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Case Report

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Chronic Calculous Cholecystitis in *Situs inversus totalis*

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Abstract

Situs inversus totalis is a rare congenital abnormality characterized by a mirror-image transposition of both abdominal and thoracic organs. This anatomical disposition of organs not only influences the localization of symptoms and signs arising from a diseased organ but also imposes special demands on the diagnostic and surgical skills of the surgeon. We present the case of a 28-year-old woman diagnosed in our hospital with chronic calculous cholecystitis in the presence of *Situs inversus totalis*. After a thorough review of the literature on different positions of the operative team and port sites, the most appropriate and efficient method was chosen. Elective laparoscopic cholecystectomy was performed safely and the patient was discharged on postoperative day two with no significant postoperative complications.

Keywords: Laparoscopic cholecystectomy; Cholecystectomy; Gall bladder calculous; Chronic cholecystitis; Laparoscopic surgery; Situs inversus

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Introduction

Laterality is established early in development and is governed by multiple genes; any failure in this process can lead to a wide variety of disorders, one extreme of which is *Situs inversus totalis*. *Situs inversus totalis* affects less than 0.01% of the population, occurring in approximately 1 out of every 10,000 to 20,000 live births [1].

It is imperative to recognize that a detailed preoperative evaluation with radiological investigations is required to ascertain the anatomy of the hepatobiliary system for performing laparoscopic cholecystectomy. Surgery performed by a highly skilled surgeon, with appropriate adaptations in trocar placement and positioning of the operating team, is likely to reduce complications, the duration of surgery, morbidity and length of postoperative stay [2].

Case Presentation

A 28-year-old female presented to the outpatient department with complaints of recurrent upper left abdominal pain and nausea since past two years. The symptoms had exacerbated over the past two weeks. She has a history of hypertension and hypothyroidism which is well controlled with oral medications. Physical examination revealed no fever or jaundice. Upper left abdominal tenderness was present, but there was no guarding. Laboratory investigations show normal complete blood count, liver function test, serum amylase and lipase levels. Chest radiograph confirmed dextrocardia **(Figure1)**.

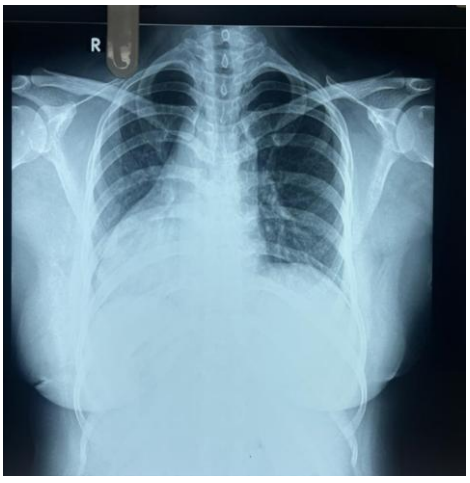

Figure 1: Chest Xray showing dextrocardia.

Ultrasound of the abdomen visualized the gallbladder in the left hypochondriac region with multiple echogenic shadows, the largest measuring 14 mm within the lumen. Contrast enhanced computed tomography revealed no dilatation of intra or extra hepatic biliary ducts **(Figure 2)**. The patient was scheduled for an elective laparoscopic cholecystectomy.

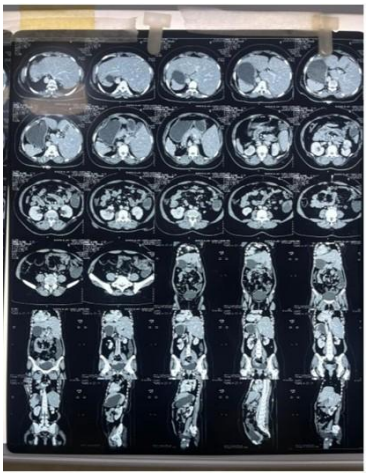

Figure 2: Contrast enhanced computed tomography.

The operating room equipment and team were set up as a mirror image of a routine laparoscopic cholecystectomy, in accordance with American variable. Under general anesthesia and strict aseptic precautions, the patient was painted and draped. Pneumoperitoneum was created by the open method through the umbilicus with a pressure of 14 mmHg using the 10 mm camera port. A 10 mm working port was inserted in the subxiphoid position and another 5 mm working port was introduced at the left mid-clavicular line under the vision of the laparoscope. Inspection of the abdomen confirmed the diagnosis of *Situs inversus totalis*. Dense omental adhesions were observed over the gallbladder and Calot's triangle. The gallbladder wall was found to be thickened. Consequently, a fourth 5 mm port was introduced in the left anterior axillary line **(Figure 3)**.

Figure 3: Port placements. A: Camera port; B: Subxiphoid port; C: Left subcostal port.

The Calot's triangle was delineated above the Rouviere's sulcus and the critical view of safety was achieved **(Figure 4)**. The cystic duct was clipped. The cystic artery was cauterized. The gallbladder was then dissected off its fossa from the liver using hook diathermy and was delivered through the epigastric port. Adequate hemostasis was achieved and the port sites were closed. The patient was discharged on postoperative day 2 and no postoperative complications were noted during follow-up in the outpatient department to date. Histopathological examination confirmed the diagnosis of chronic calculous cholecystitis.

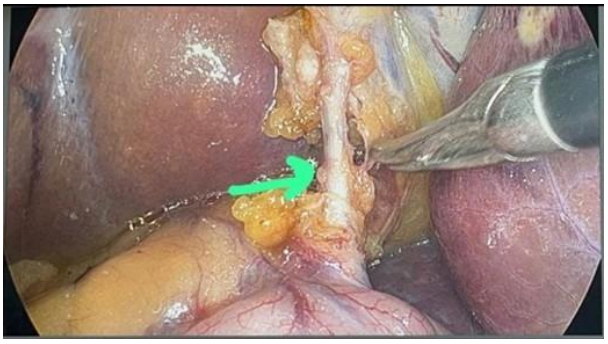

Figure 4: Critical view of safety, green arrow: Cystic duct.

Discussion

Küchenmeister, in 1888, reported four cases in living persons through physical examination and detailed anatomical drawings. He called this anatomical situation situs *Viscerum transversus* [1]. The condition was classified according to the variation from this normal arrangement (*Situs solitus*) expressed either as randomization (situs ambiguous) or complete reversal (*Situs inversus*) of normal organ position, resulting in heterotaxy. Familial heterotaxy can have autosomal dominant, recessive and X-linked inheritance. Genetic studies have led to the identification of a gene on the X chromosome responsible for some cases of human heterotaxy [3]. Situs inversus is associated with a myriad of conditions like polysplenia or asplenia, cardiac malpositions, pulmonary malformations, microgastria, primary ciliary dyskinesia, renal anomalies, biliary tree malformations and aberrant biliary vasculature [4]. Laparoscopic cholecystectomy was performed by Campos and Sipes in 1991 and has since emerged as the treatment of choice [5]. The American technique involves the placement of the laparoscopic equipment, positioning of the surgical team and port sites as mirror image of the standard technique. Another technique described involves the surgeon positioning between the patient's legs while the patient is in the Lloyd-Davis position, known as the French technique. The handedness of the surgeon is believed to influence the operation duration. Some authors believe that left-handed surgeons may have shorter operating times [6]. intraoperative cholangiopancreatogr-

aphy can be used as an adjunct in cases where visualizing and delineating is complicated, to avoid iatrogenic injuries to the biliary tree [7].

Conclusion

The surgical treatment of the patients with *Situs inversus totalis* requires detailed preoperative evaluation to develop a reliable surgical plan, technical modifications and careful exploration during the operation to perform efficient and safe procedure. It is also crucial that the significant congenital malformations associated with *Situs inversus totalis* are ruled out before undertaking the surgery.

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