Meta-analysis of laparoscopy-assisted distal gastrectomy with D2 lymph node dissection for gastric cancer


CRD summary
Compared to open distal gastrectomy, laparoscopy-assisted distal gastrectomy was minimally invasive, led to faster recovery and fewer complications and resulted in similar levels of radicality and short-term prognosis. Operating time was longer and long-term prognosis was unclear. The evidence and the review were subject to potential biases and so the conclusions may be unreliable.

Authors' objectives
To evaluate the value of laparoscopy-assisted distal gastrectomy with D2 dissection for gastric cancer treatment.

Searching
MEDLINE, EMBASE and The Cochrane Library were searched from January 1995 to October 2010. Search terms were reported.

Study selection
Clinical studies that compared laparoscopy-assisted distal gastrectomy with open distal gastrectomy with D2 lymph nodes dissection for gastric cancer were eligible. Patients with primary distal gastric cancer were included. Studies had to report most of the following: operation time, blood loss, number of harvested lymph nodes, time to first flatus, time to first oral intake, hospital stay, 30-day complications, 30-day mortality and recurrence. Laparoscopy-assisted distal gastrectomy with methods of dissection other than D2 (according to the lymph node classification of the Japanese Gastric Cancer Association) were excluded. Studies that included patients with recurrent gastric cancer, non-primary gastric cancer, or benign gastric diseases were excluded. Duplicate publications or published studies with insufficient data were excluded.

Most studies included patients with early and advanced gastric cancer. Most adopted Billroth I and Billroth II reconstruction techniques and half used Roux-en-Y. Laparoscopic surgery lasted on average between four and five and a half hours and open surgery between three and four and half hours.

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality
Study quality was assessed using a standard checklist based on criteria of selection and whether patients were representative of the target population, comparability of patients groups and outcome assessment.

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

Data extraction
Means and standard deviations were extracted on continuous outcomes to calculate weighted mean differences (WMDs). Dichotomous outcomes were extracted to calculate odds ratios (ORs). These were estimated with 95% confidence intervals (CIs).

Three reviewers extracted data from each study.

Methods of synthesis
The studies were synthesised by meta-analysis using a fixed-effect or random-effects model. Heterogeneity was assessed with $X^2$. If the $X^2$ test indicated heterogeneity ($p<0.05$), a random-effects meta-analysis was used.

Results of the review
Eight non-randomised retrospective case-control studies (1,065 cases) were included in the analysis. Patients were...
considered representative of the target population, their characteristics were found comparable within the study groups (where reported) and five studies had more than 90 patients followed-up for five years.

The number of complications was significantly lower following laparoscopy-assisted distal gastrectomy compared to open distal gastrectomy at 30 days (OR 0.61, 95% CI 0.42 to 0.88; eight studies). No significant differences were observed in mortality rates at 30 days and recurrence rates between the two interventions. There was no significant heterogeneity ($\chi^2=0\%$) for these outcomes.

Operative time was significantly longer for laparoscopy-assisted surgery compared to open gastrectomy, with an overall difference of approximately 37 minutes (WMD 36.51, 95% CI 15.55 to 57.46; six studies). Intraoperative blood loss was significantly lower for the laparoscopic surgery group compared to open surgery (WMD -114.73 mL, 95% CI -160.46 to -69.01; seven studies). There was evidence of very high heterogeneity for these outcomes ($\chi^2>90\%$).

First flatus and first oral intake following surgery took place significantly earlier for the laparoscopic surgery group (first flatus WMD -1.01 day, 95% CI -1.44 to -0.57; five studies, $X^2=86\%$ and first oral intake WMD -0.95 day, 95% CI -1.19 to -0.71; three studies, $X^2=0\%$). Patients who received open surgery stayed in hospital for about three more days than those who received laparoscopic surgery, which was statistically significant (WMD -3.28 days, 95% CI -4.16 to -2.39; six studies, $X^2=57.4\%$). There were no significant differences in the number of harvested lymph nodes between the two groups.

**Authors' conclusions**

Compared to open distal gastrectomy, laparoscopy-assisted distal gastrectomy was minimally invasive, led to faster recovery and fewer complications and resulted in similar levels of radicality and short-term prognosis. Operating time was longer and long-term prognosis were unclear.

**CRD commentary**

The review question and inclusion criteria were clear. The search for published studies was reasonably thorough. Unpublished studies were not searched, which suggested a risk of publication bias. Data extraction was carried out with sufficient attempts to minimise error and bias; it was unclear whether similar precautions were taken during study selection and quality assessment.

The source of the significant heterogeneity observed for some outcomes was unclear. The analyses were based on few and relatively small retrospective case series in which the data were subject to potential biases. Studies with zero events were omitted from the analyses and the extent to which this may have influenced the results was unclear.

Studies were conducted in Japan, Korea and China. This should be borne in mind when interpreting the results of this review.

The risks of bias associated with the designs of the studies, the presence of heterogeneity for some outcomes and the risk of publication bias mean that the conclusions of the review 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 randomised controlled trials are needed to provide stronger evidence on the effects of laparoscopy-assisted distal gastrectomy with D2 dissection.

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