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How to Do It

Laparoscopic-Assisted Proximal Gastrectomy for Early Gastric Carcinomas

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Abstract: Laparoscopic-assisted proximal gastrectomy was performed in two Japanese patients with early gastric cancinomas located in the gastric cardia. The lower esophagus and upper stomach was divided under the pneumoperitoneum and resected via a minilaparotomy through an incision, 5 cm long, made in the epigastric area. The distal esophagus was anastomosed to a gastric tube made by resecting the lesser curvature of the stomach with a linear auto-stapler. Both patients recovered quickly without any postoperative complications, such as esophagitis, developing during follow-up periods of 3 and 6 months, respectively. Thus, we conclude that laparoscopic-assisted proximal gastrectomy and reconstruction with a gastric tube may be an effective method of treatment for patients with early gastric carcinomas located in the upper stomach in this era of minimally invasive surgery.

Key Words: laparoscopic surgery, proximal gastrectomy, gastric tube

Introduction

Most patients with gastric mucosal cancers are candidates for endoscopic mucosal resection[1] because of the negligible rate of lymph node metastasis; however, it is often technically difficult to resect superficially spreading cancers en bloc due to the possibility of leaving remnant carcinoma cells. In the case of widely spreading mucosal cancers, any regional lymph nodes with possible metastasis should be dissected. The development of instruments and advances in techniques enables us to perform complicated procedures such as intestinal anastomosis under laparoscopic-assisted surgery with a small skin incision.[2,3] We first performed a laparoscopic-assisted Billroth I gastrectomy on December 12, 1991, in a patient with early stage carcinoma localized in a distal portion of the stomach.[4] We describe herein a new laparoscopic technique of performing proximal gastrectomy, which was successfully employed to treat two patients with early gastric carcinomas situated just below the esophagogastric junction.

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Technique

With the patient placed in the supine position, a Hasson type cannula is inserted into supraumbilical area. Under laparoscopic guidance, another four ports are inserted into the upper abdomen, the two operating ports being positioned in the upper right and upper left abdomen (Fig. 1). First, an avascular area below the greater curvature of the short gastric pedicle is identified and the gastrosplenic ligaments are divided upwards to the esophagus. The small vessels are dissected with electrocautery forceps. Laparoscopic coagulating shears (LCS) are used for dissecting tissues close to the stomach and colon to avoid thermal injury. The lesser omentum is then divided from the esophagus as far as the pylorus, and the stomach is elevated to expose the left gastric artery and vein. The left gastric vessels are doubly ligated with an extracorporeal knot technique, then cut, while the right gastric and right gastroepiploic arteries are preserved. Division of the phrenoesophageal membrane exposes the loose mediastinal areolar tissue. As mobilization of the lower esophagus under the pneumoperitoneum is associated with a risk of pneumomediastinum, this division is carefully continued up to 5–6 cm from the junction.

After the upper stomach and lower esophagus with perigastric lymph nodes have been freed from the surrounding tissues, a transverse skin incision (5 cm) is made in the epigastrium. The esophagus is then divided 1 cm below the occluding clamp, and the proximal stomach is exteriorized through the access minilaparotomy

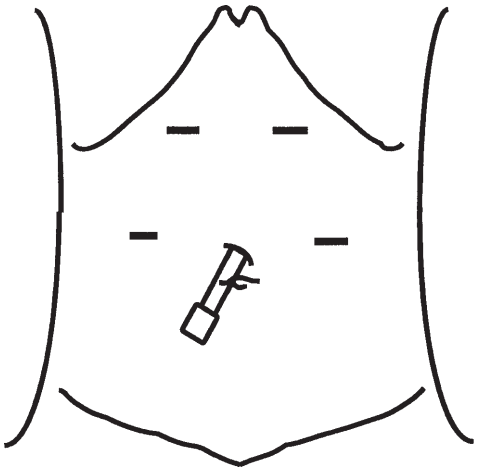

Fig. 1. Port sites for proximal gastrectomy

after ensuring appropriate barrier protection of the wound edges (Fig. 2a). The exteriorized upper stomach is then stapled obliquely from the lesser curvature toward the greater curvature to form a gastric tube, 20 cm long and 4 cm wide, using an autosuture stapler (GIA 60, U.S. Surgical, Cincinnati, OH, USA) (Fig. 2b). The esophagogastrostomy is carried out using the same technique as used for open surgery. Briefly, the lower esophagus is anastomosed to the posterior wall of the gastric tube with a circular stapler (Proximate ILS25, Ethicon, Cincinnati, OH, USA) inserted through a small opening made on the anterior wall of the stomach (Fig. 3a). Simultaneous resection of the proximal stomach with perigastric lymph nodes and closure of the anterior wall of the gastric tube is effected with the use of an autosuture stapler (Fig. 3b). Pyloroplasty is performed by the Heineke-Mikulicz method and the abdominal wall is closed in a layer-to-layer fashion, after hemostasis has been confirmed.

Results

We performed this laparoscopic procedure on two Japanese patients with early gastric carcinoma localized in the gastric cardia. The operation time was 3.5 h in one patient and 4.5 h in the other, with an estimated blood loss of less than 200 g. Both patients had an uneventful postoperative course and returned to work early, similarly to patients who have undergone more routine laparoscopic surgery. Histological examinations of the resected specimens revealed mucosal carcinomas with no lymph node metastasis. There were no postoperative symptoms of dysphagia or heartburn. Follow-up roentgenography using oral contrast medium showed good

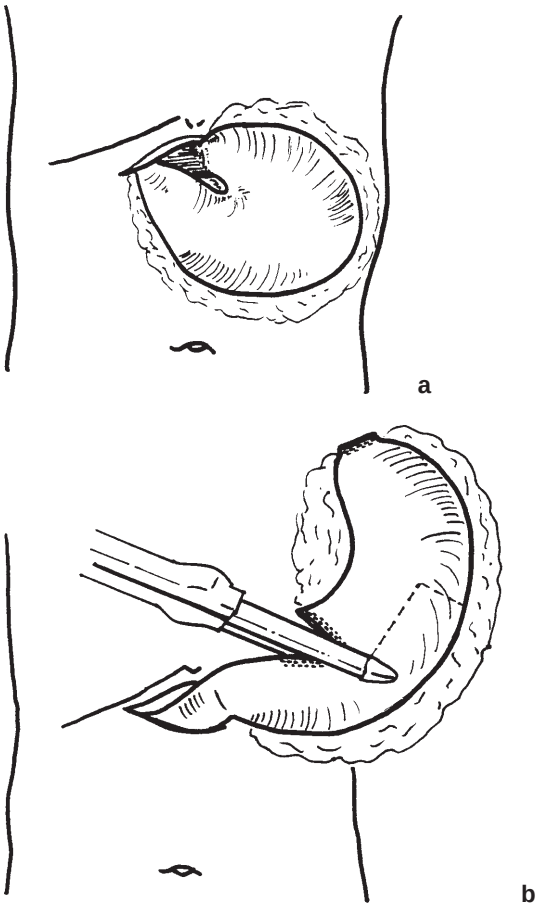

Fig. 2. a Exteriorization of the proximal stomach through a 5-cm minilaparotomy. **b** Method of application of the autosuture stapler to make a gastric tube

passage through the gastric tube (Fig. 4), and endoscopies done 3 months after surgery showed no findings of reflux esophagitis, gastritis, or stomal ulcer in either patient.

Discussion

When large-masses requiring resection exist inside the abdominal cavity, a minilaparotomy must be performed to provide a route for removal of the specimen. The minilaparotomy can also enable lymph node dissection to be performed under laparoscopic-assisted surgery. By utilizing the minilaparotomy, we have developed a new technique for resecting the proximal stomach to treat early gastric carcinoma. The indications for this new procedure are the same as those for open proximal gastrectomy, although it may be restricted by the patient's physical constitution as it would be difficult to obtain a wide operative field in obese patients. A wider operative field of vision of the lower esophagus and

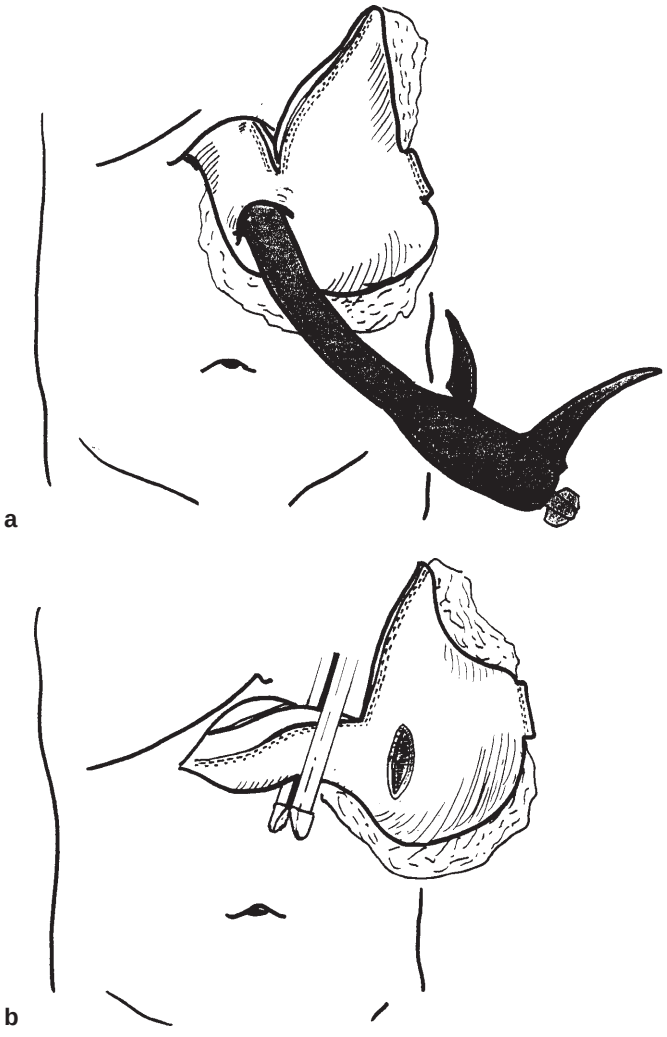

Fig. 3. a Method of performing esophagogastrostomy with a circular stapler inserted through a small opening made in the anterior wall of the stomach. **b** Resection of the proximal stomach and closure of the anterior wall of the stomach with an autosuture stapler

pyrolus can be obtained through a transverse incision of the epigastric region, rather than through a midline abdominal incision. The use of a gastric tube made from the greater curvature of the stomach provides for a simple and safe anastomosis for reconstruction, because it is a single anastomosis. In conclusion, we believe this procedure to be a treatment of choice for patients with early gastric carcinomas localized in the gastric cardia and fornix, not only because it is less invasive than open surgery, but also for its curability when the perigastric lymph nodes need to be dissected.

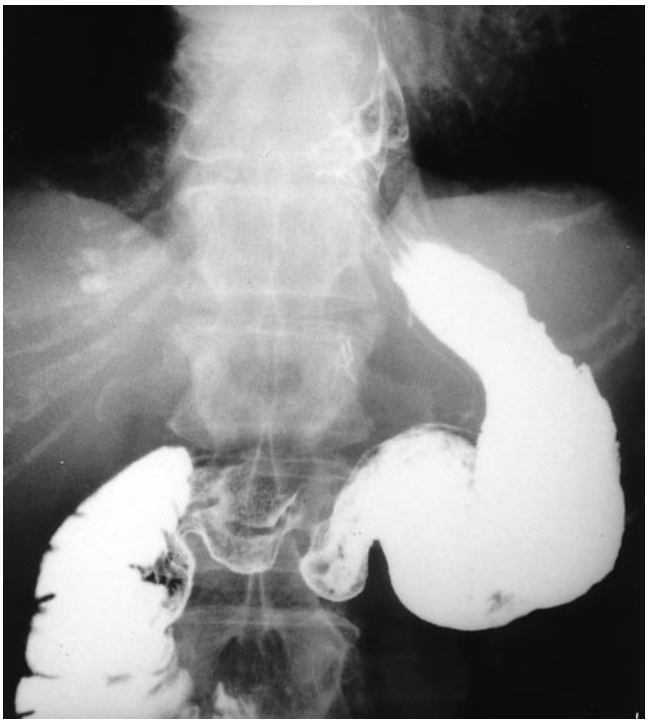

Fig. 4. Roentgenography done 3 months after the laparoscopic proximal gastrectomy

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