

Gangrenous Laparoscopic Cholecystectomy With Compound Complications Leading to Multiple Hospitalizations: A Complex Case Presentation

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Abstract

Laparoscopic cholecystectomy is a common procedure in general surgery but can lead to complications, ranging from minor bile leaks to more rare and serious complications. In this article, we present a complex case involving a biloma resulting from injury to the accessory bile duct during laparoscopic cholecystectomy. This rare complication was further complicated by a residual phlegmon turned abscess, subacute-subcapsular hematoma, and persistent bile duct leak. To our knowledge, no other case with this combination of complications has been reported. We aim to describe the case and discuss preventive measures that can be taken to reduce the incidence of these complications. This case highlights the importance of careful surgical technique and postoperative monitoring in preventing complications after laparoscopic cholecystectomy.

Keywords: Biloma, subcapsular hematoma, Lap chole complications, improving outcomes, persistent bile leak

1. Introduction

Laparoscopic cholecystectomy is a well-established and safe procedure that has emerged as an alternative to open cholecystectomy (1). Despite its relatively low risk, complications can occur, with bile duct injury (BDI) being a well-recognized occurrence (2). BDI can have serious consequences, including biliary strictures, cholangitis, and bile leaks. The incidence of bile leaks has been reported in literature as 0.3-2.7%, and a rarer complication that may result from bile leaks is biloma (3). Bilomas are encapsulated collections of bile within the abdomen that can lead to serious complications such as peritonitis and sepsis (4, 5). Therefore, it is essential to detect and manage bilomas promptly.

In this article, we present a rare and complex case of a patient who underwent a laparoscopic cholecystectomy that resulted in a bile duct injury and subsequent persistent leak, biloma, subacute-subcapsular hematoma, and abscess formation. This case highlights the importance of careful surgical technique, prompt diagnosis, and postoperative monitoring in preventing and managing complications following laparoscopic cholecystectomy. The aim of this article is to describe the case and discuss preventive measures that can be taken to reduce the incidence of these complications.

2. Case Report

Patient Information

Age: 70 years old. Gender: Female. Ethnicity: White. Related Medical Problems: Type II diabetes mellitus, hypertension.

Objective for Case Reporting: Our aim is to demonstrate the possible domino effect of complications that may result from a relatively safe laparoscopic cholecystectomy procedure. Physicians should be aware of the possible complications and utilize methods to improve quality outcomes.

3. Case Presentation

We present the case of a 70-year-old woman who presented with severe stomach cramps, spasms, and pain in the right upper quadrant that worsened over three days. Patient's past medical history was significant for Type II diabetes mellitus and hypertension, both of which are well controlled on medication. The patient reported an

episode of nausea, vomiting and dry heaving. She had not eaten anything in the past 48 hours and denied fever, shortness of breath, or chest pain. The patient's labs were significant for white blood cell count (WBC) 21600/uL, alkaline phosphatase (ALP) 176U/L, blood urea nitrogen (BUN) 30 mg/dL, creatinine 1.88 mg/dL, aspartate aminotransferase (AST) 95 U/L, alanine aminotransferase (ALT) 213 U/L, and total bilirubin 2.7 mg/dL. Computed tomography (CT) showed cholelithiasis with a significantly thickened gallbladder wall and moderate pericholecystic inflammation, consistent with gangrenous cholecystitis (Figure 1).

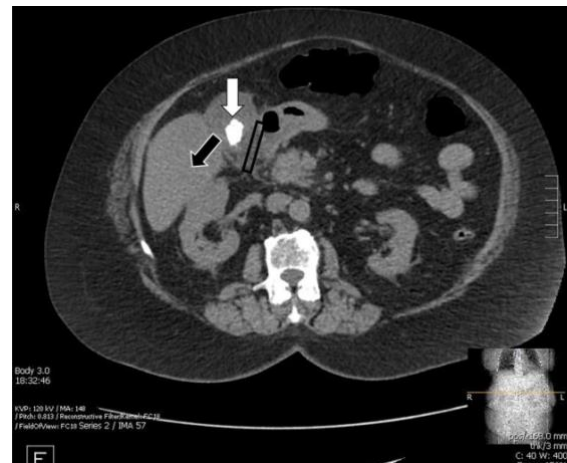


Figure 1. CT abdomen and pelvis without IV contrast showing cholelithiasis (white arrow). Gallbladder wall thickening (black rectangle) and moderate pericholecystic inflammation consistent with acute cholecystitis and borderline hepatic steatosis (black arrow).

The patient underwent a robotic cholecystectomy during which an accessory duct of Luschka leak was suspected. She was discharged four days later.

Sixteen days post-cholecystectomy, the patient returned with complaints of persistent nausea and fatigue, but denied abdominal pain, fever, or vomiting. Her labs showed AST 683 U/L, ALT 670 U/L, total bilirubin 4.2 mg/dL. The patient was found to have a subhepatic biloma suspected from the intraoperative accessory duct of Luschka leak (Figure 2).

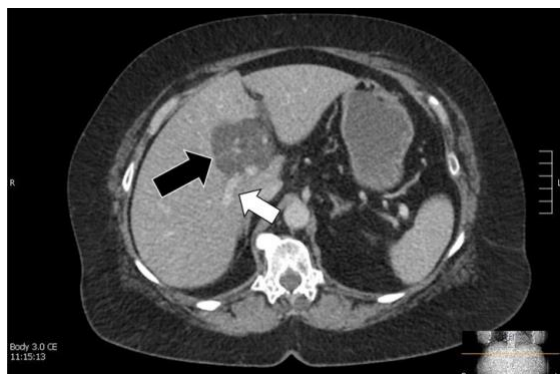


Figure 2. Interval cholecystectomy. Low attenuation fluid collection in the gallbladder fossa measures 6.1 x 3.6 x 6.5 cm consistent with biloma (black arrow). Biloma surrounds the hepatic arteries and has a mild mass effect on the portal vein displacing it dorso-distally (white arrow).

This was treated with endoscopic retrograde cholangiopancreatography (ERCP) with stent placement and computed tomography-guided catheter drainage of the biloma (Figure 3).

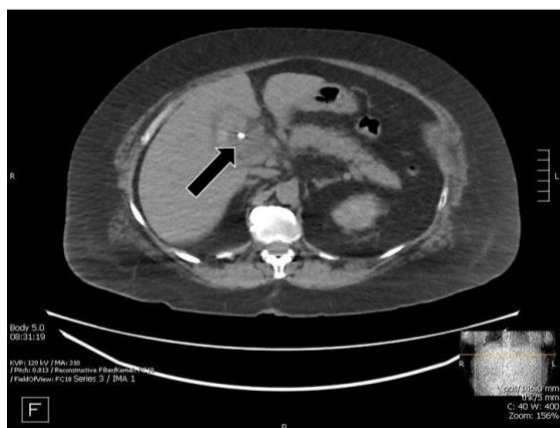


Figure 3. CT guided abscess drainage of gallbladder fossa fluid collection. Successful placement of an 8 French all-purpose drainage catheter into known gallbladder fossa fluid collection (black arrow). Specimen sent for gram stain culture and sensitivity.

The drain had a fairly high output initially but appeared to control the leak. Her liver enzymes decreased towards normal. She was discharged home and underwent a stent exchange two weeks later due to proximal stent migration. The patient returned a week post stent exchange complaining of malodorous drainage, worsening jaundice and bilious drainage. Her ALP 921 U/L, AST 133 U/L, ALT 80 U/L, total bilirubin 6.7 mg/dL and WBC 14700/uL. 48 hours later, her WBC increased to 22,200/uL, she was found to have extensive inflammation with abscess formation in

the previous biloma managed via CT-guided drainage and placement of a Blake drain (Figure 3). Fluid cultures collected intraoperatively grew *Enterococcus faecalis*, *Klebsiella pneumoniae*, and *Candida albicans*. Patient was put on appropriate pharmacotherapy.

CT scan of the abdomen and pelvis revealed a subacute subcapsular hematoma of the right lobe of the liver with a large amount of scattered gas in the gallbladder fossa region and in the adjacent liver and falciform ligament (Figure 4).

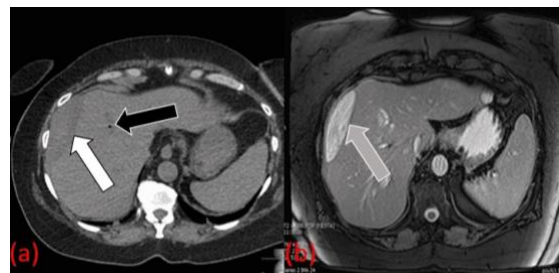


Figure 4. (a) CT scan showing Abscess drainage catheter remains in the gallbladder fossa region. Fluid collection has decreased in size (black arrow). There is a relatively isodense and hypodense subcapsular hematoma in the lateral right lobe of the liver with maximum thickness of 2.8 cm. It is approximately 8.5 cm anteroposterior and 10 cm craniocaudal (white arrow). (b) MRI shows subcapsular hematoma on the right lobe of liver (grey arrow).

Bile was seen coming from the right hepatic duct on ERCP (Figure 5).



Figure 5. ERCP demonstrating biliary extravasation

from the right hepatic duct near the portal hepatis (black arrow).

T-tube was placed in the right hepatic duct, and cholangiogram was performed showing free flow of bile into the duodenum (Figure 6).



Figure 6. Intrahepatic radicles mildly prominent in contrast blush below the confluence indicate extravasation (black arrow). There is small bowel contrast as well (white arrows).

Blake drain was placed. Fluid cultures collected intraoperatively grew *Enterococcus faecalis*, *Klebsiella pneumoniae*, and *Candida albicans*. Patient was put on appropriate pharmacotherapy. 72 hours later, the patient developed bleeding around the drain site and underwent evacuation of the clot and exchange of the intraperitoneal blake drain (figure 3). A cholangiogram obtained 48 hours later demonstrated persistent bile leak from the right hepatic duct near the point of entry of the T-tube (Figure 7).



Figure 7. Cholangiogram demonstrating T-tube in place (black arrow).

the right hepatic duct (black arrow) with contrast extravasation indicating persistent bile leak from the right hepatic duct near the point of entry of the T-tube (white arrow).

Plans were made to continue conservative management at the inpatient rehabilitation unit. Two weeks later, the patient was able to complete her recovery at the rehab unit, and her liver enzymes normalized with AST 50 U/L, ALT 29 U/L, and total bilirubin 1.2 mg/dL. Cholangiogram was obtained prior to discharge showing T-tube in place (Figure 8).



Figure 8. Cholangiogram showing T-tube in place (black arrow).

The patient was discharged after re-suturing both of her drains with recommendations to follow up in the outpatient clinic for another T-tube cholangiogram.

4. Discussion

Bile duct injuries, including biliary leakage, haemobilia, biliary fistulas, and bilomas, are most commonly associated with intraoperative complications, particularly those occurring after laparoscopic cholecystectomies. Although minimal bile leakage occurs in up to 44% of laparoscopic cholecystectomies, the vast majority of small volume leaks resolve spontaneously (6). Biliary injuries frequently involve the common hepatic ducts, with right hepatic duct injuries being less common.

Anatomical misidentification of the cystic duct as the common bile duct or an aberrant right hepatic duct is a common cause of biliary injuries during

laparoscopic cholecystectomies (7). However, certain measures can be taken to prevent such complications, such as performing complete circumferential dissection of the gallbladder neck and cystic duct before cholangiography, or clip placement and using techniques like Strasberg's conclusive identification and a 30-degree telescope to decrease the occurrence of misidentification errors (8). For instance, Strasberg's critical view of safety (CVS) attempts to decrease risk of laparoscopic cholecystectomy to zero by dissecting to an optimal plane in which the surgeon can visualize the bile duct anatomical structures prior to cutting, thus preventing injuries (9). CVS requires blunt dissection of the upper part of Calot's space, away from arterial or biliary structures rendering it safe a dissection, even in less experienced hands (10). Prevention of biliary injuries may also decrease the incidence of bilomas, which are defined as intra- or extrahepatic bile collections (11). Bilomas increase the risk of infection, and prompt diagnosis is essential for a good prognosis. Literature suggests that in the setting of post cholecystectomy bile collection serious illness was associated with a longer period of undrained bile at 15.4 versus 9.2 days, and failure to drain a bile collection within just 5 days resulted in serious illness in some cases (12). Therefore, detection of a biloma within the first five days is ideal. Ultrasound, CT scans, magnetic resonance imaging (MRI), magnetic resonance cholangiopancreatography (MRCP), hepatobiliary iminodiacetic acid (HIDA) scans, and ERCPs are used to diagnose and sometimes treat bilomas (13). Factors like size, location, abdominal pain, jaundice, and leak volume guide biloma management, and treatments may range from observation to percutaneous-endoscopic drainage to more invasive surgical drainage (14). Endoscopic ultrasound-guided drainage is preferred over CT to minimize radiation (15). While bilomas are a rare presentation, their management is critical for good outcomes. Once managed percutaneously, these bilomas rarely recur, but ongoing bile leaks may require surgical fixation or stent placement (8). This is similar to what we saw in this case where a bile leak from the right hepatic duct persisted. The sample sizes of studies on bilomas are generally small and statistically weak, but the concept remains that the sooner the diagnosis and treatment, the better the prognosis. Further complicating this case was the formation of subcapsular hematoma. Subcapsular hematoma of the liver is a potentially life-threatening but

extremely rare condition, may be caused by a blunt trauma, a liver tumor, or surgery (16). While the patient in this case had the predispositions mentioned, the case timeline points towards ERCP as the potential cause. Post-ERCP hematoma is an extremely rare complication and has only been reported in a few case reports since its identification in 2000 (17). The choice of management of subcapsular hematoma depends on the size, location, and symptoms. Due to the complexity of this case, the hematoma was managed conservatively.

Another complication the patient experienced is abscess formation in the biloma fossa post stent exchange. The natural history of abdominal bile collections from bile duct injuries is to progress from sterile bile collection to infection (12). Therefore, biloma drainage and antibiotic therapy are the mainstay treatment. In this case however, abscess formation occurred despite drainage. This was perhaps due the stent exchange and ongoing right hepatic duct leak which was diagnosed later. The proposed domino effect in this case stemmed from the thought that one complication led to the next. For instance, the patient presented with acute cholecystitis which was managed via laparoscopic cholecystectomy. Laparoscopic cholecystectomy led to a bile injury. Bile injury turned into a biloma which was managed via ERCP and stent placement. ERCP lead to the formation of a subacute subcapsular hematoma and stent exchange lead to abscess formation. What was a safe procedure turned into a complicated case requiring multiple hospitalizations in an overall healthy patient.

Review of literature shows no sufficient evidence on whether the well-controlled comorbidities this patient exhibited have a significant effect on the outcomes of a laparoscopic cholecystectomy. Current literature focuses on intraoperative changes and difficulty in dissection of diabetics due to increased adhesions which might increase the risk of bile duct injury. However, not enough studies have explored bilomas, intrahepatic abscesses, and subcapsular hematomas in the setting of well controlled hypertension and diabetes. In the absence of such link prediction of the outcome of surgery beforehand can be challenging rendering this link an important area for exploration in the future.

5. Conclusion

In conclusion, the presented case highlights the complexity and severity of complications that can

arise following laparoscopic cholecystectomy, including bile leak, biloma formation, subcapsular hematoma, and abscess formation. The persistence of bile leak from the right hepatic duct further adds to the challenge of managing such cases. The rarity of some of these complications, such as symptomatic bilomas, emphasizes the need for early clinical suspicion and prompt diagnosis to achieve favorable outcomes. It is crucial for surgeons to follow preventive measures and techniques, such as complete circumferential dissection of the gallbladder neck and cystic duct before clipping. Moreover, appropriate imaging modalities and drainage procedures, such as endoscopic ultrasound-guided drainage, should be employed for timely diagnosis and management of bilomas.

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