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Special Topic Study

Effect of long-time needle retaining at Baihui (GV 20) on cognitive impairment in post-stroke patients

百会穴长留针对中风病患者认知障碍的影响

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Abstract
Objective: To observe the clinical efficacy of long-time needle retaining at Baihui (GV 20) in treating post-stroke cognitive impairment.
Methods: A total of 60 eligible patients with post-stroke cognitive impairment were randomized into a treatment group and a control group by random digital table, 30 cases in each group. The control group was intervened by basic treatment including routine therapy in Neurology department and Western medicine rehabilitation therapy, while the treatment group was intervened by same treatment in the control group combined with long-time needle retaining at Baihui (GV 20). Mental state of patients was evaluated by National Institute of Health stroke scale (NIHSS) and mini-mental state examination (MMSE) after 4 weeks of treatment.
Results: After 4-week treatment, the NIHSS score dropped in both groups, and intra-group comparisons showed statistical significances (both $P<0.05$), and the score in the treatment group was statistically lower than that in the control group ($P<0.01$); the MMSE score in the treatment group was significantly higher than that in the control group, there was a statistical inter-group difference ($P<0.01$); the total effective rate was 93.3%, and the marked effective rate was 50.0% in the treatment group, versus 76.7% and 20.0% in the control group, there were significant differences in the total effective rate and the marked effective rate between the two groups (all $P<0.05$).
Conclusion: Long-time needle retaining at Baihui (GV 20) can produce a safe valid therapeutic efficacy in treating post-stroke cognitive impairment.
Keywords: Acupuncture Therapy; Point, Baihui (GV 20); Needle Retaining; Cerebral Infarction; Poststroke Syndrome; Cognitive Dysfunction

【摘要】目的：观察针刺百会穴长留针治疗中风后认知障碍的疗效。**方法：**将符合纳入标准的60例中风后认知障碍患者按随机数字表随机分为治疗组和对照组，每组30例。对照组采用基础治疗，包括神经内科常规治疗及西医康复治疗；治疗组在接受与对照组相同的基础治疗的同时加用针刺百会穴长留针。治疗4星期后观察疗效，并采用美国国立卫生研究院卒中量表(NIHSS)及简易精神状态检查量表(MMSE)评定患者精神状态。**结果：**治疗4星期后，两组NIHSS评分均较同组治疗前降低，组内差异均具有统计学意义(均$P<0.05$)，且治疗组评分低于对照组，组间差异具有统计学意义($P<0.01$)；治疗组MMSE评分高于对照组，组间差异具有统计学意义($P<0.01$)；治疗组总有效率为93.3%，显效率为50.0%，对照组分别为76.7%和20.0%，组间差异均有统计学意义(均$P<0.05$)。**结论：**针刺百会穴长留针治疗中风后认知功能障碍安全有效。

【关键词】针刺疗法;穴，百会；留针；脑梗死；中风后遗症；认知障碍
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Post-stroke cognitive impairment is a set of symptoms ranging from mild cognitive impairment to dementia caused by acute cerebrovascular accident including cerebral infarction and hemorrhage or cerebral vascular risk factors including high blood pressure, diabetes and hyperlipemia[1]. In 2008, cerebrovascular disease was the first cause of death, accounting for 22.45% of the total and the third cause of death in urban area according to the third death investigation in China[2]. In local area like Guangzhou, cerebral vascular disease was the fourth cause of death according to an investigation of cause of death and loss of life span between 2003 and 2006[3]. Cognitive impairment is a category of mental health disorders that primarily affect memory, calculation, attention, perception, consciousness and executive function, and is a common symptom after stroke[4]. Modern medicine have proven that vascular impairment in cerebral cortex,

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thalamus, hippocampal and basal ganglia region of the brain will lead to cognitive impairment[5]. A systematic review showed that the average incidence of post-stroke cognitive impairment is 55.9%, and 56.6% of development of cognitive impairment, but current therapy has limited effect on it. Therefore, diagnosis, crucially intervention and treatment in early stage are important. We used long-time needle retaining at Baihui (GV 20) to treat post-stroke cognitive impairment, and the results are reported as follows.

1 Clinical Materials

1.1 Diagnostic criteria

Referring to the *Diagnosis Criteria for Stroke* by Acute Encephalopathy Cooperative Group, State Administration of Traditional Chinese Medicine[7], and finding of CT/MRI scan is in accordance with diagnosis of cerebral infarction.

1.2 Inclusion criteria

Conforming to the above diagnostic criteria of stroke; disease duration between 5 d and 30 d; age between 40 and 80 years old; National Institute of Health stroke scale (NIHSS) score ranging from 4 points to 24 points[8]; mini-mental state examination (MMSE) score ＜24 points (24 is the division value internationally, while the division value varies in different educational status domestically. Specifically, illiteracy ≤ 17 points; elementary school ≤20 points, middle school or above ≤ 24 points)[9], and educational status should be elementary school or above; signed the informed consent by themselves or relatives.

1.3 Exclusion criteria

Those who failed to follow the acupuncture and rehabilitation treatment; with primary fatal diseases of liver, kidney, heart or other organs; with mental diseases, alcohol addicts or alcoholism, drug abuse; with transient ischemic attack; cerebral hemorrhage or subarachnoid hemorrhage; during pregnancy or lactation.

1.4 Statistical methods

All data were processed by the SPSS 17.0 version software. The enumeration data were analyzed by Chi-square test; measurement data were described by mean ± standard deviation ($\bar{x} \pm s$), independent *t*-test was used for inter-group comparison, and paired-sample *t*-test was used for intra-group comparison. A *P* value less than 0.05 indicated a statistical significance.

1.5 General data

A total of 60 patients with post-stroke cognitive impairment were included from the Acupuncture and Tuina Department of the Jiaxing Hospital of Traditional Chinese Medicine Affiliated to Zhejiang Chinese Medical University between May 2016 and February 2017. The patients were divided into a treatment group and a control group by a random number table according to visiting sequence, 30 cases in each group. There were no significant differences in comparing gender, age, disease duration, or educational status between the two groups (all $P>0.05$), indicating the comparability (Table 1).

Table 1. Comparison of general data

Group	*n*	Gender (case)		Mean age ($\bar{x} \pm s$, year)	Mean duration ($\bar{x} \pm s$, day)	Education status (case)	
		Male	Female			Below middle school	Middle school or above
Treatment	30	17	13	66.9±7.6	15.5±6.4	18	12
Control	30	16	14	68.8±8.1	13.9±6.1	14	16

2 Treatment Methods

2.1 Treatment group

2.1.1 Basic treatment

Routine treatment in the Neurology Department: anti-platelet aggregation, nourishing brain cells, improving cerebral blood flow; controlling blood pressure, blood glucose, blood lipid for underlying diseases; anti- depression or anti-anxiety, anti-dementia treatment for post-stroke emotional disorder.

Rehabilitation treatment: provide rehabilitation assessment for patients and formulate personal rehabilitation scheme. A rehabilitation scheme includes occupational therapy (OT), physical therapy (PT) and speech therapy (ST); strengthen cognitive exercise including training of attention, visuospatial ability, memory, executive function, problem solving, calculating and orientation.

2.1.2 Acupuncture treatment

Acupoint: Baihui (GV 20)

Methods: Acupuncture treatment was offered when vital signs of patients were stable. The patient took a sitting position in which practitioner sit face to face with patient. After routine sterilization, a disposable filiform needle of 0.25 mm in diameter and 40 mm in length were quickly inserted into Baihui (GV 20) along the Governor Vessel (the needle tip forward) with a 30° angle with scalp. On reaching the lower level of galea, adjusted the needle to the parallel position with scalp and inserted for 35 mm. After qi arrival, cut the needle

handle from 5 mm of the needle root (5 mm of needle handle was left outside scalp), and the needle was retained for 24 h. After withdrawing needle, pressed the hole with a dry cotton ball in case of bleeding.

Course: The treatment was given every other day, 3 times a week; NIHSS and MMSE were evaluated after 4 weeks of treatment.

2.2 Control group

Patients in the control group only received the same basic treatment as those in the treatment group.

3 Therapeutic Observation

3.1 Observation items

3.1.1 NIHSS score

NIHSS was used for evaluating the nerve impairment degree, the score ranged from 0 to 42 points, a higher score indicated a more serious impairment condition.

3.1.2 MMSE score[10]

MMSE was used for evaluating cognitive functions in patient, the total score was 30 points, 27-30 was normal, and a lower score indicated a more serious impairment condition.

3.2 Criteria of therapeutic efficacy[11]

The improvement rate of symptom score was used for therapeutic effect evaluation. Improvement rate of symptom score = (Post-treatment MMSE score − Pre-treatment MMSE score)÷Pre-treatment MMSE score×100%.

Marked effect: Improvement rate of symptom score ≥20%.

Effective: Improvement rate of symptom score ≥12% , but <20%.

Invalid: Improvement rate of symptom score <12%.

3.3 Results

3.3.1 Comparison of NIHSS and MMSE scores

Before intervention, there were no significant differences in comparing the NIHSS and MMSE score between the two groups (both $P > 0.05$). After treatment, NIHSS and MMSE scores were all changed significantly in both groups (all $P<0.05$), the inter-group comparisons of NIHSS and MMSE scores showed statistically significant (both $P<0.01$), (Table 2).

3.3.2 Comparison of therapeutic efficacy

The total effective rate was 93.3%, and the marked effective rate was 50.0% in the treatment group, while the total effective rate was 76.7%, and the marked effective rate was 20.0% in the control group. There were significant differences in comparing the total effective rate and the marked effective rate between the two groups (both $P<0.05$), (Table 3).

Table 2. Comparison of NIHSS and MMSE score ($\bar{x}\pm s$, point)

Group	*n*	NIHSS		MMSE	
		Before treatment	After treatment	Before treatment	After treatment
Treatment	30	13.77±2.10	9.47±1.63[1)2)]	13.43±2.46	20.70±2.61[1)2)]
Control	30	14.93±3.03	11.63±2.43[1)]	12.87±2.34	16.67±2.04[1)]

Note: Intra-group comparison, 1) $P<0.05$; inter-group comparison, 2) $P<0.01$

Table 3. Comparison of clinical efficacy (case)

Group	*n*	Marked effect	Effective	Invalid	Marked effective rate (%)	Total effective rate (%)
Treatment	30	15	13	2	50.0[1)]	93.3[1)]
Control	30	6	17	7	20.0	76.7

Note: Inter-group comparison, 1) $P<0.05$

4 Discussion

Cognitive impairment falls under the category of 'dementia', 'forgetfulness' or 'poor memory' in Chinese medicine. In terms of pathogenesis, Chinese medicine maintains it is associated with malnourishment of the brain marrow due to kidney essence insufficiency, coupled with internal retention of blood stasis[12]. Located in the brain[13], its root cause is kidney deficiency; however, it manifests as turbid phlegm and blood stasis. In Chinese medicine, stroke is closely linked to cognitive impairment, whose underlying cause is brain marrow insufficiency. Since the kidney stores essence, fills up the marrow and nourishes the brain, kidney qi abundance guarantees sharp mental activities. Brain is an organ that serves as the center of vital activities and governs mental consciousness. Normal functioning of the brain depends on normal transformation between yin essence and yang qi[14]. Consequently, the treatment strategies are to supplement kidney essence, fill up marrow, refresh the mind and benefit the intelligence.

The history of treating stoke with scalp acupuncture can be dated back to thousands of years ago. According to meridian and collateral theory, scalp area is abundant in meridian channels, and scalp acupuncture can concurrently stimulate meridian, and activate the projection areas of cerebral cortex to tonify yang, open orifice and regulate spirit. Cognitive impairment is linked with the Governor Vessel. Therefore, the selected points are mainly located in the pathway of the Governor Vessel[15]. Baihui (GV 20) is the crossing point of Governor Vessel, Hand and Foot Taiyang Meridians and the Liver Meridian. This point governs all meridians and is named as the ancestral vessels and converging yang point. Stimulating this point can adjust qi and blood, vitalize yang and dredge meridians, supplement brain marrow and refresh spirit[16-17]. Research has shown that acupuncture at Baihui (GV 20) can accelerate blood circulation of posterior cerebral artery, decrease vascular resistance, improve free radical damage, plasma viscosity, serum nitric oxide and vascular endothelial cell, and hence improve blood supply in brain tissue to accelerate blood flow, and enhance the therapeutic efficacy[18].

Long-time needle retaining method literally means retaining the needle for a longer course, which can be stretched to 6-24 h. Such method can stimulate acupoint for a longer duration of time to await qi and transmit qi to the disease location, and also reinforce the healthy qi and eliminate the pathogenic factors, dredge channels to accelerate local blood circulation and increase sensitivity of nervous impulse which is conductive to meridian qi stimulation and reach the proper stimulation amount to increase therapeutic efficacy[19-22]. Chu JM, *et al*[23] observed the therapeutic effect of long-time needle retaining method on vascular dementia patients and its effect on somatostatin (SS) and arginine vasopressin (AVP) level, and found that such method can lift SS and AVP levels, increase oxygen content in brain tissue, improve cerebral circulation, promote secretion and metabolism of neurotransmitter in brain and thus facilitate rehabilitation of memory, etc.

Compared with routine Western medicine treatment alone, adding long-time needle retaining at Baihui (GV 20) on the basis of the conventional method has a better clinical effect for post-stroke cognitive impairment, and can alleviate progression of disease to a certain degree. Such method can relieve pain and improve patients' quality of life (QOL). It can also lighten burdens of family and society, thus worth popularization.

Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

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Statement of Informed Consent

Informed consent was obtained from all individual participants or their relatives included in this study.

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