VOLUME-6 | ISSUE-3 | MARCH - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

Original Research Paper

Effect of Mini Gastric Bypass in Blood Sugar Control of Type 2 Diabetic Patient

General Surgery

KEYWORDS: Mini Gastric Bypass

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ABSTRACT

BACKGROUND: Mini gastric bypass is thought to have a major role in the rapid improvement in glycemic control of Type 2 diabetes patient

OBJECTIVE: The goal of this study was to determine the effect of MGB on T2D remission in obese and morbidly obese patients.

METHODS: The present study was conducted in a single center – Saraswathy Hospital, Thiruvanthapuram , India, with the data collected prospectively and analyzed retrospectively. The study group consisted of all patients with T2D who underwent MGB from January 2010 to December 2016 and had at least 1 month of follow-up. An informed consent was obtained from all the patients. T2D patients with a BMI of ≥ 31 kg/m2 were offered MGB after failure of conservative treatment, following complete evaluation by a multi-disciplinary team

RESULTS: MGB had a marked effect on T2D. HbA1c markedly improved or returned to normal. Out of 17 patients, 15 patients achieved HbA1c levels between 6.4 and 5.2% without anti-diabetic medicine,98 % patients stopped complete medication 2 % patients switched on from multiple anti diabetic medications to single oral diabetic medication

CONCLUSION: MGB results in sustained weight loss and significant improvement in blood sugar control, leading to clinical improvement in T2D and its related complications.there fore Type 2 Diabetes in obese patient can be controlled with this MGB

INTRODUCTION:

Diabetes mellitus represents an expanding pandemic that contributes markedly to worldwide morbidity and mortality. The world prevalence of diabetes among adults (aged 20–79 years) was 6.4%, affecting 285 million adults, in 2010and will increase to 7.7% and 439 million adults by 2030 [1].There is a strong relationship between obesity and type 2 diabetes mellitus (T2DM) [2]. In a large USA population study, the prevalence of diabetes increases with increasing weight classes according to body mass index (BMI). Approximately half of those diagnosed with T2DM are obese [3]. Weight control is the key to successful T2DM management. Weight loss achieved by lifestyle interventions has been shown to be effective in preventing and treating T2DM [4–7]. However, conventional treatment, such as, lifestyle modification and pharmacotherapy has produced small improvements in weight [7–10]. By contrast, bariatric surgery has been shown to effectively provide durable weight loss[11].Currently, Bariatric surgery is now considered appropriate for T2DM patient with BMI _ 35 kg/m2. Bariatric surgery leads to remission of T2DM in the majority of patients and improvement in the rest [12] Growing evidence from clinical studies indicates that bariatric/metabolic surgery ie beneficial for T2DM in non severely obese or even non obese patients(BMI < 35 kg/m2) [13, 14]. Recently, International Diabetes Federation has released its position statement [15]: surgery should be an accepted option in people who have T2DMand BMI of 35 more. Surgery should be considered as an alternative treatment option in persons with BMI 30 to 35when diabetes cannot be adequately controlled by optimal medical regimen, especially in the presence of other major cardiovascular disease risk factors.

Although lifestyle modifications and medical treatment is the mainstay for obesity and T2D, the last decade has proven that weight loss surgery is an effective solution, especially for morbidly obese T2D patients [16,17].

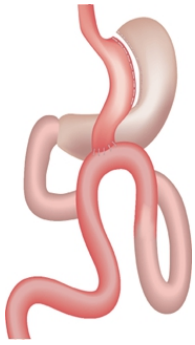
It is generally accepted that bypass operations have more powerful effects on T2D than gastric restrictive operations. Both Roux-en-Y gastric bypass (RYGB) and Mini-Gastric Bypass (MGB) act on the principle of restriction and malabsorption, but MGB is simpler with better outcomes, proven in a number of published comparative studies [18-20].

Materials and methods

The present study was conducted in a single center – Saraswathy Hospital, Thiruvanthapuram , India, with the data collected prospectively and analyzed retrospectively. The study group consisted of all patients with T2D who underwent MGB from January 2010to December 2016 and had at least 1 month of follow-up. An informed consent was obtained from all the patients. T2D patients with a BMI of ≥ 31 kg/m2 were offered MGB after failure of conservative treatment, following complete evaluation by a multi-disciplinary team.

Surgical technique

The MGB is a mildly restrictive but importantly a malabsorptive operation, started in 1997 by Robert Rutledge [21]. MGB was performed using a 5-trocar technique, with the first stapler firing perpendicular to the lesser curvature distal to the crow's foot, using a 45-mm blue cartridge. This was followed by vertical gastric division continuing proximally to the left of the angle of His (which was explicitly not dissected). Thus, a long gastric tube was created loosely against a 38-Fr bougie. The excluded part of the stomach remained in situ (Figure 1). Next, the jejunum was measured 150- 200 cm distal to the ligament of Treitz, where an antecolic wide gastrojejunostomy (GJ) was performed using a 45-mm or 60-mm blue cartridge. The GJ anastomosis may be placed more proximally or distally, depending on the need for weight loss [17]. A long gastric conduit and a length bypass with a longer common channel (minimum 300 cm) avoided complications.



Data collection

The data consisted of 17 T2D patients, of whom 52.94. % (9) were female and 47.05% (8) were male. Mean age was 39 years (20 to 58) years, and mean BMI was 43.5 kg/m2 (31 to 56). The patients were further categorized as patients who were on insulin and oral anti diabetic medicine, and patients who were on oral anti-diabetic medicines. Minimum duration of T2D was 12 months and maximum was 22 years. Data was collected from the in-patient and out-patient medical records, phone calls and electronic media. Data included pre-operative investigation, and post-operative outcome at 30 days, 3 months, 6 months, 12 months ,24 months and 32 months .

The database included pre-operative demographics and anthropometric features including BMI, weight, excess weight loss

VOLUME-6 | ISSUE-3 | MARCH - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

(EWL), , HbA1c, , type of anti-diabetic treatment and follow-up information.

Patients were stratified into groups based on duration of T2D (≤5years, 6 to 15 years and 16 to 25 years),only on oral anti-diabetic medicines or on both insulin and OHA.

Pre-operative check-up

Pre-operative evaluation including history and physical examination, and nutritional and psychiatric assessment were performed on all patients. All patients were screened for T2D, and co-morbidities associated with T2D and obesity was recorded.

Statistical analysis

Data are presented as mean ± SD unless otherwise stated. Data before and after surgery were compared using Student's t-test. A p-value <0.05 was considered significant.

Results

From Jan 2010 to December 2016, 17 diabetic patients underwent MGB. Complete follow-up information was achieved in 17 patients (100%), and mean duration of follow-up was 37 months (minimum 1 months and maximum 72 months)..

The data consisted of 17 T2D patients, of whom 52.94. % (9) were female and 47.05% (8) were male. Mean age was 39 (20 to 58) years, and mean BMI was 43.5 kg/m^2 (31 to 56). The patients were further categorized as patients who were on oral anti-diabetic medicines are on both oral anti-diabetic medicines and insulin. Minimum duration of T2D was 1 year and maximum was 22 years.. Patients were stratified into groups based on duration of T2D (≤5years, 6 to 15 years and 16 to 22 years) , (Table 1)

Table 1: Perioperative Demographic And Clinical Characteristics

VARIABLES	MGB (n= 17)
Age (years)	39.5+ 4.3
Sex ratio (M/F)	9 F/8 M
BMI(kg/m^2)	43.5 + 3.3
Mean weight (kg)	124 + 6.4
Mean height (cm)	168 + 2.6
Diabetes duration (years)	11.5+ 3.2
Excessive weight (kg)	68 + 6.7
HbA1c	10.1+ 1.7

Results reported as mean +SD

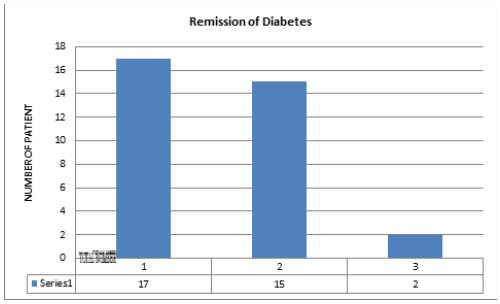
Weight Loss: The mean % of excessive weight loss(EWL) was 98 % in 32 months

Glycosylated hemoglobin: MGB had a marked effect on T2D. HbA1c markedly improved or returned to normal. Out of 17 patients, 15 patients achieved HbA1c levels between 6.4 and 5.2% without anti-diabetic medicine. (Table 2).

Change in usage of anti-diabetic medication: 98 % patients stopped complete medication 2 % patients switched on from multiple anti diabetic medications to single oral diabetic medication (Table 2).

Table 2 Perioperative And Postoperative Demographic And Clinical Characteristics

Parameter	Before	1 month	3 month	6 month	12 month	24 month	32 month
BMI(kg/m^2)	43.5 + 3.3	42.9+ 2.5	39+2.4	33.6+2.3	26.5+ 2.2	24.4+2.2	23.4+2.1
Mean weight (kg)	124 + 6.4	121 +3.3	110+3.19	95+3.1	73+ 2.9	69+2.6	65+2.5
Excessive weight loss(%)	-	7.5+ 2.1	18+2.6	30+ 3.8	42+4.6	48+6.2	58+5.4
HbA1c(%)	10.1+ 1.7	-	6.3+0.5	5.9+0.4	5.3+1.2	5.5+1.0	5.0+1.6



Discussion

The goal of this study was to determine the effect of MGB on T2D remission in obese and morbidly obese patients. Our results showed that there is a marked reduction in blood glucose levels and HbA1c after MGB. Biochemical and clinical analysis showed a diabetic remission rate of 98%, similar to results in other studies 22 -24[18-20].. Dixon et al. also found that %EWL and pre-operative duration of T2D were independent predictors of diabetes remission after gastric banding [25].

Ten patients, who were on insulin and OHA pre-operatively in this 8 patients stopped all the medications and 2 of the patients are on single OHA.

We had previously found MGB to be a more effective and safe bariatric and metabolic procedure than sleeve gastrectomy and RYGB [14].

Conclusions

MGB results in sustained weight loss and significant improvement in blood sugar control, leading to clinical improvement in T2D and its related complications.there fore Type 2 Diabetes in obese patient can be controlled with this MGB

Disclosures

The authors have no conflicts of interest.

Acknowledgement

We thank Mrs Athira and Mrs Deepthi MSc Nursing graduates (Research Assistants) for assistance with data collection

References

1. [J. E. Shaw, R. A. Sicree, and P. Z. Zimmet, "Global estimatesof the prevalence of Diabetes for 2010 and 2030," Diabetes Research and Clinical Practice, vol. 87, no. 1, pp. 4–14, 2010.
2. D. M. Nathan, J. B. Buse, M. B. Davidson et al., "Medicalmanagement of hyperglycaemia in type 2 Diabetes mellitus:a consensus algorithm for the initiation and adjustment oftherapy. A consensus statement from the American DiabetesAssociation and the European Association for the Study ofDiabetes," Diabetologia, vol. 52, no. 1, pp. 17–30, 2009.
3. C. L. Leibson, D. F. Williamson, L. J. Melton III et al.,"Temporal trends in BMI among adults with Diabetes,"Diabetes Care, vol. 24, no. 9, pp. 1584–1589, 2001.
4. D. F. Williamson, T. J. Thompson, M. Thun, D. Flanders, E.Pamuk, and T. Byers, "Intentional weight loss and mortality among overweight individuals witDiabetes," Diabetes Care, vol. 23, no. 10, pp. 1499–1504, 2000.
5. W. C. Knowler, E. Barrett-Connor, S. E. Fowler et al.,"Reduction in the incidence of type 2 Diabetes with lifestyle intervention or metformin," The New England Journal of Medicine, vol. 346, no. 6, pp. 393–403, 2002.
6. . Tuomilehto, J. Lindstr¨om, J. G. Eriksson et al., "Preventio of type 2 Diabete mellitus by changes in lifestyle among subjects with impaired glucose tolerance," The New England Journal of Medicine, vol. 344, no. 18, pp. 1343–1350, 2001.
7. S. L. Norris, X. Zhang, A. Avenell et al., "Long-term effectiveness of lifestyle and behavioral weight loss interventions in adults with type 2 Diabetes: a meta-analysis," The American Journal of Medicine, vol. 117, no. 10, pp. 762–774, 2004.
8. M. A. Khan, J. V. S. Peter, G. A. Breen, G. G. Hartley, and J. T. Vessey, "Diabetes disease stage predicts weight loss outcomes with long-term appetite suppressants," Obesity Research, vol. 8, no. 1, pp. 43–48, 2000.
9. P. Zimmet, J. Shaw, and K. G. Alberti, "Preventing type 2 Diabetes and the dysmetabolic syndrome in the real world: a realistic view," Diabetic Medicine, vol. 20, no. 9, pp. 693–702, 2003.
10. R. R. Wing, M. D. Marcus, L. H. Epstein, and R. Salata, "Type II diabetic subjects lose lessweight than their overweight nondiabetic spouses," Diabetes Care, vol. 10, no. 5, pp. 563–566, 1987
11. L. Sj¨ostr¨om, K. Narbro, C. D. Sj¨ostr¨om et al., "Effects of bariatric surgery on mortality in Swedish obese subjects," The New England Journal of Medicine, vol. 357, no. 8, pp. 752,2007.
12. H. Buchwald, R. Estok, K. Fahrbach et al., "Weight and type

13. 2 Diabetes after bariatric surgery: systematic review and metaanalysis,"The American Journal ofMedicine, vol. 122, no. 3, pp.248–256, 2009.
14. F. Rubino, A. Forgione, D. E. Cummings et al., "The mechanism of Diabetes control after gastrointestinal bypass surgery reveals a role of the proximal small intestine in the pathophysiology of type 2 Diabetes," Annals of Surgery, vol. 244, no. 5, pp. 741–749, 2006.
15. F. Rubino, P. R. Schauer, L. M. Kaplan, and D. E. Cummings,"Metabolic surgery to treat type 2 Diabetes: clinical outcomes and mechanisms of action," Annual Review of Medicine, vol.61, pp. 393–411, 2010.
16. J. B. Dixon, P. Zimmet, K. G. Alberti, and F. Rubino, "Bariatric surgery: an IDF statement for obese type 2 Diabetes," Diabetic Medicine, vol. 28, no. 6, pp. 628–642, 2011.
17. Kim Z, Hur KY (2011) Laparoscopic mini-gastric bypass for type 2 diabetes: the preliminary report. World J Surg 35: 631-636. [Crossref]
18. Brethauer SA, Aminian A, Romero-Talamás H, Batayyah E, Mackey J, et al. (2013) Can diabetes be surgically cured? Long-term metabolic effects of bariatric surgery in obese patients with type 2 diabetes mellitus. Ann Surg 258:628-636. [Crossref]
19. Milone M, Di Minno MN, Leongito M, Maietta P, Bianco P, et al. (2013) Bariatric surgery and diabetes remission: sleeve gastrectomy or mini-gastric bypass? World J Gastroenterol 19: 6590-6597. [Crossref]
20. Jammu GS, Sharma R2 (2016) A 7-Year Clinical Audit of 1107 Cases Comparing Sleeve Gastrectomy, Roux-En-Y Gastric Bypass, and Mini-Gastric Bypass, to Determine an Effective and Safe Bariatric and Metabolic Procedure. Obes Surg 26: 926-932. [Crossref]
21. Quan Y, Huang A, Ye M, Xu M, Zhuang B, et al. (2015) Efficacy of Laparoscopic Mini Gastric Bypass for Obesity and Type 2 Diabetes Mellitus: A Systematic Review and Meta-Analysis. Gastroenterol Res Pract 2015: 152852. [Crossref]
22. Rutledge R (2001) The mini-gastric bypass: experience with the first 1,274 cases. Obes Surg 11: 276-280. [Crossref]
23. Musella M, Apers J, Rheinwalt K, Ribeiro R, Manno E, et al. (2016) Efficacy of Bariatric Surgery in Type 2 Diabetes Mellitus Remission: the Role of Mini Gastric Bypass/One Anastomosis Gastric Bypass and Sleeve Gastrectomy at 1 Year of Follow-up. A European survey. Obes Surg 26: 933-940. [Crossref]
24. Kular KS, Manchanda N, Cheema GK (2016) Seven Years of Mini-Gastric Bypass in Type II Diabetes Patients with a Body Mass Index <35 kg/m(2). Obes Surg 26: 1457-1462. [Crossref]
25. Robert M, Ferrand-Gaillard C, Disse E, Espalieu P, Simon C, et al. (2013) Predictive factors of type 2 diabetes remission 1 year after bariatric surgery: impact of surgical techniques. Obes Surg 23: 770-775. [Crossref]
26. Sugerman HJ, Wolfe LG, Sica DA, Clore JN (2003) Diabetes and hypertension in severe obesity and effects of gastric bypass-induced weight loss. Ann Surg 237: 751-756. [Crossref