

INPLASY PROTOCOL

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Effect of Remote Ischemic Conditioning on organ transplantation: a meta-analysis of randomized controlled trials

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Review question / Objective: Remote ischemic conditioning (RIC) has shown great advantages in protecting organs from ischemia-reperfusion loss and applied research on RIC continues to increase. We performed a systematic review and meta-analysis to comprehensively investigate the value of RIC for different organ transplantation.

Condition being studied: To proffer solution to the problem of IRI, people began to study aspects such as static refrigeration (SCS), low temperature machine perfusion (HMP) and many others. Although some were successfully translated from animal research to clinical settings; unfortunately, little progress has been made. The ischemic distancing effect is a reversible procedure whereby the cuff is inflated and deflated, repeatedly occluding and opening blood flow to the limb, with the aim of making the target organ more resistant to subsequent ischemic events. Remote ischemic conditioning (RIC) is divided into pre-conditioning (RIPreC), post-conditioning per-conditioning (RIPerC), and post-conditioning (RIPostC). Since its appearance in 1997, it has been proven that RIC has a protective effect on the heart, brain, liver, kidney, and other organs due to its non-invasive, reversible, and inexpensive advantages. Although there have been several systematic reviews and meta-analyses on the role of RIC in patients with myocardial, renal, and hepatic ischemia, there has been no comprehensive elaboration on organ transplantation to date. Therefore, our aim was to investigate the safety and feasibility of RIC in organ transplantation.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 May 2023 and was last updated on 14 May 2023 (registration number INPLASY202350056).

INTRODUCTION

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METHODS

Participant or population: No Patients; Participant: Youguo Dai, Xiang Ma and Mingxiong Zhang designed the study and writing. Xuejun Wang and Mengqiu Zheng screened literatures. Cuiting Zhang and Weihao Ma assessed bias risk. All authors reviewed and approved final manuscript.

Intervention: Remote Ischemic Conditioning on organ transplantation.

Comparator: Control group: no Remote Ischemic Conditioning on organ transplantation.

Study designs to be included: Randomized controlled trials.

Eligibility criteria: Selection criteria The following criteria were used for the selection process: (1) The subjects of the study were patients undergoing organ (heart, lung, liver, and kidney) transplantation; (2) The subjects were classified into two groups: ischemia distant regulated and unregulated; and (3) The research type was a randomized controlled trial (RCT). **Exclusion criteria** Studies that met the following conditions were excluded: (1) There is no comparability between the research subjects, such as children and adults, liver transplantation and kidney transplantation; (2) Researches on organ or tissue transplantation such as skin flaps, bone tissue, and intestines were excluded; (3) Incomplete data or statistical analysis, Insufficient research; (4) Reviews, reviews and letters; and (5) Duplicate published research.

Information sources: We conducted an electronic literature search on PubMed, Cochrane Library, and EMBASE to obtain relevant articles up to February 15, 2022, using a combination of subject headings and keywords.

Main outcome(s): The primary outcomes varied according to the transplanted organs including: liver transplantation (Graftloss, Early allograft dysfunction[EAD], Acute kidney injury [AKI], Days in hospital, and Mortality); kidney transplantation (delayed graft function [DGF], Acute rejection [AR], Graft loss, 50% decrease in serum creatinine, glomerular filtration rate [eGFR], Days in hospital, and mortality); Heart and Lung Transplantation (AR, Mortality).

Quality assessment / Risk of bias analysis: Using the Cochrane collaboration manual, we assessed the risk of bias, including random sequences, allocation hiding, participant and personnel blindness, outcome assessment, incomplete data, and selective results reporting. In addition, the included studies were divided into three

grades described as high quality, moderate quality, and low quality, respectively.

relationships that could be construed as a potential conflict of interest.

Strategy of data synthesis: We used the analysis software Stata 15 to perform this meta-analysis. Continuous variables such as days in hospital and eGFR were estimated by Standard Mean Difference (SMD); dichotomous variables, including mortality, graft failure, DGF, EAD, AKI, AR, and 50% fall in CR, were presented as hazard ratios (RR), both with corresponding 95% CIs. Statistical heterogeneity among the studies was analyzed using chi-square test and I^2 analysis was used to detect heterogeneity among included studies. Heterogeneity between studies was considered if I^2 was >50% or P was >0.1, and a random effects model was used; otherwise, a fixed-effects model was used. Regarding the study results, $P < 0.05$ was considered statistically significant.

Subgroup analysis: There has no subgroup analysis.

Sensitivity analysis: No sensitivity analysis is needed.

Country(ies) involved: China.

Keywords: Remote Ischemic Conditioning (RIC), organ transplantation, meta-analysis.

Contributions of each author:

Author 1 - mingxiong zhang.

Author 2 - xiang ma.

Author 3 - xuejun wang.

Author 4 - guiting zhang.

Author 5 - mengqiu zheng.

Author 6 - weihao ma.

Author 7 - youguo dai.

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Conflicts of interest: The authors declare that the research was conducted in the absence of any commercial or financial