REVIEW ARTICLE

Comparison between Roux-en-Y Gastric Bypass and Mini-gastric Bypass in Patients of Developing Countries

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Abstract

Background: The disease of obesity mostly common in the developed countries is also predominantly seen in the developing countries in recent times. This is therefore a cause to worry.

Aim: To review literature comparing Roux-en-Y gastric bypass (RYGB) and mini-gastric bypass (MGB) to ascertain the more effective and safe bariatric and metabolic operation.

Materials and methods: Detailed literature review online was perfected via Springer Link, International Bariatric Club, and the World Health Organization. Of immense use was a database of 1,000 bariatric surgeries collated from multiple hospitals in the developing countries.

Conclusion: Both bariatric procedures are effective in the treatment of morbid obesity by restriction and malabsorption. They resolve obesity-related metabolic complications and hence increase quality of life for morbidly obese patients. However, in their comparison, MGB take lesser time to perform than RYGB. Also, MGB has shown to be simpler and safer surgery than RYGB. Thus, in the developing country, with its high population and increasing prevalence of morbidly obese individuals, MGB procedure can be used to treat more patients and also reduce the time and energy taken to manage the patient because of its technical ease, efficacy, revisibility, and reversibility. Overall, a zero mortality in MGB makes it the gold standard in bariatric surgery.

Keywords: Laparoscopy, Mini-gastric bypass, Roux-en-Y gastric bypass.

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Introduction

Obesity has become a problem worldwide and currently severely ravaging the developing countries. The developing countries include the recently industrialized countries such as India, China, and many South and Central American countries.

The developed countries such as the Western Europe, Japan, South Korea, Australia, United States, Canada, Israel, and New Zealand have been living in affluence which is highly associated with endemic obesity. The diffusion of western cultural norms has fuelled widespread trends of obesity in developing countries in recent times. Increasing adiposity, improved hygiene and public health services, vaccination and basic amenities, such as safe drinking water, have led to better lifespan long enough to develop problems linked to obesity which included cardiovascular disease and metabolic disorders such as diabetes mellitus, osteoarthritis, and liver cirrhosis. A BMI of 37.5 is classified as severe obesity and surgery remains the weight-reducing gold standard in the treatment of such individuals. Follow-up of these patient is the Achilles' heel of every bariatric program, because in the absence of continuous contact with the patient, the surgeon loses feedback from the patient. Even though some comorbidities of obesity, such as essential hypertension and type 2 diabetes, have been considered in the health bill of the developing countries, obesity itself has not. A few hospitals are trying to perform bariatric surgery in the developing countries; however, this procedure is in direct competition with other digestive system surgeries such as gastric cancer and cholelithiasis, both of which are highly prevalent diseases in the developing country.

This situation means that there are extensive waiting lists for bariatric surgery in the developing countries. The mini-gastric bypass (MGB) which subserves a lesser operating time than Roux-en-Y gastric bypass (RYGB) is thus preferred in this circumstance. Being technically simpler, MGB is a safe and effective alternative to the previous gold standard RYGB with equal results plus the advantage of being technically simpler with lower complication rates and impact more on the quality of life of the patients.[1]

Surgery has become the best treatment for morbid obesity as has been universally accepted.[2] Both open and minimally invasive laparoscopic surgeries are effective in the management of morbid obesity.[3–5] Laparoscopy is associated with postoperative complications and requires more operative time and an almost vertical learning curve.[6,7] Apart from the occurrence of marginal ulcers and reflux bilious gastritis, mini-gastric bypass also known as one anastomosis gastric bypass is easier and adequate enough than Roux-en-Y gastric bypass in the treatment of morbid obesity.

Aim

The aim is to compare RYGB with MGB with the view of drawing inference on which is best in the treatment of morbid obesity.

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A specified number of bariatric surgeries of RYGB and MGB done were analyzed over several variables.

Materials and Methods

This a multicenter survey in which there is a detailed review of cases done in specialized hospitals in developing countries assisted by search engines such as MSN, etc., using Springer Link and the Journal of Minimal Access Surgery (MAS). Bariatric-specific longitudinal data analyzed for complication and benefits formed the bedrock of assessment in the comparison of MGB and RYGB.

Operative Techniques

The MGB (one anastomosis gastric bypass) is a mal-absorption procedure but is also minimally restrictive. Figure 1 depicts the contour of the operation. Robert Rutledge first performed this surgery in 1997.[8]

In laparoscopy, the procedure is done using a five-trocar technique, with the first stapler firing perpendicular to the lesser curvature distal to the crow's foot using a 45-mm green or gold cartridge. Then, a vertical gastric division starting proximally to the left of the angle of His which is not dissected thereby establishing a long gastric tube carved out snugly on a 38-fr bougie. The ostracized part of the stomach remains in situ and extends into a biliopancreatic limb. In the next phase of the procedure, an estimated 200 cm of the jejunum distal to the ligament of Treitz is where a wide antecolic gastrojejunostomy is done using a 45-mm blue cartridge and closed. The gastrojejunostomy anastomosis may be placed more proximally or distally, depending on the need for weight loss.[9]

Roux-en-Y gastric bypass is principled on restriction and malabsorption. Laparoscopic RYGB was first reported in 1994 by Wittgroove. A small gastric pouch is created by firing the stapler at the level of the second short gastric vessel, straight to the lesser curvature, creating a 30–50 mL gastric pouch. The jejunum is then transected 50 cm distal to the ligament of Treitz. The proximal divided end of the jejunum is anastomosed 75 cm distally (or 150 cm distally for the superobese), where a stapled side-to-side enteral–enteral anastomosis is done using a 60 cm white cartridge, with subsequent enterotomy closure. The gastrojejunostomy (Roux limb) is done from end-to-end or from end-to-side. This is as shown in Figure 2.[10]

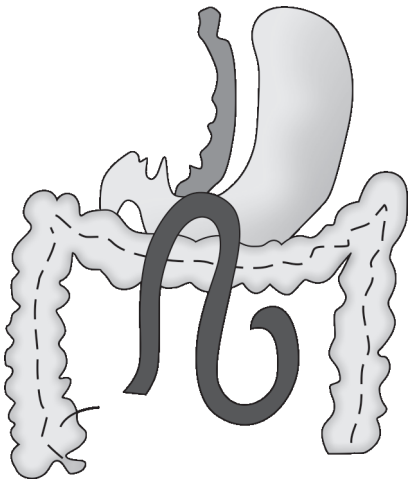

Fig. 1: Showing MGB[11]

Result

The result was on the parameters of operation time, operative morbidities follow-up, and Quality of Life Assessment survey. A multicenter study of 500 MGBs and 500 RYGB done in 5 years in the developing country revealed the mortality rate to be 0.3% in RYGB and zero in MGB. A comparative analysis of results is as indicated in Table 1.

Bile reflux was <1% in the MGB series and nil in RYGB.

In both, there was no persistent vomiting, and the weight regain was 8.5% in RYGB but 0% in MGB.

Hypoalbuminemia was 2% in RYGB and 13.17 in MGB.

Hypertension, type 2 diabetes, dyslipidemia, and percent excess weight loss had maximum resolution in MGB.

The most common complication of RYGB is leakage which is not seen in MGB. Conversion rate from laparoscopy to open surgery in RYGB ranged 0.8–11.8%. No conversion was recorded after laparoscopic MGB.

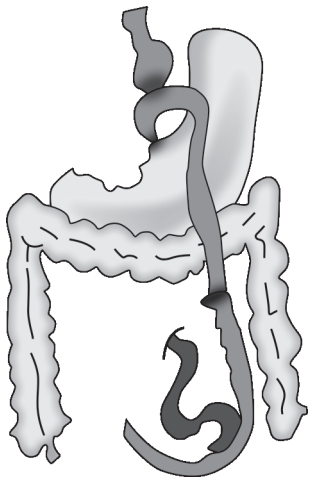

Fig. 2: Showing RYGB[11]

Table 1: Comparative analysis between procedures ($p < 0.05$)

Characteristics	*RYGB*	*MGB*
Mortality rate	0.3%	0
Bile reflux	Nil	<1%
Persistent vomiting	Nil	Nil
Weight regain	8.5%	0%
Hypoalbuminemia	2%	13.1%
Duration of operation	123–198 minutes	42–75 minutes
Minor complication • Wound infection • Gastrointestinal bleeding • Ileus	7.5–15%	0–5%
Early anastomotic leakage	3.3–15%	Nil
Late anastomotic leakage	2.2–27%	Nil
Reoperation rate	5–10%	<1%
Marginal ulcers	<2%	3%
Resolution of hypertension	72.3%	85.4%
Resolution of dyslipidemia	74%	93.3%
Resolution of type 2 diabetes	75.8%	95.1%
Excess weight loss	72.3%	92.2%

Discussion

It is pertinent to note that previously the more commonly recognized bariatric surgeries are RYGB and vertically banded gastroplasty (VBG). This was enunciated in 1999 by the National Institute of Health Consensus Conference NIH. In 2004, a consensus conference emanated from the American Society for Bariatric Surgery (ASBS), which updated the evidence and the conclusions of the NIH. At this time, RYGB was considered as the most commonly performed bariatric surgery. As the preoperative complications continue to soar, experience became a necessity in the performance of this procedure. Leakage was significant and proved to be the most common complication.[11] As weight reduction is more in RYGB than in VBG, RYGB became the more popular procedure. Laparoscopic sleeve gastrectomy (LSG) is also another popular technique and has its drawback. The incidence of leaks was even higher in LSG because the intraluminal pressure in the sleeve is very high making the stomach to give way at its weakest point, near the esophagogastric junction.

Mini-gastric bypass is low antecolic and one less anastomosis, and given a better blood supply, it decreases the danger of leakage. High anastomosis near the gastroesophageal junction and the earlier retrocolic method complexes, this procedure and the antecolic approach with a bivalve of the omentum to reduce tension on the mesentery are currently being carried out.

Either way, the technical difficultly and the postoperative complications of leakage, hospital stay, pain, and time taken are more for RYGB compared to MGB. The operative time for RYGB is more than MGB. In laparoscopy, even though five-port technique is used for both, more dissection and anastomosis make RYGB a more time-consuming procedure.

Reflux gastritis does occur in MGB; however, this might require long-term follow-up with endoscopy. The other problem with MGB is the formation of marginal ulcers. Here, the incidence is more compared to RYGB. This is possible because of the volume of gastric tube in MGB. Weight loss and reduction in BM1 is more with MGB compared to RYGB as a result of the long bypass limb of the bowel. This may be associated with nutritional deficiency in folate, hypoalbuminemia, iron, and vitamin.[12] However, in both, iron deficiency anemia was the only culprit.[12–14] A long period of follow-up is required to detect the occurrence of micronutrients deficiency and bone diseases. To balance weight reduction with micronutrient deficiency, it is better to adopt the following precautions: use a bypass limb of 150 cm in those with BM1 less than 40 and add a 10-cm increase in the bypass limb with every BM1 category related to obesity instead of applying a particular 200 cm limb for all the cases. This will give a better result.

Overall, MGB has a better safety profile than RYGB and is thus preferred. Indications for operation in morbidly obese patients include a BM1 more than 40 or more than 35 if comorbidities are associated.

Note that for patients with moderate obesity BMI 30–35 but suffering with metabolic syndrome, the decreased risk of laparoscopic gastric bypass surgery suggests its inclusion in the options of management.

Maximum resolution of type 2 diabetes, hypertension, and dyslipidemia in the MGB were as a result of the cummulative effect of some restriction of intake, significant rapid transit (incretin effect), and more fat malabsorption.[15–20] Mini-gastric bypass is proven to be reliable in developing countries like India, as India is only second to China in the population with type 2 diabetes.[21,22]

Conclusion

In comparing MGB to RYGB in the developing countries, we conclude that MGB is an effective alternative to RYGB. With the increasing burden of obesity in these countries, MGB is a simpler and safer approach toward weight reduction and control of obesity associated metabolic syndrome. With MGB, there is a differential reduction in the short- and long-term complications associated with most other bariatric techniques. It will thus proffer quality treatment to majority of the populace in these recently industrialized developing countries.

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