Laparoscopic Cholecystectomy in Situs Inversus Totalis: Challenges, Difficulties and Solutions

A Case Series Study

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ABSTRACT

Background: Situs inversus totalis is a rare autosomal recessive disorder which can cause diagnostic challenges in a lot of clinical conditions including calculous cholecystitis due to the reversed anatomical position of abdominal viscera.

This is a case series study including three patients who were diagnosed to have situs inversus totalis with gallstones between May 2012 and December 2013 at our laparoscopic unit at Mosul Medical City and underwent laparoscopic cholecystectomy. The 1st two patients were 43 and 51-year-old women, respectively while the 3rd one was a 38-year-old male. All had symptomatic gallstones and all were already diagnosed to have situs inversus totalis at time of referral to us. The three patients underwent laparoscopic cholecystectomy safely and easily after adjustment of the positions of the team members inside the operative theatre and of the port sites. All of them were discharged home after 24 hours and on regular follow up visits afterward they were doing well and free of symptoms.

Keywords: Situs inversus totalis, Laparoscopic cholecystectomy, Critical view of safety.

Iraqi Medical Journal Vol. 65, No. 1, January 2019; p.99-103.

Situs inversus is a rare autosomal recessive disorder which refers to a spectrum of mirror image transpositions of the thoracic viscera, abdominal viscera, or both, and is present in approximately 1 in 5000-20,000 live-births[1].

It may be total including abdominal and thoracic viscera, known as situs inversus totalis or it may be partial known as situs inversus partialis. The transposition of the organs may be associated with other congenital anomalies, such as renal dysplasia, biliary atresia, congenital heart disease or pancreatic fibrosis. Situs inversus totalis associated with bronchitis, chronic sinusitis and deficient tracheo-bronchial cilia is known as the Kartagener's syndrome[2,3].

Situs inversus is not a risk factor for cholelithiasis by itself, but it carries a risk of diagnostic confusion since the symptoms and signs will be misleading as they are arising from abnormally positioned gallbladder especially in patients in whom the diagnosis of situs inversus have not been made yet, and a delay in the diagnosis is expected. In a patient who is already a known case of situs inversus, there will be a high index of suspicion and the diagnosis will be readily made. Laparoscopic cholecystectomy remains the gold standard for symptomatic cholelithiasis even in the presence of situs inversus[2,3].

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Review of Cases

Between May 2012 and December 2013, three patients with the diagnoses of situs inversus totalis and gallstones were managed at our unit. Two of them were females and the third patient was a male.

Case 1: The 1st patient was a 43-year-old woman, who was diagnosed 5 years earlier to have dextrocardia by a chest x-ray performed for an attack of pneumonia. She presented to us with a 3-month history of vague upper abdominal pain and flatulent dyspepsia. The pain was mainly felt in the epigastric region and was radiating to the

back, mainly felt after heavy meals. She had no vomiting, fever, jaundice or weight loss. She never had investigations for her condition before. On examination: the patient did not have jaundice, abdominal examination was negative apart from tenderness at the epigasric and left upper quadrant. To be mentioned, the apex beat was felt on the right side of the chest.

Case 2: The 2nd patient was a 51-year-old lady who was diagnosed before to have situs inversus totalis by her physician. During the last few months before the operation, she had recurrent attacks of dyspepsia and epigastric pain. She had no vomiting, fever, jaundice or weight loss.

Case 3: The 3rd patient was a 38-year-old male again who was diagnosed to have situs inversus totalis. He was operated 5 years earlier for acute appendicitis through a left gridiron incision. His presentation with gallstones was almost the same as the 1st two patients apart from that he had an attack of jaundice few months earlier that subsided spontaneously.

Laboratory investigations including liver function tests were normal in all the three patients. Chest X-ray (Figure 1 for the 1st patient), ECG and echocardiography confirmed the previous diagnoses of dextrocardia. Ultrasonography demonstrated that the liver was located mainly on the left side of the abdomen and the spleen on the right. The gallbladder, filled with multiple gall stones of different sizes and was located on the left side in all of them. The bile ducts were normal except in the 3rd patient in whom it was dilated (11 mm) without stones. CT scan of the abdomen (Figures 2 and 3 for the 2nd patient) and chest confirmed the diagnosis of situs inversus totalis. The patients were scheduled for elective laparoscopic cholecystectomy.

We adjusted the condition of the theatre and of the team in order to perform this unusual surgery. The monitor was placed near the head of the patient to the left side, (Figure 4).

Figure 1: Chest x- ray of the 1st patient revealing dextrocardia.

Figure 2: CT scan of the 2nd patient demonstrating the liver located in the left side of the abdomen.

The surgeon was on the right side of the patient together with the camera assistant and the second assistant stood on the left side.

Figure 3: CT scan of the 2nd patient axial section demonstrating the liver located in the left side of the abdomen.

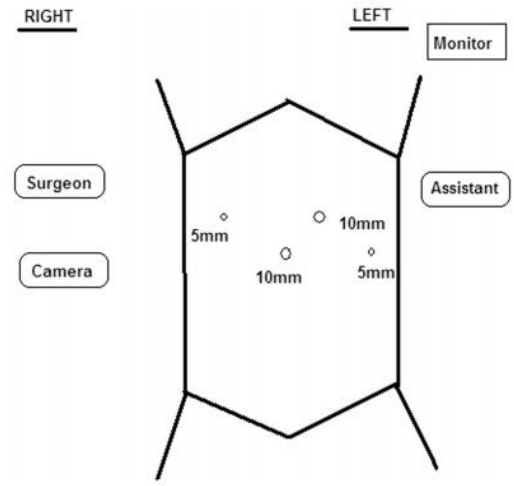

Figure 4: The adjustment of the positions of the team in the theatre and of the port sites.

We placed a 10 mm port at the infra umbilical region through which the abdominal cavity was insufflated with carbon dioxide to 14 mm Hg and was used later on for the camera and for extraction of the gallbladder, another 10 mm port was placed on the left side of the abdomen at the midclavicular line below the costal margin, this port was the operating port through which the right hand was used for dissection. A 5 mm port was placed on the right side of the abdomen at the midclavicular line, almost the same level as the 10 mm port on the left side; this was used by the left hand of the surgeon for retraction of the infundibulum. Another 5 mm port was placed on the left side of the abdomen at the anterior axillary line and was used by the second assistant for caudal traction of the fundus of the gallbladder.

In all cases the situs inversus was confirmed, the stomach and spleen were on the right side and the liver and gallbladder were on the left side (Figures 5 and 6 of the 3rd patient).

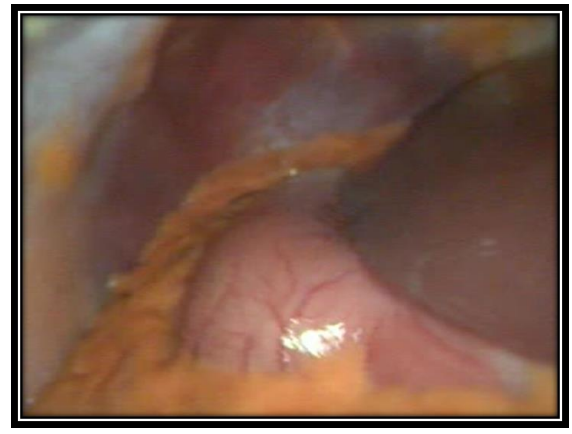

Figure 5: Operative view of the 3rd patient demonstrating the stomach and spleen located in the right side of the abdomen.

Figure 6: Operative view of the 3rd patient demonstrating the gallbladder located in the left side of the abdomen.

The dissection was carried out using electrocautery with the right hand of the surgeon while the assistant was applying traction to the fundus. After achieving a clear view of safety of the triangle of Calot, the cystic duct and artery were clipped and the gallbladder dissected away from the liver bed and extracted safely.

The mean duration of the procedures was 70 min. All patients tolerated the operation very well and were discharged home after 24 h. On follow-up visit the patients were doing very well and completely free of symptoms. Histopathological examination of the specimens revealed chronic calculous cholecystitis only.

Discussion

Until now, there is no evidence to suggest that patients with situs inversus totalis are more prone to cholelithiasis[2] . The first reported case of laparoscopic cholecystectomy in a patient with situs inversus totalis was by Campos and Sipes[3]. In our search; we found 42 reports about laparoscopic cholecystectomy in patients with situs inversus. All reports documented that situs inversus is not a contraindication for laparoscopy and that the procedure can be performed safely by an experienced laparoscopic surgeon. Pitiakoudis et al[4] on 2005 reviewed 22 reports concerning 25 patients with situs inversus and cholelithiasis, who had laparoscopic cholecystectomy, seven of them were men and 18 women, aging from 20 to 80-year-old. He reported that laparoscopic cholecystectomy, laparoscopic exploration of the common bile duct, intraoperative cholangiography and additional appendectomy were successful in all cases, with none of the patients exhibiting postoperative complications[4].

According to Rao et al[5], most of the patients (60-70%) reported with situs inversus and cholecystitis presented with pain that was felt mainly in the left upper quadrant or epigastric as well as left side. While 30% of patients presented with epigastric pain only, and 10% of patients had right upper quadrant pain also[5] this was the same finding by McKay and Blake[6] and Eisenberg[7]. Our patients had their pain mainly felt in the epigastric region. Due to this unusual pattern of pain, it is fairly understood that patients who have not been diagnosed before to have situs inversus will have delay in the diagnosis of gallstones disease.

Our 1st patient was a known case of dextrocardia, that's why we were highly suspecting the diagnosis of situs inversus totalis. In the 2nd and 3rd patients, the diagnoses of situs inversus totalis were already made by the physician and the patients were referred to us because of the pain. CT scan was diagnostic, (Figures 2 and 3).

It has been documented that laparoscopic cholecystectomy in patients with situs inversus can be performed safely by adjusting ports placement to accommodate for a right-handed surgeon[6]. Some authors preferred using the left hand in dissection to perform the operation in a complete mirror image to the conventional laparoscopic technique[8-11]. In that case, the umbilical and epigastric 10 mm ports remain the same, but the two 5 mm ports will be on the left side of the abdomen instead of the right side. This of course prefers a left-handed surgeon. We chose to adjust the site of the ports and the standing of the team in order to perform the operation with the right hand, (Figure 4). The surgeon stood on the right side together with the camera-man, while the second assistant stood on the left. This is exactly the reverse of our standard. We put the infra umbilical port in the usual way, after creating the pneumoperitoneum and examining the peritoneal cavity carefully, we put the second 10 mm port on the left side of the abdomen at the midclavicular line below the costal margin, this port was the operating port through which the surgeon used his right hand for dissection, that is to say, this replaced the epigastric port in our standard technique.

A 5 mm port was placed on the right side of the abdomen at the mid-clavicular line, almost the same level as the 10 mm port on the left side; this was used by the left hand of the surgeon for retraction of the infundibulum. Another 5 mm port was placed on the left side of the abdomen at the anterior axillary line and was used by the second assistant for caudal traction of the fundus of the gallbladder. Our dissection was not difficult, although it was careful and slower than usual because of the mirror image of organs. The surgeon can use any of the two methods, or any other configuration he or she prefers, the main point is that the principles of dissection of the triangle of Calot should be always followed and the critical view of safety should be always achieved before clipping or cutting any structure. We were able to perform the procedures safely although it took us 70 min in mean, which is longer than our standard mean duration (55 min), but we think that the delay in such an unusual case is fairly justified.

One last point deserves attention that the surgeon should always exclude other serious congenital malformations that might be associated with situs inversus totalis especially congenital heart disease, renal problems and of course biliary malformations like atresia before embarking on the surgery for such unusual patients.

In conclusion; Situs inversus totalis is a rare autosomal recessive disorder which can cause diagnostic confusion in a lot of clinical conditions including calculous cholecystitis due to the reversed anatomical positions of abdominal viscera.

Laparoscopic cholecystectomy is much more challenging in the presence of this disorder due to loss of usual orientation.

The surgeon can choose any configuration of the ports he or she prefers, the main point is that the principles of dissection of the triangle of Calot should be always followed and the critical view of safety should be always achieved before clipping or cutting any structure.

The surgeon should always exclude other serious congenital malformations that might be associated with situs inversus totalis before embarking on the surgery for such unusual patients.

References

1 Bohun CM, Potts JE, Casey BM, et al. A population-based study of cardiac malformations and outcomes associated with dextrocardia. Am J Cardiol 2007;100:305–9.

2 Nursal TZ, Baykal A, Iret D, et al. Laparoscopic cholecystectomy in a patient with situs inversus totalis. J Laparoendosc Adv Surg Tech 2001;11:239–41.

3 Campos L, Sipes E. Laparoscopic cholecystectomy in a 39-year old female with situs inversus. J Laparoendosc Surg 1991;1:123–6.

4 Pitiakoudis M, Tsaroucha AK, Katotomichelakis M, et al. Laparoscopic cholecystectomy in a patient with situs inversus using ultrasonically activated coagulating scissors. Report of a case and review of the literature. Acta Chir Belg 2005;105:114–17.

5 Rao PG, Katariya RN, Sood S, et al. Situs inversus totalis with calculus cholecystitis and mucinous cystadenomas of ovaries. J Postgrad Med 1977;23:89–90.

6 McKay D, Blake G. Laparoscopic cholecystectomy in situs inversus totalis: a case report. BMC Surg 2005;5:5–6.

7 Eisenberg D. Cholecystectomy in situs inversus totalis: a laparoscopic approach. Int Med Case Rep J 2009;2:27–9.

8 Wood GO, Blalock A. Situs inversus totalis and disease of the billiary tract. Arch Surg 1940;40:885–96.

9 Crosher RF, Harnarayan P, Bremner DN. Laparoscopic cholecystectomy in situs inversus totalis. J R Coll Surg Edinb 1996;41:183–4.

10 Al-Jumaily M, Achab M, Hoche F. Laparoscopic cholecystectomy in situs inversus totalis: is it safe? J Laparo endosc Adv Surg Tech 2001;11:229–31.

11 Goh P, Tekant Y, Shang NS, et al. Laparoscopic cholecystectomy in a patient with empyema of the gallbladder and situs inversus. Endoscopy 1992; 24:799–800.

IMJ 2019;65(1):99-103.