Evidence for elective replacement of peripheral intravenous catheter to prevent thrombophlebitis: a systematic review
Idvall E, Gunningberg L

CRD summary
This review evaluated evidence for elective replacement of peripheral intravenous catheters (PICs) in adults. The authors concluded that there is limited scientific evidence suggesting that elective replacement of PICs might reduce the risk and severity of thrombophlebitis, and that appropriate intervals for PIC replacement have not been investigated. Though unpublished studies might have been missed, these conclusions appear appropriate.

Authors' objectives
To review the scientific evidence for elective replacement of peripheral intravenous catheters (PICs) in adults, in relation to reducing the incidence and severity of thrombophlebitis.

Searching
The Cochrane Library, MEDLINE and CINAHL were searched for relevant publications (from inception to early 2005); the search terms were reported. In addition, reference lists were handsearched.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion in the review.

Specific interventions included in the review
Studies evaluating elective replacement of PICs were eligible for inclusion. In the included studies, PICs delivering saline solution and/or medication were replaced every 48 hours and PICs delivering total parenteral nutrition (TPN) were replaced every 24 hours, with or without 12 hours without a PIC.

Participants included in the review
Studies including adults using PICs were eligible for inclusion. The patients in the studies were receiving either saline solution and medication, or TPN.

Outcomes assessed in the review
The authors did not state any inclusion criteria relating to the outcomes. The main outcomes of interest were the incidence and severity of thrombophlebitis.

How were decisions on the relevance of primary studies made?
The authors did not state how many reviewers selected the studies.

Assessment of study quality
The studies were assessed according to published criteria for evaluating the validity of clinical trials, with quality graded as high, medium or low. Three reviewers independently assessed study validity. The reviewers were not blinded to authors or journals.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the extraction. Data were extracted on any outcomes referring to the incidence or severity of thrombophlebitis.
Methods of synthesis

How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
Certain differences in study characteristics were discussed in the body of the narrative synthesis.

Results of the review

Three RCTs (n=158) were included in the review.

The outcome assessors were unblinded in all three included RCTs. Two studies were graded as medium quality and one as low quality.

One TPN study compared both regular 24-hour replacement and ‘12 hour’ replacement (i.e. 12 hours TPN, then 12 hours without TPN, followed by 12 hours TPN) against a control group where PICs were replaced when thrombophlebitis was suspected. Controls had a significantly higher mean thrombophlebitis severity score than either regular replacement group. Patients in the regular 24-hour replacement group reported more symptoms than those in the ‘12 hour’ replacement group.

A second TPN study found the '12 hour' replacement protocol resulted in significantly less thrombophlebitis than in controls receiving TPN via PICs which were heparinised and left in situ.

The third RCT found that replacement of PICs providing crytaloids or drugs every 48 hours significantly reduced thrombophlebitis compared with replacement on the occurrence of pain, placement disturbance, or the appearance of thrombophlebitis (p<0.003).

Authors’ conclusions

There is limited scientific evidence to suggest that elective replacement of PICs might reduce the risk and severity of thrombophlebitis. Appropriate intervals for PIC replacement have not been investigated.

CRD commentary

The review question was reasonably well defined in terms of the participants, interventions and study designs of interest. More than one database was searched and reference lists were checked for relevant publications. However, no attempt was made to identify unpublished studies, so the potential for publication bias remains. A validity assessment, based on published criteria, was undertaken by multiple reviewers; this minimises the potential for errors and bias in this process. However, it is not clear if similar precautions were taken during the study selection and data extraction processes. Given the clear heterogeneity of the included studies, the authors appropriately did not attempt a meta-analysis. Though unpublished studies might have been missed, the authors’ conclusions about the limitations of the published evidence appear appropriate.

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that more clinical trials providing stronger evidence on the elective replacement of PICs are needed, and that such studies should investigate different groups of patients under different circumstances, different intervals for replacement, and larger samples. They also stated that patient experiences and discomfort, as well as cost-effectiveness, require investigation.

Bibliographic details
Idvall E, Gunningberg L. Evidence for elective replacement of peripheral intravenous catheter to prevent...

PubMedID
16925620

DOI
10.1111/j.1365-2648.2006.03962.x

Indexing Status
Subject indexing assigned by NLM

MeSH
Catheterization, Peripheral /adverse effects /methods; Humans; Infusions, Intravenous; Risk Factors; Sweden /epidemiology; Thrombophlebitis /epidemiology /prevention & control

AccessionNumber
12007005207

Date bibliographic record published
31/03/2008

Date abstract record published
31/03/2008

Record Status
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.