Section: General Surgery and Minimal Invasive Surgery

Case Report

EMPYEMA OF GALL BLADDER: CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

Gallbladder empyema represents one of the most severe complications of acute calculous cholecystitis and constitutes a surgical emergency requiring prompt diagnosis and definitive management (2,10). Obstruction of the cystic duct by an impacted gallstone leads to bile stasis, bacterial infection, progressive distension, ischemia of the gallbladder wall, and accumulation of purulent material (2,10). Delay in treatment may result in gangrene, perforation, generalized peritonitis, septic shock, and death (2,10,11). Although patients commonly present with fever, right upper quadrant pain, and leukocytosis, elderly patients and those with diabetes mellitus may exhibit atypical clinical features, resulting in delayed intervention (6,15). We report the case of a 65-year-old man with diabetes mellitus, dyslipidaemia, and coronary artery disease who presented with acute right hypochondrial pain and vomiting. Imaging demonstrated a distended inflamed gallbladder with impacted calculi at the neck (5). Emergency laparoscopic adhesiolysis and cholecystectomy were successfully performed after aspiration of infected bile. Histopathological examination revealed acute-on-chronic cholecystitis with focal gangrenous change. The patient recovered uneventfully. This case highlights that laparoscopic cholecystectomy remains a safe and effective treatment for gallbladder empyema in experienced hands despite significant inflammatory distortion of anatomy (3,8,15).

Keywords: Gallbladder empyema, acute cholecystitis, Laparoscopic cholecystectomy, Gangrenous cholecystitis, Gallstones, Surgical emergency.

INTRODUCTION

Empyema of the gallbladder is a suppurative infection characterized by the accumulation of pus within the gallbladder lumen secondary to prolonged cystic duct obstruction, most commonly caused by an impacted gallstone.[2,10] It represents an advanced stage of acute calculous cholecystitis and accounts for approximately 2–11% of patients undergoing emergency cholecystectomy for acute gallbladder disease.[10,11] Despite advances in imaging, antimicrobial therapy, and minimally invasive surgery, gallbladder empyema continues to be associated with considerable morbidity because of its potential progression to gangrene, perforation, biliary peritonitis, intra-abdominal abscess formation, and sepsis.[2,10,15]

The pathological process begins with obstruction of the cystic duct, resulting in progressive bile stasis and increased intraluminal pressure. Reduced venous and lymphatic drainage subsequently compromises arterial perfusion, leading to ischemic injury of the gallbladder wall.[2,10] Secondary bacterial infection, most frequently involving Escherichia coli, Klebsiella species, Enterococcus species, and anaerobic organisms, transforms sterile bile into purulent material.[2,14] Once suppuration develops, antibiotic therapy alone is insufficient because penetration into the closed infected cavity is limited, making surgical source control mandatory.[2,14]

Clinical manifestations include severe right upper quadrant pain, fever, nausea, vomiting, anorexia, localized guarding, and a positive Murphy's sign.[2,10] Laboratory investigations typically

demonstrate leukocytosis with neutrophilia and elevated inflammatory markers, whereas liver function tests may remain normal unless common bile duct obstruction coexists.[6,7] Elderly individuals, diabetic patients, and immunocompromised patients frequently present atypically, often lacking fever or marked abdominal tenderness, thereby increasing the likelihood of delayed diagnosis and adverse outcomes.[6,15]

Ultrasonography remains the preferred initial imaging modality and usually demonstrates gallbladder distension, diffuse wall thickening, impacted calculi, intraluminal echogenic debris, and pericholecystic fluid.[5,14]

Contrast-enhanced computed tomography and magnetic resonance cholangiopancreatography provide additional information regarding gangrene, perforation, surrounding inflammation, biliary anatomy, and possible common bile duct pathology.[5]

Early laparoscopic cholecystectomy is currently recommended as the definitive treatment for patients who are medically fit for surgery.[1,2,15]

However, severe inflammation and dense adhesions frequently distort Calot's triangle, increasing the risk of bile duct injury.[3,13] In high-risk surgical candidates, percutaneous cholecystostomy may serve as a temporizing measure before definitive cholecystectomy.[14]

We report a case of gallbladder empyema with focal gangrenous change successfully treated by emergency laparoscopic cholecystectomy.

CASE REPORT

A 65-year-old man presented to the emergency department with severe right-sided upper abdominal pain of one day's duration. The pain was continuous and was associated with multiple episodes of vomiting. There was no history of radiation of pain to the back, loose stools, jaundice, or recent outside food consumption.

His medical history was significant for type 2 diabetes mellitus and dyslipidaemia, both on regular medical treatment. He also had established coronary artery disease but had discontinued cardiac medications six months prior to presentation.

On examination, the patient was alert and hemodynamically stable. Abdominal examination revealed localized tenderness in the right hypochondrium with rebound tenderness. Murphy's sign was positive, and the fundus of the gallbladder was palpable. Bowel sounds were sluggish. No generalized peritonitis was evident.

Laboratory investigations revealed marked leukocytosis (16,270 cells/mm³) with neutrophilia (14,510 cells/mm³), elevated C-reactive protein (5.92 mg/dL), total bilirubin of 1.23 mg/dL, indirect bilirubin of 0.95 mg/dL, and HbA1c of 6.5%. Routine renal and liver function tests were otherwise within normal limits. Viral serology and urine examination were unremarkable.

Electrocardiography demonstrated right bundle branch block with T-wave inversion. Echocardiography showed a preserved left ventricular ejection fraction of 56% with regional hypokinesia. Chest radiography was normal.

Contrast-enhanced CT abdomen demonstrated a markedly distended gallbladder containing multiple calculi, including an impacted stone measuring 5.5 mm at the gallbladder neck, associated with wall thickening and pericholecystic fat stranding. The common bile duct measured approximately 6.5 mm without definite choledocholithiasis.

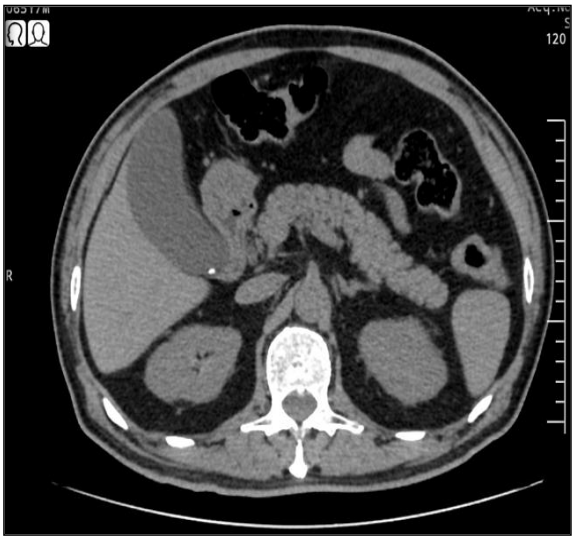


Figure 1: CT abdomen showing a distended GB with calculi.

Figure 2: GB calculi seen impacted at the neck

MRCP confirmed diffuse gallbladder wall thickening measuring 7.2 mm, multiple gallstones within the lumen, an impacted calculus at the gallbladder neck measuring 5.2 × 3.8 mm, and surrounding inflammatory fat stranding without evidence of biliary obstruction.

Figure 3: MRCP of the GB and the biliary tree

Considering the diagnosis of complicated acute calculous cholecystitis with suspected gallbladder empyema, emergency laparoscopic cholecystectomy was planned.

Following induction of general anaesthesia, pneumoperitoneum was established using a Veress needle at Palmer's point. Four laparoscopic ports were inserted. Dense omental adhesions involving the gallbladder and anterior abdominal wall were carefully divided using a harmonic scalpel. The gallbladder appeared markedly inflamed, tense, elongated, and distended.

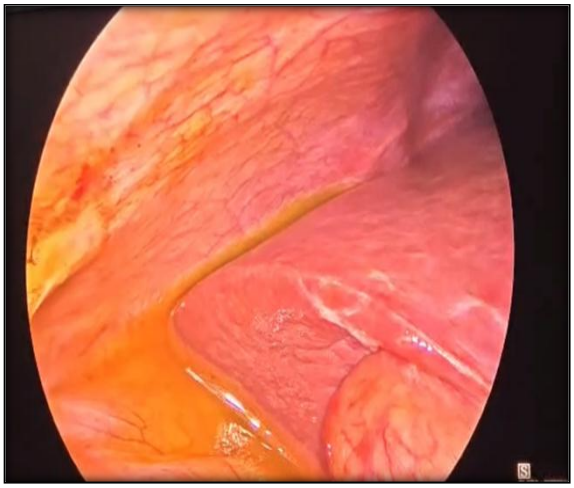


Figure 4: Inflammatory fluid in the right hepatic flexure

To facilitate safe handling, approximately 20 mL of purulent infected bile was aspirated from the gallbladder fundus and sent for microbiological culture and sensitivity. Following decompression, meticulous dissection was continued until the critical view of safety was achieved. The cystic artery and cystic duct were clipped and divided, after which the gallbladder was dissected from the liver bed using a harmonic scalpel. Thorough peritoneal lavage was performed, meticulous haemostasis was secured, and the specimen was retrieved for histopathological examination.

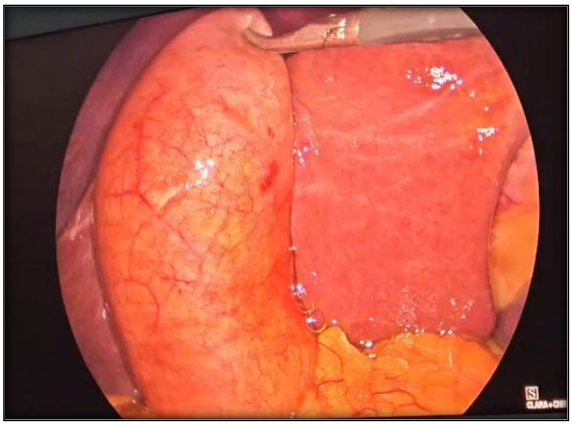


Figure 5: Grossly distended GB

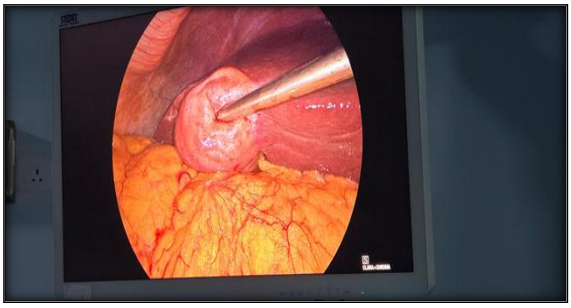
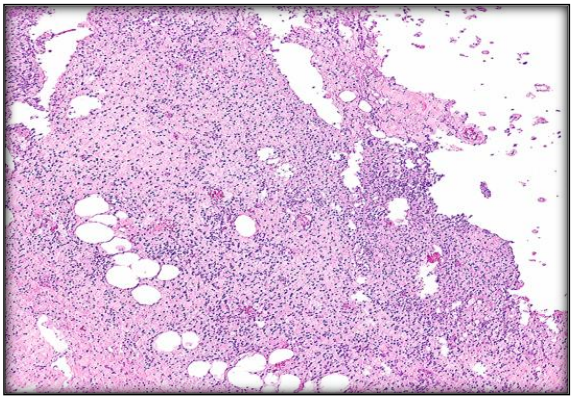


Figure 6: Aspiration of infected bile

Histopathological examination demonstrated acute-on-chronic cholecystitis with focal gangrenous changes, confirming the advanced stage of gallbladder infection.



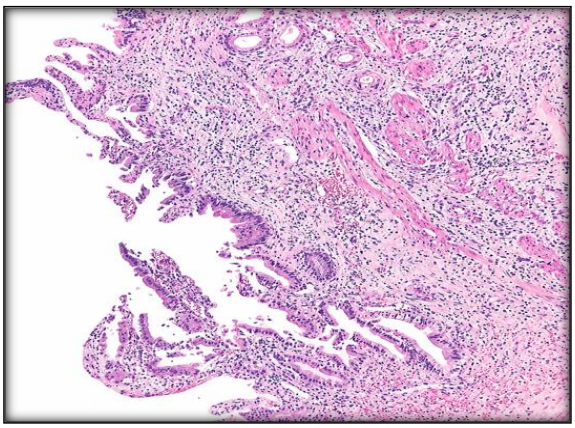


Figure 7 & 8: HPE

The postoperative recovery was uneventful, and the patient was discharged in stable condition following completion of intravenous antibiotics and satisfactory clinical improvement.

DISCUSSION

Gallbladder empyema represents one of the most advanced manifestations of acute calculous cholecystitis and remains associated with significant perioperative morbidity despite improvements in modern surgical care.[2,10,15] Obstruction of the cystic duct initiates a cascade of progressive gallbladder distension, ischemia, bacterial proliferation, and suppuration. Increasing intraluminal pressure further compromises mural blood supply, predisposing to transmural necrosis and gangrene.[2,10]

Several risk factors have been associated with progression from uncomplicated acute cholecystitis to empyema, including advanced age, male sex, diabetes mellitus, delayed presentation, and cardiovascular disease.[6,7,15] Diabetes contributes through impaired neutrophil function, microvascular disease, and reduced inflammatory responses, often masking the severity of infection.[15] Our patient possessed several of these recognized risk factors.

The clinical diagnosis of gallbladder empyema remains challenging because its presentation overlaps considerably with uncomplicated acute cholecystitis.[2,5] Although fever and marked systemic toxicity are classically described, many elderly patients present without significant constitutional symptoms.[10,11]

Leukocytosis exceeding 15,000 cells/mm³, elevated inflammatory markers, palpable gallbladder, and imaging evidence of marked distension with impacted calculi should raise suspicion for empyema.[6,7]

Ultrasonography remains the first-line diagnostic investigation owing to its accessibility and high sensitivity for gallstones. However, CT and MRCP provide superior evaluation of surrounding inflammatory changes, gangrene, perforation, and biliary anatomy, thereby facilitating operative planning in complicated cases.[5]

Early laparoscopic cholecystectomy has consistently demonstrated lower morbidity, shorter hospital stay, fewer recurrent biliary events, and reduced healthcare costs compared with delayed cholecystectomy.[1,2,8,15]

Historically, gallbladder empyema was considered an indication for open cholecystectomy because severe inflammation frequently obscured Calot's triangle.[10,11]

However, increasing surgical experience has established laparoscopic cholecystectomy as the preferred approach in appropriately selected patients.[3,8,15]

Decompression of the tense gallbladder by aspiration, meticulous adhesiolysis, careful identification of the critical view of safety, and readiness to perform subtotal cholecystectomy or convert to an open procedure when anatomy is uncertain are key principles for minimizing bile duct injury.[13,15]

In the present patient, aspiration of purulent bile significantly improved manipulation of the gallbladder and facilitated safe laparoscopic dissection. Despite dense adhesions and severe inflammation, the critical view of safety was successfully achieved, permitting completion of a standard laparoscopic cholecystectomy without conversion. Histopathological confirmation of focal gangrenous change further emphasized the importance of early operative intervention before perforation or generalized sepsis developed.[3,8,15]

Overall, this case reinforces contemporary evidence that laparoscopic cholecystectomy can be safely performed in patients with gallbladder empyema when undertaken by experienced surgeons using meticulous operative technique and sound intraoperative judgment.[3,8,13,15]

CONCLUSION

Gallbladder empyema is a life-threatening surgical emergency representing the most severe spectrum of acute calculous cholecystitis (2,10). Prompt recognition, early initiation of broad-spectrum antibiotics, and timely surgical source control are essential to prevent progression to gangrene, perforation, biliary peritonitis, and septic shock (2,10,15). Although severe inflammation frequently makes laparoscopic dissection technically demanding, adherence to the principles of safe cholecystectomy, including decompression of the gallbladder, achievement of the critical view of safety, and willingness to employ bailout procedures when necessary, allows successful minimally invasive management in most patients (3,13,15). This case illustrates that early laparoscopic cholecystectomy remains the treatment of choice even in complicated gallbladder empyema with focal gangrenous change when performed by experienced surgeons.[3,8]

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