

Safety and efficacy of laparoscopic sleeve gastrectomy in elderly patients: A matched case-control study

Original
Article

Hosam B. Barakat, Ahmed Badran and Mohamed Elsheikh

Department of General Surgery, Faculty of Medicine, Tanta University, Tanta, Egypt.

ABSTRACT

Background: Despite the increasing prevalence of obesity among elderly individuals, there is ongoing debate regarding the safety of bariatric procedures in this age group.

Objective: This study aimed to assess the efficacy and safety of laparoscopic sleeve gastrectomy (LSG), specifically in patients aged 55 years and older.

Patients and Methods: A retrospective analysis was performed on patients subjected to LSG in our institution from 2019 to 2023. Forty elderly patients more than or equal to 55 years were included (study group) and were matched with forty younger patients (control group) based on BMI, sex, and comorbidities distribution. The study compared short-term outcomes regarding weight loss, comorbidities improvement, operative time, hospital stay, and complications.

Results: There were no significant differences regarding the demographic characteristics or preoperative comorbidities distribution within the two groups. The mean operative time was slightly longer in the older patients than in the control group (53.85±12.17 vs. 49.25±16.22 min, respectively), but with no statistical significance. There was no perioperative mortality in both groups. The percent excess weight loss at 1 year for the older group was significantly lower than that for the younger group (58.1 vs. 68.74%, respectively). Most comorbidities in both groups were improved or resolved with no significant statistical. The morbidity rate was 15 and 17.5% for the elderly and the younger group, respectively, with no significant difference.

Conclusion: LSG is safe and effective in patients more than or equal to 55 years and presents a valuable bariatric option that is efficient in inducing weight loss and improving obesity-related comorbidities and is associated with an acceptable morbidity rate comparable to younger populations.

Key Words: Elderly, morbid obese, sleeve gastrectomy.

Received: 22 January 2024, **Accepted:** 10 February 2024, **Publish:** 7 July 2024

Corresponding Author: Hosam B. Barakat, MD, Department of General Surgery, Faculty of Medicine, Tanta University, Tanta, Egypt. **Tel.:** +201002841231, **E-mail:** elbohohyossam2018@gmail.com

ISSN: 1110-1121, July 2024, Vol. 43, No. 3: 717-721, © The Egyptian Journal of Surgery

INTRODUCTION

The incidence of obesity in the older adult population is expected to rise significantly in the upcoming years due to an increase in life expectancy, in addition to the rising prevalence of obesity^[1,2]. The overall poor health associated with aging may be attributed to a gradual decline of muscle mass, progressive rise in visceral fat, atherosclerosis, insulin resistance, nutritional deficiencies, inactivity, cognitive decline, and frailty^[3]. Obesity exacerbates the age-related decline in physical function, leading to frailty and disability, by way of shared pathophysiological mechanisms^[4]. Bariatric surgery has been proven to be the most reliable means for inducing sustained weight loss in morbidly obese populations. However, there are concerns about using surgical intervention on older patients^[5]. The presence of multiple medical and surgical comorbidities in geriatric obese patients poses a challenge for bariatric surgeons. These individuals often have comorbidities that extend beyond metabolic syndrome, which can make

them less suitable candidates for elective interventions that may have substantial physiological consequences^[6]. Numerous studies have already shown that weight-losing surgeries are safe for older patients, with perioperative rates of morbidity and mortality comparable to those in the general population. However, there are other studies reported greater incidence of morbidity and less weight reduction in geriatric populations^[7-10]. Laparoscopic sleeve gastrectomy (LSG) has gained significant popularity among bariatric surgeries worldwide. This study aimed to conduct a comparison analysis regarding the safety and efficacy of LSG in elderly patients more than or equal to 55 years in contrast to a younger age group.

PATIENTS AND METHODS:

Study design

This retrospective study was conducted at the Gastrointestinal and Laparoscopic Surgery Unit within the

General Surgery Department at Tanta University Hospitals, following approval from the institutional ethical committee. Data were prospectively collected for patients who underwent LSG between February 2019 and January 2023. Upon reviewing the patients' data, 57 elderly patients aged more than or equal to 55 years underwent LSG. Seventeen patients were excluded due to previous upper abdominal surgery (eight cases), concomitant operations (five cases), short follow-up period less than 1 year (two cases), and refusal to provide written consent for future data collection and retrospective analysis (two cases). In conclusion, the study comprised 40 elderly patients (study group) who were carefully matched with 40 younger patients (18–55 years) based on their BMI, sex, and distribution of comorbidities such as hypertension, type 2 diabetes mellitus, obstructive sleep apnea syndrome, dyslipidemia, and osteoarthritis. Retrospective data analysis was conducted on both groups to compare short-term outcomes, including excess weight loss (EWL), total weight loss (TWL), improvement in comorbidities, length of hospital stay, operative time, morbidity, and mortality rate. It is essential to note that all included patients met the eligibility criteria for bariatric surgery according to the 1991 National Institutes of Health guidelines^[11]. A multidisciplinary team comprising surgical, cardiopulmonary, psychiatry, and nutrition services evaluated all morbidly obese patients before surgery.

Study outcomes

The primary outcomes assessed at 1-year follow-up were TWL%, EWL%, and comorbidities remission or

improvement, while the secondary outcomes were the study of perioperative complications.

Surgical technique

All operations were conducted under general anesthesia with the patient positioned in the French and reverse Trendelenburg position. The surgical procedures were performed using a four to five port technique. Comprehensive details of the procedure have been previously published by the main author^[12].

Statistical analysis

The data analysis was performed using the IBM SPSS software package, version 20 (IBM, Armonk, New York, USA). Quantitative data were presented using range, mean, and SD, while qualitative data were expressed as frequency and percentage. To compare proportions between two qualitative parameters, the χ^2 test of significance was employed. Additionally, the independent t test was utilized to compare the means between two groups. Statistical significance was set at *P* values less than 0.05.

RESULTS:

There were no significant differences observed in demographic data and preoperative comorbidities between the two age groups, as illustrated in (Table 1).

Table 1: Baseline characteristics of study population

Variables	Study group (N=40)	Control group (N=40)	<i>P</i> value
Female [<i>n</i> (%)]	32 (80)	30 (75)	0.592
Mean preoperative weight (kg)	124.4±20.17	124.42±16.68	0.869
Mean BMI	46.06±4.68	45.72±5.32	0.962
Mean excess weight	57.3±14.94	56.25±13.88	0.745
Comorbidity [<i>n</i> (%)]			
Type 2 diabetes mellitus	9 (22.5)	7 (17.5)	0.576
Hypertension	11 (27.5)	8 (20)	0.431
OSA	1 (2.5)	1 (2.5)	1.0
Dyslipidemia	10 (25)	12 (30)	0.617
OA	14 (35)	11 (27.5)	0.469

OA, osteoarthritis; OSA, obstructive sleep apnea.

*Significant *P* value less than 0.05.

Operative records and hospital stay

All procedures were successfully performed laparoscopically, with no instances of conversion to open surgery in either group. Additionally, no significant intraoperative complications were observed in either group. The mean operative time for the study group

was 53.85±12.17, while for the control group, it was 49.25±16.22, with no statistically significant differences. Regarding the mean length of hospital stay, it was 1.6±0.95 days (range: 1–6 days) in the study group, slightly longer than the control group (1.32±0.57 days, range: 1–3 days), although this difference did not reach statistical significance (*P*=0.18).

Weight loss results

At the 1-year follow-up, there was a statistically significant difference in the mean EWL%, TWL%, and mean patients' BMI between the study and control groups. Insufficient weight loss (EWL% <50% at 1 year) was observed in four cases in the study group and one patient in the control group. Most obesity-associated comorbidities in both groups showed improvement or resolution

after the first postoperative year, although there was no statistically significant difference. In the elderly group, the resolution/improvement of comorbidities was 66.5% for diabetes mellitus, 63.5% for hypertension, 80% for dyslipidemia, 100% for OSA, and 85% for chronic joint pain. In the younger group, the resolution/improvement of comorbidities was 71.5% for diabetes mellitus, 62.5% for hypertension, 83.5% for dyslipidemia, 100% for OSA, and 81.5% for chronic joint pain (Table 2).

Table 2: Results of weight loss during 1 year follow up

Variables	Follow up	Study group (N=40)	Control group (N=40)	P value
EWL% (mean)	6 month	48.80±10.60	59.33±10.05	0.0001*
	12 month	58.1±11.29	68.74±13.33	0.0001*
TWL% (mean)	6 month	21.87±4.27	27.29±5.86	0.0001*
	12 month	26.46±5.86	34.63±7.59	0.0001*
BMI (mean)	6 month	35.04±6.20	32.99±3.15	0.06
	12 month	33.87±3.55	29.52±2.89	0.0001*
Weight (mean)	6 month	96.85±15.6	90.47±14.2	0.05
	12 month	91.25±14.26	80.28±9.1	0.0001*

EWL, excess weight loss; TWL, total weight loss.

*Significant *P* value less than 0.05.

Postoperative mortality and morbidity

No mortality was recorded in either group. Early and late postoperative complications are described in Table 3. Laparoscopic re-exploration was essential in one patient within the study group and one patient within the control

group because of the occurrence of severe bleeding in the first day postoperative, which did not improve on conservative treatment. Revisions were done in one patient within the control group (because of the development of chronic gastric stricture). Details of early and late complications are illustrated in Table 3.

Table 3: Early and late complications

Early complications	Study group [n (%)]	Control group [n (%)]	P value
Bleeding	1 (2.5)	1 (2.5)	1.0
Leak	0	1 (2.5)	0.314
Wound infections	1 (2.5)	1 (2.5)	1.0
Pulmonary atelectasis	1 (2.5)	0	0.314
Deep vein thrombosis	1 (2.5)	0	0.314
Late complications			
Stricture	0	1 (2.5)	0.314
Gastroesophageal reflux	1 (2.5)	1 (2.5)	1.0
Port site hernia	1 (2.5)	0	0.314
Symptomatic gallstones	0	2 (5)	0.152

Significant *P* value less than 0.05.

DISCUSSION

Few researchers have documented the safety and efficacy of bariatric surgery in individuals aged 55 years and older. Nevertheless, a growing number of published studies, indicate an increasing acceptance of bariatric surgery within this age group^[13]. LSG is the most frequently performed bariatric procedure, owing to factors such as preserved anatomy, the absence of anastomoses, shorter surgical duration, and technical simplicity^[14,15]. This study undertakes a comparison of LSG outcomes in two groups of morbidly obese individuals – those aged more than or equal to 55 and those under 55 years. Despite well-matched characteristics, our findings reveal a significantly lower EWL% in the elderly group at 6 months and 1-year follow-up compared to the control group. However, both age groups exhibited TWL exceeding 20% and BMI reduction surpassing 10%. In contrast Burchett *et al.*^[16] found no significant disparity in weight loss outcomes between individuals aged 62 and above and those under 62 years. Our reported 1-year EWL% in the elderly group was 58.1% and this was similar to that reported by Pajeccki *et al.*^[17], (EWL% of 60%). In a study by Leivonen *et al.*^[18] the mean EWL at 12 months was 50.3% for younger patients and 45.6% for older patients. Even with a modest weight loss, most obesity-related comorbidities in our elderly patients were either improved or resolved at 1 year follow-up with no significant difference between both age groups. These results agree with different published studies^[16–20]. Examining our study's operative time and hospital stay, no significant differences emerged between the two age groups, consistent with Leivonen *et al.*'s^[18] findings in patients older than 59 and younger patients. Takemoto *et al.*^[21] also reported no significant disparity in hospital stay between elderly morbidly obese Japanese patients aged 65 and above and their younger counterparts. Conversely Morgan and Ho^[22] documented longer hospital stays in individuals over 55 than younger patients, with statistically significant values. Regarding the safety of LSG in elderly morbid obese populations, the current study reported no perioperative mortality and demonstrates that LSG is safe and associated with elderly morbidity rate comparable to that in younger patients (15 vs. 17.5%, respectively), with no significant difference. This was in agreement with other studies^[16,21,23–25]. On the contrary, Leivonen *et al.*^[18], reported a high surgical morbidity rate (42%) in elderly morbid obese patients compared to younger patients (9%). Also, a review of 26 557 individuals, with 5.6% of them aged over 65 years and registered in the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database, uncovered higher postoperative mortality and complication rates among the older patient cohort^[26]. One possible explanation for the rise in adverse events could be the increased

frequency of comorbidities among elderly individuals. Our study is constrained by several limitations, including its retrospective nature, a restricted number of participants, and a relatively brief follow-up period. Despite these constraints, notable emphasis has been placed on the remarkably low occurrence of perioperative complications and the significant amelioration of comorbidities.

CONCLUSION

In the context of elderly morbidly obese patients aged 55 years and above, LSG emerges as a secure bariatric option, demonstrating effectiveness in promoting weight loss and enhancing obesity-related comorbidities. Notably, it is associated with an acceptable morbidity rate comparable to younger populations. Our findings imply that age alone should not serve as the exclusive criterion when determining the suitability of bariatric surgery for the obese population; rather, a more comprehensive evaluation is warranted.

CONFLICT OF INTEREST

Nothing to declare.

REFERENCES

1. Han TS, Tajar A and Lean MEJ. Obesity and weight management in the elderly. *Br Med Bull* 2011; 97(1): 169–196.
2. Arterburn DE, Crane PK, Sullivan SD. The coming epidemic of obesity in elderly Americans. *J Am Geriatr Soc.* 2004;52(11):1907-12.
3. Mathus-Vliegen EM. Obesity and the elderly. *J Clin Gastroenterol* 2012; 46:533–544.
4. Villareal DT, Apovian CM, Kushner RF, Klein S. Obesity in older adults: technical review and position statement of the American Society for Nutrition and NAASO, The Obesity Society. *Am J Clin Nutr* 2005; 82:923–934.
5. Cazzo E, Gestic M, Utrini M, Chaim F, Neto F, Pareja J, and Chaim E. Bariatric surgery in the elderly: A narrative review. *Rev Assoc Med Bras* 2017; 63(9):787-792
6. Quintero R, Grosser R, Velez G. Safety and efficacy of roux-en-y gastric bypass in older aged patients. *Rev Col Bras Cir* 2022; 49:e3332.
7. Moon RC, Kreimer F, Teixeira AF, Campos JM, Ferraz A, Jawad MA. Morbidity rates and weight loss after Roux-en-Y gastric bypass, sleeve

- gastrectomy, and adjustable gastric banding in patients older than 60 years old: which procedure to choose? *Obes Surg* 2016; 26:730–736.
8. Sugerman HJ, DeMaria EJ, Kellum JM, Sugerman EL, Meador JG, Wolfe LG. Effects of bariatric surgery in older patients. *Ann Surg* 2004; 240:243–247.
 9. Goldberg I, Yang J, Nie L, Bates AT, Docimo JR, Pryor A, *et al.* Safety of bariatric surgery in patients older than 65 years. *Surg Obes Relat Dis* 2009; 15:1380–1387.
 10. Susmallian S, Barnea R, Weiss Y, Raziel A. Outcome of bariatric surgery in older patients. *Surg Obes Relat Dis* 2018; 14:1705.
 11. National Institutes of Health Consensus Development Conference Panel. National Institutes of Health conference: gastrointestinal surgery for severe obesity. *Ann Intern Med* 1991; 171:74–79.
 12. Barakat HB, Swelam A, Elmahdy TM. Short-term outcomes of laparoscopic sleeve gastrectomy for super-obese Egyptian patients— a single-center experience. *Egypt J Surg* 2020; 39:1138–1143.
 13. Lynch J, Belgaumkar A. Bariatric surgery is effective and safe in patients over 55: a systematic review and meta-analysis. *Obes Surg* 2012; 22:1507–1516.
 14. Borbely Y, Zerkowski J, Altmeier J, Eschenburg A, Kroll D, Nett P. Complex hernias with loss of domain in morbidly obese patients: role of laparoscopic sleeve gastrectomy in a multi-step approach. *Surg Obes Relat Dis* 2017; 13:768–777.
 15. Borbely Y, Juilland O, Altmeier J, Kroll D, Nett PC. Perioperative outcome of laparoscopic sleeve gastrectomy for high-risk patients. *Surg Obes Relat Dis* 2017; 13:155–160.
 16. Burchett M, McKenna D, Selzer D, Choi J, Mattar S. Laparoscopic sleeve gastrectomy is safe and effective in elderly patients: a comparative analysis. *Obes Surg* 2015; 25:222–228.
 17. Pajceki D, Dantas A, Tustumi F, Kanaji A, Cleva1 R, Santo M. Sleeve gastrectomy versus roux-en-y gastric bypass in the elderly. 1-year preliminary outcomes in a randomized trial (BASE Trial). *Obes Surg* 2021; 31:2359.
 18. Leivonen M, Juuti A, Jaser N, Mustonen H. Laparoscopic sleeve gastrectomy in patients over 59 years: early recovery and 12-month follow-up. *Obes Surg* 2011; 21:1180–1187.
 19. Hutter MM, Schirmer BD, Jones DB, Ko CY, Cohen ME, Merkow RP, and Nguyen NT. First Report from the American College of Surgeons Bariatric Surgery Center Network: laparoscopic sleeve gastrectomy has morbidity and effectiveness positioned between the band and the bypass. *Ann Surg.* 2011;254(3):410–20.
 20. Abbas M, Cumella L, Zhang Y, Choi1 J, Vemulapalli P, Melvin W, Camacho D. Outcomes of laparoscopic sleeve gastrectomy and roux-en-y gastric bypass in patients older than 60. *Obes Surg* 2015; 25:2251–2256.
 21. Takemoto M, Hayashi A, Inaba Y, Tanaka T, Chun T, Hayashi H, Kasama K, Saiki A *et al.* Safety and effectiveness of metabolic surgery in older Japanese patients. *Ann Gastroenterol Surg.* 2023;7:750–756.
 22. Morgan DJ, Ho KM. Incidence and outcomes after bariatric surgery in older patients: a state wide data linked cohort study. *ANZ J Surg* 2017; 87:471–6.
 23. Soto FC, Gari V, Garza JR, Szomstein S and Rosenthal R. Sleeve gastrectomy in the elderly: a safe and effective procedure with minimal morbidity and mortality. *Obes Surg.* 2013 Sep;23(9):1445-9.
 24. Rutte PWJ, Smulders JF, Zoete JP, and Nienhuijs SW. Sleeve gastrectomy in older obese individuals. *Surg Endosc.* 2013;27:2014–9.
 25. Nevo N, Eldar SM, Lessing Y, Sabo E, Nachmany I, Hazzan D. Sleeve gastrectomy in the elderly. *Obes Facts* 2019; 12:502–508.
 26. Edwards MA, Mazzei M, Agarwal S, Rhodes L, Bruff A. Exploring perioperative outcomes in metabolic and bariatric surgery amongst the elderly: an analysis of the 2015-2017 MBSAQIP database. *Surg Obes Relat Dis* 2021; 17:1096–1106.