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Case Report
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A Novel Place for the Biliary Rendezvous: The Left Hepatic Duct

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Abstract

The rendezvous technique is a hybrid approach that integrates percutaneous and endoscopic procedures to enable efficient biliary access. The process involves the percutaneous insertion of a guidewire, which is subsequently advanced to the common bile duct and duodenum, and then retrieving it with the aid of Endoscopic Retrograde Cholangiopancreatography (ERCP).

The present case aims to demonstrate the innovative application of the 'lowercase y' stent formation, along with the rendezvous at the left hepatic duct, as an unprecedented locale for the implementation of the rendezvous biliary drainage technique. This novel approach was used in a patient diagnosed with a Bismuth Type 3a Klatskin's tumor, characterized by the invasion of the common hepatic duct, as well as the left and right biliary ducts. Notably, the procedure yielded effective drainage and the patency of the stents was successfully maintained one year after the surgical intervention.

Main Points

1. The process of biliary drainage in cases of Klatskin types 3a, 3b, and 4 tumors presents certain technical challenges.

2. The use of appointment technique has the potential to improve the technical success of biliary drainage.

3. The rendezvous technique performed with the 'lowercase y stent formation' described in this study can be used in biliary drainage in the presence of Klatskin type 3a and 3b tumors.

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Introduction

The rendezvous technique combines percutaneous and endoscopic procedures to facilitate biliary access. A percutaneously inserted guidewire is advanced to the common bile duct and then duodenum and grasped by a snare, forceps, or basket with the guidance of Endoscopic Retrograde Cholangiopancreatography (ERCP). In this case, we are willing to share the biliary drainage technique and the novel rendezvous place of a type 3a Klatskin's tumor patient.

Case Presentation

An informed consent was obtained. 41-year-old female patient with Bismuth type 3a and metastatic Klatskin's tumor presented with jaundice. The patient's complaint was abdominal pain for three months and concomitant darkening of urine color. At the physical examination, no findings were detected except for jaundice. At the presentation, laboratory findings were as follows: Total bilirubin: 8.79 and direct bilirubin: 8.32 mg/dl, ALT: 224 U/L, AST:67 U/L, CA 19-9: 4790 U/ml, ALP: 208 U/L, GGT: 153 U/L, CRP: 57.7 mg/L. The hemogram was normal, and no other lab abnormality was detected. Triphasic abdominal CT was performed, and the findings were: A 37 mm × 36 mm in diameter, centrally located mass was observed in the liver, around the common hepatic duct, invading the common hepatic and the right biliary ducts, the main portal vein and, causing stenosis in the main portal vein, the main hepatic artery, and middle hepatic vein (Figure 1). Also, multiple mass lesions in the liver and metastatic abdominal lymph nodes were noted. A biopsy was performed with endoscopic ultrasound of the hilar mass and the diagnosis was adenocarcinoma with squamous differentiation. The final diagnosis was metastatic Bismuth type 3a Klatskin's tumor. The patient had external biliary drainage performed in another center, draining only the anterior segment of the right biliary tree.

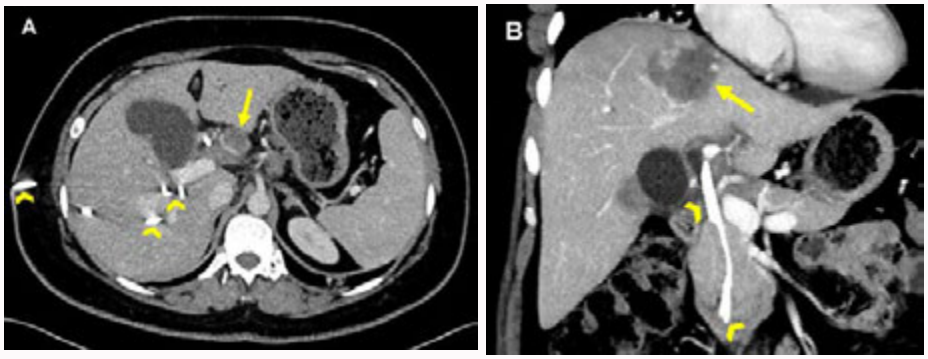

Figure 1: The portal phase axial image demonstrates (a) a 3.5 cm heterogeneously hyper-enhanced lesion (arrow) invading right hepatic duct, common hepatic duct, portal vein and hepatic artery. An external biliary drainage catheter (arrowhead) was placed into the right hepatic duct. The portal phase coronal image (b) shows two biliary plastic stents (arrowheads), both extending from duodenum to left hepatic duct (an incidental hemangioma is shown with arrow).

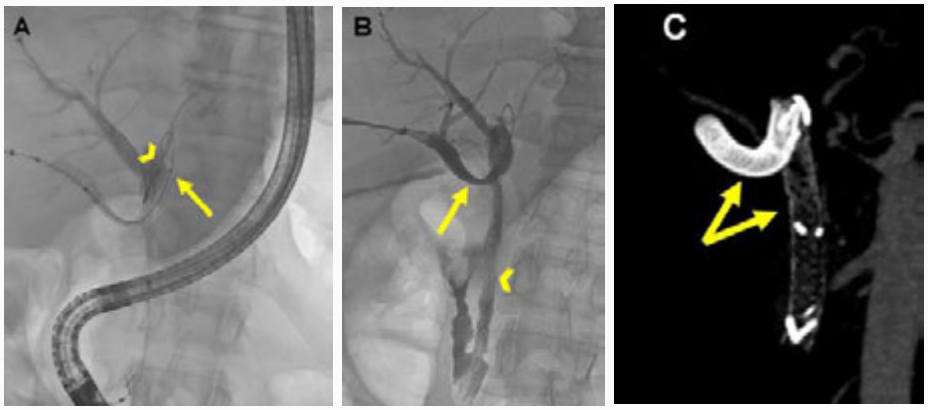

Figure 2: Both plastic stents were removed endoscopically. A stiff guidewire (arrow) was placed via an existing external drainage catheter, then the catheter was removed. (a) The WallFlex uncovered metallic biliary stent (arrow) placed from the right hepatic duct to the left hepatic duct and the endoscopic metal stent (arrowhead) placed from the left hepatic duct to the duodenum were deployed simultaneously. Then, balloon dilatation was conducted on the percutaneous stent to address the stenosis in the proximal common hepatic duct. (b) The final run was performed through percutaneous access. It was observed that the contrast in the right biliary duct was effectively transferred to the left hepatic duct via the WallFlex biliary stent (arrow) and to the duodenum via the endoscopic stent (arrowhead). (c) In post-procedure imaging, the arterial phase coronal MIP image shows 'lowercase y' stent formation (arrows).

Technique

In these clinical settings, ERCP was performed by a gastroenterologist, and two plastic stents were placed through the duodenum to biliary ducts; one was thought to be at the right hepatic duct and the other one at the left hepatic duct. At follow-up, the patient's direct bilirubin value decreased to 3.57 mg/dl and reached a plateau. Another diagnostic CT was performed, and it was found that both plastic stents were placed at the left hepatic duct. Afterward, the patient was referred to IR for stenting of the right hepatic duct. The drainage plan was based on a rendezvous at the left hepatic duct since an ERCP was compulsory for removing the plastic stents. The right external drainage catheter was removed on the first intervention, and a 6F vascular sheath (Cordis, Tipperary, Ireland) was placed via an Amplatz stiff guidewire (Boston Scientific, Marlborough, Massachusetts, US). Initially, an attempt was made to cross the common hepatic duct and common bile duct. However, due to tumoral occlusion, the wire was only able to progress to the left hepatic duct. Then, obstruction at the level of the right hepatic duct was crossed with maneuvers using a 4F vertebral diagnostic catheter (Cordis, Tipperary, Ireland) and 0.035-inch Roadrunner guidewire (Cook Medical, Bloomington, Indiana, US) to reach the left hepatic duct. A transhepatic external drainage catheter was placed with the distal tip at the left hepatic duct, and a rendezvous procedure was planned for the next day with the gastroenterology team. The rendezvous procedure began with removing both plastic stents and placing a 0.035 guidewire to the left hepatic duct with ERCP. Then the external drainage catheter was exchanged with a 9F vascular sheath (Cordis, Tipperary, Ireland) *via* a stiff guidewire, distal end at the left hepatic duct (Figure 2a). An endoscopic 10 mm × 100 mm metallic stent from the left hepatic duct to the duodenum and an 8 mm × 60 mm WallFlex uncovered metallic biliary stent (Boston Scientific, Marlborough, Massachusetts, US) from the left hepatic duct to the right hepatic duct were deployed simultaneously. The percutaneous stent then was dilated with an 8 mm × 40 mm balloon catheter (Mustang, Boston Scientific, Marlborough, Massachusetts, US). Effective drainage was noted both angiographically and endoscopically with a ''lowercase y'' stent formation (Figure 2b, 2c). A 10F external biliary drainage safety catheter was placed, and the procedure ended without any adverse events. The external safety drainage catheter was removed 2 days later.

There were no complications related to the procedure in the post-procedure follow-up. The patient has been followed for one and a half years and is still alive. The last total bilirubin level was 0.98. One year after the procedure, a contrast-enhanced abdominal CT scan is performed for the follow-up of the patient's primary mass. The CT images show that the size of the primary mass in the liver

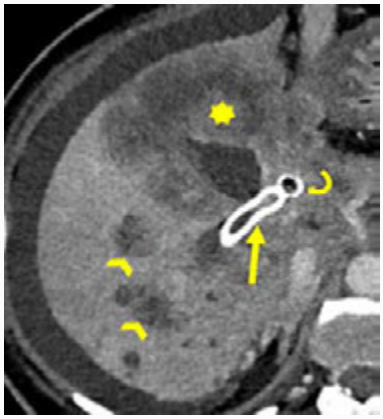

Figure 3: The portal phase axial CT image shows that the size of the primary mass (asterisk) in the liver has increased, and there were newly developed metastases (arrowheads) in the liver parenchyma. The stent (arrow) extending from the right hepatic duct to the left hepatic duct and an endoscopically inserted stent extending from the left hepatic duct to the duodenum (curved arrow) can be seen. Despite the progression in the malignancy findings, the biliary drainage was uneventful. No prominent dilatation was detected in the intrahepatic or extrahepatic bile ducts.

has increased, and there were newly developed metastases in the liver parenchyma. The stent extending from the right hepatic duct to the left hepatic duct and an endoscopically inserted stent extending from the left hepatic duct to the duodenum can be seen. Despite the progression in the malignancy findings, the biliary drainage was uneventful, and the stents were patent. No dilatation was detected in the intrahepatic or extrahepatic bile ducts (Figure 3). Any additional biliary intervention was not required during the 1-year follow-up period.

Discussion

Endoscopic Retrograde Cholangiopancreatography (ERCP) is routinely used to treat biliary tract obstruction; however, when ERCP is unsuccessful, the rendezvous technique helps to restore biliary recanalization in cases of complete biliary obstruction [1]. To perform the percutaneous-endoscopic rendezvous technique, two separate access pathways are used to reach one common site, mostly the duodenum. This is accomplished by crossing the occlusion and inserting a guidewire through the percutaneous access site and grabbing the guidewire with an endoscope. Then, the through-and-through access is used to insert balloon catheters or stents through the occlusion site [2].

Traditionally, the common site where the catheter and the guidewire meet, is the duodenum [3]. However, in this presented case, the patient had a Bismuth type 3a Klatskin's tumor; the common bile duct and distal of the right hepatic duct were obstructed. It was not possible to cross the occlusion at the right hepatic duct and to reach the common bile duct. ERCP was compulsory for removing plastic stents, and for the percutaneous classic Y stent formation, another puncture from the left biliary ducts was needed. These were the main reasons for deciding on the treatment plan. The rendezvous site was selected as the left hepatic duct, and the ''lowercase y'' stent formation was intended. In this case, "lower case y" stent formation was formed by percutaneous and endoscopic combined rendezvous technique, and to the best of our knowledge, this has not been previously reported in the literature.

In previous studies, different rendezvous sites have been reported. One of the most frequently used modified rendezvous sites is the biliary confluence, which is the junction of the right and left hepatic ducts. For this type of modified rendezvous technique, previous studies have described two percutaneous accesses that were used to overcome hilar obstruction or stricture, and the biliary drainage has been successfully performed [4,5]. Another modified rendezvous site which has been defined as extra-anatomic is inside the postoperatively developed biliomas at the hepatectomy margin. In the reported case, in addition to the bilioma, the biliary fistula feeding the bilioma and the biliary tract stricture were also shown; to overcome the stricture, the percutaneous-endoscopic rendezvous technique was chosen [3].

In addition to the rendezvous technique, magnetic compression anastomosis is an alternative for treating benign biliary strictures and obstruction. The magnetic compression force induces tissue necrosis. Two magnets are used to access successful passage, and the most commonly percutaneous-endoscopic route is chosen [6,7]. This technique is used when there is significant stenosis/occlusion of the bile duct in which the standard endoscopic or percutaneous procedures are unsuccessful or cannot be performed [7].

In conclusion, we demonstrate the feasibility and success of the percutaneous-endoscopic rendezvous in the left hepatic duct to treat complex hilar biliary obstruction. This procedure can eliminate the necessity of the two percutaneous accesses from both the left and right hepatic ducts and minimize morbidity. In addition to this technique, we believe that in cases where there is stenosis or obstruction in the left hepatic duct (Bismuth type 3b), the rendezvous site can potentially be in the right hepatic duct as well, with a percutaneous left hepatic duct access.

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