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Case Report

A Rare Case of Cystic Artery Pseudoaneurysm because of Cholecystitis Managed with Non-invasive Technique

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Abstract

Cystic artery pseudoaneurysm due to acute on chronic cholecystitis is very rare in spite of the high incidence of cholecystitis, and very few cases have been reported in the literature. Most of the pseudoaneurysms are symptomatic at the time of diagnosis due to rupture. Very few cases of unruptured cystic artery pseudoaneurysm caused by cholecystitis have been reported in the literature. We present a case of a 41-year-old man who presented in the Intervention Radiology Department with the diagnosis of cholecystitis and cystic artery pseudoaneurysm. Three treatment options are available for such cases. The first approach is surgical clipping of the pseudoaneurysm and cholecystectomy. The second approach is endovascular management of pseudoaneurysm and cholecystectomy. We chose the third approach, endovascular management of the pseudoaneurysm, percutaneous cholecystostomy, and elective laparoscopic cholecystectomy.

Keywords: Embolization, Image-guided procedures, Cystic artery pseudoaneurysm

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Introduction

Cystic artery pseudoaneurysm is a very rare entity, and most of the pseudoaneurysms are iatrogenic due to complications of biliary procedure.[1] Cystic artery pseudoaneurysms due to acute on chronic cholecystitis are very rare in spite of the high incidence of cholecystitis, and approximately 36 cases have been reported in the literature.[2] Most of the pseudoaneurysms are symptomatic at the time of diagnosis due to rupture. Very few cases of unruptured cystic artery pseudoaneurysm caused by cholecystitis have been reported in the literature.[3] The presumed etiology of the formation of pseudoaneurysm is the erosion of the arterial wall by inflammation or direct pressure by calculus.[4] We present a rare case of cystic artery pseudoaneurysm incidentally detected during the workup of cholecystitis, which was managed with minimally invasive techniques followed by planned laparoscopic cholecystectomy.

Case Report

A 41-year-old male patient presented in the Intervention Radiology Department with the diagnosis of cholecystitis and cystic artery pseudoaneurysm. He had a history of right upper quadrant abdominal pain, and contrast computed tomography (CT) in the venous phase showed a distended gallbladder (GB) measuring up to 10×3.5 cm with thickening and edema of the GB wall up to 8 mm thick. Multiple variable size calculi were noted in the GB lumen. A hyperdensity of size 9×7 mm in the wall of the GB appeared to be continuous, with a branch of the cystic artery suggestive of pseudoaneurysm. This finding was further confirmed with the follow-up CT performed in the arterial phase, and the diagnosis of acute cholecystitis with pseudoaneurysm of the superficial branch of the cystic artery was established (Figure 1). No obvious sign of pseudoaneurysm rupture was seen. Laboratory investigation showed borderline high white blood count, and C-reactive protein (CRP) was very high 150 mg/L.

Using right femoral artery access, an angiogram was performed with a Cobra catheter (5F, Cook, Bloomington, IN, USA) from the common hepatic artery, and a cystic artery was identified (Figure 2). The cystic artery originated from the right hepatic artery, traveled superiorly, and divided into the superficial branch and deep branch in a V-like fashion. No attempt was made to demonstrate pseudoaneurysm on angiogram due to the fear of rupture of the pseudoaneurysm because of strong injection, and we already knew from the preprocedural CT that pseudoaneurysm was arising from the superficial branch of the cystic artery. Superselective cannulation of the superficial branch of the cystic artery with Progreat microcatheter (Progreat, Terumo, Tokyo, Japan) and microwire (0.016 Fathom wire, Boston Scientific, Natick, MA, USA) and embolization with the 3-mm microcoils (vortex 0.018", Boston Scientific, Natick, MA, USA, 4 in number) was done. A follow-up angiogram showed complete embolization of the superficial branch of the cystic artery and patent deep branch (Figure 3).

Under ultrasonography and fluoroscopy guidance,

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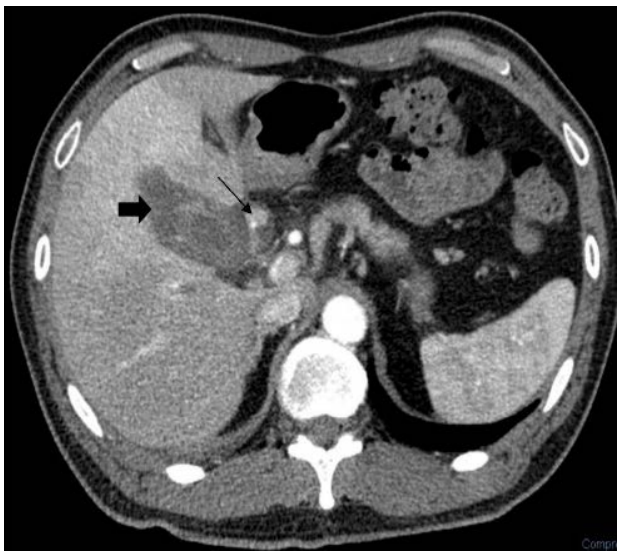

Figure 1. Contrast computed tomogram in arterial phase axial section confirms the diagnosis of cystic artery suggestive of pseudoaneurysm (thin arrow). Signs of cholecystitis, such as thickened gall bladder wall and pericholecystic fluid, are seen (thick arrow)

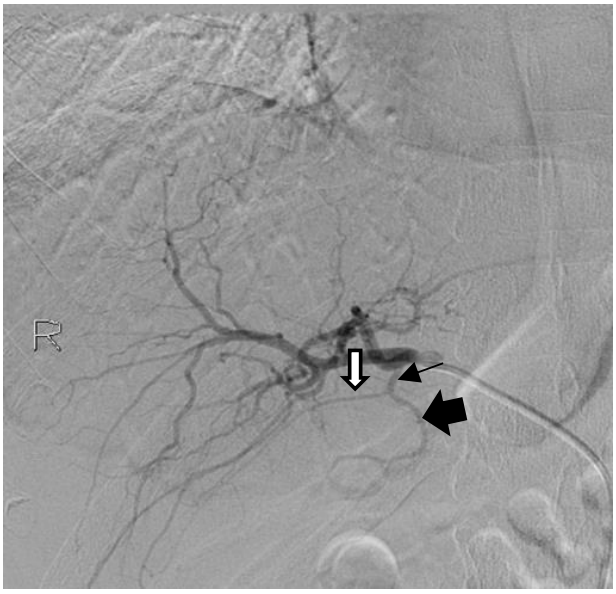

Figure 2. Angiogram of hepatic artery shows the cystic artery (thin arrow) originates from the right hepatic artery, travels superiorly, and divides into the superficial branch (thick black arrow) and deep branch (thick white arrow) in a V-like fashion

a pigtail catheter (8.5F, Cook, Bloomington, IN, USA) was placed in the GB lumen. The catheter position was confirmed with injecting contrast under fluoroscopic guidance. Contrast injection showed a good position of the drainage catheter, with opacifying the intrahepatic and extrahepatic duct and filling defects in the GB lumen representing calculi (Figure 4). The patient was significantly improved and discharged after 5 days with oral antibiotics. The cholecystostomy catheter was removed after 4 weeks when the patient was asymptomatic. Follow-up CT and magnetic resonance imaging (MRI) demonstrated collapsed GB with multiple calculi and no radiological sign of cholecystitis. Elective uneventful laparoscopic cholecystectomy was performed after 3 months.

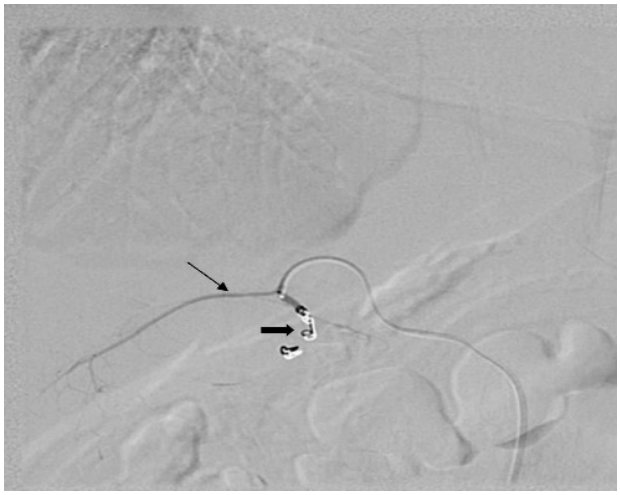

Figure 3. Post-embolization angiogram shows complete embolization of the superficial branch of the cystic artery with coils (thick arrow) and patent deep branch (thin arrow)

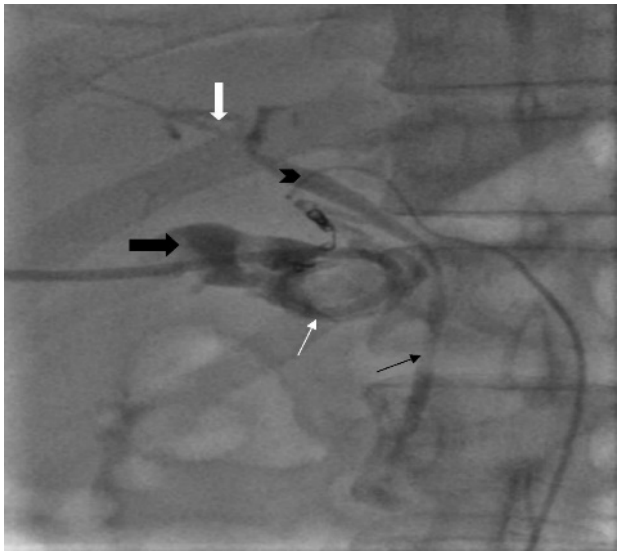

Figure 4. Contrast injection shows the good position of the drainage catheter (white arrow) with opacifying the intrahepatic (thick white arrow) and extrahepatic duct (black arrow) and filling defects (black thick arrow) in the gall bladder lumen representing calculi. Microcatheter tip (thick arrowhead) is seen in the cystic artery during cholecystostomy

Discussion

Cystic artery pseudoaneurysm is most commonly seen as a complication of cholecystectomy. Other causes include cholecystitis, pancreatitis, and liver trauma. Cystic artery pseudoaneurysm is a rare complication of cholecystitis, which increases the morbidity. Incidental diagnosis is rare, and most of the cases present with the clinical triad of hemobilia consist of jaundice, colicky abdominal pain, and upper gastrointestinal hemorrhage due to ruptured pseudoaneurysm.[5,6] In our case, the patient presented with pain in the upper abdomen, and pseudoaneurysm was diagnosed incidentally with the diagnosis of cholecystitis.

Contrast CT/MRI with arterial phase has high sensitivity and specificity over ultrasonography, but conventional angiography is the gold standard with the benefit of therapeutic role.[7] Because of the rarity of this disease, there are currently no guidelines on the management of

this condition; however, two approaches to the treatment are mentioned in the literature. The first approach mentioned surgical clipping of the pseudoaneurysm and cholecystectomy,[8,9] and the second approach mentioned endovascular management of pseudoaneurysm and cholecystectomy.[10] We chose the third approach, endovascular management of the pseudoaneurysm, percutaneous cholecystostomy, and elective laparoscopic cholecystectomy. This approach is mentioned in the literature but not performed frequently because the procedure involves a high risk of pseudoaneurysm rupture during cholecystostomy.[8,11]

Endovascular treatment of an aneurysm and percutaneous cholecystostomy catheter insertion was reported as effective, with less trauma to the patient and no need for general anesthesia compared with the first approach.[3,12] Case reports are available where the patient was scheduled for laparoscopic clipping of cystic artery pseudoaneurysm and laparoscopic cholecystectomy, but because of the underlying significant inflammation, the laparoscopic procedure turned to open cholecystectomy. In a few case reports, laparoscopic cholecystectomy was performed successfully, but major laparotomy and a vascular instrument set were kept on standby.[4] In our patient, we used the third approach, where we embolized the pseudoaneurysm and a percutaneous cholecystostomy catheter was placed to control the source of infection, and the patient was scheduled for elective laparoscopic cholecystectomy when GB was not distended and no sign of infection on blood examination and no sign of GB inflammation on radiological imaging existed.

Reports are available on the use of different embolic agents, but in our case, we used micro coils to achieve superselective and controlled embolization. We were aware that there had been no case report available in the literature for GB ischemic complications, likely due to collateral blood supply from the epicholedochal artery.[13] Still, we took extra precautions during the embolization regarding the patency of the deep branch of the cystic artery. We kept the microcatheter in the cystic artery during cholecystostomy to deal with any arterial complications during cholecystostomy. We removed the microcatheter from the cystic artery when infected bile was drained well by a drainage catheter, and there was no sign of arterial complication.

Conclusion

Cystic artery pseudoaneurysm associated with cholecystitis is a rare entity. Pseudoaneurysms can be safely treated with transcatheter techniques, and cholecystitis can be managed by percutaneous cholecystectomy followed by elective laparoscopic cholecystectomy.

Authors' Contribution

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Funding acquisition: Lukman Khan.
Investigation: Amit Shrivastava.
Methodology: Amit Shrivastava.
Project administration: Gunjan Jindal.
Resources: Amit Shrivastava.
Software: Gunjan Jindal, Rohan Chaube.
Supervision: Gunjan Jindal.
Validation: Amit Shrivastava.
Visualization: Amit Shrivastava.
Writing–original draft: Gunjan Jindal.
Writing–review & editing: Amit Shrivastava.

Competing Interests

The authors declare no conflict of interest related to this work.

Consent for Publication

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