



General Surgery

NAVIGATING ANATOMICAL MIRROR IMAGE: LAPAROSCOPIC CHOLECYSTECTOMY IN SITUS INVERSUS TOTALIS(SIT)

Dr Jeet Singh Rawat

Post Graduate Resident, Department of Surgery, Lokmanya Tilak Municipal Medical College & General; Hospital, Mumbai

Dr Prabhakar Subramaniam

Head of Department, Department of Surgery, Lokmanya Tilak Municipal Medical College & General; Hospital, Mumbai.

Dr Vineet Kumar

Assistant Professor, Department of Surgery, Lokmanya Tilak Municipal Medical College & General; Hospital, Mumbai.

ABSTRACT Situs inversus totalis (SIT) is a rare congenital condition characterized by the mirror-image reversal of internal organ arrangement, occurring in approximately 1 in 10,000 individuals, more frequent in males: 1.5:1. This case report discusses a laparoscopic cholecystectomy performed on a 37-year-old female patient diagnosed with Situs inversus totalis. Initial diagnosis was made through a chest radiograph, confirmed by Contrast Enhanced Computed Tomography. The patient experienced an uneventful postoperative recovery, being discharged after 72 hours.

KEYWORDS : Situs Inversus Totalis (SIT), Laparoscopic Cholecystectomy**INTRODUCTION**

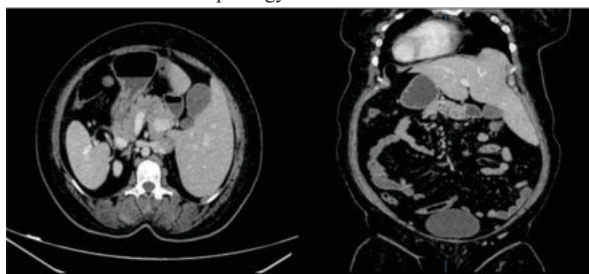
Situs inversus totalis (SIT) is a rare congenital condition in which the organs of both the chest and abdomen are arranged in a mirror-image reversal of their normal positions. This occurs due to a disruption in the typical left-right asymmetry during development, leading to a full reversal of the body's internal organ arrangement. Frequency of situs inversus is 1:10,000 and is more frequent in males: 1.5:1⁽¹⁾ Surgeries on patients with situs inversus totalis (SIT) can present challenges. The reversed positioning of organs may require surgeons to use instruments with their left hand or control pedals with their left foot, which can be awkward and uncomfortable for them. Preoperative imaging knowledge becomes crucial for surgeon to beforehand understand the complexity of surgery. This case report of a laparoscopic cholecystectomy in a patient with SIT has been reported in accordance with SCARE criteria.⁽²⁾

Case Report

A 37-year-old female presented to the outpatient department with intermittent abdominal pain radiating to left thoracic region for 6 months. She had aggravated symptoms since last one month. There was no significant medical history of patient. Patient has no past surgical history. There was no significant findings on physical examination, Murphy's sign was negative, and no other abnormalities were detected during the examination.

The condition of situs inversus was initially visualized on chest radiograph. Diagnosis was confirmed by the ultrasonography which was suggestive of cholelithiasis with Situs Inversus Totalis.

Patient underwent preoperative Contrast Enhanced Computer Tomography Abdomen which revealed liver, gall bladder, common bile duct, head of pancreas, inferior vena cava, superior mesenteric vein and ileo caecal junction is noted on left side. Stomach, spleen, duodeno-jejunal junction, aorta and superior mesenteric artery is noted in on right side. Dextrocardia seen with right sided aortic arch. S/O Situs inversus totalis morphology.

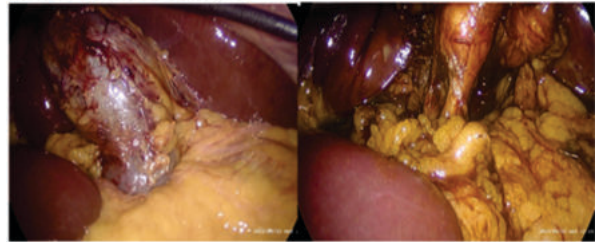


Contrast Enhanced Computed Tomography (Abdomen)

Axial View

Coronal View

All the visceral organs were located opposite to the normal position

INTRA OPERATIVE IMAGES

Liver and Gall bladder on left Side

Critical View of Safety

After confirming the presence of cholelithiasis, patient was planned for elective laparoscopic cholecystectomy as patient was symptomatic. Her blood panel was within normal limits. Preoperative physician and anesthesia assessment revealed no contraindications for surgery. Her preoperative 2D echography revealed congenital heart disease with dextrocardia and normal ejection fraction.

There was no anesthesia related complications or difficulties with intubation prior to the procedure's commencement.

She underwent a laparoscopic cholecystectomy in a reverse Trendelenburg position with left up position, monitor on patient's left shoulder area, surgeon standing on right side of the patient, camera assistant on right side and an assistant surgeon for retraction on the left side of patient, performed by an experienced right-handed surgeon.

The procedure began with a supraumbilical incision, followed by the insertion of a Veress needle for achieving pneumoperitoneum. A 10-mm supra umbilical port was now inserted for the Laparoscope. The liver and the gallbladder were located in the left hypochondrium, with the gallbladder obscured by omental adhesions. Three ports were placed as ten mm below xiphisternum, five mm at left mid-clavicular line and five mm at left anterior axillary line. Cephalad traction was applied by assistant holding the gallbladder's fundus through the anterior axillary port five mm port, Gall bladder and calot's triangle were identified, omental adhesions were released. No abnormalities within biliary tract were observed. Critical view of safety was achieved. Cystic duct and cystic artery were doubly clipped and ligated from 10 mm midclavicular port using left hand to apply clips. Gall bladder was dissected out from the liver bed using electrocautery. Specimen was extracted from epigastric port in endo-bag. Findings revealed a thin-walled gallbladder, which measured 8 x 4 x 4 cm, and contained multiple gallstones. Peritoneal lavage was given with 500 ml normal saline. 20 French abdominal drain was placed in left side Morrison Pouch as there was spillage of bile while dissecting gall bladder. Hemostasis was confirmed. Total operative duration 110 min. Patient had uneventful post-op stay of 72 hours. Drain was removed after 48 hours. Patient was discharged on subsequent day.

DISCUSSION

Situs inversus is a rare birth condition, categorized into two forms: complete situs inversus (situs inversus totalis, SIT) and partial situs inversus (situs inversus partialis, SIP). the majority of surgeries have been performed involve SIT patients.⁽³⁾

Total situs inversus is marked by the heart being located on the right side of the body, the aorta curving to the right, and all cardiac chambers being in reversed positions. The liver and gallbladder are situated on the left. While patients with this condition are typically asymptomatic and have a normal lifespan, it can occasionally be linked to other health issues. This may lead to its incidental discovery either before surgery or as an unexpected finding during an operation.⁽⁴⁾

The frequency of cholelithiasis in patients with Situs inversus is similar to that in the general population⁽⁴⁾; however, the condition may present diagnostic difficulty. The pain of biliary colic may be located in the epigastrium or in the left subcostal region and that of cholecystitis radiates to the left infrascapular region and the left shoulder. Due to the altered organ positions, the symptoms of acute cholecystitis can resemble those of acute pancreatitis, which greatly increases the risk of a missed diagnosis.⁽⁵⁾

In 1991, Campos and Sipes⁽⁶⁾ were the first to report a successful laparoscopic cholecystectomy on a 39-year-old woman with SIT. They used a "mirror image" four-port technique of the standard laparoscopic procedure. However, this technique poses challenges for most right-handed surgeons.

Typically, the surgical approach involves the surgeon standing on the right side of the patient, placing the monitor on the left side, and positioning the ports in a mirror-image arrangement compared to standard laparoscopic procedures. This method accommodates the reversed anatomy and helps the surgeon adjust to the different orientation of the internal structures.

No matter which configuration is used, it is important to clearly dissect the cystic duct and artery, stay close to the inferior gallbladder edge, and obtain the critical view of safety prior to transecting any structures. This is true of all laparoscopic cholecystectomy, but especially true in this case, in which the patient's anatomic configuration is not familiar.⁽⁷⁾

CONCLUSION

The presence of asymptomatic or undiagnosed situs inversus in patients with symptomatic gallstones creates a significant diagnostic challenge for surgeons.

Both existing literature and our clinical experience indicate that the distinctive anatomical configuration associated with SIT necessitates adaptations in surgical methodology.

In our case, prior awareness of the patient's SIT diagnosis enabled us to perform an exhaustive preoperative assessment, which facilitated a challenging yet ultimately successful surgical procedure.

REFERENCES

1. Eitler K, Bibok A, Telkes G. Situs inversus totalis: A clinical review. *Int J Gen Med*. 2022 Mar 3;15:2437-2449. doi: 10.2147/IJGM.S295444. PMID: 35264880; PMCID: PMC8901252.
2. Sohrabi C, Mathew G, Maria N, Kerwan A, Franchi T, Agha RA; Collaborators. The SCARE 2023 guideline: updating consensus Surgical CAse Report (SCARE) guidelines. *Int J Surg*. 2023 May;109(5):1136-1140. doi: 10.1097/JS9.0000000000000373.
3. Aisu Y, Kadokawa Y, Kato S, Yasukawa D, Kimura Y, Hori T. Robot-assisted distal gastrectomy with lymph node dissection for gastric cancer in a patient with situs inversus partialis: a case report with video file. *Surg Case Rep*. 2018 Feb 13;4(1):16. doi: 10.1186/s40792-018-0422-7. PMID: 29441475; PMCID: PMC5811421.
4. Elbeshry TM, Ghnam WM. Retrograde (fundus first) laparoscopic cholecystectomy in situs inversus totalis. *Sultan Qaboos Univ Med J*. 2012 Feb;12(1):113-5. doi: 10.12816/0003097. Epub 2012 Feb 7. PMID: 22375268; PMCID: PMC3286706.
5. He T, Zou J, Song H, Yi B, Sun K, Yang J, Lei T, Xu L, Li G. Laparoscopic cholecystectomy in a patient with situs inversus totalis presenting with cholelithiasis: A case report.
6. Campos L, Sipes E. Laparoscopic cholecystectomy in a 39-year-old female with situs inversus. *J Laparoendosc Surg*. 1991;1(2):123-5; discussion 126. doi: 10.1089/lps.1991.1.123. PMID: 1834260.
7. Eisenberg D. Cholecystectomy in situs inversus totalis: a laparoscopic approach. *Int Med Case Rep J*. 2009;2:27-29.