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Laparoscopic cholecystectomy in situs inversus totalis

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Abstract

INTRODUCTION
Situs inversus totalis is a rare congenital anomaly characterized by transposition of organs to the opposite site of body. Diagnosis and treatment of cholelithiasis in such cases pose a challenge to operating surgeon because of unusual clinical picture and due to contralateral disposition of visceral organs. Laparoscopic cholecystectomy in these patients is technically demanding still it is feasible in hands of experienced laparoscopic surgeon. Difficulty is encountered in skeletonizing the cystic duct and cystic artery in Calot's triangle, which increases intraoperative time.

Keywords: Cholelithiasis, laparoscopic cholecystectomy, situs inversus totalis

1. Introduction

Situs inversus totalis (SIT) is a rare entity. It was first reported by Fabricius in 1600.[1] The incidence is thought to be in the range of 1:10 000 to 1:20 000.[2]
Transposition of the organs may also affect thoracic organs, besides abdominal organs. It can be associated with Kartegener triad (bronchietasis, sinusitis, and situs inversus) and cardiac anomalies. There is no evidence for increased incidence of cholelithiasis in SIT.[3]
Since Mouret first performed it in 1987, laparoscopic cholecystectomy (LC) has become the standard operative procedure for cholelithiasis.[4]
Several cases have been reported in patients with situs inversus totalis. Laparoscopic cholecystectomy in these patients is technically demanding and needs orientation of visual-motor skills to operate in left upper quadrant.[5]
We present a case report of laparoscopic cholecystectomy in situs inversus totalis with its difficulty.

2. Case report

A 58 year old female presented with left hypochondrium and epigastric pain 2 months duration. The pain was colicky in nature, prominent after meals. The patient had not been diagnosed as situs inversus totalis before. The abdominal examination was unremarkable. Chest radiography revealed situs inversus, with no evidence of bronchietasis (Fig. 1).

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Fig.1 X-Ray chest showing situs inversus

Further evaluation with ultrasound, computerized tomography (CT) confirmed situs inversus totalis and presence of multiple gall bladder stones with no intra or extrabiliary duct dilatation were observed (Figs. 2 and 3).

Fig. 2 Ultrasound showing stone in gallbladder on the side

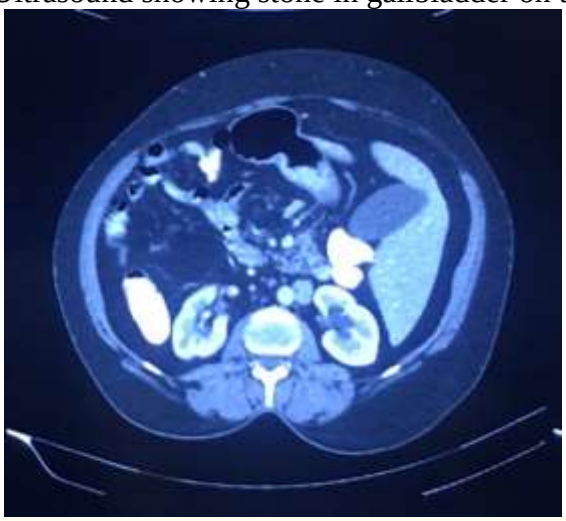

Fig. 3 Computed tomography (CT) revealed the liver and gall bladder in the left side

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Fig. 4 coronal cut of CT showing liver and gall bladder on left side

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

3. Technique

Laparoscopic cholecystectomy was performed with the 4-trocar Technique. The operative team and laparoscopic devices were located in the theatre as a mirror image configuration of normal laparoscopic cholecystectomy. The pneumoperitoneum (CO_2) was created by insertion of a Veress needle through the supraumbilical area with a pressure of 12 mmHg. 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 left mid-clavicular line. A 5-mm trocar was inserted at subxiphoid location and second 5-mm trocar was inserted in left anterior axillary line under the view of laparoscope.

At laparoscopic abdominal exploration the entirely of the abdominal contents were indeed reversed, at the Calot's triangle the cyst artery was found to lateral side on the right of cystic duct (Fig. 5).

Fig. 5 Calot's triangle of the gall bladder in situs inversus totalis.

Fundus of the gall bladder was grasped and retracted by the assistant using a clinch, which was inserted through the 5-mm trocar in the left anterior axillary line. Traction of the Hartmann's pouch was performed by left hand of the surgeon using a grasper inserted through the trocar located at subxiphoid location. Dissection of the Calot's triangle is one of the major problems for a right-handed surgeon in case of situs inversus totalis abnormality. Dissection

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of Calot's triangle was carried out with an anterior approach by using a forceps that was inserted through the trocar located in the left mid-clavicular line. Meticulous dissection ensured complete freeing and definition of the course of both cystic duct and cystic artery, the duct was left to cystic artery (Fig. 6). Dissection was performed above the plane of Rouviene's sulcus to avoid any injury.

Fig. 6 Dissection of Calot's triangle of the gall bladder in situs inversus totalis.

Fig.7 Clipping of cystic artery and duct

Both cystic duct and cystic arteries were clipped (double proximal, single distal titanium clips Fig. 7) and then divided by scissors. (Fig. 8)

Fig. 9 Cystic duct dividing by scissors

After division of all peritoneal reflection on either side, the gall bladder was separated from the liver bed by using electrocautery. It was then extracted through the 10-mm left midclavicular port. Wound was closed by non-absorbable suture. (Fig. 10)

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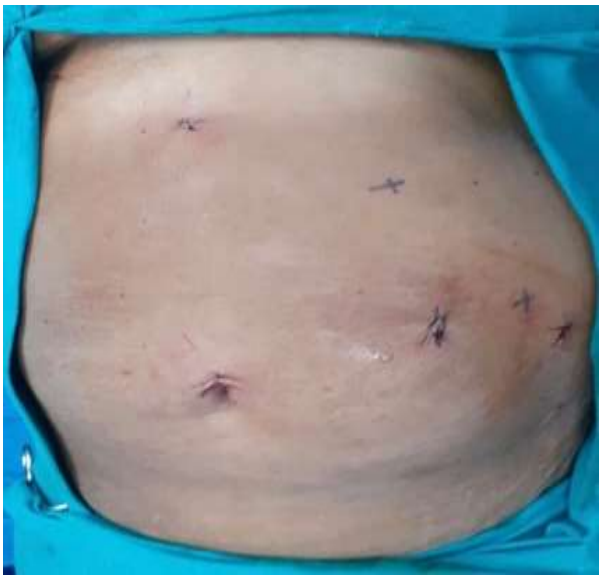

Fig. Post-operative photo

The postoperative period was uneventful, and the patient was discharged on the 2nd postoperative period.

4. Discussion

Since Campos and Sipes[6] described the first case of laparoscopic cholecystectomy in a patient with situs inversus, this uncommon malformation has been challenging for many surgeons. Due to the contralateral disposition of the viscera, the diagnosis and surgical approach of these patients may be more difficult than that of orthotropic patients.

Situs inversus does not predispose one to gallbladder disease, but it leads to diagnostic confusion.[7] Most patients presented with left-sided upper abdominal pain. However, about 10% of patients with left-sided cholelithiasis present with right-sided abdominal pain.[7] This phenomenon has been observed for both visceral biliary pain and somatic pain in cases of cholecystitis and suggested that central nervous system may not share in general transposition.[8]

A high index of suspicion is hence the key to avoiding mishaps in patients with situs inversus presenting with an acute abdomen. Apart from the confusion related to the side of the pain, the spectrum of clinical presentation related to complication of left-sided cholelithiasis is similar to that occurring in right-handed gallbladder.[7]

An apical beat in the right fifth intercostals space, reserved side of the liver dullness, and the right testicle hanging lower than the left occasionally suggest situs inversus.[7] Ultrasonography, abdominal CT, chest scan, and MRI will confirm the presence of visceral transposition. Several reports in the literature emphasize the feasibility of the safe laparoscopic cholecystectomy in this challenging situation.[9,10] However, the procedure often requires more time to rearrange the equipment's in the operating room and extra time to recognize the mirror image anatomy.[11]

The anatomical variation and, mainly, the contralateral disposition of the biliary tree demand an accurate dissection and exposure of the biliary structures to avoid iatrogenic injures.

Technical difficulties merit consideration, the mirror image reversibility of the abdominal viscera requires the surgeon to stand on the right side with video monitor above the patient left shoulder. Two 10-mm ports are placed in the left midclavicular and supraumbilical

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positions. Two 5-mm ports are placed in the subxiphoid location and left anterior axillary line.

Technical aspect of laparoscopic cholecystectomy in patients with situs inversus totalis is privilege left-handed surgeons. The dissection of the biliary tree can be carried out with either the right or left hand,[12] however, for right-handed surgeons using the unskilled and non-dominant left hand; the manipulation may be cumbersome and not precise. This is most apparent during clip application where both precision and power are required. However, in this case using the right hand has technical difficulties of either having to cross the hands or hyperflex the trunk and strike the anaesthesia screen with left elbow.[5]

The skeletonizing of the structure of Calot's triangle consumes extra time and is more difficult than in patient with a normally located gallbladder, some have overcome such difficulties by standing between 2 abducted lower limbs.[1,13]

The problem of crossing the hands to retract Hartmann's pouch while dissecting Calot's triangle has been overcome by some by allowing the first assistant to retract Hartmann's pouch while the primary surgeon dissect Calot's triangle using his right hand via epigastric port without hindrance.[11]

The dissection should be carried out from lateral side as in this study by dissecting on lateral (left side) of the Hartmann's pouch and stick closely to the gall bladder wall until the cystic duct skeletonized from above downward (from the Hartmann's pouch to the cystic duct). The general agreement is that the procedure will be longer than in patient with normally located gallbladder, the need to redirect the visual-motor skills of the surgeon and the cameraman to the left upper quadrant along with the difficulty in skeletonizing Calot's triangle in responsible for longest portion of the extra operative time.[1]

Apart from mirror image transposition, patients with situs inversus usually do not have associated extrahepatic biliary, venous, and arterial anomalies.[7,8,14,15] Hence, it appears that the surgeon should not be discouraged from performing laparoscopic cholecystectomy for situs inversus on the ground of unexpected associated biliary tract anomalies.

In conclusion, laparoscopic cholecystectomy is feasible and should be done in situs inversus totalis patient by experienced laparoscopic surgeon, as changes in anatomical disposition of organ not only influence the localization of symptoms and signs arising from a diseases organ but also imposes special demands on the diagnosis and surgical skills of the surgeon.

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