ACG CASE REPORTS JOURNAL

CASE REPORT | BILIARY

Endoscopic Ultrasound–Directed Transgastric Endoscopic Retrograde Cholangiopancreatography for Removal of Cystic Duct Coils: A Novel Application of an Emerging Technique

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ABSTRACT

The altered anatomy of patients after Roux-en-Y gastric bypass (RYGB) surgery creates technical challenges for endoscopic and surgical treatment of gallstones. We present a unique case of a post-RYGB patient with complicated gallbladder surgery requiring coiling and embolization of the cystic duct for bile leak. The cystic duct coils migrated out into the bile duct forming a nidus for infection and biliary obstruction, which was resolved using the novel endoscopic ultrasound–directed transgastric routine endoscopic retrograde cholangiopancreatography technique, with successful transpapillary removal of cystic duct coils in RYGB anatomy.

INTRODUCTION

Weight loss after bariatric surgery increases the risk of cholelithiasis. Cholecystectomy is the preferred surgical intervention for gallstone-related complications.[1] Laparoscopic cholecystectomy was first performed in 1988 in the United States, and approximately more than 600,000 patients undergo laparoscopic cholecystectomy annually.[2,3] Postsurgical bile leaks are a rare and serious complication that occurs in 0.3%–2% of all cholecystectomy cases.[4,5] This complication is managed in a minimally invasive manner with endoscopic options such as sphincterotomy, nasobiliary drain, and bile duct stenting.[6] In refractory cases, cystic coil embolization has proven to be a safer and more efficacious treatment.[7] In our case, the patient admitted with sepsis because of biliary obstruction secondary to migration of the cystic duct coils, requiring endoscopic removal. Given the patient's history of roux-en-Y gastric bypass (RYGB), routine endoscopic retrograde cholangiopancreatography (ERCP) could not be performed. We present the novel use of endoscopic ultrasound–directed transgastric ERCP (EDGE) technique with which we have extensive experience and high clinical and technical success, to achieve transpapillary removal of cystic duct coils effectively.

CASE REPORT

A 33-year-old man with morbid obesity underwent RYGB. Over the next 6 months, he lost 130 lb (35% of his total body weight). Three years after RYGB, he presented with acute calculous cholecystitis, requiring laparoscopic converted to open cholecystectomy because of his gangrenous gall bladder and extensive adhesions. Postoperatively, he developed a large cystic duct leak, requiring percutaneous transhepatic biliary drainage. Interventional Radiology-guided coil embolization of the cystic duct remnant was successfully performed to control the persistent leakage. After 3 years, the patient presented again with right upper quadrant pain, nausea, and fever. A computed tomography scan showed cystic duct coil migration into the common bile duct, with upstream dilation (Figure 1). Given multiple previous abdominal surgeries, other techniques such as balloon-assisted enteroscopy was not performed, given its lower technical and clinical success rates in postsurgical anatomy.

ACG Case Rep J 2021;8:e00576. doi:10.14309/crj.0000000000000576. Published online: May 14, 2021

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Figure 1. Computed tomography showing cystic coils in common bile duct (coronal view).

This procedure entailed creation of an endoscopic ultrasound–guided access from the gastric pouch to the gastric remnant using an electrocautery enhanced 20-mm lumen-apposing metal stent (LAMS) for the creation of the gastrogastrostomy (Figure 2). A through-the-scope balloon dilator was used to dilate the lumen of the stent. After establishing the gastrogastric access, a standard duodenoscope was passed through the LAMS to reach the native ampulla. Migrated cystic duct coils were seen protruding through the ampulla (Figure 3). Biliary sphincterotomy was performed, and the partially migrated cystic coils were removed by advancing a biopsy forceps intraductally with a rotating action, which wrapped the coils around the forceps and allowed the coils to be extracted from the bile duct, followed by endoscopic removal with a snare (Figure 4). After procedure, the patient tolerated his diet well and was discharged home in 24 hours in stable condition. The gastrogastric LAMS stent was removed after 8 weeks, and the fistula was closed with endoscopic suturing. The patient had interval weight change of negative 10 lbs on follow-up.

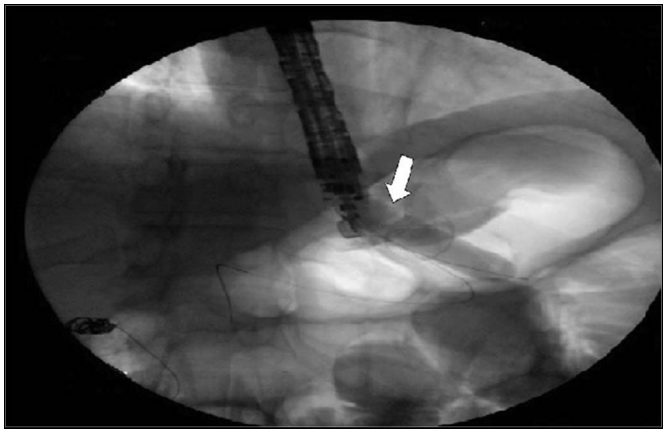

Figure 2. Lumen-apposing metal stent placement.

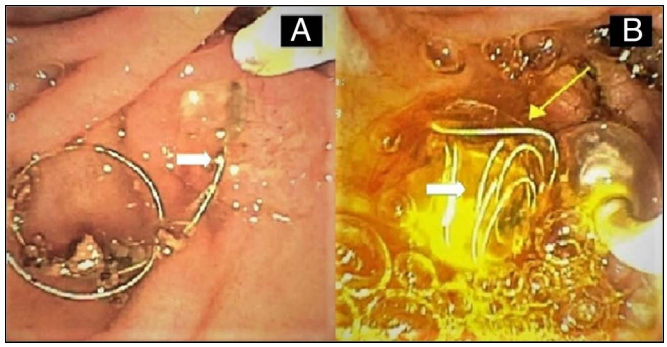

Figure 3. (A) Coils protruding out of the ampulla (white arrow) and (B) coil extraction with a balloon (white and yellow arrow).

DISCUSSION

Coil migration is a rare complication after coil embolization. Although migrations of coils into the common bile duct, stomach, duodenum, and rectum after arterial aneurysm repairs have been reported in the multiple case discussions,[8–12] migration of coils and clips after laparoscopic cholecystectomy has only been reported once, which was treated with ERCP.[13] However, these previous reports were not in RYGB patients and thus did not encounter the technical challenge of altered anatomy.

To the best of our knowledge, this is a unique case of EDGE-assisted endoscopic removal of migrated cystic duct coils, successfully performed in an RYGB patient. When these coils have migrated, they serve as a nidus for infection and stone formation. Depending on the migration location, the clinical presentation includes abdominal pain, passing of coils in defecation, signs of cholangitis, obstructive jaundice, and elevated liver function tests. Ultrasound, computed tomography, magnetic resonance imaging, and ERCP are used for the diagnosis. ERCP is the standard of care for removing coils from the common bile duct. In altered post-RYGB anatomy, traditional ERCP using standard duodenoscope presents technical challenges.[14,15]

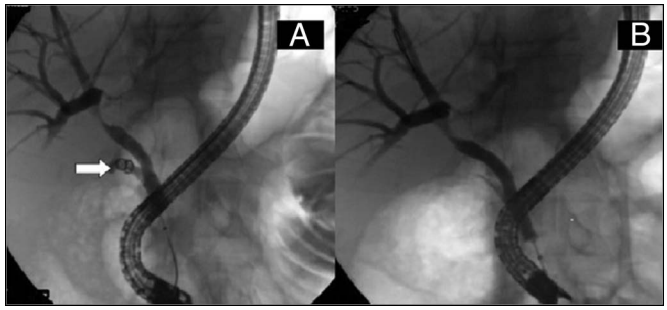

Figure 4. (A) Cystic duct coils on fluoroscopy and (B) negative cholangiogram after complete removal of coils.

Removal of normal and asymptomatic gallbladders at the time of bariatric surgery has not been shown to be necessary and may expose a patient to possible risk of complications without proven benefit. Since only a very small portion of patients develop symptomatic gallstones after RYGB, prophylactic cholecystectomy is not recommended in these patients.[16] Laparoscopy-assisted ERCP was one of the preferred techniques for treating gallstone complications in RYGB patients because of its higher technical and clinical success rates, but it is labor-intensive and requires coordination with both a surgeon and a gastroenterologist.[17] We performed the EDGE technique in our patient because it is entirely endoscopic and therefore does not have surgical limitations from previous hostile surgical abdomen. This technique was introduced in 2014 by Kedia et al, who described a single-stage ERCP technique using an LAMS and was termed EDGE.[18] The technical and clinical success rates for EDGE have been reported up to 100%.[19]

The most common adverse event for EDGE has been stent dislodgement, as well as concerns for bleeding from ulcer formation, LAMS embedment because of mucosal overgrowth, or weight gain because of the passage of food into the excluded stomach. In our patient, we did not have any issues with stent dislodgement because of the use of a wider 20-mm LAMS or any weight gain or stent ingrowth because of gastrogastric access and short interval stent removal.[20] Based on the evidence to date, EDGE is a cost-effective, minimally invasive endoscopic technique for successfully treating pancreaticobiliary diseases in RYGB patients, with a unique indication in our patient for removal of migrated cystic duct coils causing biliary obstruction.

DISCLOSURES

Author contributions: S. Parvataneni and HS Khara wrote the manuscript and reviewed the literature. VS Kumar, YI Khan, DE Deivert, and J. Obuch edited and revised the manuscript for intellectual content and approved the final manuscript. S. Parvataneni is the article guarantor.

Previous presentation: This case was presented at the American College of Gastroenterology Annual Scientific Meeting; October 25–30, 2019; San Antonio, Texas.

Financial disclosure: None to report.

Informed consent was obtained for this case report.

Received August 1, 2020; Accepted December 2, 2020

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