Introduction

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and increased health problems ***(Barness et al., 2007).***

The world health organization (WHO) predicts that overweight and obesity may soon replace more traditional public health concerns such as under nutrition and infectious diseases as the most significant cause of poor health. Losing weight isn't easy and for many severely overweight people exercise and diet simply aren't effective enough to shed significant weight. When all else has failed, many people start thinking about weight loss surgery, also called bariatric surgery ***(Buchwald et al., 2007).***

Gastric bypass is indicated for the surgical treatment of morbid obesity. The national institute of health(NIH) have set the current standard for consideration of surgical treatment, the body mass index (BMI).Which defined as the body weight (in kilograms),divided by the square of the height(in meters).The result is expressed as a number usually between 20 and 70,In units of kilograms per square meter. People who have a BMI of 40 or higher are recommended for bypass surgery.

The gastric bypass accounts for a large majority of bariatric surgical procedures performed. It is estimated that 200,

000 of such operations were performed in United States in 2008. An increasing number of these operations are now performed by laparoscopy. The gastric bypass procedures consist of, Creation of small, (15/30ml, 1-2tbsp) thumb-sized pouch from upper stomach, accompanied by bypass of remaining stomach (about 400ml). This restricts the volume of food which can be eaten. The stomach may simply be partitioned (typically by the use of surgical staples) or it may be totally divided into two parts (also with staples).Then re-construction of GI tract to enable drainage of both segment of the stomach ***(Nicholas et al., 2009).***

Mini gastric bypass involves making of a long narrow tube of the stomach along its right border, the lesser curvature. A loop of small gut is brought up and hooked to this tube at about 180 cms from the start of the intestine (ligament of treitz). MGB has been suggested as an alternative to roux en-y procedure due to simplicity of its construction, which reduces the challenges of bariatric surgery. It is becoming more and more popular because of low risk of complications and good sustained weight loss. It has been estimated that 15.4% of weight loss surgery in Asia is now performed via the MGB technique ***(Clair et al., 2009).***

Aim of the Work

Whether Mini gastric bypass could be used as an alternative procedure to roux en y gastric bypass for treatment of morbid obesity, showing its advantages disadvantages and its complication

Chapter (1)
Etiology of Obesity

At an individual level, a combination of excessive food energy intake and lack of physical activity is thought to explain most cases of obesity. A limited number of cases are due to genetics, medical reasons, or psychiatric illness ***(Bleich et al., 2008).***

In contrast, increasing rates of obesity at a social level are felt to be due to an easily accessible and palatable diet, increased reliance on cars and mechanized manufacturing ***(James et al., 2008).***

Other possible contributors to recent increase of obesity:

(1) Insufficient sleep.

(2) Endocrine disruptors (environmental pollutants that interfere with lipid metabolism).

(3) Increased use of medications that can cause weight gain (e.g., atypical antipsychotic).

(4) Pregnancy at a later age (which may cause susceptibility to obesity in children).

(5) Epigenetic risk factors passed on generations.

(6) Emotions: Some people overeat because of depression, hopelessness, anger, boredom, and many other reasons that have nothing to do with hunger. This doesn't mean that overweight and obese people have more emotional

problems than other people. It just means that their feelings influence their eating habits, causing them to overeat.

(7) Sex: Men have more muscle than women, on average. Because muscle burns more calories than other types of tissue, men use more calories than women, even at rest. Thus, women are more likely than men to gain weight with the same calorie intake.

(8) Age: People tend to lose muscle and gain fat as they age. Their metabolism also slows somewhat. Both of these lower their calorie requirements.

(9) Pregnancy: Women tend to weigh an average of 4-6 pounds more after a pregnancy than they did before the pregnancy. This can compound with each pregnancy

(10) Environmental factors: The most important environmental factor is lifestyle. Your eating habits and activity level are partly learned from the people around you. Overeating and sedentary habits (inactivity) are the most important risk factors for obesity.

Increased concentration of obesity risk factors (this would increase the number of obese people by increasing population variance in weight) ***(Keith et al., 2006)***.

There are many causes for obesity. The most important are:

Diet and obesity

The dietary energy supply varies markedly between different regions and countries. The widespread availability of nutritional guidelines has done little to address the problems of overeating and poor dietary choice ***(Marantz et al., 2008).***

From 1971 to 2000, obesity rates in United States increased from 14.5% to 30.9%. During the same period, an increase occurred in the average amount of energy consumed. For women, the average increase was 335 calories per day, while for men the average increase was 168 calories per day. Most of this extra food energy came from an increase in carbohydrate consumption rather than fat consumption ***(Wright et al., 2004).***

The primary sources of these extra carbohydrates are sweetened beverages, which account for almost 25 percent of daily food energy in young adults in America, and potato chips. Consumption of sweetened drinks is believed to be contributing to the rising rates of obesity ***(Olsen et al., 2009).***

Fast-foods meals consumption also found to be associated with obesity. In U.S consumption of fast-foods, meals tripled and food energy intake from these meals quadrupled between 1977 and 1995. Agricultural policy and techniques in U.S and Europe have led to lower food prices. In

U.S, subsidization of corn, soy, wheat, and rice through the U.S farm bill has made the main sources of processed food cheap compared to fruits and vegetables ***(Pollan et al., 2007).***

Sedentary lifestyle and exercise trends

A sedentary lifestyle plays a significant role in obesity. Worldwide there has been a large shift towards less physically demanding work, and currently at least 60% of world population gets insufficient exercise. This is primarily due to increasing use of mechanized transportation and prevalence of labor-saving technology in the home. In children, there appear to be decline in levels of physical activity due to less walking and physical education

In both children and adults, there is an association between television viewing time and risk of obesity. A review found 63 of 73 studies (86%) showed an increased rate of childhood obesity with increased media exposure, with rates increasing proportionally to time spent watching television ***(Salmon et al., 2007).***

Genetics of obesity

Like many other medical conditions, obesity is the result of interplay between genetic and environmental factors. Polymorphisms in various genes controlling appetite and metabolism predispose to obesity when sufficient food energy present.

People with two copies of the FTO gene (fat mass and obesity associated gene) has been found to have a 1.67-fold greater risk of obesity compared to those without the risk allele ***(Loos et al., 2008).***

Obesity is a major feature in several syndromes, such as prader-willi syndrome. The term "non-syndromic obesity" is sometimes used to exclude these conditions ***(Walley et al., 2009).***

In people with early-onset severe obesity (defined by an onset before 10 years of age and body mass index over three standard deviations above normal), 7% harbor a single point DNA mutation ***(Wells et al., 2011).***

Studies that have focused upon inheritance patterns rather than upon specific genes have found that 80% of the offspring of two obese parents were obese, in contrast to less than 10% of the offspring of two parents who were of normal weight ***(Kolata et al., 2007).***

Other illnesses

Certain physical and mental illnesses and the pharmaceutical substances used to treat them can increase risk of obesity. Medical illnesses that increase obesity risk include several rare genetic syndromes as well as some congenital or acquired conditions as:

Cushing syndrome, growth hormone deficiency and the eating disorders as night eating syndrome. However, obesity is

not regarded as a psychiatric disorder. The risk of overweight and obesity is higher in patients with psychiatric disorders than in persons without psychiatric disorders. Certain medications may cause weight gain, these include: insulin, sulphonylureas, atypical antipsychotics, antidepressants, steroids, certain anticonvulsants (phenytoin and valproate), and some forms of hormonal contraception ***(Chilles et al., 2010).***

Social determinants of obesity

The correlation between social class and BMI varies globally. A review in1989 found that in developed countries women of high social class less likely to be obese. No significant differences were seen among men of different social classes.

In the developing world, women, men, and children from high social classes had greater rates of obesity ***(Mclaren et al., 2007).***

Among developed countries, levels of adult obesity, and percentage of teenage children who are overweight, are correlated with income inequality.

Many explanations have been put for the associations between BMI and social class. It is thought that in developed countries, the wealthy are able to afford more nutritious food, they are under greater social pressure to remain slim, and have more opportunities along with greater expectation for physical fitness. In undeveloped countries the ability to afford food, high energy expenditure with physical labor, and cultural values

favoring a larger body size are believed to contribute to the observed patterns. A correlation in BMI changes overtime has been found among friends, sibling, and spouses ***(Christakis et al., 2007).***

Stress and perceived low social status appear to increase risk of obesity. Smoking has a significant effect on the weight of most people. Those who quit smoking gain an average of 4.4 kg for men and 5kg for women over tenyears.however, changing rates of smoking have had little effect on the overall rates of obesity ***(Chiolero et al., 2008).***

In U.S the number of children a person has is related to their risk of obesity. A woman risk increase by 7% per child, while a man risk increases by 4% per child. This could be partly explained by the fact that having dependent children decrease physical activity in western parents ***(Bellows et al., 2008).***

Infectious agents and obesity

The study of effect of infectious agents on metabolism is still in early stages. There is an indication that gut flora in obese and lean individuals can affect the metabolic potential. This alteration of metabolic potential is believed to confer a greater capacity to harvest energy contributing to obesity ***(DiBaise et al., 2007).***

Chapter (2):
Surgical Treatment of Morbid Obesity

Being overweight and obesity becoming endemic, particularly because of increasing nourishment and decrease physical activity ***(Haslam et al., 2005).***

Insulin resistance, type 2 DM, dyslipidemia, hypertension, cholelithiasis, certain forms of cancer, steatosis, gastro-esophageal reflux, obstructive sleep apnea, degenerative joint disease, gout, low back pain, polycystic ovary syndrome, depression, fertility and pregnancy problems are all associated with obesity.

Long term effects of diet, exercise, medical therapy on weight are relatively poor so bariatric surgery is the most effective long term treatment for obesity ***(Meinder et al., 2003).***

Recent evidences show that bariatric surgery for severe obesity is associated with decreased overall mortality, however serious complications can occur and so careful selection of patients is important.

Bariatric surgery should at least considered for patients with BMI of more than 40kg/m2 and for those with BMI more than 35kg/m2 with concomitant obesity related conditions after failure of conventional treatment.

Bariatric surgical techniques are divided into three groups:

Malabsorptive procedures, restrictive procedures and combined procedures ***(Buchwald et al., 2007).***

Classification of surgical procedures:

- **Predominantly malabsorptive procedures**
  - Jejunoileal bypass
  - Biliopancreatic diversion

- **Predominantly restrictive procedures**
  - Vertical banded gastroplasty
  - Adjustable gastric band
  - Sleeve gastrectomy
  - Intragastric balloon
  - Gastric Plication

- **Combined procedures**
  - Gastric bypass surgery
  - Sleeve gastrectomy with duodenal switch

Malabsorptive procedure induces decreased absorption of nutrients by shortening the functional length of the small intestine. The created short-bowel syndrome leads to a negative energy balance and weight loss.

The jejunoileal bypass was one of the first bariatric operations (purely malabsorptive). It is associated with substantial long term complications including liver failure, malnutrition,

electrolyte imbalances, vitamin deficiencies, renal (oxalate) stones and death. This procedure is no longer performed ***(Santry et al., 2005).***

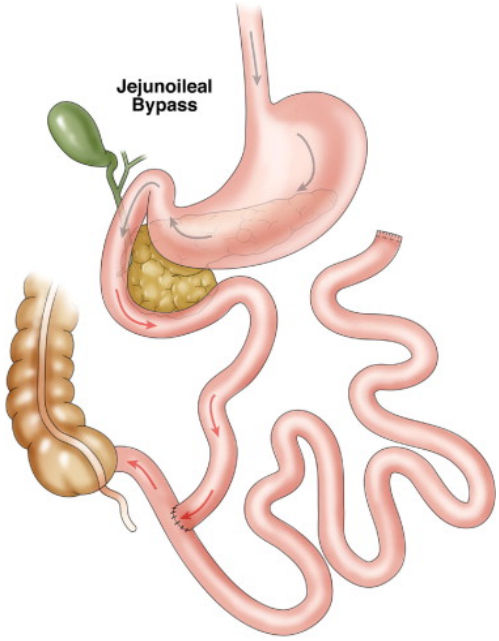

Figure (1): Jejunoileal bypass ***(Griffen et al., 1977).***

Currently used techniques are the biliopancreatic diversion and the biliopancreatic diversion with duodenal switch. In both procedures, a partial gastrectomy is performed, creating a 100-150 ml gastric pouch.

The biliopancreatic diversion consist of a horizontal distal gastrectomy with a gastro-jejunostomy or gastro-ileostomy, this long (food) limb is anastomosed to the biliopancreatic (bile, a pancreatic juice) limb ***(Schneider et al., 2005).***

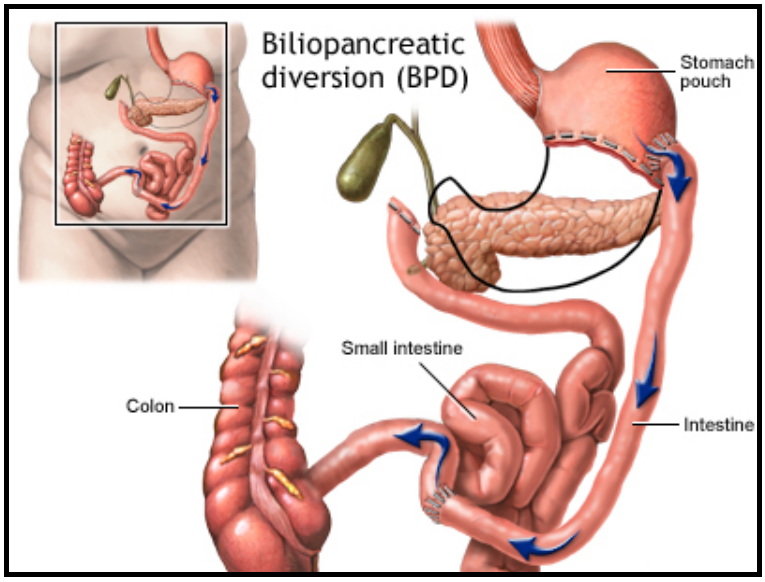

Figure (2): Biliopancreatic diversion ***(David et al., 2012).***

The biliopancreatic diversion with duodenal switch, a pylorus-sparing sleeve gastrectomy with duodeno-ileostomy is performed.

It is generally accepted that biliopancreatic diversion with duodenal switch result in less cases of dumping syndrome and marginal ulcers than a classical biliopancreatic diversion. In both procedures, the length of the common limb (time during which digestion and nutrient absorption can occur) determines the degree of malabsorption ***(Hess et al., 2005).***

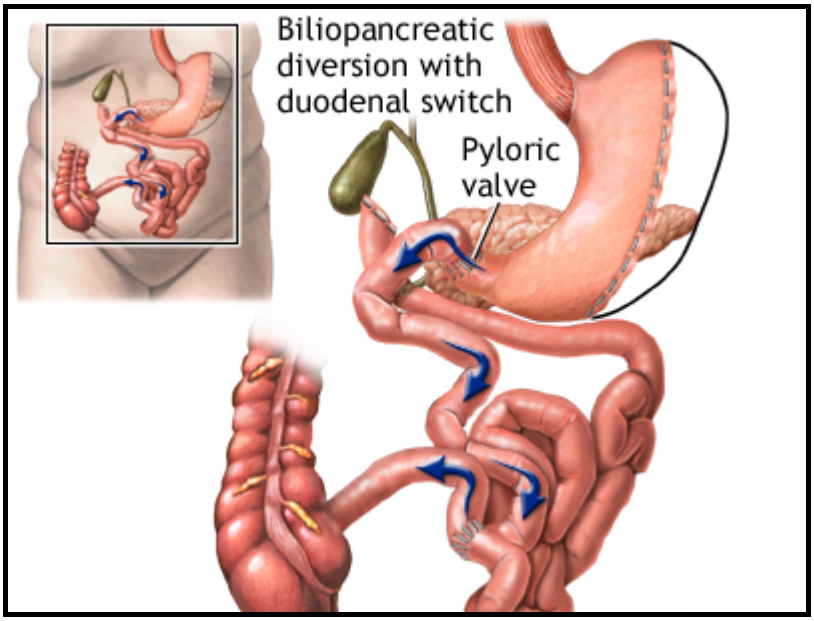

Figure (3): Biliopancreatic diversion with duodenal switch ***(David et al., 2012).***

Restrictive operations reduce the storage capacity of the stomach and as a result early satiety arises, leading to a decreased caloric intake. In general, restrictive procedures are simpler to perform and are accompanied by less complication than malabsorptive procedures. Sleeve gastrectomy, vertical banded gastroplasty and laparoscopic adjustable gastric band represent the current most frequently performed restrictive procedures ***(Stanczyk et al., 2007).***

Sleeve gastrectomy is a type of restrictive weight loss operation. It reduces the amount of food by reducing the size of the stomach. A thin vertical sleeve of the stomach is created by using a stapling device, removing the rest of the stomach following the major curve. The opened edges are then attached together by surgical staples forming a sleeve. Populations of cells