

Acute cholecystitis in a patient with complete situs inversus: a case report

Fleur Berbers, Suzanne van Leuven, Ton K.C.A. van Engelenburg, Richard P.G. ten Broek

Department of Surgery, Slingeland Hospital, Doetinchem, the Netherlands

Abstract

Situs inversus is a rare congenital anomaly, characterized by transposition of the large organs. Although the anomaly is generally without symptoms, it can cause difficulties in the diagnostic process. We present the case of 44-year old man presenting with acute cholecystitis. The patient underwent successful laparoscopic cholecystectomy, from which he recovered uneventful. Performing a laparoscopic cholecystectomy in a patient with situs inversus can be technically more demanding and requires re-orientation from the surgeon.

Introduction

Situs inversus totalis is a rare congenital condition where both thoracic and abdominal organs are transpositioned to the opposite site of the body. This condition was first described in 1600 by Fabricius and it occurs in 1:20,000 hospital admissions.¹ Regularly, patients are asymptomatic but a higher incidence of other anatomical anomalies is found, such as cardiac anomalies and Kartagener's triad (bronchiectasis, sinusitis, and situs inversus).²

Previous research did not indicate that patients with situs inversus totalis have a higher risk of developing gall stone disease.³ However, it can cause difficulties in the diagnostic process especially if the situs inversus was previously unknown.

Correspondence: Richard P.G. ten Broek, Division of Surgery, Slingeland Hospital, P.O. box 169, 7000 AD Doetinchem, the Netherlands.
Tel.: +31.314.329911 - Fax: +31.314.329150.
E-mail: Richard_tenbroek@hotmail.com

Key words: Situs inversus; cholecystitis; emergency surgery.

Conflicts of interest: the authors declare no potential conflict of interest.

Received for publication: 16 August 2016.

Revision received: 26 September 2016.

Accepted for publication: 6 October 2016.

©Copyright F. Berbers et al., 2016
Licensee PAGEPress, Italy
Journal of Peritoneum (and other serosal surfaces) 2016; 1:33
doi:10.4081/joper.2016.33

This article is distributed under the terms of the Creative Commons Attribution Noncommercial License (by-nc 4.0) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

Case Report

A 44-year old male, known with total situs inversus, presented himself at the emergency room complaining of acute colicky pain in the epigastric region and the left upper quadrant. The pain radiated to his back and he was nauseous. Examination of abdomen was normal. Laboratory testing showed a slightly elevated bilirubin (20 $\mu\text{mol/L}$) and alanine aminotransferase (ALAT) (59 U/L) and leucocyte count ($12.5 \times 10^9/\text{L}$), the C-reactive protein was normal (2 mg/L). Chest radiograph showed a mirror image of the heart configuration confirming situs inversus (Figure 1). Abdominal ultrasonography showed multiple concrements in the gall bladder located in the left upper quadrant, establishing a diagnosis of symptomatic cholelithiasis. During the evaluation the patient became free of pain. He was discharged with an appointment at the outpatient clinic with planning of an elective cholecystectomy.

Three days later he returned to the emergency department with recurrence of the abdominal pain in the left upper quadrant. Pain had become more constant. Abdominal exam revealed decreased peristalsis, and pain from percussion and palpation mainly in the left upper abdomen. At laboratory testing the bilirubin and ALAT were comparable, but a slight increase in leucocyte counts ($13.75 \times 10^9/\text{L}$) and C-reactive protein (14 mg/L) were seen. The patient was admitted for emergent cholecystectomy for acute cholecystitis.

Laparoscopic cholecystectomy was carried out using a 4-trocar technique. The surgeon was positioned on the right side of the patient and a sub-umbilical incision was made. A 12 mm balloon trocar was placed into the peritoneal cavity. Inspection conformed a total situs inversus with liver and gall bladder positioned in the left upper abdomen (Figure 2). Stomach was located right from the hepatic round ligament (Figure 3). The gall bladder was infected and partially necrotic. Furthermore, gallbladder ascites was seen in left side of the abdomen. The surgeon inserted respectively a 12-mm trocar sub-xiphoidal and two 5-mm trocars in left upper quadrant of the abdomen. Calot's triangle was carefully dissected. The ductus cysticus and cystic artery clipped and cut after achieving a critical view of safety (Figure 4). The gallbladder was fully dissected from the liver bed and removed from the peritoneal cavity using an endobag. The patient was treated with 3 days of intravenous antibiotics postoperatively. He showed normal recovery and was discharged from the hospital on day three after surgery. At day 12 the patient was seen at the outpatient clinic. The patient was fully recovered.

Discussion and Conclusions

Total situs inversus is an uncommon genetic disorder. Usually, patients with this condition are asymptomatic and incidence of cholelithiasis is equal to people with normal anatomy. Especially in patients in whom the anomaly is unknown, correct diagnosis of abdominal pain can be difficult. Most situs inversus-patients with cholelithiasis present with abdominal pain in the left upper quadrant.

However, it has been suggested that approximately 30% of these patients complain of only epigastric pain² and approximately 1 in 10 may only experience pain on the right side of the abdomen.⁴ This phenomenon cannot be anatomically clarified yet some authors hypothesize that it may be caused by nervous tissue which does not take part in the general transposition.^{5,6}

First successful laparoscopic cholecystectomy in a total situs inversus-patient was performed in 1991.⁷ It should be taken into account that the mirrored anatomy can make the operation more difficult. The surgeon stands on the patients' right side, which necessitates mental adaptation and increased orientation time. Moreover, ergonomic problems can arise during surgery. Literature suggests an advantage for the left-handed surgeon.⁸

In people without situs inversus a variety of anomalies is seen in the hepatobiliary anatomy. One of these anomalies is an *inferior* cystic artery. It is described that in up to 80% of patients with normal anatomy the cystic artery arises from the right hepatic artery within the hepatobiliary triangle. From there it goes directly to the gallbladder, cranial from the cystic duct. The *inferior* cystic artery is an anatomical anomaly where the cystic artery originates outside of this triangle and runs inferiorly from the cystic duct. This anomaly is seen in 6% of patients.⁹ One study reported a case of a patient with situs inversus totalis showing the inferior cystic artery exactly mirrored from the original situation.¹⁰ These differences in hepatobiliary anatomy can also complicate the surgical procedure. It has been stated that it might be helpful to perform magnetic resonance cholangiopancreatography procedure in patients with situs inversus before undergoing their cholecystectomy. Hepatobiliary anatomy can be analysed, thereby more careful preparation is guaranteed.^{10,11}

Total situs inversus is associated with the syndrome of Kartagener. Besides transposition of the general anatomy patients have chronic sinusitis and bronchiectasis. Symptoms are due to defect in function of cilia. Thereby, most men with Kartagener's syndrome are infertile.¹² In this case, our patient told us he has a child but due to conceiving problems he and his wife underwent an intracytoplasmic sperm injection procedure. Consequently, we can assume that our patient has Kartagener's syndrome.

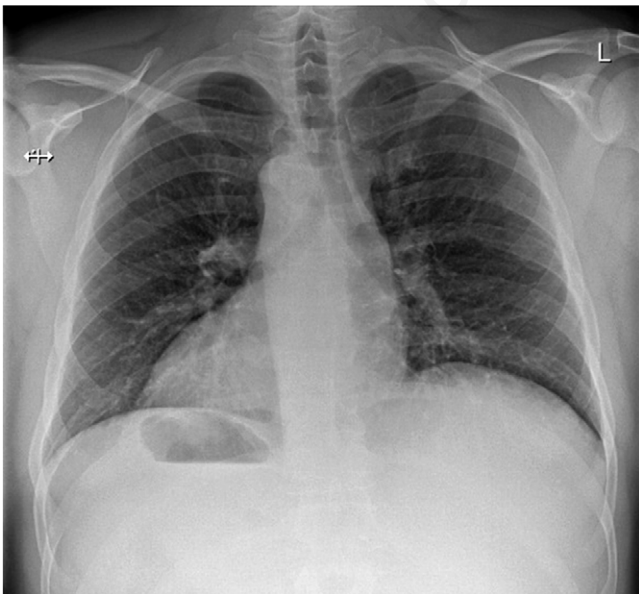


Figure 1. Conventional radiological image of thorax confirming situs inversus by *mirror image* of the heart.



Figure 2. Laparoscopic view of the gallbladder at the left upper side of the abdomen.

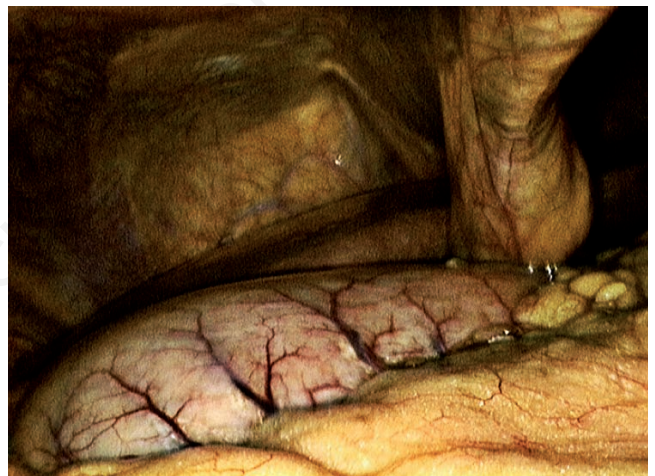


Figure 3. Laparoscopic view of the stomach at the right upper side, not the position of the falciform ligament.

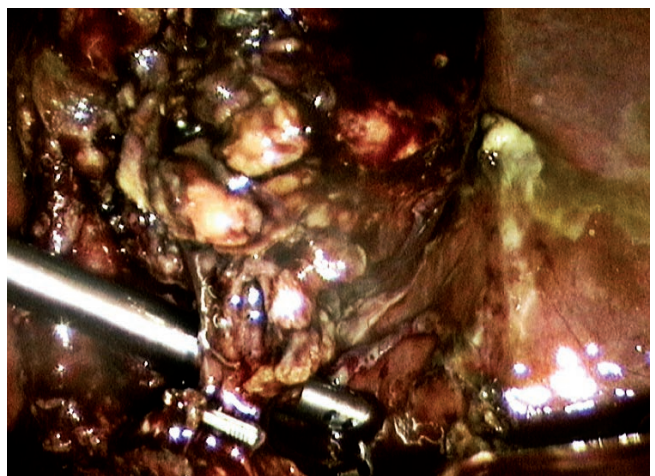


Figure 4. Dissection of Calot's triangle.

References

1. Mayo CW, Rice RG. Situs inversus totalis; a statistical review of data on 76 cases with special reference to disease of the biliary tract. *Arch Surg* 1949;58:724-30.
2. McKay D, Blake G. Laparoscopic cholecystectomy in situs inversus totalis: a case report. *BMC Surg* 2005;5:5.
3. Crosher RF, Harnarayan P, Bremner DN. Laparoscopic cholecystectomy in situs inversus totalis. *J R Coll Surg Edinb* 1996;41:183-4.
4. Rao PG, Katariya RN, Sood S, Rao PL. Situs inversus totalis with calculus cholecystitis and mucinous cystadenomas of ovaries. *J Postgrad Med* 1977;23:89-90.
5. Sato M, Watanabe Y, Iseki S, et al. Hepatolithiasis with situs inversus: first case report. *Surgery* 1996;119:598-600.
6. Eisenberg D. Cholecystectomy in situs inversus totalis: a laparoscopic approach. *Int Med Case Rep J* 2009;2:27-9.
7. Campos L, Sipes E. Laparoscopic cholecystectomy in a 39 year old female with situs inversus. *J Laparoendosc Surg* 1991;1:123-5.
8. Oms LM, Badia JM. Laparoscopic cholecystectomy in situs inversus totalis: the importance of being left-handed. *Surg Endosc* 2003;17:1859-61.
9. Hugh TB, Kelly MD, Li B. Laparoscopic anatomy of the cystic artery. *Am J Surg* 1992;163:593-5.
10. Kamitani S, Tsumamoto Y, Hanasawa K, Tani T. Laparoscopic cholecystectomy in situs inversus totalis with "inferior" cystic artery: a case report. *World J Gastroenterol* 2005;11:5232-4.
11. Butt MQ, Chatha SS, Ghumman AQ, et al. Laparoscopic cholecystectomy for left sided gallbladder in situs inversus totalis. *J Coll Physicians Surg Pak* 2015;25:S22-3.
12. Afzelius BA. A human syndrome caused by immotile cilia. *Science* 1976;193:317-9.

Non-commercial use only