

Mucosal Repair of Posterior Perforation of Duodenal Diverticulitis Using Roux Loop Duodenojejunostomy

Victor T.W. Lee, Alexander Y.F. Chung and Khee-Chee Soo, Department of General Surgery, Singapore General Hospital, Singapore.

Perforation of duodenal diverticulum is a rare occurrence but has a potentially fatal outcome. It is a difficult surgical problem because of delayed diagnosis and the attendant risk of duodenal fistula following primary repair. We present a case of posterior perforation of duodenal diverticulitis, diagnosed on computed tomography and successfully repaired with a Roux loop duodenojejunostomy. We also discuss the rare pathology, diagnosis and surgical options with special reference to this alternative form of mucosal repair. [*Asian J Surg* 2005;28(2):139-41]

Key Words: duodenal diverticulum, mucosal repair, perforation, Roux loop duodenojejunostomy

Introduction

Primary duodenal diverticula are solitary in about 90% of cases, and almost 80% of them occur in the second part of the duodenum, on its inner concavity, close to the ampulla of Vater.¹ They may cause complications of inflammation, haemorrhage or perforation or symptoms from the pancreaticobiliary region. Fewer than 10% of recognized identified duodenal diverticula will become symptomatic, and about 1% will require definitive treatment.² Perforation is one of the most dangerous complications but this is, fortunately, rare.

We report a case of perforated duodenal diverticulitis repaired using a Roux loop duodenojejunostomy. We also discuss its diagnosis and the surgical options.

Case report

A 74-year-old woman presented with sudden-onset epigastric pain of 1-day duration. The pain was constant and progressively worsened with time. There were no symptoms of obstructive jaundice.

The patient was afebrile, with blood pressure of 160/70 mmHg and heart rate of 70/min. Her abdomen was soft but

tender in the right hypochondrium. Chest and abdominal X-rays were unremarkable. Abdominal computed tomography (CT) showed an air-containing mass anterior to the right kidney related to thickened second (D2) and third (D3) parts of the duodenum, suggestive of perforation with abscess formation (Figure 1). Laparotomy revealed posterior perforation of an inflamed duodenal diverticulum at D2. The defect measured 3 cm. An enterolith was found in the diverticulum with evidence of erosion through the wall. Cholecystectomy and intraoperative cholangiography were performed. After refashioning the edges, the defect was closed with a Roux loop duodenojejunostomy.

The surgical approach was through an extended Kocher's incision. The duodenum was Kocherized and the edges of the perforation freshened. A tension-free Roux-en-Y loop of jejunum was brought up in a retrocolic position to the retro-duodenal space. A side-to-side duodenojejunostomy anastomosis was performed over the perforation with full thickness of the bowel wall. This mucosa-to-mucosa repair was effected using interrupted Vicryl® 1/0 sutures starting from the deeper end of the perforation (Figure 2). Omentum was used to drape over the anastomosis. Jejunostomy was performed for alimentary tract continuity about 60 cm distal

Address correspondence and reprint requests to Dr. Alexander Y.F. Chung, Department of General Surgery, Singapore General Hospital, Singapore 169608.

E-mail: gsucyf@sgh.com.sg • Date of acceptance: 21 April 2004



Figure 1. Computed tomography scan showing the air-containing mass that was the result of an enterolith eroding through the posterior duodenal diverticulum with surrounding retroperitoneal inflammation.

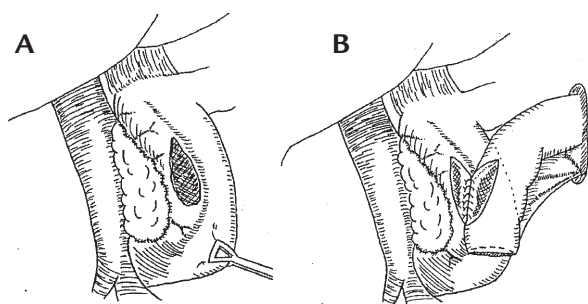


Figure 2. (A) The posterior perforation visualized after Kocherization of the duodenum. (B) The Roux jejunal loop brought up in a retrocolic fashion for side-to-side mucosal repair of the perforation.

to the Roux loop and the mesenteric window was closed.

Gastrograffin study on the 10th day showed no evidence of leakage (Figure 3). The patient was started on feeds and subsequently progressed to a full diet. Gastroscopy assessment was performed at 3 months and revealed a well-healed stoma at the duodenojejunosomy repair.

Discussion

Perforation of a duodenal diverticulum is a difficult problem because of its delayed diagnosis and high rate of postsurgical complications. Posterior perforation into the retroperitoneum occurs in 70% of cases, with inflammation as a common antecedent cause.³ As in most retroperitoneal duodenal injuries, peritoneal irritation is often masked, making clinical diagnosis difficult. There is also a lack of awareness of this entity, which is diagnosed preoperatively in only 8% of operated cases, while a disturbing 14% are missed during surgery.⁴ Fortunately,

because of greater awareness among surgeons today, Duarte et al noted a lower “missed” rate of 2%.³ CT scan has also significantly helped to make preoperative diagnosis possible,⁵ as evidenced by this report.

The mortality rate associated with perforated duodenal diverticulum was high before 1969 (34%).⁴ With improved anaesthetic care and preoperative diagnosis, the rate decreased to 13% by 1992.³ Nevertheless, it is still high and one cannot discount the possibility of bias in reporting as only successfully managed cases have been reported recently.

The surgical options for treating perforated duodenal diverticulum include simple closure after diverticulectomy, with or without gastric diversion such as gastrojejunostomy or tube duodenostomy. Also, in large perforated duodenal diverticula, primary repair can give similar problems to those encountered in a difficult duodenal stump⁶ or traumatic duodenal injuries,⁷ especially when surgery is delayed. In Duarte et al’s review, where most cases were repaired primarily after diverticulectomy, the complication rate was 41%, with 20% duodenal fistulation and 4% intra-abdominal abscess formation.³ Though no explanation was offered for the high rate of postsurgical fistula, one could surmise that in a septic field, primary repair alone was probably not the ideal procedure. A recent series of peri-Vaterian duodenal injuries caused by endoscopic retrograde cholangiopancreatography-related procedures reported delay in diagnosis and surgery, necessitating diversionary procedures with no duodenal fistula.⁸ While diversionary procedures may relieve intraluminal pressure off the repair site, the latter is still subjected to tension and local factors of wound healing.

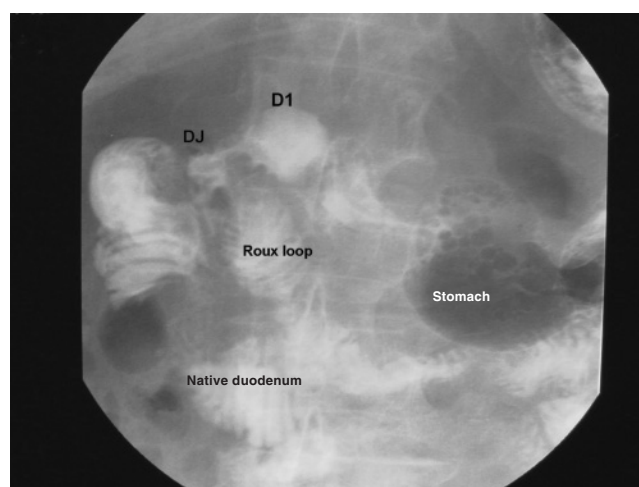


Figure 3. Water-soluble contrast showing the Roux loop draining the C-loop of the duodenum at the duodenojejunosomy (DJ). D1 = first part of duodenum.

A mucosa-to-mucosa Roux loop duodenojejunostomy was performed in this patient. This alternative mucosal repair has not been used for such a scenario, according to the literature. There are several technical advantages to this method of repair. Firstly, the repair was tension free. The defect in the posterior duodenum was patched rather than closed primarily. This was important as the tissues were thickened and indurated, which could result in significant tension if apposed primarily. Secondly, healthy tissues from a new segment of jejunum helped effect healing. Lastly, the Roux loop helped to divert gastrointestinal effluent.

The surgeon must be aware of the location of the papilla and the lie of the common bile duct. As the papilla is usually at the edge of the duodenal diverticulum, suturing of the defect may result in biliary duct injury and injury to the accessory duct of Santorini, which can cause pancreatic fistula or pancreatitis, either of which may be life threatening. Intraoperative cholangiography was used to delineate the biliary duct anatomy in our patient. Alternatively, a long-limb T-tube or probe from a supraduodenal choledochotomy may achieve the same objective of protecting the bile duct.¹

The management of perforated duodenal diverticulum remains a difficult problem. Knowledge of the various methods of duodenal closure will allow greater flexibility in decision making. The technique of mucosa-to-mucosa duo-

denojejunostomy is an additional method that adheres to the principles of surgical repair, potentially resulting in a lower leak rate and improving outcome. However, this technique can be demanding, requiring a slightly longer operating time, and, thus, may not be appropriate in patients who are haemodynamically unstable.

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