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High-Output External Duodenal Fistula: Treatment with Percutaneous Transhepatic Biliary/Duodenal Drainage

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Abstract
Percutaneous transhepatic drainage was successfully performed on a patient with a high-output duodenal fistula as a complication of Billroth II surgery, resulting in closure of the fistula.

Key words: Duodenal fistula—Percutaneous transhepatic biliary drainage—Postoperative fistula—Duodenal stump

External duodenal fistula is a relatively infrequent complication of gastric resection or operations on the biliary tract, duodenum, or pancreas. The associated morbidity is severe. Though medical treatment of enterocutaneous fistulas has improved substantially over the last 25 years, closure of the fistula does not occur in a fair number of patients.

We present a new effective therapeutic modality for a duodenal fistula—percutaneous transhepatic drainage.

Case Report

A 64-year-old man, who was diagnosed 9 years earlier with duodenal ulcers, was admitted with melena in hemorrhagic shock and underwent a Billroth II partial gastrectomy. Penrose drainage was placed in the subhepatic space. The operative diagnosis was perforated posterior bulbar ulcer with active bleeding from the gastroduodenal artery.

Postoperatively the patient maintained an output of 400 ml/day of bilioenteric contents through the surgical drainage. The clinical suspicion was dehiscence of the duodenal stump with enterocutaneous fistula. He was treated with parenteral nutrition, nasogastric suction, and somatostatin for 5 weeks which resulted in reduction of fistula output to 250 ml/day, but no closure. An endoscopically placed nasogastric tube in the second portion of the duodenum was also ineffective. A computed tomography (CT) scan (Fig. 1) showed extravasation of orally administered contrast from the duodenal stump and an abdominal wall abscess. The patient also developed hepatotoxicity from parenteral nutrition.

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Technique

Surgical reexploration confirmed persistence of the duodenal fistula, but the stump leak was not able to be repaired. We then attempted percutaneous drainage through a transhepatic route. After multiple transhepatic punctures with a skinny needle the nondilated intrahepatic biliary tree was entered and opacified (Fig. 2); a new entry into an appropriate right intrahepatic duct was made and a 0.018-inch nitinol guidewire (Microvena, Inc., Minneapolis, MN, USA) was passed into the bile duct. After coaxial tract dilatation, a 0.035-inch stiff type Radiofocus wire (Terumo, Inc., Tokyo, Japan) could be advanced through the common bile duct into the duodenum. A 7 Fr internal-external loop drainage catheter (Cope loop; Cook, Inc., Bloomington, IN, USA) was placed with the tip of the catheter in the second duodenal portion at a distance of 2 cm from the surgical stump (Fig. 3). The catheter was left to gravity drainage.

During the first week the transhepatic drainage catheter showed an output of 400 ml/day, whereas the output of the surgical drainage diminished progressively until the 10th day when it ceased and the fistula was considered closed. Parenteral nutrition was suspended and enteral feeding was tolerated 3 weeks later, when the transhepatic catheter was removed. The patient was discharged 2 months after the procedure and seen as an outpatient 8 months later when he was found to be without symptoms.

Discussion

External duodenal fistula is a relatively infrequent pathology secondary to inadequate closure of the duodenal stump. Afferent loop obstruction favors its development. Its reported incidence following gastric resection is approximately 3% [1]. In the last decades there has been a reduction in morbidity and mortality as a result of improved surgical care and adequate nutritional support [2].

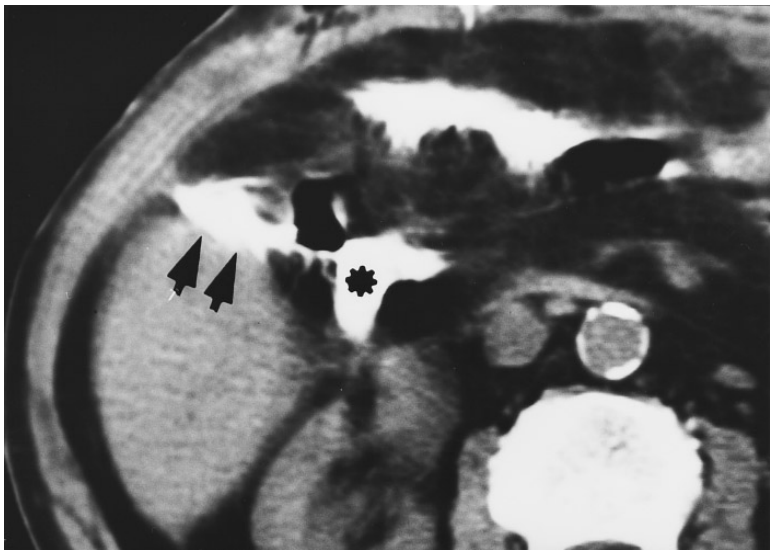

Fig. 1. Computed tomography showing oral contrast extravasation (arrows) into the perihepatic space from the duodenal stump (asterisk).

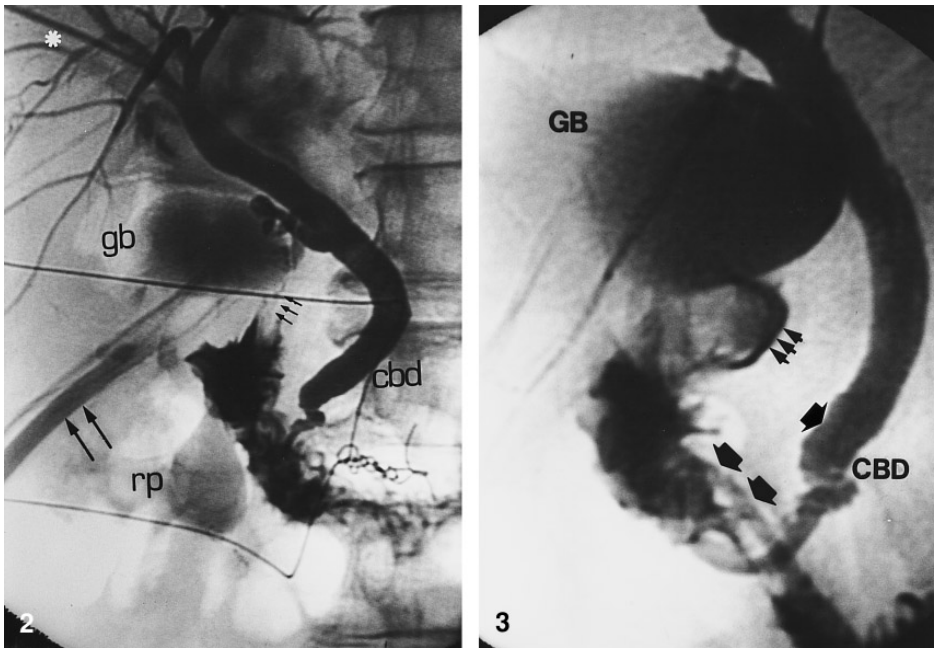

Fig. 2. Percutaneous transhepatic cholangiography showing fistulous tract (small arrows) arising from the duodenal stump. Contrast opacification of the surgical drain (large arrows). * = introducer sheath; gb = gallbladder; cbd = common bile duct; rp = renal pelvis.

Fig. 3. Placement of pigtail catheter by transhepatic route into the second part of duodenum. Small arrows = fistulous tract; large arrows = catheter; gb = gallbladder; cbd = common bile duct.

The principle of conservative treatment consists of reduction of volume and enzyme content of secretions from the fistula and appropriate nutritional support [3]. On this basis, some authors have confirmed that the time needed to reduce fistula output and to achieve its closure was significantly shorter in patients treated with parenteral nutrition and an enzyme inhibitor, somatostatin [4]. Still, among larger series, only 24%–61% [5, 6] achieve spontaneous closure of the fistula, with a mortality rate of 7%–30% [7]. The high mortality rate is related to the multiple predominantly infectious complications. Garden et al. [8] reported 18 patients with external duodenal fistula, 11 of whom developed an intraabdominal abscess, the most frequent complication; only one patient had no complications during the hospitalization. Other authors [8, 9] consider 4–6 weeks of adequate conservative treatment without spontaneous closure or substantial decrease in the fistula output, an indication for definitive surgical closure.

In our case, only a reduction of fistula output was achieved in the course of 5 weeks of medical treatment and complications developed in the form of hepatotoxicity related to parenteral nutrition and an abdominal wall abscess which required percutaneous

drainage. Subsequent surgical closure of the stump leak failed.

The indications for definitive surgical closure of the fistula are well established [10]. Most large series [2, 7, 11] report 62%–71% surgical reinterventions. More recently, Garden et al. [8] reported only 8%, with 92% spontaneous closures of fistula due to appropriate nutritional support and prompt control of sepsis.

One problem associated with surgery is the likelihood of fistula recurrence. According to Rossi et al. [1], surgery was performed in about half of 18 cases. Six of these patients required surgical reinterventions; in only three of these was closure of fistula achieved.

In the last few years, several authors [12, 13] have been able to seal modest-output fistulas through percutaneous introduction of different substances (fibrin tissue sealant and prolamine) into the fistulous tract. Our case dealt with a high-output fistula. Given the seriousness of the patient's clinical state, it was decided to place a percutaneous bilioenteric drainage catheter in an attempt to reduce the volume of the secretions in the duodenal stump. The insertion of a transhepatic drainage catheter in this type of pathology presents some difficulty related to the nondilated intrahepatic bile ducts. The placement of a drainage catheter into the descending duodenum drains bile, intestinal, and pancreatic secretions that accumulate in the duodenal stump. The risk of infectious complications due to retrograde drainage of intestinal contents through the biliary tract is considered minimal once afferent loop syndrome has been ruled out.

In summary, treatment of an external duodenal fistula should include the reduction of enzyme secretion. Percutaneous biliary drainage can result in an effective treatment of this pathology.

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