Laparoscopic versus open adhesiolysis in patients with adhesive small bowel obstruction: a systematic review and meta-analysis
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CRD summary
The review concluded that laparoscopic adhesiolysis was safer than open surgery with regards to overall complications, prolonged ileus rates and pulmonary complications but was recommended for experienced surgeons in selected patients. Due to limited numbers of participants and substantial limitations in the quality of the evidence base, the authors’ conclusions should be treated with caution and may not be reliable.

Authors' objectives
To compare laparoscopic with open adhesiolysis with regards to surgical outcomes in patients with small bowel obstruction.

Searching
PubMed, EMBASE and The Cochrane Library were searched from January 1985 to June 2010 for studies published in English; limited search terms were reported. The reference lists of relevant studies were also searched up to July 2010.

Study selection
Randomised controlled trials, cohort and comparative studies that investigated laparoscopic versus open surgery in patients of any age or sex for adhesive small bowel obstruction were eligible for the review. Unpublished studies or abstracts were excluded. Outcomes of interest were the overall complication rate, the rate of intraoperative injury to the bowel, wound infection rate, prolonged ileus rate, pulmonary complication rate and mortality.

In the included studies, the conversion rate ranged from 26 to 51.9%. Prior procedures before bowel obstruction included appendectomy, gynaecologic operations, cholecystectomy and colonic resection. Studies were published between 2003 and 2010.

Two reviewers independently selected studies with confirmation by a third reviewer, with disagreements resolved by discussion.

Assessment of study quality
Studies were assessed for quality using the Scottish Intercollegiate Guidelines Network checklist for cohort studies, the Rangel assessment scale for retrospective clinical studies and suggestions by Sajid, with a maximum score of 20; multiple criteria were used.

The authors did not state how many reviewers assessed studies for quality.

Data extraction
Data were extracted to enable calculation of odds ratios, with 95% confidence intervals. Some of the trials allocated participants to three groups: completely laparoscopic, intended laparoscopy and completely open surgery; the two former groups were combined and considered as the laparoscopy group, although some of the participants converted to open surgery.

The authors did not state how many reviewers extracted data.

Methods of synthesis
Study results were pooled and summary effect odds ratios, with 95% confidence intervals, were calculated using a fixed-effect model. Heterogeneity was assessed by $X^2$ ($P<0.10$ considered evidence of significance) and quantified by $I^2$. Publication bias was assessed by inspection of a funnel plot.

Results of the review
Four retrospective observational case control studies (334 patients, sample sizes ranged from 62 to 104) were included in the review. None of the trials had clearly reported allocation concealment, blind assessors, intention-to-treat analyses or description of drop-outs; the studies were considered fair quality.

Compared with open surgery, laparoscopic adhesiolysis was associated with significantly reduced overall complications (OR 0.42, 95% CI 0.25 to 0.70; four studies; no significant heterogeneity), significantly reduced prolonged ileus (OR 0.28, 95% CI 0.10 to 0.73; two studies; significant heterogeneity, $I^2=70\%$) and significantly reduced odds of pulmonary complications (OR 0.20, 95% CI 0.04 to 0.94; three studies; no significant heterogeneity).

There was no evidence of a significant difference in overall mortality (two studies; significant heterogeneity); there was a non significant trend favouring laparoscopy for wound infection (three studies; no significant heterogeneity) and a non significant trend favouring open surgery for intraoperative bowel injury (two studies; no significant heterogeneity, $I^2=63\%$).

The authors reported that inspection of the funnel plot indicated no publication bias.

**Authors' conclusions**

Laparoscopic adhesiolysis was safer than open surgery with regards to overall complications, prolonged ileus rates and pulmonary complications, but was recommended for experienced surgeons in selected patients.

**CRD commentary**

The review addressed a clear research question, supported by appropriate inclusion and exclusion criteria. Relevant sources were used to search for studies published in English; language bias could not be ruled out and the exclusion of unpublished studies meant that studies may have been missed. The assessment of the potential for publication bias by inspecting a funnel plot was not appropriate or conclusive, as too few studies were identified for this analysis to be meaningful. Appropriate methods were used to select studies, but the authors did not state how many reviewers assessed studies for quality or extracted data, so reviewer error and bias could not be excluded.

Multiple criteria were used to assess the studies for quality, but quality items appeared to have been arbitrarily used from three different sources, so the overall quality score may not be reliable or meaningful. A limited number of non randomised studies with few participants were identified and they were of fair quality, so the likelihood of selection bias was high and the reliability of the conclusions was not clear. Synthesis of the studies and assessment of heterogeneity were appropriate. Summary effect estimates were imprecise and some analyses had substantial heterogeneity. The authors acknowledged the variation in laparoscopic surgical expertise and the conversion from laparoscopy to open surgery which may have influenced results.

Due to limited numbers of participants and substantial limitations in the quality of the evidence base, the authors' conclusions should be treated with caution and may not be reliable.

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

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further randomised clinical trials with large sample sizes and high statistical power were required to reach robust conclusions.

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