Heparin and Saline for Maintaining the Patency of Central Venous Lines and Peripherally Inserted Catheters: An Update Regarding the Clinical Effectiveness, Safety, and Guidelines
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Acknowledgments:

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada’s health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.
Research Questions

1. What is the clinical effectiveness and safety of heparin and saline for maintaining patency when flushing central venous lines and peripherally inserted catheters?

2. What are the evidence-based guidelines associated with maintaining patency in central venous lines and peripherally inserted catheters?

Key Findings

Eleven systematic reviews (six with a meta-analysis), 14 randomized controlled trials, and nine non-randomized studies were identified regarding the clinical effectiveness and safety of heparin and saline for maintaining patency when flushing central venous lines and peripherally inserted catheters.

Methods

This report makes use of a literature search developed for a previous CADTH report. The original literature search was conducted in May 2009 on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit the retrieval by health technology assessments, systematic reviews and meta-analyses, randomized controlled trials, non-randomized studies, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and September 13, 2017. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Selection Criteria</th>
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<tr>
<td><strong>Population</strong></td>
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<tr>
<td>Patients with central venous lines and peripherally inserted central catheters</td>
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<td><strong>Interventions Comparators</strong></td>
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<tr>
<td>Heparin or saline used to flush central venous lines and peripherally inserted central catheters</td>
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<tr>
<td>Q1:  Heparin (any dose);</td>
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<td>Saline;</td>
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<tr>
<td>Sodium citrate (Na3C6H5O7);</td>
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<td>Standard of care (other preparations)</td>
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<td>Q2:  No comparator</td>
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<td><strong>Outcomes</strong></td>
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<tr>
<td>Q1:  Clinical effectiveness (e.g., maintaining patency, is one solution better than the other) and safety (harms and risks, medical errors, etc.)</td>
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<tr>
<td>Q2:  Guidelines</td>
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<tr>
<td><strong>Study Designs</strong></td>
</tr>
<tr>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, evidence-based guidelines</td>
</tr>
</tbody>
</table>
Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

Eleven systematic reviews (six with a meta-analysis), 14 randomized controlled trials, and nine non-randomized studies were identified regarding the clinical effectiveness and safety of heparin and saline for maintaining patency when flushing central venous lines and peripherally inserted catheters. No relevant health technology assessments or evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses


Randomized Controlled Trials

12. Luiz MV, Scavone C, Tzanno C. The CLOCK trial, a double-blinded randomized controlled trial: trisodium citrate 30% and minocycline 3 mg/mL plus EDTA 30 mg/mL are effective and safe for catheter patency maintenance among CKD 5D patients on hemodialysis. Hemodial Int. 2017 Apr;21(2):294-304. PubMed: PM27670267


PubMed: PM25866710


PubMed: PM26478866

PubMed: PM24949292

PubMed: PM22418764


Non-Randomized Studies


Guidelines and Recommendations

No literature identified.
Appendix — Further Information

Previous CADTH Reports


Randomized Controlled Trials – Alternative Comparator


Clinical Practice Guidelines – Uncertain Methodology


See: Section 2.5: Checking the Patency


Review Articles


Additional References