INPLASY

Percutaneous Coronary Intervention with Stents versus Coronary Artery Bypass Grafting in Treating Unprotected Left Main Coronary Artery Diseases: A Systematic Review and Meta-analysis Comprising 35,409 Patients

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ADMINISTRATIVE INFORMATION

Review Stage at time of this submission - Data analysis.

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 04 September 2023 and was last updated on 04 September 2023.

INTRODUCTION

Review question / Objective In this systematic review and meta-analysis, we comprehensively collected data and evaluated the diferences from the studies that have compared PCI and CABG strategy in treating patients with LMCA diseases, seeking to clarify which strategy was superior. The comparison of long-term outcomes after percutaneous coronary intervention (PCI) with stents versus coronary artery bypass grafting (CABG) for patients with unprotected left main (UPLM) diseases yielded discrepant conclusions.

Condition being studied The left main coronary artery (LMCA) is the first segment of the left coronary artery and supplies approximately 75% of the myocardium in the left ventricle. Left main lesions tend to have worse clinical prognosis and higher mortality than non-left main lesions. Over the past few decades, as LMCA diseases has become more common in clinical practice, its anatomical complexity has gradually increased (1).

For a long time, CABG has been regarded as the gold standard revascularization strategy for patients with LMCA diseases. Along with the evolution of stent technology, assistance of intra-procedural imaging, optimization of antithrombotic strategy, and application of new drugs, percutaneous coronary intervention (PCI) is increasingly used and gradually becoming an alternative treatmengt strategy (1). The 2018 European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS) on myocardial revascularization recommended PCI as an appropriate alternative to CABG (Class IIa)(2). In recent years, multiple randomized controlled trials (RCTs) were conducted, trying to identify the optimal revascularization strategy for patients with LMCA diseases. However, long-term findings from several studies have come to conflicting conclusions (3-8). The SYNTAX trial showed similar 10-year incidence of all cause death in PCI and CABG. However, CABG provided a significant survival benefit in patients with three-vessel disease, but not in patients with left main coronary artery disease (6).

The LE-MAIN trial manifested that in patients with unprotected left main coronary artery stenosis with low and medium complexity of coexisting coronary artery disease, stenting offers numerically, but statistically nonsignificant, favorable long-term outcome up to 10 years in terms of safety and efficacy outcomes (7). The 10-year report of the MAIN-COMPARE registry (Revascularization for Unprotected Left Main Coronary Artery Stenosis: Comparison of Percutaneous Coronary Angioplasty Versus Surgical Revascularization) showed a benefit of CABG over PCI on mortality and a composite of death, Q-wave MI, or stroke after 5 years (8). Therefore, the results were conflicted.

METHODS

Search strategy A comprehensive search was conducted using PubMed, Embase, Cochrane Database and Web of science. RCTs and observational studies comparing PCI with stents and coronary artery bypass grafting (CABG) for UPLM disease published from library or database construction to 30 Jun. 2023 were searched. The key search terms included "left main", "percutaneous coronary intervention", "coronary artery bypass grafting". The search terms were retrieved using a free combination method, and all relevant references that were not identified from the initial database searches were evaluated for addition if they met the inclusion criteria.

Participant or population Unprotected left main (UPLM) disease patients.

Intervention Percutaneous coronary intervention (PCI) with stents.

Comparator Coronary artery bypass grafting (CABG).

Study designs to be included (1) RCTs and OSs comparing percutaneous coronary intervention and coronary artery bypass grafting strategies for UPLM disease; (2) comparable general information between the two strategies;(3) outcomes in the study includes at least one of MACCE, all-cause death, cardiac death, myocardial infarction (MI), stroke, TVR, and ST; (4) the duration of follow-up was at least 3 year.

Eligibility criteria (1)Endpoint events of interest were not explicitly reported or could not be extracted and calculated from published results; (2)Duplicate published studies.

Information sources A comprehensive search was conducted using PubMed, Embase, Cochrane Database and Web of science. RCTs and observational studies comparing PCI with stents and coronary artery bypass grafting (CABG) for UPLM disease published from library or database construction to 30 Jun. 2023 were searched.

Main outcome(s) The primary endpoint of this meta-analysis was MACCE, defined as a composite of death, MI, stroke and TVR.

Additional outcome(s) The secondary endpoints were ST and the individual components of the primary endpoint, including all-cause death, cardiac death, MI, TVR, and stroke.

Quality assessment / Risk of bias analysis RCTs were assessed by the Cochrane Collaboration tool (9), while OSs were assessed by the Newcastle-Ottawa Quality Assessment Scale (NOS) (10).

Strategy of data synthesis, Subgroup analysis and Sensitivity analysis STATA/MP 17.0 was used to calculate the aggregated odds ratios (OR) at 95% confidence intervals (CI). Heterogeneity between the studies was explored using the I2 test and the fixed-effects model was used when P > 0.01 and I2 < 50%, while the random-effects model was used if not. A heterogeneity test and sensitivity analysis was used to select the origin of heterogeneity. Contour-enhanced funnel plots, a regression-based Egger test, and non-parametric trim-and-fill analysis were used to assess publication bias if the number of studies was more than ten. P-value < 5% was considered the difference was significant.

Country(ies) involved China.

Keywords percutaneous coronary intervention, coronary artery bypass grafting, UPLM, MACCE.

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