

INPLASY PROTOCOL

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Corresponding author:
Jiaen Yang

joshua19882006@qq.com

Author Affiliation:
Affiliated Foshan Gaoming
Hospital of Guangdong
Medical University.

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None declared.

Acupuncture Combined with Hyperbaric Oxygen in The Treatment of Delayed Encephalopathy after Acute Carbon Monoxide Poisoning: A Systematic Review and Meta-analysis

Zhao, KH¹; Zhou, GJ²; Ma, WX³; Ou, ZX⁴; Xiao, R⁵; Feng, JQ⁶.

Review question / Objective: To evaluate the efficacy of acupuncture combined with hyperbaric oxygen (HBO) in treating delayed encephalopathy after carbon monoxide poisoning.

Condition being studied: Acute carbon monoxide poisoning can damage multiple organs, mainly the central nervous system and cardiovascular system. Some patients have symptoms of acute disturbance of consciousness, mainly neuropsychiatric injury and delayed encephalopathy. Delayed encephalopathy occurs to approximately 10% to 30% of patients with acute carbon dioxide poisoning (DEACMP). Under the condition of hyperbaric oxygen, with the increase of oxygen partial pressure, brain tissue will also obtain enough oxygen supply to correct hypoxia, promote the circulation of medial branches and capillaries, strengthen the repair of structure and function of damaged tissue and accelerate the formation of the nerve fiber myelin. Under the action of hyperbaric oxygen, the body's humoral immune function declines, in order to reduce the autoimmune response. Previous studies have shown that acupuncture can significantly improve the excitability of cerebral cortex, accelerate the blood flow of patients' microcirculation, improve the state of blood flow, increase tissue perfusion, and directly promote the rehabilitation of patients' brain tissues. Currently, there is no specific treatment for DEACMP, and poor prognosis is one of the characteristics of the disease. Therefore, this review is to evaluate the efficacy and safety of acupuncture in combination with HBO in a randomized controlled trial of DEACMP in order to find an appropriate or better treatment strategy.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 September 2022 and was last updated on 13 September 2022 (registration number INPLASY202290057).

INTRODUCTION

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organs, mainly the central nervous system and cardiovascular system. Some patients have symptoms of acute disturbance of consciousness, mainly neuropsychiatric injury and delayed encephalopathy. Delayed encephalopathy occurs to approximately 10% to 30% of patients with acute carbon dioxide poisoning (DEACMP). Under the condition of hyperbaric oxygen, with the increase of oxygen partial pressure, brain tissue will also obtain enough oxygen supply to correct hypoxia, promote the circulation of medial branches and capillaries, strengthen the repair of structure and function of damaged tissue and accelerate the formation of the nerve fiber myelin. Under the action of hyperbaric oxygen, the body's humoral immune function declines, in order to reduce the autoimmune response. Previous studies have shown that acupuncture can significantly improve the excitability of cerebral cortex, accelerate the blood flow of patients' microcirculation, improve the state of blood flow, increase tissue perfusion, and directly promote the rehabilitation of patients' brain tissues. Currently, there is no specific treatment for DEACMP, and poor prognosis is one of the characteristics of the disease. Therefore, this review is to evaluate the efficacy and safety of acupuncture in combination with HBO in a randomized controlled trial of DEACMP in order to find an appropriate or better treatment strategy.

METHODS

Participant or population: Literature language is limited to Chinese and English; There was no restriction on age, sex, race and course of disease, but baseline comparison was required; The intervention measures of the observation group were acupuncture combined with hyperbaric oxygen, and the control group was symptomatic support treatment; Primary outcomes included mini-mental status examination (MMSE), secondary outcomes included modified Barthel index (MBI) or Barthel index (BI), and adverse reactions.

Intervention: Acupuncture Combined with Hyperbaric Oxygen.

Comparator: Hyperbaric Oxygen.

Study designs to be included: Randomized controlled trials.

Eligibility criteria: Repeated publications without original text; Review, experience summary, theory discussion and case report.

Information sources: The Cochrane Library, MEDLINE, EMBASE, PubMed, Web of Science, and the China National Knowledge Infrastructure (CNKI), the China Science and Technology Journal Database (VIP), and Wan-Fang Data searched for articles.

Main outcome(s): Mini-mental State Examination.

Additional outcome(s): Modified Barthel Index; Barthel Index.

Quality assessment / Risk of bias analysis: The included literature was evaluated fairly and impartially using the risk of bias tool recommended by the Cochrane Collaboration. The evaluation content includes: ① Random allocation method; ② Allocation concealment; ③ blind method; ④ Integrity of result data; ⑤ Selective reporting of research results; ⑥ Other sources of bias. According to the six directions to evaluate the included literature. Each item can be from low risk, unclear and high-risk three levels to evaluate, and the results were presented as bias risk graph by the software RevMan 5.2. Finally, according to the bias risk results of each study, if there is one high risk, the study will be evaluated as high risk; if both are evaluated as low risk, the study will be labeled as low risk; other evaluations will be considered as unclear.

Strategy of data synthesis: ① In order to ensure the accuracy of the data and the preciseness of the study, two researchers

independently extracted relevant data according to the previously established standards. The extracted content included study authors and years, baseline, intervention measures and outcome indicators and filled them into Excel forms. Integrate and check with each other after extracting and perfecting the data; ② The retrieved literatures were imported into Endnote and duplicated articles were deleted. Then, 2 researchers read the titles and abstracts of the remaining literatures and deleted articles that did not meet the requirements, such as reviews and conference papers, etc. ③ At last, two researchers carefully read the literatures screened for the second time, and deleted the literatures with incomplete diagnostic criteria, outcome indicators, data or repeated publication. In case of any disagreement during this process, experts of a third party with years of evidence-based medicine work experience shall be invited to make joint judgment.

Subgroup analysis: Not available.

Sensitivity analysis: The statistical data and dichotomous variables are described by odds ratio (OR), while the correlation results of quantitative data and continuous variables are describe by meandifference (MD). The odds ratio and mean difference were expressed by effect value and 95% confidence interval (95% CI). χ^2 test was used for heterogeneity in statistical analysis, and I² could be used to determine the size of heterogeneity. If $I^2 \leq 50\%$ in the study, the fixed effect model could be used, and It is considered that it has good homogeneity. If $I^2 > 50\%$ in this study, it indicates that there is a large heterogeneity among multiple studies in this study. In this case, sensitivity analysis or subgroup analysis should be further conducted to find out the reasons for the large heterogeneity caused by correlation. In terms of the model, random effect model can be considered for analysis.

Country(ies) involved: China.

Keywords: Acupuncture, Hyperbaric Oxygen, Meta-analysis, Delayed encephalopathy after carbon.

Contributions of each author:

Author 1 - Zhao kehong.

Author 2 - Guangjin Zhou.

Author 3 - Wenxiao Ma.

Author 4 - Zixuan Ou.

Author 5 - Xiao rui.

Author 6 - Feng jiaqi.