



## ORIGINAL ARTICLE

# RESULTS OF 50 CONSECUTIVE TOTAL LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASSES TO TREAT MORBID OBESITY

By

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**Aim:** Study of laparoscopic Roux-en-Y gastric bypass for treatment of morbid obesity.

**Methods:** Total laparoscopic Roux-en-Y gastric bypass was attempted in 50 consecutive patients. Procedures included only proximal antecolic antegastric bypasses the gastrojejunostomy and jejunojejunostomy were primarily constructed using linear stapling techniques.

**Results:** The mean age of the patients was 34.7 years (range 21-47) and 60% were female. The mean preoperative body mass index was 53.3 kg/m<sup>2</sup>. The operative time ranged from 160 to 220 minutes (average 192.4 + 18.8). Postoperative length of stay averaged 6.6 + 5.6 days (range 3-25). Three patients required conversion to an open procedure (1.5%). Complications included three (1.5%) major wound infections (each followed a reoperation for a complication or open conversion), Bleeding in one patient required reoperation while two cases of bleeding were managed conservatively, and anastomotic leak with peritonitis in 5 patients (2.5%). One case underwent endoscopic dilatation for stomal stenosis. Weight loss at one year was 62.3% of excess weight. Most co-morbid conditions resolved by 1 year after surgery.

**Conclusions:** Laparoscopic gastric bypass demonstrates excellent weight loss and resolution of co-morbidities with a low complication rate.

**Keywords:** Morbid obesity, Laparoscopy.

## INTRODUCTION

Morbid obesity is a serious health problem that occurs more and more frequently and at younger ages, usually associated with a series of comorbidities that justify its treatment.<sup>(1)</sup> According to the American National Institutes of Health in 1991, surgery is the only effective treatment of morbid obesity, indicated by a body mass index (BMI) of >40 or >35 with associated comorbidities.<sup>(2)</sup> The most commonly used surgical techniques are vertical banded gastroplasty and gastric bypass, the latter regarded by some as the gold standard for the surgical treatment of morbid obesity.<sup>(3-5)</sup> The laparoscopic approach for treating morbid obesity has increased considerably in recent years because of the use of simple techniques involving low morbidity and mortality rates, such as gastric banding.<sup>(6,7)</sup> As the surgeon's experience and ability progress, other more complex techniques, such as gastric bypass or biliopancreatic diversions, are performed via

laparoscopic surgery.<sup>(8-10)</sup> The aim of this study was to determine the safety and efficacy of laparoscopic Roux-en-Y gastric bypass for the treatment of morbid obesity.

## PATIENTS AND METHODS

From Jan 2006 to June 2007; total laparoscopic Roux-en-Y gastric bypass was attempted in 50 consecutive patients. The patients were evaluated by the Psychiatry (patients with depressive disorders were excluded), Endocrinology (thyroid function and glucose tolerance were assessed), Anesthesia (vital signs, respiratory functions and biochemical profile) and Surgery units (full history taking, clinical examination and detailed explanation about the procedure and possible complications) to rule out significant contraindications for surgery. They all gave their written consent for the operations. Patients with previous bariatric surgery were excluded from the study.

Table 1. shows the criteria of patients included in the study. The age ranged from 21 to 47 with an average of 34.7 + 8.36 years while 60% of the patients were females and 40% were males. The BMI ranged from 40.2 to 61.3 kg/m<sup>2</sup> with an average of 53.3 + 5.63 kg/m<sup>2</sup>.

**Table 1. Preoperative patients' data.**

Age	34.7±8.36 years (Range 21-47)
Sex	Male 40%, Female 60%
BMI	53.3±5.63 kg/m <sup>2</sup> (40.2-61.3kg/m <sup>2</sup> )

**Surgical technique:** All the patients in the pre- and postoperative periods were given an antibiotic prophylaxis with Ceftriaxone 1gm and an antithrombotic prophylaxis with low-molecular-weight heparin (0.6) and lower extremities compression. The laparoscopic gastric bypass was performed by creating a small pouch between the first and second coronary vessels and the angle of His. Procedures included only proximal antecolic bypasses. The gastro- jejunostomy and jejuno-jejunosomy were primarily constructed using stapling techniques. The intestine was dissected 50- 60 cm from the ligament of Treitz and divided by linear stapler. A side-to-side jejuno-jejunal anastomosis is performed 120-130 cm from the duodeno-jejunal junction using a linear stapler, and the opening for the insertion of the stapler is closed with running suture. The bowel loop for the gastroanastomosis is drawn up antecolic and antegastric, the anastomosis is done with a 21-mm circular stapler, and the anterior face is reinforced with loose sutures to relieve tension. The defect in the mesentery is closed with several interrupted sutures (Fig. 1).

**Postoperative plan:** Following surgery, all patients were monitored for the vital signs and drain output and they were all kept nothing per oral (NPO). All patients were put in semi-setting position to facilitate respiratory movement and a spirometer was used to stimulate lung expansion. Postoperative thrombo-embolism was prevented using a single dose of subcutaneous low molecular weight heparin. Ceftriaxone was used as a prophylactic antibiotic in a dose of 1gm every 24 hours. Complete blood count was routinely performed at six hours postoperatively to help early detection of blood loss. In the evening of the following day, patient underwent gastrographin study to assess the anastomotic site and if no leakage was detected patients

started to have oral clear fluids.

## RESULTS

Laparoscopic gastric bypass was tried in all cases with an operative time ranging from 160 to 220 minutes with an average of 192.4+ 18.8 minutes (Fig. 2). Progressive shortening of procedure time was noticed with growing experience in recent cases than in early cases. There was a wide range of postoperative stay ranging from 3 to 25 days with an average of 6.6+ 5.6 days (Fig. 3).

Three cases were converted to open surgery due to technical difficulties faced at the first twenty cases of the study and were continued as open bypass. These cases included splenic injury during dissecting the angle of His in two cases and extreme hepatomegaly in one case.

Anastomotic leakage occurred in five patients (2.5%); three of them were managed conservatively having asymptomatic leaks of the gastro-entero-anastomosis, diagnosed during a control intestinal transit performed in the immediate postoperative period. A further transit was performed at 6 days, with no evidence of leaks, and a liquid diet was started, with good patient progress while two needed laparotomy with surgical repair of the leakage site.

Two patients developed intra-abdominal bleeding revealed by blood in the drains, without hemodynamic repercussions or need for transfusion, which ceased spontaneously, probably because of bleeding of the gastric dissection line. One case of internal hemorrhage needed laparotomy to control the bleeding.

Among six cases of open surgery; three cases had major wound infection.

Data at 1 year after surgery showed an average weight loss of 62.3% of excess weight (Fig. 4).

In our series, only one patient (2%) suffered gastrojejunostomy stenosis that was dilated endoscopically.

It is worth mentioning that most co-morbid conditions mainly D.M. and hypertension resolved by 1 year after surgery as 70% of patients became normoglycemic (all patients suffered abnormal glucose tolerance curve) and 80% had normal blood pressure (40 patients suffered hypertension) (Fig. 5).

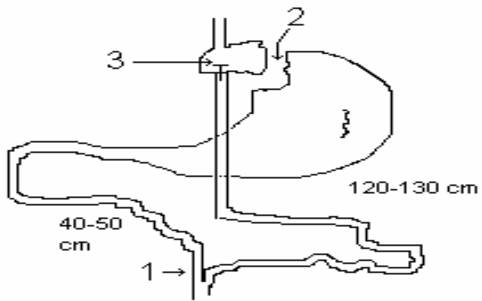


Fig 1. The figure demonstrates the steps of the procedure where number 1 shows the entero-enterostomy, number 2 shows the gastric pouch creation and number 3 shows the gastro-jejunostomy.

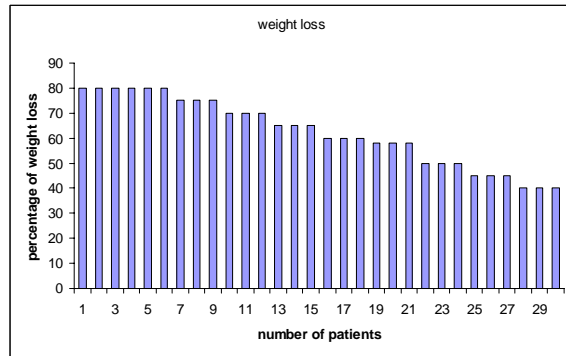


Fig 4. Loss of excess weight.

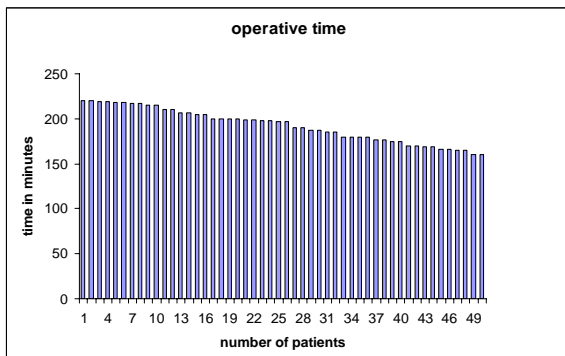


Fig 2. Operative time.

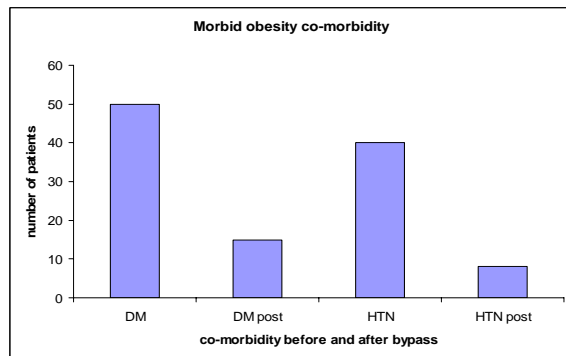


Fig 5. Changes in co-morbidity after bypass.

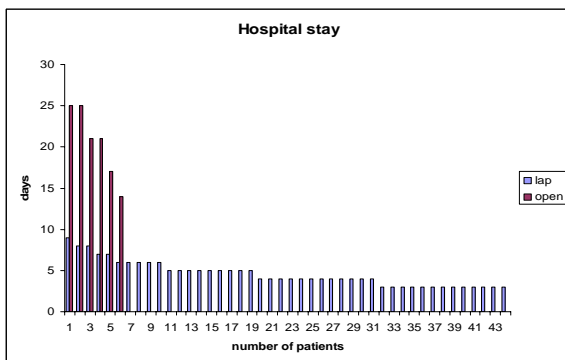


Fig 3. Hospital stay.

## DISCUSSION

Since the introduction of laparoscopic surgery, a wide variety of techniques have been performed via this approach, some were widely accepted such as cholecystectomy or treatment of gastroesophageal reflux disease, and others were the subject of heated debates such as the treatment of colorectal cancer.<sup>(11)</sup> This advance and great acceptance of laparoscopic surgery has been due to the advantages it offers, i.e., less pain in the postoperative period, short hospital stay, early return to normal physical activity, better esthetic results and a decrease in incidence of incisional hernias.<sup>(12)</sup> It also causes less alteration in systemic and immunologic stress. As laparoscopic surgery is a minimally invasive technique it would benefit patients with morbid obesity since they present with a series of associated comorbidities that make them more susceptible to complications in the postoperative period. Therefore, surgeons began using the different techniques that exist for treating morbid obesity via the laparoscopic approach. Gastric banding was the first laparoscopic technique described, which became extremely popular due to its relatively low technical difficulty and low morbidity and mortality rates, but the long-term results regarding weight loss are still unknown.<sup>(6,7)</sup> Another variety of the procedures performed via laparoscopy is vertical banded gastroplasty. This technique is not difficult to perform by laparoscopy and has low morbidity and mortality rates, but the long-term results are worse than with gastric bypass.<sup>(12-14)</sup> This technique is used by few bariatric surgeons due to the discomfort it causes the patient and the high incidence of staple-line disruption.<sup>(15)</sup> Gastric bypass is the operation recommended by the National Institutes of Health for treatment of morbid obesity due to its low morbidity and mortality rates and excellent long-term results regarding weight loss. Witgrove was the first to perform it via the laparoscopic approach in 1994.<sup>(8)</sup> Since then, others have performed this technique with different technical variations such as creation of a gastro-entero-anastomosis, Roux-en-Y positioning of the loop in relation to the colon and stomach, the length of this loop, and use of an entero-enterostomy, the great majority reporting good results.<sup>(8,16-18)</sup> Others, however, have not seen their perspectives on laparoscopic gastric bypass (LGBP) maintained and attribute this mainly to the learning curve, which is more difficult than for other laparoscopic procedures.<sup>(19)</sup> For example, anastomotic leak is the most feared complication when performing gastric bypass, with an incidence of 1-2%,<sup>(8)</sup> which increases with laparoscopic surgery but gradually decreases as the surgeon's experience grows (18). In our study there were 3 patients in the LGBP group who were totally asymptomatic and diagnosed as leakage during the control transit in the postoperative period. Two more cases had symptomatic leakage that was surgically managed. These leaks occurred in the first 20 patients and in our experience are directly related to the learning curve.

Stenosis of the gastrojejunostomy is a common complication following gastric bypass (3-12%), via both the open and laparoscopic approaches.<sup>(20)</sup> The cause of this stenosis is unclear.<sup>(21)</sup> Our incidence was 2%, which is relatively low, possibly because we established the anastomosis on the anterior face of the gastric pouch, 7-10 mm from the transection line, leaving a well-vascularized anastomosis as shown by a 4% incidence of bleeding with a gastrojejunal anastomosis.<sup>(20)</sup>

One of the disadvantages of laparoscopic surgery is that the costs in the operating theater are higher because of the use of nonreusable instruments and longer operating times.<sup>(9,19)</sup> This increase in intraoperative costs may be compensated by a shorter intensive care stay during the first hours or days of the postoperative period, a shorter hospital stay and a lower incidence of incisional hernias that require subsequent reoperations, as has been shown in this study.<sup>(21)</sup> Operating time decreases considerably as the surgeon's experience progresses.

The reduction of comorbidities might be more important to demonstrate long-term success of a bariatric procedure. Therefore, we included comorbidity data in our analysis to compare the effectiveness of the procedure. We found that weight loss in the gastric bypass group paralleled the resolution of comorbidities such as diabetes and hypertension.<sup>(22)</sup>

In conclusion, laparoscopic gastric bypass demonstrates excellent weight loss with resolution of co-morbidities in a low complication rate. The learning curve is evident as shown by decreasing operative time and leaks.

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