CLINICAL CASE

Hepatectomy and intrahepatic biliary enteric anastomosis: A rescue surgery for obstructed metallic biliary stents in chronic pancreatitis

Hépatectomie et anastomose bilio-digestive intrahépatique : une chirurgie de secours pour stent biliaire métallique inextirpable dans la pancréatite chronique

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Introduction

Obstructed uncovered metallic biliary stents (MS) in the setting of benign biliary stenoses can be complicated by sepsis and severe inflammation, rendering definitive surgical treatment difficult and complex \cite{1,2}. We report a case of a patient with chronic pancreatitis and subsequent duodenal inflammation and biliary stenosis treated by MS. This case emphasizes the potential complications and consequences of MS deployment for benign disease and describes an effective surgical strategy to manage patients with this complex clinical problem.

Case report

A 56-year-old man with a past history of chronic alcoholic pancreatitis, extensive portal vein thrombosis with cavernous transformation and benign biliary obstruction, previously treated with an uncovered metallic stent (MS), was referred to our center for the management of an external biliary fistula.

In April 2004, the patient developed obstructive jaundice secondary to chronic pancreatitis and was treated with an uncovered biliary MS inserted by a percutaneous transhepatic approach via the right liver. In January 2005, the patient underwent a percutaneous drainage of a 5-cm liver biliary abscess in segment 6. After removal of the abscess drain, a persistent external biliary fistula appeared through the drain tract. One year later, there was persistence of the external biliary fistula and the patient was referred to our center. Clinically, he was significantly malnourished (BMI = 17.8)
Table 1  Biological parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total bilirubin (μmol/L)</td>
<td>44/25</td>
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<tr>
<td>Conjugated bilirubin (μmol/L)</td>
<td></td>
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<tr>
<td>γGT (IU/L)</td>
<td>1291</td>
</tr>
<tr>
<td>ASAT/ALAT (IU/L)</td>
<td>39/65</td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>32</td>
</tr>
<tr>
<td>Prothrombin time (% of normal ratio)</td>
<td>70</td>
</tr>
<tr>
<td>Hemoglobin (g/dL)</td>
<td>12</td>
</tr>
<tr>
<td>Platelets (/mL)</td>
<td>212,000</td>
</tr>
<tr>
<td>White blood cells (/mL)</td>
<td>6400</td>
</tr>
</tbody>
</table>

with no sepsis or jaundice. The amount of drainage from the biliary fistula ranged between 50 and 300 mls per day. The biochemical profile of the patient is shown in Table 1. A computed tomography (CT-scan) showed a slight dilatation of the intrahepatic bile ducts and cavernous transformation of the portal vein (Fig. 1A). An esophagogastroduodenoscopy (EGD) revealed grade II esophageal varices as well as inflammatory duodenal stenosis that precluded initially endoscopic MS insertion. A fistulogram demonstrated a communication with bile duct of segment 6 of the liver. To temporarily treat the external biliary fistula, an external-internal plastic biliary drain (10F) was inserted by transhepatic approach (through segment 8) across the two partially obstructed MS. Cholangiography through this drain showed an incomplete separation of right and left bile ducts by the obstructed MS at the level of the main biliary convergence (Fig. 1B).

Following drainage, the external biliary fistula resolved and general clinical status of the patient improved.

To definitively treat the biliary obstruction, definitive internal biliary drainage with removal of obstructed MS was planned. To improve feasibility and safety of this surgery, a decompressive portal-systemic shunt was undertaken to treat the portal cavernoma [3,4]. Mesenteric angiography showed a complete thrombosis of the portal vein and splenic vein with patency of superior mesenteric vein (Fig. 1C). A meso-caval anastomosis was performed subsequently decreasing the portal-caval gradient from 18 mmHg to 5 mmHg. This surgery was complicated by early chylous ascites and complete thrombosis of the anastomosis at the sixth postoperative day despite anticoagulation. Chylous ascites was treated with a fat-free diet and the patient was discharged at 1 month postoperatively without symptoms and with a clamped external-internal drain. In May 2008, the patient was readmitted for recurrence of the external biliary fistula and jaundice caused by obstruction of the external-internal drain. A CT-scan with biliary opacification demonstrates the biliary anatomy at the time of surgery (Fig. 1D).

Intra-operatively, an initial attempt at dissection and removal of the biliary MS was abandoned due to severe scarring and inflammation in the setting of persistent portal hypertension and an intrahepatic biliary enteric anastomosis was undertaken. A resection of the inferior part of segment 6 was then undertaken to expose, after ligation

![Figure 1](image_url)

**Figure 1**  A. Injected CT-scan at portal phase. White arrow: portal cavernoma. B. Trans-hepatic cholangiography. White arrow: persistence of a biliary communication between right and left liver. C. Angiography at portal phase. White arrow: superior mesenteric vein. D. CT-scan with biliary opacification trough the external-internal biliary stent placed into the partially obstructed MS. White arrow: bile duct of the segment 6.
of the artery and portal vein of the pedicle, the bile duct that was opened longitudinally. A Roux-en-Y bilio-enteric anastomosis was performed (Fig. 2). The postoperative recovery was uneventful. The internal-external drain was clamped on the 12th postoperative day and removed on the 30th postoperative day. After 2 years of follow-up, the patient remained asymptomatic.

Discussion

This case emphasizes significant problems in the treatment of benign biliary strictures due to chronic pancreatitis with the use of uncovered and permanent MS. If we described here a rescue surgery in this complex case with accompanying co-morbidities, this case highlights the importance of an initial multidisciplinary decision to avoid the described situation that was a failure of endoscopic strategy. Causes of this strategy failure were the introduction of several uncovered MS by a transhepatic approach in this setting of biliary and duodenal compression secondary to chronic pancreatitis. In the literature, the long-term patency of this type of MS is low except in the first published series (Table 2). Long-term use of MS makes them susceptible to recurrent obstructions and the secondary patency rates obtained by deploying additional stents have not been satisfactory [1]. The second problem is the added surgical complexity incurred by inflammation induced by stents in the surgical field [2].

External-internal biliary drainage through the partially obstructed MS at the outset was necessary to control the fistula, treat the patient’s sepsis and improve the patient’s malnutrition prior to any surgical intervention.

Biliary decompression by a bilio-enteric anastomosis is difficult and dangerous when complicated by portal hypertension. For this reason, porto-systemic decompression was undertaken prior to the planned biliary reconstructive surgery as previously described in symptomatic portal biliopathy [3,4,9].

After the failure of our attempt of portal decompression, four therapeutic options were possible to definitively treat this patient’s ongoing and life-threatening persistent biliary fistula:

- a permanent internal-external biliary plastic drainage;
- an attempt at surgical removal of the MS despite cavernous transformation of the portal vein and portal hypertension;
- an intrahepatic bilio-enteric anastomosis [10];

The decision to perform an intrahepatic biliary anastomosis was made intra-operatively because of severe inflammation and portal hypertension complicating dissection of the hilar structures, and making any anastomosis at that level prohibitive. The portal cavernoma and the inflammation due to obstructed MS were the two factors that precluded safe dissection of the hepatic pedicle. Before performing intrahepatic biliary anastomosis, a peroperative cholangiography was made to affirm a persistent

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### Table 2

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Number of patients</th>
<th>Complication of stent (%)</th>
<th>Removal of stent (%)</th>
<th>Success of strategy (%)</th>
<th>Follow-up of stenting (median in months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviere et al.</td>
<td>1994</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>90</td>
<td>33 (range 24—42)</td>
</tr>
<tr>
<td>Van Berkel et al.</td>
<td>2004</td>
<td>13</td>
<td>7</td>
<td>0</td>
<td>68</td>
<td>50 (range 1—86)</td>
</tr>
<tr>
<td>Cantu et al.</td>
<td>2005</td>
<td>14</td>
<td>7</td>
<td>7</td>
<td>37</td>
<td>22 (range 12—33)</td>
</tr>
<tr>
<td>Yamaguchi et al.</td>
<td>2006</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>37</td>
<td>78 (range 33—99)</td>
</tr>
</tbody>
</table>
communication of the right and the left bile duct and to localize a large intrahepatic bile duct where to perform the anastomosis. In this patient, the largest bile duct was localized in segment 6 from which the external biliary fistula originated as well. To treat both the external fistula and to perform a biliary drainage with the greatest safety, we performed an intrahepatic bilio-enteric anastomosis to the bile duct of segment 6 proximal to the external fistula.

In conclusion, this case emphasizes the long-term risks of using MS in the setting of benign biliary compression, particularly in complex patients. Subsequent definitive surgical management following placement of MSs is significantly more difficult and may incur additional morbidity and/or mortality for patients. Intrahepatic biliary enteric anastomosis possibly combined with partial hepatectomy, as described here, can be a surgical strategy to manage recurrent obstructions of metallic biliary stents, particularly when complicated by portal hypertension. Evaluation and treatment of patients with benign biliary strictures by a multidisciplinary team will offer the maximum benefit to this complex group of patients.

Conflict of interest statement

The authors declare that they have no conflict of interests regarding this article.

References