

## CASE REPORT

## Single-incision cholecystectomy in a patient with situs inversus totalis presenting with cholelithiasis: A case report

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### Keywords

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### Abstract

Laparoscopic cholecystectomy has become the gold standard for the treatment of cholelithiasis, and many reports of single-incision laparoscopic cholecystectomy have been published in the past few years. Situs inversus totalis is a very rare condition, but the variant anatomy should not preclude a minimally invasive approach to surgery. We report a case of successful single-port laparoscopic cholecystectomy in a patient with situs inversus totalis, describe the technical advantages, and review the literature.

### Introduction

Laparoscopic cholecystectomy has become the gold standard operation for patients with symptomatic cholelithiasis. Single-port and reduced-port surgeries have become increasingly popular because they can achieve improved short-term outcomes such as reduced postoperative pain and better cosmesis.

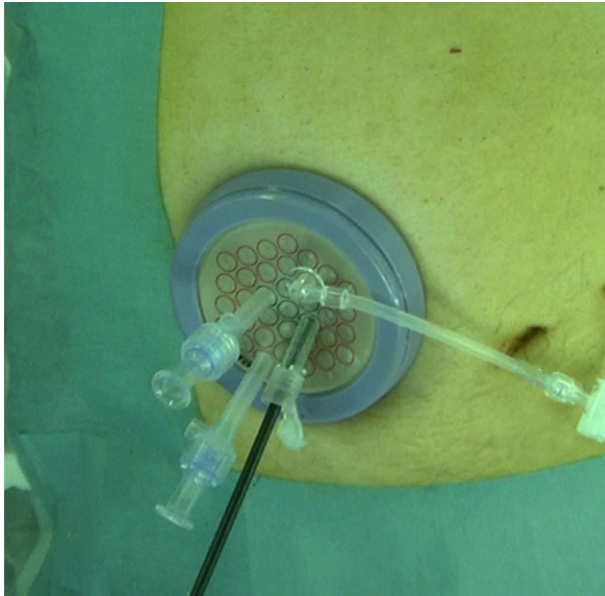
Situs inversus totalis (SIT) is a rare congenital abnormality that results in organs being transposed from their normal anatomic locations to the opposite side of the body. It can cause some technical difficulties as well as diagnostic confusion. The traditional method of four-port laparoscopic cholecystectomy in SIT patients poses a disadvantage for right-handed surgeons because of the mirror image of the organs. To avoid this difficulty, we propose single-port cholecystectomy as the optimal method for the treatment of cholelithiasis in patients with SIT.

### Case Presentation

A 66-year-old man was referred to our hospital by his primary care physician for treatment of left upper

quadrant abdominal pain. He had a known history of SIT. A diagnosis of cholelithiasis was made by abdominal ultrasonography and MRI, which revealed numerous small gallstones and a thickening of the gallbladder wall. Of note, the gallbladder was located in the left upper quadrant, while the spleen and stomach were located on the right side. There were no common bile duct stones. A chest X-ray demonstrated dextrocardia with no evidence of bronchiectasis.

After obtaining informed consent, we performed a single-port laparoscopic cholecystectomy. The patient was placed in a supine/split-leg position with the surgeon on his right side and the assistant on his left side. The video monitors were placed near patient's head. A 2.5-cm vertical intra-umbilical skin incision was made, and a small Alexis wound retractor (Applied Medical, Rancho Santa Margarita, USA) was placed. The outer white ring of the Alexis was covered with a Free Access device (TOP CO., Tokyo, Japan) designed to maintain pneumoperitoneum and fix support of the trocars (Figure 1). CO<sub>2</sub> pneumoperitoneum was induced and an intra-abdominal pressure of 8 mmHg was achieved. The patient was then placed in reverse Trendelenberg



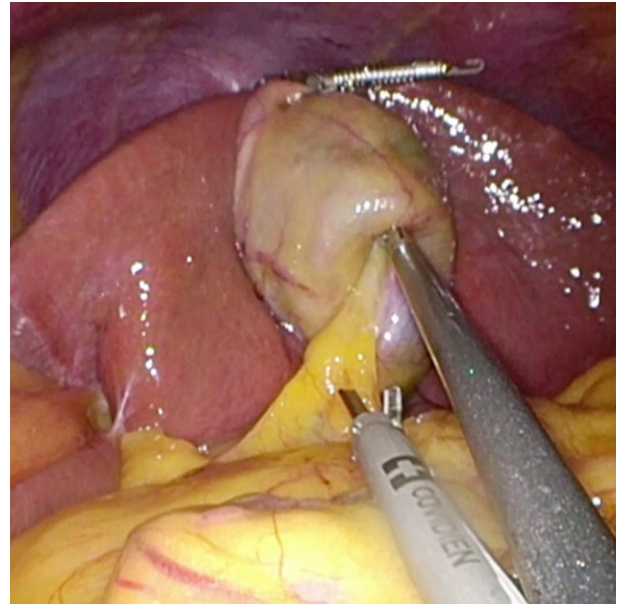
**Figure 1** Placement of the Free Access device on the Alexis wound retractor at the umbilicus. The dimple beside the retractor is an appendectomy scar in the left lower quadrant.



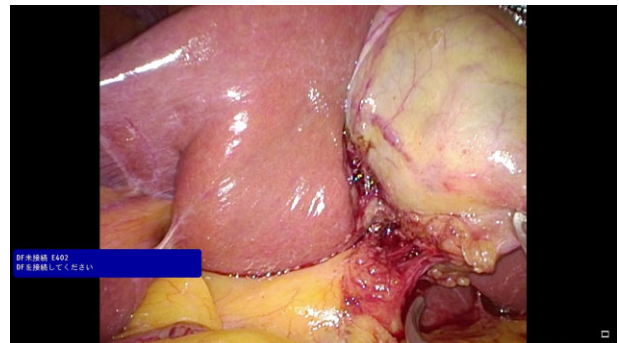
**Figure 2** The Endograb™ and the introducer.

position and tilted slightly to the right. A 30° rigid 5-mm telescope with a vertical light cable (Olympus, Tokyo, Japan) was used. SIT was confirmed with an inspection of intra-abdominal cavity through the laparoscope.

To perform the cholecystectomy, Hartmann's pouch was retracted with the Endograb™ (Virtual Ports, Caesarea, Israel), an internally anchored retracting device (Figure 2). We introduced the Endograb through a 5-mm port and deployed the device, which grasped the gallbladder with one end and was anchored to the anterior abdominal wall just inferior to the diaphragm with the other end. This provided retraction equivalent to



**Figure 3** Anterior superior retraction of the gallbladder using the Endograb™ retractor.



**Figure 4** The critical view of safety.

what is normally achieved with a standard retracting instrument but without the need for an additional working port. The serosa was dissected from the lateral aspect of the gallbladder neck. The cystic duct and artery were identified, isolated, and sharply divided between Hem-o-lok clips (Weck Closure Systems, Research Triangle Park, USA). The gallbladder neck was grasped with the left-hand grasper and retracted in various directions to facilitate dissection from the liver bed with an ultrasonomic coagulating device (Figure 3). We confirmed the critical view of safety (Figure 4). The gallbladder was dissected from the liver uneventfully. The specimen was retrieved through the umbilicus, and the fascia and skin were closed in the standard fashion. The operation took 102 min, and the operative blood loss was minimal. The postoperative course was

uncomplicated, and the patient was discharged on the third postoperative day. Pathological examination of the specimen confirmed chronic cholecystitis with a hyperplastic polyp. The patient has been followed up and has recovered well.

## Discussion

SIT is a rare congenital disorder found in just 0.01% of the population (1). There is no evidence to suggest that gallstones are more common in people with this condition, but if this condition were unknown at the time of presentation, it could result in a delay in the diagnosis of cholelithiasis (2). We should consider how to proceed with laparoscopic cholecystectomy for cholecystitis in patients with SIT.

A comprehensive search of PubMed was performed in October 2014 using the terms “laparoscopic, cholecystectomy” and “situs inversus.” Since de Campos Martins *et al.* first reported a successful laparoscopic cholecystectomy in a patient with SIT in 1991, there have been 57 reports of laparoscopic cholecystectomy in patients with SIT (2). This procedure can be performed safely in SIT patients, but only five cases have been published in English on single-incision or single-port laparoscopic surgery (3–6).

Han *et al.* first published a report on single-incision multiport laparoscopic cholecystectomy in a patient with situs inversus totalis in 2011 (1). They noted that single-incision multiport laparoscopic cholecystectomy can overcome the difficulties posed by a surgeon's right-handedness. If the setting were symmetrical to the usual four ports, a right-handed surgeon would encounter some difficulties such as mirror image anatomy. The right hand would retract the gallbladder upward while the left hand dissected Calot's triangle. However, right-handed surgeons have an advantage when performing single-port surgery in SIT patients, even if they have little experience, performing single-port surgery because dissection of Calot's triangle can be performed with the right hand despite the mirror image anatomy. In addition, to decrease potential difficulties, we employed an internally anchored retracting device, which made it possible to reduce the number of ports and avoid conflicts between the instruments (7). The surgeon could then grasp the

neck using the left hand and provide optimal retraction of the gallbladder while using the right hand entirely for dissection.

Though SIT is a very rare condition, it should not prevent a minimally invasive approach to surgery. The technical difficulties associated with placing ports in a mirror image of the standard approach should be considered. The single-port method removes the difficulties of reversing the operating hands in order to approach the mirror image anatomy. As a result, we are convinced of the merit of the single-port method using an internally anchored retracting device for right-handed surgeons to accomplish single-port laparoscopic cholecystectomy in patients with SIT.

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