INPLASY

Comparative Efficacy of Different Surgical Approaches for Moderate-to-Severe Ischemic Mitral Regurgitation: A Systematic Review and Network Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - No.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202420049

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 February 2024 and was last updated on 11 February 2024.

INTRODUCTION

Review question / Objective To assess the differences in efficacy among various surgical approaches for treating ischemic mitral valve regurgitation.

Condition being studied Ischemic mitral regurgitation (IMR) refers to the occurrence of left ventricular geometric changes as a result of myocardial ischemia and necrosis caused by partial narrowing or occlusion of the coronary artery, leading to rupture or elongation of the papillary muscles and chordae tendineae, further resulting in passive expansion of the valve annulus, leaflet prolapse, and abnormal left ventricular motion. This ultimately leads to functional dilation of the mitral valve, causing regurgitation. The American Association for Thoracic Surgery (AATS) 2016 guidelines strongly suggest that, for patients with moderate to severe IMR, treatment options may include coronary artery bypass grafting (CABG), mitral valve repair (MVr), replacement (MVR), or a combination of these procedures depending on the specific circumstances. However, the exact differences in efficacy between these surgical approaches remain unclear. This study aims to compare the ultimate efficacy of different surgical treatments for IMR, providing valuable insights for clinical practice.

METHODS

Participant or population The study includes patients diagnosed with moderate to severe IMR by cardiac color Doppler ultrasound.

Intervention The interventions include coronary artery bypass grafting (CABG), mitral valve repair (MVr), mitral valve replacement (MVR), CABG+MVr,

CABG+MVR, and transcatheter edge-to-edge repair with MitraClip for the mitral valve.

Comparator Patients with IMR undergoing different surgical procedures are used as the control group.

Study designs to be included Restricted to randomized controlled trials (RCTs).

Eligibility criteria Literature screening and data extraction were conducted by two researchers.Inclusion criteria: (1) Limited to randomized controlled trials (RCTs); (2) Patients diagnosed with moderate to severe IMR by cardiac color Doppler ultrasound; (3) Intervention measures including: CABG, MVr, MVR, CABG+MVR, CABG+MVr, and transcatheter edge-to-edge repair with MitraClip; (4) Primary outcome measures: 30-day all-cause mortality, renal complications, stroke, major bleeding events, respiratory complications, and neurological complications.Exclusion criteria: (1) Duplicate publications; (2) Studies lacking relevant outcome measures; (3) Inaccessible full text; (4) Review or letter publications; (5) Non-clinical studies.

Information sources We conducted searches in PubMed, the Cochrane Library, Web of Science, and Embase databases up to September 2023. The search terms included "ischemic mitral valve regurgitation," "ischemic insufficiency, mitral valve," "mitral valve repair," "coronary artery bypass graft," "coronary artery bypass surgery," and "bypass, coronary artery" among others.

Main outcome(s) 30-day all-cause mortality, renal complications, stroke, major bleeding events, respiratory system complications, and neurological complications.

Quality assessment / Risk of bias analysis The risk of bias of the included studies was assessed by two independent reviewers using the revised version of the Cochrane tool for randomized trials . Disagreements were resolved either by consensus or by a third reviewer. Six domains, including bias arising from the randomization process, bias arising from deviations from intended interventions, bias arising from missing outcome data, bias in the measurement of the outcome, and bias in the selection of the reported results were considered in the evaluation process. Finally, the overall bias of studies was identified. Studies were considered to be of “low concern” if all domains were rated to have “low risk”. Once one domain was rated to be of “some concern”, studies were considered to be of “unclear risk of bias” (including not applicable and no information). When more than one domain was rated as “high risk”, the studies were considered to be of “high concern”.

Strategy of data synthesis Employing the frequentist approach, visualize network relationships, optimal sorting probability graphs, and funnel plots using Stata 17.0 software. For binary variables, analyze effect sizes using odds ratios (OR) and provide 95% confidence intervals (CI). Assess heterogeneity between study results using χ^2 tests ($\alpha=0.1$) and quantitative I^2 analysis. Utilizing the frequentist approach, conduct meta-analysis to illustrate the connections between different interventions through network diagrams. Subsequently, assess consistency to determine differences between direct and indirect comparisons: a significance level of $P<0.05$ indicates disparity. In cases of inconsistency, employ node-splitting methods to explore its sources and rank interventions based on the area under cumulative ranking curves.

Subgroup analysis If there is high heterogeneity among the included studies, it is advisable to address this through subgroup analysis, sensitivity analysis, meta-regression, and other methods.

Sensitivity analysis Using the method of systematically removing individual elements included in the study to conduct sensitivity analysis, in order to assess the stability of the statistical analysis results.

Country(ies) involved China - The First Clinical Medical College of Lanzhou University.

Keywords Coronary artery bypass grafting; Mitral valve repair; Ischemic mitral regurgitation; Systematic review/Network meta-analysis.

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