Special Topic Study

# Therapeutic observation on electroacupuncture at Zusanli (ST 36) and Fenglong (ST 40) for senile dementia

# 电针足三里和丰隆穴治疗老年性痴呆的疗效观察

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# Abstract

**Objective:** To explore the clinical effects of electroacupuncture (EA) at Zusanli (ST 36) and Fenglong (ST 40) in treating senile dementia.

**Methods:** A total of 74 patients were randomly divided into an EA group and a medication group based upon the random digital table, 37 cases in each group. EA at Zusanli (ST 36) and Fenglong (ST 40) was given in the EA group, once every day, for six treatments per week. Donepezil Hydrochloride Tablets were given to the medication group, 5 mg per time and once a day in the former four weeks, 10 mg per time and once a day after 4 weeks, oral administration before sleep at night. The courses of the treatment were 12 weeks in both groups. The scores of mini-mental state examination (MMSE) and Barthel index (BI) were observed before and after the treatment, for processing the comparative analysis of the clinical effects after the course of the treatment.

**Results:** The total effective rate was 86.5% in the EA group and 70.3% in the medication group. The therapeutic effect was better in the EA group than that in the medication group, and the difference between the two groups was statistically significant (P < 0.05). MMSE and BI scores after the treatment in the two groups were all elevated than those of the same groups before the treatment (P < 0.05, P < 0.01). The improving situation was obviously better in the EA group than that in the medication group, and the difference between the two groups was statistically significant (P < 0.05).

**Conclusion:** EA at Zusanli (ST 36) and Fenglong (ST 40) is affirmative in the therapeutic effect for senile dementia and can also improve the cognitive function and enhance the patients' quality of life .

Keywords: Acupuncture Therapy; Electroacupuncture; Point, Zusanli (ST 36); Point, Fenglong (ST 40); Alzheimer Disease

【摘要】目的: 探讨电针足三里和丰隆穴治疗老年性痴呆的临床疗效。方法: 将74 例患者按随机数字表法分为 电针组和西药组, 每组37 例。电针组予电针足三里、丰隆穴治疗, 每日1次, 每星期治疗6次; 西药组予盐酸多 奈哌齐片, 前4个星期5 mg/次,1次/d;4 星期后,10 mg/次,1次/d,均为睡前口服。两组疗程均为12 星期。观察 治疗前后的简易智能状态量表(MMSE)评分和 Barthel 指数(BI)评分, 疗程结束后对临床疗效进行对比分析。结果: 电针组的总有效率为 86.5%, 西药组的总有效率为 70.3%, 电针组疗效优于西药组, 组间差异有统计学意义 (P<0.05)。治疗后两组的 MMSE 评分和 BI 评分均较本组治疗前升高(P<0.05, P<0.01);电针组改善情况明显优于 西药组, 组间差异有统计学意义(P<0.05)。结论: 电针足三里、丰隆穴治疗老年性痴呆疗效确切, 并能改善患者 的认知功能, 提高患者的生活能力。

【关键词】针刺疗法; 电针; 穴, 足三里; 穴, 丰隆; 阿尔茨海默病 【中图分类号】R246.6 【文献标志码】A

Senile dementia, i.e Alzheimer disease (AD), is a latent and degenerative disease in the neurological system and clinically characterized by memory disturbance, cognitive disturbance and personality changes<sup>[1]</sup>. Because the pathogenesis of this disease

is still not definite, currently the therapeutic methods and medications of precise therapeutic effects have not been revealed yet. No satisfactory therapeutic effects could be achieved in various therapy modalities. It has been proven by the clinical and experimental studies that electroacupuncture (EA) could produce better therapeutic effect for senile dementia, but the points were mainly selected from the head<sup>[2-6]</sup>. In order to seek a safe and reliable therapy modality with precise

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therapeutic effects and develop a new therapeutic thought. According to traditional Chinese medicine (TCM) theory that 'phlegm results from stomach deficiency' and 'there is no magic method for dementia except resolving phlegm', we treated 37 AD cases by EA at Zusanli (ST 36) and Fenglong (ST 40), from March 2014 to March 2015, and compared with a control group treated by Donepezil Hydrochloride Tablets. Now, the report is given as follows.

# 1 Clinical Data

#### 1.1 Diagnostic criteria

The diagnostic criteria of Western medicine were stipulated by referring to the fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM) of American Psychiatric Association<sup>[7]</sup>. The objective evidences indicate the short-term and long-term memory impairment, including one of the following four items at least: damage in abstract thinking, damage in judgment, and disturbance in the advanced functions of other cortexes (such as aphasia, apraxia, agnosia and 'structural difficulties'), and personality changes. The above two items of disturbance obviously interfere with the professional and daily social activities or interpersonal relationship. Not only happening in the process of delirium, one of the following two items exists: the evidences found from the history, somatic check or experimental inspection could indicate that the etiological relevance exists between one or some specific organic factors and the present disturbance. Without the above evidences, the symptoms could not be explained by any non-organic mental disorders. In latent onset, the pathological situation is in chronic and progressive development, mainly manifested by mental retardation, short-term memory disturbance in particular, with the symptoms in small fluctuation and persistent existence. The radiographic inspection would show diffuse cortical atrophy of the brain, and expansion of the cerebral ventricles and sulci.

#### 1.2 Inclusion criteria

In conformity with the above diagnostic criteria of Western medicine; the age ranged from 65 to 80 years old, all genders; in mild or moderate pathological situation; informed consent.

# 1.3 Exclusion criteria

The dementia patients caused by other reasons, such as intracranial tumor, infection, severe Parkinson's disease; the patients with allergic constitution or allergic to medication used in this study; AD patients at the final stage; the patients with severe symptoms of nerve defect; the patients complicated with serious primary diseases in the cardiac, hepatic or hematopoietic system, or with mental disorders; the patients in critical condition.

### 1.4 Statistical management

The SPSS 18.0 version statistical software was used for statistical analysis. The counting data were processed by Chi-square test. In normal distribution and homogeneity of variance, the measurement data were expressed by mean ± standard deviation ( $\overline{x} \pm s$ ) and analyzed by *t*-test. While not in the normal distribution and homogeneity of variance, the rank-sum test was adopted. The grading data were processed by the rank-sum test. P < 0.05 was used to express the statistical significance in the difference.

#### 1.5 General data

Totally, 74 cases were recruited from the inpatients and outpatients of Acupuncture and Rehabilitation Department of Changsha Hospital of Traditional Chinese Medicine, and were divided into two groups by random digital table. In the EA group, there were 37 cases, with the age ranging from 67 to 79 years old and duration 1-7 years, including 27 cases in mild condition and 10 cases in moderate condition<sup>[8]</sup>. In the medication group, there were 37 cases, with the age ranging from 68 to 80 years old and duration 1-8 years, including 25 cases in mild condition and 12 cases in moderate condition. By statistical management of the general data of the patients in the two groups, the differences were not statistically significant (all P > 0.05), indicating that the two groups were comparable (Table 1).

0	n —	Gender (case)		Average age	Average duration	Degree (case)	
Group		Male	Female	$(\overline{X}\pm s, year)$	$(\overline{x} \pm s, year)$	Mild	Moderate
EA	37	16	21	71.5±4.7	3.2±1.9	27	10
Medication	37	17	20	70.2±4.6	3.0±1.4	25	12

#### Table 1. Comparison of general data between the two groups

#### 2 Therapeutic Methods

#### 2.1 EA group

Acupoints: Bilateral Zusanli (ST 36) and Fenglong (ST 40)<sup>[9]</sup>.

Methods: After the skin of the acupoints was disinfected with 75% alcohol, the disposable sterile acupuncture needles of 0.30 mm in diameter and 25-60 mm in length were selected. Zusanli (ST 36) was punctured perpendicularly for 25-50 mm, and Fenglong

(ST 40) was punctured perpendicularly for 25-40 mm. After the arrival of the needling sensation, the even reinforcing-reducing manipulation was adopted. Then, another needle was inserted 2 mm proximal to the above acupoint for 20 mm, as an auxiliary needle, without manipulating the needle, in order to link with G91-D EA apparatus (Yangzhou Kangling Medical Electronic Instrument Co., Ltd., China). The above acupoint was linked with its corresponding auxiliary needle as a pair of electrodes, but the metal clips of the two electrodes must not be touched, by continuous wave, 2 Hz in frequency, and the intensity within the tolerance of the patient. The treatment lasted for 30 min, once a day and 6 treatments per week, with one day for rest. Totally, the treatments were given for 12 weeks.

### 2.2 Mediation group

The patients in the medication group were given Donepezil Hydrochloride Tablets (lot number: 121120A, specification: 5 mg, 7 tablets, manufacturer: Eisai China Holdings Ltd., China), 5 mg for each time, and once a day in the former 4 weeks, 10 mg for each time, once a day after 4 weeks, oral administration before sleep at night, totally for 12 weeks.

# **3 Observation of Results**

#### 3.1 Observed items

3.1.1 Mini-mental state examination (MMSE) score<sup>[10]</sup>

MMSE was adopted to evaluate the cognitive function of the patients, including the contents in 11 aspects of orientation, calculation and language. In total 30 points, the lower the scores, the more severe the patient's cognitive disorder.

3.1.2 Barthel index (BI) score<sup>[11]</sup>

BI was used to evaluate the patient's activity of daily living (ADL), including the contents in 10 aspects of bowels, bladder, dressing, and mobility. In total 100 points, the lower the scores, the worse the independent ability.

The above items were evaluated once before and after treatment respectively.

#### 3.2 Criteria of therapeutic effects

The clinical effects were evaluated based upon the changes in MMSE scores before and after the treatment  $^{[12]}$ .

Basically normal: After treatment, MMSE score was increased by more than 10 points, with total score  $\geq$ 23 points.

Remarkable effect: After treatment, MMSE score was increased by 5-10 points.

Effect: After treatment, MMSE score was increased by less than 5 points.

Failure: No change in MMSE scores before and after treatment, and even decreased than before treatment.

### 3.3 Results

During the treatment, no case dropped out in the two groups.

3.3.1 Comparison of therapeutic effects between the two groups

The total effective rate was 86.5% in the EA group and 70.3% in the medication group. The therapeutic effect was better in the EA group than that in the medication group and the difference between the two groups was statistically significant (P<0.05), (Table 2).

3.3.2 Comparison of MMSE and BI scores before and after treatment between the two groups

After treatment, MMSE and BI scores in the two groups were all elevated than those of the same groups before treatment (P < 0.05, P < 0.01). The improving situation was obviously better in the EA group than that in the medication group, and the difference between the two groups was statistically significant (P < 0.05), (Table 3).

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Group	n	Basically normal	Remarkable effect	Effect	Failure	Total effective rate (%)
EA	37	0	22	10	5	86.5 <sup>1)</sup>
Medication	37	0	14	12	11	70.3

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

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

Group		Ν	IMSE	BI		
	<i>n</i> –	Before treatment	After treatment	Before treatment	After treatment	
EA	37	13.78±3.36	19.75±3.82 <sup>1)3)</sup>	45.81±9.03	$62.04 \pm 13.35^{1)3)}$	
Medication	37	15.33±3.47	17.36±4.58 <sup>2)</sup>	47.72±8.49	$55.73 \pm 12.72^{1)}$	

Note: Compared with the same group before treatment, 1)  $P \le 0.01$ , 2)  $P \le 0.05$ ; compared with the medication group after treatment, 3)  $P \le 0.05$ 

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# **4** Discussion

AD is a common and frequent disease. It is believed in modern medicine that the pathogenesis of this disease includes genetic mutation and abnormalities of microtubule-associated protein. The medications to improve metabolism of cerebral cells and cholinergic neurotransmission can postpone the development of AD to some extent, but the therapeutic effects are not quite obvious<sup>[13]</sup>.

There is no such a name of AD in TCM. In accordance with its clinical manifestations, AD is categorized into the scope of 'dementia' and 'poor memory'. The medical experts in the successive dynasties believed that this disease is in the brain but closely related to kidney deficiency, and its basic pathogenesis is the emptiness of the brain marrow and disuse of the mind and spirit. Chen Shi-duo pointed out in Bian Zheng Lu (Collecting Records of Pattern Identification) that dementia disease occurs in the pathological mechanism of the stomach gi decline and its main pathogenesis is the production of phlegm due to stomach decline. We found out by the clinical observation that this disease mostly occurs in the elders, as the dysfunction of the spleen and stomach is especially prominent in the elderly. When the spleen and stomach are deficient, perform their transportation failing to and transformation, body fluid would be stagnant, gathering dampness and producing phlegm. Once phlegm and dampness attack and obstruct the brain, this disease occurs. If phlegm and dampness are not dispersed, the deficiency of the spleen and stomach would be further aggravated, forming a vicious cycle of deficiency of spleen and stomach-retention of phlegm and dampness-deficiency of spleen and stomach, in coincidence with the viewpoints that 'phlegm results from stomach deficiency'. It is further pointed out in Shi Shi Mi Lu (Secret Records of Stone Chamber) that 'there is no magic method for dementia except resolving phlegm'. Therefore, it is necessary to strengthen and normalize the spleen and stomach, resolve phlegm and disperse the turbid, as the major treatment method for senile dementia. In acupuncture prescription, Zusanli (ST 36) is the He-Sea point of the Stomach Meridian, and also an important acupoint for tonifying. Therefore, it is selected to strengthen and normalize the spleen and stomach, dissolve dampness and phlegm. It has been proven in the studies that EA at Zusanli (ST 36) can reduce amyloid precursor protein (APP) gene and expression of amyloid  $\beta$ -protein (A $\beta$ ) in the brain of senescence-accelerated dementia mice, so as to inhibit the formation of senile plaques and neurofibrillary tangles, and improve the intellectual status of dementia mice<sup>[14]</sup>. Fenglong (ST 40) is the Luo-Connecting point of the Stomach Meridian and also an important acupoint to dissolve phlegm, and is punctured to strengthen the spleen, dissolve phlegm, harmonize the stomach and rectify the adverse flow of gi. It has been proven by the experiments that EA at Fenglong (ST 40) can obviously lower the total cholesterol (TC) and low density lipoprotein cholesterol (LDL-C) in blood lipid of hyperlipidemia rats<sup>[15]</sup>. Hyperlipidemia belongs to the scope of 'phlegm turbidity' in Chinese medicine, indicating that Fenglong (ST 40) plays a good role in dissolving phlegm and turbidity. The two acupoints were used in combination to strengthen the spleen and stomach, dissolve phlegm and turbidity, in order to deal symptoms with the and causative factors simultaneously<sup>[16-18]</sup>

This study was based upon the theory that 'phlegm results from stomach deficiency' and 'there is no magic method for dementia except resolving phlegm'. MMSE and BI were used in this study to observe the clinical effects of EA at Zusanli (ST 36) and Fenglong (ST 40) for AD. It has been proven by the results that EA at Zusanli (ST 36) and Fenglong (ST 40) was effective in the treatment of AD, better than oral administration of Donepezil Hydrochloride Tablets alone. It can improve the cognitive function and enhance the life ability of the patients and is an effective therapeutic method. But, its long-term effect and its action mechanism need further studies.

#### **Conflict of Interest**

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

#### **Statement of Informed Consent**

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

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