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Case Report

Sleeve gastrectomy in a patient with situs inversus totalis: a case report

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ABSTRACT

The following is a case report of a 20-year-old female patient with morbid obesity and situs inversus totalis (SIT) who successfully underwent laparoscopic sleeve gastrectomy. Situs inversus (SIT) is a rare condition in which the organs are situated on the opposite side of their normal positions; it has some peculiarities during the surgery. Attention to detail in preparations before the surgery as well as modifications in the operating room allowed for the completion of the surgery in this case despite the numerous challenges. This report will show how the surgical plan was implemented in this clinical case, focusing on the intra-operative techniques and the post-operative course underscoring the flexibility of surgical treatment in such an anatomically complex case.

Keywords: Situs inversus, Laparoscopic sleeve gastrectomy, Morbid obesity, Reversed anatomy, Bariatric surgery, Port placement

INTRODUCTION

Situs inversus totalis (SIT) is a very rare congenital anomaly that was first described by Matthew Baillie in the late 18th century. It consists of the complete mirror-image transposition of the thoracic and abdominal viscera.[1-3] Although often asymptomatic and found incidentally, situs inversus complicates the diagnosis and surgical approach to any pathology within the abdomen or thorax. The condition is so rare, occurring in only about 0.01% of the population, that most surgeons will only encounter it once in a lifetime.[4] Obesity is a growing global epidemic that affects millions worldwide and is associated with significant morbidity and mortality.[6] Bariatric surgery has emerged as the most effective long-term solution for morbid obesity, improving weight loss and enhancing the resolution of associated comorbidities like diabetes, hypertension, and obstructive sleep apnea.[1] Of all available bariatric surgeries, LSG is gaining favor because of its simplicity, safety, and effectiveness.[5] However, LSG in situs inversus patients presents some unique challenges that need careful modification of surgical techniques.[3] This case report describes the successful management of a 20-year-old female patient with SIT who underwent LSG for morbid obesity. Discussion will cover preoperative planning, surgical challenges, intraoperative adjustments, and postoperative care in an attempt to provide insight into technical considerations necessary to perform bariatric surgery on patients with altered anatomy.

CASE REPORT

A 20-year-old female patient, who had a history of morbid obesity, sought medical care at our clinic. The patient's weight was 83 kg and height was 152 cm, the BMI calculated was 35.9 kg/m². She had tried to lose weight to no avail even though they had tried to modify their meals and lifestyle accordingly. The morbid weight had led to a deterioration of their quality of life tremendously. Because we wanted to assess the situation further, we ordered a chest X-ray and abdominal ultrasound, which revealed SIT; the heart is situated on the right side of the body, and the liver-on the left side, and the spleen-on the right side. The positioning of the stomach was also reversed, as were the other abdominal

viscera. The patient had no significant medical or surgical history; there were no associated co-morbidities. The patient was an appropriate candidate for bariatric surgery. After multidisciplinary discussions and obtaining informed consent, laparoscopic sleeve gastrectomy was selected as the procedure of choice.

Pre-operative planning

This was a case of SIT, so preoperative planning needed to be as detailed as possible. It required a multidisciplinary team of bariatric surgeons, anesthesiologists, and radiologists to establish the best results. Imaging studies played a critical role in mapping the patient's altered anatomy and allowed the surgical team to anticipate complications that might arise, thereby changing their approach to it.

One of the main concerns was the mirror reversal of internal organs. The liver, spleen, and stomach were on the opposite side; thus, the port positions and surgical technique had to be adapted. The normal port positions for laparoscopic sleeve gastrectomy were carefully mirrored to provide optimal access to the stomach and omentum in this reversed orientation. Other significant challenges included handling instruments. Surgeons needed to reorient themselves mentally and conduct many aspects of the procedure in reverse, requiring ergonomic modification with heightened focus.

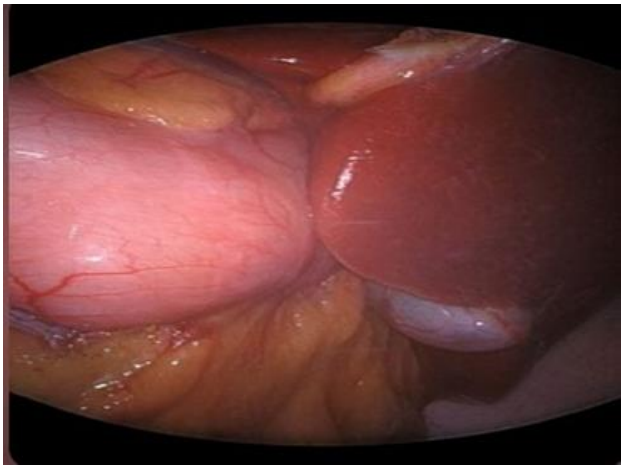

Figure 1: The reversed position of the liver and the stomach as visualized during the operation.

The anesthesia team was also prepared for potential challenges related to the management of the airway and vascular access-both potential complications that might arise from the reversed positioning of thoracic and abdominal structures. Finally, the patient was counseled at length about the unique aspects of her surgery: the potential risks, the technical challenges that were expected, and what could be reasonably expected in terms of surgical outcome. This pre-operatively prepared her fully for the operation and was important for a smooth and successful surgical experience.

Operative technique

The surgery was performed under general anesthesia. The patient was placed in the supine position with the lithotomy position and sequential compression devices on both lower extremities to prevent thromboembolic events. The abdomen was prepared in a sterile fashion with iodine solution. Multiple laparoscopic ports were introduced, and the peritoneal cavity was insufflated with carbon dioxide to a pressure of 15 mmHg. The surgical technique was modified to accommodate the patient's anatomy as follows:

Port placement

A total of four trocars were used, positioned in a mirror image of the usual alignment for LSG.

The principal working port was cited on the right midline, usually occupied by the left on non-SIT patients; similarly, the assistant ports were adjusted to achieve optimal ergonomics and access.

Dissection/mobilization

The greater omentum was divided 3 cm from the pylorus, working upward toward the angle of his. The use of a Ligasure device facilitated the precise dissection and hemostasis, especially around the short gastric vessels. Care was taken to preserve the integrity of the gastric vessels despite the reversed anatomy.

Sleeve creation

A 36 French bougie was introduced along the lesser curvature of the stomach to guide the stapling process. Using the ENDO GIA stapler with purple cartridges, the stomach was divided longitudinally. This step required extra vigilance due to the reversed anatomy, which altered the usual landmarks.

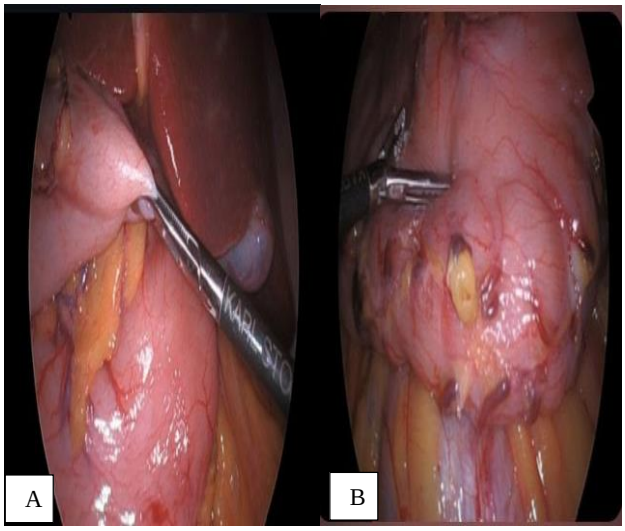

Figure 2 (A and B): Sleeve creation.

The resected stomach portion was removed via the right-sided trocar site.

Hemostasis and closure

Hemostasis was ensured with meticulous inspection of the staple line. Surgical was applied to reinforce areas of concern.

A 19 Fr drain was placed near the staple line to monitor for potential leaks or bleeding. The peritoneal cavity was deflated, and the skin incisions were closed with subcutaneous monocryl sutures.

The procedure lasted approximately 120 minutes and was completed without complications.

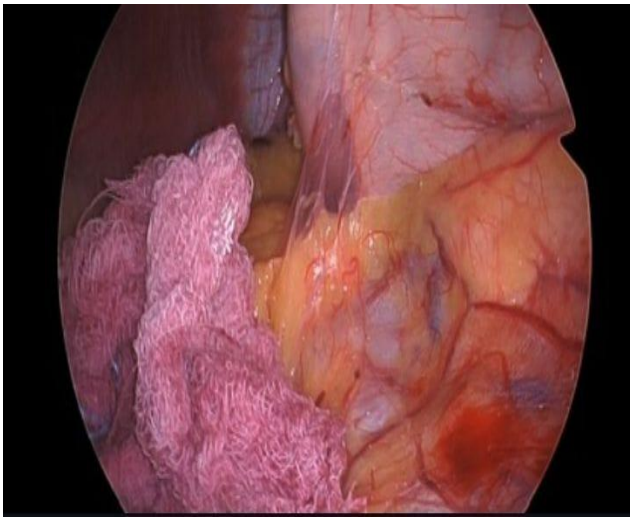

Figure 3: Intra-op images showing achieved hemostasis.

Intra-operative findings and challenges

During surgery, it was confirmed that she had SIT: The stomach, liver, and spleen were all in their "wrong" places. This unusual anatomy challenged the surgical team on several fronts and required a mix of mental flexibility and technical adjustments to steer the case through to its successful completion.

One major challenge was the adaptation at the mental level. The reverse anatomy necessitated that the surgeons reset their usual thinking of the gastric structures and adjust their normal approach. Indeed, this was a mindset adjustment necessary to give an accurate landing and access the relevant anatomical sites.

Instrument handling also imposed challenges because many surgical maneuvers had to be performed in reverse. This created ergonomic challenges that needed changes in how instruments were used and coordinated amongst team members. Under these conditions, maintaining precision required a high level of focus and adaptability.

Moreover, the identification of important anatomical landmarks required increased awareness. Familiar structures, such as the pylorus and the angle of his, were mirror images of their usual locations. This size reversal necessitated that the team rely heavily on preoperative imaging and intraoperative cues to assure accuracy in the dissection and stapling processes.

Despite such complications, preparation for all eventualities and flexibility on the part of the surgical team assured smoothness and success of the whole procedure. Actually, anticipation of and overcoming the special challenges of situs inversus were some of the important elements that contributed to a positive patient outcome.

Post-operative care

After the surgery, the patient was successfully extubated within the described period and the patient was transferred to the recovery room in a clinically stable state. Her condition required good pain control and she received intravenous analgesic to ensure that her pains were well controlled. Regarding thromboembolic complications, she was prescribed low molecular heparin then was encouraged to have early ambulation.

Her nutritional program was well thought out and progressed appropriately from a clear liquid diet on the first post-operative day, with a gradual advancement over two weeks to pureed foods, corresponding with the patient's recovery and alterations in the anatomy of the stomach. During this post-operative period, the patient was being closely followed for possible complications such as staple line leaks, bleeding, or infection.

During this one-month follow-up visit, the patient showed significant weight loss and had no signs of post-operative complications, proving the success of the procedure and her smooth recovery.

DISCUSSION

Surgery for laparoscopic sleeve gastrectomy in a patient with situs inversus must be adapted because the mirror-image anatomy is challenging for surgeons. The reverse orientation of the internal organs would need careful adaptation of surgical techniques and problem-solving strategies for a safe and successful procedure.

One of the main challenges is the changed anatomical anatomy. The reverse positioning of visceral structures, like the stomach, liver, and spleen, requires changes in port placement, dissection techniques, and visualization during the operation.[3] Surgeons should strongly depend on preoperative imaging and intraoperative identification of landmarks to overcome these difficulties.

Other determinants include team preparation. The success of these procedures is dependent on a well-prepared

surgical team that not only has to be able to navigate through the intricacies of the patient anatomy but must also undergo critical imaging review and team briefings to confirm that all members apply their approach correctly.[2] Technical adaptation also helps in dealing with the challenge of situs inversus. Surgeons use advanced instruments such as staplers and hemostatic agents, which help manage the surgical process and minimize hazards. The ergonomic changes involve modifying instrument ports and the ways of holding an instrument to ensure fine control and quick work during the process.

Despite these complicated anatomical features, statistics prove that bariatric surgery for patients with situs inversus is as safe and effective as for those with no anatomical abnormalities. This particular case shows that although situs inversus is a rare and difficult condition, patients should not be deprived of standard surgical treatment. This contributes to the growing body of evidence which indicates that when adequate planning and technical capacity is available, then good results can be obtained from such procedures.

CONCLUSION

This case depicts feasibility and safety in laparoscopic sleeve gastrectomy for SIT. It can be safely done with very careful planning and flexibility intra-operatively for bariatric surgery in such patients with this very rare anomaly. With the increasing trend of obesity, surgeons should be adequately prepared to treat anatomically complex patients. This report indicates the importance of individualized care and points to the need for further studies in the development of an optimal surgical approach in patients with situs inversus.

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