

Iatrogenic Cystic Artery Pseudoaneurysm Post Laparoscopic Cholecystectomy: Original Case Report with Literature Review

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ABSTRACT

Cystic artery pseudoaneurysm post laparoscopic cholecystectomy is a rare complication associated with potential risk of morbidity and mortality. This is a case of cystic artery pseudoaneurysm post laparoscopic cholecystectomy in a 27-year-old female who presented postoperative day 10 post laparoscopic cholecystectomy with abdominal pain, melena, and hematemesis. Esophagogastroduodenoscopy showed no active bleeder, and initial computed tomography (CT) only showed gallbladder bed hematoma that was treated in percutaneous drainage. However, recurrent symptoms prompt a CT angiography that revealed a cystic artery pseudoaneurysm with hemoperitoneum. The pseudoaneurysm was successfully treated with transarterial catheter embolization of the cystic artery stump. She was well post intervention but required parenteral antibiotics resulting in a 2-week hospitalization, and eventually discharged.

Literature review reports only 10 cases of iatrogenic cystic artery pseudoaneurysm post laparoscopic cholecystectomy in the last two decades. Based on our literature review, the main presentation is usually hemobilia (70%), age of the patient ranging 26–79 years old, and timing of presentation ranging from 1 week to 3 years post laparoscopic cholecystectomy. The pathophysiology is often due to indirect or direct thermal injury during cauterization. Computed tomography angiography is the investigation of choice. Transarterial embolization is the treatment of choice with high success rate. However, surgery still plays a role in complex cases where embolization failed. There should be a high index of suspicion of such pathology, especially in patients who present with upper gastrointestinal bleed post cholecystectomy, so early diagnosis and treatment can be done.

Keywords: Aneurysm, Case report, Cholecystectomy, False, Hemobilia, Laparoscopic.

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INTRODUCTION

Laparoscopic cholecystectomy has been the gold standard of treatment for cholelithiasis in the 21st century. It has distinct advantages due to minimally invasive, reduced complications, and reduced hospital stay compared with open technique. It is very rarely associated with vascular complications. However, it does happen. The mechanism involved is likely due to thermal or direct injury to the vascular wall. Patients normally present with upper gastrointestinal bleed, abdominal pain, or jaundice. We here present a case report and literature review of cystic artery pseudoaneurysm post laparoscopic cholecystectomy. The presentation, diagnosis, and management are discussed.

CASE DESCRIPTION

A 27-year-old female, who is postoperative day 11 of laparoscopic cholecystectomy presented to a private hospital with abdominal pain with hemodynamic instability. There were no intraoperative difficulties encountered during that time. Physical examination revealed that the patient was pale, with tender abdomen at the right hypochondriac region. Blood works and computed tomography (CT) scan revealed that the patient was anemic with Hb of 8.2, and CT scan showed gallbladder bed hematoma (Fig. 1). The patient is treated with blood transfusion, and an ultrasound-guided drainage of gallbladder bed hematoma was done. Subsequently, the symptoms resolved. However, the patient had an episode of upper gastrointestinal bleed 1 day post procedure, an urgent upper endoscopy was done, and no active or recent bleeders were

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identified. Computed tomography angiography was then done, which this time showed a cystic artery pseudoaneurysm and massive hemoperitoneum, which was not found in the first CT likely due to the masking effect of gallbladder bed hematoma. The recurrent symptom could also be explained by the loss of tamponade effect of gallbladder bed hematoma after drainage. A decision was made for angioembolization after a multidisciplinary discussion between the hepato-biliary team and interventional radiology team. Coiling of the right hepatic artery was then done (Figs 2 and 3). The patient

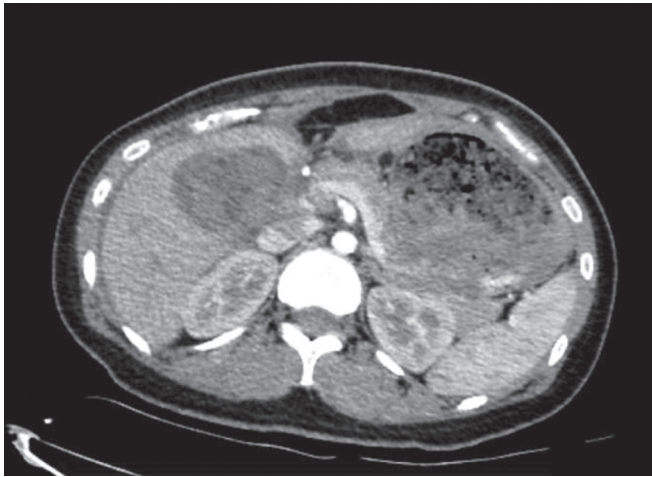


Fig. 1: Gallbladder bed hematoma

was well after that, with no more episodes of UGIB or abdominal pain, recovery was uneventful, and the patient was subsequently discharged.

METHODS

An extensive literature search is carried out in the PubMed databases. All case reports of cystic artery pseudoaneurysms related to laparoscopic cholecystectomies from 2000 to 2020 are included (Table 1). Additionally, we present a case of cystic artery pseudoaneurysm that was treated in our center and included its data in the literature review.

RESULTS

About 10 case reports were found between year 2000 and 2022, including our own case report. The main presentation was upper

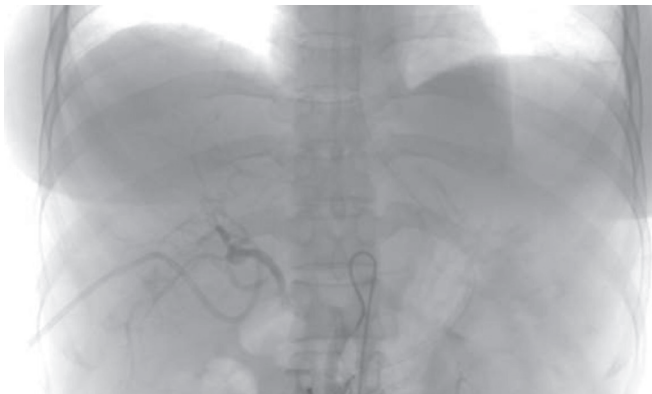


Fig. 2: Angiography preembolization

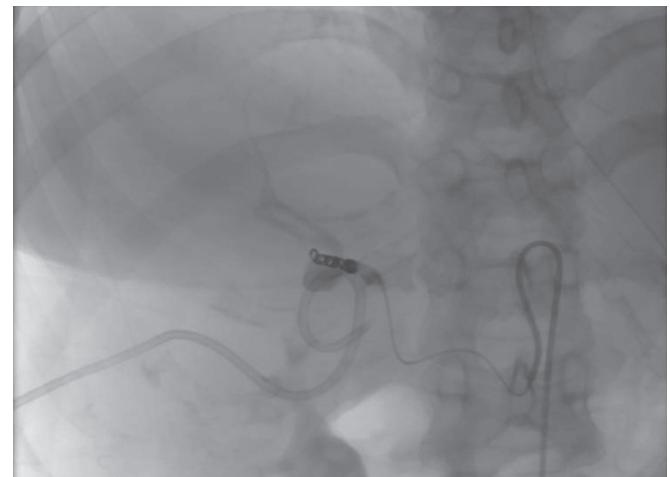


Fig. 3: Angiography postembolization

Table 1: Nine cases of iatrogenic cystic artery pseudoaneurysm post laparoscopic cholecystectomy on PubMed database from 2000 to 2020, including our case report

References	Author	Year of article	Age	Sex	Symptoms	Time of presentation	Treatment
Int Surg 2012;97(2):140–144 ¹	Petrou A	2012	31	Female	Hemobilia	3 months	Angioembolization, followed by ligation of pseudoaneurysm
Trop Gastroenterol 2008;29(2):107–109 ²	Moses V	2008	26	Male	Hemobilia	3 months	Angioembolization
Surg Today 2008;38(6):567–571 ³	Nakase Y	2008	63	Female	Hemobilia	11 days	Angioembolization
HPB (Oxford) 2006;8(4):318–319 ⁴	De Molla Nateo OL	2006	31	Female	Abdominal pain and jaundice	50 days	Ligation of RHA
J Laparoendosc Adv Surg Tech A 2006;16(6):609–612 ⁵	Heyn J	2006	78	Male	Hemobilia	1 year	Excision of pseudoaneurysm
Surgery 2002;131(5):585–586 ⁶	Saldinger PF	2002	50	Female	Hemobilia	1 week	Angioembolization
Hong Kong Med J 2018;24(2):203–205 ⁷	To K	2018	56	Male	Hemobilia	4 weeks	Angioembolization
ACG Case Rep J 2017;4:e38 ⁸	Badillo R	2017	79	Male	Abdominal pain, Jaundice	15 months	Angioembolization
Clin Imaging 2014;38(4):522–525 ⁹	Kumar A	2014	45	Female	Hemobilia	3 years	Angioembolization and percutaneous thrombin injection
Current case report	Tan PH	2022	26	Female	Hemobilia	11 days	Angioembolization

gastrointestinal bleed 7 (70%), followed by abdominal pain with jaundice 3 (30%). There is a near-equal gender distribution of 6 females (60%) and 4 males (40%). The age of patients involved is wide, ranging from 26 to 79 years of age, with a mean of 48. Timing of presentation ranges from 1 week to 3 years post laparoscopic cholecystectomy. Eight patients were treated with angio-embolization (80%). Six were successful (75%), while two required further intervention. One case needed excision of pseudoaneurysm, while the other required percutaneous thrombin injection. Two cases (20%) were treated primarily with surgical intervention. There was no mortality reported in these 10 case reports.

DISCUSSION

Cystic artery pseudoaneurysm post laparoscopic cholecystectomy is rare. Despite laparoscopic cholecystectomy being a common procedure in the 21st century, only about 10 cases were reported for the past two decades. Most case reports of vascular pseudoaneurysm post laparoscopic cholecystectomy were the involvement of right hepatic artery with only a minority involving cystic artery.¹⁰ Multiple theories for development of such complication are proposed. Direct injury, thermal injury, and bile leaks leading to vascular wall damage are some of the proposed mechanisms. Thermal injury can be direct or indirect through metal clips. Bile acid from bile leaks causing erosion of vascular wall can be a cause as well. There was no mortality in case reports of cystic artery pseudoaneurysm reported. However, there are cases reported of mortality in other vessel involvement.

Based on our literature review, there is a wide age range of presentation ranging from 26 to 79 years of age. These data could possibly indicate that surgical factors such as difficult cholecystectomies rather than patient factors play a bigger role in the pathophysiology of such complications. However, there are insufficient data to prove this statement, as there are cases where these complications developed in the absence of intraoperative difficulties.³ There is also wide timing of presentation postop. possibly due to the fact that the majority of pseudoaneurysms remain asymptomatic during the initial phase. However, regardless of the pathophysiology, age and time of presentation, the diagnostic and treatment modalities remain roughly the same.

Computed tomography angiography is the diagnosis of choice with high sensitivity. However, concurrent gallbladder bed hematoma could make the diagnosis difficult due to the masking effect during CT review. Modalities of treatment in most cases reported are angioembolization with a high success rate. Gel foam, coils, or thrombin can be used to embolize blood vessels. Regardless of the mode of embolization, most patients treated with transarterial embolization yield good outcome.^{2,3,6-8} There is much less risk compared with surgery, and in most cases, only local anesthesia is needed. However, there is associated failure and complications, such as failure in coiling due to coagulopathies,¹ difficulties in placing, cannulation issues, misidentification of vessels, or loosely packed coils. In successful transarterial embolization, there are complications such as liver abscess,³ ischemia, and post-procedure bleeding. In cases where service is not available or embolization failed, surgical repair would be recommended which yields good outcome.^{1,4,5} The most common surgical options for pseudoaneurysm are either excision of aneurysm or ligation of the right hepatic artery. There

are even reported cases where ligation of pseudoaneurysm was done laparoscopically.¹¹ Regardless of whether done open or laparoscopically, it does come with complications such as failure of excision. Ligation of the right hepatic artery can be done with a high success rate and a low risk of liver ischemia due to portal vein flow. Generally, surgical treatment yields good outcome based on recent literature review.¹ There is also one case reported where the cystic artery pseudoaneurysm was treated successfully with percutaneous thrombin injection. However, it does carry risk of liver ischemia, although it did not happen in this particular case.

CONCLUSION

Cystic artery pseudoaneurysm post laparoscopic cholecystectomy is rare but relevant in clinical settings as it is a very common procedure. There is a potential risk of high morbidity and mortality if not diagnosed and treated early. We as clinicians should have a high index of suspicion of such complications, especially in patients presenting with upper gastrointestinal bleed post laparoscopic cholecystectomy, so that it can be treated timely and appropriately.

AUTHOR'S CONTRIBUTIONS

PHT – Data gathering, case report, and discussion writing, KCY – case report and discussion writing, ER – case report and discussion writing, NE – editor, and KK – editor.

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Availability of Data and Materials

All data and materials can be found on PubMed database with link given in references.

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