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Case Report

Laparoscopic cholecystectomy in case of complete situs inversus: an ergonomic challenge

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ABSTRACT

Situs inversus totalis (SIT) is an uncommon congenital condition in which the thoracic and abdominal organs are arranged in a complete mirror image configuration. To date, roughly 60 cases of laparoscopic cholecystectomy(LC) performed in patients with situs inversus have been documented. Performing laparoscopic cholecystectomy in these patients is technically more challenging, as it requires surgeons to adapt their visuomotar coordination and operative orientation to the left upper abdominal quadrant. We report a case of a 46 years old lady with pain in left upper abdomen for last 6 months. Diagnosis of situs inversus totalis was confirmed with ultrasound with presence of multiple gall bladder stones with no intra or extrabiliary duct dilatation. The patient underwent laparoscopic cholecystectomy by a right-handed surgeon standing at the right side of patient with the other ports in mirror image of the standard procedure. The duration of surgery was around 90 minutes and the patient was discharged uneventfully in 48 hours and was well on one-week follow-up. It requires an experienced surgeon, re-training of visual-motor coordination and modification of surgical steps.

Keywords: Situs inversus totalis-cholelithiasis, Laparoscopic cholecystectomy

INTRODUCTION

Laparoscopic cholecystectomy (LC) is the standard treatment for cholelithiasis. Situs inversus totalis a rare autosomal recessive congenital condition, with an incidence of 1in 10,000 to 1in 20,000 individuals.[1] The first laparoscopic cholecystectomy in a patient with situs inversus was reported by Campos and Sipes.[2] More than 60 cases of such cases have been reported in patients with situs inversus totalis since then, mostly for cholelithiasis and acute cholecystitis.[3] The mirror-image anatomy requires modifications of surgical technique and the need for left-handed dissection may pose technical challenges for right-hand dominant surgeons.

CASE REPORT

A 46-year-old female presented with left hypochondrium pain from past 6 month with normal liver function test. The patient had not been diagnosed as situs inversus totalis before. Echocardiography report showed normal study with LVEF=65%, Dextrocardia (Figure 1).

X-Ray Chest PA view shows apex of heart noted on right side suggestive of dextrocardia (Figure 2). The abdominal examination was unremarkable except the patient exhibit a left sided “Murphy's sign”.

Further evaluation with ultrasound confirmed situs inversus totalis and presence of two gall bladder stones

measuring 19 mm and 5 mm respectively with no intra or extrabiliary duct dilatation (Figure 3).

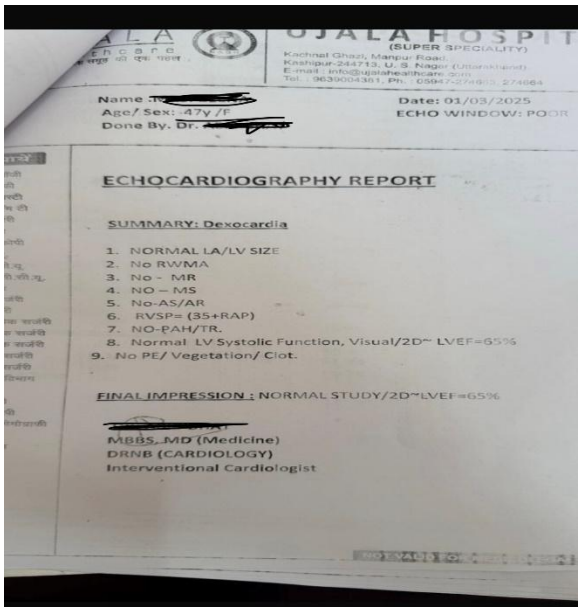

Figure 1: 2D ECHO- dextrocardia.

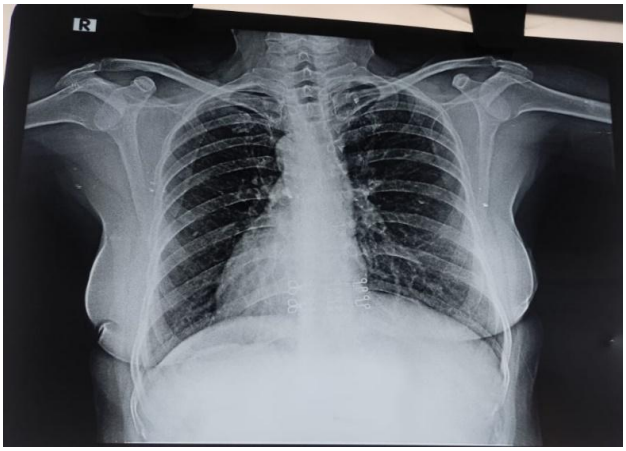

Figure 2: CXR PA – dextrocardia.

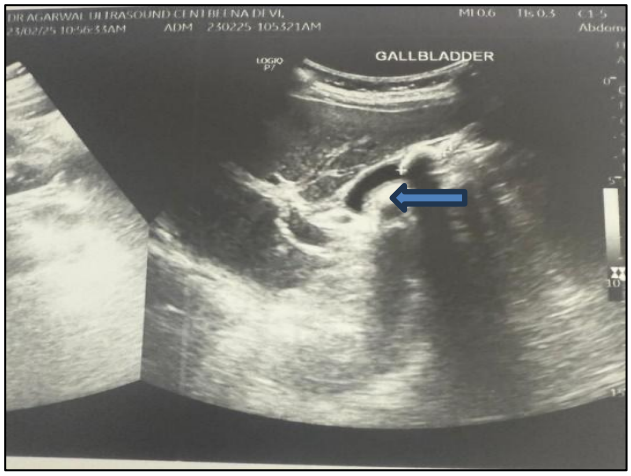

Figure 3: USG abdomen- left side GB.

Laboratory investigation revealed normal liver functions, normal coagulation profile excluding the hematological causes of gall stone in such age. After providing consent from the patient, the patient underwent laparoscopic cholecystectomy.

Surgical techniques

The surgical equipment was arranged on the side opposite to that used for routine LC (Figure 4).

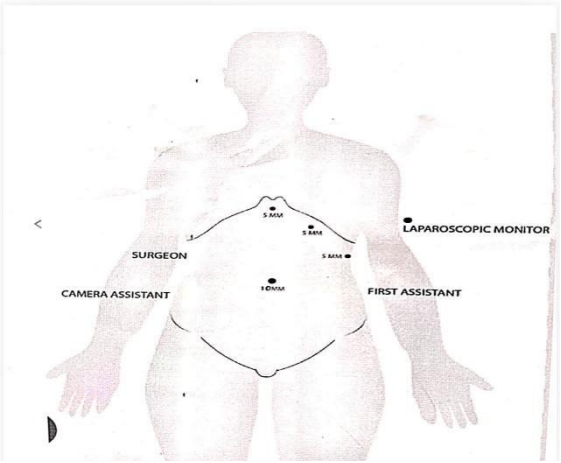

Figure 4: Port positions.

The patient was placed in the supine position, and the surgeon and camera assistant stood to the patient's right, with the assistant to the left. A 10 mm trocar was inserted into the peritoneal cavity through the umbilicus using the closed method, and pneumoperitoneum was created. Another 10 mm trocar was placed immediately inferior to the xiphoid process of the sternum, for insertion of instruments from the surgeon's left. Two more subcostal 5 mm trocars were placed in the midclavicular and the left anterior axillary lines for manipulation of instruments by the surgeon's right hand and for the assistant, respectively. Intraoperatively, we confirmed SIT; however, the gallbladder appeared nearly normal.

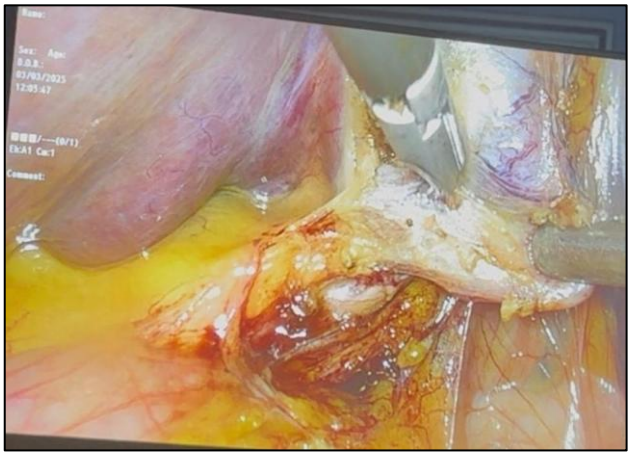

Figure 5: Posterior dissection.

Using a Maryland forceps electrocautery, the surgeon made a serosal incision at the level of the infundibulum-cystic junction, and the incision was extended along both aspects of the gallbladder. Subsequently, using his left hand, the surgeon flipped the Hartmann's pouch to the ventral aspect on the right, and using his right hand, performed dissection posterior to the gallbladder body to neck from the left side of the gallbladder (the side opposite to Calot's triangle) (Figure 5).

After dissection to the maximum extent possible on the posterior aspect of the gallbladder, using his right hand, the surgeon flipped the Hartmann's pouch to the left. Using his left hand, the surgeon made a small incision posterior to the gallbladder body, which was immediately communicated with the dissected space from the left aspect (Figure 6).

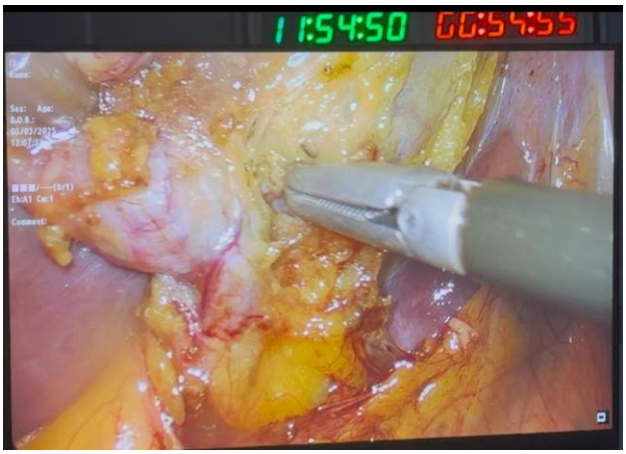

Figure 6: Anterior dissection.

After creating adequate space posterior to the gallbladder neck to body the surgeon cut the connective tissues around the cystic artery and the cystic duct and could successfully achieve the critical view of safety (CVS). The cystic artery and the cystic duct were clipped and cut sequentially, and the gallbladder was detached from the liver and removed through the umbilicus. The operative time was 90 min with negligible bleeding. The patient's postoperative course was uneventful.

DISCUSSION

laparoscopic cholecystectomy in patients with situs inversus totalis (SIT) is an uncommon surgical scenario due to the rarity of the condition. The first case was reported by Campos and Sipes in 1991, establishing the feasibility of laparoscopic management in such patients. Subsequent reports have confirmed that SIT does not appear to be associated with an increased incidence of cholelithiasis, acute cholecystitis, or other gallbladder pathologies when compared with the general population.[4] Despite a similar incidence of gallstone disease, the clinical presentation in patients with SIT maybe atypical.[6] Left upper quadrant or gastric pain is more commonly reported, which can lead to diagnostic delays. Therefore, imaging place a critical role in confirming the diagnosis and identifying the reversed anatomy pre-operatively. Ultrasonography and computed tomography are valuable tools for accurate anatomical delineation and surgical planning.

The mirror image transposition of abdominal organs presents technical and ergonomic challenges during laparoscopic cholecystectomy, particularly for right-handed surgeons. Most authors advocate a complete mirror image port placement, replicating the standard technique used in patients with normal anatomy. In this configuration, the surgeon typically retracts the gallbladder infundibulum with the right hand and perform dissection of calot`s triangle using the left hand through the epigastric port. Although this approach may initially be uncomfortable, it allows for safe and effective dissection when performed with caution. careful dissection and clear identification of the cystic duct and cystic artery are essential to avoid by duct injury, particularly in the setting of reversed anatomy.

Situs inversus totalis is a rare autosomal recessive congenital anomaly characterizes by complete mirror image transposition of thoracic and abdominal viscera.[5] While the condition itself does not increase surgical risk, unfamiliarity with the anatomy may increase the likelihood of intraoperative errors. Hence, awareness and appropriate preoperative planning are paramount.

CONCLUSION

Laparoscopic cholecystectomy can be safely and effectively performed in patients with situs inversus total is when performed by a surgeon with sufficient laparoscopic expertise. The reversed anatomical configuration may alter the clinical presentation and complete diagnostic assessment, while also requiring modifications in surgical approach and technique. Careful preoperative evaluation and advanced laparoscopic proficiency are therefore essential to achieve optimal surgical outcomes in these patients.

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