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CASE REPORT | BILIARY

A Unique Approach to Obtaining Tissue in a Difficult to Access Indeterminate Biliary Stricture: Percutaneous Cholangioscopy and Biopsy

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ABSTRACT

When evaluating biliary strictures, establishing a diagnosis can present challenges. The first-line approach of endoscopic retrograde cholangiopancreatography can often involve anatomic restrictions. Traditionally, percutaneous transhepatic cholangioscopy has been the answer for biopsies unable to be obtained with the modalities above but requires time for large tract dilation and days of sinus tract maturation to allow for a scope. We present a novel case of percutaneous digital cholangioscopy with SpyGlass DS, a small caliber scope traditionally used with endoscopic retrograde cholangiopancreatography, used for percutaneous transhepatic cholangioscopy after previous failed attempts by several different standard methods. Our case highlights a multidisciplinary approach in ultimately diagnosing malignancy.

KEYWORDS: SpyGlass; cholangioscopy; biliary stricture

INTRODUCTION

When evaluating biliary strictures, establishing a diagnosis can present challenges. Tortuous duodenal and/or cholangial anatomy, that can often be seen in patients with carcinoma, present obstacles to practically advancing an endoscope or scope to the biopsy target. In addition, the first-line tissue acquisition modality of cytology brushings has low sensitivity and poor negative predictive value, estimated to be 41.6% and 58%, respectively.[1] We present a case of digital cholangioscopy (DC) with a Spyglass Direct Visualization System II cholangioscope-assisted (SpyDS; Spyglass DS Boston Scientific Corporation, Marlborough, MA) percutaneous transhepatic cholangioscopy (PTCS), resulting in a definitive diagnosis of a cholangiocarcinoma after previous failed attempts through standard methods.

CASE REPORT

A 59-year-old woman presented with 1 week of epigastric pain, jaundice, and pruritus. Alkaline phosphatase (507 U/L, NV 35–105 U/L), direct bilirubin (9.1 mg/dL, NV 0.0–0.3 mg/dL), and CA 19-9 (6,871 U/mL, NV 0–35 U/mL) were elevated. Abdominal magnetic resonance imaging revealed intrahepatic biliary ductal dilation with cutoff near the hepatic hilum, concerning for cholangiocarcinoma (Figure 1). Endoscopic retrograde cholangiopancreatography (ERCP) could not be completed because it revealed fixed luminal narrowing in the duodenal sweep with edema and ulcerations, and biopsies from the duodenal stricture showed small bowel inflammation. The patient subsequently underwent interventional radiology (IR) fluoroscopic-guided percutaneous transhepatic catheter placement, with direct biliary duct punch and brush biopsy that showed atypical epithelial cells. Endoscopic ultrasound (EUS) with fine needle aspiration (FNA) of a hypoechoic area in the gallbladder neck showed acute inflammation. The patient was discussed at the multidisciplinary tumor board, and a collaborative effort between IR and gastroenterology was planned. Percutaneous access was upsized from 10 to 12 Fr to accommodate a SpyDS cholangioscope freely. Subsequently, a cholangioscope was advanced through the catheter sheath across the common hepatic duct to the level of the hilar stricture, and biopsies were obtained under direct visualization (Figure 2), which were positive for adenocarcinoma (Figure 3). The patient then began chemotherapy.

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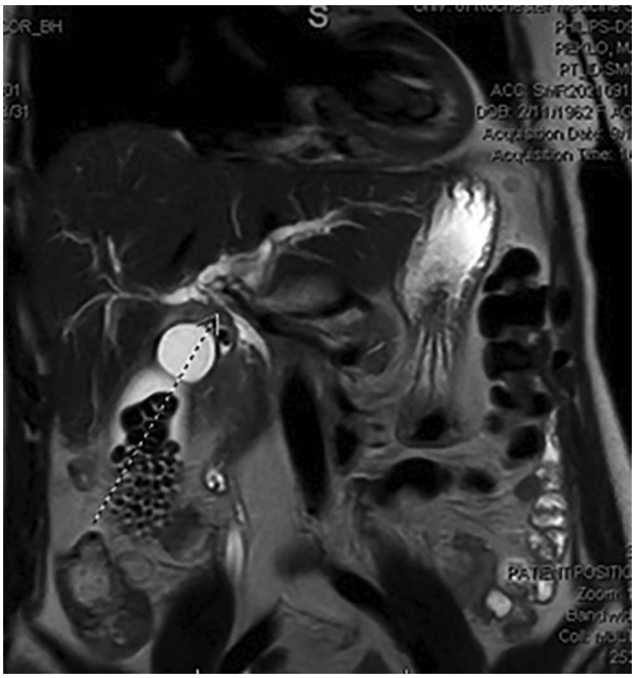

Figure 1. Magnetic resonance imaging showing intrahepatic ductal dilation with cutoff at the hilum and prominent perihilar soft tissue.

DISCUSSION

The management of benign biliary strictures, such as those due to chronic pancreatitis, primary sclerosing cholangitis, and choledocholithiasis, differs greatly from the treatment of malignant strictures, which often require surgical intervention. For this reason, establishing a diagnosis is essential to proceed with an appropriate treatment plan and potentially spare a patient from a high-risk surgery. However, when evaluating strictures of the common bile duct, establishing a definitive diagnosis often presents challenges.

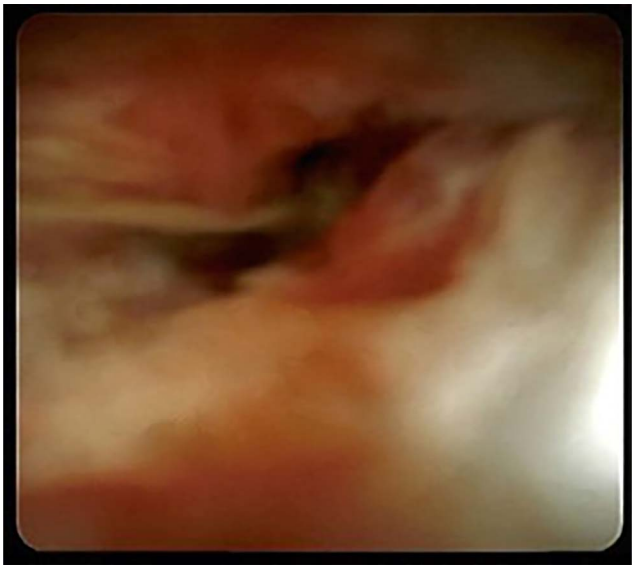

Figure 2. Image taken by a Spyglass cholangioscope of common bile duct stricture.

As discussed above, ERCP with brushings is the first-line method to evaluate biliary strictures; however, tissue yield has low sensitivity (41.6%).[1] Although EUS-FNA has been shown to have the highest sensitivity for tissue sampling at 93.8%, this is not always possible because of anatomical restrictions, such as the presence of vascular structures, and angulation causing the needle to be unable to exit the scope.[2] In a study evaluating the utility of EUS in cholangiocarcinoma, the sensitivity of EUS-FNA to diagnose cholangiocarcinoma was found to be 73%, with a sensitivity of 81% for distal tumors and 59% for proximal lesions.[3] Furthermore, EUS success is partially dependent on endoscopist experience.[4,5]

The Spyglass cholangioscope was introduced in late 2006 and was initially a fiberoptic platform. Subsequently, in 2015, the direct visualization system was introduced, which enabled high resolution imaging and therapy during an ERCP to target biopsies and fragment stones. ERCP with SpyDS-directed biopsy has been reported to have higher sensitivity when compared with ERCP-directed cytology brushings for definitive diagnosis of a malignant biliary stricture, 90% vs 30%–50%, respectively.[6,7]

Percutaneous transhepatic cholangioscopy (PTCS) has been proposed as an alternative approach when the peroral approach was not feasible.[2] PTCS-guided biopsy sensitivity has been demonstrated to be far superior to imaging diagnosis alone, with estimates of biopsy sensitivity as high as 85.7%, compared with computed tomography imaging at 42.9%, magnetic resonance cholangiopancreatography at 53.3%, and direct cholangiography at 70.8%.[8] However, traditional PTCS requires dilation to 16–18 Fr and at least 7–10 days of sinus tract maturation before scope advancement.

There are several benefits to SpyDS when compared with traditional PTCS. The SpyDS diameter is 10.5 Fr and therefore requires a biliary tract dilation to only 12 Fr, compared with the 16–18 Fr diameter that traditional PTCS requires. The smaller biliary tract avoids unnecessary time, pain, and suffering, associated with larger tract dilations. In addition, the need for only a single operator, a dedicated irrigation channel, 4-way deflected steering, and sterile packaging, all position digital

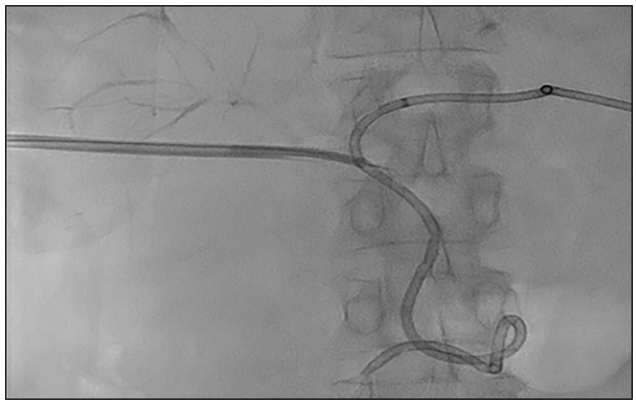

Figure 3. Spyglass cholangioscope advancing through percutaneous transhepatic cholangioscopy to obtain biopsies.

cholangioscopy as a superior method of both stone management and biopsy compared with traditional PTCS.

Although percutaneous cholangioscopy has been used for the management of biliary stones, there are limited reports of intraductal biopsy reported in the literature. In one case series consisting of 5 patients, SpyDS DC was used through a percutaneous approach, with 4 cases of biliary stone removal and case requiring 1 biopsy of a biliary stricture, which was ultimately reported as benign inflammatory tissue.[9] Chon et al reported 19 SpyDS-assisted PTCS procedures in 13 patients, e8 with bile duct stones and only f5 with biliary strictures. All strictures were biopsied using SpyBite forceps, all with ultimate diagnoses of cholangiocarcinoma.[10] The success rate of SpyDS PTCS biopsy reported in the literature has been 100%, albeit with extremely limited data. Furthermore, there have been no reported adverse events, while the reported adverse events from traditional PTCS range from 0% to 17%.[10–13] Hypotheses for why the adverse event rates are so low for DC PTCS biopsy include smaller tract dilatation, prior antibiotic treatment of cholangitis, and continuous irrigation of the biliary tract during the procedure itself, which may contribute to improved biliary flow.

Our case highlights a multidisciplinary approach with digital cholangioscopy-assisted PTCS in diagnosing malignancy when standard methods were unsuccessful. With the need for a safe, effective, and painless method to both biopsy indeterminate/inaccessible biliary strictures and treat biliary stones in patients where ERCP and EUS/FNA are not achievable, we believe digital cholangioscopy-assisted PTCS is positioned to be a potential answer, though with more prospective data needed to identify long-term outcomes of this novel approach.

DISCLOSURES

Author contributions: A. Schubach: writing manuscript draft and revisions. A. Penmetsa: manuscript revisions. A. Sharma and S. Kothari: manuscript revisions, interventionalist on case. S. Kothari is the author guarantor.

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Informed consent could not be obtained from the family of the deceased. All identifying information has been removed from this case report to protect patient privacy.

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