

EBM Mini CAT – Jay Kolasinac

Scenario: 53 year old, obese male, w/ a PMH of DMII, HTN, and HLD. After a few months of trying to lose weight by dieting and exercise, he is now considering bariatric surgery. He wants to know which bariatric surgical approach would be better: Laparoscopic Roux-En-Y Gastric Bypass or a Laparoscopic Sleeve Gastrectomy?

CAT: *Are Laparoscopic Roux-En-Y Gastric Bypass [LRYGB] surgeries more effective at weight loss compared to Laparoscopic Sleeve Gastrectomies [LSG]?*

Population – Obese Adults

Intervention – Laparoscopic Roux-En-Y Gastric Bypass Surgery

Comparison -- Laparoscopic Sleeve Gastrectomy

Outcome – Weight loss

Search Strategy: Google Scholar, PubMed

Google Scholar –

“Roux en Y gastric bypass and sleeve gastrectomy” □ 27,400

+more effective □ 19,100

+ Since 2016 □ 9,700

PubMed –

“Roux en Y gastric bypass and sleeve gastrectomy” □ 3,379

+More effective □ 2294

+5 years □ 1,563

I choose articles that were either meta-analyses or randomized clinical trials. Lots of my studies were on average about 5 years old which is relatively new. Most of studies took place in the US, however, some meta-analyses included studies done in other countries where I wanted to see if participants in the studies were experiencing similar results to participants here in the United States. There was a retrospective study I included which tracked participants over multiple intervals as opposed to just one like the others which I found interesting, and it was relatively new as well within the last 4 years. All other articles were RCTs or meta-analyses.

CITATION	Gu, L., Huang, X., Li, S., Mao, D., Shen, Z., Khadaroo, P. A., Ng, D. M., & Chen, P. (2020). A meta-analysis of the medium- and long-term effects of laparoscopic sleeve gastrectomy and laparoscopic Roux-en-Y gastric bypass. <i>BMC surgery</i> , 20(1), 30. https://doi.org/10.1186/s12893-020-00695-x
ABSTRACT	<p>Background: Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (LSG) are two representative bariatric surgeries. This study aimed to compare the effects of the LSG and LRYGB based on highquality analysis and massive amount of data.</p> <p>Methods: For this study databases of PubMed, Web of Science, EBSCO, Medline, and Cochrane Library were searched for articles published until January 2019 comparing the outcomes of LSG and LRYGB.</p> <p>Results: This study included 28 articles. Overall, 9038 patients (4597, LSG group; 4441, LRYGB group) were included. The remission rate of type 2 diabetes mellitus (T2DM) in the LRYGB group was superior to that in the LSG group at the 3-years follow-up. Five-year follow-up results showed that LRYGB had an advantage over LSG for the percentage of excess weight loss and remission of T2DM, hypertension, dyslipidemia, and abnormally low-density lipoprotein.</p> <p>Conclusions: In terms of the long-term effects of bariatric surgery, the effect of LRYGB was better than of LSG.</p>
LINK/PDF	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7014764/
CITATION	Lager, C. J., Esfandiari, N. H., Subauste, A. R., Kraftson, A. T., Brown, M. B., Cassidy, R. B., Nay, C. K., Lockwood, A. L., Varban, O. A., & Oral, E. A. (2017). Roux-En-Y Gastric Bypass Vs. Sleeve Gastrectomy: Balancing the Risks of Surgery with the Benefits of Weight Loss. <i>Obesity surgery</i> , 27(1), 154–161. https://doi.org/10.1007/s11695-016-2265-2
ABSTRACT	<p>Background: The purpose of the study was to compare weight loss, metabolic parameters, and postoperative complications in patients undergoing Roux-en-Y gastric bypass (GB) and sleeve gastrectomy (SG).</p> <p>Methods: We retrospectively studied 30-day postoperative complications as well as change in weight, blood pressure, cholesterol, hemoglobin, hemoglobin A1C, and creatinine from baseline to 2, 6, 12, and 24 months postoperatively in 383 patients undergoing GB and 336 patients undergoing SG at the University of Michigan from January 2008 to November 2013. For a study population which typically has high attrition rates, there were excellent follow-up rates (706/ 719 at 2 months, 566/719 at 6 months, 519/719 at 12 months, and 382/719 at 24 months).</p> <p>Results: Baseline characteristics were similar in both groups except for higher weight and BMI in the SG group. The GB group experienced greater total body weight loss at 6, 12, and 24 months (41.9 vs. 34.6 kg at 24 months, $p < 0.0001$). Excess weight loss was 69.7 and 51.7 % following GB and SG respectively at 24 months ($p < 0.0001$). BP improved significantly in both groups. Surgical complication rates were greater after GB (10.1 vs. 3.5 %, $p = 0.0007$) with no significant difference in life-threatening or potentially life-threatening complications.</p> <p>Conclusions: Weight loss was greater following GB compared to SG at 2 years. The risk for surgical complications was greater following GB. Surgical intervention should be tailored to surgical risk, comorbidities, and desired weight loss.</p>
LINK/PDF	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5187368/

CITATION	Salminen, P., Helmiö, M., Ovaska, J., Juuti, A., Leivonen, M., Peromaa-Haavisto, P., Hurme, S., Soinio, M., Nuutila, P., & Victorzon, M. (2018). Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss at 5 Years Among Patients With Morbid Obesity: The SLEEVEPASS Randomized Clinical Trial. <i>JAMA</i> , 319(3), 241–254. https://doi.org/10.1001/jama.2017.20313
ABSTRACT	<p>Importance: Laparoscopic sleeve gastrectomy for treatment of morbid obesity has increased substantially despite the lack of long-term results compared with laparoscopic Roux-en-Y gastric bypass.</p> <p>Objective: To determine whether laparoscopic sleeve gastrectomy and laparoscopic Roux-en-Y gastric bypass are equivalent for weight loss at 5 years in patients with morbid obesity.</p> <p>Design, Setting, and Participants: The Sleeve vs Bypass (SLEEVEPASS) multicenter, multisurgeon, open-label, randomized clinical equivalence trial was conducted from March 2008 until June 2010 in Finland. The trial enrolled 240 morbidly obese patients aged 18 to 60 years, who were randomly assigned to sleeve gastrectomy or gastric bypass with a 5-year follow-up period (last follow-up, October 14, 2015).</p> <p>Interventions: Laparoscopic sleeve gastrectomy (n = 121) or laparoscopic Roux-en-Y gastric bypass (n = 119).</p> <p>Main Outcomes and Measures: The primary end point was weight loss evaluated by percentage excess weight loss. Prespecified equivalence margins for the clinical significance of weight loss differences between gastric bypass and sleeve gastrectomy were –9% to +9% excess weight loss. Secondary end points included resolution of comorbidities, improvement of quality of life (QOL), all adverse events (overall morbidity), and mortality.</p> <p>Results: Among 240 patients randomized (mean age, 48 [SD, 9] years; mean baseline body mass index, 45.9 [SD, 6.0]; 69.6% women), 80.4% completed the 5-year follow-up. At baseline, 42.1% had type 2 diabetes, 34.6% dyslipidemia, and 70.8% hypertension. The estimated mean percentage excess weight loss at 5 years was 49% (95% CI, 45%-52%) after sleeve gastrectomy and 57% (95% CI, 53%-61%) after gastric bypass (difference, 8.2 percentage units [95% CI, 3.2%-13.2%], higher in the gastric bypass group) and did not meet criteria for equivalence. Complete or partial remission of type 2 diabetes was seen in 37% (n = 15/41) after sleeve gastrectomy and in 45% (n = 18/40) after gastric bypass ($P > .99$). Medication for dyslipidemia was discontinued in 47% (n = 14/30) after sleeve gastrectomy and 60% (n = 24/40) after gastric bypass ($P = .15$) and for hypertension in 29% (n = 20/68) and 51% (n = 37/73) ($P = .02$), respectively. There was no statistically significant difference in QOL between groups ($P = .85$) and no treatment-related mortality. At 5 years the overall morbidity rate was 19% (n = 23) for sleeve gastrectomy and 26% (n = 31) for gastric bypass ($P = .19$).</p>

	<p>Conclusions and Relevance: Among patients with morbid obesity, use of laparoscopic sleeve gastrectomy compared with use of laparoscopic Roux-en-Y gastric bypass did not meet criteria for equivalence in terms of percentage excess weight loss at 5 years. Although gastric bypass compared with sleeve gastrectomy was associated with greater percentage excess weight loss at 5 years, the difference was not statistically significant, based on the prespecified equivalence margins.</p>
LINK/PDF	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5833550/?report=classic
CITATION	Zhang, C., Yuan, Y., Qiu, C. <i>et al.</i> A Meta-analysis of 2-Year Effect After Surgery: Laparoscopic Roux-en-Y Gastric Bypass Versus Laparoscopic Sleeve Gastrectomy for Morbid Obesity and Diabetes Mellitus. <i>OBES SURG</i> 24 , 1528–1535 (2014). https://doi-org.york.ezproxy.cuny.edu/10.1007/s11695-014-1303-1
ABSTRACT	Literature search was performed for bariatric surgery from inception to September 2013, in which the effects of laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (LSG) on body mass index (BMI), percentage of excess weight loss (EWL%), and diabetes mellitus (DM) were compared 2 years post-surgery. A total of 9,756 cases of bariatric surgery from 16 studies were analyzed. Patients receiving LRYGB had significantly lower BMI and higher EWL% compared with those receiving LSG (BMI mean difference (MD)=-1.38, 95 % confidence interval (CI)= -1.72 to -1.03; EWL% MD=5.06, 95 % CI=0.24 to 9.89). Improvement rate of DM was of no difference between the two types of bariatric surgeries (RR=1.05, 95 % CI= 0.90 to 1.23). LRYGB had better long-term effect on body weight, while both LRYGB and LSG showed similar effects on DM.
LINK/PDF	https://link-springer-com.york.ezproxy.cuny.edu/article/10.1007/s11695-014-1303-1

CITATION	Zhang, Y., Zhao, H., Cao, Z. <i>et al.</i> A Randomized Clinical Trial of Laparoscopic Roux-en-Y Gastric Bypass and Sleeve Gastrectomy for Treatment of Morbid Obesity in China: a 5-Year Outcome. <i>OBES SURG</i> 24 , 1617–1624 (2014). https://doi-org.york.ezproxy.cuny.edu/10.1007/s11695-014-1258-2
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ABSTRACT	<p>Background: No randomized comparative trials have presented long-term outcomes for laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB). The present study was designed to compare the efficacy and safety of these two procedures.</p> <p>Methods: From January 2007 to July 2008, 64 eligible patients were randomly assigned to LSG or LRYGB. During the 5- year follow-up, we compared morbidity rate, body mass index (BMI), percent of excess weight loss (%EWL), MooreheadArdelt (M-A) II quality of life, and resolution/improvement rate of obesity-related comorbidities between the groups.</p> <p>Results: Both groups were matched with respect to age, gender, and BMI. Slightly more major complications were observed in patients undergoing LRYGB (P>0.05). Weight loss was significantly better with LRYGB except during the first postoperative year. At 5 years, %EWL for LSG and LRYGB was 63.2±24.5 % and 76.2±21.7 % (P=0.02), respectively. No statistical difference was observed in quality of life between the groups at intervals (P>0.05). At the last followup, most comorbidities in both groups were resolved or improved, with no difference between the groups (P>0.05).</p> <p>Conclusion: LRYGB and LSG are equally safe and effective in quality of life and improvement or resolution of comorbidities, and LRYGB poses the superiority in terms of weight loss. Further studies are needed to evaluate micronutrient deficiencies of these procedures.</p>
LINK/PDF	https://link-springer-com.york.ezproxy.cuny.edu/article/10.1007%2Fs11695-014-1258-2

Author; reference	Level of Evidence	Patient group/ Data collection	Outcomes	Key Findings	Limitations/ Bias
Gu et al., 2020	Meta-Analysis	28 articles - Overall, 9038 patients (4597, LSG group; 4441, LRYGB group) were included	Five-year follow-up results showed that LRYGB had an advantage over LSG for the percentage of excess weight loss	No real significant data supporting a decrease in remission of DMII, HTN, between the two groups within 3 years LRYGB superior to LSG in losing weight especially for super-obese patients	This study included retrospective studies that reduced the overall quality of the evidence. The degree of obesity was necessarily classified because most papers did not necessarily specify

Lager et al., 2017	Retrospective Study	<p>383 patients undergoing GB and 336 patients undergoing SG at the University of Michigan from January 2008 to November 2013</p> <p>Focused on 30-day postoperative complications as well as change in weight, blood pressure, cholesterol, hemoglobin, hemoglobin A1C, and creatinine from baseline to 2, 6, 12, and 24 months postoperatively</p>	The GB group experienced greater total body weight loss at 6, 12, and 24 months	<p>Weight loss was greater following GB compared to SG at 2 years. The risk for surgical complications was greater following GB.</p> <p>Results raise the possibility that the obesity surgery field has moved to SG predominance too quickly, ahead of full characterization of observed benefits.</p> <p>Excellent follow up rates</p>	<p>Comprised of retrospective data analyses, however group were similar at baseline in all variables except with BMI, might be due to the fact that some insurances would only cover the cost of the surgery after a specific BMI</p> <p>Small sample size</p>
Salminen et al., 2018	Randomized Control Trial	240 randomized adults with morbid obesity	Gastric bypass compared with sleeve gastrectomy was associated with greater percentage excess weight loss at 5 years	<p>Patients who underwent LSG saw a 49% increase excess weight loss after 5 years.</p> <p>Patients who underwent LRYGB saw a 57% increase in excess weight loss.</p>	<p>Small sample size</p> <p>20% of the patients population was lost to follow up after the 5 year mark seen in both groups</p>

				Gastric bypass was seen to have more postoperative complications	
Zhang et al., 2014	Meta-Analysis	<p>A total of 9,756 cases of bariatric surgery from 16 studies were analyzed.</p> <p>Studies were conducted in Spain (5), USA (3), Japan (2), China (2), Switzerland (1), Greece (1), Slovenia (1), and Chile (1).</p>	At 2 years of follow-up, LRYGB provides for greater weight loss than LSG	<p>Both LRYGB and LSG both yielded similar effects on remission of DMII as well</p> <p>Patients receiving LRYGB had a significantly higher EWL% 2 years after surgery compared with those receiving LSG</p> <p>GB was seen to have more complications post operatively</p>	<p>There was only 1 randomized control trial within the meta analysis</p> <p>Some studies had high rates of loss of follow-up with patients</p>
Zhang et al., 2014	Randomized Control Trial	<p>64 eligible patients were randomly assigned to LSG or LRYGB.</p> <p>5 year follow up where there was comparison in morbidity rate, BMI, EWL%, and more.</p>	<p>Weight loss was significantly better with LRYGB except during the first postoperative year.</p> <p>After 5 years, EWL% for LRYGB was ~76.2% .</p> <p>After 5 years, EWL% was ~62.2%</p>	<p>LRYGB and LSG are equally safe and effective in quality of life and improvement or resolution of comorbidities, and LRYGB possesses the superiority in terms of weight loss.</p> <p>LRYGB was not seen to have statistical significance in postoperative complications compared to LSG</p>	<p>Small sample size only 64 patients</p> <p>LSG patients are to receive Vitamin B12 supplementation, so micronutrient deficiency may have played a role in the weight loss</p>

Conclusion

Gu et al., 2020	Five-year follow-up results showed that LRYGB had an advantage over LSG for the percentage of excess weight loss
Lager et al., 2017	Weight loss was greater following GB compared to SG at 2 years. The risk for surgical complications was greater following GB.
Salminen et al., 2018	Gastric bypass compared with sleeve gastrectomy was associated with greater percentage excess weight loss at 5 years. Gastric bypass was seen to have more postoperative complications.
Zhang et al., 2014	At 2 years of follow-up, LRYGB provides for greater weight loss than LSG. GB was seen to have more complications post operatively
Zhang et al., 2014	LRYGB and LSG are equally safe and effective in quality of life and improvement or resolution of comorbidities, and LRYGB possesses the superiority in terms of weight loss. LRYGB was not seen to have statistical significance in postoperative complications compared to LSG
<p>All the above mentioned articles continuously demonstrated evidence to suggest that laparoscopic Roux-En-Y gastric bypass surgery was more effective at reducing weight loss in obese patients compared to the laparoscopic sleeve gastrectomy, which is a relatively new technique that has gained popularity over the years. Although LRYGB is seen to be more effective in regards to excess weight loss, there was also evidence in the literature to suggest that LRYGB was seen to have higher incidences of postoperative complications compared to LSG. (Lager et al., 2017; Salminen et al., 2018; Zhang et al., 2014) However, one RCT conducted by Zhang et al., (2014) suggested LRYGB and LSG are equally safe and effective with no significant evidence to suggest that LRYGB was prone to more complications compared to LSG. However, this study contained a very small sample size.</p>	

Clinical Bottom Line

Every patient is different when it comes to healthcare. Although one procedure might seem more effective at achieving a certain goal, it may come with certain consequences down the road. Clinicians should take the time to sit and explain both procedures to their patients where they can then weigh out the benefits and risks on an individual basis and not simply perform a LRYGB because it renders a greater weight loss down the road. Personally, I would suggest the LSG to a patient considering both because it is almost as effective as the LRYGB in regards to weight loss while less prone to postoperative complications.

References

Gu, L., Huang, X., Li, S., Mao, D., Shen, Z., Khadaroo, P. A., Ng, D. M., & Chen, P. (2020). A meta-analysis of the medium- and long-term effects of laparoscopic sleeve gastrectomy and laparoscopic Roux-en-Y gastric bypass. *BMC surgery*, *20*(1), 30. <https://doi.org/10.1186/s12893-020-00695-x>

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