



Cholecystectomy and appendectomy by laparoscopy in a patient with *situs inversus totalis*. A case report and review of the literature

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Abstract

Aim: To report a case of a patient with cholecystitis and *situs inversus totalis* treated by laparoscopy.

Design: case report.

Institution: Texas Endosurgery Institute. San Antonio, Texas.

Case Report: A 25-year-old female was referred with a 3-month history of colicky abdominal pain, localized to the left upper quadrant, which progressively worsened and became constant. The physical examination revealed diffuse pain in the epigastrium, without signs of peritoneal irritation. The abdominal US showed cholelithiasis and the gallbladder was localized in the left hypochondrium. The white cell count was 8,500/mL and liver function tests were normal. Standard laparoscopic cholecystectomy and appendectomy with a mirror-image surgical approach were performed successfully without complication.

Conclusion: Cholelithiasis occurring with *situs inversus totalis* is a rare condition which is safely and effectively treated by laparoscopy. Meticulous attention to detailed anatomical dissection and cholangiography are recommended.

Key words: *Situs inversus totalis*, cholelithiasis, laparoscopy.

Resumen

Objetivo: Reportar el caso de una paciente con colecistitis y *situs inversus totalis* tratado por laparoscopia.

Diseño: Reporte de un caso.

Institución: Texas Endosurgery Institute. San Antonio, Texas (USA)

Descripción del caso: Se trata de un paciente femenino de 25 años de edad, con dolor abdominal de 3 meses de evolución, tipo cólico, localizado en el cuadrante superior izquierdo, el cual se tornó progresivo y constante.

El examen físico reveló dolor difuso en epigastrio, sin signos de irritación peritoneal. El ultrasonido abdominal mostró colelitiasis con la vesícula biliar localizada en el hipocondrio izquierdo. La cuenta leucocitaria fue de 8,500/mL con pruebas de funcionamiento hepático normales y radiografía de tórax con dextrocardia.

La paciente fue sometida a colecistectomía y apendicectomía por laparoscopia con un abordaje en "imagen en espejo". El evento quirúrgico fue exitoso y sin complicaciones.

Conclusiones: La litiasis vesicular en el seno de un *situs inversus totalis* es una rara condición clínica, la cual puede ser tratada de manera segura y efectiva por laparoscopia. Se recomienda una meticulosa atención a los detalles anatómicos así como la realización de colangiografía transoperatoria.

Palabras clave: *Situs inversus totalis*, colelitiasis, laparoscopia.

INTRODUCTION

Situs inversus totalis (SIT) is a rare condition with a genetic predisposition, in which organs or organ systems are transposed from their normal sites to locations on the opposites side of the body (the mirror image of normal). The syndrome may include transposition of the thoracic viscera, the abdominal viscera or, more commonly, both (SIT)¹ The incidence has been calculated variously as 1 in 6,000-35,000 live births.² This anatomic anomaly complicates diag-

nosis and management of acute abdominal pain such as biliary colic, acute appendicitis and diverticulitis.³

Laparoscopic cholecystectomy, since its introduction by Mouret in 1987, has replaced conventional surgery becoming the procedure of choice in the elective treatment of symptomatic cholelithiasis.⁴ However a minimal number of cholecystectomies in anatomic anomalies such as *situs inversus* have been reported in the past few years.^{1,3-6}

We present the case of a patient with SIT and cholelithiasis who was treated successfully with cholecystectomy and prophylactic appendectomy by laparoscopy.

CASE REPORT

A 25-year-old female in otherwise excellent health was referred with a 3-month history of colicky abdominal pain, loca-

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lized to the left upper quadrant. This pain became constant and associated with nausea and vomiting.

The physical examination revealed a diffuse pain in the epigastrium, without signs of peritoneal irritation.

The abdominal ultrasound showed the gallbladder with multiple gallstones and localized in the left hypocondrium with a normal common bile duct. The white cell count was 8,500/mL and liver function tests were normal. Her chest x-rays revealed dextrocardia (*Figure 1*).

A laparoscopic cholecystectomy was performed with the patient under general anesthesia using a zero degree laparoscope and a video camera system with the surgeon and the video monitor assistant positioned on the patient's right side and the first assistant on the left side. Pneumoperitoneum with CO₂ was created with a pressure of 14 mmHg. A 10-mm trocar was inserted into the abdominal cavity in the position of the umbilicus. Three more 5-mm trocars were placed in the midline left to the falciform ligament, in the left subcostal midclavicular line and in the anterior axillary line, lateral to the umbilicus.

The peritoneal adhesions were dissected away exposing Calot's triangle. All dissection was carried out with extreme care and diligence. The cystic duct and cystic artery were then isolated and both structures were seen to arise from the left side of the common bile duct (*Figure 2*). A cholangiogram was performed confirming the unusual anatomy (*Figure 3*). Clips were then placed across the previously dissected cystic duct and artery.

A division was made between the second and the third clip respectively. The gallbladder was dissected from the li-



Figure 1. Chest X-ray showing dextrocardia. Note the "L" at the left of the X-ray for "left side"



Figure 2. Cystic duct and gallbladder arising from the left side of the common bile duct. Chol: Common bile duct; Cystic: cystic duct; Duod: duodenum; GB: gallbladder.

ver bed using electrocautery and sharp dissection and was placed into a specimen bag.

The laparoscope was switched to the epigastric port in order to perform the appendectomy. Its artery was dissected, coagulated and divided. The appendix base was ligated with pre-tied endoscopic sutures and the appendix was put into the specimen bag. Both were then extracted through the umbilical port.

DISCUSSION

Despite the fact that Aristotelles considered transposition of viscera as a punishment from Gods, this situation if not associated with other severe anomalies permits a normal life and sometimes remains unknown. This entity is considered to have a genetic predisposition that is autosomal recessive with the defect being localized on the long arm of chromosome 14.⁴

The condition may present with others congenital anomalies including renal dysplasia, pancreatic fibrosis, intrahepatic biliary dysgenesis,⁷ and severe anomalies, such as:

Cardiovascular: (8% in SIT cases and 23% in cases of dextrocardia) more frequent being interventricular septal and interatrial septal defects, tetralogy of Fallot, pulmonary arterial stenoses or transposition of the great arteries.

Respiratory: Congenital absence of one lung, bronchiectasis, absence or deformity of the paranasal sinuses.

Digestive: atresia or stenoses of the duodenum, persistent of Meckel's diverticulum, absence of appendix, megacolon, atresia of anus.

Hepatobiliary, splenic, genitourinary tract, orthopedic and neurological anomalies have also been described. Many of these anomalies often present in groups, such as in Kartagener's syn-

drome (*situs inversus*, sinusitis and bronchiectasis). Ivemark's syndrome (SIT or incomplete, cardiac anomalies, asplenia) or Yoshikawa's syndrome (SIT, bilateral renal dysplasia, pancreatic fibrosis and meconium ileus).⁴ None of the above was appreciated on our patient.

There are reports of *situs inversus* and cholelithiasis treated successfully by laparoscopy. McDermott and Cusjhai reported on successful performance of laparoscopic cholecystectomy in a patient with SIT and cholangitis⁸ and Goh et al reported a case of cholecystectomy in a patient with *situs inversus* and empyema of the gallbladder.⁶ Wong was the first surgeon who reported a successful laparoscopic cholecystectomy and exploration of common bile duct in a patient with *situs inversus*.⁷

It is uniformly felt that in patients with this condition the procedure is potentially hazardous due to the transposition of biliary ducts on the opposite-like mirror side of the body with biliary anomalies in up to 25% of the patients.⁸ In addition, surgeons are relatively unfamiliar with this situation; they have to be positioned differently and act in a reverse fashion and confusion of the anatomy thus, may produce iatrogenic injuries.⁹ Because of all of the above, it is recommended that this surgery should be carried out uniformly with transoperative cholangiogram and by an experienced laparoscopic surgeon. The use of laparoscopic ultrasound may be of benefit.^{4,7,8}

We performed an appendectomy because of known confusion in the diagnosis of acute appendicitis in these patients. About 50% of patients with "left-side" appendicitis have pain on right side; in fact, although the viscera are transposed, the components of the nervous system are not reversed. Consequently, incisions in inappropriate sites have been reported in > 41% of these cases.^{2,3}

SUMMARY

We conclude that laparoscopic cholecystectomy can be performed safely in a patient with SIT using intraoperative cholangiogram. An appendectomy may be performed at the same time and both procedures must be carried out carefully by an experienced laparoscopic surgeon with slow meticulous dissection because of the known anatomic anomalies.

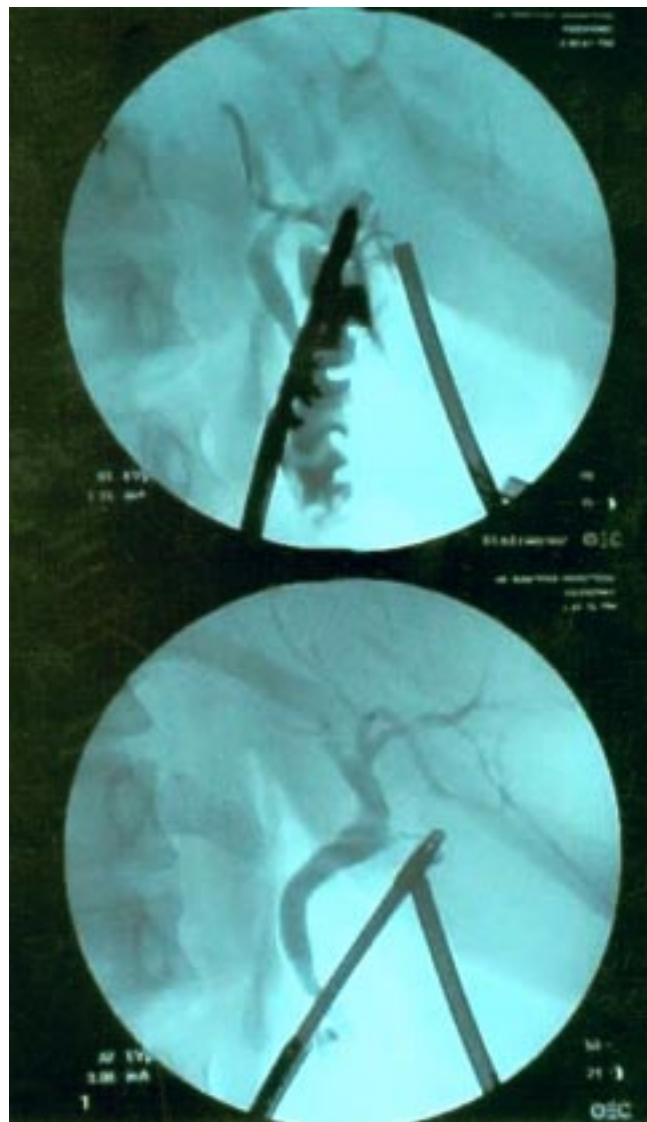


Figure 3. Intraoperative cholangiogram. Duodenum and common bile duct to the left of the vertebral spine.

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