

Intraluminal Approach for Resection of a Gastric Ulcer: a Case Report

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ABSTRACT

Laparoscopy, both diagnostic and therapeutic, has been used in the management of gastric pathology because of all the benefits of a minimally invasive procedure, such as faster recovery, shorter hospital stay, fewer wound complications, and other benefits. We report a case involving the resection of a gastric ulcer in a 71-year-old patient. Endoscopy revealed a nonhealing antral ulcer that was not acutely bleeding. With a combined endoscopic and laparoscopic approach, we successfully performed a wide resection by using 2-mm instruments. Laparoscopy was needed to orient the lesion so that a transgastric intraluminal resection could be performed with 2-mm instruments. This case illustrates the feasibility of using a combined endoscopic and laparoscopic technique to treat a lesion that would otherwise require a formal resection.

Key Words: Intraluminal, Gastric ulcer, Needlescopic, Endoscopic, Laparoscopic.

INTRODUCTION

In recent years, technological advances and innovative technical refinements of laparoscopic instruments have encouraged surgeons to explore the application of laparoscopic methods for benign and malignant disorders of the stomach. Nonhealing gastric ulcers have been conventionally treated by open wedge resection, laparoscopic resection surgery, and endoscopic procedures. Open surgical approaches are more invasive compared with endoscopic methods and carry a higher incidence of complications, such as infection, leak, peritonitis, and other complications. Conventional endoscopic removal of gastric ulcers also presents significant disadvantages including risk of perforation, bleeding, and an inability to completely excise a lesion. Advances in surgical technology have provided sophisticated instruments that allow combined laparoendoscopic approaches to intraluminal pathology of the alimentary tract. This approach has been used at the Texas Endosurgery Institute since 1993 and has included procedures for benign and malignant gastric tumors, gastric carcinoid, creation of pancreatic cystogastrostomy, and colonic polyps.¹ This is a case report of a transgastric laparoscopic approach to complete resection of a nonhealing prepyloric ulcer.

CASE REPORT

A 71-year-old male was referred for evaluation of a nonhealing gastric ulcer that was present for more than 1 year. His past medical history is significant for ischemic cardiomyopathy and a past surgical history of total knee replacement and prostate surgery. On examination, the patient was pale with upper abdominal tenderness but no peritoneal signs or abdominal distention. Laboratory tests included white blood cell count $6.1 \times 10^9/L$ (normal, 4.0 to $10.5 \times 10^9/L$), hemoglobin 10.7 g/dL (normal, 12.5 to 17 g/dL), hematocrit 32.8% (normal, 36.0 to 50%), red cell distribution width 16.6% (normal, 11.7 to 5.0%). An upper gastrointestinal series with double contrast revealed an abnormal appearance of the gastric antrum with a possible gastric mass. Abdominal ultrasound was not remarkable. Esophagogastroduodenoscopy showed a 2x1.5-cm irregular ulcer in the gastric antrum. Biopsies showed hyperplastic antral mucosa with focal erosion and changes

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of reactive gastropathy. No malignant changes were reported; however, malignancy was a significant concern.

After initial assessment and supportive measures, treatment consisted of intraoperative endoscopy, laparoscopic evaluation, and endoluminal resection for transgastric excision.

Technique

With the patient in supine position and under general anesthesia, a nasogastric tube and a urinary catheter were inserted. A site was selected in the left lower quadrant for insertion of a Veress needle, and the abdomen was insufflated to a pressure of 14mm Hg followed by placement of a 10-mm trocar and a 10-mm scope. A 5-mm trocar was subsequently placed in the right upper quadrant under direct vision just below the costal margin at the midclavicular line. The final trocar position is shown in **Figure 1**. Once inside the abdomen, we retracted the omentum upward, and the ligament of Treitz was identified. A laparoscopic Glassman clamp was applied across the small bowel at 10cm from the ligament of Treitz to avoid small bowel insufflation during the gastroduodenoscopy (**Figure 2**). An intraoperative esophagogastroduodenoscopy (EGD) was performed, and a 12-mm prepyloric ulcer on the posterior surface of the stomach was identified. At this point a 5-mm Marlow (Cooper Surgical, Trumbull, CT) balloon cannula was placed through the abdominal wall

and into the lumen of the stomach under direct vision. A zero-degree 5-mm laparoscope was then passed, and this allowed the placement of 2 more 2-mm trocars into the stomach under direct vision. Using 2-mm graspers and scissors, we excised the gastric ulcer under laparoscopic and endoscopic guidance (**Figures 3 and 4**). All bleeding was controlled with light electrocautery. The specimen was then removed with the gastroscope by using an endoscopic snare. The stomach was decompressed (**Figure 5**), and the trocar sites in the stomach were closed with 3-0 braided absorbable sutures. The pathologist evalu-

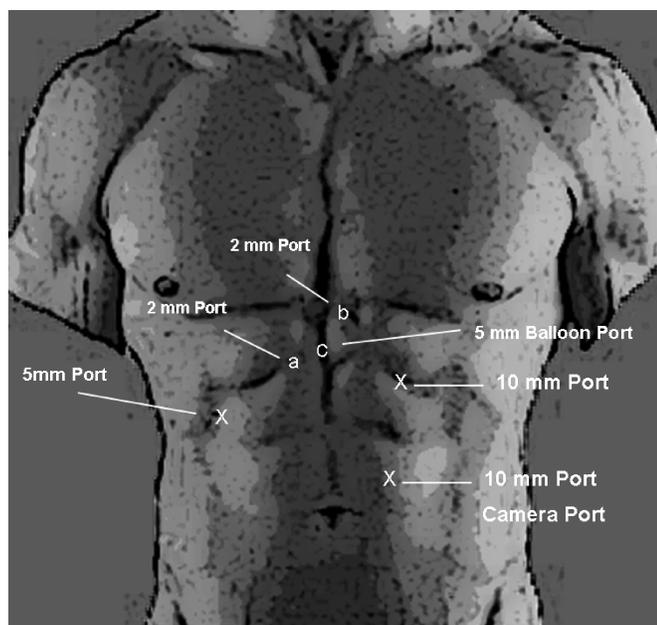


Figure 1. Final trocar position.

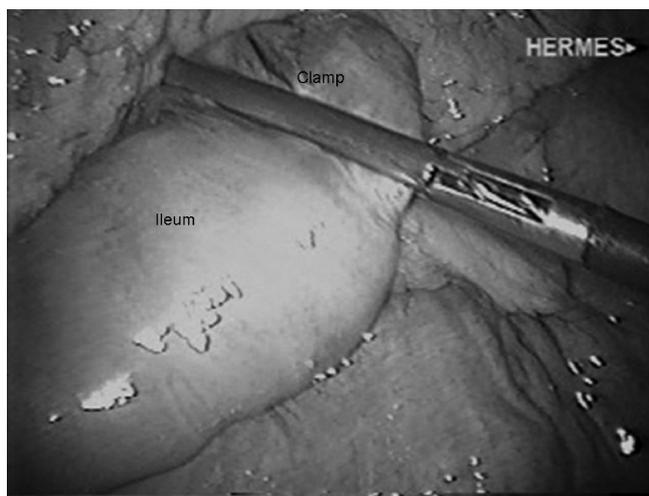


Figure 2. Laparoscopic Glassman clamp applied across the small bowel at 10 cm from the ligament of Treitz to avoid small bowel insufflation during the gastroduodenoscopy.

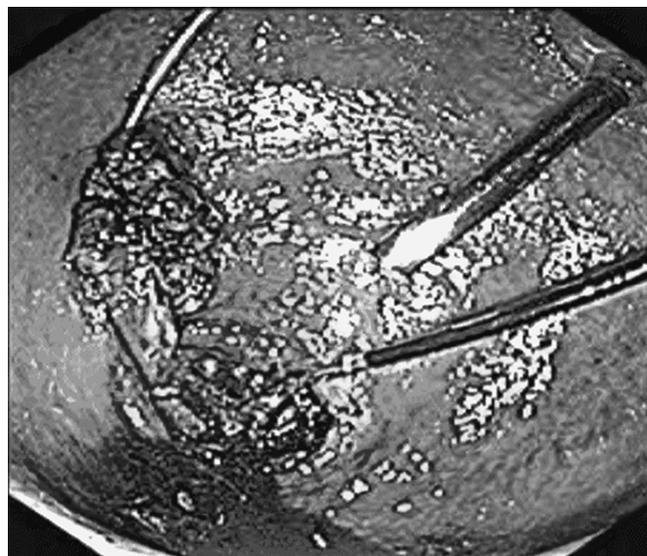


Figure 3. Excision of gastric ulcer.

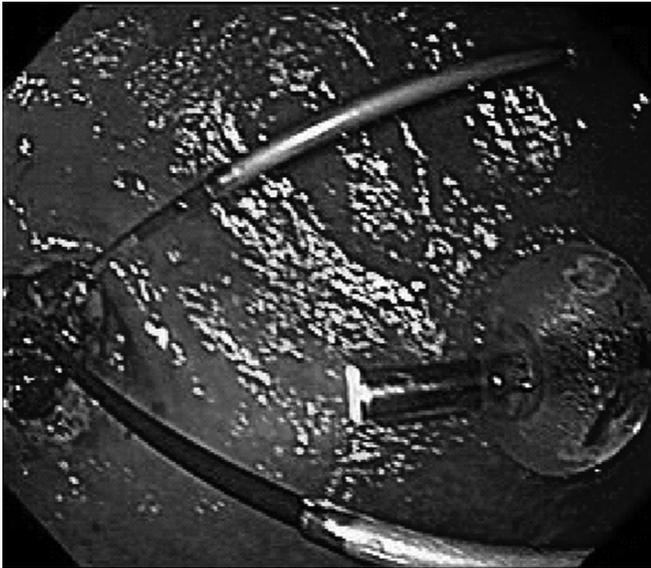


Figure 4. Excision of gastric ulcer.

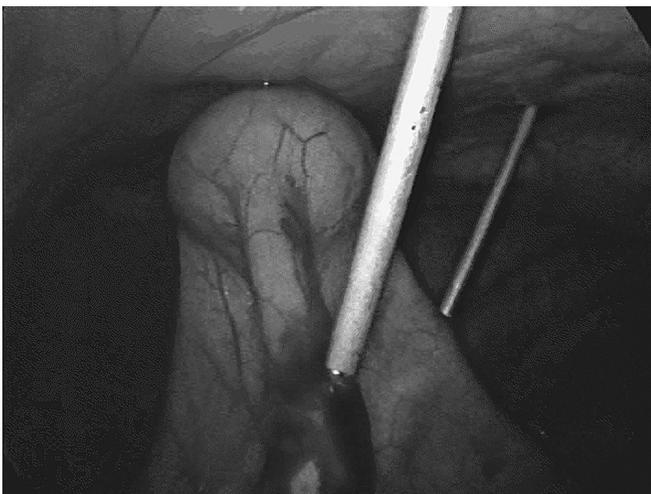


Figure 5. Ulcer was removed with gastroscope using an endoscopic snare, and the stomach was decompressed.

ated the specimen by frozen section and found no evidence of malignancy. The endoscope was then used to inspect the stomach; no evidence was found of residual bleeding or leakage. The clamp across the ligament of Treitz was then removed, and the bowel noted to be unharmed. The trocar sites and the skin incisions were closed.

Intraoperative blood loss was 40cc and operative time was 100 minutes. The patient had an uneventful recovery. He was placed on a clear liquid diet on postoperative day #2 and was discharged home at operative day #3. At the

3-month follow-up, he remains pain free and tolerates a regular diet with no evidence of complications.

DISCUSSION

The first published report of an intraluminal procedure for excision of a gastric mucosal lesion was by Ohashi in 1995,¹ showing the feasibility of a laparoscopic transgastric approach for the resection of gastric ulcer. It also underscores the synergy of laparoscopic and endoscopic procedures in minimally invasive gastric surgery that otherwise requires a conventional open approach. Endoscopy procedures, such as band ligation, insulated-tip electrosurgical knife, strip biopsy, and resection with a cap-fitted endoscope²⁻⁵ have significant disadvantages, such as perforation, bleeding, incompletely resected lesions, electrosurgical and mechanical damage and difficulty, in tumor orientation by the pathologist, limited view, and inability to resect large tumors. Furthermore, endoscopic approaches are limited by a number of technical factors, including tumor size, location, shape, and insufficient number of instrument channels.⁶ To overcome the limitations of conventional endoscopic methods, it is necessary to explore other techniques for complete resection with a high degree of safety. Laparoscopic transgastric resection appears to be a safe and effective minimally invasive approach for benign mucosal or submucosal lesions on virtually any part of the stomach.^{2,6-10} Certain locations, such as the anterior gastric wall and cardia, are not very conducive to a transgastric approach.¹¹⁻¹³ This technique also allows for definitive treatment with full-thickness excision with closure of resulting defects if necessary. We carefully evaluate the site of resection searching for places with a question of integrity, such as full thickness burnings (serosal bleaching), serosal tearings, perforations, and others; in these cases, we prefer to reinforce the site in question with an absorbable braided suture and simple inverted stitches. Hemorrhage and perforation can be easily managed via the intraabdominal ports, which avoids major gastric resection with its potential complications. If a malignancy is encountered, a laparoscopic resection can be performed if needed.¹ The patient incurs all the laparoscopic benefits with less pain, shorter hospital stay, and quicker time to resumption of a regular diet.¹⁴

CONCLUSION

In our experience, the percutaneous endoluminal resection of a gastric ulcer is a safe and feasible procedure. Further experience with this technique is needed to define the selection criteria and its limitations, advantages, and

disadvantages. And it may become an important new minimally invasive tool in the armamentarium for the treatment of gastric pathology.

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