Clinical Study

Efficacy evaluation on electroacupuncture for Alzheimer's disease

电针治疗阿尔茨海默病的临床疗效评定

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Abstract

Objective: To observe the clinical efficacy of electroacupuncture (EA) on Alzheimer's disease (AD).

Methods: A total of 50 AD patients were randomly allocated into a Western medication (WM) group (*n*=25) and an acupuncture plus medication (APM) group (*n*=25). Patients in the WM group took oral huperzine A capsules. In addition to huperzine A capsules, patients in the APM group also received EA at Shenting (GV 24), Baihui (GV 20), Dazhui (GV 14), Fengfu (GV 16), Mingmen (GV 4) and Yongquan (KI 1). The needles on the above points were connected to G6805-II electric stimulator [3 pairs: Shenting (GV 24) and Baihui (GV 20); Dazhui (GV 14) and Fengfu (GV 16); and bilateral Yongquan (KI 1)]. The needles were retained 25 min. The treatment was done once a day, and 10 times made up a course of treatment. The patients received a total of 3 treatment courses. There was a 3-day interval between two courses. The mini-mental state examination (MMSE) and Hasegawa dementia scale revised (HDS-R) were conducted before and after treatment. The clinical efficacies were evaluated when the treatment was completed.

Results: Before treatment, there were no between-group statistical differences in MMSE and HDS-R scores (both P>0.05). After treatment, the MMSE and HDS-R scores in the APM group were significantly higher than those in the WM group (both P<0.05). The total effective rate in the APM group was 88.0%, versus 76.0% in the WM group, showing a statistical difference (P<0.05).

Conclusion: EA is effective for AD and can improve clinical symptoms in AD patients.

Keywords: Acupuncture Therapy; Electroacupuncture; Acupuncture Medication Combined; Alzheimer Disease; Dementia; Rehabilitation; Mental Status Schedule

【摘要】目的:观察电针治疗阿尔茨海默病(AD)的临床疗效,探讨其临床应用价值。方法:将50例 AD 患者采用随机数字表分为2组,每组25例。西药组口服石杉碱甲胶囊;针药组在口服石杉碱甲胶囊基础上加用电针治疗,穴位选神庭、百会、大椎、风府、命门和涌泉,针刺得气后接 G6805-II 型电针治疗仪(神庭与百会为一组,大椎和风府为一组,双侧涌泉为一组)。刺激量以患者能够耐受为度。每次留针25 min,每日1次,连续10次为1疗程,两个疗程间休息3d,共治疗3个疗程。治疗前后进行简易精神状态检查量表(MMSE)和修订后的长谷川智能量表(HDS-R) 评分,并于治疗结束后进行临床疗效评价。结果:治疗前两组 MMSE 及 HDS-R 评分均无统计学差异(均 P>0.05)。治疗后针药组 MMSE 和 HDS-R 评分均明显高于西药组(均 P<0.05)。治疗后针药组总有效率为88.0%,西药组为76.0%,针药组的临床疗效优于西药组(P<00.05)。结论:电针是治疗 AD 的有效方法,能有效改善 AD 患者的临床症状,提高疗效。

【关键词】针刺疗法; 电针; 针药并用; 阿尔茨海默病; 痴呆; 康复; 精神状态检查表 【中图分类号】R246.6 【文献标志码】A

Alzheimer's disease (AD) is a chronic neurodegenerative disease^[1]. In Chinese medicine, it falls under the category of 'dementia' or 'forgetfulness'. The three major pathologic features of AD are loss of neuronal connections, amyloid plaques^[2], and neurofibrillary tangles^[3]. AD patients mainly present with failure of memory, disturbances in other cognitive functions and behavioural changes. AD severely affects the patients' daily living and threatens their life and health. This condition affects more than 20% of those aged over 80 years^[4]. The pathological process underlying Alzheimer's disease may take as long as decades. There are no specific measures for persistent, progressive mental decline once clinical symptoms are presented^[5]. Western medication helps to stabilize the

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condition but does not have a long-term effect. Acupuncture has a good effect for AD and does not cause side effects^[6]. We observed and analyzed 50 AD cases between January 2015 and February 2016 using the mini-mental state examination (MMSE) and Hasegawa dementia scale revised (HDS-R). The results are now summarized as follows.

1 Clinical Materials

1.1 Diagnostic criteria

The diagnostic criteria were based on the diagnosis for AD in the *Diagnostic and Statistical Manual of Mental Disorders: Revised Fourth Edition* (DSM-IV-R)^[7] issued by American Psychiatric Association (APA) or the diagnosis for dementia by the National Institute of Neurological Disorders and Stroke-association/ Internationale pour la Recherche et l'Enseignement en Neurosciences (NINDS-AIREN)^[8].

1.2 Inclusion criteria

Those who met the above diagnostic criteria; aged between 60 and 80 years; MMSE scores: illiterate ≤ 17 , primary education ≤ 20 , middle school education ≤ 22 , college education ≤ 23 ; HDS-R score <21; and the patients or their relatives signed the informed consent.

1.3 Exclusion criteria

Those who did not meet the diagnostic criteria; having severe neurologic deficits such as aphasia or agnosia; having complications of severe, primary diseases involving the cardio-cerebrovascular, hepatic, renal and hemopoietic systems; having mental disorders; having critical conditions that are hard to evaluate therapeutic safety and efficacy; having a hereditary disease.

1.4 Statistical management

The SPSS 19.0 version software was used for statistical analysis. The measurement data were expressed in the form of mean \pm standard deviation ($\overline{x} \pm s$). The *t*-test was used for intra-group comparison before and after treatment. The independent sample *t*-test was used for inter-group comparison. The Chi-square test was used for enumeration data. A *P* value of less than 0.05 indicated a statistical significance.

1.5 Source of the cases

The 50 cases who met the inclusion criteria between January 2015 and February 2016 were randomly assigned to a Western medication (WM) group (n=25) and an acupuncture plus medication (APM) group (n=25). The age range was 60-78 years and the duration was 3-12 years in the WM group, versus 61-77 years (age range) and 4-13 years (duration) in the APM group. There were no between-group statistical differences in gender, age, and duration, indicating that the two groups were comparable (Table 1).

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C		Gender (case)		Mean age	Mean duration	
Group	n	Male	Female	$(\overline{X} \pm s, year)$	$(\overline{X} \pm s, year)$	
WM	25	12	13	69.5±5.3	7.6±1.7	
APM	25	12	13	69.4±5.4	7.5±1.8	

2 Treatment Methods

Patients in both groups received the same standard neurology treatment for blood pressure, blood fat and water/electrolyte stability.

2.1 APM group

2.1.1 Western medication

In addition to the standard neurology treatment, patients took 0.2 mg huperzine A capsules (HYZZ: No.H20030621, manufactured by Shanghai Fudan Fuhua Pharmaceutical Co., Ltd., China) for each dose, 1 dose a day, for a total of 1 month.

2.1.2 EA treatment

Points: Shenting (GV 24), Baihui (GV 20), Dazhui (GV 14), Fengfu (GV 16), Mingmen (GV 4) and Yongquan (KI 1).

Method: The patient took a sitting position. After sterilization of the local area using 75% medical alcohol, disposable filiform needles of 0.25 mm in diameter and 25-40 mm in length (Hwato Brand, Suzhou Medical Appliance Co., Ltd., China) were used to puncture 0.5 cun obliquely into Shenting (GV 24), Baihui (GV 20), Dazhui (GV 14) and Fengfu (GV 16) along the pathway of the Governor Vessel. Yongguan (KI 1) was punctured 0.5-0.8 cun perpendicularly. Even reinforcing- reducing manipulations were used upon arrival of qi, followed by а connection to G6805-II electric stimulator (manufactured by Qingdao Xinsheng Industrial Co., Ltd.) [3 pairs: Shenting (GV 24) and Baihui (GV 20); Dazhui (GV 14) and Fengfu (GV 16); and bilateral Yongquan (KI 1)], using a continuous wave, a frequency of 50 Hz and a voltage of 2-4 V. The needles were retained for 25 min. The treatment was done once a day and 10 times made up a course of treatment. There was a 3-day interval between two courses. The patients were treated for 3 courses.

3 Outcomes Observation

3.1 Observation items

The patients were evaluated using $\rm MMSE^{[9]}$ and $\rm HDS-R^{[10]}$ scores before and after treatment.

3.1.1 MMSE score

The MMSE was used to evaluate the overall intelligent changes before and after treatment. It includes 30 items, examining the patients' orientation, recall, calculation, and language abilities. The maximum score is 30. A score of 27-30 is interpreted as normal;

and a score of < 27 is interpreted as cognitive impairment.

3.1.2 HDS-R score

The HDS-R was used to evaluate the overall cognitive functions before and after treatment. It includes 10 items, examining the patients' orientation, memory, activities of daily living, calculation, and cognition. The maximum score is 30. A score of <21 is interpreted as dementia.

3.2 Efficacy criteria

This was based on the *Efficacy Evaluation Criteria for Senile Dementia*^[11] issued by Geriatrics Society, China Association of Traditional Chinese Medicine.

Marked efficacy: Absence of clinical signs and symptoms, a clear mind, accurate orientation, correct answers to questions and self-care ability.

Improvement: Significant alleviation of clinical signs and symptoms, simple answers to questions, conscious disturbance and basic self-care ability. Failure: No changes in clinical signs and symptoms, failure to answer questions, and inability for self-care.

3.3 Results

3.3.1 Between-group comparisons of MMSE and HDS-R scores before and after treatment

Before treatment, there were no between-group statistical differences in MMSE and HDS-R scores (both P > 0.05). After treatment, the MMSE and HDS-R scores were significantly increased in both groups (both P < 0.05); and the improvements in the APM group were significantly better than those in the WM group (both P < 0.05), indicating that patients in the APM group obtained more significant improvement in intelligence and cognition (Table 2).

3.3.2 Between-group comparison of clinical efficacy

The total effective rate was 88.0% in the APM group, versus 76.0% in the WM group, showing a statistical difference (P<0.05), (Table 3).

Table 2.	Between-group co	mparisons in M	IMSE and HDS-R	scores before and a	fter treatment (\overline{x} ±s, point)
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Group		MMSE	HDS-R		
	n —	Before treatment	After treatment	Before treatment	After treatment
WM	25	16.71±5.23	18.91±4.72 ¹⁾	18.88±6.32	20.27±6.35 ¹⁾
APM	25	15.93±6.17	21.66±6.67 ¹⁾²⁾	17.99±6.21	$23.51 \pm 7.02^{1)2)}$

Note: Intra-group comparison before and after treatment, 1) P<0.05; compared with the WM group, 2) P<0.05

Table 3. Between-group comparison in clinical efficacy (case)

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Group	п	Marked efficacy	Improvement	Failure	Total effective rate (%)
WM	25	4	15	6	76.0
APM	25	6	16	3	88.0 ¹⁾

Note: Compared with the WM group, 1) P<0.05

4 Discussion

The underlying pathogenesis of AD is unknown yet. It's generally believed to be associated with neurofibrillary tangles in hippocampal area and neuronal apoptosis^[12]. In Chinese medicine, AD is located in the brain but closely associated with functions of the five Zang organs^[13]. Its major pathogenic features are deficiency and stasis. The 'deficiency' here mainly refers to kidney yang deficiency, which causes malnourishment of the brain. The 'stasis' here refers to obstructed flow of gi and blood in meridians, especially the Governor Vessel, which in turn causes malnourishment of the brain marrow. As a result, the pathomechanism of AD is summarized as kidney deficiency, marrow insufficiency and obstructed meridians^[14]. Our treatment strategies were to tonify the kidney, unblock the Governor Vessel, refresh the mind and benefit the intelligence using points of the Governor Vessel. Baihui (GV 20) is a crossing point with the Bladder, Triple Energizer, Gallbladder and Liver • 298 • © Shanghai Research Institute of Acupuncture and Meridian 2017

Meridians. Shenting (GV 24) is a crossing point with the Bladder and Stomach Meridians. The two points are essential for mental problems. Dazhui (GV 14) is a crossing point with three yang meridians of both hand and feet. It strengthens the body, just like Mingmen (GV 4). Fengfu (GV 16) is a crossing point with the Bladder Meridian and Yang Link Vessel. It is a key point to remove wind and refresh the mind. Yongquan (KI 1) is the Yuan-Primary point of the Kidney Meridian. It tonifies kidney yang and benefits intelligence^[15]. Needling Baihui (GV 20) and Yongquan (KI 1) can unblock meridians, benefit the kidney, open the orifices and increase the patients' intelligence and nervous functions, alleviate symptoms and improve the clinical efficacy^[16]. In addition, needling these two points can improve the blood supply to the brain and interfere with the neuronal hippocampus apoptosis, mitochondrial enzyme activity and cerebral amyloid protein expression^[17].

Huperzine A is a naturally occurring sesquiterpene alkaloid compound found in the firmoss huperzia

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serrata. It is a reversible acetylcholinesterase inhibitor. Because of its high liposolubility and small molecular size, huperzine A crosses the blood-brain barrier, reaches the central nervous system (CNS) and spreads extensively to the frontal lobe and hippocampus^[18]. It effectively increase the concentration of can acetylcholine between synapses, supplement acetylcholine neurotransmitters and help to improve the patients' cognition. However, it needs to be taken for a long period of time and causes side effects. In this study, our results have shown that the MMSE and HDS-R scores in the APM group were significantly better than those in the WM group ($P \le 0.05$). This indicates that it's advisable to use acupuncture plus medication to alleviate clinical symptoms and improve efficacy^[19]. The results suggested that acupuncture plus medication obtained better efficacy for AD than medication alone, which was consistent with the previous literature report^[20]. However, the future study requires larger samples and should focus on laboratory findings.

Conflict of Interest

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 included in this study.

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