

# SUCCESSFUL MANAGEMENT OF PERFORATED DUODENAL DIVERTICULITIS WITH INTRA-ABDOMINAL DRAINAGE AND FEEDING JEJUNOSTOMY: A CASE REPORT AND LITERATURE REVIEW

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We report the clinical experience of one patient with perforated duodenal diverticulitis who was successfully treated by intra-abdominal drainage and feeding jejunostomy. A 53-year-old male patient visited our hospital due to acute onset of abdominal pain and distension. Physical examination revealed tenderness over the epigastric area and right-lower quadrant of the abdomen without obvious rebound tenderness or muscle guarding. Duodenal diverticulitis with a retroperitoneal abscess was identified by abdominal computed tomography scan. Surgical intervention was performed after the failure of conservative treatment. The operative findings were compatible with perforated duodenal diverticulitis, and intra-abdominal drainage of retroperitoneal abscess with simultaneous feeding jejunostomy was undertaken. The patient was doing well at the 4-month postoperative follow-up visit. We suggest the use of a conservative operative method, as opposed to conventional diverticulectomy and duodenorrhaphy, as an alternative approach for the management of this disorder, especially when conservative treatment has failed.

**Key Words:** duodenal diverticulum, feeding jejunostomy, intra-abdominal drainage, perforation

(*Kaohsiung J Med Sci* 2008;24:425–9)

Duodenal diverticula are not uncommon, and patients are frequently asymptomatic. Few patients with complications of duodenal diverticula need surgical intervention. Perforation is an exceptionally rare complication of duodenal diverticula, and it often presents with nonspecific symptoms and signs. However, the diagnosis of this rare complication is difficult, and

the best treatment remains inconclusive [1–3]. We present a case of perforated duodenal diverticulitis successfully treated by intra-abdominal drainage and feeding jejunostomy, as well as a short review of the relevant literature.

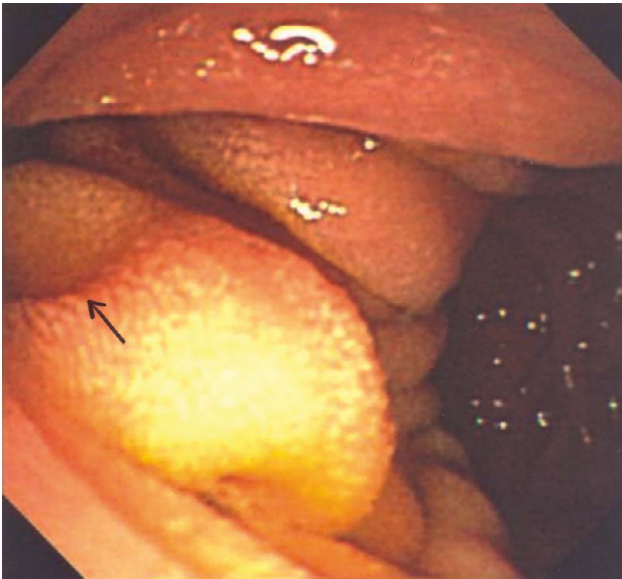
## CASE PRESENTATION

A 53-year-old male patient was sent to the Emergency Department of Kaohsiung Medical University Hospital because of a sudden onset of abdominal pain. He had been previously healthy except for a history of hyperlipidemia controlled by regular medication.



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**Figure 1.** Gastroduodenoscopic examination identified one diverticulum (arrow) on the posterior wall of the second portion of the duodenum just next to the periampullary Vater.

Unfortunately, fever (up to 38°C), nausea, vomiting and abdominal distension then developed. The characteristics of his abdominal pain included steady dull pain over the epigastric abdomen, and aggravation after intake of food. On general physical examination, only epigastric tenderness was evident without any obvious sign of peritonitis. Laboratory data demonstrated leukocytosis (white blood cell count, 12,000/ $\mu\text{L}$ ) and elevated C-reactive protein level (184  $\mu\text{g}/\text{mL}$ ), but normal serum amylase level. Plain film showed no intraperitoneal free air. Abdominal ultrasonography revealed a normal biliary tract without ascites in the subhepatic space. Thereafter, gastroduodenoscopy identified one diverticulum on the posterior wall of the second portion of the duodenum, just next to the periampulla of Vater (Figure 1). Abdominal computed tomography (CT) revealed one diverticulum on the second portion of the duodenum with edematous change of the duodenal wall, combined with linear infiltration of the retroperitoneal and right anterior pararenal space (Figure 2). Neither intraperitoneal nor retroperitoneal free air was noted. Under the impression of duodenal diverticulitis, conservative treatment was given first. However, high-grade fever (more than 38.5°C), and progressive abdominal pain with rebound pain were noted 36 hours after admission.

Because of the deterioration of his clinical condition, emergency exploratory laparotomy was performed.



**Figure 2.** (A, B) Abdominal computed tomography performed on admission shows the diverticulum (double arrows) over the distal second portion of the duodenum (double arrowheads), and linear infiltration in the retroperitoneal and right anterior pararenal space (single arrowhead).

Some turbid ascites was noted in the subhepatic space and right paracolic gutter space, with pus in the retroperitoneal and right anterior pararenal space. An inflammatory diverticulum surrounded by necrotic bile-stained material was identified at the second portion of the duodenum. Consequently, microperforation of the duodenal diverticulitis was confirmed. Instead of exploring the diverticulum and performing diverticulectomy with two-layer duodenorrhaphy, we only placed one intra-abdominal drainage tube with its tip in the retroperitoneal pus-accumulated space and performed feeding jejunostomy concurrently. The patient had an uneventful recovery. A second abdominal



**Figure 3.** A second abdominal computed tomography scan performed postoperatively reveals the interval improvement of fluid accumulation over the right anterior pararenal space (double arrowheads), improvement of the edematous change of the second portion of the duodenum, and clear identification of the duodenal diverticulum (arrow).

CT scan demonstrated interval improvement of the edematous change of the duodenum and infiltration of the retroperitoneal space (Figure 3). Four months later, the patient remained asymptomatic without any symptoms or signs of recurrence or complications.

## DISCUSSION

The duodenum is the second most common site for the development of gastrointestinal diverticula, occurring in approximately 5–10% of adults undergoing upper gastrointestinal radiography or endoscopy [4]. The symptoms associated with duodenal diverticulum are often nonspecific, with the result that early diagnosis is usually difficult. The possible complications of duodenal diverticulum include ulceration and hemorrhage, partial duodenal obstruction, common bile duct obstruction with cholangitis and jaundice, acute or chronic pancreatitis, diverticulitis, fistula formation, enterolithiasis, and perforation [5]. Fortunately, these complications are uncommon, and surgical intervention is required in only 1–2% of cases of duodenal diverticulum [1].

Spontaneous perforation of a duodenal diverticulum is a rare but serious complication associated with

significant mortality. Just over 110 cases have been reported in the literature over the past two decades [1]. Among the 56 cases reported on by Juler et al [5], the causes of perforated duodenal diverticula included diverticulitis, enterolithiasis, ulceration, foreign bodies and blunt abdominal trauma, with diverticulitis being the major etiology of this complication (71.4%). Duarte et al [1] indicated that most patients with duodenal diverticulitis had perforation complications occurring retroperitoneally, which subsequently led to the formation of retroperitoneal abscesses. Other rare conditions secondary to perforation of duodenal diverticulitis—for example, mediastinitis, duodenocolic fistula [6], and gastrointestinal bleeding due to perforation into the abdominal aorta [5]—have also been reported.

Preoperative diagnosis is usually missed or delayed because of this complication's nonspecific symptoms, which mimic those of other gastrointestinal disorders, and is often made by exclusion. Seventy-one percent of patients presented with sudden or acute onset abdominal pain [5]; however, others presented with different patterns, including chronic abdominal pain, anorexia and general malaise. The most common diagnoses that are often confused with this rare complication of duodenal diverticula include acute cholecystitis, perforated viscus and acute appendicitis. In a review of 101 patients with perforated duodenal diverticula, Duarte et al [1] indicated that this complication was correctly diagnosed with the use of plain abdominal radiography in only 13 cases (12.9%). One crucial diagnostic clue is the presence of periduodenal or retroperitoneal free air by plain abdominal radiograph [7–9]. Sakurai et al [10] also suggested that an upper gastrointestinal series with the collection of contrast media in the diverticulum and findings of extravasation of the contrast represented another key point for the accurate preoperative diagnosis of perforated duodenal diverticulum. Abdominal CT has also been reported to be a useful diagnostic tool for demonstrating duodenal perforation [2,10,11].

Several reports have suggested that diverticulectomy and double-layer duodenorrhaphy is the best treatment of choice for this rare complication [1,5,12]. Alternatively, Donald [13] reported the clinical experiences of two cases of perforated duodenal diverticulitis, one of whom underwent diverticulectomy with duodenorrhaphy combined with two-layer suturing, while the other underwent the same operation with

additional vagotomy, antrectomy and Billroth II gastrojejunostomy owing to severe inflammation of the duodenum and insecure closure. Both patients have remained well for more than 7 years postoperatively. However, severe complications from diverticulectomy with duodenorrhaphy have been reported, including pancreatitis, sepsis-related complications, biliary tract injury/obstruction, and duodenal fistula [1,5]. Furthermore, the operative mortality rate for perforated duodenal diverticula from 1907 to 1969 was more than 30% [5], even though it was reduced to 13% from 1969 to 1992 [1]. Consequently, a few surgeons have adopted conservative treatment for this disease. Two patients with perforated duodenal diverticulum were successfully treated with conservative therapy alone; both were elderly and had underlying medical problems [3,14]. Recently, another patient who was afebrile, with only mild symptoms, also received conservative treatment and recovered uneventfully [2]. Therefore, conservative therapy for this rare complication may be used as an alternative to laparotomy, especially in elderly or weakened patients.

In our patient, instead of exploring with mobilization of the diverticulum from the retroperitoneum and performing diverticulectomy, we performed only drainage of the abscess to avoid further injury because of the microperforation of this disease and the juxtaampullary location of the diverticulum, as well as the fact that the location of the ampulla of Vater with the distal common bile duct could not be identified with certainty during the operation. We also executed a feeding jejunostomy to ensure early enteric feeding in the postoperative period. Because of the simple operative technique and lack of significant morbidity, we consider that our experience could represent an alternative method of surgical intervention for this disorder, especially in patients with only microperforation.

Herein, we report our clinical experience regarding a case of perforated duodenal diverticulitis who was managed successfully by drainage of an intra-abdominal abscess and by ensuring adequate

enteric feeding via feeding jejunostomy. This operative option may be a useful and simple surgical approach to the management of such cases.

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# 十二指腸憩室炎合併憩室穿孔以腹腔內引流及 空腸造瘻手術治療成功之經驗： 病例報告及文獻回顧

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我們報告了以腹腔內引流及空腸造瘻手術成功治療一位患有十二指腸憩室炎合併憩室穿孔病人之臨床經驗。一位 53 歲男性病患因腹痛及腹脹至本院求診，理學檢查顯示有上腹和右下腹壓痛但缺乏明顯之腹膜炎徵象，腹部電腦斷層攝影顯示高度懷疑十二指腸憩室炎合併憩室穿孔之影像特徵。我們先嘗試給予保守治療，但隨後因為其病況之惡化而安排了手術。術中証實了十二指腸憩室炎合併憩室穿孔的情形，我們針對後腹腔膿瘍施行了引流手術，隨後也做了空腸造瘻手術以確保術後儘早進行腸道灌食，病患術後恢復良好並順利出院。由以上的經驗，我們建議在這些病人接受手術治療時—特別是在保守治療失敗後，相較於過去多數文獻所推薦的十二指腸憩室切除合併十二指腸修補手術，採行較為保守的術式，亦是另外一個可供考慮的選擇。

**關鍵詞：**十二指腸憩室，空腸造瘻，腹腔內引流，穿孔  
(高雄醫誌 2008;24:425-9)

收文日期：96 年 8 月 1 日  
接受刊載：96 年 10 月 15 日  
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