

Duodenal Diverticulum Perforation: a Case Report and Review of the Literature

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Abstract

Duodenum is the second most common site for diverticula formation. Duodenal diverticula (DD) are asymptomatic incidental findings and their complications are rare. The rarest and most severe complication is DD perforation. Until 2012, only 162 cases of DD perforation were reported in the world literature.

A woman presented with acute abdomen and peritonitis. CT scan revealed hydropneumoretroperitoneum suggestive of duodenal perforation. The patient underwent an exploratory laparotomy and the diagnosis of a DD perforation was made. A diverticulectomy with tube duodenostomy was performed, without complication.

A duodenal diverticulum perforation can be treated either surgically or conventionally. Only selected patients can be treated conventionally. Surgical treatment remains the standard option. Treatment must be individualized.

Keywords

case report, complication, duodenal diverticulum, perforation, surgery

INTRODUCTION

Duodenum is the second most common site of diverticula formation in the gastrointestinal (GI) system, after the colon. Duodenal diverticula DD are a common finding in imaging studies and endoscopies of the upper GI track. The DD prevalence varies from 5% to 22%, depending on the diagnostic method used.^[1] The majority of them are asymptomatic and their diagnosis is usually incidental.

DD complications are rare. Perforation of DD is the most rare and severe complication and is associated with a mortality rate as high as 30%. Herein, we report a case of DD perforation with symptoms of acute abdomen that was treated surgically in our institution. This case report has been prepared according to the SCARE group guidelines.^[2]

CASE REPORT

A 61-year-old Caucasian female patient, with no prior medical history, was admitted to our emergency department complaining of nausea and severe abdominal pain. The pain had a sudden onset and it was, firstly, located in the epigastrium, but quickly became non-specific and diffuse.

On clinical examination, her abdomen was stiff and tender, with guarding and rebound tenderness. There were no audible bowel sounds and the digital rectal examination was unremarkable. Laboratory tests showed a mild leukocytosis ($11.11 \times 10^3/\mu\text{l}$ with 86% neutrophils). Her vital signs were stable. The blood pressure was 150/93 mmHg, the heart rate was 104/min, the respiratory rate was 28/min, and the SO_2 was 98%.

A non-contrast computed tomography (CT) was performed in the private medical clinic where the patient was

initially referred, which revealed retroperitoneal free air and fluid (Fig. 1), suggestive of duodenal perforation. The patient was referred to our hospital's emergency department for definitive treatment.

A diagnosis of acute abdomen was made and an emergent exploratory laparotomy was performed through a midline incision. Using the Kocher maneuver, the duodenum was mobilized and a 4-cm perforated diverticulum was revealed in the second portion (Fig. 2). A diverticulectomy was performed and the surgical specimen was sent for histopathological examination (Fig. 3).

A duodenostomy was performed with the placement of a Pezzer's drainage tube in the duodenum through the defect. In addition, a drain was placed in the retroperitoneum. A nasogastric catheter was inserted postoperatively.

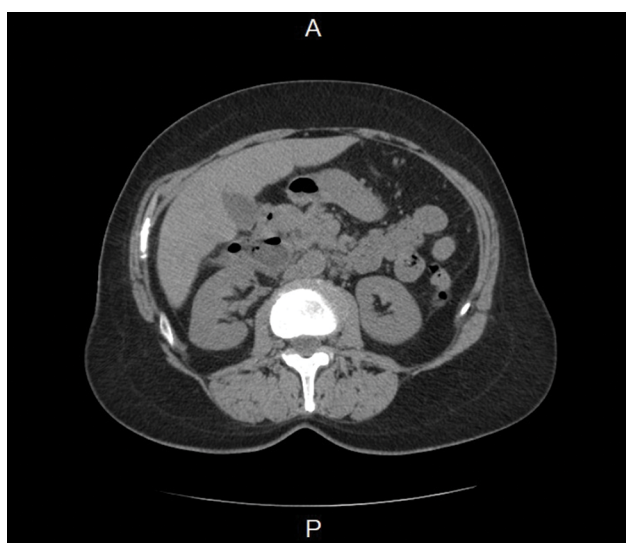


Figure 1. CT scan without contrast. The CT scan revealed free air and liquid around the second part of the duodenum, findings suggestive of duodenal perforation.

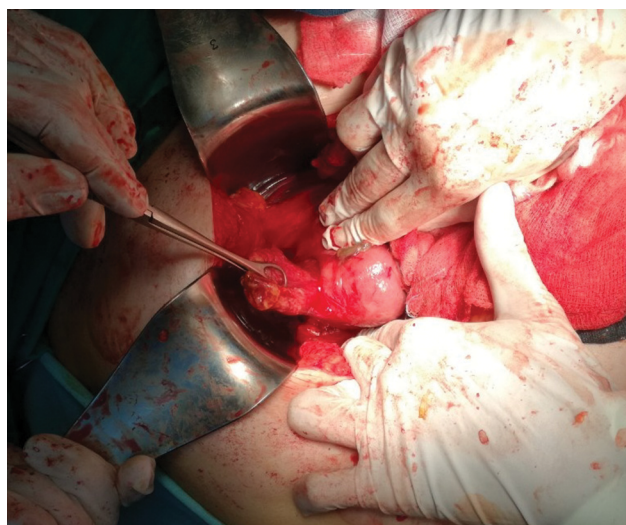


Figure 2. Intraoperative photograph; A ruptured duodenal diverticulum was identified in the second part of the duodenum.

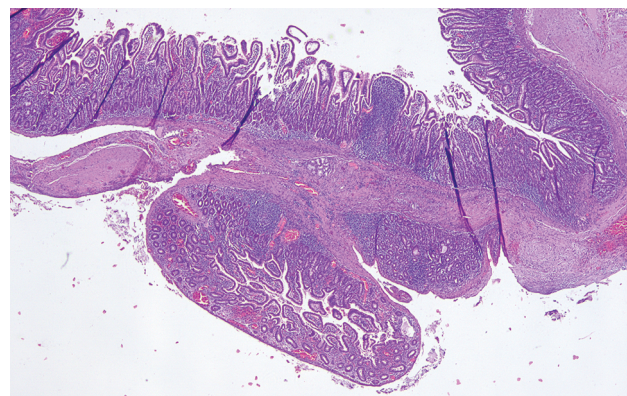


Figure 3. Microscopic photograph of the specimen; the pathology report confirmed the diagnosis.

The postoperative care consisted of digestive rest, intravenous antibiotics, use of protein pump inhibitors (PPIs), and total parenteral nutrition. The patient recovered without complications and was discharged 9 days postoperatively. The duodenostomic tube was removed after six weeks. At 12 months, at the follow-up examination, the patient reported no discomfort.

DISCUSSION

Although duodenal diverticula are a common finding in radiology studies, they are asymptomatic and their diagnosis is usually incidental. The majority of cases occur in the second and third portion of the duodenum, around the ampulla of Vater with their incidence rate rising with age. They manifest symptoms only when they are complicated (5-10%).^[1]

The duodenal diverticulum complications are uncommon and include upper GI bleeding, pain, diverticulitis and obstructive symptoms of the biliary tract such as jaundice, cholelithiasis, cholecystitis, choledocholithiasis, cholangitis, and pancreatitis. The rarest and most severe complication is the perforation of DD.^[3] Only 162 cases of perforated duodenal diverticula have been documented between 1710, the year Chomel initially described it, and 2012.

The main causes of DD perforation, as described by Thorson et al.^[1], are diverticulitis (62%), enterolithiasis (10%), iatrogenic (5%), ulceration (5%), trauma (4%), foreign bodies (2%), and unspecified causes (19%). It seems that perforations high mortality (up to 34%) in past case series is declining, due to more accurate diagnosis and improved therapeutic protocols.

Diagnosis of DD perforation is challenging. Due to the retroperitoneal location of most of the duodenum parts, it usually perforates the retroperitoneum. Symptoms can be subtle and vague. The abdominal pain may be located in the epigastrium, the right upper quadrant or even in the back of the patient. Also, fever, nausea, vomiting and other no specific symptoms can be present. Differential diagnosis has to be done from other cases of acute abdomen.

CT scan is essential for the diagnosis. CT scan can identify DD as pouches containing air (94.7%) or air and fluid (73.6%). Signs of DD perforation are free air and fluid in close proximity with a DD diverticulum. Abdominal X-ray, (MRI) and endoscopy of the upper GI can be helpful for the diagnosis of DD perforation.^[3,4] In some cases, the diagnosis is made intraoperatively.

Historically, DD perforation has been managed surgically. Morbidity and mortality may increase due to the high incidence of complications such as bile duct injury, pancreatitis, and fistula or abscess formation. The most common surgical treatment of DD perforation is stapled or hand sewed diverticulectomy, accompanied with proper drainage of the retroperitoneal space.^[5] Laparoscopic diverticulectomy is feasible and has been correlated with shorter hospital stay and better outcomes than in the open approach.^[6]

Other therapeutic options are diverticulectomy with duodenostomy, the use of omental patch, partial duodenectomy, and reconstruction with duodenojejunostomy.^[7] In some cases, more complex operations have to be performed such as biliary diversion procedures intervention.^[8]

Nowadays, conservative management of DD perforation is safe and feasible in selected cases. Patients with no comorbidities, with contained perforation or local small abscess formulation are eligible for non-surgical management. Conservative treatment consists of bowel rest and administration of intravenous fluids and broad-spectrum antibiotics.^[9]

For now, surgery remains the standard treatment for DD perforation. Non-operative treatment should be offered, at first, to patients who are at high risk for surgical treatment

or have contained DD perforations. Surgery is the appropriate treatment for cases with acute symptoms or for those in which conventional treatment fails.

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Перфорация дивертикула двенадцатипёрстной кишки: клинический случай и обзор литературы

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Резюме

Двенадцатипёрстная кишка является вторым по частоте местом образования дивертикулов. Дивертикулы двенадцатипёрстной кишки (ДДК) являются бессимптомной случайной находкой и их осложнения встречаются редко. Наиболее редким и тяжёлым осложнением является перфорация ДДК. До 2012 г. в мировой литературе сообщалось всего о 162 случаях перфорации ДДК.

Пациент женского пола поступила с признаками острого живота и перитонита. На КТ выявлен гидропневмоторетроперитонеум, свидетельствующий о перфорации двенадцатипёрстной кишки. Больной произведена диагностическая лапаротомия и поставлен диагноз перфорации ДДК. Выполнена дивертикулэктомия с трубчатой дуоденостомией без осложнений.

Перфорацию дивертикула двенадцатипёрстной кишки можно лечить как хирургическим, так и традиционным способом. Только избранные пациенты могут лечиться традиционно. Хирургическое лечение остаётся стандартным вариантом. Лечение должно быть индивидуальным.

Ключевые слова

клинический случай, осложнение, дивертикул двенадцатипёрстной кишки, перфорация, операция
