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Effects of new hypoglycemic drugs on patients with heart failure: a systematic review and network meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202390031

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 September 2023 and was last updated on 10 September 2023.

INTRODUCTION

Review question / Objective (P) Heart failure patients over 18 years old with or without diabetes;(I) intervention: The experimental group treated with GLP-1RA or DPP-4i, or SGLT-2i . (C) Control: active comparator was treated with placebo or one of the 3 drugs. (O) Outcome:Including one or more of the following outcomes:1) report at least one outcome variable evaluated by echocardiography or cardiovascular magnetic resonance (CMR). The main outcomes were changes in LVEF、LVEDV、LVESV、LVEDD、E/e';2)Indicators representing symptoms and exercise function of patients with heart failure:NTproBNP、the 6-minute walk test (6MWT)、Kansas City Cardiomyopathy Questionnaire(KCCQ) Score、Minnesota Living with Heart Failure questionnaire; 3)Reported at least one cardiovascular adverse event:hospitalization for HF (HHF) 、cardiovascular death (CV death) 、All-cause mortality、arrhythmic events、MI or Acute coronary syndrome.(S) Study design: Randomized controlledtrial.

Condition being studied Network meta-analysis is a recent evidence-based technique that uses direct or indirect comparisons to compare the impact of multiple interventions on a disease and estimate the ranking of each treatment . This study comprehensively evaluates the impact of SGLT-2i, DPP-4i, and GLP-1RA on heart failure patients through a mesh meta-analysis, providing reliable recommendations for patients and clinical physicians.

METHODS

Search strategy Heart failure patients over 18 years old with or without diabetes.

Participant or population Heart failure patients over 18 years old with or without diabetes.

Intervention The experimental group treated with GLP-1RA or DPP-4i, or SGLT-2i.

Comparator Placebo as a comparison.

Study designs to be included Randomized controlled trial.

Eligibility criteria (1) The investigators' search strategy was carried out using the PICOS tool; (2) Of full age of consent (according to local legislation, usually ≥ 18 years) at screening;Patients diagnosed with heart failure;screening tools including GLP-1RA or DPP-4i, or SGLT-2i; (3) Studies including the following metrics: LVEF, LV end-diastolic diameter (LVEDD), LV end-diastolic volume (LVEDV), LV end-systolic volume (LVESV), and mitral infow E velocity to tissue Doppler e′ ratio (E/e′);6MWT、KCCQ Score、Minnesota Living with Heart Failure questionnaire; HHF 、CV death、All-cause mortality、arrhythmic events、MI or Acute coronary syndrome.

Information sources As of August 2023, the literature was retrieved using PubMed, EMBASE, an electronic database of Cochrane Controlled Trials, as well as other Clinical Information databases.

Main outcome(s) Including one or more of the following outcomes:1) report at least one outcome variable evaluated by echocardiography or cardiovascular magnetic resonance (CMR). The main outcomes were changes in LVEF、LVEDV、LVESV、LVEDD、E/e';2)Indicators representing symptoms and exercise function of patients with heart failure:NTproBNP、the 6-minute walk test (6MWT)、Kansas City Cardiomyopathy Questionnaire(KCCQ) Score、Minnesota Living with Heart Failure questionnaire; 3)Reported at least one cardiovascular adverse event:hospitalization for HF (HHF) 、cardiovascular death (CV death) 、All-cause mortality、arrhythmic events、MI or Acute coronary syndrome.

Quality assessment / Risk of bias analysis Hongmei Gao and Xiaojing Shi respectively used Cochrane collaboration s tool forassessing risk of bias [7] to determine the quality of the selected literature, discussed and unified the evaluation results. The scale evaluation included Random sequence generation (selection bias)、 Allocation concealment (selection bias)、Blinding of participants and personnel (performance bias)、Blinding of outcome assessment (detection bias)、Incomplete outcome data (attrition bias)、Selective reporting (reporting bias)、Other bias. Bias risk is defined as "low", "high"/"uncertain". Discuss and resolve any disagreement with Fang Liu during quality evaluation.

Strategy of data synthesis In studies with different new hypoglycemic drugs used as interventions, The evaluation indicators of quality of life and left heart function were continuous and represented by the mean and standard deviation;Cardiovascular events were categorical variables,and summarized using the number and percent in each group.Because there are differences among various researches, the random effects model was chosen to analyze.

Subgroup analysis None.

Sensitivity analysis Stata software (version 15.1,StataCorp LLC,College Station,TX,USA) was recruited to perform mesh meta-analysis using a Bayesian framework based on the PRISMA NMA User Manual [9,10]. Data were inputted into Stata15.1 software and p-values were obtained. Node method was used to quantify the consistency of the included study. If the p-value was above 0.05, it passed the consistency test[11].

Country(ies) involved China.

Keywords Heart failure;SGLT-2 inhibitors;GLP-1 agonists;DPP-4 inhibitors.

Contributions of each author
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Author 2 - Hongmei Gao.
Author 3 - Fang Liu.
Author 4 - Jun Chen.
Author 5 - Xiaojing Shi.