VIDEO CASE REPORT

Endoscopic treatment of a refractory benign biliary stricture using cholangioscopy-guided thulium laser stricturoplasty

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BACKGROUND

ERCP with balloon dilation and placement of multiple plastic stents or covered metal stents for distal biliary strictures has been established as the standard of care in the management of benign biliary strictures.[1,2] Etiologies include chronic pancreatitis, chronic inflammation from biliary stone disease, postsurgical injury following cholecystectomy, primary sclerosing cholangitis, and biliary anastomotic strictures.[1] Some biliary strictures, especially at the bifurcation and above, remain refractory to standard endoscopic therapies, with successful stricture resolution reported only in approximately 75% of patients.[3,4] Recently, we described cholangiopancreatoscopy-guided laser dissection/stricturoplasty as a novel therapeutic modality in the treatment of recalcitrant pancreaticobiliary strictures.[2,5] In this report, we present a patient in whom thulium laser stricturoplasty was used in the management of a refractory, benign biliary stricture.

Briefly, the case involves a 52-year-old male patient with a history of a recurrent benign common hepatic duct stricture of unknown etiology for 4 years. The patient had undergone multiple evaluations, including benign brushings and cholangioscopy-guided biopsies, and therapies including ERCP with dilation, multiple plastic stenting, and metal stenting. During a stent-free trial, the patient experienced recurrent jaundice, pruritus, and acholic stools approximately 6 months later. Because the patient desired to exhaust all minimally invasive modalities before resorting to surgical intervention with Roux-en-Y hepaticojejunostomy, the decision was made to perform cholangioscopy-guided laser dissection/stricturoplasty after a subsequent trial of stenting failed to resolve the stricture.

PROCEDURE

ERCP was performed, and cholangiogram demonstrated a moderate common hepatic duct stenosis of 4 mm in length, approximately 10 mm below the hepatic bifurcation, with upstream hepatic ductal dilation (Fig. 1). Cholangioscopy was subsequently performed using a SpyGlass DS II SpyScope (Boston Scientific, Marlborough, Mass, USA). A benign and smooth common hepatic duct stricture with concentric fibrosis without tumor vessels was visualized endoscopically (Fig. 2). The

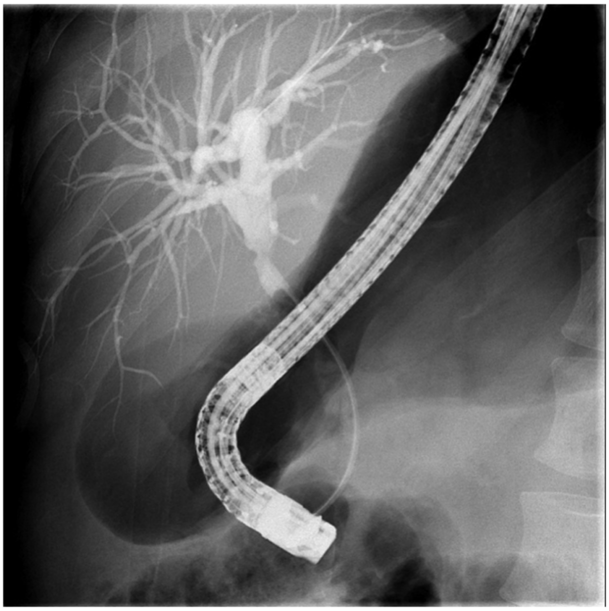

Figure 1. Cholangiogram demonstrating moderately severe common hepatic duct stricture.

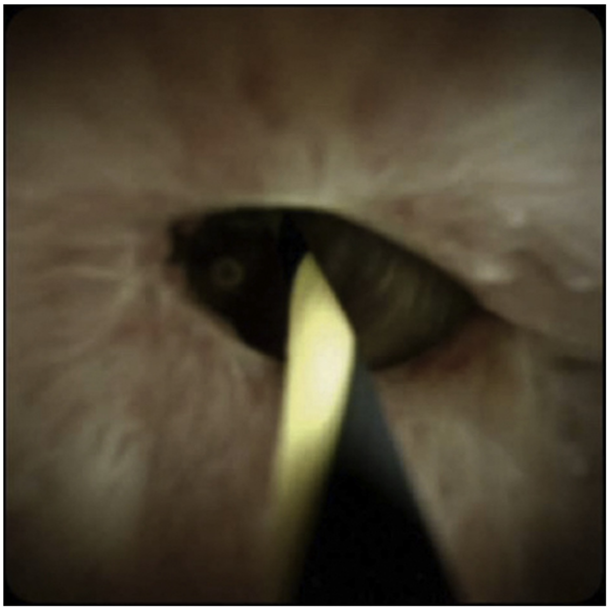

Figure 2. Cholangioscopy image of benign and smooth common hepatic duct stricture.

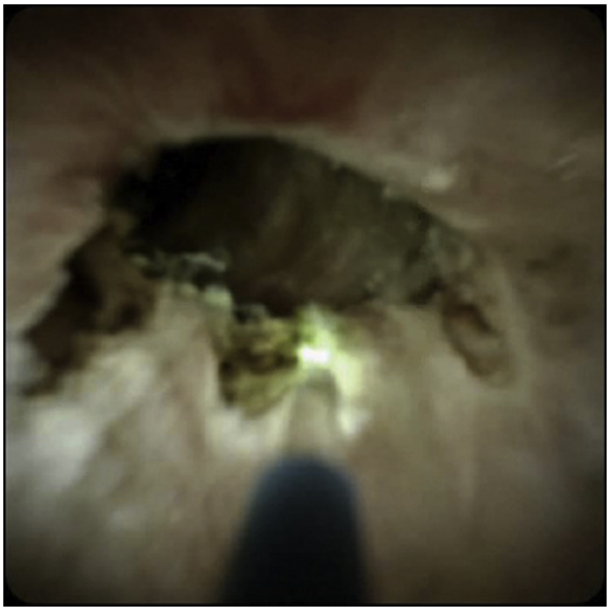

Figure 3. Cholangioscopy-guided thulium laser stricturoplasty of stricture.

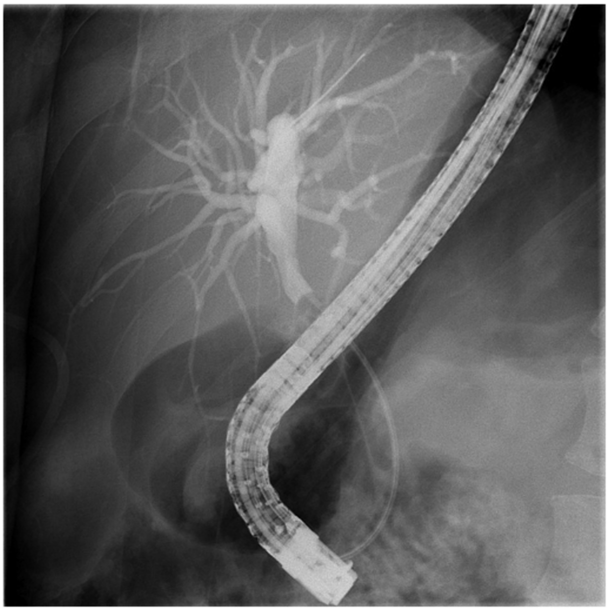

Figure 4. Occlusion cholangiogram demonstrating significant improvement in common hepatic duct stricture following index stricturoplasty.

cholangioscope was able to traverse the stricture with minimal resistance. Thulium laser, which has a continuous, shallower tissue penetration depth (0.25 mm) and less coagulation, with more of a "cut effect" compared to Holmium laser,[6] was used to perform stricturoplasty and ablation of fibrotic tissue. A single-use 272-μm fiber (set to continuous frequency, 7-10 W with a total of 162 J) was passed through the working channel of the cholangioscope, and stricturoplasty was performed using gentle strokes across the fibrotic area from proximal (upstream of the stenosis) to distal in 3 quadrants (Fig. 3; Video 1, available online at www.giejournal.org). A fourth quadrant was partially treated because of difficult angulation; however, it was believed that this portion of the stenosis was less critical.

The depth of dissection is not to exceed the depth of the adjacent normal bile duct and is controlled with swift upward and downward motions using the dials on the cholangioscope to reduce the risk of deep focal burn. The cholangioscope was removed, and the stricture was subsequently dilated with an 8-mm dilating balloon. The cholangiogram at the end of the procedure demonstrated near complete (~95%) resolution of the stricture (Fig. 4). Two 10F plastic stents were placed across the stenosis, and the procedure was complete.

Two weeks later, the stents were removed because the patient experienced right upper quadrant pain attributed to possible stent intolerance. Hepatic enzymes 2 months after stent removal remained normal. The patient experienced recurrence of right upper quadrant pain with an associated elevation in liver enzymes 6 months later. A follow-up ERCP was performed, which demonstrated recurrence of the common hepatic duct stricture, although to a milder degree compared to earlier stenting trials. The degree of recurrence was likely affected by intolerance of earlier stenting, which is thought to have synergistic effects with stricturoplasty in improving patency. ERCP with cholangioscopy-guided thulium laser stricturoplasty, balloon dilation, and stenting was repeated, followed by a repeat ERCP 6 weeks later for stent upsizing, at which time the stricture appeared markedly improved. The stents were subsequently exchanged in 2- to 3-month intervals. During this time, the patient remained asymptomatic, and stent tolerance was improved with the use of softer material stents. ERCP 11 months after initial laser stricturoplasty demonstrated approximately 75% resolution of stricture compared to pre-stricturoplasty.

DISCLOSURE

Dr Shah is an advisory board member and consultant for Boston Scientific and is a consultant for Cook Medical and Olympus. All other authors disclosed no financial relationships.

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https://doi.org/10.1016/j.vgie.2022.03.009