

CLINICAL RESEARCH

Effect of Acupuncture on Immunoglobulin and Facial Nerve Function in Stroke Patients with Facial Paralysis

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Abstract

Objective To explore the effect of acupuncture on immunoglobulin and facial nerve function of stroke patients with facial paralysis. **Methods** A total of 67 stroke patients with facial paralysis diagnosed at our hospital from September 2015 to December 2019 were selected, and were randomly divided into control group and observation group. The control group was treated with conventional basic treatment, while the observation group was additionally treated with acupuncture on the basis of the control group. The clinical effect, immunoglobulin and facial nerve functional classification were compared between the two groups before and after treatment. **Results** After treatment, the Static D1, Static D2, Smiling D1 and Pouting D2 in both groups were significantly lower than those of before treatment, with the parameters of the observation group noticeably lower than the control group. After treatment, the levels of IgA, IgG and IgM in both groups was greatly lower than those of before treatment, with the observation group sharply lower than the control group. After treatment, facial nerve functional classification of observation group showed significantly better results than the control group. **Conclusion** Acupuncture is effective in treating stroke patients with facial paralysis, and can significantly improve the level of immunoglobulin and facial nerve function.

Introduction

Stroke is a common acute cerebrovascular disease encountered in clinical practice, and its incidence is related to factors such as high blood pressure, diabetes, hyperlipidemia and lifestyle. The most common symptoms of stroke are hemiplegia, sudden fainting, unconsciousness, crooked mouth and eyes, and poor speech. The occurrence of stroke could results in

functional impairments such as cognition, sensory, and motor. Facial paralysis will be caused when the facial nerve of stroke patients is damaged, and severe facial paralysis physically and mentally affect the patient's appearance and eating, and their psychology [1]. Facial paralysis after stroke is mainly caused by invasion of wind pathogen, which results in meridian stasis, stagnant movement of Qi (vital energy) and

blood as well as the unnourishment of the channels and collaterals, thus, treatment should be focused on eliminating pathogens and dredging the collaterals, promoting blood and Qi circulation. In this aspect, acupuncture has the effect of dredging channels and vessels, regulating Qi and blood

[2]. Therefore, this study applied acupuncture therapy to treat stroke patients with facial paralysis, and aimed to analyze its effects on the immune globulin and facial nerve function of the patients. The results of the study were reported as follows.

Materials and methods

Clinical data

General information

Totally 67 patients with stroke and facial palsy diagnosed at our hospital's outpatient and ward consultations from September 2015 to December 2019 were selected and randomly divided into a control group (32 cases) and an observation group (35 cases). The observation group consisted of 19 males and 16 females, with an average age of (65.71±11.33) years old and course of disease of (62.34±12.29) days. The control group consisted of 17 males and 15 females, with an average age of (63.19±13.24) years old and course of disease of (65.11±10.70) days. There was no statistically significant difference between the two groups of patients in general information such as gender, age and disease course, and they were comparable ($P>0.05$).

Inclusion and exclusion criteria

Inclusion criteria: ①The diagnostic criteria of stroke were based on the Fourth National Cerebrovascular Disease Academic Conference in 1996; ②The diagnostic criteria of facial paralysis were based on the "Conventions of Diagnosis and Treatment of Traditional Chinese Medicine". Exclusion criteria: ①Patients with severe mental or cognitive dysfunction; ②Intracranial space-occupying lesions; ③Transient cerebral ischemia; ④Patients with neurological disorders; ⑤Patients with low treatment compliance.

Treatment methods

The control group was given conventional basic treatment, drugs for promoting blood circulation, removing blood stasis, and nourishing nerves, and training of the facial muscles surrounding the nose and mouth. The observation group was treated on the basis of the control group with acupuncture at the following acupoints: Shangjuxu, Sun, Qianzheng, Zusanli, Yifeng, Yingxiang, Fengchi, Jingming, Taichong, Chengjiang, Chuanzhu, Sibai, Xiache, and Renzhong, with needle retaining of 30 min after arrival of the needling sensation. The acupuncture was performed once a day, one day off every 6 days, for a continuous treatment of 1 month.

Observation indicators

①Static D1, Static D2, Smiling D1, Pouting D2 were evaluated. D1 is the distance from the corner of the patient's mouth to central seam of the teeth, and D2 is the distance from the lateral canthus to the corner of the mouth. Static D1, static D2, Smiling D1, and pouting D2 were respectively measured when the face is static, smiling, and pouting. ②Immunoglobulin: IgA, IgG, IgM. The venous blood of the patient was collected to separate the serum by centrifugation. The patient's serum immunoglobulin IgA, IgG, and IgM were detected by an automatic chemiluminescence immunoassay instrument. ③Facial nerve function classification: grade I (normal), grade II (mild dysfunction with mild facial muscle weakness), grade III (moderate dysfunction with obvious asymmetry in both eyes and mouth), grade IV (moderate to severe dysfunctions, with obvious muscle weakness and facial deformities), Grade V (severe dysfunction, with weak movements when closely observed with naked eyes), Grade VI (complete paralysis without movement).

Statistical analysis

Statistical analysis was performed using SPSS 20.0. The count data were compared by χ^2 test, rank data were compared by rank sum test, measurement data were expressed as mean±standard deviation ($\bar{x}\pm s$). The t test was used for comparison. A $p<0.05$ was

considered as a statistically significant difference.

Results

Comparison of related facial indicators before and after treatment

Before treatment, there was no significant difference in the measured values of Static D1, Static D2, Smiling D1, or Pouting D2 between the two groups of patients ($P>0.05$). After treatment, the four indicators of the two groups of patients were significantly lower than before treatment, with observation group showing sharply lower values than the control group ($P<0.05$), see Table 1.

Comparison of immunoglobulin levels between the

two groups before and after treatment

Before treatment, there was no significant difference in the levels of IgA, IgG, or IgM between the two groups ($P>0.05$). After treatment, the levels of IgA, IgG, and IgM in the two groups were sharply lower than before treatment, with the observation group showing significantly lower values than the control group ($P<0.05$), see Table 2.

Comparison of nerve function between the two groups after treatment

After treatment, the facial nerve function classification of the observation group was significantly better than that of the control group ($P<0.05$), see Table 3.

Table 1 Comparison of related facial indicators before and after treatment ($\bar{x}\pm s$)

Groups	Cases	Static D1		Static D2		Smiling D1		Pouting D2	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	35	4.35±0.92	1.52±0.33 ^a	5.72±1.12	2.19±0.44 ^a	6.71±1.32	3.01±0.66 ^a	4.25±0.80	1.33±0.27 ^a
Control group	32	4.23±0.85	2.31±0.49 ^a	5.89±1.25	4.17±0.92 ^a	6.88±1.87	4.56±0.89 ^a	4.07±1.03	2.82±0.55 ^a
<i>t</i>		0.553	-7.800	-0.587	-11.392	-0.433	-8.143	0.803	-13.112
<i>P</i>		0.582	0.000	0.559	0.000	0.667	0.000	0.425	0.000

Note: compared with before treatment, ^a $P<0.05$

Table 2 Comparison of immunoglobulin levels between the two groups before and after treatment ($\bar{x}\pm s$, g/L)

Groups	Cases	IgA		IgG		IgM	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	35	5.41±1.03	2.94±0.56 ^a	16.52±3.71	10.61±2.13 ^a	5.24±1.05	2.13±0.41 ^a
Control group	32	5.53±1.16	3.88±0.83 ^a	17.19±3.02	14.09±2.88 ^a	5.11±0.97	3.05±0.69 ^a
<i>t</i>		-0.449	-5.476	-0.806	-5.656	-0.525	-6.702
<i>P</i>		0.655	0.000	0.423	0.000	0.601	0.000

Note: compared with before treatment, ^a $P<0.05$

Table 3 Comparison of nerve function between the two groups after treatment [n(%)]

Groups	Cases	Grade I	Grade II	Grade III	Grade IV
Observation group	35	25 (71.43)	8 (22.86)	2 (5.71)	0 (0.00)
Control group	32	13 (40.63)	15 (46.88)	3 (9.38)	1 (3.13)
Z				-2.485	
P				0.013	

Discussion

In recent years, the incidence and disability rate of stroke have increased considerably [3]. Stroke can leave different degrees of neurological damage. Facial paralysis is a central movement disorder caused by abnormal facial nerves. At present, studies have suggested that the onset of facial paralysis is related to local neurotrophic vasospasm, ischemic neuropathy and immune response [4-5]. Western medicine treatment of stroke and facial paralysis mainly focuses on nourishing nerves, improving circulation and rehabilitation training. While traditional Chinese medicine treatment focuses on removing wind pathogens, clearing collaterals, promoting blood circulation and Qi. Acupuncture therapy, which has the function of clearing meridians and regulating Qi and blood, is commonly used in the treatment of stroke and facial paralysis. This study applied acupuncture to treat patients with stroke and facial palsy, aiming to explore the effect of acupuncture on immunoglobulin and facial nerve function in patients with stroke and facial paralysis.

Acupuncture has a history of more than 2500 years in the treatment of diseases. The needle is inserted into the patient at a certain angle, and acupuncture techniques such as twisting and lifting are used to stimulate specific body acupoints, so as to achieve the purpose of alleviating disease symptoms [6-8]. In this study, Juxu and Zusanli acupoints have the effect of strengthening the spleen and stomach; acupuncture at the temple and Yifeng points has the effect of replenishing qi and yang; acupuncture at Yingxiang, Jingming, Taichong and Sibai acupoints can dispel pathogens, dredge collaterals, promote qi and blood flow. Acupuncture at all these points together can realize the effect of unblocking qi and smoothing blood flow, and regulating meridians. By stimulating these acupoints using acupuncture will promote blood

circulation, dilate blood vessels, and increase blood flow to the face, thereby enhancing the absorption of facial nerve edema, improving nutrient metabolism, and promoting damage repair and functional recovery. The results of this study showed that the measured values of Static D1, Static D2, Smiling D1, and pouting D2 of the two groups after treatment were significantly lower than those before treatment, with the above values significantly lower in the observation group than the control group, indicating that acupuncture treatment can significantly improve stroke and facial paralysis of the patients. This may be because acupuncture stimulation promotes the recovery of nerve function that innervates muscle contraction, and thus can better control facial muscle activity [9].

After stroke, the body will appear immune abnormalities, and the levels of immunoglobulins IgA, IgG, and IgM in the patient's body will increase abnormally, which stimulates the inflammatory response of the facial nerve, and in turn aggravates the patient's facial paralysis. The results of this study showed that the levels of IgA, IgG, and IgM in the two groups after treatment were significantly lower than before treatment, with the parameters in the observation group significantly lower than the control group. This indicated that acupuncture therapy can effectively reduce the levels of immunoglobulin IgA, IgG, and IgM, improve the immune function of the patient's body, reduce the inflammatory response of the facial nerve, thereby alleviating the symptoms of facial paralysis.

The facial nerve is the seventh pair of cranial nerves mainly functioning to manage facial expression muscle movement, tongue taste and gland secretion [10]. Facial nerve function damage is an important cause of stroke and facial paralysis. In this study, acupuncture was used to treat patients with stroke and

facial paralysis. The results showed that the facial nerve function classification of the observation group was significantly better than that of the control group, demonstrating that acupuncture can effectively promote facial nerve function, enhance facial muscle strength and muscle fiber movement, and thereby improving facial paralysis symptoms.

To sum up, acupuncture therapy has shown a strong clinical effect on treating stroke and facial paralysis, and can significantly reduce the patient's immunoglobulin level and improve facial nerve function.

Declaration of conflict-of-interest

The authors declare no conflict-of-interest.

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