

INPLASY

INPLASY2023120045

doi: 10.37766/inplasy2023.12.0045

Received: 11 December 2023

Published: 11 December 2023

Corresponding author:

Liu Yifan

1345123379@qq.com

Author Affiliation:

yangzhou university.

Meta-analysis of two kinds of metabolic surgery for obese type 2 diabetes mellitus: A comparison of postoperative gastrointestinal hormone changes and short-term remission

Liu, YF¹; Liu, Y².

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2023120045

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 December 2023 and was last updated on 11 December 2023.

INTRODUCTION

Review question / Objective The prevalence of obesity combined with type 2 diabetes mellitus is increasing year by year, and metabolic surgery has become an absolute indication for some patients, but the mechanism of action is still poorly described, and the effect of gastrointestinal hormones on diabetes remission is receiving increasing attention. The aim of the present meta-analysis was to compare the recent outcomes and gastrointestinal hormonal changes between laparoscopic Roux-en-Y gastric bypass and sleeve gastrectomy.

P: obese T2DM patients

I: laparoscopic Roux-en-Y gastric bypass

C: laparoscopic sleeve gastrectomy

O: short-term remission, gastrointestinal hormonal changes

S: RCT or cohort study.

Condition being studied The prevalence of obesity combined with T2DM is increasing globally with the improvement of living standards and changes in dietary habits. More and more clinical practices and guidelines have confirmed that metabolic surgery can significantly improve the glycemic control of obese patients with T2DM, and is currently the only effective long-term treatment for diabetes mellitus. Currently, the most commonly used is laparoscopic Roux-en-Y gastric bypass with sleeve gastrectomy. However, the mechanism of action of these two metabolic surgeries for the treatment of T2DM is still of conflicting accounts and lacks systematic studies, which may be related to the alteration of gastrointestinal tract-related hormone secretion. The aim of this study was to compare the effects of LRYGB and LSG on diabetes remission and changes in gastrointestinal hormone levels in

combined obese T2DM patients intervened, and to assess whether the secretion of GLP-1 and other hormones, such as GIP, PYY, and Ghrelin, could explain recent T2DM remission, in order to elucidate the potential mechanisms associated with T2DM remission.

METHODS

Search strategy Electronic resources PubMed, EMbase, The Cochrane Library, and Web of Science were used to search for articles published in English in foreign journals, while domestic CNKI, Wanfang, and WeiPu databases were used to search for articles published in China. The search strategy in English was to use a combination of subject terms and keywords, with the first search terms being "bariatric surgery" OR "metabolic surgery" OR "laparoscopic sleeve gastrectomy" OR "laparoscopic surgery" OR "metabolic surgery" OR "metabolic surgery". The first search term was "bariatric surgery" OR "metabolic surgery" OR "laparoscopic sleeve gastrectomy" OR "laparoscopic sleeve gastrectomy", the second search term was "diabetes" OR "type 2 DM", the third search term was "Gastrointestinal Hormones" OR "Glucagon-Like Peptide 1" OR "Gastric Inhibitory Polypeptide" OR "Peptide YY". " OR "Ghrelin". Referring to nationally published articles, the search terms were: obesity, type 2 diabetes mellitus, metabolic surgery, bariatric surgery, sleeve gastric, gastric bypass, SG, RYGB, gastrointestinal hormones, GLP-1, GIP, PYY, and Ghrelin. At the same time, manual searches were added for complementary and search completeness, and the authors were contacted for raw data when needed.

Participant or population Obese (BMI \geq 30 kg/m², Asians \geq 27.5 kg/m²) patients diagnosed with type 2 diabetes mellitus, aged > 18 years.

Intervention laparoscopic Roux-en-Y gastric bypass.

Comparator laparoscopic sleeve gastrectomy.

Study designs to be included RCT or cohort study.

Eligibility criteria Inclusion criteria: (1) Study type: inclusion of RCTs or cohort studies of recent efficacy and gastrointestinal hormonal changes of laparoscopic Roux-en-Y gastric bypass versus gastric sleeve resection for the treatment of obesity in combination with type 2 diabetes mellitus. (2) Study population: obese (BMI \geq 30 kg/m², Asians \geq 27.5 kg/m²) patients diagnosed with

type 2 diabetes mellitus, aged > 18 years. Exclusion criteria: (1) Study subjects with type 1 diabetes mellitus or type 2 diabetes mellitus who had previously undergone bariatric surgery. (2) Study subjects aged <18 years. (3) Non-diabetic patients. (4) Pediatric obesity and diabetic surgery. (5) Other diseases that may affect prognosis. (6) Failure to provide complete data reports, animal experiments, case reports, conference abstracts and review articles; loss of follow-up more than 20%, failure to record preoperative and postoperative efficacy data; the number of surgical cases of T2DM combined with obesity <3 cases.

Information sources PubMed, EMbase, The Cochrane Library, Web of Science, CNKI, Wanfang, WeiPu.

Main outcome(s) Main outcome indicators: diabetes remission rate. Gastrointestinal hormone indicators: fasting GLP-1, Ghrelin, PYY, GIP.

Additional outcome(s) Clinical indicators: glycosylated hemoglobin and body mass index (BMI), insulin sensitivity (HOMA-IR) changes.

Data management Endnote.

Quality assessment / Risk of bias analysis Cochrane TOO.

Strategy of data synthesis Meta-analysis was performed using RevMan 5.3 software or StataMP 14. Count data were expressed as relative risk (RR) or odds ratio (OR) and their 95% CL, while measure data were expressed as mean difference (MD) or standard deviation (SMD) and their 95% CI. Heterogeneity test was first performed, and statistical heterogeneity was considered to exist if $I^2 > 50\%$ and $P < 0.1$ in Q test. On the premise that there was no significant clinical heterogeneity among the results of the studies, Meta-analysis would be performed using a random-effects model if statistical heterogeneity existed. Conversely, if no statistical heterogeneity exists, Meta-analysis will be performed using a fixed-effects model. For obvious clinical heterogeneity, it can be handled by subgroup analysis, sensitivity analysis, or only descriptive analysis. Also, funnel plots would be used to analyze potential publication bias. The test level for Meta-analysis was set at $\alpha = 0.05$.

Subgroup analysis Subgroups were analyzed according to patient age, ethnicity, BMI, and type of literature.

Sensitivity analysis After deleting any of them, the combined results of the rest of the literature were not significantly different from what they would have been without deletion, which means that the sensitivity analysis was passed.

Country(ies) involved China.

Keywords Laparoscopic Roux-en-Y gastric bypass; Laparoscopic sleeve gastrectomy; Type 2 diabetes mellitus; Short-term efficacy; Remission.

Contributions of each author

Author 1 - Liu Yifan.

Author 2 - Liu Yan.