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WEIGHT REDUTION TREATMENTS BOON OR BANE FOR MANKIND A CRITICAL STATISTICAL ANALYSIS

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ABSTRACT

Obesity is becoming a danger not only in developed countries but also in the developing countries like India, China, Pakistan, Bangladesh, Srilanka etc. The main reason for obesity is excessive eating and lack of exercise. Most of the people all over the world are now attracted towards junk food rather than the staple food. Even though there are many natural ways to reduce weight people are now attracted towards rapid weight loss treatments. This paper explains about the advantages and limitations giving emphasis on adverse effects of all the weight loss treatments available today.

KEYWORDS: Bariatric, Obesity, BMI, Surgery, Methylene blue, Silicone Band.

INTRODUCTION

Weight loss surgery works where diets have failed because they produce hunger control or satiety [feeling of being sated] which allows you to have control over food. Diet fails because the longest most patients can stay on them is six months and when they resume eating a normal amount of food they regain all their weight and more. Morbidly obese patients have broken metabolism which only requires around 1200 calories of food daily. If they eat 1600-2000 calories they will gain 6-10 kg yearly. Morbid obesity is metabolic disease which is best treated with bariatric surgery to allow patients to match their food intake with their body's metabolism.

OBESITY

Obesity is when a person is carrying too much body fat for their height and sex. A person is considered obese if they have BMI [Body Mass Index] of 30 or greater.

Today's way of life is less physically active than it used to be. People travel on buses and cars rather than walking, and many people work in offices, where they are sitting still for most of the day. This means that the calories they eat are not getting burnt of energy. Instead, the extra calories are stored as fat.

It can be measured in different ways. An easy way is to simply step on the scales and compare your actual weight with your ideal weight. The most widely used way to measure your weight is to calculate BMI.

- If the person BMI is between 25-29.9, then the person is over the ideal weight for his/her height.
- If the person BMI is between 30-39.9, then the person is considered as obese.
- If the person BMI is over 40, then the person is considered as very obese.
  The BMI calculation cannot take into account if the person is particularly muscular.

COMPLICATIONS

- Cardiovascular diseases
- Type-2 diabetes
- Obstructive sleep apnea[sleep disorder in which breathing repeatedly stops and starts]
- Osteoarthritis
- Depression

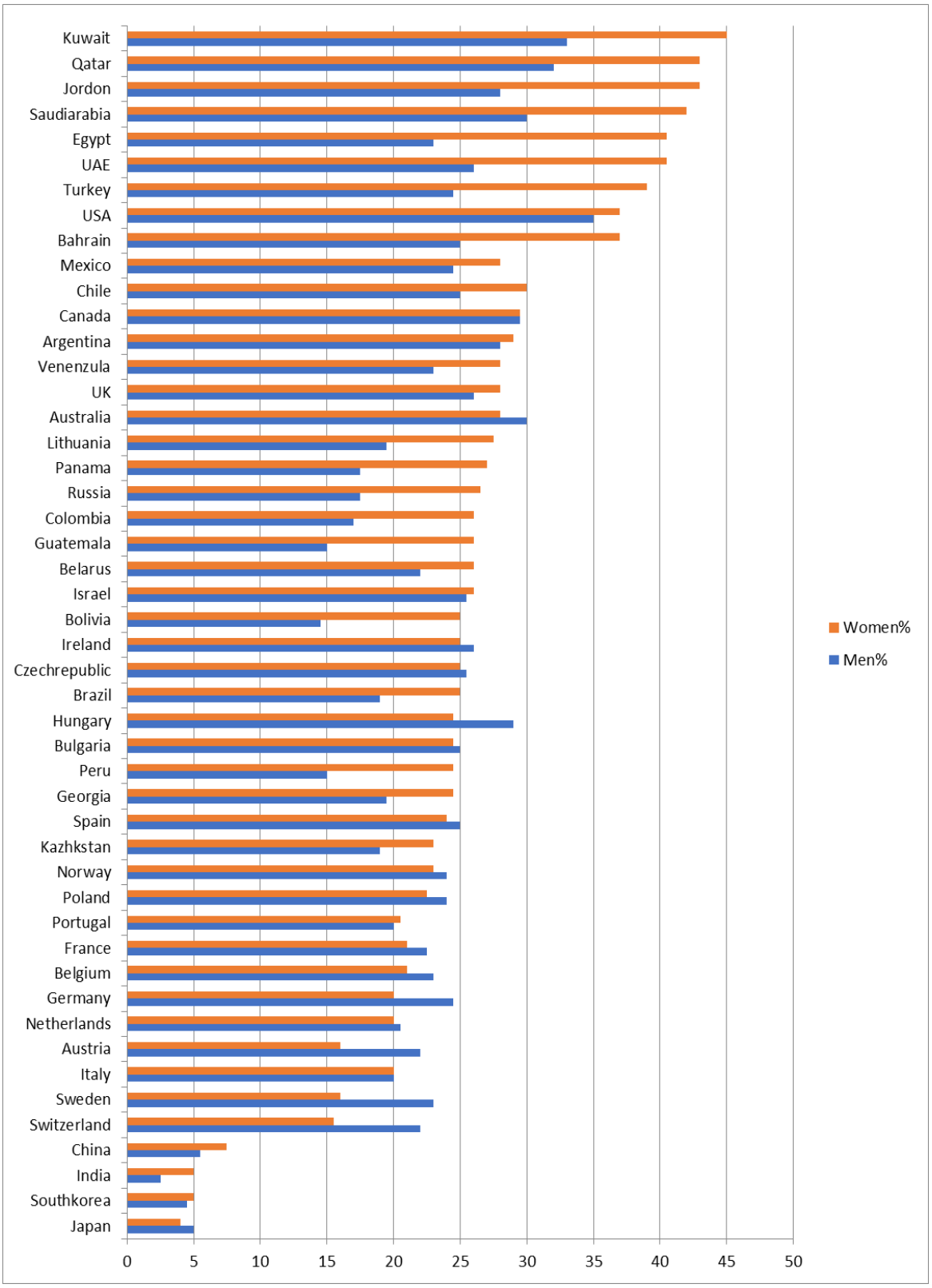
TREATMENT

- Diet.
- Exercise.
- Medications.
- Surgery

Reason for consulting weight loss

People who are over weight or obese are more likely to develop heart disease and stroke, even if they have no other risk factors. Obesity is unhealthy because excess weight puts more strain on the person's heart. It can raise blood pressure and cholesterol. Losing weight is one of the way to reduce the risk of heart problems and other diseases.

STATISTICAL DATA ON OBESITY WORLD WIDE



The statistic analysis of obesity in India is given in below table. Separately each state and union territory wise.

STATES	Women BMI below >18.05kg/m2	Men BMI below>18.05kg/m2 %	Women BMI above (OBESE) >18.5Kg/m2%	Men BMI above(OBESE) >18.5kg/m2%
ANDHRA PRADESH	17.6	14.8	**33.2**	**33.5**
ARUNACHAL PRADESH	8.5	8.3	18.8	20.6
ASSAM	25.7	20.7	13.2	12.9
BIHAR	30.4	25.4	11.7	12.6
CHHATTISGARH	26.7	24.1	11.9	10.2
GOA	14.7	10.8	33.5	**32.6**
GUJARAT	27.2	24.7	23.7	19.7
HARYANA	15.8	11.3	21	20
HIMACHAL PRADESH	29.9	29.7	13.5	10.6
JAMMU&KASHMIR	12.1	11.5	29.1	20.5
JHARKHAND	31.5	23.8	10.3	11.1
KARNATAKA	20.7	16.5	23.3	22.1
KERALA	9.7	8.5	32.4	**28.5**
MADHYAPRADESH	28.4	28.4	13.6	10.9
MAHARASTRA	23.5	19.1	23.4	23.8
MANIPUR	8.8	11.1	26	19.8
MEGHALAYA	12.1	11.6	12.2	10.1
MIZORAM	8.4	7.3	21	20.9
NAGALAND	12.3	11.5	16.2	13.9
ODISHA	26.5	19.5	16.5	17.2
PUNJAB	11.7	10.9	31.3	27.8
RAJASTHAN	27	22.7	14.1	13.2
SIKKIM	6.7	2.4	26.7	**34.8**
TAMILNADU	14.6	12.4	30.9	28.2
TELANGANA	22.9	21.5	28.6	24.2
TRIPURA	18.9	15.7	16	15.9
UTTARPRADESH	25.3	25.9	16.5	12.5
UTTARAKAND	18.4	16.1	20.4	17.7
WESTBENGAL	21.3	19.9	19.9	14.2
UNION TERRITORIES				
PONDI CHERRY	36.9	37.2	36.9	**37.2**
LAKSHWADWEEP	40.6	24.1	40.6	24.1
DAMAN& DIU	31.6	30.7	31.6	30.7
DADRA AND NAGAR HAVELI	19.1	22.9	19.1	22.9
DELHI	33.5	24.6	33.5	24.6
CHANDIGARH	41.5	32	41.5	32

The above table gives the statistical information about obese and non-obese male and female percentages all over india according to national family health survey-4 (2015-16) Different types of surgical and non surgical weight loss treatments given below.

BARIATRIC SURGERY

Surgery on the stomach and instestine to help people with extreme obesity lose weight. bariatric surgery is an option for people who have a body mass index(BMI) above 40 and also for people having BMI ranges from 35-40 who having chronic health problems. Basically there are two kinds of surgeries.

Restrictive surgeries

The physical restriction of size of the stomach and slow the digestion.

Malabsorptive/restrictive surgeries

In this along with physical restriction of stomach, physical removal of digestive tract and interfering with absorption of calories.

Roux-en GASTRICBYPASS

Gastric Bypass also called Roux-en-y gastric bypass. It is a type of weight-loss surgery that involves creating a small pouch from the stomach and connecting the newly created pouch directly to the small intestine. After gastric bypass, swallowed food will go into this small pouch of stomach and then directly into the small intestine, there by bypassing most of a person stomach and the first section of a person small intestine.

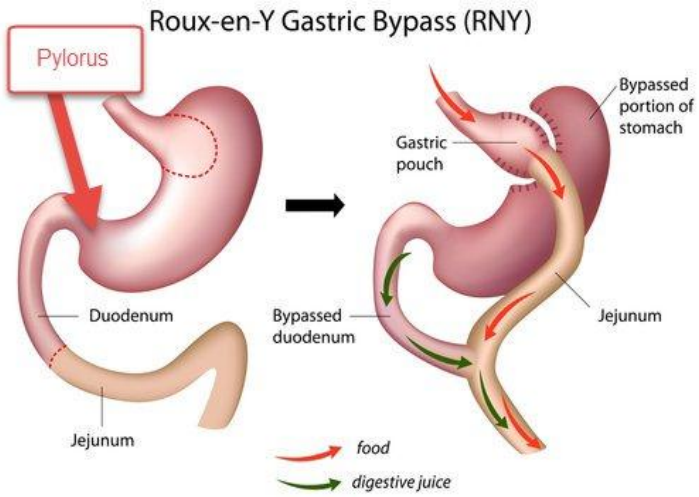
Gastric bypass is one of the most common types of bariatric surgery in the united states. Gastric bypass is done when diet and exercise haven't worked or when you have serious health problems because of a person weight.

PROCEDURE

- The specific of a person gastric bypass depend on a person individual situation and the doctor's practices. Some surgeries are done with traditional large incisions in a patient's abdomen. However, most are preformed laparoscopically, which involves inserting instruments through multiple small incision in the abdomen.
- After making the incision with the open or laparoscopic technique, the surgeon cuts across the top of a patient stomach, sealing it off from the rest of a patient's stomach. The

resulting pouch is about the size of a walnut and can hold only about an ounce of food. Normally a patient stomach can hold about 3pints of food.

- The surgeon cuts the small intestine and seas part of it directly onto the pouch. Food then goes into this small intestine sewn to it. Food bypass, most of a patient stomach and the first section of middle part of a patient small intestine.
- Surgery usually takes a few hours. After surgery, patient a wake in a recovery room, where medical staff monitors patient for any complications.
- The below fig-1 represent the treatment gastric bypass.



ADVANTAGES: In addition to weight-loss gastric bypass many improve(or)resolve conditions often related to being over weight, including

Gastro esophageal reflux disease.

Heart disease.

High blood pressure.

High cholesterol.

Obstructive sleep apnea.

Type 2 diabetics.

Stroke.

Infertility.

RISKS AND COMPLICATIONS

As with any major surgery, gastric bypass and other weight-loss surgeries poses potential health risks, both in the short term and long term. Risks associated with the surgical procedure are similar to any abdominal surgery and can include.

Execessive bleeding

Adverse reaction to anesthesia

Lung problems

Leaks in patient gastrointestinal system

Long term and complications of gastric bypass can include:

Dumping syndrome(i.e A group of symptoms including weakness abdominal discomfort and some times abnormally rapid bowle a combination), causing diarrhea nausea or vomiting'.

SLEEVE GASTRECTOMY

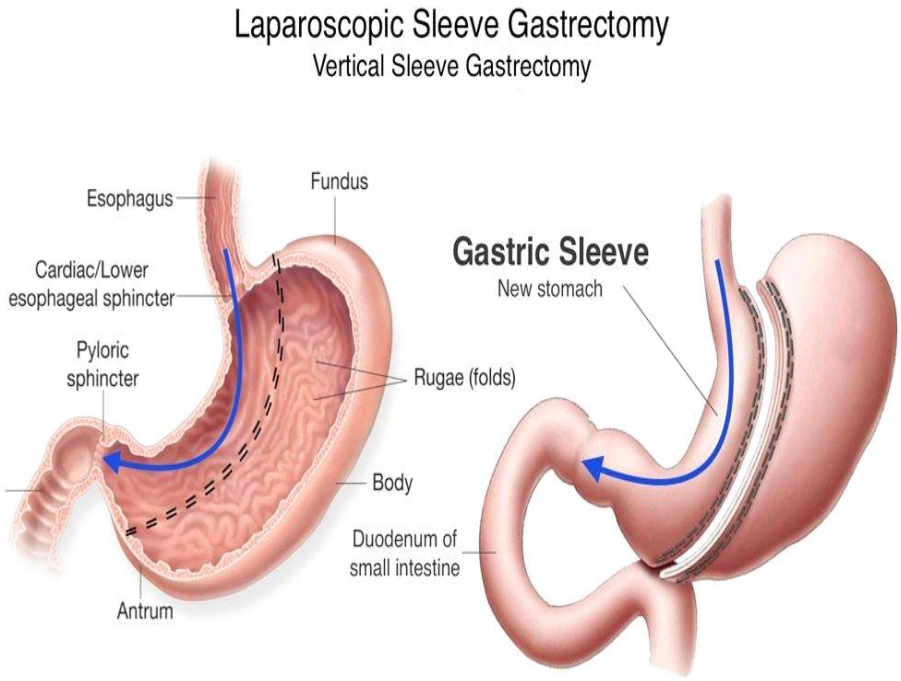
Several hypersensitivity and allergic reaction Gastric sleeve is a surgical therapy which was a type of bariatric system.

Sleeve gastrectomy is becoming most popular weight-loss surgery all over the world. It is an irreversible procedure where we reduce the size of the stomach by almost 80%, by surgical removal of a large portion of the stomach, following the major curve. The open edges are then attached together (often with surgical stapes) to from a sleeve or tube with a banana shape. The procedure permanently reduce the size of the stomach. The procedure is performed laparoscopically is not reversible.

This surgery is specifically designed to help individuals who are too overweight to receive other type 's of weight to receive other type of weight-loss surgeries such as a gastric bypass. There are some benefits, risks and non medical issue surrounding the procedure.

PROCEDURE

- The actual surgery is performed on patient's who have been administered general anesthetic. It is also usually done with laparoscopic tools that only requires small incisions in the body.
- The procedure involves cutting away a very large portion of the stomach with these laparoscopic tools.
- Depending on the actual weight of the patient and some other issue as much as 80 percentage of the stomach will be removed. The doctors are careful not to damage or remove important parts of the stomach so that it will continue to function normally absorb nutrients from food. The remaining portion of the stomach is then sealed closed with staples before the surgery ends and healing can begin. The below fig-2 represents.



ADVANTAGES

No malabsorption, No micronutrient deficiency

No strictures, No marginal ulcerations

Creates restrictions more than obstruction

Lesser follow up.

RISKS AND COMPLICATIONS

The parts of the stomach that are removed are not able to be placed back into the body there are no artificial ways to replace the tissue. This is one reason why the surgery is considered only a single step towards a more comprehensive type of weight-loss procedure.

Low level of gastric side effects

Nausea can be a side effects

Decreased appetite, leading to weight-loss

Headache.

GASTRIC SLEEVE PLICATION

Laproscopic gastric plication (or) laproscopic greater curvature plication is newer less invasive weight loss surgery technique that reduce the size of stomach more than halves of the person's stomach by just folding the walls of stomach without cutting and staping.

It involves sewing one (or) more large folds in the stomach and stiches are placed in the secure manner.

It produce massive weight loss with in a short time and it also reversible to make the stomach as early, but it some want diffcult when compare to other procedures due to folding. finally it is experimental stages.

PROCEDURE

- First the general anesthesia is given to the person, then the person feel numbed and sleepy.
- The surgeon make five to seven incisions in the abdomen then they insert the laproscope and other medical instruments to carry out process.
- they fold the stomach several large folds with the shrinking the size of it.
- but no portion of stomach is resected and the anatomy of digestive system is not altered.
- At the end of the procedure the surgeon carefully close the incisions with sterile dressing, just it takes 40 minutes-2 hours of duration to complete procedure (approx.).

ADVANTAGES

No rerouting of intestine as gastric bypass.

No adjustments as like gastric banding.

No implantation of devices around of stomach.

It is reversiable, unlike sleeve gastrectomy.

RISKS AND COMPLICATIONS

Nausea and vomiting.

leaks from sutured area.

Standard risks associated with surgery and general anesthesia.

It is a new procedure and it is not used like other's.

GASTRIC BANDING

Gastric banding is a surgical therapy which was a type of bariatric surgery.

Gastric banding is a laproscopic adjustable gastric band commonly called as lap band (brand name) is an inflatable silicon band surgically implanted around the top portion of the stomach to help a person lose weight squeezed by silicon band stomach becomes a pouch with about an inch wide outlet. after banding the stomach comhold only about an 28.35grams of food.

A plastic tube runs from the silicon band to device just under the skin. Saline can be injected/removed through the skin flowing into/out of silicon band. Injecting saline fills the band and make it tighter. In this way, the band can be tightened as needed to reduce side effects and improve weight loss. The gastric banding has two types.

- # **Vertical banded gastroplasty**:- It also involves a plastic band placed around the stomach. In addition the surgeon staples the stomach above the band into small pouch. Only 5% of bariatric surgeries are performed by this type (fig-4).
- # **Mixed surgery**:- It is mixture of both restrictive and malabsorptive procedures. It effect by decreasing size of stomach and absorption of calories in small intestine.

PROCEDURE

- Gastric banding is done under full general anesthesia conditions.
- It take 1-2hrs of duration.
- It is done by laproscopic technique.
- It is carryout by making 3-5 small incisions and each incisions is 1 inch in length.
- Surgeon placed small camera attached with tube into one of the incision.
- Instruments are placed into stomach from remaining incisions.
- By using instrument, silicon band is placed around the upper portion of stomach then a tube is attached to that band is accessible through a port under the skin of abdomen using the port of tube the surgeon injects saline solution into the band to tighter it.
- Adjustment is made to change the degree of constriction of around to stomach. It creates small stomach pouch above stomach leave rest of stomach.
- The small pouch reduces the amount of food that can held by stomach at a time and cases fullness of stomach with smaller food this lead to reduce over a food intake.
- Gastric band is also removed after sometimes, if unwanted by same laproscopy tube and all.

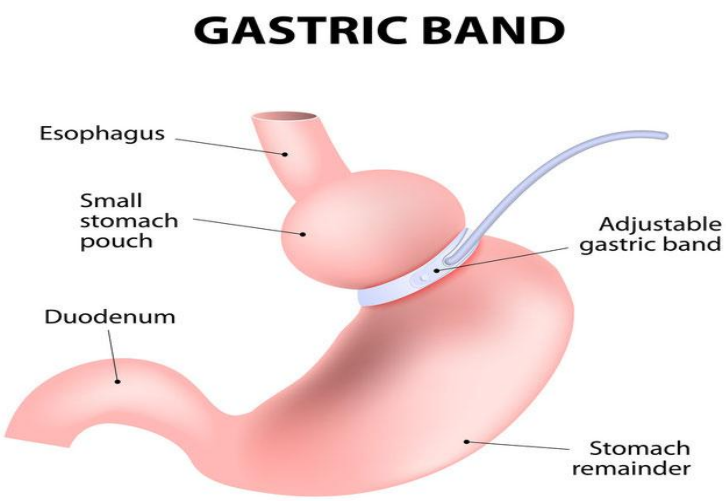


Fig-3

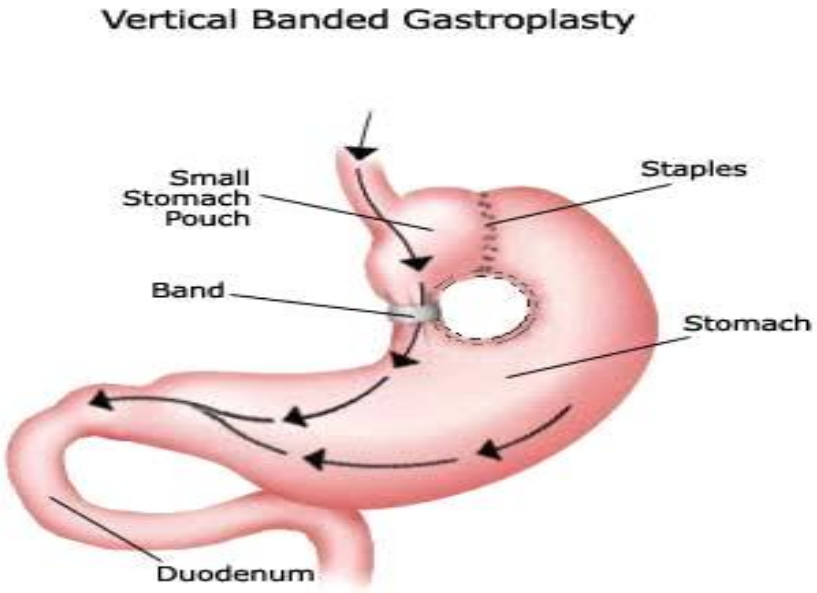


Fig-4

ADVANTAGES

There is no malabsorption because all food consumed is digested and absorbed.

This is inexpensive when compare to other procedures.

It is safer and can be recovered faster and reversible.

It is also to control problems like arthritis, asthma, depression, gastro-oesophagal reflux disease.

large redution is use of medications.

It is beneficial for type-2 diabetic patients.

RISKS AND COMPLICATIONS

complications like bleeding, infection inside abdomen, blood clots in case of surgery.

slip out of position of band, block the outlet of stomach erode od lining of stomach in case of band.

common complication like nausea, vomiting, constipation.

poor nutrition as a result of less food intake.

BILIOPANCREATIC DIVERSION WITH DUODENAL SWITCH (BPD/DS)

A biliopancreatic diversion with duodenal switch (BPD/DS) is a less common weight loss procedure that entails two major steps.

The first step is sleeve gastrectomy in which about 80% of the stomach is removed, leaving a small tube-shaped stomach similar to a banana. The valve that releases food to small intestine (the pyloric valve) remains along with limited portion of the small intestine that normally connects to the stomach(duodenum). Hence, the name biliopancreatic diversion with duodenal switch.

It is only done to lose weight by improving diet and exercise habits.

- But it is not for everyone. It's only related to the people who are severely overweight.
- The person who have undergoes the surgery, must also be willing to make permanent changes leading to healthy life by their lifestyle and diet both before and after surgery.
- It involves long term follow up plans which include :-
- Maintaining nutrition
- Lifestyle
- Behaviour

PURPOSE

If a person is qualified for (BPD/DS), health care team gives some instructions on how to prepare for the surgery and it include various lab tests and exams before surgery.

DIET AND MEDICATIONS:- (before surgery)

Before the surgery, surgeon (or) any health care team will give the list of medicines, vitamins, minerals and herbal (or) dietary supplements to take and also have restrictions on eating and drinking supplements.

If the person take blood-thinning medications, consult the doctor. Because they affect clotting and bleeding which leads to changes.

If the person is diabetic, they will manage your insulin(or) other diabetic medications after surgery.

PRECAUTIONS

- If the person have any habit of tobacco use, it must be stopped and have to start a physical activity program.
- After surgery, if any help is needed, it can be arranged from the home itself.

PROCEDURE

Before entering the operation room, dress will be changed by wearing a surgical gown and a number of questions will be asked by both the doctors and nurses. In the operating room, a general anaesthesia is given before starting the surgery to make asleep and comfortable during surgery.

During the procedure, the specific's of surgery depend on the person situation and doctor's practices. Some surgeries are done by large number of (or) open incisions in abdomen whereas in the case of laproscopic surgery, it is performed by inserting instruments into abdomen through multiple small incision.

As we mentioned in introduction, it involves two steps, they are given below fig-5.

The first step involves removing a large portion of stomach. After making incisions with the open(or)laproscopic technique, the remaining portion forms into a narrow sleeve. The surgeon leaves intact i.e., the valve that releases food small intestine (the pyloric valve), along with a limited portion that normally connects to the stomach(duodenum). It is also known as sleeve gastrectomy.

During the second step, surgeon make one cut through the part of the small intestine just below the duodenum and second cut further down near the lower end of the small intestine.

Then surgeon brings the cut end near the bottom of the small intestine up to the other cut end, just below the duodenum. The effect is to bypass a large segment of the small intestine.

Each part usually takes few hours. After the surgery the person awaken in a recovery room, where medical staff asks for any complications

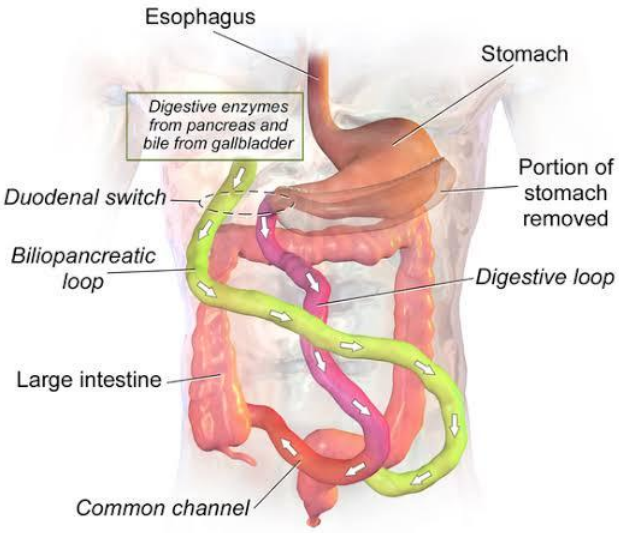


Fig-5

DIET AND MEDICATIONS (after the surgery)

Immediately after BPD /DS procedure, the person have to take only liquids but not solid food and therefore it changes to pureed food and then to solid food which body can able to digest.

Diet after surgery is continued to be quite restricted. They recommend to take vitamin and mineral supplements including multivitamin, calcium and vitaminB12. The person who have undergone the surgery must have frequent check-ups after surgery to know health condition.

- Body experience changes to rapid weight loss in the first three to six months including.

Body aches

Feeling tired

If the person has flu, it includes.

Feeling cold

Dry skin

Hair thinning

Mood changes

ADVANTAGES

After a BPD /DS, about 70 to 80%of excess weight is losed within two years.

The amount of weight loss depends on the persons lifestyle habits.

RISKS AND COMPLICATIONS

BPD/DS possess potential health risks are

Excessive bleeding

Infection

Bowel obstruction

Dumping syndrome, causing diarrhoea, nausea, (or) vomiting

Gallstones

Hernias

Hypoglycemia

Malnutrition

Stomach perforations, ulcers

Rarely, complications of BPD/DS, can be fatal.

vBloc [Vagal Blocking] THERAPY

Vagal blocking therapy utilizes an implantable device that help to regulate the messages that our stomach sends to our brain. The surgeon places two small c-shaped electrodes on the vagus nerve which is located on upper part of our stromach. The electrodes are then connected to Maestrosystem, which blocks the selected signals between our stomach and brain. This system is the first kind in weight loss technology. It was the first device approved for weight loss by US Food and Drug Administration.

PROCEDURE

During the procedure, the surgeon will implant the vBloc therapy device below the person rib cage just under the skin. The surgeon will attach the device to the person vagal nerve just above the stomach. The whole procedure usually takes between 60 to 90 minutes. Once placing the device, it will block the vagal nerve from delivering hunger signals to brain and it will feel full between meals and full sooner after smaller meals.

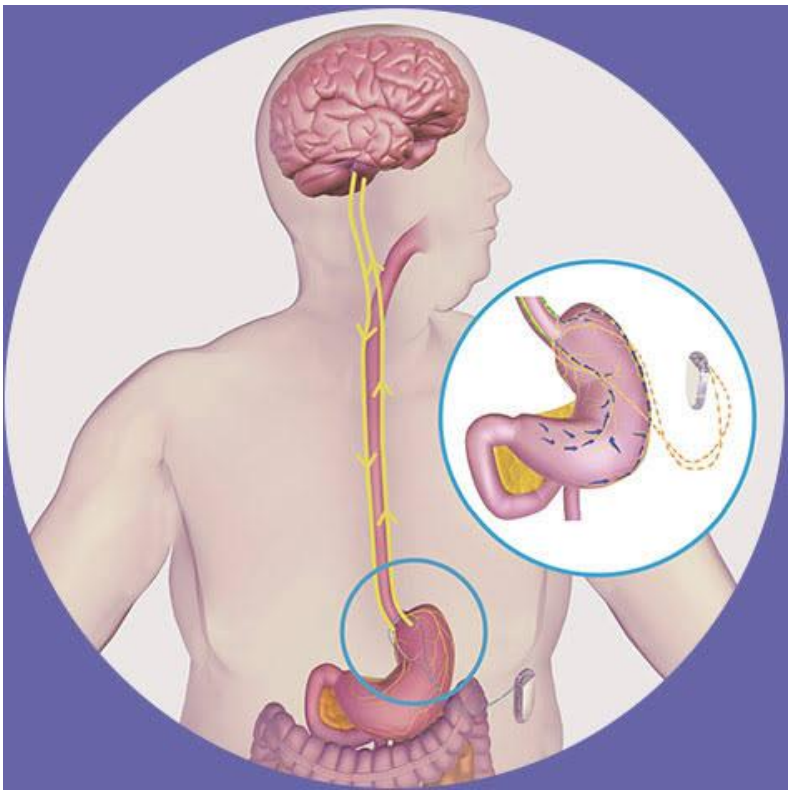


Fig-6

PROCEDURE

During the procedure, the surgeon will implant the vBloc therapy device below the person rib cage just under the skin. The surgeon will attach the device to the person vagal nerve just above the stomach. The whole procedure usually takes between 60 to 90 minutes. Once placing the device, it will block the vagal nerve from delivering hunger signals to brain and it will feel full between meals and full sooner after smaller meals.

ADVANTAGE: vBloc implantations are completely reversible and require no cutting, stapling. Most patients achieve 17-24% reduction in excess weight within the first year of treatment and are able to eat a wide variety of food. In most of cases, the person can leave the hospital on same day as surgery.

RISKS AND COMPLICATIONS

Vomiting [< 1% Of Patients]

Neuroregulator malfunction.

Pain at neuroregulator site.

Collapsed lung.

Gall bladder disease.

ASPIRATION THERAPY

Aspiration therapy is endoscopic treatment for morbid obesity promotes weight loss by endoscopically inserting an aspiration tube which is modified percutaneous endoscopic gastrostomy tube to aspirate and discard about one-third of intragastric food after meals. Scant data exists on aspiration tube complications due to little clinical experience. Only one case small, sterile, aseptic, abdominal cavity at gastrostomy site status post aspiration tube aspiration as shown in fig- 7,8.

PROCEDURE

- The Aspire assist is placed during 15 minute out patients procedure. Patients can return home within one to two hours and many return to work very quickly compared to invasive bariatric surgeries this does not usually require general anesthesia and it is performed under Twilight anesthesia [mild dose of general anesthesia] which is used during dental procedures. This procedure is very similar to routine placement of feeding tubes. For past 35 years feeding have been used for people who control eat through their mouths.

ADVANTAGES

Certain types of abdominal surgery.

Certain ulcers.

Coagulation disorders.

Anaemia.

Night eating syndrome.

Chronic abdominal pain.

RISKS AND COMPLICATIONS: It is not recommended for patients who have certain disorders like.

Indigestion.

Stomach ulcers.

High blood pressure.

ENDOSCOPIC SLEEVE GASTROPLASTY (ESG)

Endoscopic sleeve gastroplasty(ESG) is a newer type of weight-loss procedure. ESG reduces the size of stomach using an endoscopic suturing device without the need for surgery. This procedure may be an option the person is significantly overweight i.e., having a body mass index of 30 (or) more and diet and exercise have not worked.

ESG leads to significant weight loss. It helps to lose weight by limiting how much the person eat. The procedure is minimally invasive, reducing the risk of operative complications.

ESG requires commitment to healthier lifestyle. The person need to make permanent healthy changes in diet and exercise to ensure the long term success of endoscopic sleeve gastroplasty.

PURPOSE

Endoscopic sleeve gastroplasty is performed to help to lose weight and lower risk of serious weight-related health problems, including.

Gastro-oesophageal reflux disease

High blood pressure

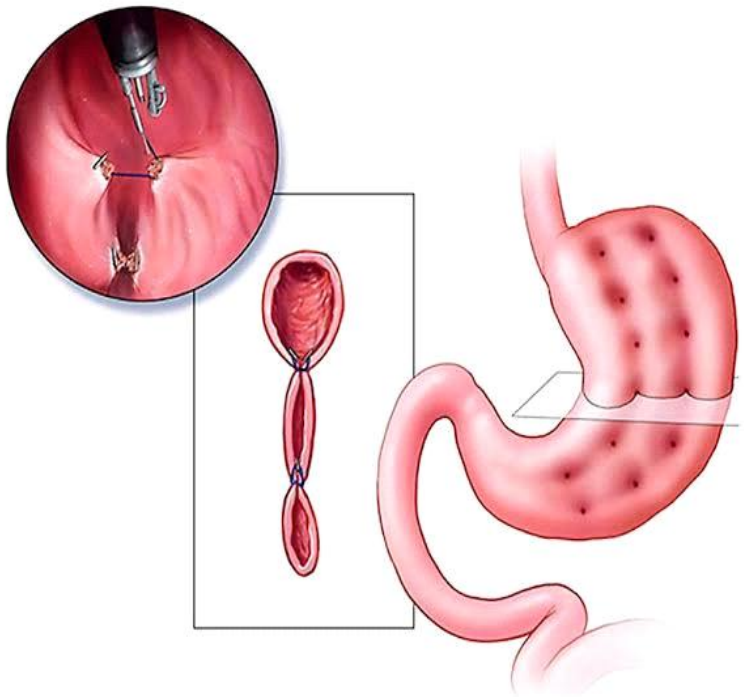
Sleep apnea

Endoplasmic sleeve gastroplasty is less invasive and cheaper than other forms of bariatric surgery.

PRECAUTIONS:-The person have to start a physical activity program.

PROCEDURE

- General anaesthesia is used for the procedure, so the person will be unconscious.
- The procedure is done using an endoscope, a flexible tube with a camera and an endoscopic suturing device attached. The endoscope is inserted down the throat into the stomach. The tiny camera allows the doctor operating the endoscope to see and operate inside the stomach without making incisions in abdomen
- Using the endoscope, the doctor places approximately 12 sutures in the stomach. The sutures changes the structure of the stomach leaving it shared like a tube. This restricts the amount of calories that the body can absorbs.
- The procedure takes about 90 minutes. After this, the person can be awaken from recovery room, where staff asks for any complications.
- Majority of people go home after recovering from sedation whereas some people require short admission in the hospital for a day (or) less than two days for observation.
- The below figure-9 explains about ESG



DIET AND MEDICATIONS :- (after surgery)

After the procedure, generally would not be allowed to eat for about eight hours. Then allowed to start a liquid diet for at least two weeks and for four weeks, can move on to semis olive foods.

After the ESG procedure, medical check-up's meet with nutrition and psychologist frequently is needed for health condition.

ADVANTAGES

Endoscopic sleeve gastroplasty leads to significant weight loss.

A recent study of people with an average body mass index (BMI) around 38 found that ESG led to an average weight loss of 39 pounds (178 kg) after 6 months.

After 12 months, weight loss was 42 pounds (19 kg's).

In a study of people with an average body mass index of about 45, procedure resulted in an average weight loss of about 73 pounds (33kg's) during first 6 months.

RISKS AND COMPLICATIONS

In early studies on ESG, the procedure shown a safety profile. Pain and nausea is seen for several days and which can be managed by usage of medications. Most people feel better after two days.

In addition to this, it is not designed to be a temporary procedure, the ESG can be reversed. In some cases, it can be converted bariatric surgery.

Because the procedure is still new and not in wide use, questions remain about It's long term effectiveness and risks.

INTRAGASTRIC BALLOON

Intragastric balloon is also a type of bariatric surgery is an effective aid to weight loss the need to undergo invasive surgery. there are soft flexible devices are placed into stomach endoscopically and remains for six month, the balloon creating the fullness of stomach further that laid to less consumption of food, there are also called as stomach balloon.

Balloons are made of silicon which is filled with saline solution and methylene blue dye acts as marker for diagnosis.

There are three types are intragastric balloons which are official in FDA and approved

- 1) obera - capacity 500-750ml
- 2) obalon - pill form
- 3) reshape due -capacity(twice of obera)

obera and reshape duo endoscopically administered but obalon is a pillform and duration is three minutes.

PROCEDURE

- First it just takes less than an hour to complete.
- It is done under mild anesthesia with sedation.
- The person's throat is numbed with the special spray it helps to tolerate the instrument used in procedure.
- then the plastic mouth guards placed between the teeth to keep mouth open.
- The scope will be placed into the mouth first then into the stomach but person doesnot have any feeling, he/she can breath easily.
- The physician blow air through scope tube for clear view, then the scope is removed.
- Finally the deflated balloon is passed into stomach, it is then inflated with saline or air and methylene blue is also added for diagnosis.
- Again the scope is passed into stomach to check for proper adjusted or not,to remove same procedure is done.
- The below figures-10,11,12 represents the visual information the placing the different balloons inside the stomach and idea about the appearance of pill form.

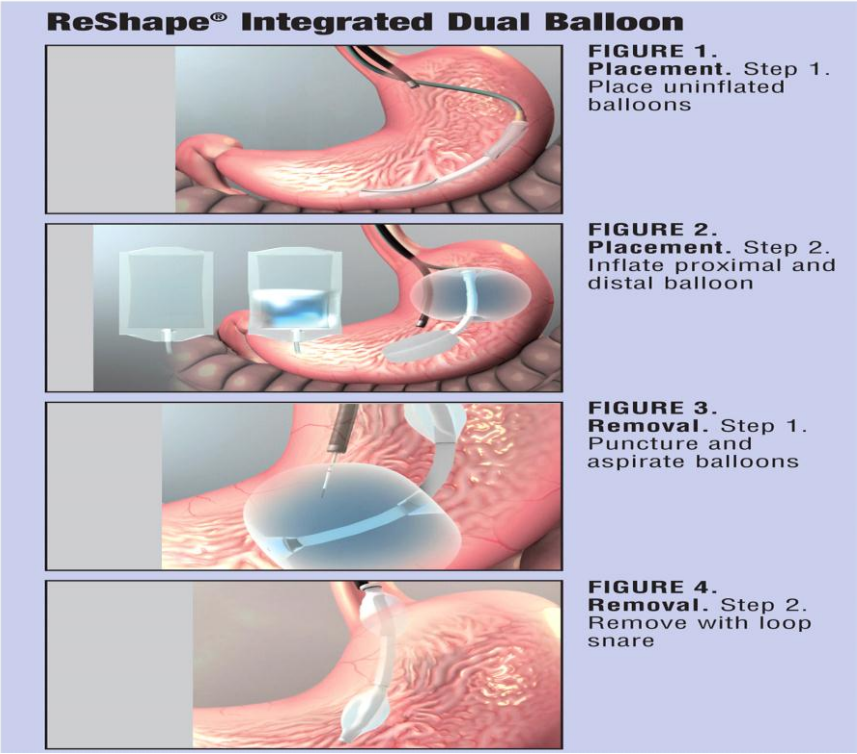


Fig-10,11

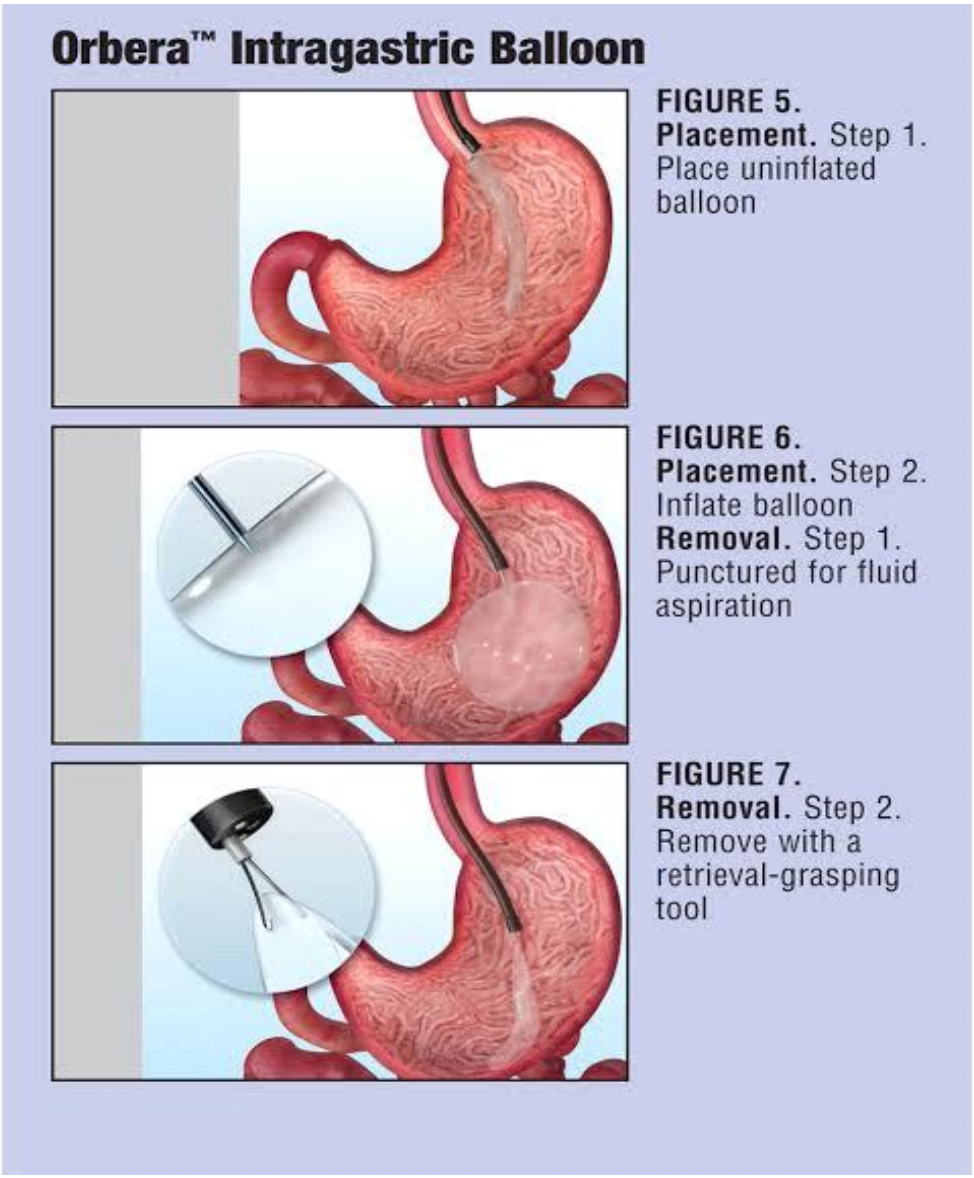

Orbera™ Intragastric Balloon
FIGURE 5.
Placement. Step 1.
Place uninflated balloon
FIGURE 6.
Placement. Step 2.
Inflate balloon
Removal. Step 1.
Punctured for fluid aspiration
FIGURE 7.
Removal. Step 2.
Remove with a retrieval-grasping tool

Fig-12

ADVANTAGES

No medication needed.

No surgery needed.

Less expensive.

Temporary and reversible.

RISKS AND COMPLICATIONS

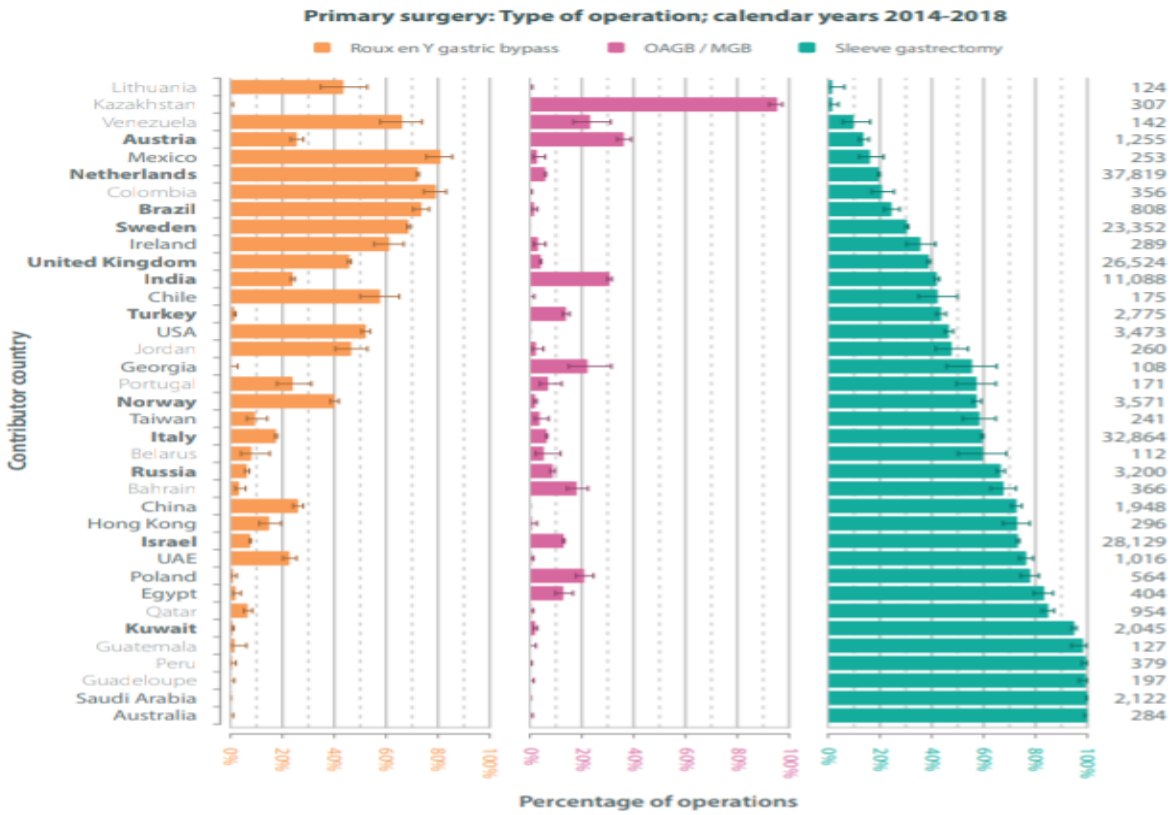
Cramps, nausea, vomiting.

Bloating

Acute pancreatitis due to compression of balloon towards pancreas.

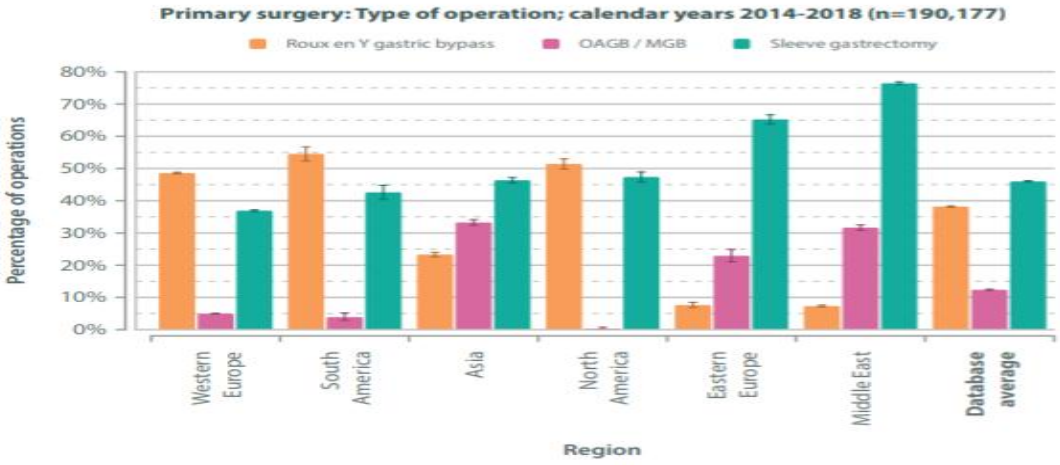
Anesthesia

STATISTICAL DATA ABOUT SURGERIES WORLD WIDE



Primary surgery: operations performed; calendar years 2014-2018

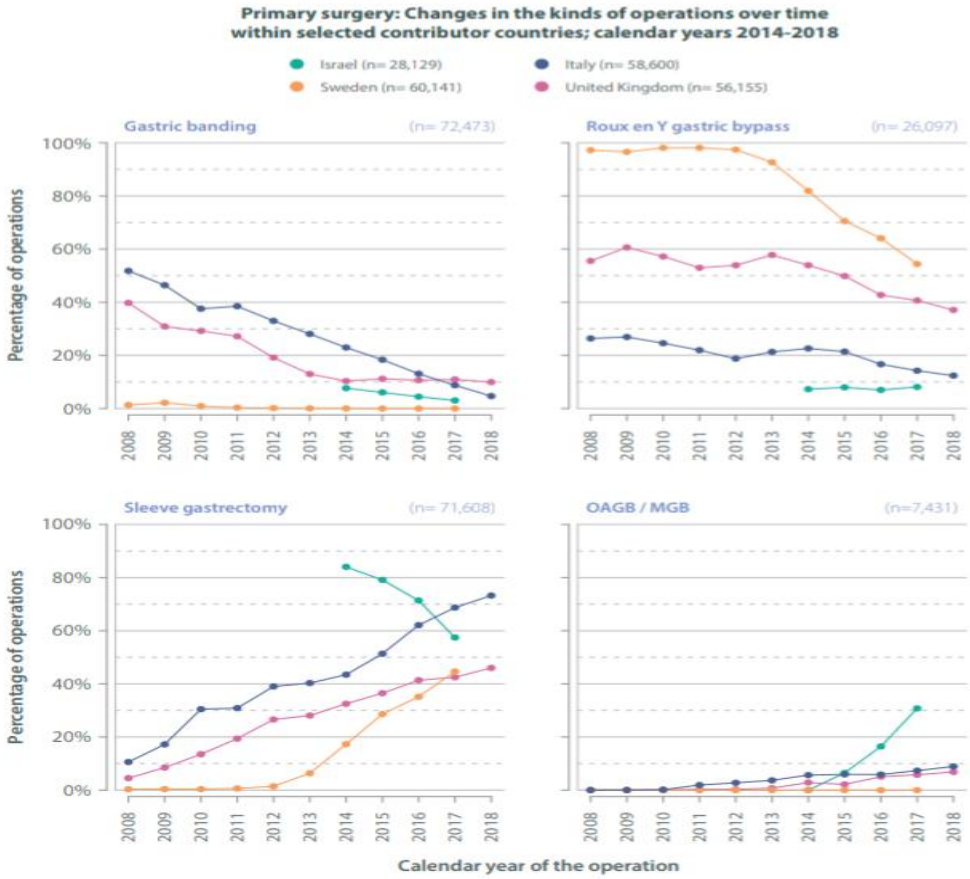
Operation	Count	Percentage
Gastric band	9,534	5.0%
Roux en Y gastric bypass	72,639	38.3%
OAGB / MGB	14,516	7.7%
Gastric bypass (NOS) [1]	1,701	0.9%
Sleeve gastrectomy	87,015	45.9%
Bilio-pancreatic diversion	267	0.1%
Duodenal switch	61	0.0%
Duodenal switch with sleeve	319	0.2%
Other	3,667	1.9%
All	**189,719**	



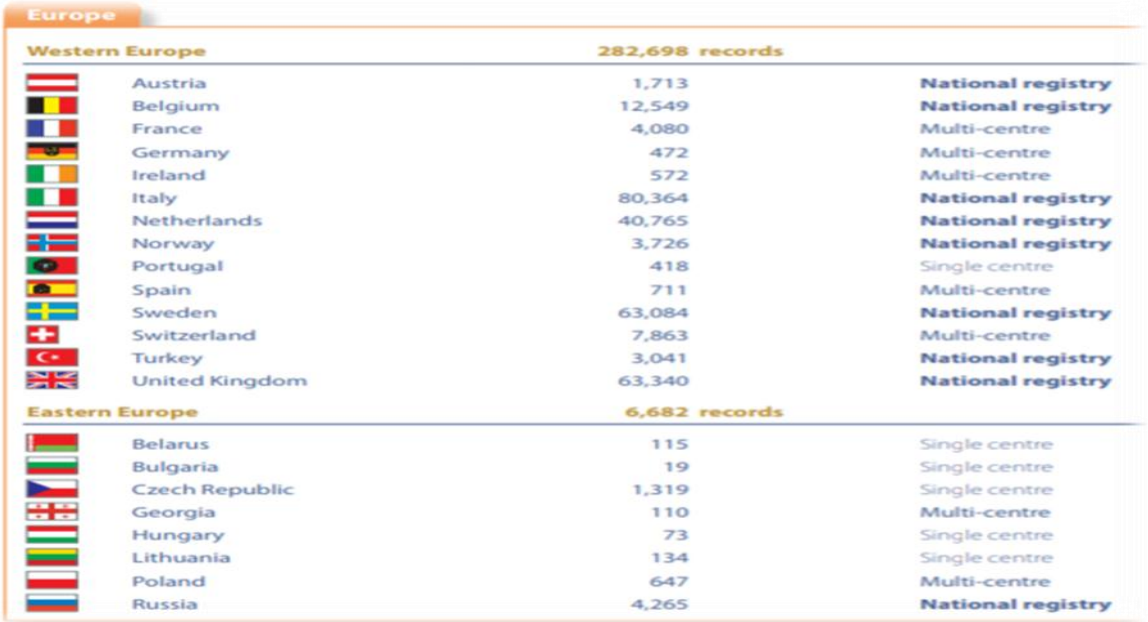
The above figures-13,14 explain about growth of different weight loss surgeries performed in between the years 2014-18 in European, Asian, American and middle east countries.

The below figures-15,16 give detail information about changes in different methods of performing of weight loss surgeries and their count all and percentages all over the world between years 2014-2018.

Operation	Approach				
	Laparoscopic	Laparoscopic converted to open	Endoscopic	Open	Unspecified
Counts					
Gastric band	4,949	4	4	2	4,575
Roux en Y gastric bypass	66,551	92	4	183	5,815
OAGB / MGB	12,206	3	4	24	2,279
Sleeve gastrectomy	67,471	69	21	177	19,729
All	**153,981**	**184**	**116**	**773**	**35,123**
Percentages					
Gastric band	99.80%	0.08%	0.08%	0.04%	
Roux en Y gastric bypass	99.58%	0.14%	0.01%	0.27%	
OAGB / MGB	99.75%	0.02%	0.03%	0.20%	
Sleeve gastrectomy	99.61%	0.10%	0.03%	0.26%	
All	**99.31%**	**0.12%**	**0.07%**	**0.50%**	

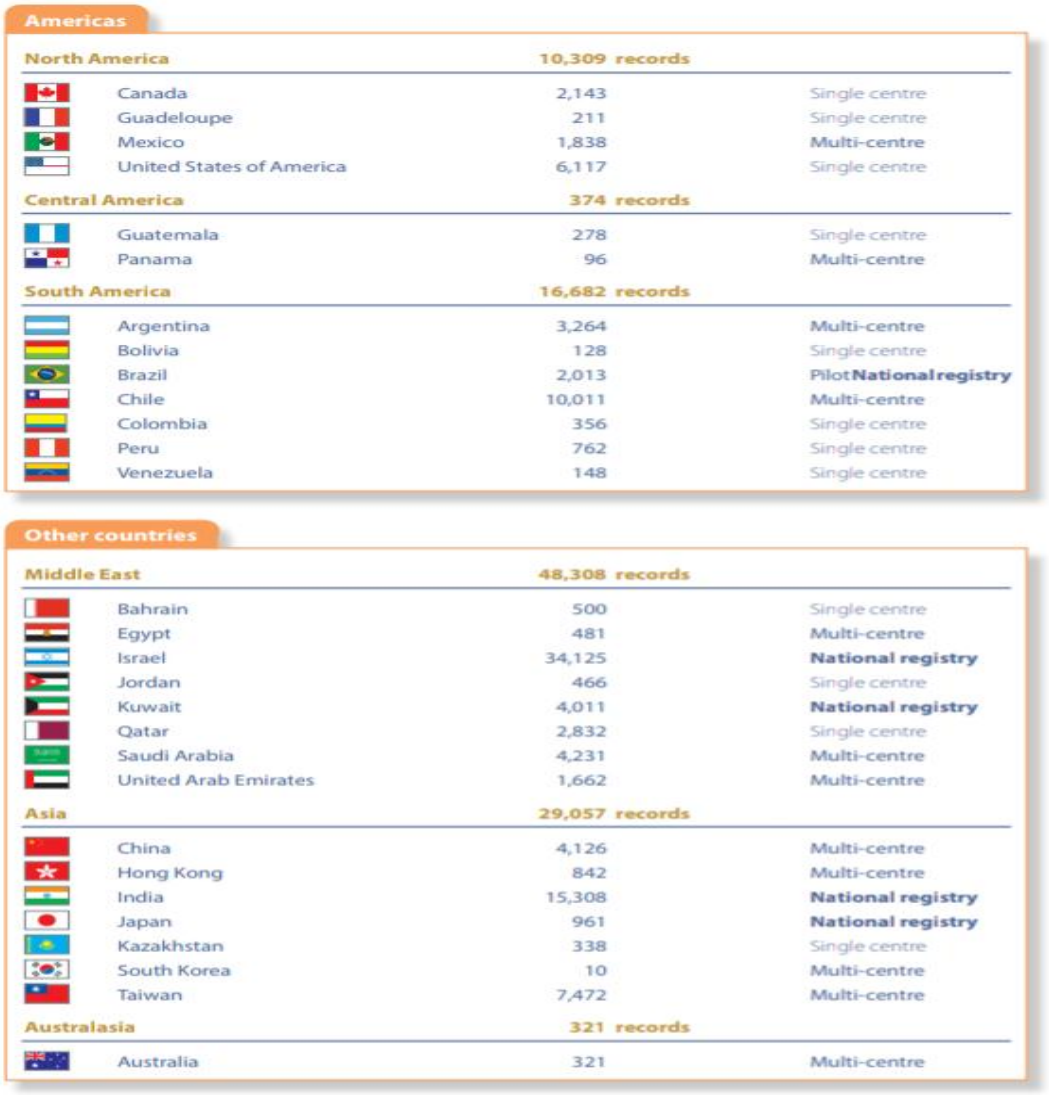


The below figures-17,18 represent the number of weight loss surgeries registered all over the world in national registry, multicenter and single center. In this European countries give more contribution to resgistry.



Europe

Western Europe	**282,698 records**	
Austria	1,713	**National registry**
Belgium	12,549	**National registry**
France	4,080	Multi-centre
Germany	472	Multi-centre
Ireland	572	Multi-centre
Italy	80,364	**National registry**
Netherlands	40,765	**National registry**
Norway	3,726	**National registry**
Portugal	418	Single centre
Spain	711	Multi-centre
Sweden	63,084	**National registry**
Switzerland	7,863	Multi-centre
Turkey	3,041	**National registry**
United Kingdom	63,340	**National registry**
Eastern Europe	**6,682 records**	
Belarus	115	Single centre
Bulgaria	19	Single centre
Czech Republic	1,319	Single centre
Georgia	110	Multi-centre
Hungary	73	Single centre
Lithuania	134	Single centre
Poland	647	Multi-centre
Russia	4,265	**National registry**



Americas		
North America	**10,309 records**	
Canada	2,143	Single centre
Guadeloupe	211	Single centre
Mexico	1,838	Multi-centre
United States of America	6,117	Single centre
Central America	**374 records**	
Guatemala	278	Single centre
Panama	96	Multi-centre
South America	**16,682 records**	
Argentina	3,264	Multi-centre
Bolivia	128	Single centre
Brazil	2,013	Pilot **National registry**
Chile	10,011	Multi-centre
Colombia	356	Single centre
Peru	762	Single centre
Venezuela	148	Single centre

Other countries		
Middle East	**48,308 records**	
Bahrain	500	Single centre
Egypt	481	Multi-centre
Israel	34,125	**National registry**
Jordan	466	Single centre
Kuwait	4,011	**National registry**
Qatar	2,832	Single centre
Saudi Arabia	4,231	Multi-centre
United Arab Emirates	1,662	Multi-centre
Asia	**29,057 records**	
China	4,126	Multi-centre
Hong Kong	842	Multi-centre
India	15,308	**National registry**
Japan	961	**National registry**
Kazakhstan	338	Single centre
South Korea	10	Multi-centre
Taiwan	7,472	Multi-centre
Australasia	**321 records**	
Australia	321	Multi-centre

CONCLUSION

We can summarise by going through the above surgical and non-surgical procedures that each procedure has its own advantages and disadvantages. The world wide statistics clearly indicates that sleeve gastrectomy method is used by many surgeons all over the world including India. But all the doctors and the scientists in the world suggest a natural way of reducing weight rather than opting for the above surgical procedures. Patients and doctors are hence requested to go through the above given information before performing any surgery.

ACKNOWLEDGEMENTS

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