Comparison of endoscopic ultrasound and computed tomography for the preoperative evaluation of pancreatic cancer: a systematic review
DeWitt J, Devereaux B M, Lehman G A, Sherman S, Imperiale T F

CRD summary
This review concluded that studies differed in their design, quality and results but, overall, endoscopic ultrasound is superior to computed tomography for the detection of pancreatic cancer, although the optimal method for staging and determination of resectability remains undetermined. The reliability of these conclusions is restricted by methodological limitations in the selection and synthesis of studies in the review.

Authors' objectives
To determine whether computed tomography (CT) or endoscopic ultrasound (EUS) is superior for the detection, staging and resectability of pancreatic cancer.

Searching
MEDLINE was searched for relevant English language studies published between 1986 and 2004; the search terms were reported. In addition, the bibliographies of retrieved articles were checked for additional studies.

Study selection
Study designs of evaluations included in the review
The authors did not report any specific inclusion criteria relating to the study designs.

Specific interventions included in the review
Studies comparing EUS and CT techniques were eligible for inclusion. The included studies used different EUS and CT techniques.

Reference standard test against which the new test was compared
Studies that reported a reference standard of surgery, biopsy or clinical follow-up in the majority of patients were eligible for inclusion. In the included studies, surgical examination was obtained in 71% of all patients (range: 19 to 71).

Participants included in the review
Studies including patients with suspected or established pancreatic cancer were eligible for inclusion. Overall, 71% of the included patients had pancreatic cancer.

Outcomes assessed in the review
Studies assessing pancreatic cancer detection, staging and/or resectability were eligible for inclusion.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The methodological quality of the included studies was assessed according to the following criteria: consecutive series of patients evaluated; standardisation of EUS and CT techniques; independent interpretation of both tests; unbiased determination of resectability; surgical examination as reference standard; independent blind comparison with reference standard; diagnostic test performance measures (e.g. sensitivity, specificity) reported; and clinical follow-up used as a surrogate reference standard. Each item met received a score of up to 1 point, with a potential maximum score of 7 points. The authors did not state how many reviewers performed the study assessment.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data on the sensitivity, specificity and diagnostic accuracy of EUS and CT were extracted.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
Differences between the study characteristics were discussed in the narrative synthesis. The results from the 3 studies with the highest quality scores were discussed separately.

Results of the review
Eleven studies (n=678) were included in the review.

Studies met between 2 and 6.5 of the quality assessment criteria.

Tumour detection (9 studies): all 9 studies reported EUS to be more sensitive than CT, particularly for tumours smaller than 3 cm. The specificity of EUS was reported to be superior to CT in 2 studies and equivalent in one.

Tumour staging (5 studies): 4 studies concluded that EUS was superior to CT for tumour staging.

Nodal staging (8 studies): 5 studies concluded that EUS was superior to CT for nodal staging, though three more recent studies reported helical CT or multidetector CT to be equivalent to EUS.

Resectability (4 studies): of the 4 studies evaluating resectability, one favoured EUS, one favoured CT, and two found no difference.

Authors' conclusions
The literature comparing EUS and CT for pre-operative assessment of pancreatic cancer is heterogeneous in terms of study design, quality and findings, and all studies had important methodological limitations. EUS is superior to CT for the detection of pancreatic cancer, but the optimal method for staging and determination of resectability remains undetermined.

CRD commentary
This review used broadly appropriate inclusion criteria that supported its stated objectives. The search was limited to English language publications identified through a single electronic database and the cross-referencing of retrieved bibliographies. Consequently, relevant studies may potentially have been missed in the search. In addition, the authors did not state that any attempts were made to minimise the potential for errors or bias in the study selection or data extraction processes. Though aspects of study validity were discussed in some detail, the synthesis of study outcomes was generally limited to counting the number of studies favouring one imaging modality over another; specific measures of diagnostic test accuracy were not clearly reported or combined in the synthesis. Given these methodological limitations, the conclusions of the review may not be entirely reliable.

Implications of the review for practice and research
Practice: The authors stated that the routine use of EUS for staging and assessment of resectability in surgically fit patients with a clearly resectable pancreatic mass on multidetector CT (MDCT) cannot be recommended. If MDCT is equivocal for resectability, or does not clearly show a pancreatic mass, EUS and MDCT may be complementary. In the case where MDCT shows a clearly unresectable tumour, EUS fine-needle aspiration (EUS-FNA) of the mass might be used before treatment.
Research: The authors stated that a large, prospective, preferably multicentre study comparing combined radial and linear EUS/EUS-FNA with dual-phase imaging against state-of-the-art MDCT scanners is needed.

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