A systematic review on the clinical diagnosis of gastrointestinal stromal tumors
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CRD summary
This review concluded that ultrasound endoscopy with fine needle aspiration biopsy was the preferred technique for diagnosing gastrointestinal stromal tumours; other methods were considered valid alternatives when ultrasound endoscopy with fine needle aspiration was unavailable. As data on specificity were not considered, it is not possible to determine which, if any, of the techniques should be used in clinical practice.

Authors' objectives
To determine the diagnostic yield of clinical procedures for the diagnosis of gastrointestinal stromal tumours (GIST).

Searching
MEDLINE, EMBASE, Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from 1998 to October 2007. Search terms were reported. The review was restricted to full-text studies published in English, Dutch, Spanish, German, French and Italian. References were screened to identify additional studies.

Study selection
Studies that assessed the clinical presentation and/or preoperative diagnostic assessment of patients with possible GIST were eligible for inclusion. Studies had to provide data on the diagnostic yield (proportion of patients with correctly diagnosed GIST). Studies that exclusively reported data on operative or postoperative management and studies with less than 10 GIST patients were excluded.

The overall male to female ratio in the included studies was 1.23 to 1. The range of median ages was 55 to 68 years. GISTs were located in the oesophagus, stomach, small bowel and colonrectum. Clinical symptoms evaluated included: gastrointestinal bleeding; anaemia; abdominal pain; abdominal mass at physical examination; dysphagia; obstruction episodes; and weight loss. Procedures assessed were endoscopy, ultrasound endoscopy (EUS), ultrasound endoscopy with fine needle aspiration biopsy, computed tomography (CT) and magnetic resonance imaging (MRI).

Two reviewers independently selected studies for inclusion. Disagreements were resolved through discussion.

Assessment of study quality
Two reviewers independently assessed study quality based on the following criteria: number of patients (>30 or <30); clear indication of the tumour site; complete diagnosis from symptoms to diagnosis; comparison of diagnostic tools; prospective/consecutive patient enrolment; and clear description of molecular diagnosis. Studies were assigned a summary quality score according to the number of items fulfilled out of a maximum 7 points. Studies that scored less than 3 points on the quality assessment were excluded.

Data extraction
Two reviewers independently extracted data on the diagnostic yield (proportion of patients with GIST correctly identified) of each technique evaluated and the proportion of patients with GIST who presented with each of the clinical symptoms assessed.

Methods of synthesis
Data on diagnostic yield (sensitivity) and the prevalence of various clinical symptoms in patients with GIST were pooled. Methods used to pool data were not reported. Yates' correct $X^2$ test was used to compare pooled diagnostic yields.

Results of the review
Forty six studies were included (n=5,105 patients of whom 4,543 had GIST). One study was prospective and all others
were retrospective. Some 63% of studies included more than 30 patients, 91% clearly indicated the tumour site, 43% calculated the diagnostic yield of the various procedures, 28% included a comparison of diagnostic tools, 93% enrolled consecutive patients and 83% provided a clear definition of the disease's molecular diagnosis.

There was considerable variation across studies in the proportion of patients with GIST who presented each of the clinical symptoms examined. Gastrointestinal bleeding was the most common clinical presentation (pooled prevalence 33%, range 0 to 84% across studies).

The pooled diagnostic yield of endoscopy plus mucosal biopsy was 33.8% (range 0 to 100%, based on 11 studies) and of intestinal contrast radiography was 35.1% (range 11 to 100%, based on five studies). The yield of ultrasound endoscopy was 68.7% (range 40 to 100%, based on six studies), which increased to 84% (74 to 100%, based on five studies) when associated with fine needle aspiration biopsy. The diagnostic yield of CT was 73.6% (range 35 to 100%, based on 10 studies) and that of MRI was 91.7% (range 75 to 100%, based on five studies).

**Authors' conclusions**

Endoscopy combined with mucosal biopsy should be reserved for patients with gastrointestinal bleeding. Ultrasound endoscopy-fine needle aspiration provided direct visualisation of the neoplasm and adequate samples for molecular diagnosis. Ultrasound endoscopy, abdominal CT and MRI may be considered valid alternatives when ultrasound endoscopy-fine needle aspiration is unavailable or a cytological diagnosis is unnecessary.

**CRD commentary**

The review addressed a broad question with some details on inclusion criteria specified. The review was limited to published studies in certain languages and so there was a possibility of language and publication bias. Appropriate steps were taken to minimise bias and errors at all stages of the review process. Study quality was assessed using appropriate criteria and the results of the quality assessment were reported. The quality assessment did not contribute directly to the analysis, but it appeared that studies that did not fulfil at least three quality items were excluded from the review. Details on methods used to pool data were not reported and the review focused only on diagnostic yield (sensitivity) with no information on specificity. Given the lack of assessment of specificity, the conclusions drawn around the recommendations for the use of these tests in clinical practice should be viewed with some caution.

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

The authors did not state any implications for practice or research.

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