INPLASY

Efficacy and safety of macitentan for pulmonary hypertension: A meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data extraction.

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 10 August 2023 and was last updated on 10 August 2023.

INTRODUCTION

Review question / Objective To investigate the efficacy and safety of macitentan for pulmonary hypertension. Population: patients with pulmonary hypertension. Intervention: macitentan. Control: placebo. Outcomes: The primary end points: 6-minute walking distance(6MWD) and the worsening in WHO/NYHA functional class. The secondary end points: hemodynamic parameters (mean pulmonary arterial pressure, pulmonary vascular resistance, cardiac index and right atrial pressure) and incidence of severe adverse events (SAE). Study: randomized controlled trial.

Condition being studied Pulmonary hypertension (PAH) is a pathophysiological disease caused by changes in pulmonary vascular structure or function, caused by a variety of heterologous diseases and mechanisms, which leads to increased pulmonary vascular resistance and pulmonary artery pressure. The progression of the disease can lead to right heart failure and death. Macitentan, as a dual endothelin receptor antagonist, has a high affinity for endothelin receptors and can be bound permanently, which is recommended by guidelines for pulmonary hypertension. However, there are five types of pulmonary hypertension, and it is unclear whether macitentan is effective for various types of pulmonary hypertension. Therefore, We have summarized the published randomized controlled trials to evaluate the efficacy and safety of macitentan in various types of pulmonary hypertension through meta-analysis.

METHODS

Search strategy ("pulmonary arterial hypertension"[Title/Abstract] OR "arterial hypertension pulmonary"[Title/Abstract] OR "hypertension pulmonary arterial"[Title/Abstract] OR "PAH"[Title/Abstract]) AND "macitentan"[Title/Abstract] AND ("randomized controlled trial"[Publication Type] OR "randomized"[Title/Abstract] OR "placebo"[Title/Abstract]).

Participant or population The patients were diagnosed with pulmonary hypertension through right heart catheterization examination.

Intervention Macitentan.

Comparator Placebo.

Study designs to be included Randomized controlled trial (RCT).

Eligibility criteria The inclusion criteria are: (1) The study design must be a randomized controlled trial (RCT); (2) The patients were diagnosed with pulmonary hypertension through right heart catheterization examination; (3) The intervention of the experimental group was macitentan, while the control group was placebo; (4) The main outcome indicators were 6-minute walking distance (6WMD) change and WHO/NYHA cardiac function deterioration. The secondary indicators were changes in hemodynamic parameters(mean pulmonary arterial pressure, pulmonary vascular resistance, cardiac index and right atrial pressure) and incidence of severe adverse events (SAE). The exclusion criteria are: (1) non-randomized controlled trials; (2) repeated publication, conference reports, systematic reviews, reviews, comments, animal experiments; (3) The main patients was children; (4) inconsistent research content and inconsistent intervention measures; (5) inconsistent outcome indicators.

Information sources We performed searches of Pubmed, Embase, Web of Science and Cochrane library up to July 1, 2023.

Main outcome(s) 6-minute walking distance(6MWD) and the worsening in WHO/NYHA functional class.

Additional outcome(s) Mean pulmonary arterial pressure(mPAP), pulmonary vascular resistance(PVR), cardiac index(CI), right atrial pressure(RAP) and serious adverse events(SAE).

Quality assessment / Risk of bias analysis The quality of each RCTs were evaluated according to the Cochrane recommended tools, which included: 1. random sequence generation (selection bias); 2. allocation concealment (selection bias); 3. blinding of participants and personnel (performance bias); 4. blinding of outcome assessment (detection bias); 5. incomplete outcome data (attrition bias); 6. selective reporting (reporting bias); 7. other bias.

Strategy of data synthesis RevMan 5.3 software will be used for statistical analysis. Chi-square test will be used to test the statistical heterogeneity of the therapeutic effects of the two groups. If there is no heterogeneity in the study($P>0.1$, $I2<50\%$), the fixed effect model is used for analysis. If there is significant heterogeneity($P\leq0.1$, $I2\geq50\%$), the sensitivity analysis is used to analyze the causes, and the random effect model will be selected. The count data use the risk ratio (RR) as the effect size, and the continuous data use the mean difference (MD) as the effect size. The results are calculated 95 % confidence interval(CI), $P < 0.05$ for the difference are statistically significant. The bias test will be expressed by funnel plot.

Subgroup analysis None.

Sensitivity analysis If necessary, sensitivity analysis will be performed.

Country(ies) involved China.

Keywords Macitentan; pulmonary hypertension; 6WMD; randomized controlled trial; Meta-analysis.

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