Case Report

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# Laparoscopic sleeve gastrectomy in situs inversus totalis: a case report

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**Introduction and Importance:** Obesity and being overweight are defined as abnormal and excessive fat accumulation, respectively. Obesity is defined as a BMI of 30 or higher. Sleeve gastrectomy, the most commonly performed bariatric surgery worldwide, is an effective treatment for obesity and its comorbidities. However, some cases, such as situs inversus, may present additional challenges for surgeons.

**Case Presentation:** The authors present the case of a 28-year-old female scheduled for gastric sleeve surgery with a BMI of 49. During the preoperative evaluation, dextrocardia was evident, and a diagnosis of situs inversus totalis was made. The surgery was performed without complications in a high-volume hospital specializing in bariatric surgery.

**Clinical Discussion:** Gastric sleeve surgery should be considered an effective and safe procedure in such patients as long as the surgeon is prepared, makes technical adjustments with their team, and has the necessary experience.

**Conclusion:** Laparoscopic gastric sleeve surgery is a safe procedure in patients with situs inversus, as long as it is performed by an experienced surgeon.

**Keywords:** case report, bariatric surgery, obesity, situs inversus, sleeve gastrectomy

## Introduction

Obesity and being overweight are defined as abnormal or excessive fat accumulation, respectively. Overweight is defined as a BMI of 25 or higher, and obesity is defined as a BMI of 30 or higher. These conditions have reached epidemic proportions according to the global burden of illness, with over four million people dying each year as a result of being overweight or obese in 2017[1]. Sleeve gastrectomy, the most commonly performed bariatric surgery worldwide, has proven to be an effective treatment for obesity and its comorbidities[2]. However, some conditions such as situs inversus, a rare congenital condition characterized by thoracic and abdominal organ translocation, may present surgeons in this field with additional challenges when performing the treatment. Situs inversus is a rare illness that affects ~1 out of every 10,000 people, and is more frequent in males (~1.5:1 ratio). Laterality develops early in the fetus, and over 100 genes have been linked to this pathology. As these patients are uncommon, most practicing doctors have little experience with them[3]. This disorder highlights the challenge of performing laparoscopic operations in patients with mirror-image anatomy[4].

This manuscript has been reported in line with Surgical CAse REport (SCARE) 2020 criteria[5].

### HIGHLIGHTS

- Situs inversus totalis is a rare congenital condition.
- The surgeon must adapt the surgical technique according to the situation.
- Laparoscopic gastric sleeve is a feasible procedure in patients with situs inversus.
- Bariatric surgery is a feasible and safe treatment for obese patients with situs inversus totalis.

## Presentation of case

Here, we present the case of a 28-year-old female residing in the United States of America, scheduled for gastric sleeve surgery. The patient's height was 1.7 m, weight was 142 kg, and BMI was 49. She had a history of anxiety and depression for which she had been undergoing pharmaceutical treatment with desvenlafaxine for 3 years; no other known diseases, drugs intake, or allergies. The patient reported having followed multiple diet and exercise regimens without success, as well as the use of pharmacotherapy. During preoperative evaluation, dextrocardia was observed on the electrocardiogram and chest X-ray, and computed

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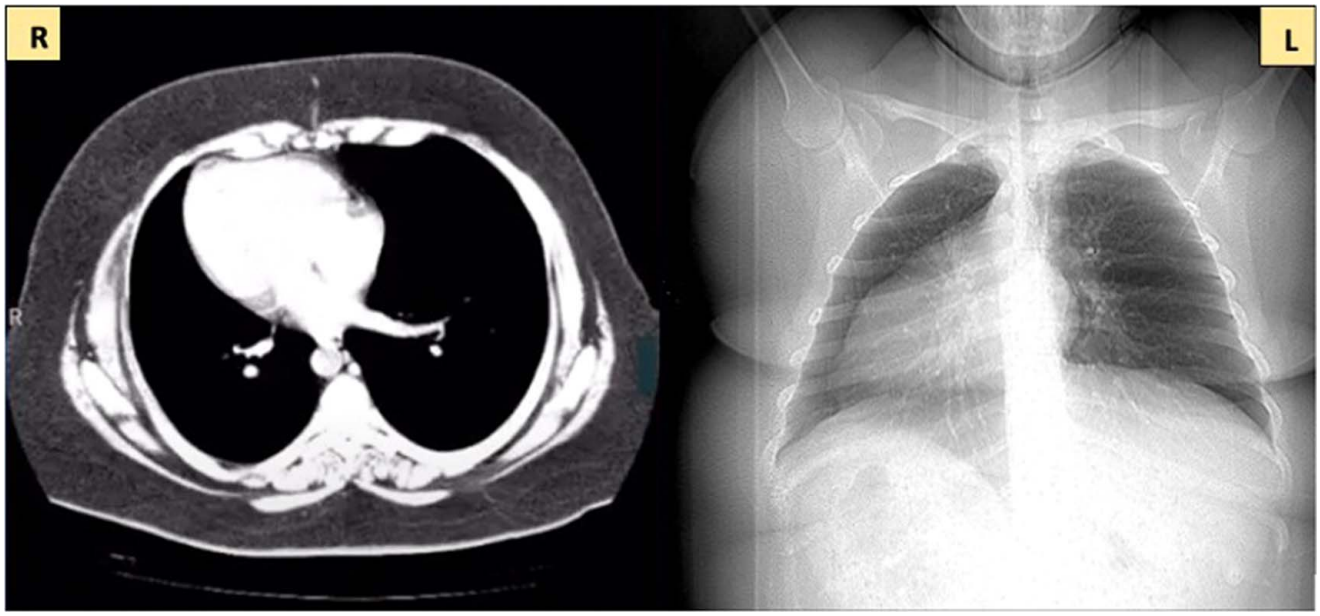


**Figure 1.** Situs inversus present in computed tomography and chest radiograph.

tomography (CT) was performed (Fig. 1), after which she was diagnosed with situs inversus totalis (SIT). Other laboratory evaluations fell within expected normal parameters.

The surgery was performed in a high-volume hospital specializing in bariatric surgery by a bariatric surgeon and a fellow bariatric surgery trainee, with the following findings: a conventional laparoscopic gastric sleeve was performed[6] with five trocar ports in modified positions (Fig. 2), an orogastric tube of 36 Fr, invaginating reinforcement in the staple line (Fig. 3), total bleeding of 35 ml, surgical time of 70 min, and closed circuit drain placement. The patient's prognosis was favorable.

In the postoperative period, patient recovery was normal and normal analgesic (ketorolac and paracetamol) and antiemetic (metoclopramide and ondansetron) regimens were used. The patient was able to resume walking within 6 h and her drain was removed at 24 h with 35 ml of serohematic expenditure. She tolerated a liquid diet without incident. A control fluoroscopy at 24 h showed no alterations, and she was discharged at 48 h as per a normal recovery regimen. A follow-up consultation was carried out over telephone 6 months after the surgery, at which time the patient reported a weight loss of 24 kg. She adhered to the prescribed diet and wound care regimen. There were no complications and the patient resumed a normal daily routine with adequate food intake.

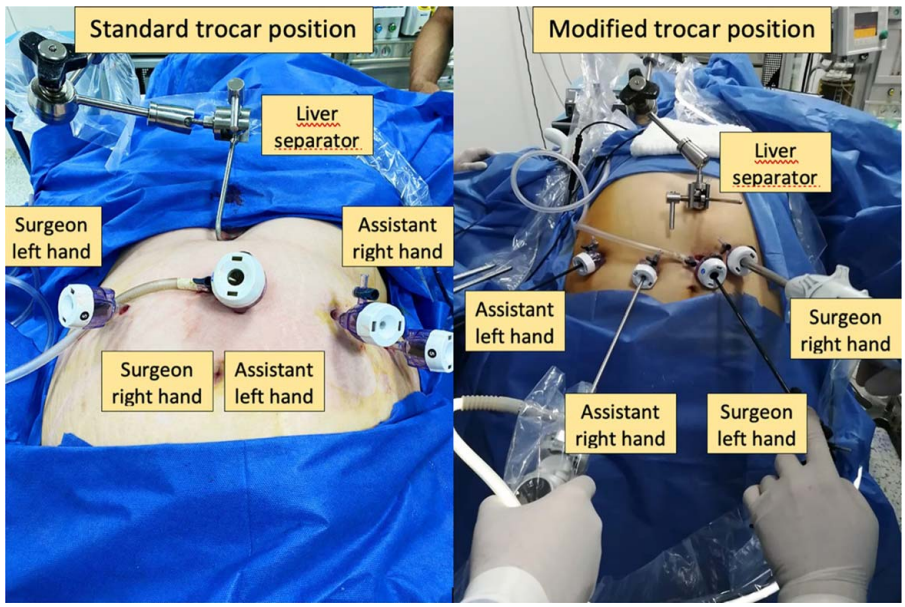


**Figure 2.** Comparison between the standard position of trocars and the modified position.

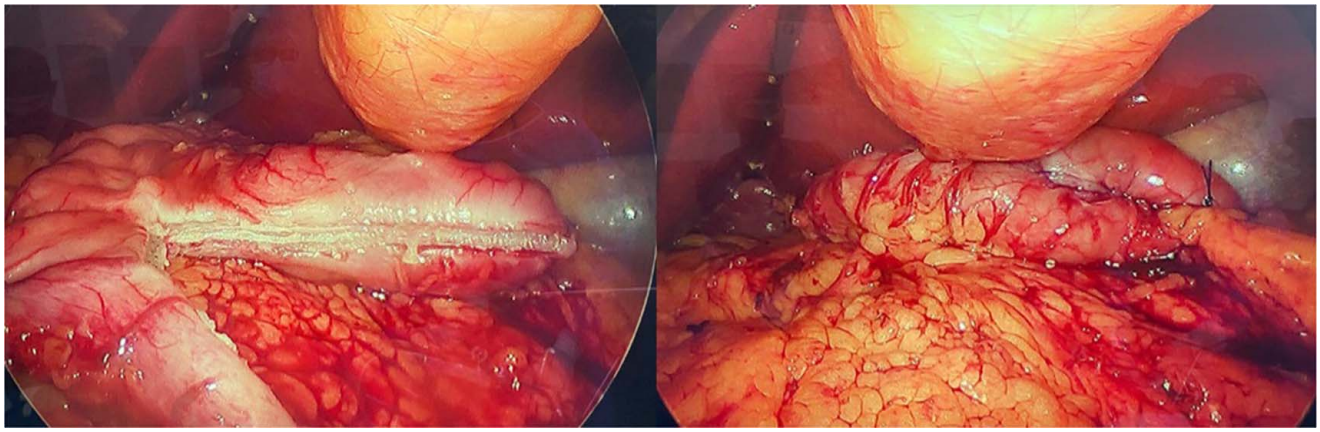

**Figure 3.** Staple line before and after reinforcement.

## Discussion

The first report of laparoscopic bariatric surgery in situs inversus was published in 1998. Since then, ~20 cases have been anecdotally documented, with ~50% reporting gastric sleeves, 25% reporting bypasses, and 25% documenting gastric banding[2]. Because SIT is a rare condition, surgeons with high patient volumes should expect to see it once or twice over the course of their career[2]. Preoperative diagnosis is important because, from the standpoint of anesthesia, it can help prevent pulmonary and cardiac issues, and from a surgical viewpoint, proper planning for these patients can help lower the risk of complications[7].

The placement of trocars must be precise for these patients because there are no established guidelines for these cases, and the surgeon must adapt them according to the situation (Fig. 2), following the principles of triangulation and ergonomics. Occasionally, the placement of an extra trocar may be necessary[8]. These patients require greater flexibility and creativity from the surgical team. However, our results in the reported case were promising. The average surgical time reported for gastric sleeves in patients without anatomical variations ranges 60–120 min[9]. In this case, the surgical time fell within this range despite the patient's anatomical abnormalities; however, this may depend on the experience and skill of the surgeon.

Other authors agree with our conclusion that different types of bariatric surgeries are safe treatment options for obese patients with SIT. Catheline *et al.*[10] described a normal recovery in a 19-year-old patient with a BMI of 76, without transoperative or postoperative complications, resulting in a reduction of the patient's BMI to 55 kg/m$^2$ at 9 months post-surgery. Similarly, Ersoy *et al.*[11] reported the placement of a laparoscopic gastric band in a 33-year-old patient with SIT, weighing 132 kg, without any transoperative or postoperative complications, resulting in a weight loss of 42 kg at 18 months post-surgery. In a case reported by Ahmed and O'Malley[12] of a patient with SIT with a BMI of 58.1 kg/m$^2$ who underwent a Roux-en-Y gastric bypass, the surgery was performed without incident and the postoperative period progressed without any associated complications. That patient's BMI dropped to 49 kg/m$^2$ within 4 months following the surgery.

Although there were no postoperative complications in the cited case reports, many authors agree that surgery times are generally longer in these patients compared to patients with normal anatomies, due to the various modifications that must be made in the operating room. This case report confirms that bariatric treatment can be performed satisfactorily, without the need to make changes to the usual gastric sleeve technique. However, making small modifications in the positions of the trocar entry ports helps to perform the surgery with greater ease and fewer trans-surgery complications.

The number of patients opting for bariatric surgery is expected to increase in the coming years, as it is one of the best options for the treatment of obesity in the medium term and long term. Consequently, there will be an increase in the number of patients presenting with SIT, either as a previously known condition or as a novel finding in the presurgical assessment. Gastric sleeve surgery should be considered an effective and safe procedure in these patients as long as the surgeon is prepared, makes the necessary technical adjustments with their team, and has the necessary experience and skills[13].

## Conclusions

Laparoscopic gastric sleeve surgery is a feasible and safe procedure for patients with morbid obesity and situs inversus. A good understanding of anatomy facilitates the procedure as long as it is performed by an experienced surgeon.

## Ethical approval

The patient and the ethical committee were informed and agreed to the publication of this case report.

## Consent of patient

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Patient perspective

At first, the patient was uneasy and worried; however, the surgery was successful and the patient was happy and grateful to the surgical team.


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## Author contribution

J.E.O.G. and P.S.A.H. obtained the patient data and performed the surgical treatment. I.E.E. and J.A.G.B. analyzed and interpreted the data and were major contributors in writing the manuscript. J.E.O.G. revised the manuscript, reviewed the available data, and prepared figures.

## Conflicts of interest disclosure

The authors declare that they have no financial conflicts of interest with regard to the consent of this report.

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None.

## Guarantor

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