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## Interventional Radiology

# Percutaneous embolization of cystic duct stump leak following failed endoscopic management

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### ABSTRACT

A case of a 79-year-old man, status post laparoscopic cholecystectomy with a drainage catheter placed at the gallbladder fossa is presented. The case was complicated postoperatively by abdominal pain and bilious discharge from the drainage catheter. Endoscopic retrograde cholangio-pancreatography demonstrated leakage through the cystic duct stump into the gallbladder fossa. Placement of a covered metal stent endoscopically failed to seal the leak. We performed percutaneous embolization of the cystic duct stump using a combination of coils and gelatin sponge through the drainage catheter in the gallbladder fossa. To our knowledge, this technique has not been previously described in the literature.

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## Introduction

Cystic duct leak is an uncommon but potentially serious complication following cholecystectomy [1]. Endoscopic treatment methods such as sphincterotomy, nasobiliary drain placement, and bile duct stenting are considered safe and effective first-line therapies [1]. Percutaneous interventions including cystic duct embolization have been performed with success with multiple embolic materials [2]. We present a case of successful percutaneous coil and particle embolization of cystic duct stump leak following complicated cholecystectomy and failed endoscopic management. To our knowledge, this technique has not been previously described in the literature.

## Case report

Brief reports are exempt from institution review board approval in our institution.

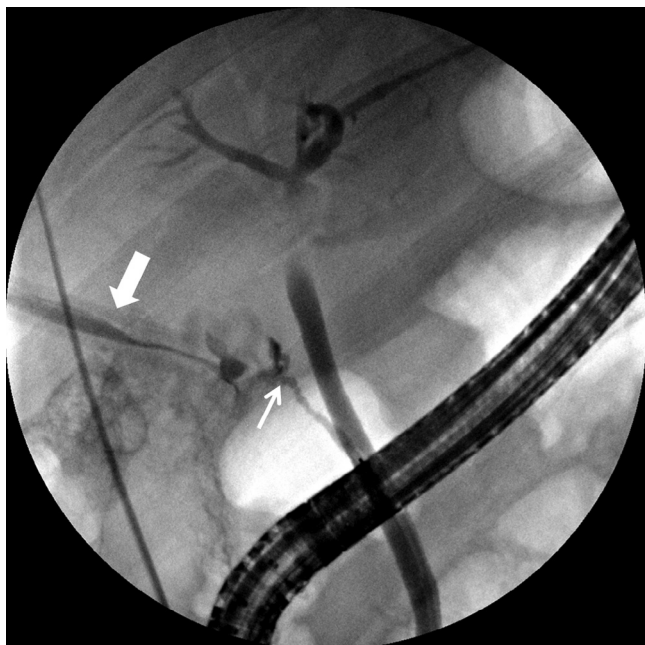
A 79-year-old man with history of complete heart block and multiple comorbidities presented to our institution with nausea, vomiting, diarrhea, and abdominal pain. On examination, the patient was found to have soft but distended abdomen with minimal tenderness to palpation at the right upper quadrant. Laboratory examinations were within normal range. Ultrasound and contrast enhanced computed tomography of the abdomen were performed and revealed a distended gallbladder and gallbladder wall thickening which was consistent with acute cholecystitis. A subphrenic and pericholecystic fluid

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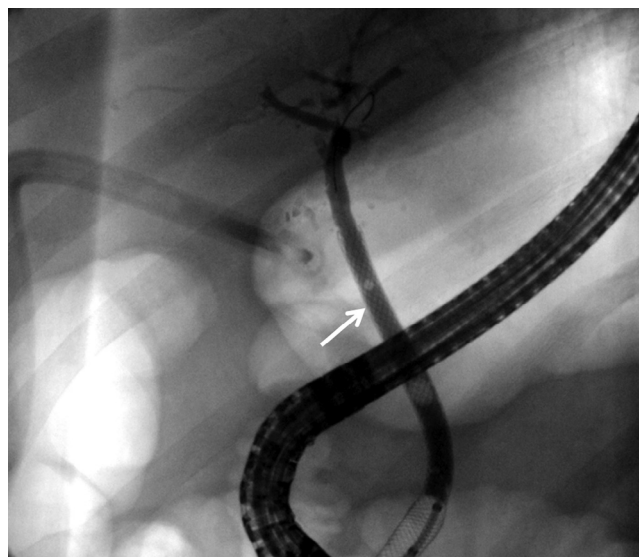


**Fig. 1 – Cholangiogram performed during ERCP demonstrates cystic duct stump leak (small arrow) with free flow of contrast into previously placed surgical drain (large arrow).**

collection and fluid tracking in between bowel loops raised the concern for acute gangrenous cholecystitis with perforation. The patient then underwent laparoscopic abdominal exploration and complicated cholecystectomy during which the necrotic portion of his gallbladder (dome and body of the gallbladder) was removed. Because complete removal of his gallbladder was felt to be unsafe at the time of surgery due to the severity of the inflammation, the viable gallbladder infundibulum was not surgically removed. A 24 French drainage catheter was left in the gallbladder fossa. His postoperative course was complicated by acholic stools, abdominal pain, tenderness, and persistent postoperative high bilious output of approximately 500–600 mL per day through the surgical drain, all consistent with cystic duct stump leak.

Endoscopic retrograde cholangio-pancreatography (ERCP) was performed 4 days following his surgery and demonstrated leak at the cystic duct stump (Fig. 1). A 10 French, 9-cm plastic stent was placed in the common bile duct. Throughout the following 2 weeks, the patient's clinical status remained the same, with persistence of his signs and symptoms. Therefore, a repeat ERCP was performed which again showed bile leak at the cystic duct stump. Sphincterotomy was successfully attempted, and the previously placed plastic stent was removed and replaced by an 8-mm × 80-mm covered self-expanding stent graft which was placed in his common bile duct (Fig. 2). His 24 French gallbladder fossa surgical drain was downsized at 5 weeks postoperatively to 18 French as the drained fluid went down from 600 mL/day to 150 mL/day. The patient's bilious output from the surgical drain and the acholic stools persisted thereafter.

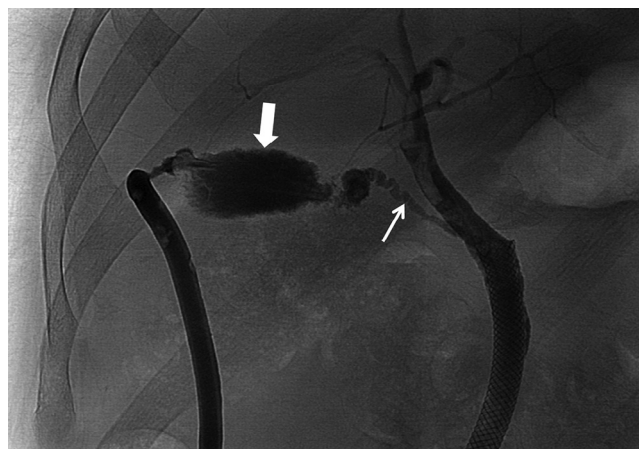
Because of failed endoscopic management for 2 months following his complicated cholecystectomy, Interventional Radiology was consulted for potential treatment. After reviewing the



**Fig. 2 – Cholangiogram performed during ERCP demonstrating placement of 8 mm × 80 mm self-expanding stent graft (small arrow) within the common bile duct to exclude the cystic duct origin.**

patient's clinical presentation and imaging, we decided to offer the patient a nonstandard minimally invasive treatment for his cystic duct stump leak, and the patient consented to the procedure.

The patient was then taken to the angiography suite and contrast was injected through the preexisting 18 French drainage catheter in the gallbladder fossa, demonstrating communication with a gallbladder remnant and the cystic duct (Fig. 3). A hydrophilic guidewire and 4 French angled catheter (Berenstein, Cook, Bloomington, IN) were advanced through the drain and gallbladder remnant and negotiated into the cystic duct stump. A 2.4 French microcatheter (Progreat, Terumo, Tokyo, Japan) was advanced through the 4 French catheter into the cystic duct stump (Fig. 4). Several detachable microcoils



**Fig. 3 – Nonsubtracted image following injection of contrast through preexisting gallbladder fossa drainage catheter demonstrating the pseudo-gallbladder (large arrow) communicating with a patent cystic duct (small arrow).**

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