Is body mass index ≥50 kg/m² a predictor of higher morbidity for patients who have undergone laparoscopic sleeve gastrectomy?

ABSTRACT

Background: Super-morbid obese (SMO) patients (body mass index [BMI] ≥50 kg/m²) carry a higher risk for bariatric surgery. Despite several studies addressing this patient group, the number of patients included tends to be relatively small.

Methods: We reviewed 708 patients who underwent laparoscopic sleeve gastrectomy between 2009 and 2015 and compared the outcome of SMO (BMI ≥ 50 kg/m²) patients with MO (BMI < 50 kg/m²) patients.

Results: Of 708 patients, 217 were SMO and 491 were MO. Both groups had homogeneous baseline characteristics and comorbidities, except sleep apnea which was higher in SMO group. There was no significant difference for the duration of operation, length of stay, or recovery room time. The mean number of trocars was four for both groups. There were no conversions to open or documented intraoperative complications in either group. Postoperative complications occurred in 13 (6%) SMO patients (3 patients with leakage and 10 with bleeding). Postoperative complications occurred in 21 (4.3%) MO patients (11 patients with leakage and 10 with bleeding). No reoperation was done in both groups. There was no surgical mortality.

Conclusion: We detected no significant difference in the duration of operation and intra- or postoperative complication between SMO and MO groups. The possibility of the safety of this procedure in SMO group can be adopted.

Key words: Postoperative complications; sleeve gastrectomy; super-morbid obesity

Introduction

Obesity is a major health issue that is increasing instantly worldwide.[1] The prevalence of obesity (body mass index [BMI] ≥30 kg/m²) in Saudi Arabia is about 28.7%. Women are more likely to be obese than males (33.5% vs. 24.1%), with an absolute estimated 3.6 million obese Saudis aged 15 years or older.[2] Bariatric surgery is the most effective long-term treatment for morbid obesity.[3] Super-morbid obesity (SMO) (BMI >50 kg/m²) is associated with high morbidity and mortality. Patient characteristics and surgeon experience also affect the rates of morbidity and mortality in this patient group.[4] Only a few studies with small sample sizes have addressed the morbidity and mortality of SMO patients undergoing laparoscopic sleeve gastrectomy (LSG). Most of these studies drew a comparison to gastric bypass surgery. Here, we aimed to assess the operative and...
postoperative complications of SMO patients and compared to MO patients who underwent LSG at the King Khalid University Hospital (KKUH), King Saud University Medical City, Saudi Arabia.

Methods

After obtaining institutional review board approval, we reviewed 708 medical records of consecutive patients who underwent LSG surgery at KKUH between 2009 and 2015. Data for 217 patients who underwent LSG and BMI ≥ 50 kg/m² were collected, including patient demographic characteristics, weight and height on admission, and comorbid conditions. Other data included operative time, the number of trocars, intraoperative complications, conversion to open, recovery room period, need for high dependency unit (HDU) admission postoperatively, length of hospital stay, and 30-day postoperative complications. The data were collected using a predefined checklist and was filed by reviewing the retrospectively collected data records.

Surgical technique

Surgical procedure

All operations were performed laparoscopically under general anesthesia, with the patient in the supine position. All procedures were performed by certified bariatric surgeons with previous experience in this field. We used a standard 4-port technique with the bed in the reverse-Trendelenburg position. Division of greater curvature vascular supply of the stomach was begun from the pylorus and continued to the angle of His, using the LigaSure device (Covidien, Norwalk, CT, USA). Gastrectomy was performed using staples of either ECHelon FLEX (Ethicon, Somerville, NJ, USA) or Covidien Endo GIA. All staple devices were used with reinforcement materials. The sleeve volume was calibrated to an intraluminal 36-Fr-sized bougie. The proximal resection line was performed 1 cm to the left of the angle of His. A methylene blue leak test through a bougie. The proximal resection line was performed 1 cm to the left of the angle of His. A methylene blue leak test through a nasogastric tube intraoperatively and an upper gastrointestinal contrast study on the first postoperative day were performed. All patients were discharged on a standard liquid diet.

Statistical analysis

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 21 (SPSS Inc., Chicago, IL, USA). The Chi-square or Fisher’s exact tests were used to compare the nominal variables of the SMO and MO groups. The Student’s t-test was used to compare measurable variables. P < 0.05 was considered statistically significant.

Results

A total of 708 patients were included in the study. Of these, 217 (30.6%) were SMO (mean age 32 ± 10.96 years) and 491 (69.3%) were MO (mean age: 33 ± 10.72 years). Average admission weight was 114.1 ± 19.2 mean ± standard deviation (SD) for MO group and 159.40 ± 26.5 mean ± SD for the SMO group with a significant P value. The patient characteristics are shown in Table 1. Sleep apnea was the only comorbidity that differed significantly between the two groups (higher in the SMO group).

Operative and postoperative course

Comparing the SMO and MO groups, we detected no significant difference in the duration of operation, length of stay, number of trocars, or recovery room time [Table 2]. LSG was performed successfully in all patients, and no conversion

Table 1: Characteristics of patients and comorbidities in different groups

|                          | MO BMI <50 group (n=491) | SMO BMI ≥50 group (n=217) | P       |
|--------------------------|--------------------------|---------------------------|---------|
| Age, mean±SD             | 33.46±10.7               | 32.21±11                  | 0.155***|
| Height, mean±SD          | 1.6±0.096                | 1.65±0.007                | 0.500***|
| Admission weight, mean±SD| 114.1±19.2               | 159.40±26.5               | <0.0001***|
| Admission BMI, mean±SD   | 41.9±4.7                 | 58.27±7.19                | <0.0001***|
| Hypertension, n (%)      | 67 (13.6)                | 36 (16.6)                 | 0.306*  |
| Diabetes mellitus, n (%) | 68 (13.8)                | 29 (13.4)                 | 0.863*  |
| Dyslipidemia, n (%)      | 38 (7.7)                 | 24 (11.1)                 | 0.150*  |
| Sleep apnea, n (%)       | 69 (14.1)                | 48 (21.2)                 | 0.017*  |
| Infertility, n (%)       | 6 (1.2)                  | 2 (0.9)                   | 0.535** |

*Chi-square tests, **Fisher’s exact test. ***t-test. MO: Morbid obese; SMO: Super-morbid obese; SD: Standard deviation; BMI: Body mass index

Table 2: Comparison of operative and post-operative course between both groups

|                          | MO BMI <50 group | SMO BMI ≥50 group | P       |
|--------------------------|------------------|-------------------|---------|
| Duration of operation, mean±SD| 90.64±38.3 | 92.74±35          | 0.53*   |
| Number of trocars, mean±SD | 4.60±7.23       | 4.30±0.68         | 0.56*   |
| Length of stay, mean±SD   | 3.73±2.54        | 4.47±3.18         | 0.003*  |
| Recovery room time, mean±SD| 84.39±28.28    | 87.63±29.11       | 0.301*  |
| HDU admission, n (%)      | 32 (6.5)         | 62 (28.6)         | <0.0001**|
| Blood transfusion, n (%)  | 4 (0.8)          | 0                 | 0.230***|
| Early leak, n (%)         | 4 (0.8)          | 1 (0.5)           | 0.515***|
| Late leak, n (%)          | 7 (1.4)          | 2 (0.9)           | 0.445***|
| Postoperative bleeding, n (%) | 10 (2)       | 10 (4.6)         | 0.057** |

*t-test, **Chi-square tests, ***Fisher’s exact test. MO: Morbid obese; SMO: Super-morbid obese; SD: Standard deviation; BMI: Body mass index; HDU: High dependency unit
to open surgery or documented intraoperative complications were encountered in either group. Sixty-two (28.6%) SMO patients and 32 (6.5%) MO patients were admitted to the HDU. This could be explained by the fact that it was a standard of care by the anesthesia department to transfer patients with BMI >50 to a continues monitoring bed whenever available for 24-h postoperative. The practice now is changing to select patients with poorly controlled comorbidities and BMI >50 for HDU monitoring. Postoperative complications occurred in 13 (6%) SMO patients (3 patients with leakage and 10 with bleeding). Postoperative complications occurred in 21 (4.3%) MO patients (11 patients with leakage and 10 with bleeding). Leaks were treated conservatively by early stenting and percutaneous abdominal drainage. Bleeding was treated with observation and blood transfusion if required. There was no surgical mortality [Table 2].

Discussion

LSG is effective at providing sustainable weight loss and control of comorbid diseases associated with obesity (including diabetes, hypertension, and obstructive sleep apnea). As an intervention to treat obesity with an acceptable morbidity and mortality profile, LSG has been gaining in popularity over the last decade. With the increased number of treated patients, concerns have been raised about the safety of this procedure in patients with BMI >50 kg/m². Multiple studies have compared the safety of LSG to less invasive procedures in SMO patients. Although these results have been promising, their findings should be reproduced with larger patient numbers. Several studies have addressed the safety of LSG on SMO with good results. Most of these studies have included between 30 and 45 patients with an average BMI ranging from 49 to 68 kg/m². Our study reached the same conclusion but with higher number of patients (217 patients with BMI >50 kg/m²-491 with BMI <50 kg/m²) of the 217 SMO patients included in our study, 4 had BMI >81 kg/m², 12 had BMI of 71–80 kg/m², 54 had BMI of 61–70 kg/m², and 144 had BMI of 50–60 kg/m² [Table 3]. Comorbidities (e.g., hypertension, diabetes mellitus, dyslipidemia, and obstructive sleep apnea) considered as predictors of outcome were compared between the two groups. Only sleep apnea differed between the two groups (more prevalent in the SMO group). There was no conversion to open surgery or documented intraoperative complications in either group. We detected no difference in the rate of postoperative complications between the groups. As a secondary endpoint in our study, we compared the number of trocars used and operative duration in each group. As shown previously, we detected no difference between the groups (an average of 4 trocars were used in both groups). By following a standardized technique as possible, one would be able to overcome challenging operations easier. Mean operative duration was 90.64 ± 38.3 mean ± SD min for the MO group and 92.74 ± 35 mean ± SD min for the SMO group. Due to the retrospective nature of our study, the follow-up data were in an average of 1 year. Long-term follow-up (beyond 1 year) was not included because of the loss of most patients during follow-up. Prospective studies are needed to achieve long-term follow-up. Our aim was to study the perioperative course of the procedure and long-term follow-up data would not affect our conclusions. Unintentionally, the selection bias occurred because a greater proportion of female patients were included in the MO group than the SMO group. The results of this study elaborate the possibility that LSG could be suitable as a primary option for SMO group. However, more studies with larger numbers and deferent procedures can demonstrate best option for SMO group.

Conclusion

We detected no significant difference in the duration of operation and intra- or postoperative complication between SMO and MO groups. The possibility of the safety of this procedure in SMO group can be adopted.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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**Table 3: Body mass index for patients ≥50**

| BMI (kg/m²) | Frequency |
|------------|-----------|
| 50-60      | 144       |
| 61-70      | 54        |
| 71-80      | 12        |
| 81 above   | 4         |

BMI: Body mass index
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