Short Assessment of Mini Gastric Bypass on Weight Loss and Diabetes Volunteers Client in Sari's Avicenna Hospital: A Preliminary Study

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Abstract

Background: Obesity is one of the important chronic diseases with high growth in worldwide and bariatric surgery is currently considered the most effective treatment for weight reduction.

Objectives: We aimed to analyze weight loss follow up and diabetes management in patients submitted to mini gastric bypass on use of vitamin and mineral supplementation, in the new set up center, in Mazandaran province for the first time.

Methods: Prospective analysis of 27 volunteers of both sexes, aged between 23 - 52 years, using laparoscopic mini gastric bypass in Sari's Avicenna hospital, were included; personal information, anthropometric and laboratory data in the preoperative, 3, 6 and 9 months were collected. Statistical analysis was done with SPSS, 19 and using the Wilcoxon and Friedman test.

Results: During follow up time after 276 days mean weight decreased from 118.7 ± 23.3 to 82.9 ± 15.7, $P < 0.001$ BMI also changed from 45.2 ± 1.8 to 32.2 ± 1.3, $P < 0.001$. There was decrease in percentage of excess weight loss at month of 3, 6 and 9 were 52.1, 32.6 and 16.4 respectively. Fasting blood sugar in diabetic subjects (n = 16) decreased from 170.9 ± 84.5 to 89.8 ± 11.3, $P = 0.04$.

Conclusions: In the newly set up center similar to the older one, surgical treatment in our follow up duration was effective for reducing weight, body mass index reduction and achievement of success in biochemical markers on diabetics.

Keywords: Obesity, Weight Loss, BMI, Mini Gastric Bypass, Diabetics

1. Background

Obesity is one of the important chronic diseases with high increase in the population. World health organization has estimated that, in 2015, 2.3 billion people will be overweight and 700 million will be obese worldwide (1). Bariatric surgery is an efficient intervention for patients with clinically severe obesity. In addition to significant weight loss, it is also associated with improvements in co-morbidities (2, 3). The mini gastric bypass (MGB) is the most commonly used mixed procedure and it has been observed to have some levels of weight recovery from two to three years after the surgery (4). The weight recovery after the surgery reinforces the concept that obesity is a chronic and incurable disease, and it needs specific treatment even after the surgery (5). Besides of obesity (21.5%), the high prevalence of diabetes (7.7%) in Iranian adults is an undesirable (6). Involving dietary or behavioral interventions, physical activity and medication is the first treatment step for obesity and diabetes. However, due to the lack of continuity in long term success, especially morbid obesity and diabetes that caused weight gain due to drug treatment, methods such as surgery are offered. Surgical treatment includes limiting methods, mal-absorption or both, that better outcomes in the treatment of diabetes rely on method of mal-absorb (7, 8). In comparison with referral center of minimally non invasive sugary, newly designed center must have advantages such as more focus on cases management with lower complication. But, there is controversy in the previous study (9).

2. Objectives

So, we decided to assess this issue in our area. Current study was early result of assessed MGB surgery effects on weight changes and diabetes biomarkers in the Sari's Avicenna hospital, newly established bariatric surgery.

3. Methods

We started prospective observational study with 27 volunteers of MGB surgery aged 23 - 52 from both sexes referred to Sari's Avicenna hospital, north of Iran from September 2014. All patients underwent MGB surgery in line with inclusion and exclusion criteria for surgery as the consensus of surgery for morbid obesity. Anthropometric parameters (weight, height, waist, hip), clinical history (co morbidities, medication use) and hematologic

and biochemical variables (total cholesterol and its fractions, triglycerides, fasting glucose level) of diabetic and hyperlipidemic patients were available before, 30, 60 and 90 days after surgery. Blood samples for hematologic and biochemical tests were collected after an overnight fast of 12 hours. Based on basic anthropometric data, body mass index (BMI), ideal body weight (IBW), excess body weight (EBW), and it's percent were calculated. Selection of mini gastric bypass surgery for all candidates for bypass and laparoscopic method was done and access to the peritoneal cavity was done with optical ports. For patients who underwent LMGB, a 50 ml gastric pouch was created and loop gastrojejunostomy was performed 200 cm from the treitz ligament.

The postoperative diet consisted of four phases according with the nutritional protocol of CENTROBESO: 1) liquid diet (21 days), 2) soft diet (7 days), 3) semi-solid diet (15 days), and 4) solid diet (final). All patients were advised to make use of multivitamin-mineral supplementation and iron (50 mg of elemental iron daily) after 15 days of surgery and Zinc and vitamin D supplement were advised after 4 month based on individual condition (their laboratory repot). In the follow up, regarding better management, besides monthly visits, we used social network (TELEGRAM) to keep in touch with patients, daily. For this purpose, every day our surgeon and nutritionist were online on specific times.

The numerical results were evaluated for distribution through the Kolmogorov-Smirnov test. The results were expressed as mean and standard deviation (SD) for continues variables and frequencies (percents) report used for qualitative variables. The Wilcoxon test was used to compare before and after of surgery values. The Friedman test were utilized for comparing the statistical significance of changes in the mean of post operative change trend of continues outcomes. Statistical analysis was performed using SPSS 19 software (SPSS Inc., Chicago, IL, USA). P-values less than 0.05 was statistically significant.

4. Results

Participants of this study included the volunteers who referred to Avicenna hospital for their obesity surgery treatment or were referred from diabetes research center of Mazandaran University of Medical sciences that only one of 27 participants was man.

According basement data in Table 1, participants were adults and sixteen of them were diabetic patients. For diabetic patients, fasting blood glucose was shown before and one month after surgery. Results show a statistically significant decrease in blood glucose after a month. In Table 1, also triglyceride and total cholesterol levels of serum

are shown for eleven participants which had no significant changes third month after surgery.

In this study, each one of diabetes type 2 and high blood pressure has been seen in sixteen participants (59.3%). Seven (25.9%) and three (11.1%) participants were hyperlipidemic and depressed, respectively. Five (18.5%) of participants have shown thyroid dysfunction. Both osteoporosis and apnea has been seen in two (7.4%) participant. Infertility was seen in one patient (3.7%).

In Table 2, results are shown as anthropometric indicators changes trend, before surgery and through the study in each three months after entrance of a participant to the study. For all participants, maximum weight changes were seen in first trimester and changes lead to descries with increasing of time. In this table, a statistically significant decrease can be seen till the third trimester after surgery.

An intra-operative complication (bleeding) has been reported in two subjects, and stomach and intestinal perforation in four and one cases, respectively.

Three subjects reported persistent diarrhea after operation which stopped during two weeks. Only seven subjects had vitamin D deficiency and supplement were prescribed for them.

5. Discussion

This study demonstrated that during follow-up time with median of 276 days after MGB surgery, blood glucose level became normal in diabetic patients and a significant weight loss had happened.

Several studies that have used this method to treat obesity, obtained results similar to this study (10-12). This surgery method can reduce weight by reducing calorie intake. Several studies have shown that the diet was very low-caloric immediately after surgery and increased a little monthly. But even after a year of surgery, most patients receive much less than the recommended amount. To prevent weight regain and weight maintenance, 120 - 60 grams of protein is recommended per day. Observational studies have shown improvement in glycemic control in a couple of days after surgery. This acute and rapid improvement cannot be attributed to weight loss or better insulin tolerance (13). In the study conducted by Lim et al. (12), 11 diabetic participants who were under a very restricted diet, after 8 weeks of energy restriction, fasting blood glucose and insulin sensitivity became normal. Negative energy balance explained this normal blood glucose immediately after surgery which was due to the reduction in gluco-toxicity in pancreatic cells (14). Glucotoxicity (glucose toxicity) is due to the long effect of hyper glycemiaon which is the function of pancreatic beta cells resulting in decreased glucose function because of aging of these cells

Table 1. Basic Anthropometric Data and Serum Profiles Before and After MGB[a]

Characteristics	Number	Before Surgery	After Surgery	P Value
Age, y	27	38.7 ± 10	-	-
Height, cm	27	160.5 ± 7.1	-	-
Weight, kg	27	118.7 ± 23.3	97.9 ± 19.5	< 0.001
Fasting blood sugar, mg/dL	16	170.9 ± 84.5	89.8 ± 11.3	0.04
Triglyceride, mg/dL	11	168.7 ± 72.6	131.2 ± 35.02	0.655
Cholesterol total, mg/dL	11	201.8 ± 48.7	179.2 ± 42.3	0.593

[a]Values are expressed as mean ± standard deviation.

Table 2. Weight Evaluation Pre and Post-Operative MGB[a]

Variables	Pre-Operative	Post-O 3 m	Post-O 6 m	Post-O 9 m	P Value
Weight, kg	116.3 (22.2)	96.4 (18.8)	86.9 (15.3)	82.9 (15.7)	< 0.001
EBW, %	121.9 (10.6)	78.1 (7.1)	60.9 (5.9)	53.1 (5.9)	< 0.001
WL, %	-	17.1 (1.2)	9.4 (1.5)	4.8 (0.9)	< 0.001
EWL (%	-	52.1 (6.7)	32.6 (7.9)	16.4 (3.6)	0.002
BMI, kg/m^2	45.2 (1.8)	37.5 (1.6)	33.8 (1.3)	32.2 (1.3)	< 0.001

Abbreviations: BMI, body mass index; EBW, Excess body weight; EWL, excess weight loss; m, month; post-O, post-operative; WL, weight loss.
[a]Values are expressed as mean (SD).

and decrease in its mass due to apoptosis ([13], [14]). In compare to older study which conducted in the referral center with high number of physician and fellowship, our study had fewer percent of major and minor complications during the follow up time. But it must be kept in mind that the because of intensity and load of referred patients causing this issue, comparison is difficult ([15], [16]).

After surgery, patients have more calorie intake, generally. However, weight loss occurs, which leads to improvement of glucose function. This improvement is due to increased insulin sensitivity, decreased glucotoxicity and lipotoxicity ([13]) of pancreatic beta cells. Lipotoxicity results from long-term increased level of fatty acids due to reduce response of beta-cells to the blood glucose levels ([16]). Another mechanism that may be with reduced energy intake acts on the hyperglycemia function, is change in the release of gastrointestinal hormones such as gerelin production and increases serum GLP1 ([17], [18]). This study has several strengths and limitations. This is the first report from newly bariatric surgery center in north of Iran, with has limited number of cases in compare to older one with several fellowship students and personnel. In our study, we focused on follow up by using social network such as TELEGRAM to have more accessibility to physician and dietitian and beside, monthly follow up by dietitian specialist is strength of our study. Although, we have some missing data on diabetes and hyperlipidemy's profile due to this biomarkers measured only for diabetics and hyperlipidemic patients. Another limitation of our study was limited number of cases and short follow up time. In short, hyperglycemia remission after MGB surgery should be a combination of several factors, such as reducing calorie intake combined with weight loss and changes in production or sensitivity of gastrointestinal hormones and insulin function.

This early study in the newly design center, demonstrated that MGB in our follow up time, effects weight reduction, BMI and modification of blood glucose levels, significantly.

Acknowledgments

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