A Study of the Treatment Methods and Clinical Efficacy of Post-stroke Sequelae

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Abstract: Stroke has become the leading cause of death and disability among adults in China, and its sequelae involve the whole body, with a longer course of disease and poorer prognosis, so the treatment not only needs to pay attention to the changes in the condition in order to prevent recurrence, but also to pay attention to the psychological state of the patients. At present, the clinical treatment of post-stroke sequelae is mainly based on drug therapy and targeted rehabilitation training, but the effect is not good, after the joint application of Buyang Huanwu Decoction, traditional Chinese medicine characteristic therapy and repetitive transcranial magnetic stimulation therapy, the therapeutic effect of the patient and the therapeutic efficiency are significantly improved. Therefore, it is of great clinical significance and value to study and explore the treatment of post-stroke sequelae.

Keywords: Post-stroke sequelae; Buyang Huanwu Decoction; acupuncture; Electroacupuncture; moxibustion

1. Introduction

Stroke is an acute cerebrovascular disease, a disease in which blood cannot enter the brain directly due to rupture or blockage of a blood vessel in the brain and damages the structure and function of brain tissue, including ischemic and hemorrhagic strokes ^[11]. Ischemic stroke, referred to as cerebral infarction, cerebral infarction, etc., is caused by local ischemic necrosis or softening of brain tissues due to disorders of cerebral blood supply, ischemia and hypoxia, and men over 40 years of age are the high-risk group. Hemorrhagic stroke, also known as cerebral hemorrhage, can be caused by high blood pressure, intracranial aneurysm, etc. Although its incidence rate is lower than that of ischemic stroke, the mortality rate and disability rate are higher.

The China Stroke Prevention and Control Report points out that the disease with the highest rate of death and disability among adults in China is stroke ^[2]. In the early stage of post-stroke sequelae, there is usually numbress of limbs, weakening of muscle strength, unfavorable limb movement, unfavorable speech, choking on drinking water, etc, and then gradually develop into hemiparesis, aphasia, abnormal swallowing function, cognitive disorders, etc. , and usually accompanied by emotional problems, such as anxiety and depression ^[3].

In addition to conventional drugs and rehabilitation training, the treatment of post-stroke sequelae is more frequently applied to oral Chinese herbal Buyang Huanwu Decoction plus reduction, acupuncture, electroacupuncture, moxibustion, tuina, and repetitive transcranial magnetic stimulation therapy. This paper discusses and researches the above treatment modalities of post-stroke sequelae and their efficacy by searching the databases of CNKI, Wanfang, WeiPu, and PubMed.

2. Application of Buyang Huanwu Decoction

A large body of literature suggests that Buyang Huanwu Decoction plays a crucial role in the herbal treatment of post-stroke sequelae. A large number of literature searches were conducted in CNKI, Wanfang, WeiPu, and PubMed, and a total of 1,259 articles were retrieved with the title or subject terms of Buyang Huanwu Decoction. After deleting duplicate literature, 686 articles were left, and 458 articles were left after searching for the terms of effect, therapeutic efficacy, clinical research, clinical observation, effect, effectiveness and etc, respectively. Finally, only 403 articles were left after removing

the duplicates. Based on the results of a 23-year study of the clinical effects of Buyang Huanwu Decoction and its additive and subtractive formulas on 100 post-stroke patients at Huangshi Aikang Hospital, it can be concluded that it is recommended to popularize the use of Buyang Huanwu Decoction in the treatment of post-stroke sequelae ^[4]. A study conducted by Shaxian District Hospital of TCM, Sanming, Fujian ^[5], on 96 patients with post-stroke sequelae of the qi deficiency and blood stasis type proved that the combination of Buyang Huanwu Decoction with edaravone had excellent efficacy in treating post-stroke sequelae. The Qixia City Hospital of Traditional Chinese Medicine [6] grouped 100 post-stroke patients, 50 in each group, and evaluated them after eight weeks of treatment, indicating that Buyang Huanwu Decoction have obvious clinical effects in the treatment of post-stroke symptoms. After observing 70 cases of post-stroke patients admitted to Yichun Tiantai Town Central Health Hospital^[7], it was concluded that based on conventional basic treatment for post-stroke patients, the use of Buyang Huanwu Decoction Plus Reduction can enhance the efficacy of treatment, promote the improvement of the condition, and speed up the prognosis. By studying the changes in symptoms and various scale scores of 100 patients with post-stroke sequelae after four weeks of treatment, Jie Hu^[8] showed that the Buyang Huanwu Decoction is indispensable in assisting in the treatment of post-stroke sequelae, and it can help patients to enhance their self-care ability and have a great improvement in their quality of life. By studying the pharmacology of some of the Chinese medicines in the Buyang Huanwu Decoction, Xingwen Pi^[9] showed that the components of certain Chinese medicines in the Buyang Huanwu Decoction have targeted therapeutic effects on post-stroke sequelae. Tianlei Wang^[10] randomly grouped 78 patients with post-stroke sequelae, and found that the treatment of Buyang Huanwu Decoction with electroacupuncture was able to reduce the expression rate of inflammatory factors and promote the recovery of limb motor function by comparing the indexes and data analysis of the two groups. (Table 1)

	Control subjects		Experimental group		01	
Literatures	Intervention	Number of examples	Intervention	Number of examples	indicators	Healing effect
[4]	Conventional treatment	50	On the basis of the control group, the diagnosis and application of Buyang Huanwu Decoction plus reduction	50	Chinese Medicine Score, Symptoms and Positive Signs, Satisfaction, SF-36 Quality of Life Scale	Effective and recommended for promotion
[5]	Intravenous edaravone	48	On the basis of the control group, the application of Buyang Huanwu Decoction	48	NIHSS assessment, MBI scores	Effective
[6]	Individualized conventional treatment	50	On the basis of the control group, the diagnosis and application of Buyang Huanwu Decoction plus reduction	50	TCM Evidence Score, Barthel Index Scale, CNDS Assessment, FMA Scale, Mo-cA Scale, Adverse Reaction Rate	Effective and recommended for promotion
[7]	Conventional Western medicine	35	On the basis of the control group, the diagnosis and application of Buyang Huanwu Decoction plus reduction	35	TCM Evidence Score, NIHSS Assessment, FMA Scale, ADL Scale, Adverse Reactions	Effective, safe and reliable
[8]	Conventional treatment	50	On the basis of the control group, the application of Buyang Huanwu Decoction	50	TCM evidence score, NIHSS assessment, Barthel Index Rating Scale, SF-36 Quality of Life Scale, adverse effects, recurrence	Effective, low recurrence rate
[10]	Conventional Treatment + Buyang Huanwu Decoction	39	The control group was based on the addition of electroacupuncture	39	NIHSS assessment, FMA scale, FAC scale, inflammatory factors	Effective

Table 1: Application of Buyang Huanwu Decoction and its additive formulae

Although a large number of studies have shown that the Buyang Huanwu Decoction can effectively treat the sequelae of stroke, it still cannot be used as the main treatment program, and the clinical application of the combination of other programs together with the effect of treatment is even more.

3. Application of Acupuncture, Electroacupuncture, Moxibustion, and Tuina

The role of Chinese medicine specialty therapies in the treatment of post-stroke sequelae is also not to be underestimated. A total of 1992 articles were searched in CNKI, Wanfang, WeiPu, and PubMed in the past 10 years with acupuncture, electroacupuncture, moxibustion, and tuina as the title or subject matter, and after removing the duplicates, 825 articles were left, and after searching for the words effect, efficacy, clinical research, clinical observation, effect, and effectiveness, only 502 articles were left. A

study of 56 post-stroke hemiplegic patients at the Heilongjiang Provincial Hospital of Traditional Chinese Medicine [11] demonstrated that the acupuncture based on Midnight-Noon Cycle of Qi can effectively relieve limb spasms in post-stroke hemiplegic patients and also improve limb motility and the patients' ability to perform daily life activities. Zhenli Guo ^[12] summarized several clinical efficacy studies and concluded that acupuncture is more efficient and can significantly improve limb motor function and quality of life; electroacupuncture can promote the recovery of limb motor function in poststroke hemiplegic patients; and moxibustion, although not as efficient as direct acupuncture and electroacupuncture, can improve limb movement and self-care ability with regular long-term treatment. Dr. Shuhui Huang from Fuzhou Jianqiang Fifth Hospital^[13], studied 121 post-stroke patients, and divided the patients into two groups for randomized controlled clinical trials, 60 in the control group and 61 in the experimental group, the results of the experiments proved that the simultaneous use of warm acupuncture and electroacupuncture treatment can reduce the inflammatory response and maintain the speed of cerebral blood flow, and effectively improve the quality of life of patients with post-stroke symptoms. In order to study the therapeutic effect of moxibustion and traditional Chinese medicine fumigation in the treatment of post-stroke sequelae, the Department of Rehabilitation of Chaozhou Hospital of Traditional Chinese Medicine ^[14] admitted 62 patients with post-stroke sequelae, and analyzed the pre- and post-treatment data at the end of 30 days of controlled treatment, concluding that the simultaneous application of moxibustion and herbal fumigation in the treatment of post-stroke sequelae can effectively improve the patients' motor function of the limbs and enhance the ability of life and self-care. Xuefeng Qian ^[15] collected data from 108 post-stroke patients before and after randomized controlled treatment over 19 months, and through statistical analysis, he found that conventional rehabilitation exercise therapy together with Chinese medicine characteristic massage therapy can promote blood circulation and reduce the occurrence of brain injury to a certain extent, therefore, conventional exercise therapy together with massage therapy can promote the recovery of various functions of patients with post-stroke, which is conducive to the improvement of the condition. Xu Zhang ^[16] conducted a clinical study on 80 post-stroke patients who were hospitalized in the Department of Rehabilitation Medicine of the Ninety-fifth Hospital of the Chinese People's Liberation Army Navy from March 19 to March 21, and divided them into two groups, comparing the scores of NIHSS scale and ADL scale before and after the treatment of each group after one month of continuous treatment, to prove that acupuncture treatment can effectively promote the recovery of limb motor function and the enhancement of the ability of daily life of patients with post-stroke sequelae. The sequelae of the stroke is the superior disease of the rehabilitation department of the Second Traditional Chinese Medicine Hospital in Guangdong Province. Dr. Chunyan Yu will treat 84 stroke sequelae patients for 40 days in continuous treatment. The results of the score score and the improvement of the Ashworth method evaluation results, the three results show that moxibustion therapy can significantly improve the physical movement function of patients with stroke sequelae and improve quality of life^[17]. See Table 2.

	Control subjects		Experimental group			
Literatures	Intervention	Number of examples	Intervention	Number of examples	Observation indicators	Healing effect
[11]	Conventional hospitalization + conventional meridian acupuncture treatment	28	Conventional hospitalization + acupuncture based on Midnight- Noon Cycle of Qi	28	Barthel Index Rating Scale, FMA Scale, Modified Ashworth Scale (MAS)	Effective and worth promoting
[13]	electroacupuncture	60	The control group was based on the addition of warm acupuncture	61	Clinical efficacy, NIHSS assessment, Barthel Index Rating Scale, Inflammatory Response Index, Cerebral Hemodynamic Index, Clinical Spasticity Index assessment	Good effect
[14]	moxibustion	31	The control group was based on the addition of herbal fumigation	31	Barthel Index Rating Scale, FMA Scale, SS- QOL Scale	Efficient
[15]	sports therapy	54	The control group was based on the addition of tuina	54	NIHSS assessment, Barthel Index Rating Scale, MMSE method assessment, Modified Boston Chinese Aphasia Test	Efficient
[16]	rehabilitation	40	The control group was based on the addition of acupuncture	40	NIHSS assessment, ADL scale	Effective
[17]	acupuncture	42	moxibustion	42	Clinical efficacy, Barthel Index Rating Scale, Modified Ashworth	Effective

Table 2: Application of acupuncture, electroacupuncture, moxibustion and tuina

A large number of studies have proved that the reasonable use of acupuncture, electroacupuncture, moxibustion, tuina, and other traditional Chinese medicine therapy can effectively promote the

restoration of physical movement and daily life functions, and improve the quality of life of patients.

4. Application of repetitive transcranial magnetic stimulation therapy

	Control subjects		Experimental group			
Literatures	Intervention	Number of examples	Intervention	Number of examples	Observation indicators	Healing effect
[19]	Conventional treatment + rTMS in the M1 area of the healthy cerebral cortex	35	The control group was treated with the addition of a motion control system	34	MBI scores, BBS scores, gait parameter analysis	Efficient
[20]	Basic therapy + Brunnstrom staging training	40	The control group was based on the addition of high- frequency rTMS treatment	40	NIHSS assessment, FIM assessment, testing of serum MBP, NSE and NGF-1 levels, GQOLI- 74 assessment	Efficient
[21]	Duloxetine hydrochloride enteric-coated tablets	50	The control group was treated with rTMS on top of the control group	50	Clinical efficacy, NIHSS assessment, ADL scales, neurotransmitter levels, SAS scales, SDS scales, PSQI scores, detection of BDNF and CRP levels, occurrence of adverse events	Good effect
[22]	Conventional medication + conventional cognitive and ingestion training	30	The control group was treated with rTMS on top of the control group	30	MMSE scale, VDS scale, OTT and SET values	Effective
[23]	Cognitive training + sham stimulation therapy	30	Cognitive training + high frequency (10Hz) rTMS therapy	30	FAB scale, TOH test, TMT-A test, event- related potentials P300	Effective, safe
[25]	Routine rehabilitation training	60	On the basis of the control group, add rTMS treatment	60	NIHSS assessment, MBI score, HAMD scale, HAMD scale, neurophysiologic indices, coagulation- related indices, LOTCA score	Effective

Table 3: Applications of repetitive transcranial magnetic stimulation therapy

Repetitive transcranial magnetic stimulation is one of the safer and more effective forms of stroke physiotherapy. In the same way, in CNKI, Wanfang, WeiPu, and PubMed, we searched the literature with repeated transcranial magnetic stimulation, low-frequency repetitive transcranial magnetic stimulation, high-frequency repetitive transcranial magnetic stimulation and its related synonyms as the title or the subject word, in addition to the duplication of the literature, the remaining 1, 938, and then searched for the effect, the therapeutic efficacy, the clinical research, the clinical observation, the effect, the effectiveness, and so on. A Meta-analysis of 347 studies ^[18] concludes that repetitive transcranial magnetic stimulation offers a noninvasive treatment for stroke patients that improves cognitive function and self-care. Cuiwei Hao ^[19] studied 70 post-stroke hemiplegic patients, of which 1 patient withdrew halfway, the rest of the patients were divided into two groups that completed the study, after a period of systematic and standardized treatment, comparing the two groups before and after the treatment of MBI scores, BBS scores, gait parameters, and then concluded that: low-frequency rTMS can promote the lesion side of the cerebral cortex excitation and thus effectively promote the recovery of the limb movement of the patients with sequelae of stroke and the enhancement of the ability of life and self-care. Xinhua Li^[20] randomly grouped 80 post-stroke patients for treatment, compared the indicators after 28 consecutive days of regular treatment, statistically analyzed the assessment data, and proved that the addition of high-frequency rTMS treatment on the basis of rehabilitation training can further improve the quality of life of post-stroke patients while improving their limb motor function. Dr. Hanfu Zhang and Dr. Qiang Hou of Baoji Hospital of Traditional Chinese Medicine ^[21] jointly included 100 post-stroke depressed patients in the study, with a treatment time of 56 days, and statistically analyzed the data before and after the treatment, which showed that oral duloxetine hydrochloride enteric-coated tablets combined with rTMS treatment can significantly improve the mood problems of post-stroke depressed patients, and relative to conventional antidepressant treatment, the application of rTMS treatment produces relatively fewer side effects and adverse reactions, and the clinical efficacy of rTMS treatment is relatively significant. Xuzhou Central Hospital^[22] studied 60 patients with post-stroke cognitive and feeding disorders. The control group was given conventional treatment, while the experimental group was treated with repetitive transcranial magnetic stimulation (rTMS) on the basis of the control group,

and the treatment cycle was 28 days, and the comparison of the data before and after the treatment showed that the cognitive function of the patients with stroke is closely related to the function of feeding, and the combination of conventional medication, targeted rehabilitation training, and rTMS treatment can significantly improve the cognitive function and feeding function of the patients with stroke. Neurological Rehabilitation of the First People's Hospital of Lianyungang City department ^[23] has been treated and studied 60 patients with sequelae of stroke. They are obstacles to the execution function. After six weeks of group treatment, add high -frequency (10Hz) RTMS treatment group for treatment effects. The group obviously proves that high -frequency RTMS treatment can better promote the recovery of patient execution function after stroke. In the existing treatment, RTMS treatment has a safe and efficient advantage. A systematic review ^[24] studied the results of 338 stroke patients who underwent fMRI before and after rTMS treatment showed that fMRI can be used to predict the outcome of rTMS. To study the efficacy of rTMS in the treatment of post-stroke sequelae, Shujin Lu ^[25] admitted 120 patients with post-stroke sequelae for the study. After the group treatment, the results of the evaluation of various indexes were analyzed, and it was concluded that: rTMS can stimulate the central nerves to have an effect on the brain's neuroelectrical activity, which can ultimately improve the prognosis of the post-stroke sequelae; and that the addition of rTMS to the rehabilitation therapy can promote the recovery of neurological and cognitive functions of the patients with post-stroke sequelae. See Table 3.

Repetitive Transcranial Magnetic Stimulation is a painless and non-invasive rehabilitation therapy with high therapeutic efficiency and safety, and fewer adverse reactions and side effects.

5. Summary

Stroke is equivalent to "stroke" in traditional medicine, and its capital pathology is the imbalance of yin and yang, the rebellious operation of qi and blood ^[26]. Under specific conditions, wind, fire, phlegm, blood stasis, and emptiness interact and transform each other, inducing the internal wind, which leads to the reversal of qi and blood and directly rushes to the clear orifices, with blood stasis in the brain veins or blood overflowing out of the veins, which results in an ischemic stroke or hemorrhagic stroke.

To summarize, for the treatment of post-stroke sequelae, on the basis of conventional medication and rehabilitation training, it is also necessary to combine a variety of ways to apply together. Combined treatment can not only improve the efficiency of treatment and promote the recovery of the condition, but also improve the psychological condition of patients and give them great confidence.

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