Hepatic artery pseudoaneurysm formation following intraductal biliary radiofrequency ablation

A 73-year-old man with a history of liver transplantation developed cholestasis. No abnormality was seen on magnetic resonance imaging. Percutaneous cholangioscopy via a left-sided transhepatic tract (Fig. 1) demonstrated carpet-like villous change with biopsies showing high-grade dysplasia in the right and left ducts. Intraductal ultrasound (IDUS) showed a T1 lesion, with bile duct wall thickening to 2.4 mm. Radiofrequency ablation (RFA) was performed in the right and left hepatic ducts with an 8-French catheter (Habib EndoHPB, EMcision, Montreal, Canada) at 10W for 90 seconds. Sixteen days later the patient presented with melena, requiring transfusion of 6 units packed red blood cells. Angiography showed a 1.2-cm pseudoaneurysm of the right hepatic artery, which was thrombosed with percutaneous thrombin injection. Subsequent cholangioscopy demonstrated successful ablation of the biliary dysplasia (Fig. 1). The close temporal relationship of RFA to pseudoaneurysm formation, and the absence of other apparent etiologies, implicate intraductal RFA as the likely cause. RFA may be used to treat cholangiocarcinoma [1, 2] and intraductal extension of ampullary polyp [3]. The cross-sectional diameter of the RFA tissue ablation zone varies from 4.3 to 11.3 mm depending on the power and duration of treatment [4]. These values are probably underestimates, since they are based on ex-vivo experiments and do not take into account delayed tissue necrosis. We hypothesize that RFA induced necrosis of the bile duct wall and a portion of adjacent right hepatic artery, leading to pseudoaneurysm formation with subsequent rupture into the right hepatic duct.

The right hepatic artery may focally approach within 1 mm of the bile duct wall [5]. We now utilize IDUS immediately prior to RFA, and avoid performing RFA at 10W wherever a vessel passes within 4 mm of the IDUS probe (Fig. 2). However, when a closely approximating vessel cannot be avoided, we decrease the RFA energy setting.

Competing interests: None

Fig. 1 Right hepatic duct dysplasia treated by intraductal biliary radiofrequency ablation: a cholangiogram before treatment shows poor filling of the right hepatic duct; b cholangioscopy of the right hepatic duct shows sessile polyp; c follow-up cholangioscopy of the right hepatic duct after treatment shows successful ablation of the polyp.

Fig. 2 Intraductal ultrasound (IDUS) guides radiofrequency ablation (RFA) in a patient with hilar cholangiocarcinoma and recurrent stent occlusion: a IDUS probe (arrow) positioned at the proximal edge of a right hepatic biliary stent; b IDUS image at the same location shows the right hepatic artery approaching within 2.6 mm of the IDUS probe, with echogenic ends of the metal stent wires also visible; c RFA was performed within the stent (arrow), avoiding the location shown in a and b.
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