Retrograde Percutaneous Transjejunal Creation of Biliary Neoanastomoses in Patients with Complete Hepaticojejunostomy Dehiscence

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ABSTRACT

A technique of percutaneous hepaticojejunostomy (PHJ) was developed to allow creation of a neoanastomosis in cases of hepaticojejunostomy (HJ) dehiscence when endoscopic intervention is unfeasible as a result of postsurgical anatomy. PHJ involves transhepatic biliary catheterization and transjejunal retrograde enterotomy. A rendezvous establishes the communication between the bile ducts and the jejunum. PHJ was performed in five patients, and neoanastomosis creation without residual biliary leak was achieved in all cases, with no procedure-related complications. Bilirubin levels and white blood cell counts quickly decreased after PHJ (median, 1 d; range, 1–4 d). Median survival after PHJ was 210 days (range, 45–540 d).

ABBREVIATIONS

HJ = hepaticojejunostomy, PBD = percutaneous biliary drain, PHJ = percutaneous hepaticojejunostomy, PTBD = percutaneous transhepatic biliary drainage, PTJBI = percutaneous transjejunal biliary intervention

Reported incidences of hepaticojejunostomy (HJ) dehiscence range between 3% and 8% after pancreatic resection and between 0.4% and 12% following hepatobiliary surgery (1,2). Bile leakage is a major cause of postoperative morbidity (3). Percutaneous transhepatic biliary drainage (PTBD) can divert away the bile flow and facilitate leakage healing (1,2). Endoscopy and rendezvous techniques can be performed when a small anastomotic defect is present, but repeat intervention is generally needed in patients with complete HJ dehiscence (4). Endoscopic intervention can be technically unfeasible in patients with altered anatomy after surgery, as endoscopy may fail to traverse the afferent loop and reach the HJ. Percutaneous transjejunal biliary intervention (PTJBI) techniques have been proposed for the treatment of benign biliary diseases in patients with Roux-en-Y HJs (5–7). The purpose of the present study is to describe a novel percutaneous hepaticojejunostomy (PHJ) technique that allows creation of a neoanastomosis in patients with HJ dehiscence and biliary leak when percutaneous intervention has been unsuccessful and endoscopy is technically impossible.

MATERIALS AND METHODS

Institutional review board approval was not required for this study. PHJ was performed in five nonconsecutive patients over a 10-year period. Inclusion criteria were presence of complete HJ dehiscence with biliary leak following pancreatic or hepatobiliary surgery, unsuccessful conventional percutaneous transhepatic biliary intervention, and technical unfeasibility of radiologic/endoscopic rendezvous. Clinical signs of HJ dehiscence (eg, bilious-looking drainage from surgical drains, abdominal pain, fever, presence of bilomas) developed within a median of 10 days after surgery (range, 7–167 d). Demographic, clinical, and radiologic features of patients are reported in **Table 1**. Complete HJ dehiscence was diagnosed with fistulography: contrast medium leaks from the HJ without opacification of the afferent loop were found in all patients (**Fig 1a**). According to previous reports (1,2), all

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Table 1. Demographic and Clinical Data and Imaging Findings

Pt. No./Sex/ Age (y)*	Disease	Surgery	Clinical Findings	Imaging Findings
1/F/68	Hilar CCC (Bismuth IIIb)	Left hepatectomy, caudate lobe resection, biliary confluence resection	Fever, abdominal pain, biliary output 50 mL/d	Biloma (76 × 30 mm)
2/F/60	PDAC	Pancreaticoduodenectomy	Biliary output 50 mL/d	Biloma (30 × 30 mm)
3/F/65	Hilar CCC (Bismuth IIIb)	Left hepatectomy, caudate lobe resection, biliary confluence resection	Fever, abdominal pain, biliary output 50 mL/d	Biloma (110 × 65 mm)
4/F/60	Gallbladder carcinoma	Pancreaticoduodenectomy, hepatic resection (segments 4b, 5, and 6)	Fever, biliocutaneous fistula	Biloma (60 × 40 mm), intrahepatic bile duct dilation
5/M/66	Hilar CCC (Bismuth IIIb)	Left hepatectomy, caudate lobe resection, biliary confluence resection	Fever, abdominal pain, biliary output 50 mL/d	Biloma (50 × 35 mm)

CCC = cholangiocarcinoma; PDAC = pancreatic ductal adenocarcinoma.
*Median age, 65 y.

patients were initially treated with PTBD (8-F Ring Ultrathane biliary duct drainage catheter; Cook, Bloomington, Indiana). Contrast medium passage into the afferent loop was never observed during percutaneous transhepatic cholangiography (PTC; Fig 1b); therefore, the tip and side holes of the biliary drainage catheter were placed within a bilioma (n = 4) or the tract of a biliocutaneous fistula (n = 1) with the goal of draining the fluid collection and promoting fistula healing through the diversion of bile flow. A radiologic/endoscopic rendezvous treatment was attempted in all patients the day after PTBD, but endoscopy was technically unfeasible because the HJ could not be reached; a nasoenteric tube was placed into the afferent loop during endoscopy in one patient. Patients were then referred to undergo PHJ; the median time between PTBD and PHJ was 5 days (range 4–8 d).

PHJ Technique Description

Patients received intravenous prophylactic ceftriaxone immediately before PHJ. All procedures were performed under conscious sedation (intravenous midazolam hydrochloride and fentanyl citrate); no specific bowel preparation was performed.

Previous imaging examinations were reviewed before PHJ to identify the afferent loop and anatomic or postsurgical landmarks (eg, surgical clips) that could facilitate the procedure. Positive hydrosoluble contrast medium (meglumine amidotrizoate/sodium amidotrizoate; Gastrografin; Bayer Schering, Leverkusen, Germany) was administered per os (n = 4) or through a nasoenteric tube (n = 1) to opacify the afferent loop. Anteroposterior, lateral, and oblique fluoroscopy was used to identify the most suitable entry site to the afferent loop that would permit PHJ to be performed via the shortest distance from the skin to the bile ducts. After identification of the proper entry point, sterile preparation of the abdominal wall was performed and local anesthesia (10 mL lidocaine 1%) was administered.

The afferent loop was punctured percutaneously under fluoroscopic guidance by using a 16-gauge two-piece needle. A small amount of iodine contrast medium mixed with air was injected through the outer cannula of the needle to confirm proper intraluminal positioning. The bowel lumen was probed with a hydrophilic wire (0.035-inch Radifocus Guide Wire M; Terumo, Tokyo, Japan), and an 8-F, 25-cm-long sheath (Radifocus Introducer II; Terumo) was placed over the wire inside the jejunum. The wire was placed in a distal position into the jejunal loop during the whole procedure (Fig 2a).

A 8-F, 25-cm-long sheath (Radifocus Introducer II; Terumo) was placed via the transhepatic biliary access, and a small amount of contrast medium was injected to identify the common bile duct. The trocar stylet of a transjugular liver access set (0.038-inch Rosch–Uchida transjugular liver access set; Cook) was inserted through a 5-F straight catheter. The stylet and catheter assembly was introduced via the jejunal sheath. The jejunal sheath was oriented toward the bile ducts and wedged against the jejunal wall. After verifying the position of the common bile duct in different projections, the stylet and catheter assembly was thrust forward through the jejunal wall, toward the common bile duct (Fig 2b). The stylet was removed from the catheter, and a syringe with contrast medium was connected to the catheter hub. While suction was applied, the catheter was gradually withdrawn until bile was freely aspirated. The tip of the catheter was then positioned in the common bile duct. Proper positioning of the catheter was indicated by aspiration of bile; a small amount of contrast medium was then injected to confirm the position of the catheter.

A hydrophilic wire was advanced through the 5-F catheter into the bile ducts. With the wire in a distal