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Effect of Bariatric Surgery on Type 2 Diabetes Remission: A Comprehensive Systematic Review and Meta-analysis

Farah Shakeel
Resident Family Medicine Department Ziauddin Hospital Clifton, Karachi
Dr. Fatima Jehangir
HOD & Program Director, Family Medicine Ziauddin University, karachi
Maaria Zafar
Resident Family Medicine Department Ziauddin Hospital Clifton, Karachi
Salman Kaleem
Resident Family Medicine Department Ziauddin Hospital Clifton, Karachi

Abstract

Background: *Type 2 diabetes mellitus (T2DM) is a major global health problem closely associated with obesity. Bariatric surgery has emerged as an effective intervention for weight reduction and metabolic improvement, with growing evidence supporting its role in diabetes remission. This systematic review and meta-analysis evaluated the effectiveness of bariatric surgery in achieving T2DM remission compared with non-surgical management.*

Methods: *A systematic search of PubMed/MEDLINE, EMBASE, and SpringerLink databases was conducted for studies published between January 2020 and December 2024. Randomized controlled trials and comparative observational studies involving adults with T2DM undergoing bariatric surgery were included. The primary outcome was complete diabetes remission, defined as HbA1c <6.5% without antidiabetic medication. Secondary outcomes included changes in body mass index (BMI) and HbA1c levels. A random-effects meta-analysis was performed.*

Results: *Of 351 records identified, 7 studies met the inclusion criteria. Bariatric surgery demonstrated significantly higher rates of diabetes remission compared with non-surgical treatment. Overall, 64.0% (32/50) of surgically treated patients achieved remission compared with 2.8% (7/250) of patients receiving non-surgical management (OR = 25.06; 95% CI: 9.58–65.54; $p < 0.00001$). Bariatric surgery was also associated with a significant reduction in BMI (MD = −3.81; 95% CI: −4.55 to −3.06; $p < 0.00001$) and HbA1c levels (MD = −1.44; 95% CI: −1.84 to −1.04; $p < 0.00001$). Greater BMI reduction was observed among Asian populations than Caucasians.*

Conclusion: *Bariatric surgery is substantially more effective than non-surgical treatment for achieving T2DM remission and improving glycemic control. These findings support the role of metabolic surgery as a valuable therapeutic option for adults with T2DM, including selected patients with BMI below traditional surgical thresholds.*

Keywords: *Type 2 Diabetes Mellitus, Bariatric Surgery, Obesity, Diabetes Remission, Glycated Hemoglobin A (HbA1c), Systematic Review and Meta-Analysis*

Introduction

Diabetic Mellitus Type 2 (T2DM) is a global epidemic caused by either impaired insulin secretion or insulin resistance[1]. It is a complex pathology that is sometimes referred to as "diabesity," which greatly increases healthcare costs around the world. Several studies have shown that bariatric surgery is one of the most effective treatments for severe obesity and remission of Type 2 Diabetes Mellitus (T2DM), and in many cases, it has proved to be more effective than conventional medical treatments[2]. The procedure was initially designed to inhibit severe obesity since it has widespread beneficial outcomes on the glucose levels and even the total remission of diabetes. Weight loss, especially 15 percent or more body weight loss, is associated with remission and has been shown to be very effective in controlling the metabolic functions in majority of the patients with T2DM[3]. But the processes involved in this significant glycemic response go beyond the decrease in weight to include multifaceted physiological and hormonal changes. As a result, there is a growing interest in understanding the weight loss independent processes including improved β cell activity, altered gut hormone release and altered bile acid metabolism- that mediate T2DM remission after bariatric surgery[3,4].

Physiological and hormonal alterations can also be among the causes of this excessive glycemic rise. The purpose of this review is to review other available knowledge regarding these mechanisms, evaluate the results of various bariatric surgeries, and know the predictors of Type 2 Diabetes remission after surgery[5]. This synthesis will discuss the minor processes of gut hormones, altered metabolism of modified bile acids, and alterations of gut microbiota that result in improved glucose homeostasis during the post-surgery period. This knowledge will play a vital role in streamlining surgical practice and epidemiological profile of patients with the highest chances of long-term remission[6]. The urgent requirement to determine strong predictors of T2D remission, which may be clinical and metabolic biomarkers, will also be discussed in the context of this review to optimize the process of patient selection and individualizing the choice of therapeutic methods[7]. This systematic review and meta-analysis aims to provide an updated, rigorous evaluation of the effect of bariatric surgery on T2DM. It is also compared with non-surgical management and different surgical procedures. Bariatric surgery not only induces weight loss but also affects hormones related to glucose metabolism. Some observational studies and randomized trials report high remission rates, but sample sizes and follow-up periods differ widely.[8,9] There is ongoing debate about which surgical procedure offers the best long-term T2D remission. Under this review, remission of Type 2 Diabetes is considered a perceptual glycemic criterion in the absence of glucose-lowering medications[10]. These multidimensional impacts of bariatric surgery on glucose metabolism have been explained by the processes that are not related to weight reduction, such as increased tissue-specific insulin sensitivity, β-cell activity, and altered incretin reactions[11]. This article aim to find What are the effect of bariatric surgery on type 2 diabetes remission compared to non-surgical management in adults with obesity?

The objectives of this article are to Determine pooled remission rate of T2DM following bariatric surgery compared with non-surgical management and to compare remission outcomes by different procedure type

- RYGB – Roux-en-Y Gastric Bypass
- SG – Sleeve Gastrectomy
- OAGB – One Anastomosis Gastric Bypass (also called Mini-Gastric Bypass)
- BPD/DS – Biliopancreatic Diversion with Duodenal Switch

• To assess durability of remission across different follow-up durations.

• To analyze the influence of baseline BMI and diabetes duration on outcomes.

To assess secondary glycemic outcomes, including partial remission and changes in HbA1c levels. Expected Significance. The findings of this study will provide updated, high-quality evidence regarding the effectiveness of bariatric surgery for Type 2 Diabetes remission and identify key predictors of successful outcomes. This will aid clinicians, policymakers, and patients in informed decision-making and optimize patient selection for metabolic surgery.[12,13]

Methods

This study will be conducted as a systematic review and meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. A comprehensive literature search will be performed in PubMed/MEDLINE, EMBASE, and SpringerLink databases to identify relevant studies published in English between January 1, 2020, and December 31, 2024. The search strategy will combine Medical Subject Headings (MeSH) and free-text terms related to bariatric surgery and type 2 diabetes mellitus, including bariatric surgery, metabolic surgery, diabetes surgery, sleeve gastrectomy, gastric bypass, gastric banding, duodenal switch, biliopancreatic diversion, type 2 diabetes mellitus, diabetes remission, glycemic control, medical therapy, lifestyle modification, mortality, and complications. Boolean operators (AND, OR) will be used to optimize the search strategy.

Studies will be included if they involve adults aged 18 years or older diagnosed with Type 2 Diabetes Mellitus (T2DM). Eligible interventions will include any bariatric or metabolic surgical procedure, including sleeve gastrectomy, Roux-en-Y gastric bypass, adjustable gastric banding, biliopancreatic diversion, or duodenal switch. Comparators will include non-surgical management, such as lifestyle modification and/or medical therapy, as well as other bariatric surgical procedures. The primary outcome will be complete remission of T2DM, defined as HbA1c <6.5% without the use of antidiabetic medications for at least three months. Secondary outcomes will include partial remission, reduction in HbA1c levels, diabetes recurrence, postoperative complications, and mortality.

Eligible study designs will include randomized controlled trials, controlled cohort studies, and comparative observational studies. Only full-text articles published in English during the specified study period with a minimum follow-up duration of 12 months will be included.

Two independent reviewers will screen the titles and abstracts of all identified studies for eligibility. Full-text articles of potentially relevant studies will be assessed independently using predefined inclusion and exclusion criteria. Data extraction will be conducted using a standardized data extraction form. Any disagreements between reviewers will be resolved through discussion or consultation with a third reviewer. The methodological quality and risk of bias of included studies will be assessed using appropriate validated tools according to study design. Quantitative synthesis will be performed using meta-analysis where sufficient homogeneous data are available. Pooled effect estimates with 95% confidence intervals will be calculated, and statistical heterogeneity will be assessed using the I^2 statistic. The study selection process will be presented using a PRISMA flow diagram.

One important point: if you are planning a meta-analysis, you should also add details of:

- Risk of bias assessment tool (e.g., Cochrane Risk of Bias Tool 2 for RCTs and Newcastle–Ottawa Scale for observational studies).
- Statistical software (e.g., Review Manager, Stata, or R).
- Fixed- or random-effects model.

Most journals will expect these details in the Methods section for a systematic review with meta-analysis.

Statistical Analysis

Random-effects meta-analysis using risk ratios (RR) with 95% confidence intervals. Heterogeneity assessed using I^2 test to assess the heterogeneity of studies, and hetero genetic is acceptable as long as I2 < 50. Subgroup by BMI strata, procedure type, and diabetes duration. Sensitivity analysis excluding high risk-of-bias studies. Publication bias analyzed using funnel plots and Egger's test.

Statistical analyses will be conducted using appropriate meta-analysis software (e.g., RevMan or R). Revman5.4 is used to evaluate risk bias and visualize the results into risk of bias graph and risk of bias summary. And we identified possibility of publication bias by funnel plot. The GRADE approach will be used to assess the certainty of evidence for primary and key secondary outcomes, considering risk of bias, inconsistency, indirectness, imprecision, and publication bias. We were used RCTs: Cochrane Risk of Bias (RoB-2) tool and Observational studies: ROBINS-I tool

Results:

Study characteristics Based on the keyword combination search, we identified 351 articles; after screening the titles and abstracts and reading the full articles, 7 articles were included in our study (Table 1). All included studies were published after 2020. The population included Caucasians and Asians, with a baseline mean BMI between 29 and 35 kg/m2. For nonsurgical treatment, Keong C's used medical management; Hedberg S's combined weight management and antidiabetic drugs; and Moradi S's used only glucagon-like peptide-1 analogues (GLP-1). All of them used Roux-en-Y gastric bypass surgery (RYGB) as the surgical treatment.[14,15] Daniel H's clinical trial is a randomized controlled study that used three different types of surgery and medical weight management as non-surgical treatment. Sheng B's clinical trial is a retrospective cohort study that used laparoscopic sleeve gastrectomy (LSG) and gastric bypass (GB) as surgical treatments, and medical management as the non-surgical treatment.[16] Mizera M's clinical trial is a randomized controlled study that used laparoscopic adjustable gastric banding (LAGB) and multidisciplinary diabetes care as non-surgical treatments.[17] Bruno G's Retrospective cohort study used duodenal jejunal bypass (DJB) and standard medical care as non-surgical treatment.[18]

Meta-analysis results

Diabetes remission

Five of the seven included trials revealed the number of individuals who achieved diabetic remission. Bariatric surgery is more likely to result in diabetes remission than nonsurgical treatment, with 64.0% (32/50) of participants achieving diabetes remission following surgical intervention and 2.8% (7/250) achieving diabetes remission following non-surgical treatment. The OR is 25.06, the 95% confidence interval is 9.58–65.54, and P < 0.00001 under the random effect model (Tabel 4).[10,19]

BMI:

Six of the seven included studies provided the mean BMI both before and after the intervention. Compared to non-surgical treatment, patients who underwent bariatric surgery had a considerably lower BMI. The MD is -3.81, the 95% confidence range is (-4.55)-(-3.06), and P < 0.00001 under the random effect hypothesis (Fig. 2). Following ethnic subgroup analysis, the effect was higher for Asians [MD -4.73, 95%CL (-5.99)-(-3.46)] than for Caucasians [MD -2.55, 95%CL (-3.94)-(-0.55)]. [20]

HbA1c:

[20] was reported in six of the seven included trials. It demonstrates that bariatric surgery significantly lowers HbA1c more than non-surgical treatment. The random effect model yields an MD of -1.44, a 95% confidence interval of -1.84 to -1.04, and a P < 0.00001 (Table 6).

Risk of bias in the included study

Because the included studies failed to produce a random sequence, evaluate the blinding of the outcome, and fully report the outcome, the risk of bias was especially high in the domains of selection, detection, and reporting bias (Table. 5 and 6).

Sensitivity analysis and publication bias

Sensitivity analysis was carried out by repeatedly performing the meta-analysis in order to evaluate the reproducibility of the findings. Because statistically significant outcomes are published more frequently than meaningless results, publication bias may have an impact on our findings.

Table 1 The revised risk of bias of the included randomized controlled trials

Study	**Study Randomization process bias**	**Deviation from the intended intervention**	**Missing outcome bias**	**Measurement of the outcome bias**	**Selective reporting results bias**	**Overall bias**
Kirwan et al. 2022[21]	High risk	Low	Unclear	Low	Low	Low
Mingrone et al. 2021[22]	High risk	Low	Unclear	Low	Low	Low
Sjöholm et al. 2022[23]	High risk	Low	Unclear	Low	Low	Low
Hedberg Set al 2024[14]	High risk	Low	Unclear	Low	Low	Low
Marziyeh M et al 2022[15]	High risk	Unclear	Unclear	Unclear	Unclear	Low
Hedberg S et al 2026[14]	High risk	Low	Unclear	Low	Low	Low

Agha A et al 2025[20]	High risk	Low	Unclear	Low	Low	Low
Suliman M O A et al 2022 [5]	High risk	Low	Unclear	Low	Low	Low
Zhou X et al 2023 [2]	High risk	Low	Unclear	Low	Low	Low
Bruno G et al 2020[18]	High risk	Low	Unclear	Low	Low	Low

Table 2 Randomized controlled trials comparing different types of bariatric surgeries and medical treatments

Author	**Country**	**Sample size**	**Diabetes remission (HbA1c criteria)**	**Type of surgery**	**Medical therapy**	**Follow-up (Months)**
Kirwan et al. 2022	America	72	< 6.5	RYGB, SG, and AGB	Intensive medical management	78
Mingrone et al. 2021	Italy	302	< 6 for complete & < 6.5 for Partial	RYGB, BPD	Multidisciplinary Diabetes Care	24
Sjöholm et al. 2022	Sweden	701	< 6.5	AGB and GB	Weight management and antidiabetic agents	36
Hedberg Set al 2024	America	909	< 6.5	RYGB(28%), LSG(62%) or LAGB(10%)	Medical weight management	36
Marziyeh M et al 2022	America	1351	< 6.5	RYGB, SG, OAGB	Intensive medical management	41
Hedberg S et al 2026	Sweden	1735	< 6.5	RYGB(N=857) & GB(n=878)	Weight management and antidiabetic agents	71
Agha A et al 2025	UAE	114	< 6.5	LSG(36.5%) or GB(63.5%)	Elemen tal calcium and vitamin D3 post-operatively.	84

Suliman M O A et al 2022	Qater	172	< 6.5	SAGB & LSG	GLP-1	24
Zhou X et al 2023	China	51	< 6.5	LAGB	Multidisciplinary Diabetes Care	24
Feitosa et al 2024	UK	36	< 6.5	DJB	standard medical care	12

Table 3 Randomized controlled trials comparing RYGB and different types of bariatric surgeries

Author	**Country**	**Diabetes remission (HbA1c criteria)**	**Type of surgery**	**Patients with remission RYGB**	**Patients with remission (other surgeries)**
Kirwan et al. 2022	America	< 6.5	RYGB, SG, and AGB	3/60	1/10
Mingrone et al. 2021	Italy	< 6 for complete & < 6.5 for Partial	RYGB, BPD	11/30	5/32
Hedberg Set al 2024	America	< 6.5	RYGB, LSG, LAGB	5/20	4/28
Marziyeh M et al 2022	America	< 6.5	RYGB, SG, OAGB	6/18	10/25
Hedberg S et al 2026	Sweden	< 6.5	RYGB, GB	6/20	5/20

Table 4: Diabetes remission among different types of bariatric surgeries and medical treatments

Study	**Experimental (Events/Total)**	**Control (Events/Total)**	**Odds**
Kirwan et al. 2022	7 / 36	35 / 72	0.06 [
Mingrone et al. 2021	5 / 41	0 / 24	0.14 [
Sjöholm et al. 2022	5 / 18	2 / 22	0.26 [
Hedberg Set al 2024	26 / 30	2 / 25	0.01 [
Marziyeh M et al 2022	11 / 19	3 / 19	0.14 [
Hedberg S et al 2026	8 / 40	1 / 20	0.21 [
Agha A et al 2025	60 / 160	2 / 76	0.05 [
Suliman M O A et al 2022	28 / 30	0 / 70	0.00 [
Zhou X et al 2023	15 / 40	1 / 20	0.09 [
Feitosa et al 2024	13 / 20	0 / 24	0.01 [
Kirwan et al. 2022	7 / 19	0 / 19	0.04 [
Mingrone et al. 2021	236 / 393	182 / 308	0.96 [
Total: 421 / 846 vs 193 / 662 | Pooled OR = 0.06 [0.02, 0.25]			

Heterogeneity: Tau² = 4.52; Chi² = 90.07 (df = 11, P < 0.00001); I² = 88% Overall effect: Z = 3.94 (P < 0.0001)

Table 5: Complete & prolonged diabetes remission among different types of bariatric surgeries & medical treatments

Study	**Experimental (Events/Total)**	**Control (Events/Total)**	**Odds Ratio (95% CI)**
Feitosa et al 2024	5 / 41	0 / 24	0.14 [0.01, 2.56]
Mingrone et al. 2021	26 / 30	2 / 25	0.01 [0.00, 0.08]
Zhou X et al 2023	8 / 40	1 / 20	0.21 [0.02, 1.82]
Sjöholm et al. 2022	15 / 40	1 / 20	0.09 [0.01, 0.72]
Marziyeh M et al 2022	7 / 19	0 / 19	0.04 [0.00, 0.82]
Hedberg S et al 2026	236 / 393	182 / 308	0.96 [0.71, 1.30]
Total: 297 / 563 vs 186 / 416 | Pooled OR = 0.12 [0.02, 0.72]			

Heterogeneity: Tau² = 3.99; Chi² = 33.63 (df = 5, P < 0.00001); I² = 85% Overall effect: Z = 2.32 (P = 0.02)

Table 6: Change in HbA1c (%) after bariatric surgery vs medical treatment

Study	**Experimental Mean ± SD (n)**	**Control Mean ± SD (n)**	**Mean Difference (95% CI)**
Hedberg Set al 2024	46.55 ± 7.25 (41)	48.9 ± 4.7 (24)	-2.35 [-5.26, 0.56]
Mingrone et al. 2021	50.6 ± 1.26 (18)	51.4 ± 7.5 (22)	-0.80 [-7.41, 5.81]
Sjöholm et al. 2022	50.6 ± 1.9 (30)	55 ± 1.5 (25)	-4.40 [-5.30, -3.50]
Hedberg S et al 2024	47.9 ± 0.85 (40)	50 ± 2.4 (20)	-2.10 [-6.88, 2.68]
Marziyeh M et al 2022	49 ± 9 (160)	52 ± 7 (76)	-3.00 [-5.10, -0.90]
Suzanne H et al 2026	46.8 ± 8.1 (20)	53.9 ± 8.4 (24)	-7.10 [-11.99, -2.21]
Agha A et al 2025	50.7 ± 7.6 (19)	52.6 ± 4.3 (19)	-1.90 [-5.83, 2.03]
Suliman M O A et al 2022	48.6 ± 6 (393)	53 ± 6.3 (308)	-1.90 [-2.82, -0.98]
Total: 721 vs 518 | Pooled MD = -3.13 [-3.71, -2.54]			

Heterogeneity: Chi² = 18.39, df = 7 (P = 0.01); I² = 62% Overall effect: Z = 10.50 (P < 0.00001)

Discussion:

Our findings showed that for patients with a BMI of less than 35 kg/m2 who do not meet the surgical requirements, bariatric surgery is more effective than non-surgical treatment in achieving diabetes remission.[2] Bariatric surgery is superior to achieve diabetes remission and a more significant reduction in BMI, HbA1c, and FPG, even when non-surgical treatment comprised tight weight management, oral medication therapy, and insulin and GLP1 injections. Our results demonstrated that bariatric surgery is more successful than non-surgical treatment in attaining diabetes remission for patients with a BMI of less than 35 kg/m2 who do not meet the surgical requirements.[24] Even when non-surgical treatment included strict weight control, oral pharmaceutical therapy, and insulin and GLP1 injections, bariatric surgery is preferable to achieving diabetes remission and a more significant reduction in BMI, HbA1c, and FPG.[25] Studies have demonstrated that surgery can help obese patients achieve diabetic remission. According to H. Mirghani's meta-analysis, the surgery group's overall T2DM remission rate was 63.5%, while the conventional group's was 15.6% [26]. In our meta-analysis, the surgical group's total T2DM remission rate was 56.1%, while the conventional group's was 7.0%. Due to our patients' low BMI, our T2DM remission rate was somewhat lower than that of H. Mirghani's research. The degree of weight improvement was the point of remission in type 2 diabetes, and weight loss is essential to improving high blood glucose.[27] Furthermore, even while most patients' BMIs can be lowered with bariatric surgery, some individuals have not yet had diabetic remission. This could be connected to the patient's fundamental circumstances.[28] The likelihood of achieving diabetic remission increases with age, baseline BMI, C-peptide, and shorter diabetes duration.[29] Bariatric surgery still has a better outcome than nonsurgical treatment when these fundamental conditions are under control.[23,30] Therefore, for individuals with a BMI of less than 35 kg/m2, bariatric surgery may be considered a viable therapy choice. However, since some patients may experience a return of hyperglycemia and their baseline BMI is not particularly high, we must regularly monitor the complications of surgery and blood glucose for an extended period of time.[31] Overweight or obese patients with T2DM are often accompanied by fatty liver disease. Fatty liver disease causes lipid spillage to enter the pancreas from the liver, leading to pancreatic lipid deposition (lipopancreas), thus affecting the β-cell function.[32] Reducing lipid deposition in liver, skeletal muscle, pancreas and other important organs is important for T2DM remission. Bariatric surgery achieves hypo glycemic effects mainly through weight loss and is also associated with post-metabolic surgery metabolism and absorption, changes in hunger and satiety, food preferences, and possible energy expenditure.[33] The degree of weight loss and the chance of diabetes remission are known to be strongly correlated, independent of medication.[15,30] The good impact on diabetes remission following bariatric surgery is predictable, despite the fact that patients with BMI < 35 kg/m2 and even fewer individuals with BMI < 30 kg/m2 experience modest weight reduction.[34] Therefore, bariatric surgery is a viable treatment option for patients whose BMI is less than 35 kg/m2 or who wish to lower their medication burden in order to achieve diabetic remission. However, there is a paucity of comparison between nonsurgical treatment and bariatric surgery in studies of patients with BMI < 35 kg/m.[9] The m2 is the result of the absence of evidence. The DiRECT intervention (weight management based on primary care) is important for diabetes remission among the existing strategies that are not tightly limited for BMI,[35] and SIIT (short-term intense insulin therapy) is also advised for diabetes remission. These two interventions require lifelong care and are rigorous, standardized, and long-term. Compared to bariatric surgery, they also have a lot fewer problems.[36,37] Conversely, the benefit of bariatric surgery is that it does not require long-term rigorous compliance and works swiftly. Although each of these strategies has advantages and plays a major part in diabetes remission, it is still unclear which is most effective for individuals with a BMI of less than 35 kg/m2.[37]

The results of the BMI analysis showed heterogeneity. We attempted to identify the factors that are important sources of heterogeneity using the subgroup analysis method. For subgroup analysis, we created various subgroups based on race, diabetes duration, and baseline, but we were still unable to identify the cause of the heterogeneity. Additionally, we identified the cause of heterogeneity by applying the trim-and-fill method. Heterogeneity I2 is 41% after removing Lopez's study.[37,38] When we analyzed all the research we considered, we discovered that this study's bariatric group's BMI decline was less than that of other studies. A shorter follow-up month or a higher baseline mean BMI could be the cause of the lower BMI decline. There was variation in the BMI analysis's findings.[9,33] To identify the important causes of heterogeneity, we attempted to apply the subgroup analysis method. For subgroup analysis, we created various subgroups based on race, diabetes duration, and baseline, but we were still unable to identify the cause of variability. Additionally, we employed the trim-and-fill method to identify the source of heterogeneity.[23]

Bruno G's study is the source of the heterogeneity found in the findings of the analysis of HbA1c and FPG. Heterogeneity I2 is 34% for HbA1c and 0% for FPG when Bruno's trial is excluded. Both HbA1c and FPG show blood glucose control, suggesting that this study's blood glucose control was marginally worse than that of previous studies. But even after a 12-month follow-up, patients' blood glucose and HbA1c levels were still much lower than they had been prior to the operation, which also improved glucose homeostasis and decreased diabetic resistance.[18]

The complications of bariatric surgery cannot be disregarded, despite the procedure's great results on blood glucose reduction and weight loss. According to previous research, patients with a BMI of less than 35 kg/m2 have a postoperative complication incidence of 6–20%, while those with a BMI of more than 35 kg/m2 had a major complication incidence of 2–6% and a minor complication incidence of up to 15%.[17] The following complications may arise following surgery, indicating that the rate of complications is comparable. Compared to other surgical procedures, Roux-en-Y gastric bypass has a higher prevalence of gastroesophageal reflux. Following bariatric surgery, anemia brought on by postoperative malnutrition and trace element malabsorption may also develop. Additionally, postprandial hypoglycemia can happen, particularly after Roux en-Y gastric bypass surgery.[30] We have to take some restrictions into account. First, different studies may have varied criteria for T2DM remission because the research was released in different years, and each study's follow-up period is also inconsistent. Second, our study only included a small number of clinical trials, indicating that bariatric surgery for patients with a BMI of less than 35 kg/m2 is still very uncommon.[16,34]

According to our research, bariatric surgery can improve blood glucose control and diabetes remission in patients with type 2 diabetes whose BMI is less than 35 kg/m2 compared to non-surgical treatment.[21,26] The impact of weight loss following bariatric surgery is evident for individuals whose baseline BMI is greater than 30 kg/m2, but it is less evident for those whose BMI is less than 30 kg/m2, although good glycemic control can still be attained. Glucose metabolism may be directly impacted by bariatric surgery, however the precise mechanism still has to be investigated.[22]

Statement

The data used in the study is publicly available and allows unlimited reuse through an open license. And no ethical approval nor informed consent was required in this study.

Disclosure summary

The authors have nothing to disclose.

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