

Is lesser curvature resection for GIST can be associated with delayed gastric emptying?

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Abstract

Aim: Patients who performed wedge resection of the lesser curvature of the stomach due to GIST were evaluated for delayed gastric emptying.

Material and Methods: Thirty patients who underwent wedge gastric resection for GIST in stomach between 2009-2019 were evaluated retrospectively. In Seven patients it is located in lesser curvature.

Results: Fifty-five patients were operated between 2009 and 2019 for GIST. In 7 patients, GIST was found to be located in the lesser curvature of the stomach. Of the 7 patients, 2 (%28) were male and 5 (%72) were female. Laparoscopy was performed in 4 patients and conventional procedure was performed in 3 patients. The average age was 56 ± 10.5 (46-67) years in the conventional procedure group, and 61.5 ± 10.4 (50-73) in the laparoscopic group. Average hospital stay was 4.67 ± 1.5 (3-6) days for conventional procedure and, 2.75 ± 0.9 (2-4) days for the laparoscopic group. Age and length of hospital stay were not different between the two groups ($p=0.522$ and $p=0.094$, respectively). All patients had normal radiological findings. Stool discharge was observed on postoperative day 3 at the latest.

Conclusion: In conclusion, resection of lesser curvature (with laparoscopic or conventional procedure) GISTs with a tumor free surgical margin staying near to the gastric wall to prevent vagal nerve injury is feasible without gastric emptying problems.

Keywords: Delayed gastric emptying; gastric cancer; gastrointestinal stromal tumor

INTRODUCTION

Gastrointestinal stromal tumor (GIST) is the most common mesenchymal tumor in the gastrointestinal tract. Gastrointestinal stromal tumor was first described in 1983 by Mazur and Clark (1). GISTs are generally found in the stomach (%60) and originate from interstitial cell of Cajal so that GISTs differ from leiomyoma and leiomyosarcoma which take root from smooth muscle cells (1,2). GIST is slow-growing submucosal tumor. Small lesions are often incidentally recognized although they may occasionally ulcerate and produce significant bleeding. However, clinical symptoms vary from a small lesion to a large tumor with metastases (3).

Wedge resection with clean margins is an adequate surgical treatment. When the tumor is large and invasive, if safe, en bloc resection of the surrounding organs is required to remove the entire tumor. Although metastasis is hematogenous, resected specimens may sometimes have positive lymph nodes (3). In addition to conventional surgery, laparoscopic and robot-assisted minimally

invasive surgical methods have been successfully applied in many centers in recent years.

The delay gastric emptying (DGE) after gastric surgery is occur between 5 and 25%. The patient's failure to take regular diet for 10 days after gastric procedure was called DGE. It has symptoms such as nausea, vomiting, epigastric pain, weight loss (4). Pylorus is innervated by the vagus nerve. The vagus nerve lies along the lesser curvature of stomach, and it is possible to be injured in lesser curvature surgery (5). In this study, it was aimed to investigate whether there is a delay in gastric emptying after GIST resection located in lesser curvature.

MATERIAL and METHODS

Fifty-five patients operated for GIST between 2009 and 2019 were retrospectively evaluated. In 7 patients, GIST was found to be located in the lesser curvature of the stomach. All patients underwent wedge resection. Drain was placed in all patients during the operation. On the first postoperative day only clear liquids were allowed

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and regime gradually increased. After the operation, electrolytes and radiological controls of the patients were performed daily. Daily intestinal sounds were examined.

Statistical analysis

Statistical Package for Social Sciences [SPSS (Inc. Chicago,IL)] 22.0 for Windows was used for statistical analysis. Distribution characteristics of the groups were not analyzed due to the small number of participants. Numerical data were outlined as mean±SD and categorical data were given as percentage (%). Data of independent groups were compared with independent samples t test. p value less than 0.05 was accepted statistically significant.

RESULTS

Fifty-five patients were operated between 2009 and 2019 for GIST. Table 1 shows the distribution of the organs. Liquid was given on postoperative day 1. Regimen was gradually increased. Patients were followed by daily physical examination. Bowel sounds and electrolytes balance were checked. Of the 7 patients, 2 (%28) were male and 5 (%72) were female. Laparoscopy was performed in 4 patients and conventional procedure was performed in 3 patients. The average age was 56±10.5 (46-67) years in the conventional procedure group, and 61.5±10.4 (50-

73) in the laparoscopic group. Average hospital stay was 4.67±1.5 (3-6) days for conventional procedure and, 2.75±0.9 (2-4) days for the laparoscopic group. Age and length of hospital stay were not different between the two groups (p=0.522 and p=0.094, respectively). Clinical and pathological findings were shown in Table 2. All patients had normal radiological findings. Stool discharge was observed on postoperative day 3 at the latest.

Table 1. Distribution of organs among 55 patients operated between 2009-2019

| Organ | Number of patients |
|--------------------|--------------------|
| Stomach | 30 |
| Small intestine | 17 |
| Rectum | 2 |
| Liver (metastasis) | 2 |
| Colon | 1 |
| Duodenum | 2 |
| Appendix | 1 |

Table 2. Clinic and pathological characteristics of the patients

| Case | Sex | Age | Tumor Size (cm) | Type of Surgery | Place of tumor | Type of Pathology | Day of Discharge |
|------|--------|-----|-----------------|-----------------------|------------------|-------------------|------------------|
| 1 | Male | 50 | 18 | Laparoscopic Surgery | Lesser curvature | GIST | 4 |
| 2 | Female | 73 | 4 | Laparoscopic Surgery | Lesser curvature | GIST | 2 |
| 3 | Female | 67 | 6 | Laparoscopic Surgery | Lesser curvature | GIST | 3 |
| 4 | Female | 56 | 4 | Laparoscopic Surgery | Lesser curvature | GIST | 2 |
| 5 | Female | 55 | 19 | Conventional approach | Lesser curvature | GIST | 6 |
| 6 | Male | 46 | 15 | Conventional approach | Lesser curvature | GIST | 5 |
| 7 | Female | 67 | 3 | Conventional approach | Lesser curvature | GIST | 3 |

DISCUSSION

Gastrointestinal stromal tumor is originated by Cajal cells and most commonly occurs in the stomach. Subtotal gastrectomy is recommended for malignant tumors located distally to the lesser curvature of the stomach (6,7). Loop gastrojejunostomy or Roux-n-Y anastomosis is added to subtotal gastrectomy. Complications such as duodenal stump leakage, anastomosis leakage, intra-abdominal infections, sepsis, bleeding in the anastomosis line, bleeding into the abdomen, delayed gastric emptying; early or late ileus may be seen in these procedures. These complications can sometimes lead to fatal consequences.

Gastrointestinal stromal tumor may show endophytic or exophytic growth pattern. It can grow from the stomach into the abdominal cavity or stomach lumen. These

growth patterns can exist together at the same case. Pseudocapsule is a possible manifestation of GIST (8). In this situation, it can be more easily separated from the surrounding tissues during surgery.

Gastrointestinal stromal tumor shows hematogenous spread. Although rare, spread to surrounding lymph nodes can also be observed. Lymph node dissection is often not performed ,because of hematogenous spread. Lymph nodes detected preoperatively by imaging procedures or intraoperatively should be removed (9). For GISTs located in the lesser curvature of the stomach, resection is performed laparoscopically or conventionally to provide a tumor free surgical margin. The possibility of impaired innervation and delayed gastric emptying may occur in lesser curvature GISTs. In this study, we investigated whether the resection was caused delaying in gastric

emptying. Tumor formation in the lesser curvature of the stomach was present in 7 patients who were treated for GIST between 2009 and 2019. After resection of the tumor with tumor free surgical margin, patients were followed up with physical examination. The soft diet regimen was started and tolerated on the 2nd postoperative day. No pathological findings suggesting a delay in gastric emptying such as nausea and vomiting. On physical examination, no distension was observed. Bowel sounds were normoactive. There were no unusual findings on standing abdominal x-ray. Patients were discharged on average 3.8 days (3-5 days) postoperatively.

Returning to work in gastric resection and reconstruction operations such as loop gastrojejunostomy or roux-n-Y gastrojejunostomy is thought to be longer than gastric wedge resections performed with a tumor-free surgical margin. No delay problems were observed in gastric emptying, which was the biggest uneasiness. Gastric motility problems can be seen both in laparoscopic or endoscopic surgery (10). Delayed gastric emptying can be associated with diabetes mellitus, neurological disorders like Parkinson's disease, nervusvagus or smooth muscle injury (11,12). The limitation of our study is the small number of patients and a retrospective study. Large prospective studies are required about DGE in parical resections of lesser curvature of stomach.

CONCLUSION

In conclusion, resection of lesser curvature (with laparoscopic or conventional procedure) GISTs with a tumor free surgical margin staying near to the gastric wall to prevent vagal nerve injury is feasible without gastric emptying problems.

Competing interests: The authors declare that they have no competing interest.

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Ethical approval: Ethics committee approval was not obtained because it was a retrospective study.

REFERENCES

1. Yang Z, Wang F, Liu S, et al. Comparative clinical features and short-term outcomes of gastric and small intestinal gastrointestinal stromal tumours: a retrospective study. *Sci Rep* 2019;10:10033.
2. Danzi M, Grimaldi L, Fabozzi M, et al. Outcome of surgical resection of localized gastrointestinal stromal tumors: our experience. *BMC Surg* 2013;13:10.
3. Stanek M, Pisarska M, Budzyńska D, et al. Gastric gastrointestinal stromal tumors: clinical features and short – and long-term outcomes of laparoscopic resection. *Wideochir Inne Tech Maloinwazvine* 2019;14:176-81.
4. Meng H, Zhou D, Jiang X, et al. Incidence and risk factors for postsurgical gastroparesis syndrome after laparoscopic and open radical gastrectomy. *World J Surg Oncol* 2013;11:144
5. Yoshizaki T, Obata D, Aoki Y, et al. Endoscopic submucosal dissection for early gastric cancer on the lesser curvature in upper third of the stomach is a risk factor for postoperative delayed gastric emptying. *Surg Endosc* 2018;32:3622-9.
6. Gouzi JL, Huguier M, Fagniez PL, et al. Total versus subtotal gastrectomy for adenocarcinoma of the gastric antrum. A French prospective controlled study. *Ann Surg* 1989;209:162-6.
7. Bozzetti F, Marubini E, Bonfanti G, et al. Subtotal versus total gastrectomy for gastric cancer: five-year survival rates in a multicenter randomized Italian trial. Italian Gastrointestinal Tumor Study Group. *Ann Surg* 1999;230:170-8.
8. Nishida T, Cho H, Hirota S, et al. Clinicopathological Features and Prognosis of Primary GISTs with Tumor Rupture in the Real World. *Ann Surg Oncol* 2018;25:1961-9.
9. Chourmouzi D, Sinakos E, Papalavrentios L, et al. Gastrointestinal stromal tumors: a pictorial review. *J Gastrointestin Liver Dis* 2009;18:379-83.
10. Waseda Y, Doyama H, Inaki N, et al. Does laparoscopic and endoscopic cooperative surgery for gastric submucosal tumors preserve residual gastric motility? Results of a retrospective single-center study. *PLoS One* 2014;26:9:101337.
11. Marrinan S, Emmanuel AV, Burn DJ. Delayed gastric emptying in Parkinson's disease. *Mov Disord* 2014;29:23-32.
12. Koch KL, Calles-Escandón J. Diabetic gastroparesis. *Gastroenterol Clin North Am* 2015;44:39-57.