

Effect of Bougie Size on Outcome in Laparoscopic Sleeve Gastrectomy

Thesis

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

By

Mohamed Elemam Elemam Elshawy

M.B.B.Ch, M.S.

Faculty of Medicine - Ain Shams University

Under supervision of

Prof. Tarek Mohamed Farid Elbahar

Professor of General Surgery

Faculty of Medicine

Ain Shams University

Assist. Prof. Mohamed Mahmoud Abozeid

Assistant Professor of General Surgery

Faculty of Medicine

Ain Shams University

Dr. Medhat Mohamed Helmy Khalil

Lecturer of General Surgery

Faculty of Medicine

Ain Shams University

Ain Shams University

2017

Contents

Subjects	Page
List of abbreviations.....	II
List of Figures	IV
List of Tables	VI
• Introduction	1
• Aim of the Work	5
• Review of Literature	
○ Morbid Obesity, Overview	6
○ Laparoscopic Sleeve Gastrectomy, Overview	9
○ Technical Controversies of LSG.....	17
○ Sizing the Sleeve.....	27
○ Complications of LSG	29
○ Management of Selected Complications	47
• Patients and Methods	79
• Results	93
• Discussion	105
• Summary and Conclusion	115
• References	118
• Arabic Summary	

List of Abbreviations

BED	Binge eating disorder
ASMBS	American Society of Metabolic and Bariatric Surgery
BMI	Body Mass Index
BPD	Biliopancreatic diversion
BPD-DS	Biliopancreatic diversion with duodenal switch
CHD	Coronary Heart Disease
CNS	Central nervous system
CRH	Corticotrophic releasing hormone
DS	Duodenal Switch
DVT	Deep Vein Thrombosis
ECG	Electrocardiogram
EWL	Excess weight loss

FDA	U.S. Food and Drug Administration
GERD	Gastroesophageal Reflux Disease
GLP-1	Glucagon-like peptide 1
HDL	High density lipoprotein
ICSSG	International Consensus Summit on Sleeve Gastrectomy
IVC	Inferior vena cava
JIB	Jejunonoileal bypass
LAGB	Laparoscopic adjustable gastric banding
LCDs	Low calorie diets
LDL	Low- density lipoprotein
LOS	Length Of hospital stay
LRYGB	Laparoscopic Roux-en-Y gastric bypass
LSG	Laparoscopic Sleeve Gastrectomy

NIDDM	Non insulin dependent diabetes mellitus
NOTES	Natural orifice transluminal endoscopic surgery
NPO	Nothing-by-mouth
NPY	Neuropeptide Y
OTSC	Over-the-scope clip
PCOS	Polycystic ovarian syndrome
PE	Pulmonary Embolism
PVN	Paraventricular nuclei
RYGB	Roux-en-Y gastric bypass
SG	Sleeve gastrectomy
T2DM	Type 2 Diabetes Milletes
UBO	Upper body obesity

List of Tables

Table (1)	Classification of overweight and obesity by BMI, WHO classification	7
Table (2)	Eligibility criteria for Bariatric surgery.	12
Table (3)	Weigh control hormone studied after LSG	24
Table (4)	Technical controversies for LSG, Review of published data	39
Table (5)	Calculated volume of 25 cm-long gastric tube (excluding antrum) according to varying bougie size.	52
Table (6)	% EWL in relation to Bougie size, Review of published data.	116
Table (7)	Incidence of complications among the published articles	60

Table (8)	Summary of the complications associated with laparoscopic sleeve gastrectomy and principles of Management.	61
----------------------	--	----

Table (9)	Incidence of staple line leaks after sleeve Gastrectomy	62
----------------------	---	----

Table (10)	Clinical presentations of patients with gastric leak.	68
-----------------------	---	----

Table (11)	Reoperation in patients with gastric leak.	72
-----------------------	--	----

Table (12)	Bleeding rate following LSG and proposed preventive surgical strategies, Review of published data.	83
-----------------------	--	----

Table (13)	The scale used for assessment of postoperative vomiting post-LSG	110
-----------------------	--	-----

Table	Baseline characteristics of the patients prior to	
--------------	---	--

(14)	surgery.	113
Table (15)	Number and percentages of comorbidities in both groups	191
Table (16)	Mean operative time among both groups.	115
Table (17)	The hospital LOS among the 2 groups	115
Table (18)	Comparison between Group 1 and Group 2 as regard preoperative BMI and postoperative BMI at 1, 6, 12 months.	116
Table (19)	Comparison between group A and Group B in terms of %EWL at 6 and 12 month.	119

Table (20)	No statistical significant difference between the 2 groups in terms of postoperative bleeding.	120
Table (21)	Numbers, percentages and statistical analysis of patients as regard leakage.	123
Table (22)	statistical analysis of patients who had postoperative vomiting according to the vomiting scale	132
Table (23)	statistical analysis of patients who had postoperative vomiting according to the vomiting scale	133

List of Figures

Figure	Figure title	Page number
Figure (1)	Estimated number of bariatric operations performed in the United States, 1992–2003. Data from the American Society for Bariatric Surgery.	10
Figure (2)	The Magenstrasse and Mill procedure.	16
Figure (3)	Biliopancreatic Diversion.	17
Figure (4)	Duodenal Switch	18
Figure (5)	Completed Sleeve Gastrectomy.	20
Figure (6)	Proximal gastric surgical unit	21
Figure (7)	Distal gastric surgical unit.	21
Figure (8)	Ghrelin and leptin act on the brain via the hypothalamus.	26
Figure (9)	SG, Trocar placement.	31
Figure	SG, Exposure of the stomach.	33

(10)		
Figure (11)	Division of the short gastric vessels.	33
Figure (12)	Sleeve Gastrectomy, first stapler.	34
Figure (13)	Gastric Stapling.	35
Figure (14)	Complete the gastrectomy.	36
Figure (15)	Surgical technique of LSG, showing how the size of the final gastric pouch changes in regard to the usage of different bougie sizes and different starting and ending transection points.	40
Figure (16)	Vascularization of the cardia	44
Figure (17)	Proximal section away from the gastroesophageal junction	46
Figure (18)	Joseph-Frederic-Benoit Charriere (1803-1876).	49
Figure (19)	Various sized biliary stents based upon the French gauge 20:346-9 (1 Fr = 0.333 mm).	50
Figure (20)	Calculating volume of the tube	51

Figure (21)	Gastric leak localized at the proximal third.	63
Figure (22)	Gastric leak localized at the distal third,	63
Figure (23)	Critical area of vascularization.	64
Figure (24)	Patient with postoperative air-fluid collection adjacent to GEJ consistent with staple line leak.	70
Figure (25)	Endoscopic application of biological glue for treatment of leak following LSG.	73
Figure (26)	The area of the fistula is demarcated by the metal clips, was tightly sealed in a position in the middle of the serial two stent configuration.	75
Figure (27)	Pouch volume evolution from wider sleeve (B) into tighter sleeve (A).	89
Figure (28)	Upper gastrointestinal (GI) contrast study. A small stream of contrast is noted to pass just distal to the gastroesophageal junction	93
Figure (29)	Patient position in LSG	99
Figure (30)	Port placement LSG	108

Figure (31)	Identification of pyloric ring	101
Figure (32)	Opening of greater omentum.	101
Figure (33)	Dissection of the gastro-colic ligament	101
Figure (34)	Complete freeing of left crus.	102
Figure (35)	Dissection of posterior gastric wall from pancreas.	102
Figure (36)	Introduction of bougie along lesser curvature	103
Figure (37)	First stable firing (4-6 cm from pylorus).	104
Figure (38)	Stapling of the fundus.	104
Figure (39)	Gastric pouch is distended with methylene blue to test leak.	105

Figure (40)	The excluded gastric pouch after completion of transection that will be extracted.	106
Figure (41)	Histogram showing the postoperative hospital stay in both groups.	116
Figure (42)	Line chart demonstrating the change in BMI at 1, 6, 12 months	118
Figure (43)	Line chart demonstrating %EWL at 6, 12 months between the 2 groups.	119
Figure (44)	Laparoscopic exploration for patient with +GG study	122
Figure (45)	Positive methylene blue test	122
Figure (46)	Laparoscopic primary repair of Gastric perforation	122
Figure (47)	Omental patch over the repair	122
Figure (48)	GG study showing kinking in midsleeve (blue arrow)	124

Figure (49)	CT virtual gastroscopy showing kinking of the sleeve (red arrow), potential site of stenosis (green arrow)	124
Figure (50)	Focal stenosis in the proximal part of the gastric sleeve (Blue arrow)	126
Figure (51)	Fig (10): Kinking of the upper stomach (Red arrow)	126
Figure (52)	GG study done 1 week after dilatation revealed free flow of the contrast	126
Figure (53)	GG study shows Dilated upper part of the sleeve (Red arrow) with weak stream of the dye in mid-sleeve (blue arrow), and delayed filling of the pylorus (green arrow).	127
Figure (54)	GG showed slight kink at incisura (blue arrow)	129
Figure (55)	slight kink at the incisura and failure to introduce the bougie beyond the site of stenosis	129
Figure (56)	Site of stenosis at incisura with post stenotic antral dilatation	130
Figure (57)	Designing Gastro-jejunostomy of RYGB cranial to the site of anastomosis	130