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Magdy Mahmoud Moustafa
Department of General Surgery, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt.

Mohamed Hassan El-kasser
Department of General Surgery, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt.

Hossam El-din Abd El-latif Habib
Department of General Surgery, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt., hossam.habeeb94@gmail.com

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ORIGINAL ARTICLE

Fast Track Protocol in Bariatric Surgery

Hossam El-din Abd El-latif Habib*, Magdy Mahmoud Moustafa, Mohamed Hassan El-kasser

Department of General Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Abstract

Background: **Being overweight and obese is linked to a significant increase in type 2 diabetes mellitus (type 2 DM), hypertension, cardiovascular disease, nonalcoholic steatohepatitis (NASH), gallbladder diseases, sleep apnea syndrome, arthritis, several tumors, and gastroesophageal reflux disease (GERD). Weight loss surgery is referred to as bariatric surgery. The four most popular bariatric surgical methods are adjustable gastric banding (AGB), gastric bypass, sleeve gastrectomy (SG) (5), and sleeve gastrectomy with sleeve irradiation (SASI). A fast track pathway is a multidisciplinary technique to improve postoperative recovery and decrease morbidity by decreasing surgical stress and its repercussions stress-free surgery.**

Aim: **Evaluating applications of a Fast Track Protocol in bariatric surgery in order to reduce surgical preoperative stress and incidence of postoperative problems, hence accelerating postoperative recovery.**

Patient and methods: **A descriptive study included 50 cases, at the General Surgery Department of Al-Azhar University Hospitals (El Hussein and Sayed Galal) and other hospitals.**

Results: **The overall patient satisfaction rate was 80%. Satisfaction was classified according to five-point Likert scale. Twenty-seven (54%) patients were very satisfied. Statistics show a dramatic decline in albumin levels postoperatively. The mean white blood cell (WBC) count increased significantly to $10.1 \pm 1.8 \times 10^9$/l. The most common late postoperative complication was dysphagia, followed by dilatation and reflux.**

Conclusion: **Patients receiving laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic adjustable gastric banding (LAGB) can have their perioperative care accelerated. It has been shown through a review of the relevant literature that mortality, complication, and readmission rates can be reduced to levels comparable to those reached with traditional target LOS.**

Keywords: Bariatric surgery, Fast-track protocol, Obesity

1. Introduction

Obesity is defined as a rise in BMI above 30 kgm in 2017, according to the global burden of illness, more than four million people each year die as a result of obesity. The global prevalence of obesity is rising at an alarming rate. In 2009, the global prevalence of overweight and obesity surpassed that of malnutrition.[1]

Overweight and obesity are related with a high incidence of type 2 diabetes mellitus, hypertension, cardiovascular disease, nonalcoholic steatohepatitis (NASH), gallbladder illnesses, sleep apnea syndrome, arthritis, various malignancies, and gastroesophageal reflux disease (GERD). Increased BMI correlates with increased mortality (BMI). The death rate is 12 times higher among young males of normal weight.[2]

Laparoscopic sleeve gastrectomy (LSG) has become one of the most popular bariatric surgeries and the procedure of choice for the majority of bariatric surgeons worldwide, accounting for 70% of all bariatric procedures.[3]

Technical feasibility, preservation of normal morphology and absorptive ability of the gut, absence of foreign bodies inserted, and reduced risks of nutritional shortages all contribute to the popularity of LSG.[4]

The therapeutic impact of LSG on weight loss can be linked to two primary mechanisms: mechanical and hormonal.

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* Corresponding author at: Resident of General Surgery at Al Hussin Hospital, Faculty of Medicine for Boys, Al-Azhar University, Cairo, 11484, Egypt.
E-mail address: hossam.habeeb94@gmail.com (H.E.-d.A.E.-l. Habib).

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According to the mechanical explanation, SG leads to a reduction in stomach capacity and generates an early feeling of satiety, hence reducing the size of meals, the undamaged pylorus exerts a natural band-like effect that augments the mechanical restrictive impact.[5]

It helps obese individuals lose weight in multiple ways. The little pouch limits the quantity of food that can be consumed. The link between the small intestine and gastric pouch redirects food directly into the small intestine.[3]

SASI carries advantages of SG and gastric bypass together.

Redo or revisional weight loss surgery is performed on individuals who have previously had weight reduction surgery that has failed or resulted in unmanageable problems. This may include turning your existing operation into a new one.[6]

A Fast Track Pathway implies a multidisciplinary method to increase postoperative recovery and minimize morbidity by eliminating surgical stress and its repercussions, Stress-free Surgery.[7]

Our study's objective was to examine applications of a Fast Track Protocol in bariatric surgery to decrease surgical preoperative stress and the incidence of postoperative problems, hence accelerating postoperative recovery.

2. Patients and methods

A descriptive study included 50 cases, at the General Surgery Department of Al-Azhar University Hospitals (El Hussein and Sayed Galal) and other hospitals.

All of them underwent different bariatric surgeries such as (LSG, Gastric Bypass, SASI, or Redo).

The application of fast track protocol assists the efficacy of such protocol in improving the quality of life, nutrition, and surgery.

2.1. Inclusion criteria

Sex: both male and female, age 18–55 years, BMI greater than or equal to 35 kg/m^2+comorbidity or greater than 40 kg/m^2 without comorbidities.

2.2. Exclusion criteria

Patients less than 18 or more than 55, patients with contraindications of Laparoscopic surgery (cardiac and bad chest condition) and patient refusal to be included in the study.

2.3. Ethical considerations

Approval was obtained from the ethical committee of the Department of General Surgery, Faculty of Medicine for boys (Cairo), Al-Azhar University.

2.4. Primary assessment

Full history taking, clinical examination: General examination and local examination, laboratory Investigations: CBC (preoperative and three days postoperative), prothrombin time (PT), partial thromboplastin time (PTT), INR, Bleeding time, clotting time, liver functions (Albumin: preoperative and three days postoperative), renal functions HBsAg, hepatitis C virus antibody (HCVAb) and T3, T4 TSH. If Diabetes mellitus: fasting blood glucose, postprandial blood glucose (PPBG), HbA1c. Radiology: Pelviabdominal ultrasound, electrocardiogram and echocardiography.

2.5. Fast track protocol

A Fast Track Pathway proposes a multidisciplinary technique to promote postoperative recovery and minimize morbidity by lowering surgical stress and its repercussions (Stress-free Surgery).

When compared with more conventional methods of care, the average hospital stay is significantly decreased.

2.5.1. Preoperative

All patients must be informed of the nature of the surgery to reduce anxiety and help to accelerate recovery. Two hours before operation time, patients should check in at the hospital. Calorie restriction and aerobic exercise before to bariatric Laparoscopy have been shown to increase cardiorespiratory reserve and enhance surgical outcomes. Stop smoking and alcohol one month before surgery. Low molecular weight heparin 12 h before the operation. Fasting 6 h before the operation for clear fluid and 12 h for solid food. Gastric secretion inhibitors should be used in premedication's to lessen the risk of aspiration such as (Omeprazole 40 mg IV).

2.5.2. Intraoperative

Rapid induction of anesthesia, limitation of the volume of fluid inflow to less than 1500 ml. As soon as anesthesia was administered, a nasogastric tube and calibration bougie were inserted and then withdrawn once the stomach had been entirely resected, adequate heat preservation using heated

warm saline and/or blanket and limitation to the use of the intra-abdominal drain.

2.5.3. Postoperative

After surgery, patients should be extubated and transferred awake to the recovery room. The patient is placed in a 25 : 30° head-up posture in the recovery room. Adequate analgesia using: regional anesthesia, injection of anesthetic agent in operative bed at the end of surgery, patient-controlled analgesia (PCA), and NSAID: Encourage early mobilization and respiratory exercise. Start oral clear fluid 8 : 12 h postoperative. Low molecular weight heparin started 12 h postoperative for high-risk patients. Allow patients to discharged 24 h after surgery, with the following discharge criteria: body temperature less than or equal to 37 °C, no tachycardia, no evidence of infection or other problems. Forms of bariatric diet guidance and a schedule for follow-up were assumed. Inform patients about gastrointestinal dangerous signs that require hospital readmission before discharge.

2.5.4. Observation index

Operation time, blood loss, postoperative hospital stay, pain score 1 : 3 days after surgery using numeric pain rating scale (NRS) pain scale, complications were recorded, nutritional status assessment by pre and post Albumin (3 days after the operation), stress indicators: WBCs count and Neutrophils (before surgery and three days following surgery) and patient satisfaction.

Table 1. Demographic data (N = 50).

Parameter	Value
Age (y)	37.5 ± 10.2 (Range, 18–54)
Less than 35	18 (36%)
Between 35 and 45	20 (40%)
More than 45	12 (24%)
Sex	
Female	23 (46%)
Male	27 (54%)
BMI (kg/m^2)	41.1 ± 2.8 (Range, 36.4–47.7)
Less than 40	20 (40%)
More than 40	30 (60%)
Surgical Procedure	
Laparoscopic Sleeve Gastrectomy	22 (44%)
Gastric Bypass	11 (22%)
Single Anastomosis Sleeve Ileal Bypass	12 (24%)
Redo Surgery	5 (10%)
Associated Comorbidities	
Hypertension	11 (22%)
Diabetes Mellitus	12 (24%)
Dyslipidaemia	11 (22%)
Cardiovascular Morbidities	7 (14%)
Smoking	7 (14%)

3. Results

A total of 50 patients undergoing bariatric surgery using fast track protocol, were enrolled in our study. Table 1 summarizes the basic demographic data of enrolled patients, including age, gender, BMI, procedure, and associated medical comorbidities.

As demonstrated in Table 2, the mean operative time was 163.8 ± 24.4 min, ranging from 120 to 200 min. The average amount of intraoperative blood loss was 31.3 ± 12.8 ml, beginning with 10–50 ml. Average hospitalisation length of stay was 3.1 ± 1.1 days, ranging from 1.1 to 5 days. The mean time to first flatus was 1.8 ± 0.3 days, ranging from 1.3 to 2.5 days and the mean time to first food intake postoperatively was 1.9 ± 0.5 days, ranging from 1 to 2.7 days. The mean time of gastric tube indwelling was 0.96 ± 0.48 h, ranging from 0.24 to 2.16 h.

As shown in Fig. 1, the mean NRS pain on first postoperative day (POD 1) was 5.4 ± 1.2, ranging from 3 to 8. On second postoperative day (POD 2), the pain score declined to a mean of 2.9 ± 1.3, ranging from 1 to 5. On third day postoperatively (POD 3), the pain score further declined to 2.04 ± 0.8, ranging from 1 to 3. A statistically significant difference was noticed between POD 1, POD 2, and POD 3 pain ratings (repeated measure ANOVA, $P < 0.001$).

As demonstrated in Table 3, the overall patient satisfaction rate was 80%. Satisfaction was classified according to five-point Likert scale. Twenty-seven (54%) patients were very satisfied, 13 (27%) were satisfied, seven (14%) were had neutral judgement, two (4%) were dissatisfied, and none were very dissatisfied.

Table 4 summarizes the preoperative and postoperative laboratory results, including nutritional markers (serum albumin), and stress markers (WBC count, and neutrophil count).

As shown in Fig. 2, intraoperative complications were reported in 6% of patients, including intraoperative bleeding (4%), and splenic injury (2%). The most common early postoperative complication was infection (10%), followed by surgical complications (8%), and cardiopulmonary events (6%). The most common late postoperative complication was

Table 2. Surgical data (N = 50).

	Mean	SD	Minimum	Maximum
Operation Time (min)	163.8	24.4	120	200
Blood Loss (ml)	31.3	12.8	10	50
Hospital Stay (day)	3.1	1.1	1.1	5
First Flatus (day)	1.8	0.3	1.3	2.5
First Food Intake (day)	1.9	0.5	1	2.7
Gastric Tube Indwelling Duration (hour)	0.96	0.48	0.24	2.16

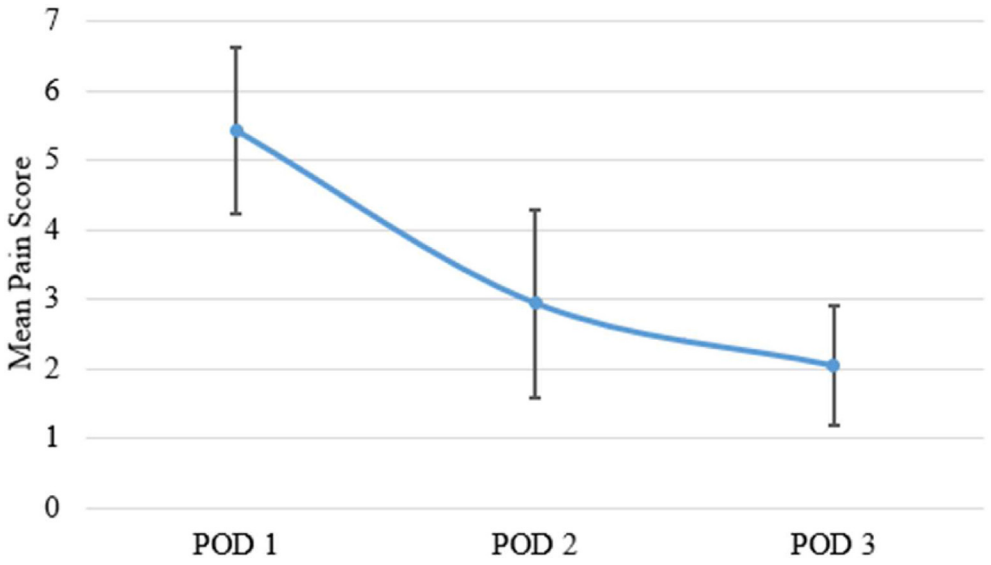

Fig. 1. NRS pain.

dysphagia (8%), followed by dilatation and reflux (6%), stenosis (4%), abscess (2%) and dehydration (2%).

4. Discussion

The use of FT protocols in bariatric surgery has been shown to speed up patients' recoveries and reduce their total time spent in the hospital LOS. Conversely, a lack of home monitoring may increase the risk of postoperative complaints and serious problems for a patient who stays in the hospital for a shorter period of time.[8]

The primary objective of this research was to assess the feasibility of using the fast track protocol in bariatric surgery in order to shorten the duration of the hospital stay, ease patients' minds during the operation, and hasten their recovery.

As regard basic demographic data of enrolled patients, the mean age of our cohort was 37.5 ± 10.2 years, ranging from 18 to 54 years. There were three distinct age categories for the patients: less than 35 ($n = 18$), between 35 and 45 ($n = 20$), and more than 45 ($n = 12$). 23 (46%) patients were females, while 27 (54%) were males. The mean BMI was 41.1 ± 2.8 kg/m^2, ranging from 36.4 to 47.7. These patients were sorted into two BMI groups: less than 40 ($n = 20$), and more than 40 ($n = 30$).

While 839 bariatric patients were operated on in a row in the research by Galal et al.[9] Seven hundred thirty patients met the inclusion criteria, and they are all shown here (633 primary and 97 conversion procedures). Surgery for internal hernia, blind loop, pouch revision, band removal, or repositioning were among the 105 corrective cases and 2 emergency cases that were not included (2 cases). Banded Roux-en-Y gastric bypass (BRYGB, 79.3%), SG (10.7%), adjustable gastric band (4.7%), nonbanded Roux-en-Y gastric bypass (RYGB, 2.8%), one-anastomosis gastric bypass (2.2%), and biliopancreatic diversion (BPD, 0.3%) were the most common main operations. Women made up the vast bulk of the group. The average (±SD) age was 44.3 ± 11.2 years and BMI mean (±SD) was 43.6 ± 6.1 kg/m^2.

In the study of Zhang et al.,[10] there were a total of 80 patients who had LSG for their extreme obesity

Table 3. Patient satisfaction (N = 50).

	Frequency	Percentage
Very Satisfied	27	54
Satisfied	13	27
Neutral	7	14
Dissatisfied	2	4
Very dissatisfied	0	0

Table 4. Laboratory data (N = 50).

	Mean	SD	Minimum	Maximum
Albumin (g/dl)				
Preoperative	4.5	0.5	3.5	5.4
POD 3	3.8	0.3	3.2	4.5
P value[a]	0.000			
WBC Count (× 10^9/l)				
Preoperative	7.5	1.9	4.1	10.7
POD 3	10.1	1.8	5.0	14.8
P value[a]	0.000			
Neutrophil Count (× 10^9/l)				
Preoperative	4.8	1.2	2.6	6.9
POD 3	7.1	1.9	4.1	9.9
P value[a]	0.000			

[a] Paired sample *t*-test.

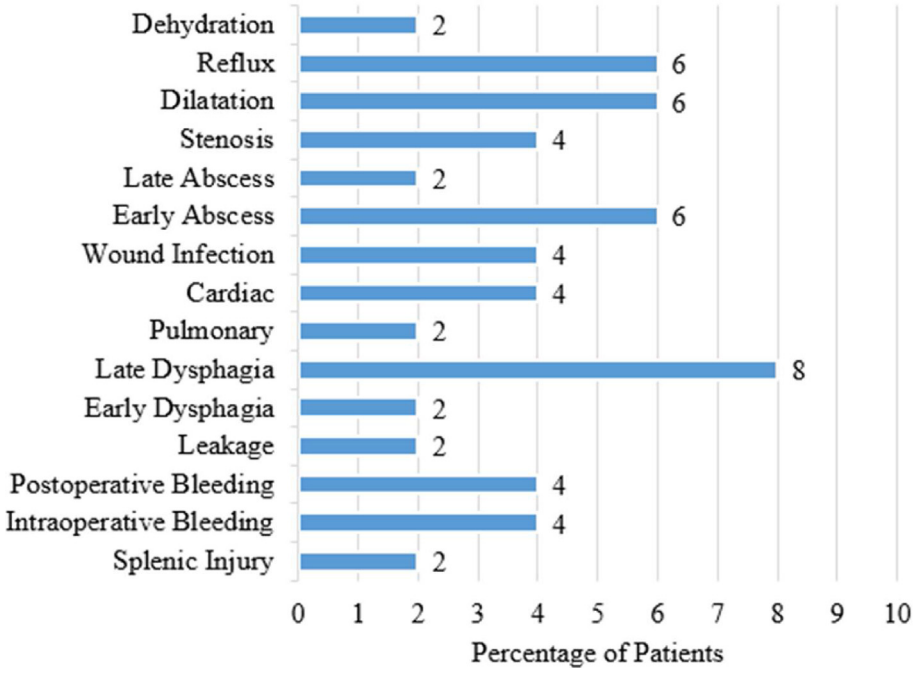

Fig. 2. Complications.

and related metabolic problems. Fast-track surgeries (FTS) were performed on forty patients, while the other patients were placed in a control group (40 cases). A total of 80 people, 40 men and 40 females, with a mean age of 35.2 ± 10.3 (16–71 years) and a BMI of 37.9 ± 6.6 kg/m^2 (26–59 kg/m^2), had bariatric surgery. Hypertension, type 2 diabetes mellitus, hyperthyroidism, sleep apnea syndrome, and musculoskeletal discomfort are all symptoms experienced by patients with metabolic diseases. Age, sex, BMI, and metabolic disease showed no significant differences.

There is a well-established logistical programmed in colorectal and gastric surgery known as FTS, also known as the Enhanced Recovery after Surgery (ERAS) scheme. This research highlights the benefits to patients and healthcare systems of an 'evidence-based' approach to perioperative care, including reduced hospital stays and expedited recoveries. On the other hand, the accelerated programmes do not incorporate OR logistics optimization. The multimodal approach is the backbone of these programmes, and several authors have shown that expedited bariatric surgery is both safe and possible.[11]

The present study showed that as regard Surgical Outcomes, the mean operative time was 163.8 ± 24.4 min, ranging from 120 to 200 min. The average amount of intraoperative blood loss was 31.3 ± 12.8 ml, ranging from 10 to 50 ml. The mean duration of hospital stay was 3.1 ± 1.1 days, ranging from 1.1 to 5 days. The mean time to first flatus was 1.8 ± 0.3 days, ranging from 1.3 to 2.5 days and the mean time to first food intake postoperatively was 1.9 ± 0.5 days, ranging from 1 to 2.7 days. The mean time of gastric tube indwelling was 0.96 ± 0.48 h, ranging from 0.24 to 2.16 h.

The benefits of FT in primary bariatric surgery have been demonstrated in a vast number of studies. Patients who required a longer postoperative stay were shown to be more likely to be readmitted after bariatric surgery, although early discharge was found to have no effect on readmission rates, as stated by Lois et al.[12] Also, Khorgami et al.[13] have shown that patients on the fast track for bariatric surgery can be safely discharged the day after surgery, with minimal risk of complications or readmission. The laparoscopic adjustable gastric band operation has been found to be safe for outpatients by Sasse et al.[14] In a group with an average obesity surgery mortality risk score of 1.3, 95% of patients who had laparoscopic Roux-en-Y gastric bypass (LRYGB) were released within 23 h without death or 30-day readmission. Fast track procedure decreased duration of stay from 2 days to 1 day in patients undergoing LSG and LRYGB without significantly increasing postdischarge resource use, according to research by Rickey et al.[15]

For their part, Simonelli et al.[16] compared a retrospective series of 103 patients who had undergone bariatric surgery and been managed using the enhanced recovery (ER) pathway to a cohort of 103

patients who had undergone the same procedure but been managed using the standard care pathway (group CS). Mean LOS was shorter in the ER group (1.79 days) than in the CS group (4.18 days; $P < 0.0001$). Patients in the CS group had an average operational time (OT) of 190.20 min, whereas those in the ER group averaged just 133.54 min, leading to an average CS patient cost of 7272.57 euros and an ER patient cost of 5424.09 euros. Price of recovery was on average 1809.94€ for the CS series and 775.07€ for the ER series.

Vreeswijk et al.[17] also reported that 805 patients participated in the trial. For 487, doctors followed the standard approach for treating patients while doctors in the fast-track group dealt with the remaining 318. (FT). Compared with the standard care group, the median length of operations was considerably lower in the FT group (40 min vs. 60 min; $P < 0.001$). The FT group had a median duration of stay in the hospital of two days (1–21), whereas the CC group had a median length of stay of three days (1–79). The significance level here was likewise rather high ($P < 0.001$).

Van Wezenbeek et al.,[18] showing that 407 individuals were included in the study's final tally A total of 303 (74.4%) patients were cared for during and after surgery using the fast track procedure. When comparing the FT group with the CC group, the operational time (135.3 ± 42.6 min vs. FT 79.3 ± 29.3 min; $P < 0.001$) and the length of hospital stay (CC 5.1 ± 6.3 days vs. FT 3.1 ± 5.3 days; $P < 0.001$) were both considerably reduced.

According to Vecchioni et al.,[19] a total of 88 participants were analyzed, with 44 patients assigned to the 'pre-Enhanced Recovery after Bariatric Surgery' (ERABS) group and 44 assigned to the 'ERABS' group. When it came to the actual time spent in surgery, the ERABS group was noticeably faster (67.25 vs. 97.02 min). The ERABS group had better postoperative outcomes in terms of length of hospital stays in the Intensive Care Unit (ICU; 0.02 days vs. 0.32 days, $P = 0.014$) and the Surgical Intensive Care Unit (SICU (0.23 vs. 2.02, $P < 0.001$).

The current study showed that as regard laboratory measures; the mean preoperative albumin level was 4.5 ± 0.5 (range, 3.5–5.4). The albumin level decreased at POD 3 to a mean of 3.8 ± 0.3 (range, 3.2–4.5). There was a statistically significant reduction in albumin level postoperatively (paired sample *t*-test, $P = 0.000$). However, the reduction in albumin level was not clinically significant. The mean preoperative WBC count was 7.5 ± 1.9 × 109/l (range, 4.1–10.7).

Also, Geubbels et al.,[20] indicated that there were no fatalities there was no difference in the occurrence of problems, their severity, or the need for readmissions. Bleeding, leaking, pneumonia, dehydration, and infection at the staple line or the incision site were the most common problems.

In addition, Dogan et al.,[21] found that of the 21 patients in the FTS group, six experienced a complication; three had major complications (requiring two re-laparoscopies for intra-abdominal bleeding or a gastroscopy for intraluminal bleeding), and three had minor complications (bleeding from the port site). One patient admitted with acute appendicitis to the CPC was readmitted within 30 days. One patient in the FTS group had a second hospital stay due to biliary pancreatitis and subsequent laparoscopic cholecystectomy.

Furthermore, Vreeswijk et al.,[17] shows that there were substantially fewer early postoperative problems in the FT group (5% vs. 9.9%; $P = 0.016$; χ^2 test). More specifically, when considering all surgical problems together, the FT group showed to have a considerably lower frequency (2.2% vs. 5.1%; $P = 0.026$). Eleven (2.3%) patients in the CC group experienced postoperative leakage, with a secondary complication affecting a further three of these patients, resulting in a lengthier hospital stay and extra procedures. Six patients (1.8% of the total) in the FT group experienced staple line leakage, with three of those cases progressing to abscess development.

4.1. Conclusion

Patients undergoing LRYGB and laparoscopic adjustable gastric banding (LAGB) can be managed quickly throughout the perioperative period. Mortality, morbidity, and readmission rates that are competitive with traditional goal LOS can be obtained, according to the research reviewed.

Disclosure

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Conflicts of interest

The authors declared that there were NO conflicts of Interest.

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