

Case report

Laparoscopic Cholecystectomy in Situs Inversus Totalis

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Abstract:

Laparoscopic cholecystectomy is considered to be the gold standard surgical procedure for cholelithiasis with reduced hospital stay, fewer respiratory complications, less pain, faster return to work and is one of the commonest surgical procedures in the world today. However, problem arises in rare cases of previously undiagnosed situs inversustotalis (with dextrocardia) with respect to the presentation of the cholecystitis, its diagnosis and the operative procedure. Situs inversus is a rare morphological anomaly with genetic predisposition presenting as reversal of the usual 'handedness' of visceral topography. The mirror image anatomy makes the laparoscopic intervention difficult even for an experienced surgeon. The presentation and management of one such patient is discussed with an emphasis on operative technique.

Keywords: laparoscopic cholecystectomy, situs inversustotalis

INTRODUCTION:

In 1600 the first known case of situs inversus in humans was reported by Fabricius¹. The incidence is thought to be in the region of 1:5000 to 1:20000². The condition may affect the thoracic organs, abdominal organs or both. It is associated with a number of other conditions such as Kartagener's (bronchiectasis, sinusitis, situs inversus) and cardiac anomalies. There is no current evidence that situs inversus predisposes to cholelithiasis³.

It is a rare congenital disorder occurring in 0.01% of the population.⁴ It is characterized by the transposition of the major thoracic organs and all the visceral organs of the abdomen to the side opposite to normal position in the body. The liver and gall bladder are located on the left, while the stomach and the spleen are on the right. The normal development requires a 270 degree counterclockwise rotation that yields the normal anatomy. In situs inversustotalis, the 270 degree rotation is in the clockwise direction.⁵ The exact etiology is unclear; however, it is thought to be due to a single autosomal recessive gene of incomplete

penetration. The male to female ratio is 1:1 and there is no racial predilection.

Though situs inversus on its own is not pathological, it may be associated with cardiorespiratory, hepatopancreaticobiliary, gastrointestinal, neurological, orthopaedic and urological anomalies, some of which may be life-threatening.^{6,8} In the published literature, there have been only about 40 reports of open cholecystectomy in the pre-laparoscopic era and 20 reports of laparoscopic cholecystectomy in patients with situs inversus^{7,9,10}

Since Mouret first performed it in 1987, laparoscopic cholecystectomy has become the standard operative procedure for gallbladder disease. The first known laparoscopic cholecystectomy *in situs* inversus has been reported by Campos and Sipes in 1991.¹¹

CASE REPORT

A 45-year-old woman presented to the surgical clinic with a few months' history of intermittent left upper quadrant pain, radiating to the left scapular region. Pain became constant with

increased intensity since 2 days . On examination there was mild tenderness in left hypochondrium and apex beat heard in the right fifth intercostal space, midclavicular line suggestive of situs inversus.

An ultrasound scan of the upper abdomen identified the gallbladder, which contained multiple stones, in the left upper quadrant. The spleen was visualised in the right upper quadrant.

There was no evidence of common bile duct or intrahepatic duct dilatation.

CT angiogram of abdomen also confirmed dextrocardia with right sided descending and abdominal aorta and left sided inferior vena cava. Based on clinical and radiographic investigation (Fig 1,2,3) it was diagnosed as acute cholelithiasis with situs inversus totalis.



Fig 1

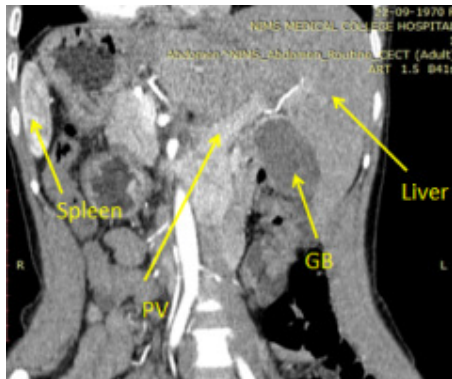


Fig 2

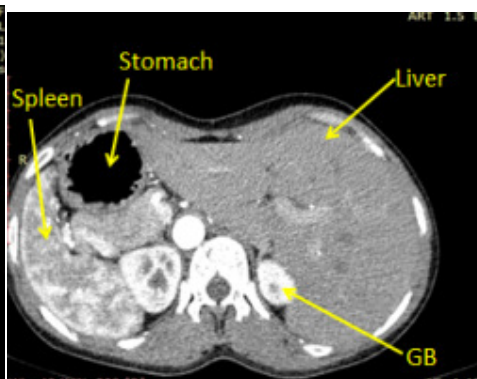


Fig 3

PROCEDURE:

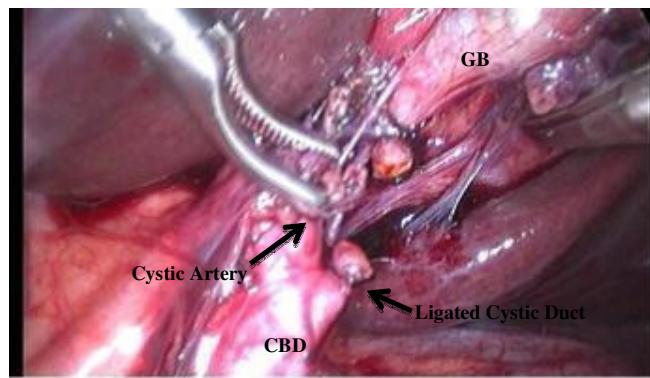
In order to conduct the laparoscopic cholecystectomy all theatre equipment including diathermy, monitors and CO₂ insufflator were positioned in the mirror image of their normal position. The surgical team also changed sides with

the primary surgeon and first assistant on the patient's right and the second assistant on the left. The ports were inserted in the usual way but on the left side. Laparoscopic cholecystectomy was performed using four trocars (Fig 4) .

A supraumbilical incision was given and a 10 mm trocar was introduced through it and pneumoperitoneum (CO₂) was created with pressure of 12 mm Hg. An incision given at epigastric region just left to midline and 10mm trocar was introduced into epigastric in subxiphoid location. A 5mm trocar inserted at midclavicular line just below lower border of liver. At laparoscopy the entirety of the abdominal contents were indeed reversed. Gallbladder was edematous and adhesive with omentum. A 5mm

trocar was inserted in left anterior axillary line below the lower border of liver.

Dissection of Calots triangle was done. Both cystic duct and artery were ligated with silk 2-0 intracorporeal suture and divided by scissors (Fig 5). Remaining gall bladder was separated from gall bladder fossa using electrocautery and extracted through 10 mm umbilical port. Closure of trocar site was done and patient was discharged next day. One week postoperative follow-up was uneventful.



Fig

4

Fig 5

DISCUSSION:

There are several important aspects of the management of gallstones in patients with situs inversus that are worth highlighting. While there is no evidence to suggest that gall stones are more or less common in people with situs inversus, the presentation with left upper quadrant pain may delay the diagnosis of symptomatic gall stones. Ultrasonography, abdominal CT, chest scan, and magnetic resonance imaging will confirm the presence of visceral transposition. Patients with situs inversus who are scheduled for laparoscopic cholecystectomy should be assessed pre-operatively for any potentially serious cardiac or respiratory abnormalities.

It requires mental adaptability and manual dexterity to cope with unusual orientation of internal viscera.

In our case, both the surgeon and assistant are right-handed and therefore the technique has to be adjusted. It may be easier for a left-handed surgeon to perform laparoscopic cholecystectomy in such patients but not documented. While there is no evidence to suggest that there is an increased risk of bile duct injuries in patients with situs inversus, the orientation and ergonomic challenges may result in an increased operative time. Our total operating time was 50 mins with intracorporeal suturing to ligate the cystic duct and artery as we routinely do not use lega clips as a matter of choice.

Usual difficulties encountered during this surgical procedure:

1. Due to unusual anatomy, there are chances of iatrogenic injury.

2. Dissection is difficult for right-handed surgeons and may be easy for left-hand surgeons. Frequent change of hands with change of grasper and Maryland were required to adjust.
3. Common bile duct is located on right-side of Calot's triangle, not on the left-side, and this should be constantly be kept in mind during dissection.

For right-handed surgeon, it is useful to 445 the anatomy in terms of "medial" and "lateral" relations, rather than "left" and "right" since the medial and lateral relations in situs inversus are preserved and position of ports may be rearranged to perform dissection and clip application (if clip is used).

Various modifications which can be made during surgical procedures : (as per literature but not tried)

1. Right-dominated surgeon can slightly bend their body to dissect the structure of Calot's triangle using their right hand in the epigastric port while allowing their assistant to retract Hartmann's pouch.
2. The lateral ports can be moved slightly caudally, and the dissecting hand can be

placed in one of those ports, while the left hand retracts the GB(gall bladder) fundus through the epigastric port.

3. Use the epigastric port to retract with the left hand and operate with the right hand through the lateral subcostal port.
4. The surgeon standing at the foot end, in between the legs of the patient while the patient is in a Lloyd-Davis position

CONCLUSION

Although laparoscopic cholecystectomy in patients with SIT may consume extra time, it should be considered the procedure of choice in the management of cholelithiasis as the normally positioned gall bladder. Different scenarios should be kept in mind to compensate for the unskilled nondominant left hand. The surgeon should not forget training and gaining skills for his nondominant hands. Also, he should gain skills in dealing with all instruments well (e.g. hook, grasper) and not stick to only one in his dissection. Extra precautions taken before and during the procedure.

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