Cervical or thoracic anastomosis after esophagectomy for cancer: a systematic review and meta-analysis

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CRD summary
The authors concluded that cervical anastomosis could be associated with higher anastomotic leak rates and recurrent nerve trauma, but evidence was limited and further trials were needed. The authors’ cautious conclusions reflect the strength of available evidence, but the possibility of statistical heterogeneity made their reliability unclear.

Authors' objectives
To compare short and long-term outcomes between cervical and thoracic anastomosis following oesophagectomy for cancer.

Searching
MEDLINE, EMBASE and The Cochrane Library were searched from inception to March 2010 for articles in any language. Search terms were reported. The search was expanded using the related articles feature of PubMed. Bibliographies of relevant articles were handsearched.

Study selection
Randomised controlled trials that compared cervical and thoracic anastomosis in patients following oesophagectomy for carcinoma were eligible for inclusion.

Included studies compared cervical hand-sewn or stapled anastomosis with thoracic stapled anastomosis. Outcomes reported in the review were pulmonary complications, anastomotic leakage, mortality, recurrent nerve trauma, positive resection margin, length of hospital stay, stricture of anastomosis, tumour recurrence and predefined quality of life assessment. Date of publication ranged from 1989 to 2007.

Two reviewers independently performed the search. Articles were selected by title and abstract and again by full text.

Assessment of study quality
The validity of the included studies was assessed using the Dutch Cochrane Centre critical review checklist of blinding allocation concealment, eligibility criteria specified, comparability of groups at baseline, follow-up, intention-to-treat analyses, exclusion of patients and similar non-trial treatment. Caregiver and patient blinding were not possible for all studies and these items were excluded.

Two reviewers independently assessed study quality.

Data extraction
Means and standard deviations were extracted for continuous data. For dichotomous data, the number of events in each group was extracted and used to calculate odds ratios (ORs) and 95% confidence intervals (CI).

Two reviewers independently performed the data extraction.

Methods of synthesis
Weighted mean differences with 95% CIs were calculated for continuous data. For dichotomous data, pooled odds ratios and 95% CI were calculated. Random-effects models were used. Statistical heterogeneity was assessed using $\chi^2$ and $I^2$. A narrative synthesis was used for one study that used a stapled cervical anastomosis and for outcomes with two or less studies.

Results of the review
Four randomised controlled trials were included (267 participants). One was excluded from the meta-analysis because it used a different anastomotic technique. All studies specified eligibility criteria, had similar groups at baseline and
follow-up and had similar non-trial treatment. Allocation concealment was present in three studies. Three studies used intention-to-treat analysis.

**Meta-analyses**: There were three studies (175 participants). Cervical anastomosis was associated with significantly greater anastomotic leakage (OR 3.43, 95% CI 1.09 to 10.78) and recurrent nerve trauma (OR 7.14, 95% CI 1.75 to 29.14) compared to thoracic anastomosis. There were no significant differences between cervical and thoracic anastomoses in incidence of pulmonary complications, mortality, stricture of anastomosis needing dilation and tumour recurrence.

**Narrative synthesis**: One RCT (92 participants) compared cervical anastomosis that was predominantly stapled with stapled thoracic anastomosis found significantly more anastomotic leaks (p<0.02) in the cervical group. There was no difference between cervical and thoracic anastomosis on incidence of pulmonary complications, mortality, resection margins and benign stricture requiring dilation. One RCT (32 participants) found no significant differences between groups on quality of life. Significance levels were not reported for length of hospital stay.

**Authors' conclusions**
Cervical anastomosis could be associated with higher anastomotic leak rates and recurrent nerve trauma, but evidence was limited and further trials were needed.

**CRD commentary**
The review addressed a clear question. Inclusion criteria for intervention, participants and study design were well defined. It was unclear whether inclusion criteria for outcomes were defined in advance. Several relevant databases were searched with no language restrictions. There seemed to be no attempts to identify unpublished data, so publication bias could not be ruled out. Appropriate steps were taken to minimise risks of reviewer error and bias. A validity assessment was performed and the included studies were of moderate quality. The studies spanned a long period of time and so clinical differences between studies may have affected the findings. The decision to exclude one study from the meta-analysis on the grounds of clinical heterogeneity was appropriate. The authors reported that they carried out tests of statistical heterogeneity, but they did not report the findings so it was difficult to determine the suitability of combining studies in a meta-analysis. Only a small number of studies were included and these had small sample sizes, which limited the conclusions that may be drawn.

The authors' cautious conclusions reflect the strength of available evidence, but the possibility of statistical heterogeneity made their reliability unclear.

**Implications of the review for practice and research**
**Practice**: The authors did not state any implications for practice.

**Research**: The authors stated a need for further research to compare cervical and thoracic anastomosis, in particular to evaluate new anastomotic techniques.

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