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ORIGINAL SCIENTIFIC REPORT

Bariatric Surgery Versus Lifestyle Intervention in Class I Obesity: 7–10-Year Results of a Retrospective Study

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Abstract

Introduction The American Society of Metabolic and Bariatric Surgery (ASMBS) and the International Federation of Surgery for Obesity (IFSO) have both stated that bariatric surgery (BS) should not be denied in Class I patients. However, lifestyle intervention (LI), such as diet plus gym programs, is still considered the preferred approach for subjects with a BMI ranging from 30 to 35 kg/m^2. The aim of this study was to retrospectively compare results of LI and BS in patients in Class I obesity.

Methods Retrospective analysis of prospective maintained databases of two centers for the "Interdisciplinary Treatment of Obesity" was performed. All patients in Class I obesity and follow-up >7 years were included in the study. Subjects were divided into two groups: BS group that included patients who had undergone surgery and LI group that included patients who underwent lifestyle intervention (LI). Percentage of excess body mass index loss (%EBMIL) and comorbidities remission were recorded.

Results Seventy-six patients were included in the study. Fifty-six subjects were submitted to surgery (BS group); 20 subjects were treated with nonsurgical approach (LI group). In BS group, 34 underwent laparoscopic adjustable gastric band, 13 laparoscopic sleeve gastrectomy (LSG), and 9 laparoscopic Roux-en-Y gastric bypass. EWL% resulted significantly higher in BS group at 1, 3, 5, 7 and 10 years ($p < 0.01$).

Conclusion Bariatric surgery is more effective than LI for patients in Class I obesity. Due to its versatility, low-risk profile and high-effectiveness LSG could be the standard intervention for these patients.

Introduction

Bariatric surgery (BS) is currently considered the best treatment for severe obesity [1]. Indications to surgery for patients in Class I obesity (BMI ranging from 30 to 35 kg/m^2) are still a matter of discussion. Several studies have reported that lifestyle intervention (LI) may result in significant weight loss (WL) in obese patients in the short term [2, 3]. However, results are usually not maintained in the long term [4, 5]. Patients in Class I obesity have the same overall mortality risk of subjects with a normal value

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of body mass index (BMI), but they have an increased risk of all obesity-related diseases [6].

Risk of diabetes is increased for all BMl levels > 24.0 kg/m^2, well below the standard criteria for obesity [7], and the prevalence of hypertension and dyslipidemia is significantly higher among patients with BMI 30–35 kg/m^2 [8].

Despite these health problems induced by Class I obesity, Italian and European guidelines still recommend BS for subjects with a BMI > 40 or 35 with comorbidities [9, 10].

The American Society Of Metabolic And Bariatric Surgery (ASMBS) stated for the first time in 2013 that BS should be considered as an available option in patients with BMI 30–35 who did not achieve substantial durable weight loss and/or comorbidity improvement with nonsurgical methods [11].

In 2014, the International Federation of Surgery for Obesity (IFSO) declared that BS should not be denied in Class I patients only on the basis of the BMI and that the decision should be based on a more comprehensive evaluation of the patient's global health [12].

The aim of our study was to evaluate long-term outcomes of BS in subjects with BMI 30–35 kg/m^2 in comparison with long-term outcomes of LI.

Materials and methods

In January 2017, a retrospective analysis of prospective maintained databases of two centers for the "Interdisciplinary Treatment of Obesity" was carried out. All patients with BMI 30–35 kg/m^2 and follow-up >7 years were included in the study. Subjects were divided into two groups according to the received treatment:

- BS group that included patients who had undergone surgery
- LI group that included patients who underwent lifestyle Intervention (LI)

BS was intended as any laparoscopic or laparotomic weight loss surgery; endoluminal procedures were excluded from this retrospective study. Each patient attended a clinical visit at 1, 3, 6 and 12 postoperative months. After the first year, subjects underwent annual clinical evaluation.

LI was intended as diet plus exercise regimen, prescribed and supervised by our dietitians. A diet providing 1200–1500 kcal/day combined with moderate-intensity exercise for at least 30 min and for at least 5 days per week was initially recommended. Daily calories intake and exercise intensity were subsequently tailored on weight changes and patients' compliance to the regimen. Subjects in this group were regularly evaluated in clinic every 3 months in the first year and then every 4–6 month depending on the weight trend. The main goal of the LI was to introduce a healthier behavior in patients who did not undergo any surgical procedures.

Weight loss (WL) and comorbidities remission between LI and BS groups were compared. WL was expressed as percent excess BMI loss (%EBMIL) calculated as:

$$[(\text{initial BMI} - \text{current BMI})/(\text{initial BMI} - 25)] \times 100.$$

(reviewer 1 Q7 and Q8)

Ideal weight was calculated as weight for a BMI = 25 kg/m^2.

Among comorbidities, we collected data on the presence of type 2 diabetes mellitus (T2DM) and arterial hypertension (HTN).

T2DM remission was defined as fasting plasma glucose (FPG) below 126 mg/dl and HbA1c [13] <6.5% in the absence of hypoglycemic drugs. Arterial hypertension (HTN) remission was defined as blood pressure <140/90 mmHg without antihypertensive medications [14].

Statistical analysis

Data are expressed as mean ± standard deviation (SD) unless otherwise indicated. Analysis of variance (ANOVA) was performed to test differences between groups means. χ^2 test was used to compare nonparametric data. Significance level was set below 0.05. Statistics were obtained using the "Statistical Package for Social Sciences" software (SPSS; version 12.0).

Results

Baseline

Seventy-six patients, 16 males and 60 females, were included in the study. Fifty-six subjects were submitted to surgery (BS group); 20 subjects were treated with non-surgical approach (LI group). Mean BMI at enrollment was not significantly different in the two groups ($p = 0.1$).

Table 1 summarizes the demographic characteristics and the prevalence of HTN and T2DM in the two groups at baseline.

Among patients of BS group, 34 underwent laparoscopic adjustable gastric band (LAGB), 13 laparoscopic sleeve gastrectomy (LSG), and 9 laparoscopic Roux-en-Y gastric bypass (LRYGB).

7–10-year results

BS patients showed significant higher %EBMIL at 1,3,5,7 and 10 years compared to LI group ($p \leq 0.001$ in all cases).

Table 1 Demographic characteristics and prevalence of HTN (hypertension) and T2DM (type 2 diabetes) in the two groups at baseline

	BS group $N = 56$ pts	LI group $N = 20$ pts	p
Gender (M/F)	9/47	8/12	0.1
Weight (kg)	93.6 ± 14.3	96.2 ± 16.4	0.5
BMI (kg/m^2)	33.8 ± 1.2	32.8 ± 1.5	0.1
Age (year)	36.9 ± 12.1	36.8 ± 14	0.9
Hypertension (%)	2 (3.5%)	1 (5%)	0.7
Type 2 diabetes (%)	3 (5.4%)	1 (5%)	0.5

Data are expressed as % or mean ± SD

%EBMIL at 1, 3, 5, 7 and 10 years in BS group was 67.9%, 76.8%, 78.3%, 72.3% and 69.1%, respectively.

%EBMIL at 1, 3, 5, 7 and 10 years in LI group was 16.2%, 17.9%, 19.4%, 25% and 14.6%, respectively.

Figure 1 summarizes %EBMIL results.

Among LAGB patients, 2 underwent band removal for slippage; 1 subject was converted to LSG after 2 years for insufficient weight loss.

In LSG group, 3 patients referred de novo gastro-esophageal reflux symptoms (GERD).

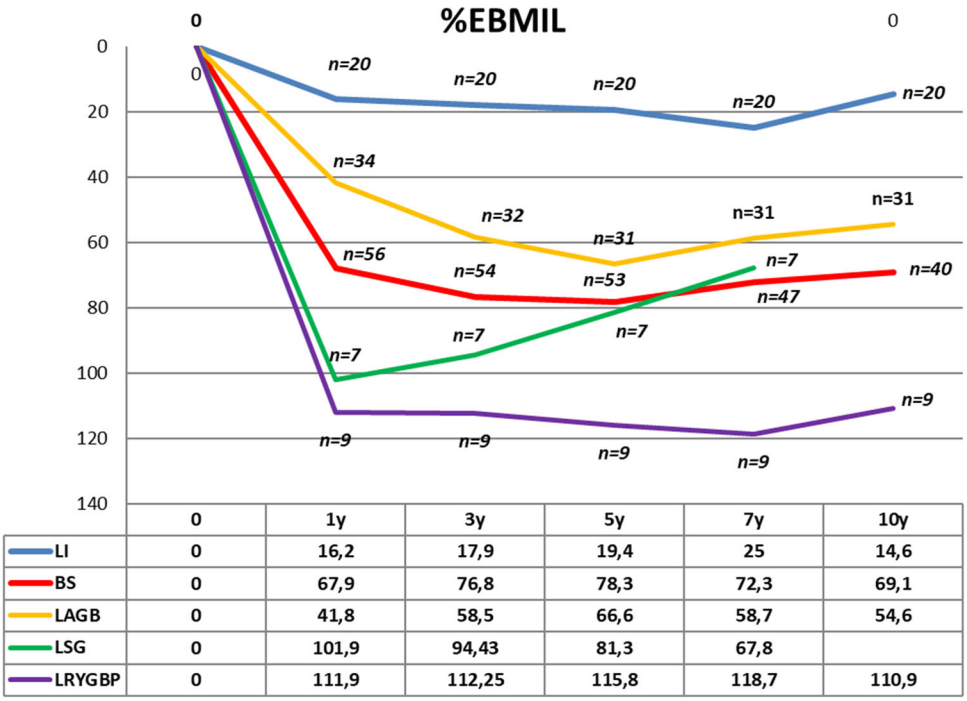
Among LRYGB patients, 1 complained with Dumping syndrome, 1 developed an internal hernia after 37 months, and 1 was treated with endoscopic reshape of gastric pouch due to insufficient weight loss.

No improvement of obesity-related disease was observed in the LI group. Remission from hypertension was achieved by subjects in BS group, while 2 out of 3 diabetic patients experienced remission.

Discussion

Outcomes of bariatric surgery in Class I obesity have been already reported in the literature. Four randomized controlled studies have proved effectiveness of LAGB [15, 16], LRYGB [17] and mini-gastric bypass [18] over lifestyle intervention for the treatment of obesity and its related diseases; in these studies, sample of patients ranged from 80 to 857 and a satisfactory %EWL (up to 87%) was reported after surgery. However, results were demonstrated only in a short-term follow-up (1–2 years). In 2012, Li et al. published a meta-analysis on 13 studies with 357 diabetic subjects with BMI < 35 kg/m^2, reporting that BS is an effective and well-tolerated treatment for this class of patients [19].

Also 3 observational studies have reported not only the effectiveness of bariatric surgery for subjects with BMI 30–35, but also high remission rate of comorbidities. Angrisani et al. [20] reported a 71.9% EWL at 5 years and 89.1% remission from comorbidities in a group of 210 patients that had undergone LAGB.



	0	1y	3y	5y	7y	10y
LI	0	16,2	17,9	19,4	25	14,6
BS	0	67,9	76,8	78,3	72,3	69,1
LAGB	0	41,8	58,5	66,6	58,7	54,6
LSG	0	101,9	94,43	81,3	67,8	
LRYGBP	0	111,9	112,25	115,8	118,7	110,9

Fig. 1 %EBMIL (percent excess BMI loss) at 1, 3, 5, 7 and 10 years in LAGB, LSG, LRYGB and LI groups

In the study of Cohen et al. [21], 5 years after LRYGB, 66 patients achieved 36% total weight loss (TWL) and 88% remission from diabetes.

Abbatini et al. [22] first published results of LSG in diabetic patients with BMI < 35, with 8 out of 9 subjects experiencing remission.

In 2011, Scopinaro et al. [23] demonstrated a higher remission rate from diabetes in patients with BMI 30–35 than in overweight subjects after bilio-pancreatic diversion (BPD).

Although these evidences have already demonstrated safety and effectiveness of BS in Class I obesity, some concerns remain regarding the choice of a surgical approach when BMI < 35; therefore, lifestyle intervention is still considered the preferred therapy. The aim of LI is to achieve and sustain a 10% weight loss of initial body weight [24, 25], which is considered safe and sufficient to obtain a significant improvement of general health in patients who are overweight or have Class I obesity. RCTs conducted with traditional diet programs tend to demonstrate that the mean weight loss obtained is generally inferior to the above-mentioned objective, and this weight loss is rarely maintained [26].

Outcomes of our study show that BS is more effective than LI in short and long terms, but subjects of LI group surprisingly achieved and maintained a 10% EWL during the whole studied period. This result still does not match the above-mentioned objective, but demonstrates that LI could help patients in controlling the disease; Indeed, it has to be considered that even if subjects treated with LI have still a BMI > 30, the obesity condition did not progress to Class II or III and no new case of diabetes or hypertension was diagnosed in these patients.

In BS subgroups, it was not unexpected that LRYGB showed better results over LAGB and LSG, but LAGB showed satisfactory %EWL > 50 only in the first 5 years; in this group of patients, mean BMI was only slightly below the threshold of obesity. In LSG group, the outcomes resulted comparable to LRYGB in the first year after surgery, but afterward patients experienced a slow weight regain and after 7 years, results are more similar to LAGB.

In LRYGB group, mean BMI < 25 and %EWL > 50 were achieved and maintained during the whole follow-up period, but malabsorptive procedures could represent an overtreatment in cases with BMI < 35.

Despite small numbers regarding the impact on comorbidities, it is interesting that all bariatric procedures were able to induce remission from diabetes and hypertension, while LI failed to obtain any improvement.

Limitations

This is a small retrospective study; larger prospective cohorts of subjects are needed to confirm our findings. Patients that received nonsurgical treatment were mostly males (40% of the LI group vs 16% of the BS group), and they showed an exceptional compliance to the treatment (follow-up after 10 months was still 100%); these peculiarities could explain the surprising results in LI group.

Conclusion

Bariatric surgery in Class I obesity shows satisfactory long-term results. Lifestyle intervention could control the progression of obesity, but it is less effective than BS for the short- and long-term treatments of the disease. Due to its versatility, low-risk profile and high-effectiveness LSG could be the standard intervention for these patients.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all patients submitted to surgery and included in the study.

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