بسم الله الرحمن الرحيم

∞∞∞

تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

Antral Resection versus Antral Preservation during Laparoscopic Sleeve Gastrectomy for Morbid Obese Patients and its Influence on Weight Loss: A Prospective Randomized Study

Thesis

Submitted for Partial Fulfillment of M.D. Degree in General Surgery

By

Abdel Fattah Ibrahim Mahmoud
M. B. B. Ch, MS in General Surgery, Ain Shams University

Under Supervision of

Prof. Dr. Alaa Abbas Sabry
Professor of General and Bariatric Surgery
Faculty of Medicine, Ain Shams University

Assist. Prof. Dr. Moheb Shoraby Eskandaros
Assistant Professor of General and Bariatric Surgery
Faculty of Medicine, Ain Shams University

Assist. Prof. Dr. Mohammad Abdalmegeed Alsayed
Assistant Professor of General Surgery
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
2022

سورة البقرة الآية: ٣٢

Acknowledgments

First and foremost, I feel always indebted to ***Allah*** *the Most Beneficent and Merciful.*

I wish to express my deepest thanks, gratitude and appreciation to ***Prof. Dr. Alaa Abbas Sabry,*** *Professor of General and Bariatric Surgery, Faculty of Medicine, Ain Shams University, for his meticulous supervision, kind guidance, valuable instructions and generous help.*

Special thanks are due to ***Assist. Prof. Dr. Moheb Shoraby Eskandaros,*** *Assistant Professor of General and Bariatric Surgery, Faculty of Medicine, Ain Shams University, for his sincere efforts, fruitful encouragement.*

I am deeply thankful to ***Assist. Prof. Dr. Mohammad Abdalmegeed Alsayed,*** *Assistant Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his great help, outstanding support, active participation and guidance.*

I would like to express my hearty thanks to all my family for their support till this work was completed.

Last but not least my sincere thanks and appreciation to all patients participated in this study.

Abdel Fattah Ibrahim Mahmoud

List of Contents

Title	Page No.
List of Tables	i
List of Figures	ii
List of Abbreviations	iv
Introduction	1
Aim of the Work	3
Review of Literature	
Chapter 1: Obesity	4
Chapter 2: Anatomical Consideration	14
Chapter 3: Laparoscopic Sleeve Gastrectomy	18
Chapter 4: Complications of Sleeve Gastrectomy	30
Chapter 5: Physiology of Gastric Emptying	36
Chapter 6: Effect of Sleeve Gastrectomy on Gastric Emptying	53
Patients and Methods	57
Results	66
Discussion	79
Summary	86
Conclusion	89
References	90
Arabic Summary	

List of Tables

Table No.	Title	Page No.
Table 1:	Mean ± S.D for gender, age, BMI, comorbidities and G.Et1/2	67
Table 2:	The frequency of short term and delayed complications in each group	72
Table 3:	Mean ± S.D showing %EWL within each group at 3,6,12 months	74
Table 4:	The difference in BMI in each group at 3,6,12 months	76
Table 5:	Resolution of comorbidities	77
Table 6:	The mean of Postoperative gastric emptying in each group	78

List of Figures

Fig. No.	Title	Page No.
Figure 1:	Gross anatomy of the stomach	15
Figure 2:	Arterial supply of stomach	16
Figure 3:	Venous drainage of stomach	17
Figure 4:	Hormonal changes occurring postoperatively after LSG	21
Figure 5:	The sleeve gastrectomy. A purely restrictive operation	22
Figure 6:	The 2012 expert panel transection distance from pylorus	24
Figure 7:	Regional motor functions within the stomach	37
Figure 8:	Difference between solid and liquid emptying	42
Figure 9:	Propulsion, grinding, and retropulsion of solids by peristaltic contractions of distal stomach	45
Figure 10:	Transection 2 cm proximal to the pylorus (antral resection)	60
Figure 11:	Transection 4 cm proximal to the pylorus (antral preservation)	60
Figure 12:	Descriptive data of gender	68
Figure 13:	Comparison between antral resection and antral preservation regarding gender	68
Figure 14:	Descriptive data of BMI	69
Figure 15:	Comparison between antral resection and antral preservation regarding hyertension, diabetes mellitus and dyslipidemia	69
Figure 16:	Descriptive data of preoperative gastric emptying	70

List of Figures cont...

Fig. No.	Title	Page No.

Figure 17: Comparison between antral resection and antral preservation regarding hyertension, diabetes mellitus and dyslipidemia 71

Figure 18: Comparison between the two groups regarding short term and long term complications 73

Figure 19: Comparison between the two groups regarding %EWL within each group at 3,6,12 months 75

Figure 20: Comparison between the two groups regarding BMI in each group at 3,6,12 months 76

Figure 21: Comparison between the two groups regarding postoperative gastric emptying..... 78

List of Abbreviations

Abb.	Full term
BMI	Body mass index
CBC	Complete blood cell count
DM	Diabetes mellitus
DS	Duodenal switch
Dyslipid	Dyslipidemia
GERD	Gastroesophageal reflux disease
GLP-1	Glucagon-like peptide-1
GRP	Gastrin-Releasing Peptide
HLD	Hyperlipidemia
HTN	Hypertension
ICC	Interstitial cells of Cajal
LSG	Laparoscopic sleeve gastrectomy
NPY	Hypo- thalamic neuropeptide Y
OSA	Obstructive sleeve apnea
PYY	Peptide YY
%EWL	Percentage of excess weight loss
RBCs	Random blood sugar
SD	Standard deviation
SG	Sleeve gastrectomy
SPSS	Statistical Package for Social Sciences
T2D	Type 2 diabtetes mellitus
VIP	Vasoactive Intestinal Peptide

INTRODUCTION

Obesity is a pandemic health problem in both developed and developing countries and the costs of care continue to grow in parallel with the prevalence of the disease. This morbid condition leads to a high incidence of complications and a decrease in life expectancy, especially among younger adults ***(Fontaine et al., 2013).***

Surgical treatment of morbid obesity results in significant sustained weight loss, which reduces obesity-related morbidity and increases survival compared with patients receiving optimal medical therapy ***(Sjostrom et al., 2007).***

Bariatric surgery is currently considered to efficiently produce long-term weight loss, improve comorbidities and improve quality of life for the morbidly obese patient ***(Sjostrom et al., 2007).*** Currently, there is much interest in restrictive procedures with their lower operative and nutritional risks compared to mixed and malabsorptive procedures ***(Brunault et al., 2011).***

Laparoscopic sleeve gastrectomy (LSG) in creating a narrow tube-like stomach is designed to decrease appetite by reducing the ability of the stomach to distend and producing the sensation of fullness with minimal oral intake ***(Moy et al., 2008).*** LSG is carried out as a single and definitive bariatric procedure with promising short-term results ***(Himpens et al., 2010).***

Unfortunately, LSG has its own disadvantages as the potential complications of the relatively long staple line and the irreversibility of the procedure ***(Frezza, 2007).***

In the last years, the number of LSG performed has risen dramatically. However, many points of controversy regarding the operative technique create a wide range of possibilities including the size of bougie caliber, the necessity of reinforcing the staple line, the routine use of intraoperative seal testing, the section at the oesophagogastric junction and the distance from the pylorus to beginning of antral resection ***(Sakran et al., 2013; Iannelli et al., 2008; Ferrer-Márquez et al., 2012).*** All of these are matters that are debated among the most experienced surgeons.

AIM OF THE WORK

The aim of this study is to compare between antral resection (gastrectomy 2 cm from pylorus) and antral preservation (gastrectomy 6 cm from pylorus) during laparoscopic gastric sleeve and its influence on the percentage of weight loss, postoperative complications and nutritional and elemental deficiencies.

OBESITY

Obesity is the excessive or abnormal accumulation of fat or adipose tissue in the body that impairs health via its association to the risk of development of diabetes mellitus, cardiovascular disease, hypertension, and hyperlipidemia. It is a significant public health epidemic which has progressively worsened over the past 50 years. Obesity is a complex disease and has multifactorial etiology. It is the second most common cause of preventable death after smoking. Obesity needs multiprong treatment strategies and may require lifelong treatment. A 5% to 10% weight loss can significantly improve health, quality of life, and economic burden of an individual and a country as a whole ***(Gowd et al., 2019).***

- **Etiology**

Obesity is the result of an imbalance between daily energy intake and energy expenditure resulting in excessive weight gain. Obesity is a multifactorial disease, caused by a myriad of genetic, cultural, and societal factors. Various genetic studies have shone that obesity is extremely heritable, with numerous genes identified with adiposity and weight gain. Other causes of obesity include reduced physical activity, insomnia, endocrine disorders, medications, the accessibility and consumption of excess carbohydrates and high-sugar foods, and decreased energy metabolism. The most common syndromes associated with obesity include Prader Willi syndrome and *MC4R* syndromes, less commonly fragile X, Bardet-Beidl

syndrome, Wilson Turner congenital leptin deficiency, and Alstrom syndrome ***(Gowd et al., 2019)***.

- **Obesity: Co-Morbidities, Mortality, and Economic Burden**

Obesity is associated with concomitant or increased risk of nearly every chronic condition, from diabetes, to dyslipidemia, to poor mental health. Its impacts on risk of stroke and cardiovascular disease, certain cancers, and osteoarthritis are significant.

- **Overall Mortality**

In the year 2000 in the USA, 15% of deaths were attributable to excess weight, owing to poor diet and physical inactivity. Overweight/obesity in middle age shortens life expectancy by an estimated 4–7 years. Many long-term cohort studies, as well as three recent major thesis of pooled data from established cohorts, which adequately accounted for history of smoking and chronic disease status, unequivocally show that overweight and obesity over the life course is associated with excess risk of total mortality, death from cardiovascular disease, diabetes, cancer, or accidental death ***(Chen et al., 2013).***

- **Diabetes**

Excess weight and diabetes are so tightly linked that the American Diabetes Association recommends physicians test for type 2 diabetes and assess risk of future diabetes in *asymptomatic* people ≥45 years old simply if they are overweight/obese, and

regardless of age if they are severely obese. Overweight raises risk of developing type 2 diabetes by a factor of three, and obesity by a factor of seven, compared to normal weight. Excess weight in childhood and in young adulthood, and weight gain through early to mid-adulthood are strong risk factors for diabetes ***(Park et al., 2014).***

While not every overweight/obese individual has diabetes, some 80% of those with diabetes are overweight/obese. Obesity itself raises diabetes risk even in the absence of other metabolic dysregulation (insulin resistance, poor glycemic control, hypertension, dyslipidemia). While metabolically healthy obese individuals are estimated to have half the risk of their metabolically unhealthy counterparts, they still have four times the risk of those who are normal weight and metabolically healthy ***(Bell et al., 2014).***

- **Heart and Vascular Diseases**

Ischemic heart disease and stroke are the leading causes of death in the USA and globally. Excess body weight is a well-known risk factor for heart disease and ischemic stroke, including their typical dyslipidemia and hypertension. Recent studies have consistently shown that benign obesity appears to be a myth; overweight clearly adds to risk of heart disease and stroke beyond its implications for hypertension, dyslipidemia, and dysglycemia ***(Lozano et al., 2012).***