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Original Research Article

The study of laparoscopic mini gastric bypass in patients of morbid obesity

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ABSTRACT

Background: Laparoscopic mini gastric bypass (MGB) is considered superior in terms of weight loss, co-morbidity resolution and less complications, thus improve quality of life.
Methods: A prospective interventional study using laparoscopic MGB in 52 morbidly obese patient over a period of 2 years.
Results: Weight loss with average percentage excess weight loss (%EWL) at the end 6 months is 72.62%, at the end of 1st year 80.55% and at the end of 2nd year it is 85.83%. Out of 15 diabetic patients, 66.66% had complete remission of Diabetes mellitus resulting in discontinuation of medications and 20% of them had partial remission. Out of the 18 hypertensive patients, 88.88% had complete remission and 5.55% of them had partial remission and other 5.55% had decrease in dosage medications. Out of 20 patients of obstructive sleep apnoea syndrome (OSAS), 75% patients had complete remission and 25% of them had partial remission.
Conclusions: Laparoscopic MGB is an effective procedure with >50% EWL as early as 3 months. Laparoscopic MGB causes complete or partial remission of the comorbidities like diabetes mellitus, Hypertension and OSAS.

Keywords: Mini gastric bypass, Body mass index, Diabetes mellitus, Hypertension

INTRODUCTION

It is well established fact that obesity is an epidemic with its tentacles spread to nearly every part of the globe. Due to globalisation and introduction of cheap fast food, sedentary lifestyle, lack of exercise, hereditary factors prevalence of obesity has increased. According to Ahirwar et al, the prevalence of obesity in India has become 16.9%-36.3%.[1] Diseases like hypertension, diabetes mellitus, osteoarthritis have been directly linked to obesity, grouped together as metabolic syndrome. Many people who want to reduce their weight do so by non-surgical methods like exercise, dieting or by consumption of banned medicines. Despite this, a majority of the obese population fail to have significant weight loss or long-lasting results. Ever since the introduction of bariatric surgery in 1960s, there have been multiple studies that have proven the efficacy of the application of these methods in achieving a solution to significant weight loss in motivated individuals along with the resolution of comorbidities mentioned above. Bariatric procedures have been found to have long lasting results that are far superior to any non-surgical method of weight loss. Laparoscopic mini-gastric bypass (LMGBP), first reported by Dr. Robert Rutledge, a trauma surgeon in North Carolina, in September 1974, in a patient of gunshot injury with multiple severe abdominal injuries.[2] It was proposed as a simple and effective treatment of

morbid obesity. The objective here is to study the effect of Lap MGB on weight loss, resolution of co-morbidities and complications associated with the procedure.

METHODS

This is the prospective interventional type of study of Laparoscopic MGB in 52 patients in IGGMC, Nagpur from 2018 to 2021 with local ethical committee approval. Patients were selected based on inclusion criteria according to International Federation for the surgery of Obesity: Asia-pacific Chapter (IFSO-APC:2011), includes patients in age group of 18 to 65 years with body mass index (BMI) 32.5 kg/m^2 and more with 2 or more co-morbidities or BMI 35 kg/m^2 or more with no co-morbidities, failed attempts at weight loss and patients with obesity related complications.[3] Patients excluded from study were those with age less than 18 or more than 65 years of age with BMI less than 32.5 kg/m^2, patients with gastroesophageal reflux disease (GERD), unfit for anaesthesia, patients not willing to adhere to dietary advice and long follow up with mental illness, substance abuse and serum albumin less than 3.5 g/dl.

Figure 1: Patient position on dedicated bariatric OT table.

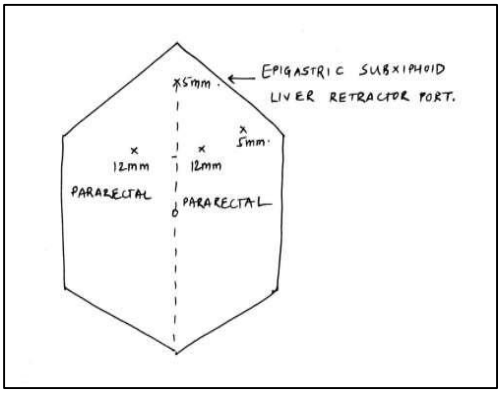

Figure 2: Port position.

All patient underwent batteries of investigations pre-operatively likes complete blood count, renal and liver function test, fasting and post prandial blood sugar level, HIV test, Hepatitis B Antigen, Thyroid function test, chest X-ray, neck X-ray AP/lateral view, glycosylated Haemoglobin, lean body mass measurements, pulmonary function test, sleep study, ultrasonography of abdomen and pelvis, Upper GI endoscopy, ECG, 2D-Echocardiography.

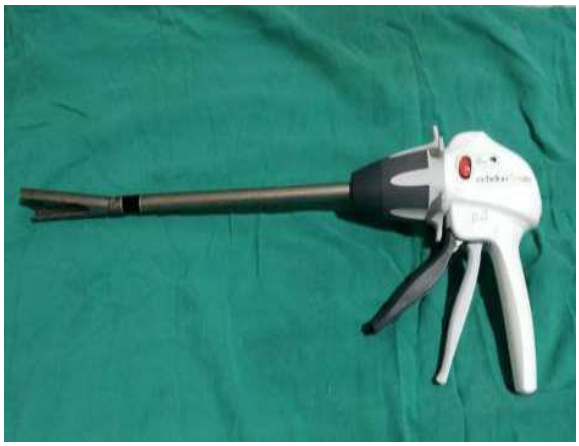

Figure 3: Laparoscopic endo GI stapler gun.

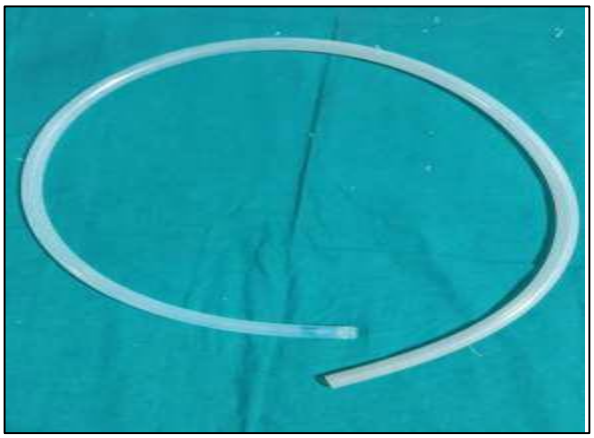

Figure 4: Gastric calibration tube (GCT)-40 Fr.

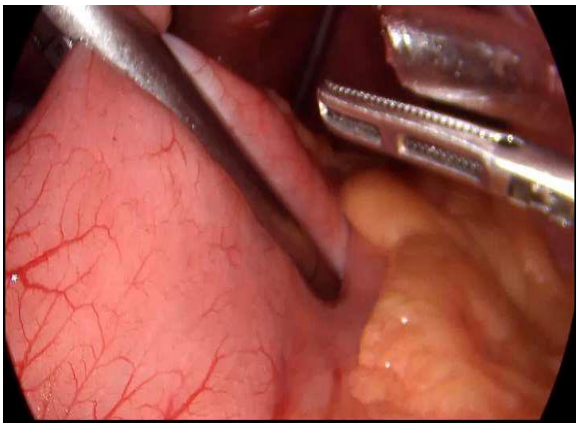

Figure 5: Firing of first linear stapler.

After proper informed consent and preanesthetic check-up weight and BMI of all the patients are recorded. Patients with DM and HTN, blood sugar levels and blood

pressure levels are monitored. Intensive spirometry and bronchodilator like salbutamol are advised to all patients to build pulmonary strength.

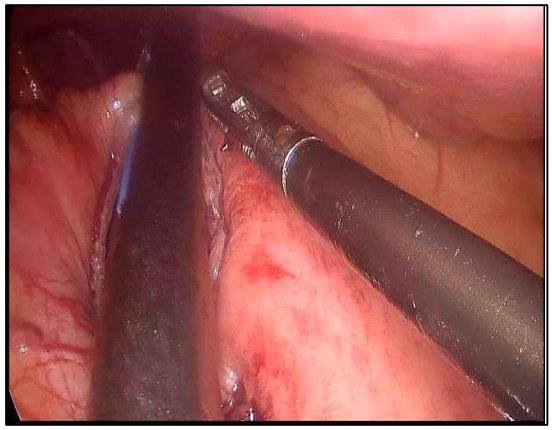

Figure 6: Creation of stomach tube.

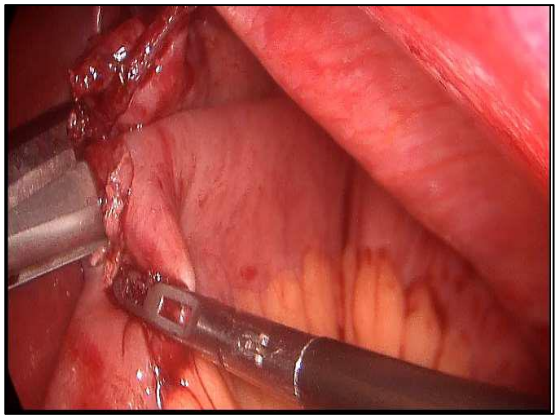

Figure 7: Creation of gastrojejunostomy using staplers.

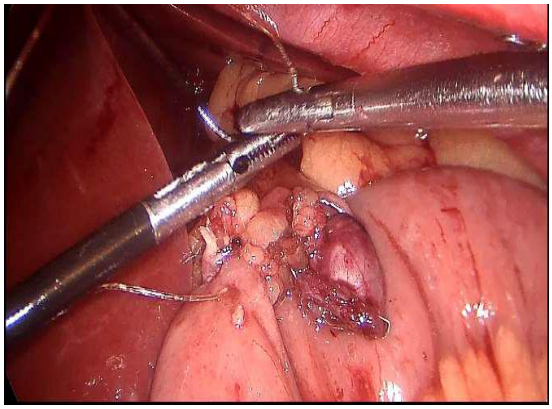

Figure 8: Handsewn gastrojejunostomy stoma.

All patients are started on liquid diet for 7 days preoperatively which consisted of water, clear juices, milk. Tablet metformin 500 mg od for 7 days, other oral hypoglycaemic agents and antihypertensive drugs are started to Diabetic and hypertensive patients. Low molecular weight heparin, compression stockings and pneumatic compression devices are used in perioperative period as prophylaxis for deep vein thrombosis. Patients are given injectable antibiotic prophylaxis before surgery.

Procedures are performed in dedicated bariatric operating theatre, the patient is placed in a split leg position over a dedicated bariatric table with capacity to accommodate a patient up to 350 kg. Surgery is performed in a steep reverse Trendelenburg position. All patients are operated by laparoscopic approach under general anaesthesia with inhalational and intravenous agents, with endotracheal intubation. Foley catheterization is done with aseptic precautions. Sequential Compression Devices (SCD)/Deep venous thrombosis (DVT) compression stockings are applied. Proper strapping of the patient to the table is the vital step to avoid accidental fall and other non-surgical complications.

Veress needle is use to create pneumoperitoneum, inserted through palmer's point. First 12 mm camera port placed in left para-rectal supra-umbilical region (Midway between xiphi-sternum and umbilicus), second 5 mm right hand working port placed 5 cm below left subcoastal margin in midclavicular line, 12 mm left hand working port in right para-rectal supra-umbilical region and 5 mm/Subxiphoid /epigastric port used to retract liver. Seldom, we used 5th port i.e., 12 mm port placed in right para-rectal region at the level of umbilicus.

After inspection of the small bowel, liver and any other grossly detectable abdominal pathology on initial laparoscopy, the first step is the creation of the lesser omental window. Dissection is started along lesser curvature midway between pylorus and crows' foot and a lesser omental window is created. The window is created for about 2–4 cm, lysing all the anterior and posterior adhesions to stomach, and the lesser sac is entered. Liver retraction is done by the assistant surgeon, using blunt instruments without traumatizing the organ. An endo-GIA stapler, usually 45-mm blue is engaged across the antrum of the stomach at right angles to its axis. An adequate lesser omental window free of adhesions is a necessary prerequisite for this step. This first vertical firing should not transect antrum more than 60% of its width. Anterior and posterior walls of the stomach must be grasped equally by the stapler to avoid a twist and "bird beaking" of the edges, thereby avoiding trouble in the gastro-jejunostomy. A moderate-sized stomach pouch is the hallmark of MGB. A long wide and low-pressure tube is characteristic of stomach pouch created in MGB. First, transverse firing from the left para-rectal port using 60 mm green cartridge from the edge of the previously divided stomach will be done. The axis of division should be perpendicular to the first firing and parallel to lesser curvature of the stomach, making sure to divide the antrum longitudinally almost at the centre. Subsequent firings are done along a 40-Fr Bougie. The dissection should be lateral to the left crus of the diaphragm, leaving a minimum cuff of 1 cm from the angle of His, and a

stomach tube will be created. Care to avoid inadvertent injury to short gastric, inferior phrenic vessels and spleen is taken. Haemostasis attained by using haemostatic clips and suturing the staple-line on the pouch and also on the bypassed stomach side. An antecolic loop gastro-jejunostomy is done. An enterotomy is made on the jejunum 150–200 cm from ligament of Treitz. Gastrotomy is done on the anterior surface of the pouch midway between the two inferior angles and parallel to the previous staple-line. The Bougie is used to stabilize the pouch during gastrotomy. The gastrotomy and enterotomy are closed either by a 60mm green cartridge stapler or by using 2-0 vicryl continuous extra-mucosal hand-sewn sutures. The leak test is done by using methylene blue to check the integrity of anastomosis. An abdominal drain is placed near anastomosis selectively. All port sites are closed after infiltrating with 0.5% Bupivacaine.

Postoperatively, patients are monitored overnight in the surgical ICU. Ambulation is performed within 4 to 8 hours after surgery and chest physiotherapy is started in the immediate postoperative period. Clear liquids are started after 24 hours. Patients are observed for intraoperative complications like port site bleeding, injury to stomach, spleen while insertion of veress needle and also for injury to liver, major vessels, small bowel during port insertion. Patients are monitored immediate post-op to look for bleeding and anastomotic leak and complications regarding anaesthesia.

The patient is discharged once oral intake of 1500–2000 ml/24 h is established, usually after 3-5 days. A liquid diet is given for 1 week, a pureed/soft diet for next 3 weeks, and normal diet of restricted, high protein low sugar, low fat diet for 1 month. Dietary counselling is provided, and a normal consistency, low-calorie, high-protein diet is advised at 2 months from surgery. Patients are followed up at 3, 6, 12, 18 and 24 post-operative months and as per need of patients.

Lifelong supplementation of iron, calcium and multivitamins are given. Patients after uneventful discharge are followed up after 15 days to counsel and ensuring prescribed dietary schedule. At the 1st month patients are followed to record dietary advice, record of weight and BMI, gastrointestinal complaints like nausea, vomiting, heart burn to look for bile reflux and dumping syndrome and asked to resume daily routine activity. Follow up HbA1c, blood pressure records, lipid profile and obstructive sleep apnoea (both objective evidences given by patient's family members and follow up sleep study) on 3rd month post op are done and treatment is given accordingly. Patient is reviewed for parameter like blood sugar levels, blood pressure after 6 months also.

A follow up upper GI endoscopy is mandatory after 1 year of bariatric surgery and then repeated every 1-2 yearly for surveillance.

RESULTS

The interventional study aims to study the clinical profile, weight loss, resolution of comorbidities and complications in morbidly obese patients in which laparoscopic Mini gastric bypass was performed.

Table 1: BMI distribution.

BMI range	Total	Percentage
32.5-34.9 Obese class I	5	9.62
35-39.9 Obese class II	34	65.38
40-49.9 Obese class III	11	21.16
50-60 Super obese	2	3.84
Total	52	100

Table 2: Co-morbidities distribution.

Associated Co-morbidities	Number of patients	Percentage
Diabetes	18	28.84
Hypertension	15	34.61
OSAS	20	38.46

Figure 9: Reduction of BMI after Lap MGB. (A) Weight-96 kg, BMI-36.2 kg/m^2 (B) Weight-59 kg, BMI-22.2 kg/m^2.

Age range of the patients in study was between 21 to 60 years. Mean age of the patient undergoing MGB was 41 years. Out of 52,17 i.e., 32.69% patients were males and 35 patients i.e., 67.31% were females. The male to female sex ratio is 1:2.05 suggestive of female preponderance.

Out of 52, the lowest BMI of the patient operated was 33 kg/m^2. The highest BMI operated was 55.5 kg/m^2. The mean BMI operated was 38.81 kg/m^2. The most common group of patients belonged to BMIs between 35-39.9

kg/m^2, i.e., 65.38%. The least common range of BMI was 50 to 60 kg/m^2 which accounted to 3.84%.

Table 3: %EWL Follow up.

Follow up	%EWL
6 months	72.62%
1 year	80.55%
2 years	85.83%

Table 4: Co-morbidities remission follow-up.

	DM	HTN	OSAS
Total patients	15	18 (100%)	20 (100%)
Complete remission	10 (66.67%)	16 (88.88%)	15 (75%)
Partial remission	3 (20%)	1 (5.55%)	5 (25%)
Improvement	2 (13.33%)	1 (5.55%)	-

Some patients were found to have co-morbidities in the form of diabetes mellitus, hypertension, hypothyroidism and obstructive sleep apnoea syndrome, polycystic ovarian syndrome, ischemic heart disease and other comorbidities such as dyslipidaemia, gout and sexual dysfunction. In the present study mainly the incidence of co-morbidities associated with obesity like hypertension, diabetes and obstructive sleep apnoea were studied.

Patients with blood pressure of >140/90 mmHg were considered hypertensive, fasting blood glucose level of >126 mg% or HbA1C of >7% was used as marker for diabetes, clinically Obstructive sleep apnoea (OSA) is defined by the occurrence of daytime sleepiness, loud snoring, witnessed breathing interruptions, or awakenings due to gasping or choking in the presence of at least 5 obstructive respiratory events (apnoea, hypopnea or respiratory associated arousals) per hour of sleep. We studied obstructed sleep apnoea by performing sleep study test on all patients. The incidence of diabetes was 15 i.e., 28.84%. The incidence of hypertension was 18 i.e., 34.61%, and that of obstructive sleep apnoea was 20 (38.46%). There were 12 patients in study i.e., 23.07% who were having 2 or more than 2 coexisting co-morbidities.

6 patients (11.53%) had ventral hernias with omentum as content, only anatomical repair was done by intermittent trans-fascial sutures using prolene no.1. As major weight loss occurs in these patients after few months causing change in dynamics of abdominal wall, meshplasty wasn't considered. Patients were counselled pre-operatively about chances of recurrence and may need to undergo a second surgery for recurrence. 2 patients i.e., 3.84% had associated cholelithiasis as an incidental finding on screening ultrasound and with consent underwent prophylactic laparoscopic cholecystectomy after MGB. We recorded the weight of every patient on each follow up of the patient and recorded in proforma. Out of 52, the number of patients followed up at 6th month are 52 i.e., 100%, at 1 year 42 i.e., 80.76% and 30 patients at 2 years i.e., 57.69%. The average percentage excess weight loss (%EWL) at end of 6th months is 72.62%, at the end of 12th months is 80.55% and the average percentage excess weight loss at the end of 24th months 85.83%.

Out of 52 patients, 15 patients i.e., 28.84% were associated with DM of which 10 patients i.e., 66.66% had complete remission with discontinuation of medication and 3 i.e., 20% had partial remission and 2 (13.33%) had improvement with decrease dose of medication. 18 patients i.e., 34.61% were hypertensive, of them 16 i.e., 88.88% patients had complete remission of hypertension and 1 patient i.e., 5.55% had partial remission and 1 patient had decrease in dosage of antihypertensive medications. Every patient was subjected to preoperative sleep study to diagnose OSAS and a follow up sleep study at the end of 3rd month to look for resolution. Out of all 52 patients, 20 patients i.e., 38.46% were diagnosed with OSAS, 15 i.e., 75% patients had complete remission and 5 patients i.e., 25% of them had partial remission.

1 (1.92%) patient had intra-operative leak and managed intra-operatively with suture line reinforcement and again re-confirmed by methylene blue test with no leak. The patients developed soakage from port site wound on 28th post-operative day, contrast enhanced CT scan revealed minor leak from gastrojejunostomy anastomosis with oral contrast tracking down and coming out from left subcoastal port site with no intraperitoneal collection s/o low output enterocutaneous fistula managed conservatively. Minor complications like port site infection in 3 patients (5.76%) treated conservatively by local wound care, bile reflux was present in 42 patients at the end of 1 year follow-up but only 1 patient had symptomatic gastroesophageal reflux reason being continued smoking in post-operative period which resolved on PPIs and cessation of smoking. All the patients were given calcium, iron and multivitamin supplementations, still 3 patients i.e., 5.76% had Hb less than 9 g% due to noncompliance with the post-operative advice. These patients were recounselled regarding nutritional supplements. 1 patient i.e., 1.92% experienced postprandial fainting, giddiness and sweating, characteristic of dumping syndrome, was conservatively managed by small frequent meals. No mortality was observed in the study.

DISCUSSION

In the study, the mean BMI operated was 38.81 kg/m^2. Carbajo et al from Spain studied 209 patients, mean BMI was 48 kg/m^2.[4] Rutledge et al from USA has studied 2410 patients, mean BMI of 46 kg/m^2.[5] Wang et al in Taiwan had a case series of 423 patients with mean BMI of 44.2±7 kg/m^2.[6] Noun et al of Lebanon in the case series

of 923 patients the mean BMI of 42.5±6.39 kg/m^2.[7] Kular et al of India studied 1054 patients with mean BMI as 43.2±7.4 kg/m^2.[8] The mean BMI of present study is comparable to studies by Noun et al with mean BMI of 42.5±6.39 kg/m^2 and Kular et al with mean BMI in study of 43.2±7.4 kg/m^2.[1,4-6] This disparity between average BMI of our study and that of the foreign studies is that the criteria for bariatric surgery in our studies is BMI>32.5 or more with 2 or more comorbidities or BMI>35 with no comorbidities according to Asian Consensus for morbid obesity for metabolic surgery and in other studies criteria was the European standard in which patients of BMI>35 with comorbidities or >40 without comorbidities are selected for study. In Indian and Asian patients, complications of obesity are seen at even in class 1 and 2 of obesity.

Table 5: Result comparison of present study with other authors.

Studies	Mean BMI (kg/m^2)	%EWL at the end of 1st year	DM resolution (%)	HTN resolution (%)
Carbajo et al	48	75	-	94
Rutledge et al	46	80	83	80
Wang et al	44.2±7	69.3	100	98
Piazza et al	-	65	90	80
Noun et al	42.5±6.39	69.9	85	-
Kular et al	43.2±7.4	85	93.2	-
Musella et al	-	70.12±8.34	87	87.5
Jammu et al	-	92.2	95.1	85.4
A Hussain et al	-	-	-	61
Present study	38.81(CLASS II)	80.55%	86.67%	88.88%

Table 6: Comparison of complication of present study with other authors.

Study	IDA (%)	Anastomotic leak	Dyspepsia
Carbajo et al	8.1%	1.9%	5.9%
Rutledge et al	4.9%	1.09%	-
Wang et al	41%	-	33.8%
Kim et al	12.85%	-	-
Kular et al	0.6%	-	7.6%
Musella et al	5.3%	-	1.7%
Jammu	4.9%	-	
Present study	5.76%	1.92%	1.92%

In the present study, the %EWL at the end of 6 months was 72.62%, at the end of 1 year was 80.55% and at the end of 2 years was 85.83%. Carbajo et al study %EWL of 75% at end of 1 year and 80% at the end of 18 months.[4] Rutledge et al observed 80% EWL at the end of 1 year.[5] Wang et al6 observed %EWL of 69.3% at the end of 1 year. Piazza et al study in 197 patients observed 65% EWL at the end of 1 year, and %EWL at the end of 2 years was 80%.[9] Noun et al study observed %EWL at the end of 1 year 69.9% and at the end of 2 years was 88.2%.[7] Kular et al study observed %EWL at the end of 1 year was 85%, 91% at the end of 2 years and 85% at the end of 5 years.[8] Musella et al had a major case series of 974 patients and observed %EWL at the end of 1 year was 70.12±8.34% and 77% at the end of 5 years.[10] Jammu et al study observed the effect on %EWL at the end of 1st year as 92.2%.[11] Thus, the present study results of %EWL at the end of 1 year was 80.55% and are comparable to studies by Carbajo et al i.e., 75%, Rutledge et al i.e., 80%, Kular et al had 85% and Musella et al had 70.12±8.34. And the study results in view of %EWL at the end of 2 years that was 85.5% are comparable to Carbajo et al with 80%, Piazza et al with 80% and Noun et al with 88.2%.

The incidence of diabetes mellitus in the present study of 52 patients is 28.84% i.e., 15 patients and the resolution in Diabetes mellitus at the end of 1 year was seen in 86.67% patients. Rutledge et al in 2410 patients with total of 24 % patients were diabetic and had 83% resolution.[5] Wang et al study of 423 patients, 79 patients i.e., 18.67% were diabetic and resolution in DM in 100% patients.[6] Piazza et al study of 197 patients, 40 patients were diabetic i.e., 20.30% and the resolution in 90% patients.[9] Noun et al had a case series of 923 patients with total diabetic 19% and resolution in 85%.[7] Kim et al of Korea in 2014 had an exclusive case series of effect of lap MGB on DM in 107 patients, with resolution in diabetes in 53% patients at the end of 1 year, 63% at the end of 2 years and 90% at the end of 3 years. Kular et al study of 1054 patients with 674 patients were diabetic i.e., 64% and resolution observed in 93.2%.[8,12] Musella et al study of 224 out of 974 were diabetic i.e., 22.9% with resolution in 87% patients at the end of 1 year. Jammu et al study, 359 out of 473 patients were diabetic with 95.1%

resolution.[10] The findings of the present study regarding the incidence of DM in patients of obesity undergoing lap MGB are comparable with the study done by Rutledge et al i.e., 24%, and nearly comparable with studies done by Piazza et al i.e., 20.30%, Musella et al i.e., 22.9%. Thus, incidence of DM is more in the studies conducted by Kular et al and Jammu et al as the mean BMI of the patient operated in their study is more, as the incidence of DM increases as BMI increases. Thus, it can be seen that nearly every 1 in 3 to 4 patients of obesity suffers from DM. Thus, in the present study there was resolution in DM in 86.67% at the end of 1 year. And the study results are comparable to studies conducted by Rutledge et al with resolution of DM in 83% patients, Piazza et al study with resolution of DM in 90% patients, Noun et al study had resolution of diabetes mellitus in 85% patient and Musella et al study had diabetes resolution in 87% patients.

The incidence of HTN in present study was 34.61% i.e., 18 patients out of 52. Hussain et al conducted study of lap MGB on 527 patients with 100 patients i.e., 18.97% were hypertensive.[13] Remission of HTN in other studies were 94% in Carbajo et al study, 80% in Rutledge et al study, 98% in Wang et al study, 80% in Piazza et al study, 74.8% in Kular et al study, 87.5% in Musella et al study, Jammu, operated 473 patients for MGB, hypertension was observed in 325 patients i.e., 68.71% with resolution in 85.4% patients.[4-11]

In the present study, the incidence of OSAS was 20 i.e., 38.46%. In the study conducted by Hussain et al has incidence of OSAS of 7.9% i.e., 42 patients.[13]

Minor complications like port site infection were in 3 patients out of 52 i.e., 5.76% and were managed conservatively. Rutledge et al had 2.89 patients i.e., 0.12% patients with port site infection. In our study, Dyspepsia and reflux gastritis was observed in 1 i.e., 1.92% patient.[5]

Rutledge et al5 study had 142 patients i.e., 5.9% with dyspepsia. Wang et al study had developed dyspepsia in 33.8% patients.[6] Kular et al study performed on 1054 patients, observed reflux gastritis in 68 patients i.e., 7.6%.[8] Musella et al study of 974 patients, about 14 patients developed dyspepsia i.e., 1.7% and reflux gastritis in 0.9% i.e 8 patients.[10] Thus, the findings of present study are comparable to study conducted by Musella et al.

In the present study, 3 patients had haemoglobin less than 9 gm% in the follow up visits at 3 and 6 months i.e., 5.76%. Carbajo et al study, iron deficiency anaemia (IDA) was in 18 patients i.e., 8.1%.[4] Rutledge et al study out of 2410,120 patients i.e., 4.9% developed IDA.[5]

Wang et al study 173 of 423 patients developed IDA.[6] Kim and Hurr et al study, 12 out of 107 patients reported IDA.[12] Kular et al study, 5 of 423 patients develop IDA i.e., 0.6%. Musella et al10 study, 5.3% i.e., 44 patients developed IDA.[8]

Jammu et al study 18 out of 473 patients, presented with IDA i.e., 4.9%. Thus, the present study findings of IDA are comparable to studies conducted by Musella et al and Jammu et al.[11]

In the present study, 1 patient presented with signs and symptoms of Dumping syndrome i.e., 1.92%, was managed conservatively with dietary advice. Jammu et al study had 5.9% patients (22) developing dumping syndrome.[11] Thus, findings of the present study and other author studies are non-comparable regarding complications like dumping syndrome because the case volume and patients load of other authors is more and as the number of patients increases the incidence of dumping syndrome may be more.

Amongst major complications in present study, 1 patient had anastomotic leak intra-operatively, which was repaired and patient's recovery was uneventful and 1 patient developed anastomotic leak post-operatively on post-operative day 2, i.e., 1.92%. Carbajo et al observed anastomotic leak in 4 patients which accounted to 1.9%.[4] Rutledge et al study, 26 patients developed anastomotic leak i.e., 1.09%.[5] Jammu et al in the case series of 473 patients no anastomotic leak was observed.[11]

Lap MGB being a major operative intervention requires extensive preoperative work-up, proper patient selection, can only be done in dedicated operation theatres and intensive care units and patients need to strictly adhere to post-operative dietary advices with regular and long follow-up.

CONCLUSION

Most number of patients that opt for lap MGB are in the 4th and 5th decade of life. Obesity is more common in females and they are more commonly opting laparoscopic Mini gastric bypass surgery. Lap MGB is an effective procedure producing >50% EWL as early as 3 months and with good short term weight loss, causes complete or partial remission of the comorbidities like diabetes mellitus, hypertension and obstructive sleep apnoea syndrome and is safe procedure with low mortality and morbidity. If facilities are available then even the patients of lower socio-economic strata opt for lap MGB.

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