

We assessed the effectiveness and safety of antimicrobial (antiseptic or antibiotic) dressings in reducing CVC-related infections in newborn infants” Lai et al (2016).

Abstract:

BACKGROUND: Central venous catheters (CVCs) provide secured venous access in neonates. Antimicrobial dressings applied over the CVC sites have been proposed to reduce catheter-related blood stream infection (CRBSI) by decreasing colonisation. However, there may be concerns on the local and systemic adverse effects of these dressings in neonates.

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OBJECTIVES: We assessed the effectiveness and safety of antimicrobial (antiseptic or antibiotic) dressings in reducing CVC-related infections in newborn infants. Had there been relevant data, we would have evaluated the effects of antimicrobial dressings in different subgroups, including infants who received different types of CVCs, infants who required CVC for different durations, infants with CVCs with and without other antimicrobial modifications, and infants who received an antimicrobial dressing with and without a clearly defined co-intervention.

SEARCH METHODS: We used the standard search strategy of the Cochrane Neonatal Review Group (CNRG). We searched the Cochrane Central Register of Controlled Trials (The Cochrane Library 2015, Issue 9), MEDLINE (PubMed), EMBASE (EBHOST), CINAHL and references cited in our short-listed articles using keywords and MeSH headings, up to September 2015.

SELECTION CRITERIA: We included randomised controlled trials that compared an antimicrobial CVC dressing against no dressing or another dressing in newborn infants.

DATA COLLECTION AND ANALYSIS: We extracted data using the standard methods of the CNRG. Two review authors independently assessed the eligibility and risk of bias of the

retrieved records. We expressed our results using risk difference (RD) and risk ratio (RR) with 95% confidence intervals (CIs).

MAIN RESULTS: Out of 173 articles screened, three studies were included. There were two comparisons: chlorhexidine dressing following alcohol cleansing versus polyurethane dressing following povidone-iodine cleansing (one study); and silver-alginate patch versus control (two studies). A total of 855 infants from level III neonatal intensive care units (NICUs) were evaluated, 705 of whom were from a single study. All studies were at high risk of bias for blinding of care personnel or unclear risk of bias for blinding of outcome assessors. There was moderate-quality evidence for all major outcomes. The single study comparing chlorhexidine dressing/alcohol cleansing against polyurethane dressing/povidone-iodine cleansing showed no significant difference in the risk of CRBSI (RR 1.18, 95% CI 0.53 to 2.65; RD 0.01, 95% CI -0.02 to 0.03; 655 infants, moderate-quality evidence) and sepsis without a source (RR 1.06, 95% CI 0.75 to 1.52; RD 0.01, 95% CI -0.04 to 0.06; 705 infants, moderate-quality evidence). There was a significant reduction in the risk of catheter colonisation favouring chlorhexidine dressing/alcohol cleansing group (RR 0.62, 95% CI 0.45 to 0.86; RD -0.09, 95% CI -0.15 to -0.03; number needed to treat for an additional beneficial outcome (NNTB) 11, 95% CI 7 to 33; 655 infants, moderate-quality evidence). However, infants in the chlorhexidine dressing/alcohol cleansing group were significantly more likely to develop contact dermatitis, with 19 infants in the chlorhexidine dressing/alcohol cleansing group having developed contact dermatitis compared to none in the polyurethane dressing/povidone-iodine cleansing group (RR 43.06, 95% CI 2.61 to 710.44; RD 0.06, 95% CI 0.03 to 0.08; number needed to treat for an additional harmful outcome (NNTH) 17, 95% CI 13 to 33; 705 infants, moderate-quality evidence). The roles of chlorhexidine dressing in the outcomes reported were unclear, as the two assigned groups received different co-interventions in the form of different skin cleansing agents prior to catheter insertion and during each dressing change. In the other comparison, silver-alginate patch versus control, the data for CRBSI were analysed separately in two subgroups as the two included studies reported the outcome using different denominators: one using infants and another using catheters. There were no significant differences between infants who received silver-alginate patch against infants who received standard line dressing in CRBSI, whether expressed as the number of infants (RR 0.50, 95% CI 0.14 to 1.78; RD -0.12, 95% CI -0.33 to 0.09; 1 study, 50 participants, moderate-quality evidence) or as the number of catheters (RR 0.72, 95% CI 0.27 to 1.89; RD -0.05, 95% CI -0.20 to 0.10; 1 study, 118 participants, moderate-quality evidence). There was also no significant difference between the two groups in mortality (RR 0.55, 95% CI 0.15 to 2.05; RD -0.04, 95% CI -0.13 to 0.05; two studies, 150 infants, $I^2 = 0\%$, moderate-quality evidence). No adverse skin reaction was recorded in either group.

AUTHORS' CONCLUSIONS: Based on moderate-quality evidence, chlorhexidine dressing/alcohol skin cleansing reduced catheter colonisation, but made no significant difference in major outcomes like sepsis and CRBSI compared to polyurethane dressing/povidone-iodine cleansing. Chlorhexidine dressing/alcohol cleansing posed a substantial risk of contact dermatitis in preterm infants, although it was unclear whether this was contributed mainly by the dressing material or the cleansing agent. While silver-alginate patch appeared safe, evidence is still insufficient for a recommendation in practice. Future research that evaluates antimicrobial dressing should ensure blinding of caregivers and outcome assessors and ensure that all participants receive the same co-interventions, such as the skin cleansing agent. Major outcomes like sepsis, CRBSI and mortality should be assessed in infants of different gestation and birth weight.

Full Text

Reference:

Lai, N.M., Taylor, J.E., Tan, K., Choo, Y.M., Ahmad Kamar, A. and Muhamad, N.A. (2016) Antimicrobial dressings for the prevention of catheter-related infections in newborn infants with central venous catheters. The Cochrane Database of Systematic Reviews. 3:CD011082.

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