Section: Surgery

Case Report

SITUS INVERSUS AND THE LEFT-SIDED GALLBLADDER: A CASE OF LAPAROSCOPIC CHOLECYSTECTOMY

Hayam Al Madani, Ali Alahmari, Saad Alshahrani, Razan Sultan Al-Hufayyan, Abdulrahman Alshehri

Asser Central Hospital, Abha, Kingdom of Saudi Arabia.

Received : 17/11/2025
Received in revised form : 09/12/2025
Accepted : 30/12/2025

Keywords:
Cholelithiasis, Situs Inversus, Gallbladder, Laparoscopic Cholecystectomy.

Corresponding Author:
Dr. Hayam Almadani,
Email: almdanihayam@gmail.com

DOI: 10.47009/jamp.2025.7.6.12

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (6); 61-63

ABSTRACT

Situs inversus totalis (SIT) is a rare congenital condition in which visceral organs are arranged as a mirror image of normal anatomy. Mirror-image anatomy makes diagnosis and laparoscopic cholecystectomy technically challenging because usual anatomic landmarks and ergonomics are reversed, and vascular/biliary variations may coexist. We report a patient with known situs inversus totalis who presented with symptomatic cholelithiasis. Preoperative imaging confirmed left-sided gallbladder and mirror-image hepatic anatomy. Laparoscopic cholecystectomy was performed with ports positioned as the mirror image of the standard set-up and with the operating team adjusted to optimize ergonomics for a right-handed surgeon. Meticulous dissection was performed to achieve the critical view of safety (CVS). A tortuous right hepatic artery forming a caterpillar (Moynihan's) hump and two cystic arteries were identified intraoperatively; both cystic arteries were carefully isolated and secured while preserving the hepatic arterial inflow. The procedure was completed laparoscopically without bile duct or major vascular injury; the patient recovered uneventfully. In SIT patients, surgeons should anticipate mirror-image orientation and consider modified port placement, possible change of surgeon position, and intraoperative adjuncts (intraoperative cholangiography or indocyanine green fluorescence) to improve biliary visualization. Awareness of vascular variants such as Moynihan's hump or multiple cystic arteries is essential to avoid misidentification and injury during dissection of Calot's triangle. Careful stepwise dissection to obtain CVS remains the cornerstone of safe cholecystectomy in these cases. Laparoscopic cholecystectomy in patients with situs inversus totalis is feasible and safe when planned and executed with adaptations for mirror anatomy and with heightened attention to anatomic variants; readiness to adjust technique (including use of imaging adjuncts or conversion to open surgery if required) helps prevent complications.

INTRODUCTION

Situs inversus is a rare phenomenon. It can be identified by the inverted position of the internal viscera. The condition known as situs inversus totalis (SIT) results in the entire migration of the thoracic and abdominal organs to the other side of the body.[1] The first laparoscopic cholecystectomy (LC) in a SIT patient was performed in 1991. Laparoscopic cholecystectomy is the standard treatment for cholelithiasis. Situs inversus is a congenital developmental anomaly of the internal visceral posture that can be categorized as either partial or total visceral inversion. Reports of situs inversus totalis (SIT) range from 110,000 to 120,000. There would be several challenges in doing laparoscopic cholecystectomy with situs inversus, the gold standard procedure for removing a sick gallbladder, from the diagnostic and patient examination to the most important step, which is actually administering the medication. In this case report, we describe a patient with SI who underwent successful LC.[1-3] After suffering intermittent upper abdominal pain on the left side for more than a year, which worsened over more than ten days, a Saudi patient, who was ---- years old, was taken to Aseer Central Hospital. Every method employed in this study conformed with the ethical norms of the institutional and/or national research committees as well as the Helsinki Declaration.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

The patient provided written informed consent for the publication of this case report and the accompanying images.

CASE PRESENTATION

In this case report, A Saudi patient was taken to Aseer Central Hospital after developing intermittent left-sided upper abdominal pain that worsened over a period of more than ten days.

After being admitted to ACH; a reducible incisional hernia and epigastric pain were discovered during an abdominal examination. The complete blood count (CBC), lipase, troponin, electrocardiogram (EKG), and comprehensive metabolic panel (CMP) all showed findings that were within normal limits.

An ECG, echocardiography, and chest X-ray were performed. The organs' transposition was aberrant, exhibiting situs inversus totalis, although the pericardial and ventricular function was normal. Given the presence of situs inversus and dextrocardia, the patient had cardiac and pulmonary function testing prior to surgery. Color Doppler echocardiography revealed dextrocardia, but no significant structural or functional issues were found. Lung function tests showed no obvious problems. Doctors at the department discussed cholelithiasis and ruled out acute pancreatitis based on the patient's clinical presentation and related ancillary testing. It was determined that the patient had clear reasons for surgery and no contraindications. On the third day after being admitted to the hospital, the cholecystectomy was performed laparoscopically.

The theatre was set up to replicate normal circumstances in order to do the laparoscopic cholecystectomy. The patient was positioned with the surgeon and first assistant on the right and the scrub nurse and second assistant on the left. A typical procedure was used to produce anaesthesia.

Port Placement

- Supraumbilical Port (10 mm): To provide pneumoperitoneum and visibility, a 10 mm port was placed supraumbilically for the laparoscope (camera).
- Epigastric/Xyphoid Port (5 mm): A 5 mm port for operating devices, usually for a hook or dissector, was positioned directly beneath the xyphoid process (epigastric area).
- Left Lateral Midclavicular Port (10 mm): For the primary working instrument (typically the dominant hand), a 10 mm port was placed at the left midclavicular line (mirror image due to situs inversus).
- Port on the left anterior to the mid-axillary line (5 mm): To retract the gallbladder fundus, a 5 mm port was positioned anterior to the mid-axillary line.

Both the left and right sides of the gallbladder were carefully dissected. An endo-bag was used to retrieve the specimen through the epigastric port. A local hemostatic substance was applied to the gallbladder bed in order to achieve hemostasis. (Fig. 1A to 1D: Surgery-related operational pictures) The entire procedure took seventy minutes. Following a smooth postoperative course and a 72-hour surveillance period to watch for any possible rebleeding from the gallbladder bed, the patient was released. The results of the histopathological analysis were in line with chronic cholecystitis. The patient was asymptomatic and in good health at the one-week follow-up.

Figure 1: Intraoperative findings during the procedure.
(A) Initial exposure of the operative site with surrounding anatomical structures visualized. **(B) Detailed view highlighting the identified structure following careful dissection.**

DISCUSSION

About 1 in 5,000 to 20,000 live infants have situs inversus totalis (SIT), a rare autosomal recessive disease. Numerous more congenital heart, renal, and biliary system issues are associated with it. Situs inversus totalis is a very uncommon congenital disease in which the internal organs are entirely

ISSN (O): 2687-5365; ISSN (P): 2753-6556

opposite to those of the normal body.[5,6] However, the physiological function of the organ is comparable to that of normal individuals. SIT is an autosomal genetic disorder that may be caused by incorrect translocation of parental genes during embryonic development, according to a study conducted in the Gulf. Although its cause is uncertain, a somewhat higher incidence of the illness has been noted in women.[7-9]

Diagnosing gallstones in these people might be challenging, particularly if their medical history is unclear. Because the gallbladder is located on the left side, discomfort is typically felt in the left upper quadrant. However, 30% of patients have been found to experience discomfort in the epigastrium, whereas 10% of people may experience upper abdominal pain on the right side. Regarding the common LC approaches in SIT, there has been no agreement. The process is technically difficult, and several changes have been made according to the surgeon's preference and the biliary anatomy.[10] The location of ports and dissection procedures, as well as other surgeon-specific considerations, are critical to the overall patient outcomes and surgical ergonomics while executing an LC on this patient cohort. About 90% of surgeons are right-handed, compared to just 7% who are left-handed, like the majority of the general population.[1,11]

In this case, the surgeon was right-handed. The setup of the operating room, the position of the surgeon, and the port insertion were all the same as for a typical laparoscopic cholecystectomy.

Surgeons can operate more quickly, understand anatomy better, and adopt the right hand more readily. In fact, the primary drawback of this approach may be that it necessitates the surgeon to possess good manual abilities in order to use the energy instrument with the adverse hand. Typically, the surgeon stood on the right side and performed the dissection using the epigastric port. The fundus retraction was done by the helping surgeon. Only a few of these examples have been reported in the literature thus far.[12] This is one of the few known cases of laparoscopic cholecystectomy in situ inversus from Saudi Arabia, as far as the authors are aware.

CONCLUSION

Because cholelithiasis is as common in SIT patients as it is in the general community, surgeons should be prepared for LC in these patients despite the rarity of SIT. Perform the dissection procedure intraoperatively from the left side of the gallbladder and ensure that sufficient space is produced posterior to the gallbladder body to neck before striking Calot's triangle in order for patients to have a successful LC. A high degree of suspicion and high-resolution preoperative and/or intraoperative imaging techniques are required for the diagnosis and confirmation of altered anatomy in order to prevent iatrogenic damage. Although LC is a safe treatment for cholelithiasis in this case, the operational technique must be modified based on the biliary anatomy as well as the skill and training of the surgeon.

This case demonstrated the significance of careful preoperative planning for patients with known situs inversus totalis and the necessity of foreseeing technical difficulties because to the abdominal organs' reversible location. Thorough planning reduced the possibility of unanticipated problems during laparoscopic cholecystectomy.

REFERENCES

1. Phothong N, Akaraviputh T, Chinswangwatanakul V, Trakarnsanga A. Simplified technique of laparoscopic cholecystectomy in a patient with situs inversus: a case report and review of techniques. BMC Surg. 2015;15:23.
2. Salama IA. Laparoscopic cholecystectomy in situs inversus totalis. Ann Med Health Sci Res. 2013; (case report).
3. McKay D, Wemyss-Holden S. Laparoscopic cholecystectomy in situs inversus totalis. BMC Surg. 2005;5:5.
4. Alsabek M, Alzahrani A, Alshammari F, et al. A case report of laparoscopic cholecystectomy in situs inversus totalis with double cystic artery. Int J Surg Case Rep. 2016.
5. He T, Li Y, Huang S, et al. Laparoscopic cholecystectomy in a patient with situs inversus totalis: case report and technical tips. Am J Case Rep. 2022; (case report).
6. Matsumoto T, Okawa T, Asakura Y, Sakamoto H, Arimoto A, Yokoyama K, Ueno N, Yoshikawa T. Laparoscopic cholecystectomy in a patient with situs inversus totalis: report of a case with surgical tips. AME Surg J 2023;3:10.
7. Jang JY, et al. Laparoscopic cholecystectomy in two patients with situs inversus. J Minim Invasive Surg. 2018;21:82–86.
8. Malatani TS. Laparoscopic cholecystectomy in situs inversus totalis: a case report and a review of the literature. Ann Saudi Med. 1996;16(4):458–459.
9. Jamal Hamdi, Omar Abu Hamdan. Laparoscopic cholecystectomy in situs inversus totalis. Saudi J Gastroenterol. Saudi J Gastroenterol 2008 Jan;14(1):31-2.
10. Pérez JA, Rodríguez JA, De Alba Cruz I, et al. Moynihan's Lump (caterpillar hump) as an unusual variant of the right hepatic artery during laparoscopic cholecystectomy: a case report. Int J Surg Case Rep. 2021;85:106221.
11. Marano L, Bartoli A, Polom K, et al. The unwanted third wheel in the Calot's triangle: incidence and surgical significance of caterpillar hump of the right hepatic artery. J Minim Access Surg. 2019;15:185–191.
12. Wadhokar PS, Chhabda TT, Pathrikar SG. Case Report: Moynihan's Hump: A Must Know Anatomical Variant for Every Laparoscopic Surgeon. World J Lap Surg 2023;16(2):94–96.

ISSN (O): 2687-5365; ISSN (P): 2753-6556