Transparent cap-assisted colonoscopy versus standard adult colonoscopy: a systematic review and meta-analysis

Westwood DA, Alexakis N, Connor SJ

CRD summary

This review found that cap-assisted colonoscopy was associated with improved detection of potentially cancerous polyps compared with standard colonoscopy. Differences between the included studies and some weaknesses in the review suggest that the conclusions should be regarded as provisional. The authors' suggestions for further research seem appropriate.

Authors' objectives

To evaluate the detection of potentially cancerous polyps with the use of transparent cap-assisted colonoscopy compared to standard colonoscopy.

Searching

PubMed, EMBASE and The Cochrane Library were searched to November 2010; search terms were reported. Five journals (Gastroenterology, GI Endoscopy, American Journal of Gastroenterology, Gut and Endoscopy) were handsearched for relevant conference abstracts. Reference lists of relevant articles were checked to identify additional studies. There were no language restrictions.

Study selection

Randomised controlled trials (RCTs) that evaluated cap-assisted colonoscopy with any transparent colonoscopic cap device compared to standard colonoscopy in adults were eligible for inclusion. Standard adult colonoscopy definitions included the use of paediatric colonoscopes and colonoscopes of variable stiffness. The primary outcomes were caecal intubation rate, caecal intubation time, polyp detection rate and polyp miss rate.

The indications for colonoscopy in the included studies were screening and surveillance or the presence of polyps on previous barium enema examination. Most studies excluded patients who had undergone previous colonic resection. Where stated, cap protrusion ranged from 4mm to 10mm and rim types were straight in most studies; in one study the rim was oblique. Polyp miss rates were determined by tandem colonoscopy where two same-day colonoscopies were performed on each patient by the same endoscopist. Some studies included endoscopists who had performed fewer than 1,000 procedures; other studies included results from endoscopists who had performed more than 3,000 procedures.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality

The authors did not report a particular method for assessing methodological quality but relevant items of randomisation, allocation concealment, reporting of technician experience, blinding and association of researchers with endoscopy equipment manufacturers were reported in the results.

The authors did not state how many reviewers evaluated methodological quality.

Data extraction

Data were extracted to calculate odds ratios (ORs) for dichotomous outcomes and mean differences for continuous variables, with 95% confidence intervals (CI). Study authors were contacted for additional data where required.

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

Methods of synthesis

Pooled mean differences, odds ratios and 95% CIs for the summary estimates were calculated using a fixed-effect model. Statistical heterogeneity was evaluated using $I^2$. The reviewers assessed the potential for publication bias using visual appraisals of funnel plots.
Results of the review
Twelve RCTs (6,185 patients, range 24 to 2,502) were included in the review. Three trials were published as abstracts. Four trials adequately described randomisation. Three trials reported appropriate allocation concealment. Endoscopists’ experience levels were not stated in two studies.

Caecal intubation was achieved in significantly more cap-assisted colonoscopies than standard colonoscopy procedures (OR 1.36, 95% CI 1.06 to 1.74; I²=0%; 10 studies, 5,969 patients).

Polyp detection rates were significantly higher when cap-assisted colonoscopy procedures were used (OR 1.13, 95% CI 1.02 to 1.26; I²=65%; seven studies). There were no differences between procedures in caecal intubation time (eight studies, 2,519 patients; I²=88%).

Polyp miss rates (three studies, 200 patients) were 12.2% of total polyps detected for cap-assisted colonoscopy and 28.6% of total polyps detected for standard colonoscopy.

No evidence of publication bias was observed on the funnel plots for caecal intubation rates. There was potential for publication bias for caecal intubation time and polyp detection rate (shown by a lack of symmetry in the funnel plots).

Authors’ conclusions
Cap-assisted colonoscopy was associated with higher rates of detection of colorectal neoplasia (polyps) and higher caecal intubation rates compared to standard colonoscopy.

CRD commentary
The review outlined a clear question. Criteria for the inclusion of studies were outlined. Appropriate databases and journals were searched for relevant studies. There were no language restrictions. There were some attempts to identify abstracts. Potential for publication bias was assessed using validated means and evidence of bias was found for some outcomes. However, the small number of included trials made the reliability of funnel plot analysis uncertain. The reviewers did not report steps to minimise errors and biases at any stage of the review process. Some aspects of methodological quality for randomisation and allocation concealment were evaluated and the studies were found to be of medium quality.

There were high rates of statistical heterogeneity for most outcomes and there were no systematic attempts to explore potential reasons for this. There were considerable differences in cap protrusion length, device profile and endoscopist experience in the included studies. Polyp miss rates were evaluated in only three studies, which implied some uncertainty regarding the relative efficacy of the two procedures for this outcome.

The authors’ conclusions reflect the evidence presented but differences between the studies and methodological and/or reporting weaknesses in the review suggest that the conclusions should be regarded as provisional. The authors’ suggestions for further research seem appropriate.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated the optimum method of polyp detection was still to be determined. Further direct comparisons between cap-assisted colonoscopy and standard colonoscopy should be made using a tandem colonoscopy model with controlled withdrawal times before cap-assisted colonoscopy was adopted into routine clinical practice. Optimal cap protrusion length and device profile were yet to be determined.

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Bibliographic details

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.