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Original Article

A comparative study of efficacy between acupuncture therapy and drug therapy for primary trigeminal neuralgia

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Abstract: Objective: To observe the clinical efficacy of acupuncture therapy and carbamazepine therapy for primary trigeminal neuralgia. Methods: A total of 150 patients with primary trigeminal neuralgia treated in Department of Rehabilitation Medicine of Linyi Central Hospital from January 2010 to December 2016 were selected. They were divided into acupuncture group (n=75) and drug group (n=75). The patients in the acupuncture group received acupuncture based on the shape of trigeminal nerve once daily with 10 days as a treatment course. The results were observed after two treatment courses. Those in the drug group took 0.1 g carbamazepine three times daily with 20 days as a treatment course. The visual analogue scale (VAS) scores before treatment and in the 1st, 2nd, 3rd and 4th week after treatment, the adverse reactions within 3 months after treatment and the hospitalization time were compared between the two groups of patients. Results: In the 3rd and 4th week after treatment, the VAS scores in the acupuncture group were obviously lower than those in the drug group (both P<0.001). The total effective rate in the acupuncture group was notably superior to that in the drug group (85.33% vs. 62.67%, P=0.002). The comparison showed that the incidence rates of gastrointestinal discomfort and adverse reactions in nervous system in the acupuncture group were obviously lower than those in the drug group (P=0.000, P=0.006), but there were no significant differences in skin allergies between the two groups (P=0.681). The hospitalization time of the patients in the acupuncture group was significantly shorter than that of the patients in the drug group (P<0.001). Conclusion: The treatment of primary trigeminal neuralgia with acupuncture therapy is characterized by better efficacy, higher safety and shorter hospitalization time, which is worthy of clinical popularization.

Keywords: Primary trigeminal neuralgia, carbamazepine, acupuncture therapy, visual analogue scale

Introduction

Trigeminal neuralgia is a temporary paroxysmal extreme pain that occurs in the region dominated by facial trigeminal nerve. It is characterized by repetition and irregularity [1, 2]. Currently, the morbidity of trigeminal neuralgia in China is 0.18%. Once the disease occurs, the pain is generally unbearable [3]. Trigeminal neuralgia is usually divided into primary trigeminal neuralgia and secondary trigeminal neuralgia. Secondary trigeminal neuralgia is often caused by the oppression or invasion of the trigeminal nerve root due to inflammation, multiple sclerosis, tumors and other reasons. In general, there is no obvious cause for primary trigeminal neuralgia, and no neuropathological sign of substantial lesion in each group of imaging examination. Current doctrine points out that central neuropathy, peripheral neuropathy and biochemical and immunological factors are the pathogenesis of primary trigeminal neuralgia [4, 5].

Once primary trigeminal neuralgia occurs, the pain is violent and tear-like. The disease primarily attacks the second and third branches of trigeminal nerve and is mainly manifested as pain in the face, head and neck. The patients' quality of life drops significantly, and many patients even develop anxiety or mental illness [6]. However, the treatment regimens for primary trigeminal neuralgia cannot relieve the suffering of all the patients. Conservative treatment with carbamazepine or other drugs is the main treatment method at present [7, 8]. However,

Table 1. Comparison of general information between the two groups of patients

	Drug group (n=75)	Acupuncture group (n=75)	X^2/t	P
Male/female	35/40	38/37	0.107	0.744
Age (years)	49.27 ± 4.26	50.23 ± 4.14	1.400	0.163
Course of disease (month)	15.32 ± 3.56	16.01 ± 3.81	1.146	0.254

Table 2. VAS scores between the two groups of patients with trigeminal neuralgia at different time points

	Drug group (n=75)	Acupuncture group (n=75)	t	P
Before treatment	6.8 ± 1.7	7.2 ± 1.5	1.529	0.129
The 1st week after treatment	6.0 ± 1.3	6.4 ± 1.8	1.560	0.121
The 2nd week after treatment	5.8 ± 1.0	5.5 ± 1.3	1.584	0.115
The 3rd week after treatment	4.3 ± 0.8	2.5 ± 0.5	16.524	<0.001
The 4th week after treatment	3.8 ± 0.7	1.2 ± 0.5	26.175	<0.001

Note: VAS, visual analogue scale.

most patients will experience drug resistance, skin allergies and adverse reactions in digestive system and central nervous system after a long-term use of carbamazepine [9]. Surgical treatments include nerve block, peripheral nerve transection and radiofrequency ablation of trigeminal nerve [10-12]. Although surgical treatments have better efficacy than conservative treatments with drugs, they have the shortcomings such as higher treatment cost, higher recurrence rate and greater trauma, holding the patients back. Recently, acupuncture is more and more popular. It is a traditional Chinese medicine therapy with the characteristic of painlessness and fast onset. Most patients are satisfied with its analgesic effect [13]. Now there are few studies on the comparison of efficacy between acupuncture therapy and conservative treatment with drugs. This retrospective study was conducted to compare the analgesic effect, clinical efficacy, adverse reactions and hospitalization time between the two therapies for primary trigeminal neuralgia. Now it is reported as follows.

Materials and methods

Information of cases

A total of 150 patients diagnosed with primary trigeminal neuralgia in our department from January 2010 to December 2016 were selected as the subjects. They were divided into acupuncture group (n=75) and drug group (n=75). There were 38 males and 37 females in the acupuncture group, and 35 males and 40 females in the drug group. All the patients signed the informed consent, and this study was approved by the Ethics Committee of Linyi Central Hospital.

Inclusion criterion: Patients who met the diagnostic criteria for primary trigeminal neuralgia and were aged 25-75 years old.

Diagnostic criteria for primary trigeminal neuralgia: Firstly, paroxysmal pain occurred in the face or forehead for a few seconds to two minutes. Secondly, characteristics of pain in case of attack: Sudden, drastic, sharp, superficial, stabbing or burning pain was scattered in one branch or several branches of trigeminal nerve; the pain was triggered from the trigger area at the trigger point or induced by some daily activities; no symptoms were observed in the patients during the intervals of the attack, ocular conjunctival congestion, tearing, facial redness, salivation and other autonomic symptoms occurred in case of pain attacks, and facial twitching could also be observed due to repeated pain attacks. Thirdly, there were no neurological symptoms and signs or defects upon physical examination. Fourthly, the attack in each patient had stereotype. Fifthly, no other diseases that could cause facial pain based on the disease history, physical examination and necessary special examination [14].

Exclusion criteria: Patients who did not meet the diagnostic criteria or patients with secondary trigeminal neuralgia induced by other reasons; patients who experienced surgical treatment and were accompanied with corresponding serious nerve damage; patients with severe cardiovascular diseases and liver or kidney dysfunction; pregnant women.

Methods

Treatment methods: Drug group: The patients received a treatment with carbamazepine (Bei-

Table 3. VAS scores of the two groups of patients with trigeminal neuralgia at different time points

	Drug group (n=75)	Acupuncture group (n=75)
Before treatment	6.8 ± 1.7	7.2 ± 1.5
The 1st week after treatment	6.0 ± 1.3	6.4 ± 1.8
The 2nd week after treatment	5.8 ± 1.0	5.5 ± 1.3
The 3rd week after treatment	4.3 ± 0.8	2.5 ± 0.5
The 4th week after treatment	3.8 ± 0.7	1.2 ± 0.5
F	79.27	P<0.0001
P	48.00	P<0.0001

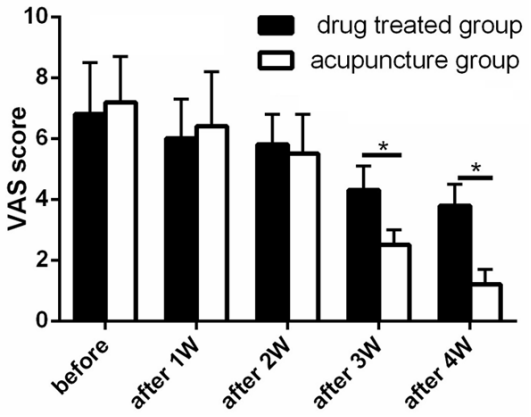

Figure 1. Intergroup and within-group comparisons of VAS scores between the two groups of patients before treatment, in the 1st, 2nd, 3rd and 4th week after treatment VAS, visual analogue scale; before: before treatment; after 1W: in the 1st week after treatment; after 2W: in the 2nd week after treatment; after 3W: in the 3rd week after treatment; after 4W: in the 4th week after treatment; intergroup comparison: *P<0.05.

jing Novartis Pharmaceutical Co., Ltd.; Tegretol; 0.2 g * 30 tablets) by oral administration. Initial dose: 0.4 g, twice (one in the morning and the other in the evening) daily, 0.2 g/time. The dose was increased gradually until the pain was relieved, then the dose was gradually reduced to the minimum maintenance dose. The daily maximum dose was 0.8 g.

Acupuncture group (acupuncture at the ganglion and habenula perforata): The patients took seats or lay in a supine position. Local skin disinfection with iodophor was conducted. The puncture was performed at 1 cm away from the mouth. The needle (0.35 mm * 65 mm) was slowly punctured at 2 mm away from the lower edge of the midpoint of the zygomatic arch at the affected side, forming a 45-degree angle with the skin. When patients had a feeling of soreness after the needle was punctured into 45-60 mm, rotating, lifting and thrusting in a moderate strength by acupuncture reduction method of filiform needles were conducted. The needles were retained for 30 min, during which the needle was punctured into the acupoint once. The acupuncture was conducted once daily. Ten days were taken as a treatment course [15].

Observation indicators and methods: VAS scores: Visual analogue scale (VAS) is currently a common pain-assessing standard: the degree of pain was expressed with 11 numbers from 0 to 10, among which 0 referred to painlessness, and 10 indicated the most severe pain. The patients chose one number to show their own pain based on their own condition. The higher the score was, the severer the pain would be. Zero point: painlessness; ≤3 points: mild pain which could be tolerated by the patients; 4-6 points: the pain that could be tolerated by the patients but affected the patients' sleep; 7-10: the pain that was more and more severe, severe pain or pain that could not be tolerated [16].

Efficacy evaluation: Completely relieved: A VAS score of 0 point without medication or acupuncture; obviously relieved: VAS score of 1-2 points with the administration of carbamazepine or acupuncture therapy; moderately relieved: VAS score of 3-4 points with continuous treatment; mildly relieved: VAS score of 5-6 points with continuous treatment; not relieved: VAS score of more than 7 points without any relief right after treatment.

Overall effective rate: Effective: Completely, obviously or moderately relieved; ineffective: Mildly relieved or not relieved.

Adverse reactions: Common complications related to the drug and acupuncture therapies were observed during treatment. The complications included gastrointestinal discomfort such as nausea and vomiting, adverse reactions in the central nervous system such as headache, dizziness, ataxia, lethargy, fatigue and diplopia and skin allergies such as red spots on the skin.

Hospitalization time: The duration from admission to discharging when the pain was obviously relieved was calculated.

Table 4. Clinical efficacy of the two groups of patients with primary trigeminal neuralgia

	Drug group (n=75)	Acupuncture group (n=75)	χ^2	P
Completely relieved	5	8		
Obviously relieved	12	35		
Moderately relieved	30	21		
Mildly relieved	23	11		
Not relieved	5	0		
Overall effective rate	47 (62.67)	64 (85.33)	10.014	0.002

Statistical analysis

All the data were statistically analyzed with SPSS 17.0 software. Graphpad prism 5 was used for picture drawing. The measurement data were expressed with mean ± standard deviation ($\overline{x}$ ± sd). The baseline measurement data between two groups were compared using two independent samples t test. The difference between two groups of categorical variables was detected using double-side chi-square test (X^2) or Fisher's exact test. Repeated measures of variance analysis were used to evaluate the intergroup effect of VAS scores at different time points. The difference between the two groups at the same time point was compared using Bonferroni corrected independent t test, and the significance level was defined as 0.05/5= 0.01. Except for Bonferroni corrected independent t test, other statistical differences were defined as bilateral α=0.05.

Results

General information

There were no statistically significant differences in gender distribution, age, course of disease and other basic information between the two groups of patients before treatment (all P>0.05). All of the information was researchable. See **Table 1**.

VAS scores of the two groups of patients

There was no obvious difference in the VAS score between the two groups of patients before treatment. With the progress of treatment, the VAS scores of the two groups decreased significantly, and the degree of decline in acupuncture group was more significant than that in the drug group. In the 3rd week after treatment, the VAS score in the acupuncture group was significantly lower than that in the drug group (P<0.001). In the 4th week after treatment, the pain relief in the acupuncture group was notably superior to that in the drug group (P<0.001). See **Tables 2**, **3** and **Figure 1**.

Clinical efficacy of the two groups of patients

The total effective rate in the acupuncture group was notably superior to that in the drug group (85.33% vs. 62.67%, P=0.002). See **Table 4**.

Adverse reactions of the two groups of patients

Adverse reactions occurring in the drug group included gastrointestinal discomfort such as nausea and vomiting and adverse reactions in the central nervous system such as headache, dizziness, ataxia, lethargy, fatigue and diplopia. There were 15, 8 and 4 patients suffered from gastrointestinal discomfort, adverse reactions in the central nervous system and skin allergies, respectively. The adverse reactions in the acupuncture group included gastrointestinal discomfort and skin allergies which were observed in 1 and 2 patients, respectively. Adverse reactions in the central nervous system did not occur in this group. The comparison showed that gastrointestinal discomfort and the adverse reactions in the central nervous system in the acupuncture group were significantly lower than those in the drug group (P=0.000, P=0.006), but there were no significant differences in skin allergies between the two groups (P=0.681). See **Table 5**.

Hospitalization time of the two groups of patients

The hospitalization time of the patients in the acupuncture group was significantly shorter than that of the patients in the drug group (P<0.001). See **Table 6**.

Discussion

Carbamazepine is currently the most commonly used drug for the treatment of primary trigeminal neuralgia, which blocks the sodium ion channel in nerve cells, and acts on the reticular structure-thalamic system, thereby slowing the

Table 5. Comparison of adverse reactions between the two groups of patients with primary trigeminal neuralgia

	Drug group (n=75)	Acupuncture group (n=75)	χ^2	P
Gastrointestinal discomfort	15	1	13.71	0.000
Adverse reactions in the central nervous system	8	0		0.006*
Skin allergies	4	2	0.174	0.677

Note: *Fisher's exact test.

Table 6. Comparison of hospitalization time of the two groups of patients

	Drug group (n=75)	Acupuncture group (n=75)	t	P
Hospitalization time	13.3 ± 2.5	7.1 ± 2.4	15.49	<0.001

transmission of synapse of spinal nucleus of trigeminal nerve [17]. A study of Olusanya et al. showed that although the pain is inhibited effectively, adverse reactions such as gastrointestinal symptoms, nervous system symptoms and skin allergies are increased obviously when the dose is increased [18]. It was also found in this study that the incidence of side effects of carbamazepine was really high, and the incidence of gastrointestinal symptoms, nervous system symptoms and skin allergies were 20.00%, 10.67% and 5.33%, respectively. However, the incidence of side effects in the acupuncture group was 1.33%, 0.00% and 2.67%, respectively, which were notably lower than those in the drug group. The acupuncture acts on local nerves, which has no impact on the circulation throughout the body. Therefore, the symptoms in the gastrointestinal tract and the central nervous system are not obvious. However, skin acupuncture may damage peripheral skin, so the incidence of skin allergies is increased.

Nervous system is the most complex system of the human body, which is composed of peripheral nerves and central nerves. The analgesic mechanism of the peripheral nervous system: The peripheral nerve of the acupuncture conduction sensation can cause the conduction block of the fibers that conduct pain in this nerve. Acupuncture can inhibit neuralgia to transmit pain-associated nervous impulse to the central nervous system. Meanwhile, acupuncture can also inhibit the response of spinal cord nerve cells to harmful stimuli, thereby reducing or preventing the spread of pain impulses and the introduction of pain receptors. Analgesic mechanism of central nervous system: Acupuncture can not only inhibit the tractus spinothalamicus to transmit pain information to the central nervous system, but also reduce or inhibit the introduction of this information. The painful stimuli are suppressed through the processing and integration of the central nervous system as well as the combined action of endocrine system and pain control system. However, the acupuncture acts on local nerves, which reduces the degree of direct pain sensitivity to the nerves. Therefore, it is more effective. Carbamazepine mainly uses its analgesic, sedative and antiepileptic effects to relieve pain [19]. In addition, carbamazepine can also ease anxiety and other negative emotions, and stabilize the emotion of patients [20]. It was found in this study that VAS scores and overall effective rate in the acupuncture group were significantly higher than those in the drug group. Primary trigeminal neuralgia is sudden and severe, which can cause anxiety and other negative emotions, so pain relief and anxiety resistance are effective.

This study still has many shortcomings. There are many ways to treat primary trigeminal neuralgia. Nerve block is a common therapy. Thermal ablation is also an effective means to treat trigeminal neuralgia, and the cutting of the posterior branch of trigeminal nerve root is one of the essential treatment methods for trigeminal neuralgia. There are a variety of treatment methods, and the efficacy of other treatment methods will be analyzed in the future so as to develop more effective treatment methods for patients.

In conclusion, the treatment of primary trigeminal neuralgia with acupuncture therapy is characterized by better efficacy, higher safety and shorter hospitalization time, which is worthy of clinical popularization.

Disclosure of conflict of interest

None.

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