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The Effect of Gastropexy on Postoperative Nausea and Vomiting in Patients Undergoing Sleeve Gastrectomy

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Abstract **Objectives:** Obesity remains a major global health problem with widespread metabolic consequences. Laparoscopic sleeve gastrectomy (LSG) is a common bariatric operation, but detaching the natural gastric ligaments along the greater curvature can allow the gastric tube to twist or kink. This rotation can cause functional obstruction and lead to troublesome postoperative nausea and vomiting (PONV). In this study, we investigated whether adding posterior gastropexy during LSG helps reduce PONV. **Patients and Methods:** We carried out a prospective randomized comparative trial at Erbil International Hospital between July 2022 and July 2023. A total of 107 patients were randomly assigned to two groups: Group A underwent LSG with posterior gastropexy (n = 53), and Group B underwent standard LSG without gastropexy (n = 54). Nausea and vomiting were evaluated at one week, one month, and three months after surgery. **Results:** Both groups had similar baseline demographics and body mass index values. Surgeries took slightly longer in the gastropexy group (38.1±7.2 vs. 30.7±5.9 minutes, p<0.001). At one week and one month, we found no significant differences in nausea or vomiting between the two groups (1-week nausea: 22.6% vs 33.3%, p = 0.218; 1 week vomiting: 18.9% vs 20.4%, p = 0.840; 1-month nausea: 18.9% vs 18.5%, p = 0.960; 1-month vomiting: 20.8% vs 31.5%, p = 0.200). At three months, nausea was reported in 5 out of 53 patients (9.4%) in Group A compared to 0 out of 54 (0%) in Group B (p = 0.020), whereas vomiting rates remained similar (9.4% vs 5.6%, p = 0.400). **Conclusion:** Adding gastropexy during LSG increases operative time without reducing early PONV. The higher nausea rate observed at three months in the gastropexy group should be interpreted with caution and warrants further evaluation in larger trials.

Key Words: Laparoscopic Sleeve Gastrectomy, Gastropexy, Postoperative Nausea and Vomiting, Bariatric Surgery

INTRODUCTION

Obesity has become a worldwide health crisis, creating major clinical challenges and placing a heavy burden on public health systems [1]. When dietary changes, lifestyle modifications, and medical therapies do not achieve meaningful weight loss, bariatric surgery is still the most effective long-term treatment [2,3]. Among the available surgical options, laparoscopic sleeve gastrectomy (LSG) is one of the most widely performed procedures due to its straightforward technique, effective weight loss, and positive impact on metabolic health [4,5].

LSG works by reducing stomach volume, restricting food capacity, raising internal pressure, and altering gastrointestinal hormones such as lowering ghrelin levels [6-8]. However, postoperative nausea and vomiting (PONV) remain among the most frequent and uncomfortable problems patients face after surgery [9,10]. PONV can cause significant distress, lead to dehydration and electrolyte imbalance, delay discharge from the recovery unit, and increase early hospital readmissions [11].

During standard LSG, dividing the gastrosplenic, gastrocolic, and short gastric ligaments along the greater curvature leaves the narrow gastric sleeve without its natural anatomical support [12-13]. Without these attachments, the sleeve can rotate along its long axis, leading to organo-axial or mesenteric-axial twisting, kinking, or functional stenosis, particularly near the incisura angularis [14-15]. This twisting creates a mechanical hindrance that slows stomach emptying and triggers nausea and vomiting [16].

To prevent sleeve rotation and functional narrowing, surgeons have tried technical additions such as posterior gastropexy, omentopexy, and ligament reattachment [17-18]. However, published studies show conflicting results regarding whether fixing the stomach improves postoperative nausea and vomiting [19-20]. Moreover, many studies do not clearly distinguish between early nausea in the first few days and persistent symptoms months later. In this study, we evaluated whether performing a posterior gastropexy during LSG reduces nausea and vomiting at one week, one month, and three months after surgery compared to standard sleeve gastrectomy without fixation.

METHODS

Study Design and Ethical Considerations

We conducted this prospective randomized comparative study in the Department of General and Bariatric Surgery at Erbil International Hospital in Erbil, Iraq, from July 2022 to July 2023. The study protocol was reviewed and approved by the Research Ethics Committee of the College of Medicine at Hawler Medical University (Approval No. 82, June 10, 2022). All procedures followed the ethical principles outlined in the Declaration of Helsinki (2013 revision). Written informed consent was obtained from all adult patients before enrollment. For minor participants aged 16 to 17 years who met standard bariatric criteria, written informed consent was obtained from their parents or legal guardians, along with written assent from the patients themselves.

Patient Selection and Randomization

A total of 113 consecutive patients scheduled for primary elective LSG were evaluated for eligibility during preoperative clinic visits. Six patients were excluded prior to randomization (four met clinical exclusion criteria and two declined to participate). The remaining 107 patients were enrolled and randomly assigned in a 1:1 ratio into two parallel groups:

- **Group A (N = 53):** Underwent LSG with posterior gastropexy
- **Group B (N = 54):** Underwent standard LSG without gastropexy

Randomization was carried out using a computer-generated random number sequence. To ensure allocation concealment, sequentially numbered, opaque, sealed envelopes were opened in the operating room by the circulating nurse right before completing the staple line.

Research staff who conducted post-discharge follow-ups were kept blinded to patient group assignments.

We set specific exclusion criteria to avoid confounding causes of nausea, excluding patients with a history of severe motion sickness, diagnosed migraines, active peptic ulcer disease, severe reflux esophagitis, previous stomach surgery, or chronic use of antiemetics or pain medications.

Surgical Technique and Perioperative Protocol

The same surgical team performed all operations to keep the technique consistent. Anesthesia protocols were standardized across all patients, including uniform antiemetic prophylaxis (IV dexamethasone 8 mg at induction and IV ondansetron 4 mg before recovery). Postoperative pain was managed using IV paracetamol with rescue tramadol as needed.

Laparoscopy was started using a standard four-port arrangement:

- A 5 mm epigastric port for liver retraction
- A 10 mm supraumbilical port for the 30-degree camera
- A 15 mm port in the left hypochondrium (mid-clavicular line) for the main working instruments
- A 12 mm trocar in the right hypochondrium (mid-clavicular line) for assistant access

Mobilization of the greater curvature was performed using an energy device (LigaSure™), starting 2 cm proximal to the pylorus and moving upward to the left diaphragmatic crus to expose the angle of His. Sleeve resections were performed over a 38-Fr calibration bougie placed along the lesser curvature using laparoscopic linear staplers. Thick tissue (black/purple) staple loads were used at the antrum, followed by blue/gold loads for the body and fundus.

In Group A (Gastropexy), after completing the sleeve, we secured the gastric tube posteriorly using 3-0 PDS absorbable sutures. Three interrupted stitches were placed starting at the incisura angularis (one stitch at the incisura, one 2 cm above, and one 2 cm below), anchoring the posterior staple line to the retroperitoneal pre-pancreatic fascia and remnant gastrosplenic tissue to prevent rotation.

In Group B, the staple line was checked for bleeding without adding any fixation sutures.

Postoperative Care and Follow-up

Postoperative care followed an ERAS pathway. Patients began clear liquids within 24 hours. All patients received IV proton pump inhibitors (PPIs) in the hospital and were discharged on oral PPIs (pantoprazole 40 mg daily) for two months, along with low-molecular-weight heparin for 7 days.

Primary outcomes were operationalized as follows:

- **Nausea:** Defined as a subjective urge to vomit, recorded as present or absent and noted for daily frequency

- **Vomiting:** Defined as the actual vomiting or expulsion of stomach contents

Follow-up assessments took place at 1 week, 1 month, and 3 months after surgery during clinic visits or structured phone calls. All 107 patients completed all three follow-up contacts, giving us complete data for analysis.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics Version 26.0. Continuous variables were checked for normal distribution and are reported as mean±standard deviation (SD) with ranges. Categorical data are presented as counts and percentages (N, %).

We compared continuous variables using the independent samples t-test and categorical outcomes using the Pearson Chi-Square test, for small cell counts where expected values fell below 5 (such as 3-month nausea), we used Fisher's Exact Test. All tests were two-tailed, and p-values under 0.05 were considered statistically significant.

RESULT AND DISCUSSION

All 107 randomized patients completed the study (Group A: n = 53; Group B: n = 54). Baseline patient features and surgical details are summarized in Table 1.

The two groups were similar at baseline. Average age was 32.8±8.8 years (range 16–61) in Group A and 34.6±10.8 years (range 16–65) in Group B (p = 0.189). Group A had a mean baseline BMI of 44.3±7.05 kg/m2, while Group B had a mean BMI of 47.09±8.1 kg/m2, showing no significant difference (p = 0.620). Female patients made up 73.6% (n = 39) of Group A and 68.5% (n = 37) of Group B (p = 0.560). Rates of hypertension, diabetes, and smoking were also comparable between groups (p>0.05).

Operative time was significantly longer in the gastropexy group, averaging 38.1±7.2 minutes (range 27–70) compared to 30.7±5.9 minutes (range 23–50) in the standard group (p<0.001).

Postoperative Nausea and Vomiting Outcomes

At one week, 12 patients (22.6%) in Group A and 18 patients (33.3%) in Group B reported nausea (p = 0.218). Vomiting occurred in 10 patients (18.9%) in Group A and 11 patients (20.4%) in Group B (p = 0.840). Neither difference was statistically significant.

At one month, nausea was present in 10 patients (18.9%) in Group A and 10 patients (18.5%) in Group B (p = 0.960). Vomiting affected 11 patients (20.8%) in Group A and 17 patients (31.5%) in Group B (p = 0.200), showing no significant difference.

At three months, 5 patients (9.4%) in Group A still had nausea compared to 0 patients (0%) in Group B. Using Fisher's Exact Test, this difference was statistically significant (p = 0.020). Vomiting at three months occurred in 5 patients (9.4%) in Group A and 3 patients (5.6%) in Group B (p = 0.400).

We observed no major complications such as staple line leaks, bleeding, or strictures requiring endoscopic dilation in either group during follow-up. Postoperative nausea and vomiting remain among the most common and uncomfortable recovery issues following bariatric procedures. The main reason surgeons perform gastropexy during LSG is to fix the gastric tube to surrounding structures, preventing axial rotation or twisting that could create functional obstruction and worsen symptoms [12-16].

In our trial, performing posterior gastropexy did not reduce nausea or vomiting during the first week or first month postoperatively. Although nausea rates at one week were slightly lower in the gastropexy group (22.6% vs 33.3%), this difference was not statistically significant (p = 0.218). By one month, nausea rates were practically equal (18.9% vs 18.5%, p = 0.960). Our findings agree with prospective studies by Afaneh *et al.* [5] and AlHaddad *et al.* [20], who also found that fixating the sleeve (via omentopexy or gastropexy) did not lead to better early GI symptom control.

Table 1: Baseline Demographics and Clinical Characteristics of Study Participants

Baseline Parameter	Group A (Gastropexy) (N = 53)	Group B (No Gastropexy) (N = 54)	Statistical Test	p-value
Age (years) (Mean±SD, Range)	32.8±8.8 (16–61)	34.6±10.8 (16–65)	Student's t-test	0.189
BMI (kg/m2) (Mean±SD, Range)	44.3±7.05 (30.9–58.5)	47.09±8.1 (32.0–65.0)	Student's t-test	0.620
Operative Duration (min) (Mean±SD)	38.1±7.2 (27–70)	30.7±5.9 (23–50)	Student's t-test	< 0.001
Gender — Male / Female (N, %)	14 (26.4%) / 39 (73.6%)	17 (31.5%) / 37 (68.5%)	Chi-Square	0.560
Hypertension (N, %)	4 (7.5%)	6 (11.1%)	Chi-Square	0.530
Diabetes Mellitus (N, %)	3 (5.7%)	3 (5.6%)	Chi-Square	0.980
Smoking Status (N, %)	15 (28.3%)	14 (25.9%)	Chi-Square	0.780

Table 2: Comparison of Postoperative Nausea and Vomiting Outcomes Between Groups

Follow-up Interval & Outcome	Group A (Gastropexy) (N = 53)	Group B (No Gastropexy) (N = 54)	Statistical Test	p-value
First Week — Nausea (N, %)	12 (22.6%)	18 (33.3%)	Chi-Square	0.218
First Week — Vomiting (N, %)	10 (18.9%)	11 (20.4%)	Chi-Square	0.840
One Month — Nausea (N, %)	10 (18.9%)	10 (18.5%)	Chi-Square	0.960
One Month — Vomiting (N, %)	11 (20.8%)	17 (31.5%)	Chi-Square	0.200
Three Months — Nausea (N, %)	5 (9.4%)	0 (0.0%)	Fisher's Exact	0.020
Three Months — Vomiting (N, %)	5 (9.4%)	3 (5.6%)	Chi-Square	0.400

At three months, we found an unexpected difference: more patients in the gastropexy group reported ongoing nausea compared to the standard group (9.4% vs 0%, p = 0.020). While fixation is meant to keep the stomach aligned, rigid suturing might sometimes reduce stomach flexibility, create minor kinks during contraction, or pull on retroperitoneal tissues. However, because the overall number of affected patients was small (5 cases vs 0 cases) and we evaluated multiple time points without formal statistical adjustment, this result should be interpreted cautiously rather than taken as proof of long-term harm.

Adding gastropexy also increased operating time by an average of 7.4 minutes (38.1±7.2 vs 30.7±5.9 minutes, p<0.001). While a few extra minutes in surgery is clinically manageable, any additional step should offer clear benefits. Since gastropexy did not improve early nausea or vomiting, routine use adds operative time without obvious short-term clinical gain.

Regarding safety, we saw no leaks, bleeding, or stomach narrowings in either group. This shows that posterior gastropexy can be done safely, though it did not reduce major complications compared to standard sleeve gastrectomy alone.

Limitations

Our study has several limitations that should be kept in mind:

- Single-center setting and modest sample size (107 patients), which limits our ability to detect rare outcomes.
- Open-label surgical procedure: while follow-up staff were blinded, surgeons knew which procedure was performed
- Multiple follow-up checks without statistical correction, which increases the chance of a false-positive finding at three months
- Symptoms were collected via clinical interviews rather than validated multi-item gastroparesis questionnaires

CONCLUSIONS

Our study shows that adding posterior gastropexy to laparoscopic sleeve gastrectomy increases surgical time but does not reduce nausea or vomiting during early recovery (1 week and 1 month). The small increase in nausea seen at 3 months suggests we should be cautious about performing routine fixation. Larger, multicenter blinded trials using standardized symptom questionnaires are needed to determine if specific patients might benefit from gastric fixation.

Declarations

Ethical Approval: Approved by the Research Ethics Committee of the College of Medicine, Hawler Medical University, Erbil, Iraq (Approval No. 82, dated June 10, 2022).

Consent to Participate

Written informed consent was obtained from all adult patients. For patients aged 16–17 years, legal guardian consent and participant assent were secured. Conflict of Interest: The authors declare that they have no competing interests.

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No external funding or commercial grants were received for this study.

Data Availability

Datasets analyzed during the study are available from the corresponding author upon reasonable academic request.

Author Contributions

SAN: Conceptualization, study design, surgical execution, data collection, manuscript drafting; HSF: Statistical analysis, methodological review, manuscript editing; AAT: Clinical supervision, surgical execution, final manuscript approval.

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