

Laparoscopic Resection of Symptomatic Gastric Diverticula

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ABSTRACT

Gastric diverticula are rare and usually asymptomatic. This report, however, describes two examples of symptomatic gastric diverticula successfully treated by laparoscopic resection. Both patients were male and in their sixth decade of life. One patient was relatively healthy with no past medical history, whereas the other patient had chronic pain issues and at presentation was also undergoing evaluation for hyperaldosteronism. The patients presented with gastrointestinal symptoms, including nausea, emesis, abdominal pain, and change in bowel function. In both cases, a gastric diverticulum was identified by CT scan, and precise anatomic position was determined by upper endoscopy. After discussion with the treating teams, including a gastroenterologist and surgeon, surgical treatment and resection was elected. Successful laparoscopic removal was accomplished in both patients, and they were discharged home after tolerating liquid diets. Both patients reported resolution of their abdominal symptoms at follow-up.

Key Words: Gastric diverticulectomy, Laparoscopic gastric surgery, Diverticulum, Abdominal pain.

INTRODUCTION

Gastric diverticula are rare and characterized as an out-pouching of the gastric wall. They are found in 0.02% of autopsy studies and in 0.04% of upper gastrointestinal studies.¹ Distribution by gender is equal with highest prevalence in middle-aged individuals.² Furthermore, 75% of gastric diverticula are located ~2 cm below the esophagogastric junction and on the posterior aspect of the lesser stomach curvature.³ Most gastric diverticula remain asymptomatic and are managed without surgery. Symptomatic patients typically present with epigastric pain, dysphagia, belching, and early satiety. The pathophysiology of symptoms is thought to be related to a combination of stasis, obstruction, and bacterial overgrowth. Complications are rare but can include bleeding, perforation, diverticulitis, and malignancy.⁴⁻⁷ Because gastric diverticula are rarely symptomatic, it is important to rule out other gastric pathology as a cause of symptoms before operative resection. This report describes two examples of symptomatic gastric diverticula treated by laparoscopic resection.

CASE PRESENTATIONS

Case 1

A 54-year-old man with no significant other past medical history presented for evaluation of a symptomatic gastric diverticulum. The patient was evaluated by his primary care physician 3 years earlier for recurrent nausea, vomiting, and change in bowel function. A colonoscopy was performed that was significant only for mild sigmoid diverticulosis. Polyethylene glycol, high-fiber diet, and probiotics were initiated. Because nonsurgical management did not resolve the patient's symptoms, he returned to his primary care physician for further evaluation. Computed tomographic (CT) enterography was performed and showed stool throughout the colon and a gastric diverticulum, but no acute process in the abdomen or pelvis. He was referred to a gastroenterologist and underwent a full workup, including testing for dietary sensitivities/allergies, defecography, colonic transit study, and a double-contrast upper gastrointestinal (UGI) series—all of which were negative for acute

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findings. The UGI confirmed the presence of a 4-cm wide-mouth diverticulum projecting posteriorly from the gastric fundus (size not significantly different from CT) without evidence of a stomach mass, ulcerations, deformity, or gastric outlet obstruction (**Figure 1**). The patient was sent for surgical evaluation, and on presentation at our clinic, further detail regarding his symptomatology revealed paroxysmal periumbilical abdominal pain, postprandial fullness, spontaneous abdominal distention, and foul-smelling eructation. He underwent preoperative upper endoscopy to more closely evaluate the anatomic location and specifically the location from the esophagogastric junction. Evaluation appeared consistent with stasis with debris and bacterial overgrowth. The patient was scheduled for laparoscopic partial gastrectomy. The operation began with an optical trocar placed in the left lower quadrant of the abdomen, followed by 3 other ports in the left lower, right lower, and right upper abdomen. The short gastric vessels were ligated to gain exposure to the posterior gastric diverticulum, which was 2 cm from the esophagogastric junction (**Figure 2**). This mobilized the diverticulum from the retroperitoneum and pancreas. The diverticulum was transected at its base with a linear stapler and oversewn with suture without complication (**Figure 3**). On postoperative day 1, a UGI series showed normal anatomy and no leaks. The patient tolerated a liquid diet and was discharged on postoperative day 2. At a 1-month follow-up, the patient was tolerating a regular diet and had complete resolution of symptoms.

Case 2

A 58-year-old man presented for surgical evaluation of abdominal pain and a gastric diverticulum. He had an extensive past medical and surgical history, including a small bowel resection and ileostomy with subsequent

takedown in the early 1990s for perforated bowel of unclear etiology, schwannomatosis, chronic back pain with nerve-block treatments, anxiety, tobacco use, hypertension, and hyperaldosteronism. During a thorough evaluation for his hyperaldosteronism, he developed progressive abdominal pain different from his chronic pain symptoms. The pain was epigastric and radiated to the left upper quadrant. A CT scan demonstrated a stable 1.2-cm nodule in the left adrenal gland and a 3.7-cm epiphrenic diverticulum containing barium, arising from the posterior fundus of the stomach (**Figure 4**); however, there were no other gastrointestinal findings. He was scheduled for a robot-assisted left adrenalectomy for removal of the suspected aldosteronoma, and because his abdominal pain had not improved, a laparoscopic partial gastrectomy and esophagogastroduodenoscopy (EGD) were added to the original surgical plan. Intraoperatively, an optical trocar was placed in the left periumbilical region followed by 3 other trocars in the right lower, right upper, and left upper quadrants of the abdomen. Initial examination of the anatomy revealed a 3-cm hiatal hernia; after further dissection, a 5-cm diverticulum on the posterior aspect of the gastric fundus, 3 cm from the gastroesophageal junction, was identified and completely dissected. The diverticulum was transected at its base and the staple line was oversewn, all without complication. The hiatal hernia was repaired after sac reduction and excision, along with primary suture repair. The specimen was extracted through a separate existing infraumbilical incision created during the robot-assisted adrenalectomy (portion of the operation) that directly preceded the resection of the diverticulum. Postoperatively, a UGI did not show a leak, the patient tolerated a liquid diet, his pain was controlled, and he was discharged home on day 3 after surgery. On postoperative

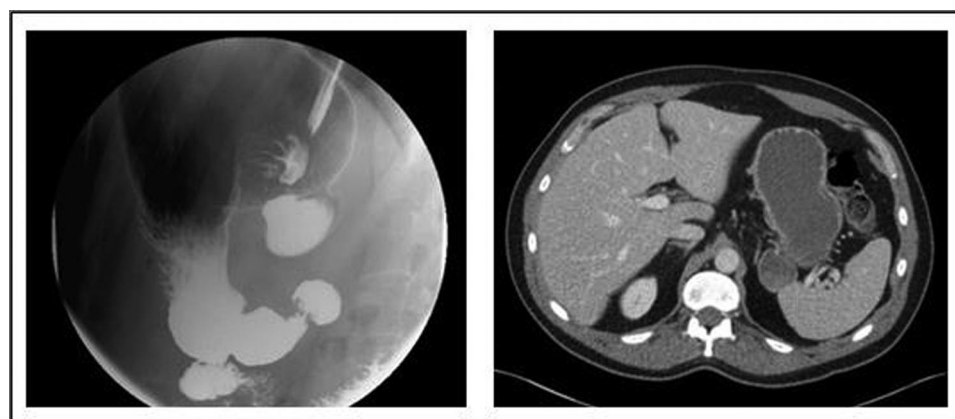


Figure 1. UGI and CT scan showing posterior gastric diverticulum.

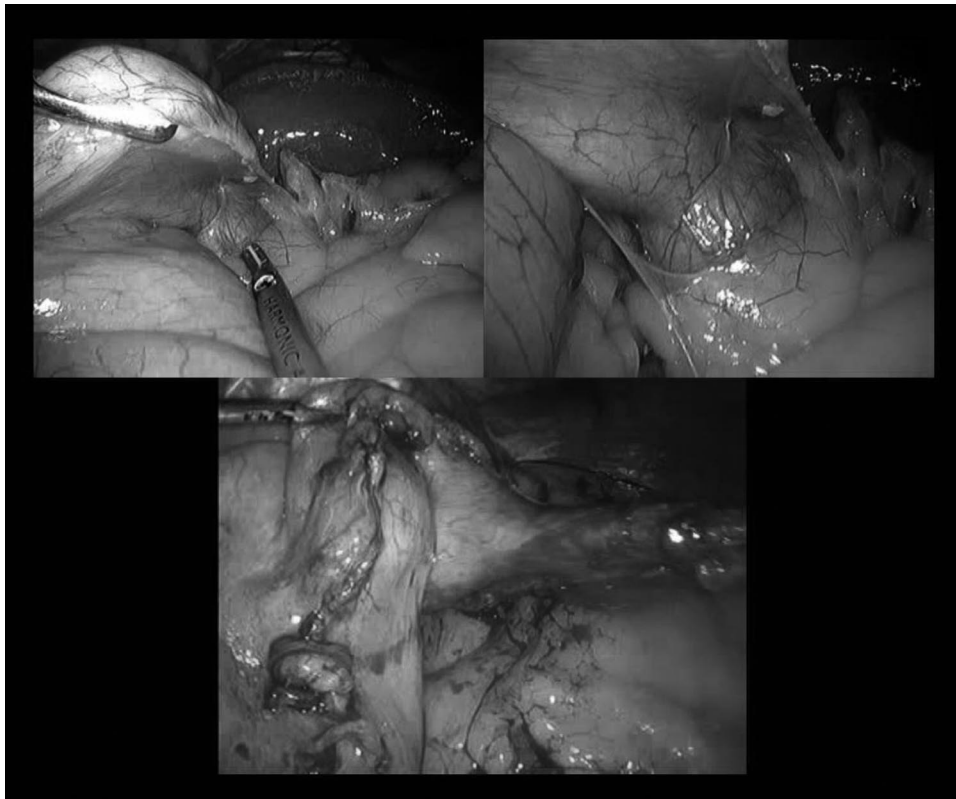


Figure 2. Intraoperative exposure of diverticulum.

day 7, he developed severe lower abdominal pain and presented to the emergency department late on postoperative day 9 for evaluation. He was diagnosed with a partial small-bowel obstruction after a CT scan demonstrated a transition point at the specimen extraction site in the right upper quadrant and was taken to the operating room for a laparoscopic exploration. Intraoperatively, a hernia was not identified, but there were dense adhesions in the right periumbilical area. The mesentery of the small bowel had been inadvertently incorporated into the closure of the 10-mm periumbilical port site, resulting in a small-bowel obstruction. Neither enterotomy nor intraperitoneal contamination was uncovered. After surgery he improved clinically and was discharged home. At 3-month follow-up, the patient denied any abdominal pain and was tolerating a regular diet with no complaints.

DISCUSSION

Gastric diverticula were first described by Moebius in 1661 and are an uncommon gastrointestinal pathology.⁸ They are often single lesions, varying from 1 to 3 cm in size, and they are best diagnosed with a UGI contrast study or

esophagogastroduodenoscopy (EGD). A recent publication by DuBois et al⁹ commented on the importance of UGI and EGD for the diagnosis of gastric diverticula. Gastric diverticula may be incidentally detected on CT, although it is not the primary mode of detection in symptomatic patients.^{10,11} In both of the cases reported above, diverticula were diagnosed initially by CT; however, the scans were completed to rule out other acute pathology.

Medical treatment with thorough evaluation for other gastrointestinal pathology should be the first line of therapy for suspected symptomatic gastric diverticula. Soft diet, antacids, antispasmodics, and proton pump inhibitors have all been reported to relieve symptoms.^{1,12} If symptoms do not subside and further diagnostic procedures are indicated, a UGI series or EGD can aid in detecting gastric obstructions or masses.^{12,13} Surgical resection is the standard treatment for gastric diverticula that do not respond to medical therapy or that are complicated by bleeding, malignancy, or perforation. In the patient presentations described, the decision to proceed with surgery was due to a failure of medical management and worsening symp-

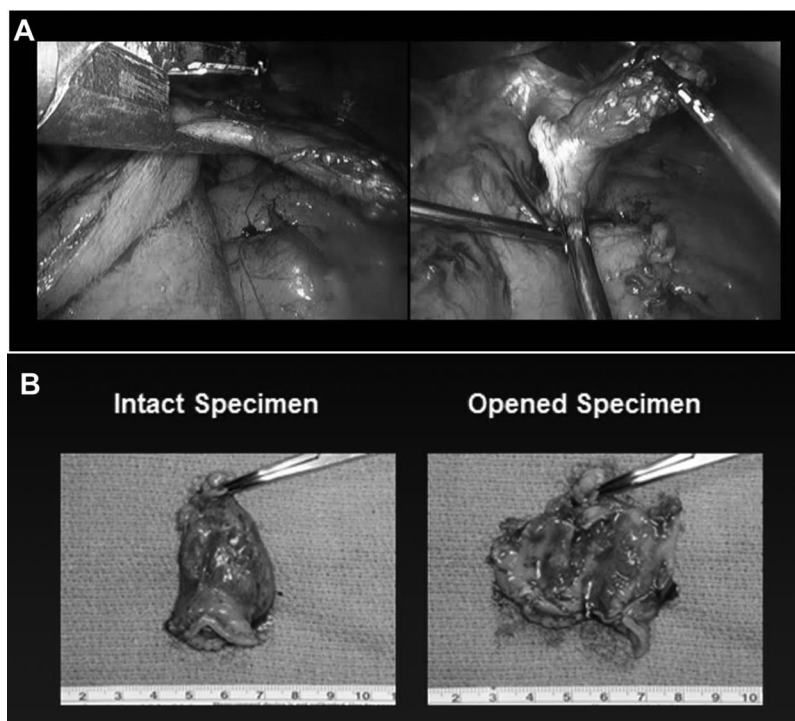


Figure 3. (A) Intraoperative resection of diverticulum. (B) Resected specimen.



Figure 4. CT scan showing posterior gastric diverticulum with air and contrast.

toms presumably secondary to stasis and bacterial overgrowth.

Laparoscopic resection of a gastric diverticulum was first reported by Fine in 1998, with a total of 9 cases.¹⁴ Since then, other reports of surgical management with laparoscopy and primary resection of the diverticulum have been described.^{9,15–18} The most common surgical approach and port placement that provide the necessary exposure re-

semble that of a laparoscopic Nissen fundoplication. To expose the posterior aspect of the stomach, it is necessary to divide the gastrocolic ligament or to ligate the short gastric vessels. Mobilization of the short gastric vessels provided the most direct approach to access the diverticulum in both patients described here. The diverticula were also resected at their bases with a cutting stapler and oversewn, as reported in similar case reports in the literature.

When evaluating a patient with a longstanding history of vague gastrointestinal symptoms that do not improve with medical treatment, clinicians should highly suspect a gastric diverticulum. Furthermore, a focused investigation is needed to identify and treat such patients. In summary, these cases provide examples of symptomatic gastric diverticula with successful symptom resolution after laparoscopic resection.

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