Gallbladder sinistroposition (left-sided) finding in laparoscopic cholecystectomy, a case report

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SUMMARY

A left-sided gallbladder (LSGB), also known as sinistropostition, is a rare anatomical variant with a reported incidence of 0.2-1.1%. It is defined as a gallbladder located on the left side of the falciform ligament, embedded in the third hepatic lobe, without situs inversus viscerum.

A 37-year-old Latino man with a history of bilateral inguinal repair underwent a scheduled laparoscopic cholecystectomy due to multiple gallbladder polyps. Preoperative ultrasound reported a gallbladder of 60x20 mm, wall thickness of 1 mm, with polyps of up to 10 mm. Standard laparoscopic cholecystectomy trocar placement was used. Upon revision of the right hepatic lobe, there was an absence of the GB in the visceral side of segments IV, V, or VI. It was identified to the left of the falciform ligament with adhesions to the anterior and superior portions of the pylorus and lesser curvature. The subxiphoid trocar was adjusted to the left of the falciform ligament, and Calot's triangle dissection was performed to obtain a critical view of safety. No other anatomical variants were identified. The procedure was performed safely with a satisfactory view of critical cholecystectomy steps and anatomy identification. After the procedure, the surgeon complained of right-hand pain and numbness due to a medial position of the subxiphoid trocar for dissection. The surgical approach of a LSGB in laparoscopic surgery should be individualized for each patient. A minimally invasive approach may be realized successfully when critical thinking by the surgeon is applied and always prioritizing the safety of the patient.

Key words: Left-sided gallbladder – Sinistroposition – Laparoscopic cholecystectomy – Anatomy importance – Surgical critical thinking

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INTRODUCTION

A Left-Sided Gallbladder (LSGB) also known as "sinistroposition" is a rare anatomical variant with a reported incidence of 0.2 to 1.1% (Abongwa et al., 2017). It is defined as a gallbladder (GB) located on the left side of the falciform ligament, embedded in the third hepatic lobe, without situs inversus viscerum (Pereira et al., 2019; Almas et al., 2021). Routine identification of this anatomical variant is uncommon, usually missed by ultrasound (US), as approximately 80% are identified transoperatively (Pereira, 2019). Computed tomography (CT) is the best imaging study alternative, with 85% of LSGB identified this way, but it is not a standard study for GB disease assessment (Jung, 2022). Laparoscopic cholecystectomy continues to be the gold standard for cholecystitis. However, challenges arise in the surgical approach when anatomy is distorted by acute or chronic inflammation, as well as anatomical variants of the GB or biliary tract (Lamah et al., 2001).

Surgeons must consider alternative or complementary surgical strategies to improve the safety view of elemental structures (Abongwa et al., 2017; Lamah et al., 2001). This might include the repositioning or addition of more trocars, to allow for better traction and safer dissection (Nastos, 2014; Pereira, 2019). If the anatomy cannot be fully visualized or the surgeon is doubtful, intraoperative cholangiography (IOC) should be performed. If needed, conversion to an open approach or subtotal cholecystectomy should be considered to avoid biliary tract injury (Pereira, 2019; Jung, 2022). Knowledge of typical anatomy and its variants involved in cholecystectomies has a high impact on the assessment of surgical procedures and their safety. We present the case of a LSGB during laparoscopic surgery, with its management and outcomes. This case has been reported in line with the SCARE criteria, for reporting surgical cases (Agha et al., 2020).

CLINICAL CASE

A 37-year-old Latino man with a history of bilateral inguinal repair, and a body mass index of 27.2, underwent a scheduled laparoscopic cholecystectomy due to multiple gallbladder polyps. Previous 2-year follow-up with gastroenterology with progressive polyp growth, the reason behind indicating surgical procedure. The patient was otherwise asymptomatic to GB symptoms. Preoperative ultrasound reported a GB of 6x2 cm, wall thickness of 1 mm, with polyps of up to 10 mm. There were no other significant findings. Preoperative laboratories were within the normal ranges, except for a slight increase of serum glutamate-pyruvate transaminase (GPT 61.5 U/L) and serum glutamate-oxaloacetate transaminase (GOT 52.5 U/L).

Standard laparoscopic cholecystectomy trocar placement was used with an 11 mm trocar in the umbilicus for 30° 10mm telescope, and under direct visualization, an 11 mm subxiphoid trocar was placed towards the patient's right side of the falciform ligament, and a 5 mm right subcostal trocar for GB traction. Upon revision of the right hepatic lobe, there was an absence of the GB in the visceral side of segments IV, V, and VI (Fig. 1). Upon further examination, it was identified to the left of the falciform ligament with adhesions to the anterior and superior portions of the pylorus and lesser gastric curvature. The subxiphoid trocar was retracted and adjusted through the extraperitoneal space to the left of the falciform ligament. An additional 5 mm left subcostal trocar was considered, however, once adhesions were liberated, the GB could be retracted to the right for adequate Calot's triangle dissection with a critical view of safety. The cystic duct was identified and dissected, placing clips, before continuing with dissection and identifying a posterior angulation. The cystic artery was identified further into the GB bed, towards the posterior of the GB body. No other anatomical variations were identified. IOC was considered but deemed not necessary to avoid additional costs. The cystic duct and artery were cut, and the remaining GB was removed. There was no need for drain placement. Total operative bleeding was quantified as 10 ml. The surgical time was 52 minutes. The postoperative period was uneventful. The patient was discharged the following day. Pathology reported a GB of 7.5x2.6x2.5 cm, 2 mm walls with mucosal cholesterol polyps of up to 8 mm. Lymphocyte inflammatory infiltrates throughout the GB wall, thickened muscle layers, and congested blood vessels were found. Seven-day and 30-day follow-up visits were uneventful.

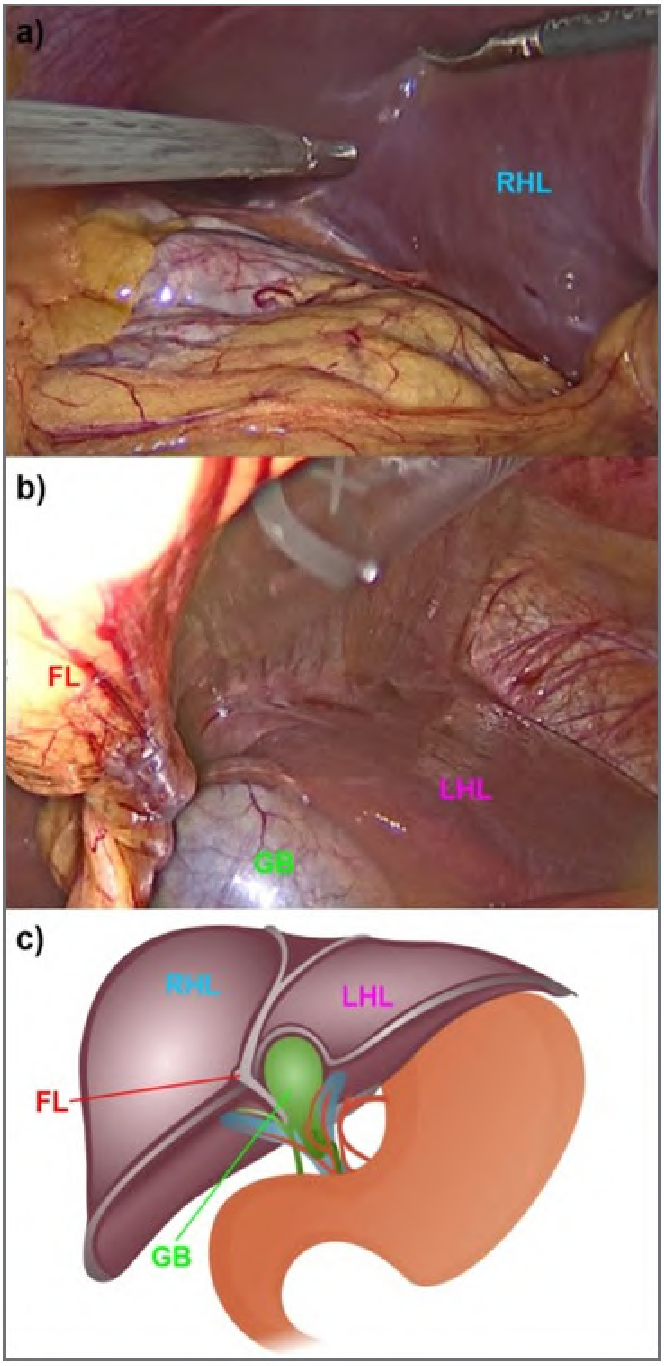

Fig. 1.- Left-sided Gallbladder. **a)** Examination of right hepatic lobe, with abscess of gallbladder. **b)** Gallbladder embedded in left hepatic lobe, segment III. **c)** Schematic drawing of left/sided gallbladder. RHL: right hepatic lobe; LHL: left hepatic lobe; FL: falciform ligament; GB gallbladder.

The procedure was performed safely with a satisfactory view of critical cholecystectomy steps and anatomy identification. The trocar incisions were not relocated by choice of the operating surgeon, only the angulation of the subxiphoid trocar, however, this was contemplated during the surgery due to ergonomy, and not due to safety concerns. After the procedure, the surgeon complained of slight pain and numbness in both hands, primarily the right hand, secondary to uncomfortable right-hand dissection due to a medial position of the subxiphoid trocar. The 5 mm right subcostal trocar was not adjusted and provided adequate GB traction; however, this was further than usual, also creating discomfort and strain, which was alleviated shortly after the surgery with non-steroid anti-inflammatory drugs.

Written consent was acquired by the patient to report the case without any personal information.

DISCUSSION

Awareness of anatomical variants such as a "sinistroposition" of the gallbladder is essential to a well-prepared surgeon. Surgical personnel may frequently be exposed to scenarios of uncertainty and rely on clinical reasoning and use of their anatomical knowledge to solve unforeseen circumstances. Constant exposure to extensive training in different scenarios via simulation will aid in more assertive performance (Quiroga-Garza et al., 2020; Fernández-Reyes et al., 2022). Changing the angle of the subxiphoid trocar for positioning the left of the falciform ligament allows a surgical approach without the need to modify the surgical field. In the present case, due to favorable conditions, no further modification was needed. However, the optimal surgical approach for LSGB has been subject to scrutiny and debate (Nastos, 2014; Pereira, 2019; Abongwa, 2017). Each patient's anatomy will be individual and the approach has to be considered with the intent of visualizing the critical anatomical view needed for safe dissection. Some reported approaches are placement of additional ports, different patient positioning, mirror image setup, retrograde dissection, conversion to open surgery, use of existing ports with manipulation of the falciform ligament, and IOC (Nastos, 2014).

The most frequent presentation of LSGB is when the cystic duct joins the hepatic duct on the right side after a hairpin turn anterior to the common hepatic duct (Pereira, 2019). Other variations have been recorded, such as the union of the cystic duct left of the common hepatic duct, the union on the left hepatic duct, the right hepatic duct, and a branch of the right hepatic duct (Pereira, 2019). Assessment of other anatomical variants should be on the surgeon's mind, as it is frequent to find multiple anatomical variations or malformations in individuals who present one (Jung, 2022).

The risk of complications is a very important consideration when a surgeon plans the approach as the normal anatomy is altered in LSGB cases. The line of dissection has a direct impact on critical anatomical landmarks like Calot's triangle since obstruction of a clear view of biliary and vascular structures has a higher risk of injury (Pereira, 2019). The use of IOC is recommended to evaluate associated anatomical variations and avoid biliary tract lesions (Jung, 2022). In this case, the operating surgeon was satisfied with the critical safety view and continued careful dissection, with a watchful approach for other anatomical variants (Quiroga-Garza et al., 2020; Tapia-Nañez, 2022). Also, to avoid additional costs, as the patient was paying out-of-pocket, although patient safety should always be prioritized.

The LSGB is usually associated with other anatomic variants and is important for the surgeon to be aware of them. A lawsuit analysis reported 10% of *mala praxis* lawsuits were due to surgical errors attributed to "ignorance about anatomical variations" and 13% due to abnormal or difficult anatomy (Cahill and Leonard, 1999; Rogers et al., 2006). Surgeons must constantly review the anatomy of their procedures and consider anatomical variations to reduce the risk of errors and complications (Tapia-Nañez, 2022). Higher exposure via simulation has been proven to increase the comfort of the surgeon in different scenarios enabling faster decision-making and critical thinking when considering the safety of the procedure (Fernández-Reyes et al., 2022).

Take-Away Lessons

The surgical approach for LSGB in laparoscopic surgery must be individualized to each case taking into consideration the anatomy, the expertise of the surgeon, and the frequency of intraoperative incidental findings. The best approach for each case must be developed according to the surgeon's critical thinking and always prioritizing the safety of the patient. If accurate anatomical structure identification is achieved a minimally invasive approach may be the best alternative.

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