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ORIGINAL ARTICLE

Incidence and Management of Vomiting After Laparoscopic Sleeve Gastrectomy

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Abstract

Introduction: **Morbid obesity is a serious health concern on a global scale. Laparoscopic sleeve gastrectomy remains one of the safest and most effective modern surgical options for the treatment of morbid obesity. Although laparoscopic sleeve gastrectomy is safe and efficacious, postoperative vomiting is abundantly common and problematic.**

Aim: **This study's objective was to assess the frequency of vomiting 6 months after a laparoscopic sleeve gastrectomy, its causes with investigations, and ways of management.**

Patients and methods: **This study comprised eighty (80) people who were morbidly obese. Preoperative evaluations and a 6-month postoperative follow-up were performed on all patients undergoing laparoscopic sleeve gastrectomy. At the Al Azhar University Hospitals in Cairo, Egypt, patients were treated. Retrospective controls were used for the study from February 2021 to May 2022.**

Results: **Large percentage of patients (40%) developed postoperative vomiting during the first 48 postoperative hours. While (5%) of cases continue to suffer from vomiting during the postoperative 6 months.**

Conclusion: **Laparoscopic sleeve gastrectomy is highly effective and widespread in weight loss operations that have their own specific complications. Our results show that postoperative vomiting after Laparoscopic sleeve gastrectomy represents a significant complication that occurs commonly after Laparoscopic sleeve gastrectomy. Vomiting of medical causes responds well to centrally-acting antiemetics. And to a lesser extent, endoscopic and surgical interventions were required for technical problems.**

Keywords: After laparoscopic, Incidence, Management, Sleeve gastrectomy, Vomiting

1. Introduction

Morbid obesity is a serious health concern on a global scale. Although some individuals can lose extra body weight through lifestyle changes, workout routines, and diet plans, many people still choose to have bariatric surgery as their chosen treatment option. Excellent results have been achieved with bariatric surgeries in terms of weight loss and comorbidity reduction.[1] Bariatric operations can be restrictive (like sleeve gastrectomy and adjustable gastric bands) malabsorptive (like biliopancreatic diversion) or both (like Roux-en-Y gastric bypass surgery) depending on how they are carried out.[2] Laparoscopic sleeve gastrectomy is one of the safest and most effective surgical procedures for the treatment of morbid obesity currently accessible.[3] Significant morphological and functional changes result from the ablation of the gastric fundus, which comprises a sizable amount of the body and the antrum. These changes influence stomach acid secretion and motility, including accommodation, which may result in GI discomfort.[4]

After restrictive bariatric operations, like as sleeve gastrectomy, nausea and vomiting can occur postoperatively. This is mostly because the gastric capacity is drastically reduced. However, additional factors may be at play. Although the laparoscopic sleeve gastrectomy is safe and efficacious, postoperative vomiting is abundantly common and problematic.

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Laparoscopic sleeve gastrectomy patients are more prone than patients of other bariatric surgeries to experience postoperative vomiting, with as many as 65% of patients having it within the first 24 h.[5]

The purpose of this study was to assess the frequency of vomiting for 6 months following laparoscopic sleeve gastrectomy, as well as its underlying reasons and available treatment options.

2. Patients and methods

This study comprised 80 people who were morbidly obese. All patients receiving laparoscopic sleeve surgery underwent preoperative examinations and a 6-month postoperative follow-up. Patients were treated at Al Azhar University Hospitals in Cairo, Egypt. The study was controlled retrospectively, from Feb. 2021 to May 2022. Ethical approval from the local ethics committee of surgery department was obtained.

Inclusion criteria: Morbidly obese patients with BMI more than 40 with or without co-morbidity, morbidly obese patients between 18 and 55 years old, obesity that did not respond to dietary regimen, both genders were included and patients are generally fit for anesthesia and surgery.

Exclusion criteria: Medically unfit patients for anesthesia and surgery in general, patients refuse to do surgical intervention or refusing to participate the research, patients with previous malabsorptive or restrictive procedure performed for the treatment of obesity or a history of gastroesophageal surgery, extremities of age, pregnancy or lactation at screening for surgery, patients with any medical condition e.g.: poorly controlled diabetes, history of chronic nausea and emesis requiring medications, patients with history of HH or GERD proved with upper endoscopy and inability to provide informed consent.

2.1. Methods

All patients were subjected to the followings:

2.2. Preoperative assessment

Thorough preoperative history taking including: Age and sex, age of onset of obesity, previous trails of conservative weight reduction and history of obesity related co-morbidities: Major: Cardiovascular diseases: hypertension and coronary artery disease (CAD), diabetes mellitus (DM), dyslipidemia, respiratory system: sleep apnea and obesity hypoventilation syndrome, osteoarthritis, and infertility. Minor: Lower extremity venous stasis disease, gastroesophageal reflux disease (GERD), urinary stress incontinence and menstrual irregularities. Past surgical history, Dietary habits: to detect eating disorders such as Binge Eating Disorder (BED), overeater (OE), atypical Eating Disorder (AED) and sweet eater:

Abdominal Ultrasound: To determine size of liver and spleen and presence of gall bladder stones.

Upper GIT endoscopy: To exclude any upper GIT lesions.

Preoperative quality of life evaluation: It utilises the Moorehead-Ardelt Quality of Life Questionnaire II (M-A QoLQII). In order to gauge a patient's subjective assessment of their quality of life in the following areas: general self-esteem, physical activity, social interactions, work satisfaction, sexual enjoyment, and dietary habits Preoperative DVT prophylaxis: Clexane (Enoxaparin sodium: low molecular weight heparin LMWH): 40 mg (4000 IU) subcutaneous injection 12 h prior to surgery.

Surgical Procedure: All the patients underwent lap sleeve gastrectomy.

2.3. Technique of laparoscopic sleeve gastrectomy (LSG)

Operational room layout, under general anesthesia with cuffed endotracheal intubation, the patient is placed in the supine split-leg position with reverse Trendelenburg with assurance of adequate support for the extremities to prevent falls during position changes of the operating table. Calf compression was used during the procedure to prevent DVT, and the patient is then placed in the prone split-leg position (Figs. 1–6).

2.4. Follow-up

Post-operative follow-up for all patients for early postoperative complications like bleeding, leakage, superficial or deep infection, vomiting, gastric stenosis and twisting.

2.5. Statistical analysis

The SPSS v26 statistical analysis programme was used (IBM Inc., Armonk, NY, USA). Histograms and the Shapiro-Wilks test were employed to assess the normality of the data distribution. The mean and range of quantitative parametric data were displayed. The median and range of quantitative nonparametric values were displayed. Frequency and percentages were used to depict the qualitative factors. (%).

3. Results

The retrospective study included 80 patients presented with morbid obesity with BMI range between

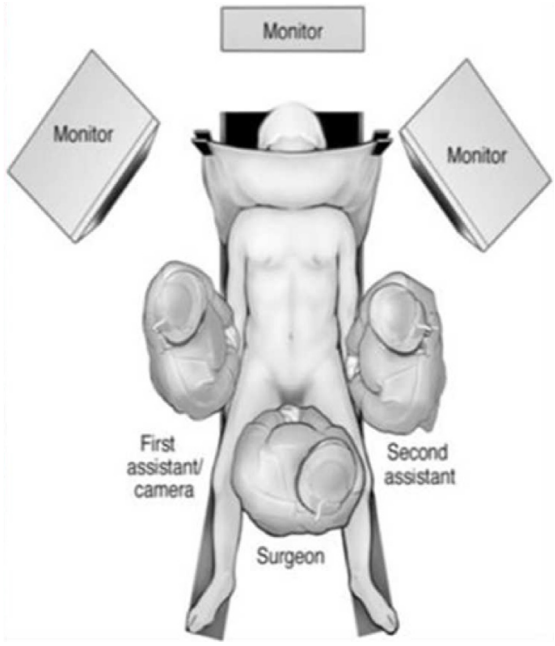

Fig. 1. The surgeon standing between patient's legs.

(40–55) kg/m^2 who were treated surgically by laparoscopic sleeve gastrectomy in Al-Azhar university hospitals during the period from January 2021 to 2022.

There were 60 females and 20 males Table 1.

The age of the patients ranged between 18 and 55 years with mean of 37.9 years old years for all patients. With male ranging between 26 and 55 years with mean of 41.8 years and females ranging between 18 and 58 years with mean of 37.3 years Table 2.

The body mass index of these morbidly obese patients included in this study was ranging from 40 to 55 kg/m^2 (median BMI for female was 37.3 kg/m^2 and for male …… kg/m^2) with a median for all patients …. Kg/m^2. Table 3.

(75%) of patients had no comorbidities while (5%) were diabetic, (15%) were hypertensive and (5%) were asthmatic Table 4.

Searching for H. Pylori antigen in stool before surgery (75%) rendered negative while (25%) were marked positive by the test. Table 5.

A large percentage of patients (40%) developed postoperative vomiting during the first 48 postoperative hours. While (5%) of case who continue to suffer from vomiting during the postoperative 6 months. Table 6.

The management of persistent vomiting: 5% of patients had persistent vomiting during the postoperative 6 months, endoscopic treatment was successful for 2 of the 4 patients (50%), after ball on dilatation and insertion of stent. 2 of the 4 patients (50%) required surgical intervention. Table 7.

3.1. Case (1)

Complained with vomiting, regurgitation, reflux within an average of 1 month after gastric sleeve.

Upper contrast study was done routinely as a first diagnostic tool which revealed axial twist upper endoscopy was performed to confirm absence of an organic stricture endoscopic intervention was done

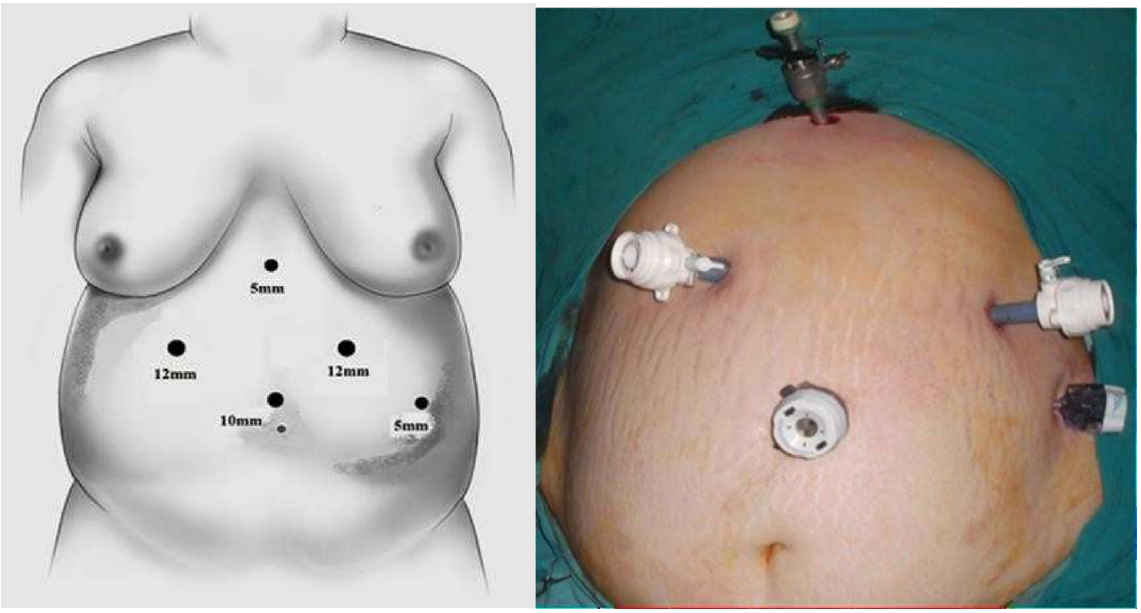

Fig. 2. Trocar positions for LSG.

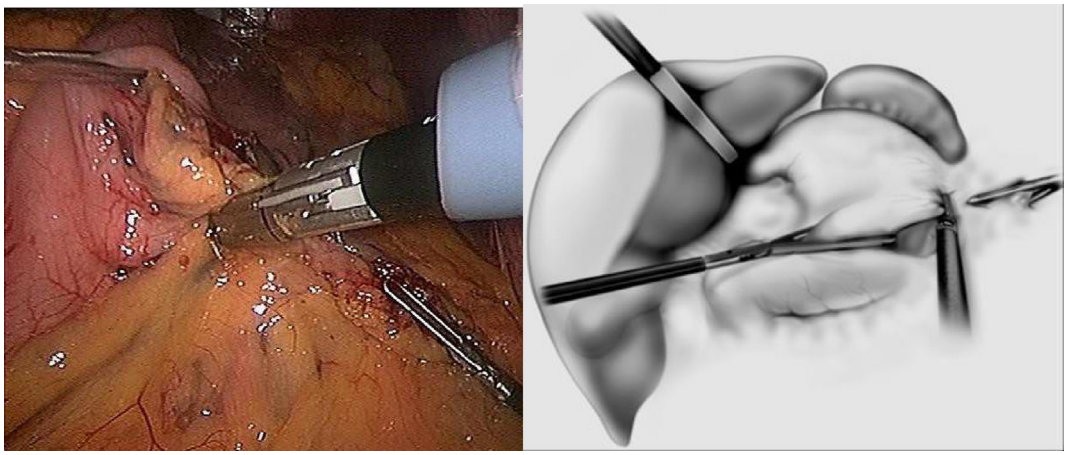

Fig. 3. Greater curvature dissection.

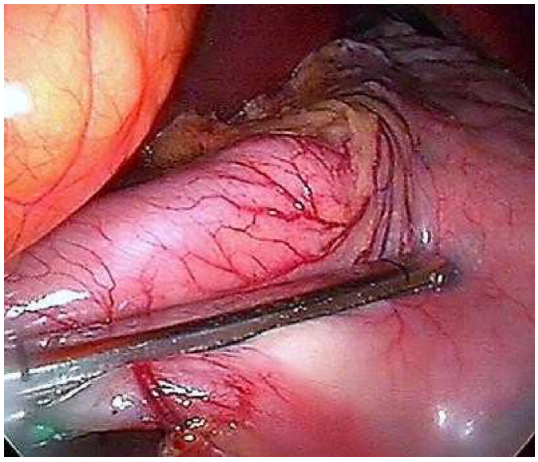

Fig. 4. Selecting the point in the antrum where the stapler firing.

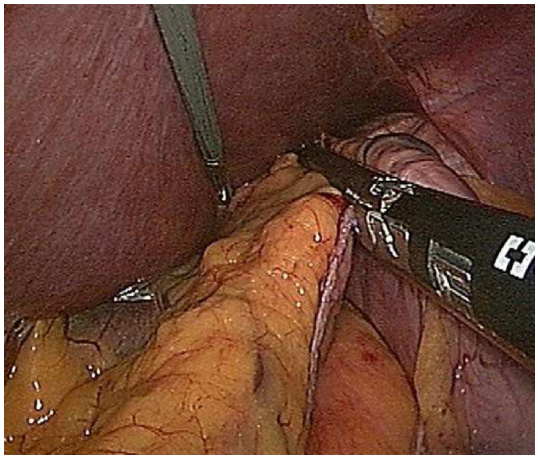

Fig. 5. The stomach after completion of the SG.

and balloon dilatation in two sessions with a weak interval Fig. 7.

3.2. Case (2)

Complained with vomiting by epigastric pain, post prandial bloating, Upper GI endoscopy confirmed the presence of axial twist. Endoscopic balloon dilation was done and the patient was free of symptoms for a few weeks and then relapsed again.

The case was managed surgically with laparoscopic adhesiolysis and gastropexy Figs. 8 and 9.

3.3. Case (3)

Underwent LSG suffered from persistent postoperative vomiting and progressive dysphagia to fluids. With UGI endoscopy, the case had gastric outlet stenosis. Therefore, the case was managed endoscopically by dilation with stent insertion Fig. 10.

3.4. Case (4)

Underwent LSG with delayed recovery complained of recurrent episodes of postoperative vomiting.

UGI contrast study showed long segment of stricture at the level of incisura angularis. Endoscopy confirmed the diagnosis, but an attempt to place a fully covered stent was unsuccessful, because of a stent displacement noted the day after the procedure. Surgical revision to RYGB done Figs. 11 and 12.

4. Discussion

Obesity is an issue that is spreading around the globe and is a chronic medical condition Puzziferri

Fig. 6. Specimen of LSG during extraction.

Table 1. Sex distribution of the studied patients.

	Female	Male
Number of patients	60	20
Percentage	75%	25%

Table 2. Age distribution of the studied patients.

Age (years)	Female	Male	Total
Range	18–52	26–55	18–55
Mean	37.3	41.8	37.9

Table 3. Body mass index (BMI) of the studied patients.

BMI (Kg/m^2)	Female	Male	Total
Range	42.3–54.8	40.1–53.9	40.1–54.8
Median	47.5	45.8	46.7

Table 4. Comorbidities distribution of the studied patients.

	Number of patient (Percentage)
DM	4 (5%)
HTN	12 (15%)
Asthmatic	4 (5%)
No-comorbidity	60 (75%)

DM, Diabetes Mellitus; HTN: Hypertension.

Table 5. Preoperative H. Pylori infection distribution of the studied patients.

	Positive	Negative
No. of patients	20	60
Percentage of patients	25%	75%

Table 6. Distribution of percentage of postoperative vomiting of the studied patients.

	Number of patients (Percentages)
Vomiting during first 48 h	32 (40%)
Vomiting during the postoperative 6 months	4 (5%)

Table 7. Distribution of the management of persistent vomiting of the studied patients.

Management of persistent vomiting	No. of patients (Percentage)
Endoscopic intervention	2 (50%)
Surgical intervention	2 (50%)

and colleagues.[6] The most successful long-term option for metabolic regulation and weight loss in obese people has been demonstrated to be bariatric surgery Puzziferri and colleagues.[6] With the introduction of laparoscopic surgery, the bariatric surgery complication rates have considerably dropped Hajjar and colleagues.[7] Adjustable gastric bands and sleeve gastrectomy are two examples of bariatric procedures that are either restrictive, lowering the amount of nutrients absorbed or malabsorptive, lowering the amount of food ingested. A different illustration is biliopancreatic diversion (e.g.; Roux-en-Y Gastric bypass surgery) Wolfe and colleagues.[8]

This study looked at the frequency and treatment of vomiting 6 months following laparoscopic sleeve gastrectomy. 80 patients with morbid obesity who underwent laparoscopic sleeve gastrectomy surgery and were followed-up for 6 months were included in

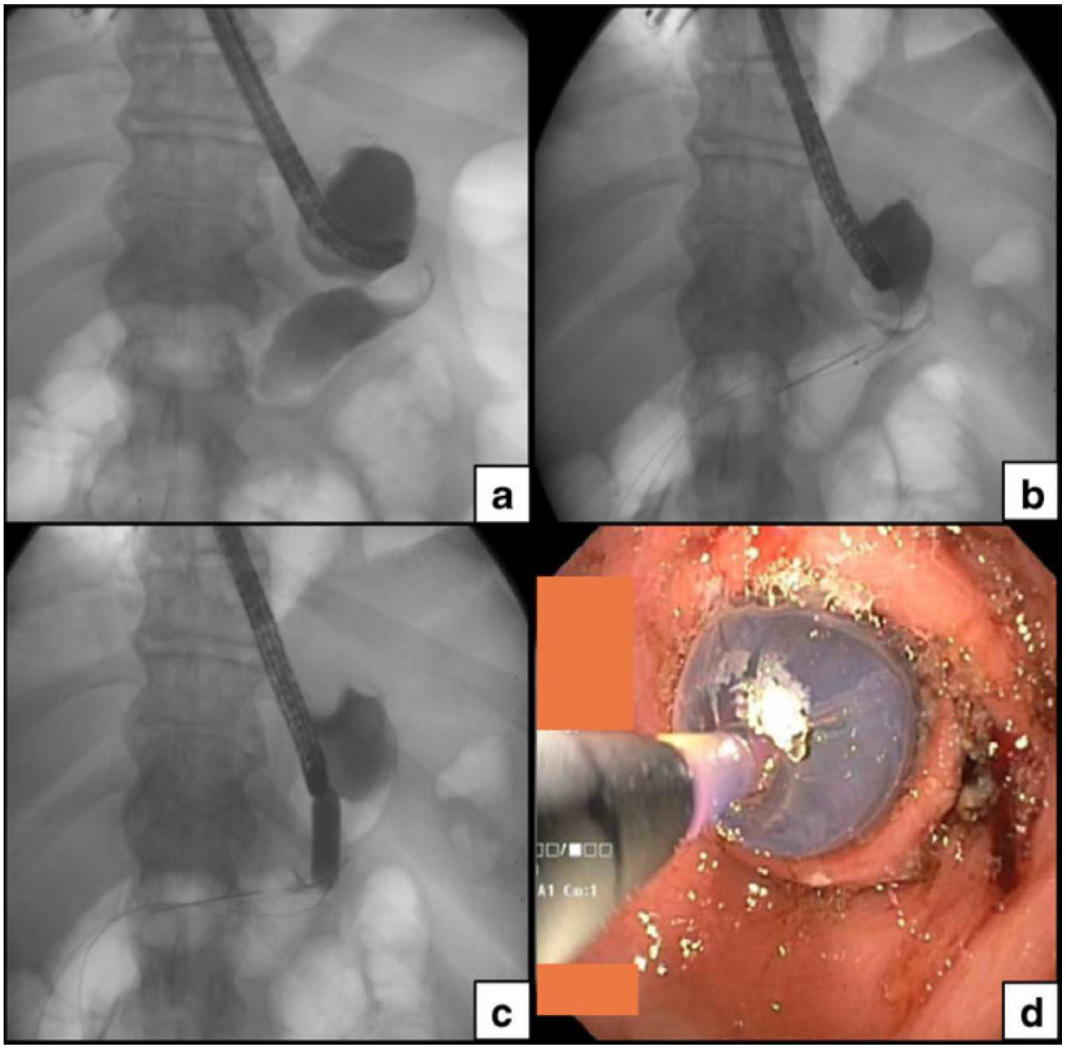

Fig. 7. Endoscopic procedure for GS. (a) Endoscopic procedure showing GS. (b) Implementation of guidewire through the scope below the GS. (c) Dilatation of GS with under control of fluoroscopy using 30 mm-diameter achalasia balloon with 20 psi pneumatic pressure. (d) Endoscopy findings during dilatation of GS.

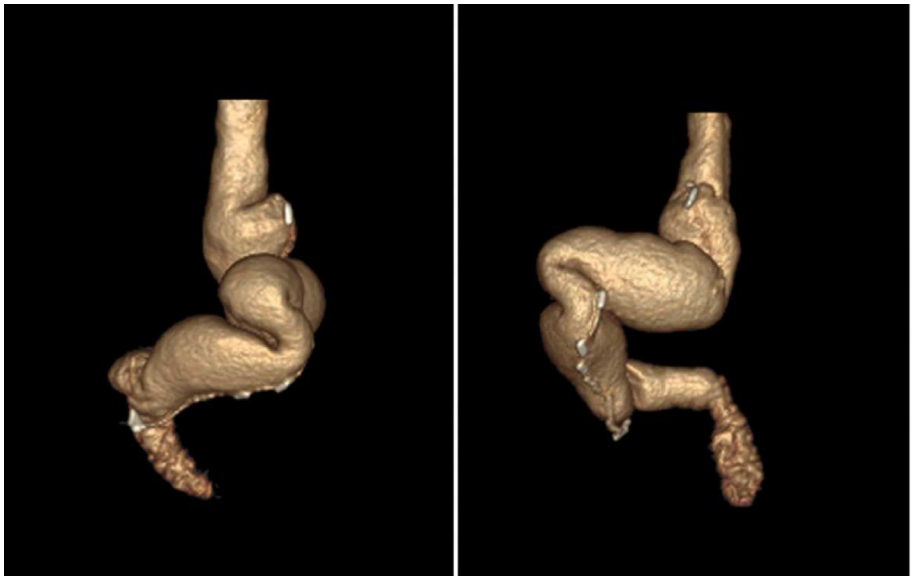

Fig. 8. Computed tomography (CT) volumetry with three dimensional reconstruction diagnoses gastric axial twist.

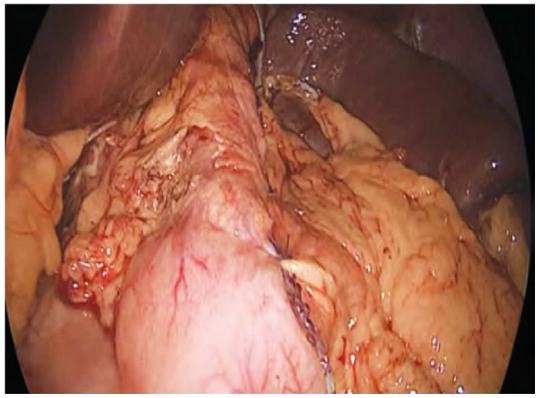

Fig. 9. Sleeve after gastropexy.

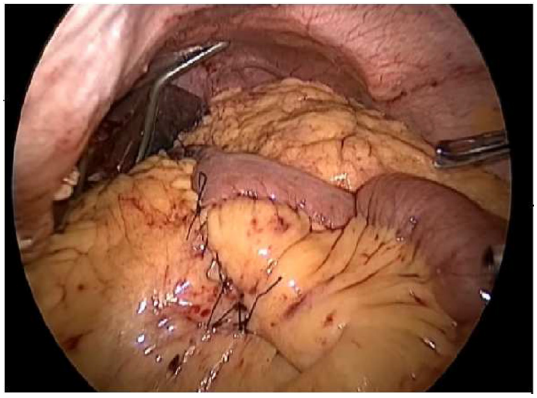

Fig. 12. After conversion to RYGB.

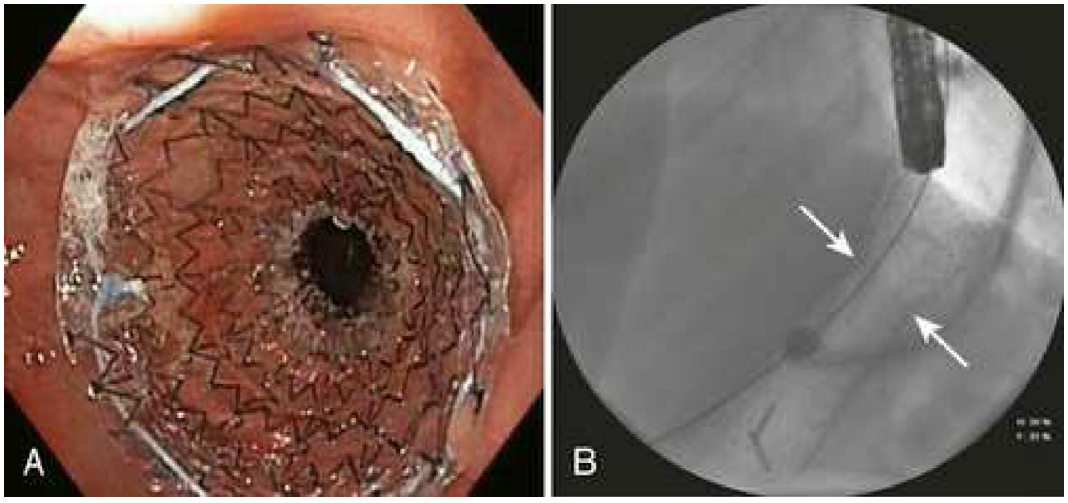

Fig. 10. Endoscopic stent insertion.

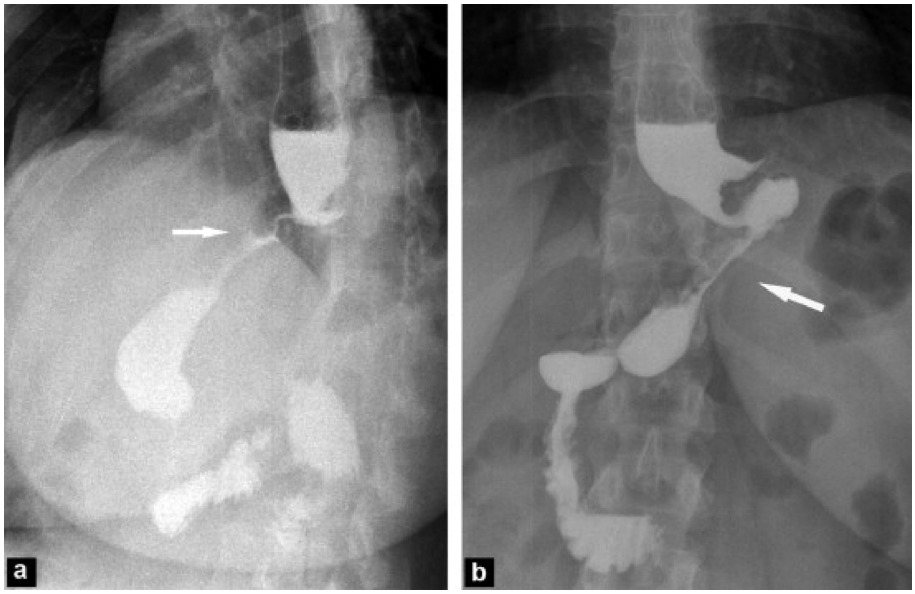

Fig. 11. Stricture complicating LSG with delayed contrast passage. (a) Oblique view (b) Antero posterior (AP) view.

this retrospective investigation. All patients underwent rigorous procedures to acquire their personal, medical, and surgical histories, as well as testing for post-operative vomiting. In our study, individuals with morbid obesity had a body mass index (BMI) ranging from 40 to 55 kg/m^2, an average age of 37.9 years, and 20% of them were smokers. Suh and colleagues, Puzziferri and colleagues[6] carried out a retrospective chart analysis of 449 patients who underwent primary bariatric surgery throughout the research period. 56.1% of these patients had LSG, and 43.9% had LRYGB. The average BMI and age of the patients were 48.8 14.4 kg/m2 and 44.7 12.3 years, respectively. Smokers made up 8.3% of reported cases of nausea. Celio and colleagues,[9] prospective observational cohort study was therefore carried out in order to assess the prevalence and severity of PONV in patients following laparoscopic sleeve gastrectomy. The study included 65 patients, with a mean age of 6.5 9.7, a mean BMI of 46.9 6.1 kg/m^2, and a history of tobacco usage of 34.5%. Our finding revealed that 75% of patients had no comorbidities while 5% were diabetic, 15% were hypertensive and 5% were asthmatic.

Suh and colleagues,[6] reported that 32.5% of recruited patients were diabetic and 55.2% were hypertensive patients. The different percentage could be explained by the different sample size and different populations.

Similarly, Abd Ellatif and colleagues[10] reviewed 3634 morbidly obese patients who underwent laparoscopic sleeve gastrectomy (LSG) retrospectively. They found that 42.5% were diabetic, 61.3% were hypertensive and 17.1% were asthmatic.

Our result showed that regarding preoperative H. Pylori infection 25% of patients were marked positive.

In their study, Moustafa and colleagues,[11] enrolled 100 patients who underwent LBS and demonstrated that regarding the searching for H-pylori antigen in stool before surgery 74% rendered negative where 26% were marked positive. Several researchers discussed the anatomical and physiological consequences of LBS and hypothesised how they would affect GERD. Braghetto and colleagues[12] employed manometry to demonstrate that, after LSG, the pressure in the LES dropped, which can cause reflux symptoms and esophagitis.

Esophageal manometry might be a helpful factor in determining whether to provide LBS, according to Klaus and Weiss' reasoning. The worsening of GERD symptoms one year after LBS was caused by the absence of gastric compliance and emptying as well as the blunting of the angle of His inherent in LSG. They hypothesised that the improvement in GERD symptoms at three years was most likely caused by an increase in stomach compliance and clearance. Lastly, they added that barium swallow testing performed three years later demonstrated restoration of the His angle, which may have contributed to the decline in GERD Klaus and Weiss.[13]

In a retrospective analysis conducted by Fernandes and colleagues[14] data from 613 patients receiving UGE were evaluated. All of these patients met the criteria for bariatric surgery (BMI >40 kg/m^2 or BMI >35 kg/m^2 and at least one major obesity-related comorbid condition). 77.8% of the population is female, with a mean age of 46.5 years and a mean BMI of 44.7 kg/m^2 345 individuals, or 56.3%, had at least one aberrant finding on their UGIE. There were observations in the oesophagus, stomach, and duodenum in 22.2, 41.8, and 11.4% of patients, respectively. According to his findings, investigations have found aberrant endoscopic findings in 10–90% of individuals. However, inconsequential and mild endoscopic results have led to overzealous and pointless procedures. Due to this, numerous writers decided to restrict endoscopy to people who exhibited symptoms of gastrointestinal disease. Given that numerous studies have documented pathologic endoscopic findings in asymptomatic patients, this may not be sufficient. Before surgery, routine UGE has been abandoned by other authors. There is a lack of information on which endoscopic results should postpone, alter, or rule out surgery. Gastric and duodenal ulcers were the only significant predictors of postoperative problems, according to Fernandes and colleagues,[14] 's research Peromaa-Haavisto and Victorzon.[15]

In the first 48 h following surgery, postoperative vomiting affected 40% of patients, according to the study. Having the use of a medicine with a centrally acting antiemetic effect, the majority of them shown a noticeable improvement. Suh and colleagues.[6]'s findings, which show LSG patients had a significant prevalence of PONV, corroborated our findings. In a study by Therneau and colleagues[16] on 338 patients who received triple antiemetic and 172 (51%) patients who also received prepatent, they looked at Postoperative Vomiting Episodes during 48 h postoperative following LBS, and they also noted this. Patients receiving and not receiving prepatent therapy experienced postoperative vomiting at rates of 11 vs. 17% in the postanesthesia care unit. In our study, 5% of patients suffered from persistent vomiting during the postoperative 6 months without improvement with antiemetic medical treatment and were in need for further management.

Investigated by virtual gastroscopy, UGIE and CT scan with contrast. And upper gastrointestinal swallow study with oral contrast.

In concurrence with our outcomes, Siqueira and colleagues,[17] announced that the extraordinary greater part of gastric turn cases were analyzed in 1 year following Esophagogastroduodenoscopy (EGD). Just patients with extreme clinical introductions, for example, relentless heaving was submitted to an early EGD. The time slipped by between the exhibition of SG and the beginning of side effects is differed from 25 to 259 days Murcia and colleagues.[18]

The current review uncovered that two of these cases experienced pivotal curve, one case experienced gastric outlet stenosis and the fourth case had long fragment of injury at the degree of incisura angularis.

In a similar setting, Abd Ellatif and colleagues,[10] Upper differentiation study was ordinarily proceeded as a first demonstrative method for such patients, and it was shown that 45 (1.23%) of them had sleeves with hub curve and 41 had sleeves with injury.

Out of a sum of 860 patients who went through SG, Hassan and colleagues,[19] found a moderately bigger number of gastric bend cases, detailing a frequency of 2.5%.

Siqueira and colleagues[17] found 45 gastric curve cases out of 2723 patients who went through laparoscopic SG, illustrating generally speaking rate of 1.6%.

Moreover, the current study found that two cases were managed by endoscopic balloon dilation and stent insertion and the other two cases were managed surgically with laparoscopic adhesiolysis and gastropexy or surgical revision to RYGB.

Confirming our results, Abd Ellatif and colleagues,[10] reported that 43 (95.5%) patients' endoscopic treatments were successful. Endoscopic intervention typically occurred about two months after surgery. Endoscopic stenting was successful in managing 16 patients, while balloon dilation was successful in managing 27 patients. After three additional sessions, two patients who had not responded to balloon dilation had laparoscopic adhesiolysis and gastropexy. To prevent axial twist of the stomach that has been sleeved, surgeons advise symmetrical partition of the anterior and posterior stomach walls and accurate placing of the staples. The pancreatic fascia should be stapled to the staple line, according to some surgeons, especially if the gastric tube coils or becomes floppy following the procedure.Endoscopy is the best diagnostic tool, but a clear picture of obstruction may not be visualized. When it is extremely difficult and requires high level of maneuverability to reach the pylorus, it is indicative of twisting or partial torsion. The winding appearance of the mucosal crease shows complete twist of the sleeve.

The equivalent was affirmed by Murcia and colleagues,[18] who observed that the upper endoscopy is profoundly important for determination.

4.1. Conclusion

Laparoscopic sleeve gastrectomy is highly effective and widespread in weight loss operation that has its own specific complications. Our results show that postoperative vomiting after Laparoscopic sleeve gastrectomy represents a significant complication which occurs commonly after Laparoscopic sleeve gastrectomy. Vomiting of medical causes responds well to centrally acting antiemetic. And to a lesser extent, endoscopic and surgical interventions were required for technical problems.

Disclosure

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Authorship

All authors have a substantial contribution to the article.

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Conflicts of interest

Conflict of interest statement: The authors declared that there were No conflicts of Interest.

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