Endobiliary radiofrequency ablation and percutaneous biliary stent placement for choledocal invasion of renal cell carcinoma

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Dear Editor,

Malignant biliary obstruction is a frequent complication of carcinoma of the ampulla Vateri, bile duct, and head of the pancreas. Whereas, metastatic invasions of other tumor types are less common causes of biliary obstruction. Self-expandable metal stents (SEMS) are used for palliative treatment of patients with unresectable malignant biliary obstruction whose life expectancy is greater than 3 months (1).

Palliative therapies such as ablative techniques, which have direct necrotic effects on local tumors, have been developed to reduce tumor load and to prolong SEMS patency. Foremost of these techniques is endobiliary radiofrequency ablation (ERFA), which has been successfully used in the management of malignant biliary obstruction via both endoscopic and percutaneous approaches (2).

Percutaneous ERFA heats up local tumor tissues, which results in coagulative necrosis, and reduces tumor burden. Several studies have demonstrated the efficacy and safety of this technique to improve the patency of the SEMS in patients with primary biliary malignancies (3). Herein, we report a distinctive case of malignant biliary obstruction due to recurrent renal cell carcinoma (RCC) invasion, which was treated with percutaneous ERFA and SEMS placement.

A seventy-year-old woman presented in our clinic with jaundice and abdominal discomfort, which had increased in severity over 2 days. Her physical examination revealed jaundice, as well as right, upper, and lower quadrant fullness and tenderness. She had a history of right nephrectomy 4 months prior due to RCC. Laboratory results showed increased total bilirubin 15.14 mg/dL, direct bilirubin 11.9 mg/dL, indirect bilirubin 3.24 mg/dL, aspartate aminotransferase 62 U/L, alanine aminotransferase 42 U/L, alkaline phosphatase 377 U/L, and γ-glutamyl transpeptidase 288 U/L.

Endoscopy was ordered as a result of her dyspeptic complaints, and demonstrated a fragile ulcerated area, 2 cm in diameter, covered with necrotic debris in the second part of the duodenum. Tissue samples were obtained from this area, and pathology revealed recurrent RCC. Contrast-enhanced magnetic resonance imaging revealed a 85×65×92 mm irregular mass at the nephrectomy area, which had invaded the head of the pancreas, common bile duct, and second part of the duodenum (Figure 1a). Intrahepatic and extrahepatic bile ducts were dilated secondary to occlusion (Figure 1b). There was restricted diffusion (Figure 1c) and peripherally avid contrast enhancement with central necrotic nonenhanced areas (Figure 1d).

A percutaneous drainage procedure was performed after obtaining informed consent to show bile ducts and treat if possible. A 21-gage Chiba needle was inserted from the left lobe of the liver under ultrasound guidance. Contrast agent was injected through needle to visualize the bile ducts under fluoroscopy. Contrast material filled the markedly dilated intrahepatic bile ducts and common hepatic ducts but was unable to pass to the duodenum via the common bile duct (Figure 2a). A 0.035 Terumo guidewire was placed through the needle. Following the dilatation procedure, 8F, a 25 cm internal biliary drainage catheter (Flexima APDL Catheter-Boston Scientific, MA, USA) was placed (Figure 2b).

A week later, at the control imaging, injected contrast filled the dilated intrahepatic bile ducts. Contrast passed

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from common bile duct to the duodenum only through the catheter within the lumen (Figure 2c). SEMS placement along with ERFA had planned. At that time, we found mild improvement in laboratory results with total bilirubin 13.35 mg/dL and direct bilirubin 10.16 mg/dL, due to drainage from catheter.

Percutaneous ERFA and stent placement procedure was performed under sedation the following week. The internal biliary drainage catheter was extracted under fluoroscopy guidance and an 8F introducer sheath was inserted. A 0.035 inch Terumo guidewire was inserted through the sheath from the left intrahepatic bile duct to the duodenum. A newly designed temperature-controlled ERFA catheter (ELRA- STARTmed, Seoul, Korea) was placed near the distal end of the occluded site within the common bile duct. ERFA was applied at 10 watts for 2 minutes under 80°C of intraductal temperature. After successful ERFA, a 9 mm×100 mm SEMS (Epic stent-Boston Scientific, MA, USA), whose distal end lies within the duodenum, was placed. Postdiltation was done with a 9x80 mm balloon (Powerflex Balloon Catheter-Cordis, Florida, USA) within the stent. On control imaging, contrast material passed to the duodenum without defect (Figure 2D). No complication such as hemorrhage, bile duct perforation, or bile leak was observed. An 8F external biliary

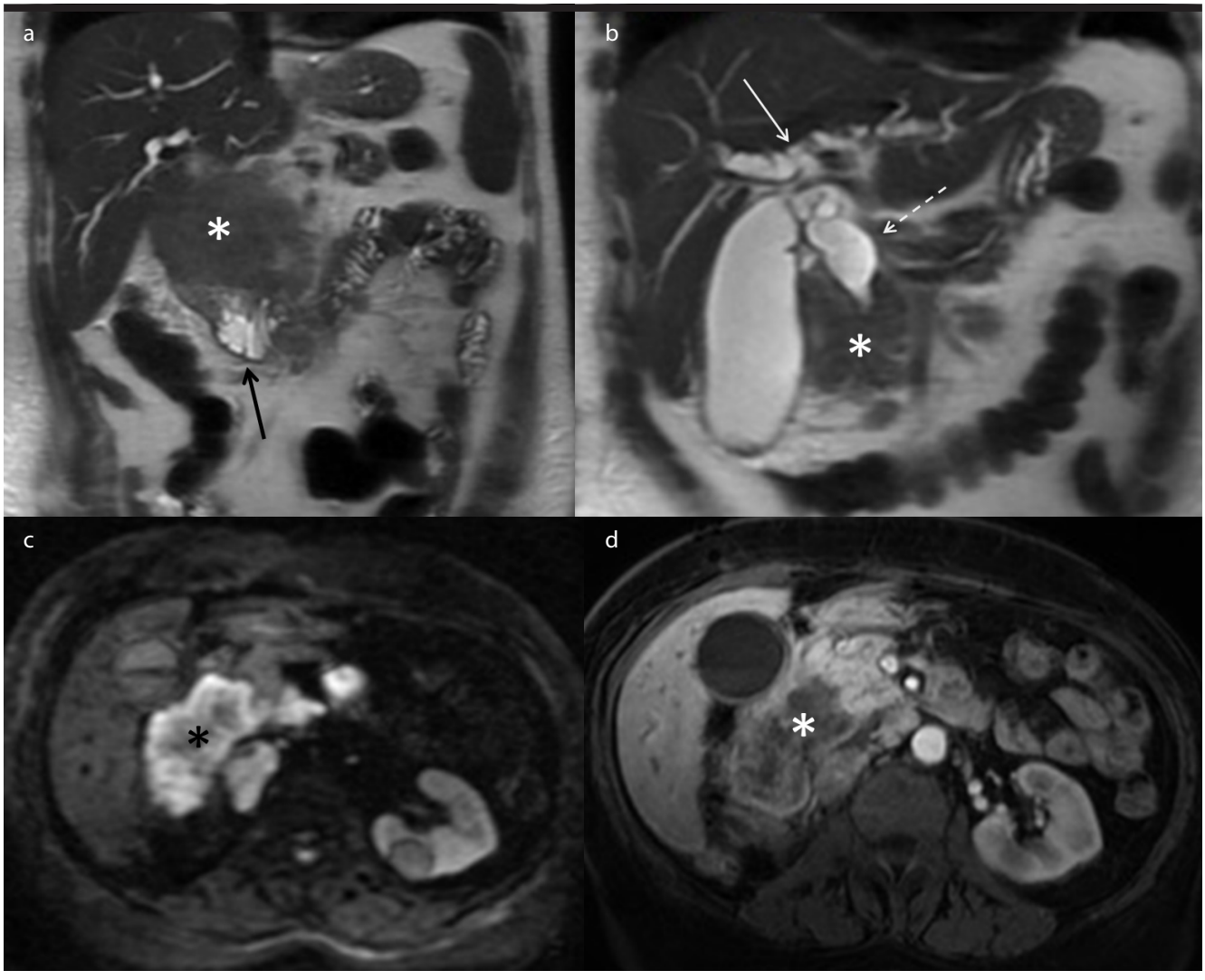

Figure 1. a-d. Coronal (a, b) T2 weighed magnetic resonance images reveal irregular hypointense mass at nephrectomy area (asterisk) which invade the head of the pancreas and second part of the duodenum (black arrow). Marked dilatation is seen at the intrahepatic (white arrow) and extrahepatic (dashed arrow) bile ducts secondary to occlusion. Diffusion weighed imaging (c) demonstrates restricted diffusion and postcontrast (d) T1 weighed images show peripherally avid contrast enhancement and nonenhanced central necrotic areas.

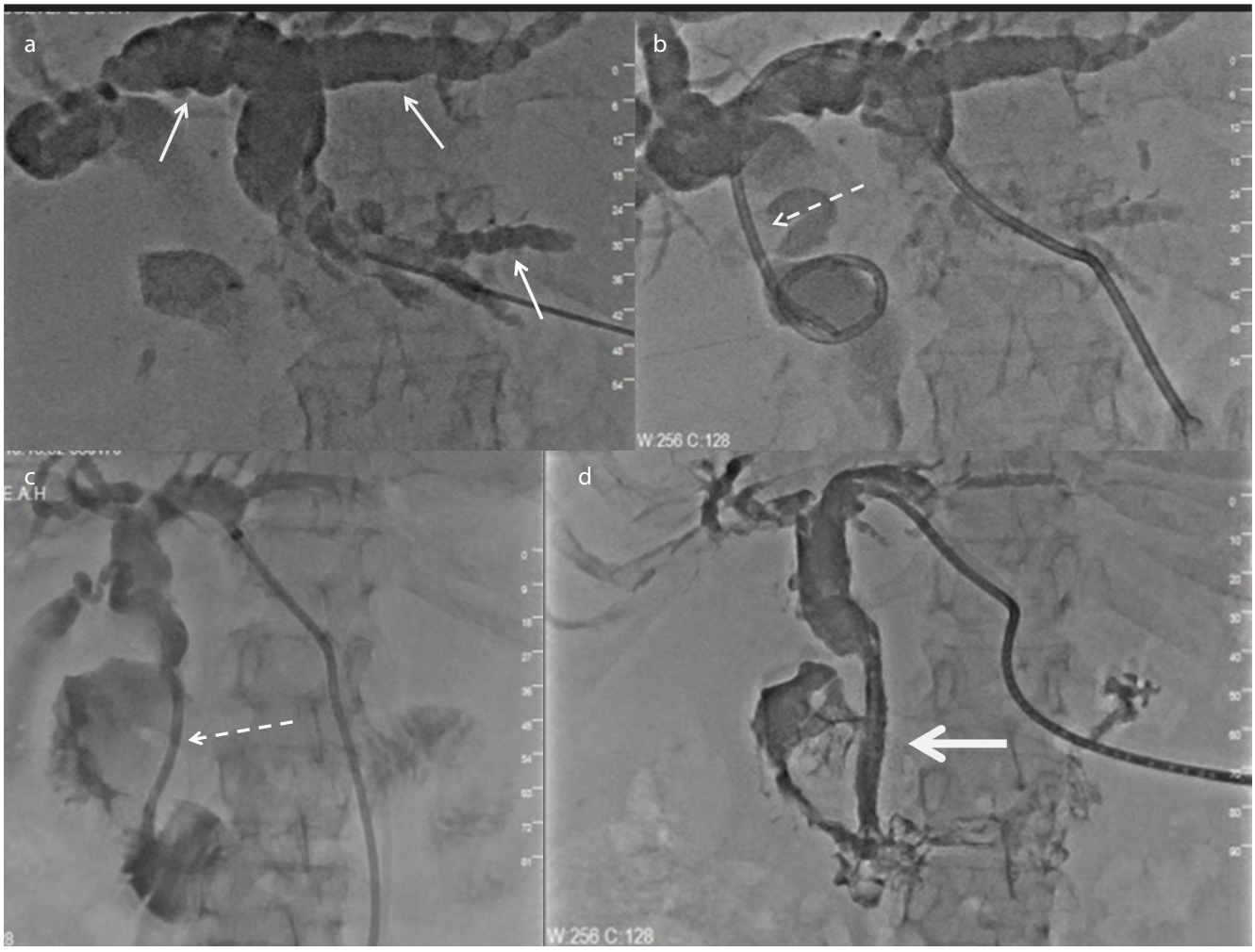

Figure 2. a-d. Fluoroscopy images are demonstrated after contrast material was injected into the bile ducts through percutaneously inserted Chiba needle. Severe dilatation is seen at the intrahepatic and extrahepatic bile ducts (white arrows) however contrast material unable to pass to duodenum via common bile duct (a). Guidewire was placed through the needle, internal biliary drainage catheter (dashed arrow) was placed and contrast passed via catheter into duodenum (b). In the control image after 1 week contrast passed from common bile duct to duodenum only through the catheter (dashed arrow) within the lumen (c). Self-expandable metallic stent (thick arrow) was placed and contrast material passed to duodenum without any filling defect (d).

drainage catheter was left in the bile duct to control patency of the SEMS.

The following week, after establishing stent patency, the last catheter was removed from the patient. At that time, we observed marked improvement in total bilirubin 3.78 mg/dL and direct bilirubin 2.86 mg/dL.

Palliative biliary drainage of malignant biliary obstruction in unresectable patients aims to improve liver function, resolve cholestasis, and reduce sepsis risk. Long term patency of a metallic stent can be challenging for malignant biliary obstruction. During the last twenty years, percutaneous or endoscopic retrograde cholangiopancreatography (ERCP) inserted stents have been the preferred treatment (4). Recently, plastic bare metallic stents have been replaced with covered metallic and drug eluting stents to increase stent patency and prevent tumor ingrowth. SEMS have proven superior because of their durability and lifespan, and have become the standard treatment for patients with unresectable malignant biliary obstruction whose life expectancy is greater than 3 months (1,5).

Several publications have demonstrated that intraductal ERFA, along with biliary stent placement for malignant biliary obstruction is feasible and effectively prolongs the

duration of stent patency (1-3). Common complications of ERFA are reported as post-procedure pain, biochemical pancreatitis, post-procedure rigors, cholecystitis, cholangitis, gallbladder empyema and hemobilia (1). Risk of cholangitis might be reduced with broad-spectrum antibiotics (3). In our patient we did not observe any of these complications.

In the literature, ERFA therapy has been previously utilized in primary biliary tract cancer that caused unresectable biliary obstruction. Until now, there have not been any publications relating ERFA and stenting of malignant biliary obstruction due to metastatic invasion of RCC. We treated our patient with a combination of percutaneous ERFA and SEMS placement, which worked well to address primary malignant biliary obstruction.

In conclusion, ERFA along with SEMS placement seems to be efficient method for treatment of malignant biliary obstruction, not only for biliary malignancies, but also metastatic disease. Randomized studies are needed to determine the effect of ERFA therapy on long term biliary stent patency.

Informed Consent: Informed consent was obtained from the patient who participated in this study.

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