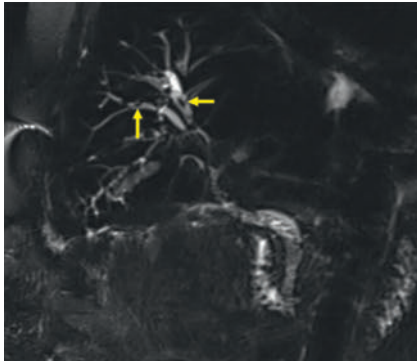
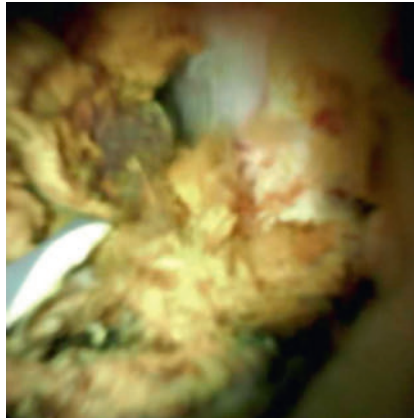


Cholangioscopy findings of biliary candidiasis post-liver transplantation



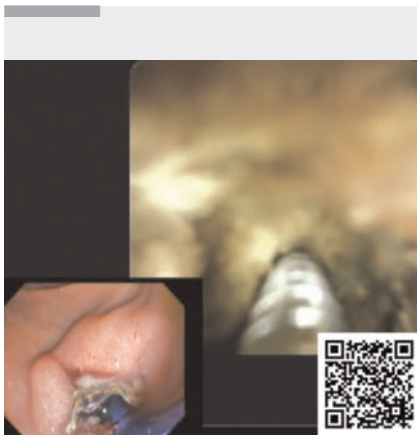
► **Fig. 1** Magnetic resonance imaging revealing filling defects (arrows) within the intrahepatic ducts suggestive of debris or fungal balls.



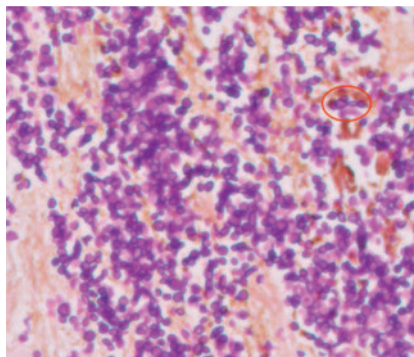
► **Fig. 2** Brown strands of fibrous tissue found at the confluence, representative of fungal overgrowth.



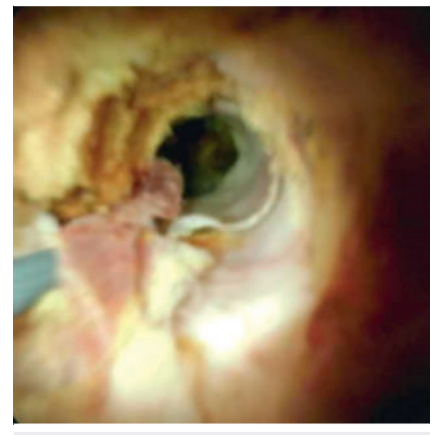
► **Fig. 3** Streaks of black mucosa in the intrahepatic ducts, suggestive of ischemic injury.



► **Video 1** Cholangioscopy findings of biliary candidiasis.



► **Fig. 4** Yeast forms with pseudohyphae (arrow) visible on hepatic duct biopsies with periodic acid-Schiff stain with diastase.



► **Fig. 5** Improvement in fungal overgrowth found within the right hepatic duct on repeat cholangioscopy.

Solid organ transplant patients are often subject to immunosuppressive agents, which predispose them to opportunistic infections. Of those infectious agents, fungal infections such as *Candida* are associated with the highest mortality rate [1].

A 51-year-old man with a history of cirrhosis after orthotopic liver transplantation, with postoperative course complicated by bile leak that was treated with placement of a covered metal stent, was found on magnetic resonance imaging to

have filling defects in the intrahepatic ducts suggestive of either debris or fungal balls (► **Fig. 1**). As the patient had persistent fungemia with *Candida glabrata* despite treatment, he underwent endoscopic retrograde cholangiopancreatography (ERCP) for further evaluation. Cholangioscopy (► **Video 1**) during ERCP revealed diffuse irregularities at the hepatic duct confluence, consisting of large amounts of brown fibrous tissue (► **Fig. 2**). Additionally, black streaks were scattered throughout the left hepatic ducts (► **Fig. 3**). Cholangioscopy-

guided biopsies and brush cytology were obtained, as well as cultures from the biopsies and aspirated biliary fluid. Then, 500 mL of amphotericin B (50 mg/500 mL) were directly instilled into the intrahepatic ducts via the cholangioscope over 30 minutes.

Brush cytology and intraductal biopsies revealed fungal organisms morphologically consistent with *Candida* (► **Fig. 4**), in addition to ulcerated mucosa with fungal cultures growing *Candida glabrata*. As a salvage treatment, we repeated ERCP-

1 week later with placement of a nasobiliary drain into the right hepatic duct. The patient received intrabiliary irrigation of amphotericin 12.5 mg three times daily, in addition to parenteral liposomal amphotericin and oral flucytosine, which resulted in resolution of the fungemia.

Repeat ERCP after 2 weeks of this regimen showed significantly improved fibrous-like material in the right hepatic duct (► Fig. 5), with mild improvement in the left hepatic duct. Owing to persistent fungemia and bacteremia, however, the patient required repeat liver transplantation 3 months later.

Endoscopy_UCTN_Code_TTT_1AR_2AK

Conflict of Interest

S. Han is a consultant for Boston Scientific. D. Y. Ryoo, S. M. Black, A. Limkemann, S. Sun, and N. Gray declare that they have no conflict of interest.

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