A 0.5% chlorhexidine gluconate in 70% isopropyl alcohol swab was more effective than 2 other methods for intravenous skin antisepsis


QUESTION: Which of 3 methods for skin antisepsis before peripheral intravenous (IV) therapy is most effective for preventing catheter related infection?

Design
Randomised [allocation concealed]*, blinded [investigators, patients, outcome assessors]*, controlled trial with follow up at 72 hours after removal of the IV catheter.

Setting
A 139 bed, acute care hospital in Yarmouth, Nova Scotia, Canada.

Patients
300 patients who required a peripheral IV catheter and were able to read and understand English. Exclusion criteria was an IV catheter that remained in situ for < 8 hours. Patients were recruited from the hospital’s medical, surgical, intensive care, obstetrics and gynaecology, and outpatient and emergency services. Follow up was 81%.

Intervention
Before peripheral IV insertion, patients were allocated to receive 1 swab of 0.5% chlorhexidine gluconate (CHG) in 70% isopropyl alcohol (group 1, n = 100), a 70% isopropyl alcohol swab followed by a 10% povidone-iodine swab (group 2, n = 100), or a 10% povidone-iodine swab followed by a 70% isopropyl alcohol swab (group 3, n = 100).

Main outcome measures
Local catheter related infection (defined as ≥15 colony forming units in the absence of accompanying clinical symptoms), probable catheter related infection (defined as having fever ≥38 °C, pain, erythema, or heat at the involved vascular site and > 15 colonies cultured from the intravascular cannula tip), and signs and symptoms at 72 hours after removal of the IV catheter.

Main results
Group 1 had a lower rate of probable catheter related infection than group 2 [p = 0.002]* or group 3 [p = 0.01]* (table). No differences existed among the 3 groups for rates of local catheter related infection. Fewer patients in group 1 had redness or pain at the IV site than those in groups 2 or 3 [p ≤ 0.001]*. Fewer patients in group 1 had fever than those in group 3 [p = 0.01]*.

Conclusion
Patients who had skin antisepsis before peripheral intravenous therapy with 0.5% chlorhexidine gluconate had a lower risk of probable catheter related infection than those who had skin antisepsis with an alcohol swab followed by a povidone-iodine swab or a povidone-iodine swab followed by an alcohol swab.

*Information provided by author.
†p Value calculated from data in article.

Comparison of 3 intravenous skin preparation methods on risk of probable catheter related infection at 72 hours after IV catheter removal.

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Event rates</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHG v alcohol followed by povidone-iodine</td>
<td>1.2% v 12.5%</td>
<td>90% (44 to 98)</td>
<td>9 (5 to 23)</td>
</tr>
<tr>
<td>CHG v povidone-iodine followed by alcohol</td>
<td>1.2% v 9.9%</td>
<td>88% (27 to 98)</td>
<td>12 (6 to 48)</td>
</tr>
</tbody>
</table>

CHG = chlorhexidine gluconate. Other abbreviations defined in glossary: RRR, NNT, and CI calculated from data in article.

COMMENTARY
It is perhaps surprising that there is only limited research available on skin preparation before IV cannulation. Hospital acquired infection has important detrimental effects on patient comfort, morbidity, and mortality and increases length of hospital stay and healthcare costs. Thus, evidence that can help to reduce the incidence of infection has important implications for nursing practice.

This randomised controlled trial by LeBlanc and Cobbett compared 3 different methods of skin antisepsis before IV catheter insertion. The results suggest a reduction in probable catheter related infection in those patients whose skin was prepared using 0.5% chlorhexidine gluconate in 70% alcohol compared with alcohol and povidone iodine combinations. No differences existed between the groups in colonisation of the catheter tips.

The randomised design of this trial should ensure an even distribution among the groups of those factors likely to influence the outcomes, although the authors did not provide important baseline data that would convince us of this. For example, pain, heat, and erythema (used in this study as markers of infection) are also signs of non-specific phlebitis. Furthermore, we are not told how the method of catheter fixation (which may influence the incidence of phlebitis) was distributed across groups.

Siting of IV may also be important and UK nurses are taught that cannulation of the median cubital vein is more likely to cause irritation than cannulation of the superficial palmar or radial veins.

Therefore, although this study on its own does not provide evidence to change practice, it highlights the need for further primary research and perhaps a systematic review that synthesises research on skin preparation and catheter fixation in IV treatment.

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