LESS

Original Article

Laparosc Endosc Surg Sci 2018;25(2):43-46
DOI: 10.14744/less.2018.82787

Laparoscopic surgery for gastric tumor: a single-center experience

Oktay Karaköse,[1] Servet Karagül,[2] Mehmet Aslan[1]

[1]Department of Surgical Oncology, University of Health Sciences, Samsun Training and Research Hospital, Samsun, Turkey
[2]Department of Gastroenterological Surgery, University of Health Sciences, Samsun Training and Research Hospital, Samsun, Turkey

ABSTRACT

Introduction: The advantages of minimally invasive surgery compared to open surgery have led to increased use in recent years. Although there are concerns that the appropriate oncological results may not be obtained in cases of stomach cancer as a result of technical difficulties, a laparoscopic gastrectomy is often preferred to open gastrectomy. The Far East is currently leading in this field. The aim of this paper was to share the results of laparoscopic gastrectomy performed for stomach tumors.

Materials and Methods: A retrospective study was performed of patients who had a laparoscopic gastrectomy for a gastric tumor in 1 clinic between September 2016 and April 2018. Patient characteristics, tumor features, surgical approach, postoperative follow-up, and oncological outcomes were evaluated.

Results: Gastric resection was performed in 66 patients. Laparoscopic surgery was performed in a total of 19 patients. Nine patients underwent laparoscopic total gastrectomy, 8 patients underwent laparoscopic distal gastrectomy, and laparoscopic wedge resection was performed in 2 cases. In 16 patients, D2 dissection was performed. The surgical margin and lymph node number were found to be compatible with oncology principles. In the postoperative period, mortality occurred in 2 patients, and anastomosis leakage in 1 patient. The mean length of stay in hospital was 9.8 days and the mean follow-up period was 9.1 months.

Conclusion: Although the number of cases was small and the follow-period was short, the results obtained from laparoscopic surgery applied to patients with a stomach tumor were considered to be compatible with those of open surgery and with oncology principles.

Keywords: Cancer; gastric surgery; laparoscopic gastrectomy; laparoscopic surgery.

Introduction

Minimally invasive surgery has been preferred in recent years for all intra-abdominal gastro-intestinal system operations as it is superior to open surgery in respect of postoperative patient comfort and wound site problems. The laparoscopic approach in gastric cancer surgery was first performed in 1994 by Kitano in Japan.[1] Since that time there have been significant developments in the application of minimally invasive approaches to gastric cancer. Several studies have reported advantages such as less blood loss, less postoperative pain, earlier intestinal movement and a shorter stay in hospital.[2,3]

Received: 20.05.2018 **Accepted:** 11.06.2018
Correspondence: Oktay Karaköse, M.D., Department of Surgical Oncology, University of Health Sciences, Samsun Training and Research Hospital, Samsun, Turkey
e-mail: oktaykarakose@gmail.com

Despite the high number of cases, laparoscopic gastrectomy is approached with caution as there is still a lack of information of long-term oncological results and advanced stage tumours.[4] Moreover, there is a separate difficulty in respect of the applicability of laparoscopic total gastrectomy. It is necessary for the surgeon to be a specialist in open gastric surgery in addition to having advanced laparoscopic skills.[4,5]

The aim of this study was to evaluate the outcomes of patients treated with laparoscopic surgery in our clinic because of a gastric tumor.

Materials and Methods

A retrospective study was carried out in patients who had laparoscopic gastrectomy for gastric tumor in Gastroenterological Surgery and Surgical Oncology Departments of Samsun Training and Research Hospital between September 2016 and April 2018. Patient characteristics, tumour features, surgical procedure, postoperative follow-up and oncology outcomes were evaluated.

Patients with a history of abdominal surgery, and those determined with advanced stage local invasion of adjacent organs in the preoperative tests were not considered for laparoscopic surgery but were admitted for open surgery. In addition, as there were problems related to the purchase of materials in our hospital in this period, there were patients who were applied with open surgery even though they were suitable candidates for laparoscopic surgery.

The operations were performed with the patient in a 30° reverse Trendelenburg position with the feet apart. A total of 6 trochars were used; 2 of 10mm, with one used for the camera, a 12 mm one for the laparoscopic linear cutter and 3 of 5 mm size. A liver retractor was used from the 5 mm trochar placed from the xiphoid. In all the total gastrectomies, a circular stapler was used by enlarging the trochar cuts placed from the left inferior abdomen. In the initial cases, the specimens were removed from these incisions, and in the later cases a suprapubic incision was made for this procedure.

Results

Within the study period, gastric resection was performed in 66 patients because of gastric tumor. Laparoscopic surgery was carried out to a total of 19 patients. The patients comprised 9 males and 10 females with a mean age of 59 years (range, 23–80 years). The diagnoses were gastric adenocarcinoma in 15 patients, gastric neuroendocrine tumour (NET) in 2 patients, gastrointestinal system tumour (GIST) in 1 patient and inflammatory fibroid polyp in 1 patient. In the patient with a polyp, the decision for surgery was made based on the lesion size of 8cm diameter and that there had been repeated bleedings. The localisation of the lesions was determined as in the upper third of the stomach in 5 cases, the mid-third of the stomach in 5, and the lower third of the stomach in 9. Stage 1 lesions were determined in 5 cases, stage 2 in 1 case, and stage 3 in 9 patients. The patient with GIST was in the high-risk group according to the NIH classification and 2 patients with stomach NET were clinicopathologically Type 1. Laparoscopic total gastrectomy (LTG) was performed in 9 patients, laparoscopic distal gastrectomy in 8 patients, and laparoscopic wedge resection in 2 patients. (Fig. 1a–c). In 16 patients, D2 dissection was carried out. No dissection was applied to the 2 patients with stomach NET or to the patient with polyp excision.

Oesophagojejunostomy anastomosis in LTG was performed side-to-side with a circular stapler in 7 patients and side-to-side with a linear stapler in 2. In the 8 patients with distal gastrectomy, oesophagojejunostomy anastomosis was applied side-to-side with a linear stapler. Two patients treated with wedge resection and the first 9 patients of the series, the specimen was removed with enlargement of the trochar site on the left of the umbilicus,

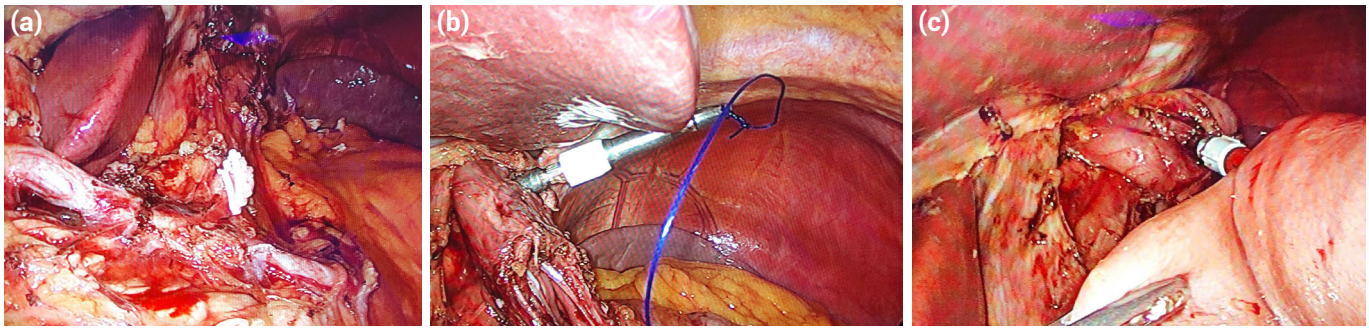

Figure 1. (a) Appearance after lymph node dissection. **(b)** Appearance of circular staplers anvil inserted into esophagus. **(c)** Side-to-side anastomosis with a circular stapler.

Table 1. Tumor and operation characteristics

Localization	n=19
Upper 1/3 stomach	5
Mid 1/3 stomach	5
Lower 1/3 stomach	9
Stage	n=15
Stage 1	5
Stage 2	1
Stage 3	9
Operation	n=19
Laparoscopic total gastrectomy	9
Laparoscopic distal gastrectomy	8
Laparoscopic wedge resection	2
The closest surgical border (mean)	2.7 cm (1.4 cm–5.5 cm)
Number of lymph nodes removed (mean)	28 (15–47)
Postoperative length of hospital stay (mean day)	9.8 day (5–42)
Operating time (mean minutes)	228 mins (150–320)
Follow-up period (mean month)	9.1 month (3–20)

and in the last 8 cases, the specimen was removed by making a suprapubic incision. The closest surgical margin to the cancer was mean 2.7 cm (range, 1.4–5.5 cm) and the mean number of lymph nodes removed was 28 (range, 15–47). In 1 patient, perioperative pneumothorax occured, so a chest tube was applied. The postoperative length of hospital stay was mean 9.8 days (range, 5–42 days) (Table 1). Mortality was recorded in 2 patients; 1 patient on the 42nd day postoperatively because of pneumonia following the development of ARDS and subcutaneous infection, and 1 patient on the postoperative 5th day because of pulmonary embolism. Anastomosis leakage occured in 1 patient and percutaneous drainage was applied. Subsequently, as stenosis developed, the problem was eliminated by the application of dilatation 3 times at intervals. With the exception of the 2 patients lost to mortality, the follow-up period of the remaining patients was mean 9.1 months (range, 3–20 months). Recurrence developed in 1 patient who was then lost at 13 months postoperatively. The other 16 patients are being followed up disease-free.

Discussion

Laparoscopic gastrectomy (LG) has become more widespread throughout the world, primarily in the Far East, with superior oncological results obtained compared to open gastrectomy.[5,6] In randomised, controlled studies that have compared LG with open gastrectomy, LG has been shown to have advantages of a smaller incision, less intraoperative blood loss, a shorter hospital stay, and low rates of postoperative complications and mortality.[7–9] Nevertheless, this operation is approached with caution in respect of oncological reliability and technical applicability. In addition, the high rate of diagnosis of the disease at an advanced stage in Turkey is a separate problem.[6]

Especially in the West, the minimum requirement in gastric cancer surgery is R0 resection with sufficient surgical margins and dissection in which at least 15 lymph nodes are removed.[4,9,10] In the current study, the closest surgical margin to the tumor was mean 2.7 cm (range, 1.4–5.5 cm) and the mean number of lymph nodes removed was 28 (range, 15–47), which demonstrated that our procedure was sufficient in terms of oncology reliability and applicability.

Another important problem is the applicability of LG. In recent years, the increase in surgical experience, the improvements in equipment used, and the encouragement by related academic organisations have increased the rates of LG applied to stomach tumors.[7–9] Despite the use of LG in certain centers in Turkey, there have been no studies related to this with high patient numbers.

In various studies it has been recommended that surgeons who are experienced in open gastrectomy, start LG and the learning curve is said to be approximately 50–60 cases.[5,11] As the number of current cases is below this level, it is thought that in the future our experience will be completed on this subject. With the exception of the 2 cases where wedge resection was performed, the mean operating time of the current cases was 228 mins (150–320 mins) and mean blood loss was 75 cc (range, 30–200 cc).

In studies that have been conducted on different groups such as early gastric tumours, advanced stage gastric cancers and elderly patients, LG results have been found to be similar to those of open gastrectomy. As there are insufficient randomised, controlled studies related to long-term results, LG is approached with caution.[2,4,9,12] As our centre has low patient volume, no group differentiation could be made. With the exception of patients with advanced stage local invasion of adjacent organs and those with a history of abdominal surgery, LG was planned for all operable patients. Of the 15 gastric cancer patients, 9 (60%) were

stage 3 and 6 (32%) were aged over 70 years. Although gastrectomy has been found to be safe in elderly patients in some studies, higher postoperative complication and mortality rates have been reported due to medical comorbidities and insufficient cardiac and pulmonary function capacity in this patient group.[9]

Mortality in the current study at postoperative days 5 and 42 after the development of major complications of pulmonary embolism and ARDS were in this group. In addition the patient who had tumor recurrence and was lost to mortality in the 13th postoperative month was in this group and was T4aN3. While some studies have found similar complication rates in LG and open gastrectomy,[13] others have reported that although the anastomosis problems were greater in LG, wound site infection and the postoperative complication rate was lower.[14] In 1 patient of the current study, leakage developed in the oesophagojejunostomy anastomosis, which was treated with percutaneous drainage. In the follow-up, anastomosis stricture developed and the problem was resolved with dilatation applied at intervals 3 times.

In various studies that have examined the 5-year long-term results, no difference has been shown between LG and open gastrectomy. Nevertheless, randomised controlled studies related to this are awaited.[4] The mean follow-up of the current study was 9.1 months, which was not sufficient. One patient died at 13 months postoperatively because of tumour recurrence and the remaining 16 patients are being followed up disease-free.

Conclusion

Although the low number of patients and the short follow-up period show that there is still a long road ahead of us, laparoscopic surgery for patients with gastric tumor can be considered compatible with oncology principles and can be performed without falling behind the results obtained in open surgery.

Disclosures

Ethichs Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

References

1. Kitano S, Iso Y, Moriyama M, Sugimachi K. Laparoscopy--assisted Billroth I gastrectomy. Surg Laparosc Endosc 1994;4:146–8.
2. Lee JH, Han HS, Lee JH. A prospective randomized study comparing open vs laparoscopy-assisted distal gastrectomy in early gastric cancer: early results. Surg Endosc 2005;19:168–73. [CrossRef]
3. Lee JH, Yom CK, Han HS. Comparison of long-term outcomes of laparoscopy-assisted and open distal gastrectomy for early gastric cancer. Surg Endosc 2009;23:1759–63.
4. Inokuchi M, Nakagawa M, Tanioka T, Okuno K, Gokita K, Kojima K. Long- and short-term outcomes of laparoscopic gastrectomy versus open gastrectomy in patients with clinically and pathological locally advanced gastric cancer: a propensity-score matching analysis. Surg Endosc 2018;32:735–42.
5. Song JH, Choi YY, An JY, Kim DW, Hyung WJ, Noh SH.Short-Term Outcomes of Laparoscopic Total Gastrectomy Performed by a Single Surgeon Experienced in Open Gastrectomy: Review of Initial Experience. J Gastric Cancer 2015;15:159–66. [CrossRef]
6. Aktimur R, Cetinkunar S, Yıldırım K, Odabaşı E, Alıcı Ö, Nigdelioğlu A, et al. Initial experience with laparoscopic gastrectomy in a low-volume center. Dicle Med J. 2015;42:12-7.
7. Li G, Hu Y, Liu H. Current status of randomized con¬trolled trials for laparoscopic gastric surgery for gastric cancer in China. Asian J Endosc Surg. 2015;8:263-7. [CrossRef]
8. Hu Y, Huang C, Sun Y, Su X, Cao H, Hu J, et al. Morbidity and Mortality of Laparoscopic Versus Open D2 Distal Gastrectomy for Advanced Gastric Cancer: A Randomized Controlled Trial. J Clin Oncol 2016;34:1350–7. [CrossRef]
9. Yang XW, Zhu SH, Li PZ, Li WZ, Sun XL. Outcomes of laparoscopic gastrectomy for gastric cancer in elderly patients. J BUON 2018;23:85–91.
10. Antonakis PT, Ashrafian H, Isla AM. Laparoscopic gastric surgery for cancer: where do we stand? World J Gastroenterol 2014;20:14280–91. [CrossRef]
11. Kodera Y, Yoshida K, Kumamaru H, Kakeji Y, Hiki N, Etoh T, et al. Introducing laparoscopic total gastrectomy for gastric cancer in general practice: a retrospective cohort study based on a nationwide registry database in Japan. Gastric Cancer 2018.
12. Ludwig K, Schneider-Koriath S, Scharlau U, Steffen H, Möller D, Bernhardt J. Totally Laparoscopic versus Open Gastrectomy for Gastric Cancer: a Matched Pair Analysis. Zentralbl Chir 2018;14:145–54. [CrossRef]
13. Kim W, Kim HH, Han SU, Kim MC, Hyung WJ, Ryu SW, et al; Korean Laparo-endoscopic Gastrointestinal Surgery Study (KLASS) Group. Decreased Morbidity of Laparoscopic Distal Gastrectomy Compared With Open Distal Gastrectomy for Stage I Gastric Cancer: Short-term Outcomes From a Multicenter Randomized Controlled Trial (KLASS-01). Ann Surg 2016;263:28–35. [CrossRef]
14. Jeong O, Jung MR, Kim GY, Kim HS, Ryu SY, Park YK. Comparison of short-term surgical outcomes between laparoscopic and open total gastrectomy for gastric carcinoma: case-control study using propensity score matching method. J Am Coll Surg 2013;216:184–91. [CrossRef]