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Protective effects of glycyrrhizic acid on the heart: A systematic review and meta-analysis of preclinical studies

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ADMINISTRATIVE INFORMATION

Support - Tianjin Medical University.

Review Stage at time of this submission - Preliminary searches.

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 15 April 2026 and was last updated on 15 April 2026.

INTRODUCTION

Review question / Objective P (Population): Study subjects: Subjects must be model animals with cardiac injury, including rats or mice, with no restrictions on gender, body size, species, or sample size. I (Intervention): Intervention measures: Administration of glycyrrhizic acid and glycerolic acid. C (Comparison): Control group: Feeding with distilled water or normal saline. O (Outcome): Outcome evaluation: Assessment of cardiac injury severity through inflammatory markers, oxidative stress, and left atrial systolic function indices. S (Study design): Study design: The study design employs an animal-controlled trial to ensure scientific validity and reliability.

Condition being studied Cardiovascular diseases (CVDs) constitute a category of heart and blood vessel disorders, including coronary artery disease (CAD), cerebrovascular diseases, rheumatic heart disease, and other conditions. CVDs are major causes of mortality and disability.

METHODS

Participant or population Study subjects: Subjects must be model animals with cardiac injury, including rats or mice, with no restrictions on gender, body size, species, or sample size.

Intervention Mice using glycyrrhizic acid intervention.

Comparator Mice feed with distilled water or normal saline.

Study designs to be included The study design employed an animal control trial.

Eligibility criteria Exclusion criteria include: systematic reviews, case reports, clinical studies, and cell experiments; preclinical studies unrelated to glycyrrhizic acid; duplicate publications; studies lacking experimental data; and studies with significant risk of bias in experimental results.

Information sources PubMed、Embase、Web of Science、Cochrane Library.

Main outcome(s) Inflammatory markers, oxidative stress, and left atrial systolic function indices were used to assess the degree of cardiac injury.

Quality assessment / Risk of bias analysis To assess the quality of the included studies, two reviewers independently evaluated the risk of bias using the 10 SYRCLE bias risk tools developed by the Experimental Animal Experiment Evaluation Center.

Strategy of data synthesis Statistical analysis was performed using Review Manager (RevMan) version 5.4.1 and STATA 15.1. The overall effect size was estimated using standardized mean difference (SMD) and its corresponding 95% confidence interval (CI) for outcome measures.

Subgroup analysis None.

Sensitivity analysis One article was excluded sequentially, and the remaining literature (n-1 article) was meta-analyzed and merged, and the results of the original meta-analysis were evaluated by observing the changes in the combined results, and whether the results of the original meta-analysis had changed significantly due to the influence of some studies.

Country(ies) involved China.

Keywords Glycyrrhizic acid, cardioprotective, preclinical, mechanisms,meta-analysis.

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