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Sleeve gastrectomy versus Roux-en-Y gastric bypass in terms of hypertension remission rate after surgery: A meta-analysis based on Chinese obese patients

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ADMINISTRATIVE INFORMATION**Support** - No financial support for the research.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202440068**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 April 2024 and was last updated on 17 April 2024.**INTRODUCTION**

Review question / Objective The aim of this study is to compare the effects of SG and RYGB on the remission rate of hypertension and weight loss in Chinese patients. The selected research methods are RCTs (randomized controlled trials) and cohort studies.

Condition being studied Obesity, characterized by excessive accumulation of body fat, is a prevalent global health issue with significant implications for individual health and public health systems. It is typically defined by a body mass index (BMI) greater than 30 kg/m². The condition has reached epidemic proportions worldwide, affecting individuals of all ages, genders, and socioeconomic backgrounds.

Obesity is associated with an increased risk of various comorbidities, including hypertension, which is a chronic medical condition characterized by elevated blood pressure levels. Hypertension, also known as high blood pressure, is a major risk factor for cardiovascular diseases, stroke, and

other adverse health outcomes. The relationship between obesity and hypertension is complex and multifactorial, involving mechanisms related to insulin resistance, inflammation, and abnormal adipokine secretion.

Understanding the association between obesity and hypertension is crucial for effective prevention and management strategies. Therefore, this study aims to investigate the impact of different surgical interventions, such as sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB), on hypertension remission rates and weight loss outcomes among Chinese patients with obesity and hypertension.

METHODS

Participant or population In this review, the participants of interest are individuals diagnosed with obesity and hypertension. These participants may come from various demographic backgrounds, including different age groups, genders, and socioeconomic statuses. They should meet specific criteria related to obesity,

typically defined by a body mass index (BMI) greater than 30 kg/m². Additionally, they should have a confirmed diagnosis of hypertension, characterized by elevated blood pressure readings. The review may include participants from different geographical locations, but the focus is primarily on studies involving Chinese populations. Both male and female participants may be considered, and their age range could vary, although most studies might focus on adults. Overall, the review will address individuals who have been diagnosed with both obesity and hypertension, regardless of their age, gender, or other demographic factors, with a specific focus on the Chinese population.

Intervention Sleeve Gastrectomy (SG) involves the surgical removal of a portion of the stomach, resulting in a smaller stomach size and reduced food intake. This procedure aims to promote weight loss by restricting the amount of food that can be consumed.

Comparator Roux-en-Y Gastric Bypass (RYGB) is a more complex procedure that involves creating a small pouch at the top of the stomach and connecting it directly to the small intestine. This bypasses a portion of the stomach and duodenum, reducing the absorption of nutrients and promoting weight loss.

Study designs to be included The study designs to be included are randomized controlled trials (RCTs) and cohort studies that compare the effects of sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) surgeries on hypertension remission rates and weight loss outcomes in Chinese patients.

Eligibility criteria Inclusion Criteria: (1) Study Population: Chinese obese patients with a BMI > 30 kg/m² and aged over 18 years. (2) Surgical Procedures: Patients undergoing different surgical procedures were categorized into the observation group undergoing sleeve gastrectomy and the control group undergoing Roux-en-Y gastric bypass. (3) Outcome Measures: Included systolic and diastolic blood pressure data, as well as the number of hypertensive patients before and after surgery. (4) Study Types: Accepted study types comprised randomized controlled trials, cohort studies, and case-control studies. (5) Availability and Criteria Adherence: Full-text availability and data meeting the extraction criteria were essential. Exclusion Criteria: (1) Study Types: Excluded pathological reports, conference abstracts, comments, reviews, and animal experiments. (2) Patient Characteristics: Excluded

lactating and pregnant women. (3) Medical History: Excluded patients with gastroesophageal reflux disease or a history of abdominal surgery.

Information sources The information sources for this study include: PubMed database, Embase database, Web of Science database, Cochrane Library database.

These databases will be searched separately using specific search terms and combinations of subject headings and free text terms related to sleeve gastrectomy, Roux-en-Y gastric bypass, obesity, hypertension, and China. The search period will encompass the inception of each respective database up to April 2024. Both Chinese and English language articles will be considered for inclusion.

Main outcome(s) The main outcomes of the study include: Hypertension remission rate: Defined as the proportion of patients achieving blood pressure below a certain threshold (e.g., 135/75 mmHg) without antihypertensive treatment after sleeve gastrectomy or Roux-en-Y gastric bypass surgery. Weight loss effect: Assessed by parameters such as percent excess weight loss (%EWL), body mass index (BMI) reduction, and changes in weight over time. Blood pressure changes: Evaluation of changes in systolic and diastolic blood pressure before and after surgery in both treatment groups. These outcomes will be analyzed to compare the effectiveness of sleeve gastrectomy and Roux-en-Y gastric bypass in treating obesity-related hypertension.

Quality assessment / Risk of bias analysis The quality assessment and risk of bias analysis will be conducted using various evaluation tools, including the Cochrane Risk of Bias Tool and the Newcastle-Ottawa Scale (NOS). For randomized controlled trials (RCTs), the assessment will cover selection bias (randomization), performance bias (blinding of participants and personnel), detection bias (blinding), attrition bias (completeness of outcome data), reporting bias, and other biases. For cohort studies, the evaluation will focus on the methods used for participant selection, comparability between study groups, and outcome assessment.

Strategy of data synthesis The data synthesis strategy will involve combining the findings from included studies to draw overall conclusions regarding the effects of sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) on hypertension remission rates and weight loss among Chinese patients. This will include quantitative synthesis through meta-analysis, where appropriate, to calculate pooled effect sizes

and their corresponding confidence intervals. Subgroup analyses may be performed based on factors such as patient age, follow-up time, and other relevant variables to explore potential sources of heterogeneity and assess the robustness of the findings. Sensitivity analyses will also be conducted to evaluate the impact of individual studies on the overall results. Additionally, narrative synthesis will be employed to summarize and interpret the findings qualitatively, providing insights into the clinical implications of the study results.

Subgroup analysis Subgroup analysis involves dividing the study population into different subgroups based on specific characteristics or variables, and then analyzing each subgroup separately to explore the impact of different factors on the study outcomes. In the comparison of the effects of SG and RYGB on hypertension remission rates and weight loss outcomes in Chinese patients, possible subgroup analyses may include:

1. Age subgroup analysis: Patients are grouped by age to compare differences in hypertension remission rates and weight loss outcomes between younger and older patients.
2. Follow-up time subgroup analysis: Patients are grouped by follow-up time to compare differences in hypertension remission rates and weight loss outcomes between short-term and long-term follow-up patients.
3. Other potential factor subgroup analysis: Patients are further divided based on other factors that may influence the outcomes, such as gender, BMI level, comorbidities, etc., to explore the impact of these factors on the study results.

Through these subgroup analyses, a more comprehensive understanding of the effects of different factors on the outcomes of SG and RYGB surgeries can be obtained, providing more targeted recommendations for clinical practice.

Sensitivity analysis Sensitivity analysis is a method used to assess the robustness and reliability of study results by examining the impact of individual studies or variables on the overall findings. It involves systematically excluding one study at a time or altering certain parameters to evaluate whether the results remain consistent. In the context of comparing the effects of SG and RYGB on hypertension remission rates and weight loss outcomes in Chinese patients, sensitivity analysis includes the following aspects:

1. Exclusion of studies: The studies by Zhang (2021) and Lee (2015) were excluded, and the overall results were recalculated to determine their impact on the conclusions.

2. Alteration of analysis methods: After systematically adjusting the analysis methods, a random-effects model was adopted to reassess the robustness of the study results. Through these sensitivity analyses, the reliability of the study results can be determined, and the impact of excluding specific studies or adjusting analysis methods on the conclusions can be evaluated.

Country(ies) involved China.

Keywords Sleeve gastrectomy; Roux-en-Y gastric bypass; Meta-analysis; Hypertension; Metabolic syndrome; Morbid Obesity; Chinese population.

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