A meta-analysis of the yield of capsule endoscopy compared to double-balloon enteroscopy in patients with small bowel diseases

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CRD summary
This review concluded that the diagnostic yield of double-balloon endoscopy using a combination of oral and anal approaches might be as high as that of capsule endoscopy in patients with small bowel diseases. However, these findings may not be reliable given the failings in the review methodology and analysis.

Authors' objectives
To compare the diagnostic yield of capsule endoscopy (CE) with double-balloon enteroscopy (DBE) in patients with small bowel diseases.

Searching
PubMed, EMBASE, ScienceDirect, the China Academic Journals Full-text Database and the Cochrane Controlled Trials Register were searched up to February 2007; the search terms were provided. In addition, abstracts presented at the proceedings of Digestive Disease Week (USA) and the World Congress of Gastroenterology were also searched for additional studies.

Study selection
Prospective studies comparing the diagnostic yield of CE and DBE successively in patients with symptoms suggestive of organic small bowel disease (i.e. obscure gastrointestinal bleeding, abdominal pain and diarrhoea) were eligible for inclusion. Patients with functional gastrointestinal (GI) disease had to be excluded, and patients had to have undergone gastroscopy, colonoscopy and other diagnostic tests without positive findings. The majority of included participants suffered from obscure GI bleeding, the source of which was classified into different lesions. All of the included studies used either oral and/or anal approaches to DBE. The authors did not specify criteria as to the eligibility of the outcomes, but the number of positive findings and complications were reported.

Two reviewers independently assessed the eligibility of the studies, and any disagreements were resolved by consulting a third reviewer.

Assessment of study quality
The authors did not state that they assessed validity, but they did report whether the studies were double-blinded.

Data extraction
The odds ratios (ORs) of diagnostic yields for the two tests were calculated. The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
Where no significant statistical heterogeneity was detected, ORs with 95% confidence intervals (CIs) for diagnostic yields were pooled using a fixed-effect model; in the presence of significant heterogeneity, a random-effects model was used. Statistical heterogeneity was assessed using the $\chi^2$ and $I^2$ tests, with the significance level set at 0.10. Subgroup analyses were performed to investigate differences due to the different types of DBE insertion approach. Funnel plots were used to assess the risk of publication bias.

Results of the review
Eight studies (n=277), five of which were double-blind, were included in the analysis. No significant differences (random-effects model) in diagnostic yield were reported for CE and DBE, but there was some evidence of significant statistical heterogeneity ($I^2=59.8\%$). A subgroup analysis according to the insertion approach used for DBE showed that the diagnostic yield of CE was significantly higher than that of the separate approaches for DBE (OR 1.67, 95% CI: 1.14, 2.44; $I^2=0\%$; fixed-effect model). When the two approaches (oral and anal) were combined, a non significant
difference in favour of combined DBE was found (random-effects model), but there was evidence of significant heterogeneity ($I^2=75.5\%$).

No adverse events were reported.

Funnel plots suggested that there was no risk of publication bias.

**Authors' conclusions**
The diagnostic yield of DBE using a combination of oral and anal approaches might be as high as that of CE.

**CRD commentary**
This review answered a clear review question. Limited attempts were made to reduce the risk of publication bias, and the authors' assessment is unlikely to be reliable given the small number of included studies. It is also unclear whether appropriate steps were taken to reduce the risk of reviewer error and bias, and the reliability of the data is unclear in the absence of any assessment of validity. Few details of the study and participant characteristics were presented and evidence of statistical heterogeneity was reported. Some limited attempts were made to investigate potential sources of heterogeneity, but these failed to identify the cause and were based on small numbers of participants. The authors' analysis only focused on diagnostic yield and did not assess diagnostic accuracy, which takes into account both false-positive and -negative findings. These failings in the review methodology and analysis suggest that the reviewers' conclusions may not be reliable.

**Implications of the review for practice and research**
Practice: The authors stated that the decision as to the initial approach to the diagnosis of small bowel diseases should be made with the physical status of the patient, the availability of technology, patient preference and the potential for therapeutic endoscopy taken into account.

Research: The authors stated that more studies are required to compare the diagnostic yield and accuracy of DBE using combined insertion approaches and CE.

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