

INPLASY PROTOCOL

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Conflicts of interest:
None declared.

The effects of hyperxemia on the nervous system after Return Of Spontaneous Circulation: A protocol for systematic review and meta-analysis

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Review question / Objective: We will search the EMBASE, WANFANG DATA, Web of Knowledge, CNKI, PubMed, ClinicalTrials.gov and Cochrane Library from inception to December 31, 2022. To screen out studies on the relationship between hyperoxic therapy and in-hospital mortality and neurological system after discharge in adult patients with cardiac arrest. According to the partial oxygen pressure (PaO₂) after treatment, patients in hyperoxemia group and normal oxygen concentration group were divided into two groups. The in-hospital mortality and the incidence of adverse neurological recovery within 6 months after discharge were compared between the two groups.

Eligibility criteria: (1) Study types: randomized controlled study, prospective cohort study and retrospective study in Chinese and English; (2) Subjects: adult patients with cardiac arrest, aged ≥ 18 years; (3) Exposure factors: according to PaO₂ after treatment, they were divided into Hyperoxia group and normal oxygen concentration group; (4) Outcome indicators: neurological recovery after discharge. Poor neurological recovery was determined by Glasgow-Pittsburgh Cerebral Functional Performance score (CPC) ≥ 2 .

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 April 2023 and was last updated on 14 April 2023 (registration number INPLASY202340046).

INTRODUCTION

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from inception to December 31, 2022. To screen out studies on the relationship between hyperoxic therapy and in-hospital mortality and neurological system after discharge in adult patients with cardiac arrest. According to the partial oxygen

pressure (PaO₂) after treatment, patients in hyperoxemia group and normal oxygen concentration group were divided into two groups. The in-hospital mortality and the incidence of adverse neurological recovery within 6 months after discharge were compared between the two groups.

Rationale: Currently, most patients with ROSC still suffer from long-term neurological dysfunction of varying degrees. Studies have found that high concentration oxygen therapy can lead to excessive PaO₂ in patients with cardiac arrest, thus affecting the prognosis of patients. There is currently no consensus on the optimal range of FiO₂ after cardiopulmonary resuscitation in cardiac arrest patients.

Condition being studied: According to statistics, More than 500,000 [1] die in the United States from cardiac arrest (Cardiac Arrest, CA), about 544,000 people die from cardiac arrest every year in China [2-3]. Currently, although 47% Of CA patients can resume Return Of Spontaneous Circulation (ROSC) after Cardio-pulmonary Resuscitation (CPR) [2], However, most patients with ROSC still suffer from long-term neurological dysfunction of varying degrees [4]. Studies have found that high concentration oxygen therapy can lead to excessive PaO₂ in patients with cardiac arrest, thus affecting the prognosis of patients [5-6]; However, other studies have come to the opposite conclusion [7-8]. Therefore, there is currently no consensus on the optimal range of FiO₂ after cardiopulmonary resuscitation in cardiac arrest patients. Current guidelines emphasize the use of 100% O₂ during CPR. [9]

METHODS

Participant or population: (1) Study types: randomized controlled study, prospective cohort study and retrospective study in Chinese and English; (2) Subjects: adult patients with cardiac arrest, aged ≥ 18 years; (3) Exposure factors: according to PaO₂ after treatment, they were divided into Hyperoxia group and normal oxygen

concentration group; (4) Outcome indicators: neurological recovery after discharge. Poor neurological recovery was determined by Glasgow-Pittsburgh Cerebral Functional Performance score (CPC) ≥ 2 .

Intervention: Hyperoxia group and normal oxygen concentration group.

Comparator: Hyperoxia group and normal oxygen concentration group.

Study designs to be included: We will search the EMBASE, Wanfang, Web of Knowledge, Zhiwang, PubMed, and WeiPu. Clinical Trials.gov and Cochrane Library from inception to February 28, 2023, to retrieve relevant studies using the search strategy: "Hyperoxia" and ("Cardiac arrest" or "cardiopulmonary resuscitation"). We will also search for citations of relevant primaries and reviews. The authors of the abstract in the meeting will be further searched in PubMed for potential full articles. To minimize the risk of publication bias, we will conduct a comprehensive search that includes to find published and unpublished studies

Eligibility criteria: (1) Study types: randomized controlled study, prospective cohort study and retrospective study in Chinese and English; (2) Subjects: adult patients with cardiac arrest, aged ≥ 18 years; (3) Exposure factors: according to PaO₂ after treatment, they were divided into Hyperoxia group and normal oxygen concentration group; (4) Outcome indicators: neurological recovery after discharge. Poor neurological recovery was determined by Glasgow-Pittsburgh Cerebral Functional Performance score (CPC) ≥ 2 .

Information sources: Computer retrieval and manual retrieval will be used to retrieve all the published literature independently by 2 authors. Databases searched include China National Knowledge Infrastructure, Chinese Scientific Journals Database, Wanfang Database, China Biological Medicine Database, PubMed, EMBASE Database, and Cochrane Central Register of

Controlled Trials. All relevant RCTs will be collected from the inception of each database to January 2023. The specific search strategy will be formulated with the specific database. We will search the reference lists of the relevant articles and will manually search Google Scholar to identify additional gray literature for inclusion.

Main outcome(s): This study will assess the effects of hyperxemia on the nervous system of adult patients with cardiac arrest.

Quality assessment / Risk of bias analysis: Two reviewers will employ the search strategy by reading the papers and scoring them according to the QUADAS-2 checklist and Newcastle-Ottawa Quality Assessment Scale, and disagreements will be settled by a third opinion, and important information will be abstracted from the included articles in a standardized form by two reviewers. Important information included the name of the first author, publication year, publication country, type of study, study population, sample size, Arterial partial oxygen pressure, and outcomes studied (neurological recovery). Risk of bias assessment will be carried out according to the Newcastle-Ottawa Scale (NOS) to rate the internal validity of the individual studies, and funnel plots were constructed to assess the risk of publication bias.

Strategy of data synthesis: Two reviewers will employ the search strategy by reading the papers and scoring them according to the QUADAS-2 checklist [10] and Newcastle-Ottawa Quality Assessment Scale [11], and disagreements will be settled by a third opinion, and important information will be abstracted from the included articles in a standardized form by two reviewers.

Subgroup analysis: None.

Sensitivity analysis: All pairwise meta-analytic calculations will be performed using Review Manager software (RevMan) version 5.4 Cochrane

(Collaboration). Heterogeneity will be examined by computing the Q statistic and I² statistic, and the presence of reporting bias by visual inspection of funnel plots. Statistical significance was considered when the P-value was <0.05.

Country(ies) involved: China.

Keywords: Hyperoxia, Cardiac arrest, Adult, Nervous system, Meta-analysis.

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