

Case Report

Left sided gallbladder: a rare case report and approaches to surgical management

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ABSTRACT

Left-sided gallbladder (LSGB) is a rare anatomical anomaly defined by its location to the left of the round ligament. With a reported incidence of 0.7-1.2%, LSGB is clinically significant due to association with the biliary tree and vascular abnormalities, which can increase technical difficulty and risk of intra-operative injury during laparoscopic cholecystectomy. We describe the case of a female patient in her 30s who presented with sudden onset epigastric pain in the context of recurrent gallstone pancreatitis. Pre-operative imaging, including ultrasound, CT and MRCP showed non-obstructive cholelithiasis with no obvious anatomical abnormalities. A gallbladder located to the left of the falciform ligament, in keeping with a true LSGB, was identified during her laparoscopic cholecystectomy. To obtain optimal retraction and exposure, an additional left upper quadrant port was inserted. Intra-operative cholangiogram demonstrated conventional biliary anatomy with the cystic duct draining to the right of the hepatic duct. The patient had an uncomplicated post-operative recovery. LSGB is often diagnosed intra-operatively and carries an increased risk of biliary and vascular injury. Early recognition and modification of surgical technique, including adjustment of port placement and use of intra-operative cholangiography may be helpful to achieve critical view of safety and minimise operative complications.

Keywords: Left sided gallbladder, Laparoscopic cholecystectomy, Biliary anomalies

INTRODUCTION

Aberrant gallbladder anatomy is rare but an important consideration for surgeons performing laparoscopic cholecystectomies. LSGB is one such aberrant variation, first described by Hochstetter in 1856, with a reported incidence of 0.7-1.2%.^{1,2} It is defined as an anatomical anomaly where the gallbladder lies to the left of the round ligament, with 3 recognised variants noted.^{3,4} Whilst pre-operative imaging may identify these abnormalities, this is often only recognised intra-operatively.⁵ The rate of bile duct and vascular injuries associated with LSGB is higher compared to cases involving conventional biliary anatomy.⁶ Raised awareness of variants can facilitate pre-operative planning and/or early intraoperative

recognition.⁶ Authors detail a case of a LSGB identified intra-operatively for a young female presenting with gallstone pancreatitis.

CASE REPORT

A female in her 30s with no significant past medical history presented to the emergency department of a regional hospital in New South Wales, Australia with sudden onset epigastric abdominal pain with associated nausea. This was in the context of recurrent biliary colic. Biochemistry demonstrated normal inflammatory markers, elevated serum lipase (8883 U/L) and deranged liver function tests with an obstructive pattern and raised serum bilirubin (35 $\mu\text{mol/L}$). Ultrasound (US) and

computed tomography (CT) confirmed the diagnosis of mild uncomplicated pancreatitis with cholelithiasis. There was no evidence of cholecystitis, choledocholithiasis or significant biliary dilatation. Operative management within the index admission was offered to the patient, however the decision was made to defer and undergo an interval laparoscopic cholecystectomy.

The patient re-presented with a recurrence of gallstone pancreatitis within 1 month of the index admission. Due to persistently elevated LFTs, magnetic resonance cholangiopancreatography (MRCP) was undertaken, which suggested the presence of non-obstructing calculi in the proximal common bile duct. No abnormal biliary anatomy was demonstrated (Figure 1). Endoscopic retrograde cholangiopancreatography (ERCP) was not readily available at our centre. The patient was consented for a laparoscopic cholecystectomy and potential transcystic exploration.

Laparoscopic access with standard port placement was performed. Cranial retraction of the gallbladder demonstrated a gallbladder originating to the left of the falciform ligament, associated with accessory liver parenchyma originating from the left hepatic lobe (Figure 2). Given the anatomic anomaly, the dissection of a critical view of safety was difficult to achieve. An additional left upper quadrant laparoscopic port was used to achieve appropriate retraction and exposure. Repositioning of ports and conversion to open were considered intra-operatively.

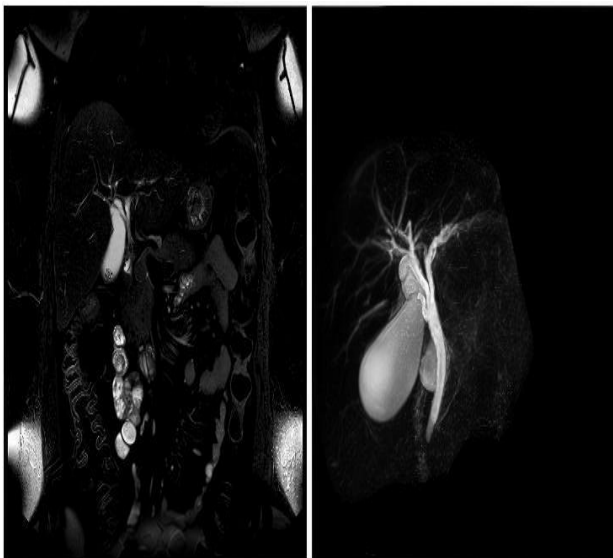


Figure 1: Pre-operative MRCP images demonstrating cholelithiasis with conventional biliary anatomy.

Careful hepatocystic dissection was performed to obtain an adequate critical view. Two calculi were retrieved from the cystic duct and an intra-operative cholangiogram (IOC) was performed. Conventional biliary anatomy was identified with no filling defects and a cystic duct joining to the right of the hepatic duct. The cystic duct and artery

were controlled with ligaclips. The patient was discharged post-operatively on day 2 and remained well at 4-week follow up.

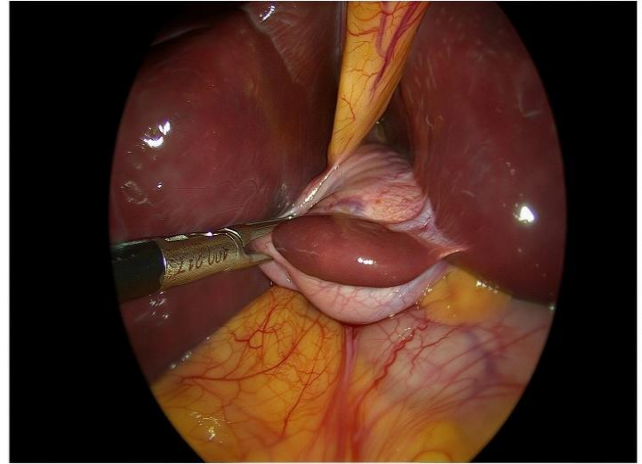


Figure 2: Intra-operative picture of LSGB originating from Sg III of liver. Accessory liver parenchyma to fundus of GB originating from left hepatic lobe.

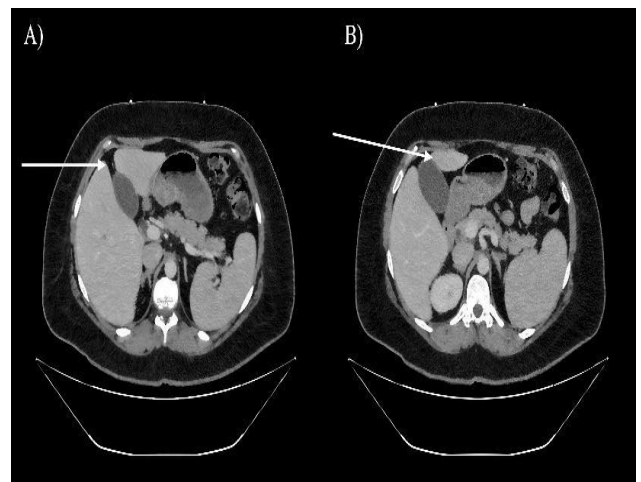


Figure 3 (A and B): Pre-operative CT with gallbladder between right and left hepatic lobes. It is difficult to appreciate on this imaging whether the gallbladder is originating from left or right hepatic lobe. A) The Round ligament appears to be marginally to right of the gallbladder (arrow) and B) Accessory hepatic parenchyma originating from left hepatic lobe is noted.

DISCUSSION

LSGB is a rare anatomical aberrance with a reported incidence between 0.7-1.2%.^{1,2} The three recognised variants of LSGB are: LSBG associated with situs inversus, True-LSGB, and LSGB associated with an abnormally located right sided round ligament.⁴ True-LSGB is defined as being to the left of the round ligament and beneath segment III of the liver. Whilst the aetiology remains unclear, there are multiple embryological theories

proposed regarding the origin of this abnormality. One theory describes subsequent aberrant migration of the GB to the developing left hepatic lobe following origination from the hepatic diverticulum. Another postulates that an accessory GB bud develops directly from the left hepatic duct, with regression of the original right-sided GB, resulting in associated biliary tree anomalies.⁷

LSGB is most often an intra-operative finding, due to the difficulty in clinical and radiological diagnosis clinically. Patients most commonly present with right upper quadrant pain despite a left sided abnormality, as visceral pain fibres do not transpose with the aberrant gallbladder.⁸ LSGB may be diagnosed on pre-operative imaging, with CT and MRI being the most effective diagnostic imaging modalities in assessing for LSGB.⁹ The predominant finding of the GB being positioned to the left of the round ligament is subtle and often difficult to appreciate. Retrospective review of the pre-operative CT of our patient demonstrated the GB between left and right lobes of the liver and marginally to the left of the round ligament and accessory hepatic tissue extending from the left lobe to the GB fundus (Figure 3).

Significantly, LSGB is associated with other biliary and vascular anomalies, increasing the surgical challenges of resection.^{4,8,10} These abnormalities are significant in major hepatic resections and liver transplant. Therefore, awareness of this correlation is critical to ensure safe cholecystectomy. The incidence of bile duct injuries in LSGB in cholecystectomy is up to 7-10%, significantly greater than with conventional anatomy illuminating this fact.^{6,8} There was no abnormal portal vein or biliary anatomy noted in our patient. The intra-operative cholangiogram demonstrated the cystic duct joining to the right side of the hepatic duct.

Early recognition intra-operatively is of paramount importance. LSGB may require modification to routine laparoscopic approach to attain a critical view of safety, particularly with the increased altered anatomy that may be encountered. The decision was made in our case to introduce an extra assistant port in the LUQ to assist in retraction of the left hepatic lobe falciform ligament to assist in adequate exposure. Along with the additional port sites, multiple other operative manoeuvres including, but not limited to, left tilt of the patient, repositioning of ports/alteration in the epigastric port to the left of the falciform ligament have been proposed to assist in performing a safe operation with LSGB laparoscopic cholecystectomy.¹¹⁻¹⁴ There remains a low threshold for conversion to open if unable to safely proceed or achieve adequate exposure. Case reports have also suggested a retrograde fundus-first dissection; however, this was not required in our case.¹⁵

CONCLUSION

LSGB is a rare anatomical anomaly which is often an incidental finding during laparoscopic cholecystectomy and presents increased risk of biliary tree and vasculature damage, particularly in operators unfamiliar with this

anatomical variation. Early recognition and subsequent adjustment in surgical technique is imperative to mitigate increased risk. As demonstrated in our case, alteration to conventional port placement may facilitate retraction and dissection to allow for a critical view of safety.

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