Laparoscopic Resection of Duodenal Diverticulum. A Case Report

Florin Graur, Ovidiu Bala, Raluca Bodea, Iren Geczi-Toth, Liviu Vlad, Cornel Iancu

3rd Surgical Clinic, Cluj-Napoca

Abstract

We report the case of a laparoscopic resection of a symptomatic duodenal diverticulum. A 35 year old female with history of pain in the upper abdomen, nausea and regurgitation was diagnosed with a diverticulum of the second portion of the duodenum on the external border at upper gastrointestinal radiography. The diverticulum size was medium (2 cm in diameter). Under general anesthesia, a pneumoperitoneum was created. Four trocars were inserted into the peritoneal cavity for this intervention. After the sectioning of posterior parietal peritoneum on the external border of the second portion of duodenum, the diverticulum was dissected. The resection was performed with an endo-GIA linear stapler at the base of the diverticulum. One subhepatic drain was inserted. The operative time was 30 min. There were no intra- or postoperative complications. Postoperative gastrointestinal series revealed no signs of diverticulum or stenosis on the second portion of the duodenum. The patient was discharged in the fifth postoperative day after a normal course. The follow-up evaluation was normal.

Keywords

Duodenal diverticulum - laparoscopic resection - laparoscopic stapling

Rezumat

Prezentăm un caz de rezecție laparoscopică a unui diverticul duodenal simptomatic. O pacientă de 35 de ani cu antecedente de dureri în portiunea superioară a abdomenului, greață și regurgitări, a fost diagnosticată cu un diverticul situat pe marginea externă a porțiunii a doua a duodenului la tranzitul baritat. Diverticulul a fost de dimensiuni medii (2 cm în diametru). Sub anestezie generală a fost instituit pneumoperitoneul. Pentru această intervenție chirurgicală s-au introdus patru trocare în cavitatea peritoneală. După secțiunea peritoneului parietal posterior pe marginea externă a porțiunii a doua a duodenului, diverticulul a fost disecat. Rezecția a fost efectuată cu un stapler linear Endo-GIA aplicat la baza diverticulului. Un tub de dren a fost plasat subhepatic. Intervenția chirurgicală a durat 30 min. Nu au existat complicații intra sau postoperatorii. Examinările baritate postoperatorii nu au evidențiat prezența diverticulului sau a stenozei la nivelul D2. Pacienta a fost externată în ziua a 5-a postoperator, după o evoluție fără incidente. La urmărirea postoperatorie nu au fost semnalate elemente patologice.

Romanian Journal of Gastroenterology
December 2005 Vol.14 No.4, 405-408
Address for correspondence: Florin Graur
3rd Surgical Clinic
Croitorilor Str., no.19-21
Cluj-Napoca, Romania
E-mail: graurf@yahoo.com

Introduction

The duodenum is the second site after the colon regarding the frequency of diverticula. Duodenal diverticula are found in 6-22% of cases at autopsy, in 2-6% of cases at upper gastrointestinal radiographs and in 9-23% of cases at endoscopic retrograde cholangio-pancreatography (1-4).

Duodenal diverticula are usually asymptomatic, more often coming as a surprise on gastrointestinal series. When symptomatic (less than 10%), they cause upper abdominal pain, haemorrhage, duodenal obstruction, duodenal ulcer, diverticulitis, perforation, obstruction of the main biliary or pancreatic duct, ascending cholangitis or pancreatitis.

Depending on the position of the diverticulum it may be easier or more difficult to resect it especially by laparoscopic approach. The diverticula of the "duodenal window" – named also juxtapapillary diverticula – with an intrapancreatic development - are more difficult to treat compared to those with lateral growth. Juxtapapillary diverticula are more frequently associated with biliary and pancreatic pathology.

Duodenal diverticula can be true diverticula (the diverticular wall contains all layers of duodenum) or false diverticula (their wall consists only of the mucous layer - covered or not by peritoneum - which herniates through a duodenal wall defect). The congenital diverticula are more

often true diverticula and the acquired diverticula are more often false diverticula. The duodenal diverticula can be extra or intraluminal.

There are two reports of duodenal diverticula treated by laparoscopic resection, and one by laparoscopic inversion of the diverticulum.

Case report

A 35 year old female had a 3 year history of intermittent and severe pain in the right upper abdominal quadrant with left irradiation associated with nausea and emesis, headache and diarrhea. All these symptoms were associated with recent weight loss. She had been diagnosed with viral hepatitis with HBV four years ago, mushroom poisoning and appendicitis one year ago.

The ultrasound examination prior to admission found no morphologic cause of these symptoms. Endoscopic examination of the upper digestive tract showed chronic gastroduodenal inflammation without any other associated pathology. A duodenal diverticulum of 2 cm diameter was found at gastrointestinal radiography.

At admission in our hospital, the physical examination and blood tests were normal. The barium meal in our service confirmed the presence of a 2 cm diverticulum on the lateral wall of the second portion of the duodenum. Abdominal ultrasound examination showed minimal left pyelocaliceal dilatation and hyperechoic tiny images raising the suspicion of left renal microlithiasis and a left microcystic ovary (29 mm diameter).

The operation was performed laparoscopically under general anesthesia with endotracheal intubation, two days after admission.

The patient was positioned in dorsal decubitus with the arms in abduction at 90 degrees.

The pneumoperitoneum was created by using the Veress needle inserted right above the umbilicus through a transverse incision of 1.5 cm length. When intraabdominal pressure reached 12 mm Hg and the peritoneal cavity was distended, a 10 mm trocar was inserted. Two more trocars of 5 mm diameter were inserted: one on the midline 15 cm above the umbilicus and one in the right upper quadrant on medioclavicular line. One trocar of 12 mm diameter was inserted under the umbilical level on the right pararectal line.

The patient was positioned in the reverse Trendelenburg (Fowler) position. The abdominal exploration was performed with a 30-degree laparoscope revealing a 2 cm duodenal diverticulum on the lateral side of the duodenum, right under the gall bladder. The second part of duodenum was grasped and pulled towards the left.

The posterior peritoneum was dissected with the electrocoagulator hook at the lateral side of duodenum (Kocher maneuver). The diverticulum was grasped carefully and dissected circumferentially. The dissection was carried out toward its neck near the duodenal wall.

An Endopath EZ (ETHICON®) suture stapler of 45 mm was inserted through a 12 mm trocar and was directed toward

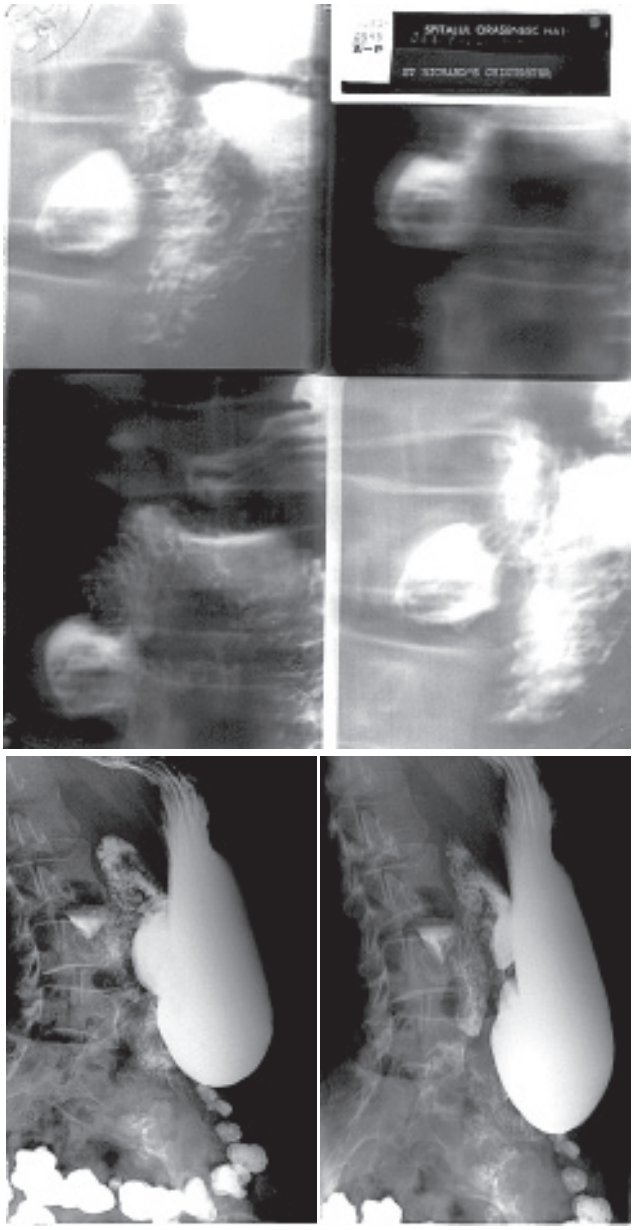


Fig.1 Upper gastrointestinal radiography. The duodenal diverticulum appears on the right side of the second duodenum.

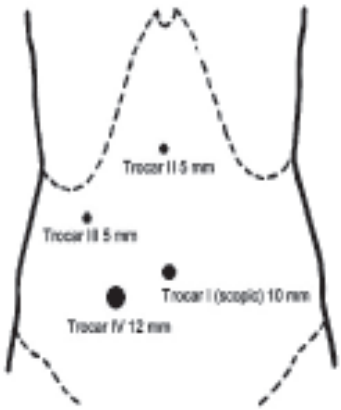


Fig.2 Trocar position.

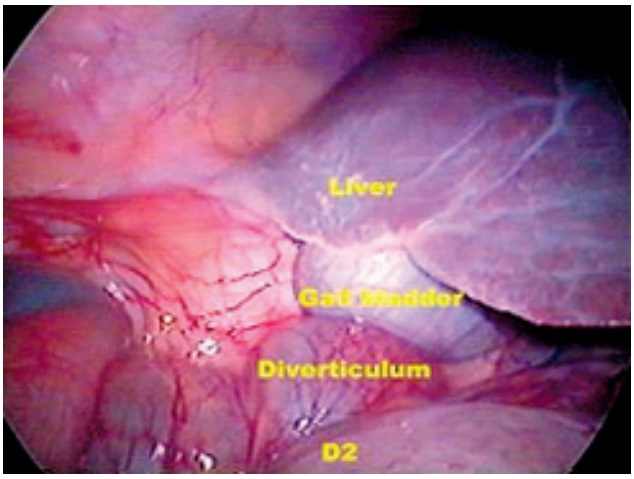


Fig.3 The second portion of the duodenum is grasped to the left and the duodenal diverticulum appears under the gall bladder.

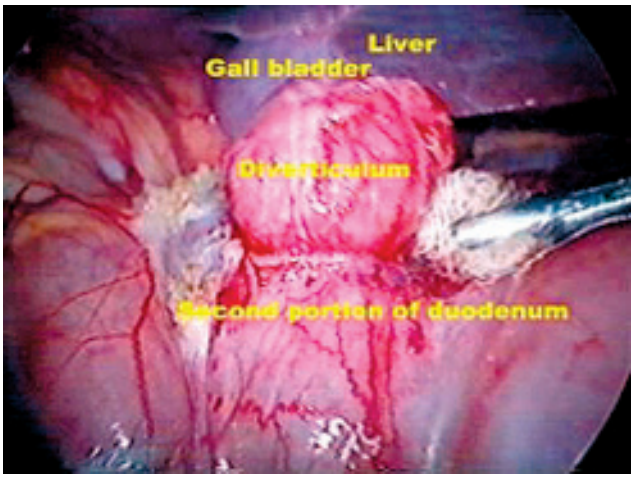
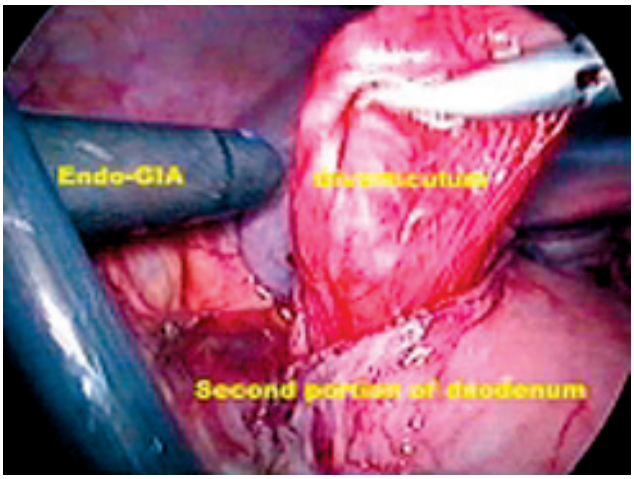
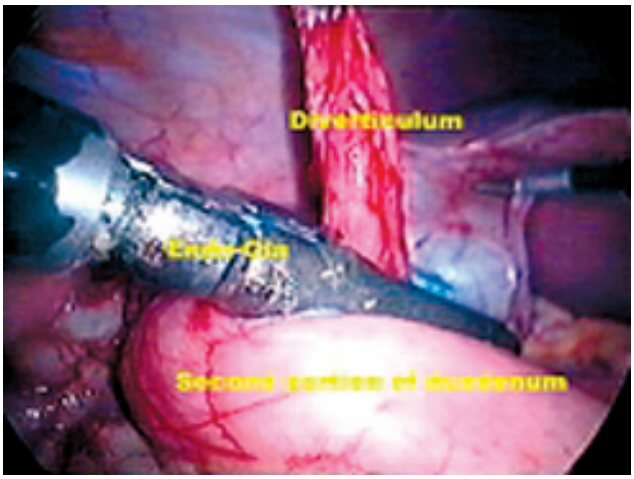


Fig.4 The duodenal diverticulum is dissected near the duodenal insertion.





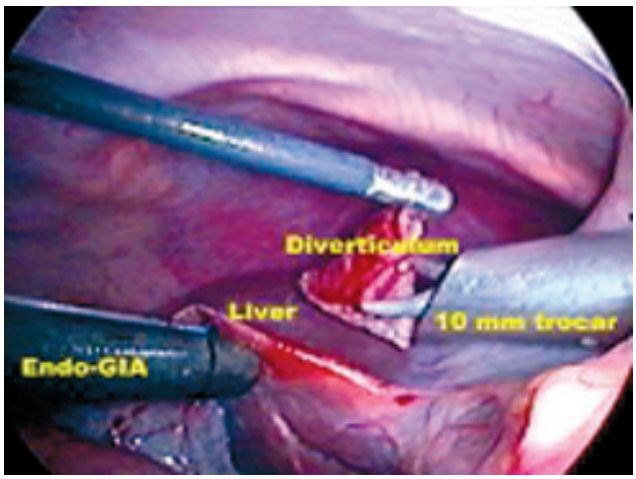


Fig.5. a The duodenal diverticulum is fully dissected and the Endo-GIA stapler is inserted. **b.** The Endo-GIA stapler is fired. **c.** The resected diverticulum is removed.

the neck of diverticulum. The stapler was fired and the diverticulum removed.

The hemostasis was controlled and a 16 French drain was inserted through the right upper quadrant trocar and placed in the Winslow hiatus.

The aponeurosis was sutured at the 10 and 12 mm trocars, and the skin was closed with separate sutures.

The operative time was 30 minutes.

The nasogastric tube was maintained until the second postoperative day when bowel movements were present. The subhepatic drain was removed in the fourth post-operative day and the patient was discharged on the fifth postoperative day without complaints.

The patient was asymptomatic and had no complications

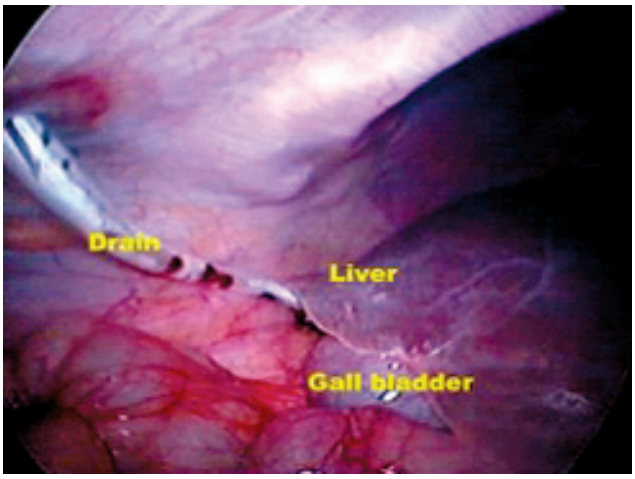


Fig.6 A subhepatic drain is inserted.

during the three months follow-up. The gastrointestinal series performed one month after operation showed no diverticulum or other pathology. The anatomopathologic study revealed that it was a false diverticulum, without a muscular layer in its wall.

Discussion

The D_2 diverticula are most frequently encountered, followed by the D_3, D_4 and D_1 diverticula and 70% of all duodenal diverticula are placed juxtapapillary. Only 4% of duodenal diverticula are situated on the lateral side of second duodenum (D_2). Duodenal diverticula are rarely found under the age of 40 years.

Abdominal pain is the most frequent symptom of the duodenal diverticula. Haemorrhage is also a common symptom. Surgical treatment is rarely indicated in duodenal diverticula, only when a complication occurs such as perforations and bleeding or persistent abdominal pain after exclusion of other causes of pain. The classic surgical procedures for duodenal diverticula are resection or inversion through laparotomy and are associated with significant morbidity and mortality (5-10%).

Chomel reported the first duodenal diverticulum in 1710 and Forsell and Cey performed the first surgical treatment for duodenal diverticulum in 1915 (5).

Callery et al. (6) reported the first case of laparoscopic resection of a duodenal diverticulum with a stapler in 1994. Tagaya et al. (7) reported another case treated similarly in 2000. Coelho et al. (8) reported a laparoscopic inversion of a duodenal diverticulum in 1999. The diverticulum inversion avoids the use of a stapler – reducing the intervention's costs – and also maintains the duodenal mucous layer integrity.

Coelho et al (8) used five trocars – three 10-mm trocars and two 5-mm trocars as follows: 4 cm above the umbilicus; 1 cm below xyphoid process; right subcostal region 6 cm from xiphoid; left subcostal region 10 cm from xiphoid; a point midway between left subcostal trocar and the one above the umbilicus.

The location of the diverticulum on the lateral side of duodenum facilitates the laparoscopic treatment. Other locations of diverticulum such as duodenal window are less accessible through laparoscopic approach. In selected cases, the laparoscopic approach minimizes the postoperative pain, scarring and hospitalization, and increases the patient's satisfaction.

References

1. Jang LC, Kim SW, Park YH, Kim JP. Symptomatic duodenal diverticulum. World J Surg 1995;19:729-733.
2. Pinotti HW, Tacla M, Pontes JF, Bettarello A. Surgical procedures upon juxta-ampullar duodenal diverticula. Surg Gynecol Obstet 1972;135:11-16.
3. Trondsen E, Rosseland AR, Bakka AO. Surgical management of duodenal diverticula. Acta Chir Scand 1990;156:383-386.
4. Scudamore CH, Harrison RC, White TT. Management of duodenal diverticula. Can J Surg 1982;25:311-4.
5. Maingot R. Gastric and duodenal diverticula. In: Maingot R. *Abdominal operations.* New-York: Appleton-Century-Crofts, 1980:141-156.
6. Callery MP, Aliperti G, Soper NJ. Laparoscopic duodenal diverticulectomy following hemorrhage. Surg Laparosc Endosc 1994;4:134-138.
7. Tagaya N, Shimoda M, Hamada K, Ishikawa K, Kogure H. Laparoscopic duodenal diverticulectomy. Surg Endosc 2000;14:592. Epub 2000 May 15.
8. Coelho JC, Sousa GS, Salvalaggio PR. Laparoscopic treatment of duodenal diverticulum. Surg Laparosc Endosc 1999;9:74-77