

Cystic Artery Pseudoaneurysm Following Endoscopic Retrograde Cholangiopancreatography (ERCP): A Case Report

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Abstract

Case Report

Background: Cystic artery pseudoaneurysms (CAP) are rare vascular entities, with only seventy-five case reports documented in the literature between 1991 and 2022. None of these reported cases occurred following endoscopic retrograde cholangiopancreatography (ERCP). Management typically involves endovascular embolization or surgical intervention. **Case Presentation:** We present the case of a 35-year-old woman with a cystic artery pseudoaneurysm that followed an ERCP procedure. The patient underwent an uneventful emergency laparoscopic cholecystectomy. **Conclusion:** CAP remains a rare but life-threatening complication of biliary procedures and severe gallstone disease. Early diagnostic imaging with contrast-enhanced CT is essential, and primary laparoscopic cholecystectomy can offer a safe, definitive resolution in stable patients.

Keywords: Cystic artery pseudoaneurysm, calculous cholecystitis, endoscopic retrograde cholangiopancreatography.

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INTRODUCTION

Cystic artery pseudoaneurysm (CAP) is an exceptionally rare clinical condition characterized by the disruption of the arterial wall layer, resulting in a contained hematoma bounded by adventitia or surrounding tissue. The primary etiologies of CAP reported in the literature include severe acute or chronic cholecystitis, trauma, and iatrogenic injury following laparoscopic or open cholecystectomy.

While endoscopic retrograde cholangiopancreatography (ERCP) is a well-established diagnostic and therapeutic modality for pancreatobiliary pathology, its recognized complications are largely restricted to post-ERCP pancreatitis, bleeding at the sphincterotomy site, cholangitis, bowel perforation, and post-procedural acute cholecystitis. To date, the formation of a cystic artery pseudoaneurysm following ERCP has not been reported in the medical literature. Here, we present a rare case of a 35-year-old woman who presented with acute gangrenous cholecystitis and an incidental CAP immediately following ERCP, successfully managed via laparoscopic cholecystectomy.

CASE REPORT

A 35-year-old woman presented to the emergency department with increasing right upper quadrant pain and nausea. She had undergone an ERCP with sphincterotomy for choledochal duct cholelithiasis the day before.

On examination, she was tachycardic (115 beats/min) and febrile (38.5 °C), with a blood pressure of 130/80 mmHg. There was abdominal tenderness in the epigastric region and the right upper quadrant. Murphy's sign was positive.

Initial laboratory investigations showed a hemoglobin of 10.4 g/dL, a white blood cell count (WBC) of $14,610/\text{mm}^3$, and a platelet count of $277,000/\mu\text{L}$. Laboratory investigations also showed that total bilirubin, AST, ALT, and ALP were within normal limits. The serum lipase level was less than three times greater than the upper limit of normal, ruling out pancreatitis.

After resuscitation, an abdominal contrast-enhanced computed tomography scan (CT scan) revealed extensive gallbladder wall thickening and pneumobilia

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(Figure 1). Moreover, the CT scan revealed a cystic artery pseudoaneurysm measuring $6 \times 4 \text{ mm}$ in diameter (Figure 2). The pseudoaneurysm, individualized in the arterial phase, didn't change in the venous phase, testifying to its contained character. Additional ultrasound revealed a thickened wall gallbladder, cholelithiasis generating a posterior shadow cone, and air bubbles producing a comet-tail appearance.

Given the imaging concerning for cholecystitis complicated with cystic artery pseudoaneurysm, the patient underwent emergency laparoscopic cholecystectomy using the standard technique with four ports. On surgical exploration, the gallbladder was edematous and gangrenous (Figure 3). We isolated Calot's triangle. Then, the cystic duct and artery were identified, clipped, and dissected (Figure 4). After an uneventful postoperative course, the patient was discharged home on the third postoperative day.

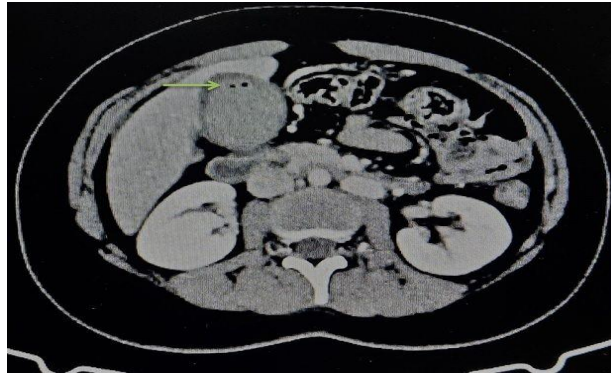


Figure 1: CT scan of the abdomen showing a gangrenous cholecystitis with pneumobilia



Figure 2: Contrast-enhanced CT scan of the abdomen showing a cystic artery



Figure 3: Laparoscopic view of the gangrenous cholecystitis

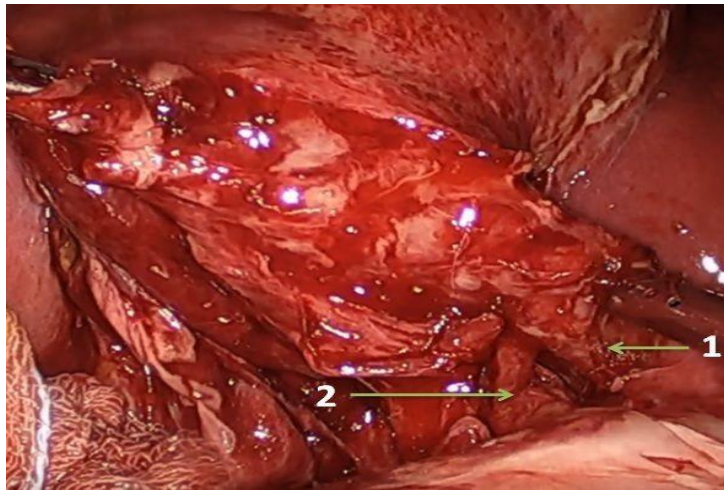


Figure 4: Laparoscopic view of the Calot's triangle after dissection.
1: Cystic artery. 2: Cystic duct

DISCUSSION

CAP is a rare complication; however, it has a significant risk of morbidities such as bleeding and biliary obstruction [1]. This complication may occur during acute cholecystitis or after cholecystectomy. The pathophysiology of CAP is unclear when it is due to cholecystitis. Acute cholecystitis may lead to inflammatory damage of the cystic artery. The inflammation weakens the adventitia; consequently, the pseudoaneurysm appears [3]. During a cholecystectomy, vascular erosion from manipulation, clip application, or thermal injury may happen. However, the incidence of vascular injury through cholecystectomy is low (0.2% to 0.5%) [4].

As for our reported case, the patient presented immediately after the ERCP with cholecystitis and a CAP. This situation causes a debate about whether the ERCP led to CAP or cholecystitis. CAP is not a described ERCP complication in the literature. Otherwise, cholecystitis, pancreatitis, bleeding, perforation, cholangitis, and cardiopulmonary complications are well-known ERCP complications [5,6].

By far, right upper quadrant pain and hemobilia are the most common clinical CAP presentations. Other clinical presentations are biliary obstruction, anemia, hemoperitoneum, and hemodynamic shock [1]. The radiological investigation for diagnosis involves an arterial phase contrast-enhanced CT scan. However, color Doppler ultrasound and Magnetic Resonance Imaging (MRI) are options [7,8].

The management of CAP is not standardized. Treatment options include endovascular embolization, open cholecystectomy, and laparoscopic cholecystectomy [2,9]. Some authors recommend endovascular embolization to control CAP. They propose surgery (cholecystectomy or vessel ligation) in cases where the endovascular approach is unsuccessful

[1]. Scheduled cholecystectomy is recommended following arterial embolization when the CAP occurs secondary to cholecystitis [10].

To our knowledge, this is the first case where an ERCP is complicated by CAP and cholecystitis. The correlation between ERCP and CAP is still unclear in this case. Was the CAP secondary to the ERCP as a biliary tract procedure, or was it secondary to the cholecystitis that followed the ERCP? Yet, our patient underwent laparoscopic cholecystectomy and recuperated well.

CONCLUSION

Even if cystic artery pseudoaneurysm is a rare phenomenon, it has a significant risk of morbidities. It is often secondary to cholecystitis or iatrogenic biliary tract injuries. Arterial phase contrast-enhanced CT scan is the gold standard for diagnosis. The management involves endovascular embolization or cholecystectomy.

Declarations

Data Availability: All data generated or analyzed during this study are included in this published article.

Competing Interests: The authors declare that they have no competing interests.

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