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Case Report
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# Bilioenteric Anastomotic Stricture Post-Roux-en-Y treated by Gradual Stricture Dilation Method *via* PTCD – Case Report

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## Abstract

**Background:** Benign anastomotic stricture after hepaticojejunostomy remains one of the undesirable complications of biliary surgery. Consequently, if not dealt with properly, jaundice, cholangitis, or cirrhosis may develop. While surgery is being associated with high morbidity and mortality and endoscopy is challenging to perform due to the complex anatomical reconstruction, percutaneous therapy, including stricture dilatation and stenting, seems to offer a practical approach to cases of benign biliary stricture post hepaticojejunostomy.

**Case Presentation:** Percutaneous transhepatic stricture dilation can provide a safer, easier, and cheaper alternative to the traditional approaches above. We used dilation by PTCD (Percutaneous Transhepatic Cholangio Drainage) to manage three patients who developed biliary anastomotic strictures after biliary enteric reconstructive surgery.

**Conclusion:** This paper reports how this method's usage could provide another less invasive way of treating billion enteric anastomotic stricture post-Roux-en-Y.

**Keywords: Hepaticojejunostomy; Stricture; PTCD; Dilation; Roux-en-Y**

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## Abbreviations

PTCD**:** Percutaneous Transhepatic Cholangial Drainage; HJ: Hepaticojejunostomy; ERCP: Endoscopic Retrograde Cholangiopancreatography; MRCP: Magnetic Resonance Cholangiopancreatography; CT: Computed Tomography; DSA: Digital Subtraction Angiography; PTBD: Percutaneous Transhepatic Biliary Drainage

## Background

In patients with significant bile duct injuries post-cholecystectomy or post type 1 choledochal cyst resection, Roux-en-Y hepaticojejunostomy is a standard effective procedure. Creating a Roux-en-Y Hepaticojejunostomy (HJ) is a critical component of many types of hepatobiliary operations. Usually, the normal biliary function can be achieved after biliary enteric anastomosis [1]. However, one of the complications of the biliary-enteric anastomosis is a stricture [2]. Biliary strictures may present with pain, jaundice, cholangitis, pruritus, or with alteration of liver function tests. If left untreated, they can lead to secondary biliary cirrhosis and even death [3]. The incidence of anastomotic stricture following HJ has been reported to be around 10% [2,4]. There are 3 therapeutic approaches to manage this condition reportedly: Surgical, endoscopic, and percutaneous. Surgery has been regarded as the mainstay treatment for the management of this condition. However, in addition to the possibility of stricture recurrence, biliary reconstruction in those situations is associated with significant morbidity and mortality [5-7]. Endoscopic Retrograde Cholangiopancreatography (ERCP) is usually mandated in the setting of biliary stricture. Nevertheless, it is complicated to perform in cases where the biliary stricture is post-hepaticojejunostomy anastomosis due to the complex reconstructed bilioenteric structure. Alternatively, for that matter, percutaneous therapy seems to be a better option for the treatment of biliary obstruction in cases of bilioenteric anastomosis [8]. It has been reported that the percutaneous transhepatic approach with balloon catheters has proved to be successful, but it can lead to anastomotic rupture and recurrence of stricture. Here we present 3 cases where we used the percutaneous transhepatic "gradual stricture dilatation" method to treat biliary enteric anastomotic stricture post-Roux-en-Y, and the results are promising.

## Case Presentation

### Case 1

A 48-year-old male presents with epigastric pain for 25 days. Ultrasound showed that the gall bladder was about 8.1 cm × 3.4 cm, having a wall thickness of 9 mm, and contained stones. He underwent a laparoscopic cholecystectomy. Three days postoperatively, the patient felt right scapular pain and right upper quadrant rebound tenderness accompanied by yellow urine. Total bilirubin and direct bilirubin were 125.8 and 76.20 umol/L, respectively. ALT was 474 u/L, and AST was 137 u/L. The patient was given an emergency MRCP suggesting extrahepatic bile duct obstruction with intrahepatic bile duct dilatation and discontinuity of the common bile duct (Figure 1). As a result, the patient underwent emergency surgery, during which 300 ml of bile fluid was present in the abdomen, and the common hepatic duct was found to be transected and partially clamped. A hepaticojejunostomy anastomosis was done, and a 12-F T-tube was left at the anastomotic site for support. After surgery, the patient would occasionally feel feverish and chills. On flushing the T-tube, a 'sludge' was seen, and the symptoms disappeared 4 months later, we decided to do a percutaneous transhepatic cholangiography drainage to dilate the strictured anastomotic region; the T-tube was pulled out, and a small catheter stent of size 10.2 F was inserted through the PTCD. We gradually increased the stent diameter's size, and 2 weeks later, we replaced the 10.2 F with a 12 F catheter (Figure 2). The patient's condition was improving efficiently. Six months later, around the period when we were about to increase the stent's size, the patient insisted on removing the stent as he had no symptoms. Despite our advice to continue the gradual stricture dilation to maintain the anastomotic site patency, the patient opted to stop the treatment and have the catheter removed. Three months, post-catheter removal, the patient experienced biliary stricture with cholangitis again. He underwent open surgery in another hospital.


**Figure 1**: MRCP showing intrahepatic duct dilatation with the discontinuity of common bile duct.

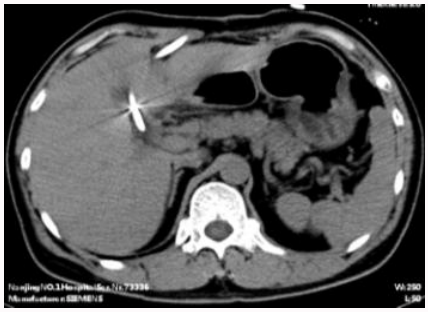

**Figure 2**: CT showing intrahepatic catheter postoperatively.

### Case 2

A female patient, aged 33 years old, presented to the hospital with right upper quadrant pain for over 2 months. MRCP showed common bile duct stones with the presence of a choledochal cyst. The patient underwent laparoscopic cholecystectomy with choledochal cyst resection and hepaticojejunostomy reconstruction. She was discharged post-surgery. Two months later, the patient experienced fever and pruritus along with icterus and scleral jaundice. She was admitted, and MRCP showed intrahepatic duct dilation and anastomotic site stricture (Figure 3). A gradual stricture dilation method *via* PTCD was chosen for the patient, and a 10.2 F gauge catheter was inserted through the strictured site. Three months later, the catheter size was changed to 12 F. After 4 months, we gradually increased the catheter size to 14 F and then switched to 16 F in another 2 months. The 16 F catheter was removed in an additional 2 months. Contrast medium injection confirmed the patency of the anastomotic site (Figure 4). Since then, the patient has recovered well, with no recurrent signs and symptoms over more than 1 year follow up.

### Case 3

A 30-year-old female patient underwent a hepatic teratoma resection 7 years ago (Figure 5). The liver tumor had infiltrated the gall bladder and compressed the hepatic artery and part of the portal vein. Cancer had also invaded the left hepatic duct. Consequently, the tumor and the gall bladder were removed, and the left hepatic duct was reconstructed with an end-to-end anastomosis of the bile ducts. A stent was left to support the anastomotic site. After surgery, she had mild bile leakage. Five years ahead, the patient developed obstructive jaundice, which was confirmed by MRCP (Figure 6). During surgery, it was found that there were massive adhesions and severe scarring,

**Figure 3**: MRCP showing intrahepatic duct dilation and an anastomotic site stricture.

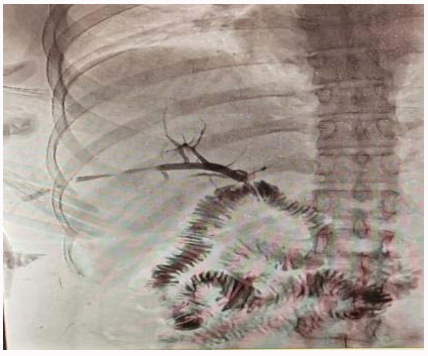

**Figure 4**: Contrast medium injection confirms the patency of the anastomotic site.

**Figure 5**: CT showing hepatic teratoma at the hilum of the liver.

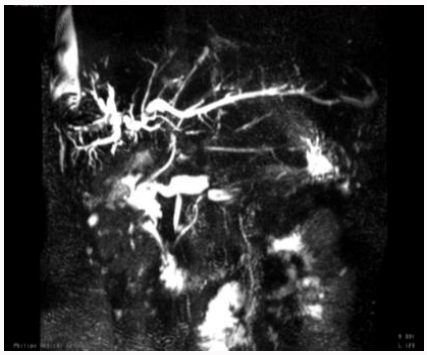

**Figure 6**: MRCP showing intrahepatic duct dilatation.

**Figure 7**: Removal of the 18-F catheter from the patient.

**Figure 8**: Contrast medium reaching the jejunum through the anastomotic site *via* an 18-F catheter.

which involved the hepatic hilum and the area around the left hepatic duct reconstruction location. The jejunum was thus anastomosed with the 2nd branch of the left hepatic duct. A small tube was left to maintain the anastomotic site patency, and she underwent the gradual stricture dilation therapy via PTCD. A 10.2 F diameter was inserted *via* the PTCD and was increased to 12 F size 6 months later. We then changed to 14 F around 1 month later. Five months later, we gradually expanded to 16 F and then switched to 18 F in an additional 5 months. The catheter was removed definitely after 7 months (Figure 7), and DSA showed the lucidity of the anastomotic site (Figure 8). Here also, our patient proved to be without any recurrent signs and symptoms for 12 months.

## Discussion and Conclusion

Patients with benign anastomotic strictures after a hepaticojejunostomy or a choledochojejunostomy are challenging to manage in clinical practice. Anastomotic strictures are usually narrowing caused by circumferential fibrosis, probably induced by wound healing or bile leakage. Signs and symptoms including right quadrant pain, jaundice, cholangitis findings, and even intrahepatic dilatation on imaging and liver functions test elevation should raise suspicion of bilioenteric anastomosis stricture. Surgical reconstruction, endoscopy, and Percutaneous Transhepatic Biliary Drainage (PTBD) are all plausible treatment methods for this problem. For years, surgical reconstruction has been the mainstay line of management for those types of anastomotic strictures. Not only was it the only method of treatment available, but some studies also reported a high yield of success [9]. However, it was also associated with high levels of morbidity and mortality [5-7]. In the light of this setting, endoscopic measures seemed to be an efficient therapy that offered good short-term results [10]. But, it requires advanced endoscopic skills and equipment and thus is very difficult to perform in patients with surgically altered bilioenteric anatomy. There may be a need to use general anesthesia. Furthermore, endoscopic methods such as double-balloon endoscopy are very time consuming and technically difficult. Besides, in some cases, it might not dilate the strictured site, which became very hard due to severe fibrosis. In these regards, PTCD causes less trauma to patients as it is less invasive, and it has been reported that PTCD has a success rate of over 90% in dilating intrahepatic ducts [11]. Nonetheless, the site needs to be slowly widened over time. So, a gradual change in the stent size is recommended. The stent chosen at the beginning of the therapy should perceptibly be according to the strictured site. Too much of a small stent will lead to more bile stasis and, consequently, sludge formation. In our cases, we started with the 10.2 F. Our method aims to steadily increase to 12 F to 14 F until it is suitable to progress to 16 F and 18 F. 16 F and 18 F would allow the previously strictured site to expand to a size of 5.3 mm to 6 mm, all in the normal diameter range of the common bile duct. We chose to keep the last stent for at least 6 months to maintain the patency long enough to become definite. Our previous 2 patients were proven efficiency, who had no recurred stricture upon more than 1 year follow up. In our group, the first patient did not comply with our suggested therapy's full course and opted to discontinue further dilation on reaching the 12 F sized catheters itself. This allowed stricture recurrence as the stent size was not big enough, and patency was not maintained for enough time. It is important not to rush in this therapy and gradually increase the stent sizes over an adequate amount of time. Our study is limited to three cases, but the results are promising. Thus, percutaneous therapies being easier to perform appear to be less invasive, more reliable, more efficient, and safer with excellent results.

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