

# Laparoscopic Cholecystectomy in Situs Inversus Totalis Patients: A Case Report

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## Abstract

Laparoscopic surgery has been around in the general surgery world for a long time. It has revolutionized how conventional surgeries used to be carried out. Performing laparoscopic surgery, there is a faster recovery time, complications are less likely, and a significantly lower bleeding and hemorrhage-related risk in these patients. However, some surgeries are still carried out in the traditional 'open' way. One major reason for this is the lack of skilled professionals available to carry out such complicated cases alone or the fact that some surgeries provide better access to the surgeons when carried out traditionally. This case study revolves around two patients, both of which presented with situs inversus. Situs inversus is a congenital condition where the majority or all of the organs present in the chest and abdomen mirror their normal physiological positions, that is, they are present in the opposite direction of where they normally should be. Since the condition revolves mainly around the 'position' of the major body organs and does not usually involve any defect or malfunctioning in their 'function', it is usually seen that the affected people are capable of living on their own, without any complications affecting their lives. However, this was not the case with both of the patients that are being discussed in this case study. Both of them developed cholelithiasis. Their case was already bound to face complications owing to their condition-situs inversus. But, due to the presence of efficient and skilled surgeons working on the case, it was seen that laparoscopic cholecystectomy was performed on both of these patients. Whether this surgery was carried out successfully or led to further complications is the focus of this paper. Along with that, this study also aims to revolve to look at the diagnostic measures that led to effectively diagnosing the condition in these patients affected by situs inversus. Case Study



# **Laparoscopic Cholecystectomy in Situs Inversus Totalis Patients: A Case Report**

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## **Author's contribution**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **Case Study**

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## **ABSTRACT**

Laparoscopic surgery has been around in the general surgery world for a long time. It has revolutionized how conventional surgeries used to be carried out. Performing laparoscopic surgery, there is a faster recovery time, complications are less likely, and a significantly lower bleeding and hemorrhage-related risk in these patients. However, some surgeries are still carried out in the traditional 'open' way. One major reason for this is the lack of skilled professionals available to carry out such complicated cases alone or the fact that some surgeries provide better access to the surgeons when carried out traditionally. This case study revolves around two patients, both of which presented with situs inversus. Situs inversus is a congenital condition where the majority or all of the organs present in the chest and abdomen mirror their normal physiological positions, that is, they are present in the opposite direction of where they normally should be. Since the condition revolves mainly around the 'position' of the major body organs and does not usually involve any defect or malfunctioning in their 'function', it is usually seen that the affected people are capable of living on their own, without any complications affecting their lives. However, this was not the case with both of the patients that are being discussed in this case study. Both of them developed cholelithiasis. Their case was already bound to face complications owing to their condition - situs inversus. But, due to the presence of efficient and skilled surgeons working on the case, it was seen that laparoscopic cholecystectomy was performed on both of these patients. Whether this surgery was carried out successfully or led to further complications is the focus of this paper. Along with that, this study also aims to revolve to look at the diagnostic measures that led to effectively diagnosing the condition in these patients affected by situs inversus.

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## 1. INTRODUCTION

Situs inversus totalis is a condition where the abdominal and thoracic cavities become a 'mirror image' of their normal anatomy. That is, some or all (situs inversus totalis) of the organs of both the cavities are present on the opposite side of where they should be [1].

Situs inversus totalis is a rare congenital condition. It was first discovered and then described by Matthew Baillie in the 16th Century. It has a rare prevalence rate, with every 1 in 10000 people being diagnosed with the condition, and sometimes later in their life. It is said to be an autosomal recessive condition and in more than half of the cases, the patients are usually asymptomatic with no complications or symptoms present in them for most of their lives [2].

Cholelithiasis or 'gallstones' develop when there are hardened deposits of digestive fluid present in the gallbladder. Cholelithiasis is mostly an asymptomatic condition with a prevalence of about 6% of men and 9% of women in the United States suffering from it at a given time. It has been estimated that it takes at least 15 years for these gallstones to fully develop and manifest themselves symptomatically in a given patient [3].

If cholelithiasis is not taken care of appropriately and no treatment interventions are undertaken, then it may very well progress to complications such as cholangitis, cholecystitis, pancreatitis, and in some rare cases, and even cholangiocarcinoma. Therefore, once the condition becomes symptomatic and uncomfortable for the patient, it is better to get it treated accordingly to provide comfort as well as to avoid complications [4].

Regarding a management and treatment plan, laparoscopic cholecystectomy is the most preferred mode of treatment to be considered for patients nowadays. The laparoscopic method has replaced the open technique since the 1990s and the surgery world has changed ever since then for these patients and the surgeons alike. It is a minimally invasive procedure that is used for conditions like acute or chronic cholecystitis, symptomatic cholelithiasis, gallstone pancreatitis, gallbladder mass or polyps, biliary dyskinesia, etc. It is estimated that approximately 300,000

cholecystectomies are carried out annually in the United States alone [5].

Concerning this case study, we are presenting two such patients who both had similar presentations and were diagnosed to be suffering from cholelithiasis. However, this was not all. Interestingly enough, both of these patients were found to be affected with situs inversus totalis, which made these cases particularly interesting to present, diagnose, and treat. The patients were treated using laparoscopic cholecystectomy, which is indeed a challenge in itself.

This case study revolves around discussing all the presented aspects of the case and seeing if the patients were successfully treated, recovered, and discharged, or whether any unexpected complications occurred in the process.

## 2. CASE STUDY

### 2.1 Patient 1

A 30-year old patient presented to the hospital with complaints of epigastric pain. The pain was colicky and radiated to the backside of the patient. The patient also remembers suffering from a similar episode 3 weeks back. There was no vomiting, however, the patient admitted to being nauseous at times. This nausea never progressed to vomiting even if it presented after consuming food. Moreover, when the patient took analgesics for his pain, it was seen to partially get relieved for some time.

The patient is also a known case of situs inversus.

**Examination:** When the patient was subjected to abdominal examination, it was found that his abdomen was soft and nondistended. There was some tenderness noticed in the epigastrium, but the bowel sounds were normal and no other abnormality was seen by the doctor or reported by the patient. Murphy's sign was found to be positive in this patient.

**Investigations:** Since it was obvious that there was some sort of pathology present in the abdomen, particularly the gallbladder (hence, the positive Murphy's sign), both an ultrasound and a CT scan were ordered for the patient, the results of which are summarized below.

**Ultrasound Abdomen:** The ultrasound revealed that the patient was a previously known case of dextrocardia with situs inversus. Apart from this, mild hepatomegaly associated with fatty changes in the liver was seen. And then, cholelithiasis was confirmed along with mild thickening of the gallbladder walls. No pericholecystic collection was noticed.

**CT Chest with IV Contrast:** Normal. No abnormality was seen.

**CT Scan Pelvis and Abdomen with IV Contrast:** This CT scan confirmed that the patient had situs inversus totalis (universalis).

The gallbladder was seen to be filled with contents made up of cholesterol (cholelithiasis) for which an ultrasound scan was ordered.

**Management And Treatment Plan:** Laparoscopic cholecystectomy was performed on the patient. As the surgeon was right-handed, the procedure was therefore carried out in the French position, with the surgeon standing in between the legs of the patient.

## 2.2 Patient 2

This patient, a 36-year old, presented to the hospital with complaints of upper abdominal pain, mainly centered towards the epigastrium and the left side. The patient also had nausea with on and off vomiting.

He was also a known case of situs inversus with dextrocardia.

**Investigations:** The investigations which were ordered for the patient along with their results have been summarized below:

**Ultrasound Abdomen and Pelvis:** Apart from confirming the fact that the patient was a confirmed case of situs inversus. His gallbladder was identified on the left side of the abdomen and the findings seemed to suggest a possible case of acute calculous cholecystitis, for which further clinical correlation was ordered.

**CT Scan Abdomen and Pelvis with IV Contrast:** The patient was confirmed to be a case of situs inversus totalis. The gallbladder appeared to be distended with no obvious wall thickening or peri gallbladder fluid collection. There was no definite density in the lumen to suggest stones.

**Management & Treatment Plan:** This patient was treated through laparoscopic cholecystectomy under general anesthesia. The surgeon, being right-handed, opted for the French position, and in this way, the operation was carried out successfully.

**Imaging:** Some imaging related to the condition of both patients has been given below to help understand the concept clearly.

## 3. DISCUSSION

Situs inversus totalis is a rare, congenital disorder where there is a transposition, in the form of a mirror image reflection of the organs in both the abdominal and thoracic cavities. As a result of this disorder, there is often an inability of the body to establish left-right asymmetry [6].

Although asymptomatic, this condition is known to cause significant abnormalities during diagnostic and therapeutic procedures. Moreover, because it is a rare condition, it is often easily confused and poses difficult challenges to doctors, surgeons, and radiologists to deal with it effectively, because most don't have considerable enough experience in managing this condition effectively [7].

Up to now, there have been about 36 cases of gallbladder-related pathology that have been handled and treated laparoscopically, and without any complications as well. The majority of these cases were females within the age group of 20-80 years, whereas the conditions that were treated involved cholelithiasis, empyema, and other related and prevalent pathologies [8].

The cases are bound to present with difficulty in diagnosis. Since the position of the organs is on the opposite side, therefore, the biliary colic may either be present in the epigastric region or the left subcostal region.

Out of all the cases dealt with, it was seen that 30% of them presented with pain only in the epigastrium, whereas 10% presented with pain in the right upper quadrant. Although this is an anomaly in itself, it can very much lead to confusion, especially in those people who are confirmed cases of situs inversus. The widely accepted theory behind this confusion is said to arise due to the central nervous system not corresponding to the transposition of organs [9].

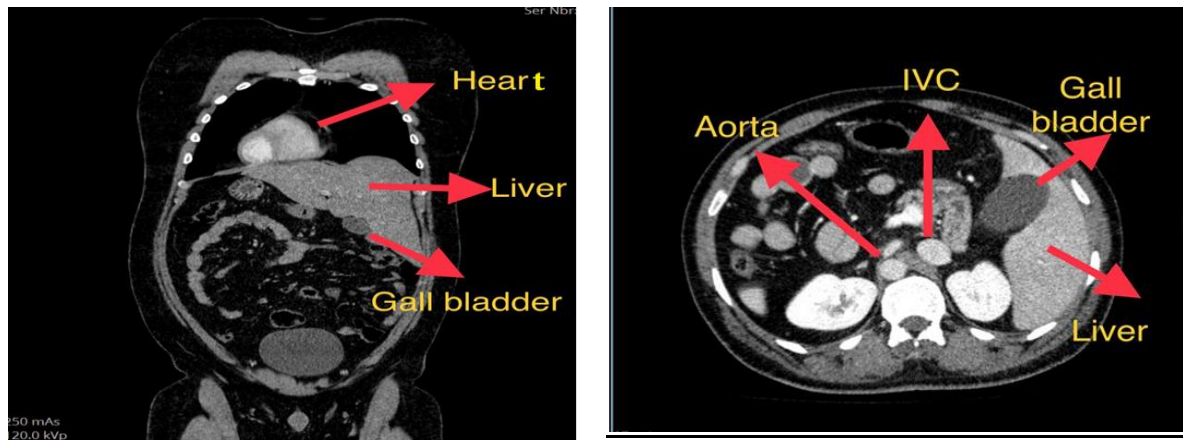


Fig. 1. Patient 1



Fig. 2. Patient 2

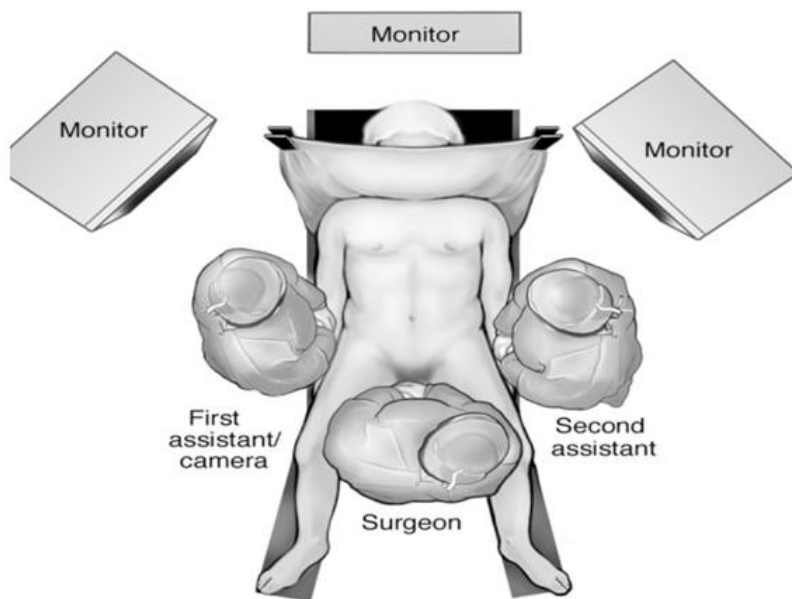


Fig. 3. French position (not in bold)

It is because of this very transposition that surgeons encounter difficulties while operating laparoscopically. There needs to be several laparoscopy ports put in so that a clear yet uncomplicated picture of the patient's internal organs and cavities can be visualized.

However, it has been seen that so far, no complications or even minor injuries such as bile duct injuries have been encountered during laparoscopic procedures in patients with situs inversus totalis [10].

This case study that revolved around two patients, helped to clear any doubts that laparoscopic cholecystectomy can be performed on patients suffering from gallbladder-related pathologies effectively.

#### 4. CONCLUSION

Although mirror imaging of the organs poses great difficulty in the diagnosis and treatment of certain thoracic and abdominal organs, it does not in any way pose any contraindication or threat to laparoscopic surgery, which is the preferred mode of treatment for such procedures.

Although laparoscopic surgery appears to be a daunting and challenging task, mainly due to the lack of expertise of the surgeons in such a scenario, that is, with situs inversus, it is best if it is carried out as per the convenience of the surgeon. This way, it could be carried out easily and effectively, allowing the patient to enjoy all the benefits that come along with the least invasiveness of this surgery.

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#### ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

#### CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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