

Laparoscopic Sleeve Gastrectomy Outcomes

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Abstract

Introduction: Sleeve gastrectomy was first defined in 1990 as a part of the duodenal switch procedure with the formation of a narrow stomach tube along the small curvature of the stomach. Later, researchers proposed that Laparoscopic leave gastrectomy (LSG) reduced the risk profile of the duodenal switch procedure in high risk patients. Additionally, LSG was accepted as a rapid single bariatric surgical procedure due to its simplicity and efficacy. The aim of this study was to describe the outcomes of LSG at a single bariatric unit in King Salman North West Armed Forced Hospital (KSAFH), Tabuk, Saudi Arabia. Objective: To compare outcomes of primary LSG regarding pre and post operative sleep apnea, diabetes mellitus (DM), arterial hypertension (HTN), bronchial asthma, female urinary incontinence, infertility, and gastroesophageal reflux (GERD). We will assess our complications according to the Clavein-Dindo classification. We reviewed the medical records of patients who underwent LSG in King Salman Armed Forces Hospital from 1/1/2015 till 31/6/2017. Methods: This retrospective comparative study is performed in the Department of Surgery, KSAFH. All patients are instructed for follow-up at 1 week and 1, 3, 6, 12, 18, 24 months postoperatively. Laboratory tests are requested every 6 months post op. Improvement of Comorbidities assessed post-operatively. Surgical Complications reported according to the Clavein-Dindo classification. Our results were compared with international studies. Inclusion criteria (more than 14 years, morbid obese with BMI > 40 and obese class 11 with comorbidities). Exclusion criteria (less than 14 years, BMI < 35 and BMI < 40 with no medical illness, revisional cases). Results: A total of 127 patients underwent LSG at King Salman Armed Forces Hospital from 1/1/2015 till 31/5/2017. Of these, 40 were male (31.5%) and 87 were female (68.5%). The mean age was 35 years. Comorbidities included diabetes 31 (24.4%), sleep apnea 25 (19.6%), hypertension 27 (21.3%), dyslipidemia 15 (11.8%) Infertility 9 (7.01%), Osteoarthritis 6 (4.7%), GERD 4 (3.1%), Female Urinary Incontinence 3 (2.4%), Intracranial Hypertension 4 (3.14%), Bronchial Asthma 5 (3.9%), Smoker 2 (1.6%), IHD 3 (2.4%) and ESRD 2 (1.6%). The mean Body Mass Index (BMI) was 47 kg/m². All patients underwent LSG none had conversion. Mean operative time was 86 minute. The mean follow-up duration was 12 months. The mean hospital stav was 3 days. The mean EWL was 67%. The rates of complication by Clavein-Dindo Classification were grade-0 (89.8%), grade-I (5.5%), grade-II (0.8%), grade-IIIA (2.4%), grade-IIIB (2.6%) and none for grade-IV and grade-V. Of Patient with diabetes, 31 (31.5%) preoperative, 2 (6%) no change, 0 (0%) worse, 10 (32%) improve and 19 (61%) resolved postoperative. Patient with sleep apnea, 25 (19.6%) preoperative, 0 (0%) no change, 0 (0%) worse, 4 (16%) improve and 21 (84%) resolved postoperative. Patient with hypertension, 27 (21.3%) preoperative, 5 (19%) no change, 0 (0%) worse, 5 (19%) improve and 17 (63%) resolved postoperative. Patient with infertility, 9 (7.01%) preoperative, 2 (22%) no change, 0 (0%) worse, 2 (22.2%) improve and 5 (55.5%) resolved postoperative. Patient with dyslipidemia, 15 (11.8%) preoperative, 1 (7%) no change, 0 (0%) worse, 4 (27%) improve and 10 (67%) resolved postoperative. Patient with osteoarthritis, 6 (4.7%) preoperative, 2 (33%) no change, 0 (0%) worse, 0 (0%) improve and 4 (67%) resolved postoperative. Patient with GERD, 4 (3.1%) preoperative, 0 (0%) no change, 1 (25%) worse, 2 (50%) improve and 1 (25%) resolved postoperative. Patient with Female Urinary Incontinence, 3 (2.4%) preoperative, 0 (0%) no change, 0 (0%) worse, 1 (33%) improve and 3 (67%) resolved postoperative. Patient with Intracranial Hypertension, 4 (3.14%) preoperative, 1 (25%) no change, 0 (0%) worse, 2 (50%) improve and 1 (25%) resolved postoperative. Patient with Bronchial Asthma, 5 (3.9%) preoperative, 0 (00%) no change, 0 (0%) worse, 2 (40%) improve and 3 (60%) resolved postoperative. Conclusions: Morbid obesity occurs more in females than males. LSG had a long-term weight reduction success to improve and resolution of comorbidities.

Keywords

Gastrectomy, Morbid Obesity, Sleeve Gastrectomy

1. Introduction

Laparoscopic sleeve gastrectomy (LSG) has gained popularity over the years as a standalone procedure. In 2014, it was the most rapidly growing bariatric procedure [1]. In addition to the significant weight loss outcome, its advantage lies in the significant improvement or remission of co-morbidities. LSG, compared with other bariatric procedures preserves gastrointestinal anatomy, results in low surgical morbidity and fewer nutritional deficiencies [2]. The aim of this study was to describe the outcomes of LSG at a single bariatric unit in King Salman North West Armed Forced Hospital (KSAFH), Tabuk, KSA.

2. Objective

We aims to compare outcomes of primary LSG regarding pre and post operative

sleep apnea, diabetes mellitus (DM), arterial hypertension (HTN), bronchial asthma, female urinary incontinence, infertility and gastroesophageal reflux (GERD). We will assess our complications according to the Clavein-Dindo classification. We reviewed the medical records of patients who underwent LSG in King Salman Armed Forces Hospital from 1/1/2015 to 31/6/2017.

3. Methods

This retrospective comparative study is performed in the Department of Surgery, KSAFH.

All patients are instructed for follow-up at 1 week and 1, 3, 6, 12, 18, 24 months postoperatively. Laboratory tests are requested every 6 months post op. Improvement of Comorbidities assessed post-operatively. Surgical Complications were reported according to Clavein-Dindo classification. Our results were compared with international studies. Inclusion criteria (more than 14 years, morbid obese with BMI > 40 and obese class 11 with comorbidities). Exclusion criteria were people who were less than 14 years, BMI < 35 and BMI < 40 with no medical illness, revisional cases).

4. Operative Technique

The surgery was performed through the right-sided position, in a supine position with legs adducted. The surgeon and the cameraman stood on the patient's right side, and the assistants stood on the patient's left side. The procedure was performed through four abdominal trocars. Insufflation was achieved after insertion of the first port optically guided by a 0° scope and then replaced by a 30° scope for optimum visualization. Devascularization of the greater curvature was started at the level of the middle of the body of the stomach, where the greater omentum is made of a single layer and then extended cephalad through the short gastric vessels till the gastroesophageal junction (GEJ) exposing the left leaflet of right crus with complete mobilization of the posterior aspect of the fundus. This means that we start 1st stapling 4 - 6 cm from pylorus and firing after the introduction of 36 French bougies to avoid tight sleeve. The sleeve was completed by sequential firings of the stapler going cephalad toward 1 cm lateral to the angle of his. The hiatal repair was performed when the hiatal hernia is diagnosed preoperatively or intraoperatively. Methylene blue test was done routinely.

5. Results

A total of 127 patients underwent LSG at King Salman Armed Forces Hospital from 1/1/2015 till 31/5/2017. Among which, 40 were male (31.5%) and 87 were female (68.5%). The mean age was 35 years. Comorbidities included: diabetes 31 (24.4%), sleep apnea 25 (19.6%), hypertension 27 (21.3%), dyslipidemia 15 (11.8%), infertility 9 (7.01%), osteoarthritis 6 (4.7%), GERD 4 (3.1%), Female Urinary Incontinence 3 (2.4%), Intracranial Hypertension 4 (3.14%), Bronchial

Asthma 5 (3.9%), Smoker 2 (1.6%), IHD 3 (2.4%) and ESRD 2 (1.6%). The mean Body Mass Index (BMI) was 47 kg/m². All patients underwent LSG didn't have a conversion. The mean operative time was 86 minutes. The mean follow-up duration was 12 months. Mean hospital stay was 3 days. The mean EWL was 67%. The rates of complication by the Clavein-Dindo Classification were grade-0 (89.8%), grade-I (5.5%), grade-II (0.8%), grade-IIIA (2.4%), grade-IIIB (2.6%) and none for grade-IV and grade-V. Of Patient with diabetes, 31 (31.5%) preoperative, 2 (6%) no change, 0 (0%) worse, 10 (32%) improve and 19 (61%) resolved postoperative. Patient with sleep apnea, 25 (19.6%) preoperative, 0 (0%) no change, 0 (0%) worse, 4 (16%) improve and 21 (84%) resolved postoperative. Patient with hypertension 27 (21.3%) preoperative 5 (19%) no change, 0 (0%) worse, 5 (19%) improve and 17 (63%) resolved postoperative. Patient with Infertility, 9 (7.01%) preoperative, 2 (22%) no change, 0 (0%) worse, 2 (22.2%) improve and 5 (55.5%) resolved postoperative. Patient with dyslipidemia, 15 (11.8%) preoperative, 1 (7%) no change, 0 (0%) worse, 4 (27%) improve and 10 (67%) resolved postoperative. Patient with osteoarthritis, 6 (4.7%) preoperative, 2 (33%) no change, 0 (0%) worse, 0 (0%) improve and 4 (67%) resolved postoperative. Patient with GERD, 4 (3.1%) preoperative, 0 (0%) no change, 1 (25%) worse, 2 (50%) improve and 1 (25%) resolved postoperative. Patient with Female Urinary Incontinence, 3 (2.4%) preoperative, 0 (0%) no change, 0 (0%) worse, 1 (33%) improve and 3 (67%) resolved postoperative. Patient with Intracranial Hypertension, 4 (3.14%) preoperative, 1 (25%) no change, 0 (0%) worse, 2 (50%) improve and 1 (25%) resolved postoperative. Patient with Bronchial Asthma, 5 (3.9%) preoperative, 0 (00%) no change, 0 (0%) worse, 2 (40%) improve and 3 (60%) resolved postoperative.

LSG outcome	No change	Worse	Improve	Resolve
Sleep apnea 25 (19.6%)	0 (0%)	0 (0%)	4 (16%)	21 (84%)
Diabetes 31 (31.5%)	2 (6%)	0 (0%)	10 (32%)	19 (61%)
Hypertension 27 (21.3%)	5 (19%)	0 (0%)	5 (19%)	17 (63%)
Infertility 9 (7.01%)	2 (22%)	0 (0%)	2 (22.2%)	5 (55.5%)
Dyslipidemia 15 (11.8%)	1 (7%)	0 (0%)	4 (27%)	10 (67%)
Osteoarthritis 6 (4.7%)	2 (33%)	0 (0%)	0 (0%)	4 (67%)
GERD 4 (3.1%)	0 (0%)	1 (25%)	2 (50%)	1 (25%)
Urinary Incontinence 3 (2.4%)	0 (0%)	0 (0%)	1 (33%)	3 (67%)
Intracranial Hypertension 4 (3.14%)	1 (25%)	0 (0%)	2 (50%)	1 (25%)
Bronchial Asthma 5 (3.9%)	0 (0%)	0 (0%)	2 (40%)	3 (60%)

6. Discussion

Obesity is a worldwide health problem in both developed and developing countries [1]. At present, bariatric surgery is the most effective method to achieve major, long-term weight loss, which has led to a sharp rise in the number and interest of bariatric surgical procedures performed over the past 15 years [3]. Laparoscopic sleeve gastrectomy (LSG) has gained popularity whether as a primary, staged or revisional operation for its proven safety and short-term efficacy [4]. LSG has been associated with several important advantages in terms of pylorus preservation (avoidance of dumping syndrome): preservation of intestinal continuity; does not involve any digestive anastomosis; no mesenteric defects are created; eliminating the risk of internal hernia; and no foreign material is used [5]. LSG results in stable and adequate weight loss with resolution/improvement in comorbidities in a high percentage of patients. It can be considered a definitive operation for morbid obesity [6].

Obesity and rapid weight loss are known risk factors for gall stones formation, and some centers routinely perform prophylactic cholecystectomy with bariatric procedures to prevent complications of cholelithiasis, whereas other centers prefer to do cholecystectomy only for those having gall stones [7]. LSG may cause de novo GERD or may improve or aggravate existing reflux. There is no consensus about mechanisms responsible for the existing reflux outcome, the development of de novo GERD, and also about the effects of LSG in LES function. However, most surgeons agree that LSG can be effectively and safely performed when bariatric surgery is indicated with the exception of Barrett's esophagus and severe GERD. Additionally, there is no universally accepted policy for simultaneous hiatal repair and LSG, although most surgeons agree when hiatal hernia is diagnosed pre- or intra-operatively, that posterior hiatus repair is necessary [8].

The surgical technique and standards of doing sleeve vary from surgeon to surgeon and so are the results in terms of its efficacy (%EWL 33% - 85%) and complication rate (0% - 23.8%). A randomized clinical trial done by Kehagias *et al.* has demonstrated 66% of %EWL by LSG [8]. Many other published series on long-term results of LSG have shown %EWL between 60% and 75% in the initial two years of procedure and maintenance of this excess weight loss to >50% level in long-term follow-up [9].

7. Conclusion

Morbid obesity occurs more in females than males. LSG had long-term weight reduction success, improvement and resolution of comorbidities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Abou-Ashour, H.S. and Ammar, M.S. (2016) Minigastric Bypass: Short-Term Results. *The Egyptian Journal of Surgery*, 35, 215-221.
- [2] Kehagias, I., Karamanakos, S.N., Argentou, M. and Kalfarentzos, F. (2011)

Randomised Clinical Trial of Roux-en-Y Gastric Bypass versus Laparoscopic Sleeve Gastrectomy for the Management of Patients with BMI < 50 Kg/m². *Obesity Surgery*, **21**, 1650-1656. <u>https://doi.org/10.1007/s11695-011-0479-x</u>

- [3] Cui, Y., Elahi, D. and Andersen, D.K. (2011) Advances in the Etiology and Management of Hyperinsulinemic Hypoglycemia after Roux-en-Y Gastric Bypass. *Journal of Gastrointestinal Surgery*, 11, 1585-1588. https://doi.org/10.1007/s11605-011-1585-8
- [4] Akkary, E., Duffy, A. and Bell, R. (2008) Deciphering the Sleeve: Technique, Indications, Efficacy, and Safety of Sleeve Gastrectomy. *Obesity Surgery*, 18, 1323-1329. https://doi.org/10.1007/s11695-008-9551-6
- [5] Guraya, S.Y. and Murshid, K.R. (2011) Laparoscopic Sleeve Gastrectomy for Morbid Obesity: The Future of Bariatric Surgery? *British Journal of Medicine and Medical Research*, 1, 212-222. <u>https://doi.org/10.9734/BJMMR/2011/417</u>
- [6] Chopra, A., Chao, E., Etkin, Y., Merklinger, L., Lieb, J. and Delany, H. (2012) Laparoscopic Sleeve Gastrectomy for Obesity: Can It Be Considered a Definitive Procedure? *Surgical Endoscopy*, 26, 831-837. https://doi.org/10.1007/s00464-011-1960-2
- [7] Hamad, G.G., Ikramuddin, S., Gourash, W.F. and Schauer, P.R. (2003) Elective Cholecystectomy during Laparoscopic Roux-en-Y Gastric Bypass: Is It Worth the Wait? *Obesity Surgery*, 13, 76-81. <u>https://doi.org/10.1381/096089203321136638</u>
- [8] Melissas, J., Braghetto, I., Molina, J.C., Silecchia, G., Iossa, A., Iannelli, A. and Foletto, M. (2015) Gastroesophageal Reflux Disease and Sleeve Gastrectomy. *Obesity Surgery*, 25, 2430-2435. <u>https://doi.org/10.1007/s11695-015-1906-1</u>
- [9] Hirth, D.A., Jones, E.L., Rothchild, K.B., Mitchell, B.C. and Schoen, J.A. (2015) Laparoscopic Sleeve Gastrectomy: Long-Term Weight Loss Outcomes. *Surgery for Obesity and Related Diseases*, 11, 1004-1007. <u>https://doi.org/10.1016/j.soard.2015.02.016</u>