

Adaptability in the Midst of Anatomical Challenge: a Case Report on Situs Inversus Totalis in a Laparoscopic Cholecystectomy

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INTRODUCTION

- Situs inversus totalis (SIT) is an autosomal recessive condition involving the complete left-right reversal of a patient's visceral organs¹.
- The incidence of SIT has been recorded to affect 1:10,000².
- In many cases, abdominal pathologies will present with symptoms on the opposite side of "normal" due to the anatomical inversion³.
- With everything opposite of the standard "usual", the diagnosis and management of SIT patients are higher on the difficulty index versus patients without SIT².
- In this case, we report the treatment of symptomatic cholelithiasis in a 33-year-old female with comorbid SIT who underwent a laparoscopic cholecystectomy without postoperative complications

CASE SUMMARY

Patient is a 33-year-old female referred by her PCP for a recurrent history of episodic LUQ pain and diffuse epigastric pain exacerbated by fatty foods. Over the past month, the patient states the episodes were occurring more frequently and felt they were beginning to impair her acts of daily living. A previous US demonstrated the presence of stones in her gallbladder; however, there was no mention of its localization to the left abdomen on radiology report (Figure 1). PMH was significant for SIT. She had no previous history of abdominal surgeries. Her pre-op labs were within normal limits. Due to her presentation, the patient was signed up for an elective laparoscopic cholecystectomy.

On the day of surgery, the patient was taken back to the OR and placed under general anesthesia. The abdomen was prepped and draped in a sterile fashion. A small vertical incision was made superior to the umbilicus and visual entry into the peritoneum was confirmed via laparoscope. A Hassan trocar was then utilized to insufflate the abdomen to a pressure of 15mmHg. The laparoscope was then reinserted for abdominal examination and review of anatomical deviations. At this time, the patient was placed in the reverse Trendelenburg position with the right side tilted down. Under laparoscopic visualization, three standard 5-mm ports were placed: two in the right upper quadrant along the costal margins and one in the epigastrium. Upon further investigation of the biliary anatomy, the cystic duct appeared more medial as opposed to lateral. For ease of maneuvering, an additional 5-mm port was placed in the left flank region. In total, one Hassan trocar was utilized in addition to 4 additional 5-mm trocars. The gallbladder was then located on the left side of the patient's abdomen, grasped, and retracted superolaterally. The cystic duct and cystic artery were circumferentially dissected with no evidence of anatomic deviation in the biliary system. Once identified, the structures were clipped, twice on the proximal side and once distally, before being divided with scissors. Electrocautery was then used to divide the attachments between the gallbladder and the liver. During the dissection process, mild bleeding occurred. Electrocauterization was used to resolve this, in addition to use of Arista over the gallbladder fossa to ensure adequate hemostasis. No evidence of a bile leak was detected. The gallbladder was then removed from the abdomen without complication. The umbilical port site was closed and dressed with Dermabond. Patient was discharged home without any acute postoperative complications.

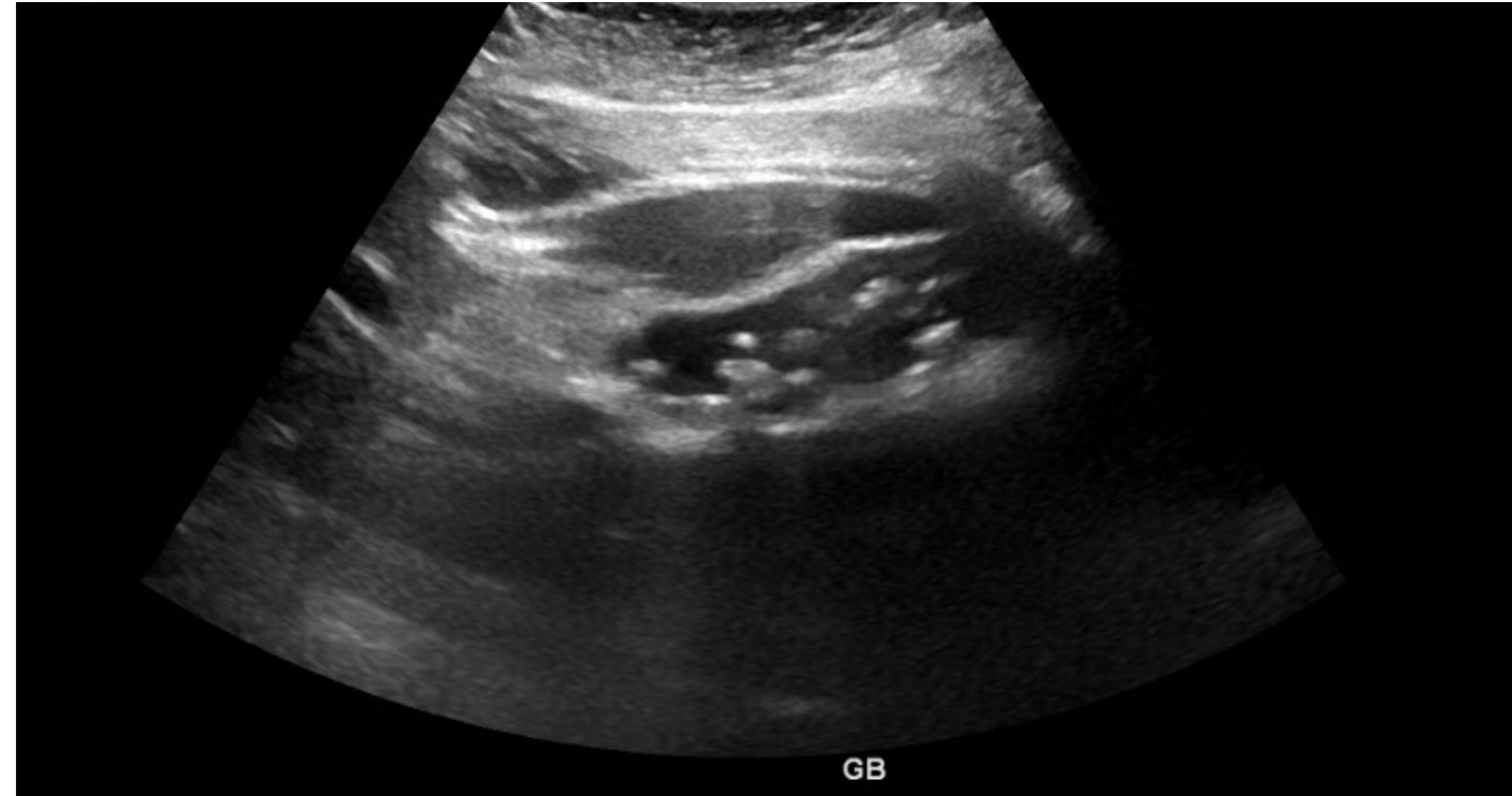


Figure 1. Left upper quadrant ultrasound showing calculi in the gallbladder

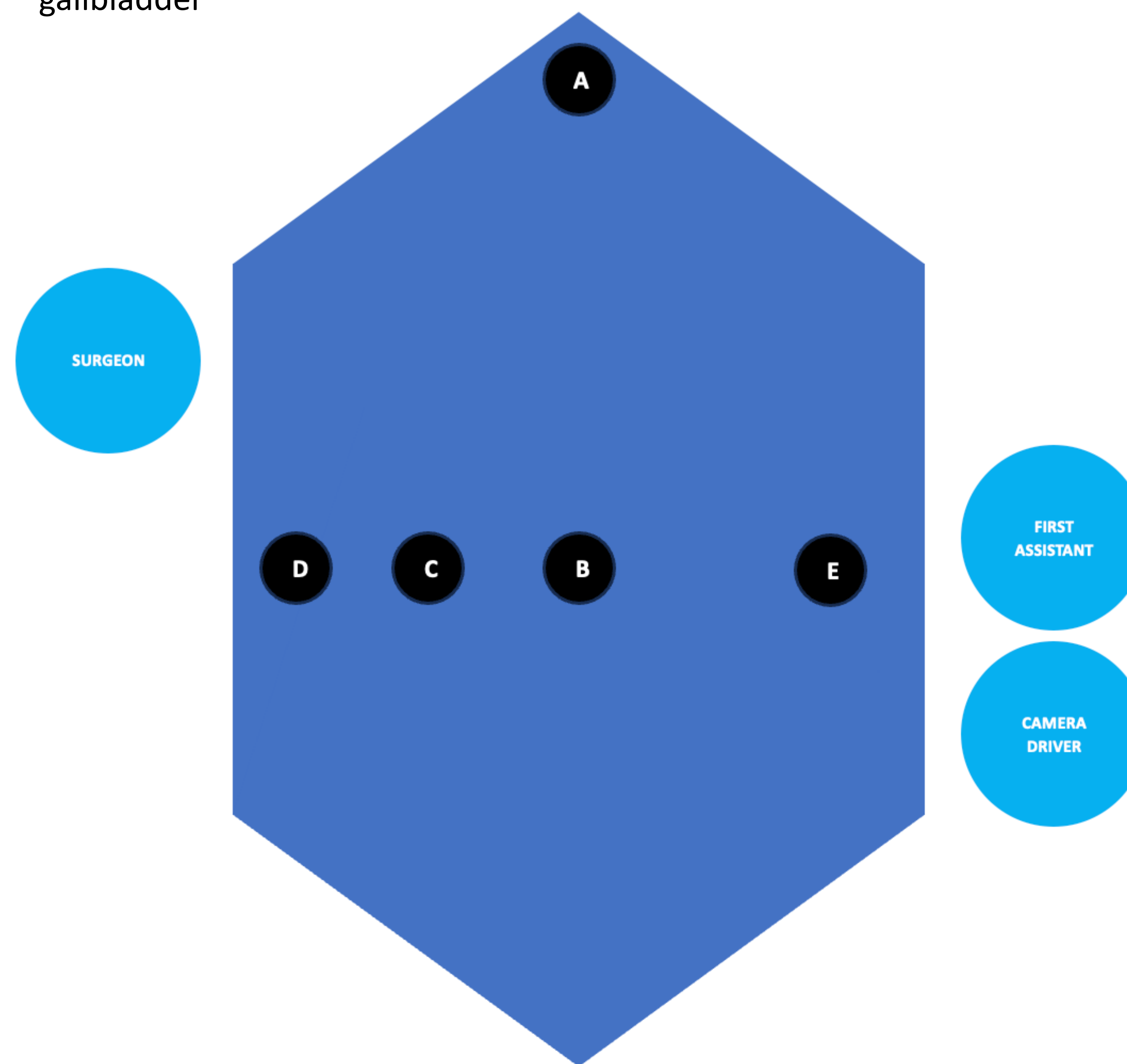


Figure 2. Port site and perioperative team placement (A - subxiphoid 5 mm, B - umbilical - 10 mm, C - midclavicular line 5 mm, D - anterior axillary 5 mm, E - anterior axillary 5 mm)

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DISCUSSION

SIT is a clinically asymptomatic congenital condition that involves the visceral organs being located directionally opposite of the typical human anatomy. Though multiple theories exist, the etiology of this autosomal-recessive condition remains unknown³. Despite the location change, all affected organs function as intended⁵. SIT patients present to the clinic with an added layer of complexity for physicians. When diagnosing and managing these patients, seemingly common abdominal pathologies will present in traditionally different anatomical locations, requiring a more thorough workup. In many cases, SIT has been linked with comorbid conditions such as Kartagener syndrome, polysplenia/asplenia, and Ivemark's syndrome³.

In the surgical realm, the management of a SIT patient comes with challenges that primarily revolve around the unfamiliar reversal of the abdominal anatomy. Additionally, special considerations must be made to account for potential differences in the vasculature, especially in procedures involving the kidneys³. These added complexities result in a higher difficulty index rating, which makes intraoperative complications more likely². Fortunately, in our case, laparoscopic procedures are commonly used in gallbladder disease pathologies. The laparoscopic approach to a cholecystectomy was first performed in 1987 and remains the gold standard today¹. The choice to perform a laparoscopic cholecystectomy in SIT patients provides surgeons with the ability to use the same technique but requires significant adaptability to seamlessly maneuver around the patient's reversed anatomy¹. Though the option to perform an open laparoscopic cholecystectomy is available, there have been very few reported cases as the laparoscopic approach remains heavily preferred³.

The surgical planning for laparoscopic cholecystectomy in SIT patients requires a strong understanding of their anatomy and additional planning from the surgeon to determine the optimal placement of surgical equipment, staff, and ergonomics to maximize positive outcomes. On the day of surgery, our team placed the lead surgeon on the right side of the patient, and to the left were the first assistant and camera driver. Varying configurations have been reported with the most common setup placing the surgeon and camera driver on the right of the patient and the first assistant on the left¹. In addition to optimal positioning, it is advised that additional time be spent by the surgeon orienting themselves to the anatomical structures within the operative space. Though uncommon, the risk of iatrogenic injuries to the common bile duct has been reported in 2 laparoscopic cholecystectomy cases with comorbid SIT². Other complications such as bleeding may occur and hemostasis should be accomplished utilizing the same techniques in a standard patient.