Submitted: 13 October, 2022 Accepted: 11 January, 2023 Published: 08 September, 2023 DOI:10.22514/sv.2023.093

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CASE REPORT

Intraoperative gastroscopy during laparoscopic sleeve gastrectomy after gastric band surgery with unrecognized hiatal hernia—a case report

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Abstract

Obesity is the civilizational disease of our era, and often leads to comorbidity, hypertension, diabetes and obstructive sleep apnea. Contemporary non-surgical treatment for obesity is frequently inefficient, resulting in the increased prominence of surgical procedures, specifically, laparoscopic sleeve gastrectomy (LSG). In our case report, we present a case in which LSG was not feasible in reference to the traditional surgical technique due to severe hiatal hernia (HH), which inexplicably went undetected during preoperative examinations, however, with the help of intraoperative gastroscopy, the problem was effectively solved. The patient, a middle-aged Caucasian male, underwent removal of a gastric band due to gastric band migration, and was presented for LSG due to repeated weight gain. During the operation, the insertion of the bougie proved unsuccessful after several attempts. Through intraoperative gastroscopy, a severe HH was discovered. The endoscope was inserted into the compromised passageway leading into the stomach, effectively substituting the role of bougie used in the traditional surgical procedure. Unexpected difficulty or inability to insert a bougie is rare in consideration of LSG, however, in this case, surgery could not have been performed in the conventional manner. During intraoperative gastroscopy, the gastroscope is inserted into the stomach using visual control, and effectively substitutes the bougie function. The likelihood of rare, yet severe, life-threatening complications from the insertion of a bougie is reduced and surgery can be performed in the traditional sense. We have no knowledge of cases in which a HH prevents the conventional surgical technique. However, in extreme cases in which the traditional non-surgical technique and other types of surgery are deemed unsuitable, intraoperative gastroscopy provides a simple and safe solution.

Keywords

Bariatric surgery; Gastrectomy; Gastroesophageal reflux; Hernia; Hiatal; Gastroscopy; Comorbidity; Sleep apnea; Obstructive

1. Introduction

In cases regarding patients with obesity, the excessive fat deposit may prove detrimental to health leading to the development of comorbidities resulting in the reduction of life expectancy [1]. Obesity, due to the disruption of metabolic processes by genetic, central nervous system, endocrine or environmental factors, results in the alteration of energy balance. Mainly, the multi-effects of several factors including excessive calorie intake, lack of exercise and genetic predisposition lead to the development of obesity, while, in other cases, genes, endocrine disorders, drugs or psychiatric diseases are the causative factors [2].

Obesity increases the risk of development regarding certain diseases, especially cardiovascular diseases, type 2 diabetes mellitus, obstructive sleep apnea syndrome [3], tumors, osteoarthritis and degenerative diseases. In patients afflicted with obesity, major forms of surgery, polytrauma, severe burning, severe infections, sepsis and COVID-19 infections exponentially deters a successful outcome.

Ghrelin, produced by the stomach, results in neuropeptide Y secretion by stimulating the nucleus arcuate receptors [4], affects energy balance, provokes hunger, increases ingestion and promotes fat deposition [5].

Effective treatment of extreme obesity and its comorbidities often requires surgical intervention. Recently, laparoscopic sleeve gastrectomy (LSG) is the most common and up-to-date form of surgery, which consists of endoscopic removal of approximately 75% of the stomach's greater curvature, unlike gastric bypass. In consideration of both LSG and laparo-

scopic Roux-en-Y gastric bypass (LRYGB), "no differences were observed in the percentage of excess weight loss or the resolution of type 2 diabetes mellitus and hypertension. The hypercholesterolemia improvement/resolution rate was lower in the LSG group than in the LRYGB group" [6]. Strikingly, when comparing LSG and LRYGB, "there were more complications after LRYGB, but the individual burden for patients with complications was similar after both operations" [7]. Furthermore, in contrast to LSG, LRYGB is associated with malabsorption (vitamin B12). LSG possesses more attack points including volume restriction and reduces the amount of consumable nutriments. Additionally, in reducing ghrelin secretion of the stomach, once the portion of the upper stomach is removed, fundus epithelial cell function is non-existent, hence, the procedure is now considered a metabolic operation.

We reported a case referencing LSG with preoperatively unrecognized severe hiatal hernia (HH), in which the bougie, due to its unsuccessful insertion, was replaced by the gastroscopic device. Without effectively implementing this solution, the planned LSG could not have been performed in the traditional way, and the patient's status would have returned to non-surgical, conservative methods, of which, had previously proved unsuccessful. As an additional option, another operation, essentially an LRYGB, would have to be performed, due to aforementioned reasons and it would have been a less favorable solution for the patient.

During the operation, with effective gastroscopic assistance, the mobilization and retraction of the thoracic portion of the stomach to the abdominal cavity was performed using an endoscope.

Our goal is to provide a simple and safe solution for clinicians who encounter a similar problem in describing the case.

To the authors' knowledge, there is no published case report in which clinically significant HH makes it impossible to perform LSG in a conventional manner.

In writing our case report, we fully adhered to the guidelines of the Committee on Publication Ethics (COPE) and the International Committee of Medical Journal Editors (ICMJE) Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals.

2. Case report

A 47-year-old Caucasian male currently prescribed esomeprazole (Esomeprazol Sandoz, 2 × 40 mg), presented with a family history of varicectomy. The patient's body mass index (BMI) was 48.7 kg/m^2 (174 kg), of which, following gastric band surgery in 2016, was reduced to a BMI of 26.6 kg/m^2 (95 kg). Abdominal skin and subcutaneous tissue relaxation occurred due to weight loss and an abdominal dermolipectomy with umbilical restoration was performed in 2019. One year later, the patient presented with abdominal complaints due to gastric band migration. The gastric band was removed in March 2020, resulting in steady weight gain, which necessitated the reoperation of the patient in March 2021 (BMI of 42.27 kg/m^2; 151 kg).

Preoperative consultations and examinations including gastroscopy were carried out as suggested by protocol, showing no contraindications of the operation. Inexplicably, HH was not discovered during the preoperative gastroscopic examination. In terms of radiological examinations, in addition to gastroscopy, an abdominal ultrasound examination was also performed, and no abnormalities were detected in the examined organs. Echocardiography and a respiratory function test were also performed, of which, no significant differences were described.

Based on preliminary consultations, LSG was proposed. The proposed surgery was carried out following preparation, and an intact abdominal anatomy was found with mild scarring under the diaphragm.

After separating the omentum and repairing the scars adjacent to the diaphragm, anesthetists attempted to insert the bougie, which proved to be unsuccessful following several attempts. Hence, acute intraoperative gastroscopy could not be technically carried out and the operation was delayed to avoid mediastinal perforation. It was decided to adjourn the operation and allow the patient's general anesthesia to wear off, since LSG cannot be performed without successful insertion of the bougie into the stomach. LRYGB was not a potential consideration due to the reasons detailed above. A LRYGB would prove less favorable regarding the patient. Additionally, the patient authorized informed consent only to the LSG after the prior surgical consultation. The intervention was performed the following day using gastroscopic assistance. Following the appropriate preparations, general anesthesia was initiated and gastroscopy was performed. The examination revealed an intact oesophagus with epithelium transition at 38 cm, however, nearly two-thirds of the stomach was herniated above the diaphragm, which led to the unsuccessful insertion of the bougie during the previous operation. The corpus, passage fold, antrum, pylorus, bulbus and postbulbar duodenum were intact. The thoracic portion of the stomach was mobilized by endoscope, and the stomach was drawn back into the abdominal cavity. Resection of the greater curvature was performed by firmly maintaining the gastroscope along the lesser curvature (Fig. 1).

In our case, a portion of the patient's stomach was removed and the endoscope was used to contour the interior of the remaining portion of the stomach, which replaced the role of bougie used in the traditional surgery technique. This was followed by laparoscopic localization and resection of the 2–3 cm large pouch under the passage fold and was performed using an endoscope. Furthermore, 60 mL of methylene blue solution was injected into the stomach without signs of dye emission. The gastroscope-assisted resection was followed-up by tumbling the 8 cm long separated portion above the diaphragm using endo stitch, and fixing it to the left diaphragm. Additionally, omentum was also applied in support of tamponade. The postoperative course was uneventful, fever was not present, abdominal drains were removed and probe feeding was introduced. The patient received postoperative education referencing proper eating behavior following surgery (oral and written suggestions), and was discharged from the hospital with healing, reactionless wounds and medication prescriptions, including pantoprasol (Controloc, 2 × 40 mg tablets) per os for 10 days and 1 × 0.6 mL enoxaparin (Clexane 6000 NE, 60 mg/0.6 mL) subcutan, followed by the administration of rivaroxaban (Xarelto 1 × 10 mg tablets per os for 20

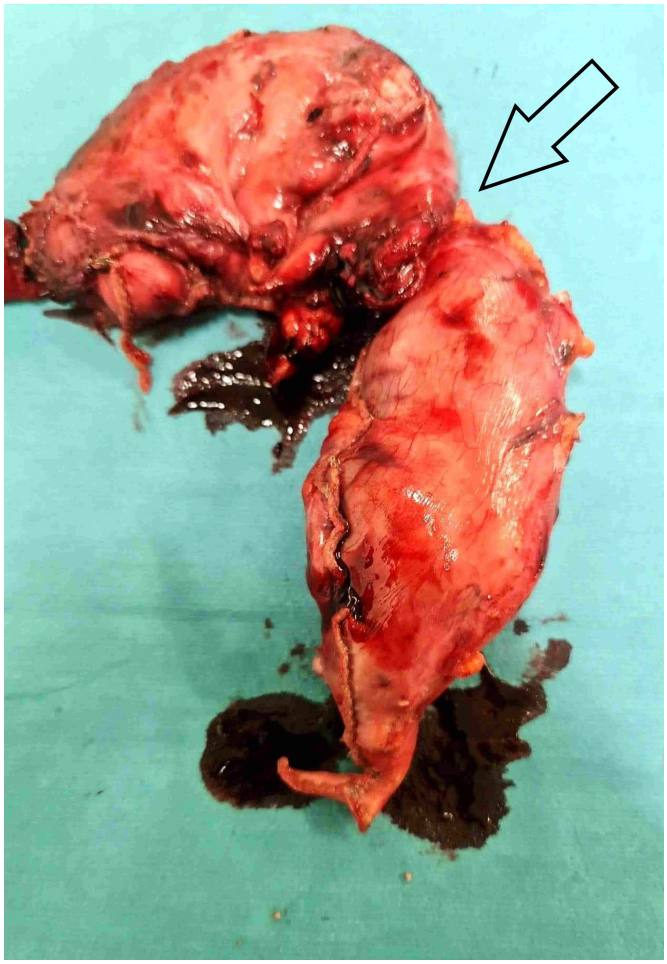

FIGURE 1. Removed portion of the patient's stomach. The indentation marked with an arrow shows the earlier location of the hiatus esophagus.

days). Personal control consultations and telephone consultations were carried out several times. The patient expressed no complaints during the control examinations. Recovery was uneventful. Six months following the LSG, the BMI of the patient was reduced to 35.6 kg/m^2 (127 kg).

3. Discussion

According to a study, "morbidly obese patients commonly have gastroesophageal reflux and associated HH. Based on the same examination, 'the prevalence of HH was 37.0% and of gastroesophageal reflux disease (GERD) was 39.8%; the prevalence of moderate or large hiatal hernia was 4.4%, and the prevalence of moderate or severe GERD was 13.3%' [8]. The HH repair can be performed concomitant with the LSG operation, however, "symptomatic and de novo GERD rates found to be higher" in concomitant operated LSG and HH group than when compared to those in the LSG group [9].

"The gold standard for all symptomatic reflux patients is still surgical correction of the paraesophageal hernia, hiatal closure and fundoplication" [10].

The lack of the aforementioned surgical correction in patients with obesity and HH may lead to severe consequences during bougie insertion. In our case, the failure of the blind insertion of the bougie was due to an unknown severe case of HH in the patient.

During intraoperative gastroscopy, the gastroscope was successfully inserted into the intra-abdominal region of the stomach through the gastric portion which was largely herniated in the chest cavity, in contrast to the blindly operated bougie, which was thought to be trapped in the herniated area of the stomach even after repeated attempts.

On the other hand, after the thoracic portion of the stomach was mobilized by endoscope and was drawn back into the abdominal cavity, the stomach was narrowed and positioned using the gastroscope, which replaced the role of bougie in the traditional surgery technique.

Additionally, in a high majority of cases, the insertion of the bougie rarely leads to serious, life-threatening complications, including esophageal rupture and mediastinitis. A case report presents a cervical esophageal perforation caused by the use of bougie during LSG which led to the severe complication described above [11].

In consideration of another case report, even the insertion of a significantly thinner nasogastric tube insertion may lead to the same severe complication described above [12].

Severe HH can make the procedure significantly more difficult, if not impossible, to insert a bougie during LSG. During intraoperative gastroscopy, the gastroscope was expected to be successfully inserted into the stomach and in this case, in replacing the function of bougie, it allowed the surgery to be performed in a conventional manner.

Intraoperative gastroscopy provides an elegant, simple, accessible and safe solution for the clinical problem presented earlier.

To the authors' knowledge, there is no published case report in which the remaining portion of the stomach was contoured in the use of the endoscope, which replaced the role of bougie in the traditional surgery technique.

4. Conclusion

Our case draws attention to the relevance of a thorough, careful preoperative examination, since as in the case of an asymptomatic patient, a severe HH was not detected during the preoperative examination, which underlines the importance of a careful clinical and endoscopic preoperative evaluation, specifically, among obese patients undergoing sleeve gastrectomy.

Our case also highlights, on rare occasions, HH makes it impossible to insert the bougie blindly during LSG, in which it is impossible to perform conventional surgical techniques. To solve this problem, intraoperative gastroscopy provides a simple and safe solution.

ABBREVIATIONS

LSG: Laparoscopic sleeve gastrectomy; BMI: Body Mass Index; HH: Hiatal Hernia; GERD: Gastroesophageal Reflux disease; LRYGB: Laparoscopic Roux-en-Y Gastric Bypass.

AVAILABILITY OF DATA AND MATERIALS

The patient's data is available in appropriate official hospital electronic data storage systems.

AUTHOR CONTRIBUTIONS

MS—conducted the clinical study and was a major contributor in writing the manuscript. SM—performed the anesthesia, analyzed and interpreted the patient data regarding the disease and surgerical outcomes, additionally, SM was a contributor in writing the manuscript. GT—performed the surgery, and was a contributor in writing the manuscript. BN—was a contributor in writing the manuscript. SR—was a contributor in writing the manuscript. All authors contributed to editorial changes in the manuscript, read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The case report was conducted in full accordance with the Declaration of Helsinki, and the protocol was approved by the Local Research Ethical Committee of University of Pécs, Medical School (protocol code: 8832-PTE-202, date of approval: 11 July 2021). Written informed consent was obtained from the patient to publish this paper as well as recording his medical data and using it anonymously in our research.

ACKNOWLEDGMENT

Not applicable.

FUNDING

This research received no external funding.

CONFLICT OF INTEREST

The authors declare they have no competing interests. There were no sponsors involved in the interpretation, nor writing of this case report.

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How to cite this article: Miklós Siptár, György Tizedes, Bálint Nagy, Szilárd Rendeki, Sándor Márton. Intraoperative gastroscopy during laparoscopic sleeve gastrectomy after gastric band surgery with unrecognized hiatal hernia—a case report. Signa Vitae. 2023; 19(5): 254-257. doi: 10.22514/sv.2023.093.