



## CASE REPORT

## Cholecystitis in Situs Inversus with Dextrocardia: A Case Report

Mohammad Ali Raza Qizalbash<sup>1\*</sup>, Rida Zahra<sup>2</sup>, Adnan Adil Mithwani<sup>3</sup>, Anwar Adil Mithwani<sup>4</sup>, Muaaz Adil Mithwani<sup>5</sup>

<sup>1</sup>Department of Internal Medicine, Dalian Medical University, Dalian, China

<sup>2</sup>Department of University College of Medicine & Dentistry, Lahore, Pakistan

<sup>3</sup>Department of Rocky View General Hospital, Calgary, AB, Canada

<sup>4</sup>Consultant Pediatrician/Neonatologist

<sup>5</sup>Student of Master in Health Sciences

**Corresponding Author:** Mohammad Ali Raza Qizalbash, E-mail: [dr\\_aq@hotmail.com](mailto:dr_aq@hotmail.com)

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## ABSTRACT

**Introduction:** The surgical problem called acute cholecystitis is very common nowadays; however, it may be difficult to diagnose when a person has situs inversus, which is a congenital anomaly characterized by the viscera being situated on the opposite side of the body. Our case report discusses the history, findings from the physical examination, radiographic images, diagnosis, as well as how we dealt with cholecystitis in situs inversus with dextrocardia.

**Case presentation:** An 86-year-old male presented to the emergency department with a complaint of pain in the upper-left hypochondrium region. He was later diagnosed to have acute cholecystitis (inflammation of the gallbladder) with cholelithiasis (presence of gallstones in the gallbladder) in situs inversus totalis. The patient underwent an elective open cholecystectomy within 24 hours. The patient recovered well and was discharged on postoperative day 4.

**Conclusion:** Acute cholecystitis in situs inversus with dextrocardia is a rare congenital anomaly, and it requires great expertise in the field of surgery to operate on these patients because of the reverse anatomy of the organs.

## INTRODUCTION

According to Mayo et al, situs inversus totalis is a rare congenital defect with an incidence of 1:10,000 to 1:20,000. Patients with this condition usually do not complain about any symptoms and have a normal life span similar to a healthy person. However, because the organs are transposed to the opposite side of the body, surgeons might face problems in performing an open cholecystectomy.

## CASE PRESENTATION

An 86-year-old male from Peshawar, Pakistan, visited an emergency department with a complaint of abdominal pain for 10 days in the upper-left quadrant, with nausea, vomiting, and low-grade fever. He was experiencing a sharp pain that was radiating to the epigastric area. The patient denied having such episodes in the past. Several years ago, he had undergone a hemorrhoidectomy. His medical history and his

family history were insignificant. The patient denied using medication and also denied drug abuse.

When presented to the emergency department, the patient had no fever; he had a blood pressure of 120/80 mm Hg, a pulse of 80 bpm, and a respiratory rate of 16 breaths per minute. The general physical examination was insignificant, with no evidence of jaundice. On inspection, it was revealed that the abdomen was normal. The abdominal examination revealed palpation tenderness in the upper-left quadrant and epigastric region. There was a positive Murphy's sign as pain was induced in the upper-left quadrant. The auscultation of the heart sounds was heard on the right side of the chest (dextrocardia), and it was found that the respiratory sounds were normal.

## Blood Tests

The white cell count was 21,000, with 88% neutrophils; chemistry panel, troponin T, and pancreatic enzymes were normal.

### Liver Tests

Alkaline phosphatase was 239 u/L, alanine aminotransferase was 50 u/l, and total bilirubin was 0.6 mg/dL.

### Electrocardiogram

Old anterolateral myocardial infarction with the right bundle branch block was observed (see Figure 1).

### Digital Chest X-ray

A preoperative chest X-ray demonstrated Electrocardiogram (see Figure 2).

### Ultrasound (Abdomen)

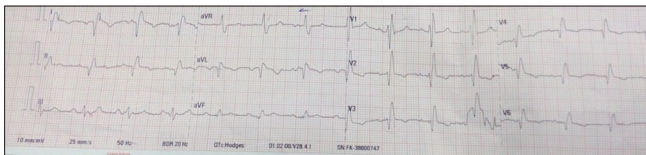
The ultrasound revealed a distended, thick-walled gallbladder (4 mm) with multiple large stones. Pericholecystic fluid was also present. The size of the gallbladder, liver, spleen, pancreas, and kidneys was normal (see Figure 3).

### Echocardiography

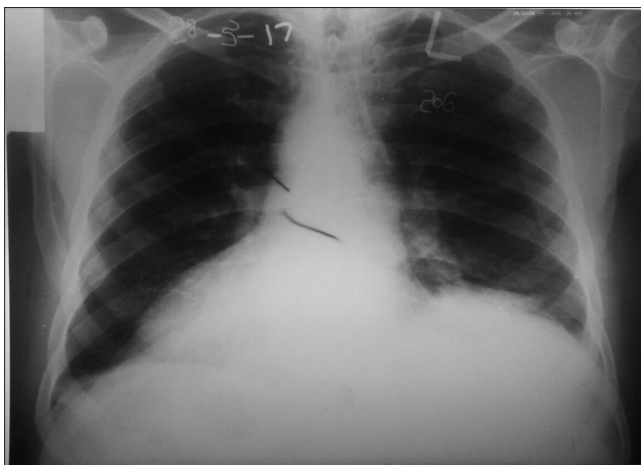
Dextrocardia was noted. The left ventricle showed concentric hypertrophy. There was evidence of diastolic dysfunction, the left ventricular systolic function was borderline, and the interventricular septum showed straightening and hypokinesis. No mixed reality or augmented reality was noted (see Figure 4).

On the basis of the patient's signs and symptoms, as well as his blood reports and radiographic images, the diagnosis of acute cholecystitis was made.

Fluid resuscitation and intravenous antibiotics (ceftriaxone) were started before proceeding for open cholecystec-



**Figure 1.** Electrocardiogram showed old anterolateral myocardial infarction with the right bundle branch block



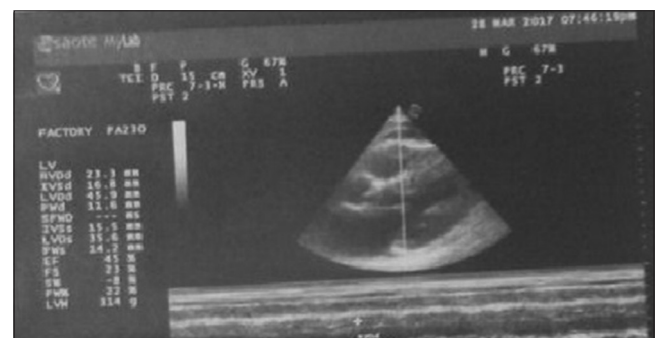
**Figure 2.** Digital Chest X-ray demonstrated Electrocardiogram

tomy. The technique we used to operate our patient was the same as for a routine open cholecystectomy; however, the positioning was reversed because of mirror image anatomy. The right-handed surgeon who was in charge of the operation stood on the left side of the patient as the liver and gallbladder in situs inversus totalis are on the left side rather than on the right side, and so a left subcostal incision was needed. The gallbladder was markedly inflamed and slightly necrotic; Lund's nodes were enlarged. To avoid rupturing of the cystic artery in the hepatobiliary triangle, it was first clipped; incision was then made on the gallbladder, which was opened. Thereafter, multiple stones were removed, each around 1 cm in length. With the exception of being 180° reversed, the cystic duct, common bile duct, and cystic artery were normal. Because this was an uncommon operation, the surgical procedure lasted longer than a normal open cholecystectomy. The rest of the case was uneventful.

The postoperative course of our patient was uneventful, and he recovered well. A normal diet was given on the first day after the operation, which he tolerated. The recovery process was slightly slower due to his age, but he did manage to recover to the full extent. He was then discharged on postoperative day 4.



**Figure 3.** The Ultrasound (Abdomen) revealed a distended, thick-walled gallbladder (4 mm) with multiple large stones. Pericholecystic fluid was also present.



**Figure 4.** Echocardiography showed the concentric hypertrophy in left ventricle. There was evidence of diastolic dysfunction, the left ventricular systolic function was borderline, and the interventricular septum showed straightening and hypokinesis

## DISCUSSION

Situs inversus totalis is a congenital problem; it has an incidence of 1:10,000 to 1:20,000, according to Mayo et al (1). Under this condition, the apex of the heart is situated on the right side of the chest (dextrocardia), with the liver and gallbladder on the left side, and the stomach on the right side of the abdominal cavity. So, on radiographic imaging of the chest, one can see the cardiac apex on the right side (see Figure 2), with the left hemidiaphragm elevated (because of the liver) and stomach bubble being on the right side.

Sporadic genetic mutation is thought to be responsible for most cases of situs inversus totalis, but there have been documented cases of autosomal dominant and autosomal recessive. More than 20 genes have been found to be responsible for this congenital problem (2).

About three-fourths of people with dextrocardia (heart on the right side) will also have a rare genetic disease known as Kartagener syndrome (immotile cilia syndrome). In this syndrome pattern, inheritance is autosomal recessive and is characterized by situs inversus, male sterility, reduced female fertility, paranasal sinusitis, and bronchiectasis (3).

Patients with situs inversus totalis exhibit the same surgical problems as patients having normal anatomy, for example, appendicitis and cholecystitis. However, the site of symptoms will be reversed, making it challenging to diagnose these conditions swiftly (4).

It is advisable that this operation should be carried out by an experienced surgeon because of the reverse anatomy of organs. In my opinion, left-handed surgeons are more suitable to perform surgery on these patients. Changing the patient's position to lithotomy position is another option to perform surgery; this way, the surgeon will feel more aligned to the reversed anatomy (5).

Since 1991, more than 50 cases have been described in the literature, which emphasizes that the procedure such as laparoscopy is not contraindicated in patients with cholecystitis in situs inversus totalis (6). Hence, it can be concluded that with proper planning and vigilant dissection (open or laparoscopic), the procedure can be safely accomplished.

## LEARNING POINTS

- Situs inversus totalis is a congenital condition that is rare, and because of the reverse anatomy of organs, it may cause delay and confusion in diagnosing.
- Treating with open or laparoscopic cholecystectomy is much more challenging for the surgeons in the presence of this disorder due to mirror image anatomy.
- During surgery, the important thing is that the triangle of Calot should always be located first, and then the cystic

artery should be clipped before taking out the gallbladder.

- The surgeon should always rule out other serious congenital malformations that might be associated with situs inversus totalis before proceeding to surgery for such atypical patients.

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## AUTHOR CONTRIBUTIONS

All authors contributed equally to this study.

## CONFLICT OF INTEREST

None declared.

## ETHICAL STANDARDS

Informed consent was obtained from the patient for the publication of this case report.

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