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Left sided gallbladder: A case report during laparoscopic cholecystectomy for acute cholecystitis

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ABSTRACT

INTRODUCTION: A true left sided gallbladder (T-LSG) is a rare finding mostly discovered incidentally during laparoscopy and often associated with several anatomic anomalies; surgical approach may be challenging with an increased risk of intra-operative injuries and conversion to open.

PRESENTATION OF THE CASE: A 76 years old woman presented with acute cholecystitis. The left sided gallbladder was unexpectedly discovered as an intra-operative finding. Laparoscopic cholecystectomy was carried out using our usual trocar set-up without the need of intra-operative cholangiography or conversion to open.

DISCUSSION: LSG is reported to be associated with a higher risk of intraoperative bile duct injuries (up to 7.3%) due to anomalies of the bile duct, portal vein, and other structures. Achieving the Critical View of Safety by opening Calot's triangle is essential to avoid bile duct injuries.

CONCLUSION: Experienced surgeons could safely approach LSG laparoscopically, also in emergency setting, without major changing in their surgical technique with limitation of diathermy use and prudent dissection of anatomical structures to avoid biliary injuries. Intra-operative cholangiography is not mandatory.

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1. Introduction

A left sided gallbladder (LSG) is a rare anatomical variation, described for the first time by Hochstetter in 1886, and is estimated to have a prevalence of 0.3% among general population [1].

This aberration is defined TRUE when the gallbladder lies to the left side of the round ligament without situs viscerum inversus.

LSG occurs when the gallbladder is found beneath the left lobe of the liver, between segments III and IV or under the segment III.

This rare finding is often discovered incidentally during laparoscopic procedures because pre-operative studies may not detect the anomaly [7]. Since LSG could be associated with several anatomic anomalies, surgical approach may be challenging with an increased risk of intra-operative injuries/morbidity [4].

2. Presentation of the case

A 76-years-old female presented with abdominal pain in the right upper quadrant (RUQ) and epigastrium, associated with fever, nausea and vomiting. Physical examination revealed a tenderness in the RUQ with a positive Murphy's sign. There was no jaundice.

Vital signs were normal. The blood biochemistry showed leukocytosis (17.7 mg/l/mm³), increased C-reactive protein (12.8 mg/dl) and liver function tests revealed increased total bilirubin (1.84 mg/dl), alkaline phosphatase 404 U/L, SGOT 44 U/L, SGPT 59 U/L.

Patient referred no previous surgeries.

Pre-operative ultrasonography of the abdomen demonstrated gallbladder inflammation, wall thickness (6 mm), biliary sludge inside the lumen, pericholecystic fluid but no dilation of the common bile duct (CBD).

Endoscopic ultrasound was performed: CBD confirmed to be normal but full of biliary sludge. Endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy was performed to allow the passage of biliary sludge and purulent material. No stent in the CBD was located.

According to Tokyo guidelines, the patient underwent laparoscopic cholecystectomy [3].

The French technique was adopted. The patient was supine with arms alongside the body and legs parted. 4 trocars were placed: one 10 mm umbilical trocar for the laparoscopic camera, a second 10 mm trocar in the left upper quadrant and two 5 mm trocars in the right flank and in the subxiphoid area, respectively.

Two laparoscopic forceps and the monopolar hook were used to perform the whole procedure.

Preliminary laparoscopic exploration showed no evidence of gallbladder under the right lobe of the liver (Fig. 1). The gallblad-

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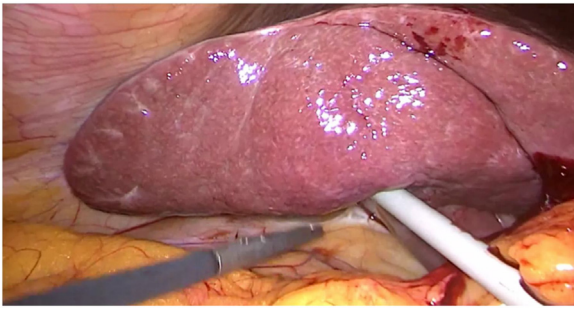


Fig. 1. Operative photograph showing the absence of gallbladder under the right lobe of the liver.

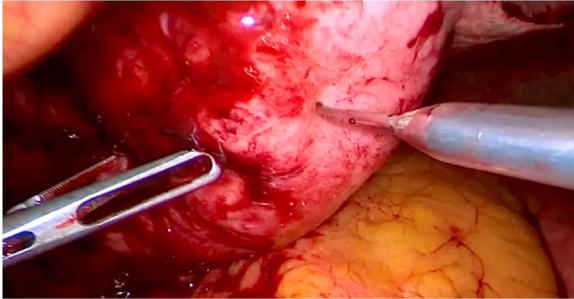


Fig. 2. The gallbladder before the puncture.

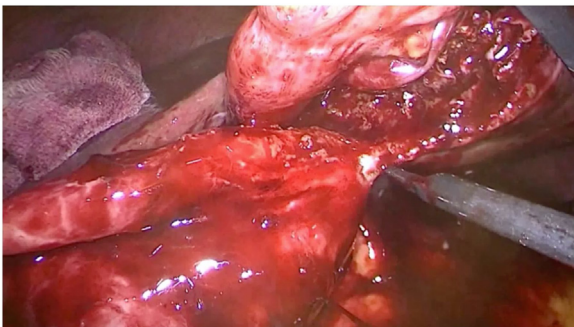


Fig. 3. The gallbladder extirpation is performed in an antegrade way; the gallbladder's bed lies to the left of falciform ligament.

der was severely diseased and seemed attached on the left side of the liver by the acute inflammatory process. The gallbladder was covered by omental and duodenal adhesions and the first step was blunt dissection performed with the suction/irrigation device, in order to avoid thermal injuries and to obtain a safe surgical field with clear view of the anatomy. The gallbladder was then deflated by a needle insertion using the 5 mm right flank port (Fig. 2), and the purulent fluid inside was sent for bile culture. Since the anatomy was unexpected, we preferred to perform an antegrade dissection of the gallbladder to obtain a better exposition of the hilum (Fig. 3). The anatomical view become clearer and a LSG was recognized. The gallbladder lied under the left lobe of the liver between the III and the IV segment, on the left side of the round ligament as in a true leftsided gallbladder. Other abdominal viscera were normally positioned (no situs viscerum inversus).

The gallbladder was retracted towards the right shoulder underneath the falciform ligament to expose the Calot's triangle that was frozen by the acute inflammatory process.

With difficulty, the Calot's triangle was opened and the anterior and posterior branches of the cystic artery were isolated. The cystic duct was separated from the CBD and entered the CBD on the right

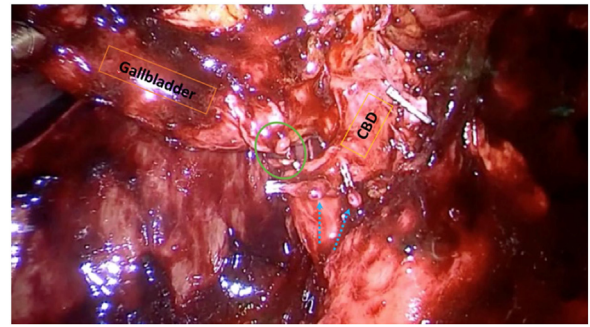


Fig. 4. The Calot's triangle is opened and the cystic duct (green circle) is clipped (it joined the CBD on the right side). Blue arrows: anterior and posterior branches of the cystic artery.

side. The Critical view of Safety was obtained, the two branches of the cystic artery and the cystic duct were clipped and divided. No other anatomical variations were noted intraoperatively. The gallbladder was put into an endobag and removed through the umbilical port. Operative time was 170 min and no intraoperative complication occurred. Postoperative course was uneventful and the patient was discharged post-operative day four. The pathological report revealed an acute gangrenous cholecystitis.

3. Discussion

On his review of gallbladder congenital anomalies Gross [2] provided two etiopathogenetic mechanisms for the development of true LSG: one involved the migration of the gallbladder bud to the left hepatic lobe, thus having the cystic duct crossing the CBD before joining it in a normal anatomical position, the second considered a development of the gallbladder directly from the left hepatic lobe, with a cystic duct joining the CBD from the left side.

Our case falls into the first pathway, since the cystic duct joined the CBD on the right side crossing the CBD from right to left (Fig. 4). Despite being located on the left, LSG usually presents with right sided pain because the visceral nerve fibers do not transpose with the gallbladder [5], therefore the diagnosis of LSG is often incidental and made intraoperatively since pre-operative examination may not detect the anomaly [5,6].

Acute cholecystitis is one of the indications for laparoscopic cholecystectomy as recommended by the 2018 Tokyo guidelines [3]. LSG is reported to be associated with a higher risk of intraoperative bile duct injuries (up to 7.3%) due to anomalies of the bile duct, portal vein, and other structures [8]. Doo-Ho Lee et al. reported one of the largest series in literature with 10 cases of laparoscopic cholecystectomy in LSG (6 for acute cholecystitis and 4 for symptomatic gallbladder stones). In 2 cases the anomaly was diagnosed preoperatively with abdominal CT scan, while the others were intraoperative findings. Although LSGB is a very rare disease, it is possible to diagnose it before surgery and safely perform laparoscopic cholecystectomy adjusting port layout [13].

Achieving the Critical View of Safety by opening Calot's triangle is essential to avoid bile duct injuries. Nastos et al. in their review reported that LSG can be safely managed with an adjustment in port arrangement and the aid of intraoperative cholangiography [9]. The use of an additional port for retraction [10] and the fundus first approach [11] have both been described to manage LSG. Besides, some authors suggest a mirror image setup of the trocars, once LSG is discovered [9]. Conversion to open and referral to a tertiary center should both be considered according to surgeon's experience, especially when high risk of biliary/vascular injury is suspected [12].

We managed to perform laparoscopic cholecystectomy with T-LSG discovered intraoperatively, without changing our usual port setting and without the support of intraoperative cholangiography; nonetheless we considered safer to carry out the dissection with a fundus first approach. Recent reports suggest that the use of intraoperative Indocyanine green fluorescence (ICG) could represent an important tool to facilitate the identification of biliary anomalies and could help reduce the incidence of intraoperative injuries [13]. ICG technology was not available in our hospital at the time of the case report, and was acquired only recently. Since the beginning of our experience with ICG, the advantages of this technology were easily recognizable and we support its routine use in difficult and emergent cases of laparoscopic cholecystectomy.

4. Conclusions

LSG is often recognized only intraoperatively and is often associated with anatomical anomalies that could relate with a higher risk of intraoperative injuries. Experienced surgeons could safely approach LSG without major changing in their surgical technique, including emergency laparoscopic cholecystectomy for severe acute cholecystitis, however conversion to open and referral to a tertiary center should be considered.

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Ethical approval

In its current form this case report does not require ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Roli Isabella Wrote the case report and made the surgical intervention.

Colli Francesco bibliographic research.

Mullineris Barbara Surgeon who made the surgical intervention.

Esposito Sofia Revision of the case report.

Piccoli Micaela supervision.

Registration of research studies

UIN not necessary.

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Declaration of Competing Interest

The authors report no declarations of interest.

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References

- [1] M. Zoulamoglou, I. Flessas, M. Zarokosta, T. Piperos, I. Papapanagioutou, K. Birbas, E. Konstantinou, T. Mariolis-Sapsakos, Left-sided gallbladder (Sinistroposition) encountered during laparoscopic cholecystectomy: a rare case report and review of the literature, *Int. J. Surg. Case Rep.* 31 (2017) 65–67, <http://dx.doi.org/10.1016/j.ijscr.2017.01.011>, Epub 2017 Jan 7.
- [2] R.E. Gross, Congenital anomalies of the gallbladder: a review of one hundred and forty-eight cases, with report of a double gallbladder, *Arch Surg.* 32 (1936) 131–162.
- [3] T. Takada, Tokyo Guidelines 2018: updated Tokyo guidelines for the management of acute cholangitis/acute cholecystitis, *J. Hepatobiliary. Sci.* 25 (2018) 1–2.
- [4] C. Nastos, A. Vezakis, I. Papaconstantinou, T. Theodosopoulos, V. Koutoulidis, G. Polymeneas, Methods of safe laparoscopic cholecystectomy for left-sided (sinistroposition) gallbladder: a report of two cases and a review of safe techniques, *Int. J. Surg. Case Rep.* 5 (2014) 769–773.
- [5] Sagar Sadhu, Tarshid A. Jahangir, Manas K. Roy, Left-sided gallbladder discovered during laparoscopic cholecystectomy in a patient with dextrocardia, *Indian J. Surg.* 74 (April (2)) (2012) 186–188.
- [6] Ishii Hiromichi, Noguchi Akinori, Onishi Mie, Takao Koji, Maruyama Takahiro, Taiyoh Hiroaki, Araki Yasunobu, Shimizu Takeshi, Izumi Hiroyuki, Tani Naoki, Yamaguchi Masahide, Tetsuro Yamane, True left-sided gallbladder with variations of bile duct and cholecystic vein, *World J. Gastroenterol.* 21 (June (21)) (2015) 6754–6758.
- [7] A. Makni, H. Magherbi, R. Ksantini, W. Rebai, Z.B. Safta, Left-sided gallbladder: an incidental finding in laparoscopic cholecystectomy, *Asian J. Surg.* 35 (2012) 93–95.
- [8] H.K. Abongwa, B. De Simone, L. Alberici, M. Iaria, G. Perrone, A. Tarasconi, G. Baiochi, N. Portolani, S. Di Saverio, M. Sartelli, F. Coccolini, J.E. Manegold, L. Ansaloni, F. Catena, Implications of left-sided gallbladder in the emergency setting: retrospective review and top tips for safe laparoscopic cholecystectomy, *Surg. Laparosc. Endosc. Percutan. Tech.* 27 (4) (2017) 220–227, <http://dx.doi.org/10.1097/SLE.0000000000000417> (PMID: 28614170).
- [9] C. Nastos, A. Vezakis, I. Papaconstantinou, T. Theodosopoulos, V. Koutoulidis, G. Polymeneas, Methods of safe laparoscopic cholecystectomy for left-sided (sinistroposition) gallbladder: a report of two cases and a review of safe techniques, *Int. J. Surg. Case Rep.* 5 (2014) 769–773.
- [10] L.S. Wong, J. Rusby, T. Ismail, Left-sided gall bladder: a diagnostic and surgical challenge, *ANZ J. Surg.* 71 (2001) 557–558.
- [11] N. Matsumura, H. Tokumura, A. Yasumoto, H. Sasaki, M. Yamasaki, H. Musya, et al., Laparoscopic cholecystectomy and common bile duct exploration for cholecystocholedocholithiasis with a left-sided gallbladder: report of a case, *Surg. Today* 39 (2009) 252–255.
- [12] T.A. Moo-Young, D.D. Picus, S. Teefey, S.M. Strasberg, Common bile duct injury following laparoscopic cholecystectomy in the setting of sinistroposition of the galladder and biliary confluence: a case report, *J. Gastrointest. Surg.* 14 (1) (2010) 166–170.
- [13] A. Gangemi, R. Bustos, P.C. Giulianotti, 1st report of unexpected true left-sided gallbladder treated with robotic approach, *Int. J. Surg. Case Rep.* 58 (2019) 100–103.

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