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CASE REPORT

Laparoscopic Cholecystectomy in Situs Inversus Totalis: a Case Report

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SITUS inversus totalis is uncommon anatomic anomaly, with gallbladder on the left side.¹ Since the first known laparoscopic cholecystectomy in a patient with situs inversus has been reported by Campos and Sipes in 1991,² there have been only approximately 40 cases of laparoscopic cholecystectomy performed in patients with situs inversus reported in the published literatures.^{3, 4} These cases may cause difficulties in the diagnostic and therapeutic management due to the mirror-image anatomy during operation, which requires more technically procedures and needs reorientation of visuomotor skills to the left upper quadrant. We herein discuss technical and diagnostic difficulties and review the literatures.

CASE DESCRIPTION

A 50-year-old female, who was unknown to have situs inversus totalis, presented to the symptom with a 2-year history of intermittent epigastric and left upper quadrant pains. Ultrasonography identified multiple gallstones with cholecystitis, a common bile duct of normal diameter, and

the presence of the liver and gallbladder in the left hypochondrium. Chest X-ray revealed dextrocardia with fundic gas shadow on the right side (Fig. 1). Abdomen computed tomography (CT) revealed situs inversus totalis (Fig. 2). Laboratory test results were normal. After providing informed consent, the patient underwent laparoscopic cholecystectomy.

The patient was placed in the supine position with slight head-up and right tilt to improve visualization. Anaesthetist was at the head end, the surgeon was a right-handed operator having performed more than 200 standard laparoscopic



Figure 1. Chest X-ray demonstrates dextrocardia.

cholecystectomies at the time. The surgeon and the monitor assistant were on the patient's right side, and the other assistant was on the left side of the patient. Laparoscopic cholecystectomy was performed using a thirty-degree viewing laparoscope with the patient under general anesthesia. Pneumoperitoneum with CO₂ was created with a pressure 1.6 kPa (12 mm Hg), using a Veress needle that was inserted midline at the supraumbilical region. Port position is a mirror image of routine four-port laparoscopic cholecystectomy (Fig. 3). Two 10-mm trocars were inserted into the abdominal cavity, one in the position of the Veress needle and the other in the midline in the epigastric region to the left of the falciform ligament. Two 5-mm ports were placed in the left subcostal region at the midclavicular and the anterior axillary lines.

On laparoscopic examination, the gallbladder was in the left upper quadrant (Fig. 4). Calot's triangle was visualised by retracting Hartmann's pouch. The surgeon carefully dissected Calot's triangle using his right hand *via* the midclavicular port. The common bile duct, cystic duct and cystic artery were identified. The cystic duct and artery were clipped and divided, and the gallbladder was dissected from the liver bed by using electrocautery and was then extracted through the epigastric port. The total duration of the operation was 73 minutes.



Figure 2. CT scan demonstrates the transposition epigastric organs.



Figure 3. Port site positioning after laparoscopic cholecystectomy (head end at top of image).

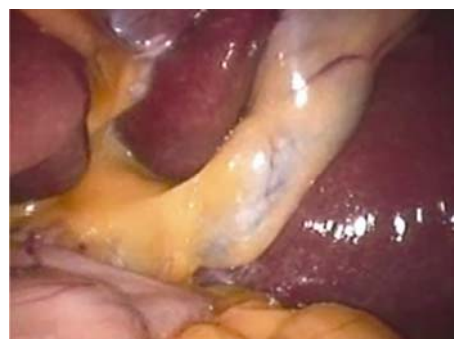


Figure 4. Intraoperative image demonstrates the left-sided gallbladder.

DISCUSSION

Situs inversus totalis is a rare congenital anomaly, and incidence is approximately 1:5000 to 1:20 000.⁵⁻⁷ Although there are some reports of patients with situs inversus and cholelithiasis, there is no evidence that situs inversus predisposes to cholelithiasis,^{8,9} but it may be a cause of diagnostic confusion due to the left upper abdominal pain and unknown situs inversus. A chest X-ray revealing dextrocardia with fundic gas shadow on right side can give quick diagnostic clues. Ultrasonography, chest and abdominal CT scan will confirm the presence of situs inversus totalis.

Although laparoscopic cholecystectomy is the standard procedure for the symptomatic cholelithiasis, the most challenging for performing laparoscopic cholecystectomy in patients with situs inversus totalis is the mirror-image anatomy. This anatomic anomaly condition may lead to some problems in orientation and dissection during the operation for the right-handed surgeons.¹⁰ To overcome this issue, some reports suggest adjusting the port placement or modifying laparoscopic technique.⁹⁻¹¹ However, a left-handed surgeon can carry out the procedure by alternating the performance of dissection maneuvers between the right and left hand as has been reported in the literature.¹²

We also changed the position of grasper with the dissector to use the midclavicular port in dissection, which is used only for traction in conventional technique, and dissected Calot's triangle from the lateral side. Dissection should be safely carried out close to the gallbladder in the triangle. It is important to clearly dissect the cystic duct and artery, and obtain the critical view of safety before transecting any structures. If this anatomical variation makes the operation confusing, then laparotomy should be thought.

With the development of laparoscopic techniques, situs inversus totalis is not a contraindication to laparoscopic cholecystectomy, although the procedure is more difficult than in orthotopic patients. Recently, single-incision laparoscopic cholecystectomy in patients with situs inversus totalis has

also been reported.^{4, 11} No evidence suggests that there is an increased risk of bile duct injuries in these patients, and the unfamiliar orientation challenges maybe result in increased operative time.

In conclusion, we suggest that laparoscopic cholecystectomy can be performed safely in patients with situs inversus totalis by practiced hepatobiliary laparoscopic surgeon.

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