



Case Report

Laparoscopic sleeve gastrectomy in a patient with situs inversus totalis: A case report



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المخلص

إن حالة انقلاب وضع الأحشاء الكامل هو اضطراب وراثي جيني متنحي، ولكن في حالات التوائم المتطابقة يمكن أن يكون مرتبط بكموسوم اكس. يكون التفاف الأعضاء الداخلية بالبطن ب ٢٧٠ درجة عكس عقارب الساعة. تكون الجراحات بالمنظار للمرضى الذين يعانون من انقلاب وضع الأحشاء الكامل غالباً أصعب من المرضى الطبيعيين نتيجة لانعكاس الوضع التشريحي. نستعرض في هذا التقرير حالة سمنة مفرطة (مؤشر كتلة الجسم ٣٦ كجم/متر مربع) تعاني من انقلاب وضع الأحشاء الكامل، وأجريت لها جراحة تكميم المعدة بنجاح. نحن نقدم في هذا التقرير كل التفاصيل التقنية والصعوبات أثناء إجراء هذه العملية. نعتقد أن جراحة تكميم المعدة عندما تكون بواسطة خبير في جراحات المناظير فإنها تكون مجدية وفعالة وأمنة في حالات انقلاب وضع الأحشاء الكامل.

الكلمات المفتاحية: منظار البطن؛ تكميم المعدة؛ الانقلاب الكامل للأحشاء؛ اضطراب جسمي متنحي؛ السمنة المرضية

Abstract

Situs inversus totalis (SIT) is a rare genetic autosomal recessive disorder; however, in identical twins, it may be misinterpreted as X-linked disorder. SIT describes a 270° counterclockwise rotation of the intra-abdominal organs. Laparoscopic surgery in patients with SIT may be more difficult than in normal patients due to its mirror image anatomy. We report a case of a morbidly obese patient (body mass index 36 kg/m²) with SIT who underwent

successful laparoscopic sleeve gastrectomy. This article describes all technical details and difficulties of this operation due to the presence of SIT. When performed by an expert laparoscopic surgeon, however, laparoscopic sleeve gastrectomy appears to be a feasible, effective, and safe procedure to treat morbidly obese patients with SIT.

Keywords: Autosomal recessive disorder; Laparoscopy; Morbid obesity; Situs inversus totalis; Sleeve gastrectomy

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Introduction

Situs inversus totalis (SIT) is a rare genetic autosomal recessive disorder, first described in 1600 by Fabricius, with an incidence of 1 in 5000 to 20,000 live births.¹ The mutation (*ZIC 3*, *ACVR2B*, *Pitx2* genes and chromosome 12) is anatomically described as a 270° counterclockwise rotation of the intra-abdominal organs, also known as “mirror-image rotation”.^{2,3} Most individuals with SIT can live normally without associated organ abnormalities, although cardiac, lung, intestinal anomalies can be present and may influence the suitability/fitness of these patients to undergo possible surgeries.⁴ Obesity is a major public health concern worldwide.⁵ Bariatric surgery is gaining popularity, especially because it is the only evidence-based approach to achieve sustainable weight loss in severely obese patients.⁶ However, to our knowledge, only a few medical reports have described bariatric surgery in patients with SIT.⁷ Herein, we report a successfully performed laparoscopic

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sleeve gastrectomy (LSG) in a morbidly obese patient with SIT.

Case report

A 30-year-old obese female weighing 95 kg, with body mass index (BMI) of 36 kg/m² and newly diagnosed with type II diabetes treated with oral medication, is described. The patient underwent cesarean section two years previously at which time which she was diagnosed with SIT. She failed to lose weight with dieting, exercise, and medical treatment including liraglutide injection (Saxenda, Novo Nordisk, Bagsværd, Denmark). The patient was informed about the different types of available bariatric surgeries and preferred LSG. A multidisciplinary approach, involving a bariatric surgeon, bariatric general practitioner, a psychologist and a dietician, was undertaken. Preoperative workup revealed normal laboratory investigations (complete blood count, coagulation profile, renal profile with electrolyte, liver profile, lipid profile, hormones, chemistry, vitamins). Electrocardiography revealed extreme axis deviation (northwest axis) with upright P waves in the AVR lead and inverted P waves in leads I and II (Figure 1). Echocardiography and chest X-ray revealed dextrocardia (Figure 2). A barium meal test revealed a right-sided stomach with no contrast obstruction (Figure 3). Ultrasound of the abdomen revealed a normal gall bladder. To assess the fitness/suitability of the patient for surgery and to exclude possible risks, she was evaluated preoperatively by personnel from the departments of cardiology, endocrinology, anesthesia, and respiratory. All agreed that she was fit for surgery with no associated organic abnormalities.

Intraoperatively, after induction of general anesthesia and intubation, the patient was positioned in the reverse Trendelenburg position using the “French method,” with the surgeon standing between the patient’s legs. Skin preparation and draping was performed as per surgical protocol, and carbon dioxide insufflation was started using a Veress needle at Palmar’s space and maintained at a pressure of 12 mmHg. After adequate gas insufflation, an 11 mm bladeless trocar was inserted into the supra-umbilical region midpoint between the umbilicus and xiphoid process.¹ A 10 mm, 30°

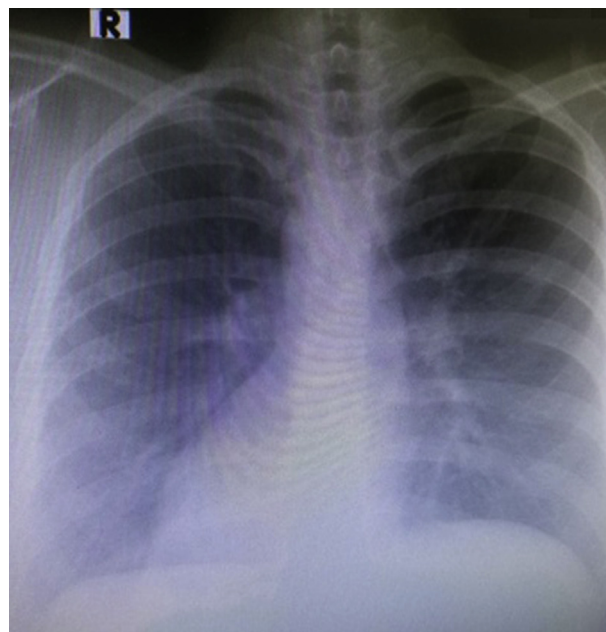


Figure 2: Chest X-ray showing Dextrocardia.

scope used for examination of the peritoneal cavity, which revealed a right-sided stomach and spleen, while the liver and gallbladder were on the left side. The monitor was positioned at the patient’s right shoulder, and the surgeon stood between the patient’s legs with the nursing assistant on the patient’s left side (mirror image). A 15 mm bladeless trocar (Johnson & Johnson, Ethicon, Cincinnati, OH, USA) was inserted into the left upper quadrant, a 12 mm bladeless trocar (Johnson & Johnson) was inserted at the right upper quadrant, and an iron intern laparoscopic liver retractor was used to lift the hepatic lobe (Figures 4 and 5). Dissection started by taking down the gastrocolic ligament from left-sided trocar immediately proximal to the pylorus all the way up to the base of right diaphragmatic crus, with meticulous dissection of the gastrosplenic ligament. First stapling was Endo GIA black articulating reload with tri-staple technology 60 mm (extra thick), starting 2 cm proximal to

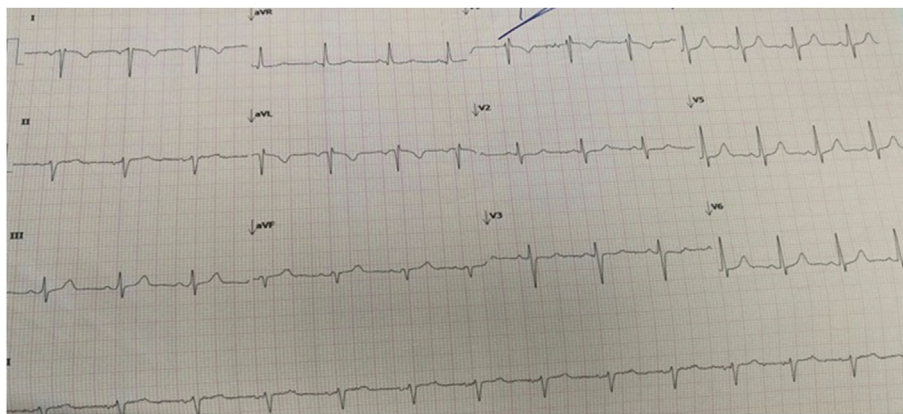


Figure 1: ECG which showed extreme axis deviation (Northwest axis) with upright P waves in AVR lead and inverted P waves in leads I&II.

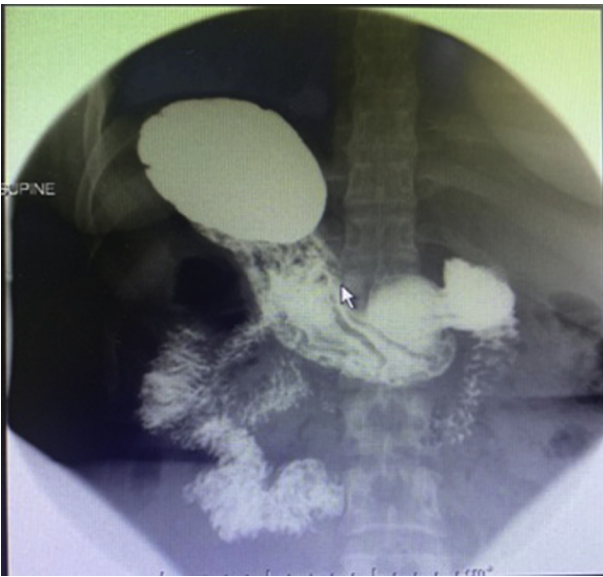


Figure 3: Preoperative barium meal study revealed right-sided stomach with no contrast obstruction.

pylorus, then a 36 Fr (12 mm) calibrating tube was inserted orally by the anesthetist under direct vision up to the pylorus followed by stapling the remainder of the stomach using Endo GIA purple articulating reload with tri-staple technology 60 mm, and ended approximately 2 cm lateral to gastroesophageal junction (GEJ). The staple line was reinforced using 10 mm Endo clips at the overlap and bleeding spots, then the calibrating tube was pulled out to the level of the GEJ, and a 150 ml methylene blue leak test was performed, which revealed no leak. The calibrating tube was removed completely. Interrupted 2.0 vicryl gastropexy stitches were placed between the sleeved stomach and prepancreatic fascia to maintain the stomach aligned in a banana-like shape. A 5 mm free gravity surgical drain was inserted at the right upper quadrant with the tip in immediate proximity to the GEJ. Resected stomach was removed from the 15 mm trocar port. Both the 12 and 15 mm port sites were

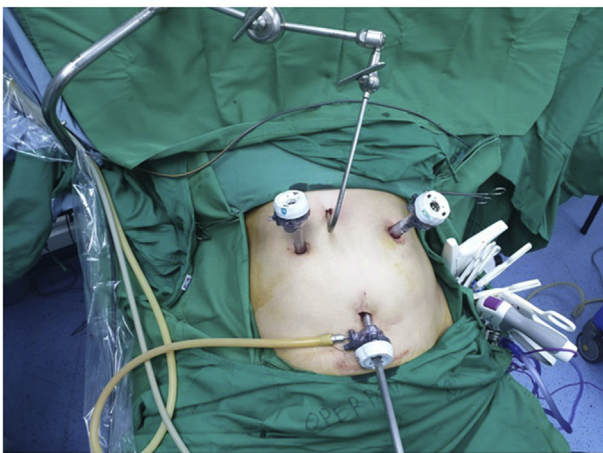


Figure 4: Trocars and liver retractors placement.

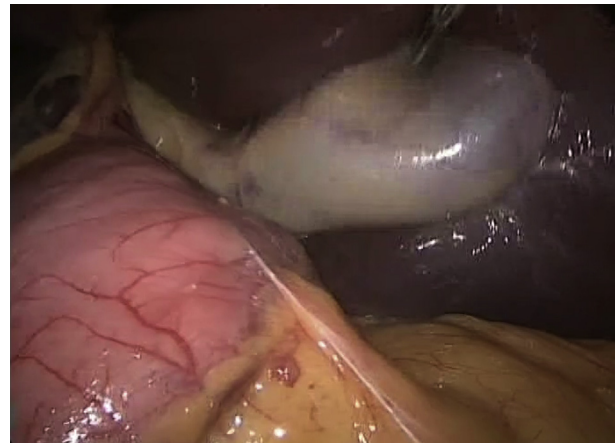


Figure 5: Intraoperative detection of right-sided stomach and left-sided liver and gall bladder.

closed using 1 vicryl and Endo closure. The skin was closed at all port sites using 3.0 monocryl in a subcuticular fashion. Surgical duration was 28 min with no surgical or anesthesia complications. The patient was extubated without problems and transferred to the recovery room in good condition.

The patient started oral fluid intake 6 h postoperatively. A gastrografin leak test was performed on postoperative day 1, which revealed satisfactory contrast flow with no leak (Figure 6), after which the drain was removed and the patient was discharged. Before discharge, the patient met with the dietitian and was provided with full written instructions.

The patient was followed up in the outpatient clinic 1 week postoperatively, at which early postoperative complications were excluded and wound care was performed. Thereafter, the patient was followed up at 3, 6, and 12 months, at which times she was satisfied, losing weight in accordance with targeted goals (83 kg, 75 kg, and 63 kg,

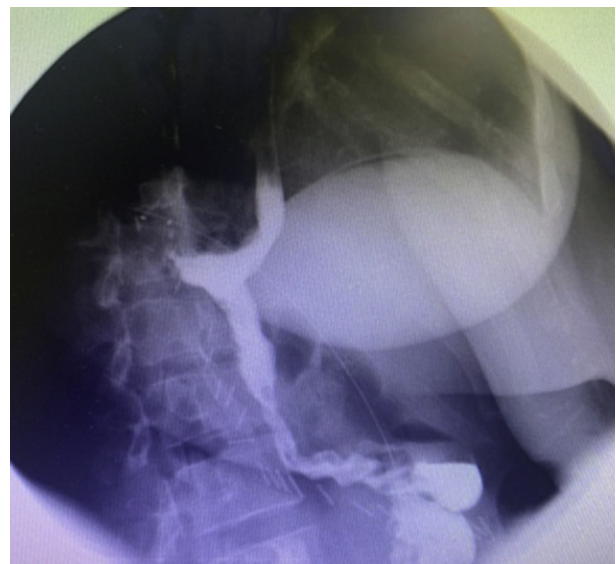


Figure 6: Gastrografin swallow study in the first postoperative day.

respectively), with no complaints. She exhibited good glycaemic control and was taken off medications.

(The patient provided consent for publishing this case report.)

Discussion

Obesity is a worldwide health problem and is increasing according to a World Health Organization report.⁸ Currently, LSG is gaining popularity because it is easy to perform and is safe, with successful weight loss in addition to low morbidity and mortality rates. As such, it is one of the most commonly performed bariatric procedures.⁹ SIT is merely one of many challenges surgeons encounter in bariatric surgery.¹⁰

In this case, SIT was diagnosed earlier during her previous cesarean section, which was also confirmed in the preoperative workup. SIT is a rare condition that could be discovered preoperatively, similar to most of the cases during patient workup for surgery or incidentally during surgery. We believe that preoperative diagnosis affords the patient better preoperative assessment, especially given that SIT can be a component of Kartagener syndrome (KS), which comprises bronchiectasis, chronic sinusitis, and SIT. The main problem is the defective movement of cilia, leading to recurrent chest infections, and infertility.¹¹ In addition, preoperative diagnosis facilitates accurate patient positioning for surgery and proper operating theater setup, team orientation, as well as the required instruments, which all may reduce technical challenges during the procedure and operative time. Intraoperative diagnosis carries the risk for non-availability of an expert surgeon and longer operative time due to slow adaptation and surgeon position changes.¹²

In our case, the operating surgeon and the assisting team were experts in the field of laparoscopy and bariatric surgeries. Synchronization between eye visualization and hand movements is opposite to the common norm sleeve gastrectomy. The operative duration in our patient was 28 min, which is considered to be reasonable compared with our experience in normal patients. This may be attributed to both preoperative diagnosis and the expertise of the surgeon. In addition, we believe that working from a position between the patient's legs may decrease the time needed for adaptation compared with working from the opposite side, which may be required in other operations.

From our perspective, surgeon experience and skill play a major role in shortening operative time. Although it was not necessary for our patient, the surgeon may decide to add more trocars, especially if concomitant laparoscopic cholecystectomy is performed for gallstone in patients with severe/morbid obesity and higher BMI. In addition, the surgeon may be obliged to work with a lower insufflation pressure if the patient has Kartagener syndrome.^{13–15}

During the follow-up period (up to 12 months) in our patient, she did not develop any early or late postoperative complications. In addition, she succeeded in losing weight, as expected. Similar good postoperative results were reported in other case studies in which LSG was performed in patients with SIT.^{7,10,12,13,16} However, some complications have been reported with other bariatric surgeries. Samaan et al.¹⁷

reported erosion after placement of a gastric band, which was removed approximately 4 months later. Deutsch et al.,¹⁸ reported leak complications in a case of adjustable gastric banding with open surgery followed by removal of the band and LSG in the same session. The patient was treated successfully with a polyflex stent inserted without any need for reoperation. We agree with Deutsch et al.¹⁸ in that SIT is not a factor that increases complications when surgery is performed by experienced hands, especially laparoscopic bariatric surgery.

Conclusion

LSG appears to be a feasible, effective, and safe procedure to treat morbidly obese patients with SIT. However, preoperative diagnosis and availability of an expert laparoscopic surgeon may be needed to reduce operative time and decrease the incidence of intraoperative and postoperative complications.

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Conflict of interest

The author has no conflict of interest to declare.

Ethical approval

No personal details or identifying information are included in this article. Consent was provided by the patient for the case report to be written and published. Ethics approval was not obtained from the authors' Clinical Research Center because it was not required for a case report.

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