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Safety and Feasibility of Day Case Laparoscopic Sleeve Gastrectomy and One Anastomosis Gastric Bypass Surgery in the Egyptian Community

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ABSTRACT

Background: Globally, the incidence of severe obesity and the comorbidities that it causes has increased. A patient who undergoes day-case surgery (DCS) is admitted and released the same day. The practicality and safety of using DCS during laparoscopic sleeve gastrectomy (LSG) and one anastomosis gastric bypass (OAGB) procedures have already been discussed and are almost established. As of yet, no studies have looked into this problem for OAGB.
Objective: The present study aimed to evaluate the safety and feasibility of DC-OAGB in the Egyptian community and to compare it with DCS-LSG.
Patients and methods: This is a prospective non-randomized controlled clinical trial that was conducted on 100 patients scheduled for bariatric surgery. Patients eligible for day-case surgery were included. The study patients were non-randomly equally allocated to the DC-LSG group or the DC-OAGB group. Patients' operative data were recorded. They were followed by telephone for 4 days, and were followed again 15 days and 1 month later, and their satisfaction with DC bariatric surgery was assessed.
Results: There was an equal same-day discharge rate (96%) in both groups. The total readmission rate was 1%, while for DC-LSG and DC-OAGB separately; the rates were 2% and 0%, respectively. The patients in the current study presented a high satisfaction rate. No statistically significant differences were found between the two groups in the postoperative outcome.
Conclusion: DC-OAGB as well as DC-LSG showed feasibility and safety. Patients for the DCS should be properly selected to avoid elevated morbidity and mortality rates. Patients were highly satisfied with the DCS protocol.
Keywords: Bariatric surgery, Obesity, Day-case surgery, Laparoscopic sleeve gastrectomy, Anastomosis gastric bypass, LRYGB.

INTRODUCTION

Worldwide, the incidence of severe obesity and the comorbidities that it causes have increased [1,2]. Bariatric surgery has thus gained a lot of popularity. Despite the fact that laparoscopic Roux-en-Y gastric bypass (LRYGB) has long been considered the gold standard [3,4]. Due to their relative simplicity and great results, laparoscopic sleeve gastrectomy (LSG) and one anastomosis gastric bypass (OAGB) are currently gaining popularity [5-7].

Technically speaking, LSG has proven to be simpler than other bariatric surgeries, with overall lower morbidity. Its efficacy and safety were emphasised by the available evidence [8,10].

Malabsorption and limitation are combined in OAGB. This is accomplished by omitting the duodenum and a portion of the jejunum and creating a long, thin gastric pouch [6]. In terms of the mechanism of weight loss and comorbidity remission, OAGB and LRYGB are similar. However, OAGB has the advantages of being a simpler procedure and requiring less time during surgery [5].

It has been demonstrated that perioperative treatment can be made simpler to decrease hospital stays without increasing the risk of health problems associated with operations [11].

A patient who undergoes day-case surgery (DCS) is treated and released the same day [12]. These procedures did not appear to require a lengthy period of postoperative recovery because they were frequently performed under local anaesthetic [13]. However, fresh ideas have been put up for important operations, such as laparoscopic colectomy [14], surgery for treating gastroesophageal reflux syndrome [15], and laparoscopic small liver resection [16].

The earliest DCS techniques for bariatric surgery used gastric banding [17,18]. The viability and safety of using DCS for LSG [19–22], and LRYGB [23–25] procedures were been previously discussed and almost established. To date, no studies have investigated such an issue for OAGB. Therefore, the present study aimed to evaluate the safety and feasibility of the application of DC-OAGB in the Egyptian community and to compare it with DCS-LSG.

PATIENTS AND METHODS

A prospective non-randomized controlled clinical trial was conducted at Cairo University Hospitals in the period from June 2020 to January 2022.

The study included 100 adult patients with severe obesity who were scheduled for bariatric surgery. Patients were indicated for bariatric surgery at our institution if they had a BMI of >40 kg/m^2, or >35 kg/m^2 with comorbidities, had tried non-surgical management of obesity for at least 6 months, and underwent full psychological and laboratory workup, including

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endocrinal assays. Patients were eligible for day-case surgery when they had a BMI range of 35-60 kg/m^2 and had an on-site caretaker for the night after surgery. The DCS exclusion criteria were the presence of a major medical compromise (such as pulmonary or cardiovascular diseases), obstructive sleep apnoea, uncontrolled diabetes mellitus, and a non-compliant attitude [20].

According to the described eligibility criteria, the study patients were selected and non-randomly equally allocated to the DC-LSG group or the DC-OAGB group. OAGB was the choice when a mal-absorptive procedure was indicated. The benefits, as well as the possible complications and side effects of each procedure, were discussed in detail with the patients. Patients who refused to participate in the study were excluded. Informed written consent was obtained from each included patient.

Patients' preoperative preparation included a liver-shrinking protocol in the form of a low carbohydrate (800 kcal/day) diet for 2–4 weeks before surgery. Smoking had been stopped for at least a month before the operation. The study patients underwent a preoperative educational sessions, where they were trained on how to check their heart rate after discharge, and they were provided with the resident's phone number for any postoperative consultation.

Preoperatively, the study patients underwent 2-hours fasting for clear fluids and 6-hours fasting for solid foods, with carbohydrate oral loading (50 mg of carbohydrates in 400 mL) two hours before the surgery.

To prevent lower limb DVT, patients wore compression stockings the night before surgery, and one preoperative dose of low-molecular-weight heparin (1 IU/Kg subcutaneous enoxaparin) was administered 12 hours before the procedure and continued for 14 days.

On the day of the operation, patients were admitted to the unit at 7:15 a.m. and then to the operating room at 8:00 a.m. The surgery started at 8:30 a.m. An optimized bariatric anaesthesia protocol was used. Erector spinae block was performed before induction under ultrasound guidance.

The study patients were administered intravenous dexamethasone (4 mg) and droperidol (625 mg) upon anaesthesia induction and ondansetron 4 mg after the surgery to preclude postoperative nausea and vomiting. Cefazolin (2 g) was given intravenously in the operation room as a preventive antibiotic. The anaesthesia protocol was based on the avoidance of long-acting opioids, the use of multimodal analgesia (intravenous fentanyl, paracetamol, and ketorolac), antacid (Zantac), and volume-controlled ventilation, and the use of high PEEP (6–8 cm/H_2O).

Sugammadex (4 mg/kg) was used to reverse neuromuscular blockade systematically, and the patient was extubated in the operating room. A maximum of 1000 ml of intravenous balanced crystalloid solution (lactated ringer) was also administered intraoperatively to avoid fluid overload and tissue oedema. Warming IV fluids, adjusting the room temperature, and covering the patients with blankets were used to keep the patients warm during the intraoperative phase. In diabetic patients, blood glucose was checked intraoperatively, and if the random blood sugar was greater than 200 mg/dl, a glucose-insulin-potassium solution was given.

As previously mentioned [26,27], skilled bariatric surgeons conducted LSG and laparoscopic OAGB. To look for any potential leaks, an intraoperative Methylene blue test was performed. There were no abdominal drains used.

Vital signs were checked on patients when they were brought to the recovery area. After that, patients were moved to the department. Oral intake in the ward started with 30 mL of clear liquids and continued every 15 minutes after that. The patient was required to be ambulated with nurses or accompaniers within 30 minutes of arriving at the hospital as part of a tight early mobility protocol. It was repeated at least once every two hours.

In the absence of any alarming signs or symptoms and after the surgeon's assessment, the patient was eligible for discharge before 24 hours (at 9-10 pm). The discharge criteria included normal vital signs, the absence of nausea or vomiting, minimal pain, oral fluid tolerance, normal voiding, and full mobility. Before leaving the department, the patient was given an information data sheet, which included the red flag symptoms that indicated immediate consultation requirements (tachycardia, fever, and pain not eased by analgesics), as well as the surgeon's 24-hour emergency phone number and dietary recommendations.

The concerned surgeon phoned the patient on the evening of the surgery and on the first, second, and third postoperative days. The patients were asked to provide information regarding their heart rate, body temperature, nausea, vomiting, and abdominal pain. On postoperative day 4, patients underwent clinical examination and C-reactive protein (CRP) level analysis. They were followed again 15 days and 1 month later, and their satisfaction with day-case bariatric surgery was assessed.

Study outcomes

The primary outcomes were the rates of successful same-day discharge, unplanned overnight admission, hospital readmission, reoperation, postoperative complications, and mortality and the levels of patient satisfaction. The secondary endpoints were the potential difference between the two groups in the postoperative outcome.

Ethical consent:

The Academic and Ethical Committee at Cairo University approved the study. After explaining our research objectives, written informed consent was obtained from all study participants. This study was conducted in compliance with the code of ethics of

the world medical association (Declaration of Helsinki) for human subjects.

Statistical analysis

The collected data were coded, processed and analysed using the SPSS (Statistical Package for Social Sciences) version 26 for Windows® (IBM SPSS Inc, Chicago, IL, USA).

Following normality testing, numeric data were presented as mean, standard deviation (SD), median and range, and categorical data as frequency and percentage. Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). Chi square test ($\chi 2$) to calculate difference between two or more groups of qualitative variables. P value ≤ 0.05 was considered significant.

RESULTS

During the study period, 100 patients were eligible for day-case bariatric surgery and accepted to participate in the study; hence, each of the study groups included 50 patients. All patients had laparoscopic surgery with no indicated revisions.

Table 1 summarizes the basic demographic and clinical data of the 2 studied groups. The DC-OAGB group had higher mean BMI and comorbidities prevalence with no statistically significant differences between the two groups.

Table (1): Comparison of the 2 studied groups regarding demographic and clinical data.

Variable		**DC-LSG group** (n=50)	**DC-OAGB group** (n=50)	**P-value**
		Mean ± SD, Median (range)		
Age (years)		32 ± 8.03**,** 32 (18-50)	32.2 ± 7.8**,** 32 (19-50)	0.98
BMI (kg/m^2)		43.8 ± 4.3, 43.1 (37.1-55.2)	44.8 ± 4.1, 44.6 (38-57.3)	0.13
Count (%)				
Gender	Female	37 (74)	40 (80)	0.64
	Male	13 (26)	10 (20)	
Comorbidities	Diabetes mellitus	7 (14)	16 (32)	0.06
	Hypertension	10(20)	13(26)	0.64
	Hyperlipidemia	20 (40)	28 (56)	0.51
	GERD	0 (0)	2 (4)	0.5

The mean time between anaesthetic induction and reversal in the DC-LSG group was lower than that in the DC-OAGB group, with a statistically significant difference ($p<0.001$).

Two patients in the DC-LSG group had recurrent attacks of vomiting, and couldn't tolerate oral fluids, so the patients were kept on intravenous fluids. The patients underwent gastrografin meals, which revealed normal gastric pouches with no twist or constriction. Upper GI endoscopy examinations were also performed, which revealed gastritis in one of them; in whom a biopsy for H. pylori was positive. The patient received the maximal dose of PPI of 40 mg/12 hours. The H pylori were eradicated, and after 6 weeks, the patient underwent another upper GI endoscopy, which confirmed that gastritis had improved. The other patient improved gradually and began to tolerate oral fluids. In the DC-OAGB group, one patient developed tachycardia 6 hours after the procedure. The clinical examination revealed bleeding through the subcostal port site, and a CT scan with IV and oral contrast revealed limited fluid collection at the site of the surgery, with no leakage. Two packs of blood were given, and the patient was stabilized and discharged 48 hours after the procedure. The other patient had a postoperative fever and was managed accordingly. Thus, the unexpected overnight hospitalization rate in both groups was 4 %.

On day 1, one patient in the DC-LSG group presented to the ER with port site bleeding. The patient was readmitted, examined, resuscitated, and discharged after ensuring normal vital signs (**Table 2**).

Regular phone consultations were carried out, and all patients were contacted at the decided times (100%). The patients were instructed to measure the vital signs at home at regular time points within the postoperative 72 hours; three times on day 1 and two times on day 2 and day 3. No abnormal signs or unplanned consultations were met. All patients were examined on day 4.

Table (2): Operative data and postoperative outcome of the study patients.

Variable	DC-LSG group (n=50)	DC-OAGB group (n=50)	P-value
	Mean ± SD		
Total surgery time (minutes)	58.7 ± 12.7	90.8 ± 5.3	<0.001*
CRP (mg/dl)	28.5 ± 6.8	29.5 ± 7.1	<0.26
Count (%)			
Same day discharge	48 (96)	48 (96)	1
Readmission rate	1 (2)	0 (0)	0.3
Day 4 morbidity	0 (0)	2 (4)	0.15
Elevated postoperative CRP	0 (0)	2 (4)	0.15

*Statistically significant.

The CRP levels mean value was slightly lower in the LSG group than in the OAGB group. Two patients in the DC-OAGB group showed elevated CRP levels (110 mg/dl and 70.1 mg/dl). They were subjected to clinical examination, abdominopelvic U/S, and chest X-ray. Examination revealed chest infection in one of them and port site infection in the other. No abdominal collection was evidenced in either of them. The patients were treated on an outpatient basis (**Table 3**).

Table (3): CRP levels in the 2 studied groups.

Group Statistics						P-value
	Type of procedure	N	Mean	Std. Deviation	Std. Error Mean	
CRP Level	Sleeve gastrectomy	25	28.520	6.96	2.39	0.841
	Mini-gastric bypass	25	29.520	6.82	4.32	

There were no reoperations for any of the patients. The study patients had a high level of overall satisfaction (96% and 94% in the two groups, respectively), with P-value of 0.65. All the non-satisfied patients were those who encountered postoperative morbidity.

DISCUSSION

Day-case surgery is becoming increasingly popular in a variety of surgical specialties. Avoiding an overnight hospital stay reduces the risk of hospital-acquired illnesses. DCS has enhanced care quality and increased patient satisfaction without introducing new hazards. Furthermore, when compared to traditional hospitalization, DCS offers a cost savings [20].

Despite the near-established safety of using DCS when performing LSG, there are still concerns [16]. In an editorial article, Gagner proposed that patients undergoing bariatric surgery stay overnight to ease burden on surgeons, institutions, and patients while also ensuring a safe atmosphere [28].

We believe that it is a matter of proper patient selection, which is a critical step in the same-day discharge protocol. In this study, we selected low-risk patients following the recommendations of **Rebibo *et al.*** [20] and as suggested by the literature [29,30]. Similarly, previous studies explored selection criteria that were proposed to reduce the DCS failure rate. These criteria were based on personal experience [19] or literature data [20].

This study showed an equal same-day discharge rate (96%) in both groups, with an unexpected overnight stay rate of 4%. This is in the range described by previous studies that reported an unplanned overnight admission rate ranging from 0% [19,30] to 24% [31].

Our relatively low rate could be attributed to the proper patient selection, in addition to the anesthetic approach, which included multimodal analgesics that reduced the postoperative pain and corticosteroids, which decreased postoperative nausea.

This study showed a total readmission rate of 1%, For DC-LSG and DC-OAGB separately, the rates were 2% and 0%, respectively. These rates are comparable to those described in the literature. The readmission rate of DC gastric banding was reported to range from 0.5% to 2.6%. Concerning DC-LSG and LRYGB, **Khorgami *et al.*** [32] found that their combined readmission rate in more than 35,000 patients was 4.9%, while that of the DC-LSG alone was 3.7%. In another larger study including more than 130,000 patients, the DC bariatric surgery readmission rate was 4.4% and 2.8% for all patients and those who underwent LSG alone, respectively [33]. Studies that assessed DC-LSG alone reported a readmission rate ranging from 0% to 8.5% [19-21,31], while those that assessed DC-LRYGB alone reported a rate of 1.7-4% [24,25,34].

The case that indicated readmission in the present work was due to port site bleeding, with an additional 2 (2%) cases having postoperative infection. Both of them were in the DC-OAGB group (4%). This was at variance with the literature data, which revealed that the most common causes of readmission were nausea, vomiting, and dehydration [32,33]. This difference may be explained by the previously described preoperative measures and anesthetic protocol that helped in the reduction of such adverse events.

In the present patient series, we did not encounter reoperation or mortality cases. The absence of reoperation cases is similar to the data reported in the literature, with the reoperation rate ranging from 0% [31] to 3% [20]. This is likely owing to the non-occurrence of leakage in our study, as the indication of reoperation in the previous studies was mainly staple line leakage. In consistency with our findings, most of the previous studies reported a mortality rate of 0% for DC bariatric surgery [19-20, 24,25,31].

The patients in the current study presented a high satisfaction rate. The satisfaction rate was 96% and 94% in the two groups, respectively. In line with our findings, **Leepalao *et al.*** [24] found high levels of satisfaction toward DC-LRYGB, and **Rebibo *et al.*** [20] found an overall satisfaction rate of 96% following DC-LSG. A lower rate was reported by **Badaoui *et al.*** [21], with a satisfaction rate of 88%. However, the authors found that the satisfaction of patients undergoing DC-LSG was comparable to that of patients managed with conventional hospitalization.

Overall, regarding the postoperative outcome, no statistically significant differences were found between the two groups in the rates of the unexpected overnight stay, readmission rates, morbidity, or mortality. The present work is the first study to evaluate the feasibility and safety of day-case OAGB. We found that either LSG or OAGB as DCSs showed feasibility and safety with little morbidity and no mortality during the short-term follow-up.

We acknowledge that our study is limited by its small sample size. It was difficult to obtain a larger number of cases due to the restrictive selection approach that we followed. Moreover, the concept of DCS is not popular in the field of bariatric surgery in the Egyptian community. This impacted the patients' acceptance to participate in the study. The larger-scale studies published in the literature were mainly retrospective reviews of cases. Our study is also limited by its short-term design. Further larger-scale multi-centric studies with long-term follow-up are recommended.

In conclusion, DC-OAGB as well as DC-LSG showed feasibility and safety. Patients for the DCS should be properly selected to avoid elevated morbidity and mortality rates. Patients were highly satisfied with the DCS protocol.

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