Management of malignant biliary diseases by the use of peroral and percutaneous cholangioscopy

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Background and Aims: The single-operator digital cholangioscope has allowed visual access to the biliary tree and the ability to perform selective biopsies. This has significantly improved our diagnostic yield in bile-duct disorders. Cholangioscopy requires specialized equipment and expertise. It is especially challenging in altered anatomy for various reasons, including difficulty in accessing the biliary tree, difficulty in maintaining endoscope position, and difficulty in using ERCP specialized tools. In addition, the use of cholangioscopy in interventional procedures has been very limited. In this video, we demonstrate some of the diagnostic and therapeutic uses of percutaneous cholangioscopy in patients with altered anatomy of the biliary tree.

Methods: Percutaneous cholangioscopy was performed in 3 different procedures in 2 patients with altered anatomy of the biliary tree. The first was for the diagnosis of a distally located malignant biliary stricture, the second was for management of hemobilia, and the third was for biliary stent placement.

Results: Technical and clinical success was achieved in all 3 situations. There were no procedure-related adverse events.

Conclusion: The use of percutaneous cholangioscopy in altered anatomy for diagnostic and therapeutic uses is safe and effective and may prove very useful in selected unusual conditions. (VideoGIE 2019;4:431-5.)

Percutaneous cholangioscopy (PC) is a complicated procedure that requires special expertise. It has both diagnostic and therapeutic applications. Better visualization of the biliary tract and highly selective sampling of suggestive lesions from the bile ducts are the main diagnostic uses of PC.

Jung et al[1] studied the role of PC in the diagnosis of malignant hilar strictures in a group of 177 patients. They found that the sensitivity of PC in detecting hilar malignant strictures by direct observation of the tumor vessel combined with histopathologic examination was 88.4%. A similar earlier study by Kim et al[2] concluded that a combination of tumor vessel observation with PC-guided biopsy of malignant biliary strictures has a diagnostic sensitivity of 96%, with a higher rate of preoperative diagnosis.

Therapeutically, PC can be helpful in patients with complicated choledocholithiasis, particularly in patients with anatomically variant biliary ducts that are difficult to manage with ERCP. In combination with lithotripsy, PC can be used effectively in the removal of intrahepatic duct stones. Other PC therapeutic indications include treatment of biliary strictures, foreign body removal, and local therapy of biliary lesions with argon plasma coagulation or photodynamic therapy.[3]

Yeh et al[4] reviewed the results of removing intrahepatic duct stones in 165 patients over a period of 12 years. The results showed a success rate of 80%. The therapeutic role of PC in the treatment of hepatolithiasis was also evaluated by Huang et al[5] in a retrospective study that included 245 patients and continued for 22 years. The results showed achievement of complete clearance of hepatolithiasis in 85.3% of patients; the rate of major adverse events was 1.6%. In comparison with peroral cholangioscopy, PC was found to be superior in the management of hepatolithiasis.

Cholangioscopy has also been used to facilitate guidewire passage in difficult ERCP when wire access fails with standard maneuvers. This was demonstrated by Parsi[6] in a case report of a 64-year-old man who had an impacted cystic duct stone. In that case, conventional means to place the guidewire failed. Using cholangioscopy, Parsi achieved guidewire placement in the cystic duct remnant, with subsequent removal of the impacted stone. Woo et al[7] studied SpyGlass cholangioscopy-assisted guidewire placement in 15 patients in whom guidewire placement by conventional methods was difficult for more than 10 minutes (Digital SpyGlass DS, Boston Scientific, Natick, Mass, USA). The results showed a total success rate of 60%, with no procedure-related adverse events.

The role of cholangioscopy in a hemobilia workup has been described in case reports in various forms, including during

Figure 1. Coronal section of abdominal CT scan showing biliary dilation but no evidence of obvious disease.

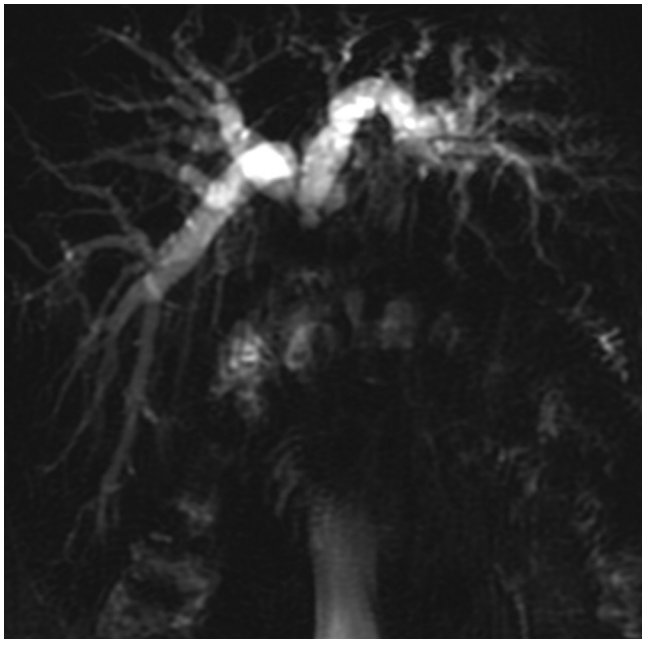

Figure 2. MRCP view showing a hilar stricture.

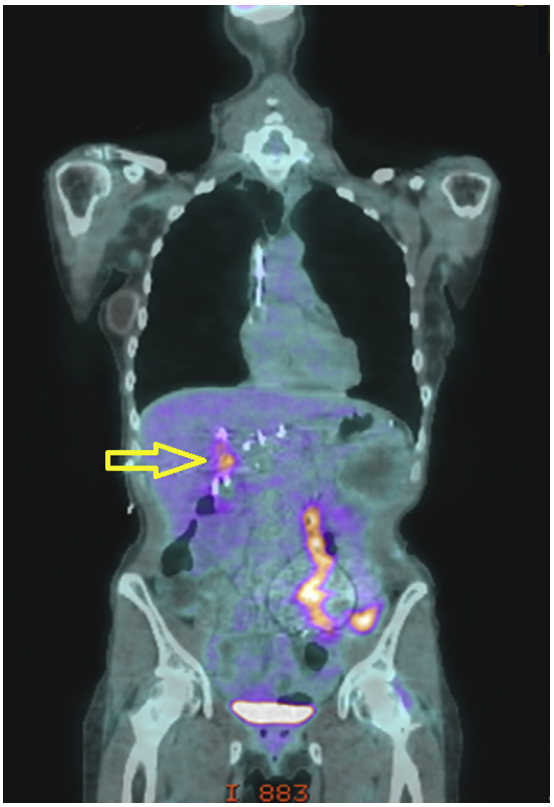

Figure 3. Positron emission tomography/CT scan showing obvious uptake in the hepatic hilum (*yellow arrow*) but no other abnormalities.

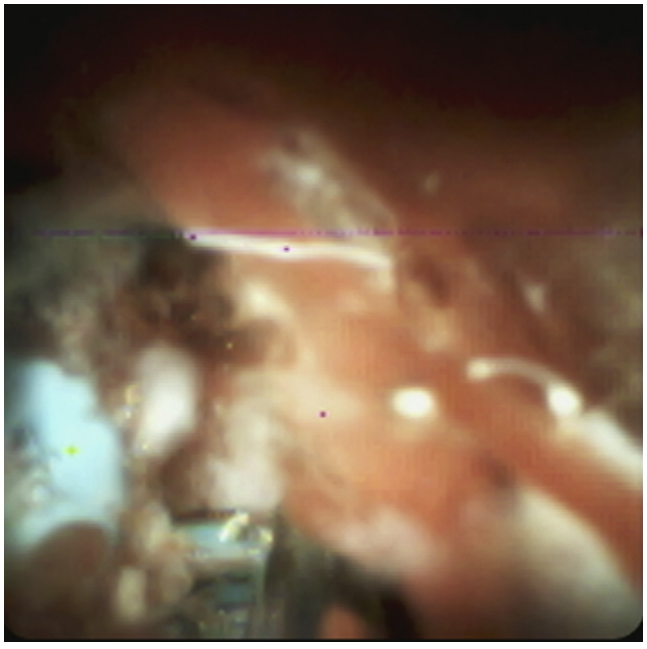

Figure 4. A friable mass is seen after cholangioscope is advanced into the hilum.

surgery and with the ultrathin endoscope. Aydinli et al[8] reported a case of intraoperative cholangioscopy with an ultrathin endoscope used to identify intrabiliary active bleeding. Sum Foong et al[9] described a case of biliary angiodysplasia that was diagnosed by SpyGlass cholangioscopy. Komaki et al[10] reported the case of a 60-year-old man with repeated hemobilia who was successfully treated by argon plasma coagulation under direct peroral

Figure 5. Arteriogram showing right hepatic artery invasion by the tumor (*yellow arrow*).

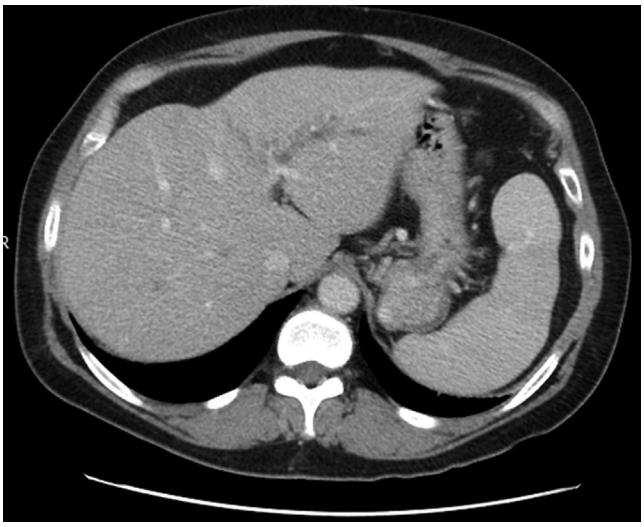

Figure 6. Axial section of abdominal CT scan showing a mass in the tail of the pancreas.

Figure 7. Percutaneous biliary cholangiogram showing a hilar stricture (*yellow arrow*) with dilated intrahepatic bile duct.

cholangioscopy after the failure of arterial embolization. Zhang and Craig[11] reported on a 90-year-old woman with active bleeding arising from the cystic duct orifice as a result of gallbladder cancer. The authors used cholangioscopy for placement of a fully covered self-expanding metal stent to cover the cystic duct origin.

Video 1 (available online at www.VideoGIE.org) presents the potential uses of cholangioscopy through the per-oral and percutaneous approaches for diagnostic and therapeutic purposes in altered anatomy.

METHODS

Patient 1

A 55-year-old woman with a history of Whipple procedure for pancreatic cancer presented with jaundice. Abdominal CT scan showed biliary dilation but no evidence of obvious disease (Fig. 1). MRCP showed a distal biliary stricture (Fig. 2). Brushings were negative for malignancy. Her elevated CA 19-9 and abnormal positron emission tomography–CT, which showed an increased uptake in the hilum (Fig. 3), prompted further workup with high suspicion of cancer recurrence. PC was performed through a sheath with a 10F inner diameter placed by the interventional radiology service. After advancement of the cholangioscope into the hilum, a friable mass was seen (Fig. 4).

Biopsy specimens obtained from the mass during cholangioscopy were positive for adenocarcinoma. The patient presented 2 months later with sudden-onset melena and jaundice. Hemobilia was suspected. The results of upper endoscopy and CT bleeding protocol were negative. The result of angiography was negative

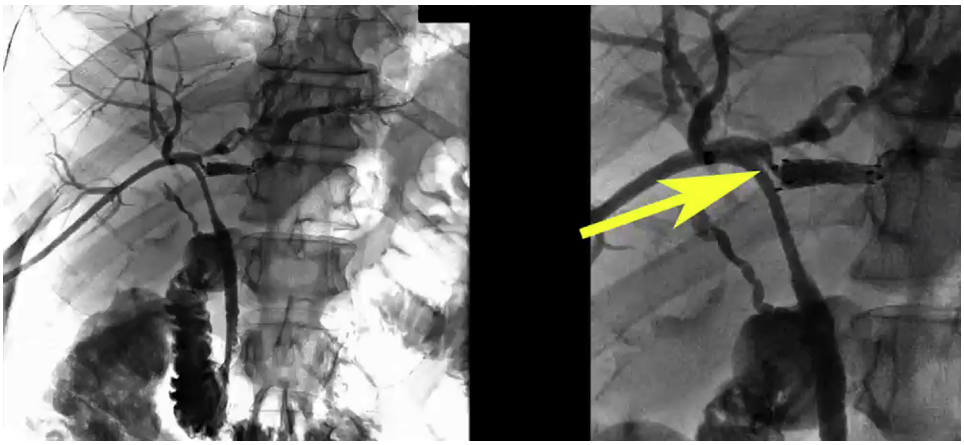

Figure 8. Placement of stent inside the dilated duct (*yellow arrow*).

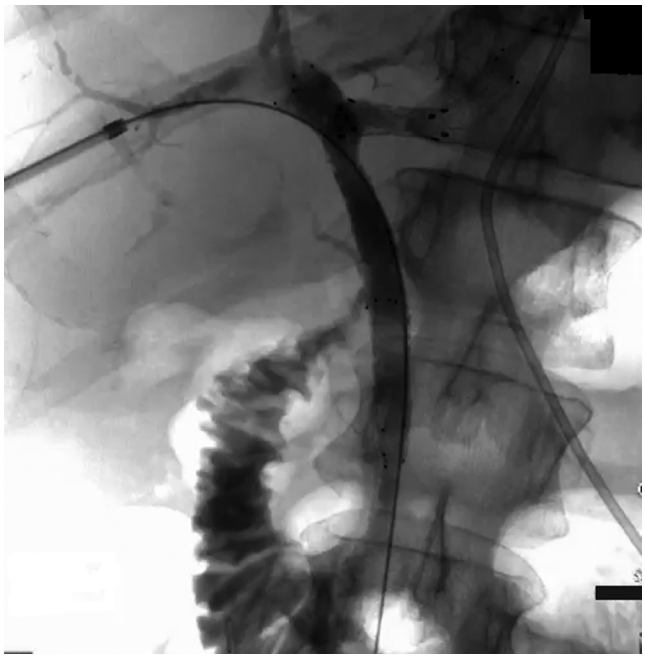

Figure 9. Passage of wire into the intrahepatic biliary tree through the stent.

despite recurrent bleeding. PC identified the likely source of the bleeding from an area of the right hepatic duct invaded by a tumor, as evidenced by active bleeding from that area and an irregular appearance of the artery (Fig. 5, *yellow arrow*).

The patient underwent selective right hepatic artery embolization with a long-term resolution of the bleeding. There were no procedure-related adverse events or hepatic decompensation. Cholangioscopy in this patient provided tissue confirmation of cancer recurrence and helped in the management of hemobilia, a condition that otherwise is very difficult to diagnose and treat.

Patient 2

A 61-year-old man with a history of pancreatic tail cancer presented with jaundice and hilar biliary obstruction. Abdominal CT scan showed a pancreatic tail mass (Fig. 6). ERCP was performed but was unsuccessful, so the patient underwent PC, which showed a hilar stricture with dilation of the intrahepatic bile duct (Fig. 7, *yellow arrow*). Interventional radiology-guided biliary drainage was performed. This hilar stricture resulted from intrabiliary metastasis from the malignant mass in the pancreatic tail.

Placement of a biliary drain was performed. An attempt to place a stent in the left hepatic system through the right drain led to maldeployment of a left stent proximal to the stricture (Fig. 8). The patient subsequently presented to our center with a bile leak and sepsis. Because of the bile leak, his left-sided biliary tree was decompressed, making percutaneous access very challenging. In addition, ERCP had the potential of draining both the right and the left biliary tree, which was needed for resolution of the infection.

Passage of the wire through the interstices of the previously deployed stent was a challenge to the deployment of the new stent because the stent might have failed to expand if it was perfectly aligned inside the previous stent (telescoping). Cholangioscopy was used, as shown in the video, to verify the wire passage through the stent without passages through the interstices (Fig. 9), thus allowing the new stent a good alignment and full expansion and leading to resolution of the obstruction and sepsis.

RESULTS

Technical and clinical success were achieved in all 3 situations. In patient 2, a bile leak resulted secondary to stent maldeployment initially. PC was performed to place

the stent successfully, leading to resolution of the obstruction.

CONCLUSION

The innovative use of PC in altered anatomy for diagnostic and therapeutic uses, specifically the use of cholangioscopy for intrahepatic interventional work, is presented. These techniques were safe and effective and may prove very useful in selected unusual conditions.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviation: PC, percutaneous cholangioscopy.

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