

Research Advances in Acupuncture in the Acute Phase of Ischemic Stroke

Kaijing Ma^{1,2*}, Junming An²

¹Shaanxi University of Traditional Chinese Medicine, Xi'an 710000, Shaanxi Province, China

²Xi'an Traditional Chinese Medicine Hospital, Xi'an 710000, Shaanxi Province, China

*Corresponding author: Kaijing Ma, 872444643@qq.com

Copyright: © 2022 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: In recent years, the incidence of ischemic stroke has been increasing. Patients are prone to many complications after half a year of onset or has slow recovery of neuromotor function of one limb on one side of hemiplegia. The clinical effect of acupuncture in treating this disease is remarkable. According to research, acupuncture combined with medication and rehabilitation can reduce the degree of nerve defects in the early stage of the disease, improve daily life, and improve prognosis. This article summarizes the research on acupuncture in the treatment of acute ischemic stroke for future reference.

Keywords: Acupuncture; Ischemic stroke; Research progress

Online publication: November 30, 2022

1. Introduction

Strokes can be divided into ischemic stroke and hemorrhagic stroke, both of which have high incidence and disability rate. According to the 2020 research data, the prevalence of stroke in China is 1114.8/100,000, and the annual incidence rate is 246.8/100,000. In recent years, the incidence of ischemic stroke has been increasing, and the age of the affected population is becoming younger. It is often difficult to restore limb motor function after various complications or six months of illness, which makes it difficult to recover the work ability of a large number of patients and increases the economic burden of the family ^[1].

2. Modern studies

Ischemic stroke is a disease in which the blood supply to the brain region is insufficient or interrupted due to the narrowing or occlusion of the arteries that supply blood, and leads to ischemic necrosis of brain tissue and neuromotor dysfunction ^[2]. At present, Western medicine mainly uses pulse recombinant tissue plasminogen activator to treat acute ischemic stroke, and the prognosis of intravenous thrombolysis is directly proportional to the thrombolysis time, which is one of the most effective methods in the treatment of acute ischemic stroke ^[3]. However, venous thrombolysis has a strict time window and a high rate of contraindications, so there are few patients who can be benefited by this treatment. As a characteristic therapy of traditional Chinese medicine, acupuncture has a remarkable effect on the treatment of neuromotor disorders caused by stroke to improve the in the sequelae stage, and it has been confirmed that acupuncture can increase local blood flow perfusion, reduce infarction area, improve oxygen metabolism of brain tissue, and have a certain protective effect on ischemic brain tissue in the acute stage of ischemic stroke ^[4]. Therefore, it is of great significance to analyze and explore the current situation of acupuncture

in the treatment of acute ischemic stroke. This paper collates the literature reports of acupuncture scholars on this disease in recent years with the goal of forming a safer and more effective clinical treatment plan.

3. Acupuncture treatment

3.1. Head needle

Head acupuncture technology is a kind of micro-acupuncture therapy commonly used in the scalp area, which is based on the theory of organ meridians, combined with the functional positioning of the cerebral cortex, biological holographic theory, and so on^[5], which is good at treating neurological and brain-derived diseases, and has been clinically applied on patients at the acute stage of stroke in recent years. Xu et al.^[6] randomly divided 120 patients into an observation group and a control group. The control group underwent acupuncture at the middle line of vertex, middle line of forehead, and anterior oblique line of vertex-temporal; the needles were retained for 4h, the treatment was done 6 times a week. The observation group underwent head needle plus stasis new acupuncture method. The needles were inserted into Quchi, Fenglong, Zusanli, Hegu and other acupoints and left for 30min; the treatment was done 5 times a week, after 4 weeks of treatment, the total effective rate of the observation group was 95.16% significantly higher than the total effective rate of 77.59% in the control group, and there was a larger decrease in the National Institutes of Health Stroke Scale (NIHSS) score in the treatment group compared to that of the control group. Besides, the observation group showed a significantly larger increase in the Barthel score compared to that of the control group, indicating that head needle can improve the hypoxia and ischemic state of the brain, increase cerebrovascular blood flow, and the new needle method for dispelling stasis can improve the blood microcirculation in the brain. Hence, the combination has a good therapeutic effect on the acute stage of ischemic cerebral infarction. Xiong et al.^[7] treated 40 patients in the acute stage of stroke with needle combination needles, with 20 cases each in the acupuncture group and the drug group. The drug group was injected intravenously with edaravone and hemocytosis, twice a day. The acupuncture group was treated with acupuncture, the head needles were inserted at the top middle line of vertex, the contralateral anterior oblique line of vertex-temporal of the affected limb, posterior oblique line of vertex-temporal, and the lateral line 1 of vertex. The needles were retained for 30 minutes after the arrival of qi, and the treatment was performed twice a week, with a total of 20 treatments. The degree of decline in the score of neurological impairment and the increase in Barthel index of the acupuncture group after treatment was more than that of the drug group. Thus, it is clear that acupuncture in the acute phase is beneficial for restoring the patient's nerve function and improving their daily lives.

3.2. Body needle

Lin et al.^[8] randomly divided the patients into a control group and experimental group and with 30 cases each. They were examined using transcranial doppler (TCD) before treatment, on the first day of treatment, and after the 14th day of treatment. In addition to the conventional treatment, the control group underwent acupuncture according to the conventional acupoints in, and the experimental group underwent acupuncture at acupoints that are non-textbook, and both groups were treated with even reinforcing-reducing method, leaving the needle for 30 minutes, a total of 14 days of treatment. The difference between TCD observations between the two groups group after the first acupuncture was not statistically significant. However, after the end of the course of treatment, the TCD values of the two groups of patients had significant differences, indicating that acupuncture at non-textbook points can also stimulate the human body to produce stress effects, and have a certain stimulation effect. Besides, in the experimental group, the cerebral blood flow in the ischemic sites was improved. Chang L et al.^[9] divided 70 cases of patients with acute cerebral infarction into two groups according to the method of treatment, the control group adopted conventional Western medicine treatment such as lowering cranial pressure, antiplatelet aggregation, scavenging free

radicals, and vegetative nerve, whereas the acupuncture group underwent a combination of conventional treatment and acupuncture. The Barthel index of the patients increased after 4 weeks of treatment, the NIHSS score decreased, and no adverse events occurred. In Feng's study ^[10], the resuscitation-inducing acupuncture method was applied to this disease. The control group used conventional drugs, and the experimental group underwent acupuncture at the Inner Pass, the philtrum, and at the Three Yin Intersection. Other acupoints were included or excluded according to the symptoms. The treatment lasted for 30 days. The results show that the total treatment efficiency of the acupuncture group is significantly higher than that of the control group. Based on the theory of "curing the spirit" of the brain-opening acupuncture method, early use can improve the efficacy and shorten the course of treatment. Dong et al. ^[11] divided the patients into four groups: conventional treatment group, conventional treatment + Sanqi Tongshu capsule group, conventional treatment + brain-opening acupuncture group, and conventional treatment + Sanqi Tongshu capsule + brain-opening acupuncture group. Each group consists of 33 patients in the acute stage of cerebral infarction. Sanqi Tongshu capsules were consumed 3 times a day, 1 capsule each time; acupuncture was given once a day, 5 times a week. After a month of treatment, the NIHSS scores of all 4 groups decreased and BI index increased, with the conventional treatment + Sanqi Tongshu capsule + acupuncture group showing the highest efficacy. Therefore, acupuncture and drug intervention in the acute stage of cerebral infarction can reduce the degree of neurological deficits and improve the daily life. Yi ^[12] studied the effect of body needles combined with butylphthalide injection in treating 50 cases of acute stage of cerebral infarction. In that study, the control group received Western symptomatic routine treatment; the observation group underwent acupuncture at three acupoints, which were the hands and feet Yang Ming Jing and other acupuncture points, after getting the gas for 20 minutes, once a day, and also butylphthalide intravenous drops 2 times a day, with an interval time is greater than 6 hours, the total effective rate of the observation group after treatment is 96% significantly higher than that of the control group, indicating that acupuncture combined with butylphthalide injection can reduce the patient's neurological damage and improve prognosis.

3.3. Eye needle

Eye acupuncture therapy is a special micro-acupuncture therapy initiated by Professor Peng Jingshan for acupuncture at a specific location around the orbit of the eye ^[13], the area around of the eye needle can reflect the condition of human organs, and acupuncture at those areas can treat diseases. In a study done by Zhou et al. ^[14] the control group underwent conventional treatment combined with swallowing training, the observation group added eye needles on the basis of the control group, with each group consisting of 75 cases. The eye needles mainly were inserted into five visceral acupuncture areas and upper focus area; swallowing training was done after acupuncture and pricking. After 15 rounds of treatments, the VFSS scores of both groups increased, WST scores decreased, and the total effective rate of the observation group was 96.66%, which was significantly higher than that of the control group (81.66%), indicating that the use of eye acupuncture in the acute stage of cerebral infarction can improve the patient's swallowing function, reduce the occurrence of aspiration pneumonia, and improve prognosis. Wang et al. ^[15], used eye needles to "awaken the nerves" to treat 174 patients in the acute stage of stroke cerebral infarction, which were divided into treatment group and control group by random parallel control method. Both groups were admitted to the hospital and underwent Western medicine routine treatment. The difference is that the control group received conventional eye needle, head needle and body needle treatment (no needle movement during needle retention), whereas in the treatment group, eye needle "inducing resuscitation and dredging meridians" method (moving and leaving the needle) was used in addition to the treatment received by the control group. Treatment was done once a day, 5 days a week, with a total of two weeks. After the treatment, the Fugl-Meyer scores and Barthel index increased significantly compared to before treatment,

the treatment group was better than the control group, the NIHSS score of both groups decreased after treatment, but the difference between the two groups was not statistically significant. Therefore, this shows that the early intervention of eye acupuncture comprehensive therapy can promote the recovery of nerve and motor functions and improve clinical efficacy.

3.4. Electric needle

The electric needle is a method of increasing the amount of stimulation to enhance the efficacy of the acupuncture after the millineedle pierces the acupuncture point to obtain qi, and the trace current wave that connects the human body bioelectricity in the needle handle or needle body, which is divided into continuous wave and intermittent wave. Yu et al. ^[16] treated 84 cases of acute cerebral infarction patients, the Western medical group underwent conventional treatment, the Chinese medicine group used electric needles combined with hemostatic injection. The acupuncture points mainly dialectically at the Ren Pulse and Tuo Pulse. The electric needles were connected to a source of electricity (dense wave) and left on the patient for 30 min. The treatment was done 5 times a week. One month later, the study results showed that the NIHSS score of patients in the Chinese medicine group was lower than that of the Western medicine group, the score of Fugl-Meyer and Activities of Daily Living (ADL) scale was higher than that of the Western medicine group, and no adverse events occurred. Therefore, it can be seen that the electroacupuncture at the Ren pulse combined with hemotherapy injection is safe and effective in the treatment of acute cerebral infarction, but further research is still needed with larger sample size.

4. Acupuncture combined with traditional Chinese medicine

Zhang et al. ^[17] treated 92 cases of acute stage of cerebral infarction with modified immature bitter orange and rhubarb decoction combined with cerebral activation acupuncture, and both groups were given basic treatment and cerebral activation acupuncture, and the main acupuncture point was Baihui, Sishengong, Sun, and the head acupoint of the movement area of the infarcted side, and the auxiliary acupuncture point Quchi, the Shou Sanli and the Hegu acupuncture point. The observation group was given modified immature bitter orange and rhubarb decoction for 14 consecutive days, and the results showed that the NIHSS score decreased after the combination treatment, which could improve the patient's TCM syndrome points. Fu Z et al. ^[18] divided 60 patients into two groups, the control group adopted basic treatment, the treatment group consumed phlegm-reducing and meridians-dredging decoction combined with ordinary acupuncture treatment; 1 acupuncture in the morning for 15 days. The total effective rate of the treatment group was 96.7%, which was higher than the control group (83.3%). The diabetic neuropathy symptom of the treatment group after treatment was lower than that of the control group, and the Fugl-Meyer score was higher than that of the control group. Hao et al. ^[19] applied Angong Niu Huang pills plus acupuncture method in the treatment of acute stage of stroke. In the study, the control group received drug treatment; on the basis of the controlled group, the experimental group consumed Angong Niu Huang pills combined with acupuncture (Baihui, Shenting, Shou Sanli, Zu Sanli, Shuigu, Temple, Yangling Spring), 45 cases each in the two groups, a course of treatment for 7 days, after treatment The experimental group has a significantly higher efficiency than the control group, and the difference between the two groups is statistically significant, indicating that Angong Niu Huang Pills combined with acupuncture can improve the clinical efficacy of ischemic stroke in the acute stage. Ding ^[20] et al. divided patients randomly by drawing lots into a treatment group and an observation group with 50 cases each, both groups underwent Western medicine and rehabilitation basic treatment, the control group underwent acupuncture based on the acupoints in "Acupuncture and Moxibustion". The observation group underwent acupuncture combined with drinking warm Daotan decoction every morning and evening. Each treatment lasted for 3 weeks. After treatment, the observation group's NIHSS decreased more significantly than the control group, ADL score also

increased significantly, indicating that ischemic stroke acute stage acupuncture combined with modified Daotan decoction can promote the recovery of patients' nerve function and improve their ability to take care of themselves. Thus, it has good clinical efficacy.

5. Acupuncture combined rehabilitation

Rehabilitation is a method of restoring the patient's ability to daily life through comprehensive medical means, and early rehabilitation of patients with acute ischemic stroke can not only promote the recovery of motor function, but also avoid the occurrence of some complications. Yang ^[21] et al. randomly divided 112 patients with acute ischemic stroke into two groups, the control group was routinely rehabilitated, the observation group was treated with acupuncture for 15 days, and the Fugl-Meyer and ADL scores of the observation group after treatment were higher than those of the control group, and the overall effective rate of the control group was high. Huang ^[22] assigned 50 cases of acute ischemic stroke patients who had been rehabilitated with acupuncture as the observation group, and 50 cases of acute ischemic stroke who have undergone drug treatment as the control group. The observation group underwent acupuncture at the philtrum, Triple Yin Intersection, Inner Pass, Fenglong acupoint, Taichong acupoint, Chize acupoint, Zu Sanli, and many more, the treatment was done over the course of 6 weeks. After treatment, the observation group's Fugl-Meyer and ADL scores was significantly higher than the control group. Zhang et al. ^[23] combined acupuncture treatment on the basis of rehabilitation, divided the patients into two groups of 40 cases each, the control group was treated with simple rehabilitation, the observation group adopted the method of rehabilitation plus acupuncture, the acupuncture points were Inner Pass acupoint, Three Yin intersection, Wind Pond, the philtrum, and other points for 15 days. After treatment, the observation group Barthel, Fugl-Meyer score was significantly higher than the control group, and the limb motor function improvement of the combined acupuncture treatment group was significantly better than that of the simple rehabilitation group. It shows that acupuncture combined with rehabilitation has a significant effect in the acute stage of ischemic stroke, which can not only reduce neurological defects, but also improve the limb movement ability of patients, which is worthy of clinical application.

6. Conclusion

In conclusion, acupuncture treatment of ischemic stroke in the acute stage is mainly to protect brain tissue ^[24], increase local blood flow to the brain, reduce neurological defects, and improve prognosis. The use of head needles, body needles, electric needles, and eye needles, can also be combined with traditional Chinese medicine, physical rehabilitation, and other treatments to improve the degree of nerve defects in stroke patients, and promote the recovery of limb motor function. In recent years, acupuncture has been regarded as a safe and side-effect-free TCM method and has continued to develop in the treatment of the acute phase of ischemic stroke. Besides, most scholars believe that TCM acupuncture should be involved as soon as possible ^[25].

Funding

Key Laboratory of Fang's Head Acupuncture, Shaanxi Administration of Traditional Chinese Medicine, Shaanxi Traditional Chinese Medicine Fa ([2018] No. 32)

Key Scientific Research Project of Traditional Chinese Medicine Inheritance and Innovation and Development of "Qin Medicine" of Shaanxi Administration of Traditional Chinese Medicine, 2021-01-22-007

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Summary of 2020, “China Stroke Prevention and Treatment Report 2019”. *Chinese Journal of Cerebrovascular Diseases*, 17(05): 272–281.
- [2] Yao J, Zou W, 2022, Research Progress on the Mechanism of Acupuncture in the Treatment of Ischemic Stroke. *Acupuncture Research*, 47(04): 354–361 + 368.
- [3] Tang Y, Luo H, He J, et al., 2022, Effect of Stroke Emergency Map and Continuous Process Optimization on Intravenous Thrombolysis in Patients with Acute Ischemic Stroke. *Nerve Injury and Functional Reconstruction*, 17(05): 285–288.
- [4] Chang L, Xu H, 2015, Efficacy of Acupuncture in the Treatment of Acute Cerebral Infarction in 35 Cases. *Hunan Journal of Traditional Chinese Medicine*, 31(07): 93–95.
- [5] Wu J, Yin H, Wang D, et al., 2019, Origin and Development Status of Acupuncture. *Journal of Guangzhou University of Chinese Medicine*, 36(11): 1783–1787.
- [6] Xu G, Sun J, 2022, Efficacy of New Acupuncture Combined with Scalp Acupuncture in the Treatment of Acute Cerebral Infarction and its Effect on Serum SOD and MDA Levels. *Liaoning Journal of Traditional Chinese Medicine*, 49(04): 183–186.
- [7] Xiong J, Ni G, 2012, Clinical Observation of Acupuncture and Drug in the Treatment of Acute Cerebral Infarction. *Shanghai Journal of Acupuncture*, 31(12): 861–863.
- [8] Lin Q, Lin X, 2021, Effect of Early Meridian Acupuncture on Cerebral Hemodynamics in Patients with Acute Ischemic Stroke. *Asia-Pacific Journal of Traditional Medicines*, 17(11): 96–98.
- [9] Chang L, Xu H, 2015, Efficacy of Acupuncture in the Treatment of Acute Cerebral Infarction in 35 Cases. *Hunan Journal of Traditional Chinese Medicine*, 31(07): 93–95.
- [10] Feng F, 2013, Early Interventional Treatment of Acute Stroke by Acupuncture Therapy: 120 Cases. *Modern Distance Education in Traditional Chinese Medicine*, 11(12): 44–45.
- [11] Dong C, Yu N, Cong S, et al., 2022, Efficacy and Neuroprotective Mechanism of Panax Notoginseng Capsules Combined with Acupuncture for Acute Cerebral Infarction. *Chinese Patent Medicine*, 44(05): 1718–1722.
- [12] Yi Z, Liu W, Chen L, et al., 2022, Acupuncture Combined with Butyphthalide in the Treatment of Limb Dysfunction in Patients with Acute Cerebral Infarction: 50 Cases. *Zhejiang Journal of Traditional Chinese Medicine*, 57(02): 137.
- [13] Wang P, Ju Q, Song Z, et al., 2016, Clinical Study of Eye Acupuncture and Needle Rehabilitation to Promote Motor Function Recovery in Hemiplegic Patients with Stroke. *Chinese Journal of Basic Medicine of Traditional Chinese Medicine*, 22(04): 534–536 + 560.
- [14] Zhou H, Qin H, Kong Y, 2022, Clinical Observation of Eye Acupuncture Combined with Swallowing Function Training in the Treatment of Dysphagia After Acute Cerebral Infarction. *Chinese Medical Forum*, 37(03): 35–37.
- [15] Wang Y, Zhou H, Wang Z, 2020, Randomized Parallel Controlled Study of Eye Acupuncture "Awakening the Spirit" Technology for Limb Movement Disorders in the Acute Stage of Ischemic Stroke. *Journal of Liaoning University of Traditional Chinese Medicine*, 22(03): 72–75.
- [16] Yu J, Zhang L, Peng F, et al., 2022, Clinical Efficacy of Electroacupuncture Combined with

Hemodrainage Injection in the Treatment of Acute Cerebral Infarction and its Effect on Serum Hypersensitive C-reactive Protein. *Journal of Hubei University of Traditional Chinese Medicine*, 24(02): 34–37.

- [17] Zhang J, Hui Z, Wang S, et al., 2022, Efficacy of Rhubarb Decoction Combined with Cerebral Activation Acupuncture in the Acute Phase of Cerebral Infarction. *Journal of Cardiovascular and Cerebrovascular Diseases of Integrated Traditional Chinese and Western Medicine*, 20(07): 1304–1307.
- [18] Fu Z, Li X, Wu Q, et al., 2015, Clinical Observation of 30 Cases of Hemiplegia in the Acute Phase of Ischemic Stroke with Phlegm Tongluo Decoction Combined with Acupuncture. *Herald of Traditional Chinese Medicine*, 21(15): 59–61.
- [19] Hao X, Sun Z, Wang X, et al., 2019, Clinical Observation of Angong ox Yellow Pill Combined with Acupuncture in the Acute Phase of Ischemic Stroke. *Modern Distance Education in Traditional Chinese Medicine*, 17(19): 55–57.
- [20] Ding Y, Lu H, 2022, 50 Cases of Acute Ischemic Stroke with Sputum Guide Decoction and Acupuncture Adjuvant Treatment. *China Science and Technology of Traditional Chinese Medicine*, 29(01): 126–127.
- [21] Yang H, Peng H, Liu Y, 2019, Effect of Acupuncture Combined with Rehabilitation on Limb Motor Dysfunction in Patients with Acute Ischemic Stroke. *Shaanxi Traditional Chinese Medicine*, 40(06): 708–710.
- [22] Huang J, 2017, Effects of Acupuncture Combined with Rehabilitation on Limb Motor Dysfunction and Living Ability in Patients with Acute Ischemic Stroke. *Sichuan Journal of Traditional Chinese Medicine*, 35(09): 158–160.
- [23] Zhang Z, Zhao L, Lei L, et al., 2020, Efficacy of Acupuncture Combined with rehabilitation in the Treatment of Acute Ischemic Stroke in Traditional Chinese Medicine and its effect on Limb Function Recovery. *Chinese Community Physicians*, 36(15): 108–109.
- [24] Liao T, Zhou H, Qin J, et al., 2020, Research Progress of Acupuncture in the Treatment of Acute Ischemic Stroke. *Hunan Journal of Traditional Chinese Medicine*, 36(04): 157–160.
- [25] Li S, Li P, 2020, Progress in the Treatment of Ischemic Stroke Disease in Traditional Chinese Medicine. *Journal of Armed Police Logistics College (Medical Sciences)*, 29(03): 72–75.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.