INPLASY

Efficacy of coronary artery bypass grafting combined with mitral valve repair in the treatment of moderate ischemic mitral regurgitation: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No.

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

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 October 2024 and was last updated on 12 October 2024.

INTRODUCTION

Review question / Objective This systematic review evaluates the efficacy of isolated coronary artery bypass grafting compared to combined coronary artery bypass grafting with mitral valve repair in the treatment of moderate ischemic mitral regurgitation.

Condition being studied Ischemic mitral regurgitation (IMR) refers to mitral valve insufficiency caused by myocardial ischemia and necrosis due to partial narrowing or occlusion of the coronary arteries. This results in papillary muscle or chordae tendineae rupture or elongation, left ventricular dilation leading to passive annular expansion, mitral valve prolapse, and abnormal left ventricular motion, which ultimately alter left ventricular geometry. Treatment options for IMR include medical therapy, interventional therapy, and surgical treatment. To date, surgical intervention remains the primary method for managing IMR. While there are effective treatment approaches for both mild and severe IMR patients, surgical treatment for moderate IMR remains challenging. Previous studies have shown significant controversy regarding the therapeutic effects of isolated coronary artery bypass grafting (CABG) versus CABG combined with mitral valve repair (MVr) in IMR patients. Therefore, this study aims to systematically evaluate the efficacy of isolated CABG and CABG combined with MVr in IMR patients to provide clinical reference for related practice.

METHODS

Participant or population The study population includes patients diagnosed with moderate to severe IMR by cardiac color Doppler ultrasound, who subsequently underwent either isolated CABG or CABG combined with MVr treatment.

Intervention The interventions include treatment with CABG combined with MVr or treatment with isolated CABG.

Comparator Patients with moderate to severe IMR who received CABG combined with MVr or isolated CABG served as the control population.

Study designs to be included The study is restricted to randomized controlled trials (RCTs).

Eligibility criteria Literature screening and data extraction were both performed by two researchers.
Inclusion Criteria:(1) The study is restricted to RCTs;(2) Patients diagnosed with moderate to severe IMR by cardiac color Doppler ultrasound;(3) Interventions include treatment with CABG combined with MVr or treatment with isolated CABG;(4) Primary outcome measures: 30-day all-cause mortality, respiratory complications, renal insufficiency, major bleeding events, wound infection, postoperative new-onset atrial fibrillation, stroke, and myocardial infarction.
Exclusion Criteria: (1) Duplicate publications; (2) Studies for which the full text is not available; (3) Review articles or letters; (4) Case reports or editorial materials; (5) Studies with missing or incomplete data.

Information sources We searched the PubMed, Cochrane Library, Web of Science, and Embase databases, with the search period ending in September 2023. The search terms included "coronary artery bypass grafting," "mitral valve repair," "ischemic mitral regurgitation," and others.

Main outcome(s) 30-day all-cause mortality, respiratory complications, renal insufficiency, major bleeding events, wound infection, postoperative new-onset atrial fibrillation, stroke, and myocardial infarction.

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 Meta-analysis was conducted using Stata 17.0 software, and forest plots, funnel plots, sensitivity analysis plots, and Egger’s test plots were generated. Categorical variables were analyzed using odds ratios (OR) as the effect size statistic, with 95% confidence intervals (95% CI) provided. For continuous variables, standardized mean difference (SDM) was used as the effect size. Heterogeneity across studies was assessed using the I^2 statistic. If I^2 0.05, it indicates insignificant heterogeneity, and a fixed-effect model was applied for the meta-analysis. If $I^2 \geq 50\%$ or $P < 0.05$, it indicates significant heterogeneity, and a random-effects model was used. The quality of the included studies was evaluated using the Cochrane risk of bias assessment tool, and publication bias was assessed using funnel plots and Egger’s test. A P-value of less than 0.05 was considered statistically significant.

Subgroup analysis If significant heterogeneity exists among the included studies, sensitivity analysis and meta-regression will be used for further assessment.

Sensitivity analysis Sensitivity analysis was performed by sequentially excluding individual studies to assess the stability of the statistical results.

Country(ies) involved China - The First School of Clinical Medicine,Lanzhou University.

Keywords Coronary Artery Bypass Grafting; Mitral Valve Repair; Ischemic Mitral Regurgitation; Systematic Review/Meta-analysis.

Contributions of each author
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