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Clinical Study of Acupotomy Trinity Lysis Combined with Rehabilitation Training for Spastic Paralysis after Stroke

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[Abstract] ***Objective:*** To study the clinical efficacy of acupotomy trinity lysis combined with rehabilitation training in the treatment of spastic paralysis after stroke, and to provide guidance for clinical diagnosis and treatment. ***Methods*:** From July 2019 to November 2020, 119 patients with post-stroke spastic paralysis who were admitted to our hospital's encephalopathy department were selected as the research objects, and 61 patients were divided into acupuncture combined with rehabilitation training group as the observation group by random number table method. 58 patients were divided into the rehabilitation training group as the control group. After 21 days of treatment, they passed the modified Ashworth Spasm Scale (MAS) grading scale score, Clinical Spasm Index (clinical spasm index, CSI) assessment, Fugl-Meyer exercise function scale (FMA)) Score, Modified Barthel Index Score, and compare the clinical efficacy after treatment. ***Results:*** After treatment, the total effective rate of the observation group (95.08%) was higher than that of the control group (86.21%), and the difference was statistically significant ($P < 0.05$); Before treatment, the contrast difference of MAS, FMA, CSI scores and modified Barthel index scores of the two groups of patients is not statistically significant; After treatment, the MAS scores and CSI scores of the elbow and knee joints of the observation group [(1.52±0.81)(1.46±0.83)(5.87±2.12)] were significantly lower than those of the control group [(2.17±0.68) (2.03±0.79)(8.36±2.41)]; FMA upper limb and lower limb scores and modified Barthel index [(51.87±4.41)(30.21±5.05)(72.41±5.81)] of the observation group were significantly higher than those of the control group [(44.26±4.78)(28.45) ±4.23) (68.65±6.09)], the difference was statistically significant ($P<0.05$). ***Conclusion:*** Acupotomy trinity lysis combined with rehabilitation training is effective in treating patients with post-stroke spastic paralysis. It provides a safe, reliable and clinically effective new program, which is worthy of popularization and application.

Key words: Acupotomy trinity lysis; Rehabilitation training; Post-stroke; Spastic paralysis

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1 Introduction

Cerebral stroke is also called "stroke" or "cerebrovascular accident". It is a group of cerebrovascular diseases with acute onset and focal neurological deficits, including cerebral infarction, cerebral hemorrhage and subarachnoid hemorrhage[1]. According to epidemiology, stroke is the second most fatal disease in the world and the first fatal

disease in China[2]. Its rapid onset, high rate of death and disability have always attracted clinical attention. In modern clinical practice, the main methods of treating spastic paralysis after stroke are rehabilitation therapy, western medicine, traditional Chinese medicine and acupuncture therapy[3-6]. Conventional rehabilitation training is currently a commonly used method, but due to limb spasm, rehabilitation is difficult with characteristics of long cycle, high cost, slow to take effect, and poor patient compliance. Based on long-term clinical work summary and research, combining modern anatomy and meridian acupoint dialectics, the author applies acupotomy trinity lysis to the treatment of spastic paralysis after stroke, combined with conventional rehabilitation training, which significantly improves the rehabilitation efficacy of patients and reduces the muscle tone, and improves the motor function and the ability of daily living. The specific report is as follows.

2 Object and methods

2.1 Research object

2.1.1 General information

All cases are patients with post-stroke spastic hemiplegia who were hospitalized in the Department of Brain Diseases, Binzhou Traditional Chinese Medicine Hospital from July 2019 to November 2020, and 119 standard cases were included. According to the random number table method, the patients were randomly divided into an observation group of 61 cases and a control group of 58 cases. The general data of the two groups of patients, such as gender, age, stroke type, and average course of disease, were statistically processed, and the differences were not statistically significant ($P > 0.05$), which is comparable (Table 1).

Table 1. General information of the two groups of patients($\bar{x} \pm s$)

Group		Sex		Average age	Stroke type		Average course of disease (days)
		M	F		Cerebral infarction	Hemorrhage	
Observation group	61	30	31	56.70±6.49	27	34	66.70±16.75
Control group	58	28	30	56.64±6.38	29	29	66.64±16.38

2.1.2 Western medicine diagnostic criteria

The "Key Points for Diagnosis of Various Cerebrovascular Diseases" the diagnostic criteria for stroke, which were established by the Fourth Cerebrovascular Academic Conference of the Chinese Medical Association, were diagnosed as cerebral hemorrhage or cerebral infarction with evidence of brain computed tomography or magnetic resonance imaging[7].

2.1.3 TCM diagnostic criteria

It meets the diagnostic criteria of stroke in the "Guidelines for the Diagnosis and Treatment of Common Diseases in Internal Medicine of Traditional Chinese Medicine"[8].

2.1.4 Inclusion criteria

It meets the above-mentioned diagnostic criteria of Chinese and Western medicine and is supported by imaging data. It belongs to the post-stroke recovery period (stroke 2 weeks to 6 months); there is post-stroke spastic hemiplegia, the degree of spasticity is assessed by MAS, and the muscle tension rating of the paralyzed limb is ≥ I Grade; age 37-75 years old, no gender limit; clear consciousness, can cooperate with treatment, voluntarily participate in clinical observation, obey the arrangement of medical staff; patients and family members voluntarily sign informed consent.

2.1.5 Exclusion criteria

Severe stroke patients with cognitive or consciousness impairment, or with moderate to severe dementia, who cannot cooperate with treatment; patients with other diseases of the nervous system, immune system, skeletal and muscular system that cause muscle spasm; patients with unstable vital signs, brain tumors, brain trauma, cerebral parasitic diseases, metabolic disorders, rheumatic heart disease, coronary heart disease, and other heart diseases combined with stroke caused by atrial fibrillation; patients who are allergic to lidocaine.

2.1.6 Rejection and shedding standards

Patients who did not meet the inclusion criteria after being included in the study; patients with other illnesses occurred during the treatment period that affected the study; patients who did not complete the treatment according to the regulations due to various reasons, and patients with incomplete curative effect observation records; patients with adverse reactions occurred during the treatment, and should stop the treatment after the doctor’s decision.

2.2 Treatment methods

2.2.1 Control group

For patients with motor dysfunction, refer to the "Guidelines for Early Retreatment of Stroke in China" to formulate a reasonable rehabilitation treatment plan, keep a good limb position, keep the elbow joint straight and the wrist joint functional position; shoulder joint flexion 90 degrees, in order to prevent contracture of the shoulder joint; keeping rehabilitation training of the affected limb, Bobath shakes hands above the head and does a shoulder shrug; Weight-bearing training of the lower limbs and core strength training of the trunk muscles; balance training for the shift of the center of gravity such as sitting, standing, and position. Manually stimulate the deltoid, biceps, quadriceps and other muscles to promote the rehabilitation of the affected limb; encourage patients to take the initiative to exercise the motor function of the affected limb, and guide the patient to change clothes, eat, wash, and go to the toilet in daily life[9].

This treatment lasts for 40 minutes each time, once a day, 21 days as a course of treatment, evaluate the efficacy after the end of the course of treatment. Due to the long treatment cycle of the disease, it should rest for 2 days after 5 consecutive treatments in one week.

2.2.2 Observation group (acupotomy trinity release + rehabilitation training group)

A. Point selection

Refer to the "Twelfth Five-Year Plan" national-level textbook "Acupuncture and Moxibustion" for general higher education: Heaven postion- acupoints such as: head and Naokong, Naohu, Fengchi; Human position-acupoints such as: Quheng in shoulder and back, Tianzong, Dazhui, Shenzhu, Shinto, Jinsuo, chest 11 Jiaji point; Earth position-acupoints such as waist 1 Jiaji point, Mingmen, Yaoyangguan, Seventeen vertebrae, Zhishi (Ashi point at the tip of the transverse process of the third lumbar vertebra)[10].

B. Needle knife operation

In the sterile treatment room, the patient lies prone on the treatment bed, fully exposes head, waist and back, and cuts a small amount of hair at the acupoints of Naokong, Naohu and fengchi to prevent infection, mark those acupoints and use iodophor cotton balls for routine disinfection; spread sterilized small hole towels. Inject 1% lidocaine with 0.5ml at subcutaneous acupoints for local anesthesia, holding a typeINo.3 needle knife with the edge line parallel to the direction of the muscle, according to the needle knife four-step needle method, gradually loose muscle tension, in order to achieve the purpose of dredging the meridians and regulating the viscera. ① Insert the needle knife at the surface of Naokong, Naohu acupoints perpendicularly, and the needle should be pierced to the bone surface of the pain point, longitudinally dredge the needle knife for 2-3 times then take out, and press to stop the bleeding for 3 minutes. ② Insert the needle perpendicularly to the bone surface of the Fengchi acupoint and pierce it to the bone surface of the occiput (do not puncture obliquely downward to prevent damage to the medulla oblongata), longitudinally dredge 2-3 times and then take out the needle knife, and press the acupoint for 3 minutes to stop bleeding. ③ Confirm the position of the marked acupoints of Quyuan and Tianzong with one hand to prevent postural changes, the knife blade should be parallel to the direction of muscle travel and reaches the bone surface of the scapula, longitudinally sparse and horizontally strip the points for 2-3 times, press the points for 1-2 minutes to stop bleeding and cover with band-aids. ④ Perpendicularly insert the needle knife to the skin of the marked acupoints of Dazhui, Shenzhu, Shendao, Jinsuo, Mingmen, Yaoyangguang, Shiqizhui, and the needle should be inserted along the lower edge of the spinous process to the bone surface. Longitudinally puncture and dredge the points for 2-3 times, and then press the points to stop bleeding for 1-2 minutes and cover with band-aid. ⑤ Insert needle knife perpendicularly to the surface of the skin at the marked acupoins of Jiaji points on chest 11 and waist 1, pierce the rib head joints and facet joints respectively, longitudinally dredge the needle knife for 2-3 times and then take out the needle knife, press the acupoints for 1-2 minutes to stop bleeding and cover with band-aid. ⑥ Perpendicularly insert the needle knife to the surface of the skin at the acupoin of Zhishi (Ashi point at the tip of the third lumbar transverse process), to the bone surface of the third transverse process, longitudinally and horizontally dredge the knife for 2-3 times and then take out, press the point for 1-2 minutes to stop bleeding and cover with band-aid. During the treatment, it will occur local soreness, numbness, swelling, tactile induction, etc. which are normal reactions. The patients should lie horizontally for 40 minutes after the operation. The treatment is performed every 7 days, and one course of treatment is divided into 3 treatments.

C. Combined rehabilitation training after acupotomy treatment (the rehabilitation treatment method is the same

as that of the control group)

2.3 Efficacy evaluation criteria

2.3.1 Efficacy judgment index

The upper limbs and lower limbs were judged by the elbow joint and knee joint respectively. The muscle tension was assessed with reference to the Modified Ashworth Scale (MAS), and the changes in muscle tension before and after treatment were recorded, 0, 1, 1 +, 2, 3 and grade 4 muscle tension is counted as 0, 1, 2, 3, 4, and 5 points, respectively[11]. The formula of total effective rate is as follow:

Total effective rate = effective number of cases + markedly effective + return to normal / total number of cases × 100% (1)

2.3.2 Motor function assessment (Fugl-Meyer assess ment FMA)

FMA motor function score is based on professional rehabilitation physicians based on the patient's tendon reflex, extensor and flexor coordinated movement and associated activities, coordination ability and speed, separation movement, hyperreflexia, wrist stability, finger movement, etc[12]. The lowest score for each function is 0, the highest score is 2 points, the upper limb with 33 items scores 66 points, the lower limb with 17 items scores 34 points, and the upper and lower limbs total score 100 points. According to the scoring results, the higher the score, the lighter the limb motor dysfunction.

2.3.3 Clinical spasticity index (CSI)

The CSI scale includes 3 aspects: tendon reflexes, muscle tone and clonic tendon[13]. (1) Tendon reflex: 0 points for no reflex, 1 point for weakened reflexes, 2 points for normal reflexes, 3 points for active reflexes, 4 points for hyperreflexia; (2) Muscle tension: 0 points for no resistance, 2 points for resistance decrease, 4 points for normal resistance, 6 points for mild to moderate increase in resistance, and 8 points for severe increase in resistance; (3) Clonal: 1 point for no clonus, 2 points for 1 or 2 times of clonus, 3 points for clonic> 2 times, 4 points for clonic lasting 30s. The total score of 3 items is 16 points. A score of 0 means no cramps. The higher the score, the more severe the cramps.

2.3.4 Evaluation of the ability of daily living of the two groups of patients

The Barthe index is used to assess the ability of daily living, with a total score of 0-100 points[14]. Barthel index:> 60 is considered good (mildly disabled, but can basically take care of oneself); 40-60 is considered moderately disabled (needs help in daily life); 20-40 is moderately disabled (incredibly dependent on life, needs very great help); <20 points means complete disability (completely dependent on life).

3 Statistical analysis methods

Use SPSS22.0 statistical software for analysis. Measurement data conforming to normal distribution are described as mean±standard deviation ($\overline{x}$ ±s). Two independent sample t-tests are used for comparison between two groups. Enumeration data is represented by constituent ratios, and comparisons between two groups Chi-square test was used, and $P<0.05$ indicated that the difference was statistically significant.

4 Results

4.1 Clinical efficacy

Refer to "Chinese Rehabilitation Medicine Diagnosis and Treatment Standards" to determine the clinical efficacy. After treatment, the effective rate of the observation group was 95.08%, which was higher than 86.21% of the control group ($P<0.05$) (Table 2).

Table 2. Comparison of efficacy between the two groups (n,%)

Group	Cases	Back to normal	Marked effective	Effective	Ineffective	Effective rate
Observation group	61	7(11.48)	25(40.98)	27(44.26)	2(3.28)	95.08
Control group	58	2(3.45)	17(29.31)	31(53.45)	8(13.79)	86.21
$\chi 2$						8.107
P						0.04385

4.2 Comparison of the degree of limb spasm before and after treatment

There is no significant difference for the comparison of the degree of limb spasm before and after treatment, and the comparison of the MAS scores of the affected limb elbow and knee joint before treatment. After

treatment, the MAS scores of the elbow and knee joints of the affected limbs were significantly lower than before treatment (P<0.01); The scores of the observation group were better than those of the control group (P<0.05) for the comparison between the two groups (Table 3).

Table 3. Comparison of MAS scores between the two groups before and after treatment ($\bar{x} \pm s$)

Group	Cases	Elbow joint		Knee joint	
		Before treatment	After treatment	Before treatment	After treatment
Observation group	61	3.82±0.81	1.52±0.81[ab]	3.56±0.67	1.46±0.83[ab]
Control group	58	3.74±0.78	2.17±0.68[a]	3.45±0.73	2.03±0.79[a]

Note: Compared with this group before treatment, aP<0.05; compared with the control group after treatment，bP<0.05

4.3 Comparison of the motor function of hemiplegic limbs before and after treatment

Compare motor function of hemiplegic limbs before and after treatment, it was found out that before treatment, there was no significant difference between the FMA scores of the upper and lower limbs of the two groups of patients. After treatment, the FMA scores of the upper and lower limbs of the two groups of patients were significantly higher than those before treatment (P<0.01); Compare the scores between the two groups, and it found out that the observation group were better than those of the control group (P<0.05) (Table 4).

Table 4. Comparison of FMA scores between the two groups before and after treatment ($\bar{x} \pm s$)

Group	Cases	Upper limb		Lower limb	
		Before treatment	After treatment	Before treatment	After treatment
Observation group	61	31.26±5.53	51.87±4.41[ab]	23.56±5.27	30.21±5.05[ab]
Control group	58	29.52±4.74	44.26±4.78[a]	21.81±5.36	28.45±4.23[a]

Note: Compared with this group before treatment, aP<0.05; compared with the control group after treatment, bP<0.05.

4.4 Comparision of the CSI scores and ADL scores before and after treatment

Before treatment, there was no statistically significant difference in CSI and ADL scores between the two groups (P>0.05), which was comparable; after treatment, the CSI scores of the two groups were significantly reduced, and the ADL scores of the two groups both significantly increased, which was statistically significant compared with before treatment (P<0.05); the scores of the observation group were significantly better than those of the control group, and the differences after treatment were statistically significant (P<0.05) (Table 5).

Table 5. Comparison of CSI and ADL scores between the two groups before and after treatment ($\bar{x} \pm s$)

Group	Cases	Time	CSI Score	ADL Score
Observation group	61	Before treatment	12.11±2.26	61.08±6.03
		After treatment	5.87±2.12[ab]	72.41±5.81[ab]
Control group	58	Before treatment	11.36±2.01	63.12±5.29
		After treatment	8.36±2.41[a]	68.65±6.09[a]

Note: Compared with this group before treatment, aP<0.05; compared with the control group after treatment, bP<0.05.

5 Discussion

The results of this study showed that after 21 days of comprehensive rehabilitation treatment, the elbow and knee joint MAS scores, CSI scores, upper and lower limb FMA motor function scores, and ADL scores of the two groups of patients after treatment were significantly better than those before treatment (P<0.05); And the degree of improvement in the observation group was higher than that in the control group (P<0.05). And the degree of improvement in the

observation group was higher than that in the control group ($P<0.05$). The total effective rate of the observation group was significantly higher than that of the control group, which fully demonstrated that the needle-knife trinity lysis combined with rehabilitation training was significantly better than simple conventional rehabilitation training in reducing the patient's limb muscle tension, improving limb motor function, and improving life ability.

6 Conclusion

In summary, although there are many treatment methods for spastic paralysis, clinical application is always difficult and the curative effect is not ideal. After acupotomy trinity lysis treatment, the patient's muscle tension, spasticity, joint mobility, and ability of daily living have been significantly improved. Rehabilitation training for patients has become more comfortable. At the same time, the patient's pain in the rehabilitation training process has been reduced, and the patient's confidence has been increased, which will shorten the patient's hospitalization period, and reduce the patient's hospitalization costs. This will provide us with a clinical basis for further research on needle-knife trinity lysis combined with rehabilitation training for the treatment of post-stroke spastic paralysis, which is worthy of application and promotion.

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