Short-term evaluation of laparoscopy-assisted distal gastrectomy for predictive early gastric cancer: a meta-analysis of randomized controlled trials

CRD summary
This review concluded that compared to open distal gastrectomy, laparoscopy-assisted distal gastrectomy improved postoperative early morbidity; the long-term survival benefit of laparoscopy-assisted distal gastrectomy is yet to be proven. Limitations such as small sample sizes, variability across trials, and unclear trial quality, mean the reliability and generalisability of the results and conclusions is uncertain.

Authors' objectives
To compare the effectiveness of laparoscopy-assisted distal gastrectomy with open distal gastrectomy in treating patients with early gastric cancer.

Searching
PubMed, EMBASE and the Cochrane Library were searched from 1990 to 2008. Relevant websites (including ClinicalTrials.gov), conference proceedings and bibliographies of articles were also searched for additional studies. Search terms were reported but language restrictions were not.

Study selection
Randomised control trials (RCTs) were eligible for inclusion if: patients were all diagnosed with gastric cancer (proven by biopsy) and predictive early gastric cancer; they compared laparoscopy-assisted distal gastrectomy with open distal gastrectomy. Eligible trials had to report at least one relevant outcome measure (related to either associated mortality or morbidity, or postoperative recovery).

In included trials, the Billroth I reconstruction procedure was predominantly used (where reported) and the preoperative stage tended to be mucosal or submucosal gastric cancer (T1), unsuitable for endoscopic mucosal resection. Age, gender, and ethnicity were not reported.

Two reviewers performed the study selection independently.

Assessment of study quality
Two reviewers assessed trial quality independently in terms of: sequence generation, allocation concealment, blinding, missing data, and other forms of bias. Disagreements between reviewers were discussed and adjudicated using a third reviewer.

Data extraction
Two reviewers independently extracted outcome measures associated with morbidity and mortality, and operation and postoperative recovery. Risk ratios (RR) were calculated for binary outcomes and mean differences for continuous outcomes, along with 95% confidence intervals (CI). If the risk ratio was not calculable, the risk difference (RD) was used.

Methods of synthesis
Pooled risk ratios (or risk differences) and weighted mean differences (WMD), with 95% confidence intervals, were calculated using a fixed-effect model, unless significant heterogeneity was observed where a random-effects model was used. Heterogeneity was assessed using a $\chi^2$ test (p<0.1).

Results of the review
Six RCTs were included in the review (n=629 patients; 323 laparoscopy-assisted distal gastrectomy, 306 open distal gastrectomy; range 20 to 342 patients). Follow-up periods (where reported) ranged from five to 53 months. Two trials reported adequate allocation concealment and five reported on losses to follow-up; none reported being blinded.
Compared with open distal gastrectomy, laparoscopy-assisted distal gastrectomy significantly reduced postoperative early morbidity (RR 0.61, 95% CI 0.41 to 0.91; six RCTs) and blood loss (WMD -108.33mL, 95% CI -174.94 to -41.72; four RCTs), but also fewer lymph nodes harvested (WMD -4.88, 95% CI -6.94 to -2.82; four RCTs) and increased operating time (WMD 86.64 minutes, 95% CI 55.88 to 117.40; five RCTs). There was no difference between the two techniques in mortality (six RCTs), time to oral analgesia (four RCTs) or duration of hospital stay (four RCTs). No significant heterogeneity was observed for mortality, morbidity or lymph node harvest.

Authors' conclusions
Compared to open distal gastrectomy, laparoscopy-assisted distal gastrectomy gave slight benefits to patients with early gastric cancer slightly in terms of decreased blood loss and postoperative early morbidity, but also might increase operation time and decrease the number of lymph nodes harvested.

CRD commentary
The research question was clear and supported by relevant inclusion criteria. Several relevant databases were searched, and specific attempts were made to locate unpublished studies. The authors did not report whether language restrictions were applied, so language bias could not be ruled out. Publication bias was investigated; the validity of investigating the impact of publication bias on the results, using sensitivity analyses to exclude studies causing asymmetry, was unclear. Each stage of the review was conducted in duplicate, reducing the risk of bias and error.

Trial quality was assessed using relevant criteria. Most trials were small and were of poor or unknown quality. None of the included trials reported being blinded, but given the intervention was surgery, this would be expected. Quality criteria specific to reviews of surgical interventions were not assessed. One trial reported only as an abstract, with few trial details available, contributed over 50% of the participants in the review. Statistically significant heterogeneity was observed for most analyses, which made the reliability of the pooled results uncertain. There were insufficient trial details to assess the level of clinical heterogeneity across trials. Given these factors, the reliability and generalisability of the outcomes and conclusions is uncertain.

Implications of the review for practice and research
Practice: The researchers did not specify implications for practice.
Research: The authors stated that an RCT is required to find a better pattern of reconstruction than Roux-en-Y or Billroth II. They also stated that the long-term benefit of laparoscopy-assisted distal gastrectomy is yet to be proven, as are differences in long-term survival rates.

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