Hepatic artery pseudoaneursym 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 10 W 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 10 W 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.

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Competing interests: None

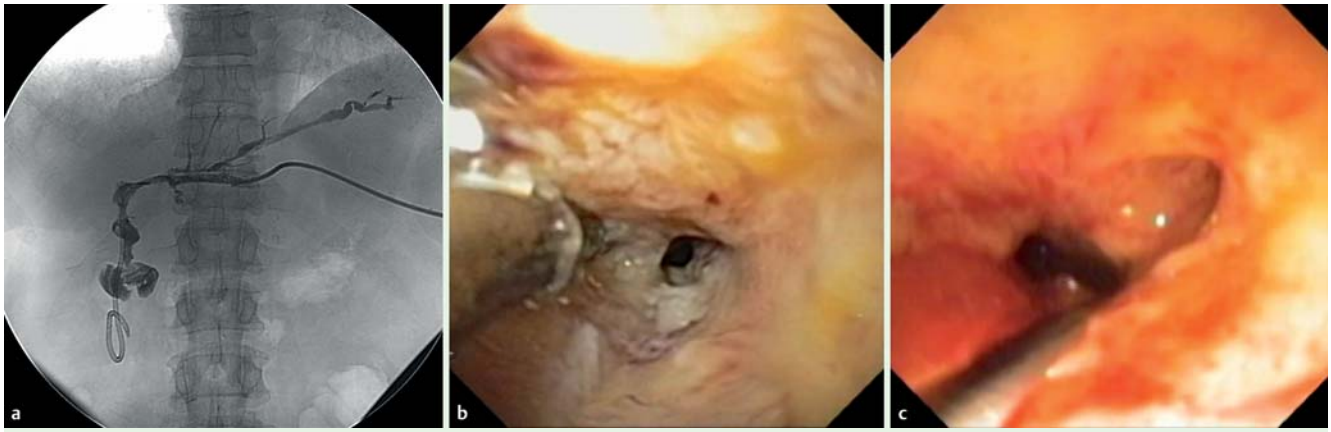

Fig. 1 Right hepatic duct dysplasia treated by intraductal biliary radiofrequency ablation: **a** cholangiogram before treatment shows poor filling of the right hepatic duct; **b** cholangioscopy of the right hepatic duct shows sessile polyp; **c** follow-up cholangioscopy of the right hepatic duct after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

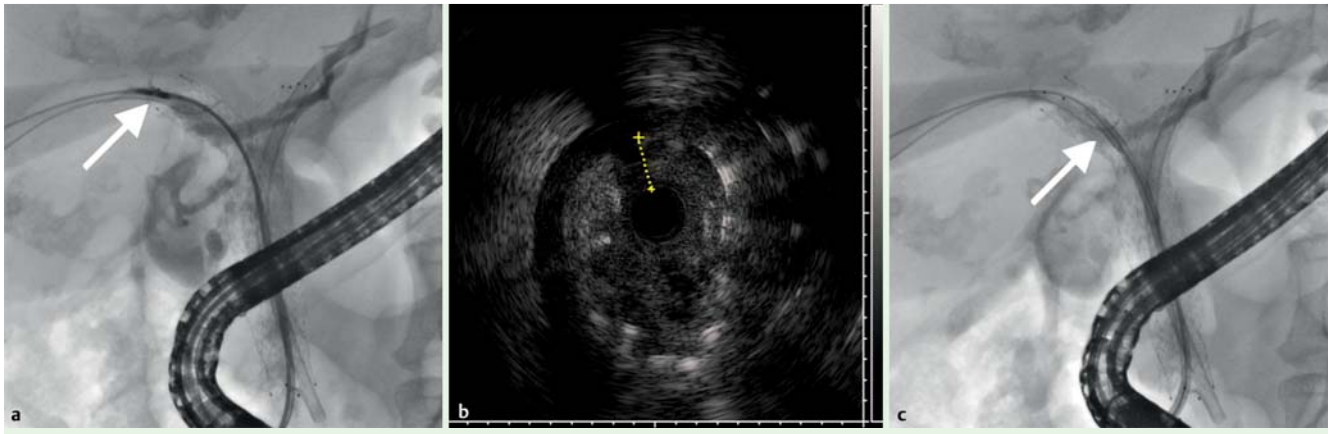

Fig. 2 Intraductal ultrasound (IDUS) guides radiofrequency ablation (RFA) in a patient with hilar cholangiocarcinoma and recurrent stent occlusion: **a** IDUS probe (arrow) positioned at the proximal edge of a right hepatic biliary stent; **b** IDUS image at the same location shows the right hepatic 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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