The Use of Silver Impregnated Dressings to Prevent or Reduce Incidence of Infection: Clinical Effectiveness
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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 Question

What is the clinical effectiveness of silver-impregnated dressings to prevent or reduce the incidence of infection?

Key Findings

Eight randomized controlled trials and seven non-randomized studies were identified regarding the clinical effectiveness of silver-impregnated dressings to prevent or reduce the incidence of infection.

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. 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, 2012 and June 12, 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 1: Selection Criteria

<table>
<thead>
<tr>
<th>Population</th>
<th>Patients who require post-operative dressings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Silver-impregnated dressings (e.g., Mepilex Ag)</td>
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<tr>
<td>Comparator</td>
<td>Any comparator (another intervention or without intervention)</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Safety, effectiveness, decreased incidence of post-operation infection and complications, silver levels</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies</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 and non-randomized studies.

Eight randomized controlled trials and seven non-randomized studies were identified regarding the clinical effectiveness of silver-impregnated dressings to prevent or reduce the incidence of infection. No health technology assessments, systematic reviews, or meta-analyses were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Eight randomized controlled trials\(^1\)\(^-\)\(^8\) and seven non-randomized studies\(^9\)\(^-\)\(^15\) were identified regarding the clinical effectiveness of silver-impregnated dressings to prevent or reduce the incidence of infection. Five studies\(^5\),\(^9\)\(^,\)\(^10\)\(^-\)\(^12\) provided evidence for the use of silver-impregnated dressings to prevent or reduce the incidence of infection; one the studies\(^5\) combined silver-impregnated dressings with Mesalt and another study\(^11\) combined the dressings with negative pressure wound therapy. Another study\(^14\) reported a decrease in post-operative ulcers after the use of silver-impregnated dressings, but they did not report on infections. Study details with accompanying conclusions are provided in the Table 2.

Table 2: Summary of Included Studies on the Clinical Effectiveness of Silver-Impregnated Dressings

<table>
<thead>
<tr>
<th>First Author, Year</th>
<th>Study Characteristics</th>
<th>Intervention</th>
<th>Comparators</th>
<th>Outcomes</th>
<th>Author’s Conclusions*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Randomized Controlled Trials</strong></td>
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</tbody>
</table>
| Staveski, 2016\(^1\) | • Children after cardiac surgery  
• N = 117 | • Silver-impregnated dressing | • Standard dressing | • Surgical site infections | *“The evidence did not support the superiority of silver-impregnated dressings for prevention of surgical site infections in children after cardiac surgery.” |
| Dickinson, 2015\(^2\) | • Patients requiring a sternotomy  
• N = 315 | • Metallic silver-containing dressing | • Ionic silver-containing dressing  
• Dry sterile dressing | • Wound healing  
• Infection rate  
• Patients comfort  
• Dressing factors | *“No statistically significant differences were found among the dressings in terms of wound healing or infection rate, but statistically significant differences were noted in patient comfort and certain dressing factors.” |
| Dobbelbaere, 2015\(^3\) | • Patients undergoing total knee arthroplasty | • Mepilex Border  
• Zetuvit with Cosmopor E  
• Zetuvit with Opsite Post- | | • Wound complications  
• Cost  
• Patient Comfort | *“Mepilex Border(R) is the most skin-friendly dressing. The number of dressing renewals is a defining...” |
<table>
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<th>Comparators</th>
<th>Outcomes</th>
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</tr>
</thead>
</table>
| Kadar, 2015        | Patients undergoing surgery for hip fractures  
N = 55  
Op Visible  
Aquacel Surgical | Silver dressing  
Regular dressing | Prevention of surgical site infection | "The use of [silver dressing] was associated with higher costs than [regular dressing], but not superior in preventing [surgical site infections] in elderly patients undergoing hemiarthroplasty or fixation of hip fractures." |
| Liu, 2015          | Patients requiring tension-free hernioplasty  
N = 60  
Mesalt combined with Mepilex  
Conventional gauze | Pain degree  
Wound healing time  
Dressing times | "Mesalt combined with Mepilex can effectively improve postoperative infection after inguinal hernia treatment, obviously reducing pain, shorting wound healing time, and decreasing dressing frequency." |
| Ozaki, 2015        | Patients who had vascular surgery  
N = 500  
Silver alginate dressing  
Standard gauze | Complication rates | "...a silver-eluting alginate dressing showed no effect on the incidence of wound complications." |
| Ruiz-Tovar, 2015   | Patients with colorectal cancer undergoing elective open surgery  
N = 147  
Silver-containing dressing  
Conventional dressing  
Mupirocin ointment dressing | Surgical site infection | "Topical application of mupirocin ointment achieves better results for the prevention of [surgical site infections] than ionic silver-containing dressing or standard dressing in patients undergoing elective open colorectal surgery." |
| Biffi, 2012        | Adults undergoing elective colorectal cancer surgery  
N = 112  
Aquacel Ag hydrofiber dressing  
Common dressing | Surgical site infection | "This randomized trial did not confirm a statistically significant superiority of Aquacel Ag Hydrofiber dressing in reducing surgical-site infection after elective colorectal cancer surgery." |
| Grosso, 2017       | Patients who underwent total knee or hip arthroplasty  
Aquacel surgical dressing  
Standard sterile dressing | Acute periprosthetic joint infection | "This 4-fold decrease in acute [periprosthetic joint infection] with the use of Aquacel dressing supports..." |
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<tr>
<td>Bocchiotti, 2016(^{10})</td>
<td>Patients undergoing thigh lift&lt;br&gt;N = 40</td>
<td>Aquacel surgical dressing</td>
<td>Traditional wound dressing</td>
<td>Wound healing&lt;br&gt;Number of infection cases&lt;br&gt;Wound-related complications</td>
<td>&quot;We recommend the use of Aquacel Surgical in all the surgery procedures where the risk of wound dehiscence and maceration is high.(^{n0})</td>
</tr>
<tr>
<td>Bukovcan, 2016(^{11})</td>
<td>Patients with acute and chronic wounds&lt;br&gt;N = 50</td>
<td>Negative pressure wound therapy with silver-impregnated dressing</td>
<td>No comparator</td>
<td>Effect, efficacy, and safety of negative pressure wound therapy with silver-impregnated dressing</td>
<td>&quot;… the use of a nonadherent silver-impregnated dressing in conjunction with [negative pressure wound therapy] to be beneficial and efficacious.(^{n1})</td>
</tr>
<tr>
<td>Zarghooni, 2015(^{12})</td>
<td>Patients undergoing hip or knee replacement&lt;br&gt;N = 60</td>
<td>Mepilex Border Post-Op dressing</td>
<td>Conventional dressing</td>
<td>Occurrence of blisters</td>
<td>&quot;By using Mepilex dressings, the risk of blistering was negated and the reduced frequency of dressing changes was associated with the reduced overall cost.(^{n2})</td>
</tr>
<tr>
<td>Schwartz, 2014(^{13})</td>
<td>Patients undergoing clean, general, vascular, orthopedic, and neurosurgical procedures&lt;br&gt;N = 199 to evaluate the incidence of surgical site infection&lt;br&gt;N = 36 to evaluate performance and handling characteristics</td>
<td>Postoperative silver dressing</td>
<td>Standard dressing</td>
<td>Incidence of antibiotic initiation for surgical site infection&lt;br&gt;Clinical signs of infection&lt;br&gt;Leukocyte counts&lt;br&gt;Performance and handling characteristics</td>
<td>&quot;Three out of 99 (3%) patients in the [postoperative silver dressing] and six out of 100 (6%) control group patients received antibiotic therapy for [surgical site infection] (P = 0.498)... Prospective, randomized, controlled clinical studies with large sample sizes are warranted to evaluate the efficacy and cost-effectiveness of the [postoperative silver dressing].(^{n3})</td>
</tr>
<tr>
<td>Kuo, 2013(^{14})</td>
<td>Pediatric patients who underwent tracheotomy&lt;br&gt;N = 134</td>
<td>Mepilex Ag dressing</td>
<td>No dressing</td>
<td>Wound complication</td>
<td>&quot;The use of Mepilex Ag after pediatric tracheotomy reduces the occurrence of postoperative peristomal pressure ulcers.(^{n4})</td>
</tr>
</tbody>
</table>
| Connery, 2012\(^{15}\) | Patients who had cesarean | Silver-impregnated | Traditional dressing | Surgical site infection | "Although there was no observed difference in the...
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<tr>
<td></td>
<td>wounds</td>
<td>dressing</td>
<td></td>
<td></td>
<td>number of women requiring additional wound care visits, the significantly greater number of comorbidities noted in the silver-impregnated dressing group should have theoretically placed them at increased risk for [surgical site infections] and additional postoperative wound care visits, suggesting that silver-impregnated dressings may have more of a protective effect than is appreciated in this study. *15</td>
</tr>
</tbody>
</table>

* Verbatim from the abstract.

### References Summarized

#### Health Technology Assessments

No literature identified.

#### Systematic Reviews and Meta-analyses

No literature identified.

#### Randomized Controlled Trials


Non-Randomized Studies


Appendix — Further Information

Systematic Reviews and Meta-Analyses – Silver Dressings Not Specified


Randomized Controlled Trials – Alternate Population


Non-Randomized Study – Alternate Population


Review Articles


