

Laparoscopic Gastrotomy in Intra-gastric Surgery for Early Gastric Cancer: A New Technique

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Laparoscopic surgery has been widely applied not only in cholecystectomy but also in gastrointestinal operations. In previous reports the authors proposed their original operative technique, laparoscopic intra-gastric surgery (LIGS),¹ in which all trocars and surgical instruments are inserted directly into the gastric lumen to perform the resection of mucosal or submucosal lesions of the stomach. The purpose of this article is to introduce laparoscopic gastrotomy as a new technique for removing early gastric cancer by LIGS.

PATIENTS AND METHODS

Between October 1994 and June 1995, modified LIGS was performed on four patients with early gastric cancer. Figure 1 describes the schema of our original LIGS procedure and Figure 2 represents the current technique with a laparoscopic gastrotomy.

The gastrofiberscopic examination and/or endoscopic ultrasound scan were preoperatively employed in all patients to identify the location, size, depth, and histology of the gastric lesion.

Under general anesthesia, a gas-

trofiberscope is inserted perorally into the stomach in order to identify the gastric lesion. After insufflation of the abdomen with CO₂, a standard 12-mm laparoscopic trocar is placed in the subumbilical position. The laparoscope is introduced into the abdomen through this trocar. Additional two trocars (12 mm) are inserted on either side of the umbilicus with video visual control to prevent intra-abdominal injury. Two surgical instruments are inserted through the other two trocars into the abdominal space.

Two holding stitches on the anterior wall of the stomach are put under laparo-

scopic monitoring (Fig. 3). Stitch-ends are taken out of the abdomen and pulled from outside to raise the anterior wall of the stomach. A small hole on the gastric wall between two stitches is made by electrocautery, followed by an adequate gastrotomy incision by application of an endostapler (Fig. 4). The inside of the gastric lumen is visualized thoroughly and the mucosal lesion is identified (Fig. 5). If the lesion is difficult to identify, a dye (methylene blue) can be applied on the surface of the lesion for easy visualization. After determination of an adequate removal margin around the lesion by electrocautery, the

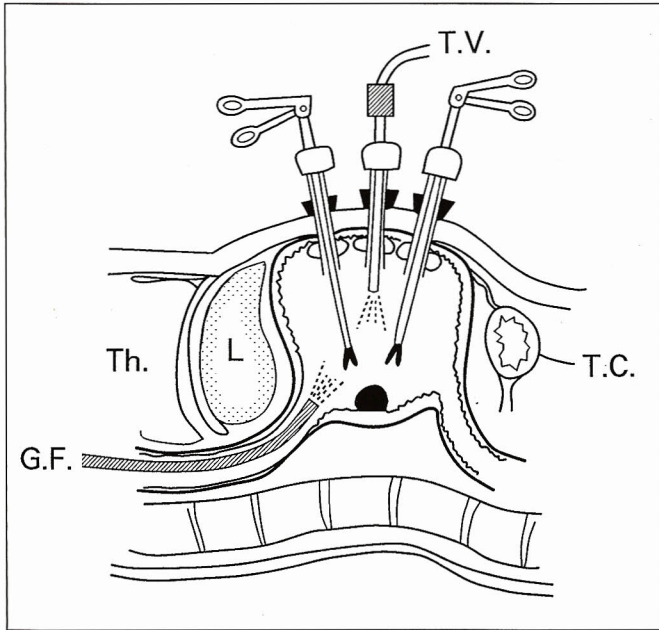


Figure 1. Schema of the original laparoscopic intra-gastric surgery, LIGS.

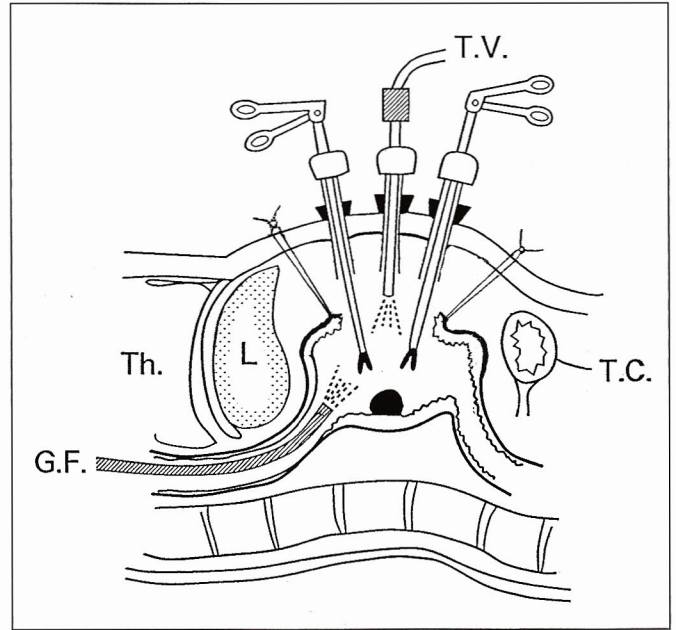


Figure 2. Schema of the gastrotomy in laparoscopic intra-gastric surgery.

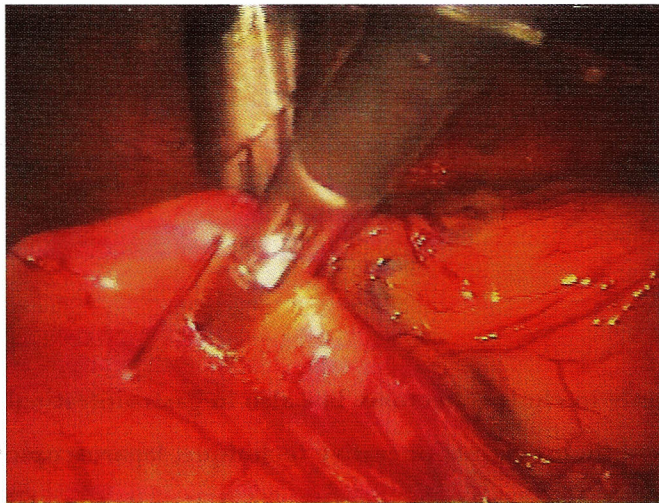


Figure 3. Laparoscopic view of suturing on the anterior abdominal wall.

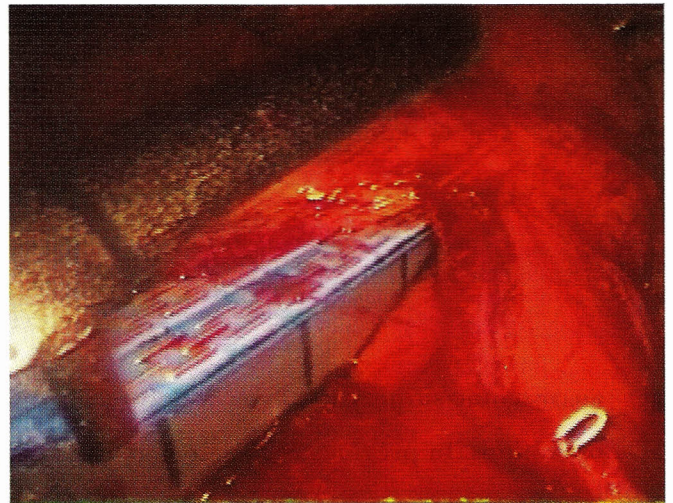


Figure 4. Laparoscopic view of gastrotomy incision with endostapler.

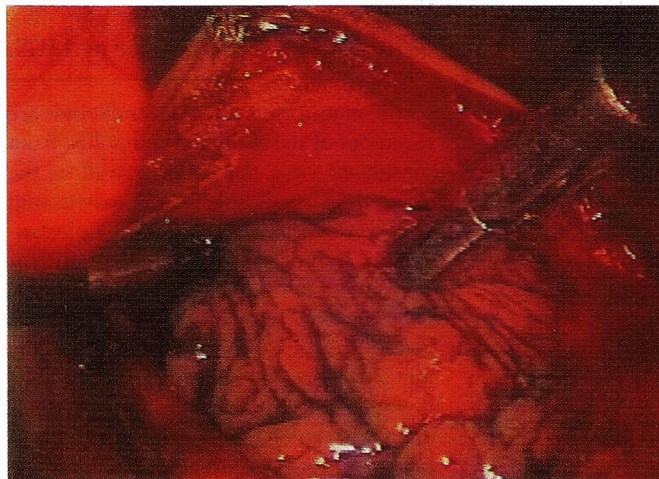


Figure 5. Mucosal lesion after dye application on the surface is seen through gastrotomy.

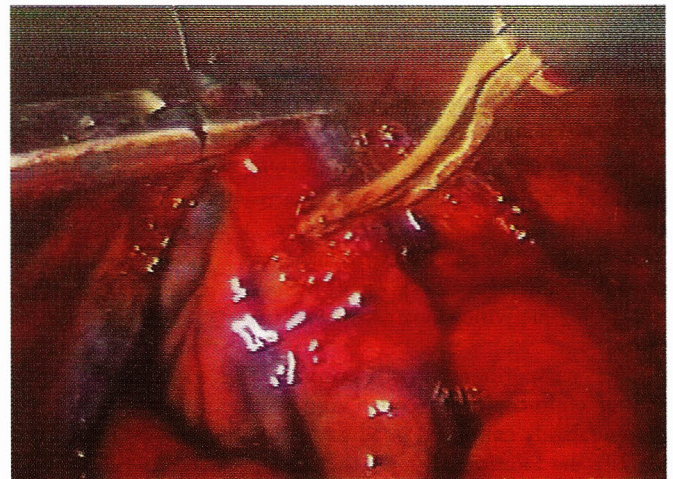


Figure 6. Dissection of the mucosal lesion (early gastric cancer).

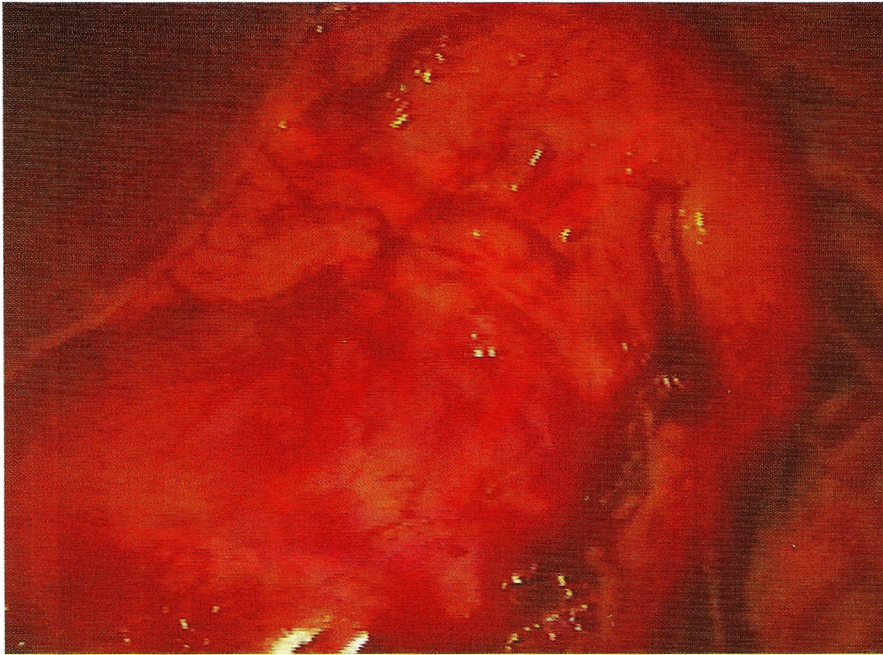


Figure 7. Laparoscopic view of the closure line of gastrotomy incision done by endostapling technique.

mucosal resection is started by dissecting the mucosal margin with forceps, electrocautery, and/or laser (Fig. 6). The resected specimen is then extracted in a special bag through the trocar to avoid the risk of tumor implantation. Electro- and laser cauterization are used to confirm hemostasis on the remaining mucosal margin and the muscular layer. The resected area is left untreated as a mucosal defect. The gastrotomy incision is then closed by endostapling technique and the operation is completed (Fig. 7). If the lesion lies on the anterior gastric wall, the gastrotomy incision should be made near the lesion for easy excision. On the other hand, if the lesion is on the posterior wall of the stomach, care should be taken in placing stitches on the anterior wall so that the performed gastric incision lies approxi-

mately opposite to the lesion.

RESULTS

In this series of four cases, no intra- and postoperative complications were encountered and the hospital stay ranged from 5 to 7 days. No reconversion to open surgery was necessary in this series. The duration of the operation ranged from 120 to 180 minutes. Oral intake was restored between the second and third postoperative day. The gastrofiberscopic examination was performed 2 to 3 weeks after the operation on all patients, indicating that the defect of the gastric mucosa after removal of the lesion was completely healed in all cases. The maximum follow-up to date in patients with early gastric cancer was 6 months and none of the patients had

a recurrence of the gastric cancer.

DISCUSSION

Laparoscopic surgery, which has gained popularity in recent years, has been applied to various types of gastric diseases.² The authors' original operative technique, LIGS, allows one to perform resection in any part of the stomach except the anterior gastric wall due to technical difficulties.¹ Moreover, only mucosal or submucosal resection can be performed with the original procedure. These limitations of the original LIGS have been overcome by utilizing an adequate gastrotomy incision under laparoscopic monitoring in the present series. As such, a full-thickness removal of the lesion, located in any part of the stomach, is possible if necessary. In addition, the gastric lesion in the anterior wall can also be removed by an adequate wedge resection. Moreover, gastrotomy allows sufficient room for easy and definite localization of the lesion on the stomach wall as well as performance of all current laparoscopic techniques. Due to the technical advantage of gastrotomy, insufflation of stomach with air as well as gastrofiberscopic manipulation can be minimized. Therefore, a laparoscopic gastrotomy is practically applicable to a wide range of gastric resections for early gastric cancer as well as for benign mucosal and submucosal gastric tumors by LIGS. **STI**

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