INPLASY PROTOCOL

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Review Stage at time of this submission: **Piloting of the study selection process.**

Conflicts of interest:
None declared.

The effect of bariatric surgery on pancreas fat accumulation: a systematic review and meta-analysis

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Review question / Objective: **This systematic review and meta-analysis aimed to assess the effect of bariatric surgery on pancreas fat accumulation.**
Condition being studied: **Pancreatic steatosis is characterized by increased accumulation of fat in the pancreas. The most common causes are obesity and metabolic syndrome. Due to this close association between obesity and metabolic syndrome, one can assume that, in addition to a rapid and sustained weight loss, bariatric surgery could affect metabolic syndrome and its components. However, it remains unclear whether bariatric surgery and weight loss can reverse abnormalities in pancreatic lipid metabolism in association with their effect on endocrine pancreatic dysfunction. This systematic review and meta-analysis aimed to measure the change of pancreatic fat in a group of patients with severe obesity before and after bariatric surgery.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 April 2023 and was last updated on 20 April 2023 (registration number INPLASY202340072).

INTRODUCTION

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METHODS

Search strategy: PubMed, Embase, Scopus, Cochrane.

Participant or population: Patients who uderwent bariatric surgery.

Intervention: None.

Comparator: Before vs. after bariatric surgery.

Study designs to be included: retrospective or prospective cohort studies, randomized controlled trials (RCTs), non-randomized controlled trials and case-control studies.

Eligibility criteria: Inclusion criteria were: (i) retrospective or prospective cohort studies, randomized controlled trials (RCTs), non-randomized controlled trials and case-control studies reporting the impact of bariatric surgery on pancreas fat accumulation and (ii) studies published in the English language. Exclusion criteria were: (i) conference abstracts, review articles and case reports.

Information sources: Electronic databases.

Main outcome(s): The primary outcome measure was the impact of bariatric surgery on pancreas fat accumulation (the change of pancreatic fat accumulation in patients with severe obesity before and after bariatric surgery).

Additional outcome(s): Secondary outcomes were the change of BMI, endocrine pancreatic dysfunction, liver fat accumulation, etc. in patients with severe obesity before and after bariatric surgery.

Quality assessment / Risk of bias analysis: Risk of bias will be assessed individually for each study in the review. The risk of bias of outcomes related to pancreatic fat accumulation in each study will be assessed using the Joanna Briggs Institute Prevalence Critical Appraisal Tool (JBI tool) for cohort studies and the Revised Cochrane Risk-ofBias Tool for Randomised Trials (RoB 2.0) for RCTs. The quality assessment will be conducted independently by the first two authors (ZX, WR).

Strategy of data synthesis: We plan to make a systematic synthesis based on the outcomes reported, risk of bias and quality of the studies.

To do that, firstly two reviewers (WR and CGH) will independently perform the study selection process according to a form established a priori. The title and abstract of each retrieved article will be examined to identify those that were likely to include in the revision. Studies appearing eligible based on their abstract or those that will be not excluded based on their title and abstract were read full-text against the inclusion criteria for their final inclusion or exclusion in the systematic review. Disagreements about study selection will be resolved by reaching consensus among reviewers.

Reviewers will create a study specific database in Excel for data collection for the final selected studies. Data will be extracted from the studies that will be included in the database by one reviewer and will be checked for accuracy by a second reviewer.

We will systematically extract a present the data: author's name, study name, and year of publication of the article, number, age, gender, BMI and pancreatic fat accumulation before and after bariatric surgery…… Apart from this, we will finally extract quantitative data to perform a meta-analysis for study the differences in the degree of pancreas fat accumulation after bariatric surgery.

Heterogeneity was quantified using the I^2 statistic (the percentage of total variability attributed to between-study heterogeneity). Potential sources of heterogeneity were assessed with meta-regression.

Subgroup analysis: We plan to carry out subgroups according to morbidly obese or combined with type 2 diabetes.

Sensitivity analysis: A sensitivity analysis will be performed excluding those studies that were categorized as poor in terms of quality. Assessment of reporting biases: We will assess publication bias and effects of small studies by creating a funnel plot if there are at least 10 studies in the meta-analysis. We will assess the degree of asymmetry using Egger's test for continuous and dichotomous outcomes (Egger 1997). We will discuss the potential impact of reporting biases on the findings of the review. To minimize the likelihood of introducing publication bias, we will attempt to develop a sufficiently sensitive search strategy.

Language restriction: English.

Country(ies) involved: China.

Keywords: Bariatric Surgery, Weight loss, Pancreatic fat, Type 2 Diabetes.

Contributions of each author:
Author 1 - Rui Wang - The author contributed to formally screen of search results, data extraction,drafted the manuscript.
Author 2 - Guanghua Chen - The author contributed to formally screen of search results, data extraction,drafted the manuscript.
Author 3 - Xuan Zhang - The author provided statistical expertise and contributed to the development of the selection criteria, and the risk of bias assessment strategy.
Author 4 - Cheng Li - The author contributed to data extraction and drafted the manuscript.
Author 5 - Yonghua Chen - The author contributed to design and oversight of the study, drafted the manuscript.
The author read, provided feedback and approved the final manuscript.
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