

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

# Tetrasodium Ethylenediaminetetraacetic Acid for Locking Central Venous Access Devices: Clinical Effectiveness, Cost- Effectiveness, and Guidelines

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## Research Questions

1. What is the clinical effectiveness of 4% tetrasodium ethylenediaminetetraacetic acid (EDTA) for locking central venous access devices (CVAD)?
2. What is the cost-effectiveness of 4% tetrasodium EDTA for locking CVADs?
3. What are the evidence-based guidelines regarding the use of CVADs?

## Key Findings

One randomized controlled trial was identified regarding 4% tetrasodium ethylenediaminetetraacetic acid (EDTA) for locking central venous access devices (CVADs). In addition, one evidence-based guideline was identified regarding the use of CVADs. No relevant economic evaluations were identified regarding the cost-effectiveness of 4% tetrasodium EDTA for locking CVADs.

## Methods

A limited literature search was conducted on key resources including Ovid Medline, Embase, the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD), and CINAHL databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic 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 April 2, 2019. 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 1: Selection Criteria**

<b>Population</b>	Patients with central venous access devices (CVADs)
<b>Intervention</b>	Q1,2: 4% tetrasodium ethylenediaminetetraacetic acid (EDTA) for locking CVADs (e.g., KiteLock, Cathasept) Q3: locking CVADs
<b>Comparator</b>	Q1,2: Heparin solutions; Saline; Antibiotic lock solutions; Combination solutions (e.g., TauroLock); Ethyl alcohol; Standard of care (other preparations) Q3: No comparator

<b>Outcomes</b>	Q1: Clinical effectiveness (e.g., catheter associated infection rates, catheter occlusion rates) and safety (e.g., side effects, adverse effects, hypocalcaemia rates, other divalent or trivalent metal deficiencies, all-cause infection rates) Q2: Cost-effectiveness (e.g., incremental cost per health benefit gained) Q3: Guidelines (e.g., appropriate use)
<b>Study Designs</b>	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 (RCT) study was identified regarding 4% tetrasodium ethylenediaminetetraacetic acid (EDTA) for locking central venous access devices (CVADs). In addition, one evidence-based guideline was identified regarding the use of CVADs. No relevant health technology assessments, systematic reviews, meta-analyses, non-randomized studies and economic evaluations were identified regarding use of 4% tetrasodium EDTA for locking CVADs.

Additional references of potential interest are provided in the appendix.

## Overall Summary of Findings

The identified RCT study<sup>1</sup> assessed whether tetra-sodium EDTA solution (Cathasept) was effective in reducing catheter-related bloodstream infections (CRBSIs) compared to heparin solution in patients receiving hemodialysis. Subjects were randomized to either the Cathasept group or heparin group to estimate the difference in microbial colonization, CRBSI rate, catheter patency, inflammatory biomarkers and anemia between groups.<sup>1</sup> Overall, the researchers concluded that the Cathasept group had lower microbial colonization rates and CRBSI rates compared to the heparin group. However, the Cathasept group had lower blood flow rates and increased thrombotic complications although the safety profile was comparable between groups.<sup>1</sup>

The evidence-based guideline<sup>2</sup> sought to identify the appropriate lock solution for central venous catheters, excluding dialysis catheters. The authors of the guideline<sup>2</sup> conclude there is no evidence supporting the heparin lock with the most appropriate lock solution containing citrate or taurolidine for unidentified patient populations.

## References Summarized

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

No literature identified.

## Randomized Controlled Trials

1. Kanaa M, Wright MJ, Akbani H, Laboi P, Bhandari S, Sandoe JA. Cathasept line lock and microbial colonization of tunneled hemodialysis catheters: a multicenter randomized controlled trial. *Am J Kidney Dis*. 2015 Dec;66(6):1015-1023.  
[PubMed: PM26141306](#)

## Non-Randomized Studies

No relevant literature identified.

## Economic Evaluations

No literature identified.

## Guidelines and Recommendations

2. Pittiruti M, Bertoglio S, Scoppettuolo G, et al. Evidence-based criteria for the choice and the clinical use of the most appropriate lock solutions for central venous catheters (excluding dialysis catheters): a GAVeCeLT consensus. *J Vasc Access*. 2016 Nov 02;17(6):453-464.  
[PubMed: PM27516141](#)

## Appendix — Further Information

### Previous CADTH Reports

3. Tetrasodium ethylenediaminetetraacetic acid for locking central venous access devices in parenteral feeding: clinical effectiveness, cost effectiveness, and guidelines. Ottawa: CADTH; 2019. (*CADTH Rapid response report: summary of abstracts*). <https://www.cadth.ca/sites/default/files/pdf/htis/2019/RB1313%20T-EDTA%20for%20CVADs%20Final.pdf>. Accessed 2019 Apr 8.
4. Tetrasodium EDTA for locking central venous access devices in parenteral feeding: clinical effectiveness, cost-effectiveness, and guidelines. (*CADTH Rapid response report: summary of abstracts*). Ottawa: CADTH; 2018. <https://cadth.ca/sites/default/files/pdf/htis/2018/RB1179%20Tetrasodium%20EDTA%20for%20CVADs%20in%20Parenteral%20Feeding%20Final.pdf>. Accessed 2019 Apr 8.
5. Tetrasodium EDTA for locking central venous catheters in hemodialysis: clinical effectiveness, cost-effectiveness, and guidelines. (*CADTH Rapid response report: summary of abstracts*). Ottawa: CADTH; 2018. <https://cadth.ca/sites/default/files/pdf/htis/2018/RB1180%20Tetrasodium%20EDTA%20for%20Locking%20CVCs%20in%20Hemodialysis%20Final.pdf>. Accessed 2019 Apr 8.

### Randomized Controlled Trials

#### *Alternative Formulations of EDTA*

6. Rijnders B, DiSciullo G, Csiky B, et al. Locking hemodialysis catheters with Trimethoprim-Ethanol-Ca-EDTA to prevent bloodstream infections. A randomized, evaluator blinded clinical trial. *Clin Infect Dis*. 2018 Oct 03. [PubMed: PM30281074](#)
7. 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*. 2017 04;21(2):294-304. [PubMed: PM27670267](#)
8. Campos RP, do Nascimento MM, Chula DC, Riella MC. Minocycline-EDTA lock solution prevents catheter-related bacteremia in hemodialysis. *J Am Soc Nephrol*. 2011 Oct;22(10):1939-1945. [PubMed: PM21852579](#)
9. Ferreira Chacon JM, Hato de Almeida E, de Lourdes Simoes R, et al. Randomized study of minocycline and edetic acid as a locking solution for central line (port-a-cath) in children with cancer. *Chemotherapy*. 2011;57(4):285-291. [PubMed: PM21778716](#)

## Non-randomized Studies

### *Alternative Formulations of EDTA*

10. Hachem R, Kanj S, Hamerschlak N, et al. International experience with minocycline, EDTA and ethanol lock for salvaging of central line associated bloodstream infections. *Expert Rev Med Devices*. 2018 Jun;15(6):461-466.  
[PubMed: PM29927699](#)

### *In Vitro Studies*

11. Liu F, Hansra S, Crockford G, et al. Tetrasodium EDTA is effective at eradicating biofilms formed by clinically relevant microorganisms from patients' central venous catheters. *mSphere*. 2018 Nov 28;3(6). pii: e00525-18.  
[PubMed: PM30487154](#)
12. Lebeaux D, Leflon-Guibout V, Ghigo JM, Beloin C. In vitro activity of gentamicin, vancomycin or amikacin combined with EDTA or l-arginine as lock therapy against a wide spectrum of biofilm-forming clinical strains isolated from catheter-related infections. *J Antimicrob Chemother*. 2015;70(6):1704-1712.  
[PubMed: PM25712314](#)

## Review Articles

13. Chen C-H, et al. Re-evaluating the protective effect of hemodialysis catheter locking solutions in hemodialysis patients. *J Clin Med*. 2019;8(412).  
<https://www.mdpi.com/2077-0383/8/3/412/pdf>. Accessed 2018 Apr 8.
14. Noelting J, Jurewitsch B, Allard JP. Non-antibiotic antimicrobial catheter lock solutions in patients on home parenteral nutrition. *Nutrients*. 2018 Aug 25;10(9).  
[PM:30149607](#)

## Additional References – Conference Abstracts

15. Hill J. CVAD lock solutions – the debate, the triple threat and the solution [presentation]. In: 5th World Congress on Vascular Access; 2018 Jun 20-22; Copenhagen (Denmark). <https://www.wocova.com/wp-content/uploads/2018/06/O-22-Jocelyn-Hill.pdf>. Accessed 2019 Apr 8.
16. Hill J, Lanuza J. Novel CVAD lock solution for high-risk patient population on home parenteral nutrition [poster]. In: 5th World Congress on Vascular Access; 2018 Jun 20-22; Copenhagen (Denmark). <https://www.morressier.com/article/novel-cvad-lock-solution-highrisk-patient-population-home-parenteral-nutrition/5af985f5101067001b3aaafe>. Accessed 2019 Apr 8.