Peritonitis due to perforation of primary congenital duodenal...

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Case Report

# PERITONITIS DUE TO PERFORATION OF PRIMARY CONGENITAL DUODENAL DIVERTICULUM - A CASE REPORT AND REVIEW OF THE LITERATURE

Tri Huu Nguyen<sup>1</sup>, Thanh Nhu Dang<sup>2</sup>

<sup>1</sup>Department of Anatomy and Surgical Training, University of Medicine and Pharmacy, Hue University <sup>2</sup>Department of Surgery, University of Medicine and Pharmacy, Hue University

### ABSTRACT

**Background:** Duodenal diverticulum is a relatively common finding that can be incidentally found in upper gastrointestinal endoscopy in up to 20% of cases. Most duodenal diverticula are asymptomatic, and perforation of a duodenal diverticulum is extremely rare.

**Case report:** We present a case of spontaneous rupture of a duodenal diverticulum in a 41-year-old female diagnosed with perforated duodenal diverticulum intraoperatively. Resection of the perforated diverticulum was performed, and closure was done interruptedly in two layers. The patient recovered uneventfully.

**Conclusion:** Duodenal diverticulum perforation is a rare condition in which accurate preoperative diagnosis and treatment are challenging. Operative treatment with diverticulectomy and one or two-layer closure is the treatment of choice in most cases.

Keywords: Perforation, surgical management, duodenal diverticulum.

#### I. BACKGROUND

The diverticulum is a protrusion of mucosa and submucosa of the small bowel through small structural defects, usually around blood vessels. Duodenal diverticulum is a relatively frequent diagnosis that can be incidentally found in upper gastrointestinal endoscopy in up to 20% of cases [1]. Most duodenal diverticula are asymptomatic, while in some cases, diverticula are complicated by pain, duodenitis, jaundice, and cholangitis. Perforation of a duodenal diverticulum is extremely rare. From 1907 to 2021, only 210 cases of perforated duodenal diverticulum were reported in the literature [2]. While most cases were treated surgically or endoscopically [2], successful conservative management has also been reported(3). The overall mortality of duodenal diverticulum was 6% [2]. We present a case of spontaneous rupture of a duodenal diverticulum as well as a review of the literature.

#### **II. CASE REPORT**

A 41-year-old female patient was admitted to the hospital because of abdominal pain in the epigastrium and right lower quadrant. The patient had no history of NSAID and steroid use, no history of peptic ulcer disease, or any particular medical conditions. She had a sudden onset of severe abdominal pain, which increased with movement. There was no nausea or vomiting.

On admission, her vital signs showed a temperature of 370C, heart rate of 90/minute, blood pressure of 130/70 mmHg, and respiratory rate of 20/minute. Clinical examination demonstrated moderate pain in the epigastrium and right lower quadrant with rebound tenderness of the right lower quadrant.

Blood analysis showed leukocytosis (11.9 K/ $\mu$ L with 92% neutrophils). Her C-reactive protein level was slightly elevated (6.89 mg/L). An

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Corresponding author: Thanh Nhu Dang. Email: dnthanh@huemed-univ.edu.vn. Phone: 0905809309

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abdominal CT scan with IV contrast showed an edematous duodenal wall with an adjacent 63x37 mm retroperitoneal gas collection. Fat stranding around the duodenum and free fluid along the ascending colon were also noted (Figure 1).



**Figure 1:** CT scan images showing perforated thin-walled diverticulum connecting with a paraduodenal gas collection.

The patient underwent exploratory laparoscopy, which revealed pus collection under the liver and along the right paracolic gutter. Conversion to open surgery was decided due to the inability to expose the site of perforation. After a midline supraumbilical laparotomy was made, the Kocher maneuver was performed to mobilize the duodenopancreatic bloc, exposing a 1.5 x 1.0 cm diverticulum on the posterior surface of the second part of the duodenum. The diverticulum neck was measured at 1.0 cm. The diverticulum was inflamed and perforated at the apex (Figure 2). It was resected and closed at the neck in two layers in an interrupted fashion using Vicryl® 3.0 sutures. Peritoneal lavage was done, and a 24F drainage tube was placed along the duodenum. The nasogastric tube was kept. Pathological results showed acute inflammation of the duodenal diverticulum without evidence of malignancy.



Figure 2: The diverticulum at the mesenteric border (left) and the perforation at its apex (right).

The patient was treated with parenteral nutrition, antibiotics, and analgesia. Bowel movement returned on postoperative day 4. The nasogastric tube and drainage were removed on day 5. She resumed oral intake on the same day, initially with clear liquid, and advanced as tolerated on the following days. She was discharged on postoperative day 11.

### **III. DISCUSSION**

In the era of frequent use of endoscopic examination for upper gastrointestinal complaints,

duodenal diverticula were reported to exist in 20% of patients, which is a significantly higher prevalence compared to previous figures in barium

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examination (5%) [4]. Most diverticula are located in the duodenum's second part, and most are found along the pancreatic or mesenteric border [5].

Symptomatic duodenal diverticula can result from diverticulitis, biliopancreatic compression, hemorrhage, or perforation [6]. Perforation is believed to be the rarest since the duodenum has more rapid intraluminal flow and smaller bacteria counts, and duodenal diverticula are generally larger than colonic diverticula [5]. Thorson C. et al. reported that the most common cause of perforated duodenal diverticulum is diverticulitis (62%). Other possible causes include enterolithiasis (10%), iatrogenic (5%), ulcer (5%), trauma (4%), and foreign body (2%) [5].

Preoperative diagnosis of perforated duodenal diverticulum represents a clinical challenge since the symptoms are vague and should be differentiated from pathologic processes of adjacent organs. CT scan has become the imaging of choice in most cases, demonstrating the presence of extraluminal air, fluid, or contrast, thickened duodenal wall, or periduodenal fat stranding. Another tool for diagnosis is diagnostic laparoscopy. However, the duodenum is more difficult to expose, and the reported sensitivity of exploratory laparoscopy is less than 25% [7].

Treatment choice is usually based on the patient's general status, comorbidities, and extent of abdominal infection. If the patient presents with peritoneal signs, prompt surgical exploration is required since delayed treatment is associated with increased mortality and complications. Laparotomy was used in most cases, but a laparoscopic approach was also reported [8]. Regarding surgical techniques, the duodenum is kocherized to assess the perforation size and the relation to the ampulla of Vater. Simple diverticulectomy and transverse closure of the duodenum using a handsewn technique or stapling device in one or two layers were done in most cases. More aggressive procedures have also been described, including segmental duodenectomy and duodenojejunostomy, duodenal occlusion, biliary diversion, and pylorus-preserving Whipple's procedure [9].

Some authors advocate conservative treatment composed of bowel rest, broad-spectrum antibiotics, and percutaneous drainage if needed, which is used in selected stable patients and patients with multiple comorbidities who are poor surgical candidates [10]. Endoscopic treatment can be added to conservative treatment in clinically stable patients. A nasobiliary and/or nasopancreatic drainage can be further added to obviate the need for invasive surgical procedures as reported by Shimada et al [3].

### **IV. CONCLUSIONS**

Duodenal diverticulum perforation is a rare condition in which accurate preoperative diagnosis and treatment are challenging. Operative treatment with diverticulectomy and one or two-layer closure is the treatment of choice in most cases.

### Consent

The patient's informed consent to publication was obtained, and all measures were taken to protect the patient's privacy.

### REFERENCES

- Blanc B, Valleur P. Chirurgie des diverticules du duodénum. Techniques chirurgicales - Appareil digestif. 2010:40–410.
- Farné GM, Lauro A, Vaccari S, Marino IR, Khouzam S, D'Andrea V, et al. Spontaneous Perforated Duodenal Diverticulum: Wait or Cut First? Dig Dis Sci. 2021;66(9):2876-80.
- Shimada A, Fujita K, Kitago M, Ichisaka S, Ishikawa K, Kikunaga H, et al. Perforated duodenal diverticulum successfully treated with a combination of surgical drainage and endoscopic nasobiliary and nasopancreatic drainage: a case report. Surg Case Rep. 2020;6(1):4-9.
- Psathakis D, Utschakowski A, Müller G, Broll R, Bruch HP. Clinical significance of duodenal diverticula. J Am Coll Surg. 1994;178(3):257-60.
- Thorson C, Ruiz PP, Roeder R, Sleeman D, Casillas V. The Perforated Duodenal Diverticulum. Arch Surg. 2012;147(1):81-8.
- Duarte B, Nagy K, Cintron J. Perforated duodenal diverticulum. British Journal of Surgery. 1992;79:877-81.
- 7. Volchok J, Massimi T, Wilkins S, Curletti E. Duodenal

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diverticulum: case report of a perforated extraluminal diverticulum containing ectopic pancreatic tissue. Arch Surg. 2009;144(2):188-90.

- Yeh TC. Laparoscopic resection of perforated duodenal diverticulum - A case report and literature review. Int J Surg Case Rep. 2016;28:204-10.
- 9. Schnueriger B, Vorburger SA, Banz VM, Schoepfer AM, Candinas D. Diagnosis and management of the

symptomatic duodenal diverticulum: a case series and a short review of the literature. J Gastrointest Surg. 2008;12(9):1571-6.

 Martínez-Cecilia D, Arjona-Sánchez A, Gómez-Álvarez M, Torres-Tordera E, Luque-Molina A, Valentí-Azcárate V, et al. Conservative management of perforated duodenal diverticulum: A case report and review of the literature. World J Gastroenterol. 2008;14(12):1949-51.