Subcutaneous infusion: non-metal cannulae vs metal butterfly needles

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Authors' objectives
To compare the effectiveness of non-metal cannulae with metal butterfly needles in maintaining subcutaneous infusion sites in patients receiving palliative care.

Searching
The Cochrane Library, MEDLINE (from 1996 to present), pre-MEDLINE (to April 2002), EMBASE (1980 to present), CINAHL (1982 to present), AMED (1985 to present) and Cancerlit (from 1975 to present) were searched. The search terms were stated. Only articles published in English or Spanish that were available in the British Library of King's College, London, were included.

Study selection

Study designs of evaluations included in the review
There was a lack of clarity regarding eligible study designs: both randomised controlled trials (RCTs) and controlled clinical trials (CCT) were specified as eligibility criteria in different parts of the text. RCTs (including parallel-group and crossover studies) and CCTs were included in the review. One identified study was subsequently excluded because the nurses were not trained to insert the intervention cannula.

Specific interventions included in the review
Studies that compared the delivery of subcutaneous infusions using non-metal cannulae versus metal butterfly needles were eligible for inclusion. Studies of intravenous infusions were excluded. The included studies compared Vialon catheters or Teflon cannulae with butterfly needles. In the included studies, the nurses had been trained to insert both types of cannulae.

Participants included in the review
Studies of patients receiving palliative care were eligible for inclusion.

Outcomes assessed in the review
Studies that assessed site duration (defined in terms of hours of patency or until change was needed) were eligible for inclusion.

How were decisions on the relevance of primary studies made?
The author does not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
Study validity was assessed by considering the adequacy of the sample size to detect clinically significant differences and the equality of treatment given to the intervention and control groups. The adequacy of the randomisation method was also assessed. Studies with high drop-out rates were not excluded. The author does not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment.

Data extraction
The author does not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. The tabulated information included study design, type of cannulae compared, participants, the outcomes assessed in individual studies, and the number of patients at baseline and at end point. The author calculated confidence intervals (CIs) for the point estimates of the difference between the interventions in terms of site duration.
Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken. The range of the difference between interventions in the duration of the infusion site was also reported.

How were differences between studies investigated?
The results were discussed separately for studies comparing Vialon cannulae or Teflon catheters with metal butterfly needles.

Results of the review
Four CCTs (253 patients at baseline, 104 at end point) were included. These comprised three RCTs (223 patients at baseline) and one non-randomised CCT (30 patients at baseline).

Only one RCT presented sufficient information to confirm the adequacy of the method of randomisation. None of the studies explicitly reported that the patients were blinded. All the studies treated groups equally. None of the studies reported a power calculation for sample size. Two studies included patients who died before trial completion, whereas the other two studies did not include this group. The follow-up rates were low, ranging from 31.1 to 66.6% (excluding patients who died before the study was completed).

The studies found that non-metal cannulae increased site duration compared with metal cannulae. The increase in site duration ranged from 21 to 159 hours in the individual studies.

Vialon cannulae versus butterfly needle (2 RCTs): neither study found any significant difference between the interventions in terms of site duration. One RCT found site duration was 177 hours with Vialon versus 138 hours with metal (95% CI for difference: -25, 101); the second RCT found site duration was 134 hours with Vialon versus 113 hours with metal (95% CI for difference: -8, 62).

Teflon cannulae versus butterfly needle (1 RCT, 1 CCT): both studies found that Teflon cannulae significantly increased site duration compared with butterfly needle. The RCT found that site duration was 286 hours with Teflon versus 127 hours with metal (95% CI for difference: 140, 177); the CCT found the median site duration was 94 hours with Teflon versus 42.8 hours with metal (P=0.0002).

Cost information
The author quoted that Teflon cannulae cost £2.51, compared with £1.93 for butterfly needle, and that Vialon cannulae were about six times more expensive than butterfly needles.

Authors’ conclusions
Non-metal cannulae appear to increase site duration in comparison with butterfly needles.

CRD commentary
The review question was clear in terms of the intervention, participants and outcomes. The eligible study designs were stated as RCTs in one part of the text and controlled trials in other parts of the text. Several relevant sources were searched, the search terms were stated, and studies in English or Spanish were included. However, restricting the included studies to those available in a single library may have resulted in the omission of other relevant studies. No attempt was made to locate unpublished studies, thus raising the possibility of publication bias. The methods used to select the studies, assess validity and to extract the data were not described. Hence, the adequacy of the methods used cannot be judged. Validity was assessed using defined criteria. Some relevant data were extracted and tabulated, but the drop-out rates were not reported with reasons and by treatment group. A narrative synthesis was appropriate given the small number of identified studies. Studies were reported as finding that non-metal cannulae increased site duration in comparison with metal cannulae, but it was not clearly stated that two studies found no significant difference. As the author correctly states in the text, in view of the high drop-out rates, conclusions from the review are tentative.
Implications of the review for practice and research
Practice: The author states that the evidence suggests that Teflon cannulae should be used rather than metal cannulae in the administration of subcutaneous infusions.

Research: The author did not state any implications for further research.

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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.