

Bariatric Surgery: Risks and Rewards

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ABSTRACT: Bariatric or metabolic surgery is amongst the most studied recent trend in medicine. This ever increasing mountain of evidence continues to show that these procedures are the most successful and durable treatment for obesity and several related diseases. **OBJECTIVE:** We aimed to evaluate the risks (complications and diabetes re-emission) and rewards (weight loss and diabetes outcome) associated with Bariatric Surgery (BS). **METHODOLOGY:** Consecutive patients who underwent BS from January 2013 to October 2014 at Global hospitals, diagnosed with BMI above 35 kg/m² were identified and taken up for the study. Of the 100 patients 28 lost follow-up and 72 patients were enrolled. Of the sample (n=72) 20 subjects were Diabetic. Data was collected from all reliable sources and analysed at 6 months period. **RESULT:** At the baseline, mean age was 40.7 ± 12 years, mean BMI was 43.67 ± 7.56 kg/m² and 63.8% were females. Overall Excess weight loss % (EWL %) was 40.7 at six months post BS. The sample was studied after segregating on the basis of the BS as group I Laparoscopic Sleeve gastrectomy (LSG) and group II Laparoscopic Gastric by-pass (LGBP). The EWL% in group I and II was 39.6 and 42.8 respectively. BMI fell from 42.2 ± 6.1 kg/m² to 33.3 ± 4.6 kg/m² for LSG and 47.7 ± 9.7 kg/m² to 37.4 ± 6.7 kg/m² for LGBP at 6 months respectively. Of the 20 patients with T2DM, 14 subjects achieved euglycemia, 5 were on minimal dose of oral hypoglycemic drugs and 1 remained to need insulin even after surgery. **CONCLUSION:** Bariatric surgery is very safe and effective procedure without any significant morbidity or mortality. The risks and rewards studied in this context is almost similar in both the groups (LSG & LGBP) at 6 months. There was marked improvement in general wellness as a parameter of QOL. Counselling, monitoring, nutrient and mineral supplementation are essential for the treatment and they go a long way in prevention of nutritional and metabolic complications after bariatric surgery. However long term effects of bariatric surgery are still being studied. **KEY WORDS:** BS- Bariatric surgery, LSG- Laparoscopic sleeve gastrectomy, LGBP- Laparoscopic Gastric bypass, LRYGB- Laparoscopic Rou-En-Y-gastric bypass, LMNGB- Laparoscopic Mini-gastric bypass, EWL %- Excess weight loss, QOL- Quality of life.

INTRODUCTION

The World Health Organization estimates that more than one billion adults worldwide are overweight; of these, at least 300 million are obese¹. Studies say that India will become the global diabetes capital by 2050 if the abdominal obesity and metabolic syndrome are not arrested. The rising prevalence of overweight and obesity in India has a direct correlation with the increasing prevalence of obesity-related co-morbidities; hypertension, the metabolic syndrome, dyslipidemia, type 2 diabetes, and cardiovascular disease^{2, 11}. Weight loss of 5 to 10% has been associated with significant reductions in comorbidities and mortality³. These numbers can be achieved through conventional lifestyle and pharmacologic interventions for mild to moderately obese; however, such interventions are quite limited in morbid obesity. Currently, bariatric surgery has been proven to be an effective treatment for morbid obesity as part of an overall weight management strategy.

Bariatric or metabolic surgery is among the most studied surgical interventions in medicine and this ever-increasing mountain of evidence continues to show that these procedures are the most successful and durable treatment for obesity and several related diseases. A person can be potentially cured of numerous medical diseases including diabetes, hypertension, high cholesterol, sleep apnea, chronic headaches, venous stasis disease, urinary incontinence, liver disease, and arthritis. This proven surgical approach, combined with the dismal failure of dieting,

the marked improvement in quality of life and the quick recovery with minimally invasive techniques, has fueled the surge in the number of bariatric procedures performed annually over the last 10 years⁴. Bariatric surgery or better referred to as metabolic surgery is any surgery performed on the stomach and/or intestines with the intent of resolution of metabolic syndrome [Obesity, Type 2 diabetes mellitus (DM), hypertension, dyslipidemia]. The mechanism of diabetes resolution after gastrointestinal bypass remains unclear, and is not related to weight loss alone. In most cases, remission of diabetes is observed in the days to weeks after surgery, before any substantial weight loss has occurred⁵.

AIM: To estimate the rewards (weight loss, diabetes outcome, general wellbeing and life style modifications) and some of the post-operative risks (complications and diabetes re-emission) of metabolic surgery.

Objectives of the study

- To compare the EWL% in patients undergoing two different surgeries (LSG, LGBP).
- To determine Diabetes re-emission after a period of 6 months.
- To examine the General wellbeing as part of QOL (quality of life) after surgery.
- To access some short term complications and compliance to life style management of BS six months after surgery.

METHODOLOGY:

This is both a retrospective and a prospective study.

Sample selection criteria: Patients who underwent bariatric surgery [LSG and LGBP] from January 2013 to October 2014 in a single tertiary center (Global hospitals, Hyderabad) were recruited for the study. Patients aged below 20 and above 70 years were excluded. A was r

Size of the sample: In the study period 100 patients were studied, 26 patients lost for follow up and two patients were excluded due to death (accidental). The total sample taken up for study was 72 (n=72).

Tools of the study: A pre-defined and a pre-tested questionnaire was used for collecting data. Patients were followed for a period of six months.

EWL % was calculated by using formula mentioned below:

$$\text{EWL \%} = \frac{\text{Preoperative weight (kg)} - \text{post operative weight (kg)}}{\text{Preoperative weight (kg)} - \text{Ideal weight (kg)}} \times 100$$

Data collection: Pre- surgical data was retrieved from medical records and 6 months post-surgical data from out-patient department. All the patient's pre and post BMI, EWL%, Glycosylated hemoglobin, general wellbeing and other investigations, necessary were collected and tabulated. The patients were split into two groups according to the surgical intervention performed [LSG, LGBP] and studied.

Data Analysis: Data was analysed using arithmetic mean, percentages, standard deviation and large sample test (Z- score).

RESULT AND DISCUSSION:

Bariatric surgery is an effective treatment option for severely obese patients for whom weight loss has been problematic with conventional pharmacotherapy and/or lifestyle intervention-based treatment. These surgeries have been shown not only to decrease body weight but to have an effect on incretins. Thus, even if diabetes did not completely get cured by bariatric surgery, change in incretins has a beneficial effect on diabetes⁶.

This study was undertaken in the department of nutrition at Global Hospitals Hyderabad between January 2013 to October 2014. After applying the

exclusion criterion 72 subjects were selected and studied for a period of 6 months. Type of surgery has a role to play in weight loss and diabetes remission. So the sample was divided into two sub groups depending on the surgery Group I consisted of patients preferring LSG 32(50%) and Group II included patients undergoing LGBP 32(50%).

Baseline Characteristics: Of the 72 patients who underwent BS mean age of the sample was 40.7 ± 12 years, 63.8% were females and male to female ratio was 1:1.76. Mean Pre- surgical

- BMI of the entire sample was 43.67 ± 7.56 (kg/m²) as depicted in Table1. The mean hospital length of stay was 4.4 days.

Table 1: Socio – demographics

Parameters	no (%)
n	72
Mean Age \pm SD (yrs)	40.7 ± 12
Males (%)	26 (36.1)
Female (%)	46 (63.8)
LSG (%): LGBP (%)	36 (50) : 36 (50)
Pre surgery BMI kg/m ²	43.67 ± 7.56
Post-surgical BMI kg/m ²	34.86 ± 6.97
Mean Hospital stay (days)	4.4
DM (%)	20 (27.8)
Non- DM (%)	52 (72.2)

REWARDS

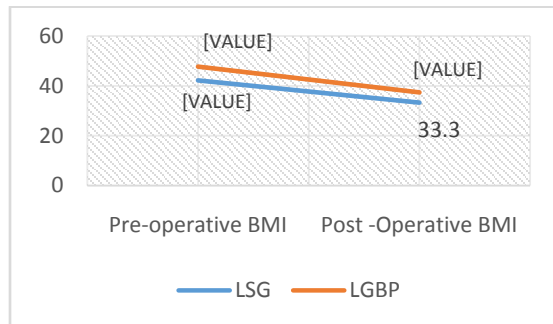
A) BMI reduction and type of BS:

BS is a powerful tool for massive weight loss, especially in the first 6 months post-surgery⁷.

On the basis of the bariatric surgery performed sample was segregated into 2 groups. Group I (LSG) of 36 patients (50%) and Group II (LGBP) with 36 patients (50%). Mean BMI fell from 42.2 ± 6.1 kg/m² to 33.3 ± 4.6 kg/m² in Group I (LGBP) and from 47.7 ± 9.7 kg/m² to 37.4 ± 6.7 kg/m² in Group II 6 months pre and post bariatric surgery respectively (figure 1). A reduction in

BMI of 11 kg/m² was observed in LSG and 10 kg/m² in LGBP at 6 months as shown below.

Figure 1: Representation of BMI reduction pre and post BS



It was observed that patients with high BMI were considered for LGBP than LSG irrespective of metabolic considerations. Coleman et.al⁸ in 2014 published a three years weight loss outcomes from bariatric surgery which reported BMI reduction of 11 in LSG and 15 in RYGB on 1 year follow-up.

Table 2: Weight loss outcome and comparison in BS

	Group I (LSG)	Group II (LGBP)
Pre-operative BMI (kg/m ²)	42.2 ± 6.1	47.7 ± 9.7
Post-operative BMI (kg/m ²)	33.3 ± 4.6	37.4 ± 6.7
Reduction BMI (kg/m ²)	11	10
Weight loss Mean ± SD	23.8 ± 5.56	26.8 ± 9.68
EWL (%)	39.6%	41.8 %

B) Excess weight loss (EWL%):

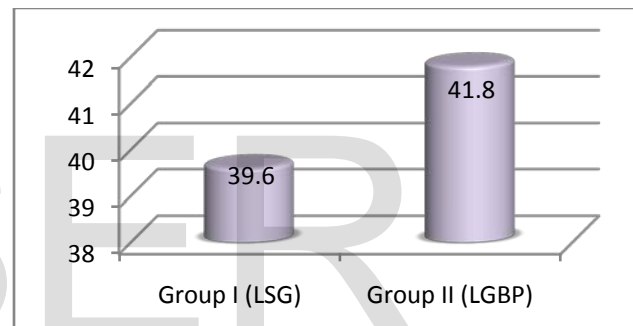
Weight loss in severely obese patients after bariatric procedures is best described by the EWL%. The extent of weight loss varied based on the procedure performed. Six months after surgery, the absolute weight loss in patients (Group II) LGBP was 26.8 ± 9.68 kg and they had a mean excess weight loss of 41.8% (Figure 2). This was almost similar with LSG (Group I)

patients who had an absolute weight loss of 23.8 ± 5.56 kg and a mean excess weight loss of 39.6% as depicted in Table 2. None of the patients, regardless of type of surgery, were observed to have a weight regain during the six months follow up.

Gastric bypass (LGBP) patients had higher rate of successful excess weight loss (defined as ≥50% at 1 year follow-up) compared to LSG patients⁷. Patients who undergo gastric by-pass typically experience a EWL% of 60-70% in 2 years with resolution of co-morbidities seen in 70-95% of individuals as reported in text book of Obesity care and bariatric surgery.⁶

Another Indian study from Ludhiana conducted at Dayanand Medical College documented a EWL% of 64.05% at 6 months interval after LSG⁹ which is deviated in the present study.

Figure 2: Comparison of EWL% in BS



The results showed patients, who underwent gastric bypass (LGBP) lost almost the similar weight when compared to LSG at 6 months follow up. This is in line with another study conducted by Haider Al-Shurafaet al⁷ showing that there was no difference in excess weight loss at 6 months in LGBP and LSG.

Table 3: Weight loss and BS

	LSG	L Gastric bypass
Mean ± SD (kg)	23.8 ± 5.56	26.8 ± 9.68
Z score	-1.57 NS	

NS – non- significant

Statistical analysis has shown that there is no significant difference between the two attributes when Z score was applied.

C) Impact on DM:

The most effective treatment for both type 2 diabetes and obesity is metabolic surgery. LSG and LGBP are

the most performed BS in India, with nearly 50% of diabetics being obese¹⁰.

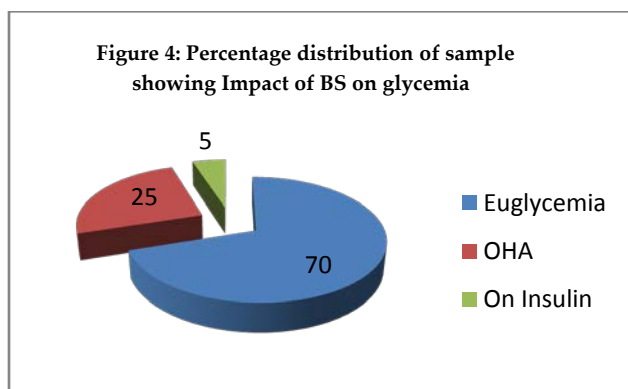
Table 4 shows the impact of BS on glycaemia. Out of the 20 diabetics studied, 14 (70%) achieved Euglycaemia, 5 (25%) patients were on a minimal dose of OHA and 1 (5%) required a reduced dose of insulin within 6 months of follow-up post-surgery.

When these 6 patients were followed (one on insulin and 5 on OHA) with EWL% it was found that all the patients had a EWL% < 25¹⁵.

Table 4: BS and its impact on Glycemia				
	Total	Euglycemia	OHA	Insulin
Group I (LSG)	4 (20 %)	3 (15%)	1 (5%)	0
Group II (LGBP)	16 (80%)	11 (55%)	4 (20%)	1 (5%)
Total	20 (100%)	14 (70%)	5 (25%)	1 (5%)

Recent BS studies showed successful results in patients with T2DM and patients were off medication after surgery. Metabolic surgery in Indian patients suggested T2DM resolution in 81-100% of patients in LGBP, 81-98% of patients 1 year following LSG¹².

LSG and LGBP are also associated with improved insulin secretion and an exaggerated postprandial rise in glucagon-like peptide 1. The vagal pathway could have a role in the neuro humoral regulatory pathways that control appetite and glucose metabolism after bariatric surgery¹³.



Bariatric surgery should be considered as a Gold standard therapy for T2DM¹¹.

Patient with best % EWL has the best chance of complete remission such as patients with >75% EWL

had statistically greater remission rates than those with % EWL < 50%¹⁵.

D) General wellbeing after BS

QOL (Quality of life) improvements were more likely to occur within the first 2 years following surgery, with greater improvements in physical QOL than mental QOL. Bariatric surgery improves QOL¹⁶. However in the present study a self- defined simple questionnaire with 3 options like very good, mediocre (neither good nor bad) and bad were used as depicted in table 5.

Table 5. General well-being and BS				
	Very good	Bad	Neither good nor bad	Mean confidence level
Group I (LSG)	45.8% (33)	1.38% (1)	2.75% (2)	81.3 ± 24.1
Group II (LGBP)	45.8% (33)	0	4.1% (3)	80 ± 24.1
Overall	91.6% (66)	1.38% (1)	6.9% (5)	56.4 ± 24.1

Overall wellbeing was very good in 91.6%, bad in 1.38% and neither good nor bad in 6.9% of the sample. Mean confidence level after surgery is 56.4 ± 24.1.

E) Compliance to Life style management at 6 months

Postoperative weight loss following any type of bariatric surgery is largely dependent on the extent to which patients can make and sustain changes in eating and activity. Therefore, lifestyle management including diet, exercise, and behavioral modification is critical to help patients achieve long-term weight loss.

Exercise helps in sustaining the lost weight and 68% of the sample were exercising frequently (5 days / week), 12.5% occasionally and 14.9% rarely or doesn't used to exercise at all.

RISKS

A) Short term complications within 6 months of BS

With the alteration in the gastrointestinal anatomy, certain side effects of bariatric surgery can be expected

and ameliorated through patient education and postoperative treatment¹⁷.

The common complications within 6 months post Bariatric surgery is listed below (table 5)

- Obesity and rapid weight loss are known risk factors for gallstone formation, and in group I (LSG) 2.7% of the sample developed gall stones when compared to group II 1.38%.
- Hair loss was found to be more 6.9% in group II when compared to group I 2.7% and could be a form of nutritional deficiency.
- Saggy skin not so evident within 6 months was observed in 3 patient (4.08%) in both the groups (LSG & LGBP).
- GI complication: Nausea and vomiting are the most common complaints after bariatric surgery, and they are typically associated with inappropriate diet and noncompliance with a gastropasty diet (i.e., eat undisturbed, chew meticulously, never drink with meals, and wait 2 hours before drinking after solid food is consumed). GI complications was observed in 12.4% of the entire sample. The most common complaint in patients were vomiting's after overeating.
- The rest 36.1% in group I and 33.3% in group II had no complications and were satisfied with the outcomes of the surgery till 6 months follow-up.

Table 5 : Short term complications within six months post BS

	Cholelit hiasis	Hair loss	Saggy skin	GI compli cations	No complica tions
Group I (LSG)	2 (2.7%)	2 (2.7%)	1 (1.38%)	5 (6.9%)	26 (36.1%)
Group II (LGBP)	1 (1.38%)	5 (6.9%)	2 (2.7%)	4 (5.5%)	24 (33.3%)
BS (LSG + LGBP)	3 (4.08%)	7 (9.6%)	3 (4.0%)	9 (12.4%)	50 (69.4%)

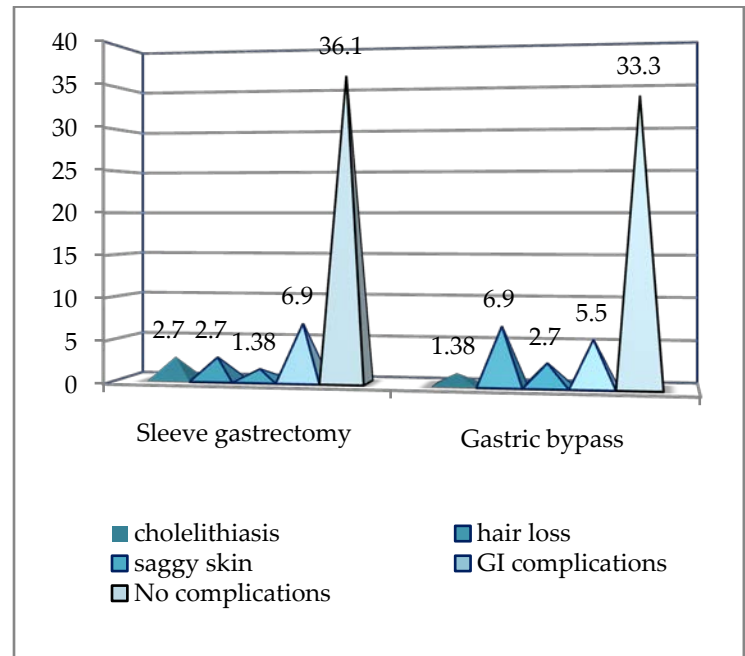


Fig 5: Graphical representation of the sample (n=72) showing short term complications after BS.

After LSG and LGBP surgery no cases complained of surgical complications like bleeding, anastomotic leak, wound infection, thromboembolism, and anastomotic strictures. Longer term complications can include marginal ulcers, bowel obstruction, gallstones, and nutritional deficiencies which are out of the range of this study.

These metabolic and nutritional consequences require lifelong monitoring and micronutrient supplementation¹⁸.

SUMMARY AND CONCLUSION

Therefore, in morbidly obese patient, BS is very safe and effective procedure without any significant morbidity or mortality. It is observed that higher BMI patients were considered for RYGB. EWL % was 40.7 and DM remission rate was 70% in the whole sample at six months post BS. Which is almost similar in both the groups (LSG & gastric bypass). There was marked improvement in general wellness as a parameter of QOL. Hence, Counselling, monitoring, and nutrient and mineral supplementation are essential for the treatment and prevention of nutritional and metabolic complications after bariatric surgery. The long-term effects of bariatric surgery are still being studied. Support groups provide weight-loss surgery patients an opportunity to discuss issues they face after surgery. Regular counselling and support group meets

not only help patient but also other bariatric support team to achieve the desired goal. However, a similar long term follow-up data and evaluation is the need of the hour especially in an Indian scenario.

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