A systematic review of the evidence for hypodermoclysis to treat dehydration in older people

Authors' objectives
To evaluate the use of hypodermoclysis (subcutaneous infusion of fluids) to treat dehydrated elderly patients, and to discuss clinical applications in the long-term care setting.

Searching
MEDLINE was searched from January 1966 to May 1996 for English language publications using the MeSH and text keywords provided. In addition, reference lists of retrieved articles were examined for other studies.

Study selection
Study designs of evaluations included in the review
RCTs, case series and case reports containing original patients' data were included.

Specific interventions included in the review
Hypodermoclysis using three types of fluid, specifically electrolyte-containing solution, nonelectrolyte solutions and hypertonic solutions. The type of fluid infused was unspecified in 3 case reports, whilst in 2 randomised controlled trials (RCTs), the control groups received intravenous infusions.

Participants included in the review
Adult patients suffering from dehydration were included.

Outcomes assessed in the review
Efficacy and adverse effects of administration of fluid by hypodermoclysis were assessed.

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

Assessment of study quality
The authors do not report the criteria used to assess validity, or how the validity assessment was performed.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
The studies were combined narratively, and by tabulation according to type of solution used and study design.

How were differences between studies investigated?
No test for heterogeneity was presented. Differences between the studies were assessed in terms of study design only.

Results of the review
Twelve studies (686 patients) were included: 2 RCTs, 2 case series and 8 single case reports.
One RCT evaluating hypodermoclysis using electrolyte-containing solutions reported adverse effects, with 4 of the 17 patients suffering either erythema around the needle insertion site or mild hyponatraemia. Efficacy was assessed in 2 RCTs of hypodermoclysis versus intravenous therapy; neither showed a statistically-significant difference. Two case reports of hypodermoclysis were thought to support its use.

Two case series and one case report of the efficacy and adverse effect profiles of hypodermoclysis used electrolyte-free solutions. One case series reported side-effects in 12 patients, 9 of whom had fluid overload.

Two case reports of hypodermoclysis using hypertonic solutions reported adverse effects in 2 patients, one with severe shock. It should be noted that these studies use different measures of efficacy, and none use valid clinical outcomes such as urinary output, cardiovascular status or status of mucous membranes.

In 3 case reports of hypodermoclysis using unspecified fluid types, one patient was reported to have had a severe adverse reaction causing pain.

**Authors' conclusions**
The evidence suggests that hypodermoclysis can be used effectively for the treatment of dehydration. When smaller volumes of electrolyte-containing solutions are used, adverse effects appear to be relatively minor. Concerns about the safety of hypodermoclysis are likely due in large part to reports from early studies in which electrolyte-free or hypertonic solutions were used. To promote the use of this potentially valuable technique, well-designed studies are required to compare the efficacy and adverse effects of hypodermoclysis to intravenous therapy using slow infusions of electrolyte-containing solutions.

**CRD commentary**
Unfortunately the review fails to include key features of the systematic review process. It lacks information on the criteria used to assess the validity of the primary studies, the process by which decisions of relevance and judgements of validity were made, and the method of data extraction. Information on the participant characteristics was poor. There was limited discussion of the differences between the studies. No cost data were provided. The conclusions reached by the authors were not backed up by the evidence presented. Much of the evidence appearing to support the use of hypodermoclysis as an alternative to intravenous infusion originates from case reports. Only two RCTs were included in the review, and these provided limited evidence of benefit for the intervention.

**Bibliographic details**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Dehydration /therapy; Electrolytes /administration & dosage; Fluid Therapy; Injections, Subcutaneous; Randomized Controlled Trials as Topic; Solutions

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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.