International Surgery Journal
Alkashty ME et al. Int Surg J. 2022 Feb;9(2):276-279
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20220312

Original Research Article

Comparison of short-term outcomes between multi-port and single-port sleeve gastrectomy: a prospective study

Mohamed Eid Alkashty*, Ashraf A. Bakr, George A. Nashed, Mohamed H. Fahmy, Athar S. Elward

Department of General Surgery, Faculty of Medicine, Cairo University, Cairo, Egypt

Received: 01 January 2022
Revised: 18 January 2022
Accepted: 19 January 2022

***Correspondence:**
Dr. Mohamed Eid Alkashty,
E-mail: dr_eid2013@yahoo.com

ABSTRACT

Background: Single-incision laparoscopic surgery has attracted a great deal of interest in the surgical community in recent years, including bariatric surgery. Literature is scarce about operative and clinical outcomes of single port sleeve gastrectomy (SPSG) compared to conventional laparoscopy. SPSG has been proposed as an alternative to the multiport laparoscopic procedure; however, it has yet to meet wide acceptance and application.
Methods: This was a prospective non-randomized clinical study, to evaluate the feasibility and short-term outcomes of SPSG in comparison to the conventional multiport sleeve gastrectomy (MPSG).
Results: Weight loss, resolution of comorbidities, length of hospital stay, complications were almost comparable in both groups. Operating times were longer in SPSG group. Two patients only required re-laparoscopy, one in either group. There were no leakage or mortalities. Patients in the SPSG group had better wound satisfaction and less post-operative pain.
Conclusions: SPSG is a safe, effective, and feasible surgical procedure for morbid obesity in selected individuals and comparable to the conventional laparoscopic technique in terms of outcomes. It has equally effective weight loss and resolution of comorbidities. It also has the added benefits of little/ no visible scarring and reduced postoperative pain.

Keywords: Laparoscopic sleeve gastrectomy, Single-incision laparoscopic surgery, SPSG

INTRODUCTION

Single incision laparoscopic surgery (SILS) is a logical progression from traditional laparoscopic surgery.[1] Nevertheless, the relatively low complexity of sleeve gastrectomy, performed in only one quadrant with limited range of movements, has made it a good candidate for SILS.[2] According to the recent literature, average weight loss between MPSG and SPSG was comparable.[3] Apart from the cosmetic benefit, potential advantages of SPSG are less postoperative pain, less incisional complications and shorter hospital stay.[4] The main aim of this study was to compare MPSG and SPSG in terms of their short-term outcomes. Our objectives have included mean EWL at 3-, 6-,12- and 18-month, resolution of co-morbidities, procedure time in minutes, length of stay in days, intra-operative and post-operative complications, post-operative pain score, overall 30-day mortality, and patient satisfaction to cosmeses.

METHODS

This was a prospective, non-randomized, controlled clinical study, which has been conducted, between July 2017 and January 2019, in general surgery department, Cairo university hospitals.

Inclusion criteria were morbidly obese patients between 18 and 65 years of age and BMI 40 Kg/m^2 or more or 35 Kg/m^2 with comorbidity.

Exclusion criteria were patients with GERD, previous upper abdominal surgery, pregnancy, and psychiatric disorders.

In our Bariatric surgery department, 40 patients have been enrolled and non-randomly allocated to either study group; group A (MPSG)-20 patients and group B (SPSG)-20 patients, based on surgical team and patient preferences, after appropriate counselling and discussion of all surgical procedures, their intent, benefits, and all possible complications.

In SPSG, the surgeon stood between the patient legs and the camera holder on the patient's right side. An applied medical Gel-Port® was placed through a 2 cm vertical trans-umbilical incision. We have used conventional straight instruments. The specimen was removed from the single umbilical incision (Figure 1).

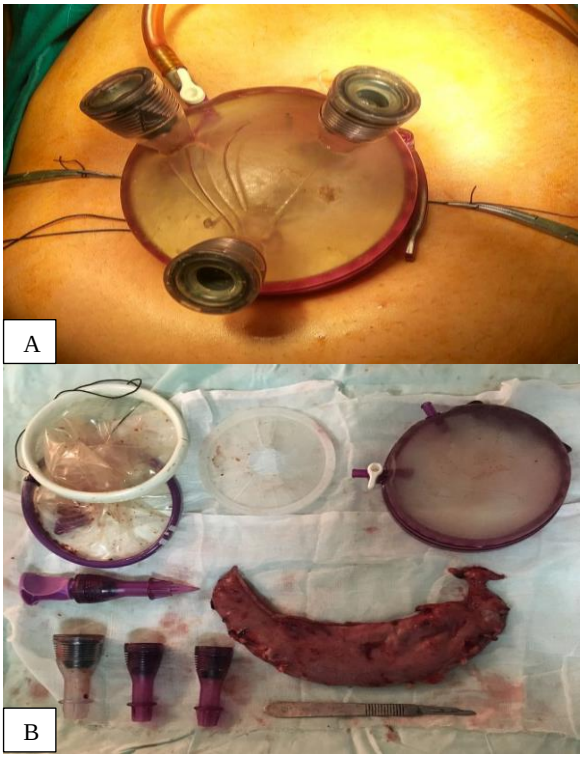

Figure 1 (A and B): SPSG.

Statistical methods

Data were coded and entered using the statistical package SPSS version 25. Data was summarized using mean, standard deviation, median, minimum and maximum for quantitative variables and frequencies and percentages for categorical variables. Comparisons between groups were done using unpaired t test in normally distributed quantitative variables while non-parametric Mann-Whitney test was used for non-normally distributed quantitative variables.[5] For comparing categorical data, Chi square ($\chi 2$) test was performed. Exact test was used instead when the expected frequency is less than 5.[6] $P<0.05$ were considered as statistically significant.

RESULTS

The 82.5% of our patients were females. Age and pre-operative BMI were comparable in both groups (Figure 2). Mean operative time was 77.80±14.14 minutes for SPSG group which was significantly longer than MPSG group 56.30±15.40 min ($p\leq0.001$). The duration of mean post-operative hospital stay was relatively longer in group A (Figure 3). There were no major intraoperative complications, however 10% have developed post-operative complications (wound infection (n=2), intestinal obstruction due to port site hernia (n=1) in MPSG and bleeding (n=1) in SPSG. We have had neither leakage nor mortalities in our study.

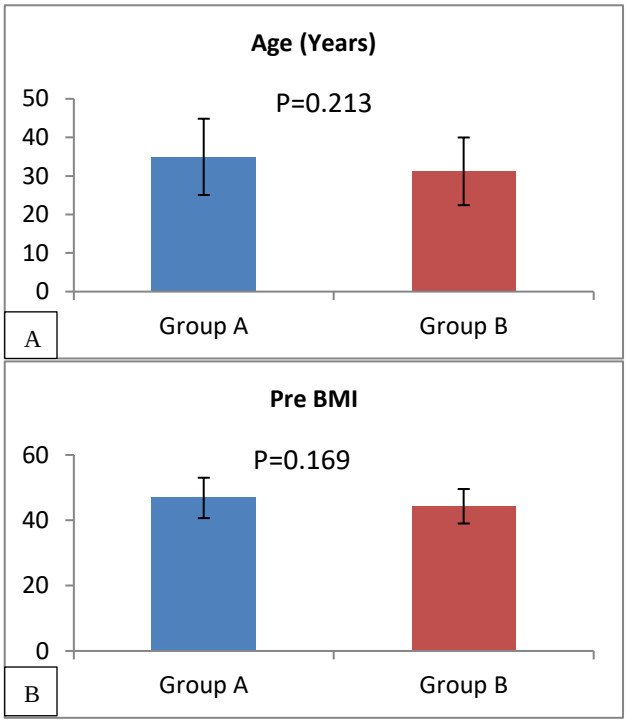

Figure 2 (A and B): Age and BMI distribution in both groups.

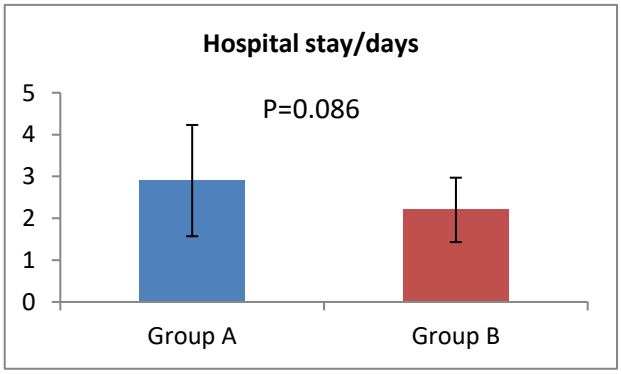

Figure 3: Duration of hospital stay in both groups (in days).

Weight loss was very similar in both groups (Figure 4). Resolution of comorbidities represented 60%. In SPSG, patients were significantly satisfied for their scarless operation (p=0.002) (Figure 5) and less post-operative pain (mean 2.50±1.32) (Figure 6).

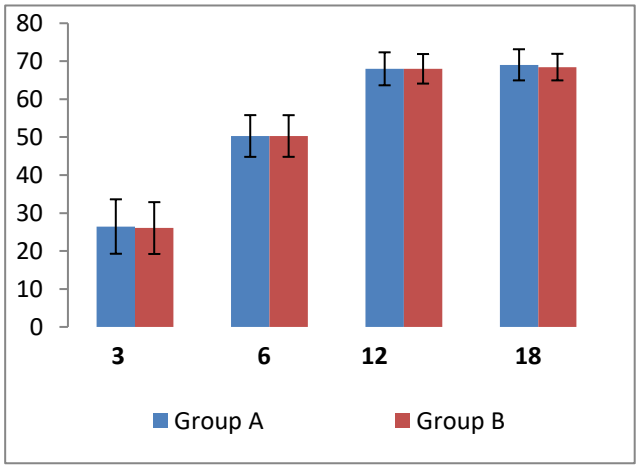

Figure 4: EWL in both groups at 3, 6, 12, 18 months.

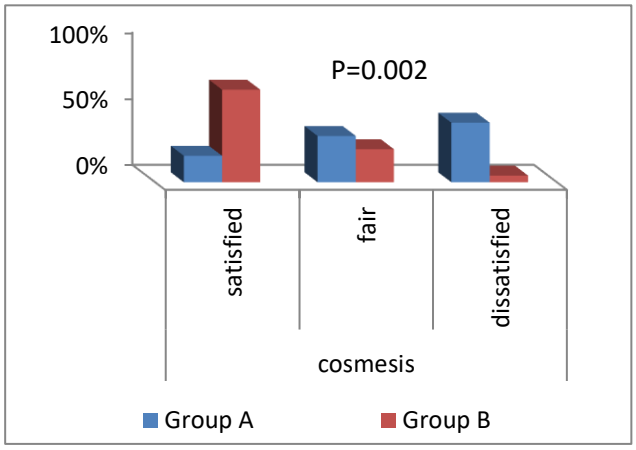

Figure 5: Patient satisfaction to cosmesis in both groups.

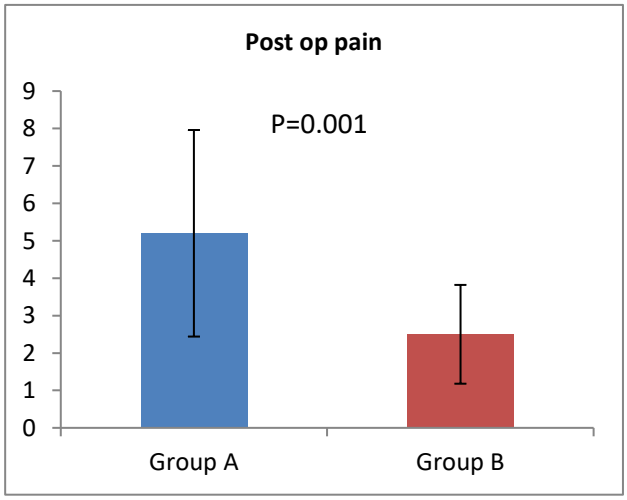

Figure 6: Mean post-operative pain in both groups.

DISCUSSION

In this study, we report our initial experience of laparoscopic SPSG. Admittedly, operating through a single incision using only rigid instruments was very challenging especially in our initial cases. Our surgeons either implemented a co-axial positioning of instruments in which controlling both instruments was relatively difficult, with both the surgeon's hands in such close proximity, or a crossing arrangement, in which either hand would control the other instrument. Compared with conventional laparoscopic surgery, SPSG challenges the standard surgical principles of traction and counter-traction due to the lack of triangulation and parallel vision of the scope that put additional hurdles. Furthermore, coordination between the surgeon and the camera person and switching the instruments between the laparoscopic ports are mandatory to optimize the instruments' range of motion for better ergonomics. This approach has a unique learning curve, principally to overcome the technical challenges of navigating instruments within a limited range of motion. Accordingly, this was reflected on the mean operative time, SPSG was significantly longer than MPSG group. However, our reported time was relatively shorter than operative time in other studies.[7,8]

Extra trocars were inserted in two patients in group B to control bleeding and retract a large heavy liver, which we did not consider it as a complication as it was mandatory for the safety of the patients. In a review of SPSG in Nineteen studies, 7.4% of patients required the placement of one or more trocars.[3]

Efficacy was reflected by weight loss which was almost identical in both groups, Therefore, SPSG appears to be a safe and effective in the short term. Our results were in line with the most recent studies.[9,10] Our complications, mortality, and resolution of comorbidities were in line with the current literature.[2,11] We are reporting two re-laparoscopies one for bleeding after SPSG and one for bowel obstruction after MPSG. Hosseini et al performed a re-laparoscopy for three patients who had leakage.[12]

Besides the aforementioned findings, it is quite important to emphasize that our study has highlighted several potential advantages of SPSG. First, SPSG has the same efficacy of MPSG, regarding, achieving the same expected weight loss, and resolution of co-morbidities. Second, when it comes to safety, there were no significant differences in complications of either technique. Third, the patients of SPSG group, not only, were more satisfied with their non-apparent scars, but also less post-operative pain. Last but not least, no doubt, this study was an important motive for our team. However, this study still has some limitations that have to be highlighted. Of course, being, non-randomized with analysis of the short-term results, a small patient pool, and selection bias, as a result a larger randomized study with a long-term follow-up will be necessary. The

benefits of this procedure may not extend to patients who are super obese or have a scarred abdomen. Additional work must be carried out before these techniques can be standardized. More flexible articulating instruments, high illumination, high magnification, flexible endoscopes, and free standing insertable retractors are highly required.

CONCLUSION

Despite the study limitations**,** SPSG is a safe, well-tolerated and feasible surgical procedure, when performed in a controlled environment. It can be routinely performed with outcomes equivalent to the surgical morbidity, postoperative weight loss, and resolution of co-morbidities found with conventional laparoscopic approach. The main potential benefits of SPSG are improved cosmetic outcomes, decreased postoperative pain, hospital stay, and faster return to work.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Alkashty ME, Bakr AA, Nashed GA, Fahmy MH, Elward AS. Comparison of short-term outcomes between multi-port and single-port sleeve gastrectomy: a prospective study. Int Surg J 2022;9:276-9.