

Laparoscopic cholecystectomy in situs inverses totalis with gall bladder phlegmon: A case report

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Abstract

Situs inverses totalis is a rare condition characterized by the transposition of abdominal and thoracic organs, often associated with cardiac anomalies. There is no established correlation between gall stones and Situs inverses. Laparoscopic cholecystectomy remains the gold standard treatment for calculous cholecystitis. Acute cholecystitis in patients with situs inversus totalis has previously been reported to be managed laparoscopically by left-handed surgeons or by using the French position for port placement. Gall bladder phlegmon is technically challenging to manage laparoscopically and becomes more demanding in patients with situs inversus. We are reporting a case of gall bladder phlegmon in a patient with situs inversus which was performed by slight modification of port positioning by a right handed surgeon.

Keywords: Laparoscopic cholecystectomy, acute cholecystitis, gall bladder phlegmon, situs inverses, calculous cholecystitis.

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Introduction

Situs inverses totalis (SIT) is a rare congenital condition first reported by Fabricius in 1600. It includes transposition of abdominal and thoracic organs, associated with cardiac anomalies. There is no evidence of an increased incidence of cholelithiasis and calculous cholecystitis in patients with SIT.¹

Gallbladder phlegmon results from transmural progression of acute cholecystitis into the pericholecystic tissues. It is a surgical emergency requiring prompt management. To the best of our knowledge, no case of gallbladder phlegmon in a patient with situs inversus totalis has been reported previously.²

Since Mouret first performed it in 1987, laparoscopic

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cholecystectomy (LC) has become the standard operative procedure for cholelithiasis by using american or french port placement techniques. Open cholecystectomy is performed in patients with gall bladder phlegmon to get the tactile feedback and to avoid injury to the friable viscera. Laparoscopic cholecystectomy in these patients is technically more demanding and it becomes future challenging in patients with situs inversus totalis. It needs reorientation of visual-motor skills to the left upper quadrant especially by the right handed surgeons.³

Herein, we present a case report of laparoscopic cholecystectomy in a patient of situs inversus totalis who developed gallbladder phlegmon with use of american technique of port placement for right handed surgeons with a slight modification.

Case report

A 46 year old female presented to the Emergency department of Sheikh Zayed medical college, Rahim Yar Khan, with pain in the left hypochondrium and epigastric pain for 2 months which had worsened over the last 2 days and led to hospitalization of patient on 4th July, 2025. The pain was sudden in onset, colicky in nature, more prominent after meals, and relieved by injectable analgesic medications. Tachycardia associated with wide pulse pressure raised suspicion of sepsis. The patient was previously unaware of and had never been diagnosed with situs inversus totalis. On examination, there was no jaundice or visceromegaly except the patient exhibited a left sided "Murphy's sign". The apex beat was found in the right hemithorax at 5th intercostals space. Chest radiography revealed dextrocardia, with no evidence of bronchiectasis (Figure-1)

Further evaluation with ultrasound confirmed situs inversus totalis and presence of multiple gall bladder stones with no intra or extrabiliary duct dilatation (Figure-2).

Laboratory investigation revealed normal liver functions, and a normal coagulation profile, excluding haematological causes of gall stone formation at this age. After obtaining informed consent, the patient was scheduled for laparoscopic cholecystectomy.

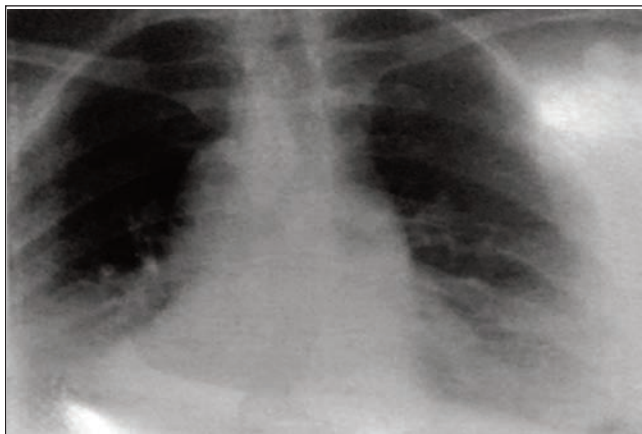


Figure-1: Chest Radiography Showing Dextrocardia.

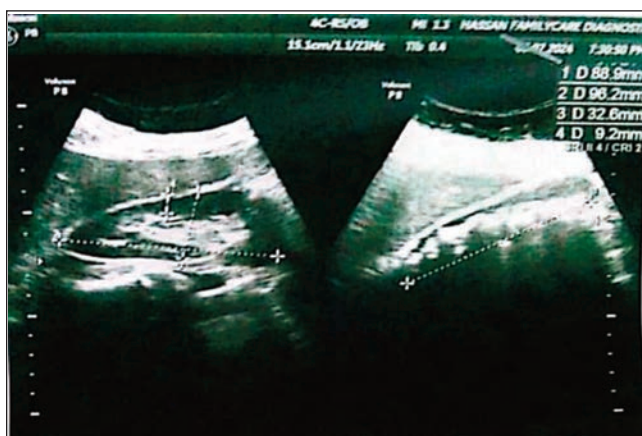


Figure-2: USG abdomen shows Gall Bladder on left side with Multiple Calculi.

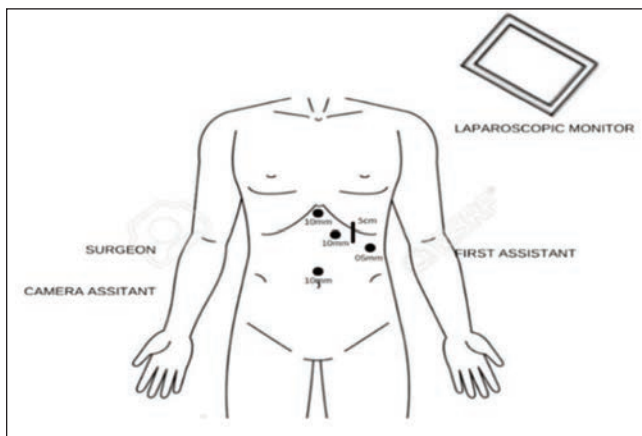


Figure-3: Modified port position and size of laparoscopic cholecystectomy in Situs inversus totalis (American port technique).

The patient was operated in the supine position with a steep head-up and left tilt after establishing pneumoperitoneum through closed technique. Laparoscopic cholecystectomy was performed with the standard 4-trocar Technique, according to the American technique of port placement with certain modifications. The operative team was on the right side of the patient and



Figure-4: Stomach is visible on the right side of abdomen.

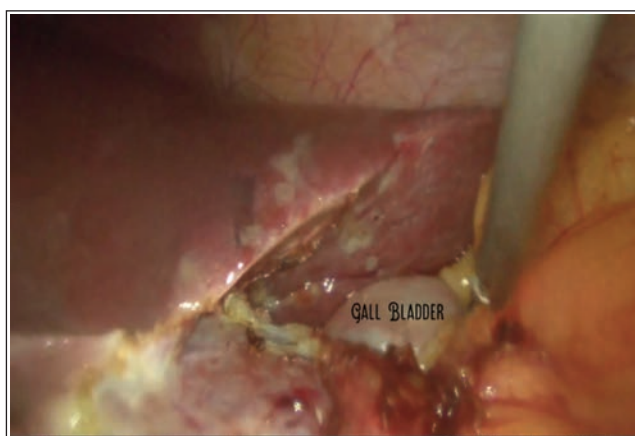


Figure-5: Gall bladder phlegmon under dissection.

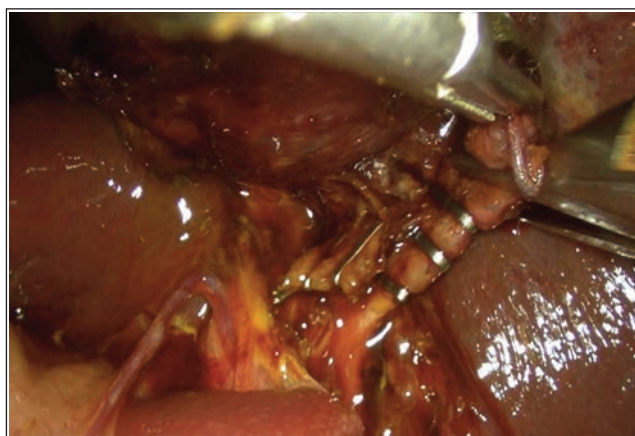


Figure-6: Clipped cystic duct on the left side of the SIT patient.

laparoscopic devices were on patient's left side. After taking all antiseptic measures the patient was draped and given general anaesthesia. As the surgeon was right handed so few modifications were made in port placement for dissection of Calot's triangle. A small incision was made in the supraumbilical region and pneumoperitoneum (CO₂) was created by insertion of a veress needle through the supraumbilical area with a pressure of 12mmHg. Two 10-

mm trocars were inserted into the abdominal cavity, one in the position of the veress needle for laparoscope and the other one in the subxiphoid/epigastric location on the left side of Falciform ligament under vision. As the operating surgeon was right handed and the patient had situs inverses totalis the insertion of 3rd port was modified instead of a 5mm trocar, a 10-mm trocar was inserted at left mid-clavicular line and distance was 5cm lower from the normal placement from subxiphoid area (which is normally 2 cm below subcostal margin) and fourth 5-mm trocar was inserted in left anterior axillary line under vision (Figure-3).

At laparoscopic abdominal exploration, abdominal contents were entirely reversed (Figure-4,5). The gall bladder had adhesions with the omentum, transverse colon and liver. Dissection was performed by using harmonic ultrasonic shear from the fundus of gall bladder and all adherent structures were shaved off by the modified positioned port of left midclavicular line. Traction of the Hartmann's pouch was performed by using a grasper inserted through the trocar located at left epigastric region. Dissection of the Hepatocystic triangle in SIT was challenging for a right-handed surgeon. Dissection of Hepatocystic triangle was carried out with a posterior approach by using grasper of midclavicular port. Meticulous dissection ensured complete freeing and definition of the course of both cystic duct and cystic artery. Dissection was performed above the plane of Rouviere's sulcus to avoid any injury. Both cystic duct and cystic arteries were clipped (double proximal, single distal with titanium clips) and then divided by hook scissors (Figure-6). After division of all peritoneal reflection on either side, the gall bladder was retrogradally separated from the liver bed by using electrocautry. It was then extracted through the 10-mm epigastric port through pouch. Fascia was closed with absorbable sutures and skin closed with prolene. Surgical site was secured with antiseptic dressing.

The operative time was slightly longer than that of a routine laparoscopic cholecystectomy, lasting 90 minutes. The postoperative period was uneventful, and the patient was discharged in stable condition.

The operation time was a bit longer compared to routine laparoscopic cholecystectomy as the surgeon took 90 minutes for this surgery. The postoperative period was uneventful, and the patient was discharged in a satisfactory status.

Discussion

Gall stone disease is a common form of morbidity with a high predilection in females. With the advent of the first laparoscopic cholecystectomy in 1987, this procedure

became the gold standard treatment for gallstone disease. Laparoscopic cholecystectomy can have high morbidity in the form of bile duct injuries, which are dependant on various patient related factors.⁴ However finding the mirror image of viscera while performing laparoscopic cholecystectomy is a unique challenge.

Situs inversus totalis is a rare anomaly which is associated with transposition of abdominal and thoracic viscera. The incidence of gallstones is not associated with situs inversus totalis; however, gallstone disease in such patients is rarely reported.² Phlegmonous gallbladder is a common complication of acute cholecystitis. It usually results from progressive acute cholecystitis, where transmural spread of inflammation causes the gallbladder to adhere to adjacent structures, forming a phlegmon composed of omentum and intestine. If the inflammation remains unresolved, it may progress to gall bladder gangrene and perforation which is indicated by a swinging fever. This is a surgical emergency that requires prompt treatment with antibiotics and urgent aspiration/removal of the gallbladder to reduce the risk of septic shock.⁵

It is rarely seen in patients of Situs inverses totalis. The clinical presentation is often misleading. Acute cholecystitis in patients with SIT presents with left upper quadrant pain in approximately 30% of cases, while nearly 50% present with right upper quadrant pain. This suggests that, despite transposition of the abdominal viscera, the peripheral nerves are not transposed, resulting in atypical or diffuse pain patterns.⁶ In this patient, the pain was predominantly in the epigastrium and left hypochondrium. On examination, the left upper quadrant was tender. An apical beat in the right fifth intercostals space suggested dextrocardia. Liver dullness was not elicitable on the right side. Ultrasonography confirmed the presence of visceral transposition and gall stones with associated phlegmon. It is surprising that she was diagnosed as a case of SIT quite late in her life, which may be attributed to limited healthcare access and reduced awareness in rural populations of our country.

Laparoscopic cholecystectomy is a minimally invasive procedure used for removal of a diseased gallbladder. Several reports in the literature emphasize the feasibility of the safe laparoscopic cholecystectomy in challenging situation like acute cholecystitis in situs inverses totalis. Although the reported cases of acute cholecystectomy in SIT are rare, no case of laparoscopic cholecystectomy for gallbladder phlegmon in SIT has yet been reported.⁷

Laparoscopic cholecystectomy in SIT with gall bladder phlegmon is challenging, as most surgeons are right handed. It is necessary for these surgeons, and their

assistants, to modify their usual surgical technique to comfortably and safely carry out the procedure. The dissection of the biliary tree can be carried out with the right or left hand. The procedure becomes more difficult because additional time is required to rearrange the operating room setup and adapt to mirror-image anatomy, which may cause orientation difficulties.⁸

In this case report, the laparoscopic cholecystectomy of a patient with situs inversus totalis was performed by a right handed surgeon with some changes in technique.⁹

The left handed surgeons may have better ergonomics and visuomotor skill for laparoscopic cholecystectomy in SIT. Some surgeons have reported using the Lloyd's position, with the surgeon standing between the patient's legs.¹⁰ Right handed surgeon can use French position for laparoscopic cholecystectomy in SIT patients, however, in our case the conventional 4 port technique was used with modifications.¹¹

On initial entry, the abdominal viscera were retracted to view the gall bladder. The epigastric port was used for grasping the gall bladder phlegmon at Hartman pouch while the hepatocystic triangle was dissected with the help of Maryland grasper of subcostal port. The fundus was given traction through the anterior axillary port grasper. Aburayya BI et al¹² mentioned a French technique of port positioning for right handed surgeons, but we performed it through the American technique of port placement and clipping was performed through subcostal port. This modification led us to dissect the triangle with right hand. Cholecystectomy was done and gallbladder was removed through epigastric port. The procedure was uneventful provided the duration was long in accordance to literature. The patient was discharged within 72 hours on oral antibiotics.

Conversion to open surgery is always an option in cases of situs inversus due to technical challenges of dealing with left sided gall bladder laparoscopically. However, in a small number of case reports, no case of laparoscopic cholecystectomy in SIT has reported conversion.

Conclusion

Laparoscopic cholecystectomy is a feasible and safe option in complicated cases of gall bladder phlegmon with situs inversus totalis. The right handed surgeon can perform the

procedure with slight modifications of conventional four ports placement despite being challenging due to visceral transposition.

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Author Contribution:

KN: Concept, data interpretation and final approval.

NF: Drafting and final approval.

MNA: Revision and final approval.

HS: Design, data analysis and final approval.