Double balloon enteroscopy and capsule endoscopy for obscure gastrointestinal bleeding: an updated meta-analysis

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CRD summary
This review concluded that capsule endoscopy (CE) and double balloon enteroscopy (DBE) had similar diagnostic yields for the localisation of bleeding in patients with occult gastrointestinal bleeding, and the yield of DBE was increased when used after a positive CE. These conclusions reflect the data presented, but should be interpreted cautiously due to potential methodological limitations in the review process.

Authors’ objectives
To compare the diagnostic yields of capsule endoscopy (CE) and double balloon enteroscopy (DBE) for the localisation of bleeding source in patients with obscure gastrointestinal bleeding.

Searching
PubMed, EMBASE and The Cochrane Library were searched to 1st January 2010; search terms were reported. The bibliographies of all retrieved articles and the abstracts from conference proceedings of Digestive Diseases (2007, 2008 and 2009) were also searched for additional studies. Only studies published in English were included. Abstracts older than three years not subsequently published as full articles were excluded.

Study selection
Eligible studies compared balloon assisted enteroscopy (either DBE or single balloon enteroscopy) with CE in the same patients with obscure gastrointestinal bleeding (both overt and occult). Studies that assessed a broader population of patients with other indications for small bowel investigations were included if separate data could be extracted for patients with gastrointestinal bleed.

All studies compared DBE and CE. In all but one study, CE preceded DBE. All studies included a mixed population of patients with obscure gastrointestinal bleeding and reported combined results for overt and occult gastrointestinal bleeding. Most studies were conducted in Japan, with the remainder conducted in the USA, the Netherlands and Italy.

One reviewer screened titles and abstracts for relevance and full copies of those that appeared to meet inclusion criteria were retrieved. These studies were independently assessed by two reviewers and any disagreements were resolved by discussion and consensus.

Assessment of study quality
The quality of studies was assessed using the STARD statement, modified by removal of four items not considered relevant to the topic. The remaining items were used to derive a total score (maximum 21). Scores of 17 to 21 were classified as “excellent quality”, 12 to 16 “good quality”, 7 to 11 “moderate quality” and below 7 “poor quality.”

Two reviewers independently assessed study quality and any disagreements were resolved by discussion and consensus.

Data extraction
Data were extracted on the number of successful localisations of gastrointestinal bleeding using CE and using DBE. The diagnostic yields of CE and DBE, and the diagnostic yields of DBE after prior positive and negative CE were calculated. The odds ratios (OR), with 95% confidence intervals (CIs) of successful localisation of the source of bleeding (using CE compared with DBE) were also calculated.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
A pooled odds ratio, with 95% confidence intervals, was calculated using a random-effects model. Pooled diagnostic yields for CE and for DBE, with 95% confidence intervals, were separately calculated and weighted by Mantel-
Haenszel inverse variance.

Heterogeneity was assessed using $\chi^2$. Subgroup analyses were undertaken to assess the diagnostic yields of DBE performed after a positive CE or after a negative CE. Publication bias was assessed using a funnel plot.

**Results of the review**

Ten studies (total of 651 participants) were included in the review. All participants in all studies underwent CE and most underwent DBE; nine participants from one study underwent CE but not DBE. Five studies were rated "excellent", four "good" and one "moderate" quality.

The pooled diagnostic yield for CE was 61.7% (95% CI 47.3 to 76.1) and the pooled diagnostic yield for DBE was 55.5% (95% CI 48.9 to 62.1).

The pooled OR for successful localisation of bleeding source using CE compared with DBE was 1.39 (95% CI 0.88 to 2.20; $I^2=69%$; 10 studies), indicating no significant difference between the two methods.

The pooled diagnostic yield of DBE performed after a positive CE was 75.0% (95% CI 60.1 to 90.0%) and the pooled diagnostic yield of DBE performed after a negative CE was 27.5% (95% CI 16.7 to 37.8). The diagnostic yield of DBE following a positive CE was greater than that for initial DBE (OR 1.79, 95% CI 1.09 to 2.96; $I^2=49%$, seven studies).

**Authors’ conclusions**

CE and DBE had similar diagnostic yields for the localisation of bleeding in patients with obscure gastrointestinal bleeding. The diagnostic yield of DBE was greater when performed in patients with a positive CE than when performed in patients with a negative CE.

**CRD commentary**

The review stated a clear objective and defined relevant inclusion criteria. A range of sources were searched for relevant studies, but the restriction to published (except for recent abstracts) studies in English may have lead to the omission of relevant data and raised the possibility of language and/or publication bias. Study selection and quality assessment incorporated measures to minimise error and/or bias, but it was not clear whether similar measures were applied to the data extraction process.

The quality of studies was assessed using criteria based on the STARD statement which was a measure of reporting quality rather than methodological quality reported as an overall score. Quality assessment was of limited value in judging the reliability of the findings. The meta-analytic methods used appeared appropriate for the data presented. Overall, the authors’ conclusions reflected the data presented, but should be interpreted cautiously due to potential methodological limitations in the review and limited reporting of the details (including quality) of the included studies.

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

**Practice**: The authors stated that the diagnostic work-up of obscure gastrointestinal bleeding should usually start with CE, especially in patients with occult bleeding as CE was less invasive than enteroscopy and the yield of DBE was significantly enhanced when guided by a previously positive CE study.

**Research**: The authors stated that further prospective studies were needed to compare CE and DBE in patients with overt obscure gastrointestinal bleeding.

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