Laparoscopic versus open gastrectomy for early distal gastric cancer: a meta-analysis

CRD summary
The review concluded that laparoscopic gastrectomy was a safe and feasible alternative to open gastrectomy for early distal cancer and was associated with better short-term outcomes. The review was generally well conducted but the small evidence base and heterogeneity for some outcomes limit the reliability of the pooled results. The authors’ call for further research appears warranted.

Authors’ objectives
To compare laparoscopic versus open gastrectomy in terms of short-term outcomes and lymph nodes harvested for early distal cancer.

Searching
PubMed, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL) and Science Citation Index were searched from January 1992 to August 2010 for articles published in English. Search terms were reported. Relevant conference proceedings and articles were handsearched. Reference lists of eligible articles were searched.

Study selection
Randomised controlled trials (RCTs) of clearly documented laparoscopic versus open gastrectomy in patients who underwent early distal cancer resection were eligible for inclusion. Trials had to provide outcome data on at least one of the outcomes: operating time, intra-operative blood loss, size of wound, overall postoperative complications, time to first flatus, time to start oral uptake, hospital stay and lymph nodes harvested. Trials of gastric surgery for benign lesions or urgent or emergency surgery were excluded.

The vast majority of cases were in early gastric cancer patients; some late stage gastric cancer patients were studied. Patient age ranged from 38 to 81 years. Trials were published between 2002 and 2010. Most trials were conducted in China, Japan or Korea and one was in Italy.

The authors did not state how many reviewers undertook study selection.

Assessment of study quality
Quality assessment was undertaken using a pre-defined tool to appraise randomisation, allocation concealment, blinding and completeness of primary outcome reporting.

The authors reported that all reviewers independently extracted data. Disagreements were resolved by discussion. Trial authors were contacted to resolve ambiguities, where possible.

Data extraction
Data were extracted on outcomes and used to calculate odds ratios (ORs) or mean differences, together with 95% confidence intervals (CIs).

The authors reported that all reviewers independently extracted data.

Methods of synthesis
A random-effects meta-analysis was undertaken to calculate pooled odds ratios and weighted mean differences (WMDs), together with 95% CIs. Statistical heterogeneity was assessed using the $X^2$ and $I^2$ statistics. Subgroup analysis was undertaken on the basis of type of trial and type of antibiotic. Publication bias was assessed using funnel plots.

Results of the review
Six RCTs were included (668 patients, range 28 to 342). All trials were randomised and concealed allocation. No trials reported on blinding. Completeness of reporting was greater than 90% in all trials.
Compared with open gastrectomy, laparoscopic gastrectomy was associated with statistically significantly lower intraoperative blood loss (WMD -115.60 mL, 95% CI -159.16 to -72.04; six RCTs), lower postoperative complications (OR 0.55, 95% CI 0.35 to 0.85; six RCTs; I²=11%), shorter hospital stay (WMD -2.65 days, 95% CI -4.97 to -0.32; five RCTs; I²=81%) and lower lymph nodes harvested (WMD -4.79 nodes, 95% CI -6.79 to -2.79; five RCTs; I²=0%). Laparoscopic gastrectomy was also associated with a statistically longer operating time (WMD 112.98 minutes, 95% CI 60.32 to 165.64; five RCTs; I²=99%). There was no significant difference in wound infection (six RCTs), intra-operative fluid collection and abscess (six RCTs), anastomotic stenosis (six RCTs) and pulmonary complications (six RCTs).

Other results were presented in the review. The authors reported that there was no evidence of publication bias for overall postoperative complications.

**Authors’ conclusions**
Laparoscopic gastrectomy was a safe and feasible alternative to open gastrectomy for early distal cancer and was associated with better short-term outcomes.

**CRD commentary**
Inclusion criteria for the review were clearly defined and several relevant databases were searched. There was potential for language bias as only articles in English were included. Publication bias was assessed and was not detected; the meaningfulness of an analysis with fewer than 10 trials was limited. Attempts were made to reduce reviewer error and bias during data extraction and quality assessment; whether the same methods were used for study selection was not clear. Quality assessment indicated that none of the trials were blinded and this may have biased results. Most of the trials included fewer than 100 patients. The authors noted that most data were in early gastric cancer and non-Western populations which may limit the generalisability of results. Data were pooled using standard meta-analysis techniques. Statistical heterogeneity was reported. There was significant heterogeneity in some of the analyses and this indicated that the data may not have been suitable for pooling.

The review was generally well conducted but the small evidence base and heterogeneity for some outcomes limit the reliability of the pooled results. The authors’ call for further research appears warranted.

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

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

**Research:** The authors stated that oncological results such as tumour recurrence rate and patient survival rate after laparoscopic gastrectomy were required. A large multicentre RCT with longer follow-up data was likely needed to reach a definitive conclusion.

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