The following table explains and compares the various weight loss surgeries, and their differences. For more information, please also read our compilation of related medical journals & articles below the table.

**Procedure Type:**

- **Restrictive**
- **Metabolic and Malabsorbtion**

**Procedure Names**

- **Adjustable Gastric Band (LAGB)**
  - AKA: Lap-Band®

- **Realize Band**

- **Vertical Sleeve Gastrectomy (VSG)**
Weight Loss Surgery Comparison

AKA: VSG, LSG

Laparoscopic Sleeve Gastrectomy

Gastric sleeve

**Gastric Bypass**
(GBP)

AKA: RYGBP

Proximal gastric bypass.

Short limb gastric bypass.

**Biliopancreatic Diversion**
(BPD)

AKA: BPD

Scopinaro procedure.

Distal gastric bypass.
Weight Loss Surgery Comparison

Long limb gastric bypass.

**Duodenal Switch (DS)**

AKA: DS, Sleeve

**LAGB**

**VSG**

**GBP**

**BPD**

**DS**

**Availability**

Performed by many bariatric surgeons. Some have opted out because of relatively high long term band removal rate.

Broadly available.
Few centers offer this procedure.

LAGB

VSG

GBP

BPD

DS

**Mechanism of action**

Reduces hunger. Reduces rate at which food can enter stomach.

Limits amount of food that can enter stomach. Reduces ghrelin hormone level. Increases pancreatic stimulating hormone.

Decreases size of stomach. Alters flow of nutrients which causes early satiety. Reduces ghrelin level. Increases pancreatic stimulating hormone.
Limits number of calories absorbed by shortening effective length of small bowel. Mild restriction of stomach size. Alteration of nutrient flow may induce early satiety. Probable change in gut hormones to improve pancreatic function.

**LAGB**

**VSG**

**GBP**

**BPD**

**DS**

**Typical percentage of excess weight loss at 5 years**

35-50%

55-60%.

65%

60-80%
Weight Loss Surgery Comparison

60-80%

LAGB

VSG

GBP

BPD

DS

Relief of comorbid conditions

Good if weight loss successful.

Early data suggest relief of diabetes is very good.

Very good, probably better than LAGB, VSG for diabetes.

Very good to excellent.
Weight Loss Surgery Comparison

Very good to excellent.

LAGB

VSG

GBP

BPD

DS

Advantages

No alteration in metabolism of ingested foods. Lowest operative risk.

No alteration in metabolism of ingested foods. Low operative risk.

Very good balance of weight loss, metabolic side effects, and surgical risk.

Well studied over many years. Very durable results.
No dumping syndrome. Iron deficiency less of a problem. Very durable results

LAGB

VSG

GBP

BPD

DS

Ease of reversibility (always requires another surgery).

Relatively straightforward. Band can be removed laparoscopically. Stomach essentially returns to normal.

90% of stomach removed. Can not be reversed. Can be converted to gastric bypass. One study suggests...
Moderate to difficult, but can be reversed to essentially normal anatomy and function.

Can not be fully reversed because the lower portion of the stomach has been removed.

90% of stomach has been removed. The small bowel can be reconnected. The sleeve portion can be converted to a gastric bypass. The bypass is less malabsorptive than the switch.

**LAGB**

**VSG**

**GBP**

**BPD**

**DS**

**Surgical risk**

Relatively low.

Low to moderate.
Weight Loss Surgery Comparison

Moderate.

Moderate.

Moderate.

<table>
<thead>
<tr>
<th>LAGB</th>
<th>VSG</th>
<th>GBP</th>
<th>BPD</th>
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Disadvantages

May not provide adequate weight loss especially for people who persist in snacking and/or eating sweets.

May not provide adequate weight loss especially for people who persist in snacking and/or eating sweets.

Effectiveness limited if patient snacks. Decreased iron and potential decreased B12 and calcium absorption.

Real potential for protein and calorie malnutrition. Diarrhea, foul smelling gas. Decreased iron and potential decreased B12 and calcium absorption.


LAGB
VSG

GBP

BPD

DS

Supplements

Multivitamins.

Multivitamins, Iron, B12.

Multivitamins, Iron, calcium, B12.

Iron, calcium, B12, multivitamins, Vitamins A, D, protein.

Calcium, protein, multivitamins, vitamins A and D. Iron, B12.

Related Medical Journals Articles

Click here for Sleeve Statement from ASMBS (12/22/2009)
Gastric Bypass vs Sleeve Gastrectomy for Type 2 Diabetes Mellitus: A Randomized Controlled Trial. Archives of Surgery. 2011 Feb;146(2):143-8

Lee WJ, Chong K, Ser KH, Lee YC, Chen SC, Chen JC, Tsai MH, Chuang LM.

Diabetic Center, Min-Sheng General Hospital, National Taiwan University, 168 Jingguo Rd, Taoyuan City, Taoyuan County 330, Taiwan, Republic of China. wjlee_obessurg_tw@yahoo.com.tw.

OBJECTIVES: To determine the efficacies of 2 weight-reducing operations on diabetic control and the role of duodenum exclusion.

DESIGN: Double-blind randomized controlled trial.

SETTING: Department of Surgery of the Min-Sheng General Hospital, National Taiwan University.

PATIENTS: We studied 60 moderately obese patients (body mass index >25 and <35) aged >30 to <60 years who had poorly controlled type 2 diabetes mellitus (T2DM) (hemoglobin A(1c) [HbA(1c)] >7.5%) after conventional treatment (>6 months) from September 1, 2007, through June 30, 2008. Patients and observers were masked during the follow-up, which ended in 2009, 1 year after final enrollment.

INTERVENTIONS: Gastric bypass with duodenum exclusion (n = 30) vs sleeve gastrectomy without duodenum exclusion (n = 30).

MAIN OUTCOME MEASURES: The primary outcome was remission of T2DM (fasting glucose...
<126 mg/dL and HbA(1c) <6.5% without glycemic therapy). Secondary measures included weight and metabolic syndrome. Analysis was by intention to treat.

RESULTS: Of the 60 patients enrolled, all completed the 12-month follow-up. Remission of T2DM was achieved by 28 (93%) in the gastric bypass group and 14 (47%) in the sleeve gastrectomy group (P = .02). Participants assigned to gastric bypass had lost more weight, achieved a lower waist circumference, and had lower glucose, HbA(1c), and blood lipid levels than the sleeve gastrectomy group. No serious complications occurred in either group.

CONCLUSIONS: Participants randomized to gastric bypass were more likely to achieve remission of T2DM. Duodenum exclusion plays a role in T2DM treatment and should be assessed. Trial Registration clinicaltrials.gov Identifier: NCT00540462 (http://www.clinicaltrials.gov).

Long-term effects of laparoscopic sleeve gastrectomy, gastric bypass, and adjustable gastric banding on type 2 diabetes.


Department of Surgical-Medical Digestive Diseases, Policlinico Umberto I, University La Sapienza, Viale del Policlinico, 00161 Rome, Italy.

BACKGROUND: This study aimed to compare the efficacy of laparoscopic sleeve gastrectomy (SG) with that of laparoscopic gastric bypass (GBP) and laparoscopic adjustable gastric banding (AGB) for glucose homeostasis in morbidly obese subjects with type 2 diabetes mellitus (T2DM) at a 3-year follow-up assessment and to elucidate the role of weight loss in the T2DM resolution after SG.

METHODS: For this study, 60 morbidly obese T2DM patients (44 females and 16 males) who underwent AGB (24 patients), GBP (16 patients), or SG (20 patients) between 1996 and 2008 were retrospectively analyzed. Age, sex, body mass index (BMI), estimated weight loss (EWL),
fasting glycemia, HbA1c, euglycemic hyperinsulinemic clamp, discontinuation of diabetes treatment, and time until interruption of therapy were evaluated.

RESULTS: In the study, 54 patients received oral hypoglycemic agents for at least 12 months before surgery, and 6 patients received insulin. The mean follow-up period was 36 months. The resolution rate was 60.8% for the AGB patients, 81.2% for the GBP patients, and 80.9% for the SG patients. The postoperative time until interruption of therapy was 12.6 months for the AGB patients, 3.2 months for the GBP patients, and 3.3 months for the SG patients. The hyperinsulinemic euglycemic clamp test was performed 12 months after surgery for the cured patients. Insulin resistance was restored to normal values in all the patients. The greatest improvement from preoperative values occurred in the SG group. For the not-cured GBP and SG patients, an improvement of 120 mg/dl in fasting plasma glucose was observed 3 months after the surgery, suggesting an enhancement in insulin sensitivity, which determines better medical control. The resolution rate remained constant at the 36-month follow-up evaluation in both the GBP and SG groups.

CONCLUSIONS: All three bariatric procedures are effective in treating diabetes, with a 3-year follow-up evaluation showing an effect that lasts. The AGB procedure was the least effective. The antidiabetic effect was similarly precocious after GBP and SG compared with AGB. This difference may indicate that a hormonal mechanism may be involved, independent of weight loss.


Sleeve gastrectomy.

Rosen DJ, Dakin GF, Pomp A.

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Much has been published over the last few years about sleeve gastrectomy. It is a bariatric operation that has evolved from both established restrictive and malabsorptive procedures. Originally used as a bridge to definitive surgery in high-risk patients, it has recently been forwarded as a stand-alone procedure. Technical details of laparoscopic sleeve gastrectomy (LSG) vary, but the premise is removal of the vast majority of the stomach, especially the
fundus, leaving only a thin gastric tube between the esophagus and the duodenum. This results in weight loss from restrictive as well as neurohormal mechanisms. Review of the literature reveals an average expected excess weight loss (EWL) of 61%. Morbidity and mortality seem to be on par with laparoscopic adjustable gastric banding (LAGB), but with superior weight loss results and an improved long-term complication profile. Unlike popular mixed malabsorptive procedures like Roux en-Y gastric bypass (RYGB) and biliopancreatic diversion with duodenal switch (BPD-DS), there is no gastrointestinal segment exclusion, maintaining continuity for endoscopic interventions and surveillance. Comorbidity resolution with LSG is variable, though compares favorably with other bariatric procedures. While the early results seem promising, long-term data is still needed to define the place of LSG within the bariatric surgery armamentarium.


Gastric banding or bypass? A systematic review comparing the two most popular bariatric procedures.

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OBJECTIVE: Bariatric surgical procedures have increased exponentially in the United States. Laparoscopic adjustable gastric banding is now promoted as a safer, potentially reversible and effective alternative to Roux-en-Y gastric bypass, the current standard of care. This study evaluated the balance of patient-oriented clinical outcomes for laparoscopic adjustable gastric banding and Roux-en-Y gastric bypass. METHODS: The MEDLINE database (1966 to January 2007), Cochrane clinical trials database, Cochrane reviews database, and Database of Abstracts of Reviews of Effects were searched using the key terms gastroplasty, gastric bypass, laparoscopy, Swedish band, and gastric banding. Studies with at least 1 year of follow-up that directly compared laparoscopic adjustable gastric banding with Roux-en-Y gastric bypass were included. Resolution of obesity-related comorbidities, percentage of excess body weight loss, quality of life, perioperative complications, and long-term adverse events were the abstracted outcomes. RESULTS: The search identified 14 comparative studies (1 randomized trial). Few studies reported outcomes beyond 1 year. Excess body weight loss at 1 year was consistently greater for Roux-en-Y gastric bypass than laparoscopic adjustable gastric banding (median
difference, 26%; range, 19%-34%; P < .001). Resolution of comorbidities was greater after Roux-en-Y gastric bypass. In the highest-quality study, excess body weight loss was 76% with Roux-en-Y gastric bypass versus 48% with laparoscopic adjustable gastric banding, and diabetes resolved in 78% versus 50% of cases, respectively. Both operating room time and length of hospitalization were shorter for those undergoing laparoscopic adjustable gastric banding. Adverse events were inconsistently reported. Operative mortality was less than 0.5% for both procedures. Perioperative complications were more common with Roux-en-Y gastric bypass (9% vs 5%), whereas long-term reoperation rates were lower after Roux-en-Y gastric bypass (16% vs 24%). Patient satisfaction favored Roux-en-Y gastric bypass (P=.006). CONCLUSION: Weight loss outcomes strongly favored Roux-en-Y gastric bypass over laparoscopic adjustable gastric banding. Patients treated with laparoscopic adjustable gastric banding had lower short-term morbidity than those treated with Roux-en-Y gastric bypass, but reoperation rates were higher among patients who received laparoscopic adjustable gastric banding. Gastric bypass should remain the primary bariatric procedure used to treat obesity in the United States.


Laparoscopic adjustable gastric banding versus Roux-en-Y gastric bypass: 5-year results of a prospective randomized trial.

Angrisani L, Lorenzo M, Borrelli V.

BACKGROUND: To perform a prospective, randomized comparison of laparoscopic adjustable gastric banding (LAGB) and laparoscopic Roux-en-Y gastric bypass (LRYGB). METHODS: LAGB, using the pars flaccida technique, and standard LRYGB were performed. From January 2000 to November 2000, 51 patients (mean age 34.0 +/- 8.9 years, range 20-49) were randomly allocated to undergo either LAGB (n = 27, 5 men and 22 women, mean age 33.3 years, mean weight 120 kg, mean body mass index [BMI] 43.4 kg/m(2); percentage of excess weight loss 83.8%) or LRYGB (n = 24, 4 men and 20 women, mean age 34.7, mean weight 120 kg, mean BMI 43.8 kg/m(2), percentage of excess weight loss 83.3). Data on the operative time, complications, reoperations with hospital stay, weight, BMI, percentage of excess weight loss, and co-morbidities were collected yearly. Failure was considered a BMI of >35 at 5 years postoperatively. The data were analyzed using Student's t test and Fisher's exact test, with P
<.05 considered significant. RESULTS: The mean operative time was 60 +/- 20 minutes for the LAGB group and 220 +/- 100 minutes for the LRYGB group (P <.001). One patient in the LAGB group was lost to follow-up. No patient died. Conversion to laparotomy was performed in 1 (4.2%) of 24 LRYGB patients because of a posterior leak of the gastrojejunal anastomosis. Reoperations were required in 4 (15.2%) of 26 LAGB patients, 2 because of gastric pouch dilation and 2 because of unsatisfactory weight loss. One of these patients required conversion to biliopancreatic diversion; the remaining 3 patients were on the waiting list for LRYGB. Reoperations were required in 3 (12.5%) of the 24 LRYGB patients, and each was because of a potentially lethal complication. No LAGB patient required reoperation because of an early complication. Of the 27 LAGB patients, 3 had hypertension and 1 had sleep apnea. Of the 24 LRYGB patients, 2 had hyperlipemia, 1 had hypertension, and 1 had type 2 diabetes. Five years after surgery, the diabetes, sleep apnea, and hyperlipemia had resolved. At the 5-year (range 60-66 months) follow-up visit, the LRYGB patients had significantly lower weight and BMI and a greater percentage of excess weight loss than did the LAGB patients. Weight loss failure (BMI >35 kg/m(2) at 5 yr) was observed in 9 (34.6%) of 26 LAGB patients and in 1 (4.2%) of 24 LRYGB patients (P <.001). Of the 26 patients in the LAGB group and 24 in the LRYGB group, 3 (11.5%) and 15 (62.5%) had a BMI of <30 kg/m(2), respectively (P <.001). CONCLUSION: The results of our study have shown that LRYGB results in better weight loss and a reduced number of failures compared with LAGB, despite the significantly longer operative time and life-threatening complications.


Comparative study between laparoscopic adjustable gastric banding and laparoscopic gastric bypass: single-institution, 5-year experience in bariatric surgery.

Oregon Weight Loss Surgery, LLC, Legacy Health System, Portland, Oregon.

BACKGROUND: Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic adjustable gastric banding (LAGB) are common surgical procedures for morbid obesity. Few single-institution studies have compared LRYGB and LAGB. METHODS: All patients underwent LRYGB or LAGB at Legacy Health System. The data for the study were obtained from a prospectively maintained database. Preoperatively, most patients were allowed to choose between LRYGB and LAGB. Age, gender, body mass index, complications, mortality, and weight loss were examined. RESULTS: From October 2000 to October 2005,
492 patients underwent LRYGB and 406 patients underwent LAGB. The mean age was 44 +/- 10 and 47 +/- 11 years, respectively (P <.001). The mean preoperative body mass index was 49 +/- 8 and 51 +/- 9 kg/m(2) (P <.05). Patients undergoing LRYGB had longer operative times (134 +/- 41 min versus 68 +/- 26 min, P <.001) and longer hospital stays (2.5 +/- 3.5 d versus 1.1 +/- 1.1 d, P <.001). Blood loss was minimal in both groups. The percentage of excess weight loss was significantly better for patients who underwent LRYGB at all points of follow-up, except at 5 years. Total complications occurred in 32% of patients who underwent LRYGB and 24% of patients who underwent LAGB (P = .002). The 90-day mortality rate was .2% in both groups. The reoperation rate was the same (17%) in both groups.

CONCLUSIONS: Patients undergoing LAGB had shorter operative times and shorter hospital stays compared with patients undergoing LRYGB. LAGB was associated with a lower complication rate. Early weight loss was significantly greater after LRYGB, but the data comparing long-term weight loss after LRYGB and LAGB have been inconclusive.


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BACKGROUND: Controversy exists regarding the best surgical treatment for super-obesity (BMI >50 kg/m2). The two most common bariatric procedures performed worldwide are laparoscopic adjustable gastric banding (LAGB) and laparoscopic Roux-en-Y gastric bypass (LRYGBP). We undertook a retrospective single-center study to compare the safety and efficacy of these two operations in super-obese patients. METHODS: 290 super-obese patients underwent laparoscopic bariatric surgery: 179 LAGB and 111 LRYGBP. RESULTS: There were one death in both groups. The early complication rate was higher in the LAGB group (10% vs 2.8%, P<0.01). Late complication rate was higher in the LAGB group (26% vs 15.3%, P<0.05). Operating time and hospital stay were significantly higher in the LRYGBP group. LRYGBP had significantly better excess weight loss than LAGB (63% vs 41% at 1 year, and 73% vs 46% at 2
years), as well as lower BMI than LAGB (35 vs 41 at 18 months). **CONCLUSION:** LRYGBP results in significantly greater weight loss than LAGB in super-obese patients, but is associated with a higher early complication rate.


**Laparoscopic adjustable gastric banding in the treatment of obesity: a systematic literature review.**


Royal Australasian College of Surgeons, Geelong Hospital, Australia.

**BACKGROUND:** We attempted to compare the safety and efficacy of laparoscopic adjustable gastric banding with vertical-banded gastroplasty and gastric bypass. Morbid obesity presents a serious health issue for Western countries, with a rising incidence and a strong association with increased mortality and serious comorbidities, such as diabetes, hyperlipidemia, and cardiovascular disease. Unfortunately, conservative treatment options have proven ineffective. Surgical interventions, such as vertical-banded gastroplasty (stomach stapling), Roux-en-Y gastric bypass, and, more recently, laparoscopic gastric banding have been developed with the aim of providing a laparoscopically placed device that is safe and effective in generating substantial weight loss.

**METHODS:** Electronic databases were systematically searched for references relating to obesity surgery by (1) laparoscopic adjustable gastric banding (LAGB), (2) vertical banded gastroplasty (VBG), and (3) Roux-en-Y gastric bypass (RYGB). **RESULTS:** Only 6 studies reported comparative results for laparoscopic gastric banding and other surgical procedures. One study reported comparative results for all 3 surgical procedures, and this study was only of moderate quality. In total, 64 studies were found that reported results for LAGB and 57 studies reported results on the comparative procedures. LAGB was associated with a mean short-term mortality rate of approximately 0.05% and an overall median morbidity rate of approximately 11.3%, compared with 0.50% and 23.6% for RYGB, and 0.31% and 25.7% for VBG. Overall, all 3 procedures produced considerable weight loss in patients up to 4 years in the case of LAGB (the maximum follow-up available at the time of the review), and more than 10 years in the case of the comparator procedures.

**CONCLUSIONS**
The Australian Safety and Efficacy Register of New Interventional Procedures-Surgical Review Group concluded that the evidence base was of average quality up to 4 years for LAGB. Laparoscopic gastric banding is safer than VBG and RYGB, in terms of short-term mortality rates. LAGB is effective, at least up to 4 years, as are the comparator procedures. Up to 2 years, LAGB results in less weight loss than RYGB; from 2 to 4 years there is no significant difference between LAGB and RYGB, but the quality of data is only moderate. The long-term efficacy of LAGB remains unproven, and evaluation by randomized controlled trials is recommended to define its merits relative to the comparator procedures.