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Best LMJ, Mughal M, Gurusamy KS. Laparoscopic versus open gastrectomy for gastric cancer. *Cochrane Database of Systematic Reviews* 2016, Issue 3. Art. No.: CD011389. DOI: 10.1002/14651858.CD011389.pub2.

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[Intervention Review]

Laparoscopic versus open gastrectomy for gastric cancer

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Editorial group: Cochrane Upper GI and Pancreatic Diseases Group. **Publication status and date:** Edited (no change to conclusions), published in Issue 3, 2016.

Citation: Best LMJ, Mughal M, Gurusamy KS. Laparoscopic versus open gastrectomy for gastric cancer. *Cochrane Database of Systematic Reviews* 2016, Issue 3. Art. No.: CD011389. DOI: 10.1002/14651858.CD011389.pub2.

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ABSTRACT

Background

Gastric cancer is the third most common cause of cancer-related mortality in the world. Currently there are two surgical options for potentially curable patients (i.e. people with non-metastatic gastric cancer), laparoscopic and open gastrectomy. However, it is not clear whether one of these options is superior.

Objectives

To assess the benefits and harms of laparoscopic gastrectomy or laparoscopy-assisted gastrectomy versus open gastrectomy for people with gastric cancer. In particular, we planned to investigate the effects by patient groups, such as cancer stage, anaesthetic risk, and body mass index (BMI), and by intervention methods, such as method of anastomosis, type of gastrectomy and laparoscopic or laparoscopically-assisted gastrectomy.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, Science Citation Index, ClinicalTrials.gov and the WHO ICTRP (World Health Organization International Clinical Trials Registry Platform) until September 2015. We also screened reference lists from included trials.

Selection criteria

Two review authors independently selected references for further assessment by going through all titles and abstracts. Further selection was based on review of full text articles for selected references.

Data collection and analysis

Two review authors independently extracted study data. We calculated the risk ratio (RR) with 95% confidence interval (CI) for binary outcomes, the mean difference (MD) or the standardised mean difference (SMD) with 95% CI for continuous outcomes and the hazard ratio (HR) for time-to-event outcomes. We performed meta-analyses where it was meaningful.

Main results

In total, 2794 participants were randomised in 13 trials included in this review. All the trials were at unclear or high risk of bias. One trial (which included 53 participants) did not contribute any data to this review. A total of 213 participants were excluded in the remaining trials after randomisation, leaving a total of 2528 randomised participants for analysis, with 1288 undergoing laparoscopic gastrectomy and 1240 undergoing open gastrectomy. All the participants were suitable for major surgery.

There was no difference in the proportion of participants who died within thirty days of treatment between laparoscopic gastrectomy (7/1188: adjusted proportion = 0.6% (based on meta-analysis)) and open gastrectomy (4/1447: 0.3%) (RR 1.60, 95% CI 0.50 to 5.10; risk

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difference 0.00, 95% CI -0.01 to 0.01; participants = 2335; studies = 11; $l^2 = 0\%$; low quality evidence). There were no events in either group for short-term recurrence (participants = 103; studies = 3), proportion requiring blood transfusion (participants = 66; studies = 2), and proportion with positive margins at histopathology (participants = 28; studies = 1). None of the trials reported health-related quality of life, time to return to normal activity or time to return to work. The differences in long-term mortality (HR 0.94, 95% CI 0.70 to 1.25; participants = 195; studies = 3; $l^2 = 0\%$; very low quality evidence), serious adverse events within three months (laparoscopic gastrectomy (7/216: adjusted proportion = 3.6%) versus open gastrectomy (13/216: 6%) (RR 0.60, 95% CI 0.27 to 1.34; participants = 432; studies = 8; $l^2 = 0\%$; very low quality evidence), long-term recurrence (HR 0.95, 95% CI 0.70 to 1.30; participants = 162; studies = 4; very low quality evidence), adverse events within three months (laparoscopic gastrectomy (204/268: adjusted proportion = 16.1%) versus open gastrectomy (253/1222: 20.7%) (RR 0.78, 95% CI 0.60 to 1.01; participants = 2490; studies = 11; $l^2 = 38\%$; very low quality evidence), quantity of perioperative blood transfused (SMD 0.05, 95% CI -0.27 to 0.38; participants = 143; studies = 2; $l^2 = 0\%$; very low quality evidence), length of hospital stay (MD -1.82 days, 95% CI -3.72 to 0.07; participants = 319; studies = 6; $l^2 = 83\%$; very low quality evidence), and number of lymph nodes harvested (MD -0.63, 95% CI -1.51 to 0.25; participants = 472; studies = 9; $l^2 = 40\%$; very low quality evidence) were imprecise. There was no alteration in the interpretation of the results in any of the subgroups.

Authors' conclusions

Based on low quality evidence, there is no difference in short-term mortality between laparoscopic and open gastrectomy. Based on very low quality evidence, there is no evidence for any differences in short-term or long-term outcomes between laparoscopic and open gastrectomy. However, the data are sparse, and the confidence intervals were wide, suggesting that significant benefits or harms of laparoscopic gastrectomy cannot be ruled out. Several trials are currently being conducted and interim results of these trials have been included in this review. These trials need to perform intention-to-treat analysis to ensure that the results are reliable and report the results according to the CONSORT Statement.

PLAIN LANGUAGE SUMMARY

Laparoscopic (key hole) operation versus open operation for treatment of people with stomach cancer

Review question

Is laparoscopic treatment (key hole surgery) equivalent to open surgical treatment for treatment of people with gastric (stomach) cancer?

Background

Stomach cancer is the third most frequent cause of cancer-related death in the world. If cancer has not spread to other areas of the body, and if the person can withstand a major operation, depending upon the part of the stomach involved, removal of part of the stomach, or the entire stomach (gastrectomy), is the only treatment that offers long-term cure of cancer. Gastrectomy can be performed by laparoscopic (key hole) operation, or by open operation, which involves a large cut. While the cut is smaller with key hole surgery, it is not clear whether key hole surgery is as safe as open surgery, and whether it offers any advantages in terms of quicker recovery of people undergoing gastrectomy. We sought to resolve this issue by searching the medical literature for studies reported until September 2015 that compared laparoscopic and open gastrectomy in people with stomach cancer.

Study characteristics

We identified 13 eligible studies (2794 participants) for this review. One trial did not report any information that we sought. Information on 213 participants was not reported because of various reasons, the common reason being that they did not receive the planned treatment. A total of 2528 participants received either laparoscopic gastrectomy (1288 participants) or open gastrectomy (1240 participants). The decision on whether a participant received laparoscopic or open gastrectomy was made using methods similar to the toss of a coin. This process ensures that the participants in the two groups are similar. All the participants were suitable for major surgery.

Key results

There was no difference between laparoscopic and open gastrectomy in short-term deaths (laparoscopic gastrectomy: 6 deaths in 1000 operations versus open gastrectomy: 3 deaths in 1000 operations). There is a certain amount of uncertainty when predicting the number of deaths or outcomes based on information in the trials. Because of this uncertainty, we were able to conclude that there was no difference in short-term deaths between the groups, although the deaths in laparoscopic gastrectomy was twice that in open gastrectomy. None of the trials reported health-related quality of life, time to return to normal activity or time to return to work. The differences in long-term deaths, serious complications within three months (laparoscopic gastrectomy: 36 complications per 1000 operations versus open gastrectomy: 60 complications per 1000 operations), all complications within three months (laparoscopic gastrectomy: 161 complications per 1000 operations versus open gastrectomy: 253 complications in 1000 operations, short-term and long-term recurrence of cancer, number of people who required blood transfusion, amount of blood transfused during or within one week of surgery, and length of hospital stay were imprecise. As a result, significant benefits or harms of laparoscopic gastrectomy compared to open gastrectomy cannot be ruled out. Further well designed trials are necessary to compare the benefits and harms of laparoscopic and open gastrectomy.

Quality of the evidence

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The quality of evidence was very low for all outcomes, apart from short-term mortality, which was low. As a result, there is a lot of uncertainty regarding the results.