

# BARIATRIC (OBESITY) SURGERY - MINIMAL ACCESS APPROACH

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**Abstract:** The developing countries are no longer immune to the growing epidemic of obesity. The problem affects males, females and is also on the increase in the pediatric age group. Obesity is associated with several co morbidities requiring frequent and expensive medical treatment like cardiovascular diseases and Type2DM. In addition it is well documented that the Indo-Asians compared to the world population are more prone to Type2DM and cardiovascular diseases which occur at much lower BMI's. Bariatric surgery has been well documented to be the best treatment option available for inducing and maintaining long term weight loss. Bariatric or obesity surgery performed by the minimal access approach is rapidly gaining popularity worldwide as it results in faster recovery with no added complications. The specialty is gradually gaining acceptance in developing countries like India as awareness of obesity as a treatable disease grows.

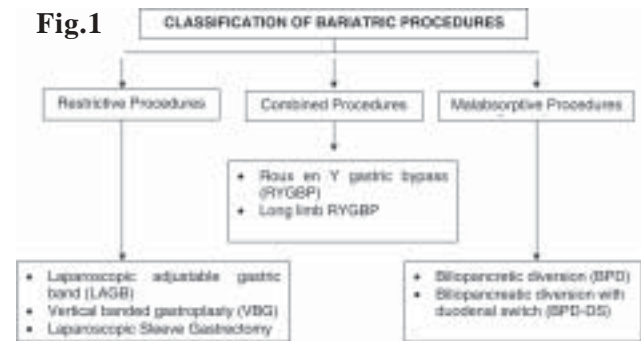
## INTRODUCTION

Bariatric surgery comprises surgical management of patients suffering from an extreme degree of obesity. Obesity, which is no longer a mere cosmetic problem, instead has become a life threatening disease. This disease is termed as morbid obesity and is defined as a patient with a BMI (body mass index) of >37.5 Kg/m<sup>2</sup> (Western > 40 Kg/m<sup>2</sup>) or 32.5 Kg/ m<sup>2</sup> (Western 35 Kg/m<sup>2</sup>) with significant associated obesity related comorbidities. The disease has developed stealthily and has been declared the worst pandemic of the 21<sup>st</sup> century.

The world health organization in conjunction with the western pacific (WPRO), the International Association for the study of obesity and the International Obesity task force have formulated an extremely well researched and crisp perspective of obesity in the Asia Pacific region. Extensive recommendations are detailed on medical management of obesity. The perspective documented in February 2000 makes a reference to the role of bariatric surgery in the management of obesity in the Asia Pacific region. Bariatric surgery in fact is the only treatment option that has reported effective, consistent and sustained prophylaxis and improvement of obesity related complications. In an observational study published by Christou et al comparing bariatric surgery to conservative management for obese patients showed a mortality rate of 0.68% in the surgery cohort as against 6.17% in the control. This shows a significant advantage of surgery vis a vis conservative management in reducing the relative risk of death<sup>1</sup>.

The two basic principles underlying bariatric surgery are restriction and malabsorption. These are at two extremes of a spectrum with a combination principle lying in between. Classification of bariatric procedures based on restriction and malabsorption is as shown in figure 1.

The data on obesity from the Asia pacific region brings to light certain *differences* in behavior patterns of obese individuals here as compared to that observed in the west.



**Table:** Difference in the behaviour pattern of obese individuals between Asia-Pacific and Western Region

1. The most glaring difference is the onset of obesity related complications occurring in this population at much lower BMIs.
2. A higher percentage of body fat for a given weight.
3. Predisposition to abdominal adiposity. Accumulation of visceral fat occurs at lower BMIs increasing risk of hypertension dyslipidemia, diabetes and metabolic syndrome.
4. Predominantly large vegetarian population e.g. India.
5. Lack of adequate data on childhood obesity.

This makes extreme malabsorptive procedures like Biliopancreatic Diversion (BPD) unsuitable for this patient population, Laparoscopic Adjustable Gastric Banding (LAGB) and Laparoscopic Roux-en-Y gastric bypass (RYGBP) are the two most popular procedures practiced in India today.

## LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING (LAGB)

This is a purely restrictive procedure in which an adjustable silicon band is placed on the stomach just below the gastroesophageal junction to create a 15cc pouch. The balloon lining the band is connected by a hollow tube tunneled through the abdominal wall to a small reservoir

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known as access port which is placed subcutaneously and fixed to the muscle sheath in the epigastrium or left hypochondrium. By injecting saline into this reservoir, the balloon lining the band can be inflated to narrow the passage between the gastric pouch and remaining stomach. The procedure of gastric banding works on a simple principle of decreasing the intake capacity of the patient and slowing the rate of emptying the gastric pouch to prolong the time interval between meals. As the entire digestive tract is intact in this procedure, digestion and absorption is normal. Success therefore relies significantly on the patients motivation level and adherence to dietary guidelines. The weight loss in various reported series ranges between 45-55% of EW by end of two years<sup>2,3,4</sup>.

*Complications* associated with LAGB include gastric perforation, access port infection, access port leak, outlet obstruction, pouch dilatation, band slippage / erosion. The overall incidence of these complications is 10-15%<sup>9</sup>. A significant advantage of this procedure is its reversibility. It is a simple and safe procedure which is rapidly gaining popularity the world over.

### LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (LRYGBP)

The gastric bypass is considered the *gold standard* in treating morbid obesity. The procedure is performed both laparoscopically and by conventional open access.

The *procedure* involves division of the stomach using staples to create a 15-20cc gastric pouch. A 100-150 cm roux-en-y jejunal loop is created using staples. The jejunum is anastomosed to the gastric pouch creating a 1.2 – 1.5 cm wide anastomosis. This gastrojejunostomy may be performed using a circular stapler/linear staples or intra corporeal suturing.

The *principle* underlying gastric bypass has a combination of restriction and malabsorption. The small size of the gastric pouch restricts the intake, the narrow outlet delays the emptying and delayed mixing of digestive juices and food consumed decreases absorption. The weight loss varies from 60-80% of EW at two years following surgery<sup>5,6,7,8</sup>. Complications of gastric bypass occur in 15-20% of patients<sup>9</sup>. Morbidity and mortality are both higher as compared to

LAGB. This is directly related to the multiple anastomosis required in performing the gastric bypass. Complications include anastomotic leak, haemorrhage, stricture, DVT, PE and dumping syndrome. The latter occurs due to concentrated food rapidly reaching the small gut causing nausea, vomiting, palpitation, dizziness and diarrhea. This unpleasant event usually results in the patient abstaining from foods which may cause this to happen.

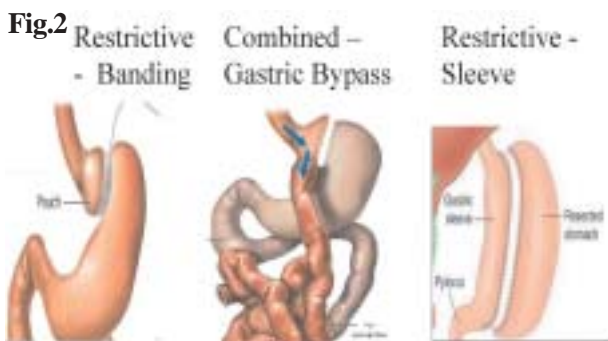
### Laparoscopic Vertical Gastrectomy (vertical Sleeve Gastrectomy, Greater Curvature Gastrectomy, Parietal Gastrectomy, Gastric Reduction and even Vertical Gastroplasty)

*Laparoscopic vertical or sleeve gastrectomy* generates weight loss by restricting the amount of food that can be eaten (removal of stomach or vertical gastrectomy) without any bypass of the intestines or malabsorption. The stomach pouch is smaller than the pouch that Duodenal Switch patients have. It is a relatively new operation that can be done either as a stand alone procedure for those who don't have much weight to lose, or as part of a staged operation for high risk patients. The weight loss is projected to be in the range of 45 to 55% (although some studies are reporting a weight loss of 60-80 %) of the excess body weight, which is comparable to that of the Laparoscopic Adjustable Gastric Banding Procedures, however It doesn't have the foreign body problems such as erosion or slippage that can occur with these procedures. In addition to avoiding foreign bodies, the other advantage of the sleeve gastrectomy is that the excess stomach volume is removed, not left in place. This eliminates production of the hormone Ghrelin and thus helps to reduce the sensation of hunger that people have due to high Ghrelin levels. The stomach is restricted by dividing it vertically and removing more than 85% of it. This part of the procedure is not reversible. The stomach that remains is shaped like a tube and measures from 60-150cc. A very important feature of the procedure is that it preserves the pylorus. This maintains the feeling of fullness and avoids dumping and marginal ulcers. The normal satiety mechanism is preserved.

*Sleeve gastrectomy* can be performed on patients who are considering a LapBand® but are concerned about a foreign body and those who have other medical problems that prevent them from having weight loss surgery such as anemia, Crohn's disease, extensive prior surgery, and other complex medical conditions.

*Complications* associated with sleeve gastrectomy are - deep vein thrombophlebitis 0.5%, non-fatal pulmonary embolus 0.5%, pneumonia 0.2%, acute respiratory distress syndrome 0.25%, splenectomy 0.5%, gastric leak and fistula 1.0%, postoperative bleeding 0.5%, small bowel obstruction 0.0%, death 0.25%

Sleeve gastrectomy is a safe and effective procedure maintaining integrity of the digestive system and providing the desired alteration to help in weight loss. It is a suitable



surgical alternative for patient who are super obese as also for those who require less weight loss (10).

## OPEN BARIATRIC SURGERY

Patients of morbid obesity have been effectively treated by bariatric surgery and life style management in the west for the past 50 years. Open bariatric surgery on these patients with a high surgical risk is associated with significant perioperative morbidity and a prolonged convalescence (11, 12). Technical difficulties include an incision through an anterior abdominal wall, of increased thickness working in a depth with difficulty in accessing areas like the esophageal hiatus, bulky and heavy intraabdominal contents, abdominal wall closure, delayed ambulation due to surgical incision with increased risk of DVT and pulmonary embolism. All complications related to an open incision such as wound dehiscence, incisional hernias, hypertrophic scars etc. An event such as post-operative bleeding or bowel leak requiring re-exploration has a very high incidence of morbidity and mortality.

Introduction of minimal access surgery has significantly shortened convalescence and perioperative morbidity. The laparoscope is able to access and provide excellent vision of nearly the entire abdominal cavity. Appropriate placement of trocars makes handling of entire GI tract comfortable. The puncture wounds made by the trocars do not require a layered closure. The post operative pain is significantly decreased and majority of patients are ambulatory in the post-operative period. This results in a rapid recovery of the patient.

Any surgeon performing bariatric procedures must be well versed with diagnosis and management of complications of these procedures and should possess appropriate and adequate surgical expertise and technical skill to perform the procedure by laparoscopic and open approach.

## SUMMARY

Bariatric surgery in India is in the stage of infancy. Patients of morbid obesity require to be managed by a multidisciplinary team comprising the surgeon at the helm with help from, physician, nutritionists, physiotherapists, psychologists and counselors. Protocol based management provides for safe surgery and yields the best results.

Recent studies have shown that the diseases associated with morbid obesity appear at much lower BMI values in the Asian population as compared to Caucasian and, hence, the BMI criteria for classifying obesity have been revised for the Asian population. (Table 1)

Bariatric surgery is slowly growing popular in India. The technology of minimal access surgery has made this surgical option for treating obesity more acceptable.

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## Literature Review

### *Characteristics of Gestational Diabetic Mothers and their Babies in an Indian Diabetes Clinic*

Shailaja D kale, SR Kulkarni, HG lubree, k meenakumari, vu despandey, ss rege, j despandey, kj coyaji, cs yajnik

Japi. VOL.53. October 2005

Antenatal information was obtained from hospital records gestational diabetes mellitus GDM was diagnosed by 75g OGTT in clinically high risk women. Anthropometric measurements of mother and the babies were recorded within 24 hours of delivery and a maternal blood sample collected for haematological and biochemical measurements. Between the period Jan 1998 to Dec. 2003, 265 women with gestational diabetes were treated in our unit; 49% had first-degree relatives with diabetes. Compared to non-diabetic mothers (n=215) GDM mother were older (29.0 vs. 26.0 years, p<0.001), more obese (body mass index – BMI 26.0 vs. 22.0 kg/m<sup>2</sup>, p<0.001), centrally obese (waist hip ratio-WHR 0.89 vs 0.86, p<0.001), adipose (sum of 4 skinfolds 98.4 vs. 61.4 mm, p<0.001) and higher blood pressure (Hg, p<0.001). GDM mothers had higher concentrations of plasma triglycerides (195.0 vs. 153.0 mg/dl, p,0.01); blood haemoglobin (11.7 vs 10.9 g/dl, p<0.001) and higher platelet count but lower concentration of HDL cholesterol and albumin. Sixty percent GDM mothers and 34% of non-diabetic mothers were delivered by caesarean-section, 23% of GDM mothers delivered pre term (<37wk). Despite the smaller gestation, babies of GDM mothers were heavier (BW 2950.0 vs. 2824.0g, p<0.0001, adjusted for gender), longer (48.9 vs. 48.0 cm, p<0.01) and more adipose (sum of 2 skinfolds 10.5 vs. 8.5mm). Only 5% of babies born to GDM mothers weighed >4000g but 30% were >90<sup>th</sup> centile of birth weight of babies born to non-diabetic mothers. Babies of GDM mothers suffered higher neonatal morbidity. GDM mothers in urban India are more obese than non-diabetic mothers, frequently have a family history of diabetes and show metabolic features of insulin resistance syndrome, suggesting high cardiovascular risk. Neonates of GDM mothers are heavier, longer and more adipose than those born to non-diabetic mothers, and suffer higher neonatal morbidity.