Suture closure of subcutaneous fat and wound disruption after cesarean delivery: a meta-analysis
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CRD summary
This review assessed the effect of subcutaneous dead space closure on wound complications after Caesarean section delivery. The authors concluded that suture closure decreases wound complications by 34% in women with fat thickness greater than 2 cm. There were limitations to the review but, overall, the authors' conclusions are likely to be reliable.

Authors' objectives
To assess the effect of suture closure of the subcutaneous dead space on wound complications after Caesarean section delivery.

Searching
MEDLINE was searched from inception to October 2002 using the search terms reported. The Cochrane Database of Systematic Reviews was also searched, and reference lists from major texts, published studies and reviews were screened.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) with clearly stated information on blinding were eligible for inclusion.

Specific interventions included in the review
Studies that compared suture closure of the subcutaneous dead space with no closure were eligible for inclusion. The included studies used running and interrupted sutures, and most studies used plain gut or a rapidly absorbed suture (where reported). The majority of the studies were set in the USA and all were set in training institutions.

Participants included in the review
Studies of patients undergoing Caesarean section delivery were eligible for inclusion. The patients in the included studies had varying thicknesses of subcutaneous tissue. Pfannenstiel incisions were used in most of the studies.

Outcomes assessed in the review
Studies that assessed wound infection, haematoma, seroma or wound separation were eligible for inclusion, providing that these outcomes were clearly defined and reported. The included studies also assessed a combination of these outcomes, termed 'wound disruption'. The included studies used similar but not identical definitions for outcomes.

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

Assessment of study quality
The studies were assessed for effectiveness of randomisation. The authors did not state how this was done, or who performed the validity assessment.

Data extraction
Two reviewers independently extracted the data onto data sheets. Any disagreements were resolved through consensus with the aid of a third reviewer if required. The numbers of patients with each outcome event of interest were extracted.
Methods of synthesis

How were the studies combined?
The pooled relative risk (RR) with 95% confidence interval (CI) for any wound complication and any thickness of subcutaneous tissue were calculated using a fixed-effect model (Mantel-Haenszel) in the absence of significant heterogeneity.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the Q statistic. Subgroup analyses were conducted to assess the influence on the results of thickness of subcutaneous tissue (2 cm or less versus more than 2 cm) and for individual wound complications. The number-needed-to-treat (NNT) to prevent one ‘wound disruption’ in women with more than 2 cm tissue thickness was calculated. The influence of each study and the robustness of the results were assessed by repeating the analysis after omitting each study in turn.

Results of the review

Six RCTs (n=1,617) were included.

All studies appear to have achieved effective randomisation.

For patients with any thickness of subcutaneous tissue, sutures significantly reduced wound complications in comparison with no sutures (RR 0.56, 95% CI: 0.36, 0.86; based on 3 RCTs with 875 patients). No statistically significant heterogeneity was detected (P=0.51). The results were similar after removing each study in turn.

For patients with subcutaneous tissue thickness of 2 cm or less, there was no significant difference between sutures and no sutures (RR 1.01, 95% CI: 0.46, 2.20; based on 2 RCTs with 181 patients). No statistically significant heterogeneity was detected (P=0.71).

For patients with subcutaneous tissue thickness greater than 2 cm, sutures significantly reduced wound complications in comparison with no sutures (RR 0.66, 95% CI: 0.48, 0.91; based on 5 RCTs with 887 patients). The NNT was 16.2. No statistically significant heterogeneity was detected (P=0.26).

There was no significant difference between sutures and no sutures for haematoma or wound infections (the results were reported).

Sutures significantly reduced seroma formation (RR 0.42, 95% CI: 0.24, 0.75; based on 4 RCTs with 852 patients). No statistically significant heterogeneity was detected (P=0.67).

The results were similar after removing each study in turn.

Authors’ conclusions

Suture closure of the subcutaneous fat decreases wound complications by 34% in women with fat thickness greater than 2 cm.

CRD commentary

The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Limiting the search to two databases, texts and reference lists might have resulted in the omission of other relevant studies, thus raising the possibility of publication bias. Since it was not stated whether any language restrictions were applied, the potential for language bias could not be assessed. Methods were used to minimise errors and bias in the extraction of data, but it was unclear whether similar steps were taken at the study selection stage. Only RCTs with clear reporting of blinding were included, but the review did not report whether blinding did occur and who exactly was blind to the treatment. Other than that no validity assessment seemed to have been undertaken, hence the quality of the included studies is uncertain.

Statistical heterogeneity was assessed, the studies were appropriately combined using meta-analysis, and the influence...
on the results of some relevant factors was examined. The limited search and possibly limited attempts to reduce errors and bias in the selection of studies and reporting of study quality weaken the strength of the evidence. However, overall, the authors' conclusions are likely to be robust.

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

**Practice:** The authors stated that subcutaneous dead space closure should be done in Caesarean sections in patients with wound thickness greater than 2 cm and in sections performed through Pfannenstiel incisions.

**Research:** The authors stated that further research is required to determine the optimal suture material and whether the results are similar for all types of incision and for primary and repeat Caesarean sections.

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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.