



Case report

Ingenuity and tips for laparoscopic local resection for local recurrence of early gastric cancer after endoscopic submucosal dissection: A case report

Kenji Kuroda^{a,*}, Katsunobu Sakurai^a, Tomohiro Kunimoto^b, Naoshi Kubo^a,
Tsuyoshi Hasegawa^a, Toru Inoue^a

^a Department of Gastroenterological Surgery, Osaka City General Hospital, Osaka, Japan

^b Department of Surgery, Osaka City Juso Hospital, Osaka, Japan



ARTICLE INFO

Keywords:

Case report
Gastric cancer
Local resection
Laparoscopic surgery
Local recurrence

ABSTRACT

Introduction and importance: The presence of severe comorbidities is associated with poor surgical outcomes in patients who undergo curative resection for gastric cancer. Herein, we present a report of laparoscopic local resection (LLR) for the local recurrence of gastric cancer in a patient with severe comorbidities.

Case presentation: A 73-year-old man underwent endoscopic submucosal dissection (ESD) for an early gastric cancer located at the greater curvature of the gastric antrum. One year after the ESD, follow-up gastroscopy revealed a local recurrence.

Clinical discussion: LLR was performed owing to severe comorbidities such as chronic heart failure, severe chronic obstructive pulmonary disease, and diabetes mellitus. We confirmed the location of the tumor with an endoscope, and full-thickness stitches were placed outside the tumor to prevent displacement between the submucosal and serosal muscular layers. Full-thickness resection of the stomach wall was performed along the stitch points using an ultrasonic shear. The edge of the resection line was closed using a laparoscopic stapling system. The patient had an uneventful postoperative course and was discharged 8 days after the operation. The patient had no disease recurrence and late complications such as digestive symptom and weight loss at the 9-month follow-up after the operation.

Conclusion: LLR might be a suitable treatment option for high-risk patients with gastric cancer. During full-thickness resection of the stomach wall, our method enables the maintenance of a negative margin without the need for ESD.

1. Background

Evidence-based treatment for patients with gastric cancer is decided based on treatment guidelines that contribute to improvements in the patients' overall survival; however, treatment strategies based on management guidelines are not always suitable for every patient. Particularly, elderly people and patients with severe comorbidities have a high-risk of mortality and complication; consequently, a less invasive surgery, and not a typical gastrectomy, may be beneficial for them. Some studies have reported partial gastrectomy using laparoscopic and endoscopic cooperative surgery (LECS) as a palliative treatment for gastric cancer [1–3]. Here, we report our experience and tips for laparoscopic local

resection (LLR), without the need for endoscopic submucosal dissection (ESD), for treating gastric cancer in a patient with severe comorbidities. The work was reported in line with the SCARE criteria. [4]

2. Presentation of case

A 73-year-old man presented at the hospital with progressing anemia. He had severe chronic obstructive pulmonary disease that was treated with long-acting muscarinic antagonist, long-acting beta agonist, and inhaled corticosteroids. He also had chronic heart failure as well as diabetes treated with sodium-glucose cotransporter 2 inhibitor. There was no relevant family history, including any genetic information,

Abbreviations: LLR, laparoscopic local resection; ESD, endoscopic submucosal dissection; LECS, laparoscopic and endoscopic cooperative surgery; LDG, laparoscopic distal gastrectomy.

* Corresponding author at: Department of Gastroenterological Surgery, Osaka City General Hospital, 2-13-22 Miyakojima hondori, Miyakojima-ku, Osaka City, Osaka 534-0021, Japan.

E-mail address: kuroken1985@yahoo.co.jp (K. Kuroda).

<https://doi.org/10.1016/j.ijscr.2022.107650>

Received 17 August 2022; Received in revised form 8 September 2022; Accepted 9 September 2022

Available online 13 September 2022

2210-2612/© 2022 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

or psychosocial history. Gastroscope revealed a 4.0×1.5 cm tumor without ulcer (type 0-III) at the greater curvature of the gastric antrum (Fig. 1a, b). Histological results of the biopsy specimen indicated papillary adenocarcinoma. Initially, we performed ESD for the early gastric cancer. Histopathologically, the ESD specimen revealed massive submucosal layer invasion of papillary adenocarcinoma (pT1b [9000 μ m]), and the horizontal margin was unevaluable. For this patient, curative distal gastrectomy was required; careful follow-up with esophagogastroduodenoscopy was selected due to his severe comorbidities. One year after the ESD, follow-up gastroscope revealed a 1 cm elevated lesion with ulceration on the post-ESD scar, and microscopic examination of the biopsy specimen revealed a well-differentiated adenocarcinoma. Distal gastrectomy with lymphadenectomy is the standard treatment for local recurrence; however, he had multiple comorbidities. The risk of local recurrence and distant metastasis was adequately explained to the patient and he opted to receive LLR. To determine the resection line, endoscopic negative biopsy was performed followed by clip placement around the tumor (Fig. 1c).

LLR of the stomach was performed as follows. After positioning the patient in the reverse Trendelenburg position, a 10 mm-camera trocar was inserted at the umbilicus, followed by the production of pneumoperitoneum. On initial intraperitoneal observation, there was no ascites, peritoneal dissemination, or liver metastasis. The location of the tumor was confirmed using an endoscope, while excluding the stomach wall using forceps. First, full-thickness stitches were placed outside the endoscopy clips to mark the edge of the dissection line and prevent displacement between the submucosal and serosal muscular layers (Fig. 2a). Subsequently, No. 4d lymph nodes near the tumor area were resected using an ultrasonic shear (Harmonic Ace, Ethicon, OH, USA) (Fig. 2b). Moreover, full-thickness resection of the stomach wall was

performed along the stitch points using an ultrasonic shear (Fig. 2c, d). The resected specimen was placed in a bag and removed through the umbilical port incision. The edge of the resection line was closed using temporal hand-sewn sutures followed by a laparoscopic stapling system (Fig. 2e, f). The operator was a senior resident with 3 years of special surgical training. The operative time and intraoperative blood loss were 210 min and 30 ml, respectively. The patient had no postoperative complications and the postoperative course was good. Oral intake was initiated the day after the operation; the patient was discharged 8 days after the operation.

Histopathological examination revealed a 9×8 mm well-differentiated adenocarcinoma, negative lateral and vertical margins, intramucosal cancer with no vascular or lymphatic invasion (pT1a, v0, ly0), and no lymph node metastasis (0/3). The patient has no disease recurrence or late complications such as digestive symptoms and weight loss at the 9-month follow-up after the operation.

3. Discussion

According to the Japanese Gastric Cancer Treatment Guidelines, gastrectomy with lymphadenectomy is the treatment of choice for patients with massive submucosal gastric carcinoma after endoscopic mucosal resection/ESD [5]. The frequency of lymph node metastasis is 11–20 % in submucosal cancer [3,6]. However, this also means that lymph node dissection is unnecessary in most operations. Yoshida et al. reported that the 30-day and in-hospital mortality rates of Stage I gastric cancer in patients who underwent laparoscopic distal gastrectomy (LDG) were 0.22 % and 0.38 %, respectively [7]. Regarding the postoperative complications of LDG, the frequency of anastomotic leakage, pancreatic fistula, and pneumonia was 1.9 %, 1.0 % and 1.7 %,

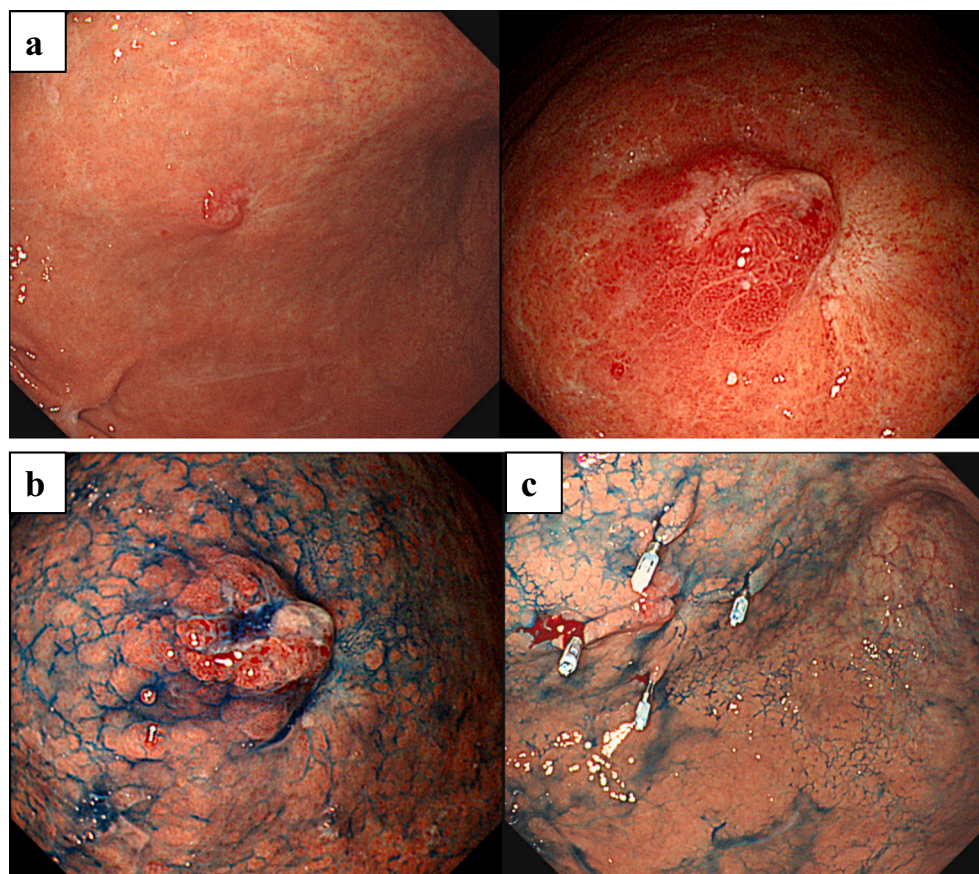


Fig. 1. Endoscopic findings. a A lesion was detected at the greater curvature of the gastric antrum. b Indigo carmine contrast. c Negative biopsy and clipping were performed.

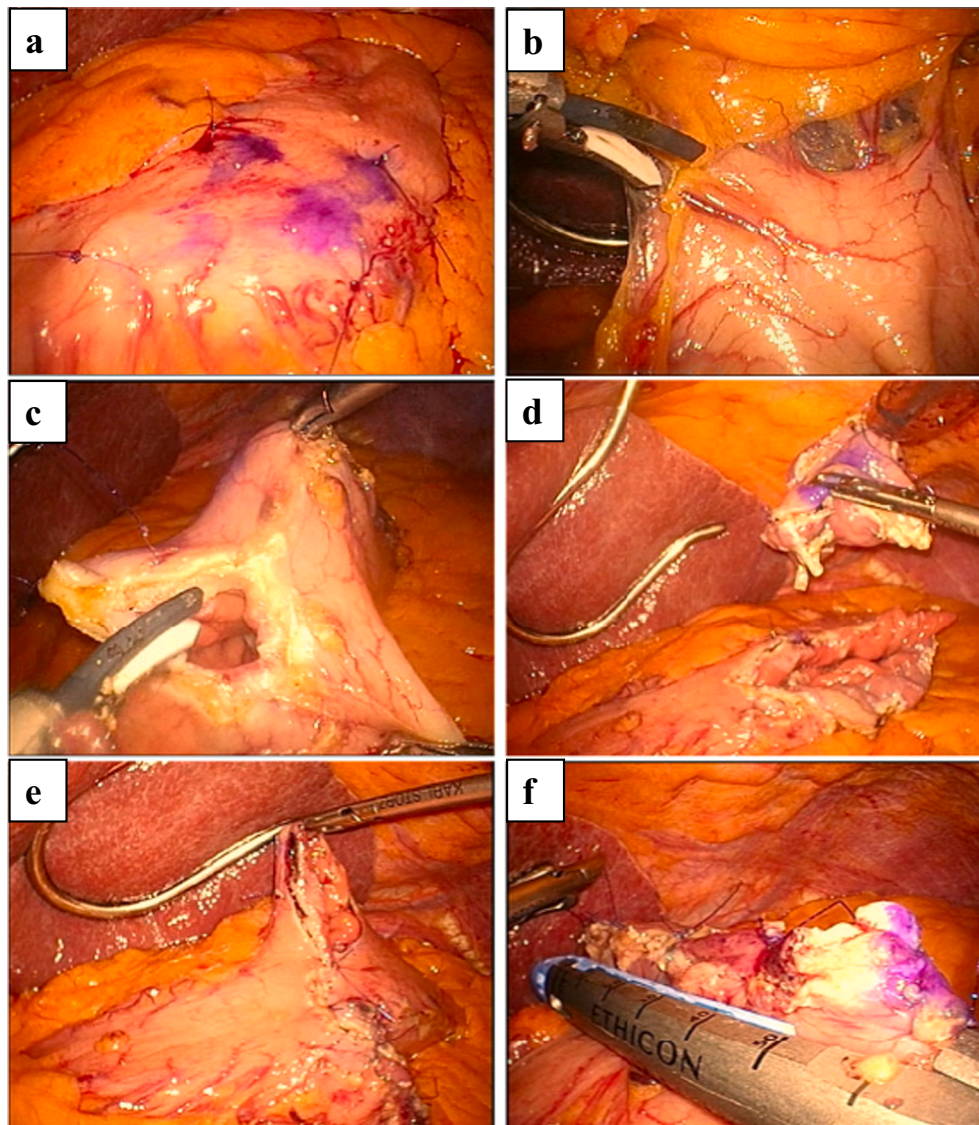


Fig. 2. Intraoperative findings. a Full-thickness stitches placed on the outside of endoscopic clips. b Resection of the omentum near the tumor area using an ultrasonic shear. c, d Full-thickness resection of the stomach wall along the stitch points. e Temporal closure of the edge of the resection line by hand-sewn sutures. f Closure of the edge of the resection line using a laparoscopic stapling system.

respectively [7]. The presence of severe comorbidities is associated with poor short- and long-term outcomes in patients who undergo curative resection for gastric cancer [8,9]. Local resection or careful follow-up may be relevant options after fully explaining the risk of local and distant recurrence to patients.

In our case, local recurrence occurred 1 year after ESD. Considering the ulcerative findings within the lesion, we judged that salvage ESD could not achieve curative resection. Although distal gastrectomy with lymph node dissection was the most adequate treatment, we performed LLR for local recurrence due to the patient's comorbidities. Recently, there have been an increasing number of case reports of local resection for gastric cancer in high-risk perioperative patients due to old age or comorbidities [1,2,10]. The extent of gastric resection and lymph node dissection is limited, resulting in less morbidity and early recovery compared with distal gastrectomy. Moreover, local gastrectomy preserves the volume and function of the gastric remnant [11]. Okubo et al. reported that LLR with sentinel lymph node navigation surgery resulted in better postoperative nutritive condition and quality of life than LDG for early gastric cancers [12]. This is because LLR preserves and maintains the nervous system involved in gastric function.

LLR, which enables dissection along the tumor, is generally used to resect submucosal tumors (SMTs) such as gastrointestinal stromal tumors. The edge of an SMT can be easily detected unless the tumor capsule is injured. Moreover, it is necessary to maintain a certain margin for the curative excision of cancer. In LLR for gastric cancer, our tips for maintaining a negative margin are described as follows. The first is to evaluate the tumor extent and attach marking clips in advance through endoscopy. In case of advanced cancer, examination using ultrasound endoscopy should be considered. Second, full thickness resection without misalignment between the submucosal and serosal muscular layers is necessary. The mucosa and submucosa, being flexible and mobile tissues, hinder an accurate dissection line, which may be misidentified during tissue traction. To prevent an inappropriate resection margin, full-thickness stitches placed outside the endoscopy clips are useful for maintaining planned resection lines. Since, the mucosal layer tends to be stretched during suturing from the serosa of the stomach, it is important to confirm full thickness suture using an endoscope. The third tip is the traction of the stitched suture during full thickness resection. This technique allows for counter-traction without touching the specimen directly. We believe that an ultrasonic incision coagulating device

is better than an electric scalpel or vessel sealer system for this purpose. Total LLR is simple for surgeons without the need for ESD.

There are some points to discuss. First, this method temporarily exposes the tumor; therefore, it is necessary to prevent contact between the primary tumor and tissues in the peritoneal cavity. For large tumors, it might be better to consider methods that avoid tumor exposure such as inverted-LECS and unexposed endoscopic wall-invasion surgery. Second, it is unclear whether the dissected greater omentum near the tumor included sentinel lymph nodes. Evidence regarding the sentinel lymph node concept for gastric cancer is not sufficient; however, several facilities frequently inject indocyanine green into the submucosa to detect sentinel lymph node exactly and its usefulness has been reported [13,14]. This procedure has the potential to result in accurate sentinel lymph node sampling and predict the prognosis of the gastric cancer patients. Third, the safety of laparoscopic surgery for patients with cardiac or pulmonary diseases is unclear. However, a systematic review reported that perioperative cardiac morbidity was less in elderly patients with laparoscopic surgery than in elderly individuals that underwent open surgery [15]. Chang et al. reported that the frequency of postoperative pulmonary morbidity did not significantly differ between laparoscopic surgery and open gastrectomy in gastric cancer patients with chronic obstructive pulmonary disease [16]. It would be appropriate to consult with the specialty department for each disease based on the preoperative examination results and determine the approach.

4. Conclusion

We demonstrated our procedure and tips for LLR without the need for ESD for treating the local recurrence of gastric cancer. This procedure might be an option for a radical but less invasive surgery for high-risk patients.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Availability of data and materials

Not declared.

Ethical approval

None declared.

Funding

None.

Guarantor

Kenji Kuroda, Katsunobu Sakurai.

Research registration number

Not declared.

CRediT authorship contribution statement

Kenji Kuroda and Katsunobu Sakurai performed the surgery; Kenji Kuroda, Tomohiro Kunimoto, and Katsunobu Sakurai performed perioperative management of the patient; Kenji Kuroda acquired the data and drafted the manuscript; Katsunobu Sakurai, Naoshi Kubo, Tsuyoshi Hasegawa and Toru Inoue helped draft the manuscript. All authors read and approved the final manuscript.

Declaration of competing interest

All authors have no conflicts of interest directly relevant to the content of this article.

References

- [1] M. Washio, N. Hiki, K. Hosoda, M. Niihara, M. Chuman, M. Sakuraya, et al., Laparoscopic and endoscopic cooperative surgery for advanced gastric cancer as palliative surgery in elderly patients: a case report, *Surg. Case Rep.* 7 (1) (2021) 241.
- [2] H. Takechi, N. Fujikuni, Y. Takemoto, K. Tanabe, H. Amano, T. Noriyuki, et al., Palliative surgery for advanced gastric cancer: partial gastrectomy using the inverted laparoscopic and endoscopic cooperative surgery method, *Int. J. Surg. Case Rep.* 50 (2018) 42–45.
- [3] R.M. Kwee, T.C. Kwee, Predicting lymph node status in early gastric cancer, *Gastric Cancer* 11 (2008) 134–148.
- [4] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, Group S, The SCARE 2020 guideline: updating consensus Surgical Case Report (SCARE) guidelines, *Int. J. Surg.* (84) (2020) 226–230.
- [5] Japanese Gastric Cancer A, Japanese gastric cancer treatment guidelines 2018, in: *Gastric Cancer*, 5th edition 24, 2021, pp. 1–21.
- [6] J. Pelz, S. Merkel, T. Horbach, T. Papadopoulos, W. Hohenberger, Determination of nodal status and treatment in early gastric cancer, *Eur. J. Surg. Oncol.* 30 (2004) 935–941.
- [7] K. Yoshida, M. Honda, H. Kumamaru, Y. Kodera, Y. Kakeji, N. Hiki, et al., Surgical outcomes of laparoscopic distal gastrectomy compared to open distal gastrectomy: a retrospective cohort study based on a nationwide registry database in Japan, *Ann. Gastroenterol. Surg.* 2 (2018) 55–64.
- [8] Y. Maezawa, T. Aoyama, K. Kano, H. Tamagawa, M. Numata, K. Hara, et al., Impact of the age-adjusted charlson comorbidity index on the short- and long-term outcomes of patients undergoing curative gastrectomy for gastric cancer, *J. Cancer* 10 (2019) 5527–5535.
- [9] J.X. Lin, Y.Q. Huang, J.W. Xie, J.B. Wang, J. Lu, Q.Y. Chen, et al., Age-adjusted Charlson Comorbidity Index (ACCI) is a significant factor for predicting survival after radical gastrectomy in patients with gastric cancer, *BMC Surg.* 19 (2019) 53.
- [10] O. Goto, H. Takeuchi, H. Kawakubo, S. Matsuda, F. Kato, M. Sasaki, et al., Feasibility of non-exposed endoscopic wall-inversion surgery with sentinel node basin dissection as a new surgical method for early gastric cancer: a porcine survival study, *Gastric Cancer* 18 (2015) 440–445.
- [11] E. Nomura, K. Okajima, Function-preserving gastrectomy for gastric cancer in Japan, *World J. Gastroenterol.* 22 (2016) 5888–5895.
- [12] K. Okubo, T. Arigami, D. Matsushita, K. Sasaki, T. Kijima, M. Noda, et al., Evaluation of postoperative quality of life by PGAS-45 following local gastrectomy based on the sentinel lymph node concept in early gastric cancer, *Gastric Cancer* 23 (2020) 746–753.
- [13] J.Y. Deng, H. Liang, Clinical significance of lymph node metastasis in gastric cancer, *World J. Gastroenterol.* 20 (2014) 3967–3975.
- [14] Z. Wang, Z.Y. Dong, J.Q. Chen, J.L. Liu, Diagnostic value of sentinel lymph node biopsy in gastric cancer: a meta-analysis, *Ann. Surg. Oncol.* 19 (2012) 1541–1550.
- [15] J.F. Wang, S.Z. Zhang, N.Y. Zhang, Z.Y. Wu, J.Y. Feng, L.P. Ying, et al., Laparoscopic gastrectomy versus open gastrectomy for elderly patients with gastric cancer: a systematic review and meta-analysis, *World J. Surg. Oncol.* 14 (2016) 90.
- [16] H.M. Chang, S.W. Lee, E. Nomura, N. Tanigawa, Laparoscopic versus open gastrectomy for gastric cancer patients with COPD, *J. Surg. Oncol.* 100 (2009) 456–458.