Endoscopic ultrasound-guided biliary drainage in a novel radiofrequency ablation-based swine biliary dilatation model

Endoscopic ultrasound (EUS)-guided drainage procedures are becoming increasingly widespread in clinical practice, even though they are technically challenging and require a substantial learning curve. In vivo swine biliary dilatation models for training have been described; however, they provide erratic biliary dilatation and can also be technically cumbersome [1–5]. We describe EUS-guided gallbladder drainage with a lumen-apposing metal stent (LAMS) in a novel swine biliary dilatation model. A 30-kg minipig underwent endoscopic retrograde cholangiography and temperature-controlled endobiliary radiofrequency ablation (EB-RFA) of the distal common bile duct (CBD) with a dedicated RFA system (ELRA, STARmed) (Video1). The ablation consisted of 10 W of power delivered via an endobiliary catheter-electrode, with a temperature sensor at a target temperature of 80 °C, for two rounds of 90 seconds. After 11 days, the pig was re-examined with a linear EUS scope, which revealed dilatation of the CBD and intrahepatic biliary ducts (*); c the RFA-induced hyperechoic lesion (arrows) in the distal CBD seen from the bulb; d the distal flange of the lumen-apposing metal stent, seen from the gastric antrum and correctly deployed in the distended gallbladder (**).

Temperature-controlled EB-RFA of the distal CBD proved to be a straightforward, effective, and novel technique to create a biliary stricture with subsequent massive upstream biliary dilatation. EUS-guided gallbladder drainage with a LAMS was feasible in this model, which is theoretically suitable also for other EUS-guided biliary interventions. Furthermore, the swine model provides excellent haptic feedback and suitable levels of realism in comparison to procedures undertaken in humans.

Competing interests

None
The authors

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DOI https://doi.org/10.1055/a-0867-9348
Published online: 2019
Endoscopy
© Georg Thieme Verlag KG
Stuttgart · New York
ISSN 0013-726X

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Video 1
Video showing endoscopic ultrasound-guided biliary drainage with a lumen-apposing metal stent in a novel swine biliary dilatation model obtained with a temperature-controlled endobiliary radiofrequency ablation system.