Choosing the best abdominal closure by meta analysis
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Authors' objectives
To assess using a meta-analysis what is the best technique to use for closing abdominal wounds.

Searching
MEDLINE was searched from 1977 to 1997 using the combined search terms 'laparotomy' and 'suture'. Additional studies were located through searching the bibliographies of retrieved articles. No language restrictions were reported.

Study selection
Study designs of evaluations included in the review
Studies comparing closure techniques, choices of suture, or both. Studies reported in the review included randomised (RCTs) and non-randomised trials.

Specific interventions included in the review
Surgical techniques and sutures for closure of abdominal wounds. Those reported in the review included: continuous versus interrupted, continuous absorbable versus continuous non-absorbable, interrupted absorbable versus interrupted non-absorbable, and mass versus layered closures.

Participants included in the review
Patients with abdominal wounds (no further details reported).

Outcomes assessed in the review
Infection rates, rates of hernia formation and dehiscence rates.

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 reviewers performed the selection.

Assessment of study quality
Study design, study size and the clarity of the results. The number of individuals involved was not stated. Studies were graded as: level I (large randomised trials with clear-cut results), level II (small randomised trials with uncertain results) or level III (non-randomised, contemporaneous controls).

Data extraction
Data were extracted onto a spreadsheet. Not stated how many individuals were involved with the process. No individual study data was presented in the review.

Methods of synthesis
How were the studies combined?
The studies were divided into groups according to the following comparisons: continuous versus interrupted, continuous absorbable versus continuous non-absorbable, interrupted absorbable versus interrupted non-absorbable, and mass versus layered closures. Studies were combined within the groups with R-squared and P values calculated for each comparison.

How were differences between studies investigated?
Chi-squared tests were used, with significance defined as p<0.05.
Results of the review

Twenty-five studies including 23 RCTs and 2 non-randomised controlled trials (in total 12,247 participants).

Continuous versus interrupted closures:

Higher infection rates (8 studies, 6,138 participants) and greater rates of hernia formation (7 studies, 3,003 participants) were observed for continuous closures (r-squared=0.01, P=0.001 and r-squared=0.01, P=0.05, respectively). However, this significance was no longer present when study size was controlled for. There was no significant difference in terms of dehiscence (6 studies, 5,739 participants).

Interrupted absorbable versus interrupted non-absorbable:

A significantly greater rate of hernia formation (4 studies, 1,130 participants) and dehiscence (3 studies, 783 participants) was observed for interrupted non-absorbable sutures (r-squared=1.0, P=0.0002 and r-squared=0.04, P=0.04, respectively). No significant differences were observed in infection rates (4 studies, 1,130 participants).

Continuous absorbable versus continuous non-absorbable:

A significantly greater rate of hernias (8 studies, 3,607 participants) was observed with continuous absorbable closures (r-squared=0.03, P=0.0007). However, a significantly greater rate of dehiscence (7 studies, 3,230 participants) was observed with continuous non-absorbable suture (r-squared=0.01, P=0.01). There were no significant differences in infection rates (7 studies, 3,230 participants).

Mass versus layered closures:

Mass closures produced significantly less hernias (9 studies, 3,321 participants) and dehiscences (8 studies, 3,109 participants) (r-squared=0.01, p=0.02 and r-squared=0.04, p=0.0002, respectively). There were no significant differences in infection rates (7 studies, 2,660 participants).

Study quality:

Nine studies were classed as level I, 14 as level II and 2 as level III.

Authors' conclusions

Continuous closures with non-absorbable suture should be used to close most abdominal wounds. However, if infection or distention is anticipated, interrupted absorbable sutures are preferred. Mass closures are superior to layered closures.

CRD commentary

This review examines clearly defined comparisons of wound closure techniques and sutures. However, the literature search only used one database, and may have missed unpublished data, so there is a possibility of publication bias. In addition the authors fail to provide details about many aspects of the review methodology, such as how many reviewers were involved in the processes of study selection, data extraction and quality assessment. Although an assessment of study quality was performed few details are provided and no individual study details are provided. Data and information about the individual studies (e.g. types of participants, size, definitions and methods of assessing outcomes) was also lacking, so it is not possible to ascertain whether it was appropriate to combine the studies. Precise definitions of the outcomes are also lacking so it is not clear whether to outcomes reported in the individual studies are comparable. In conclusion, taking into account the aforementioned problems, the authors' findings should be interpreted with caution.

Implications of the review for practice and research

Practice: The authors stated that 'Continuous closures with non-absorbable suture should be used to close most abdominal wounds. However, if infection or distention is anticipated, interrupted absorbable sutures are preferred. Mass closures are superior to layered closures'.
Research: The authors stated that 'confounding variables such as drains, peritoneal closure, skin preps and so forth could not be analysed for effect because of a lack of comparative data'.

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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.