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Hepatic ductoplasty for iatrogenic Bismuth type 2 bile duct stricture: A case report

Hiroataka Okamoto^{a,b,*}, Kazunori Takahashi^{a,b}, Hiroyuki Wakana^{a,b}, Kenji Kawashima^a, Daisuke Ichikawa^b, Hideki Fujii^b

^a Department of Surgery, Tsuru Municipal Hospital, Japan

^b Department of Gastrointestinal, Breast & Endocrine Surgery, Faculty of Medicine, University of Yamanashi, Japan

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ABSTRACT

INTRODUCTION: Biliary enteric anastomosis is a well-known biliary reconstruction method. Anastomosis stricture is one of the complications of this procedure that occurs in some patients over the long-term. We report a successful case of hepatic ductoplasty combined with hepaticojejunostomy (H-J) for the treatment of iatrogenic Bismuth type 2 stricture.

PRESENTATION OF CASE: The patient was a 68-year-old woman who had undergone choledochojejunostomy (C-J) 6 years earlier due to bile duct injury after laparoscopic cholecystectomy for cholelithiasis. She complained of recurrent chills and upper back pain. Cholangiography and computed tomography revealed a C-J anastomotic stricture with hepatolithiasis. The diagnosis was reflux cholangitis with hepatolithiasis due to C-J stricture and a fistula between the reconstructed jejunal limb and duodenum. Exploration was performed, and she underwent hepatic ductoplasty with H-J and hepaticolithotripsy. Surgery was performed uneventfully and the patient has remained well subsequently.

DISCUSSION AND CONCLUSION: We propose hepatic ductoplasty as a useful technique for the treatment of selected patients with a C-J stricture or narrow hepatic duct.

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1. Introduction

Cholecystectomy (open or laparoscopic) is the most frequent abdominal operation and one of the most common causes of biliary tract injury. The incidence of biliary tract injury is documented to be 0% to 0.5% with open cholecystectomy, while it increases to between 0.07% and 0.95% with laparoscopic procedures [1,2].

Choledochojejunostomy or hepaticojejunostomy with a Roux-en-Y (R-Y) limb are well known conventional biliary reconstruction methods for management of bile duct injury [3]. However, these procedures are also associated with some complications, including anastomotic stricture, which sometimes leads to reflux ascending cholangitis and stone recurrence. In such cases, interventional therapy like percutaneous trans-hepatic biliary drainage (PTBD) and endoscopic therapy like endoscopic retrograde sphincterotomy (EST) or balloon dilatation may be indicated, but use of such methods may be impossible because of the long efferent limb of the reconstructed jejunum.

Bismuth classified bile duct strictures according to their anatomical level [4]. In the laparoscopic era, another classification of biliary injury was proposed by Strasberg [5]. Both classifications

are useful for assessment of bile duct injury and/or stricture. Choledochojejunostomy (C-J) or hepaticojejunostomy (H-J) used to be employed for treatment of these difficult strictures, but hepatic ductoplasty is a useful method in patients with hilar hepatic duct stricture [6,7].

Here we report a patient in whom hepatic ductoplasty was effective for iatrogenic Bismuth type 2 anastomotic stricture. The work has been reported in line with the SCARE criteria [13].

2. Case report

The patient was a 68-year-old woman who underwent laparoscopic cholecystectomy for chronic cholecystitis with gallbladder stones and suffered intraoperative bile duct injury requiring diversion of the common bile duct (Strasberg E2) about 6 years ago at another hospital. Conversion to open laparotomy and choledochooduodenostomy (C-D) were performed at that time. Two-weeks later, she was found to have leakage of the C-D anastomosis and underwent re-operation with C-J. Subsequently, a biliary-cutaneous fistula persisted for two years and eventually healed with conservative treatment. Three years after healing of the fistula, the patient presented to our hospital with back pain and high fever. On examination, there was tenderness in the right subcostal region without muscle guarding.

* Corresponding author at: 5-1-55 Tsuru, Tsuru-city, Yamanashi 4020056, Japan.
E-mail address: hirotaka@yamanashi.ac.jp (O. Hiroataka).

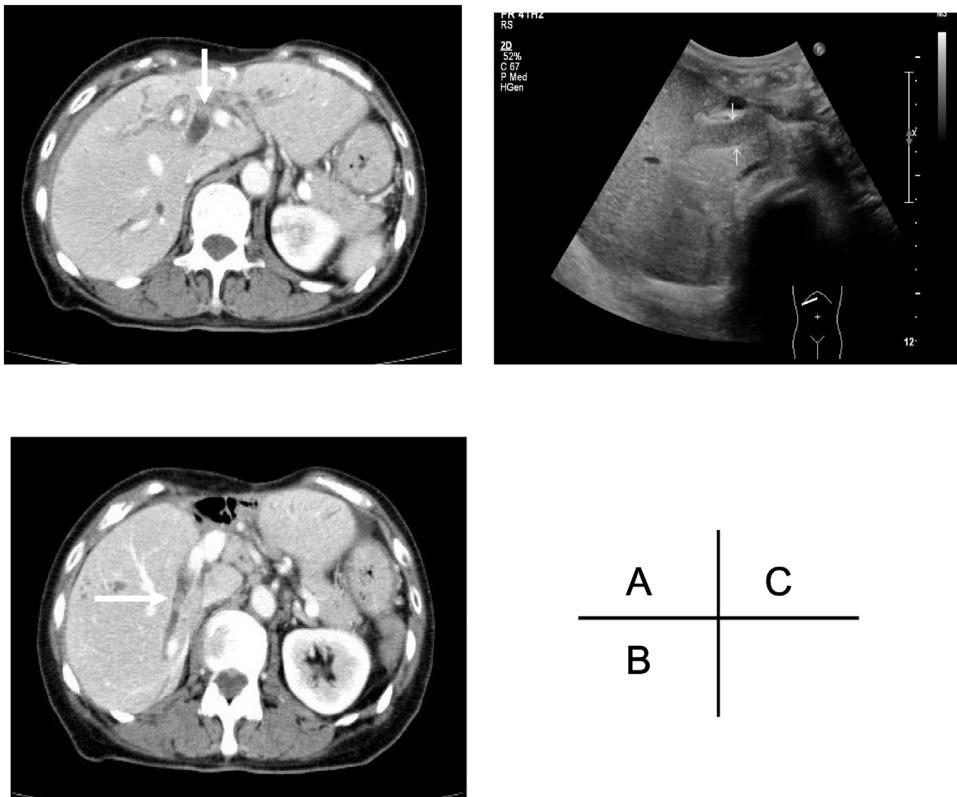


Fig. 1. CT shows a dilated left intra-hepatic duct containing a stone or debris (A, white arrow), and a dilated right intra-hepatic duct with a stone or debris (B, white arrow). US displays a right intra-hepatic duct filled with debris (C, thin arrows).

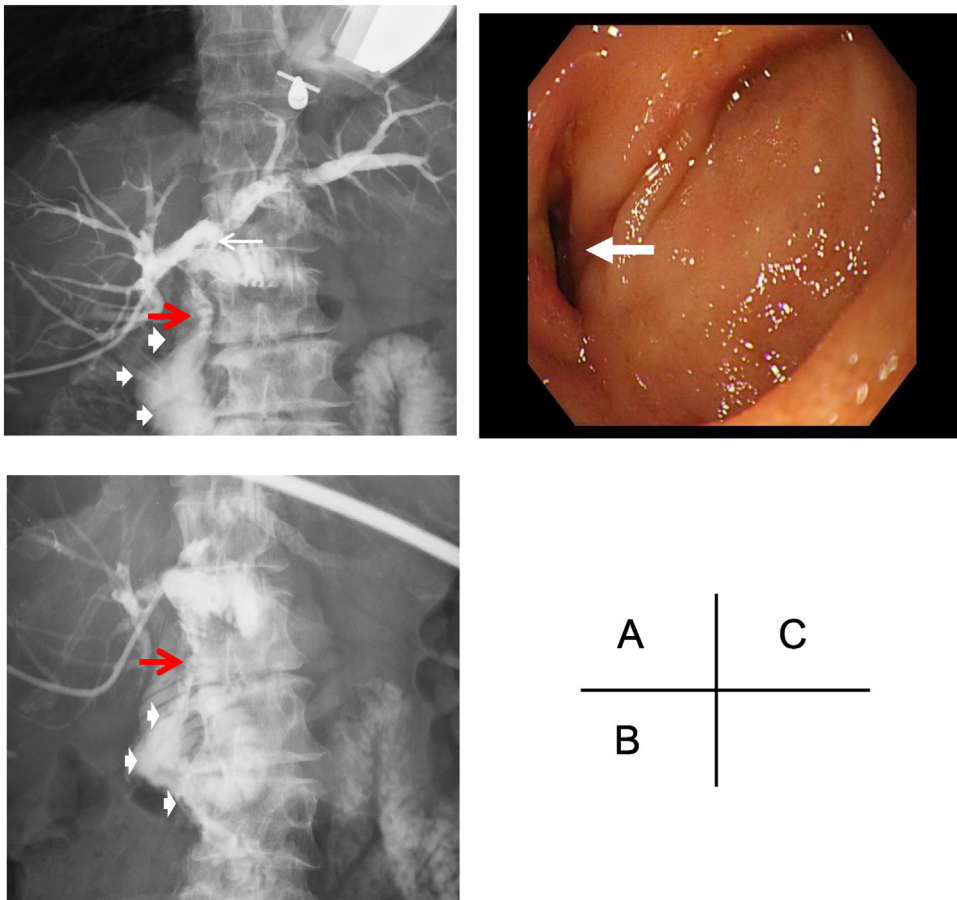


Fig. 2. Cholangiography shows stricture of the hepaticojejunostomy anastomosis (A, long arrow). There is a fistula from the jejunal limb to the duodenum (A, B, red arrow) at the right duodenal wall (A, B, short arrow). Duodenal endoscopy reveals the duodeno-jejunal fistula (C, arrow).

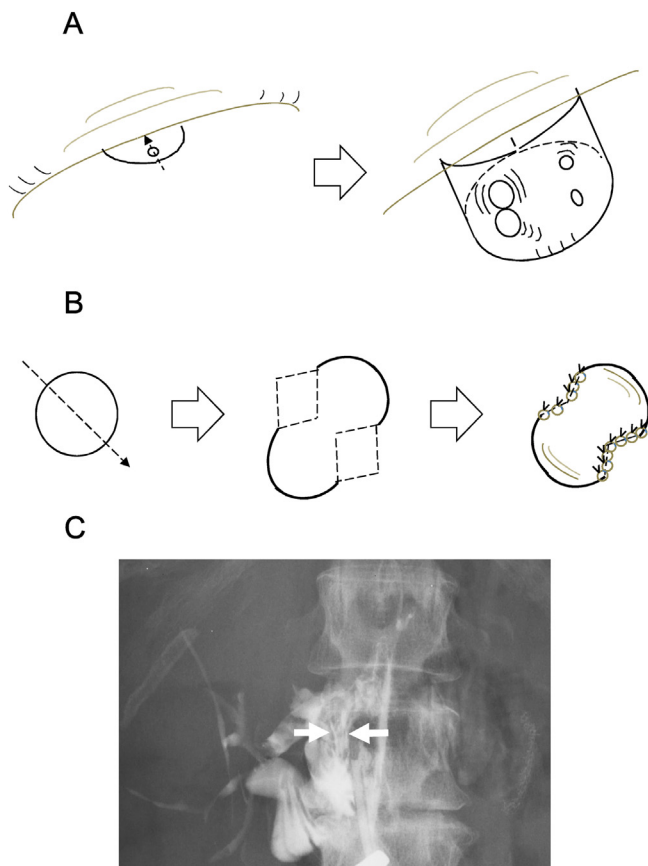


Fig. 3. Schematic illustration of hepatic ductoplasty. The anterior wall of the hepatic duct is incised longitudinally and everted towards the liver parenchyma (A). Illustration of stricture-plasty (B). Wide and broad H-J anastomosis of postoperative cholangiography (C, arrow).

Laboratory tests showed that the white blood cell count was 13,350/ul, C-reactive protein was 9.0 mg/dl, total bilirubin was 5.0 mg/dl, direct bilirubin was 3.1 mg/dl, aspartate aminotransferase was 166 U/l, alanine aminotransferase was 133 U/l, alkaline phosphatase was 881 U/l, and γ -glutamyltransferase was 196 U/l.

Abdominal computed tomography (CT) revealed dilation of intrahepatic bile ducts in the lower left lobe and posterior right lobe, with bile duct stones and/or debris also being visible (Fig. 1A, B). Abdominal ultrasonography (US) also showed that the right hepatic duct was filled with debris (Fig. 1C). Accordingly, percutaneous transhepatic biliary drainage (PTBD) was performed. Cholangiography via the PTBD tube showed a hilar hepatic duct stricture (Fig. 2A, long white arrow) and stones in the left intrahepatic bile duct. It also revealed a fistula between the reconstructed jejunal limb and the duodenum (Fig. 2 A, B, red arrow). Duodenal endoscopy directly revealed the fistula communicating with the reconstructed jejunal limb (Fig. 2C). Balloon dilatation of the hilar hepatic duct stricture was tried twice via the PTBD tube, resulting in failure to sufficiently alleviate the stricture.

Subsequently, surgical exploration was performed. The cause of the bile duct stones and recurrent cholangitis was considered to be the patient's jejunal-duodenal fistula combined with biliary stasis due to the C-J stricture. Hepatic ductoplasty was performed along with H-J and diversion of the jejunal-duodenal fistula. A diagram of the procedure is shown in Fig. 3. First, the previous biliary-enteric anastomosis was resected and the anterior wall of the stenotic shortened hepatic duct was longitudinally incised near the liver parenchyma. Intraoperative cholangioscopy was performed to remove the bile duct stones. Cleavage of stones and

washout of the remnant stones and sludge with normal saline were also done. Hepatic ductoplasty was carried out according to the method described previously [6,7]. Briefly, the anteriorly incised hepatic duct was everted toward the liver parenchyma to make a wide stoma (Fig. 3A). In addition, stricture-plasty of the left intrahepatic duct orifice was performed to relieve biliary stasis, as shown in Fig. 3B. Subsequently, H-J was performed by monolayer knob hand-sewing via the ante-colic route. Postoperative cholangiography apparently showed wide and broad H-J anastomosis in Fig. 3C. The patient had no further reflux cholangitis or hepatolithiasis when reviewed at one year after surgery.

3. Discussion

Reflux cholangitis is most commonly observed after surgery such as biliary enteric anastomosis, and the incidence was reported to be approximately 5–10% [8,9]. In our patient, C-J was required after accidental bile duct injury occurred during laparoscopic cholecystectomy. In addition, a jejunal-duodenal fistula was formed unexpectedly after alteration of the choledochoduodenostomy to choledochojejunostomy, which was presumably done because of bile leakage from the C-D anastomosis at the other hospital.

The etiology of reflux cholangitis is considered to be biliary stasis with bacterial infection due to stenosis or dysfunction of the reconstructed jejunal loop, including denervation, kinking, and/or disuse atrophy [10–12]. This condition eventually leads to formation of biliary stones. Therefore, the re-exploration was conducted in the present patient to relieve biliary stasis by hepatic ductoplasty and diversion of the intestinal communication (duodenal-jejunal fistula).

Hepatic ductoplasty is a useful and effective method for treatment of stricture due to biliary-enteric anastomosis. It was first reported in the pediatric surgery field in 1995 [6]. In particular, this procedure is applied when anastomosis is difficult, such as when there is a very short hepatic duct just below the liver parenchyma. In our patient, we used this method because the hepatic duct was short and narrow. Longitudinal incision and eversion of the hepatic duct toward the liver parenchyma allowed creation of a wide stoma to prevent reflux cholangitis. Recently, this method has been applied laparoscopically to treatment of a narrow hilar duct [7]. In our patient, laparoscopy could not be done because of adhesions due to the previous operations. However, a minimally invasive laparoscopic approach might be one option in suitable patients.

4. Conclusion

We reported the successful use of hepatic ductoplasty with H-J to treat reflux cholangitis and hepatolithiasis. This procedure seems to be an effective option for patients with such conditions.

Conflict of interest

The first author and the co-authors have no conflicts of interest to declare.

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Ethical approval

This is a case report with no identifiable information included in the manuscript, so ethical approval was not obtained. Our institution has exempted case reports from ethical approval.

Consent

Written informed consent was obtained from the patient and is available upon request. No patient identifying material was used in this manuscript.

Author contribution

This research was designed by Hirotaka Okamoto, Hideki Fujii.

Data collection, analysis and case management: Kazunori Takahashi, Hiroyuki Wakana.

Revising of the final version of the manuscript: Hirotaka Okamoto, Daisuke Ichikawa, Hideki Fujii.

Registration of research studies

As this is not a 'first-in-man' case study, our paper is eligible to be registered.

Guarantor

Hirotaka Okamoto

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