The American Journal of Surgery (2013) 206, 578-585

The American Journal of Surgery®

Clinical Science

The difficult hepaticojejunostomy after pancreatic head resection: reconstruction with a T tube

Torsten Herzog, M.D.[a], Orlin Belyaev, M.D.[a], Philipp Bakowski[a], Ansgar M. Chromik, M.D.[a], Monika Janot, M.D.[a], Dominique Suelberg, M.D.[a], Waldemar Uhl, M.D.[a,*], Matthias H. Seelig, M.D.[b]

[a]*Department of Surgery, St. Josef Hospital Bochum, University Hospital, Gudrunstr. 56, D-44791 Bochum, Germany;* [b]*Department of General-, Visceral-, Thoracic- and Vascular Surgery, Clinics of the Main Taunus-District, Bad Soden, Germany*

KEYWORDS:
Hepaticojejunostomy;
Bile leak;
Pancreatic surgery;
T tube

Abstract

BACKGROUND: After pancreatic head resection, bile leaks from a difficult hepaticojejunostomy secondary to a small or fragile common hepatic duct may be reduced by a T tube at the side of the anastomosis.

METHODS: A retrospective analysis of patients who underwent a difficult hepaticojejunostomy without or with a T tube was performed.

RESULTS: In 48% (55/114) of patients, a T tube was placed at the side of the hepaticojejunostomy; 52% (59/114) did not have a T tube. Bile leaks occurred in 12% (14/114) (9% [5/55] in patients with a T tube vs 15% [9/59] without a T tube, $P = .316$). Bile leaks were associated with mortality, abscess formation, hemorrhage, and sepsis. Seven percent (8/114) of patients required revisional laparotomy (2% [1/55] with a T tube vs 12% [7/59] without a T tube, $P = .036$). Mortality was not different between the groups. Minor T-tube–associated complications occurred in 15% (8/55) without major complications.

CONCLUSIONS: Augmentation of anastomosis with a T tube cannot prevent biliary leakage but does reduce the severity of bile leaks, resulting in less reoperations.

The risk of bile leaks after pancreatic head resection varies between 2% and 12%.[1,2] Although a bile leak is a rare surgical complication, it is associated with postoperative morbidity and mortality, even in specialized units.[3,4]

Most trials analyzing postoperative morbidity and mortality after pancreatic surgery focus on pancreatic leakage, whereas studies analyzing postoperative bile leaks are scarce. During the last 2 decades, improvements in surgical technique and intensive care management reduced morbidity and mortality from pancreatic fistula after pancreatic head resection.[5,6] Furthermore, a uniform definition and severity grading of pancreatic fistula enabled a comparison of different clinical trials, facilitating diagnostic and treatment modalities.[7] A comparable definition and scoring system for the severity of postoperative bile leaks was proposed recently but is not available yet.[8]

Today, physicians should avoid preoperative biliary drainage in patients with obstructive jaundice because bile duct stenting is associated with an increased risk for postoperative infectious complications.[9] However, many patients with pancreatic carcinoma still undergo preoperative

The authors declare no conflicts of interest.

* Corresponding author. Tel.: +49-234-509-2210; fax: +49-234-509-2209.

E-mail address: w.uhl@klinikum-bochum.de

Manuscript received October 7, 2012; revised manuscript January 11, 2013

0002-9610/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.amjsurg.2013.01.044

biliary drainage, which leads to bile duct dilation and thickening of the bile duct wall.[10] In these patients, suturing the hepaticojejunostomy is technically easy, whereas it is difficult in patients with a small common hepatic duct diameter or a thin and fragile common hepatic duct wall (eg, in chronic pancreatitis or tumors of the uncinate process or benign periampullary lesions).[11,12] These patients often have a small common hepatic duct diameter with a thin common hepatic duct wall, resulting in a difficult hepaticojejunostomy with an increased risk for postoperative bile leaks.[13,14]

Although the routine use of T-tube drainage after liver transplantation remains controversial, the placement of transanastomotic biliary drainages is a well-accepted technique for a difficult hepaticojejunostomy after bile duct injuries or benign bile duct strictures.[15–19] Thus, a temporary biliary diversion with a T tube that is brought out through the anastomotic site for patients with a difficult hepaticojejunostomy after pancreatic head resection may help to reduce the risk of postoperative bile leaks.

The goal of this study was to describe the frequency of bile leaks from the hepaticojejunostomy in patients with a difficult hepaticojejunostomy after pancreatic head resection at a specialized pancreatic center and to analyze the safety and efficacy of placement of a T tube at the side of the hepaticojejunostomy.

Methods

The study was an observational cohort design. All patients who underwent pancreatic surgery at the Department of Surgery, St. Josef Hospital, Ruhr University Bochum, Germany, were entered into a prospectively collected database. Charts and operation protocols of all patients who underwent pancreatic head resection or total pancreatectomy for both benign and malignant periampullary lesions were analyzed for study purposes.

Reconstruction was performed by a standardized end-to-side pancreaticojejunostomy using absorbable and nonabsorbable double-layer interrupted sutures without placement of pancreatic duct stents. End-to-side hepaticojejunostomy was performed 1 cm distal to the common hepatic duct bifurcation 10 to 20 cm distal from the pancreaticojejunostomy using the same jejunal loop with a single-layer suture with 7 interrupted absorbable sutures with polydioxanone 6/0 for each wall of the anastomosis. Hepaticojejunostomies were performed by 3 different attending surgeons with experience of more than 30 bilioenteric anastomoses in the study period.

Criteria for the presence of a difficult hepaticojejunostomy were a small common hepatic duct diameter (<5 mm) or a fragile common hepatic duct wall, as documented in the operation protocol or on preoperative magnetic resonance cholangiopancreatography imaging. A fragile common hepatic duct was defined as a thin common hepatic duct wall that was sutured with polydioxanone 6/0 sutures to avoid a breakdown of the wall of the common hepatic duct. During the 1st part of the study (January 2004 to September 2007), reconstruction among patients with a difficult hepaticojejunostomy was performed without a T tube. During the 2nd part of the study (October 2007 to February 2009), reconstruction included the placement of a T tube that was brought out through the site of the anastomosis. One part of the horizontal limb of the T tube was placed into the common hepatic duct; the other part was placed into the jejunal loop, whereas the vertical part of the drain was brought out through the abdominal wall. T tubes were controlled for leakage between the 5th and the 7th postoperative day by the application of water-soluble contrast medium (Gastrografin; Firma Bayer, Leverkusen, Germany). Patients did not receive antibiotics before T-tube cholangiograms. T tubes were routinely removed 6 to 8 weeks postoperatively.

All patients had 2 flat silicon drainages placed at the side of the hepaticojejunostomy and the pancreaticojejunostomy. A bile leak was defined as a bilirubin concentration in the drainage fluid 3 times above the serum bilirubin concentration starting at the 1st postoperative day or as the need for radiologic or operative intervention secondary to biliary collections or biliary peritonitis. No transhepatic drainages were used for the management of postoperative bile leaks. The severity of biliary leakage was classified according to the International Study Group of Liver Surgery.[8] A bile leak without clinical symptoms with a mildly impaired clinical condition resolving without active therapeutic intervention within 1 week was classified as a grade A fistula. The presence of a grade A fistula did not result in a strategy change on postoperative management. A bile leak that required active therapeutic intervention secondary to an impaired clinical condition with signs of infection on imaging or laboratory results was classified as a grade B fistula. Patients with a grade B fistula underwent active therapeutic intervention including interventional drainage and antibiotic therapy but no operative revision. A bile leak that severely impaired patients' clinical condition, including signs of sepsis, single- or multiple-organ failure, or the presence of biliary peritonitis, was classified as a grade C bile leak. Patients with grade C bile leaks underwent relaparotomy.[8]

A postoperative pancreatic leak was defined as a drain fluid amylase level 3 times above serum concentration on the 3rd postoperative day according to the International Study Group on Pancreatic Fistula definitions.[7] Intra-abdominal abscess formation was defined as a localized infection, which required percutaneous drainage or reoperation. Cholangitis was defined as a fever with right upper quadrant pain and elevated liver enzymes or bilirubin in the absence of other infectious complications according to the Tokyo guidelines.[20] Patients with cholangitis after T-tube removal were also included. Wound infection was defined as a positive culture collection that prolonged hospital stay or required secondary wound suturing or refashioning. Delayed gastric emptying was defined as the inability for oral food intake 14 days after surgery. Mortality was defined as death during hospital stay. The study was approved by the local review board.