Gallbladder Located to the Left of the Falciform Ligament in the Absence of Situs Inversus: ‘Sinistraposition’

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Abstract

The gallbladder, located to the left of the falciform ligament, in the absence of situs inversus; also called sinistraposition; it is a rare anatomical anomaly. Although it is rare, it is considered important that any surgeon is familiar with this finding because surgery can become a real technical challenge. Several case reports have documented the safe handling of sinistraposition when found incidentally during conventional laparoscopic cholecystectomy. Thus, this procedure can be safely performed, even if the injury to the bile duct is not unusual; because the association of these cases abnormalities, biliary tree and intrahepatic portal is not negligible. The story of a patient of 56 years old with symptomatic cholelithiasis and ultrasound that did not report the anomalous position of the gallbladder is presented. He was taken to laparoscopic cholecystectomy, where a gallbladder located in segment III of the liver without apparently associated with other extra-hepatic biliary abnormalities were found. The procedure was performed by multiport laparoscopically technique, without complications for the patient; who so far is asymptomatic.

Keywords: Sinistraposition; Left Sided Gallbladder; Vesicular Anatomical Variant; Laparoscopic Cholecystectomy; Laparoscopic Cholecystectomy Technical Considerations; Biliary Tract Abnormality

Introduction

First described in 1886 by Hochstetter, the location of the gallbladder between liver segments III and IV or in III, remains a rare anomaly. In this condition, the gallbladder is to the left of the falciform ligament, without going through situs inversus, segment IV hypoplasia, or abnormal location of the right round ligament; which is called true ‘sinistraposition’ [1,2].

This presentation has a prevalence of 0.3% [1]. Reports and case series have been published, mostly, by Japanese authors [3].

‘Sinistraposition’ has anatomical features in the bile duct and intrahepatic portal. Most of the time, this anomaly has been described as a cystic duct that joins the hepatic duct on the right side, in the direction from right to left. Less frequently, the cystic duct reaches the common liver or the left liver, from the left side.

In the presence of this anatomical variant; It is essential that it be accurately identified in order to safely perform cholecystectomy [1] and avoid complications or that the procedure may become a difficult cholecystectomy [4].

As for the embryological origin, the unusual location of the gallbladder on the left side of the liver can be presented by two mechanisms. The first, associated with the union and migration of the gallbladder to the left hepatic lobe, in which case the cystic duct adopts a normal anatomical position and crosses in front of the main bile duct from right to left. The second mechanism is the formation of the gallbladder by direct budding from the left side, in which case the cystic duct joins the hepatic duct from the left side [3,5].

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The clinical presentation of vesicular symptomatology when it is in sinistraposition; it is similar to that presented with the gallbladder in the usual location. It is believed that visceral nerve fibers do not discuss with the gallbladder and occur in the same manner as when there is pain in a vesicle located on the right side [3]. The diagnosis is mainly intraoperative and incidental, because with preoperative images, especially ultrasound, this anatomical variant is not generally recognized [3,5].

Initially, he doubted the safety of laparoscopic cholecystectomy in cases of “sinistraposition”, given the possible changes in the anatomy of the bile duct; however, there are reports that document safe laparoscopic cholecystectomy in these patients [3]. As expected, these reports emphasize the identification and management of the anatomy of the bile duct and if there are doubts, it is recommended to perform an intraoperative cholangiography [2,3].

Case Report

This is a 56-year-old male patient, without significant concomitant diseases, with a body mass index of 25 kg/m², with chronic pain in the right hypochondrium and cholelithiasis, whose ultrasound did not report abnormalities of the position of the gallbladder bile.

The institution in which this patient was operated, in most cases, uses three ports for the usual laparoscopic cholecystectomies. In this patient, it was necessary to use a four port, after identifying its location in segment 3.

These ports were positioned as follows: Two 10 mm (umbilical and left subcostal) and two 5 mm right subcostal (mid-clavicular line and anterior axillary line). One of the right subcostal ports was used to pull the vesicular fundus and the other to pull the Hartman bag. In this way, adequate triangulation and exposure was achieved for the right-handed surgeon, who dissected the Calot triangle with his right hand through the left subcostal port.

A gallbladder was found in ‘sinistraposition’ (Figure 1), attached to the round ligament (Figure 2) and its bed was located towards segment III. The gallbladder wall was thickened and fibrous in appearance (Figure 3). The duct and cystic artery were identified; observing, that the artery was anterior to the cystic duct and reaching the vesicular fundus (Figure 4). After identification of the critical safety vision, the artery was first ligated and then the cystic duct at the infundibulocystic junction with metal clips (Figure 5). The gallbladder was separated from the hepatic bed in the cystofundic direction with electrocautery and the surgery was completed without difficulties (Figure 6).

**Figure 1: Gallbladder to the left of the falciform ligament - sinistraposition.**

**LR:** Round Ligament; **LF:** Sickle Ligament; **BV:** gallbladder.
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**Figure 2:** Gallbladder with thickened and fibrotic walls attached to the round ligament.

**Figure 3:** Gallbladder with thickened and fibrotic walls.

**Figure 4:** Clipped anterior cystic artery. LR: Round Ligament; AC: Clipped Cystic Artery.

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The treating surgeon is part of the institution’s laparoscopic surgery group and, in his opinion, decided not to do intraoperative cholangiography.

The surgical time was 70 minutes, 15 minutes longer than the average surgical time for a habitual cholecystectomy in the institution. The patient was managed out patiently and so far, 9 months after his intervention he has reported asymptomatic. In histopathology, chronic cholecystitis and cholelithiasis were found.

**Discussion**

It is vitally important for the surgeon to recognize that, in ‘sinistraposition’, the anatomy of the bile duct is variable in terms of the arrival of the cystic duct into the hepatic duct, either common or left, and that its proper identification is essential [2,3,6]. An intraoperative finding of sinistraposition ‘should not prevent you from continuing the procedure laparoscopically. All possibilities and modifications of standard handling must be remembered; that can go, from change in the location of the surgeon and the ports, to the conversion to open surgery [1,6-8].

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In this patient, the clinical picture presented with pain in the right hypochondrium and the abnormal position of the gallbladder was discovered during the procedure. It should be taken into account that both the duct and the cystic artery may be longer than usual; which can facilitate dissection [6]. Cholecystectomy should be practiced carefully and the critical safety vision must be established; with the option of using intraoperative cholangiography to clarify the anatomy and minimize the risk of complications [2,6]. The ligation and division of the duct and cystic artery should be close to the gallbladder. The surgeon should do everything possible to identify key anatomical reference points and also have the option of practicing anterograde cholecystectomy, which could in some cases prevent liver hilar lesions [9].

Many techniques have been described for this laparoscopic cholecystectomy, such as the traditional multiport [1,7] or single port; which is currently one of the techniques at the forefront of minimally invasive surgery [1]. Case reports of vesicles located in the left hepatic lobe, or in situs inversus; have shown that the laparoscopic approach, for resection of these vesicles by a single port, is also safe and effective in the hands of surgeons, familiar with this technique. When the multiport technique is used; a change in the location of the trocars according to the criteria of the first surgeon, with the aim of achieving a better exposure; It allows dissection to be practically worked with the dominant hand of the surgeon [8,10-15].

It is possible, that on suspicion of this anomaly; Preoperative imaging studies are performed in order to obtain a previous diagnosis and plan the surgical procedure [6]. In case of doubt; conversion to open surgery, aborting the intervention to complete the study or even delayed transfer of the patient to a center with experience in advanced laparoscopic surgery is recommended. In some of these cases; It is likely that a left-handed laparoscopic surgeon could have an advantage and greater comfort over a right-handed one, when addressing such patients [8].

**Conclusion**

‘Sinistraposition’ is an unusual anatomical variant, but the general surgeon is not exempt from finding it. Patients have typical pain in the right hypochondrium, preoperative images may not identify it and their diagnosis may be intra-surgical; Therefore, meticulous attention to anatomical peculiarities in the bile duct is recommended. There are options to change the location of trocars, practice intraoperative cholangiography, convert to open surgery, abort the intervention, complete the study; or even transfer the patient in a deferred way to a center with experience in advanced laparoscopic surgery.

Proper anatomical identification of the reference points is key and will allow a cholecystectomy to be carried out in most or all of these cases under minimally invasive techniques, without increased risk of bile duct injury or other catastrophic complications for patient.

**Bibliography**


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