Clinical effectiveness of different approaches to peritoneal dialysis catheter exit-site care

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CRD summary
This well-conducted review concluded that topical mupirocin antibiotic may reduce the risk of exit-site infection in patients with peritoneal dialysis catheters, but that there was little evidence to support any particular antibiotic, antiseptic or dressing intervention. These conclusions are likely to be reliable and highlight the need for further high-quality research.

Authors' objectives
To appraise the clinical effectiveness of peritoneal dialysis catheter exit-site care.

Searching
The following databases were searched from inception up to September 2002: CINAHL, PubMed, Current Contents, The Cochrane Library, Expanded Academic Index and EMBASE. Two additional databases were searched for unpublished studies. Search terms were reported. Reference lists of relevant articles were checked.

Study selection
Randomised controlled trials (RCTs) that evaluated the effectiveness of peritoneal exit-site care were the study design of primary interest, but non-RCTs and before/after studies were also considered for inclusion. Eligible participants were adults (over 18 years) with chronic renal failure receiving maintenance peritoneal dialysis. Relevant interventions included exit-site dressings, skin care regimes, patient education, and prophylactic topical antimicrobial or antiseptic agents. Key outcomes were defined as exit-site infection rates and peritonitis (detailed definitions provided).

The included studies were of various designs. Most studies examined the effectiveness of home care interventions. Interventions were grouped as antibiotics, antiseptics, or types of dressing. No studies evaluating patient education were identified. Infection rates were reported as episodes per patient year, or as episodes per dialysis year.

Two independent reviewers selected studies for inclusion.

Assessment of study quality
Only studies meeting the following minimum criteria were included for any meta-analyses: randomisation, no additional treatment, outcome measurement, and comparability at baseline. Studies were also assessed on additional criteria around selection, performance, attrition and detection biases. Allocation concealment was rated according to Cochrane criteria. NHMRC (National Health and Medical Research Council, Australia) guidelines were used to allocate levels of evidence to the conclusions.

Two independent reviewers assessed the methodological quality of included studies.

Data extraction
Two independent reviewers extracted data using a standardised form. It was intended to group studies into early post-operative period and long-term period, but this was not possible due to the nature of the included studies.

Methods of synthesis
Studies were assessed for comparability based on study population, intervention and outcomes measured. Heterogeneity was formally assessed using $\chi^2$ and visual inspection of forest plots; it was considered to be significant where the p-value was less than 0.05. Dichotomous data were summarised using odds ratios and relative risks. Continuous data were summarised using weighted mean differences or standardised mean differences as appropriate. Where statistical pooling was not possible, a narrative synthesis was presented.

Results of the review
Sixteen studies were included in the review (1,792 participants): three historically controlled trials, two pseudo-RCTs, eight unblinded RCTs, one controlled trial, and one pre/post trial without a control group. Sample sizes ranged from 13
to 395 participants. Most of the studies were unblinded, small in size and considered to be poorly designed. Meta-analysis was not possible for any of the comparison groups.

**Antibiotics**

Five trials reported on the effectiveness of three antibiotics (mupirocin, ciprofloxin and sodium fusidate) and produced mixed results on their effectiveness when used as prophylaxis for exit-site infections and peritonitis. Studies that relied on historical controls were favourable for topical application of mupriocin and ciprofloxacin. A single prospective RCT found no difference between placebo and sodium fusidate for exit-site infection or peritonitis.

**Antiseptics**

Nine studies looked at antiseptic treatments applied to the catheter exit-site. Five RCTs tested various applications of povidone-iodine, two studies tested a silver ring, and one study tested each of sodium-hypochlorite and hydrogen peroxide.

Mixed results were observed for the effectiveness of povidone-iodine in preventing exit-site infection and peritonitis. Two RCTs found a beneficial effect over soap and water regimes, but no benefit in comparison with covering the exit-site with gauze. A one-year study found no benefit of povidone-iodine spray over standard dressing. A further study found no benefit from an ointment in comparison with two other antibiotics.

There was no evidence that a silver ring placed in contact with the catheter exit-site was effective in reducing or preventing infections or peritonitis when compared with no additional treatment or standard care.

**Dressings**

Five studies looked at the use of or comparative effectiveness of dressings to reduce or prevent exit-site infections and peritonitis. The results were mixed and no individual dressing technique could be recommended over any other.

**Authors’ conclusions**

Topical mupirocin may reduce the risk of exit-site infection in patients with peritoneal dialysis catheters. There was little evidence to support any particular antibiotic, antiseptic or dressing to reduce or prevent exit-site infection or peritonitis.

**CRD commentary**

This well-conducted review addressed a clear question with broad literature searches and suitable inclusion criteria. Two reviewers independently conducted the review process, which reduced the chance of bias or error, while attempts to include unpublished studies were likely to reduce publication bias. It was not clear if any language restrictions were applied.

Studies were described in detail and assessed for methodological quality. Variability between studies was clearly reported. The narrative synthesis seemed appropriate.

The reviewers identified key shortcomings in the evidence base and drew tentative conclusions which reflect the limited, small scale studies available.

**Implications of the review for practice and research**

**Practice:** The authors recommended that until better evidence was available, practice should be based on patient preferences alongside ongoing evaluation of infection rates and clinical experience.

**Research:** The authors recommended that long-term RCTs with sufficient power and blinding should compare antibiotics, antiseptics and dressings. Researchers should be aware that combinations of interventions may be required for maximum effect.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.