Laparoscopic assisted distal gastrectomy for early gastric cancer: is it an alternative to the open approach?
Yakoub D, Athanasiou T, Tekkis P, Hanna GB

CRD summary
This review found that laparoscopic-assisted distal gastrectomy procedures were associated with faster post-operative recovery compared with open distal gastrectomy in patients with early stomach cancer, but a higher number of lymph nodes were extracted with the open procedures. Although the authors’ conclusions may be reliable, some caution is required in their interpretation given some methodological flaws.

Authors’ objectives
To compare the short-term outcomes and oncological value of laparoscopy-assisted distal gastrectomy and open distal gastrectomy in patients with early gastric cancer.

Searching
MEDLINE, EMBASE, and the Cochrane Library were searched for studies published until 2008; search terms were reported. The "related articles" function was used during the searches. Google Scholar was also searched. There were no language restrictions.

Study selection
Studies that compared laparoscopic and open techniques in patients being treated for early distal gastric cancer, in which the procedures were accurately described, were eligible for inclusion. Studies of patients with advanced gastric cancer, more than one laparoscopic technique, or where there was conversion to an open technique, were excluded.

The primary outcome of interest was lymph node clearance, and studies were grouped according to two categories: where D2 lymphadenectomy was performed; where less than D2 lymphadenectomy was performed. Secondary outcomes were those relating to operative data (operative time and blood loss), postoperative recovery (analgesia, time to walking, time to oral intake and time to flatus, biochemical recovery in the form of C-reactive protein and white blood cell levels), and post-operative morbidity (overall number of events and specific complications rate).

Early gastric cancer was defined as tumours invading the gastric wall short of the muscularis propria, and including mucosal and sub-mucosal tumours (T1 ± N1 tumours according to the TNM Classification of Malignant Tumours) corresponding to Stages IA and IB.

Where reported, the mean age of included patients ranged from 55.5 to 65.7 years; two thirds were male.

The authors did not state how the papers were selected for the review.

Assessment of study quality
The reviewers used a 15-star scoring system assessing methodological quality in terms of study design, comparability of patient groups, follow-up and the reporting of results.

The authors did not state how many reviewers assessed methodological quality.

Data extraction
Two reviewers independently extracted data from to calculate odds ratios (OR) and corresponding 95% confidence intervals (CI). For continuous variables, the summary statistic calculated was the mean difference (MD) with 95% confidence intervals.

Methods of synthesis
Pooled odds ratios and weighted mean differences (WMDs), with corresponding 95% confidence intervals, were
calculated by the reviewers using a Mantel-Haenszel random-effects model. Sensitivity analyses of subgroups were conducted including: use of random-effects and fixed-effect models; RCTs; year of publication before or after 2003; study size of over 50; studies with a quality score of 11; and studies with 11 or more matching criteria between groups. Funnel plots were used to evaluate publication biases.

**Results of the review**

Twelve studies (n= 951 patients), published between 2000 and 2007, were included in the review, including three RCTs and nine retrospective studies. Seven studies were allocated a quality score of 11 or higher; the range of study quality scores were 8 to 15.

**Lymph node clearance:** A significantly higher number of lymph nodes were retrieved with the use of open distal gastrectomy (ODG; WMD 4.61 nodes, 95% CI 3.26 to 5.96). In patients who had less than D2 lymphadenectomy performed, there were no significant differences in the number of nodes extracted.

**Operative data:** There was less operative blood loss for laparoscopy-assisted distal gastrectomy (LADG) compared with (WMD -151.08mL, 95% CI -176.19 to -125.97). The LADG procedures were observed to have a longer operative time (WMD 53.48 minutes, 95% CI 34.49 to 72.48) than the ODG procedures.

**Post-operative recovery:** There were statistically significant benefits of laparoscopy-assisted distal gastrectomy (LADG) over ODG for a number of postoperative outcomes including: shorter length of hospital stay (WMD -5.72 days, 95% CI -8.16 to -3.28); less time to oral intake (WMD -1.11 days, 95% CI -1.6 to -0.63); less time to flatus (WMD -0.7 days, 95% CI -0.9 to -0.5); less time to walking (WMD -0.82, 95% CI -1.06 to -0.58); and 1.22 fewer days of increased temperature (95% CI -1.7 to -0.75). Post-operative white blood cell and C-reactive protein levels were significantly less in the LADG group at one and three days post-surgery, but there were no differences between groups after one week. The patients in the ODG group required a mean of 2.05 more days of analgesia (95% CI 1.8 to 2.31); and analgesia use was 1.36 times higher (95% CI 0.28 to 2.44) than the LADG group. There was statistically significant heterogeneity observed across all post-operative recovery outcomes.

**Post-operative complications:** Overall morbidity was reduced in the LADG group (OR 0.52, 95% CI 0.34 to 0.80), as was intestinal obstruction (OR 0.27, 95% CI 0.09 to 0.84). There were no significant differences between groups in days of post-operative analgesia, post-operative intestinal obstruction, wound infection, anastomotic stricture and leakage, and duodenal stump/anastomotic leakage. The subgroup analyses showed the same results for all these outcomes.

**Subgroup analysis of RCTs** (n=103): There were significant benefits found for the use of LADG compared to ODG for operative time, wound size, lymph node clearance, time to walking, use of post-operative analgesia and overall morbidity. There were no differences between treatment groups reported for operative blood loss, time to oral intake, time to flatus, or length of hospital stay.

The results of other subgroup analyses conducted showed the same trends and were of similar magnitude to the meta-analysis of all the studies for each outcome.

**Authors' conclusions**

The use of laparoscopically-assisted distal gastrectomy was a safe technical alternative to open distal gastrectomy in patients with early gastric cancer; it was associated with enhanced post-operative recovery and fewer complications. However, a higher number of lymph nodes were extracted with the open procedures. Data on the quality of life, cost effectiveness and survival are required to ascertain the long-term oncological value of laparoscopic-assisted distal gastrectomy in this group of patients.

**CRD commentary**

The review addressed a clear question; criteria for inclusion were stipulated. Multiple electronic sources were searched for relevant studies in any language, but there were no attempts to identify unpublished literature. The reviewers reported steps were taken to minimise errors and bias for data extraction, but did not report these methods for the selection of studies and the assessment of methodological quality.

The pooling of uncontrolled and controlled study designs may not have been appropriate. Results from these analyses...
for uncontrolled studies were subject to a substantial risk of bias. The authors did report the results of a sensitivity
analysis based on the included RCTs, but the numbers of patients included in these trials were small and probably not
sufficiently powered to detect differences in effect.

The authors’ conclusions regarding the promising nature of the laparoscopic-assisted distal gastrectomy methods may be
reliable, but caution is required when interpreting these results given the potential for publication bias, potential
inappropriate analyses of results, and the high possibility of bias in the results of uncontrolled studies.

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

Research: The authors stated that further data are required on long-term oncological outcomes and survival, quality of
life outcomes and cost effectiveness to ascertain if laparoscopic-assisted distal gastrectomy provides a better alternative
to open distal gastrectomy procedures.

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