implanted venous access devices, or central venous catheters)
<b>Intervention</b>	Q1: Locking the line with 100U/mL heparin Q2: Flushing the line with saline followed by a heparin lock at 1 frequency (e.g., once every 24 hours, 3 times a week) Q3: Locking the line with any amount of heparin Q4: Saline flushing of the line at any frequency
<b>Comparator</b>	Q1: Locking the line with 10U/mL heparin Q2: Flushing the line with saline followed by a heparin lock at a different frequency (e.g., once a week) Q3-4: Not applicable
<b>Outcomes</b>	Q1-2: Clinical effectiveness (e.g., prevention of clots, safety) Q3: Recommendations regarding the dosage of heparin for locking of the intravascular access device line Q4: Recommendations regarding the frequency of saline flushing of the intravascular access device line
<b>Study designs</b>	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

available in the abstracts of selected publications. Open access full-text versions of evidence-based guidelines were reviewed when abstracts were not available, and relevant recommendations were summarized.

## Results

One evidence-based guideline was identified regarding the dosage for heparin locking intravascular access devices and frequency of saline flushing plus heparin locking of non-continuous use intravascular access devices in pediatric patients.<sup>1</sup> No health technology assessments, systematic reviews, randomized controlled trials or non-randomized studies were identified in the literature.

Additional references of potential interest that did not meet the inclusion criteria are provided in Appendix 1.

## Overall Summary of Findings

One evidence-based guideline from the University of Wisconsin Hospitals and Clinics Authority provided recommendations for the dosage of heparin locking for various intravascular access devices and frequency of flushing using saline solution (sodium chloride 0.9%) in pediatric patients.<sup>1</sup> For peripherally inserted central catheters (PICCs), non-tunneled central venous catheters, tunneled central venous catheters, and implanted venous ports, the guideline recommends a heparin dosage of 10 U/mL.<sup>1</sup> The guideline also recommends that

100 U/mL of heparin is used when implanted venous port device locking is done on a monthly basis, and 1,000 U/mL of heparin is recommended for dialysis and apheresis locking.<sup>1</sup> Recommendations for the frequency of saline flushing are for before and after each access or every 8 hours if not in use for peripheral IV catheters, and before and after each access or every 12 hours if not in use for PICCs, non-tunneled central venous catheters, tunneled central venous catheters, and implanted venous ports.<sup>1</sup> Additionally, the guideline recommends saline flushing before and after each access or weekly if not in use for dialysis and apheresis.<sup>1</sup>

No relevant literature was found regarding the clinical effectiveness of locking intravascular access devices with 100 U/mL of heparin versus 10 U/mL of heparin or frequency of saline flushing plus heparin locking of non-continuous use intravascular access devices in pediatric patients; therefore, no summary can be provided.

## References

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

No literature identified.

### Randomized Controlled Trials

No literature identified.

### Non-Randomized Studies

No literature identified.

### Guidelines and Recommendations

1. University of Wisconsin Hospitals and Clinics Authority. Flushing/locking of venous access devices – adult/pediatric – inpatient/ambulatory clinical practice guideline. Madison (WI): University of Wisconsin; 2018: <https://www.uwhealth.org/ckm/cpg/medications/Flushing-and-Locking-of-Venous-Access-Devices—Adult-Pediatric—Inpatient-Ambulatory-180802.pdf> Accessed 2021 Jul 14

See: Table 4. Summary of Flushing and Locking Recommendations for Pediatric Patients, page 11-14

## Appendix 1: References of Potential Interest

### Previous CADTH Reports

#### *Pediatric Patients Not Specified*

2. Heparin (5,000 u/0.5 mL) for catheter lock or flush: an update regarding the clinical effectiveness, safety, and guidelines. (*CADTH Rapid response report: reference list*). Ottawa (ON): CADTH; 2017: <https://cadth.ca/sites/default/files/pdf/htis/2017/RA0928%20Heparin%20for%20Catheter%20Lock%20or%20Flush%20Final.pdf> Accessed 2021 Jul 14.

### Clinical Practice Guidelines

3. Canberra Health Services procedure: central venous access device (CVAD) management - children, adolescents and adults (not neonates). Canberra (Australia): Canberra Health Services; 2020: <https://health.act.gov.au/sites/default/files/2021-02/Central%20Venous%20Access%20Device%20%28CVAD%29%20Management%20-%20Canberra%20Health%20Services.docx>. Accessed 2021 Jul 14 See: *Section 12 – Flushing of CVAD, page 35*
4. Central venous catheters - short term, tunneled, implanted - care of. Saskatoon (SK): Saskatoon Health Region; 2017 (revision): <https://www.saskatoonhealthregion.ca/about/NursingManual/1086.pdf> Accessed 2021 July 14 See: *Appendix B: Central Venous Catheters – Pediatric Standards, page 11.*
5. The Royal Children's Hospital Melbourne. Peripheral intravenous (IV) device management. 2018; [https://www.rch.org.au/rchcpg/hospital\\_clinical\\_guideline\\_index/Peripheral\\_Intravenous\\_IV\\_Device\\_Management/](https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Peripheral_Intravenous_IV_Device_Management/). Accessed 2021 Jul 14.  
See: Flushing of PVICs