CASE REPORT

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# Laparoscopic Completion Cholecystectomy for Symptomatic Remnant Gallbladder Following Subtotal Cholecystectomy: a Report of Two Cases

**ABSTRACT**

**Background:** Subtotal cholecystectomy (SC) is considered a safe option for a bailout in the presence of a difficult laparoscopic cholecystectomy with a low incidence of complications. **Objective:** This report aims to describe the challenges in diagnosing and managing remnant gallbladder. **Case presentation:** Case 1 is a 31-year-old male who presented with right upper quadrant abdominal pain ten years following SC. Abdominal ultrasound (US) and computed tomography (CT) scan confirmed a ruminant gallbladder. He underwent successful completion of laparoscopic cholecystectomy. Case 2 is a 40-year-old male who was admitted as a case of ascending cholangitis. He had a history of subtotal cholecystectomy one year prior to his presentation. CT scan, Magnetic resonance cholangiography (MRCP), and US all confirmed the presence of a remnant gallbladder. The patient underwent endoscopic retrograde cholangiopancreatography (ERCP), followed by the completion of laparoscopic cholecystectomy. **Conclusion:** Recurring symptoms due to the remnant gallbladder are often challenging to diagnose and treat. Herein, we highlight the importance of adequate preoperative investigations and surgical planning prior to intervention.

**Keywords: subtotal cholecystectomy, completion cholecystectomy, laparoscopic, post-cholecystectomy syndrome.**

## 1. BACKGROUND

Laparoscopic cholecystectomy is one of the most common surgical procedures performed worldwide. Subtotal cholecystectomy (SC) is considered a safe option for a bailout in the presence of a difficult laparoscopic cholecystectomy due to severe inflammation, adhesions and in the setting of unclear anatomy and risk of ductal injury. The incidence of complications or recurrence of symptoms following such a procedure is about 2.5% in patients who underwent SC (1, 2). Herein, we present two patients with remnant gallbladder who became symptomatic and managed successfully using a laparoscopic approach.

## 2. OBJECTIVE

This report aims to describe the challenges in diagnosing and managing remnant gallbladder.

**Case 1**

A 31-year-old male patient with no known medical history presented complaining of on and off right upper quadrant (RUQ) abdominal pain. The patient had a history of acute cholecystitis ten years prior to his presentation, for which he underwent laparoscopic cholecystectomy. There was no record of the operation as it was done in another facility. Laboratory findings showed WBC of 4.21 x 109/L, Hb 11.7 g/dL, Total bilirubin 0.4 mg/dL, Direct bilirubin 0.1 mg/dL, Alkaline phosphates (ALP) 57 U/L, ALT 43 IU/L, AST 31 U/L, GGT 44 U/L. Abdomen Ultrasound (US) showed a large gallbladder pouch with multiple small gallstones of average 5 mm. There was no intra or extra-hepatic dilation. Computed tomography (CT) of the abdomen revealed

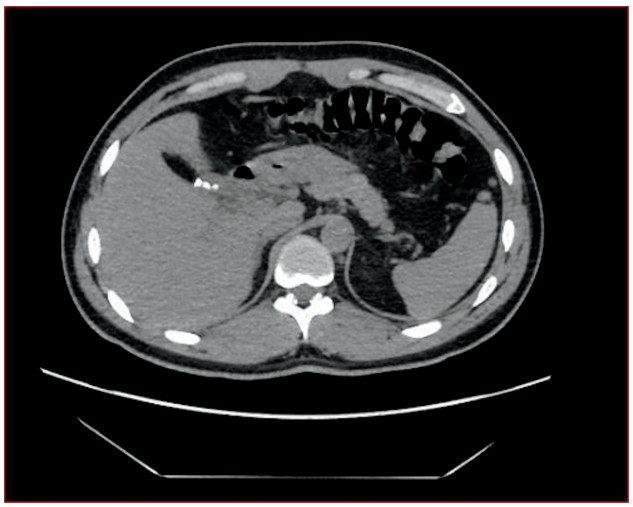

**Figure 1. Axial cut of a Computed tomography (CT) scan showing calculus in the remnant gallbladder.**

numerous calcified foci within a tubular structure at the gallbladder fossa, suggesting gallstones with remnant gallbladder (Fig1). The patient was booked for laparoscopic completion cholecystectomy. Intra-operatively, calot's triangle was dissected, and there were extensive adhesions around the gallbladder (Fig2). The cystic duct and artery were controlled, and a drain was inserted. The patient was doing well post-operative with minimal drain output of 15 ml hem serous/24 hours. The drain was removed, and he was discharged in good condition with no complaints during the follow-up period.

**Case 2**

A 40-year-old male patient who is known to have dyslipidemia presented with colicky epigastric abdominal week for one week duration. The pain was radiating to the back, 8 out of 10 in severity, aggravated by oral intake. It was associated with nausea, vomiting, and subjective fever. There was no change in the color of urine or stool and no history of pruritus. About one year prior to his presentation, the patient had a history of ascending cholangitis for which he underwent urgent endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy and stenting (Fig3). The patient underwent laparoscopic cholecystectomy within the same admission with intraoperative finding of empyema of the gallbladder with severe inflammation and adhesions. There was suspicion of mirrizi syndrome, so the decision was to proceed with subtotal cholecystectomy and drain insertion. Fortunately, postoperative magnetic resonance imaging ruled out the presence of a biliary fistula or any biliary injury, showing a remnant gallbladder with few stones.

Upon examination, he was jaundiced; however, he was hemodynamically stable. His abdomen was soft and lax with epigastric and RUQ tenderness. Laboratory investigations showed WBC of 12.3 x 109/L, Hb 11.4 g/dL, Total bilirubin of 149 umol/L, Direct bilirubin of 111 umol/L, AST 70 U/L , ALT 205 U/L, GGT 410 U/L, ALP 212 U/L, Amylase 367 U/L, Lipase 25 U/L. Magnetic resonance cholangiopancreatography (MRCP) showed a dilated CBD of 1.4 cm with retained biliary sludge. Abdomen US revealed a ruminant gallbladder with dilated CBD of 0.7 cm with no intrahepatic dilation. The patient was admitted as a case of ascending cholangitis. A contrast imaging scan (CT) showed features of ascending cholangitis with a small hepatic hypodense lesion, which was suspicious of a micro abscess. The patient underwent successful ERCP, followed by completion of laparoscopic cholecystectomy after the normalization of his liver function. Intraoperatively, adherent omentum covered the operative field, and dissection was done carefully until the remnant gallbladder reached and the cystic duct was controlled. The patient was discharged in good condition on the fifth postoperative day. He was seen during the follow-up with no complaints.

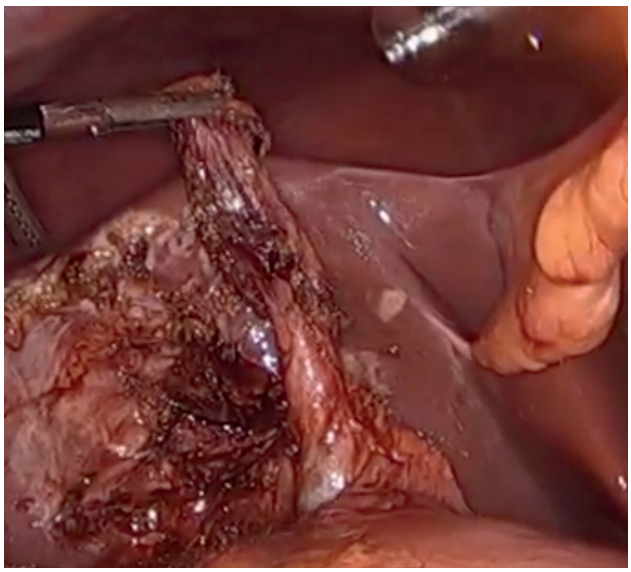

**Figure 2. Intraoperative picture of the gallbladder remnant after dissection from the liver bed.**

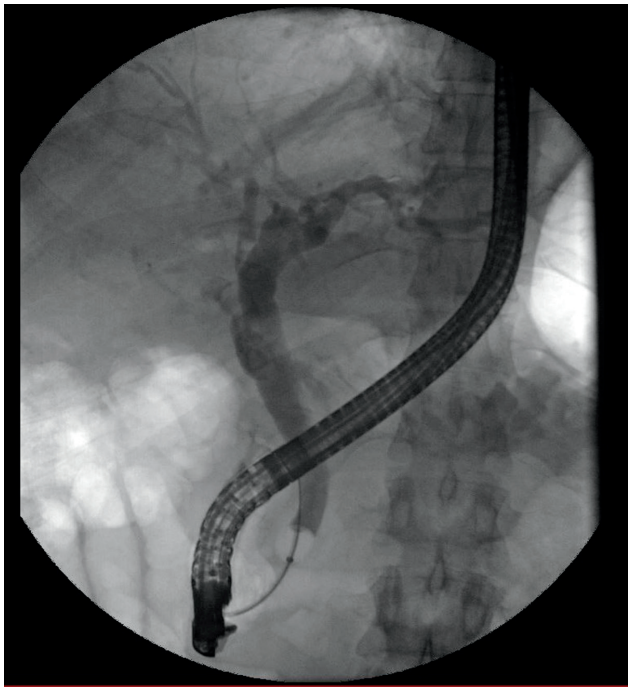

**Figure 3. Endoscopic Retrograde Cholangiopancreatography (ERCP) showing a dilated extrahepatic biliary duct with a dilated tubular structure at the cystic duct junction.**

## 3. DISCUSSION

The presence of symptoms following cholecystectomy is often referred to as post-cholecystectomy syndrome. Diagnosis is often challenging in these patients as symptoms are often attributed to non-biliary causes, including peptic ulcer disease, irritable bowel syndrome, and gastroesophageal reflex. However, the possibility of biliary causes, including choledocholithiasis, biliary duct strictures, and retained gallbladder remnant, should always be considered and excluded as part of the differential (3).

Subtotal cholecystectomy (SC) resulting in a remnant gallbladder is one of the leading causes of post-cholecystectomy syndrome. A remnant gallbladder may contain stones or form new stones, leading to the recurrence of symptoms. The risk of subsequent symptomatic cholelithiasis in these patients is variable in the literature, with various presentations, including biliary colic, cholecystitis, cholangitis, and pancreatitis (4, 5).

SC is generally classified as either reconstituting or frustrating types. Reconstituting SC involves removing a portion of the gallbladder, and the remnant is closed primarily. In the frustrating type, the anterior wall of the gallbladder is removed, and the cystic duct stump can be left open or closed while leaving a drain (6). Morbidity occurs in both subtypes. However, the frustrating type was found to have a higher risk of conversion to open surgery, bleeding, bile duct injury, bile leak, and retained stones compared with the reconstituting subtype (7).

Diagnosis of remnant gallbladder can be established using different imaging modalities. Ultrasound is usually the initial investigation for diagnosis and is sensitive and specific for diagnosing any biliary pathology. Magnetic resonance pancreaticholangiogram (MRCP) is often needed as an adjunct to confirm the diagnosis and rule out the presence of choledocholithiasis. MRCP is also beneficial in identifying the bile duct anatomy and surgical planning before any intervention (4, 5). Patients with evidence of choledocholithiasis or cholangitis often require an Endoscopic retrograde pancreaticholangiogram (ERCP) prior to any further surgical intervention.

After confirming the diagnosis of remnant gallbladder, completion cholecystectomy is usually required. Re-operation is often much more difficult than the first operation due to the presence of adhesions and unclear anatomy, leading to a higher risk of bile duct injury and other complications. The presence of a short remnant adds another challenge to the re-operation as the gallbladder plays an essential role in the traction of the liver. This highlights the importance of good pre-operative imaging studies as it give the surgeon information on the length of the gallbladder remnant and the number of stones, providing vital information for surgical planning (5, 8). Historically, open surgery was the gold standard for the management of such cases. However, with the advancement in laparoscopy and surgical training, laparoscopic completion cholecystectomy is currently accepted, and various successful cases have been reported in the literature. The choice of procedure depends mainly on the surgeon's expertise but is also confined by patients' background, previous surgeries, and pre-operative imaging. Nevertheless, surgeons should have a low threshold of conversion to open surgery to avoid any potential complications (5).

## 4. CONCLUSION

Diagnosing remnant gallbladder is often challenging, especially in the absence of previous operative records, as patients can be missed based on having a prior cholecystectomy. We emphasize the importance of adequate pre-operative investigations and planning for these patients, discussing the operative options and imaging findings prior to surgical intervention.

- **Declaration of patient consent:** All Participants were informed about the subject of this study.
- **Author contribution:** FMA: corresponding author, literature review, writing, and editing the manuscript. AIA: operating surgeon, reviewing the article. All authors participated in the study concept, read, and approved the final manuscript.
- **Conflicts of interest:** No conflict of interest
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