Review: silver alloy catheters are more effective than standard catheters for reducing bacteriuria in adults in hospital having short term catheterisation


In adults admitted to hospital and having short term urinary catheterisation, what is the effect of type of indwelling urethral catheter on the risk of urinary tract infection?

METHODS

Data sources: specialised trials registers of the Cochrane Incontinence Group (November 2003) and the Cochrane Renal Group (February 2003), bibliographies of relevant articles, and catheter manufacturers.

Study selection and assessment: randomised controlled trials (RCTs) and quasi-RCTs in any language that compared different types of indwelling urethral catheters of short term duration (≤ 14 d or other temporary short term use as defined by trialists) in adults in hospital. Studies were assessed for methodologic quality (eg, allocation concealment, blinding, and loss to follow up).

Outcomes: catheter associated infection; patient reported comfort and satisfaction; physician reported duration of catheter use; quality of life; adverse effects; and cost effectiveness.

MAIN RESULTS

18 trials (17 parallel group RCTs [4237 patients] and 1 cluster randomised crossover trial [27 878 patients]) met the selection criteria. 11 trials compared antiseptic impregnated catheters with standard catheters, 1 trial compared antibiotic impregnated catheters with standard catheters, and 6 trials compared different standard catheters. 2 types of antiseptic catheters (silver alloy and silver oxide) were compared with a standard catheter. Silver alloy catheters reduced rates of asymptomatic bacteriuria compared with standard catheters, whereas silver oxide catheters did not differ from standard catheters. Insufficient evidence exists on whether catheters impregnated with antibiotics or antiseptics reduce infection.

CONCLUSIONS

In adults who are admitted to hospital and catheterised for a short time, silver alloy catheters reduced asymptomatic or symptomatic bacteriuria more than standard catheters; silver oxide catheters did not differ from standard catheters. Insufficient evidence exists on whether catheters impregnated with antibiotics or antiseptics reduce infection.

Commentary

Urinary tract infection is the most common hospital acquired infection, and is often associated with urinary tract infection. Most studies compared antiseptic impregnated catheters with standard catheters. Only silver alloy catheters were effective in reducing urinary tract infection in short term catheter use. No other catheter types were found to reduce bacteriuria, although, silicone catheters may be less likely to cause urethral side effects. Further research on silicone catheters is warranted given that use of these catheters is increasing. The authors identified several limitations of the primary studies, including inadequate method of randomisation concealment, inability to conduct subgroup analyses by sex, diversity in study populations, variations in methods of urine sample collection, and poor quality.

The number of studies examining antibiotic impregnated catheters was too small to draw conclusions, and additional studies are recommended. To date, the Centers for Disease Control have made no recommendations on the use of these products, which is often a factor influencing selection of new products by healthcare facilities. Economic models developed by several authors suggest that reductions in the incidence of urinary tract infections justify the use of more expensive products. Benefits may vary between different countries and facilities. Only a few of the studies examined catheter care violations, reporting an incidence of 48–56%. Nurses may be contributing to the incidence of urinary tract infections. Reinforcement of basic catheter care may be an immediate and inexpensive nursing measure to reduce the incidence of urinary tract infections, regardless of the type of catheter used. Data from the review by Brosnahan et al may be useful to nurses involved in purchasing decisions or infection control activities, as long as they remain aware of the limitations of the original studies.

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<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Comparisons</th>
<th>Silver alloy or silver oxide catheters</th>
<th>SCs</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic bacteriuria</td>
<td>Silver alloy v SCs ≤ 1 wk</td>
<td>10%</td>
<td>28%</td>
<td>64% (48 to 76)</td>
<td>6 (5 to 9)</td>
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<tr>
<td></td>
<td>Silver alloy v SCs &gt; 1 wk</td>
<td>24%</td>
<td>36%</td>
<td>33% (10 to 50)</td>
<td>9 (5 to 25)</td>
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<tr>
<td></td>
<td>Silver oxide v SCs</td>
<td>12%</td>
<td>13%</td>
<td>11% (15 to 32)</td>
<td>Not significant</td>
</tr>
<tr>
<td>Symptomatic bacteriuria</td>
<td>Silver alloy v SCs</td>
<td>17%</td>
<td>28%</td>
<td>40% (27 to 50)</td>
<td>10 (7 to 1.5)</td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a fixed effects model.