

Antimicrobial lock solutions for preventing catheter-related infections in haemodialysis (Protocol)

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Abstract

Background Patients undergoing haemodialysis (HD) through a central venous catheter (CVC) are exposed to several risks, being a catheter-related infection (CRI) and a CVC lumen thrombosis among the most serious. Standard of care regarding CVCs includes their sealing with heparin lock solutions to prevent catheter lumen thrombosis. Other lock solutions to prevent CRI, such as antimicrobial lock solutions, have proven useful with antibiotic solutions, but not as yet for non-antibiotic antimicrobial solutions. Furthermore, it is uncertain if these solutions have a negative effect on thrombosis incidence. **Objectives** To assess the efficacy and safety of antimicrobial (antibiotic, non-antibiotic, or both) catheter lock solutions for preventing CRI in participants undergoing HD with a CVC. **Search methods** We searched the Cochrane Kidney and Transplant Specialised Register up to 18 December 2017 through contact with the Information Specialist using search terms relevant to this review. Studies in the Register are identified through searches of CENTRAL, MEDLINE, and EMBASE, conference proceedings, the International Clinical Trials Register (ICTRP) Search Portal, and ClinicalTrials.gov. **Selection criteria** We included all randomised or quasi-randomised control trials (RCTs) comparing antimicrobial (antibiotic and non-antibiotic) lock solutions to standard lock solutions, in participants using a CVC for HD, without language restriction. **Data collection and analysis** Two authors independently assessed studies for eligibility, and two additional authors assessed for risk of bias and extracted data. We expressed results as rate ratios (RR) per 1000 catheter-days or 1000 dialysis sessions with 95% confidence intervals (CI). Statistical analyses were performed using the random-effects model. **Main results** Thirty-nine studies, enrolling 4216 participants, were included in this review, however only 30 studies, involving 3392 participants, contained enough data to be meta-analysed. Risk of bias was low or unclear for most domains in the majority of the included studies. Studies compared antimicrobial lock solutions (antibiotic and non-antibiotic) to standard sealing solutions (usually heparin) of the CVC for HD. Fifteen studies used antibiotic lock solutions, 21 used non-antibiotic antimicrobial lock solutions, and 4 used both (antibiotic and non-antibiotic) lock solutions. Studies reported the incidence of CRI, catheter thrombosis, or both. Antimicrobial lock solutions probably reduces CRI per 1000 catheter-days (27 studies: RR 0.38, 95% CI 0.27 to 0.53; I² = 54%; low certainty evidence), however antimicrobial lock solutions probably makes little or no difference to the risk of thrombosis per 1000 catheter days (14 studies: RR 0.79, 95% CI 0.52 to 1.22; I² = 83%; very low certainty evidence). Subgroup analysis of antibiotic and the combination of both lock solutions showed that both probably reduced CRI per 1000 catheter-days (13 studies: RR 0.30, 95% CI: 0.22 to 0.42; I² = 47%) and risk of thrombosis per 1000 catheter-days (4 studies: RR 0.26, 95% CI: 0.14 to 0.49; I² = 0%), respectively. Non-antibiotic antimicrobial lock solutions probably reduced CRI per 1000 catheter-days for tunnelled CVC (9 studies: RR 0.60, 95% CI 0.40 to 0.91) but probably made little or no difference with non-tunnelled CVC (4 studies: RR 0.93, 95% CI 0.48 to 1.81). Subgroup analyses showed that antibiotic (5 studies: RR 0.76, 95% CI 0.42 to 1.38), non-antibiotic (8 studies: RR 0.85, 95% CI 0.44 to 1.66), and the combination of both lock solutions (3 studies: RR 0.63, 95% CI 0.22 to 1.81) made little or no difference to thrombosis per 1000 catheter-days compared to control lock solutions. **Authors' conclusions** Antibiotic antimicrobial and combined (antibiotic-non antibiotic) lock solutions decreased the incidence of CRI compared to control lock solutions, whereas non-antibiotic lock solutions reduce CRI only for tunnelled CVC. The effect on thrombosis incidence is uncertain for all antimicrobial lock solutions. Our confidence in the evidence is low and very low; therefore, better-designed studies are needed to confirm the efficacy and safety of antimicrobial lock solutions.

