



Comparison between Early Results of Laparoscopic Mini Gastric Bypass and Sleeve Gastrectomy Regarding Weight loss, Remission of Type II Diabetes Mellitus and Hypertension

Retrospective Study

Thesis

*Submitted for Partial Fulfillment of Master Degree
in General Surgery*

By

Mohamed Salah El din Ebrahim El Ghamrawy
M.B.B.Ch

Under Supervision of

Prof. Dr. Awad Hassan El Kayal

*Professor of General Surgery
Faculty of Medicine - Ain Shams University*

Dr. Hossam Elsadek Ibrahim

*Lecturer of General Surgery
Faculty of Medicine - Ain Shams University*

Dr. Mohamed Ebrahim Mohamed

*Lecturer of General Surgery
Faculty of Medicine - Ain Shams University*

Faculty of Medicine - Ain Shams University

2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

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. Awad Hassan El Kayal**, Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his meticulous supervision, kind guidance, valuable instructions and generous help.*

*I am deeply thankful to **Dr. Hossam Elsadek Ibrahim**, Lecturer of General Surgery, Faculty of Medicine, Ain Shams University, for his great help, outstanding support, active participation and guidance.*

*Special thanks are due to **Dr. Mohamed Ebrahim Mohamed**, Lecturer of General Surgery, Faculty of Medicine, Ain Shams University, for his sincere efforts, fruitful encouragement.*

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

Mohamed Salah El din El Ghamrawy

List of Contents

Title	Page No.
List of Abbreviations.....	5
List of Tables.....	7
List of Figures	8
Introduction	- 1 -
Aim of the Work	16
Review of Literature	17
Patients and Methods.....	105
Results.....	121
Discussion	136
Conclusion	144
Summary	145
References	152
Arabic Summary	

List of Abbreviations

Abb.	Full term
A	Artery
BMI	Body mass index
CCK	Cholecystokinin hormones
CT	Computed tomography scan
DS	Dumping syndrome
DVT	Deep venous thrombosis
EC	Eneterochromaffin cells
ECL	Enterochromaffin like cells
EWL	Excess weight loss
GB	Gall bladder
GERD	Gastroesophageal reflux disease
GI	Gastrointestinal
GIF	Gastric intrinsic factor
GIP	Glucose dependent Insulin tropic peptide
GIQL	Gastrointestinal quality of life index
GLP-1	Glucagon-like peptide 1
GRP	Gastrin releasing peptide
HCL	Hydrochloric acid
IF	Intrinsic factor
KG	Kilograms
LMGB	Laparoscopic minigastric bypass
LRYGB	Laparoscopic Roux-en-Y gastric bypass surgery
LSG	Laparoscopic sleeve gastrectomy
MGB	Minigastric bypass
NAC	Nucleus accumbens
NICE	National Institute for Health & Care Excellence

List of Abbreviations cont...

Abb.	Full term
<i>OT</i>	<i>Operative time</i>
<i>PO</i>	<i>Per oral</i>
<i>PODs</i>	<i>Postoperative days</i>
<i>PYY</i>	<i>Peptide-YY</i>
<i>QID</i>	<i>Quarter-in-die (four times a day)</i>
<i>RYGB</i>	<i>Roux-en-Y gastric bypass surgery</i>
<i>SG</i>	<i>Sleeve gastrectomy</i>
<i>T2DM</i>	<i>Type II diabetes mellitus</i>
<i>UGI</i>	<i>Upper gastrointestinal endoscopy</i>
<i>VIP</i>	<i>Vasoactive intestinal peptide</i>
<i>VTA</i>	<i>Ventral tegmental area</i>

List of Tables

Table No.	Title	Page No.
Table 1:	Gastric hormones	33
Table 2:	Drugs that Accelerate Gastric Emptying	38
Table 3:	Classification of obesity	40
Table 4:	Complications associated with laparoscopic sleeve gastrectomy	53
Table 5:	Comparison between LMGB and LSG Complications.....	94
Table 6:	Comparison between studied groups as regard Age:.....	122
Table 7:	Comparison between studied groups as regard Gender:.....	123
Table 8:	Comparison between studied groups as regard baseline clinical data:	124
Table 9:	Comparison between studied groups as regard baseline HbA1C:	127
Table 10:	Comparison between different clinical data before surgery and 6 months after LMGB operation among group I:	128
Table 11:	Comparison between different clinical data before surgery and 6 months after Laparoscopic sleeve gastrectomy operation among group II:.....	130
Table 12:	Comparison between studied groups as regard percent of change of different parameters 6 months postoperative:.....	132
Table 13:	Comparison between studied groups regarding improvement and remission of T2DM six months after surgery:	134
Table 14:	Comparison between studied groups regarding control of Hypertension six months after surgery:.....	135

List of Figures

Fig. No.	Title	Page No.
Figure 1:	Diagram of parts of the stomach	19
Figure 2:	Diagram of greater and lesser omenta.....	20
Figure 3:	Arterial blood supply to the stomach	23
Figure 4:	Lymphatic Drainage of the Stomach.....	24
Figure 5:	Gastric innervation	25
Figure 6:	Anatomy & physiology by Lindsay M. Biga, Sierra Dawson, Amy Harwell, Robin Hopkins, Joel Kaufmann, Mike LeMaster 2016.....	29
Figure 7:	BMI.....	40
Figure 8:	Laparoscopic Sleeve Gastrectomy (LSG)	47
Figure 9:	Sleeve gastrectomy.....	50
Figure 10:	Radiograph showing a leak following laparoscopic sleeve gastrectomy.....	54
Figure 11:	Radiograph showing a normal image of the stomach after laparoscopic sleeve gastrectomy.	55
Figure 12:	Common site of abscess. Axial CT image show an abscess adjacent to the upper part of staple line.	56
Figure 13:	CT scan shows extravasation of contrast suggesting with leak	56
Figure 14:	Radiograph showing an intraluminal stent for the treatment of a leak following laparoscopic sleeve gastrectomy.	58
Figure 15:	Laparoscopic Mini Gastric Bypass (LMGB)	67
Figure 16:	Normal dye study	80
Figure 17:	Stricture	80

List of Figures *cont...*

Fig. No.	Title	Page No.
Figure 18:	(a): Stomal stenosis at gastrojejunostomy – (b): Recurrent marginal ulcer at gastrojejunal anastomosis after fibrin healing.....	81
Figure 19:	Marginal ulcer in jejunum after RNY	81
Figure 20:	Foveolar dysplasia in the gastric mucosa in patients with bile reflux	84
Figure 21:	Laparoscopic Mini Gastric Bypass (LMGB) vz RYGB.....	93
Figure 22:	Vertical banded gastroplasty.....	97
Figure 23:	Open vertical banded gastro-plasty and application of proline mesh on the end of the staples	97
Figure 24:	Adjustable gastric band	99
Figure 25:	Gastric plication.....	103
Figure 26:	Operative precautions.....	107
Figure 27:	French position.....	108
Figure 28:	Position of ports and liver retractor	109
Figure 29:	Sleeve gastrectomy.....	110
Figure 30:	Creation of a tunnel behind the post gastric wall	111
Figure 31:	Transection of the stomach horizontally.....	111
Figure 32:	Vertical stomach transection guided by bougie.....	112
Figure 33:	Identification of DJ junction.....	113
Figure 34:	Measurement of jejunum.....	113
Figure 35:	Anchoring suture take through both opening to facilitate perfect alignment during anastomosis.	114
Figure 36:	Creation of gastro-jejunostomy via Endo GIA stapler.	114
Figure 37:	Closure of staple line over ryle tube.....	115

List of Figures *cont...*

Fig. No.	Title	Page No.
Figure 38:	Closure of the staple opening by vicryl 2/0.	115
Figure 39:	Methylene blue test.....	116
Figure 40:	Mean age (years) between the study groups.	122
Figure 41:	Distribution of gender between the study groups.....	123
Figure 42:	Mean weight (kgs) at baseline between the study groups.....	124
Figure 43:	Mean height (cm) at baseline between the study groups.....	125
Figure 44:	HgA1c test results.....	126
Figure 45:	Mean HbA1c (%) at baseline between the study groups.....	127
Figure 46:	Mean weight (kgs) before and 6 months after LMGB	128
Figure 47:	Mean BMI (kg/m ²) before and 6 months after LMGB	129
Figure 48:	Mean HbA1c (%) before and 6 months after LMBG	129
Figure 49:	Mean weight (kgs) before and 6 months after laparoscopic sleeve gastrectomy operation.....	130
Figure 50:	Mean BMI (kg/m ²) before and 6 months after laparoscopic sleeve gastrectomy operation.....	131
Figure 51:	Mean HbA1c (%) before and 6 months after laparoscopic sleeve gastrectomy operation.....	131
Figure 52:	Mean weight (kgs) 6 months after surgery between the study groups	132
Figure 53:	Mean BMI (kg/m ²) 6 months after surgery between the study groups	133

List of Figures cont...

Fig. No.	Title	Page No.
Figure 54:	Mean HbA1c (%) 6 months after surgery between the study groups	133
Figure 55:	Distribution of improvement and remission of T2DM 6 months after surgery between the study groups.	134
Figure 56:	Distribution of control of hypertension 6 months after surgery between the study groups.	135

INTRODUCTION

Bariatric surgery has long been introduced for weight control in conservative treatment failed individuals (*Yingjun et al., 2015*). Compared with nonsurgical strategies, bariatric surgery proves more effective for moderately to severely obese people to lose weight (*Picot et al., 2009*). Patients vary in their responses to bariatric operations. Most patients change their diets (*Sarwer et al., 2008*). Other factors that influence weight loss include age, gender, race, body composition, education, emotional status, and level of activity (*Schauer et al., 2003*).

The most remarkable effects of bariatric surgery is the full and rapid remission of type 2 diabetes mellitus (*Walter, 2008*) and improvement of metabolic/cardiovascular risk factors in severely obese patients (*Ricardo et al., 2013*). The short-term (decreased caloric intake) and long-term results (decreased fat mass and body weight) of bariatric surgery complementarily lead to improvement in glucose metabolism, insulin resistance, change in adipocytokines release and quality of life (*Andrew et al., 2005*).

The sleeve gastrectomy is a laparoscopic procedure. This involves making four or five small incisions in the abdomen and performing the procedure using a video camera (laparoscope) and long instruments that are placed through these small incisions (*D'Hondt et al., 2011*).

During the laparoscopic sleeve gastrectomy (LSG), about 75% of the stomach is removed leaving a narrow gastric “tube” or “sleeve”. No intestines are removed or bypassed during the sleeve gastrectomy. The LSG takes one to two hours to complete.

Sleeve gastrectomy is a restrictive procedure. It greatly reduces the size of your stomach and limits the amount of food that can be eaten at one time. It does not cause decreased absorption of nutrients or bypass your intestines. After eating a small amount of food, you will feel full very quickly and continue to feel full for several hours.

Sleeve gastrectomy may also cause a decrease in appetite *Kansou et al. (2016)*, this procedure is primarily used as part of a staged approach to surgical weight loss. Patients who have a very high body mass index (BMI) or who are at risk for undergoing anesthesia or a longer procedure due to heart or lung problems may benefit from this staged approach. Sometimes the decision to proceed with a two-stage approach is made before surgery due to these known risk factors. In other patients, the decision to perform sleeve gastrectomy (instead of gastric bypass) is made during the operation. Reasons for making this decision intraoperatively include an excessively large liver or extensive scar tissue that would make the gastric bypass procedure too long or unsafe.

In patients who undergo LSG as a first stage procedure, the second stage (gastric bypass) is performed 12 to 18 months later after significant weight loss has occurred and the risk of anesthesia is much lower (and the liver has decreased in size). Though this approach involves two procedures, we believe it is safe and effective for selected patients.

Laparoscopic sleeve gastrectomy can also be used as a primary procedure.

Depending on their pre-operative weight, patients can expect to lose between 40% to 70% of their excess body weight in the first year after surgery.

Many obesity-related comorbidities improve or resolve after bariatric surgery. Diabetes, hypertension, obstructive sleep apnea and abnormal cholesterol levels are improved or cured in more than 75% of patients undergoing LSG. The weight loss that occurs after LSG results in dramatic improvement in these medical conditions in the first year after surgery.

Gastric bypass surgery is an operation that creates a small pouch to restrict food intake and bypasses a segment of the small intestine. In the gastric bypass procedure, a surgeon makes a direct connection from the stomach pouch to a lower segment of the small intestine, bypassing the duodenum (the first part of the small intestine) and some of the jejunum (the

second part of the small intestine), delaying the mixing of ingested food and the digestive enzymes (*Kim et al., 2014*).

Laporoscopic mini gastric bypass is the most common type of bariatric surgery. The surgeon begins by creating a small pouch by dividing the upper end of the stomach. This restricts the food intake. Next, a section of the small intestine is attached to the pouch to allow food to bypass the duodenum, as well as the first portion of the jejunum. The small intestine is re-connected 150 centimeters from the pouch to allow ingested food and digestive enzymes to mix (*Kansou et al., 2016*).