Gastro esophageal reflux disease before and after bariatric surgeries

BY

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Abstract

Background: The relationship between obesity and GERD risk has been well established. Among the many studies supporting this association is a Norwegian survey of nearly 45,000 subjects between 2006 and 2009. Many authors suggest performing esophagogastro duodenoscopy (OGD) in all patients before bariatric procedures. On the other hand, many other investigators advocate a selective approach for asymptomatic patients. Laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered by most experts the procedure of choice for the management of GERD in obese patients, However, the effect of LSG on GERD is still unclear.

Objective: To identify presences or absences of GERD in patient undergoing different types of bariatric surgery and the effect of this surgery on GERD status post operatively.

Patients and methods: study included forty successive morbidly obese patients who present to This prospective the surgery department of al-Azhar university hospitals and Al-ahrar teaching hospital seeking for bariatric surgery, In the period from January 2018 to April 2020. In the present study seventeen (42.5%) of the patients were males while twenty-three (57.5%) were females. Full history, physical examination and special investigations were taking, OGD was done preoperative in all patient and yearly postoperative for two successive year.

Result: In the present study seventeen (42.5%) of the patients were males while twenty-three (57.5%) were females, Upper endoscopy was performed preoperatively in all cases. In LSG group (14): post-operative with follow up by OGD there was five (5) cases 35.7% have GERD sings and the rest of cases, nighen (9) cases 64.3% have normal esophageal mucosa. In LRYGB group (19) case: all patients have normal esophageal mucosa after operation. In LGCGP group (3) cases: post-operative with follow up by OGD there was one case 33.3% have GERD signs and the rest of cases, two (2) cases 66.7% have normal esophageal mucosa. In LMGB group (4) cases: post operatively two (2) case 50% improved in the 2nd year, one (1) 25% improved from the 1st year and one case 25% has increase GERD symptoms, signs, and biliary reflux.

Conclusion: OGD should be done before bariatric procedures routinely or selectively, Laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered by most experts the procedure of choice for the management of GERD in obese patients, however LSG is still un clear on obese patient with GERD.

Key words: Morbidly obese patient, morbidly obese patient with GERD, OGD before and after bariatric surgeries, RYGBP is the operation of choice in obese patient with GERD.

Introduction

Gastro esophageal reflux disease (GERD) is a result of the ascent of the gastric or gastro duodenal content above the gastro esophageal junction, which causes symptoms and/or esophageal lesions that affect the health and quality of life of the individuals that suffer from it **(1).**

GERD affects about 20% of the U.S. population. It's often characterized by heartburn and/or regurgitation. Endoscopy can further classify GERD as either nonerosive, which is more common, or erosive based on the appearance of the esophageal mucosa. Atypical GERD refers to situations in which the primary symptoms are not esophageal. Instead, patients may exhibit cough, laryngitis (hoarseness), and asthma. Chronic GERD can lead to Barrett's esophagus and esophageal adenocarcinoma **(2).**

The relationship between obesity and GERD risk has been well established. Among the many studies supporting this association is a Norwegian survey of nearly 45,000 subjects between 2006 and 2009, which showed that weight loss was associated with a reduction of GERD symptoms in a dose dependent manner **(3).**

Treatment for GERD is multifactorial and may involve dietary changes, lifestyle modifications, medication, surgery, or a combination of these, Lifestyle modifications and dietary recommendations should be individualized for each patient, loss of weight, in overweight and obese subjects, stop smoking, Reduce alcohol consumption, raise the head of the bed, sleep in the left lateral decubitus position, avoid abundant food intake at least 2 h before going to bed at night, especially if the subject has nocturnal symptoms **(4).**

The prevalence rate of obesity started to rise at early '80s. The World Health Organization (WHO) considered obesity as a major social and health problem. Until 2005, 23.2% of the world's adult population was at lower limit of obesity (BMI=25 to 29.9), and 9.8% obese (BMI ≥ 30). WHO estimates that in 2030, the 57.8% of the world population will be obese or at lower limit? **(5).**

Gastro esophageal reflux disease (GERD) is a highly prevalent condition in morbid obese patients, the pathophysiology by which the increase in body mass index leads to increase in esophageal acid exposure is multifactorial, with the increased intra-abdominal pressure playing a major role **(6).** The majority (60-70%) of patients with GERD symptoms will have normal gastroscopy (endoscopic negative reflux disease), however, patients who do

have endoscopic evidence of esophagitis normally require long-term acid suppression. **(7).**

A recent survey conducted in the United Kingdom showed that 90% of bariatric units perform preoperative upper endoscopy either routinely or selectively **(8).** However, there is also no clear consensus on the indications amongst those who do it selectively. This is particularly important in patients considered for LSG given the evidence linking it to worsening GERD and PPI dependence **(9).** The reason so much debate surrounds the issue is because significant GERD plays a major role in the choice of the bariatric procedure and the presence of per-operative reflux symptoms appears to be associated with post-operative GERD **(10).**

Laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered by most experts the procedure of choice for the management of GERD in obese patients, with excellent results in terms of reflux control and long-lasting weight loss **(11).**

Laparoscopic sleeve gastrectomy (LSG) is a surgical approach to treat morbid obesity. It restricts the stomach's size to induce satiety and resects fundal ghrelin-producing cells to decrease appetite. LSG has become a very frequent procedure in bariatric surgery, due to its simplicity and efficacy compared to the gastric bypass procedure **(12).** However, the effect of LSG on GERD is still unclear, with conflicting evidence about pre-existing reflux control and the occurrence of de novo GERD after surgery **(9).**

Patients & Methods

This prospective study included forty successive morbidly obese patients who present to the surgery department of al-Azhar university hospitals and Al-ahrar teaching hospital seeking for bariatric surgery, In the period from January 2018 to April 2020.

The inclusion criteria were: Age range will be 17~ 60 years, BMI more than 40 or more than 35 with co-morbidity, Failure of non-surgical treatment, Absence of endocrinal or psychological disorders. The exclusion criteria were: Patients less than 17 years or more than 60 years, BMI less than 40 or less than 35 without comorbidities, Good response to non-surgical treatment, Presence of endocrinal or psychological disorders, Bad general condition of the patient.

All patients were subjected to:

Full history and clinical examination with special symptoms of GERD heart burn, regurgitation, nausea, vomiting, bad breath, pain in chest and upper part of abdomen and

difficulty swallowing

- Laboratory investigations for preoperative evaluation including CBC, PT, liver functions, kidney functions, hormonal profile (FBS, Serum Cortisol, T3, T4, TSH) and coagulation profile (PT, PTT, PC and INR).
- Radiological investigations including chest X-ray, Abdomino-pelvic ultrasound, CT may be ordered in selected patients.
- Evaluation of the cardiac and respiratory condition in the form of Echocardiogram, and respiratory function tests

All patients had a written informed consent of the different types of laparoscopic procedures of obesity, OGD will be done in all patients preoperatively to identify the presences or absences of reflux disease. Prophylactic anticoagulant medications were given to all patients in the form of subcutaneous Clexane 0.5 unit/Kg/24. An ICU bed was reserved for all patients the night of operation with the decision of transfer left to the postoperative recovery assessment. According to the patient selection, all forty patients were divided in two groups as follow

- Group A) which included patient who do not have GERD manifestations or positive finding of GERD during OGD preoperatively.
- Group B) which included patient who show positive history or endoscopic finding of GERD during preoperatively OGD.

Group A patient according to history or finding of OGD, had a full range of selection of different types of bariatric surgeries conducted laparoscopic by the research team (laparoscopic gastric sleeve (LSG), mini gastric bypass (MGB), Roux-en-Y gastric bypass (RYGBP), greater curvature gastric plication (GCGP)) ,while Group B patients had to choose between (Lap mini gastric bypass versus Lap Roux-en-Y gastric bypass)

Intraoperative leak test using methylene blue was done in all cases to check for leak. A suction drain is placed as needed

Postoperative course: after a standard postoperative course and discharge of patient from hospital, all patients were followed for up to two years on regular visits every month in the first 6 month then every three month in the second 6 month then every 6 month in the second year including patient complains, weight assessment, manifestations of vitamins and minerals deficiency as well as presences of GERD symptoms and requiring for medical treatment, OGD will be done on yearly basis on patients during the follow up period up to two years, or farther radiological examination as required.

Results

In the present study seventeen (42.5%) of the patients were males while twenty-three (57.5%) were females. The patient ‘s age ranged from 20 years to 50 years with a mean value of 35years.

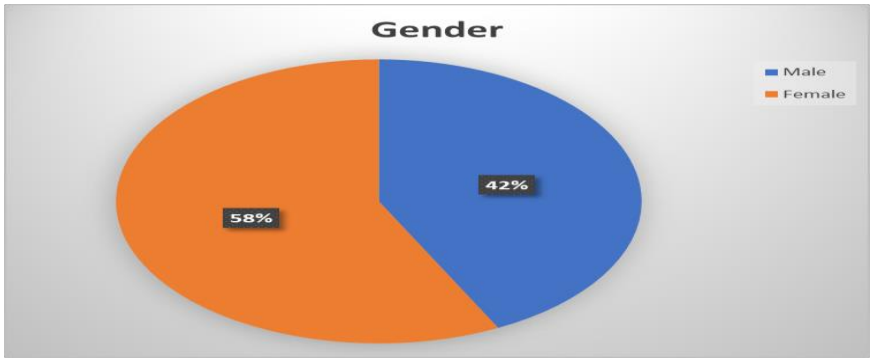

Chart 1): the percent of male and female in the study

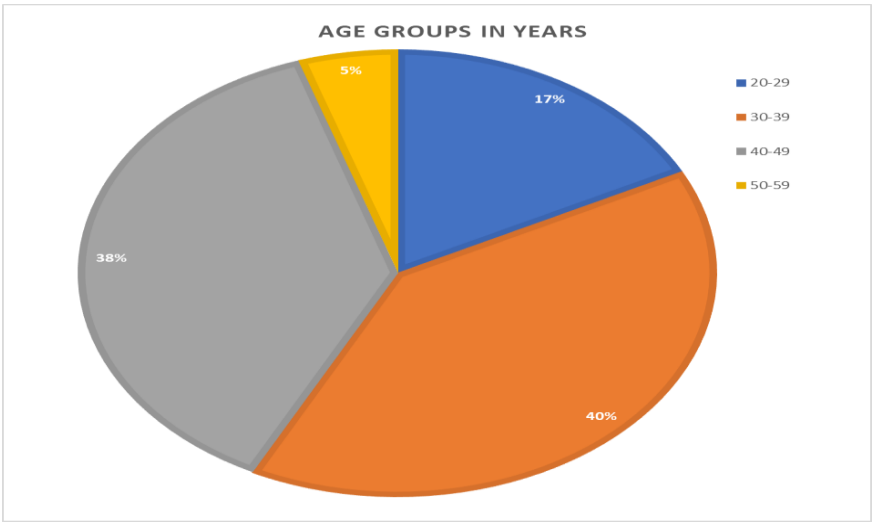

Chart 2): the percent of patients in age groups

The lowest body mass index (BMI) was 37 while the highest was 58.6with a mean value of 47.8, their height varied from 156 cm to 187 cm with a mean value of 171.5 cm, while their weights ranged from 100 kg to 170 kg with a mean value of 135 kg as in table(1).

	Age	Body Mass Index	Height	Weight
Mean	35	47.8	171.5	135
Minimum	20	37	156	100
Maximum	50	58.6	187	170

Table (1) showing maximum, minimum & mean values of the age, BMI, Height & weight.

This table demonstrate the namber of cases according to types of operation in group A&B.

	Group A			**Group B**	
Type of operation	**LSG**	**LGCGP**	**RYGBP**	**RYGBP**	**MGB**
Number of cases	14	3	3	16	4

Table (2): Number of cases according to types of operation

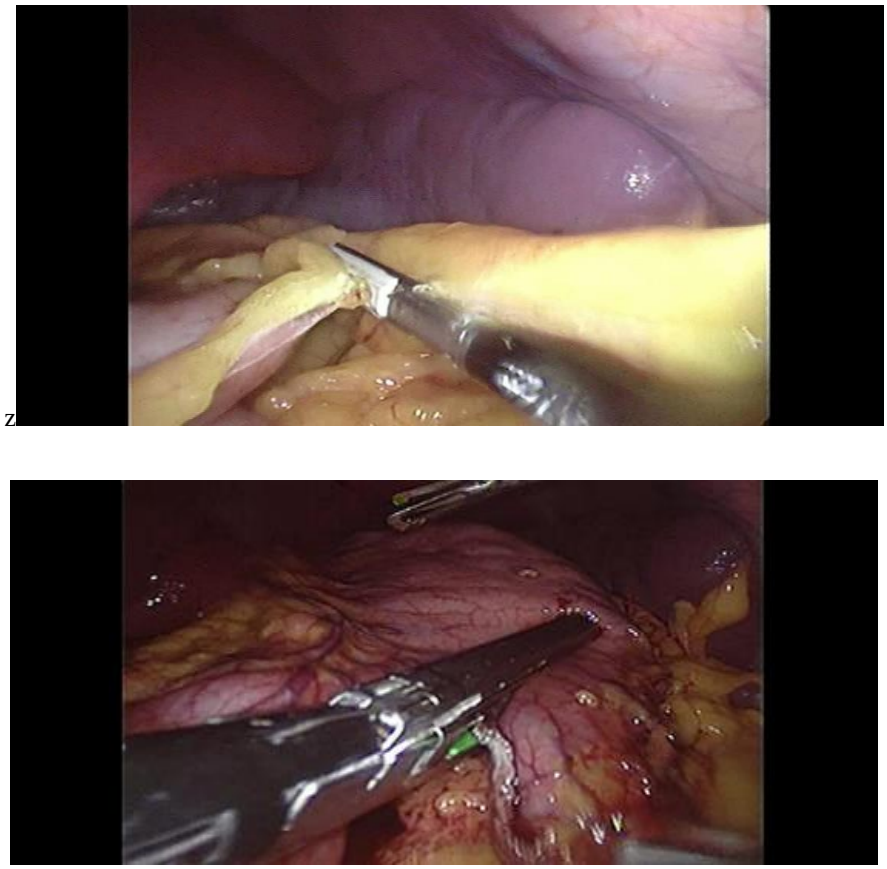

Fig (1): Steps of SG operation (upper) Devascularization (lower) Stappling

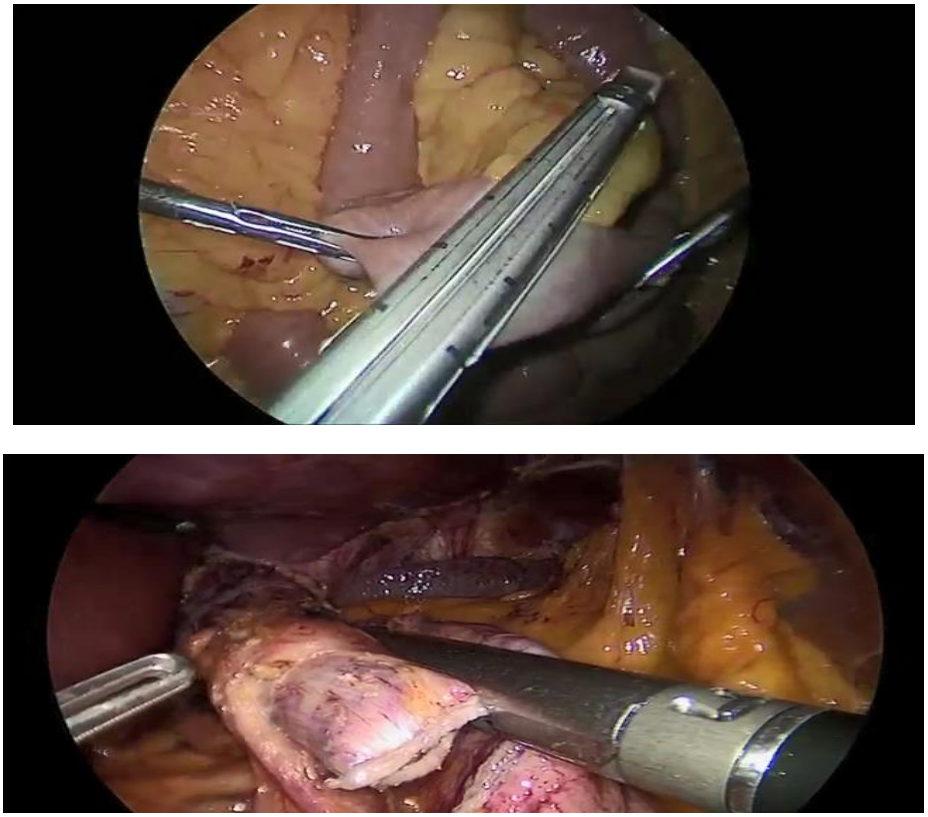

Fig (2): steps of RYGBP the (upper) division of jejunum and the (lower) Creation of gastric pouch.

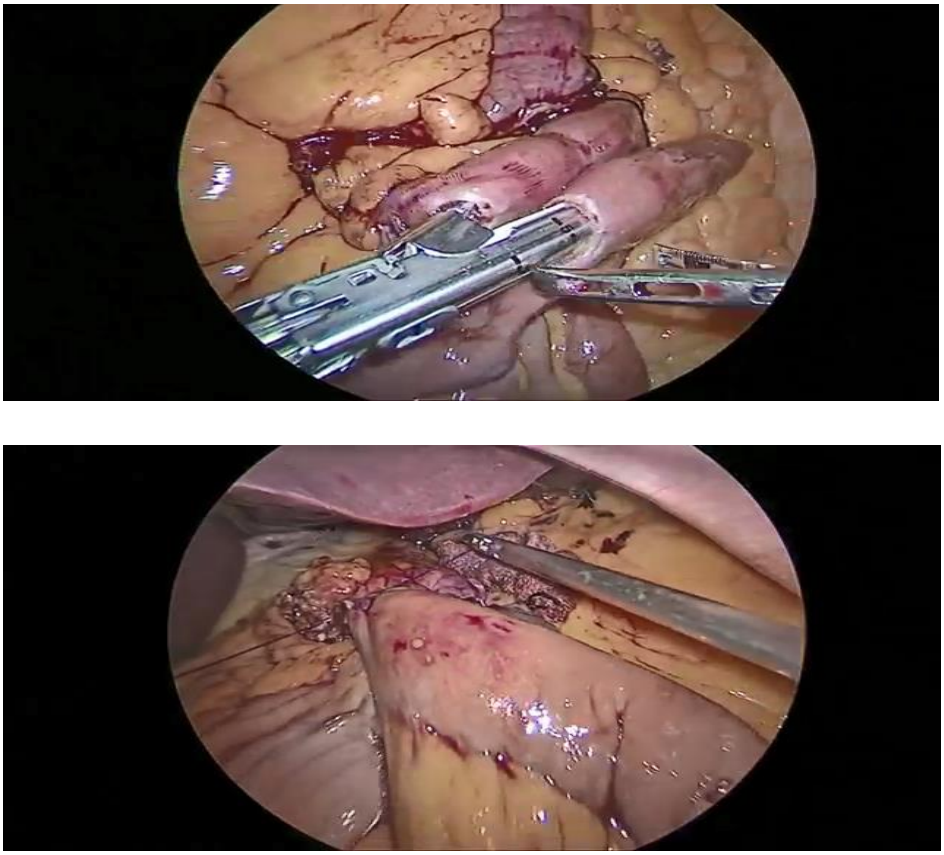

Fig (3): the (upper) jejunojejunostomy and the (lower) gastrojejunostomy

The table demonstrate the operative time in minutes& hospital stay in days between all operations in this study.

Type of operation	**Operation time(mint)**			**Hospital stay (day)**		
	Max.	**Min.**	**Mean**	**Max.**	**Min.**	**Mean**
LSG	**110**	**70**	**90**	**5**	**3**	**4**
LGCGP	**90**	**70**	**80**	**4**	**2**	**3**
LRYGBP	**130**	**100**	**115**	**13**	**5**	**9**
LMGB	**110**	**80**	**95**	**6**	**4**	**5**

Table (3) showing the comparative maximum, minimum & mean values in the operative time in minutes & the hospital stay in days between LSG, LGCGP, LRYGBP and LMGB.

The table show weight loss in maximum, minimum, and mean value according to types of operation.

Weight loss	Type of operation			
	LSG	LGCGP	LRYGBP	LMGB
Maximum.	73	36	90	70
Minimum.	41	30	58	50
Mean value.	57	33	74	60

Table (4): comparison of weight loss maximum, minimum and mean value according to type of operation (LSG, LGCGP, LRYGBP and LMGB)

Upper endoscopy was performed preoperatively in all cases. All patients GERD manifestation was followed up to April 2020, OGD was done yearly post-operative for two years.

In LSG group (14) case: all cases have not GERD manifestations and negative OGD signs of GERD preoperatively but post-operative with follow up by OGD there was five (5) cases have GERD sings from the 1st year post-operative and the rest of cases nighen (9) cases have normal esophageal mucosa. In LRYGB group (19) case: all patients who have GERD manifestations and positive OGD

signs of GERD preoperatively become normal after operation. In LGCGP group (3) cases: all cases have not GERD manifestations and negative OGD signs of GERD preoperatively but post-operative with follow up by OGD there was one case have GERD signs from the 1st year post-operative and the rest of cases two (2) cases have normal esophageal mucosa. In LMGB group (4) cases: all cases have GERD manifestations and positive OGD signs of GERD preoperatively, but post operatively two (2) case improved in the 2nd year, one (1) improved from the 1st year and one case has increase GERD symptoms, signs, and biliary reflux as in figure (4) .

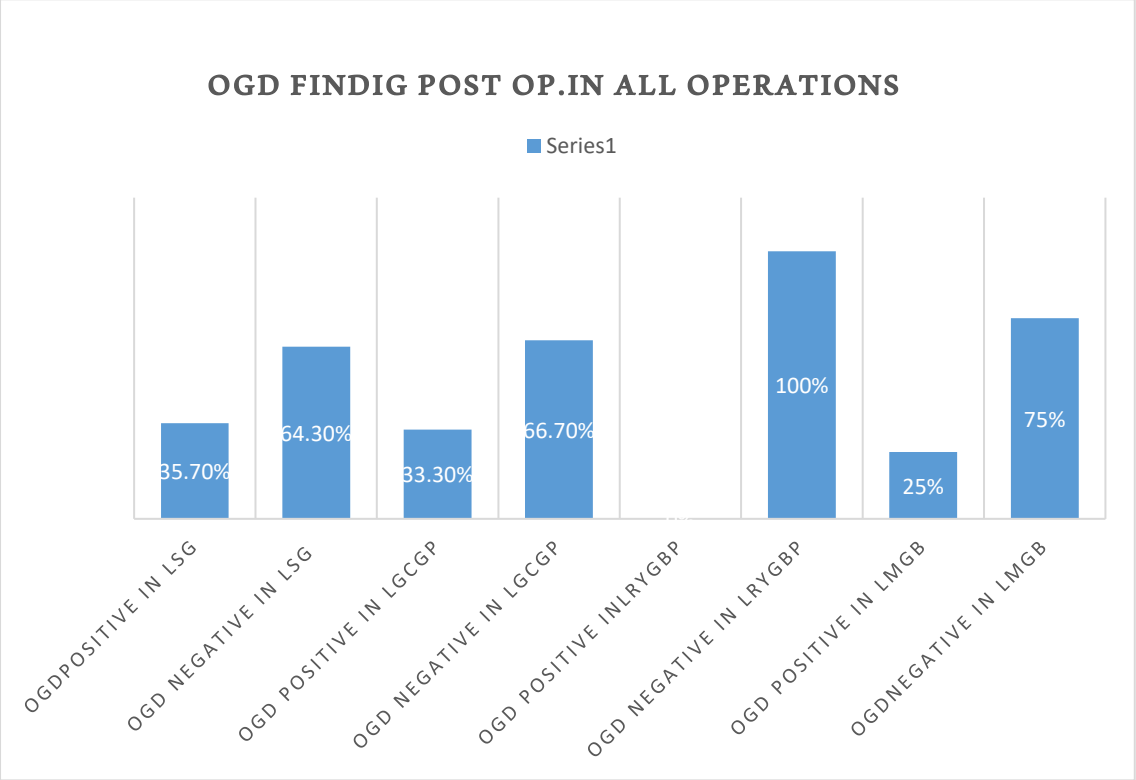

Fig (4): the percent of GERD post-operative according to types of operation

Discussion

Laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered by most experts the procedure of choice for the management of GERD in obese patients, with excellent results in terms of reflux control and long-lasting weight loss. **(11).** However, the effect of LSG on GERD is still unclear, with conflicting evidence about pre-existing reflux control and the occurrence of de novo GERD after surgery**(9).**

In present study we perform (LRYGBP or MGB) in obese patient associated with GERD, and (LSG, LGCGP, LRYGBP or MGB) in obese patient not associated with GERD. we choice LSG in bulky eater, BMI less than 50Kg/h2 and RYGBP in sweaty eater or

BMI more than 50kg/h2. A recent survey conducted in the United Kingdom showed that 90% of bariatric units perform preoperative upper endoscopy either routinely or selectively **(8).** However, there is also no clear consensus on the indications amongst those who do it selectively. This is particularly important in patients considered for LSG given the evidence linking it to worsening GERD and PPI dependence **(9).** the reason so much debate surrounds the issue is because significant GERD plays a major role in the choice of the bariatric procedure and the presence of per-operative reflux symptoms appears to be associated with post-operative GERD **(10).**

Many authors suggest performing esophagogastroduodenoscopy (OGD) in all patients before bariatric procedures because of the lack of correlation between patient symptoms and OGD findings. On the other hand, many other investigators advocate a selective approach for asymptomatic patients because of the relatively weak clinical relevance of most lesions discovered on routine OGD along with the cost and invasiveness of OGD **(13).**

In present study we perform routinely OGD preoperative in all patients (40) patients whoever those patients have or have not GERD symptoms

Stenard and Iannelli 2015 conducted the largest systematic review of LSG and GERD which included 25 studies. The findings were mixed. Thirteen studies found worsening of GERD post LSG across 5,953 patients with a mean BMI of 42±4 kg/m^2 (range, 37–55.5 kg/m^2) and mean follow up of 29±22 months (range, 3–72 months), Only one study was prospective whereas the rest were retrospective. The evaluation of GERD was heterogenous, and although all studies had preoperative endoscopy data, postoperative evaluation varied. These included esophageal manometry, contrast studies and 24-hour ambulatory pH studies, with the majority including subjective clinical evaluation by means of symptoms of validated questions **(14).**

Twelve studies found clinical improvement on GERD across 1,863 patients, with a mean BMI of 51±13 kg/m2 (range, 36.5–65 kg/m2) and mean follow-up 20±15 months (range, 6–60 months) .A majority of the studies were based on clinical evaluation, again with only a few utilizing endoscopy, 24-hour ambulatory pH studies, esophageal manometry or contrast studies .With the aforementioned findings, the authors proposed caution with performing LSG due to the unquantified potential for worsening rates of GERD **(14)**.

Oor et al. 2016 conducted the first meta-analysis on this topic and like the authors above, they were unable to provide uniformed consensus conclusions due to the

high heterogeneity of available studies. They included 33 studies with 8,092 patients undergoing LSG. Most of the studies (k=30) reported clinical evaluation of GERD symptoms postoperatively, while four included use of anti-acid medications and eight studies utilized functional tests **(9).**

Interestingly, the studies utilizing validated questionnaires had a risk difference of 4.3% postoperatively, while the eight studies with functional tests had paradoxical results. The pooled incidence of de novo GERD was 20%. Given this, the authors made no definite conclusions, stating only that there appears to be an increased prevalence of GERD symptoms post LSG **(9).**

The anatomical and physiological effects on GERD post LSG have multifactorial explanations. In cases of de novo GERD, it is thought to be due to decreased gastric emptying, reduced LES pressure, blunting of the angle of His, decreased compliance and reduced volume of the stomach and increased intra gastric pressure secondary to the narrow gastric pouch and herniation of part of the sleeve into the mediastinum **(15).**

Genco et al. 2017 advocated for endoscopic surveillance after LSG, irrespective of the presence of GERD symptoms .In view of these results, the improvement in GERD post LSG can be postulated to be anatomical (e.g., resection of acid-producing gastric fundus, accelerated gastric emptying and reduced gastric volume) or systemic (reduced intra-abdominal pressure due to weight loss**) (16).**

In present study we perform LSG in 14 case , only 5 cases (35,7%) developed GERD symptoms post-operative from the 1st year and give positive sings of GERD on OGD, the rest of cases 9 case (64,3%) still normal post-operative (have normal esophageal mucosa)

In patients with severe GERD symptoms post LSG, with resistance to maximal medical therapy, revisional surgery has been advocated: LRYGB is the procedure of choice in these patients**. Cheung D, et al. 2014** conducted a systematic review of studies examining patients undergoing revisional bariatric surgery for failed weight loss. GERD was assessed in three studies and found that all patients (n=15) had complete resolution of GERD symptoms with repeat LRYGB **(17).**

Parmar et al. converted 22 LVSG to LRYGB and found that 100% of patients reported improvement in GERD symptoms, and 80% were able to cease medications **(18).** Recently, **Holmberg D et al**. has contested this long-standing notion and postulated that the effect has been overstated. They studied all adult patients who underwent RYGB in Sweden which

included 2454 patients. The median follows up was 4.6 years (IQR 3.1–6.3). They defined postoperative reflux as residual or recurring symptoms of GERD with use of acid suppression medications for beyond six months postoperatively **(19).**

Interestingly, they found GERD persisted in 48.8% of patients within two years of RYGB and persisted for up to 10 years after surgery. The strongest risk factor for postoperative GERD was high-dose preoperative acid suppression. In comparison, less than 10% of patients have persisting GERD after the traditional anti reflux surgery of fundoplication. Despite these findings, the authors concede that RYGB remains the most effect bariatric procedure in reducing GERD for the reasons **(19).**

In present study we perform LRYGBP in 19 case of obese patient associated with GERD signs and symptoms by OGD preoperatively. At a mean follow up of 24 months by OGD, all patients experienced a clinical improvement or no symptoms of GERD

for obese patients suffering with GERD. Sleeve gastrectomy (SG) has a complex relationship with GERD **(20),** where a majority of the patients report an improvement, but some experience deterioration and others notice de novo reflux. Similarly, though GERD usually improves with MGB, several authors have reported troublesome reflux symptoms requiring revision to either RYGB or Braun's anastomosis **(21).**

The authors observed that MGB led to a significant reduction in both esophageal acid exposure and in reflux episodes, whereas SG resulted in an increase in both. More interestingly, none of the MGB patients had any "weakly alkaline reflux" before or after surgery but SG patients experienced a significantly higher total, upright, and recumbent "weakly alkaline reflux" after surgery **(22).**

In present study we perform MGB in 4 cases of obsess patient associated with GERD singes and symptoms by OGD preoperatively follow up by OGD was done for 24 months , 2case 50% improved from 1st year , 1 case 25% improved from the 2nd year and one case 25% have biliary reflux

Conclusion

Obesity is a modern major problem with a great influence on the quality of life that should be solved, OGD should be done before bariatric procedures routinely or selectively. Lifestyle modification along with medications are considered the first line to treat obesity with new, but expensive, medications reaching the market. Laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered by most experts the procedure of choice for the

management of GERD in obese patients, The effect of LSG on GERD is still unclear, with conflicting evidence about pre-existing reflux control and the occurrence of de novo GERD after surgery.

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ارتجاع المرئ قبل وبعد جراحات السمنه

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قسم الجراحه العامه كلية الطب جامعة الازهر[2] ومستشفى الاحرار التعليمى [1]

الخلفية : العلاقة بين السمنة وخطر الارتجاع المعدي المريئي مثبتة بشكل جيد. من بين العديد من الدراسات التي تدعم هذا الارتباط ، هناك مسح نرويجي لما يقرب من 45000 شخص بين عامي 2006 و 2009. يقترح العديد من المؤلفين إجراء المنظار المريئى المعدى الاثنى عشرى في جميع المرضى قبل إجراءات علاج البدانة ومن ناحيه اخرى يدعو العديد من الباحثين الى اجراء إلى اتباع نهج انتقائي للمرضى الذين لا تظهر عليهم أعراض. يعتبر معظم الخبراء إجراء جراحة المجازة المعدية بالمنظار هو الإجراء المفضل لإدارة ارتجاع المريء في مرضى السمنة ومع ذلك لا يذال تأثير عملية تكميم المعده بالمنظار على مريض السمنه الذى يعانى من الارتجاع المريئى.

الهدف من الدراسه : تحديد وجود أو غياب مرض ارتجاع المريء في المريض الذي يخضع لأنواع مختلفة من جراحات السمنة وتأثير هذه الجراحة على حالة ارتجاع المريء بعد الجراحة

المرضى وطرق الدراسة: تضمنت الدراسة أربعين مريضاً متتالياً يعانون من السمنة المفرطة والذين قدموا إلى قسم الجراحة بمستشفيات جامعة الأزهر ومستشفى الأحرار التعليمي في الفترة من يناير 2018 إلى أبريل 2020. في الدراسة الحالية سبعة عشر (42.5٪) من المرضى كانوا من الذكور بينما 23 (57.5٪) كانوا من الاناث تم إجراء التاريخ الكامل والفحص البدني والتحقيقات الخاصة ، وتم إجراء المنظار المريئى المعدى الاثنى عشرى فى جميع المرضى قبل الجراحه وبعد الجراحه سنويا لمدة عامين متتالين.

النتيجة: في الدراسة الحالية كان سبعة عشر (42.5٪) من المرضى من الذكور بينما كان 23 (57.5٪) من الإناث ،وتم اجراء المنظار العلوى العلوي قبل الجراحة في جميع الحالات

فى مجموعة المرضى الذين خضعوا الى عملية تكميم المعده بالمنظار وعددهم(14) مريض : كان هناك خمس (5) حالات 35.7٪ لديهم ارتجاع المريء بعد اجراء العمليه وبقية الحالات (9) حالات 64.3٪ لديهم غشاء مخاطي طبيعي (ليس لديهم ارتجاع مرئ بعد اجراء العمليه) وذلك خلال المتابعه بعد العمليه بالمنظار العلوى لمدة عامين متتالين

فى مجموعة المرضى الذين خضعوا الى عملية تحويل المسار المعدى الكلاسيكى بالمنظار وعددهم(19)
مريض : كان لدى جميع المرضى غشاء مخاطي طبيعي للمريء بعد العمليه اى انه تم تحسن جميع الحالات من الارتجاع المريئى

فى مجموعة المرضى الذين خضعوا الى عملية طى المعده بالمنظاروعددهم (3) حالات : كانت هناك حالة واحدة 33.3٪ لديهم علامات ارتجاع المري وذلك عن طريق المنظار العلوى اما بقية الحالات حالتان (2) 66.7٪ لديهم غشاء مخاطي طبيعي للمريئ وذلك اثناء فترة المتابعه بعد العمليه بالمنظار العلوى.

فى مجموعة المرضى الذين خضعوا الى عملية تحويل المسارالمعدى المصغر وعددهم (4) حالات : بعد الجراحة حالتان (2) تحسنت بنسبة 50٪ في السنة الثانية ، وحالة واحدة (1) بنسبة 25٪ تحسنت من السنة الأولى وحالة واحدة بنسبة 25٪ زادت أعراض ارتجاع المريء وعلامات الارتجاع الصفراوي.

الملخص : يجب إجراء المنظار المريئى المعدى الاثنى عشرى قبل إجراءات جراحات السمنة بشكل روتيني أو انتقائي ويعتبر معظم الخبراء إجراء جراحة تحويل المسارالمعدي بالمنظارالبطني هو الإجراء المفضل لإدارة ارتجاع المريء في مرضى السمنة ،ومع ذالك لايذال تأثير عملية تكميم المعده بالمنظار على الارتجاع المريئى غير واضح بشأن مريض السمنه.