A meta-analysis of randomized controlled trials of route of reconstruction after esophagectomy for cancer

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Authors' objectives
To determine the effect of route of gastric conduit reconstruction on patient outcomes, after oesophagectomy for cancer.

Searching
MEDLINE (via PubMed) was searched for papers in any language using the terms 'esophagectomy' or 'oesophagectomy'. The dates over which the search was conducted were not reported. Manual searches were also conducted: articles cited in the reference lists of the identified RCTs, and an article file belonging to one of the authors, were reviewed. No attempt was made to find unpublished material.

Study selection
Study designs of evaluations included in the review
The review was limited to randomised controlled trials (RCTs), of which there were six.

Specific interventions included in the review
Anterior or posterior gastric conduit reconstruction routes were included in this review.

Participants included in the review
There were no specific inclusion criteria for the participants, other than that they had to have undergone a gastric conduit reconstruction after oesophagectomy for cancer.

Outcomes assessed in the review
The selection process for the trials was inclusive and there were no inclusion criteria specified for the outcomes. The major outcomes included in the meta-analysis were operative mortality, anastomotic leaks, cardiac morbidity and pulmonary morbidity. Other peri-operative and functional outcomes were also evaluated.

How were decisions on the relevance of primary studies made?
Apart from reporting that the article selection process was inclusive, the authors do not state how the papers were selected for the review. However, they state that the two trial assessors agreed upon the six identified and selected RCTs.

Assessment of study quality
The quality of the included studies was assessed using the scale of Jadad et al. (see Other Publications of Related Interest). The assessment was conducted independently by two reviewers and a quality score was assigned.

Data extraction
The data extraction was conducted independently by two reviewers. Data were abstracted on the following:

major outcomes, i.e. operative mortality, anastomotic leaks, cardiac morbidity and pulmonary morbidity;

early (peri-operative) outcomes, i.e. the duration of operation, blood loss, mechanical ventilation, length of stay in intensive care unit and length of hospital stay; and

functional outcomes, i.e. strictures, swallowing, quality of life, body weight and gastric emptying.
Methods of synthesis
How were the studies combined?
For major outcomes, the studies were combined by a meta-analysis using a random-effects model, to calculate an overall relative risk (RR). There was no information relating to whether the trials were weighted according to sample size or quality. Not all of the trials had data available for all major outcomes. A systematic qualitative review was undertaken for other early (peri-operative) and late outcomes that could not be accurately synthesised quantitatively.

The authors state that publication bias could not be properly assessed as there were insufficient RCTs to construct a funnel plot. However, they contend that several of the RCTs were negative in their conclusions, i.e. no difference between the routes, so bias against the publication of negative trials seems unlikely.

How were differences between studies investigated?
The authors do not report a method for assessing heterogeneity.

Results of the review
Six RCT with a total of 342 patients were included.

The agreement between the trial assessors on the quality assessment was strong (100%).

The RRs were expressed as posterior versus anterior mediastinal route. The RR was 0.56 (95% confidence interval, CI: 0.17, 1.82, P=0.34) for operative mortality, 1.01 (95% CI: 0.35, 2.94, P=0.98) for leaks, 0.43 (95% CI: 0.17, 1.12, P=0.08) for cardiac morbidity, and 0.67 (95% CI: 0.34, 1.33, P=0.26) for pulmonary morbidity. There was no evidence of any difference in other early (peri-operative) outcomes or conduit function for the two routes of reconstruction.

Authors’ conclusions
Posterior and anterior mediastinal routes of reconstruction are associated with similar outcomes after oesophagectomy for cancer.

The authors identified two major limitations. Firstly, the issue of tumour recurrence within the transposed conduit was not adequately addressed in the included trials which, in theory, could lead to an erroneous conclusion in favour of posterior reconstruction. Secondly, the number of trials and patients was insufficient to refute the view that anterior mediastinal reconstruction leads to peri-operative complications.

CRD commentary
The review question was clearly defined in terms of the intervention and study design. However, the authors appeared to design the outcome inclusion criteria to be inclusive once they had noted the limited number of RCTs. Their search was appropriate, but the search dates were not given and only one database was searched. There was no attempt to find unpublished material. It is, therefore, possible that studies were missed. The quality assessment was performed according to published criteria. The data analysis was appropriate but it is unclear whether differences between the studies (heterogeneity) were investigated. The review process was thorough with two reviewers independently assessing the quality of the studies and extracting the data.

While the review's conclusions appear to be sound, the size of the included trials and the overall number of participants is small. As the researchers comment, there is a need for larger trials to finally resolve controversies in this area.

Implications of the review for practice and research
Practice: The authors state that both posterior and anterior mediastinal gastric conduit routes are acceptable for reconstruction after oesophagectomy and cervical oesophagostomy for cancer. When an incomplete (R1 or R2) resection is performed, there are theoretical grounds to support anterior mediastinal reconstruction. When a complete (RO) resection is performed, the posterior mediastinal route may lead to fewer post-operative complications. Both routes of reconstruction provide similar late foregut function.
Research: The authors state that further trials with larger numbers of patients are needed in order to definitively resolve the controversies in this area of surgery.

Bibliographic details

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Other publications of related interest

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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.