Topical Silver Nitrate for the Management of Hemostasis: A Review of 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.
Context and Policy Issues

Effective and rapid hemostasis by accelerating the clotting process is critical in the management of wound bleeding. Topical hemostatic agents have been used in the treatment for superficial wound bleeding and include chemical cauterizing agents (e.g., silver nitrate), adhesives (e.g., fibrin sealant), absorbable agents (e.g., QuikClot), biologics (e.g., Thrombostat), and combination products (e.g., TAC: tetracaine, adrenaline and cocaine).\(^1\)\(^3\) Silver nitrate is an inorganic chemical with antimicrobial properties and available as a solution or an applicator stick. It has been used as a cauterizing agent by delivering free silver ions which bind to tissue, forming an eschar and obstructing vessels.\(^1\)\(^4\)\(^5\) Despite its proven antiseptic ability to manage and prevent wound infection,\(^6\)\(^8\) the role of topical silver nitrate in hemostasis as compared to other hemostatic agents is somewhat unclear.

This Rapid Response report aims to review the comparative clinical and cost-effectiveness of topical silver nitrate for the management of hemostasis. Evidence-based guidelines on the use of topical agents for the management of hemostasis will also be reviewed.

Research Question

1. What is the clinical effectiveness of topical application of silver nitrate for the management of hemostasis?

2. What is the cost effectiveness of topical silver nitrate for the management of hemostasis?

3. What are the guidelines regarding the application of topical agents for the management of hemostasis?

Key Findings

There were no studies that met the pre-specified criteria regarding the comparative clinical effectiveness and cost-effectiveness of topical silver nitrate for the management of hemostasis. No evidence-based guidelines on the use of topical agents for the management of hemostasis were found.

Methods

A limited literature search was conducted 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 to health technology assessments, systematic reviews, and meta-analyses, randomized controlled trials, economic evaluations, 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, 2008 and October 1, 2018.

Rapid Response reports are organized so that the evidence for each research question is presented separately.
Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Individuals of any age with superficial bleeding wounds, infected or non-infected Individuals experiencing bleeding that require medical attention. (e.g. wound debridement, managing diabetic wounds, traumatic wounds, bleeding nose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Silver nitrate sticks or other application of silver nitrate</td>
</tr>
<tr>
<td>Comparator</td>
<td>Q1 and 2- Other cauterizing Q1 and 2- Any other active comparator</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Q1 – Comparative clinical effectiveness in achieving hemostasis Q1 – Harms Q2 – Cost-effectiveness Q3 – Guidelines regarding topical agents for the management of hemostasis</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Heath technology assessments (HTAs), systematic reviews (SRs) and meta-analyses (MAs), randomized controlled trials (RCTs), non-RCTs, guidelines</td>
</tr>
</tbody>
</table>

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published prior to 2008.

Critical Appraisal of Individual Studies

Critical appraisal was not performed as no eligible studies were identified.

Summary of Evidence

Quantity of Research Available

A total of 785 citations were identified in the literature search. Following screening of titles and abstracts, 774 citations were excluded and 11 potentially relevant reports from the electronic search were retrieved for full-text review. No potentially relevant publication was retrieved from the grey literature search. Of these potentially relevant articles, 11 publications were excluded for various reasons, and no publications met the inclusion criteria and were included in this report. Appendix 1 presents the PRISMA flowchart of the study selection.

Summary of Findings

No relevant HTAs, SRs, MAs, RCTs, non-RCTs, cost-effectiveness studies, or evidence-based guidelines on the clinical effectiveness or cost-effectiveness of topical silver nitrate for the management of hemostasis were identified.
Conclusions and Implications for Decision or Policy Making

There were no studies that met the pre-specified criteria on the comparative clinical effectiveness or the cost-effectiveness of topical silver nitrate for the management of hemostasis. No evidence-based guidelines on the use of topical agents for the management of hemostasis were identified.

A review on the management of epistaxis in patients with ventricular assist device found that cauterization with silver nitrate alone was associated with a higher likelihood of bleeding recurrence than with the use of other hemostatic materials. A randomized controlled trial evaluated different concentrations of silver nitrate cauterization in children with epistaxis found 75% solution was more efficacious than 95% solution in epistaxis resolution while causing less pain.

Clinical and economic studies comparing topical silver nitrate to other cauterizing agents and hemostats are needed to evaluate the efficacy and cost-effectiveness of topical silver nitrate, and to guide its use in the management of hemostasis.
References


Appendix 1: Selection of Included Studies

785 citations identified from electronic literature search and screened

774 citations excluded

11 potentially relevant articles retrieved for scrutiny (full text, if available)

No potentially relevant reports retrieved from other sources (grey literature, hand search)

11 potentially relevant reports

11 reports excluded
- irrelevant intervention (9)
- irrelevant population (2)

0 reports included in review