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Percutaneous Cystic Duct Stenting: Report of Two Cases

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Abstract

Percutaneous cholecystostomy involves the placement of a catheter in the gallbladder via image-guided puncture through either a transhepatic or a transperitoneal route. It is most commonly utilized for managing patients with moderate to severe acute cholecystitis who are otherwise unfit for immediate surgery. While the procedure has a high technical success rate, there is significant morbidity, mainly due to catheter-related issues. Endoscopic ultrasound (EUS) guided drainage offers the advantage of internal drainage, potentially alleviating catheter-related risks. However, EUS-guided gallbladder drainage requires a high degree of expertise. There are reports of percutaneous cholecystostomy being converted into internal drainage using endoscopic approaches. We report two cases of percutaneous cystic duct stenting.

Keywords
- acute cholecystitis
- cholecystostomy
- complications

Introduction

Percutaneous cholecystostomy (PC) involves image-guided percutaneous insertion of a drainage catheter into the gallbladder.[1] The primary indication of PC is Tokyo grade 2 to 3 acute cholecystitis.[2] The less common indication of PC is to aid biliary drainage in patients with failed endoscopic retrograde cholangiopancreatography (ERCP) or percutaneous transhepatic biliary drainage (PTBD). The gallbladder route is also utilized to remove biliary stones or for endoscopic evaluation of the biliary tree. PC has a very high technical and clinical success rates close to 90%.[1] However, a major issue with PC is the high rate of catheter-related complications. Catheter dislodgement can result in serious complications such as biliary peritonitis and external biliary fistula formation. Besides, the external drain impairs the overall quality of life.[3] The timing of the removal of the PC tube is critical. Long-term catheter can increase infection risk in moribund patients.[1] Some studies recommend waiting for 3 weeks before removing the PC catheter to allow the patient to recover from illness and give adequate time for the cholecystostomy tract to mature. It is recommended to perform a cholangiogram via the cholecystostomy catheter to confirm the patency of the cystic duct and common bile duct before removing the cholecystostomy catheter as occlusion to biliary flow at any level can result in recurrent cholecystitis.[4] Thus, in patients with obstruction at the level of the cystic duct or the neck of the gallbladder and those in whom a catheter is placed for biliary drainage, removal of the PC catheter may not be feasible till the time of surgery. In the cases where surgery is not feasible, there is a risk of lifelong external drains. Internalization of PC catheters, cystic duct stenting, cystogastric/cystoduodenal stent may be considered. A recent series reported the high technical success of PC catheter internalization.[5] Despite this, many interventional radiologists do not consider PC catheter internalization and cystic duct stenting. We present two cases of PC catheter internalization and cystic duct stenting.

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Case Report

Our first case was a 41-year-old male with gallstone-related severe acute necrotizing pancreatitis. He was admitted to our hospital in fourth week of illness with fever, abdominal distention, and breathlessness. Ultrasound revealed thickened and edematous gallbladder with gallstones and choledocholithiasis. The patient was treated with antibiotics and ERCP. The peripancreatic collection was managed conservatively. He presented again with pain in the right upper quadrant and fever in the ninth week of illness. Contrast-enhanced computed tomography of the abdomen suggested gangrenous cholecystitis (►**Fig. 1**). As the conservative management with antibiotics failed, percutaneous transhepatic cholecystostomy was performed with an 8-Fr pigtail drainage catheter. Follow-up magnetic resonance imaging after 8 weeks of PC showed slight gallbladder decompression. There was mild circumferential mural thickening. Cholecystectomy was delayed due to ongoing sepsis. PC internalization was performed at 9 weeks after PC. Fluoroscopy revealed a patent cystic duct. Internalization was done and a 7 Fr × 10 cm double pigtail stent was placed. The patient underwent open cholecystectomy 3 months after the stenting.

Our second case was a 65-year-old male who suffered penetrating abdominal trauma and blunt chest trauma. The patient developed ileal perforation peritonitis and underwent loop ileostomy for the same. There was bilious output in the abdominal drain on post-op day 1. The patient underwent re-exploration surgery and was found to have a duodenal injury with a transverse rent in the second part of the duodenum. Primary repair was done for the same. On the fourth postoperative day, the patient developed high-grade fever and pain in the right upper quadrant. His liver functions were also deranged (total and conjugated serum bilirubin of 2.2 and 1.7 mg/dL, respectively, and alkaline phosphatase of 351 IU/L). Abdominal ultrasound revealed overdistended gallbladder with layered gallbladder wall thickening. There was no intrahepatic biliary radicle dilatation. Acalculous cholecystitis was diagnosed. Due to multiple comorbidities, surgery was deferred, and the patient was planned for PC. An 8-Fr pigtail drainage catheter was placed in the gallbladder via a transhepatic route. Internalization of the PC catheter was performed on day 8 after PC. A cholangiogram revealed a patent cystic duct. Under fluoroscopic guidance, the wire was passed through the cystic duct, a 6-Fr PTBD catheter was internalized, and the tip was placed in the duodenum. One week later, the patient underwent cystic duct stenting with a 7-Fr double pigtail stent, and is currently doing clinically well (►**Fig. 2**).

Discussion

Gallbladder drainage can be performed via the percutaneous or endoscopic route.[1] Endoscopic gallbladder drainage has the advantage of internal drainage and thus alleviates the risk of catheter-related complications.[5] Endoscopic approaches are endoscopic ultrasound-guided transmural gallbladder drainage and endoscopic transpapillary gallbladder drainage. However, endoscopic drainage procedures require a high degree of

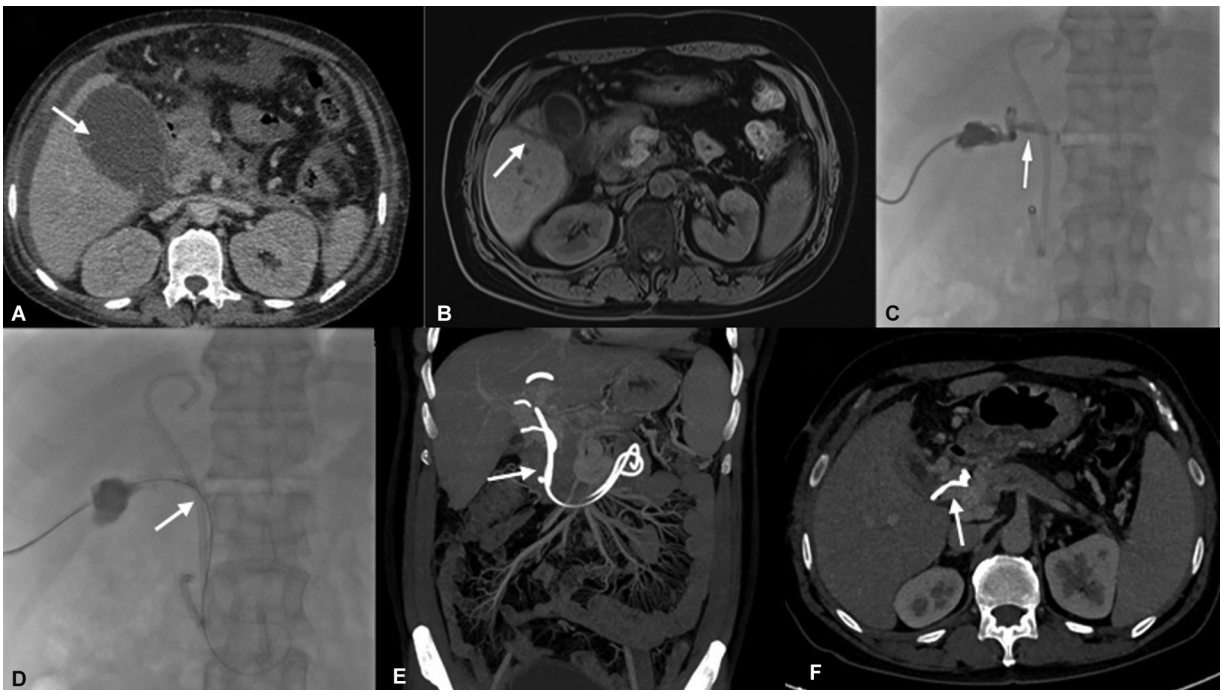

Fig. 1 (**A**) Axial contrast-enhanced computed tomography (CECT) at initial presentation shows an overdistended gallbladder with marked mural thinning at places (*arrows*), suggesting the possibility of acute gangrenous cholecystitis. (**B**) Postcontrast axial T1-weighted magnetic resonance imaging shows partially decompressed gallbladder with a catheter in situ. (**C**) Cholangiogram obtained via cholecystostomy catheter shows a patent cystic duct (*arrow*). (**D**) Fluoroscopy image shows the guidewire advanced through the cystic duct, common bile duct, and via transpapillary route into the duodenum. (**E, F**) Coronal reformatted and axial maximum intensity projection images show cholecystoduodenal stent in situ with the proximal tip in the gallbladder neck and distal tip in the duodenum. The gallbladder is decompressed.

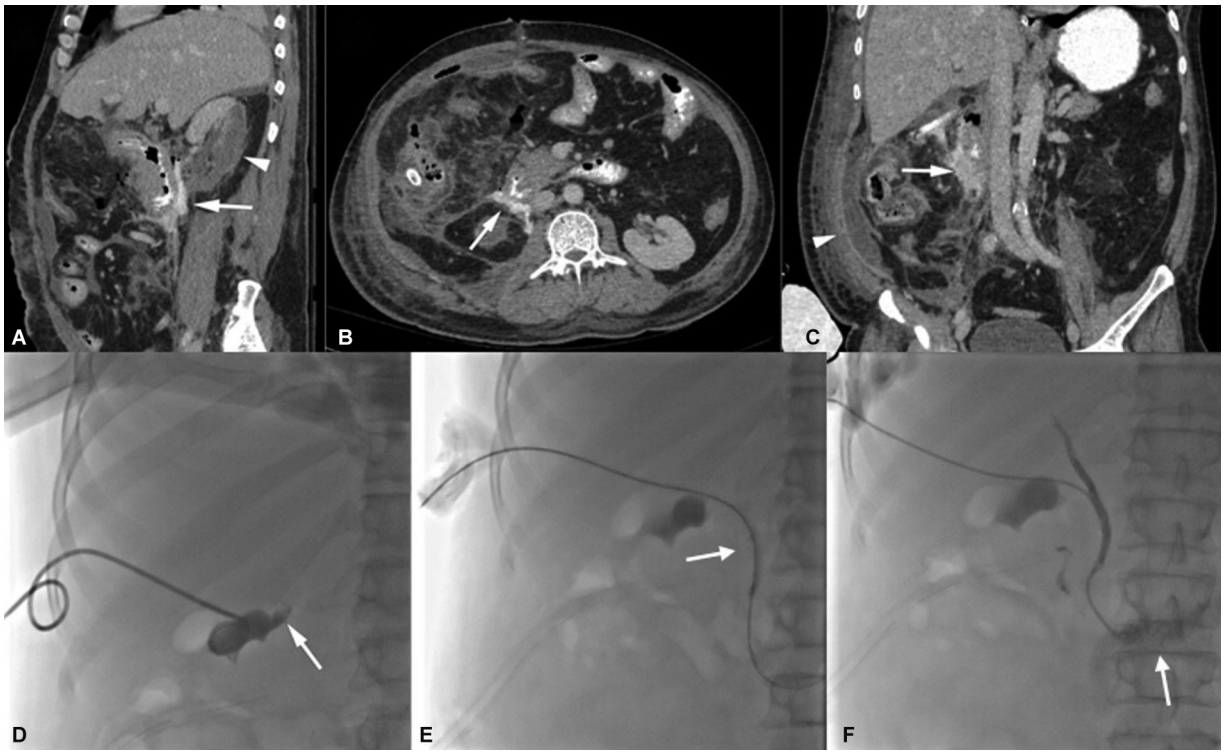

Fig. 2 CECT images (**A**, sagittal; **B**, axial; **C**, coronal) showed leakage of oral positive contrast adjacent to the 2nd and 3rd parts of the duodenum (*arrows*). Partial devascularisation of the right kidney was also seen (*arrowhead*, **A**) and collection in the right paracolic gutter (*arrowhead*, **C**). (**D**) Cholangiogram obtained via cholecystostomy catheter showed patent cystic duct (*arrow*). (**E**) Under fluoroscopic guidance, guidewire was advanced through cystic duct and CBD into the duodenum via trans papillary route (*arrow*). (**F**) Catheter was internalized through the cystic duct and tip was placed in the duodenum. Contrast injection through the catheter showed opacification of the common bile duct with passage of contrast into the duodenum (*arrow*).

expertise.[6] Thus, in most centers, PC is the first-line procedure. There are reports of successful conversion of PC to internal drainage via the endoscopic approaches, including transpapillary, transmural plastic, and lumen apposing metal stents, in patients requiring long-term gallbladder drainage.[7,8]

Percutaneous cystic duct intervention is an alternative to endoscopic procedures, especially in patients already on PC. A recent retrospective study reported the feasibility, effectiveness, and outcomes of PC catheter internalization in patients with calculous cholecystitis who were unfit for surgery.[3] Percutaneous cystic duct interventions were done in 17 patients who had previously undergone PC for acute calculous cholecystitis. In 15 of the 17 procedures, the cystic duct could be successfully negotiated. Thirteen patients underwent successful placement of dual cholecystoduodenal stents. Two patients needed repeat PC drains (one had stent migration leading to recurrent cholangitis and the other had a perihepatic biloma). The 1-year patency rate was 77%. A few case reports also demonstrate the feasibility of internal drainage via the PC route.[9,10]

PC catheter internalization and cystic duct stenting are technically feasible and should be attempted whenever there is a need for long-term gallbladder drainage. This may lead to better acceptance of the PC.

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Conflict of Interest
None declared.

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