

Percutaneous Placement of Pancreatico-biliary Drainage Catheter for the Treatment of Complicated Pancreatic Anastomotic Leakage: an Alternative Treatment Option

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Abstract A 58-year-old female patient who had anastomotic leakage after a Whipple operation was treated with a percutaneously placed pancreatico-biliary drainage catheter. Complete secondary healing of the anastomotic defect and leakage was seen on control cholangiography examination on the 35th postoperative day, and the pancreatico-biliary drainage catheter was removed. She was discharged on the 39th postoperative day uneventfully. Percutaneous pancreatico-biliary drainage should be kept in mind as an alternative treatment option of complicated pancreatic anastomotic leakage after a Whipple operation.

Keywords Pancreatic anastomotic leakage · Percutaneous · Drainage · Whipple · Pancreatic duct

Introduction

The treatment of malignant diseases of the periampullary region is pancreaticoduodenectomy (PD). The major complications of PD are pancreatic anastomotic leakage (PAL), fistulas, bleeding, infections, and trouble with the stomach emptying itself after meals. PAL is the most important technique-related complication after PD. PAL is among the most common causes of perioperative morbidity and mortality; it can cause intraabdominal abscesses, hemorrhage, and sepsis. PAL's

treatment options include conservative or invasive treatments [1–3]. Conservative treatment includes parenteral nutrition, liquid electrolyte replacement, nasogastric drainage, and appropriate antibiotic treatment. If the patients have no fever, no tachycardia, no leukocytosis, no serious wound infection, and peritonitis findings, conservative observation can be continued. The other patients need invasive treatments such as wide peripancreatic drainage, bleeding control, controls of the suture region, breaking down the pancreatic anastomosis without a new enteral anastomosis, and complementary pancreatectomy [4, 5]. Here, we describe an alternative modified percutaneous treatment option for PAL.

Case Report

A 58-year-old female patient underwent a Whipple operation due to an ampulla of Vater tumor. A bilious discharge from the pelvic drainage catheter and the incision occurred on the seventh postoperative day. Diagnostic cholangiography through the preoperatively placed biliary drainage catheter showed pancreatic anastomotic leakage. Because of increasing bilious discharge from the drainage catheter (310 cm³ per day), pancreatic liquid drainage from the incision, and high leukocyte (29,600 K/ μ L) and C-reactive protein (135.1 mg/L) levels, conservative treatment was stopped, and we decided to perform percutaneous treatment. An informed consent was obtained from the patient and family members.

Novel Technique of Percutaneous Treatment Option for the Pancreatic Anastomotic Leakage

Under standard sterile conditions, with the patient under local anesthesia and intravenous sedation, we inserted a 0.035-in. hydrophilic guide wire into the biliary tree and the available

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catheter was removed over the wire. Then, we placed a 7-French (F) vascular sheath into the right main bile duct. We point out the orifice of the pancreatic duct with the aim of perioperatively placing a 4-F feeding tube into the pancreatic duct. Then, we select the pancreatic duct with a 5-F shepherd-hook catheter (Terumo®-Europe, Leuven, Belgium) and a 0.035-in. hydrophilic guide wire (Terumo®-Radifocus) (Fig. 1a, b). After selection of the pancreatic duct, the 5-F shepherd-hook catheter was removed and a 5-F vertebral catheter introduced into the distal part of the pancreatic duct to get safer access. Then, a 0.035-in. exchange hydrophilic guide wire was introduced into the pancreatic duct and the 5-F vertebral catheter and 7-F vascular sheath were removed. We placed an 8-F internal-external biliary drainage catheter over the exchange hydrophilic guide wire with its plastic stiffener. We did not lock the catheter but just sutured it to the skin and left it to drain freely. The control abdominal CT on the 16th postoperative day showed 7×3 -cm abscess formation extending from the pancreatico-duodenal anastomosis side to the anterior perihepatic region. We placed percutaneously another 10-F drainage catheter for draining of the abscess.

The leukocyte and C-reactive protein levels dropped to normal levels. The patient had no fever and no jaundice. The control cholangiography and abdominal CT examinations showed complete healing of the leakage and abscess area. We removed the pancreatico-biliary drainage catheter from the pancreatic duct and the other catheter for the abscess area on the 35th postoperative day. Upon healing, the patient was

discharged on the 39th postoperative day. The patient had follow-up control CT examinations and laboratory tests in the first, sixth, and 12th months and the year after. All findings were within normal limits. Today, she has no complaints and uneventfully followed up at the 36th month.

Discussion

PAL is the most important technique-related complication after PD. Leakage after PD significantly contributes to the development of other major abdominal complications and is among the most common causes of perioperative morbidity and mortality, along with patient-related co-morbidities [1]. The treatment of PAL shows correlation with the patient's clinical status. Successful results can be obtained in more than 85–90 % of the patients with conservative treatment. Conservative treatment can be used for patients whose general state is good and who have no abscess. Conservative treatment includes the patient's clinical evaluation by short intervals. If the patients have no fever, no tachycardia, no leukocytosis, and no serious wound infection and peritonitis findings, conservative observation can be continued. Conservative treatment includes parenteral nutrition, liquid electrolyte replacement, nasogastric drainage, and appropriate antibiotic treatment. The other patients need invasive treatment, including wide peripancreatic drainage, bleeding control, controls of the suture region, breaking down the pancreatic anastomosis without a new enteral anastomosis, and complementary pancreatectomy [4, 5]. These secondary surgical procedures increase the patients' mortality and morbidity. Percutaneous placement of a pancreatico-biliary drainage catheter may be an alternative minimally invasive treatment option for these patients. The most important questions about this procedure are as follows: (1) how to find and select the pancreatic duct with guide wires, (2) the presence of the feeding tube can cause difficulty during the placement of the drainage catheter, (3) when we do this procedure, and (4) do all patients benefit from this procedure. The placement of a feeding tube, which

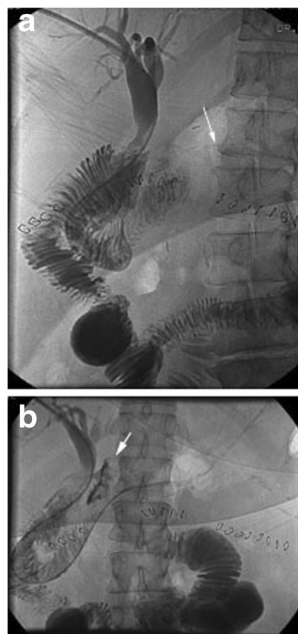


Fig. 1 a, b Selection of the pancreatic duct with 5-F catheters. a A 5-F shepherd-hook catheter was placed into the selected orifice. b A 5-F vertebral catheter was advanced into the pancreatic duct over the 0.035-in. hydrophilic guide wire. The white arrow indicates anastomotic leakage

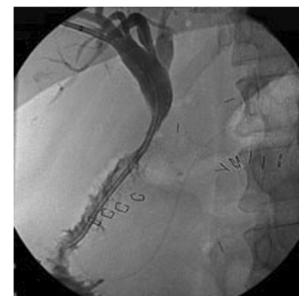


Fig. 2 The postoperative cholangiography image through the preoperatively placed biliary drainage catheter. The 4-F feeding tube which lies between the pancreatic duct and duodenum

has a metallic marker on its wall, is a routine procedure at our institution. It lies from the distal portion of the pancreatic duct to the duodenum. The pancreatico-duodenal anastomosis is made over this tube. The metallic marker of the tube can easily be seen with fluoroscopy (Fig. 2). It points the origin of the proximal pancreatic duct, and the interventional radiologist can easily select this orifice with a different catheter and guide wire maneuvers. We did not need to remove the feeding tube before catheter placement. The 8-F drainage catheter was easily introduced over the guide wire. If the existing drainage catheters which were placed intra-operatively work adequately, this minimally invasive procedure may be postponed depending on the patient's clinical and laboratory findings. In our patient, there was bilious discharge from the incision despite the drainage catheter in place and it drains 310 cm³ per day; the patient had high leukocyte (29,600 K/ μ L) and C-reactive protein (135.1 mg/L) levels. So we decided to place a pancreatico-biliary drainage catheter to treat the PAL. Another important concern about this procedure is "can all patients benefit from this procedure." Absolutely not; we think and believe that clinical success with this procedure mainly depends on the status of the anastomosis. Namely, in another female patient who underwent a Whipple operation and anastomotic leakage from the choledochoduodenostomy and pancreaticoduodenostomy anastomoses, we performed the same procedure. But it was not effectively worked because there was nearly total breakdown of the choledochoduodenostomy anastomosis, and the patient underwent a secondary surgery.

In conclusion, when the conservative approach is not the treatment of choice, percutaneous pancreatico-biliary drainage catheter placement could be an alternative treatment option for invasive surgical treatment in selected patients. It will reduce the mortality and morbidity due to the secondary surgery.

Compliance with Ethical Standards An informed consent was obtained from the patient and family members.

Conflict of Interest The authors declare that they have no conflicts of interest.

Statement of Human and Animal Rights All procedures involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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