

ABSTRACT

Change of Trend from Open to Laparoscopic Gastrectomy for Locally Advanced Carcinoma Stomach: A Retrospective Single Institution Experience

Subbiah Shanmugam¹, Sathiyaseelan Balakrishnan²

ABSTRACT

Introduction: Laparoscopic gastrectomy is gaining popularity over open gastrectomy for carcinoma stomach because of better early postoperative outcomes. In most of the studies, it is now evident that laparoscopic gastrectomy has a similar oncological outcome as that of open gastrectomy.

Materials and methods: In this study, we compared the outcomes of laparoscopic and open gastrectomy with D2 lymphadenectomy for locally advanced carcinoma stomach that were done in our institution from January 2015 to December 2019. We analyzed the intraoperative events, complication rate, duration of hospital stay, margin status, nodal yield, and the disease-free interval between the two groups.

Results: In the study period, 43 patients underwent gastrectomy for carcinoma stomach and 28 patients were on regular follow-up. Out of the 28 patients, 13 patients underwent open gastrectomy and 15 patients underwent laparoscopic gastrectomy. The disease-free interval for open gastrectomy was 13.3 months and for laparoscopic gastrectomy, it was 12.9 months. The average hospital stay was 18 days for open gastrectomy, and it was 11 days for laparoscopic gastrectomy with comparable postoperative complication rate, nodal yield, and margin status in histopathological examination.

Conclusion: The long-term oncological outcomes of laparoscopic gastrectomy with D2 lymphadenectomy were comparable with the conventional open surgery for patients with locally advanced gastric cancer with a reduced hospital stay and complication rate.

Keywords: Blood loss, Carcinoma, Early recovery, Gastrectomy, Laparoscopic, Open gastrectomy, Stomach.

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INTRODUCTION

Stomach cancer ranks third globally in terms of cancer-related deaths and is the fifth most frequent cancer worldwide. In India, stomach cancer ranks sixth in terms of frequency of cancer and sixth in terms of mortality from cancer.¹⁻³ Universally open surgery was considered as standard of care in cancer stomach. Nonetheless, laparoscopic gastrectomy is becoming more and more popular around the globe. When compared with open gastrectomy, recent studies have shown that laparoscopic gastrectomy results in a shorter stay in hospital, identical or less postoperative complications, with no significant differences in proximal and distal margins and almost harvesting equal number of nodes.⁴⁻⁶

Laparoscopic gastrectomy has an absolute benefit of a magnification, which makes it easier to see the operative field in closer manner. This facilitates surgeons to do a meticulous lymph nodal dissection which has significant prognostic value.⁷ However, some authors are opposing laparoscopic gastrectomy, arguing that the techniques used during the procedure and the effects of pneumoperitoneum may raise the possibility of cancer cells spreading to adjacent organs, especially in the case of tumors with serosal breach (T4a) and nodal metastases. This could increase the local recurrence rate.⁸ In locally advanced stomach cancer cases, laparoscopy is just as effective as open gastrectomy in terms of intraoperative and postoperative complications and oncological results, according to the KLASS 02 and LOGICA trials.^{9,10}

MATERIALS AND METHODS

In this study, we compared laparoscopic gastrectomy with open gastrectomy that were done for locally advanced carcinoma

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stomach in our center of oncology during the period from January 2015 to December 2019. Medical records of all these patients treated during that period were collected from the medical records department and details regarding intraoperative events, complication rate, duration of hospital stay, margin status, nodal yield and disease-free interval between the two groups were analyzed.

Patients with locally advanced carcinoma stomach who were admitted and operated on in our department during that period from 18 years of age to 70 years of age were included as study participants. Patients with metastatic disease and medically unfit for surgery were not included in the study.

For all these patients, we did either distal/subtotal/total gastrectomy with D2 lymphadenectomy. Patients who presented with gastric outlet obstruction and uncontrolled Malena were treated with upfront surgery followed by chemotherapy. Rest of

the patients underwent perioperative chemotherapy followed by surgery.

Patients underwent open gastrectomy with midline laparotomy incision and laparoscopic surgery using a 12 mm camera port, 10 mm and 5 mm working ports, and two 5 mm retraction ports, and an incision of about 5 cm was used for specimen extraction and anastomosis.

Patients planned for perioperative chemotherapy were treated with FLOT regimen. Fluorouracil 2600 mg/m² IV continuous infusion over 24 hours on day 1, Leucovorin 200 mg/m² IV on day 1, Oxaliplatin 85 mg/m² IV on day 1, Docetaxel 50 mg/m² IV on day 1 for every 14 days. Four cycles of preoperative chemotherapy and four cycles of postoperative chemotherapy were given.

All patients were kept under regular follow-up with monthly physical examination and contrast enhanced computer tomography of abdomen and pelvis six monthly for the first two years and annually thereafter. If the patient developed signs and symptoms of recurrence, those patients were subjected to imaging and esophago-gastroduodenal scopy.

RESULTS

During the period of study, 43 patients underwent gastrectomy for locally advanced carcinoma stomach. Out of the 43 patients, 22 patients underwent open gastrectomy and 21 patients underwent laparoscopic gastrectomy. Among these patients 30 patients were males and 13 patients were females. Upfront surgery was done on 9 patients, and the remaining 34 patients underwent perioperative chemotherapy and surgery.

Out of the 43 patients, 28 patients were on regular follow-up. Among these patients, 13 underwent open gastrectomy and 15 patients underwent laparoscopic gastrectomy. Three patients underwent upfront surgery and 25 patients were subjected to perioperative chemotherapy and surgery.

- Intraoperative blood loss (Average)
- Open gastrectomy – 230 mL
- Laparoscopic gastrectomy – 133 mL
- p-value – 0.001

The mean blood loss during intraoperatively in open gastrectomy was 230 mL whereas in laparoscopic gastrectomy, it was 133 mL. Laparoscopic gastrectomy showed a gross reduction in intraoperative blood loss compared with open gastrectomy which is statistically significant (Fig. 1).

Postoperative Complications

Among patients who underwent open gastrectomy, 25.9% of the patients had postoperative complications and paralytic ileus was the most common complication followed by pulmonary complications, whereas among patients who underwent laparoscopic gastrectomy 13.9% of patients had postoperative complications. Paralytic ileus was the most common complication encountered in laparoscopic arm also.

Even though laparoscopic gastrectomy patients had less postoperative complication compared with open gastrectomy patients, these difference does not reflect in statistical significance (Table 1).

- Mean days of hospital stay (Fig. 2)
- Open gastrectomy – 18 days
- Laparoscopic gastrectomy – 11 days
- p-value – 0.0001

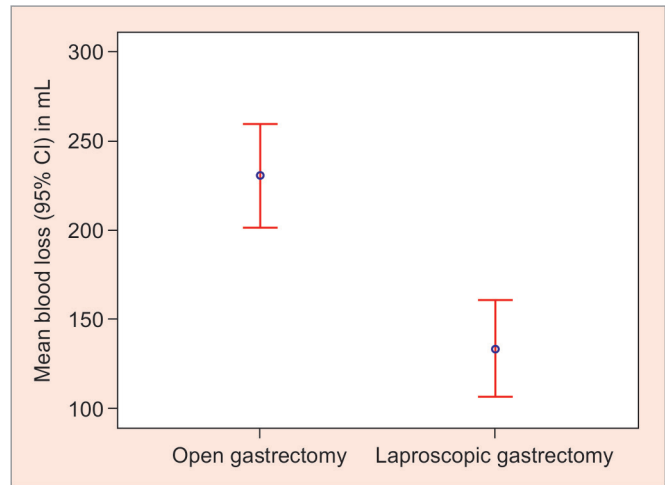


Fig. 1: Comparison of blood loss

Table 1: Comparison of complications

Complications	Open surgery	Laparoscopic surgery	p-value
Pulmonary complications	4	2	0.262
Surgical site infections	3	1	0.778
Anastomotic leak	2	2	0.877
Paralytic ileus	7	3	0.062

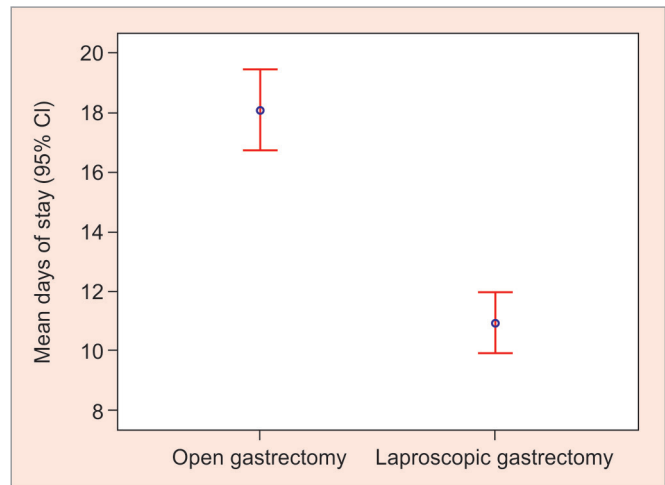


Fig. 2: Comparison of days of hospital stay

Patients who underwent open gastrectomy had a much longer hospital stay. The difference in duration of hospital stay between laparoscopic and open surgery was 7 days. Even though all of the laparoscopic gastrectomy patients were fit for discharge on postoperative day 7, due to logistic reason we had to discharge them after postoperative day 10.

MARGIN STATUS

Open

- Total gastrectomy: proximal – 1.9 cm, distal – 6.6 cm
- Distal gastrectomy: proximal – 3.9 cm, distal – 2.1 cm



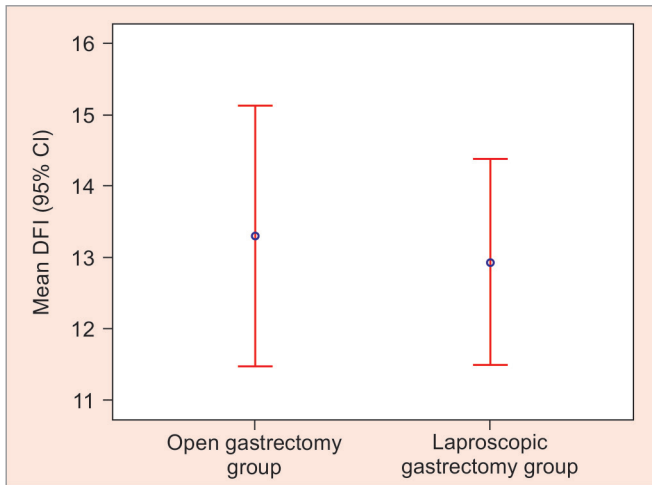


Fig 3: Comparison of disease-free interval

Laparoscopic

- Total gastrectomy: proximal – 2.0 cm, distal – 6.4 cm
- Distal gastrectomy: proximal – 3.6 cm, distal – 1.9 cm

Positive margins

- Open gastrectomy – 1
- Laparoscopic gastrectomy – 1
- *p*-value – 0.916

NODAL YIELD STATUS

- Open gastrectomy 18.4 nodes
- Laparoscopic gastrectomy 17.8 nodes
- *p*-value – 0.125

The final histopathological examination revealed not much of difference regarding margins assessment and nodes harvested in open and laparoscopic gastrectomy patients. The average nodal harvest in open gastrectomy was 18.4 and in laparoscopic gastrectomy, it was 17.8. Among these patients, we had two patients with positive margins, both patients underwent total gastrectomy with D2 lymphadenectomy and both of them had positive proximal margin.

- Disease-free interval (28 patients)
- Open gastrectomy – 13.3 months
- Laparoscopic gastrectomy – 12.9 months
- *p*-value – 0.727

Among the 28 patients who were on regular follow-up, it was found that the disease-free survival for open and laparoscopic gastrectomy were 13.3 months and 12.9 months, respectively which was not statistically significant.

There was no death recorded during the first 30 days of surgery in both open and laparoscopic gastrectomy (Fig. 3).

DISCUSSION

The prognosis of the gastrectomy patient depends on key factors like surgical margins, nodes harvested and complications encountered by the patient during surgery and in the postoperative period.¹¹ As per recent AJCC staging, locally advanced carcinoma

stomach is defined as patients with stage Ib to IIc excluding T4b and T1. On comparison with early stage disease, surgery in locally advanced gastric cancer is technically more difficult due to the absolute necessity of D2 lymphadenectomy.^{12,13} It is unclear if laparoscopic techniques can accomplish a sufficient D2 lymph node dissection.¹⁴

In the present study, there was a significant reduction in intraoperative bleeding in laparoscopic gastrectomy patients when compared with open gastrectomy. In laparoscopic gastrectomy, due to its magnification capacity, we can clearly identify the blood vessels and thereby we can minimize the loss of blood during the surgery. From most of the recent studies around the world, it is now clear that having a laparoscopic surgery results in a much shorter stay in hospital and much less blood loss during the procedure.^{10,11}

In the present study, we encountered complications, such as atelectasis, surgical site infections, anastomotic leak, and paralytic ileus. Pulmonary complications were treated with aggressive chest physiotherapy, nebulization, bronchodilators, and supportive parenteral antibiotics. Surgical site infections were treated with local wound care IV antibiotics according to pus culture and sensitivity. We also had paralytic ileus in some of our patients from both arms lasting for 4–8 days which may hamper the recovery and early discharge, those patients were managed by prokinetics, active mobilization, and masterly inactivity. There is no significant statistical difference in terms of postoperative complication rate in our study. While the JCOG0912 trial found similar rates of postoperative problems following laparoscopic and open gastrectomy, the KLASS-01 trial documented a decrease in postsurgery, complication rate, and duration of hospital stay following laparoscopic gastrectomy.^{7,15}

We had two patients with microscopic positive margins in the final histopathological report, both were total gastrectomy patients, one from open gastrectomy arm and another from laparoscopic gastrectomy patients. Nodal yield in both open and laparoscopic surgeries in both distal and total gastrectomy was comparable and an adequate number of nodes were harvested for staging purposes.

Disease-free survival (DFS) is commonly defined as the time between a curative treatment and cancer recurrence, a second cancer, or death from any cause. Disease-free survival is a strong predictor of overall survival (OS). The significant association between DFS and OS can be explained in part to the short time between relapse and death in gastric cancer.¹⁶ Various factors, such as lymph nodal metastasis, histological variant, such as signet cell type, undifferentiated histology, and palpable abdominal mass influence the recurrence rate and thereby the DFS. An immutable element could be poor tumor biology. On the other hand, higher rates of DFS are achieved by extensive resection, safe aggressive surgery (including multi-organ resections), microscopic negative margin resection, and sufficient lymph nodal dissection.¹⁷ In patients with stomach cancer without warning symptoms, Maconi et al. observed that a 6-month delay in diagnosis had no effect on survival but appeared to be associated with a better prognosis, likely because the disease was in an earlier stage.¹⁸

In the present study, the disease-free interval in open gastrectomy was 13.3 months, ranging between 8 and 19 months, whereas in laparoscopic gastrectomy, it was 12.9 months with a range from 8 months to 17 months. For patients with locally advanced carcinoma stomach, the KLASS-02-RCT demonstrated that the relapse-free survival rate following laparoscopic distal

gastrectomy with D2 lymph nodal dissection is comparable to that of open distal gastrectomy.⁹

We ambulated all our patients on postoperative day 1 and the urinary catheter was removed on the same day. We continued epidural/parenteral analgesics for 2 days. We started a proper oral diet from day 5, starting from sips of clear fluids to soft solid diet. We started chest physiotherapy for all of our patients on postoperative day 1 along with spirometry exercises. Early ambulation of patients prevents postoperative pneumonia resulting from atelectasis.

It is possible to walk around early with a small abdominal incision rather than the larger laparotomy incision since it causes significantly less amount of pain. According to Schweickert et al.'s findings, early ambulation may help avoid delirium in postoperative period.¹⁹ Reducing pain following surgery could potentially help patients in preventing delirium in postoperative period, as it is one of the causes of the condition,^{14,20} in turn helps in early recovery and discharge of patients. This results in reduced hospital stay in laparoscopic gastrectomy patients which is statistically significant in comparison with open surgery.

CONCLUSION

In our institution, the long-term oncological outcomes of laparoscopic gastrectomy with D2 lymph nodal dissection were comparable to the conventional open gastrectomy for patients with locally advanced gastric cancer. A significant reduction in the duration of hospital stay and slightly lesser postoperative complication rate shows that laparoscopic gastrectomy will completely replace open gastrectomy in near future.

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