Scalp acupuncture for patients with vascular dementia
A protocol for systematic review and meta-analysis of randomized controlled trails
Jie Li, MD\textsuperscript{a}, Qiuhong Man, PhD\textsuperscript{b}, Wenchun Wang, MD\textsuperscript{c}, Rizhao Pang, MD\textsuperscript{c}, Jiancheng Liu, MD\textsuperscript{c}, Feng Zhang, MD\textsuperscript{d}, Anren Zhang, PhD\textsuperscript{e},* 

Abstract

Background: Vascular dementia (VD) is a kind of acquired intelligence impairment syndrome caused by a series of cerebrovascular factors leading to brain tissue damage. Scalp acupuncture is widely used to treating VD. However, there is no a systematic review has been used to assess the efficacy and safety of scalp acupuncture therapy for VD. Therefore, the purpose of this paper is to systematically evaluate the effects of scalp acupuncture on VD.

Methods: We will search the following databases from their inception to July 2020: PubMed, Chinese National Knowledge Infrastructure (CNKI), Wan Fang Database, Embase, Chinese Biomedical Literature Database (CBM), EBSCO, Web of Science, Technology Periodical Database (VIP), the Chongqing VIP Chinese Science and Cochrane Library. At the same time, we will retrieve other resources including conference articles, and gray literature. The randomized controlled trials (RCTs) in English or Chinese associated with scalp acupuncture for VD will be included. Our study data collection and analysis will be conducted independently by 2 reviewers, and Rev Man V.5.3.5 statistical software will be used to performing meta-analysis.

Results: This review research will provide a high-quality synthesis to evaluate the efficacy and safety of scalp acupuncture for patients with VD.

Conclusion: This study will provide available evidence to judge whether scalp acupuncture is an effective and safe intervention for patients with VD. It also will provide reliable evidence for its widespread application.

Ethics and dissemination: This systematic review will provide convincing evidence for both patients and clinicians. It does not require ethical approval and the results will be published in a peer-reviewed journal.

OSF Registration number: DOI 10.17605/OSF.IO/7CYZR.

Abbreviations: ADL = activities of daily, CBM = Chinese Biomedical Literature Database, CDR = clinical dementia rating, CNKI = Chinese National Knowledge Infrastructure, GRADE = Grading of Recommendations Assessment, Development and Evaluation, HDS = Hasegama,s dementia scale, HDS-R = Hasegawa dementia scale revised, MMSE = mini- mental state examination, QOL = living quality of life, RCTs = randomized controlled trials, VD = Vascular dementia, VIP = the Chongqing VIP Chinese Science and Technology Periodical Database, WMS = Wechsler Memory Scale.

Keywords: meta-analysis, randomized controlled trials, scalp acupuncture, systematic review, vascular dementia

JL and QM have contributed equally to this work and are co-first authors.

This work is supported by the National Natural Science Foundation of China (81973927)
The authors have no conflicts of interest.

All data generated or analyzed during this study are included in this published article [and its supplementary information files].
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request. Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

College of Acupuncture & Massage, Shaanxi University of Chinese Medicine, Shaanxi Key Laboratory of Acupuncture & Medicine, Xisian New Area, Shaanxi Province, Shanghai Fourth People’s Hospital Affiliated to Tongji University School of Medicine, The General Hospital of Western Theater Command, Acupuncture and Tuina School, Chengdu University of Traditional Medicine, Chengdu, Department of Rehabilitation Medicine, Shanghai Fourth People’s Hospital Affiliated to Tongji University School of Medicine, Shanghai, China.

Correspondence: Anren Zhang, Shanghai Fourth People’s Hospital Affiliated to Tongji University School of Medicine, Hongkou District, 1279 Sanmen Road, Shanghai 200434, China (e-mail: anren0124@163.com).

Copyright © 2020 the Author(s). Published by Wolters Kluwer Health, Inc.

How to cite this article: Li J, Man Q, Wang W, Pang R, Liu J, Zhang F, Zhang A. Scalp acupuncture for patients with vascular dementia: a protocol for systematic review and meta-analysis of randomized controlled trails. Medicine 2020;99:43(e22798).

Received: 15 September 2020 / Accepted: 18 September 2020 http://dx.doi.org/10.1097/MD.00000000000022798
1. Introduction

As we all know, Vascular dementia (VD) refers to a kind of intelligence impairment syndrome caused by a series of cerebrovascular factors leading to brain tissue damage. Most of these patients are over 50 years old, and they have the characteristics of stepwise progression and fluctuating course. With the accelerating aging of the population, the prevalence of dementia in China continues to rise, it is estimated that the total number of people with senile dementia and vascular dementia will exceed 16 million by 2030. As an important type of dementia, VD has seriously harmed the physical and mental health of middle-aged and elderly people, which brought economic and spiritual burden to the families and society of patients.

As a preventable and treatable disease, VD has become the second largest type of dementia in China after Alzheimer’s disease. Therefore, it is of great significance to find an effective treatment. A large number of studies have shown that VD has an important feature that other types of dementia do not have – reversibility. In clinic, modern medicine of VD is lack of specific therapy, but, the traditional Chinese medicine acupuncture and moxibustion has better curative effect, especially early acupuncture intervention has positive clinical significance for VD.

As an important means of traditional Chinese medicine treatment of VD, Scalp acupuncture is a kind of micro acupuncture therapy based on the combination of traditional acupuncture theory and the theory of cortical function localization of scalp projection in Western medicine. Due to the unique position of acupuncture therapy highlights its advantages: safety, simple acupuncture selection, simple operation, not easy to induce hysteresis. At present, more and more scalp acupuncture is being used in the treatment of VD. However, there is no systematic review at home and abroad to evaluate the efficacy and safety of scalp acupuncture in the treatment of VD. Therefore, this review will assess the efficacy and safety of scalp acupuncture therapy for VD compared with western medicine and other acupuncture therapies. This systematic review will be the first to evaluate the effects of scalp acupuncture on VD, and I hope we can provide convincing results.

2. Methods and analysis

2.1. Eligible criteria for including studies

2.1.1. Types of studies. The types of studies including all available randomized controlled trials (RCTs) and quasi-randomized controlled trials on scalp acupuncture for people with VD. Others such as case report, retrospective study and studies which refer to importance random study methods will be excluded.

2.1.2. Types of participants. The types of participants including who have been diagnosed with VD, according to at least one of the current or past definitions. People who have been diagnosed with VD include regardless of their age, sex, or race.

2.1.3. Types of intervention and types of comparisons. Our experimental intervention measures should be scalp acupuncture alone. The control group include drugs, body acupuncture therapy, and physical, exercise.

2.1.4. Types of outcome measures. The primary outcome measurements will be improvement in cognitive function and behavioural disturbances those measured by mini-mental state examination (MMSE), Hasegawa’s dementia scale (HDS), Hasegawa dementia scale revised (HDS-R), activities of daily living (ADL).

The secondary Outcome Measures include the overall effective rate. Other outcomes included the quality of life (QOL), clinical dementia rating (CDR), Wechsler Memory Scale (WMS), safety and adverse events of scalp acupuncture alone will be observed.

2.2. Search methods for identification of studies

We will search the following databases from their inception to July 2020: PubMed, CNKI, WanFang Database, Embase, Medline, CBM, VIP, EBSCO, Web of Science, the Chongqing VIP Chinese Science, and Cochrane Library. In addition, we will manually retrieve other resources including conference articles, and gray literature. The randomized controlled trials (RCTs) in English or Chinese associated with Scalp acupuncture for VD will be included. The research including disease, intervention methods and study types 3 parts: (“dementia” or “Vascular Dementia” or “Vascular” or “cognitive impairment” or “cognitive disorders” or “cognitive deficits” or “vascular cognitive impairment”) and (“The International Standards of the Nomenclature of Scalp Acupuncture Zones” or “Olfactory Three-Needle” or “Xiu san zhen” or “Jiao shi” or “Fang shi” or “Zhu shi” or “Jin Three-Needle Therapy”) and (“trial” or “randomly” or “randomized” “controlled clinical trial” or “randomized controlled trial”). The example search strategy PubMed in Table 1 will be used. This search strategy will be used in several other databases.

2.3. Data collection and analysis

2.3.1. Data extraction and management.

Table 1

PubMed Search strategy draft.

| Number Search Item                                                                 |
|------------------------------------------------------------------------------------|
| #1 dementia [Title/Abstract]                                                        |
| #2 Vascular Dementia [Title/Abstract]                                              |
| #3 VD [Title/Abstract]                                                              |
| #4 Vascular [Title/Abstract]                                                        |
| #5 cognitive impairment [Title/Abstract]                                            |
| #6 cognitive disorders [Title/Abstract]                                             |
| #7 cognitive deficits [Title/Abstract]                                              |
| #8 vascular cognitive impairment [Title/Abstract]                                   |
| #9 #1 OR #2–8                                                                      |
| #10 Scalp acupuncture [Title/Abstract]                                              |
| #11 Scalp electroacupuncture [Title/Abstract]                                       |
| #12 Olfactory Three-Needle [Title/Abstract]                                         |
| #13 Xiu san zhen [Title/Abstract]                                                   |
| #14 Jin Three-Needle Therapy [Title/Abstract]                                       |
| #15 acupuncture of Jiao shi [Title/Abstract]                                        |
| #16 acupuncture of fang shi [Title/Abstract]                                       |
| #17 acupuncture of zhu shi [Title/Abstract]                                        |
| #18 #10 OR #11–17                                                                  |
| #19 trial [Title/Abstract]                                                          |
| #20 randomly [Title/Abstract]                                                       |
| #21 randomized [Title/Abstract]                                                     |
| #22 controlled clinical trial [Title/Abstract]                                     |
| #23 randomized controlled trial [Title/Abstract]                                   |
| #24 19 OR/20-23                                                                    |
| #25 #9 AND #18 AND #24                                                             |
full texts. The third reviewer (ZAR) will evaluate whether the studies will be satisfied according to inclusion criteria. This study process is shown in Figure 1 below. The unit of analysis will be conducted by the independent reviewers (PRZ).

2.3.2. Assessment of risk of bias. The bias tool of Cochrane Manual V.5.1.0 is used to conduct the assessment of risk about bias by 2 independent reviewers (LJ and LJC). This process includes: random sequence generation, allocation sequence concealment, blinding, incomplete data, and other sources. Any assessment of the bias has caused controversy will be resolved by the third reviewer (WWC). The biased results will be divided into 3 levels: “low risk of bias”, “high risk of bias”, and “uncertain risk of bias”.

2.3.3. Assessment of heterogeneity. The heterogeneity of our research data will be analyzed with $I^2$ statistic, The trials statistical heterogeneity is significant large when the $I^2$ value exceeds 50%, and our meta-analysis will not be conducted. In this time, we will carry out sensitive analysis or subgroup stratification analysis to explore the possible reasons of causing heterogeneity.

2.3.4. Dealing with missing data. Any missing data will be complemented by the independent reviewers (PRZ) through contacting with the corresponding author.

2.3.5. Assessment of reporting biases. We will use the funnel to assess reporting biases. We will conduct a test for funnel plot asymmetry using the Egger method if the numbers of available studies are sufficient.

2.3.6. Data synthesis. The Review Manager V.5.3 will be used to analyze the data. The test result indicated little or no heterogeneity. The specific methods are as follows: When the $I^2$ test is less than 50%, the fixed-effects model will be used for data synthesis. When the $I^2$ test is between 50% and 75%, the
random-effects model will be conducted for data synthesis. When the \( I^2 \) test is higher than 75\%, the meta-analysis will not be performed. When data cannot be synthesized, we will try to explore the possible reasons, and provide a descriptive analysis to solve this problem.

2.3.7. Subgroup analysis and sensitivity analysis. Subgroup analysis will be used to evaluate high heterogeneity. The factors affecting the heterogeneity include the different combinations of scalp acupuncture, different course time, and other factors. Sensitivity analysis will be used to test the robustness of the main decisions in the review process, which including the impact of quality of methods, sample size, and related issues on the study.

2.3.8. Grading the quality of evidence. We will use the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to evaluate the quality of evidence for all results of this systematic review. The quality will be divided into 4 levels: high, moderate, low, or very low.\[19\]

3. Discussion

Vascular dementia is equivalent to the category of “stupidity” and “forgetfulness” in traditional Chinese medicine. According to traditional Chinese medicine, the location of the disease is brain, and it is often caused by prolonged illness into collaterals, which can lead to Qi deficiency and blood stasis, block brain orifices, mental retardation, and even dementia, mental disorders and other symptoms. According to the traditional Chinese medicine theory, “The head is the meeting of all the Yang”. Qi and blood are gathered on the head, and the head is closely connected with the meridians and acupoints of the whole body. Scalp acupuncture can directly stimulate the “meeting of all the Yang”, which has the effect of dredging meridians, regulating qi, opening depression, promoting blood circulation, and removing blood stasis.

After years of research and practice, scalp acupuncture has been explored and summarized. Scalp acupuncture is based on the inheritance of traditional Chinese medicine and acupuncture therapy of world intangible cultural heritage, and it is based on the principle of functional localization of cerebral cortex and acupuncture as a means, which can be for the treatment of various diseases.\[20\] It is often used in the treatment of brain-derived diseases. There are many kinds of scalp acupuncture therapy. They include specific head acupoint stimulation, such as Baihui, Taiyang and other acupoints, as well as stimulation of various regions and lines of the head, such as Fang’s scalp acupuncture, Jiao’s scalp acupuncture, international scalp acupuncture, and so on.\[21\] In recent years, it has been found that scalp acupuncture has a great effect on increasing the blood supply of cerebral cortex, increasing the metabolic level of brain cells, activating potential neurons, promoting the formation of synapses of brain cells.\[22\] Moreover, scalp acupuncture is simple, safe and effective. Although the advantages of scalp acupuncture in the treatment of VD are obvious, there is still no systematic review in English at present.

This article will be the first review on the systematic evaluation of scalp acupuncture for VD. It will draw reasonable conclusions by collecting evidence, sorting out and analyzing data about the efficacy and safety of scalp acupuncture in the treatment of VD. We hope this study will provide convincing evidence for both patients and clinicians. In addition, this systematic review also has some limitations. Our research only focuses on articles published in English and Chinese, and no articles in other languages are collected.

Author contributions

Data curation: Quihong Man, Feng Zhang.

Formal analysis: Jie Li, Wenchun Wang.

Funding acquisition: Anren Zhang.

Investigation: Wenchun Wang, Anren Zhang.

Methodology: Jiancheng Liu.

Software: Jiancheng Liu, Feng Zhang.

Supervision: Rizhao Pang, Anren Zhang.

Writing – original draft: Jie Li.

Writing – review & editing: Quihong Man.

References

[1] Kjeldsen SE, Krzysztof N, Michel B, et al. Intensive blood pressure lowering prevents mild cognitive impairment and possible dementia and slows development of white matter lesions in brain: the SPRINT memory and cognition IN decreased hypertension (SPRINT MIND) study. Blood Press 2018;27:247–58.

[2] Makin SD, Turpin S, Dennis MS, et al. Cognitive impairment after lacunar stroke: systematic review and meta-analysis of incidence, prevalence and comparison with other stroke subtypes. J Neurol Neurosurg Psychiatry 2013;84:893–900.

[3] Kalaria RN. The pathology and pathophysiology of vascular dementia. Neuropharmacology 2018;134(Pt B):226–39.

[4] Kalaria RN, Akinyemi R, Ibara M. Stroke injury, cognitive impairment and vascular dementia. Biochim Biophys Acta 2016;1862:915–25.

[5] Zhang YD, Xu Y, Nie HW, et al. Prevalence of dementia and major dementia subtypes in the Chinese populations: a meta-analysis of dementia prevalence surveys. J Clin Neurosci 2012;19:1333–7.

[6] Wang QH, Wang X, Bu XL, et al. Comorbidity burden of dementia: a hospital-based retrospective study from 2003 to 2012 in seven cities in China. Neurosci Bull 2017;33:703–10.

[7] Jellinger KA. Vascular cognitive impairment: preventable dementia. European J Neurol 2004;11:428–9.

[8] Hidekazu T, Ryo O, Masafumi I. Absence of cholinergic deficits in “pure” vascular dementia. Neurology 2005;65:179.

[9] O’Brien JT, Thomas A. Vascular dementia. Lancet 2015;386:1698–706.

[10] Ballard C, Sauter M, Schelten P, et al. Efficacy, safety and tolerability of rivastigmine capsules in patients with probable vascular dementia: the Vantag F. Study. Curr Med Res Opinion 2008;24:2561–74.

[11] Yang JW, Wang XR, Zhang M, et al. Acupuncture as a multifunctional neuroprotective therapy ameliorates cognitive impairment in a rat model of vascular dementia: a quantitative iTRAQ proteomics study. CNS Neurosci Ther 2018;24:1264–74.

[12] Wang XR, Shi GX, Yang JW, et al. Acupuncture ameliorates cognitive impairment and hippocampus neuronal loss in experimental vascular dementia through Nrf2-mediated antioxidative response. Free Radic Biol Med 2015;89:1077–84.

[13] You YN, Cho MR, Park JH, et al. Assessing the quality of reports about randomized controlled trials of scalp acupuncture treatment for vascular dementia. Trials 2017;18:205.

[14] Zhang H, Zhao L, Yang S, et al. Clinical observation on effect of scalp electroacupuncture for mild cognitive impairment. J Tradit Chin Med 2013;33:46–50.

[15] Liu YC, Zhang HH, Chen GH, et al. Therapeutic effects of scalp-acupuncture in patients with vascular dementia induced by cerebral infarction: a randomized controlled trial 2008. Zhong Xi Yi Jie He Xue Bao 2008;6:806–9.

[16] Tian WJ, Huang LN, Wang RH, et al. Effects of scalp-acupuncture on astrocyte apoptosis in hippocampal CA 1 region in rats with vascular dementia 2015. Zhen Ci Yan Jiu 2015;40:6–12.

[17] Chen J, Li H, Zeng C, et al. Evaluation of the recovery outcome of poststroke cognitive impairment after cluster needling of scalp acupuncture therapy based on functional near-infrared spectroscopy. Brain Behav 2020;Nei01731.
[18] Xiong J, Zhang Z, Ma Y, et al. The effect of combined scalp acupuncture and cognitive training in patients with stroke on cognitive and motor functions. Neuro Rehabilitation 2020;46:71–82.

[19] van de Griendt EJ, Tuut MK, de Groot H, et al. Applicability of evidence from previous systematic reviews on immunotherapy in current practice of childhood asthma treatment: a GRADE (Grading of Recommendations Assessment Development and Evaluation) systematic review. BMJ Open 2017;7:e016326.

[20] Wai Y, Chung SY, Liu JC, et al. Modulatory effect of International standard Scalp Acupuncture on brain activation in the elderly as revealed by resting-state fMRI. Neural Regen Res 2019;14:2126–31.

[21] Wang Y, Shen J, Wang XM, et al. Scalp acupuncture for acute ischemic stroke: a meta-analysis of randomized controlled trials. Evid Based Complement Alternat Med 2012;480950.

[22] Zeng XH, Li QQ, Xu Q, et al. Acupuncture mechanism and redox equilibrium. Evid Based Complement Alternat Med 2014;483294.