

# A Review of Comparing Laparoscopic Roux-en-Y vs Minigastric bypass for the Morbid Obesity

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## ABSTRACT

Obesity is a major problem in whole over the world especially in urban countries. Surgical treatment for morbid obesity is now considered as a well accepted one compared to medical treatment. Now the commonly performed surgeries are Roux-en-Y gastric bypass and minigastric bypass. A literature review was performed using Springer link, BMJ, Journal of MAS and major general search engine like Google, MSN, and Yahoo, etc. The following search terms were used: laparoscopic treatment of morbid obesity; laparoscopic Roux-en-Y gastric bypass (LRYGBP) and minigastric bypass for morbid obesity. Reviews and meta-analysis, editorial letters or comments, case reports, animal or *in vitro* studies, comparisons with medical treatment, comparisons with open (nonlaparoscopic) procedures were excluded. All the studies showed that both procedures are equally good solving obesity related metabolic problems. But regarding the technique, simplicity and safety minigastric bypass is superior to Roux-en-Y gastric bypass. We believe that patients should be informed in detail on the advantages and disadvantages of each available procedure, possibly in several interviews and always accompanied by a specialized interdisciplinary team, warranting long-term follow-up.

**Keywords:** Laparoscopic Roux-en-Y gastric bypass, Minigastric bypass, Morbid obesity, Metabolic syndrom.

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## INTRODUCTION

Both in developed and developing countries, obesity is considered as an endemic problem. Medical treatment of obesity is greatly disappointing. Surgery is considered as the most effective treatment for morbid obesity as per the National Institute of Health Consensus Conference in 1991.<sup>1</sup> From there, major development has occurred in the bariatric surgery field including laparoscopy. In 2004, a consensus conference was sponsored by the American Society for Bariatric Surgery (ASBS), which

updated the evidence and the conclusions of the NIH panel. They concluded that gastric bypass is considered as one of the operation for morbid obesity; laparoscopy is equally effective as open surgery. With advances in minimally invasive technology, laparoscopic Roux-en-Y gastric bypass (LRYGBP) has been reported as a safe alternative to open RYGBP.<sup>2-4</sup> However its associated with steep learning curve, longer operation time and more perioperative complications.<sup>5,6</sup> Laparoscopic minigastric bypass (LMGBP), first reported by Rutledge from USA in 1997, was proposed as a simple and effective treatment of morbid obesity.<sup>7</sup> However, controversies about the relative safety of this procedure remain, mainly the incidence of marginal ulcer and reflux esophagitis.<sup>8</sup>

## AIM

The aim of the study was to compare the safety and effectiveness of LRYGBP and LMGBP in the treatment of morbid obesity. The following parameters were used for both the procedures:

- Time taken
- Conversion rate
- Blood transfusion
- Mortality and morbidity
- Postoperative complications (anastomotic leak, ileus, GI bleeding, reoperation)
- Postoperative recovery
- BMI
- Excess weight loss
- Normalization of metabolic syndromes
- Quality of life assessment.

## MATERIALS AND METHODS

A literature review was performed using Springer link, BMJ, Journal of MAS and major general search engine like Google, MSN and Yahoo, etc. The following search terms were used: laparoscopic treatment of morbid obesity; laparoscopic Roux-en-Y gastric bypass and minigastric bypass for morbid obesity. Sixty-one thousand and three hundred citations found in total selected papers were screened for further references. Criteria for selection of literature were the number of cases (excluded if it is less than 20), method of analysis (statistical or nonstatistical), operative procedure (only universally accepted procedures were selected). And the institution were the study

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was done (specialized laparoscopic bariatric institution were given the preference).

## PATIENT SELECTION

A history of obesity of >5 years' duration; BMI >40 kg/m<sup>2</sup> or BMI >35 kg/m<sup>2</sup> with comorbidities; documented weight loss attempts in the past; and good motivation for surgery. The age was restricted to patients from 18 to 59 years of age. Exclusion criteria were previous obesity surgery, previous gastric surgery, large abdominal ventral hernia, pregnancy, psychiatric illness, or BMI >60 kg/m<sup>2</sup>.

## OPERATIVE TECHNIQUES

The gastric bypass procedure consists of:

- Creation of a small, (15-30 ml/1-2 tbsp) thumb-sized pouch from the upper stomach, accompanied by bypass of the remaining stomach (about 400 ml and variable). 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). Total division is usually advocated to reduce the possibility that the two parts of the stomach will heal back together (fistulize) and negate the operation.
- Reconstruction of the GI tract to enable drainage of both segments of the stomach. The particular technique used for this reconstruction produces several variants of the operation, differing in the lengths of small intestine used, the degree to which food absorption is affected, and the likelihood of adverse nutritional effects.

## VARIATIONS OF THE GASTRIC BYPASS

### Gastric Bypass, Roux-en-Y (proximal) (Fig. 1)

This variant is the most commonly employed gastric bypass technique, and is by far the most commonly performed bariatric procedure in the United States. The small intestine is divided approximately 45 cm (18") below the lower stomach outlet and is rearranged into a Y-configuration, enabling outflow of food from the small upper stomach pouch via a 'Roux limb'. In the proximal version, the Y-intersection is formed near the upper (proximal) end of the small intestine. The Roux limb is constructed using 80 to 150 cm (31-59") of the small intestine, preserving the rest (and the majority) of it for absorbing nutrients. The patient will experience very rapid onset of the stomach feeling full, followed by a growing satiety (or 'indifference' to food) shortly after the start of a meal.

### Gastric Bypass, Roux-en-Y (distal)

The small intestine is normally 6 to 10 m (20-33') in length. As the Y-connection is moved further down the

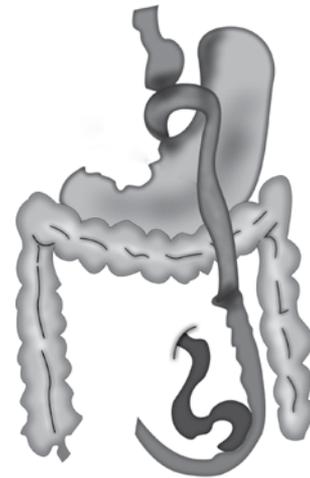


Fig. 1: View of completed retrocolic, retrogastric laparoscopic Roux-en-Y gastric bypass<sup>12</sup>

gastrointestinal tract, the amount available to fully absorb nutrients is progressively reduced, traded for greater effectiveness of the operation. The Y-connection is formed much closer to the lower (distal) end of the small intestine, usually 100 to 150 cm (39-59") from the lower end, causing reduced absorption (malabsorption) of food: primarily of fats and starches, but also of various minerals and the fat-soluble vitamins. The unabsorbed fats and starches pass into the large intestine, where bacterial actions may act on them to produce irritants and malodorous gases. These larger effects on nutrition are traded for a relatively modest increase in total weight loss.

### Minigastric Bypass (Fig. 2)

The minigastric bypass procedure was first developed by Dr Robert Rutledge from the USA in 1997, as a modification of the standard Billroth II procedure. Minigastric bypass involves making of a long narrow tube of the stomach along its right border, the lesser curvature. A loop of the small gut is brought up and hooked to this tube at about 180 cm from the start of the intestine (ligament of Treitz).

Numerous studies show that the loop reconstruction (Billroth II gastrojejunostomy) works more safely when



Fig. 2: View of completed laparoscopic minigastric bypass<sup>12</sup>

placed low on the stomach, but can be a disaster when placed adjacent to the esophagus. Today thousands of 'loops' are used for surgical procedures to treat gastric problems, such as ulcers, stomach cancer, and injury to the stomach. The minigastric bypass uses the low set loop reconstruction and thus has rare chances of bile reflux.

The MGB has been suggested as an alternative to the Roux-en-Y procedure due to the simplicity of its construction, which reduces the challenges of bariatric surgery. The surgery 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.<sup>9</sup>

## RESULTS

### Preoperative Parameters

As far as the preoperative parameters like age, sex, BMI, metabolic syndromes (as defined by ATP III criteria)<sup>10</sup> concerned no specific advantage of one procedure over other or both are equally effective in all the groups.

### Operation Time

As far as LMGB is considered operation time, postoperative stay, analgesic used are minimal compared to LRYGB. Conversion rate is also nil in case of LMGB. But the operative blood loss and passage of flatus both are comparable. No mortality detected in both the procedures.

### Operative Morbidities

Postoperative major complication in terms of anastomotic leak and minor complication like wound infection, GI bleeding, ileus, is more with LRYGB. There is also minimal increase in reoperation rate with LRYGB. But with LMGB major complication are nil but minor leakage is there but less chance compared to LRYGB.

### Follow-up

As far as the BMI, weight loss, morbidities related to obesity are concerned all were improved with surgery without a significant difference between two except for the weight loss its more for LMGB in the first year after that both are same. As per Reinholds classification excess weight loss is more for patient in LMGB.

### Quality of Life Assessment

There were significant improvement in the domains of general life including physical, social and emotional functions equally in both the groups. But there were GI symptoms like belching, gurgling sound in the abdomen, distension are same in both the groups in spite of great improvement in eating and relief of acid peptic disorder. These are assessed by gastrointestinal quality of life index.<sup>11</sup>

## DISCUSSION

Although a growing number of adjustable gastric banding operations have been reported NIH approved bariatric surgical operations are currently only VBG and Roux-en-Y gastric bypass. RYGBP is considered as the gold standard surgery in us as the weight reduction is more with this than VBG. As per the 1999 survey, RYGB is considered as the most commonly performed bariatric surgery. As the perioperative complications are high this techniques needs more experience. The reported major complication rate of LRYGBP varied from 3.3 to 15%, and the late complication rate from 2.2 to 27% conversion rate from 0.8 to 11.8%. Leakage ranged from 1.5 to 5.8% and is one of the most common complication.<sup>12</sup>

Technical difficulty of RYGB is mainly due to high anastomosis near gastroesophageal junction. Earlier retrocolic approach was used that itself added the technical difficulty. But some surgeons now prefer antecolic approach with bivalving of the omentum to reduce tension on mesentery. Theoretically, LMGB is low antecolic and one less anastomosis makes it more easier compared to RYGB and provides better blood supply thereby reducing the chance of leakage. The technical difficulty and postoperative complications in terms of leakage, hospital stay, pain and time taken are more for RYGB compared to LMGB. Operative time for RYGB is 27.8% more than LMGB even though five port technique is used for both more dissection and anastomosis make its more time consuming procedure.

All most all the studies are of shorter postoperative follow-up and the postoperative criteria for discharge is also standardized in order to avoid bias. None of the studies included extremely obese patient that is BMI more than 60 in order to avoid technical difficulty.

Studies have shown that major and minor complications are less for LMGB compared to RYGB and in the range of 0 and 7.5% comparing with 5 and 15%. But one of the limiting factor may be the learning curve. Because RYGB learning curve is very steep. Hence, the incidence may vary in highly specialized centers. The major complication of LMGB is mainly anastomotic bleeding because of high blood supply to stomach tube some time makes reoperation. Hence, it is advisable to check the anastomotic line after clipping and if needed seromuscular sutures can be put.

One of the drawback of LMGB is bile reflux gastritis and the carcinogenic effect which is still controversial.<sup>13-15</sup> High incidence of biliary gastritis is mainly because of Roux-en-Y loop anastomosis but it is technically lower in LMGB because of its low anastomosis. But for all this needs long-term follow-up with endoscopy but most of the studies are of short-term and endoscopy has not advised in regular follow-up. Most of the results are based on the gastrointestinal quality of life assessment. Based

on this both groups have got better outcome as far as quality of life is concerned. However, long-terms studies are needed to evaluate this hypothesis including endoscopy. The other adverse effect of LMGB is occurrence of marginal ulcer here the incidence is more compared to RYGB. But it can be well-controlled with proton pump inhibitors. Main reason for the occurrence is because of volume of gastric tube and ulcerogenic drugs.

The effect on BMI and weight loss is more with LMGB compared to RYGB this is mainly because of long bypass limb of bowel. That will add nutritional deficiency also like folate, iron and vitamin B<sub>12</sub>. But in both group, iron deficiency anemia was only detected.<sup>16-18</sup> But the effect of micronutrient deficiency and bone disease needs regular follow-up and a long-term study. LRYGBP is very effective in weight reduction and resolution of the metabolic syndrome for morbidly obese patients. Tailoring of the bypass limb in LMGBP according to the BMI may allow the need for weight reduction to be balanced against the need to minimize the risk of resulting micronutrient deficiencies. The results suggest that use a bypass limb of 150 cm in those with BMI below 40, with a 10 cm increase in the bypass limb with the every BMI category related to obesity instead of using a fixed 200 cm limb for all patients may provide better results.

In one of the trial 56% of patients had metabolic syndrome and 100% were cured at 1 year after gastric bypass.<sup>12</sup> Obesity surgery should therefore be recommended as the definitive treatment of morbidly obese patients with metabolic syndrome. Recent advances in laparoscopic surgery have made laparoscopic bariatric surgery a minimally invasive procedure and have generated renewed interest in obesity surgery. The results of this study indicated that LMGBP has a better safety profile than LRYGBP and thus is the preferred gastric bypass treatment of patients with metabolic syndrome. Current indications for surgery in morbidly obese patients include BMI greater than 40 or greater than 35 if comorbidities are present.<sup>3</sup> However, for patients with moderate obesity (BMI between 30 and 35) but complicated with metabolic syndrome, the low risk of laparoscopic gastric bypass surgery suggests that it might be included in the choices of treatments. Further cost-effectiveness study of laparoscopic gastric bypass surgery in the treatment of moderate obesity with metabolic syndrome is needed.

## CONCLUSION

This review article has demonstrated that both LRYGBP and LMGBP are effective treatments for morbid obesity. Both procedures can significantly resolve obesity-related metabolic complications and increase quality of life for morbidly obese patients. LMGBP was shown to be a

simpler and safer procedure than LRYGBP with similar efficacy at the 1 and 2 year follow-up. LMGBP is thus an acceptable alternative treatment to standard LRYGBP for morbidly obese patients.

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