



Guideline addendum

# epic3: revised recommendation for intravenous catheter and catheter site care

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Sir,

In parallel with the National Institute for Health and Care Excellence (NICE) MTG review of Tegaderm 2% chlorhexidine gluconate (CHG) gel-impregnated dressing, the epic3 scientific advisors reviewed the evidence and wording of the recommendation relating to the use of CHG-impregnated dressings, which currently states:<sup>1–3</sup>

## IVAD20

Consider the use of a chlorhexidine-impregnated sponge dressing in adult patients with a central venous catheter as a strategy to reduce catheter-related bloodstream infection.

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## New recommendation Class B

Following a review of the evidence, the Guideline Development Group has revised the recommendation to include 2% CHG gel-impregnated dressings in addition to 2% CHG-impregnated sponge dressings.<sup>4,5</sup> The revised evidence summary and recommendation are given below.

## Revised evidence summary

### Catheter and catheter site care

#### *Infections can be minimized by good catheter and insertion site care*

The safe maintenance of an intravascular catheter and appropriate care of the insertion site are essential components of a comprehensive strategy for preventing catheter-related infections. This includes good practice in caring for the patient's catheter hub and connection port, the use of an appropriate intravascular catheter site dressing regimen and using flush solutions to maintain the patency of the catheter.

#### *Choose the right dressing for insertion sites to minimize infection*

Following placement of a peripheral or central venous intravascular catheter, a dressing is used to protect the insertion site. Because occlusive dressings trap moisture on the skin and provide an ideal environment for the rapid growth of local microflora, dressings for insertion sites must be permeable to water vapour.<sup>5</sup> The two most common types of dressings used for insertion sites are sterile, transparent, semi-permeable polyurethane dressings coated with a layer of an acrylic adhesive ('transparent dressings') and gauze and tape dressings.

Transparent dressings are permeable to water vapour and oxygen and impermeable to micro-organisms.

The Healthcare Infection Control Practices Advisory Committee (HICPAC) reviewed the evidence related to which type of dressing provided the greatest protection against infection, including the largest controlled trial of dressing regimens on peripheral venous catheters (PVCs), a meta-analysis comparing the risk of catheter-related bloodstream infection (CR-BSI) using transparent versus gauze dressings and a Cochrane review.<sup>6–8</sup> All concluded that the choice of dressing can be a matter of preference but if blood is leaking from the catheter insertion site, a gauze dressing might be preferred to absorb the fluid. We identified an updated Cochrane review, which concluded that bloodstream infection was higher in the transparent polyurethane group when compared with gauze and tape.<sup>9</sup> The included trials were graded low quality due to the small sample size and risk of bias. There was additional low quality evidence that demonstrated no difference between highly permeable polyurethane dressings and other polyurethane dressings in the prevention of catheter-related bloodstream infection.

HICPAC reviewed the evidence related to impregnated sponge dressings compared to standard dressings and found two randomized controlled trials (RCTs) in adults that demonstrated 2% chlorhexidine-impregnated sponge dressings were associated with a significant reduction in CR-BSI.<sup>4,10</sup> However, a meta-analysis that included eight RCTs found a reduction in exit site colonization but no significant reduction in CR-BSI.<sup>7</sup> In paediatric patients, two small RCTs found a reduction in catheter colonization but not CR-BSI, and evidence of localized contact dermatitis when used for infants of very low birth weight.<sup>11,12</sup>

We identified one further systematic review and meta-analysis, undertaken as part of a quality improvement collaborative, which synthesized the effects of the routine use of 2% CHG-impregnated sponge dressings in reducing centrally inserted CR-BSI.<sup>13</sup> Five studies were included in the analysis: two of the five studies were in patients in haemo/oncological intensive care units (ICUs); the remaining three were in surgical and medical ICUs; four of the five studies were sponsored by the manufacturer of the product. The reviewers concluded that 2% CHG-impregnated sponge dressings are effective in preventing CR-BSI (odds ratio: 0.43; 95% confidence interval: 0.29–0.64) and catheter colonization (0.43; 0.36–0.51).

We identified an economic evaluation of the use of 2% CHG-impregnated sponge dressings and the non-inferiority of dressing changes at three and seven days.<sup>14</sup> The authors concluded that the major cost avoided by the use of CHG sponge dressings and seven-day rather than three-day dressing changes was the increased length of stay of 11 days associated with CR-BSI. Chlorhexidine-impregnated sponge dressings remained cost-saving for any value where the cost per CR-BSI was more than \$4,400 and the baseline rate of CR-BSI was >0.35%.<sup>14</sup>

We identified a further RCT of 2% CHG-impregnated gel dressings compared with highly adhesive semipermeable dressings or standard semipermeable dressings for the prevention of CR-BSI in 1879 patients.<sup>5</sup> In the CHG gel group the major catheter-related infection rate was 67% lower [0.7 per 1000 vs 2.1 per 1000 catheter-days; hazard ratio (HR): 0.328; 95% confidence ratio (CI): 0.174–0.619;  $P = 0.0006$ ] and the

CR-BSI rate 60% lower (0.5 per 1000 vs 1.3 per 1000 catheter-days; HR: 0.402; 95% CI: 0.186–0.868;  $P = 0.02$ ) than with non-chlorhexidine dressings. Decreases were also noted in catheter colonization and skin colonization rates at catheter removal. Highly adhesive dressings decreased the detachment rate to 64.3% versus 71.9% ( $P < 0.0001$ ) and the number of dressings per catheter to two (one to four) versus three (one to five) ( $P < 0.0001$ ) but increased skin colonization ( $P < 0.0001$ ) and catheter colonization (HR: 1.650; 95% CI: 1.21–2.26;  $P = 0.0016$ ) without influencing CR-BSI rates.<sup>5</sup>

There have been no direct comparisons of the effectiveness and costs of CHG gel dressings impregnated with 2% CHG and 2% CHG sponge dressings.

## Revised recommendation IVAD20

Consider the use of a 2% chlorhexidine-impregnated sponge or gel dressings in adult patients with a central venous catheter as a strategy to reduce catheter-related bloodstream infection.

### Conflict of interest statement

None declared.

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