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The importance of intraoperative endoscopy in bariatric surgery for patient safety and operative outcomes: Experience with single anastomosis gastric bypass (OAGB) and laparoscopic sleeve gastrectomy (LSG)

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Abstract

This study aimed to evaluate the intraoperative endoscopy results in our Laparoscopic Sleeve Gastrectomy (LSG) and Single Anastomosis Gastric Bypass (OAGB) cases and to assess the importance of intraoperative endoscopy. The study included retrospective LSG (n=328) and OAGB (n=43) patients who underwent bariatric surgery and endoscopy at various healthcare institutions between January 2012 and June 2025. Patients' gender, age, 6-month and 1-year Body Mass Index and weight loss rate, comorbidities, sleep apnea, and thyroid function test results were obtained. BMI at 6 months and 1 year was higher in the LSG group, while weight loss levels were higher in the OAGB group. However, the differences between BMI and weight loss levels were not statistically significant (p>0.05). In a total of six patients, the operation plan was modified based on the intraoperative endoscopy results. In two patients, despite being informed about fasting, food was consumed at 4 and 6 am before the operation, and their operations were canceled because they were deemed unable to manage the postoperative period. Despite adhering to preoperative fasting requirements, two patients had low food intolerances, and their operations were postponed. Two patients underwent bypass surgery instead of LSG due to gastric emptying difficulties and reflux-like symptoms. Intraoperative endoscopy can provide vital information in bariatric surgery cases that can help identify potential further complications or manage the surgical process. Although endoscopy is considered an additional invasive procedure, we believe its benefits will be beneficial in both clinical and surgical practice, as well as its inclusion in guidelines.

Keywords: Intraoperative endoscopy, laparoscopic sleeve gastrectomy, single anastomosis gastric bypass

Introduction

Bariatric surgery is an important surgical procedure, with increasing rates in the treatment of obesity every year [1,2]. Laparoscopic Sleeve Gastrectomy (LSG) and Single Anastomosis Gastric Bypass (OAGB) are among the most commonly used surgical methods in bariatric surgery [3]. Although these two methods are widely used in bariatric surgery, the most appropriate method varies depending on the patient's condition, weight, and physical examination results [4]. Revision OAGB or Roux-en-Y Gastric Bypass (RYGB) is performed in cases of weight regain after LSG or problems with LSG. However, while OAGB provides greater weight loss in revisions, adverse outcomes such as gastric reflux may be more common [5]. In a meta-analysis of 1057 cases, OAGB was reported as an effective revision surgery after primary SG [6]. LSG is one of the most commonly used methods in the treatment of morbid obesity, while OAGB has become the third most common standard surgical procedure [7]. Both methods are applied with high reliability in patients with morbid obesity [8,9].

In LSG and OAGB surgeries, as in other surgeries, the patient

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must stop food intake and enter a preoperative fasting period [10]. Fasting and abstaining from beverages before elective surgery reduces stomach volume and acidity, preventing the development of pneumonia due to vomiting or gastric contents aspirating into the trachea during surgery or during anesthesia [11]. Preoperative fasting (PF) is a vital component of the operation and a process that protects patients' lives and directly impacts the success of the surgical process [12]. Because the procedure in bariatric surgery involves the stomach and gastrointestinal tract directly, PF is a crucial part of the process. Therefore, patients are evaluated, monitored, and prepared for surgery before bariatric surgery [13,14].

Although patients are advised to consume food with PF before bariatric surgery, aiming to have an empty stomach before surgery [14,15], this may not be possible for various reasons. The stomach and gastrointestinal system may not be sufficiently empty before surgery due to the patient's psychological issues with eating, problems with gastric emptying, or other reasons. Therefore, intraoperative endoscopy can prevent serious life-threatening risks for patients. This study aimed to evaluate the intraoperative endoscopy results in our LSG and OAGB cases and to assess the necessity of intraoperative endoscopy.

Material and Methods

Research Model

The study was conducted retrospectively using a chart review and descriptive screening model. In this model, patients who met the inclusion criteria and did not meet the exclusion criteria were included. The results obtained from each bariatric surgery method were then compared.

Patients

The study included retrospective LSG and OAGB patients who underwent bariatric surgery and endoscopy at various healthcare institutions between January 2012 and June 2025. Inclusion criteria were as follows:

- Having had LSG or OAGB
- Being over 18 years of age
- Having no psychiatric illness
- Having undergone intraoperative endoscopy during the operation
- Having complete research data in the patient file

Exclusion criteria are as follows:

- Patients with missing data in their files
- Patients with a psychological or psychiatric history
- Patients using psychiatric medications
- Patients who did not undergo intraoperative endoscopy

Data

Patients' gender, age, 6th month, 1st year Body Mass Index and weight loss rate, comorbidity, sleep apnea, and thyroid function test results were obtained.

Ethical Approval

Ethical approval was taken from Memorial Hospital Clinical Research Ethics Committee with 2025/20 number and 14.08.2025 date. Since the study was retrospective design, patient consents were not taken. Helsinki Declaration and Good Clinics were employed in the study.

Statistical Methods

Frequencies were used for ordinal and nominal parameter descriptions. Mean, standard deviation, median and ranges were used for description of scale parameters. Fisher's Exact and Chi-Square tests were used for differences of nominal and ordinal parameters. Kolmogorov Smirnov test was used for normality distribution of scale parameters. Since all parameter distributions were non-normal, Mann Whitney U test was used for differences between scale parameters. SPSS 25.0 for windows was used at 95% Confidence Interval and 0.05 significance level. Because the number of patients whose operations were postponed, canceled, or changed after intraoperative endoscopy was two for each patient, semiotic and qualitative analysis methods were used in their evaluation. Each case was evaluated individually.

Result

Age mean of OAGB group (44.35±10.94) was higher than LSG group (36.54±10.19), and the difference was statistically significant ($p<0.05$). 79.0% of LSG group and 62.8% of OAGB group were females, and gender differences were significant ($p<0.05$). Diabetes mellitus and hypertension frequency were significantly higher in OAGB group ($p<0.05$). Body Mass Index (BMI) differences were significant between patient groups, and higher in the LSG group ($p<0.05$) (Table 1).

BMI at 6th month and 1st year were higher in the LSG group, whereas weight loss levels were higher in the OAGB group. However, BMI and weight loss level differences were statistically insignificant ($p>0.05$) (Table 2).

In a total of six patients, the operation plan was changed based on the results of intraoperative endoscopy. In two patients having 24 and 43 age male patients, despite being instructed to fast, food was consumed at 4 and 6 a.m. before surgery, and their operations were canceled because they were deemed unable to manage the postoperative period. In two patients having 42 and 53 aged female patients, despite adhering to the preoperative fasting requirements, food intolerances were low, and their operations were postponed. In two patients having 44 and 20 aged female and male patients, bypass surgery was performed instead of LSG due to gastric emptying difficulties and reflux-like symptoms (Table 3).

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Table 1. Baseline characteristics of patient groups and difference analysis results

Baseline parameters	Group		p value
	LSG (n=328)	OAGB (n=43)	
Age, mean±SD **Median (Min-Max)**	36.54±10.19 36.00 (18.00-70.00)	44.35±10.94 44.00 (26.00-70.00)	0.000[a]
Gender, n (%)			
Female	259 (79.0)	27 (62.8)	0.018[b]
Male	69 (21.0)	16 (37.2)	
Diabetes mellitus, n (%)	35 (10.7)	20 (46.5)	0.000[b]
Hypertension, n (%)	53 (16.2)	18 (41.9)	0.000[b]
Hyperlipidemia, n (%)	60 (18.3)	13 (30.2)	0.054[b]
Sleep apnea, n (%)	21 (6.4)	2 (4.7)	0.487[b]
Thyroid, n (%)	29 (8.8)	4 (9.3)	0.549[b]
BMI	41.01±6.97 40.00 (29.00-68.40)	39.33±8.08 36.80 (28.70-71.90)	0.037[a]

[a]: Mann whitney U test, [b]: Fisher's exact test, SD: Standard deviation

Table 2. BMI levels and weight loss levels of patient groups and difference analysis results

BMI and Weight loss parameters	Group		p value
	LSG (n=328)	OAGB (n=43)	
BMI 6th month	28.96±4.82 28.30 (20.00-44.80)	27.59±4.70 26.80 (22.30-40.40)	0.070[a]
BMI 1st year	24.30±3.38 23.70 (18.70-36.30)	24.06±4.71 23.15 (20.00-37.30)	0.348[a]
Weigh loss 6th month	83.09±24.94 79.25 (37.50-167.30)	90.28±33.76 86.85 (45.20-173.90)	0.416[a]
Weigh loss 1st year	114.35±29.59 108.90 (57.70-199.20)	123.61±36.39 119.85 (55.30-184.40)	0.291[a]

[a]: Mann whitney U test, SD: Standard deviation

Table 3. Patients whose operations were cancelled/changed/postponed as a result of endoscopy

Patients	Gender	Age	BMI	Reason	Result
Patient 1	Male	24	45	Eating at night 4 a.m. before operation at 8 am	Unable to manage the post-operative process
Patient 2	Male	43	52	Eating breakfast 6 a.m. just before operation at 8 am	Unable to manage the post-operative process
Patient 3	Female	42	35	Reflux-like complaints with gastric emptying difficulties and polar dysfunction	Returned to OAGB
Patient 4	Female	53	34.5	Reflux-like complaints with gastric emptying difficulties and polar dysfunction	Returned to Roux-n Y By-pass
Patient 5	Female	44	41.5	Very low food tolerance and core foods, no active complaints	LSG postponed to a later date
Patient 6	Male	20	60.7	Very low food tolerance and core foods, no active complaints	LSG postponed to a later date

Discussion

This study examined the impact of intraoperative endoscopy on outcomes and the surgical process in LSG and OAGB surgeries, analyzing our cases from the past two years. Based on the results, intraoperative endoscopy resulted in two of six high-risk patients having their operations canceled, two postponed, and two rescheduled.

Bariatric surgery is increasing due to both the increasing prevalence of obesity and the increasingly sophisticated and minimally invasive nature of the procedures [17-20]. Furthermore, with the rise in medical tourism opportunities, bariatric surgery has become a significant topic in global health. Postoperative follow-up and complication management are particularly challenging in patients arriving from different countries. Therefore, bariatric surgery must be performed with

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the fewest complications and minimal risk possible.

Preoperative fasting is important to reduce stomach volume and prevent gastric contents from obstructing the trachea during surgery [21,22]. In bariatric surgery, it is also important to increase the success of the procedure and minimize leakage. Although endoscopy is used for bariatric treatments [23], there are insufficient studies on endoscopy-assisted surgery in the bariatric field. However, endoscopy-assisted surgery has been reported in various fields. Gjeorgjievski et al [24] reported the effectiveness of endoscopy after LSG treatment. Masood et al [25] similarly reported that postoperative endoscopy follow-up is important and effective in reducing complications. Chen et al [26] reported that intraoperative endoscopy may be used to detect gastric stenosis.

According to the findings of our study, despite being informed of the risks of eating before surgery and obtaining informed consent, two patients ate shortly before surgery, outside of their daily routine. Although psychological and psychiatric issues were investigated before the surgery, such irresponsibility, which can be life-threatening, indicates significant problems with appetite control, responsibility, and self-care skills. Therefore, as in these patients, measurement tools and methods that include psychological and psychiatric assessment processes specific to bariatric surgery are needed. For these two patients, the operations were canceled due to the possibility that they might make similar mistakes after surgery. One patient was from Turkey, the other from abroad.

In their research, Evans et al [27] studied role of endoscopy in bariatric surgery patients, and stated that it is a compulsory and vital application for bariatric surgery. Nimeri et al [28] reported that intraoperative endoscopy may change operation strategy in bariatric operations, and colud prevent stenosis or leak. Andreas et al [29] stated that bariatric surgery with intraoperation endoscopy assistance as safe as bougie. Champion [30] reported that routine intraoperative endoscopy detected 34 correctable errors among 825 cases.

Two of our patients, despite stopping food intake and fulfilling the fasting requirements, had inadequate stomach emptying, and both patients had problems with food absorption and tolerance. However, since they had no complaints, the only obstacle to LSG was gastric emptying, and therefore, LSG was scheduled for a later date in these two patients. Two patients had both gastric emptying problems and reflux complaints. In these two patients, LSG was canceled and bypass surgery was chosen.

Limitations of the Study

The most significant limitation of the study is the lack of sufficient literature on intraoperative endoscopy due to its low prevalence in practice. Therefore, the results obtained in the study could not be compared with other relevant literature. However, this also demonstrates that the study is among the pioneering studies in the field.

Another limitation of the study is the lack of adequate measurement tools, particularly for bariatric surgery, regarding psychological and psychiatric competence. Although standard psychotechnical tests were administered before the operation, the presence of two patients whose operations were canceled highlights the need to develop more specific measurement tools in this area.

The study's contributions to surgical practice

The study's most significant contribution to the literature is its demonstration of the need for further studies and publications on intraoperative endoscopy, and its increased inclusion in practice. The fact that two of 372 patients had their operations canceled, two postponed, and two changed indicates a significant prevalence. Therefore, by addressing a gap in the literature, this study is significant.

The study's most significant contribution to surgical practice is its demonstration of the importance of intraoperative endoscopy in surgical practice, particularly in patients who come from other countries or are difficult to monitor. Therefore, the study results recommend intraoperative endoscopy for bariatric applications.

Conclusion

The research results may provide vital information regarding potential future complications of preoperative endoscopy in bariatric surgery cases or the management of the surgical process. Although endoscopy is considered an additional invasive procedure, we believe its benefits would make it beneficial for use in both clinical and surgical practice and its inclusion in guidelines.

Conflict of Interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical Approval
The study received ethical approval from the Memorial Hospital Clinical Research Ethics Committee (Approval Date: 14.08.2025; Approval No: 2025/20).

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