

## **Outcome of Laparoscopic Sleeve Gastrectomy in Morbid and Super Obese Patients: A King Abdulaziz University Hospital Experience**

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*Abstract.* The aim is to evaluate the outcome of laparoscopic sleeve gastrectomy on weight reduction, and associated co-morbidities in morbid and super obese patients. A retrospective review of 36 patients underwent laparoscopic sleeve gastrectomy from October 2008 to April 2010 at King Abdulaziz University Hospital. The medical records of patients reviewed based on excess weight loss, operative variables, postoperative complications, and the effects on obesity related to co-morbidities. The mean operating time was 186 min (120-300 min). Major complications were bleeding (one), gastric leakage (one), and deep vein thrombosis (one). There was one case of mortality. The mean hospital stay was four days and the median follow-up was 13 months (12-18 months). The median percentage of excess weight loss at one year was 38.2% (8.5-57.2%), which was more in male and super obese patients. Diabetes was improved in 13 of 14 patients and hypertension was controlled in all hypertensive patients (17 patients). Infertility was improved in the infertile patients (two patients) while joint pain improved in 80.95% and sleep apnea in 93.75% of the cases. Excess weight loss in laparoscopic sleeve gastrectomy observed to be more in male and super obese patients, thus, results in a significant improvement in obesity related co-morbidities.

Keywords: Laparoscopic sleeve gastrectomy, *Diabetes mellitus*, Hypertension.

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## Introduction

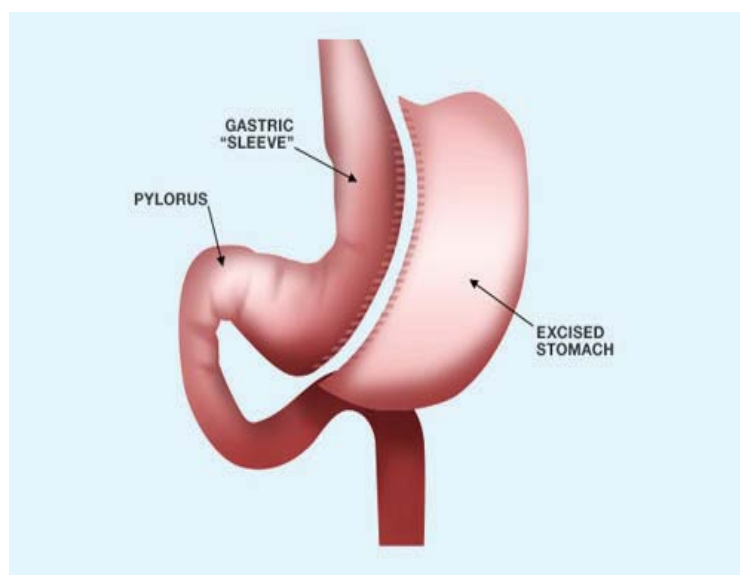
Various methods to control obesity such as dieting and exercise have failed to achieve long-term weight loss<sup>[1,2]</sup>. Drug therapy with serotonin re-uptake inhibitor (sibutramine) which reduces appetite and orlistat, which inhibits fat absorption that has been found to be effective in 10% of the obese patients<sup>[3]</sup>. Hence, there is a need for an alternative solution to this problem. Bariatric surgery, also known as metabolic surgery, offers a long-term goal of achieving weight loss and a significant improvement in co-morbid states such as Type 2 *diabetes mellitus* (T2DM) and hypertension (HTN), thus, improving the quality of life and decreasing mortality rates<sup>[4]</sup>. Indications of bariatric surgeries are BMI > 40 kg/m<sup>2</sup> or BMI > 35 kg/m<sup>2</sup> if associated with co-morbidities, such as T2DM, HTN, obstructive sleep apnea, or on a six months lifestyle modification. Plus, medical treatment have failed to produce sustained adequate weight loss, and performed on age between 18 and 65 years<sup>[5]</sup>. Common contraindications are patients with high anesthetic risk, alcohol or drug abuse, advanced liver disease, major depression or psychoses, and the inability to comply with postoperative medical, nutritional, and psychological assessments<sup>[6,7]</sup>.

There are many bariatric procedures that are available, such as laparoscopic adjustable gastric banding (LAGB) and laparoscopic sleeve gastrectomy (LSG), which are restrictive procedures, and other malabsorptive procedures, such as Roux-en-Y gastric bypass (RNY), Biliopancreatic diversion (BPD), and Biliopancreatic diversion with duodenal switch (BPDDS). This study presents preliminary results of LSG in morbidly obese patients.

## Methods

This is a retrospective review of 36 patients who underwent LSG (Fig. 1) by a single surgeon at King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia, between October 2008 and April 2010. All patients with BMI  $\geq$  40 kg/m<sup>2</sup> or BMI > 35 kg/m<sup>2</sup> if associated with co-morbidity, such as DM, HTN, sleep apnea, and lower limb joint pain were selected for surgery, except one patient with BMI of 32 kg/m<sup>2</sup>, who was operated because of the psychological effect of obesity on her social life. All patients seen and counseled by a dietician before surgery

and necessary advice was given by a psychiatrist in some cases when required. Preoperative assessment for co-morbid conditions performed in all cases such as DM, HTN, duration, medications, and their doses. Detailed history of obesity was reviewed, such as the duration, medical treatment as well as diet and exercise trials to control obesity. Effects of obesity on routine work and related complaints were also reviewed, such as sleep apnea, joint pains and infertility. LSG procedure was explained to the patients, along with its benefits and possible complications. Patients who agreed to have a minimum of 1-year follow-up were offered LSG.



**Fig. 1.** An illustration of laparoscopic sleeve gastrectomy.

Assessment of the effect of LSG was achieved by assessing the percentage of excess weight loss (EWL) and BMI changes, as well as improvement of co-morbid conditions. Operative assessment was performed based on operative time and complications during surgery, such as bleeding and injury to nearby organs, life-threatening incidents, pulmonary embolism (PE), *etc.* Postoperative complications; leakage, bleeding, intensive care unit (ICU) admission, wound infections, and deep vein thrombosis (DVT) were also reviewed. The patients were subdivided into five subgroups based on BMI. The data entered and analyzed using the statistical package for social sciences (SPSS Inc, Chicago, IL, USA), version 17. Statistical significance determined when the  $p$  value was  $< 0.005$ , by using paired  $t$ -test for comparison.

## Results

In this study, 36 obese patients underwent LSG, for which 22 were females (61.1%) and 14 were males (38.9%). The age of the patients ranged from 16 to 58 years (mean 33 years). The range of weight was 82-220 kg (mean 150 kg) and that of height was 148-177 cm (mean 161 cm). The BMI ranged between 32 and 72 kg/m<sup>2</sup> (mean 57 kg/m<sup>2</sup>) (Table 1). Distribution of obesity was of central type in nine patients (25%), while it was combined central and peripheral obesity in 27 patients (75%). Childhood obesity was predominant in 22 patients (61.1%) and adulthood obesity was found in 14 patients (38.9%). Out of the 36 patients, 25 patients (69.4%) had tried dieting and 11 patients (30.6%) had tried medication as a means to reduce weight, but with no apparent benefit. All patients were sedentary and reported that obesity was hampering their routine work. Eating habits were more of calorie and volume in 24 patients (66.7%), while 12 patients (33.3%) were calorie eaters.

**Table 1. General characteristic of patients.**

Patient	Range	Mean
Age (yrs)	16 - 58	33
Weight (kg)	82 - 220	150
Height (cm)	148 - 177	161
BMI	32 - 72	57

Preoperatively, all the patients were classified into five groups depending on their BMI. The first group had three patients (8.3%) with a BMI of 30-40 kg/m<sup>2</sup>; the second group had eight patients (22.2%) with a BMI of 41-50 kg/m<sup>2</sup>, and the third group had 14 patients (38.9%) with a BMI of 51-60 kg/m<sup>2</sup>. However, the fourth group had seven patients (19.4%) with a BMI of 61-70 kg/m<sup>2</sup>, and the fifth group had four patients (11.2%) with a BMI of 71-80 kg/m<sup>2</sup>.

Fourteen patients (38.9%) had diabetes, with 13 patients having T2DM and one patient having T1DM. Furthermore, 50% of the diabetics were both on insulin and oral hypoglycemic agents together, while 50% were on oral hypoglycemic agent alone. In addition, 17 patients (47.2%) had HTN, 26 patients (72.2%) had history of sleep apnea, and 31 patients (86.1%) were complaining of joint pains before surgery. Two patients (9.1%) were infertile, one primary and one secondary infertility.

The duration of operation ranged from 120 to 300 min (mean 180 min). Complications encountered during surgery were one case of bleeding due to injury of short gastric vein for which the surgery was converted to open as to control the bleeding. DVT in one case, despite that all patients were receiving thrombo-embolic prophylaxis before surgery; it was diagnosed on the third postoperative day and managed accordingly. Gastric leakage (one case) was discovered on the second postoperative day. The patient was taken to the operating room and the leakage was detected at the site of the first staple line at the level of crow's foot, which was re-sutured laparoscopically. PE (one case) was discovered on the third postoperative day, and subsequently, the patient died (one mortality). All patients were transferred to ICU for overnight observation. The duration of hospital stay ranged from three to five days with a mean of four days.

The median follow-up was 13 months (range 12-18 months) and the median percentage of EWL in one year was 38.2% (range 8.5-57.2%). Furthermore, the median BMI change was 25% (range 5.7-60.4%). The effect of LSG on weight reduction in different BMI groups was observed. The maximum percentage of EWL was found in Group 5 and the least was observed in Group 1; thus, the males and super obese patients (in Group 5) were the ones who had the maximum benefit on weight reduction (Table 2).

**Table 2. Postoperative changes in % of BMI and % of EWL.**

No.	BMI GROUP	No. of Patients	% of Patients	Mean EWL [Kg]	% EWL	% of BMI Change
I	30 ----- 40	3 (0 M, 3 F)	8.3	10.3	11.4	9.41
II	41 -----50	8 (2 M, 6 F)	22.2	30.58	25.34	22.2
III	51----- 60	14 (4 M, 10 F)	38.9	37.95	26.58	25.48
IV	61 -----70	7 (4 M, 3 F)	19.4	50.37	11.89	11.51
V	71 -----80	4 (4 M, 0 F)	11.2	100	49.5	53.5

*P- Value of % EWL (0.0001), P- Value of % BMI changes (0.0001) (By paired T test)*

*EWL: Excess weight loss, BMI: Body mass index, M: Male, F: Female*

Benefits of LSG were not only in terms of weight reduction, but other positive findings were also observed, such as cure of diabetes in 13 (92.9%) cases out of the 14 diabetic patients and cure of all (17 cases) hypertensive patients (100%). Furthermore, two patients who were infertile became pregnant within one year of LSG. Out of the 26 patients with sleep apnea, 22 patients (84.6%) showed improvement. Moreover, out of the 31 patients with joint pain, 27 patients (87.1%) showed improvement.

## Discussion

Incidence of obesity has been increasing both in developing and developed countries. According to the World Health Organization (WHO), one billion people in the world are overweight with a body mass index (BMI) between 25 and 30, and 300 million people are obese (BMI > 30 kg/m<sup>2</sup>). In the Kingdom of Saudi Arabia, obesity prevalence is rising, comprising 30.7% of Saudi males and 28.4% of females between the age of 18 and 60 years who are overweight (BMI > 25 kg/m<sup>2</sup>), and 14.2% of males and 23.6% of females who are obese (BMI > 30 kg/m<sup>2</sup>)<sup>[1]</sup>. The highest incidence of obesity was found in Hail (33.9%), followed by Al Sharaqiya (27.7%), Riyadh (21.7%), Makkah (19.3%), Jeddah (16.4%), and the lowest in Jizan (11.7%)<sup>[2]</sup>. These high rates of obesity in Saudi Arabia are due to sedentary lifestyle, lack of physical exercises, and shift to fast food and carbonated drinks<sup>[1]</sup>. Obesity is associated with many chronic conditions, such as Type 2 *diabetes mellitus* (T2DM), coronary heart disease, hypertension (HTN), dyslipidemia, obstructive sleep apnea, cancer, and infertility.

LSG has recently acquired its place in bariatric surgery as a viable alternative to other restrictive and malabsorptive procedures. It was first introduced in bariatric surgery in 1988 by Hess and Marceau as the restrictive part of the duodenal switch (DS)<sup>[10,11]</sup>. In 1999, Gagner and Rogula described this operation as the first of two stages of BPDDS to decrease the high mortality associated with complex operation in super obese patients<sup>[12,13]</sup>. After that, Ren *et al.* described LSG as the first-stage procedure in RNY in super obese patients. Since 2004, LSG was reported as the standalone safe bariatric procedure<sup>[14,15]</sup>.

LSG works by various mechanisms, such as restrictive mechanism, which reduces the size of the stomach, thereby reducing its volume, and

makes it less distendable during eating and generating a feeling of fullness and early satiety with minimal oral intake<sup>[7]</sup>. Another mechanism is that through transaction of fundus and greater curvature of stomach, reduction in the level of ghrelin hormone could be achieved<sup>[16,17]</sup>. Ghrelin is a hormone that is secreted from the fundus of the stomach, which is a potent appetite stimulator that regulates the growth hormone release, which activates ghrelin receptors in the hypothalamus/pituitary area. Langer *et al.* reported significantly reduced level of ghrelin following LSG at one and six months<sup>[18]</sup>.

LSG has acquired unique position in bariatric surgery as it is simpler and effective in weight reduction with few complications, when compared with LAGB, such as no postoperative adjustment of the band, better patient tolerance, and less regurgitation<sup>[5]</sup>. LSG, when compared with malabsorptive procedures, such as RNY, BPD, and BPDDS is much superior as there is no nutritional deficiency, no stomach ulceration and dumping syndrome, in addition to comparable weight loss<sup>[6]</sup>.

LSG showed a significant EWL. In this study, the median percentage of EWL was 38.2% in one year; other studies have reported 39.9, 47.2, and 78% at a one year<sup>[19-21]</sup> period. It was observed, that the maximum EWL was in males and super obese patients. The median percentage of BMI change in this series was 25% in one year, while other studies have reported 23.1% in one year<sup>[21-23]</sup>. The complications of LSG ranged from postoperative gastric leakage, DVT, PE, bleeding, splenectomy, port site infection, and hernia. The mortality rates ranged from 0 to 0.7%. Hence, no case of port site infection, hernia, or splenectomy was observed in this study.

Obesity is intimately related to T2DM, and was found that 80% of the patients with T2DM were overweight (BMI > 25 kg/m<sup>2</sup>), 50% were obese (BMI > 30 kg/m<sup>2</sup>), and 10% were morbidly obese (BMI > 40 kg/m<sup>2</sup>). In this study, diabetes was improved in 92.9% of our patients, while other reports showed 43–100% improvement<sup>[24,25]</sup>. Control of HTN in 100% of our patients, while others reported 43-92.9%<sup>[26,27]</sup>.

Obesity is associated with infertility. Anovulation is the cause of infertility in one-third of the couples attending infertility clinic<sup>[28]</sup>. Furthermore, polycystic ovary syndrome accounts for 90% of such couples, and about 40-50% of these cases are overweight<sup>[29]</sup>. Losing 5-10% of the total body weight can reduce central fat up to 30% and restore

ovulation by improving insulin sensitivity<sup>[30-32]</sup>. In this study, infertility improved in all the infertile patients (two cases). No co-relation between LSG and improvement in infertility in the literature was found, and probably, this study is the first one to show this improvement.

In conclusion, LSG is a promising standalone bariatric procedure, which results in excessive weight loss and significant improvement in co-morbid states. Furthermore, the complications are acceptable and can be minimized by careful planning and adequate counseling. Significant improvement in diabetes, HTN, and infertility shows that there is a role of surgery for the treatment of these diseases, especially in obese patients. Long-term follow-up after surgery is needed to assess the durability of weight loss and remission of co-morbidity factors.

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### **References**

- [1] **Al Othaimen AI, Al-Nozha M, Osman AK.** Obesity an emerging problem in Saudi Arabia; analysis of data from national nutrition survey. *East Mediterr Health J* 2007; **13**(2): 441-448.
- [2] **Scheen AJ, Lefebvre PJ.** Management of obese diabetic patients. *Diabetes Rev* 1999; **7**: 77-93.
- [3] **Wirth A, Krause J.** Long-term weight loss with sibutramine: a randomized controlled trial. *J Am Med Assoc* 2001; **286**(11): 1331-1339.
- [4] **Christou NV, Sampalis JS, Liberman M, Look D, Auger S, McLean AP, Maclean LD.** Surgery decreases long-term mortality, morbidity and health care use in morbidly obese patients. *Ann Surg* 2004; **240**(3): 416-424.
- [5] **Himpens J, Capri G, Cadiere GB.** Prospective randomize study between LAGB & LSG one and three years. *Obes Surg* 2006; **16**(11): 1450-1456.
- [6] **Buchwald H, Estok R , Fahrbach K , Banel D, Jensen MD, Pories WG, Bantle JP, Sledge I.** Weight and type 2 diabetes after bariatric surgery: systematic review and meta-analysis. *Am J Med* 2009; **122**(3): 248-256.
- [7] **Cottam D, Qureshi FG, Mattar SG, Sharma S, Holover S, Bonanomi G, Ramanathan R, Schauer P.** Laparoscopic sleeve gastrectomy as an initial weight-loss procedure for high-risk patients with morbid obesity. *Surg Endosc* 2006; **20**(6): 859-863.
- [8] **Mognol P, Chosidow D, Marnuse JP.** Laparoscopic Sleeve Gastrectomy as initial bariatric procedure in high risk patients. *Obes Surg* 2005; **15**(7): 1030-1033.
- [9] **Lannelli A, Dainese R, Pichie T, Facchiano E, Gugenheim J.** Laparoscopic Sleeve Gastrectomy for morbid obesity. *World J Gastroentrol* 2008; **14**(6): 821-827.



- [10] **DeMeester TR, Fuchs KH, Ball CS, Albertucci M, Smyrk TC, Marcus JN.** Experimental and clinical results with proximal end-to-end duodeno-jejunosomy for pathologic duodenogastric reflux. *Ann Surg* 1987; **206**(4): 414-426.
- [11] **Gregg HJ, Gary A.** History of sleeve gastrectomy. *Bariatric Times* 2010; **7**(2): 9-10.
- [12] **Hess DS, Hess DW.** Biliopancreatic diversion with a duodenal switch. *Obes Surg* 1998; **8**(3): 267-282.
- [13] **Tretbar LL, Taylor TL, Sifers EC.** Weight reduction. Gastric placcation for morbid obesity. *J Kans Med Soc* 1976; **77**(11): 488-490.
- [14] **de Csepel J, Burpee S, Jossart G, Andrei V, Murakami Y, Benavides S, Gagner M.** Laparoscopic biliopancreatic diversion with a duodenal switch for morbid obesity: a feasibility study in pigs. *J Laparoendosc Adv Surg Tech A* 2001; **11**(2): 79-83.
- [15] **Kim WW, Gagner M, Kini S, Inabnet WB, Quinn T, Herron D, Pomp A.** Laparoscopic vs. open biliopancreatic diversion with a duodenal switch: a comparative study. *J Gastrointest Surg* 2003; **7**(4): 552-557.
- [16] **Jacobs M, Bisland W, Gomez E, Plasencia G, Mederos R, Celaya C, Fogel R.** Laparoscopic sleeve gastrectomy: a retrospective review of 1- and 2-year results. *Surg Endosc* 2010; **24**(4): 781-785.
- [17] **Karra E, Batterham RL.** The role of gut hormones in the regulation of body weight and energy homeostasis. *Mol Cell Endocrinol* 2010; **316**(2): 120-128.
- [18] **Langer FB, Reza Hoda MA, Bohdjalian A, Felberbauer FX, Zacheri J, Wenzi E, Schindler K, Luegr A, Ludvik B, Prager G.** Sleeve gastrectomy and gastric banding: effects on plasma ghrelin levels. *Obes Surg* 2005; **15**(7): 1024-1029.
- [19] **Moy J, Pomp A, Dakin G, Parikh M, Gagner M.** Laparoscopic sleeve gastrectomy for morbid obesity. *Am J Surg* 2008; **196**(5): e56-59.
- [20] **Armstrong J, O'Malley SP.** Outcomes of sleeve gastrectomy for morbid obesity. A safe and effective procedure. *Int J Surg* 2010; **8**(1): 69-71.
- [21] **Nienhuijs SW, de Zoete JP, Berende CA, DeHingh IH, Smulders JF.** Evaluation of laparoscopic sleeve gastrectomy on weight loss and co-morbidity. *Int J Surg* 2010; **8**(4): 302-304.
- [22] **Menenakos E, Stamou K, Albanopoulos K, Papailiou J, Theodorou D, Leandros E.** Laparoscopic sleeve gastrectomy performed with intent to treat morbid obesity: a prospective single-center study of 261 patients with a median follow-up of 1 year. *Obes Surg* 2010; **20**(3): 276-282.
- [23] **Jacobs M, Bisland W, Gomez E, Plasencia G, Mederos R, Celaya C, Fogel R.** Laparoscopic sleeve gastrectomy: a retrospective review of 1- and 2-year results. *Surg Endosc* 2010; **24**(4): 781-785.
- [24] **DePaula Aureo Ludovico, Macedo A L V, Schraibman V, Mota B R; Vencio S.** Hormonal evaluation following laparoscopic treatment of type 2 diabetes mellitus patients with BMI 20-34. *Surgical Endosc* 2009; **23**(8): 1724-1732.
- [25] **Roa PE, Kaidar-Person O, Pinto D, Cho M, Szomstein S, Rosenthal RJ.** Laparoscopic sleeve gastrectomy as treatment for morbid obesity: technique and short-term outcome. *Obes Surg* 2006; **16**(10): 1323-1326.
- [26] **Silecchia G, Boru C, Pecchia A, Rizzello M, Casella G, Leonetti F, Basso N.** Effectiveness of laparoscopic sleeve gastrectomy on co-morbidities in super obese high risk patients. *Obes Surg* 2006; **16**(9): 1138-1144.
- [27] **Moon Han S, Kim WW, Oh JH.** Results of laparoscopic sleeve gastrectomy (LSG) at one year in morbidly obese Korean patients. *Obes Surg* 2005; **15**(10): 1469-1475.
- [28] **Fauser B, Tarlatzis B, Chang J, Azziz R, Legro R, Dewailly D.** The Rotterdam ESHRE/ASRM-sponsored PCOS consensus workshop group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome (PCOS). *Hum Report* 2004; **19**: 41-47.

- [29] **Legro RS, Castracane VD, Kauffman RP.** Detecting insulin resistance in polycystic ovary syndrome: purposes and pitfalls. *Obstet Gynecol Surv* 2004; **59**(2): 141-154.
- [30] **Norman RJ, Noakes M, Wu R, Davies MJ, Moran L, Wang JX.** Improving reproductive performance in overweight/obese women with effective weight management. *Hum Reprod Update* 2004; **10**(3): 267-280.
- [31] **Wax TR, Pinette MG, Cartin A, Blackstone J.** Female reproductive issues following bariatric surgery. *Obs Gynecol Surv* 2007; **62**(9): 595-604.
- [32] **Kral JG, Christou NV, Flum DR, Wolfe BM, Schauer PR, Gagner M, Ren C, Stiles S, Wadden TA, Tanner S, Stratiff R, Pories WJ, Sugarman HJ.** Medicare and bariatric surgery. *Surg Obes Relat Dis* 2005; **1**(1): 35-63.

## نتائج عملية تكميم المعدة لمرضى السمنة المفرطة والخطرة،

خبرة مستشفى جامعة الملك عبدالعزيز

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جدة - المملكة العربية السعودية

المستخلص. معرفة نتائج وتأثير عملية تكميم المعدة في إنقاص الوزن و معالجة الأمراض المصاحبة للسمنة المفرطة. دراسة استرجاعية ل ٣٦ مريض خضعوا لعملية تكميم المعدة في الفترة بين أكتوبر ٢٠٠٨ و أبريل ٢٠١٠م في مستشفى جامعة الملك عبدالعزيز. تم مراجعة ملفات المرضى لمعرفة نسبة فقدان الوزن الزائد تفاصيل العملية تأثير العملية على الأمراض المصاحبة للسمنة المفرطة أظهرت الدراسة أن متوسط زمن العملية ١٨٦ دقيقة (معدل ١٢٠-٣٠٠). المضاعفات التي حدثت أثناء أو بعد العملية كانت نزيف دموي (حالة واحدة)، تسرب من المعدة (حالة واحدة) جلطة في أوردة الساق (حالة واحدة) كانت هناك حالة وفاة واحدة. متوسط عدد أيام التنويم بالمستشفى ٤ أيام. متوسط مدة متابعة المرضى ١٣ شهرًا (١٢-١٨). متوسط فقدان زيادة الوزن بعد سنة من العملية هو ٣٨,٢% (معدل ٨,٥-٧٥,٢%) تحسن مرض داء السكري في ١٣ مريض (من أصل ١٤)، ومرض ارتفاع ضغط الدم في جميع المرضى (١٧ حالة)، ومرض العقم في الحالتين المشمولة في الدراسة، وآلام المفاصل بنسبة ٨٠,٩٥%، ومرض متلازمة توقف التنفس أثناء النوم بنسبة ٩٣,٧٥% من المرضى. تم ملاحظة أن فقدان الوزن الزائد في عملية تكميم المعدة يكون أكثر لدى المرضى

الذكور والذين يعانون من السمنة المفرطة والخطرة، كما تؤدي هذه العملية إلى تحسن ملحوظ في الأمراض المصاحبة للسمنة.