

## Research Article

# Short Term Outcomes of Laparoscopic Sleeve Gastrectomy for Obesity in Pakistan

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## Abstract

**Introduction:** Obesity has been established as a major risk factor for a number of non-communicable diseases and over the year's multiple strategies have been directed at addressing this issue including minimally invasive procedures like laparoscopic sleeve Gastrectomy, specifically with an end goal of weight reduction for the morbidly obese. This procedure has become the preferred choice for both patients and physicians over the past few years. Laparoscopic sleeve Gastrectomy was introduced at our center recently; we have carried out a retrospective review of charts to evaluate this procedure short-term outcome at our center in our local population.

**Methods:** A retrospective Cohort study, based on a record review for the treatment outcome of laparoscopic sleeve gastrectomy, was carried out at the department of surgery, Aga Khan University Hospital, Karachi over a three-year period since its inception and analyzed in June 2015 using SPSS version 20.

**Results:** A total of 17 patients fulfilled the inclusion criteria, out of which 12 were females (70.6%). The mean age of study participants was 41.53 years. Only one patient had undergone liposuction previously for weight loss. The most common comorbidities observed were diabetes mellitus (23.6%), hypertension (23.6%) and polycystic ovarian syndrome (17.7%). A statistically significant mean reduction in excess body weight of  $28.9 \pm 14.90$  Kg, CI 21.27-36.59 was observed along with reduction in BMI at 1 year with a mean difference of  $11.1 \pm 5.38$  Kg/m<sup>2</sup>, CI 21.27-36.60. Results were further analyzed for reduction in percentage excess body weight which showed a mean reduction of 43.6% for the study participants. Co-morbidity improvement was seen as reduction in systolic blood pressures in 9 patients (52%) though these were not found to be significant.

**Conclusion:** Laparoscopic Sleeve Gastrectomy shows great potential for the Indian sub-continent population, especially for patients requiring rapid weight loss for better health outcomes, although long term follow up and outcomes will determine the effectiveness of the procedure over extended periods and its role as a first line intervention for obesity.

**Keywords:** BMI; Diabetes Mellitus; Hypertension; Poly cystic Ovarian Syndrome; Sleeve Gastrectomy

## Introduction

Obesity has been established as a major risk factor for a number of non-communicable diseases including Diabetes, Ischemic heart disease, Stroke, Obstructive sleep apnea and even

some cancers [1]. Moreover, it has also been linked to negative effects on different aspects of reproductive and psychological health [2]. At the same time obesity is also one of the most reversible and controllable of risk factors leading to significant improvement in prognosis and management of diseases and their pathogenesis. These include improving insulin resistance and decreasing morbidity and mortality from complex medical issues such as metabolic syndrome [3].

A number of interventions are available for obesity including life-style changes, dietary modifications, medical therapy and surgical mediation [4]. Minimally invasive procedures such as laparoscopic sleeve Gastrectomy, specifically with an end goal of weight reduction for the morbidly obese has become the preferred choice for both patients and physicians over the past few years. These interventions are less traumatic and offer a quicker post-operative recovery with comparable outcomes to other bariatric procedures [5]. As a relatively new procedure in the subcontinent, its results, both short term and long term, are being assessed continuously to judge its success in the local cohort. Prevalence of obesity in Pakistan and India is significant enough to affect the health outcomes of the population, whereby its importance becomes paramount as the region exhibits a high incidence of cardiovascular diseases [6].

Laparoscopic sleeve Gastrectomy was introduced at our center recently; we have carried out a retrospective review of charts to evaluate this procedure short-term outcome at our center in our local population.

## Methodology

A retrospective study, based on a record review for the treatment outcome of laparoscopic sleeve gastrectomy, was carried out at the department of surgery, Aga Khan University Hospital, Karachi. Data was analyzed in June 2015 and all those cases that had undergone this procedure over the last 3 years were included, with the exception of those who had this procedure for indications other than obesity i.e. cancer etc. Pregnant or lactating women were excluded in order to have a uniform cohort.

Required approvals from the department and ethical review board were taken. Files were called from the medical records department and every possible measure was taken in order to protect the confidentiality and identity of the patients that were included. Documented data included basic demographic details (Table 1), pre-operative weight and post-operative weight at 1 year after surgery, excess weight at the time of procedure and excess weight loss or gain by 1 year of follow up. The primary outcome was to see the difference in terms of reduction or gain in excess body weight by 1 year after surgery expressed both as mean difference and percentage.

Other comorbidities such as post-operative blood pressure readings, HDL levels, HbA1C levels and fasting/random glucose levels were documented at the time of follow up at 1 year. A change in post-operative blood pressures was also analyzed and comorbidity resolution or improvement was stated for hypertension. Excess weight loss/gain was calculated by attaining the ideal body weight using Miller's formula [7] and then subtracting it from the weight at the time of the procedure at 1 year of follow up. The data was entered and analyzed via SPSS IBM version 20. Paired

sample t-test was used to analyze differences between pre- and post-operative continuous outcomes. A p-value of less than 0.05 was considered as statistically significant.

## Results

All patients who underwent laparoscopic sleeve Gastrectomy as a primary procedure for obesity from 2012 till June 2014 at our Centre who also followed up for at least one year with the department of surgery were included in this study. Study participants' demographics and co-morbidities are presented in Table 1. A total of 17 patients fulfilled this criterion, out of whom 12 were females (70.6%). The mean age of study participants was 41.53 years. Only one patient had undergone liposuction previously for weight loss. The most common co-morbidities observed were diabetes mellitus (23.6%), hypertension (23.6%) and polycystic ovarian syndrome (17.7%). The main study outcome observed was change in the excess weight of the participants (as mean difference and percentage), Body Mass Index and total body weight at 1 year of follow-up as an indicator of short-term outcome of the intervention as shown in Table 2. For this analysis post-operative weight and the lowest weight achieved by the patients at the completion of one year of surgery were taken.

A statistically significant (p-value<0.001) mean reduction in excess body weight of  $28.9 \pm 14.90$  Kg, CI 21.27-36.59 was documented for the study participants. A similar statistically significant result was obtained for reduction in BMI at 1 year with a mean difference of  $11.1 \pm 5.38$  Kg/m<sup>2</sup>, CI 21.27-36.60. Results were further analyzed for reduction in percentage excess body weight which showed a mean reduction of 43.6% for the study participants. Co-morbidity improvement was seen as reduction in systolic blood pressures in 9 patients (52%) though no statistically significant mean difference was observed between pre and post-operative blood pressures as listed in Table 3.

Variable	N	%
Mean Age	$41.53 \pm 10.43$	
Mean Age Male	$43.60 \pm 12.7$	
Mean Age Female	$40.67 \pm 9.81$	
Gender		
Male	5	29.4%
Female	12	70.6%
Past History		
FH of Obesity	0	0%
History of previous surgery for weight loss	1	5.9%
Comorbid		

PCOS	3	17.7 %
Breast CA	1	5.9 %
DM	4	23.6%
HTN	4	23.6%

Gout	1	5.9 %
Dyslipidemia	1	5.9%

**Table 1:** Basic Demographic of study participants. N=number±Standard deviation, % =percentage.

Variable	Mean±Standard deviation	Mean Difference±Standard deviation	95 % CI of the mean difference	P value
Weight Kg				
Pre-operative weight	123.2±26.77			
Post-operative weight at 1 year	94.3±15.81	28.9±14.90	21.27-36.59	<0.001
BMI Kg/m <sup>2</sup>				
Pre-operative BMI	47.8±9.27			
Post up BMI at 1 year	36.7±5.89	11.1±5.38	8.33-13.87	<0.001
Excess weight loss				
Pre -operative Excess weight	64.9±24.86			
Post-operative Excess weight at 1 year	35.9±14.82	28.9±14.90	21.27-36.60	<0.001
Post-operative %Excess weight loss at 1 year	43.6±16.59			

**Table 2:** Pre and post-Operative measurement of study outcomes and their paired sample T test for n=17.CI=confidence interval.

Variable	Mean±Standard deviation	Mean Difference±Standard deviation	95 % CI of the mean difference	P value
Blood pressures systolic				
Pre -op blood pressure	139±19.50			
Post- op blood pressure	128±24.60	10.71±21.78	-22.39	>0.05
Blood pressures diastolic				
Pre -op blood pressure	79±9.01			
Post- op blood pressure	77±10.17	2.05±10.64	-3.41 - 7.53	>0.05

**Table 3:** Pre and post-Operative measurement of secondary study outcome and their paired sample T test for n=17.CI=confidence interval.

## Discussion

Obesity is a well-established global health issue which is now considered a possible drawback of urban and economic development. Changes in life style coupled with the consumption of high caloric diet have largely led to a positive energy balance of individuals causing weight gain [8]. Being a major yet modifiable

risk factor for potentially life-threatening conditions, such as stroke and ischemic heart disease [1], investigations are being done to tackle the burden both medically and surgically. New drugs such as liraglutide and its effects, highlight the advances that have taken place to manage obesity medically [9] whereas surgically, laparoscopic sleeve gastrectomy has gained immense popularity as a minimally invasive intervention in the past decade.

Originally considered a part of a larger two step bariatric intervention [10] it has now been converted to a single procedure [5]. This change makes it important to report short term outcomes in order to add to the existing literature and show its results in different regional and population cohorts with diverse genetic, disease, life-style and dietary profiles. Furthermore, the reporting of short-term findings assists care givers to assess long term suitability of the procedure for their patients and if need be, the requirement of a secondary intervention at an earlier stage. Specifically, the importance of studying short term outcomes is vital in the case of bariatric procedures, as stated previously by Han, sang Moon et al. 2005, due to a lack of standardization of excess weight loss estimates for laparoscopic sleeve gastrectomy in the current literature. Most of the previous research was focused in the west, based on metropolitan life style populace, while Asians were prone to develop obesity related complications at a much lower BMI [11-13]. Likewise, post-operative dietary habits of different populations in dissimilar social settings had a notable impact on short- and long-term outcomes for bariatric procedures [14]. Our study, which to the best of our knowledge is the only one of its kind from Pakistan, shows an excess weight loss of  $43.6 \pm 16.59\%$  at one year with a statistically significant mean difference ( $P < 0.001$ ) between pre and post-operative weight for a mean BMI of  $47.8 \pm 9.27$ . These results are comparable to a study recently published from the neighboring country of India, which has a similar genetic, disease and lifestyle profile, which demonstrated an excess weight loss of 59.3 % at one year and had overlapping pre-operative BMI profiles to our study [15]. These similar findings complement both the studies and may point towards the effectiveness of laparoscopic sleeve gastrectomy as a primary minimally invasive surgical intervention for obesity in this region, which is inhabited by one seventh of the world population.

Sleeve gastrectomy as a procedure for weight loss has been described previously in literature, by Himpens, et al. 2006 in one of the first randomized controlled trials. This study highlighted its potential as a sole bariatric laparoscopic procedure with relatively better results as compared to older interventions, such as gastric banding, showing an excess weight loss of 57.5 % [16]. Many other studies have also evaluated the effectiveness of laparoscopic sleeve gastrectomy in different stratifications of BMI. Han, et al. in 2005 showed the greatest and highest reported percentage change in excess weight loss of 83.3 % at 12 months with a mean pre-operative BMI of 37.2 [17]. Other studies with more comparable BMI profiles such as Baltasar, et al. in 2005 and Cotem, et al. in 2006 have exhibited excess weight loss of 56.1 % and 45 % for mean BMI's of 65 and 65.4 respectively [18,19]. Similarly, Langer, et al. showed an excess weight loss of 56 % at 12 months for a post-operative mean BMI of 48.5 [20]. These short term results may be explained by the restrictive nature of the technique, a reduction in the functional capacity of the stomach as well as the hormonal

change that is caused by loss of the gastric fundus [21]. The removal of the fundus leads to a decrease in levels of the hunger-inducing enzyme ghrelin. While this effect may be short-term it is extremely helpful in producing changes in weight loss in the initial period after surgery [22]. Many other physiological factors such as increased gastric emptying and reduced post-operative gastric compliance lead to a lack of proper digestion which may also have a role in achieving this weight loss [23].

Laparoscopic Sleeve gastrectomy has many benefits including a decreased risk of serious post-operative complications [24]. The continuity of the gastro intestinal tract is preserved, and the laparoscopic nature of the surgery provides a quicker post-operative recovery [5]. The chance of acquiring mal-absorptive conditions is minimal and dietary supplementation for essentials vitamins and minerals may not be required and the need to use foreign objects such as band or intra gastric balloon is avoided. Alongside this, the option to proceed to a second surgery, with a far more stable and healthier patient, remains open if results are not satisfactory. While achieving weight loss in the super obese and obese, the procedure also has a noticeable effect on comorbidity resolution, though in our case there was no statistically significant ( $P$  value  $> 0.05$ ) mean difference in the post-operative systolic and diastolic pressures. However, a general reduction in pressures was noted in some patients. Many other studies though have shown considerable comorbidity resolution in terms of hypertension with a resolution in 13 out of 14 patients by Han, sang Moon, et al. 2005 [17] while a recent study in the west bank Palestine showed significant improvement in both hypertension and diabetes mellitus [25]. Similar findings were demonstrated by the experience of the Spanish national registry which showed improvement and remission of diabetes in 81% of its participants while hypertension was improved in 63.2% of the cases [26].

Many consider surgery as a far better treatment option for obesity with quicker and enhanced outcomes [7,28], but side effects such as gastro esophageal reflux should be kept in mind, as they can cause some discomfort for the patient [16,23]. However, over time, such effects resolve with a recovery of gastric compliance. While serious complications such as gastric leaks may have adverse effects on patient safety, they can be tackled by using a stapled buttressed absorbable polymer membrane, drainage, total parenteral nutrition and most importantly proper antibiotic coverage [29,30].

Laparoscopic Sleeve Gastrectomy shows great potential for the Indian sub-continent population, especially for patients requiring rapid weight loss for better health outcomes, although long term follow up and outcomes will determine the effectiveness of the procedure over extended periods and its role as a first line intervention for obesity.

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