

The theory of "warming yang and relieving depression" in improving depression scores of post-stroke depression patients and its impact

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Abstract: To verify the effect of Tongdu acupuncture combined with Huafeng Dan based on the theory of "warming yang and relieving depression" on depression scores and 5-HT and HCY in PSD patients. We selected 289 patients clinically diagnosed with post-stroke depression for our study and randomly divided them into two groups. The control group received routine treatment from the Department of Brain Diseases, while the experimental group received a combination of Tongdu acupuncture and Huafeng Dan on top of the control group. The Hamilton Depression Rating Scale (HAMD), Neurological Impairment Scale (NIHSS), and Activities of Daily Living (ADL) scores were measured before and after the intervention to verify its clinical efficacy by measuring 5-HT and HCY levels. The research results show that 952 patients were included in this study, and 289 patients with post-stroke depression were judged by Hamilton Depression Scale, with a incidence rate of 30.36%. ② The comparison of HAMD, NIHSS, and ADL scores between two groups of patients before and after intervention showed that the HAMD and NIHSS scores of both groups were lower than before intervention, while the ADL scores were higher than before intervention, with $P < 0.05$, indicating statistical significance. After intervention, the experimental group was significantly better than the control group, with $P < 0.01$, indicating significant statistical significance. After intervention, 5-HT levels in both groups of patients increased compared to before intervention, while HCY levels were lower than before intervention. The inter group comparison showed that the experimental group was superior to the control group, with $P < 0.01$ and significant statistical significance. The study suggests that adding the Tongdu acupuncture method based on the theory of "warming yang and relieving depression" combined with Huafeng Dan to PSD patients on the basis of conventional treatment can effectively alleviate depression, reduce neurological deficits, and improve patients' daily living abilities. It is worthy of clinical promotion and application.

Keywords: warming yang and relieving depression; Tongdu acupuncture; Huafeng pill; Post stroke depression; Depression score; 5-HT; HCY

1. Introduction

Post stroke depression (PSD) is a common complication that occurs after a stroke [1]. The amygdala, hippocampus, hypothalamus, temporal lobe, midbrain and other parts of the brain control human emotions. Once ischemia or infarction occurs in the above-mentioned areas, it is highly likely to lead to the occurrence of PSD [2-3]. Epidemiological surveys show that about 40% -60% of stroke patients will experience varying degrees of depression at different stages of stroke, with more than half of the population experiencing it between 2 months and 1 year after stroke, which is a critical period for recovery after stroke [4-5]. Due to the hidden occurrence of post-stroke depression and the presence of language disorders in some patients, the treatment of post-stroke depression is more difficult [6]. The occurrence of post-stroke depression not only affects the recovery of patients, but also leads to unexpected events to a certain extent [7]. In recent years, with the shift of medical models from simple biology to biological psychological social models, traditional Chinese medicine emotional intervention for post-stroke depression has attracted widespread attention from medical staff [8]. For patients in the recovery period of stroke, in addition to rehabilitation of limb and neurological functions, mental health is more important [9].

2. Materials and Methods

2.1 Research data

(1) Diagnostic criteria

Diagnostic criteria for stroke (ischemic stroke): The diagnosis of stroke is based on the "Integrated Traditional Chinese and Western Medicine Diagnostic Criteria for Cerebral Infarction and Cerebral Hemorrhage (Trial)" formulated by the Neurology Professional Committee of the Chinese Society of Integrated Traditional Chinese and Western Medicine in 2006 [10-11]. Diagnostic criteria for depression: Diagnosis is based on the diagnostic criteria for depression in the Chinese Classification and Diagnostic Criteria for Mental Disorders (CCMD-3) published in 2001.

(2) Inclusion criteria

Age ≥ 18 years old; Stroke duration ≥ 2 weeks; HAMD score: 7-24 points (mild to moderate depression); The patient signs an informed consent form. Age ≥ 18 years old; Stable condition, clear consciousness, able to cooperate with examination and treatment

(3) Exclusion criteria

Those who do not meet the diagnostic criteria; Patients who are preparing for pregnancy, pregnant, and breastfeeding; Having serious underlying illnesses or accompanied by mental illness, with poor cooperation.

(4) Standards for detachment and interruption

The patient and their family request to stop the trial. Other events that affect the evaluation of therapeutic efficacy occur. Detailed records of the reasons for withdrawal should be kept for the case, with signatures from both doctors and patients, and the research data should be retained.

2.2 Research Methods

This study investigated the general information of patients admitted to the Brain Disease Department of Binzhou Traditional Chinese Medicine Hospital from June 2020 to June 2021, who were clinically diagnosed with stroke (cerebral infarction, intracerebral hemorrhage). The Hamilton Depression Scale was used to investigate the depression status of patients.

2.3 Treatment Methods

Basic treatment: After admission, the patient is given treatment and nursing routine in the department of encephalopathy according to their condition, including blood pressure, blood glucose, blood lipid management, nerve nutrition, and improvement of microcirculation.

① Control group: conventional acupuncture treatment was given in addition to basic treatment. According to the new century (second edition) teaching material acupuncture and moxibustion Therapeutics, the points of "stroke" and "depression" are selected: bilateral Shenmen, Daling, Neiguan, Qimen, Xinchu, Hegu, Taichong. The main physical obstacles are the Yangming meridian acupoints on the hands and feet. The operation and disinfection methods shall comply with the requirements of the textbook. After inserting the needle, the qi is replenished and the diarrhea is relieved. Leave the needle on for 30 minutes. Treat once a day for 8 consecutive weeks.

② Experimental group: On the basis of basic treatment, the combination of Tongdu acupuncture and oral administration of Huafeng Dan was added. Huafeng Dan (National Medical Products Administration Approval No. Z20026460) is provided by Guizhou Wansheng Pharmaceutical Co., Ltd., with a specification of 0.12g per pill, batch number 040401, sealed, and stored in a cool and dry place. Take 8 pills orally each time, 3 times a day, and continue treatment for 8 weeks.

The selection of acupoints using the Tongdu acupuncture method is mainly based on the Du meridian, Hand San Yang meridian, Foot Jue Yin Liver meridian, and Foot Shao Yin Kidney meridian acupoints. The principle of selecting acupoints refers to the principle of selecting acupoints for the five transportation acupoints "Yin Jing Mu, Yang Jing Jin". The main acupoints selected are as follows: Yaoyangguan, Mingmen, Jinsuo, Zhiyang, Lingtai, Taodao (Zutaiyanghui), Dazhui (Zusanyanghui), Yamen (Yangwei), Fengfu (Yangwei), Naohu (Zutaiyanghui), Baihui (Zutaiyanghui), Shangxing

(Shangxing), Shenting (Zutaiyanghui, Yangminghui), Shuigou (Hand, Zuyangming). Disinfection method control group. Operation method:

① One needle, three acupoints method: Insert the needle from Shenting acupoint, stick it to the bone and pierce through Fanghui acupoint to Baihui acupoint.

② Guimen Thirteen Needles: Take the Zhongjiang and Chengjiang acupoints of the human body and puncture them without leaving any needles. Insert it into the cheek and upper star acupoints along the way.

③ Awakening Brain and Opening Orifice Needles: Take the herbs of Wei Zhong, Chi Ze, Ji Quan, Nei Guan, and San Yin Jiao, and use the method of lifting, inserting, and purging.

④ Tongdu Wenyang Needle: Take the Du meridian points and use the interpolation method.

Leave the needle on for 30 minutes after getting gas. Treat once a day for 8 consecutive weeks.

2.4 Evaluation indicators

Scale scores: Hamilton Depression Rating Scale (HAMD), Neurological Impairment Scale (NIHSS), and Activities of Daily Living (ADL).

Serum 5-hydroxytryptamine detection: Fluorescence spectrophotometer (XE-2100, manufactured by Hisense Medical Electronics (Shanghai) Co., Ltd.).

Homocysteine detection: Blood biochemistry is used for HCY detection (Beckman Coulter fully automatic biochemical analyzer model: DxC700AU).

2.5 Statistical Methods

This study used SPSS 20.0 statistical software for statistical analysis, and selected different statistical methods based on different data. The counting data is analyzed using the χ^2 test; Under the condition of normal distribution, the measurement data is represented by (mean \pm standard); The comparison between the two groups is conducted using t-test; This study considers $P < 0.05$ as statistically significant.

3. Results

3.1 Incidence rate of post-stroke depression

952 patients were included in this study. Through Hamilton Depression Scale, 289 patients with post-stroke depression were judged, and the incidence rate of post-stroke depression was 30.36%.

3.2 General information of two groups of patients

Table 1: General information of two groups of patients ($\bar{x} \pm s, n=289$)

group	N	Average age (years)	PSD		
			Mild	Moderate	Severe
Experimental group	145	66.55 \pm 10.65	99	32	14
Control group	144	67.06 \pm 10.38	98	34	12
T	0.464	0.324			
P	0.723	0.651			

(Note: The comparison of demographic data and clinical characteristics between the two groups has a P-value greater than 0.05 and is not statistically significant. Therefore, a clinical controlled trial can be conducted.)

Among them, patients diagnosed with depression were randomly divided into two groups according to their wishes. The control group received routine treatment from the Department of Brain Diseases, while the experimental group received additional Tongdu acupuncture combined with Huafeng Dan on the basis of the control group. The Hamilton Depression Rating Scale (HAMD), Neurological Impairment Scale (NIHSS), and Activities of Daily Living (ADL) were measured before and after intervention to verify its clinical effect by measuring 5-HT and HCY levels. The plan has been

approved by the Ethics Committee of Binzhou Traditional Chinese Medicine Hospital and the entire process has been tracked. As is shown in Table 1.

3.3 Comparison of HAMD, NIHSS, and ADL scores between two groups of patients before and after treatment

After intervention, the HAMD score and NIHSS score of both groups of patients were lower than before intervention, and the ADL score was higher than before intervention, with $P < 0.05$ and statistical significance. After intervention, the experimental group was significantly better than the control group, with $P < 0.01$, indicating significant statistical significance. As is shown in Table 2.

Table 2: Comparison of HAMD, NIHSS, ADL scores, and 5-hydroxytryptamine levels between two groups of patients before and after intervention ($\bar{x} \pm s$)

group		HAMD	NIHSS	ADL
Before intervention	Experimental group	27.21±2.94	15.32±4.72	36.72±3.11
	Control group	27.57±3.01	16.18±5.14	34.78±2.92
	T/P	0.201/0.766	0.145/0.803	0.041/0.925
After intervention	Experimental group	11.01±2.87*	7.03±4.96*	68.56±6.31*
	Control group	19.32±3.05△	10.86±5.05△	54.37±8.23△
	T/P	5.201/0.000	1.145/0.000	10.041/0.000

(*: Compared with before intervention in the same group, $P < 0.01$ showed significant statistical significance; △: Compared with the same group before intervention, $P < 0.05$, with statistical significance; Same below)

3.4 Comparison of 5-HT and HCY levels between two groups of patients before and after intervention

After intervention, 5-HT levels in both groups of patients increased compared to before intervention, while HCY levels were lower than before intervention. The inter group comparison showed that the experimental group was superior to the control group, with $P < 0.01$ and significant statistical significance. As is shown in Table 3.

Table 3: Comparison of 5-HT and HCY levels between two groups of patients before and after intervention ($\bar{x} \pm s$)

group		5-HT(mg/ml)	HCY
Before intervention	Experimental group	23.57±3.61	33.57±3.61
	Control group	24.01±3.48	34.01±3.48
	T/P	0.157/0.855	0.157/0.855
After intervention	Experimental group	39.66±2.25*	19.66±2.25*
	Control group	27.38±4.26△	27.38±4.26△
	T/P	6.127/0.000	6.127/0.000

4. Discussion

4.1 The theory of "warming yang to relieve depression" and its relationship with depression syndrome

Modern traditional Chinese medicine mostly starts with the treatment of wind, phlegm, deficiency, blood stasis, qi, and blood in the recovery period of stroke [12]. The treatment principles and methods include dispelling weathered phlegm, supplementing qi and promoting blood circulation, supporting the body and strengthening the foundation, promoting blood circulation and removing blood stasis, and unblocking meridians. Rarely used for warming yang and relieving depression. However, from the clinical manifestations of depression syndrome and the theory of yin and yang, post-stroke depression patients mainly exhibit unwillingness to move or refuse treatment (relatively static), silence (introverted), fear of cold (cold), and prolonged solitude (dark). Therefore, this article proposes the first viewpoint: the pathological nature of post-stroke depression is negative.

In the medical literature of our country throughout history, there is no disease that is completely

consistent with post-stroke depression [13]. However, in the Yellow Emperor's Inner Canon and the Synopsis of the Golden Chamber, there are descriptions of similar symptoms such as depression syndrome, women's lily disease, plum nucleus qi, and women's visceral dryness. The Yellow Emperor's Inner Canon believes that the blockage of qi and inability to do so is the main manifestation of those who are worried. According to the "Jin Xia Yao Lue", patients with lily disease... desire to eat but cannot eat, often remain silent, want to lie down but cannot lie down, want to act but cannot act... Women are dirty and restless, happy and sad, and want to cry. According to the description of mental activities such as joy, anger, worry, thought, sadness, fear, and shock in "The Spirit Pivot: The Original God", this article proposes a second viewpoint: the location of post-stroke depression is in the brain, closely related to the heart, liver, and kidneys.

According to the theory of meridians, and based on the yin-yang attributes of the five organs, the heart is the yang of yang, the liver is yin and uses yang, and the kidneys have both yin-yang attributes. In the treatment of depression syndrome, although more methods are used to soothe the liver, relieve depression, nourish the heart and calm the mind. The root of its treatment still lies in nourishing liver yin, assisting heart yang, and kidney yang. Therefore, this article proposes a third viewpoint: warming yang and relieving depression are important treatment methods for post-stroke depression.

4.2 Explanation of Tongdu Acupuncture Method Based on the Theory of "Warming Yang and Relieving Depression"

The Du meridian is the sea of yang meridians in the human body, with the kidneys leading to bone marrow and the brain being the sea of marrow [14]. Therefore, throughout history, medical practitioners have used high doses of Rehmannia glutinosa, Goji berries, Eucommia ulmoides, and other herbs to treat symptoms such as brain sounds and headaches caused by kidney deficiency and insufficient marrow. The location of post-stroke depression is in the brain, and the clinical symptoms of ischemia and infarction caused by stroke are similar to those of insufficient marrow. By regulating the Du meridian and warming it up, patients' depressive symptoms can be improved.

The selection of acupoints for the Tongdu acupuncture method mainly includes the Du Mai acupoint, the Hand San Yang meridian, the Foot Jue Yin Liver meridian, and the Foot Shao Yin Kidney meridian. The principle of selecting acupoints follows the principle of selecting acupoints for the Five Directions acupoint "Yin Jing Mu, Yang Jing Jin". The main acupoints selected are as follows: Yaoyangguan, Mingmen, Jinsuo, Zhiyang, Lingtai, Taodao (Zutaiyanghui), Dazhui (Zusanyanghui), Yamen (Yangwei), Fengfu (Yangwei), Naohu (Zutaiyanghui), Baihui (Zutaiyanghui), Shangxing (Shangxing), Shenting (Zutaiyanghui, Yangminghui), Shuigou (Hand, Zuyangming). The Du meridian is the "sea of yang meridians" in the human body, which has the function of commanding various yang meridians. The head is the meeting of all yang, and the three yang meridians of the hands and feet are all inscribed on the face. Therefore, according to the theory of meridians, by regulating the meridians and qi of the Du meridian, it can invigorate the yang, bring the head and face meridians back to their original state, and stabilize the qi. The anatomical location of the Du meridian is the spinal nerve in modern medicine, which includes bodily movement and sensory functions; The nerves responsible for visceral movement and sensory function. Stimulating the acupoints of the Du meridian also plays an important role in the functional recovery after stroke. The main acupoints are the Du meridian, combined with the Back Shu and Yuan acupoints, and supplemented with the Eight Hui acupoints, Shanzhong and Xiaoxue Neiguan, which can jointly achieve the effects of regulating the Du meridian, promoting brain circulation, soothing the liver, and relieving depression.

4.3 The effect of Huafeng Dan on post-stroke depression

Wansheng Huafeng Dan is made from fermented ingredients such as cow bile, white aconite, Sichuan wolfberry, Pinellia ternata, and Tiannanxing. While retaining the efficacy, it also restricts the dryness of Xinwen Dahe drugs. Indicating for relieving wind and spasms, relieving phlegm and opening the orifice. Related animal pharmacology experiments have shown that Huafeng Dan has significant effects on lowering blood pressure, inhibiting central nervous system activity, and can resist epilepsy, anticonvulsants, sedation and hypnosis, improve cerebral circulation, and have protective effects against cerebral ischemia and cerebral embolism; Can combat cerebral thrombosis and improve blood rheology; Can improve brain function, intelligence, and enhance memory capacity. In recent years, most of the relevant research has focused on treating diseases such as cerebral infarction, cerebral ischemia, and facial nerve paralysis. Animal experiments often focus on improving the memory and cognitive functions of experimental animals. On the basis of previous applications, this

study found that Huafeng Dan also has a significant effect on improving post-stroke depression, and when combined with Tongdu acupuncture, it has a synergistic effect.

5. Conclusion

This study is based on the theory of "warming yang and relieving depression", and selects the Tongdu acupuncture method combined with Wansheng Huafeng Dan to treat post-stroke depression. On the basis of improving patients' brain function and limb activity, it can effectively alleviate depression, reduce patients' neurological deficits, and improve their daily living abilities. It is worthy of clinical promotion and application.

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Author contributions

All authors have designed the study, developed the methodology, performed the analysis, and written the manuscript. All authors have read and agreed to the published version of the manuscript.

References

- [1] Liu Yan, Ba chi, Zhao Deng, et al. Resting state functional magnetic resonance imaging observation of the therapeutic effect of music therapy based on scalp acupuncture on post-stroke depression [J]. *Chinese Journal of Rehabilitation Theory and Practice*, 2021, 27 (03): 282-289.
- [2] Zhang Huili, Wang Wengang, Zhao Xin, et al. Clinical study on the treatment of depression after ischemic stroke with Ning Shen Kai Qiao acupuncture method [J]. *Hebei Journal of Traditional Chinese Medicine*, 2021, 36 (02): 34-36.
- [3] Tian Ming, Zheng Dan. Study on the Clinical Efficacy, SAS and HAMD Scale Scores, and 5-HT Levels of Post Stroke Depression Patients Using the Awakening Spirit and Opening Depression Acupuncture Method [J]. *Journal of Stroke and Neurological Disorders*, 2021, 38 (06): 518-521.
- [4] Liu Fan. Correlation analysis between changes in serum homocysteine levels and depression in post-stroke depression patients [J]. *Grassroots Medicine Forum*, 2021, 25 (25): 3699-3700.
- [5] Liu Honghua, Tu Li, Li Qian, et al. Application study of traditional Chinese medicine five tone therapy combined with acupoint pointer differentiation in post-stroke depression patients [J]. *General Nursing*, 2021, 19 (24): 3398-3401.
- [6] Liu Jie. The effect of low-frequency repetitive transcranial magnetic stimulation combined with rehabilitation training on the levels of 5-HIAA and 5-HT in post-stroke depression patients [J]. *Clinical Research*, 2021, 29 (07): 92-94.
- [7] Wang Xiaona, Wang Xiang, Miao Lili, et al. Study on the efficacy and mechanism of repetitive transcranial magnetic stimulation combined with music therapy in the treatment of post-stroke depression [J]. *Neuro Injury and Functional Reconstruction*, 2021, 16 (08): 459-461.
- [8] Yang Bende, Wang Heng, Xu Shengjun, et al. Clinical study of herbal separated moxibustion combined with emotional intervention in the treatment of post-stroke depression [J]. *Shanghai Journal of acupuncture and moxibustion and Moxibustion*, 2021, 40 (08): 920-925.
- [9] Lu Yi, Li Haihua, Yu Jianwei, et al. Study on the relationship between post-stroke depression and post-stroke cognitive impairment [J]. *Modern Medicine and Health*, 2021, 37 (15): 2577-2579+2585.
- [10] Liu Li, Ding Yi, Wang Jian, etc Clinical efficacy of the "Five Tones Regulating Spirit Method" in treating post-stroke depression patients with mild to moderate liver depression and spleen deficiency, and its effects on gut microbiota and serum serotonin levels [J]. *Chinese Journal of General Practice*, 2021, 24 (30): 3882-3887.
- [11] Chen Min, Ding Yuan, Huang Ying. Observation on the efficacy and quality of life of repeated transcranial stimulation therapy combined with psychological nursing intervention in patients with post-stroke depression [J]. *Psychological Monthly*, 2021, 16 (18): 55-56.

- [12] Zhang Shaohua, Wang Yulong, Zhang Chunxia, et al. Clinical study on interactive head therapy for cognitive function, depression, and anxiety after stroke [J]. *Journal of Beijing University of Traditional Chinese Medicine*, 2021, 44 (07): 659-667.
- [13] Guo Yingshu, Liu Hongliang, Liu Jie. The clinical effect of the combination of "Shugan Tiaoshen" acupuncture method and Chaihu Shugan San in the treatment of post-stroke depression with liver qi stagnation type [J]. *Henan Medical Research*, 2021, 30 (20): 3659-3663.
- [14] Li Yanli, Yang Zufu, Xu Jimin, et al. Acupuncture combined with flupentixide and metoprolol in the treatment of moderate depression after stroke: a randomized controlled study [J]. *Chinese Journal of Rehabilitation Medicine*, 2021, 36 (07): 810-815.