

Laparoscopic cholecystectomy after transcatheter arterial embolisation for haemobilia due to a pseudoaneurysm in the gallbladder: A case report

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Abstract

Pseudoaneurysms of the cystic artery are a rare but significant complication of acute cholecystitis. Laparoscopic cholecystectomy may be a safe alternative to open cholecystectomy in such cases. We report the case of a female patient in her seventies, who presented with anaemia, jaundice, and hepatic dysfunction during hospitalisation for right knee pyogenic arthritis. The patient had no pain in the right upper quadrant. Her serum haemoglobin level was 6.5 g/dL, and upper gastrointestinal endoscopy revealed no abnormalities. Six days later, jaundice worsened, and endoscopic retrograde cholangiopancreatography revealed bloody bile. An endoscopic biliary drainage tube was inserted at the discretion of the gastroenterology department. Contrast-enhanced computed tomography revealed a haematoma in the gallbladder and a pseudoaneurysm in the lateral wall of the gallbladder. On the same day, the endoscopic biliary drainage tube was replaced with an endoscopic nasobiliary drainage tube, which indicated the degree of haemorrhage and enabled lavage of the lumen in cases of obstruction. The next day, angiography revealed a pseudoaneurysm of the deep branch of the cystic artery and coil embolisation was performed at the periphery of the cystic artery. Uninterrupted laparoscopic cholecystectomy was performed. Although laparoscopic cholecystectomy is difficult when bleeding is uncontrolled, it was safely performed following haemostasis using transcatheter arterial embolisation. Laparoscopic cholecystectomy is feasible in haemodynamically stable patients with cystic artery pseudoaneurysms after transcatheter arterial embolisation.

Keywords

Cystic artery pseudoaneurysm, laparoscopic cholecystectomy, transcatheter arterial embolisation, endoscopic biliary drainage tube

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Introduction

Inflammation such as acute cholecystitis, pancreatitis, and trauma has been reported as the cause for cystic artery pseudoaneurysm.^{1–4} Cystic artery pseudoaneurysm is rare⁴ and is often reported as the cause of haemobilia.^{1,5–7} Pseudoaneurysms may in turn cause haemobilia and/or biliary obstruction.^{1,5–7} Thus, biliary obstruction caused by haemobilia requires adequate drainage.⁸

Cholecystectomy is the possible choice of surgical intervention for haemostasis and biliary obstruction caused by pseudoaneurysms. Laparoscopic cholecystectomy (LC) has a lower mortality rate owing to its small wounds and a shorter

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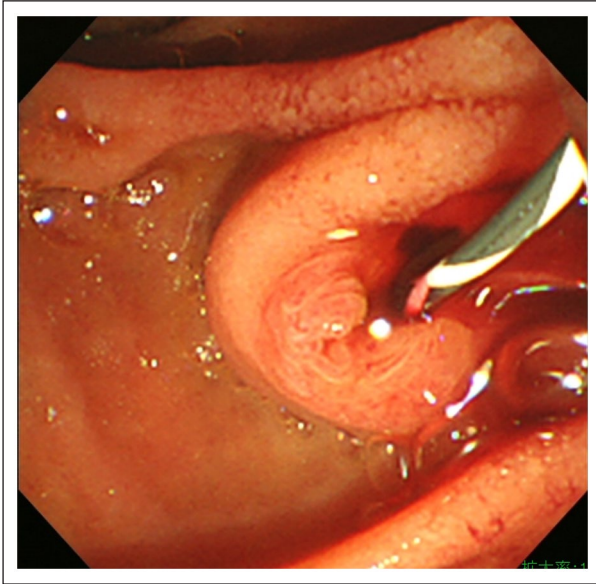


Figure 1. Endoscopy reveals haemobilia from the papilla Vater.

hospital stay compared to those of open cholecystectomy; thus, LC has become a safe alternative to open cholecystectomy.^{9,10} However, its safety and efficacy have not been established in cases of cystic artery pseudoaneurysms. Furthermore, laparoscopic surgery is difficult when bleeding is uncontrolled. Under such circumstances, the safety of LC may be inferior to that of open surgery owing to risks such as biliary duct injury.¹¹

We report a case in which LC was safely completed using ordinary technical procedures following transcatheter arterial embolisation (TAE) bleeding cessation. Preoperative TAE was performed after indwelling endoscopic nasobiliary drainage tube (ENBD tube).

Case

A female patient in her seventies with Parkinson's disease and chronic heart failure presented with anaemia, jaundice, and hepatic dysfunction during hospitalisation for right knee pyogenic arthritis. The patient had no pain in the right upper quadrant. Heart rate was 98/min and blood pressure was 105/70 mmHg. As the patient had kidney dysfunction at this timing, non-contrast-enhanced computed tomography (CT) was performed, which revealed swelling of the gallbladder and no irregular findings in the bile duct. Her total bilirubin was 6.3 mg/L, direct bilirubin was 5.2 mg/dL, and serum alkaliphosphatase was 2246 IU/mL. Although the patient's haemodynamic state was stable, her serum haemoglobin level was 6.5 g/dL, and upper gastrointestinal endoscopy revealed no abnormalities. We performed red blood cell (RBC transfusion for 4 units. The following day, magnetic resonance cholangiopancreatography showed no biliary tree obstruction. Six days later, jaundice worsened, and

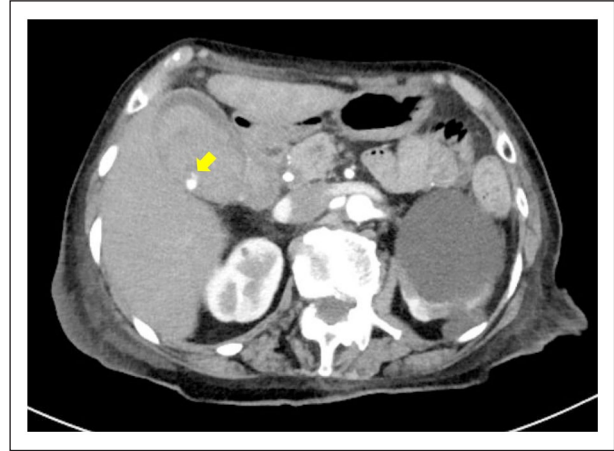


Figure 2. Contrast-enhanced computed tomography image of the extravasation of the cystic artery in arterial phase.

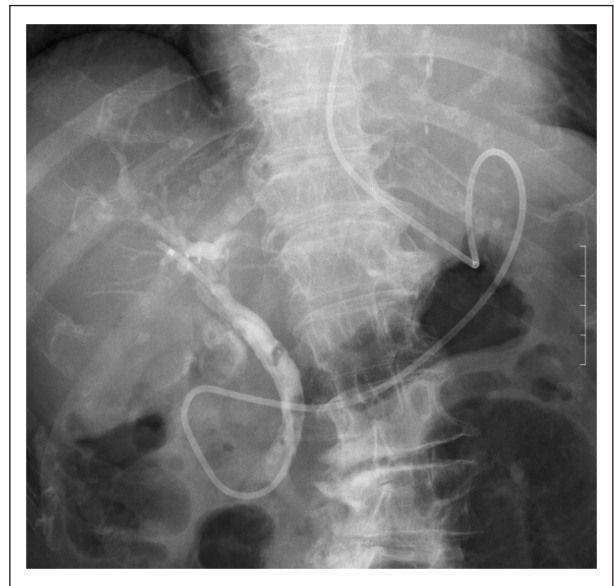


Figure 3. Insertion of endoscopic nasobiliary drainage tube. Radiolucent band indicates the haematoma.

endoscopic retrograde cholangiopancreatography (ERCP) revealed bloody bile (Figure 1). An endoscopic biliary drainage (EBD) tube was inserted at the discretion of the gastroenterology department. Contrast-enhanced CT revealed a haematoma in the gallbladder and a pseudoaneurysm in the lateral wall of the gallbladder (Figure 2); hence, she was referred to the department of surgery. On the same day, the EBD tube was replaced with an ENBD tube, which indicated the degree of haemorrhage and enabled lavage of the lumen in cases of obstruction (Figure 3). The next day, angiography revealed a pseudoaneurysm of the deep branch of the cystic artery (Figure 4(a)), and coil embolisation (VortX diamond, 2–5 mm, Boston Scientific Pushable Coil, Boston Scientific, Massachusetts, USA) was performed at

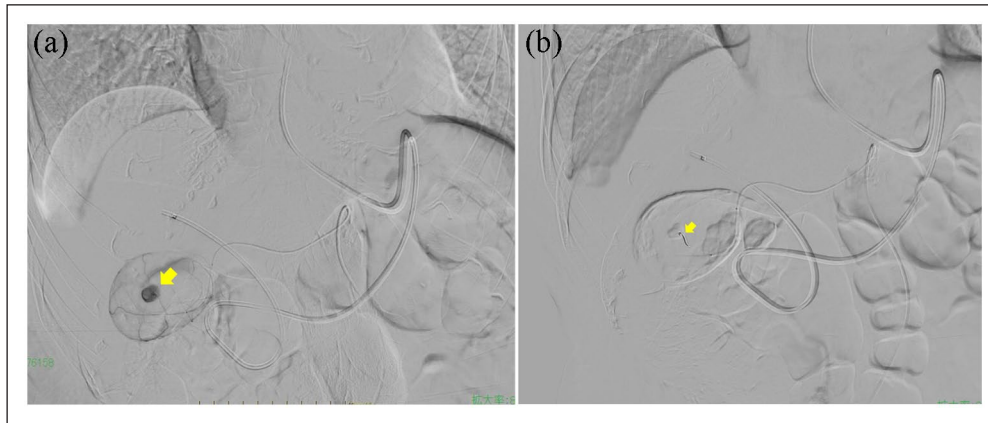


Figure 4. Angiography of the cystic artery: (a) extravasation from the cystic artery and (b) embolisation of the cystic artery by coiling.

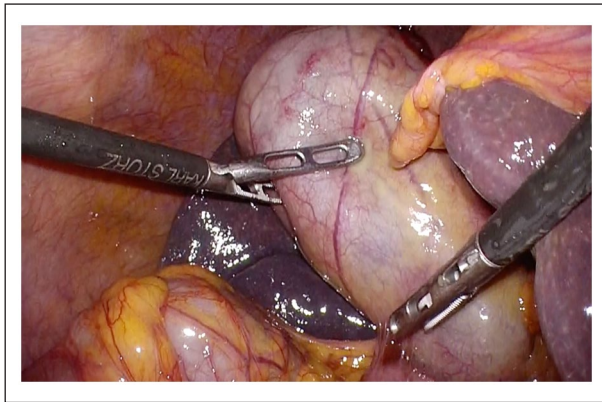


Figure 5. Laparoscopy shows a tensed gall bladder.

the periphery of the cystic artery (Figure 4(b)). No pseudoaneurysms were observed after embolisation (Figure 4(b)).

Considering necrosis of the gallbladder and failure of haemostasis using TAE, LC was performed without interruption. The gallbladder was tense and difficult to grasp, and it was necessary to aspirate the clot and bile from the gallbladder intraoperatively (Figure 5). The removed gallbladder was full of clots, but there was no major mucosal disruption or oedema. A small haematoma was observed on the mucosal surface. The perihepatic drainage tube was inserted with gallbladder resection. As there was no drainage in the ENBD tube on the day after surgery, we performed intracavitary lavage with a small amount of saline and confirmed the outflow of bile immediately after the expulsion of blood clots in the ENBD tube. Consequently, the ENBD tube was removed 1 week postoperatively without any obstruction. No blood transfusion was required during hospitalisation. The patient was transferred to another hospital for rehabilitation.

Pathological findings revealed chronic cholecystitis with fibrosis of the subplasmalemmal layer of the gallbladder and mild inflammatory cell infiltration. Some erosion and haemorrhage were observed (Figure 6(a)), however, no pseudoaneurysm was detected (Figure 6(b)). Thus, the clear

aetiology of the aneurysm was not revealed despite the detailed investigation.

Informed consent for patient information and images to be published were provided by the patient.

Discussion

Pseudoaneurysms of the cystic artery are rare and are often reported as the cause of haemobilia after LC.^{1,5-7} Although pseudoaneurysm of the cystic artery is a rare complication of acute cholecystitis,⁴ our patient was not diagnosed with acute cholecystitis. Anand et al.¹² reported an idiopathic pseudoaneurysm of the cystic artery, which was associated with only chronic cholecystitis. Segmental arterial mediolysis (SAM) is one of the most common diseases that affect the abdominal aortic branches.¹³ SAM is characterised by lysis of the medial layer of the arterial wall, which leads to dissection, aneurysm, occlusion, or stenosis. In this case, pathological abnormalities, such as lysis of the medial layer of the arterial wall, which indicate SAM, were not found. Although examined in detail, a pseudoaneurysm was not detected in the specimen (Figure 6(b)). Thus, the possibility of a pseudoaneurysm caused by SAM remained in this case. Although we speculate that the aetiology of the pseudoaneurysm was chronic cholecystitis, the same as Anand reported, the clear aetiology of the aneurysm was not detected despite the detailed investigation.

The ENBD tube is more suitable than the endoscopic biliary duct stent for haemorrhagic conditions in terms of indicating the degree of haemorrhage preoperatively.¹⁴ Furthermore, haemobilia is known to cause biliary obstruction due to clots,⁸ and drainage is required to prevent jaundice and cholangitis.^{8,15} In our case, biliary obstruction was caused by a clot preoperatively. However, by using an ENBD tube, we could perform a lavage procedure before and after surgery. Therefore, we prevented biliary obstruction due to clots before and after surgery. In a previous report, a case of haemobilia was successfully treated conservatively using an ENBD tube.¹⁶

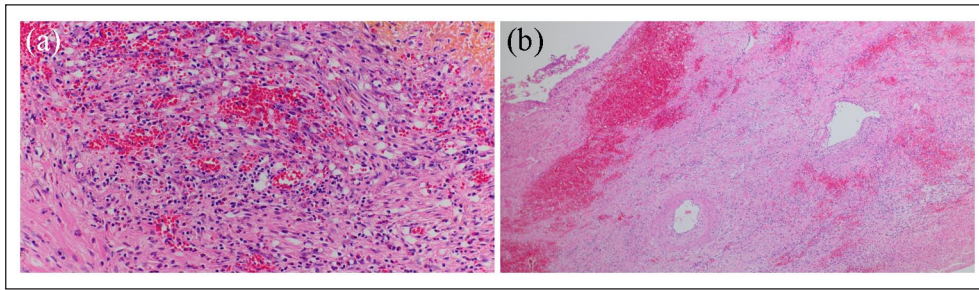


Figure 6. Haematoxylin and eosin stain of the gall bladder: (a) haematoxylin and eosin stain reveals granulation tissue and (b) although abnormalities such as lysis of the medial layer of the arterial wall were not found, the histopathologic site of the pseudoaneurysm was not detected in the specimen. No abnormalities, such as lysis of the medial layer of the arterial wall or the histopathological site of the pseudoaneurysm, were detected in the specimen.

TAE is important for stabilising the haemodynamic state and maintaining the surgical site, which contributes to the choice of laparoscopic surgery. Thus, the TAE serves as a useful pre-stage for LC. However, the timing of LC following TAE remains controversial. We decided to perform early cholecystectomy for two reasons. First, several reports have suggested the possibility of ischaemia of the gall bladder following haemostasis of the cystic artery.^{17–21} Patil et al.⁴ reported in their review of 38 cases that no gangrenous gall bladder developed following successful embolisation of the cystic artery. They also reported that 20 out of 38 patients did not undergo cholecystectomy following TAE. However, Saluja et al.¹⁷ reported the presence of peritoneal signs suggestive of gallbladder infarction after TAE and subsequent cholecystectomy. Mishima et al.²² reported a gangrenous gall bladder after TAE. Because the possibility of necrosis of the gallbladder following embolisation remains, early cholecystectomy is a definitive procedure. The second reason for early cholecystectomy is that TAE is not a perfect measure for haemostasis. Maeda et al.²³ reported cholecystectomy 10 days after TAE. However, some cases have reported failure of TAE, which requires urgent exploration.⁴ Taken together, we decided to perform early LC following TAE, which is a safe intervention for pseudoaneurysms of the cystic artery. Further studies are needed to investigate the indications and optimal timing of cholecystectomy.

Compared to open surgery, laparoscopic surgery has various merits, such as reduction of bleeding and wound infection and shortening of hospital stay, as there is a smaller wound.^{9,10} Once bleeding occurs, laparoscopic surgery becomes more difficult to perform. Therefore, open surgery may be required in some cases.¹¹ However, as in the present case, LC was safely completed in an ordinary technical process following TAE haemostasis using an indwelling ENBD tube.

Conclusion

Pseudoaneurysms of the cystic artery are rare but important complications of cholecystitis. We performed LC considering necrosis of the gallbladder and failure of haemostasis

using TAE. LC is feasible in hemodynamically stable patients with cystic artery pseudoaneurysms after TAE.

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Author contributions

Y.I., K.Y., H.T., K.N., A.F., T.I., and H.M. administered the clinical treatments and performed surgical procedures and perioperative management. T.K. made a pathological diagnosis. Y.I. drafted the manuscript. S.H. and K.Y. provided expertise, and Y.I. and provided feedback. All authors approved the final manuscript.

Declaration of conflicting interests

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Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

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