Diagnostic accuracy of CT angiography in acute gastrointestinal bleeding

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CRD summary
The review concluded that computed tomography angiography was accurate and could show the precise location and aetiology of gastrointestinal bleeding. Weaknesses in the review methods and data set mean that this conclusion is poorly supported and should be viewed with caution. The authors' conclusion that further research is needed for firm clinical recommendations is appropriate.

Authors' objectives
To assess the accuracy of computed tomography (CT) angiography for the diagnosis of acute gastrointestinal bleeding.

Searching
MEDLINE and EMBASE were searched (1997 to 2007) for studies published in English. Search terms were reported. Additional studies were identified by screening the bibliographies of identified primary studies and reviews.

Study selection
Studies that compared computed tomography (CT) with a reference standard (angiography, endoscopy, colonoscopy, surgery, or a combination of these) for the diagnosis of gastrointestinal bleeding, were eligible for inclusion. Case reports, studies of CT enteroclysis and studies of abnormal trauma were excluded.

The majority of included studies used single slice, dual slice, or 4-slice CT (one study also used 16 and 64-slice). The criteria for a positive CT varied, but generally included extravasation of contrast medium to the bowel lumen. The CT protocols also varied across studies, e.g. contrast media included intra-arterial agents and water used as an oral contrast. Where reported, the mean age of participants ranged from 58 to 69 years, and the majority of study participants were male.

The authors did not state how studies were assessed for inclusion, or how many reviewers performed the assessment.

Assessment of study quality
Study quality was assessed using the QUADAS (Quality Assessment of Diagnostic Accuracy Studies) tool.

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

Data extraction
Data were extracted on the numbers of true positives, false negatives, false positives, and true negatives, and on the severity and location of gastrointestinal bleeding.

The authors did not state how data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
Sensitivity and specificity, with 95% confidence intervals (CIs), were estimated for each included study; diagnostic odds ratio (DOR) was also reported. A value of 0.5 was added to all cells with zero values.

Pooled estimates of sensitivity and specificity were calculated using the DerSimonian and Laird random-effects model, and a summary receiver operating characteristic curve was fitted using the Moses and Littenberg model. Heterogeneity was assessed using the chi-squared test.

Results of the review
Eight studies (five prospective and three retrospective), with a total of 129 participants, were included in the review; study size ranged from five to 26 participants. The methodological quality of included studies was presented as an overall score, which ranged from 6 to 12, out of a maximum possible 14 points; two of the eight studies reported blinded interpretation of the index test and reference standard. The severity of gastrointestinal bleeding varied considerably between studies, from patients who did not require transfusion, to patients requiring multiple transfusions.

Computed tomography angiography showed a pooled estimate of sensitivity of 86% (95% CI 78 to 92), based on eight studies, and a pooled estimate of specificity of 95% (95% CI 76 to 100), based on six studies; no statistically significant heterogeneity was identified. The pooled diagnostic odds ratio was 25.4 (95% CI 7.4 to 87.1), and the area under the summary receiver operating characteristic curve was 0.93.

**Authors' conclusions**

CT angiography was accurate in the diagnosis of acute gastrointestinal bleeding and provided information on the aetiology and location of the bleed. This review had methodological limitations, so further large, prospective studies are required to define the role of CT in acute gastrointestinal bleeding.

**CRD commentary**

The aim of the review was clearly stated, however, inclusion criteria were vague and covered only the index test and reference standard. The search strategy was limited to two bibliographic databases and this, combined with the restriction to English language publications, increases the likelihood of omission of relevant data and leaves the review open to language bias. No details of the review process were reported, so that the potential for error and/or bias cannot be assessed. The methodological quality of included studies was assessed using a validated tool, but these data were presented as overall scores (an approach which evidence has shown to be invalid). Though there was no evidence of statistically significant, between study heterogeneity, the small sample sizes of studies, and high degree of variation in index test and reference standard methods and clinical populations (all of which were noted by the authors), make the generation of pooled estimates of accuracy measures of doubtful value. Overall, weaknesses in the review methodology and the data set mean that the authors’ conclusion that CT angiography is accurate for the diagnosis of gastrointestinal bleeding is poorly supported and should be treated with caution. Their conclusion that the review is insufficient for strong clinical recommendations and further research is needed is appropriate.

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

**Practice:** The authors stated that methodological limitations of the review prevented strong recommendations regarding the clinical use of CT.

**Research:** The authors stated that large, prospective studies are needed to define the role of CT in acute GI bleeding, when other investigations cannot provide a diagnosis.

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