

A REVIEW ON BARIATRIC SURGERY**Venkatesh P*, Hepcy Kalarani D, Shoba Rani V and Niharika R.V**Department of Pharmaceutical Chemistry, P.Rami Reddy Memorial College of Pharmacy-
Kadapa. A.P. India.Article Received on
22 Feb 2015,Revised on 13 March 2015,
Accepted on 04 April 2015***Correspondence for
Author****Dr. P. Venkatesh**Department of
Pharmaceutical
Chemistry, P.Rami Reddy
Memorial College of
Pharmacy Kadapa. A.P.
India.**ABSTRACT**

Excessive deposition of fat in the adipose tissue is called obesity. Obesity can be determined by calculating the Body Mass Index [BMI] value. For treatment of obesity bariatric surgery is used. It is the surgery where weight loss is achieved by reducing the size of the stomach with a gastric band or through removal of a portion of the stomach or by resecting and re-routing the small intestines to a small stomach pouch. Efforts to treat morbid obesity through controlled diets, behavior modification and exercise programs are only temporarily successful with the patient invariably regaining even more weight than the amount lost. When compared to other "Allopathic, Ayurvedic, Homeopathic treatment bariatric surgery gives long term weight loss and also produces good quality of health. Bariatric surgery

has been shown to help improve or resolve many obesity-related conditions, such as type 2 diabetes, high blood pressure, heart diseases.

KEY WORDS: Adipose, Surgery, Resecting, Morbid, Allopathy.**1. INTRODUCTION****1.1 Obesity**

Obesity today is recognized as a health problem of epidemic proportions. Obesity refers to a spectrum of problems of excess weight ranging from mild overweight to the morbidly obese. Patients with morbid obesity do not respond to medical means of weight loss. Efforts to treat morbid obesity through controlled diets, behavior modification and exercise programs are only temporarily successful with the patient invariably regaining even more weight than the amount lost. Obesity surgery is the only method by which long-term weight loss can be achieved in these patients. An obese person has accumulated so much body fat that it might have a negative effect on their health. If a person's bodyweight is at least 20% higher than it

should be, he or she is considered obese. If your Body Mass Index (BMI) is between 25 and 29.9 you are considered overweight. If your BMI is 30 or over you are considered obese.

1.2 Body mass index [BMI]

The BMI is a statistical measurement derived from your height and weight. Although it is considered to be a useful way to estimate healthy body weight, it does not measure the percentage of body fat.

1.3 Reasons for obesity

People become obese for several reasons, including

- Consuming too many calories.
- Not sleeping enough.

Endocrine disruptors, such as some foods that interfere with lipid metabolism.

- Fructose effect on the brain may promote
- Lower rates of smoking (smoking suppresses appetite).
- Medications that make patients put on weight.
- Obesity gene.

1.4 Causes of obesity

Obesity can be caused due to various reasons like changed lifestyles, energy dense diets, low level of physical activity, environmental factors, heredity, psychological and cultural influences and many others

- Heredity - Genes may increase vulnerability to obesity , Metabolic Factors , Endocrinological factors , Hypothyroidism
- Psychological Factors: ,Dietary Factors ,Mortality ,Morbidity,Regional Distribution of fat & Health.

2. TYPES OF OBESITY

Type-1 and Type-2 Obesity

Type-1 obesity is not caused by a disease and, in most cases, it is caused by excessive eating habits and lack of exercise. Type-2 obesity accounts for less than 1% of obesity cases and is caused by a disease; abnormal weight gains occur with type-2 obesity even when little is eaten.

Child-type and Adult type obesity

Although obesity may look the same from the outside, a full examination reveals that there's a considerable amount of personal difference in the number and size of fat cells. According to the size and number of fat cells, obesity can be divided into adult-type, where only the size of fat cells is increased, and child-type, where the number of fat cells is increased.

1. Android/apple-shape obesity
2. Gynoid or pear shaped obesity.

- **android obesity**

central obesity (apple shape) with fat excess primarily in the abdominal wall and visceral mesentery; associated with glucose intolerance, diabetes, decreased sex hormone-binding globulin, increased levels of free testosterone, and increased cardiovascular risk.

- **Gynoid obesity**

Android fat distribution is contrasted with gynoid fat distribution, fat around the hips and bottom, causing a "pear-shape". In other cases, an ovoid shape forms which does not differentiate between men and women.^[1]

3. TREATMENT FOR OBESITY

Methods to treat obesity

- By using allopathic drugs
- By using ayurvedic drugs
- By using homeopathic drugs
- By bariatric surgery

4. ANTI OBESITY MEDICATION (ALLOPATHIC DRUGS)

Anti-obesity medication or weight loss drugs are all pharmacological agents that reduce or control weight. These drugs alter one of the fundamental processes of the human body, weight regular altering either appetite, or absorption of calories.

- Orlistat (Xenical) Lorcaserin
- Lorcaserin (Belviq).

Sibutramine (Reductil or Meridia)

Rimonabant

Metformin.

5. TREATMENT OF OBESITY BY AYURVEDIC MEDICINE

In ayurveda, Charak Samhita describes eight different types of bodies that are disease prone. Out of these, the obese body is described as the one afflicted with the most diseases and troubles. Obesity is the condition or physical state of the body when excessive deposition of fat takes place in the adipose tissue. Extra fat puts a strain on the heart, kidneys, liver and the joints such as the hips, knees and ankles and thus, overweight people are susceptible to several diseases like coronary thrombosis, high blood pressure, diabetes, arthritis, gout, liver and gall bladder disorders. Chief cause of obesity is overeating, irregular eating habits and not following the rules of eating or mixing non-compatible food items in one meal. To decrease weight and get rid of obesity three things must be kept in mind:

1. Controlling eating habits.
2. Regular exercise.
3. Avoiding the causes of weight gain.

6. TREATMENT OF OBESITY BY HOMEOPATHIC MEDICINE

6.1 Homeopathic treatment

Homeopathy treats the person as a whole. This means that homeopathic treatment focuses on the patient as a person, as well as his pathological condition. The homeopathic medicines are selected after a full individualizing examination and case-analysis, which includes the medical history of the patient, physical and mental constitution etc. A miasmatic tendency (predisposition/susceptibility) is also often taken into account for the treatment of chronic conditions. The medicines given below indicate the therapeutic affinity but this is not a complete and definite guide to the treatment of this condition. None of these medicines should be taken without professional advice.

6.2 Homeopathic remedies for obesity

Sep., Senega, Calcarea carbonica, Ammonium muriaticum, Thyroidinum, Antimonium crudum, Graphites, Phytollaca, Fucus, Calcarea arsenicum, Capsicum, Phosphorus, Lac defloratum, Kali bichromicum, Pulsatilla, Sepia, Senega.^[2]

7. BARIATRIC SURGERY

History

Open weight loss surgery began slowly in the 1950s with the intestinal bypass. It involved anastomosis of the upper and lower intestine, which bypasses a large amount of the absorptive circuit, which caused weight loss purely by the malabsorption of food. Later Drs.

J. Howard Payne, Lorent T. DeWind and Robert R. Commons developed in 1963 the Jejunocolic Shunt, which connected the upper small intestine to the colon. The laboratory research leading to gastric bypass did not begin until 1965 when Dr. Edward E. Mason and Chikashi Ito at the University of Iowa developed the original gastric bypass for weight reduction which led to fewer complications than the intestinal bypass and for this reason Mason is known as the "father of obesity surgery". Bariatric surgery (weight loss surgery) includes a variety of procedures performed on people who are obese. Weight loss is achieved by reducing the size of the stomach with a gastric band or through removal of a portion of the stomach (sleeve gastrectomy or biliopancreatic diversion with duodenal switch) or by resecting and re-routing the small intestines to a small stomach pouch.

7.1 Classification of surgical procedure

Procedures can be grouped in three main categories: Standard of care in the United States and most of the industrialized world in 2009 is for laparoscopic as opposed to open procedures. Future trends are attempting to achieve similar or better results via endoscopic procedures. Predominantly malabsorptive procedures

7.1.2 Biliopancreatic diversion

This complex operation is termed biliopancreatic diversion (BPD) or the Scopinaro procedure. The original form of this procedure is now rarely performed because of problems with malnourishment. It has been replaced with a modification known as duodenal switch (BPD/DS). Part of the stomach is resected, creating a smaller stomach (however the patient can eat a free diet as there is no restrictive component). The distal part of the small intestine is then connected to the pouch, bypassing the duodenum and jejunum. In around 2% of patients there is severe malabsorption and nutritional deficiency that requires restoration of the normal absorption. The malabsorptive effect of BPD is so potent that those who undergo the procedure must take vitamin and dietary minerals above and beyond that of the normal population. Without these supplements, there is risk of serious deficiency diseases such as anemia and osteoporosity.^[3-6]

7.2 Jejunoileal bypass

7.2.1 History

Vertical banded gastroplasty was developed in 1980 by Dr. Edward E. Mason at the University of Iowa. Dr. Mason also developed the original gastric bypass for weight reduction in 1966 and is known for his pioneering work as the "father of obesity surgery".

7.2.2 Procedure

In both these variants a total of only about 45 cm (18") of normally absorptive small intestine was retained in the absorptive stream, compared with the normal length of approximately 7 metres (twenty feet). In consequence, malabsorption of carbohydrate, protein, lipids, minerals and vitamins inevitably occur. Where the end-to-side technique was used, reflux of bowel content back up the defunctionalized small intestine allowed absorption of some of the refluxed material resulting in less weight loss initially and greater subsequent weight regain. Bile is secreted by the liver, enters the upper small intestine by way of the bile duct, and is absorbed in the small intestine. Bile has an important role in fat digestion, emulsifying fat as the first stage in its digestion. Bypassing the major site of bile acid reabsorption in the small intestine therefore further reduces fat and fat soluble vitamin absorption. As a result, huge amounts of fatty acids, which are normally absorbed in the small intestine, enter the colon where they cause irritation of the colon wall and the secretion of excessive volumes of water and electrolytes, especially sodium and potassium, leading to diarrhea. This diarrhea is the major patient complaint and has characterized jejunoileal bypass in the minds of patient and physician alike since the procedure was introduced. Bile salts help to keep cholesterol in solution in the bile. Following JIB, the bile salt pool is decreased as a consequence of reduced absorption in the small intestine and bile salt losses in the stool. The relative cholesterol concentration in gallbladder bile rises and cholesterol crystals precipitate in the gallbladder bile, forming a nidus for development of cholesterol gallstones in the gallbladder.

7.2.3 endoluminal sleeve

A study on humans was done in Chile using the same technique however the results were not conclusive and the device had issues with migration and slipping. A study recently done in the Netherlands found a decrease of 5.5 BMI points in 3 months with an endoluminal sleeve.

7.2.4. Predominantly restrictive procedures

Procedures that are solely restrictive, act to reduce oral intake by limiting gastric volume, produces early satiety and leave the alimentary canal in continuity, minimizing the risks of metabolic complications.

7.2.5. Vertical banded gastroplasty

surgery Illustration depicting vertical banded gastroplasty Vertical banded gastroplasty surgery

VBG alternatives

- Duodenal Switch surgery
- Vertical Sleeve Gastrectomy
- Roux-en-Y Gastric Bypass
- Selective vagotomy (snipping the vagus nerve, effectively stopping hunger sensations).
- Mini Gastric Bypass^[7]

7.3 Adjustable gastric band

The restriction of the stomach also can be created using a silicone band, which can be adjusted by addition or removal of saline through a port placed just under the skin. This operation can be performed laparoscopically, and is commonly referred to as a "lap band". Weight loss is predominantly due to the restriction of nutrient intake that is created by the small gastric pouch and the narrow outlet. It is considered one of the safest procedures performed today with a mortality rate of 0.05%. A laparoscopic adjustable gastric band, commonly called a lap band, A band, or LAGB, is an inflatable silicone device placed around the top portion of the stomach to treat obesity, intended to slow consumption of food and thus reduce the amount of food consumed. Adjustable gastric band surgery is an example of bariatric surgery designed for obese patients with a body mass index (BMI) of 40 or greater — or between 35 and 40 in cases of patients with certain comorbidities that are known to improve with weight loss, such as sleep apnea, diabetes, osteoarthritis, GERD, Hypertension (high blood pressure), or metabolic syndrome, among others. In February 2011 the United States Food and Drug Administration (FDA) expanded approval of adjustable gastric bands to patients with a BMI between 30 to 40 and one weight-related medical condition, such as diabetes or high blood pressure. However, an adjustable gastric band may only be used after other methods such as diet and exercise have previously been tried.

7.3.1 Post-surgical diet and care

The patient may be prescribed a liquid-only diet, followed by mushy foods and then solids. This is prescribed for a varied length of time and each surgeon and manufacturer varies. Some may find that before their first fill that they are still able to eat fairly large portions. This is not surprising since before the fill there is little or no restriction in the band. This is why a proper post-op diet and a good after-care plan is essential to success. A recent study found that patients who did not change their eating habits were 2.2 times more likely to be unsuccessful than those who did, and that patients who had not increased their physical

activity were 2.3 times more likely to be unsuccessful than those who did.^[28] In principle, a diet long term post gastric band surgery should consist of normal healthy food, that is solid in nature and requires ample chewing to achieve a paste consistency prior to swallowing. This texture will maximise the effect of the band, rather than choosing easier wet foods, such as soups, casseroles and smoothies, which pass through the band quickly and easily resulting in greater caloric intake.^[8]

7.4 Sleeve gastrectomy

Sleeve gastrectomy is a surgical weight-loss procedure in which the stomach is reduced to about 25% of its original size, by surgical removal of a large portion of the stomach along the greater curvature. The result is a sleeve or tube like structure. The procedure permanently reduces the size of the stomach, although there could be some dilatation of the stomach later on in life. The procedure is generally performed laparoscopically and is irreversible.

7.4.1 Procedure

Sleeve gastrectomy was originally performed as a modification to another bariatric procedure, the duodenal switch, and then later as the first part of a two-stage gastric bypass operation on extremely obese patients for which the risk of performing gastric bypass surgery was deemed too large. The initial weight loss in these patients was so successful it began to be investigated as a stand alone procedure. Today sleeve gastrectomy is the fastest growing weight loss surgery option in North America and Asia. In many cases, but not all, sleeve gastrectomy is as effective as gastric bypass surgery, including weight independent benefits on glucose homeostasis. The precise mechanism(s) that produce these benefits is not known.

7.5 Mixed procedure

Mixed procedures apply both techniques simultaneously. Gastric bypass surgery refers to a surgical procedure in which the stomach is divided into a small upper pouch and a much larger lower remnant" pouch and then the small intestine is rearranged to connect to both. Surgeons have developed several different ways to reconnect the intestine, thus leading to several different gastric bypass (GBP) procedures. Any GBP leads to a marked reduction in the functional volume of the stomach, accompanied by an altered physiological and physical response to food. The operation is prescribed to treat morbid obesity type 2 diabetes, hypertension, sleep apnea, and other comorbid conditions. Bariatric surgery is the term encompassing all of the surgical treatments for morbid obesity, not just gastric bypasses, which make up only one class of such operations. The resulting weight loss, typically

dramatic, markedly reduces comorbidities.

7.5.1 Surgical indications

Gastric bypass is indicated for the surgical treatment of morbid obesity, a diagnosis which is made when the patient is seriously obese, has been unable to achieve satisfactory and sustained weight loss by dietary efforts, and suffers from comorbid conditions which are either life-threatening or a serious impairment to the quality of life. In the past, clinicians interpreted serious obesity as weighing at least 100 pounds (45 kg) more than the "ideal body weight", an actuarially-determined body-weight at which one was estimated to be likely to live the longest, as determined by the life-insurance industry.

7.5.2 Surgical techniques

The gastric bypass, in its various forms, accounts for a large majority of the bariatric surgical procedures performed. It is estimated that 200,000 such operations were performed in the United States in 2008.^[5] An increasing number of these operations are now performed by limited access techniques, termed "laparoscopy". Laparoscopic surgery is performed using several small incisions, or ports: one to insert a surgical telescope connected to a video camera, and others to permit access of specialized operating instruments. The surgeon views his operation on a video screen. Laparoscopy is also called limited access surgery, reflecting the limitation on handling and feeling tissues and also the limited resolution and two dimensionality of the video image.

7.5.4 Gastric bypass roux en Y (distal)

The small intestine is normally 6–10 m (20–33 ft) in length. As the Y-connection is moved further down the gastrointestinal tract, the amount available to fully absorb nutrients is progressively reduced, traded for greater effectiveness of the operation. The Y-connection is formed much closer to the lower (distal) end of the small intestine, usually 100–150 cm (39–59 in) from the lower end, causing reduced absorption (malabsorption) of food: primarily of fats and starches, but also of various minerals and the fat-soluble vitamins. The unabsorbed fats and starches pass into the large intestine, where bacterial actions may act on them to produce irritants and malodorous gases.

7.6 Eating after bariatric surgery

Immediately after bariatric surgery, the patient is restricted to a clear liquid diet, which includes foods such as clear broth, diluted fruit juices or sugar-free drinks and gelatin

desserts. This diet is continued until the gastrointestinal tract has recovered somewhat from the surgery. The next stage provides a blended or pureed sugar-free diet for at least two weeks. This may consist of high protein, liquid or soft foods such as protein shakes, soft meats, and dairy products. Foods high in carbohydrates are usually avoided when possible during the initial weight loss period. Post-surgery, overeating is curbed because exceeding the capacity of the stomach causes nausea and vomiting.

7.7 Fluid recommendations

It is very common, within the first month post surgery, for a patient to undergo volume depletion and dehydration. Patients have difficulty drinking the appropriate amount of fluids as they adapt to their new gastric volume. Limitations on oral fluid intake, reduced calorie intake, and a higher incidence of vomiting and diarrhea are all factors that have a significant contribution to dehydration. In order to prevent fluid volume depletion and dehydration, a minimum of 48–64 fl oz should be consumed by repetitive small sips all day.

7.8 Reduced mortality and morbidity

Several recent studies report decrease in mortality and severity of medical conditions after bariatric surgery. But long term effects are not clear. In the Swedish prospective matched controlled trial, patients with a body mass index (BMI) of 34 or more for men and 38 or more for women underwent various types of bariatric surgery and were followed for an average of 11 years. Surgery patients had a 23.7% reduction in mortality (5.0% vs. 6.3% control, adjusted hazard ratio 0.71). This means 75 patients must be treated to avoid one death after 11 years. Death rates were lower in the gastric bypass patients for all diseases combined, as well as for diabetes, heart disease and cancer.^[9]

8. GUT HORMONES AND BARIATRIC SURGERY

Glucagon

GLP-1 Human subjects with severe obesity are increasingly treated with bariatric surgery to promote weight loss via procedures that reduce the capacity of the stomach and/or the absorptive surface area of the small bowel, resulting in reduced food intake and/or energy malabsorption. Some of these surgical procedures may also be associated with changes in plasma levels of one or more gut hormones, due to anatomical alterations in gut motility, incomplete nutrient digestion, and disruption of neural innervation. Changes in the levels of circulating gut hormones have been commonly observed after gut surgery, and in some instances, relative changes in the numbers of specific enteroendocrine cell subsets have also

been described. Diversion of nutrients away from the proximal gut and consequent exposure of the distal gut to a greater load of incompletely digested nutrients is often associated with a reductions in levels of circulating peptides derived from the proximal gut, and an increase in levels of peptide hormones derived from the distal gut, such as neurotensin, PYY and enteroglucagon. As many human subjects experience significant weight loss, and even more remarkable improvement or complete resolution of their diabetes within days of the surgical procedure, there is great interest in understanding the potential roles of gut hormones in the improvement of b-cell function, the amelioration of the diabetic state, and in the factors contributing to weight loss.

9. EFFECT OF OBESITY AND BARIATRIC SURGERY ON CARDIOVASCULAR SYSTEM

Gastric band surgery is considerably more effective in preventing strokes and heart disease than medications. Bariatric Surgery Reduces Heart Disease and Stroke Risk Dramatically - Medical News Today. 2.6 million people in the USA die prematurely because they are obese, the authors explained. Excess body fat produces harmful chemicals that mess up the gut's hormonal balance, resulting in inflammation and insulin resistance - symptoms that mark the prelude to diabetes type 2.

Dyslipidemia - 65% either had considerable improvements or the condition was resolved.

9.1 Effects of Bariatric Surgery on Cardiovascular Function

9.1.1 Metabolic Syndrome, Cardiovascular Risk, and Bariatric Surgery

Obesity is recognized as a classic risk factor for atherosclerosis and subsequent cardiovascular disease. It is a component of a cluster of cardiovascular risk states including hypertension, insulin resistance, and dyslipidemia which together combine to form what is now defined as the "metabolic syndrome." Bariatric operations can achieve a sustained weight loss of up to 40%, which results in a favorable modulation of these cardiovascular risk factors. One recent meta-analysis by Buchwald et al reported an improvement of hypertension in 61.7% of patients, an improvement of hyperlipidemia in 70%, and a resolution or improvement of diabetes in 86.0% of individuals undergoing surgery.

9.1.2 Bariatric Surgery Compared With Other Weight Loss Modalities

The SOS study prospectively evaluated the cardiovascular risk changes of bariatric surgery compared with patients undergoing nonsurgical weight loss therapy. Although surgery was

more beneficial at improving cardiovascular risks, no standardization was found in the nonsurgical treatment arm. Lifestyle and diet therapies have demonstrated some cardiovascular benefits; however, no randomized controlled trials currently exist comparing the effects of bariatric surgery with standardized nonsurgical treatments, specifically focusing on cardiovascular end points. Studying the data from a number of recent meta-analyses, however, suggests that bariatric operations result in larger benefits to cardiovascular risk parameters than other weight loss therapies.

9.1.3 Bariatric Surgery and Type 2 Diabetes Mellitus

Among the most notable effects of bariatric surgery on the metabolic syndrome is the modulation of insulin sensitivity and diabetes. These operations can improve insulin sensitivity by 2 to 3 times within days after surgery, before any noticeable weight loss. This results in a total resolution of diabetes in 76.8% of surgical patients and is thought to occur by a weight loss-independent mechanism that may involve the role of modulated intrinsic gut hormones through the so-called enteroinsular axis.

9.1.4 Atherosclerotic Load and Bariatric Surgery

As bariatric procedures improve the metabolic profile, it could be predicted that there would be concomitant improvements on atherosclerotic load in obese subjects after surgery compared with controls. However, few studies have examined the role of bariatric surgery on imaged atherosclerosis, although 1 does confirm the benefits on disease status. In this controlled 4-year interventional study performed on a subgroup of the SOS study patients, intima-media thickness and lumen diameter of the carotid artery were used as markers of atherosclerosis. It was demonstrated that the progression rate of carotid bulb intima-media thickness increased significantly by almost 29% for both mean and maximum values in 9 obese controls compared with 11% mean and 6% maximum intima-media thickness progression in 14 surgical patients.

9.1.5 Obesity and Heart Failure

A strong association between obesity, increased BMI, and heart failure was described by the Framingham Heart Study, which reported that obese patients have double the risk of developing heart failure compared with subjects with a normal BMI and identified weight as the third most important predictor of heart disease after age and dyslipidemia. In this study, ≈11% of male and 14% of female cases of heart failure were directly correlated to obesity, and each incremental BMI rise of 1 kg/m² increased the risk of heart failure by 5% for male

subjects and by 7% for female subjects.

9.2 Epicardial Fat and Bariatric Surgery

Postmortem analyses demonstrate that strong evidence of ventricular dysfunction exists in obese patients. “Excessive” epicardial fat occurs in 95% of subjects, and \approx 40% demonstrate ventricular fatty infiltration. This excessive cardiac fat has been described as resulting from metaplasia of connective tissue, which subsequently develops into a fatty infiltration in \approx 3% of morbidly obese individuals.^[10]

10. THE SAFETY AND EFFICACY OF BARIATRIC SURGERY

Safety and Efficacy in Pediatric Patients Endorsed by the International Federation for the Surgery of Obesity and Metabolic Disorders and The American Society for Metabolic and Bariatric Surgery, sleeve gastrectomy is gaining popularity in children and adolescents. Recent studies have found that it is safe and effective, resulting in weight loss similar to weight loss seen in adult patients undergoing the bariatric procedure.

10.1 Methods

A competitive NIDDK grant process resulted in the creation of a group of investigators with expertise in bariatric surgery, internal medicine, endocrinology, behavioral science, outcomes research, epidemiology, biostatistics and other relevant fields who have worked closely to plan, develop, and conduct the LABS study. The LABS consortium protocol is a prospective, multi-center observational cohort study of consecutive patients undergoing bariatric surgery at six clinical centers. LABS includes an extensive database of information systematically collected pre-operatively, at surgery, and perioperatively during the 30 day post-operative period, and longer term.

10.2 RESULTS

The LABS study is organized into three phases. LABS-1 includes all patients at least 18 years of age who undergo bariatric surgery by LABS-certified surgeons with the goal to evaluate the short-term safety of bariatric surgery. LABS-2, a subset of approximately 2400 LABS-1 patients, evaluates the relationship of patient and surgical characteristics to longer-term safety and efficacy of bariatric surgery. LABS-3 involves a subset of LABS-2 subjects who undergo detailed studies of mechanisms involved in weight change. The rationale, goals, and approach to study bariatric surgery are detailed in this report along with a description of the outcomes, measures.

10.3 The Longitudinal Assessment of Bariatric Surgery (LABS)

Overview of LABS' Goals

The goals of the LABS study are to assess the risks and health benefits associated with bariatric surgery and to identify aspects of the procedures as well as patient characteristics that are associated with optimal outcomes. To achieve these goals, LABS investigators defined a range of several relevant outcome domains in bariatric surgery. Whenever possible, LABS includes objective measures of patient status and co-morbid disease burden. When objective measures of disease are not feasible, validated and standardized data collection instruments are used, if available. Investigators sought to identify existing data collection instruments which are psychometrically sound. When validated data collection instruments were not available, LABS investigators created new instruments appropriate for patients undergoing bariatric surgery or adapted questionnaires from other clinical studies.^[11]

11. BENEFITS OF BARIATRIC SURGERY

11.1 Severe Obesity

Severe obesity is one of the most serious stages of obesity. You may often find yourself struggling with your weight and essentially feeling as if you're trapped in a weight gain cycle.

11.2 The help of bariatric surgery to us

When combined with a comprehensive treatment plan, bariatric surgery may often act as an effective tool to provide you with long term weight-loss and help you increase your quality of health. Bariatric surgery has been shown to help improve or resolve many obesity-related conditions, such as type 2 diabetes, high blood pressure, heart disease, and more. Frequently, individuals who improve their weight find themselves taking less and less medications to treat their obesity-related conditions. Significant weight loss through bariatric surgery may also pave the way for many other exciting opportunities for you, your family, and most importantly – your health.

11.3 Bariatric Surgery and Hormonal Changes

Hormonal changes following bariatric surgery improve weight loss by maintaining or enhancing energy expenditure (calories burned). In fact, some surgeries even increase energy expenditure relative to changes in body size. Thus, unlike dietary weight loss, surgical weight loss has a higher chance of lasting because an appropriate energy balance is created.

11.4 Dieting and Hormonal Changes

In dietary weight loss, energy expenditure is reduced to levels lower than would be predicted by weight loss and changes in body composition. This unbalanced change in energy can often lead to weight regain. Significant weight loss is also associated with a number of other changes in your body that help to reduce defects in fat metabolism. With increased weight loss, you will find yourself engaging in more physical activity. Individuals who find themselves on a weight-loss trend often engage in physical activity, such as walking, biking, swimming, and more. Additionally, increased physical activity combined with weight loss may often improve your body's ability to burn fat, lead to a positive personal attitude, and decrease stress levels.

11.5 Long Term Weight Loss Success

Bariatric surgeries result in long-term weight-loss success. Most studies demonstrate that more than 90 percent of individuals previously affected by severe obesity are successful maintaining 50 percent or more of their excess weight loss following bariatric surgery. Among those affected by super severe obesity, more than 80 percent are able to maintain more than 50 percent excess body weight loss. One of these studies found up to an 89 percent greater reduction in mortality throughout a 5-year observation period for individuals who had bariatric surgery when compared to those who did not.^[12]

12. COMPLICATIONS OF BARIATRIC SURGERY

Bariatric surgery complications can be devastating, especially if patients are not forewarned about their likelihood. Unfortunately, there are a multitude of things that can go wrong with the surgery and are a serious concern for people considering lap band surgery.

12.1 Types of Bariatric Surgery Complications

Unfortunately, complications in bariatric surgery are fairly commonplace. Complications are when additional problems arise during the recuperation and healing process as a result of the body not healing properly, an error during the surgery, or an infection or similar arising during the hospital stay. The reported figures for bariatric surgery complications vary significantly depending on whose data you look at. The reported overall rate of complications varies between 8.8% and 26%. I have compiled several studies that I have found to be the most robust; that is, with large populations and using more stringent data collection and control methods. The aggregate average for complications is 17%.

12.2. Indigestion

12.3 Lapbanderosion

This affects an average of 5% of patients of bariatric surgery. Lap Band Erosion happens when the band itself 'grows' into or erodes the lining of the stomach. This can cause severe health damage if left untreated, and so surgeons will operate a second time and remove the lap band.

- Lap Band Intolerance
- Blood Clots
- Bowel dysfunction
- Esophageal dilation.
- Gastroesophageal reflux disease (GERD)
- Potential complications
- Nutritional effects.^[13]

13. RISKS OF BARIATRIC SURGERY

13.1 Short-term risks

An important concern about using bariatric surgery to treat type 2 diabetes is the risk of morbidity and death associated with these procedures. Buchwald et al performed a meta-analysis of 136 bariatric studies that included 22,094 patients.

13.2 Nutritional deficiencies

Nutritional deficiencies, including protein-calorie malnutrition and deficiencies of iron, other minerals, and vitamins A, E, D, and B, occur in 30% to 70% of patients (TABLE 3). Patients at high risk of developing severe nutritional deficiencies include those who have lost more than 10% of their body weight by 1 month, those with anastomotic stenosis, those undergoing surgical revision, and those with persistent vomiting.

13.3 Nutritional deficiencies after gastric bypass surgery

Protein-calorie malnutrition is recognized by signs such as edema, hypoalbuminemia, anemia, and hair loss. To minimize this problem after Roux-en-Y surgery, we suggest that patients take in 60 to 80 g of protein and 700 to 800kcal a day. Vitamin deficiencies can lead to Wernicke encephalopathy (due to thiamine deficiency), peripheral neuropathy (due to vitamin B deficiency), and metabolic bone disease (due to long-term deficiencies of vitamin D and calcium).

13.4 Nutritional supplementation after bariatric surgery procedures

In rare cases, severe hypoglycemia has been noted after Roux-en-Y surgery and is associated with prandial hyperinsulinemia related to elevated GLP-1 levels. Neuroglycopenia and seizures have been reported in severe cases. Initial treatment of hypoglycemia involves dietary modification targeting carbohydrate restriction, the use of alpha glucosidase inhibitors such as acarbose (Precose), and referral to an endocrinologist for further management.^[14]

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