

*Research Article***Dilemma of Local GIT Hormones after Bariatric Maneuvers**

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Abstract

Introduction: Lifestyle modification strategies (diet and exercise) currently form the main treatments for obesity. However, results are generally disappointing and the majority of people who attempt lifestyle modification regain any lost weight within 5 years. **Aim of the Work:** The aim of this study was To assess the effects of bariatric procedures (sleeve gastrectomy, mini-gastric bypass, sleeve gastrectomy with loop bipartition) on local GIT hormones, (secretin hormone, ghrelin hormone, peptide YY, glucagon-like peptide 1). **Patients and Methods:** Prospective randomized study which was carried out in the department of General Surgery, Minia University hospital during the period from February 2018 to February 2019. **Results:** 56 Cases, 48 females and 8 males, were collected with age ranging from 20 to 50 years old and body weight ranging from 100 to 200 Kg, and subjected to laparoscopic sleeve gastrectomy, mini gastric bypass and sleeve gastrectomy with loop bipartition. **Conclusion:** The effect of bariatric surgery upon glucose tolerance is likely to be related to increased production of the incretin hormone, GIP-1, which has a profound insulinotropic action, coupled to the improved insulin sensitivity resulting from weight loss.

Keywords: dilemmam, git hormones, bariatric maneuvers

Introduction

It is currently estimated that nearly 2 billion adults worldwide are overweight (defined by a body mass index [BMI] ≥ 25 kg/m²) and a further estimated 500 million are obese (BMI ≥ 30 kg/m²). Sharply due to readily available high-calorie food and sedentary lifestyle. It is well known that being overweight or obese carries an increased risk of type 2 diabetes, vascular disease, osteoarthritis, sleep apnoea and malignancy⁽¹⁾.

Lifestyle modification strategies (diet and exercise) currently form the main treatments for obesity. However, results are generally disappointing and the majority of people who attempt lifestyle modification regain any lost weight within 5 years⁽²⁾.

Drug treatments Sibutramine and Rimonabant were recently withdrawn due to cardiovascular and neuropsychiatric side effects respectively. The only licensed pharmacological treatment for obesity is Orlistat, an intestinal lipase inhibitor. This produces modest weight loss (in a

systematic review of randomized clinical trials, 60% of patients on Orlistat achieved $>5\%$ weight loss after 1 year of treatment⁽³⁾.

Several therapeutic strategies have been proposed for treating obesity. Intensive lifestyles interventions achieve only 5-6% body weight loss. Which is not able to be maintained for a long time, despite decreased cardiovascular risk. Many studies have shown that bariatric surgery is a very effective approach in reducing body weight. So far, bariatric surgery remains the most successful option in patients with a BMI ≥ 40 kg/m²⁽⁶⁾.

There are two ways in which bariatric surgery promotes long-term weight loss. Bariatric procedures are either restrictive, malabsorptive, or a combination of the two. The leading forms of weight loss surgery use at least one of these two methods:

- Gastric band surgery
- Sleeve gastrectomy surgery
- Gastric bypass surgery
- Duodenal switch surgery

- Biliopancreatic diversion procedure

Malabsorptive procedures enhance weight loss by altering the structure of the digestive tract, allowing food to bypass portions of the small intestine. Malabsorptive procedures generally incorporate restrictive methods by also reducing or limiting the capacity of the stomach for enhanced weight loss.

The only strictly malabsorptive weight loss surgery is:

- Biliopancreatic diversion
The two combination restrictive and malabsorptive weight loss surgeries are:
- Roux-en-Y gastric bypass surgery
- Duodenal switch surgery

Restrictive procedures promote weight loss by making changes to stomach capacity.

This form of weight loss surgery is considered restrictive because the amount of food that you can eat at one time is greatly reduced.

The two leading forms of restrictive weight loss surgery procedures are:

- Sleeve gastrectomy surgery.
- Gastric band surgery⁽⁴⁾.

Many of the beneficial metabolic effects of bariatric surgery have been attributed to altered peptide hormone profiles, especially involving pancreatic and gut peptides. The absorption and digestion of nutrients requires a healthy gastrointestinal tract which is subject to the control by nervous and hormonal influences. Several gut hormones are responsible for regulating appetite and satiety and also control the movement of the gut and hence transit of food through the intestines⁽⁵⁾.

Aim of the Work

To assess the effects of bariatric procedures (sleeve gastrectomy, mini-gastric bypass, sleeve gastrectomy with loop bipartition) on local GIT hormones, (secretin hormone, ghrelin hormone, peptide YY, glucagon-like peptide 1).

To compare the endocrine effects of the three procedures.

To highlight the hormones obviously affected by these procedures.

Patients and Methods

Study Design:

Prospective randomized study which was carried out in the department of General Surgery, Minia University hospital during the period from February 2018 to February 2019.

56 Cases, 48 females and 8 males, were collected with age ranging from 20 to 50 years old and body weight ranging from 100 to 200 Kg, and subjected to laparoscopic sleeve gastrectomy, mini gastric bypass and sleeve gastrectomy with loop bipartition.

Each patient was thoroughly evaluated by a multidisciplinary team (Nutritionist, Endocrinologist, Psychologist, and Surgeon) using a standardized protocol.

Inclusion Criteria:

All morbid obese patients surgically treated in our bariatric unit with:
- BMI of 40Kg/m² or greater,
- BMI of 35 Kg/m² with comorbidities.

Exclusion Criteria:

Patients being away from our close follow up.

Ethical Consideration:

Following the ethical guidelines, a written informed consent form was developed and attached to all sheets. The objectives of the study and full details were explained to every patient. Subjects were also assured. The aim of the study was explained to every patient. The questionnaire included:

1- Name, age, sex, address, telephone number and date of the surgery.

2- Medical history: Smoking, Diabetes Mellitus (if present type I or type II Hypertension)

3- General examination:

Weight, height, BMI, vital signs (pulse, blood pressure, temperature and respiratory

rate), chest, heart, head & neck and extremities.

4- Laboratory investigations:

A – Routine Investigations:

- Complete blood count
- Liver function tests
(including total & direct bilirubin, AST, ALT, Alkaline Phosphatase, Serum Albumin and total proteins)
- Renal function tests
(including blood urea & serum creatinine)
- Random & fasting blood glucose
- Serum electrolytes
(Including Sodium, Potassium, total & ionized Calcium)
- Arterial blood gases.
- Prothrombin time & concentration.
- Serum triglycerides & cholesterol.

B – Special Investigations:

Four GIT hormones are tested:

- 1- Secretin hormone.
- 2- Ghrelin hormone.
- 3- Peptide YY hormone (PYY).
4. Glucagon-like Peptide-1 (GLP1).

In our study we test the level of GIT hormones preoperative, two weeks and two months postoperative.

Results

Statistical presentation and analysis of the present study was conducted, using Mean, Standard Deviation, paired t-test was used to compare between related sample, Analysis of variance [ANOVA] was used for comparison among different times in the same group in quantitative data, paired Student T-test was used to compare between related sample, Linear Correlation coefficient was used for detection of correlation between two quantitative variables in one group and chi-square are computed for 2x2 tables in qualitative data by **SPSS V20**.

P-value

>0.05 Non significant

<0.05* significant

<0.001** High significant

In the current study, percent of change in BMI two-weeks postoperatively in sleeve gastrectomy, minigastric bypass and sleeve gastrectomy with loop bipartition are 6.2%, 7.7% and 7.6% respectively. However, percent of change in BMI two-months postoperatively are 11.8%, 15.9% and 14.7% respectively. So, there is a significant change in BMI in the three operations two-weeks and two-months postoperatively (P-value <0.001**), as a result, minigastric bypass achieved highest weight loss followed by sleeve gastrectomy with loop bipartition.

Table (1): relation between BMI changes preoperative, two-weeks and two-months postoperative in the three operations:

BMI	Type of Operation										
	Sleeve gastrectomy		Minigastric bypass		Sleeve gastrectomy with loop bipartition		ANOVA		Tukey's test		
	Mean	SD	Mean	SD	Mean	SD	f	P-value	S&M	S&L	M&L
Pre	48.44	5.08	49.70	8.62	54.47	10.35	2.297	0.111	0.844	0.093	0.334
Post 2wks.	45.44	4.87	45.89	8.51	50.3	9.92	1.698	0.193	0.977	0.166	0.338
% of change	6.2		7.7		7.6						
Post 2mon.	42.69	5.02	41.82	8.24	46.49	9.77	1.160	0.321	0.918	0.354	0.325
% of change	11.8		15.9		14.7						
Paired t-test											
Pre & Post 2wks.	<0.001**		<0.001**		<0.001**						
Pre & Post 2mon.	<0.001**		<0.001**		<0.001**						

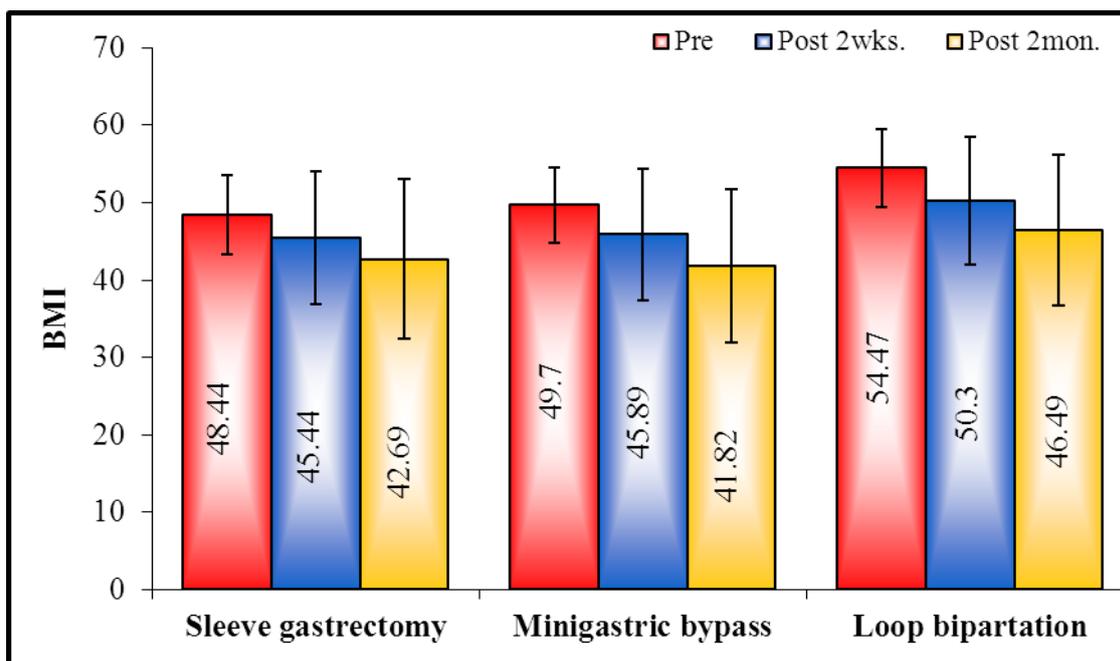


Fig (1): Relation between BMI changes preoperative, two-weeks and two-months postoperative in the three operations.

Discussion

Obesity, defined as a body mass index over 30 kg/m², is considered one of the greatest public health challenges of our time.

Obesity is associated with multiple metabolic comorbidities, including type 2 diabetes⁽⁷⁾.

The treatment of obesity with conservative measures or pharmacotherapy often fails to produce a permanent reduction in body weight. As a consequence, surgical methods are increasingly employed that produce a greater degree of long-term weight loss⁽⁸⁾.

Bariatric surgery, which aims to promote weight loss by either reducing stomach size, bypassing a portion of the intestine or a mixture of these two approaches, is associated with effective long-term weight loss and beneficial metabolic sequelae⁽⁹⁾. The mechanisms which underlie these consequences of bariatric surgery remain unclear, but they are likely to include effects upon peptide hormones, particularly gut-derived peptides⁽¹⁰⁾.

The aim of our study is to describe the different bariatric procedures available and their known effects upon peptide hormones. The most commonly used procedures at present are sleeve gastrectomy, minigastric bypass and sleeve gastrectomy with loop bipartition.

Sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) are the most widely practiced bariatric surgeries. In the recent past, mini-gastric bypass (MGB) became popular because of its effectiveness⁽¹²⁾.

The absorption and digestion of nutrients requires a healthy gastrointestinal tract which is subjected to the control by nervous and hormonal influences. Several gut hormones are responsible for regulating appetite and satiety and also control the movement of the gut and hence transit of food through the intestines⁽⁷⁾.

This is a prospective study From February 2018 to February 2019, a total of 56

patients underwent bariatric surgery in Minia University Hospital, 40 cases underwent sleeve gastrectomy, 10 cases underwent minigastric bypass and six cases underwent sleeve gastrectomy with loop bipartition. In the study of⁽¹³⁾, included 15 cases who underwent LAGB and 28 cases underwent RYGB. In the study of⁽¹⁴⁾ included 6 cases underwent RYGB , 6 cases LAGB. In the study of⁽¹³⁾ involved 9 cases of RYGB, 9 cases of LAGB and 8 cases as control group. In the study of⁽¹¹⁾ included 35 patients underwent sleeve gastrectomy and 19 cases underwent sleeve gastrectomy with loop bipartition.

Conclusion

Studies of peptide hormones concentrations after bariatric surgery have often found conflicting results. This may in part relate to differences of timing after the procedure, as it may take up to a year or more to reach a steady state, weight loss itself can cause changes in peptide hormone secretion, even in the absence of bariatric surgery. The beneficial effects of bariatric surgery are still poorly understood, but are most likely to be multifactorial in etiology. Increases in satiety-promoting hormones (GLP-1, GIP, PYY, Oxyntomodulin, and gastrin). Reductions in hunger-promoting hormones (ghrelin), reduced food intake (at least in the early post-surgery phase), central effects, and altered bile acid metabolism.

The effect of bariatric surgery upon glucose tolerance is likely to be related to increased production of the incretin hormone, GIP-1, which has a profound insulinotropic action, coupled to the improved insulin sensitivity resulting from weight loss.

From this study, sleeve gastrectomy with loop bipartition appears to be more physiologic, efficacious bariatric procedure in terms of safety, better weight loss, diabetes resolution and less malabsorption and nutritional deficiency.

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