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THE EFFECTIVENESS AND RISKS OF BARIATRIC SURGERY. AN UPDATED SYSTEMATIC REVIEW, 2013-2018

Running Title: Bariatric Surgery, Systematic Review

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Abstract:

Background: *Obesity is a chronic disease that associated with many health problems and a higher risk of death. Bariatric surgery for obesity is always only favored when other treatments have failed. In patients with BMI over than 40 or less than 40 but have obesity-related diseases such as diabetes, bariatric surgery is substantial.*

Aim of work: *We aimed to examine the effectiveness and risks of bariatric surgery using up-to-date, comprehensive data between previously published systematic reviews in the last five years.*

Design: systematic review

Data Source: *PubMed articles search in the last five years were performed. Data and information from previously published systematic reviews were used. All studies were published between 2013 to 2018.*

Exclusion criteria: *abstracts only, case reports, letters, comments, animal studies; languages other than English; duplicate studies; no surgical intervention and lack of outcomes of interest (weight change, surgical mortality and complications, and disease impacts).*

Inclusion criteria: *After removing excluded abstracts, full articles were obtained and studies were screened again more accurately using the same exclusion criteria.*

The reference list of relevant studies was examined by extensive hand searching that also included a systemic review of bariatric surgery effectiveness. Out of 58 published paper that was identified by the searches only seven were applied in the present study.

Main Outcome Measures: *Bariatric surgery can be the treatment option of obesity*

Results: *The current systematic review included 7 articles of systemic review design which published between 2013 to 2018; we summarized articles under specific titles*

Conclusion: *The prevalence of obesity continues to grow globally and is a significant load on individuals and healthcare systems. Bariatric surgery is the substantial treatment option that results in significant long-term sustainable weight loss despite early and late complications occurrence.*

Limitation: *Time was the only limitation of this study*

Keywords*: Bariatric surgery, Systematic Review, Weight loss, RYGB, LAGB, LSG.*

Abbreviation:

BMI = body mass index,
LAGB = laparoscopic adjustable gastric band
RYGB = Roux-en-Y gastric bypass,
SG = sleeve gastrectomy
RBS =revisional bariatric surgery

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INTRODUCTION:

Obesity is abnormal excessive fat accumulation that may impair health and well being (1). The body mass index (BMI) is the most commonly used measure for classifying obesity, calculated as body weight in kilograms divided by height in meters squared (kg/m2). In adults, 18.5-25 BMI was accepted and 25-30 BMI was overweight, Obesity was the BMI ≥ 30, while severe or morbid obesity is defined as BMI ≥ 40. There are associations between BMI, percentage of body fat, and health risks (2).

It was reported that globally in 2005 at least 400 million adults were obese. There are serious complications related to obesity include hypertension, type 2 diabetes, cardiovascular disease, dyslipidemia, musculoskeletal disorders, and certain cancers (3). Some of these health consequences may constitute the principal cause of death such as heart disease, stroke, and some cancers. As well as, reduced quality of life consequences include: obstructive sleep apnoea, infertility, obstetric complications, and psychiatric comorbidity (4).

Bariatric surgery for obesity is a primarly surgical intervention with a risk of significant early and late complications and of perioperative mortality (5). Contraindications for bariatric surgery include poor myocardial reserve, significant chronic obstructive airways disease or respiratory dysfunction, non-compliance of medical treatment and psychological disorders of a significant degree. Many types of bariatric surgery need long-term supplementation with vitamins and iron, and patients often have an accurate restricted liquid diet in the immediate weeks after surgery (6).

There are three main different bariatric surgical procedures:

The Roux-en-Y and resectional gastric bypass (RYGB)

It is compromised restriction and malabsorption techniques, creating both a little gastric pouch and a bypass that block the food absorption. The Roux-en-Y procedure entails partition of the upper part of the stomach using surgical staples to create a small pouch with a small outlet to the intestine that is attached to the pouch. It is technically reversible (7).

Complications associated with RYGB including acute gastric dilatation, failure of the staple partition, leaks at the junction of the stomach and small intestine, and delayed gastric emptying. Late complications including vomiting, wound hernias and intestinal obstruction, and nutritional deficiencies, such as calcium, vitamin D, vitamin B12, and some iron deficiency anemias (8).

Adjustable gastric banding (AGB)

Adjustable gastric banding is the most safest of the bariatric surgery procedures. It limits food intake by placing a constricting ring completely around the top end (fundus) of the stomach. While early bands were non-adjustable, those used currently incorporate an inflatable balloon within their lining to adjust the size of the stoma to allow food intake. Adjustment is undertaken without the need for surgery by adding or removing saline through a subcutaneous access port. One of the major advantages of Gastric banding is avoiding the problems associated with malabsorptive techniques. However, Gastric banding is technically a reversible procedure (9).

Complications include those associated with the operative procedure: persistent vomiting, band slippage, band erosion, wound infection, splenic injury, esophageal injury, lose weight failure and acid reflux (10).

Sleeve gastrectomy (SG)

A sleeve gastrectomy is preferred for some patients who are at high risk from bariatric surgery. It is followed at a later date by conversion to either a gastric bypass or a duodenal switch. However, for some, enough weight is lost with the sleeve gastrectomy alone, and it is now increasingly used as a stand-alone procedure. GS divides the stomach vertically to minimize its size to about one a quarter. The stomach function and digestion are unaltered. After six to twelve months, the stomach may have expanded and not restrict intake as much; this is when the gastric bypass can then be added if necessary. The sleeve gastrectomy is not reversible (11).

Complications are reduced as digestion is unaffected, however patients are at risk from leaking from the newly formed stomach or vomiting due to over-eating. This operation is relatively quick to perform, which reduces the risk of complications (12).

Patients and method:

The present systematic review is performed in Pubmed search with the time frame of 2013 to 2018. Exclusion criteria: abstracts only, case reports, letters, comments, animal studies; languages other than English; duplicate studies; no surgical intervention and lack of outcomes of interest (weight change, surgical mortality and complications, and disease impacts.

Inclusion criteria:

After removing excluded abstracts, full articles were obtained and studies were screened again more accurately using the same

Exclusion criteria.

The reference list of relevant studies was examined that only include a systemic review of bariatric surgery effectiveness. Out of 58 published paper that was identified by the searches only 7 were applied in the present study.

RESULTS:

The current systematic review included 7 articles of systemic review design which published between 2013 to 2018; we summarized articles under specific titles as following; author and publication year, study design, patients'number and age, early and late complications, mortality rate, results and conclusion (table1).

DISCUSSION:

Kang and Quang, 2017 study indicated that even though the differences in weight loss from RYGB and SG were not statistically significant, SG showed a trend of better weight loss. A similar tendency was shown when comparing the effect of RYGB and SG

in other meta-analyses. The RYGB and SG resulted similar in weight-loss impact, and both exceeded LAGB (5).

Sharples *et al.*, 2017 reported that LAGB was the first bariatric procedure to gain global acceptance due to its good weight loss results in the short term, its relative simplicity and low early complication rates. LAGB-related complications such as band erosion, band slippage, oesophageal dilatation and dysmotility, and tube or port dysfunction can be as high as 15–58% often leading to band removal. Also, a substantial proportion of patients fail to lose sufficient weight with LAGB alone; in one study, insufficient weight loss (defined as percentage excess weight loss (%EWL) of <25%) was reported in 10.5% of patients at five years.

Increasingly, therefore, revisional bariatric surgery (RBS) is being performed to remove the gastric band and convert to another bariatric procedure, most commonly RYGB or SG. Previous systematic reviews have demonstrated both the safety and efficacy of RBS (8).

Paulus *et al.* (2015) reported that all three analyzed bariatric surgical techniques result in effective weight loss and improvement of comorbidity in short to medium term. Because of the acceptable complication rate, surgical intervention is applicable in many obese cases. While BMI loss after RYGB is superior, a higher percentage of adverse events and interventions has to be taken into account. It was reported that RYGB is currently considered in the treatment of adolescents with a more extreme BMI (>50 kg/m2), while LAGB and LSG are applied when obesity is less severe (6).

Chang *et al.* (2014) suggested that complication rates associated with bariatric surgery range from 10% to 17% and reoperation rates approximately 7%, mortality associated with surgery is generally low (0.08%-0.35%). GB is the most effective procedure in weight loss but generates more adverse effects. AGB considered safer, lower mortality and complication rates. Although, the reoperation rate of AGB is higher than that of GB and SG, and the weight loss outcomes of LAGB are lower than GB and SG (2).

Brien *et al.* (2013) reported that although all procedures achieve substantial long-term weight loss, LAGB is a safe and effective surgical procedure for obesity in the long term. The LAGB study from 1 center demonstrates a permanent weight loss with 47% EWL maintained to 15 years. This weight loss occurred regardless of whether any revisional procedures were needed. A systematic review shows substantial and similar long-term weight losses for LAGB and other bariatric procedures (13).

Mini gastric bypass has been suggested to be capable of achieving excellent weight loss. Mini gastric bypass is technically simpler than to RYGB and reversible procedure. **Wang *et al.* (2017)** suggested that patients receiving Mini-gastric bypass had multiple advantageous indexes as compared with patients undergoing RYGB. Including, remission rates of type 2 diabetes mellitus when using Mini gastric bypass in comparison to RYGB (14).

CONCLUSION:

Bariatric surgical procedures are known to achieve substantial weight loss and major secondary health benefits, but the durability of these effects remains to be firmly established. The prevalence of obesity continues to grow globally and is a significant load on individuals and healthcare systems. Bariatric surgery is the substantial treatment option that results in significant long-term sustainable weight loss despite of early and late complications occurrence.

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Conflict of interest: No

REFERENCES:

1. Chan RS, Woo J. Prevention of overweight and obesity: how effective is the current public health approach. Int J Environ Res Public Health. 2010; 7(3):765-83.
2. Chang SH, Stoll CR, Song J, Varela JE, Eagon CJ, Colditz GA. The effectiveness and risks of bariatric surgery: an updated systematic review and meta-analysis, 2003-2012. JAMA Surg. 2014; 149(3):275-87.
3. Segula D. Complications of obesity in adults: a short review of the literature. Malawi Med J. 2014; 26(1):20-4.
4. Dang JT, Switzer NJ, Wu J, Gill RS, Shi X, Thereaux J, et al. Gastric Band Removal in Revisional Bariatric Surgery, One-Step Versus Two-Step: a Systematic Review and Meta-analysis. Obes Surg. 2016; 26(4):866-73.
5. Kang JH, Le QA. Effectiveness of bariatric surgical procedures: A systematic review and network meta-analysis of randomized controlled trials. Medicine (Baltimore). 2017; 96(46):e8632.
6. Paulus GF, de Vaan LE, Verdam FJ, Bouvy ND, Ambergen TA, van Heurn LW. Bariatric surgery in morbidly obese adolescents: a systematic review and meta-analysis. Obes Surg. 2015; 25(5):860-78.

7. Schubert T, Jahn U, Eben E, Deuber HJ. [Bariatric surgery - significance, risks, long term consequences]. MMW Fortschr Med. 2013; 155 Suppl 1:6-17.
8. Sharples AJ, Charalampakis V, Daskalakis M, Tahrani AA, Singhal R. Systematic Review and Meta-Analysis of Outcomes After Revisional Bariatric Surgery Following a Failed Adjustable Gastric Band. Obes Surg. 2017;27(10):2522-36.
9. Guller U, Klein LV, Hagen JA. Safety and effectiveness of bariatric surgery: Roux-en-y gastric bypass is superior to gastric banding in the management of morbidly obese patients: a reply to the response by Bhoyrul et al. Patient Saf Surg. 2009;3(1):20.
10. Whooten RC, Perkins ME, Gerber MW, Taveras EM. Effects of Before-School Physical Activity on Obesity Prevention and Wellness. Am J Prev Med. 2018;54(4):510-8.
11. Monkhouse SJ, Morgan JD, Norton SA. Complications of bariatric surgery: presentation and emergency management--a review. Ann R Coll Surg Engl. 2009;91(4):280-6.
12. Tanner BD, Allen JW. Complications of bariatric surgery: implications for the covering physician. Am Surg. 2009;75(2):103-12.
13. Brien EM, L; Anderson, M; Brennan,L and Brown, WA. Long-Term Outcomes After Bariatric Surgery. Fifteen-Year Follow-Up of Adjustable Gastric Banding and a Systematic Review of the Bariatric Surgical Literature. Annals of Surgery 2013;257(1):87-94.

Author and Publication year	**Study design**	**Patients number and age**	**Early and late complications**	**Mortality rate**	**Results**	**conclusion**
Wang *et al.*, 2017	Systematic Review and Meta-Analysis		No significant statistical difference was observed in Early and late complications between mini gastric bypass and RYGB.	No significant statistical difference was observed in mortality rate between mini gastric bypass and RYGB.	A higher 1-year EWL% ($P < 0.05$), higher 2-year EWL% ($P < 0.05$), higher type 2 diabetes mellitus remission rate, as well as a shorter operation time ($P < 0.05$).	Mini gastric bypass seems to be a simpler procedure with a better weight reduction effect. This seems to also be the case regarding remission rates of type 2 diabetes mellitus when using Mini gastric bypass in comparison to RYGB.

Kang and Quang, 2017	Systematic Review and Meta-Analysis	n=765	LAGB was associated with fewer complications when compared with RYGB and SG. Surgery-site infection, obstruction, and bleeding were the most common early complications for RYGB, while GERD was often observed in SG. Nutritional deficiencies occurred most frequently, followed by obstruction and ulcer/GERD for both RYGB and SG.		All clinical trials showed significant weight reduction when compared with their baseline weight after receiving bariatric surgery in all 3 procedures (P<.05).	There was no still clear difference in effect of weight loss between the RYGB and SG procedures, though they were both superior to LAGB. Between RYGB and SG, other factors such as complications should be the primary focus during surgical consultations.
Sharples *et al.*, 2017	Systematic Review and Meta-Analysis	n = 1583.	LAGB related complications have been reported in significant numbers of patients often leading to band removal. Increasingly RBS is offered, most commonly either band to B-RYGB or band to B-SG.	There was one death within 30 days (0.0004%). The overall pooled morbidity rate was 13.2%. There was no difference between the B-RYGB and B-SG groups in morbidity	There was no statistical difference in %EWL between BRYGB and B-SG at any time point.	

Dang *et al.*, 2016	Systematic Review and Meta-Analysis	N= 1370 patients who underwent primary LAGB with revisional RYGB or SG were included. 1006 were revisional surgeries to RYGB and 364 to SG. A total of 1006 patients had a one-step procedure while 364 had a two-step procedure.	Complication rates were similar between one-step and two step revisional bariatric surgeries.	Total morbidity rates being approximately 10% for both conversion to RYGB or SG in either one-step or two-step operations.		One-step or two-step revisional bariatric surgeries are both safe options for the management of gastric band complications or failed weight loss, with similar morbidity rates.
Paulus *et al.*, 2015	Systematic Review and Meta-Analysis	A total of 37 articles were included. One article reporting on both LAGB and LSG. Eleven of 18 LAGB studies, 6 of 13 RYGB studies, and 5 of 7 LSG studies were eligible for meta-analysis of BMI loss	Acceptable complication rate.	Two unrelated deaths were reported after 495 RYGB procedures.	Mean BMI loss after LAGB was 11.6 kg/m2 (95 % CI 9.8–13.4), versus 16.6 kg/m2 (95 % CI 13.4–19.8) after RYGB and 14.1 kg/m2 (95 % CI 10.8–17.5) after LSG.	All three bariatric procedures (RYGB, SG and LAGB) result in substantial weight loss and improvement of comorbidity with an acceptable complication rate, indicating that surgical intervention is applicable in appropriately selected morbidly obese adolescents

Chang *et al.*, 2014	Systematic Review and Meta-Analysis	Analyses included 161756 patients with a mean age of 44.56 years and BMI of 45.62.	The complication rate was 17% the reoperation rate was 7%	the mortality rate within 30 days was 0.08% the mortality rate after 30 days was 0.31%	BMI loss at 5 years postsurgery was 12 to 17.	RYGB was more effective in weight loss but associated with more complications. LAGB had lower mortality and complication rates; yet, the reoperation rate was higher and weight loss was less substantial than RYGB. SG appeared to be more effective in weight loss than LAGB and comparable with RYGB.
Brien *et al.*, 2013	Systematic Review	A total of 3227 patients, with a mean age of 47 years and a mean BMI of 43.8 kg/m2.	Revisional procedures were performed for proximal enlargement (26%), erosion (3.4%), and port and tubing problems (21%). The band was explanted in 5.6%.	There was no perioperative mortality for the primary placement or for any revisional procedures.	The weighted mean at maximum follow-up for LAGB was 54.2% EWL and for Roux-en-Y gastric bypass was 54.0% EWL.	A systematic review shows substantial and similar long-term weight losses for LAGB and other bariatric procedures.

%EWL: Percentage excess weight loss, BMI = body mass index, LAGB = laparoscopic adjustable gastric band, RYGB = Roux-en-Y gastric bypass, SG = sleeve gastrectomy, gastroesophageal reflux disease (GERD)