CRD summary
This review assessed the efficacy and tolerability of alternative oral bowel preparation regimes for colonoscopy. The authors concluded that no single regime was consistently superior in the included trials, many of which were methodologically flawed from a clinical perspective. These conclusions reflected the evidence but the review was poorly reported, so their reliability is unclear.

Authors' objectives
To compare the tolerability and efficacy of different regimes of bowel preparation for colonoscopy.

Searching
The following databases were searched up to January 2006: MEDLINE, EMBASE, CINAHL and Cochrane Central Register of Clinical Trials. Search terms were reported. An Internet search was also conducted. Seven relevant journals were identified from the search process and issues for the last 20 years handsearched. Only studies published in peer reviewed journals were eligible for inclusion.

Study selection
Randomised controlled trials (RCTs) that compared two or more orally administered bowel preparation regimes in patients undergoing colonoscopy were eligible for inclusion. Included studies had to assess both the quality of bowel preparation (using a categorical measure) and patient tolerability.

Included trials assessed a range of preparations. The most common comparison was between polyethylene glycol and sodium phosphate, although a large number of trials also assessed different formulations of polyethylene glycol and a range of other comparisons. Some included trials reported safety and compliance with the preparation.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The trials were assessed for validity using the following criteria: randomisation, double-blinding, and treatment of withdrawals; up to 5 points were awarded. Only trials scoring at least 3 points were included in the review.

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

Data extraction
Data were extracted on the endoscopist's blinded assessment of preparation adequacy and the patient's assessment of tolerability. For adequacy of preparation, ratings of "good" or "excellent" on 4 or 5 point scales were used to give a positive categorical measure and permit the calculation of an odds ratio (OR).

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

Methods of synthesis
Meta-analysis using the DerSimonian and Laird random-effects model was used to calculate a pooled odds ratios with 95% confidence intervals (CIs) for trials examining the same comparison. Statistical heterogeneity between the trials was assessed using the I² statistic. Where meta-analysis was not possible, a narrative synthesis was adopted.

Results of the review
Eighty-two RCTs were included in the review (number of patients not reported).
Polyethylene glycol versus sodium phosphate (24 studies): The pooled efficacy, based on the endoscopist's assessment of preparation as good or excellent, showed no significant difference between the treatments (OR 1.00, 95% CI: 0.67 to 1.50; 21 RCTs). There were some discrepancies between the text and the forest plots. Statistically significant heterogeneity was detected ($I^2=81.7\%$). Sodium phosphate was reported as having better tolerability in 14 studies, no difference between groups was reported in 10 studies, while one study favoured polyethylene glycol.

Other studies of different bowel preparation regimes could not be combined statistically.

Different formulations of polyethylene glycol: Six studies assessed different electrolyte combinations. Apart from one which found a low-sulphate formulation to be associated with increased efficacy, there were no significant differences between the groups. No differences were reported with the addition of metoclopramide, bisacodyl, cisapride, senna or magnesium citrate. Six studies assessed the addition of simethicone, with five reporting improved visibility with the agent; two studies assessed tolerability with conflicting results. Eight studies that assessed low-volume polyethylene glycol found contradictory evidence for efficacy, but most found low volume regimes to have greater tolerability.

Different formulations of sodium phosphate: Seven studies found a dose-response relationship for efficacy and an inverse effect for tolerability. Two studies found that dose division reduced nausea without impacting efficacy.

Sodium picosulphate and magnesium citrate: Two trials compared sodium picosulphate plus magnesium citrate with polyethylene glycol, and two trials compared the combination with sodium phosphate. In the comparison with sodium phosphate, one trial showed better toleration and equivalent efficacy, the other trial showed better efficacy and equivalent tolerability. The same pattern of results was found in comparisons with polyethylene glycol.

Results of trials reporting biochemical measures of safety and measures of compliance were also reported.

Authors' conclusions
No single bowel preparation emerged as consistently superior in the included trials, many of which were methodologically flawed.

CRD commentary
The review question and the inclusion criteria were clear. The authors searched several relevant databases and other sources. However, the decision to limit the review to studies published in peer reviewed journals may have led to the exclusion of some relevant studies and to the introduction of publication bias. The authors did not report using methods designed to minimise reviewer bias and error at any stage of the review process. An appropriate validity assessment was undertaken; this was used to provide an additional inclusion criterion for the review. The combined use of meta-analysis and narrative synthesis appeared to be appropriate. Statistical heterogeneity was assessed, but it was not further investigated, even though highly significant. Study details were not reported, which made it difficult to assess the appropriateness of the synthesis.

The authors' conclusions clearly reflected the results of the review but, given the poor reporting of the review process and included trials, it is difficult to assess their reliability.

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

Research: The authors stated that new bowel preparations should be developed combining better efficacy and tolerability. They also stated that rigorous new validated study designs were required to permit unequivocal comparisons between different preparation regimes.

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