Systematic review of the impact of endoscopic ultrasound on the management of patients with esophageal cancer

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CRD summary
The review assessed the impact of endoscopic ultrasound staging of oesophageal cancer on patient management and survival. The authors concluded that, whilst high quality evidence was not available, the therapeutic impact studies identified provided a higher level of evidence than test accuracy studies alone. These cautious conclusions were representative of the limited data available.

Authors' objectives
To determine the impact of endoscopic ultrasound staging of oesophageal cancer on patient management and survival.

Searching
MEDLINE, EMBASE and the Cochrane Library were searched to May 2005; search terms were reported. Websites and bibliographies of included studies were searched for additional articles. Clinical experts were also consulted. No language restrictions were applied.

Study selection
Controlled studies of endoscopic ultrasound for staging oesophageal cancer that reported therapeutic impact or patient survival were eligible for inclusion. Studies with less than ten participants and studies that assessed catheter-probe or intraoperative endoscopic ultrasound were excluded.

Most of the included studies assessed endoscopic ultrasound using radial scanners and experienced operators (where reported). Tumour sites (oesophageal, pancreatobiliary, gastric, duodenal, mediastinal, rectal), stage and breakdown of management outcomes varied across studies (details reported in tables).

One reviewer assessed studies for inclusion and a second reviewer checked inclusion decisions.

Assessment of study quality
The authors stated that the methodological quality was assessed using criteria based on elements described by Guyatt et al for before-and-after studies of the therapeutic impact of diagnostic technologies. The reported criteria were: consecutive recruitment; reporting of test accuracy data; management plan derived by referring clinician; outcomes reported by specific indication/use.

The authors did not state how many reviewers conducted the quality assessment.

Data extraction
For patient management studies, data were extracted on the total number of participants, number with a change in management following endoscopic ultrasound, and numbers with specific management changes (surgery avoided and investigations avoided). For survival studies, results were extracted as reported by included studies, e.g. hazard ratios (HR) with 95% confidence intervals (CIs) for mortality and recurrence, survival duration with and without staging by endoscopic ultrasound.

Data were extracted by one reviewer and checked by a second.

Methods of synthesis
Studies were combined in a narrative synthesis grouped by outcome (change to management plan and survival).
**Results of the review**

Seven studies were included in the review. Five pre-test/post-test case series (n=877 patients) reported on the impact of endoscopic ultrasound on pre-test management plan. None of the studies recruited a consecutive series of patients based on clinical presentation; included independent assessment of the adequacy of pre-test work-up/diagnosis; or included the contribution of endoscopic ultrasound to the management decision. One study assessed concordance between assessors rather than per patient change to management plan. Two studies provided accuracy data for endoscopic ultrasound. None of the studies reported the effectiveness of treatments provided. Overall, the generalisability of data was limited by determination of management plan with operators or setting not typical of clinical practice. Two retrospective cohort studies (n=309 patients) reported survival data in patients staged with and without endoscopic ultrasound, using a historical control group; neither study reported inclusion of consecutive patients; the potential for selection bias and differences in concomitant therapies was high.

**Patient management**

Endoscopic ultrasound changed management in 24 to 29% of patients (two studies). Combining data on endoscopic ultrasound for staging and/or diagnosis (two studies), endoscopic ultrasound changed management in 32 to 55% of patients; further investigations were avoided in 14 to 33% of these patients (two studies), and surgery was avoided in 18% (one study). Data on the avoidance of surgery in patients receiving endoscopic ultrasound for the staging of oesophageal cancer were not reported separately by any study; surgery was avoided in 10 to 16% of patients with mixed indications (three studies).

**Survival**

One study (n=167) found that staging with endoscopic ultrasound increased survival (adjusted HR 0.66, 95% CI 0.47 to 0.90), and decreased tumour recurrence (adjusted HR 0.63, 95% CI 0.43 to 0.87). A second study (n=142 patients) reported survival data for patients undergoing surgical resection, rather than for all patients tested; it found that median survival times and rates of unnecessary laparotomy were similar in patients staged with and without endoscopic ultrasound.

**Authors' conclusions**

High quality evidence about the impact of endoscopic ultrasound in the staging of oesophageal cancer on patient outcomes was not available at this time. However, the therapeutic impact studies included in this review provided a higher level of evidence of the effectiveness of endoscopic ultrasound than accuracy studies alone.

**CRD commentary**

The review addressed a clearly stated research question and defined appropriate inclusion criteria. A number of sources were searched for relevant studies; no language restrictions were applied. Methods to minimise error and bias in study selection and data extraction were evident, but it was unclear whether similar measures were applied to quality assessment.

An assessment of the methodological quality of included studies was reported and their findings were incorporated in the interpretation of results. The use of a narrative synthesis was appropriate, given the apparent heterogeneity of populations and outcomes assessed between included studies.

The authors' cautious conclusions were representative of the limited data available.

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

**Practice**: The authors recommended the public funding of endoscopic ultrasound for the staging of oesophageal cancer in Australia and this recommendation was approved by the Australian Minister for Health and Aging.

**Research**: The authors stated that further, high quality studies investigating the impact of endoscopic ultrasound on patient survival are required.

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