Chlorhexidine reduced catheter tip colonisation more than 10% povidone-iodine in critically ill neonates


QUESTION: In critically ill neonates, does a chlorhexidine dressing reduce central venous catheter (CVC) tip colonisation and bloodstream infection (BSI) more than 10% povidone-iodine (PI)?

Main results
Analysis was by intention to treat. Rate of catheter tip colonisation was lower in the chlorhexidine group than in the 10% PI group for all catheters combined (table) and for percutaneous catheters (p = 0.002), but not for surgical catheters (p = 0.83). Groups did not differ for BSI without a source and CRBSI for all catheters combined (table) and for percutaneous and surgical catheters (p > 0.44 for all comparisons). 15% of neonates weighing ≤1000 grams in the chlorhexidine group and none in the 10% PI group developed localised contact dermatitis.

Conclusions
In critically ill neonates, a chlorhexidine dressing reduced central venous catheter tip colonisation, but not bloodstream infection, more than 10% povidone-iodine. Some infants weighing ≤1000 grams developed localised contact dermatitis from chlorhexidine.

Information provided by author.

Chlorhexidine vs 10% povidone-iodine (PI) for reducing infection rates in neonates†

<table>
<thead>
<tr>
<th>Outcomes (all catheters) at time of assessment</th>
<th>Chlorhexidine</th>
<th>10% PI</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter tip colonisation</td>
<td>15%</td>
<td>24%</td>
<td>40% (10 to 50)</td>
<td>11 (9 to 42)</td>
</tr>
<tr>
<td>CRBSI</td>
<td>3.8%</td>
<td>3.2%</td>
<td>20% (50 to 170)</td>
<td>Not significant</td>
</tr>
<tr>
<td>BSI without a source</td>
<td>15%</td>
<td>14%</td>
<td>10% (10 to 50)</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

†BSI = bloodstream infection; CRBSI = catheter related bloodstream infection. Other abbreviations defined in glossary; RRR, RRI, NNT, NNH, and CI calculated from data in article.

COMMENTARY
The incidence of CVC infection and associated septicemia is high in critically ill neonates, resulting in substantial morbidity and mortality. Research studies have examined the use of 10% PI as a skin antiseptic agent before CVC insertion, and have reported the systemic absorption of iodine causing hypothyroxaemia in low birthweight infants. Responding to these concerns, the study by Garland et al evaluated the effectiveness of a novel chlorhexidine dressing in reducing catheter tip colonisation by comparing it with the conventional 10% PI skin scrub.

Methodological strengths of the study include a randomised design resulting in similar baseline characteristics between groups, clearly defined criteria for CRBSI and BSI without a source, and few infants lost to follow up. Limitations include a lack of reporting of binding and not reaching the calculated sample size for statistical power, thus limiting the ability to detect a difference in rates of CRBSI and BSI.

The authors were forced to change their inclusion criteria midway through the study because 5.9% of infants in the chlorhexidine group developed contact dermatitis. Unfortunately, the youngest, smallest neonates (≤28 wks gestational age and ≤1000 g) who are at highest risk of CRBSI and hypothyroxaemia through exposure to PI are also most likely to suffer local contact dermatitis from the chlorhexidine dressing.

This study provides evidence for the advanced practitioner to consider this novel, beneficial approach of using chlorhexidine to reduce the catheter tip colonisation rate, specifically with larger, older critically ill infants requiring a CVC for ≤14 days. The results contribute to our knowledge of catheter related bacteremia; however, aside from strict adherence to aseptic practices during catheter insertion and subsequent care, few interventions have been shown to reduce BSI rates.

Jan Van Esch, RN, MScN
Clinical Nurse Specialist / Neonatal Practitioner
Neonatal Intensive Care Unit, St Joseph’s Health Centre
London, Ontario, Canada