REVIEW ARTICLE

Tips and tricks for endoscopic transpapillary gallbladder drainage

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Background and Aims: Percutaneous gallbladder drainage has traditionally been the reference standard treatment for cholecystitis in patients deemed unfit for surgery. Endoscopic transpapillary gallbladder drainage has emerged as a reliable alternative that offers an internal, incisionless option in nonsurgical patients. The aim of this study was to describe techniques for successful selective cystic duct cannulation and gallbladder drainage during ERCP.

Methods: A series of endoscopic transpapillary gallbladder procedures is shown, including endoscopic and fluoroscopic video and images. Each case highlights best practices, devices, and techniques to aid with successful completion of challenging cases.

Results: Standard cystic duct cannulation and gallbladder access is described using a standard catheter and a 0.035-inch angled guidewire. Challenges to selective cystic duct cannulation are overcome using various approaches, including using a rotatable catheter system, downsizing to a smaller guidewire, occluding the proximal common hepatic duct with an occlusion balloon, and directly intubating the cystic duct using peroral cholangioscopy. Dilation of the cystic duct is performed using standard devices designed for biliary intervention, but smaller, percutaneous angioplasty balloons are used for small ducts and severe strictures. After dilation, a plastic, double-pigtail stent is deployed across the papilla, and access is reobtained in a similar fashion to place a second, parallel stent. To eliminate the need to re-access the gallbladder after initial stent deployment, a cytology brush catheter is repurposed to obtain dual-wire access within the gallbladder before initial stent deployment.

Conclusions: When the fundamentals of ERCP and the techniques described here are used, endoscopic transpapillary gallbladder drainage can be performed safely and effectively to treat cholecystitis in patients who are not surgical candidates. (VideoGIE 2023;8:474-7.)

INTRODUCTION

Percutaneous gallbladder drainage has conventionally been the reference standard for the treatment of acute cholecystitis in patients who are not candidates for surgical cholecystectomy.[1] This commits the patient to a cumbersome external drain that requires routine exchange with risks of infection, permanent fistula formation, and decreased quality of life.[2,3] Endoscopic transpapillary gallbladder drainage became feasible in the early 1980s with the description of selective cystic duct cannulation and, alongside EUS-guided gallbladder drainage, has emerged as an effective treatment of acute cholecystitis with internal drainage.[4,5] The transpapillary approach can be performed in patients with a patent cystic duct when expertise is available. The technique builds on fundamentals of ERCP; however, there are several technical considerations that can help ensure the procedure is successful (Video 1, available online at www.videogie.org). The overall framework for transpapillary gallbladder drainage includes (1) appropriate patient selection, (2) selective cystic duct cannulation and gallbladder access, (3) cystic duct dilation, and (4) stenting.

PATIENT SELECTION

A transpapillary approach may be preferred in patients with ascites, severe coagulopathy, or anatomy not amenable to percutaneous gallbladder access.[4] Surgical evaluation is essential to determine cholecystectomy candidacy at the time of presentation as well as in the future as this can impact the selected endoscopic approach. Prompt

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surgical evaluation when acute cholecystitis is suspected, particularly in patients undergoing ERCP for other indications, is important as transpapillary drainage can be performed at index ERCP if cholecystectomy is deferred. Transpapillary drainage preserves native anatomy and is felt to be advantageous if a patient may be a surgical candidate in the future, although preliminary data suggest EUS-guided gallbladder drainage is safe in this population as well.[6,7] A transpapillary approach may also be favored in patients with large ascites, coagulopathy, and portal hypertension who might have significant collaterals around the gallbladder. There should be a nuanced risk-benefit discussion with the patient, outlining potential treatment options and possible adverse events, including recurrent cholecystitis, stent migration, bleeding, and need for additional procedures.[8]

SELECTIVE CYSTIC DUCT CANNULATION

A standard cholangiogram is initially performed with attention to the location and orientation of the cystic duct takeoff. A biliary catheter can then be advanced with slight bowing to allow for cannulation of the cystic duct and passage of a guidewire, typically a 0.035-inch angled guidewire. The wire is carefully navigated through an often-tortuous cystic duct, across the valves of Heister, and coiled in the gallbladder. If initial attempts to access the cystic duct are unsuccessful, redefining anatomy with additional contrast or changing the angle of image acquisition can be helpful. A rotatable catheter system or smaller diameter guidewire (eg, 0.018 inches) can facilitate access of a particularly angulated or strictured duct. Another technique requires deep biliary canulation with 2 wires. One wire is used to advance a balloon catheter with the balloon occluding the common hepatic duct just proximal to the cystic duct takeoff. The second wire is withdrawn and advanced, using the inflated balloon as a "backboard" to guide it into the cystic duct. Lastly, if fluoroscopic techniques fail, direct peroral cholangioscopy can be used to locate the cystic duct and advance a wire under direct vision. While use of a cholangioscope increases procedural cost, it is an effective salvage approach in patients with limited alternative therapeutic options.

CYSTIC DUCT DILATION

Critically ill patients who are not candidates for cholecystectomy will often have acalculous cholecystitis; endoscopists should anticipate a severely strictured cystic duct.[9] Dilation is key to allowing for subsequent intervention and adequate drainage. This can typically be performed using standard biliary dilators including balloons and tapered catheters. If a severe stricture is encountered, particularly those that require downsizing of the guidewire to traverse, cross-platform percutaneous angioplasty balloons are an effective option. These 3- or 4-mm diameter balloons were initially designed for percutaneous coronary and vascular interventions but are compatible with ERCP platforms over 0.018-inch guidewires. Their use has been previously described for biliary and EUS-guided pancreatic interventions.[10-12]

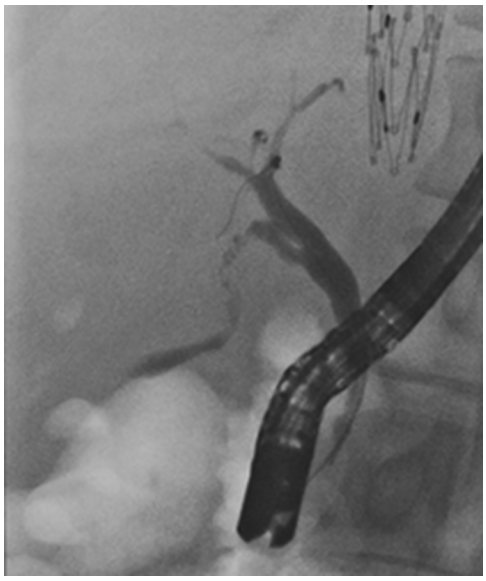

Figure 1. Cholangiogram mapping cystic duct takeoff.

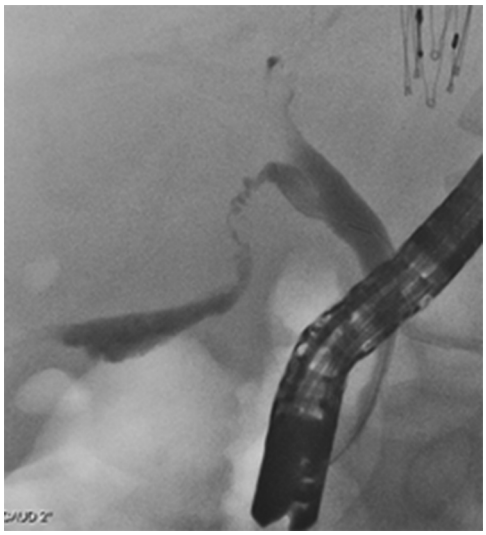

Figure 2. Selective cannulation of the cystic duct.

STENTING

Gallbladder stents treat acute cholecystitis through multiple mechanisms, including decompression to minimize transmural pressure and ischemia, prevention of stone impaction, and drainage through a wicking effect.[13] Plastic

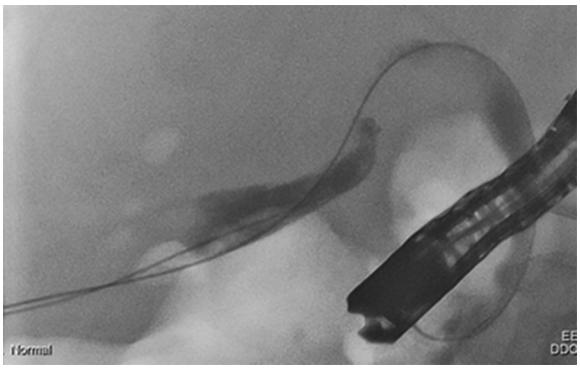

Figure 3. Guidewire coiled into gallbladder.

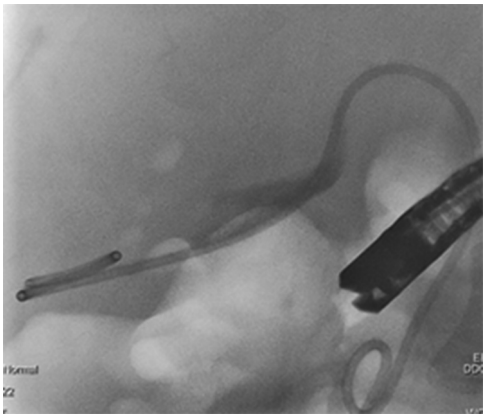

Figure 4. Deployment of first plastic stent.

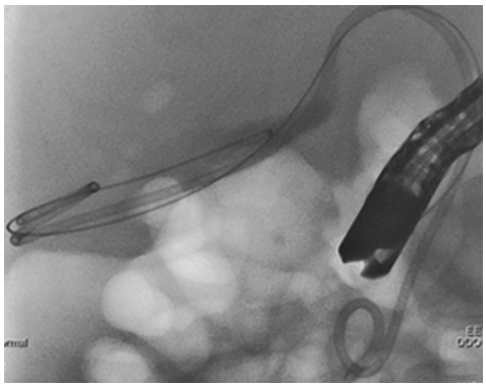

Figure 5. Recannulation of cystic duct with wire coiled in the gallbladder.

Figure 6. Final imaging of 2 parallel plastic stents draining a markedly distended gallbladder.

double-pigtail stents with 5F to 7F diameters are typically used for this purpose with stent length determined by length of the cystic duct and common bile duct. The number of stents is often limited by patient anatomy, including duct size and presence of stricture. Therefore, exact stent size and number can vary. While comparative data are limited, if feasible, our practice is to place 2 parallel stents for definitive management, reducing the risk of obstruction and need for reintervention.[14,15] To place a parallel stent, the cystic duct can be re-accessed using the standard technique previously described (Figs. 1-6). However, re-accessing the gallbladder after the first stent is deployed can be technically challenging in certain cases. A cytology brush catheter can be repurposed to obtain dual wire access up front. The cytology brush catheter is advanced into the gallbladder over the original guidewire. The brush is then removed and a second wire advanced through the original brush channel. The catheter can then be withdrawn, leaving 2 parallel wires extending from the gallbladder across the papilla. Two stents are then sequentially placed without losing access to the gallbladder after the initial stent is deployed.

FOLLOW-UP

Plastic stents are left in-situ indefinitely for management of cholecystitis. Data have shown strong efficacy and durability, particularly when a dual-stent approach is pursued, with a 95.9% long-term clinical success rate in one cohort.[15] Generally, success rates range from 64% to 100% in the literature.[16] Routine exchange is generally not performed except in the setting of symptoms concerning for obstruction and/or recurrence. In select cases, ERCP will be repeated once inflammation has improved if only 1 stent was placed during index endoscopy as this has previously been identified as a risk factor for recurrence.[15] It is important to acknowledge that these patients tend to carry significant procedural and sedation risk, and repeat endoscopy should be performed if the risk profile is overall favorable, along with a nuanced discussion with the patient.

CONCLUSION

Ultimately, the specific techniques used to achieve transpapillary gallbladder drainage will vary depending on

unique clinical and procedural factors. Awareness of the approaches described here will maximize the likelihood of technical and clinical success. When the fundamentals of ERCP alongside the tools and techniques outlined are used, endoscopic transpapillary gallbladder drainage can be performed safely and effectively to treat cholecystitis in patients who are not surgical candidates.

DISCLOSURE

Dr Law is a consultant for CONMED and Boston Scientific and received royalties from UpToDate. Dr Storm is a consultant for Apollo Endosurgery, GI Dynamics, ERBE, Olympus, and Intuitive Surgical and receives research support from Boston Scientific, Endogenex, Endo-TAGSS, and Enterasense. Dr Chandrasekhara is a consultant for Covidien LP and Boston Scientific, and he is a shareholder in Nevakar Corporation. Dr AbiMansour did not disclose any financial relationships.

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