Handsewn or stapled esophagogastric anastomoses after esophagectomy for cancer: meta-analysis of randomized controlled trials

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Authors' objectives
To compare patient outcomes from handsewn and circular stapled anastomosis reconstruction methods following oesophagectomy for oesophageal cancer.

Searching
Two independent reviewers searched PubMed to February 2001 by combining the MeSH terms 'oesophageal neoplasms/surgery' and 'anastomosis, surgical' with 'randomized controlled trial'. The bibliographies of the identified articles and one of the author's files were searched manually. Publications in any language were considered. There was no attempt to identify unpublished trials.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials were eligible for inclusion. The authors did not provide details about blinding of the outcome assessors, the duration of follow-up, or other characteristics of the individual studies.

Specific interventions included in the review
Handsewn oesophagogastric anastomoses compared with those fashioned by a mechanical circular stapling device. Circular staplers (end-to-end) were used, not small linear staplers. The authors did not provide any further details about the treatment methods.

Participants included in the review
Oesophageal cancer. People undergoing oesophagectomy for oesophageal cancer were included. The authors did not provide details about the demographic or clinical factors such as the participants' age, disease status, co-morbidities, medical treatments, follow-up regimen or gender.

Outcomes assessed in the review
The primary outcome was operative mortality (30-day and in-hospital mortality). The other main outcomes for the quantitative data synthesis were anastomotic leaks, anastomotic strictures, cardiac morbidity, and pulmonary morbidity. The secondary outcomes were the duration of the operation and the time to complete anastomosis. Definitions of the outcomes were provided in the review, but there were no details about how the outcome data were collected. Data on cancer recurrence and survival were unavailable. The outcome measures were not inclusion criteria for the review.

How were decisions on the relevance of primary studies made?
All randomised trials comparing handsewn and circular stapled techniques for reconstruction following oesophagectomy for cancer, were deemed relevant. The search was carried out independently and in duplicate. Two assessors agreed upon the trials selected.

Assessment of study quality
Validity was assessed using a quality score based on the 5-point scale developed by Jadad et al. (see Other Publications of Related Interest no.1). The studies were not excluded on the basis of their quality assessment because very few trials were identified. Two independent reviewers assigned a Jadad quality score to each trial. The inter-rater agreement was 100%. It is unclear whether the reviewers were blind to the outcomes when assessing study design.

Data extraction
Two independent reviewers extracted data on mortality, adverse effects, morbidity and procedural outcomes. The inter-rater agreement was 100%. The data were not weighted prior to pooling and analysis based on sample size or study quality.

**Methods of synthesis**

**How were the studies combined?**

The studies were combined using a statistical meta-analysis. A random-effects model was used to generate relative risk estimates and confidence intervals (CIs) for the primary outcome measures. A systematic qualitative review was used for the secondary outcomes because the data were not available in all trials.

**How were differences between studies investigated?**

Differences between the studies were assessed using tests of heterogeneity. The results for these were only reported for one analysis.

**Results of the review**

Five randomised trials with 467 participants were included.

All of the included studies received a quality rating of 2 or 3. The inter-rater agreement was 100% for the study selection, quality assessment and data extraction processes.

The relative risks of handsewn versus stapled oesophagogastric anastomoses for the main outcomes were: 0.45 (95% CI: 0.20, 1.0, p=0.05) for operative mortality, 0.79 (95% CI: 0.44, 1.42, p=0.43) for anastomotic leaks, 0.6 (95% CI: 0.27, 1.33, p=0.21) for anastomotic strictures, 0.99 (95% CI: 0.55, 1.77, p=0.97) for cardiac morbidity, and 0.93 (95% CI: 0.63, 1.37, p=0.72) for pulmonary morbidity.

Operations were significantly longer with hand sewing in 1 of the 4 studies that reported these data (p<0.05). It took significantly longer to complete the anastomosis with hand sewing in 2 of the 4 studies that reported these data (p<0.05).

The data were heterogeneous for anastomotic stricture (test of heterogeneity, p=0.07). Heterogeneity test results were not reported for other outcomes.

The small number of trials precluded a full assessment of publication bias using a funnel plot. Several of the trials found no difference between the treatments, so the authors concluded that publication bias against negative trials was unlikely.

**Authors’ conclusions**

There was little evidence of a difference between handsewn and circular stapled reconstruction techniques for oesophagogastric anastomoses. There was some evidence that hand sewing reduced operative mortality, with a tendency towards longer operational and procedural time compared with circular stapling.

**CRD commentary**

The methods and the selection criteria were reasonably valid. All relevant randomised trials were eligible. There were no restrictions on the basis of language, sample size or study quality. Heterogeneity and publication biases were assessed to the extent possible with such a small number of studies.

However, there were some potential problems.

1. While the searches (PubMed and manual) and the data extraction were independently checked, the search was based predominantly on the results from one database. There was no attempt to identify unpublished studies. Other databases that could have been searched include BIOSIS Previews, Cancerlit, Conference Papers Index, Science Citation Index, Dissertation Abstracts, EMBASE and NTIS.
2. The data were pooled using a random-effects model and a systematic qualitative synthesis. It is difficult to assess whether the data were appropriately pooled, because the details provided about the studies and heterogeneity tests were insufficient. The authors did not provide full details about the five studies included. There was no information on the characteristics of the study participants, such as age, gender and disease status. There was also no information relating to recruitment procedures or the duration of follow-up.

3. Operative mortality was the main outcome measure. The studies included did not provide details of cancer mortality or recurrence, both important outcomes for clinicians weighing up treatment options.

4. The studies focused on circular staplers. An alternative stapling technique using small linear staplers is now available (see Other Publications of Related Interest no.2). The results of this review cannot be generalised to newer stapling techniques.

5. No information was provided on the relative costs of handsewn and circular stapled techniques. If the techniques have similar clinical outcomes, an understanding of the resource costs may influence decisions on which method to use.

Despite these limitations, the data supports the authors’ conclusions.

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

Practice: The authors state that surgeons base decisions about anastomotic technique largely on personal preference and familiarity. This review found little evidence that patient outcomes are influenced by the choice of anastomotic technique. Surgeons should continue to use their preferred method.

Research: The authors did not state any implications for further research.

Reviewer’s statement: A comparison of the resource costs associated with hand sewing and stapling may be beneficial. A subgroup analysis of people with different disease status and other characteristics may also be of interest.

**Bibliographic details**


**PubMedID**

11869322

**Other publications of related interest**


**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Aged; Anastomosis, Surgical /methods; Confidence Intervals; Esophageal Neoplasms /mortality /pathology /surgery; Esophagectomy /methods /mortality; Esophagus /surgery; Female; Humans; Male; Middle Aged; Neoplasm Staging; Probability; Prognosis; Randomized Controlled Trials as Topic; Risk Assessment; Sensitivity and Specificity; Stomach /surgery; Survival Analysis; Suture Techniques; Treatment Outcome

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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.