A systematic review of silver-releasing dressings in the management of infected chronic wounds
Lo SF, Hayter M, Chang CJ, Hu WY, Lee LL

CRD summary
The authors concluded that silver-releasing dressings had an overall positive effect on the management of chronic infected wounds. However, the quality of evidence was limited and more research was needed. In view of methodological problems and poor reporting in the review, as well as the questionable quality and heterogeneity of the primary studies, the conclusions may not be reliable.

Authors' objectives
To evaluate the effectiveness of silver-releasing dressings as sole treatment for infected chronic wounds.

Searching
The following databases were searched for studies: MEDLINE, CINAHL, the Cochrane Library, the British Nursing Index, EBSCO host, Online Computer Library Center, ProQuest and PsycINFO. Search terms were reported. Search dates varied across sources, spanning 1806 to May 2007. Reference lists of articles retrieved, relevant websites and conference proceedings were hand searched. Published and unpublished studies were sought. There was no language restriction. The search was limited to studies available in full-paper form.

Study selection
Randomised and non-randomised controlled trials of ionic silver-containing wound dressings used to promote healing or improve infection control in chronic infected wounds were eligible for inclusion. Silver-containing dressings were required to be the sole or primary dressing. Controls could receive placebo or any treatment not containing silver. Outcomes of interest were objective signs of improved wound infection (for example, reduced ulceration, odour or exudate and altered wound bed composition), and self-reported measures of quality of life and function.

Participants in the included studies had venous ulcers, pressure ulcers, diabetic ulceration, miscellaneous ulcers or other chronic wound types (such as burn or trauma). Patients' ages (where stated) ranged from 18 to 99 years. Fifty six per cent of patients were female. Few studies reported the health care setting. Interventions included hydrophilic polyurethane foam and hydrofibre silver-releasing dressings. Frequency of dressing changes varied. Several studies reported use of co-interventions such as antibiotics, surgical debridement and topical creams. Duration of treatment varied from nine days to eight weeks. Duration of outcome assessment varied from two to 28 days. In most cases the assessment was conducted by wound care nurses or physicians. Outcomes reported included physical, physiological and cost-effectiveness measures. The review included controlled and uncontrolled studies, mostly of before-and-after design.

Two reviewers independently selected studies for inclusion.

Assessment of study quality
All studies were appraised using a published checklist (Melnyk 2005) for randomised controlled trials (RCTs), which included 15 items (not described in the review). Points were allocated for each item up to a maximum score of 30 points. Studies scoring below 18 points (60 per cent of the maximum score) were excluded from analysis. The authors did not state how the assessment was performed.

Data extraction
Data were extracted as risk ratios (RR) or odds ratios (OR) for categorical data and as standardised mean differences for continuous data, with 95% confidence intervals. Findings were reported in descriptive phrases (for example, improved pain) or degree of improvement from baseline (for example, percentage decrease in wound size). Two reviewers extracted the data. First authors of primary studies were contacted for more information (if required).
Methods of synthesis
Studies were combined in a narrative synthesis. It was planned to pool studies statistically if the data were suitable, but this was not the case.

Results of the review
Fourteen studies were included in the review (n=1,285, range 19 to 619): five open-label RCTs; one open-label non-randomised trial; and eight before–and-after trials, of which at least one was controlled. Studies were generally of moderate quality; quality scores ranged from 20 to 28 out of 30 points. No studies reported allocation concealment. Sample numbers were low and outcome measures were of questionable validity. Most did not use the principles of intention to treat analysis.

Efficacy: All studies measuring odour control (five studies) or wound bed composition (eight studies) reported improvement. Five studies reported significantly reduced pain and discomfort associated with the intervention. Relevant studies reported that the intervention was associated with a significant reduction in infection (four studies), a reduction in wound exudate (six studies) and a reduced incidence of maceration (three studies). Thirteen studies reported a reduction in overall wound area and improvement in epithelialisation.

Cost effectiveness (five studies): Three studies reported increased wear-time and/or easier application associated with the intervention compared to baseline. Two studies found no significant changes from baseline in health-state scores.

Adverse events: Adverse events were reported in 31 participants overall, but this outcome was either not reported or not reported clearly in four studies.

Cost information
Four of the included studies reported positive effects on costs associated with the intervention, but none applied a cost-effectiveness model.

Authors’ conclusions
Silver-releasing dressings had an overall positive effect on the management of chronic infected wounds, however, the quality of evidence was limited and more research was needed.

CRD commentary
The review objectives and inclusion criteria were clear, although many of the included trials did not comply with these criteria (for example, the restriction to controlled trials was not applied and silver dressings were not always the sole treatment). Relevant sources were searched for studies without restriction by language or publication status. Studies in abstract form were excluded, which may have caused some studies to be missed (as the authors noted). It did not appear that publication bias was assessed. Efforts were made to restrict bias and error in the review by having more than one reviewer select studies and extract data, but it was unclear how disagreements were resolved and how validity assessment was conducted. The criteria used to assess study validity were appropriate for RCTs, but of doubtful applicability to other study designs.

The decision not to pool data statistically appeared appropriate in view of the clinical heterogeneity between studies. But, the narrative synthesis did not consistently reference relevant primary studies and the review did not report estimates of effect from controlled studies, measures of statistical significance and confidence intervals. This made it impossible to judge the reliability, precision or clinical significance of the findings. The authors noted potential bias associated with confounding and low sample sizes, but study validity was not adequately taken into consideration in the interpretation of findings and the potential effects of commercial sponsorship were not discussed. There were also several inconsistencies and contradictions in the text.

In view of methodological problems and poor reporting in the review, as well as the questionable quality and heterogeneity of the primary studies, the authors’ conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that silver-releasing dressings appeared effective and well-tolerated, but should be used only in conjunction with comprehensive wound assessment.

Research: The authors stated that large studies were required in this area, preferably conducted in a non-western setting. Such studies should use standardised intervention and outcome measures. Outcomes should include patient-relevant (including qualitative) measures and precise quantitative techniques (for example, wound-bed imaging and microbial counts). Measurement of wound improvements could use the TIME acronym (Fletcher 2005, Dowsett 2006).

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