CASE REPORT

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A Case of Portal Venous Stenting for Metastatic Hilar Stricture After the Radical Resection of Colon Cancer

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ABSTRACT

Like standard stenting in an unresectable malignant stricture of the biliary or digestive tract, minimally invasive modality for portal stenosis is indispensable for palliation. We describe here a safe and practical procedure of portal stenting in a case of metastatic hilar strictures developed nine years after the radical resection of sigmoid colon cancer. After urgent delivery of the biliary tract stenting for the relief of jaundice, the patient received palliative stenting for the stricture of the portal trunk. Transhepatic approach, via the anterior branch, of the portal vein intervention may fit into the standard aspects for portal stenting.

Keywords: portal stenting, metastatic hilar stricture, palliative multi-stenting

INTRODUCTION

Because colorectal metastasis to the hepatic hilar lymph nodes is considered to be a critical prognostic factor, malignant hilar strictures are often considered unsuitable for curative resection, and palliation is therefore a crucial treatment. Although endoscopic placement of self-expandable metallic stents in malignant stenosis of the biliary or digestive tracts is an imperative modality, mutual options for malignant extrinsic portal stricture have not been standardized. The general acceptance for minimally invasive procedure of portal venous stenting may provide relief even in terminal cases.

CASE PRESENTATION

A 70-year-old woman was hospitalized for the onset of systemic jaundice with mild ascites. Data from her blood exam showed a normal blood count, but hyperbilirubinemia with liver damage (T-Bil 3.27 mg/dL, D-Bil 2.68 mg/dL, AST 119 IU/L, ALT 58 IU/L, ALP 732 IU/L, LD 367 IU/L, γ-GTP 165 IU/L, ChE 173 IU/L, Alb 2.9 g/dL, A/G 0.71). High levels of tumor

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markers were detected (CEA 581.2 ng/mL, CA19-9 127 U/mL). The patient had a medical history of diabetes mellitus and cerebral infarction with left hemiparesis at the age of 58. At 61 years of age, she underwent a radical sigmoidectomy with D3 dissection and cholecystectomy followed by adjuvant chemotherapy (Tegafur/Uracil 300 mg/day & Leucovorin 75 mg/day for 2 weeks + Irinotecan 220 mg/body on Day 1, triweekly) for stage IIIa (pT3N1M0) colon cancer and cholelithiasis. The serum levels of CEA and CA19-9 at diagnosis were 12.9 ng/mL and 7 U/mL respectively. CEA was reduced to below baseline level (1.1 ng/mL) after the procedure. Two years later, a solitary liver metastasis was detected at the lateral segment with increased levels of CEA and CA19-9 (7.4 ng/mL and 12 U/mL respectively), which required partial resection and chemotherapy with Tegafur/Gimeracil/Oteracil (S-1) medication (75 mg/day for 3 weeks, monthly). Since then, liver metastasis occurred three times sequentially during the 6-year follow up period. Each time, the liver metastasis was managed by percutaneous radiofrequency ablation (RFA) under computed tomography (CT) guidance in combination with medication: Capecitabine (3600 mg/day orally for 3 weeks, monthly). A year later, the patient developed severe systemic jaundice because of malignant strictures induced by bulky metastatic hilar lymphadenopathy (Fig. 1a). Urgent intervention was required for relief of the biliary tract occlusion. The patient received biliary drainage for obstructive jaundice by placing a self-expandable metallic stent (Niti-S Biliary ComVi Stent, 10×60 mm, Taewoong Medical) at the middle portion of the common bile duct. In addition to the obstruction of the common bile duct, a contrast CT revealed a regional stricture on the portal trunk (Fig. 1b) with tapering about 25 mm in length and 2.8 mm in diameter. It may be a while before complete occlusion, but early intervention by means of portal venous (PV) stenting prior to the emergence of lethal portal hypertension was considered to be beneficial to the patient. Indication for the PV stenting was evaluated by our institutional review board focusing on its clinical efficacy, viability, safety and risk management. Based on the agreement of the patient and her family, as well as the approval of our institutional review board, the palliative procedure of transhepatic insertion of a metallic vascular stent to the malignant stenosis of the portal trunk was carried out.

After being given a local anesthetic, a 7-Fr sheath was inserted at the anterior branch of the right portal vein under sonographic guidance. The stenosis detected on the portal venography

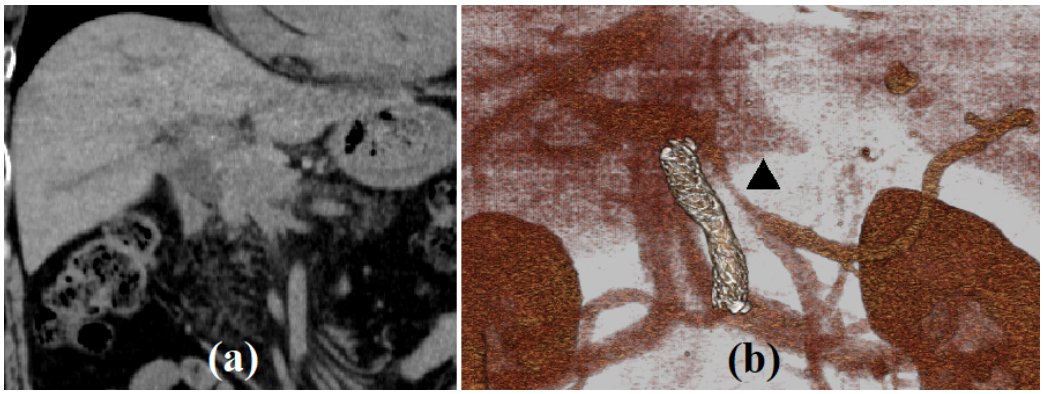

Fig. 1 Stricture of PV due to hilar metastasis
(a) Plain CT shows a bulky metastatic lymphadenopathy at the hilum of hepatoduodenal ligament. (b) Three-dimensional image of the contrast CT indicates the malignant stenosis at the portal trunk limited about 25 mm in length and 2.8 mm in diameter (arrowhead), which leads to indication of early stent insertion. A biliary stent placed for the relief of the obstruct jaundice.

using an approaching catheter (PTAII, 4.2Fr, Hanako) was measured at about 3 cm proximal to the junction of the splenic and superior mesenteric veins. It also showed a thrombus formation at the stricture (Fig. 2a). There was a mild pressure gradient across the stricture. The portal pressure proximal to the stenosis indicated approximately 12 mmHg, and around 13 mmHg to the distal. Remission of the stenosis was achieved by placing a metallic stent (Zilver vascular stent, 10×50 mm, Cook medical) into the portal trunk (Fig. 2b). Before the conclusion of vascular access, the transhepatic parenchymal route was embolized with hemostatic oxidized cellulose (Surgicel Fibrillar, Ethicon). A sheet of Surgicel was divided into ten palisading fragments which plugged the approaching route with three fragments protruding from the inner catheter through the 7-Fr sheath (Fig. 3a). It took 95 minutes to complete the whole surgical procedure. After ensuring hemostasis of the approaching route on the contrast CT (Fig. 3b), an anti-coagulant 5,000 U/day heparin infusion was administered, which was switched to oral administration of Warfarin after

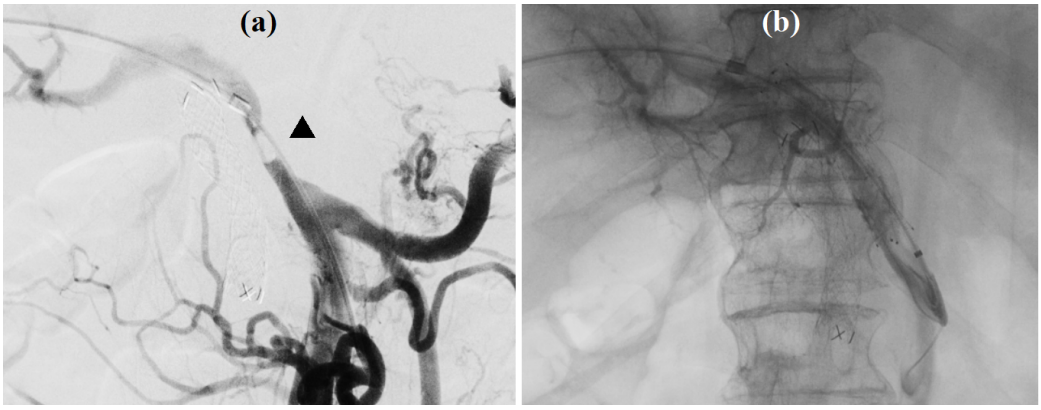

Fig. 2 Stenting for the PV stricture
(a) The percutaneous transhepatic portal venography via anterior branch shows a thrombus formation at the stricture of the portal trunk (arrowhead). (b) The expandable metallic stent (10×50 mm) is placed into the portal trunk before presence of lethal manifestations of portal hypertension.

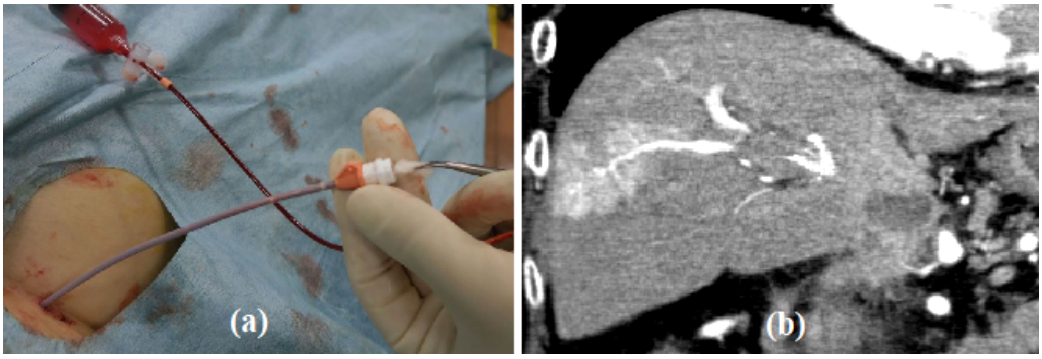

Fig. 3 Supply of the hemostatic procedure
(a) The approaching hepatic parenchymal route was plugged with several fragments of hemostatic oxidized cellulose for prevention of subsequent hemorrhage. (b) Hemostasis of the approaching site was ensured on the contrast CT, which finding allows immediate administration of anticoagulant to prevent clot formation in the portal stent.

a few days. No stent-related complications were noted. The patient was discharged in 2 weeks in fair condition maintaining with the QOL.

The patient received four courses of chemotherapy (80 mg/day of S-1 for 3 weeks, monthly and 300mg/body of Bevacizumab, biweekly) in an outpatient setting. Eventually, excessive growth of the hilar metastasis invaded the proximal duodenum causing gastric outlet obstruction. Duodenal stenting (Niti-S Enteral Colonic Uncovered Stent, 18×80 mm, Taewoong Medical) was required for emesis control as a palliative drainage, which enabled the patient to take oral ingestion. Unfortunately, however, cancerous cachexia followed by liver failure occurred during the next six weeks and the patient passed away nine months after the PV stenting.

DISCUSSION

Infiltration of the hepatic hilar lymph node is the most important prognostic factor following resection of colorectal liver metastasis.[1] The outcome of the resection for patients with hilar metastasis indicates fewer survive compared with patients without node involvement.[2] Surgical prospects for hilar invasion are provided only to candidates assigned for conversion chemotherapy.[3] Presence of hilar strictures amid ongoing treatments including chemotherapy aggravate an already difficult situation. Early delivery of palliative intervention is therefore a core competence in the therapeutic strategy as an alternative to surgical procedures for patients with metastatic hilar invasion of malignancies. Management of malignant strictures of either the biliary or gastrointestinal tracts often involves endoscopic procedures for palliative purposes. Stent placement for the biliary and gastrointestinal tracts is consistently indicated as the optimal endoscopic drainage.[4] However, the standard procedure for extrinsic portal stricture remains unmet and the indications for portal venous (PV) stenting have not been clarified. PV stenosis due to the progression of hilar metastasis causes serious portal hypertension symptoms of which include the development of gastrointestinal varices with subsequent hemorrhage, refractory ascites, splenomegaly related thrombocytopenia, and liver failure[5-8] deteriorate the QOL in patients with limited life expectancies. Stent placement contributes effectively to the recanalization of the portal vein leading to the improvement of blood flow into the liver and a reduction in collateral symptoms. Recovery from the present predicament results in improved QOL and facilitates deployment of further therapeutic options for underlying malignancies.

Applying a metallic stent into the portal trunk seems indicated in substantial number of cases of PV stenosis. PV stenting affords an opportunity not only for the palliative drainage of malignancies[5-8] but for the improvement of inflammatory strictures induced as a complication of liver transplantation,[9] abdominal surgery,[10] intra-operative radiation,[11] and pancreatitis.[12] Whereas balloon angioplasty for post-surgical PV strictures raises the recurrence rate of delayed onset PV stenosis, primary PV stenting provides long-term PV patency with alleviation of the symptoms of portal hypertension.[5,9] Serious PV strictures accompanied with peripheral portal thrombosis or massive gastrointestinal variceal hemorrhage would be compatible with treatment by stenting, either by the administration of thrombolysis[11] or coiling embolization of the varices.[13] Concurrent PV stenting with practical treatments plays a key part in palliation for symptoms related to PV stenosis. In the case of malignant PV strictures accompanied with mild ascites as present in this case study, PV stenting could be given prophylactically if diagnosed prior to the emergence of lethal manifestations of portal hypertension. Early intervention[10] to the malignant PV strictures is one of applicable strategies for initial palliation.

Of the three typical technical approaches to address PV intervention, the transhepatic procedure seems to be the most practical.[5-12] The transjugular intrahepatic approach is suitable for non-

cirrhotic cases with massive portal thrombosis[14] as outflow affords a more physiologic alternative. Although it is less common, in some cases suddenly shunting portal blood flow away from the liver may cause hepatic ischemia resulting in fatal liver infarction.[15] On the other hand, the trans-ileocolic approach is appropriate for cases with an active hemorrhage of gastrointestinal varices[13] in which surgical intervention requires laparotomy under general anesthesia. The higher incidence of complications during an approach via the posterior branch of the PV[16] indicates that a PV intervention is preferred via the anterior branch of the PV. In cases in which an approach via the anterior branch is impossible, PV intervention via the lateral segment or the trans-ileocolic approach should be provided. Transhepatic intervention via the anterior branch of the PV offers minimally invasive access for standard PV stenting.

Concurrent routines could be indispensable in the reduction of predictable complications of transhepatic PV stenting. Intraperitoneal hemorrhage is reported as the major subsequent complication with an incidence of 10.6[17]–22.2[9]%. Hepatic arterial injury occurred in 10.7%[18] of cases. Therefore, embolization is generally required. Embolization on the transhepatic parenchymal route facilitates hemostasis by using several hemostatic agents such as coils,[9,12] gelatin sponge,[6,11] and n-butyl cyanoacrylate.[10] In this case we used absorbable oxycellulose, which provides as a scaffold for platelet adhesion and aggregation leading to quick clot formation. Stent patency is another issue. One and two-year stent patency rates were 53% and 42% for patients with malignant PV strictures.[6] The mean-term patency of PV stents without administration of anticoagulation indicate shorter patency of 7.3±7.7 months in malignant strictures, 21.3±23.2 months in benign stenosis.[19] Half of the patients with malignancy develop stent problems around seven months after stent placement. Secondary routine is anticoagulation for stent patency. Patients who had normal coagulation function or had PV thrombosis likewise in this case, should be given intravenous heparin as well as oral anticoagulants following the procedure. The stent configuration also interacts with the stent patency. The self-expanding stent used for portal structure is sized 8–14 mm-diameter[10] (1–2mm larger than the adjacent uninvolved PV) and 3–10 cm-long[11] with minimal angulation between the PV and the proximal and distal edges of the deployed stent.[19] In addition to these routines, resumption of the ongoing, or other acceptable treatment, may contribute to long-term stent patency.

CONCLUSION

PV stenting for malignant hilar strictures was conducted safely via a transhepatic anterior approach followed by hemostatic access route embolization. The stent patency was preserved by the administration of anticoagulants, and the patient was given further courses of chemotherapy on an outpatient basis.

CONFLICTS OF INTEREST

All the authors certify that they have no conflicts of interest in this work.

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