Bowel preparation with split-dose polyethylene glycol before colonoscopy: a meta-analysis of randomized controlled trials


CRD summary
This review found that split-dose polyethylene glycol was superior to full-dose polyethylene glycol for bowel preparation prior to colonoscopy. The authors’ conclusions reflect the evidence, but the results should be interpreted with some caution given the small sizes of the included trials and the potential for missed trials.

Authors’ objectives
To evaluate the role of split-dose polyethylene glycol compared with full-dose polyethylene glycol for bowel preparation before colonoscopy.

Searching
PubMed, the Cochrane Central Register of Controlled Trials (CENTRAL), the Cochrane Database of Systematic Reviews and CINAHL were searched up to January 2011 for relevant studies; some search terms were reported. Abstracts from the proceedings of Digestive Disease Week and the American College of Gastroenterology National Meetings from 1999 to 2010 were also searched. Reference lists from the selected trials were checked to identify additional studies. It was unclear if language restrictions were applied.

Study selection
Randomised controlled trials (RCT) that compared the administration of full-dose solutions of polyethylene glycol (four litres) with split-dose polyethylene glycol (2L or 3L on the night before, and 1L or 2L on the day of the procedure) without adjunct therapy in adult patients prior to colonoscopy were eligible for inclusion. The outcomes of interest were the quality of the bowel preparation, compliance with preparation, willingness to repeat the preparation procedure, and side effects.

The included trials were conducted in Lebanon, South Korea, and Italy. Bowel preparation was assessed using the Aronchick and Ottawa scales. The full-dose groups (control arms) had 4L of polyethylene glycol, which was ingested from 6pm to 10pm on the evening before the colonoscopy. The split-dose polyethylene glycol groups had 2L the night before the procedure and 2L on the day of the procedure in most trials; one trial gave 3L on the night before the procedure and 1L on the day of the procedure. The first dose of the split-dose treatment was given during the afternoon prior to the colonoscopy to 8pm on the night before the procedure. The second dose was given on the morning of the colonoscopy up to 1.5 hours before the procedure. There was some variation in the pre-procedure diets in both treatment arms including: the use of regular diets to evening prior to the procedure; the cessation of fruit, vegetables and legumes for three days prior to the procedure; and liquid diets.

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

Assessment of study quality
Methodological quality was assessed using the Jadad 5-point scale for randomisation, blinding, withdrawals and dropouts.

The authors did not state how many reviewers conducted the quality assessment

Data extraction
Data were extracted by two independent reviewers to calculate odds ratios (OR) and 95% confidence intervals (CI) using standardised data extraction forms. Any differences between the reviewers were resolved by mutual agreement.

Methods of synthesis
Pooled odds ratios and 95% confidence intervals were calculated using both fixed-effect and random-effects models. Heterogeneity was assessed using I^2.
Publication bias was assessed by visual appraisal of funnel plots and the Egger and Begg tests.

**Results of the review**

Five RCTs (n=1,232 patients) were included in the review. Four trials scored 3 Jadad quality points; one RCT scored 2 points. All the trials were single-blinded, reported randomisation and used intention-to-treat analyses. Three trials did not describe allocation concealment.

Statistically significant benefits were observed with the use of split-dose polyethylene glycol compared with full-dose polyethylene glycol, with increased numbers of satisfactory bowel preparations (OR 3.70, 95% CI 2.79 to 4.91; I²=39%; four RCTs, n=929), fewer preparation discontinuations (OR 0.53 95% CI 0.28 to 0.98; I²=26%; three RCTs, n=733) and increased willingness to repeat the same bowel preparation (OR 1.76, 95% CI 1.06 to 2.91; I²=0; two RCTs, n=300).

There were statistically significant reductions in nausea observed with split-dose compared with full-dose polyethylene glycol (OR 0.55, 95% CI 0.38 to 0.79; I²=0; three trials, n=496). No differences between split-dose and full-dose polyethylene glycol were observed for abdominal cramping, abdominal bloating, vomiting, sleep disturbances, and missing work or school. There was some heterogeneity for the results of abdominal bloating (details not reported).

There was no evidence of publication bias observed in the visual appraisals of the funnel plots or the Egger or Begg tests.

**Authors' conclusions**

Split-dose polyethylene glycol before colonoscopy appeared to be superior to full-dose polyethylene glycol for colon cleansing, patient compliance and the willingness of patients to repeat the same bowel preparation.

**CRD commentary**

The review addressed a clear question. Criteria for the inclusion of trials were outlined. Appropriate databases were searched for relevant studies and some attempts were made to identify unpublished studies. Although the authors assessed publication bias, the reliability of the findings was unclear because of the small number of included trials. It was not clear whether language restrictions were applied to the search, so it was difficult to judge if there were any missed studies and language bias in the review. Steps were taken to minimise errors and bias for data extraction, but were not reported for study selection or the assessment of methodological quality.

The included trials appeared to be of medium quality, as none received a score higher than 3 points on the Jadad scale. The authors' decision to combine the results in a meta-analysis appeared to be justified. The authors acknowledged the limitations of the review in the limited number of trials that were eligible for inclusion and the assessment of certain combinations of bowel preparation with polyethylene glycol.

The authors' conclusions appeared to reflect the evidence, but the results should be interpreted with some caution given the small sizes of the included trials and the potential for missed trials.

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

**Practice:** The authors stated that split-dose polyethylene glycol offered substantial benefits in clinical practice because of increased satisfactory bowel preparations, improved patient compliance, increased willingness to repeat the same procedure, and less nausea.

**Research:** The authors stated that further trials may further provide information on some outcomes because of the paucity of trials included in this review.

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