Management of Perforated Duodenal Diverticulum: Report of Two Cases

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Duodenal diverticula are common, but perforated duodenal diverticulum is rare. Because of the disease rarity, there is no standard management protocol for perforated duodenal diverticulum. To properly manage this rare complication, a clear pre-operative diagnosis and clinical disease severity assessment are important. An abdomino-pelvic CT is an unquestionably crucial diagnostic tool. Perforation is considered a surgical emergency, although conservative treatment based on fasting and broad-spectrum antibiotics may be offered in some selected cases. Herein, we report two cases of perforated duodenal diverticulum, one case managed with surgical treatment and one with conservative treatment. (Korean J Gastroenterol 2015;66:159-163)

Key Words: Duodenum; Diverticulum; Intestinal perforation

INTRODUCTION

Duodenal diverticula are common and usually asymptomatic, with prevalence at autopsy of 22%.1 Duodenal diverticula can be congenital and acquired, with the latter being most common. Acquired diverticula represent pulsion diverticula due to a protrusion of mucosa, muscularis mucosa and submucosa through a wall weakness, formed of the papillae of one of those layers. Hence the periampullary area is the predilection site for this pathology.1,2 Complications are rare and include diverticulitis, perforation, digestive bleeding, distension or bile duct obstruction.3,4 Perforation of duodenal diverticulum is a rare complication that requires prompt treatment because of its high mortality rate. Surgical management was considered the standard therapeutic option, involving a diverticulectomy and retroperitoneal drainage.5 Nowadays, conservative treatment with nasogastric suction, bowel rest, intravenous antibiotic therapy, parenteral nutrition, endoscopic cleansing of the infected pouch and combined endoscopic and percutaneous drainage of retroperitoneal abscess can be an alternative in selected cases.6,7

We present two approaches to the management of this condition with a short literature review.

CASE REPORTS

1. Case 1
A 53-year-old male patient was admitted to our hospital due to sudden onset right side abdominal pain. The patient had no specific medical history. His vital signs upon admis-
sion were stable with blood pressure of 122/70 mmHg, a heart rate of 78 beats/min, and a body temperature of 36.9°C. On physical examination, the patient was tender to palpation in the right upper abdominal quadrant with associated rebound tenderness and guarding. Laboratory values were remarkable for a white blood cell count of 19,770/mm³ and CRP of 5.78 mg/dL. An abdomino-pelvic CT revealed a hydro-pneumoretroperitoneum around the duodenal second to the third portion extending into the peripancreatic head suggestive of focal perforation of the periampullary duodenal diverticulum with underlying linear foreign material (Fig. 1). An abdominal exploration was performed with a right subcostal incision. After mobilization of the duodenum using the Kocher maneuver, a perforated duodenal diverticulum caused by foreign material was revealed on the anteromedial side of the second portion of the duodenum (Fig. 2). The foreign material was a coiled leather string about 3 cm long. The diverticulum was grasped carefully and dissected circumferentially. The dissection was performed toward its neck near the duodenal wall, and after a diverticulectomy, primary closure was done. A drain was placed in the subhepatic region. The patient was discharged on the 12th postoperative day. At one year, the patient did not complain of any discomfort.

2. Case 2

A 73-year-old male presented with right upper abdominal pain starting one day before admission. His pain was aggravated after a meal and he could not sleep because of the abdominal pain. The patient received a subtotal gastrectomy because of gastric ulcer 20 years ago. Vital signs were stable. Upon physical examination, the patient was tender to palpation in the right upper abdominal quadrant with rebound tenderness. Blood test results were normal except for increased CRP (18.07 mg/dL). An abdomino-pelvic CT revealed a 2.7 cm duodenal periampullary diverticulum with focal wall defect, and extraluminal gas in the paraduodenal space and the right anterior pararenal space of the retroperitoneum (Fig. 3). After reviewing CT findings and symptoms, we decided upon conservative treatment using antibiotics. After 18 days of conservative treatment, we performed a CT scan and found a near complete resolution of the
Fig. 4. Following CT after 18 days in a 73-year-old male in the present case. The axial image shows a near complete disappearance of fluid collection (arrowheads).

Fig. 5. Follow-up esophagogastroduodenoscopy of the present case (arrowheads).

abscess in the right peri-duodenal and anterior pararenal space (Fig. 4). An esophagogastroduodenoscopy suggested that the perforated diverticulum was healed (Fig. 5). We could not speculate on one specific cause of perforation in this case, although possible causes include diverticulitis, ischemia, or ulcer. The patient was discharged on the 22th hospital day. At six months, the patient did not complain of any discomfort.

DISCUSSION

The duodenum is the second most frequent location for diverticula, following the colon. In contrast to colonic diverticula, they are an uncommon site of inflammation, because of their larger size and the more sterile, liquid content of the duodenum. Nevertheless, complications may occur; 5% of patients with duodenal diverticula will develop clinical symptoms of acute diverticulitis with or without free perforation in the peritoneum or retroperitoneum, abscess formation, or fistula, or obstruction of the common bile duct. Less than 200 cases of perforated duodenal diverticulum have reported. Causes of perforation are multiple and include diverticulitis, enterolithiasis, ulceration, foreign body, trauma, iatrogenic perforation during an ERCP and most frequently ischemia due to distension from food retained inside the diverticulum.

Perforations caused by a foreign body are extremely rare, with only three cases in the literature. As most perforations are retroperitoneal, symptoms are usually nonspecific, and include right upper abdominal pain, nausea and vomiting, and rarely peritoneal irritation. Blood samples are also unspecific. Moreover, the differential diagnosis is wide and can be unclear. In the setting of a perforated duodenal diverticulum, the CT findings may be misleading and be suggestive of other more common conditions. However, with wider use of CT, the preoperative diagnosis of perforated duodenal diverticulum has increased, and this is currently the best imaging modality available. In our cases, the radiologist reported that both CT findings were compatible with duodenal diverticular perforation.

Because the disease is rare, there is no standard management protocol for perforated duodenal diverticulum. In general, the surgical approach was considered the treatment of choice. Several technical options are available, ranging from local excision to the Whipple procedure, depending on the location of the duodenal diverticulum and the inflammatory status. Our surgical case was treated with excision of the duodenal diverticulum and direct suture, with a drain placed in the resection area. Laparoscopic diverticulectomy has also been reported to reduce trauma from laparotomy and achieve an early recovery with minimally invasive surgery.

Several recent cases were treated with bowel rest, nasogastric tube and antibiotics, with encouraging results in selected patients. Conservative treatment may be useful in a patient of advanced age or in a patient with multiple medical comorbidities, provided symptoms are mild and there is no evidence of impending sepsis. In our cases, the surgical case was stable at the time of admission, although preoperative CT revealed that a foreign material was the cause of perforation. The other patient who underwent con-
servative treatment was selected for such treatment because he presented with mild symptoms and a clear diagnosis was possible. Also, he was 72 years old and had a history of gastric surgery. Both patients had an uneventful clinical course.

Thorson et al.9 reviewed 40 studies producing 61 cases of perforated duodenal diverticulum from 1989 to 2011. They observed a decrease in mortality and morbidity of this disease for decades because of improved perioperative care, development of broad-spectrum antibiotics, advances in diagnostic tests, and/or increased awareness of this rare disease. Of the 61 cases, 11 patients were managed without surgery, and only one complication was reported, an intra-abdominal abscess treated successfully with percutaneous drainage. We reviewed six studies published since 2011 producing 18 cases, which were combined with the two at our institution for a total of 20 patients (Table 1).4,5,11,14-16 There were two total deaths for a mortality rate of 10%. Both deaths were in patients who were surgically managed. Of 20 patients, four were successfully treated without surgical intervention. However, to measure proper management in perforated duodenal diverticulum is difficult because it depends on clinical severity.

In conclusion, since perforated duodenal diverticulum is a rare condition and symptoms often mimic other intra-abdominal processes, precise diagnosis is important to manage this disease. The clinical presentation should be considered a guide to management. In a clinically unstable patient, surgical intervention is needed. However, non-surgical treatment should be considered in patients who present with mild symptoms.

**REFERENCES**

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