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ORIGINAL CONTRIBUTIONS

Enhanced Recovery after Bariatric Surgery: 202 Consecutive Patients in an Italian Bariatric Center

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Abstract

Background Enhanced Recovery After Surgery (ERAS) pathways have been shown to improve postoperative outcomes. However, its application in bariatric surgery is still limited. The aim of the study was to define the safety of ERAS in bariatric patients with regard to postoperative complications, length of hospital stay (LOS), and readmission rates within 30 days from surgery.

Methods The effectiveness and safety of an ERAS protocol was prospectively investigated in morbidly obese patients who underwent bariatric surgery in a single-institute experience over a 2-year period.

Results Between June 2016 and September 2018, a total of 89 laparoscopic sleeve gastrectomy (SG), 105 Roux-en-Y gastric bypass (RYGB), and 8 one-anastomosis gastric bypass (OAGB) were performed. Twenty patients (9.9%) were revisional cases. Mean (standard deviation, SD) BMI and age at time of surgery were 43.2 (± 6.2) kg/m^2 and 46 (± 11.3) years, respectively. Median (range) surgical time was 118 (45–255) minutes. Overall postoperative complication rate was 7.4%, with 6 (3.0%) patients developing grade III–IV complications according to the Clavien-Dindo classification. Median (range) LOS was 2 (1–50) days, with mean (SD) LOS of 2.3 (± 3.6) days. Overall, 36.6% of patients were discharged by first postoperative day and 77.7% by second postoperative day. Readmission rate was 4.5%. No mortality was observed during the study period.

Conclusions According to the results of the present study, ERAS in primary and revisional bariatric surgery is safe and feasible, with short LOS, low morbidity and readmission rates, and no mortality. A significant reduction of mean LOS was progressively noted over the study period.

Keywords Enhanced recovery after surgery · Enhanced recovery after bariatric surgery · ERAS · ERABS · Bariatric surgery · Roux-en-Y gastric bypass · Sleeve gastrectomy · RYGB · SG · Length of stay · LOS

Introduction

Obesity is a global health problem, presenting as a complex disease affecting, along with overweight, over a third of the world's population [1]. Compared with nonsurgical modalities, bariatric surgery represents the most effective treatment for morbid obesity, contributing to significant and long-lasting weight loss as well as reduced obesity-related comorbidities [2, 3]. At present, the most widely used surgical procedures for morbid obesity are laparoscopic sleeve gastrectomy (SG) and laparoscopic Roux-en-Y gastric bypass (RYGB), whereas laparoscopic one-anastomosis gastric bypass (OAGB) represents an emerging procedure [2–5]. However, as with any major surgery, bariatric procedures pose potential health risks both in the short- and in the long-term [5, 6].

Enhanced recovery after surgery (ERAS) pathways involve a series of perioperative evidence-based interventions that

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have been shown to improve postoperative outcomes by reducing morbidity and length of hospital stay (LOS) in various surgical specialties [7–9]. Although increasingly investigated, its application in bariatric surgery still lacks definition and major concerns refer to the presence of complex high-risk medical comorbidities that may possibly require specialist perioperative care [10–13].

The aim of this study was to evaluate the safety and feasibility of an ERAS protocol in bariatric patients with specific regard to postoperative complications, LOS, and readmission rates within 30 days from surgery in a single Italian bariatric center.

Materials and Methods

The study enrolled all patients ≥ 18 years old who met the criteria for bariatric surgery in accordance with the national and international guidelines proposed by the Italian Society of Obesity Surgery (SICOB) and the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) [14, 15]. Table 1 summarizes the items applied in the ERAS protocol for bariatric surgery, according to the available guidelines at the time [16] and the compliance rate over the study population.

Exclusion criteria included an American Society of Anesthesiology score ≥ 4, and all the clinical feature which precluded a complete ERAS protocol application (i.e., palsy or other sever inability to move out of bed, known allergies or any other medical reason preventing the administration of ERAS drugs protocol).

Each step of the clinical pathway was carefully explained by a dedicated surgeon during the preoperative consultation with each patient, and dietician and psychologist evaluations were planned. For all smokers, quit smoking was strongly encouraged as well as a 5–10% of preoperative weight loss. Surgery was contraindicated in case of alcohol abuse, which was defined by consumption of more than 3 "drinks" (i.e., roughly 14 g of pure alcohol per drink) on any single day and/or more than 7 drinks per week for women, and more than 4 drinks on any single day and/or more than 14 drinks per week for men. Patients and relatives met the whole bariatric team (surgeon, anesthetist, dietician, psychologist, and nurses) during a preadmission structured multidisciplinary counseling meeting: preoperative tests, operations details, recovery steps, and postoperative follow-up were fully explained, and the meeting ended with a "questions and answers" time. Preoperative work-up included for all patients routine blood tests, chest radiograph, electrocardiogram, whole abdominal ultrasound focused on the upper abdomen (liver, gallbladder, and kidneys), esophagogastroduodenoscopy with biopsy (i.e.,

Table 1 Enhanced recovery after bariatric surgery protocol and compliance rates

Preoperative items	Preoperative multidisciplinary counseling	100%
	Encourage aerobic-strengthening exercise (150 min of walk per week)	100%
	Achieved quit smoking (in smokers)	59.4%
	Structured, nutritionally balanced, 1200–1500 Kcal diet	100%
Perioperative items	Patient positioned on operating table while awake (beach chair position)	100%
	PONV prophylaxis (iv steroid bolus before induction and iv ondansetron at the end of the procedure)	100%
	Standardized anesthesia protocol including total intravenous anesthesia, BIS monitoring, and multimodal analgesia	100%
	(short-acting anesthetic agents, opioids sparing analgesia (ketorolac 30 mg, paracetamol 1 g, morphine 4–5 mg),	99.5%
	pre-incision port sites infiltration with levobupivacaine 3.75% 20 mL, intraperitoneal irrigation with	100%
	levobupivacaine 1.875% 80 mL)	66.8%
	Removal of nasogastric tubes in the end of the procedure	100%
	Avoidance of urinary catheters	
	Avoidance of intra-abdominal drains	
	Multimodal thromboprohylaxis (intermittent pneumatic limb compression and LMWH)	
Postoperative items	Early mobilization (1–2 h after surgery)	100%
	Early oral intake of liquids (2–4 h after surgery)	100%
	Multimodal analgesia (paracetamol 1 g tid, NSAIDs PRN)	100%
	Incentive spirometer is given and respiratory exercises	100%
	Antiemesis (ondansetron 4 mg PRN)	100%
	Upper gastrointestinal gastrografin study on postoperative day 1	100%
	Protein, vitamins, and calcium supplementations prescription	100%
	Formal postoperative instructions given by nurse, dietician, and bariatric surgeon	100%
Care after discharge	24 h nurse phone call	100%
	Dietician outpatient visit 2 weeks after discharge	100%
	Surgical outpatient visit 1 and 4 weeks after discharge	100%

Kcal kilocalorie, *PONV* PeriOperative Nausea and Vomiting, *LMWH* low molecular weight heparin, *NSAID* nonsteroidal anti-inflammatory drug; *PRN* pro re nata, as needed

random at the esophagogastric junction, gastric body and antrum, and/or from any suspected lesion), Obstructive Sleep Apnea (OSA) screening tests (i.e., STOP-BANG test), and sleep studies if needed. Additional imaging and/or heart assessments were performed on an individual basis, depending on clinical history and physical findings.

Patients were admitted to the hospital on the day of operation. All surgical procedures were performed laparoscopically by three dedicated and experienced surgeons. Before induction of anesthesia, all patients were preoxygenated and given a single dose of intravenous (IV) antibiotic prophylaxis (cefazolin 2 g or clindamycin 600 mg) and an IV steroid bolus (dexamethasone 8 mg) as postoperative nausea and vomiting (PONV) prophylaxis. Total IV anesthesia was administered with a combination of remifentanil and propofol, using cisatracurium to achieve complete muscle relaxation. A single dose of opioids (IV morphine 4–5 mg) was given about 30–60 min before the end of the procedure.

For RYGB, the basic operative technique required the creation of a 50-mL vertical gastric pouch, in which a transverse 60-mm stapled gastric section of the lesser curvature was performed 8 cm from the gastroesophageal junction, completed by further two longitudinal stapled sections sized over a 38F calibrating bougie. The establishment of the gastric pouch was followed by the creation of an antecolic, Roux-en-Y linear stapled gastrojejunostomy and a linear stapled jejunojejunostomy, determining a biliopancreatic limb of 150 cm in length and an alimentary limb of 100 cm in length. For SG, the basic operative technique included multiple firings of a 60-mm stapler along the greater curvature of the stomach, starting 5 cm from the pylorus and calibrating the size of the gastric sleeve along a 38F bougie. For OAGB, the basic operative technique consisted of an antecolic Billroth II-type 180-cm loop gastric bypass with a long, vertical gastric pouch tailored below the Crow's Foot (junction of body and antrum of the stomach), sized over a 38F calibrating bougie.

Both the anastomosis in the RYGB and the OAGB, as well as the sleeved stomach in the SG, were tested with methylene blue in order to identify a leak. Intra-abdominal drains were avoided whenever possible (i.e., no intraoperative significant bleeding, no positive blue test) and no nasogastric tube (NGT) was routinely left after the operation. There was no recorded intraoperative positioning of a urinary catheter.

Multimodal opioid sparing analgesia was started intraoperatively and included the use of paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs), as well as pre-incisional port sites infiltration and intraperitoneal irrigation at the end of the procedure with local anesthetics (levobupivacaine 3.75% 20 ml and 1.875% 80 mL, respectively). Paracetamol 1 g IV was continued on a regular basis every 6–8 h, and then shifted to oral administration. NSAIDs (ketorolac 30 mg iv) were given PRN as needed to achieve full pain control according to the Visual Analogue Scale (VAS) and Numerical Rating Scale (NRS). Antiemetics (ondansetron 8 mg) and proton pump inhibitors (pantoprazole 40 mg) were also given IV at the end of the procedure and continued postoperatively (oral pantoprazole 40 mg once a day, IV ondansetron 4 mg PRN). All patients sat up in the recovery room 1–2 h after surgery. OSA patients received postoperative oxygen supplementation and continued C-PAP as prescribed before surgery. For the first 12 postoperative hours, all patients were administered maintenance IV crystalloids at a rate of 0.5–1.0 mL/Kg/h. On the same day of operation, patients were encouraged to mobilize out of bed and were allowed to take sips of clear fluid while a soft diet (e.g., soup, mashed potatoes, cereal cream, yoghurt, fruit puree, homogenized vegetables, and meat puree (baby food)) was started the following morning after the dietician review. In order to avoid lung atelectasis, all patients were given an incentive spirometer and respiratory exercises were recommended. Glycemic control was provided in diabetic patients. No blood tests were taken postoperatively if the recovery was uneventful, and the patient's observations were normal and stable (i.e., no fever or tachycardia, described as body temperature below 38 °C, and hearth rate below 120 bpm). An upper gastrointestinal gastrograffin study was routinely performed on the first postoperative day.

Discharge criteria included adequate pain control on oral analgesia (NRS less than 4 on tid paracetamol), full mobilization (walking alone in the ward), tolerable intake of liquids and soft diet, and no evidence of infection.

The endpoints assessed in the study included postoperative complications (graded according to the Clavien-Dindo classification [17]), length of hospital stay (LOS), and 30-day readmission rates.

Statistical analyses were performed using the online available software named GraphPad Software. Results were reported in terms of mean, standard deviation (SD), number of patients, and percentage. Variables were assessed using Fisher's exact test, chi-squared test, or Student *t* test, when appropriate. A p value of less than 0.05 was considered to be statistically significant.

Results

Between June 2016 and September 2018, 204 patients underwent bariatric surgery for morbid obesity at the Department of Surgery of San Giovanni Hospital, Gorizia. Of these, two patients were not included in the present study. In one case, the patient was not considered for ERAS pathways because she required intensive care management determined by her being super obese with associated severe comorbidities, including a recent tracheostomy for acute respiratory failure and prolonged immobilization. In the second case, the patient was not enrolled in a formal ERAS protocol due to a history of severe polyallergy, including hypersensitivity to

paracetamol, NSAIDs, and local anesthetics. Her postoperative course was uneventful, although she was discharged home on the fifth postoperative day due to sub-optimal pain control. Overall, 202 patients were enrolled in the ERAS protocol. Of these, 89 (44.0%) patients underwent laparoscopic SG, 105 (52.0%) patients underwent laparoscopic RYGB, and 8 (4.0%) patients underwent laparoscopic OAGB. Redo surgery after previous gastric banding or other bariatric surgical procedures was performed in 20 (9.9%) cases. Characteristics of the study population are summarized in Table 2.

Mean (SD) BMI and age at the time of surgery were 43.2 (± 6.2) kg/m^2 and 46 (±11.3) years, respectively. Median (range) surgical time was 118 (45–255) min. All procedures were performed laparoscopically, with one laparotomy conversion (0.5%) due to extensive adhesions from previous abdominal surgery. Nine patients in the RYGB group and four patients in the SG group underwent concurrent laparoscopic cholecystectomy for symptomatic gallstones.

An intra-abdominal drain was left in 67 (33.2%) patients. As shown in Fig. 1, although not statistically significant (p 0.76), subgroup analysis showed a tendency towards reduction in use of drains over time from introduction of ERAS pathways. One patient kept the NGT in place for 24 h following intraoperative complications (i.e., technical issues requiring gastrointestinal anastomosis revision).

Post-surgical intensive care unit (ICU) monitoring after primary bariatric surgery was recorded in five (2.5%) cases. Of these, one patient was admitted to the ICU following intraoperative complications that significantly prolonged surgical time (i.e., technical issues requiring gastrointestinal anastomosis revision), whereas in four patients the postoperative ICU admission was planned based on associated comorbidities (e.g., severe chronic obstructive pulmonary disease, severe ischemic heart disease). In addition, we then reported four cases requiring critical care management after surgical revision due to postoperative complications.

Overall postoperative complication rate was 7.4%. According to the Clavien-Dindo classification, nine (4.4%) patients developed a grade I–II complication and 6 (3.0%) patients developed a grade III–IV complication. Seven (3.4%) patients experienced postoperative bleeding, requiring surgical hemostasis in two cases. Four (2.0%) patients

Table 2 Preoperative, operative, and postoperative characteristics of patients included in the study

Total of patients, *n* (%)	202
Primary procedures	182 (90.1%)
Revisional procedures	20 (9.9%)
Gender, *n* (%)	
Male	59 (29.2%)
Female	143 (70.8%)
Age (years)	
Mean ± SD (range)	46 ± 11.3 (22–70)
BMI (Kg/m^2)	
Mean ± SD (range)	43.2 ± 6.2 (28.4–63.4)
Comorbidities, *n* (%)	
Type 2 diabetes	74 (36.6%)
Hypertension	89 (44.1%)
Dyslipidemia	57 (28.2%)
Sleep apnea	79 (39.1%)
Articular disease	49 (24.3%)
Cardiomyopathy	13 (6.4%)
Smokers, *n* (%)	64 (31.7%)
Patients who quit smoking before surgery	38 (59.4%)
Operative time (minutes)	
Median (range)	118 (45–255)
Length of hospital stay (days)	
Mean ± SD (range)	2.3 ± 3.6 (1–50)
2016 : 2017 : 2018 (*p*)	4.3 (±8.7) : 2.2 (±1.3) : 1.6 (±1.1) ($p = 0.002$)
Postoperative complications, *n* (%)	
Bleeding	7 (3.5%)
Leaks	5 (2.5%)
Others	5 (2.5%)
Reoperations, *n* (%)	6 (3.0%)
Readmissions, *n* (%)	9 (4.5%)

SD standard deviation

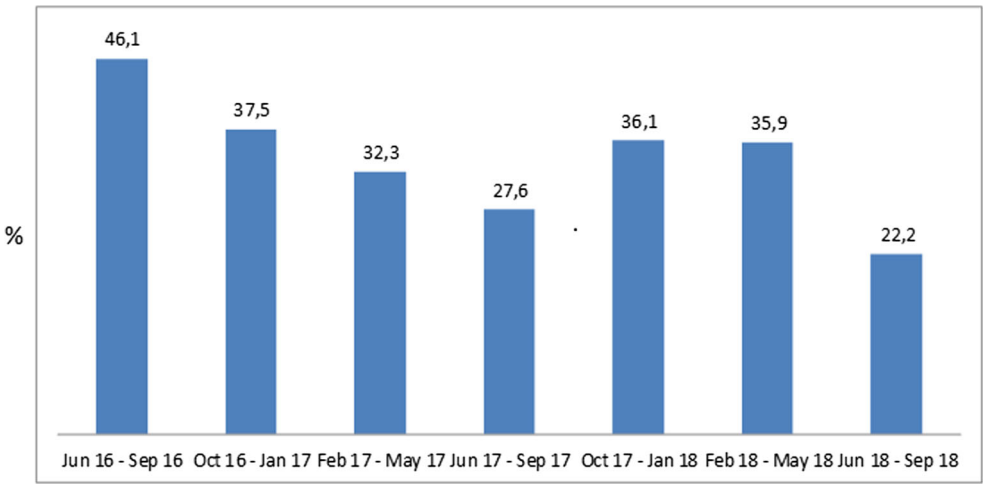

Fig. 1 Percentage rates of abdominal drain over the time

developed an anastomotic leak, requiring a surgical revision in three cases. One case required an early reoperation less than 24 h after the first operation due to intestinal perforation caused by a full thickness small bowel tear. Other complications were recorded in eight (4.0%) patients, including abdominal pain or fever without signs of infection, nausea and vomiting, and abdominal collection. Readmission was recorded in nine (4.5%) patients. Of these, three cases required surgical reintervention. No mortality was observed within 30 days from surgery. Details of complications and readmitted cases are reported in Table 3.

Median (range) LOS was 2 (1–50) days, with a mean (SD) LOS of 2.3 (± 3.6) days, which were less than half of the duration of hospital stay before implementation of the ERAS protocol. As shown in Fig. 2, when further considering data according to the time of introduction of the ERAS protocol, a significant reduction in mean LOS was recorded over the study period without registering a significant increase in readmission rates. Specifically, those who underwent surgery in 2016 (at the beginning of the ERAS experience) presented a mean (SD) LOS of 4.3 (± 8.7) days, compared to those who underwent surgery in 2017 and in 2018, who presented a mean (SD) LOS of 2.2 (± 1.3) days and 1.6 (± 1.1) days, respectively ($p = 0.002$). Of these, no readmission (0%) was recorded among the 30 patients in the 2016 group, whereas 4 (4.2%) patients out of 96 and 5 (6.6%) patients out of 76 were readmitted in the 2017 and 2018 groups, respectively ($p = 0.33$).

Overall, 36.6% of patients were discharged by first postoperative day and 77.7% of patients were discharged by second postoperative day. In particular, early discharge home within 24 h from surgery was possible in 40.5% (36 cases) of SGs, 33.3% (35 cases) of RYGBs, and 37.5% (3 cases) of OAGBs, whereas discharge home by second postoperative day was achieved in 79.8% of SGs, 75.2% of RYGBs, and 87.5% of OAGBs. Discharge trends per procedure are shown in Fig. 3. Main reason for delayed discharge after bariatric surgery included inadequate control of pain on oral medications, poor oral intake and/or nausea, and patient's social factors (e.g., patient reluctance to be discharged home because of living alone, long drive-distance from hospital, etc). All patients were discharged on oral paracetamol as only prescription to manage pain at home. No opioids were required neither after return to ward nor after discharge among uncomplicated patients (defined as patients with an uneventful postoperative recovery, not prolonged due to clinical reasons).

Discussion

The basic principle of ERAS protocols relies on preoperative, intraoperative, and postoperative measures focused primarily on the quality of recovery, reducing the surgical stress response and improving recovery times [9]. Literature data about its application in bariatric surgery is sparse and, as duly noted by the ERAS Society 2016 guidelines for bariatric perioperative care, the majority of recommendations are mainly extrapolated from colorectal settings [8, 16]. Nevertheless, in a recent systematic review and meta-analysis by Malczak et al. [18], ERAS in bariatric surgery was found to be safe and feasible, with a general reduction in LOS, a tendency towards reduced readmission rates, and no significant influence on overall morbidity or specific complication rates.

When compared with available published data (18, 22), the results of the present study confirmed both the effectiveness and safety of the implementation of an ERAS protocol in the context of primary and revisional bariatric surgery, with a reduction in LOS and no increase in either complications and readmission rates. In particular, more than one third of patients were discharged home by first postoperative day and more than three fourths of patients by second postoperative day with an overall complication rate of 7.4% and a hospital readmission rate of 4.5%.

Table 3 Complications and readmission details

Complication grade[a]	Type of surgery	Drain (Y/N)	LOS on first admission (days)	Readmission (Y/N)	POD on readmission	Reoperation (Y/N)	Type of complication	Treatment	Notes
1	RYGB	N	2	Y	6th	N	Pain control	None	Negative CT scan
1	rOAGB	N	1	Y	7th	N	Nausea and vomiting	None	Negative CT scan
1	RYGB	N	6	N	–	N	Bleeding	None	No active bleeding on CT scan (hematoma of the lesser sac)
1	RYGB	N	5	N	–	N	Bleeding	None	No active bleeding on endoscopy (intraluminal hemorrhage)
2	SG	N	6	N	–	N	Bleeding	BT	No active bleeding on CT scan (perigastric hematoma)
2	rOAGB	Y	1	Y	11th	N	Bleeding	BT	No active bleeding on endoscopy (intraluminal hemorrhage)
2	RYGB	Y	2	Y	1st	N	Fever in G6PD	ATB	Negative CT scan
2	rSG	Y	3	Y	8th	N	Pain control, collection	ATB	Perigastric collection on CT scan
2	SG	N	2	Y	4th	N	Pain control	ATB	Negative CT scan, raised CRP
3	RYGB	Y	10	N	–	Y	Bleeding	Surgery on POD1, BT	Active bleeding from the lesser sac
3	SG	N	3	Y	5th	Y	Leak	Surgery, endoscopy	Gastric leak, drainage, and stent
3	RYGB	Y	1	Y	7th	Y	Leak	Surgery	SB obstruction and gastric leak
3	rOAGB	N	4	N	–	Y	Leak	Surgery on POD1	SB perforation
4	RYGB	Y	4	Y	10th	Y	Leak	Surgery	Gastric leak and bleeding
4	RYGB	Y	50	N	–	Y	Leak	Surgery on POD2	Gastric leak

RYGB Roux-en-Y gastric bypass, *SG* sleeve gastrectomy, *OAGB* one-anastomosis gastric bypass, *r* revisional procedure, *Y* yes, *N* no, *LOS* length of stay, *POD* postoperative day, *CT* computed tomography, *BT* blood transfusion, *ATB* antibiotics, *SB* small bowel, *CRP* C-reactive protein, *G6PD* glucose-6-phosphate dehydrogenase deficiency

[a] Complication grade according to the Clavien-Dindo classification

Although not impressive, these results are comparable to literature data. In a prospective study performed by Awad et al. [12], the clinical outcomes of the ERAS protocol in 226 primary bariatric procedures demonstrated a 30-day complication rate of 4% and 30-day readmission rate of 2.7%. Similar results are reported by Blanchet et al. [19], who describe a postoperative complication rate of 2.9% and a readmission rate of 2.1%, whereas Barreca et al. [20] report a 7.6% postoperative complication rate and 4.9% readmission rate over a 4-year study period. In this study, 3.0% of patients presented a major postoperative complication (classified as grade III-IV according to the Clavien-Dindo Classification), 50% of which occurred within the first 24–48 postoperative hours, whereas hospital readmission within 30 days from surgery was recorded in 4.5% of cases, one third of which required surgical intervention for major postoperative complications (i.e., small bowel obstruction or anastomotic leakage).

As far as early discharge is concerned, several studies demonstrated a definite decrease in the mean LOS by means of applying an ERAS protocol [10–13, 19–22]. In particular, an observational study of 406 laparoscopic RYGB performed by Bambgade et al. [10] reported a decrease in the mean LOS

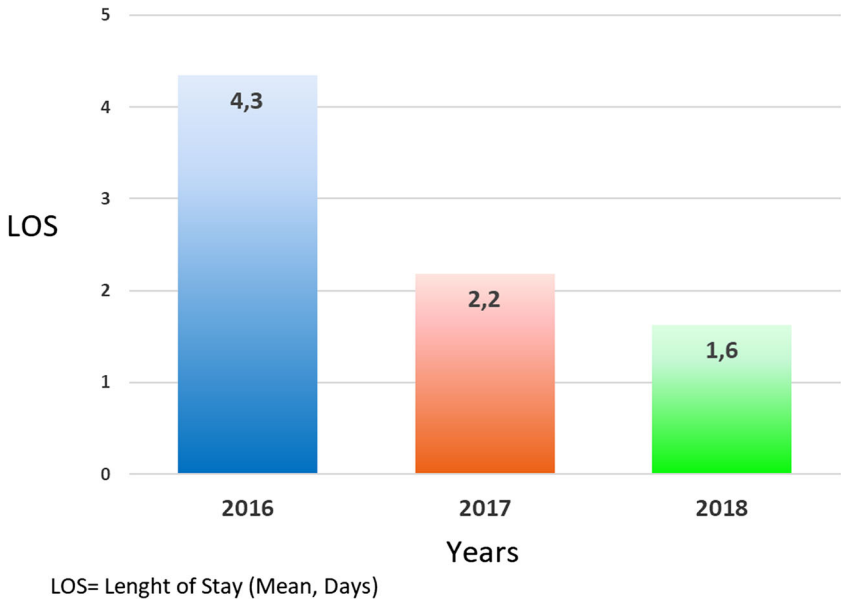

Fig. 2 Mean LOS per years

from 1 to 2 days and an overall 3.4% postoperative complication rate, with 60% of complications occurring within the first 24 h. Similarly, in a randomized clinical trial including 116 laparoscopic SG, Lemanu et al. described a shortened hospital stay without increased postoperative morbidity in the ERAS group [11], whereas the study by Barreca et al. [20] illustrated that the authors were able to discharge nearly 40% of laparoscopic RYGB and 67.5% of laparoscopic SG patients within 24 h from the index operation after implementation of an ERAS program.

As previously stated by other authors [10], establishing a fast-track service requires a multidisciplinary commitment and a learning curve of 100 cases, and LOS reflect the enhanced pathways compliance and efficacy that should decrease as the service matures. Moreover, Geubbels et al. argued that although any bariatric patient is eligible for an ERAS pathway, not everyone is an appropriate candidate for discharge within 24 h of surgery [23]. According to this line of reasoning, statistical analysis of the results of the present study showed a tendency to discharge the patients ever earlier over the years as a result of progressive implementation of ERAS pathways.

The present study has a number of limitations. First of all, it lacks a control group to compare the outcomes from the ERAS pathway. Secondly, the dataset analyzed per type of surgery after implementation of the ERAS program is not particularly numerous and results might have been influenced by the effects of the learning curve and the staff hesitancy to

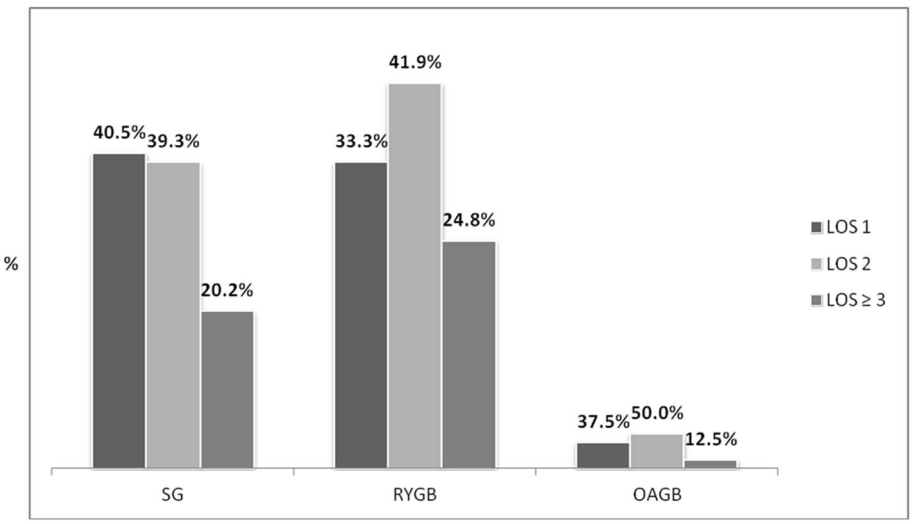

Fig. 3 Length of stay per procedure

SG = sleeve gastrectomy; RYGB = Roux-en-Y gastric bypass; OAGB = one-anastomosis gastric bypass; LOS= length of stay (days)

comply with all the items provided in the protocol. Lastly, an economic analysis of the effects of ERAS in bariatric surgery was not performed, although it has already been established elsewhere that ERAS protocols may lead to more efficient and cost-effective bariatric care [11, 18]. Nevertheless, the present study employed a thorough series of perioperative evidence-based interventions allowing for a considerable reduction in LOS.

Conclusions

This prospective, observational study was able to confirm the effectiveness and safety of an ERAS-inspired protocol in the context of primary and revisional bariatric surgery, with low complication and readmission rates and a significant progressive decrease of mean LOS over the study period. Although randomized controlled trials may not be necessary to further demonstrate the benefits of ERAS pathways, further research is required in regard to compliance with the protocol, in order to fully assess the feasibility of perioperative care programs in bariatric surgery.

Author's Contribution CN: substantial contributions to the conception and design of the work, revising it critically for important intellectual content, final approval of the version to be published. He agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved. MT: substantial contributions to the conception and design of the work; acquisition, analysis, and interpretation of data for the work; drafting the work; and final approval of the version to be published. She agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved. DP: substantial contributions to the acquisition of data for the work, revising it critically for important intellectual content and final approval of the version to be published. He agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved. AB: substantial contributions to the interpretation of data for the work, revising it critically for important intellectual content, final approval of the version to be published. He agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Statement All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki declaration and its later amendments or comparable ethical standards.

Consent Statement Informed consent was obtained from all individual participants included in the study.

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