#### **Case Report**

# Characteristic Signs and Symptoms of Duodenal Diverticula: A Case Report and a Brief Review of Literature

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#### Abstract

**Introduction:** Duodenal diverticula are weakened mucosal outpouchings that are most frequently located in the second portion of the duodenum, neighboring the ampulla of Vater. Most diverticula are acquired and asymptomatic.

**Presentation of case:** A 46-year-old female presented with complaints of recurrent intermittent epigastric pain associated with nausea and vomiting for duration of one year, and was incidentally found to have a hemoglobin level of 5.0 g/dL. She was worked up by a gastroenterologist and an upper endoscopy revealed a dilated duodenum. A CT scan confirmed the diagnosis of a duodenal diverticulum and the patient successfully underwent duodenal resection.

**Discussion:** Duodenal diverticula are common and are usually discovered incidentally. Here, we present a case report and a review of the literature in an effort to increase the awareness of signs, symptoms, demographics, and possible complications of small bowel diverticula. Signs and symptoms of a duodenal diverticulum are highly variable, and depend on the associated complications.

**Conclusion:** Duodenal diverticula are common, but are often missed by clinicians. Signs, symptoms and complications vary. Familiarity with the various modes of presentation will help clinicians diagnose and manage diverticula, as well as prevent further complications.

#### **ABBREVIATIONS**

ALT: Alanine Aminotransferase; AST: Aspartate Aminotransferase; PO: Per Os (by mouth); CT: Computed Tomography

#### **INTRODUCTION**

Duodenal diverticula are weakened mucosaloutpouchings most frequently located in the second portion of the duodenum, around or adjacent to the ampulla of Vater [3]. The majority are acquired and asymptomatic [1,2]. Approximately 5% become symptomatic or develop further complications [4]. Clinicians often miss the diagnosis of a diverticulum since the signs and symptoms may mimic other diseases such as pancreatitis or cholecystitis. Here, we describe a patient with a case of a duodenal diverticulum and present a brief review of the literature on the subject. Our aim is to aid the clinical community in identifying

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#### **Keywords**

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the signs and symptoms of duodenal diverticula and prevent subsequent complications.

#### **METHODS**

We performed a PubMed search for Duodenal Diverticulum using keywords 'Duodenal Diverticulum', 'Duodenal Diverticula', 'Extraluminal duodenal diverticulum'

#### **CASE REPORT**

A 46-year-old female with an uncomplicated medical history presented to our academic institution with complaints of epigastric pain associated with frequent nausea and vomiting that had been intermittent, but recurrent for a period of one year. During pre-operative testing for an abdominoplasty, the patient was found to have iron deficiency anemia with a hemoglobin level of 5.0 g/dL. A trial of oral iron supplementation did now show any improvement, and the patient subsequently underwent

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a gastroenterology evaluation. She received several intravenous iron infusions with much improvement of her hemoglobin level. Pre-operative laboratory findings were: white blood cell count 7,200 u/l, hemoglobin 9.4 g/dl, hematocrit 34.2, AST 203 u/l, ALT 350 u/l, alkaline phosphatase 296 u/l, and total bilirubin 0.5 mg/dl.

An upper endoscopy showed a dilated duodenum. Upon further evaluation by Computed Tomography (CT) of the abdomen and pelvis, the patient was found to have a windsock diverticulum of the duodenum in addition to cholelithiasis (Figure 1,2). The gastroenterologist following her believed the gastroenterology symptoms and iron deficiency anemia most likely were attributed to the duodenal diverticulum, although



Figure 1 Axial IV and oral contrast enhanced CT view demonstrates a windsock duodenal diverticulum (red arrows) extending into the third portion of the duodenum (blue arrows).



**Figure 2** Coronal IV and oral contrast enhanced CT view demonstrates a windsock duodenal diverticulum (red arrows) extending into the third portion of the duodenum (blue arrows).

there were no signs of active bleeding on regular colonoscopy. While, cholelithiasis could in fact have played a role in her symptoms, the duodenal diverticulum was large and was compressing the lumen. In an effort to avoid complications, the patient consented to a cholecystectomy and a duodenal resection.

Under general anesthesia, the patient underwent a laparoscopic cholecystectomy, laparoscopic mobilization of the duodenum, upper endoscopy, open duodenostomy, resection of a large duodenal diverticulum, and closure of the duodenostomy. During the operation it was noted that the patient's diverticulum was filled with debris and food, which completely compressed the lumen of the bowel. The opening of the duodenum was small and compressed by the sac of the diverticulum. Her postoperative course was uneventful and the patient was discharged on post-operative day four.

#### **DISCUSSION**

Duodenal diverticula are bulging protrusions of the duodenum, commonly located in the second portion, near the ampulla of Vater [5]. Duodenal diverticula can be classified as extraluminal or intraluminal. Intraluminal are classically congenital and occur due to incomplete recanalization of the intestinal lumen [6]. Extraluminal are the most common type, and are acquired due to herniation of weakened mucosa by protruding large vessels [6], and can be further delineated into peri-ampullaryduodenal diverticula or juxtapapillary duodenal diverticula, depending on their location [7]. The former is located adjacent to or in the ampulla of Vater while the latter is commonly found approximately 2 cm from the ampulla of Vater [7].

Due to the asymptomatic nature, many duodenal diverticula are incidental findings during upper endoscopies or barium studies [1]. The incidence of duodenal diverticula is estimated to be around 20% in the general healthy population [8]. No specific gender predilection exists. It is rare to develop one before the age of 40, and peak incidence occurs between 50 to 70 years of age [2]. The most common symptoms are upper abdominal pain radiating to the back, intermittent diarrhea, constipation and weight loss [9,10]. The differential diagnosis for small bowel diverticulum is acute or chronic pancreatitis, cholecystitis, small bowel obstruction, or peptic ulcer disease [2-4]. The location of the duodenal diverticulum plays an important role in the nature of its complications. The closer the diverticulum is to the ampulla of Vater, the higher the chance of gallstone formation in the common bile duct [7]. As the duodenum compresses the ampulla of Vater, there is more pressure on the common bile duct and pancreatic duct, which may lead to other complications such as cholangitis, cholelithiasis and pancreatitis. If left untreated, a perforated diverticulum may lead to a more complicated surgical management [4].

Table 1 displays several cases of duodenal diverticula and subsequent complications reported in the literature. Symptoms varied from right upper quadrant pain, epigastric pain, to generalized abdominal pain. The location of the diverticulum was mostly the second part of the duodenum. In this case report, the patient had experienced intermittentepigastric pain for one year, but did not have any complications such as diverticular bleeding or perforation. The patients presented in Table 1 presented with

Table 1: Signs, symptoms, treatments and outcomes in published duodenal diverticulum case reports.								
Ref #	Age	Sex	Signs & Symptoms	Location/ Size of DD	Diagnostic Imaging	Complications	Treatment	Outcome
Matuso,et al [11].	68	F	Black Stools	Third part of the duodenum (Horizontal portion)	Endoscopy CT with contrast	Diverticular bleeding	Hemostasis achieved by endoscopic clip	No evidence of re-bleeding after a year
Song, S [1].	53	М	-Sudden onset of right abdominal pain. -RUQ tenderness with associated rebound tenderness and guarding.	Second part of the duodenum	CT with contrast	Duodenal Perforation and foreign material found	Diverticulectomy and removal of foreign material	No complaints of discomfort after one year
Song, S [1].	73	М	-Right upper abdominal pain, postprandial in nature. -RUQ tenderness with rebound tenderness.	Second part of the duodenum 2.7 cm	CT with contrast	Duodenal perforation	Conservative treatment with antibiotics for 18 days.	Endoscopy showed that the perforation was healed after 18 days.
Kassir, R. et al. [12].	79	М	Generalized abdominal pain and altered bowel habits.	Jejunum	CT with contrast	Duodenal Perforation	-Laparotomy -Forty centimeters of jejunum resected -End to end anastomosis	Postoperative period uncomplicated
Majerus, B. et al. [5].	65	F	-Severe epigastric pain and nausea immediately after trauma -Abdominal guarding	Second part of duodenum 5.0 cm	CT with contrast	Duodenal Perforation	Laparotomy Diverticulectomy	Patient was asymptomatic 4 years after surgery.
Rizwann, MM. et al. [2].	69	М	-Upper abdominal pain radiating to the back -Epigastric tenderness	Second part of duodenum	ERCP	None	Conservative management	Asymptomatic 1 year follow up
Martínez,CD, et al. [8].	85	F	-Intense thoracic pain radiating to the upper abdomen accompanied by nausea and vomiting	Second part of duodenum	Gastrografin study	-Abscess surrounding the diverticula and another one retrohepatic and subdiaphragmatic	-Both abscesses were drained -Hospital length was 20 days.	Asymptomatic 6 month follow up.

more severe symptoms due to their complications. Our case report and literature review focus on the signs and symptoms of duodenal diverticula and the possible complications if left untreated or undiagnosed. More attention should be placed on the possibility of a duodenal diverticulum in patients presenting with epigastric and right upper quadrant pain associated with nausea and vomiting.

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