INPLASY PROTOCOL

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None declared.

Acupuncture improves cognitive function in animals with vascular dementia by modulating oxidative stress, inflammation and apoptosis: a systematic review and meta-analysis

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Review question / Objective: **Participant: vascular dementia animals established by various surgical methods. Intervention: Acupuncture treatment was received after surgical modeling. Comparison: untreated vascular dementia animal model (impaired group) and vascular dementia animal model receiving placebo acupuncture (non-acupoint group). outcomes: Morris water maze (escape latency, number of crossing the original platform), number of Nissl positive neurons, The rate of Tunel positive cells, Superoxide dismutase (SOD) activity, malondialdehyde (MDA) content, glutathione peroxidase (GSH-PX) activities, The levels of TNF-α, IL-1β, and IL-6.**

Information sources: **This meta-analysis was conducted according to the PRISMA 2020 statement: an updated guidelines for reporting systematic reviews. This review does not have any preregistered protocols. two authors independently searched the databases of Pubmed, Embase, Web of science(including Medline). The search time is limited to the establishment of the database until May 2022. The search terms are: acupuncture, electroacupuncture, acupoint, vascular dementia, infarct dementia, vascular cognitive impairment. each search Word are used alone or in combination.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 July 2022 and was last updated on 05 July 2022 (registration number INPLASY202270022).

INTRODUCTION

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Condition being studied: In order to improve the accuracy of clinical research and grasp the internal mechanism of acupuncture, research on animal models of acupuncture for VD has sprung up. We learned that acupuncture mainly achieves the purpose of treating VD models by inhibiting oxidative stress, inflammation, apoptosis, and increasing neurotransmitters and synaptic plasticity. It is well known that oxidative stress is one of the most important pathological mechanisms of VD. It can trigger an inflammatory storm and induce neuronal apoptosis. Recent studies have found that it is also involved in two new cell death processes, ferroptosis and copper death. Therefore, the study of oxidative stress has become the main trend of acupuncture in animal models of VD.

METHODS

Search strategy: Two authors independently searched the databases of Pubmed, Embase, Web of science (including Medline). The search time is limited to the establishment of the database until May 2022. The search terms are: acupuncture, electroacupuncture, acupoint, vascular dementia, infarct dementia, vascular cognitive impairment. each search Word are used alone or in combination.

Participant or population: Vascular dementia animals established by various surgical methods, animal species, sex, weight, and age are not limited.vascular dementia animals established by various surgical methods.

Intervention: Acupuncture treatment was received after surgical modeling, with no restrictions on acupuncture methods, acupoint combinations, treatment frequency, or stimulation intensity. Acupuncture treatment was received after surgical modeling.

Comparator: Untreated vascular dementia animal model (impaired group) and vascular dementia animal model receiving placebo acupuncture (non-acupoint group).

Study designs to be included: This study included literature on the treatment of vascular dementia with acupuncture , which mainly studied the mechanisms of oxidative stress, inflammation, and apoptosis.

Eligibility criteria: Exclusion Criteria: (1) Non-simple acupunctureresearch. (2) Non-vascular dementiaresearch. (3) Animal experiments with non-randomized controldesign. (4) Research on the mechanism of non-oxidative stress, inflammation andapoptosis. (5) Studies with different measurement units under each outcome indicator (which cannot be converted into eachother). (6) Review, abstract, conference paper, dissertation. (7) Repeated and data-identical studies.

Information sources: This meta-analysis was conducted according to the PRISMA 2020 statement: an updated guidelines for reporting systematic reviews. This review does not have any preregistered protocols. two authors independently searched the databases of Pubmed, Embase, Web of science(including Medline). The search time is limited to the establishment of the database until May 2022. The search terms are: acupuncture, electroacupuncture, acupoint, vascular dementia, infarct dementia, vascular cognitive impairment. each search Word are used alone or in combination.

Main outcome(s): Morris water maze (escape latency, number of crossing the original platform), number of Nissl positive neurons, The rate of Tunel positive cells, Superoxide dismutase (SOD) activity, malondialdehyde (MDA) content, glutathione peroxidase (GSH-PX) activities, The levels of TNF-α, IL-1β, and IL-6.

Quality assessment / Risk of bias analysis: Two investigators independently assessed the risk of bias for each included study using the SYRCLE's Risk of Bias tool, which included the following: selection bias (sequence generation, baseline characteristics and allocation concealment), performance bias (random housing and blinding), detection bias (random outcome assessment and blinding), attrition bias (incomplete outcome data), reporting bias (selective outcome reporting), other sources of bias. If disagreements are encountered, they will be resolved through discussions with a third author.

Strategy of data synthesis: Review Manager 5.3 was used for statistical analysis of the data. First, the heterogeneity test was performed. When the studies were homogenous ($P \geq 0.05$, $I2 \leq 50\%$), the fixed-effects model (FE) was used for analysis. If there was significant heterogeneity among the studies ($P < 0.05$, $I2 > 50\%$), a random-effects model (RE) was used for the analysis, and a sensitivity analysis was performed to examine the sources of heterogeneity and to assess the stability of the results. The outcome indicators of this study were all continuous variables, and their outcomes were expressed by standard mean difference (SMD) and 95% confidence interval (95% CI). The 95% CI did not contain 0, indicating that the results were statistically different ($P < 0.05$), and finally a funnel plot was used to analyze potential publication bias.

Subgroup analysis: Subgroup analysis: In order to observe the effect of different acupuncture prescriptions on the results when measuring the outcomes of the morris water maze, we set up subgroups according to different acupoint combinations, acupuncture methods, and treatment courses.

Sensitivity analysis: If random-effects model (RE) was used for the analysis, and a sensitivity analysis was performed to examine the sources of heterogeneity and to assess the stability of the results.

Country(ies) involved: China.

Keywords: acupuncture; vascular dementia; oxidative stress; inflammation; apoptosis; animal; Meta-analysis.

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