Handsewn vs. stapled anastomoses in colon and rectal surgery: a meta-analysis

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Authors' objectives
To undertake a meta-analysis of all published randomised controlled trials (RCTs) comparing handsewn with stapled anastomoses in colon and rectal surgery, and to assess whether one method is preferable to the other.

Searching
MEDLINE was searched from 1966 to December 1996 using the search terms 'anastomosis' and 'colon surgery'. The authors limited their search to English language publications describing studies of humans. Additional studies were identified by examining the reference lists of retrieved articles, in particular those on stapling techniques, and by consulting experts in the field of colon and rectal surgery.

Study selection
Published RCTs were included.

Specific interventions included in the review
Trials of handsewn versus stapled anastomoses of the colon and rectum were included. Trials in patients undergoing pelvic pouch procedure were excluded since they involved muscosectomy versus no muscosectomy.

Participants included in the review
Participants undergoing colon or rectal surgery for cancer, diverticular disease, inflammatory bowel disease, prolapse or polyps.

Outcomes assessed in the review
Mortality, technical problems, leak rates (radiologic, clinical and total), wound infections, strictures, and cancer recurrence. Outcomes were stratified for the site of anastomosis, i.e. ileocolic, colocolic or colorectal, when possible.

How were decisions on the relevance of primary studies made?
Two reviewers examined the methods section of each report to decide whether it should be included in the meta-analysis. The abstracts of retrieved studies were reviewed, and those describing RCTs comparing handsewn and stapled anastomoses were retrieved.

Assessment of study quality
The trials were appraised using a 6-point scoring system, based on a published 10-point system (see Other Publications of Related Interest no.1). Points were assigned for the following: adequate blinded randomisation; whether exclusions were specified and were appropriate; method reproducibility; an objective measurement of outcomes; whether the raw data were accessible; and whether there was complete follow-up. In addition, the overall quality of the article was judged using a score from 1 to 5. The authors imply that the two authors undertook a quality assessment of the studies.

Data extraction
The data were extracted by two reviewers, and any differences were resolved by consensus. The data were extracted in an intention to treat format. The information extracted included aspects of the trial methodology, the number of patients randomised to each group, the site of anastomoses, and indication for surgery and follow-up.

Methods of synthesis
How were the studies combined?
The statistical analysis was performed using the Mantel-Haenszel fixed-effect model. The odds ratio (OR) and confidence intervals (CIs) were calculated for each outcome measure for each trial, whilst the pooled OR and CIs were calculated for each outcome measure. The numbers-needed-to-treat (NNT) were also calculated (see Other Publications of Related Interest no.2).

How were differences between studies investigated?
Homogeneity of the pooled data was assessed statistically according to Breslow and Day (see Other Publications of Related Interest no.3), after first ensuring there was clinical homogeneity. A subgroup analysis was performed for colorectal anastomoses, and a sensitivity analysis was carried out after excluding three articles with less than 3 points on the 6-point study quality scale.

Results of the review
Thirteen RCTs were included in the meta-analysis. There were a total of 2,256 participants: 1,249 had handsewn anastomoses and 1,007 had stapled anastomoses.

The mean score of the studies on the 6-point validity assessment scale was 5.2 (range: 3 to 6), and the mean global assessment of study quality was 3.2 (range: 2 to 5).

For the subgroups, only colorectal anastomoses had sufficient data to perform a meta-analysis.

Intra-operative technical problems were more likely to occur with stapled than with handsewn anastomoses for all anastomoses (OR 0.09, 95% CI: 0.03, 0.25, p<0.0001) and for colorectal anastomoses (p<0.001). Strictures were more common following stapled anastomoses (OR 3.12, 95% CI: 1.28, 7.56, p=0.015 for all anastomoses; p=0.028 for colorectal anastomoses).

For all other outcome measures, including mortality, leak rates (total anastomotic, clinical and radiological), local cancer recurrence and wound infection, there were no statistically significant differences between handsewn and stapled anastomoses.

All studies reported anastomotic leak rates. The combined OR slightly favoured stapled anastomoses (OR 0.92, 95% CI: 0.69, 1.23), although this finding was non significant.

NNT analysis: 167 stapled anastomoses would have to be performed to prevent one leak from a handsewn anastomosis. When 95% CIs are taken into account, in the worst case scenario against handsewn anastomoses, 33 stapled anastomoses would have to be undertaken to prevent one handsewn leak. However, 56 handsewn anastomoses would have to be performed to prevent one leak from a stapled anastomosis. When these numbers are compared with the overall leak rate of approximately 9% for both handsewn and stapled anastomoses, the contribution of the type of anastomosis to the leak rate does not seem to be clinically relevant.

Sensitivity analysis: there was no difference in any of the meta-analysis results when three articles were excluded on the basis of study quality.

Authors' conclusions
Intra-operative technical problems and post-operative strictures were more common with stapled anastomoses than handsewn anastomoses. A technical mishap was generally defined as a misfiring or malfunction, rather than a difficulty in completing the anastomoses. The reporting of this malfunction was almost exclusively in patients with stapled anastomoses, and thus a difference favouring handsewn anastomoses would be expected.

Other outcome measures showed no difference between groups. The authors concluded that both techniques were effective, and the choice may be based on personal preference.

CRD commentary
The authors presented a clear review question, with appropriate inclusion criteria and a validity assessment. Data were
combined appropriately. The search was fairly limited, involving MEDLINE (over a 30-year period) and the scanning of reference lists of retrieved articles. The search could have been extended to EMBASE and Cancerlit, and also included a handsearch of relevant journals. The authors did not attempt to locate unpublished material, although they addressed this issue in the discussion.

The details of the individual studies omitted patient characteristics such as age, gender and nationality.

As the authors pointed out, although the studies were pooled, there were likely to have been differences across trials in terms of the surgical techniques used.

The authors' conclusions follow logically from the results.

Implications of the review for practice and research
The authors state that future research could examine cancer recurrence rates using larger sample sizes. The current trials do not have sufficient power to determine with certainty that clinically relevant differences in local cancer recurrence rates are absent.

Bibliographic details

PubMedID
9556242

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Anastomosis, Surgical /methods; Colon /surgery; Humans; Intraoperative Complications; Outcome Assessment (Health Care); Postoperative Complications; Rectum /surgery; Surgical Stapling; Suture Techniques

AccessionNumber
11998000394

Date bibliographic record published
31/08/1999

Date abstract record published
31/08/1999

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.