Tetrasodium EDTA for Locking Central Venous Catheters in Hemodialysis: Clinical Effectiveness, Cost-Effectiveness, 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 of 4% tetrasodium EDTA for locking central venous catheters in patients undergoing hemodialysis?

2. What is the cost-effectiveness of 4% tetrasodium EDTA for locking central venous catheters in patients undergoing hemodialysis?

3. What are the evidence-based guidelines regarding the use of 4% tetrasodium EDTA for locking central venous catheters in patients undergoing hemodialysis?

Key Findings

One randomized controlled trial was identified regarding the clinical effectiveness of 4% tetrasodium EDTA for locking central venous catheters in patients undergoing hemodialysis.

Methods

A limited literature search was conducted on key resources including PubMed, Medline via Ovid, Embase via Ovid, CINAHL, 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. 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, 2007 and December 18, 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.

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<th>Table 1: Selection Criteria</th>
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<td><strong>Population</strong></td>
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<td><strong>Intervention</strong></td>
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| **Comparator** | Q1-Q2: Sodium citrate (Na3C6H5O7);  
Antibiotic lock solutions;  
Alteplase; |
Combination solutions (e.g., TauroLock);
Ethyl alcohol;
Standard of care (other preparations)
Q3: No comparator

Outcomes
Q1: Clinical effectiveness (e.g., catheter associated infection rates, catheter occlusion rates) and safety (e.g., hypocalcaemia rates, other divalent or trivalent metal deficiencies, all-cause infection rates, urea reduction ratio, blood flow rate)
Q2: Cost-effectiveness
Q3: Evidence-based guidelines

Study Designs
Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

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, economic evaluations, and evidence-based guidelines.

One randomized controlled trial was identified regarding the clinical effectiveness of 4% tetrasodium EDTA for locking central venous catheters in patients undergoing hemodialysis.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings
One randomized controlled trial was identified regarding the clinical effectiveness of 4% tetrasodium EDTA for locking central venous catheters in patients undergoing hemodialysis. It included 117 hemodialysis patients who required tunneled catheters. Patients were randomly assigned to receive 4% Cathasept (tetrasodium EDTA) or heparin (5,000 U/Ml). Cathasept significantly reduced hemodialysis catheter colonization and had a comparable safety profile with heparin. The reduction in catheter-related bloodstream infections was not statistically significant and more patients required thrombolytic locks or infusions to maintain catheter patency with Cathasept.

References Summarized
Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
BACKGROUND: Catheter-related bloodstream infections (CRBSIs) cause morbidity and mortality in hemodialysis (HD) patients. Cathasept (tetra-sodium EDTA) solution has antimicrobial and anticoagulant activities.

STUDY DESIGN: Multicenter prospective randomized controlled study.

SETTING & PARTICIPANTS: 117 maintenance HD patients with confirmed uncolonized tunneled HD catheters from 4 HD centers.

INTERVENTION: Patients were randomly assigned to receive Cathasept 4% locks (Cathasept group) or stayed with heparin 5,000 U/mL locks (heparin group), filled thrice weekly according to catheter lumen volume until the catheter was removed or for a maximum of 8 months.

OUTCOMES: Primary outcome was clinically significant microbial colonization of the catheter, defined as a through-catheter quantitative blood culture yielding >= 1,000 colony-forming units/mL of bacteria or yeast. Secondary outcomes included CRBSI rate, catheter patency, and biomarkers of inflammation and anemia.

MEASUREMENTS: Weekly through-catheter quantitative blood culture, high-sensitivity C-reactive protein fortnightly, and full blood count and ferritin monthly.

RESULTS: Incidence rates of catheter colonization were 0.14/1,000 catheter-days in the Cathasept group and 1.08/1,000 catheter-days in the heparin group (incidence rate ratio [IRR], 0.13; 95% CI, 0.003-0.94; P=0.02). CRBSI rates were 0.28/1,000 catheter-days in the Cathasept group and 0.68/1,000 catheter days in the heparin group (IRR, 0.40; 95% CI, 0.08-2.09; P=0.3). The proportion of dialysis sessions with achieved prescribed blood flow rate was significantly lower in the Cathasept group (66.8% vs 75.3%; P<0.001), with more patients requiring thrombolytic locks or infusions to maintain catheter patency (22 vs 9; P=0.01). Mean high-sensitivity C-reactive protein level was 11.6+/-5.3 (SE) mg/L lower for patients in the heparin group (P=0.03). Anemia marker levels were similar in both groups.

LIMITATIONS: Study was underpowered to assess effect on CRBSI, terminated early due to slow recruitment, and not double blinded.

CONCLUSIONS: Cathasept significantly reduced tunneled hemodialysis catheter colonization, but the reduction in CRBSIs was not statistically significant, and it was associated with more thrombotic complications. Its safety profile was comparable to heparin lock solution.

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Non-Randomized Studies
No literature identified.

Economic Evaluations
No literature identified.

Guidelines and Recommendations
No literature identified.
Appendix — Further Information

Previous CADTH Reports