Clinical curative effect observation of stellate ganglion block treatment on shoulder-hand syndrome

Shuqiao Qin[1,2], Yuming Xu[1], Xi Zeng[2]

1 Department of Neurology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou 450052, Henan Province, China
2 The Fourth Affiliated Hospital of Zhengzhou University, Zhengzhou 450043, Henan Province, China
xuyuming@zzu.edu.cn

Abstract: Objective: To evaluate the clinical curative effect of stellate ganglion block(SGB) on shoulder-hand syndrome (SHS) treatment. **Methods:** A total of 56 cases are selected, and according to the random number table, they are equally divided into control group with routine rehabilitation treatment and experimental group with stellate ganglion block treatment based on routine rehabilitation treatment. The visual analogue scale (VAS) and upper limb simplification Fugl-Meyer Assessment (FMA) which is used to evaluate upper limb motor function, are conducted before the operation and 14 days after the operation. **Results:** 14 days after the operation, the condition of two groups are both better than that before operation, the VAS decreases significantly ($P<0.01$), and the upper limb simplification FMA improves significantly ($P<0.01$). There is significant difference between the two groups ($P<0.01$). **Conclusion:** The curative effect of tellate ganglion block (SGB) on shoulder-hand syndrome (SHS) treatment is accurate, and there are few adverse reactions, therefore, it is worthy of being generalized.
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Key Words: stellate ganglion block; stroke; shoulder-hand syndrome

Introduction

Shoulder-hand syndrome after stroke is the complication of patients with cerebrovascular disease whose major manifestations are concurrent shoulder painful dyskinesia, pain of ipsilateral hand and wrist and limb movement disorder. It is a common complication of stroke hemiplegic patients which is also called reflex sympathetic dystrophy (RSD) and its incidence rate is about 12.5%-70% [1]. SHS is a common complication, which has great influence on recovery of limb function ; if it is not treated properly and timely, it will lead to a permanent obstacle for shoulders, hands and fingers, which will bring about a great burden on their families and the society. Therefore, the curative effect of SHS plays an important part in the recovery of patients with stroke, and is closely related to patients' life quality, while there is still no accurate method which has curative effect on it at present[2-5]. This research adds SGB based on the routine rehabilitation treatment which gains good curative effect, now it is reported as follows.

1. Objects and methods
1.1 Objects of study

According to random number table method, patients with SHS in the department of rehabilitation medicine and neurology of the Fourth Affiliated Hospital of Zhengzhou University from March 2012 to March 2013 were selected, whose condition conformed to the standards of diagnosis of the shoulder hand syndrome. This research has passed the investigation of the medical ethics committee of the Fourth Affiliated Hospital of Zhengzhou University before implementation.

Selected standards take the Chinese rehabilitation research center Miao HongShi standards which is commonly used for reference[7] : (1) aged 45 to 75 years old;(2) first stroke, and diagnosis conform to the WHO stroke diagnosis criteria;(3) the disease lasts from 14 days to 3 months with stable symptoms;(4) conformed to the first-stage clinical symptoms of SHS;(5) patients and their close relatives sign the informed consent.

1.1.2 Exclusion standards: (1) other reasons for SHS except stroke;(2) SHS patients combined with severe heart, lung, liver and kidney disease, hemopathy and so on which can affect prognosis of patients;(3) mental patients and speech impaired patients who can't cooperate during treatment so that doctor can't assess curative efficiency.

1.2 Methods
1.2.1 Grouping

Selected patients were allocated research numbers and divided into control group and experimental group according to the random number table.

1.2.2 Treatment methods

Patients in control group were treated with standardized secondary prevention drugs for stroke, lidocaine injection closed support therapy for pain point, and they do rehabilitation training in the guidance of the same rehabilitation doctor which includes correct body position, sports training, electroacupuncture, oppressive centripetal winding, alternating hot and cold water immersion method, microwave, infrared radiation, electric acupuncture, Chinese medicine fumigation and so on[7]. Patients in experimental group were treated with SGB by an experienced doctor in the department of rehabilitation based on routine rehabilitation treatment: Patients lie on their back without pillow, lift shoulder highly. They were injected with 5 number needle vertically in the level of cricoid cartilage, avoiding the common carotid artery before sternocleidomastoid, and when needle touches C6 transverse process, doctor pushes 5 ~ 10 ml 1% lidocaine injection slowly. The appearance of "Horner" syndrome implies a successful block. Manifestation of Horner syndrome: block side miosis, enophthalmos, eye conjunctival congestion, no sweat of block side . Pull out the needle with local press in 15 minutes. Two groups of patients were treated with 14 days in every other day.

1.2.3 Test Methods

Neurological physicians with unified training register baseline data of the patients, recording name 、 sex 、 contact, case history (Hypertension 、 Diabetes 、 Hyperlipidemia 、 Coronary heart disease 、 AF 、 Smoking history 、 Medication history), taking the measures of Visual Analogue Scale (VAS) and Fugl 一 Meyer (FMA) to evaluate on the day entering the group and the 14th day treatment[8]. The method of VAS: Draw a 10cm long rough straight line on a white paper, the left of which represents ' No pain ' (0), the right represents ' Extreme pain ' (10), according to the degree of the pain, patients can express at a point of the line to record ratings. Repeat twice and record the average

value to quantify the degree of joint pain of shoulder and hand. The evaluation criteria[7]: Optimal: VAS reducing ≥6 points, no pain, shoulder and hand edema disappears, joint stiffness and contracture disappear; Good: VAS reducing 3.1～5.9 points, pain of shoulder still exists but reduces significantly compared with the previous condition, edema subsides and skin temperature is still high; General: VAS reducing 1.1～3.0points, edema of shoulder and hand reduces a little but joint activity is still limited; Poor: VAS reducing ≤1.0 point, there is no significant difference before and after treatment.

1.3 Statistical analysis

In this study data were processed by SPSS17.0 software package, measurement data were expressed as mean ± standard deviation, comparison before and after treatment in the group took method of a paired t test and comparison among groups took group t test. Count data of every group were indicated by rate or constituent ratio and took X2 test. P＜0.05 means the difference was statistical significant.

2 Results

There were 56 cases of patients in total, 34 male and 22 female; The average age was (56.1±9.8) years old; and among which 41 cases of cerebral infarction and 15 cases of cerebral hemorrhage. There were 28 cases in the control group, 16 male and 12 female, and average age was (54.2±10.8) years old, among which there were 6 cases of diabetes, 18 cases of hypertension and 12 cases of high cholesterol; There were28 cases in experimental group, 18 male and 10 female, average age was (58.2±7.4) years old, among which there were 8 cases of diabetes, 19 cases of hypertension and 14 cases of high cholesterol; Good patient compliance, none dropping out or falling off. There was no statistical significance about general data comparison of the two groups (Table 1)、and about score comparison of VAS score and FMA score before treatment, it is comparable.

Table 1 General data comparison of the two groups

Group	Number of cases	Sex (case)		Age ($\bar{x}$±s) years old		
		Male	Female	Average age	Minimum	Maximum
Control group	28	16	12	54.2±10.8	46	72
Experimental group	28	18	10	58.2±7.4	47	74
Total	56	34	22	56.1±9.8	46	74

Note: Sex and age comparison between the two groups P＞0.05.

2.1 Clinical efficacy

Table 2 shows the VAS score comparison before and 2 weeks after treatment in Conventional treatment group (The control group) and conventional

treatment with SGB group (The experimental group). VAS score comparison before treatment of the two groups P＞0.05, it was significantly lower after treatment and the result was significantly different (P

＜0.0001), moreover, after treatment VAS comparison of the experimental group was significantly lower than the control group, there was statistically significance about the difference (P＜0.0001). Table 3 shows FMA score comparison before and after treatment, FMA score comparison before treatment of the two groups P＞0.05, it significantly improved after treatment and the result was significantly different (P＜0.0001),

moreover, after treatment FMA comparison of the experimental group was significantly higher than the control group, there was statistically significance about the difference (P＜0.0001). Table 4 shows comparison of clinical efficacy in the two groups, of which experimental group was significantly higher than control group, X2=25.188, p＜0.0001, there was statistically significance about the difference.

Table 2 VAS score of shoulder-hand syndrome before and after treatment in the two groups ($\bar{x}\pm s$, n= 28)

Group	Before treatment	After treatment	t	p
Control group	6.89±2.24	5.14±2.21	4.949	0.0001
Experimental group	7.18±2.17	2.21±2.14	8.575	0.0001
t	0.481	5.039		
p	0.617	0.0001		

Note: Before treatment VAS score、FMA between two groups P*＞0.05, 14 days after treatment VAS score、FMA between two groups P＜0.001.

Table 3 Motor function FMA score shoulder-hand syndrome before and after treatment in the two groups ($\bar{x}\pm s$, n=28)

Group	Before treatment	After treatment	t	p
Control group	5.86±3.32	12.84±4.56	6.548	0.0001
Experimental group	5.74±3.16	18.13±3.24	14.491	0.0001
t	0.136	5.005		
p	0.624	0.0001		

Table 4 Efficacy evaluation of shoulder-hand syndrome in the two groups（%）

Group	Optimal	Good	General	Poor	Total
Experimental group	21(75.00)	4(14.29)	2(7.14)	1(3.57)	28(100.00)
Control group	4(14.29)	5(17.86)	11(39.29)	8(28.57)	28(100.00)
Total	25	9	13	9	56

Note: X2=25.188, p＜0.0001, there was statistically significance about the difference.

2.2 Security Analysis

Monitor heart rate、pulse、blood pressure、breathing every day, and test routine blood、routine urine、liver function、renal function、coagulation、myocardial enzymes、Electrocardiogram (ECG) and so on before and after treatment, there was no difference; During treatment, six cases of seven adverse events appeared in the experimental group, of which 4 patients had pharyngeal foreign body sensation and 5patients had hoarseness, without special treatment, symptoms disappeared after 0.5h～2h.

3. Discussion

SHS after stroke mainly shows shoulder pain, finger pain, swelling of fingers and wrists, rubefaction, skin cyanosis, increase of skin temperature and limitation of joint flexibility. According to clinical manifestation, SHS can be divided into three stages: Clinical manifestation of the

first stage: shoulder pain, limitation of activities, swelling of homolateral wrists and fingers, rubefaction, increase of skin temperature and other vasomotor change. Patient's fingers are in straight position, limited when buckle and patient feels pain when fingers are buckled passively; Clinical manifestation of the second stage: The disappearance of spontaneous pain of shoulder and hand, the disappearance of swelling of fingers, and the appearance of skin atrophy (particularly atrophy of hand minor muscle becomes increasingly obvious); Clinical manifestation of the third stage: Hand skin and muscle atrophy obviously, fingers contracture completely[6]. Pain and edema are early signs of SHS which also imply that treatment in this period may be effective, but once contracture, patients will be permanent disabled, and all methods will be useless. So the objective of treatment is to alleviate edema, pain and stiffness. Doctors always adopts comprehensive treatment clinically, some clinical researches[9-12] have found that comprehensive treatment has curative effect for SHS, and some

researches[13-15] have found that it is more effective to adopt routine comprehensive treatment combined with stellate ganglion block(SGB).

This research confirms that VAS score and FMA score measured 14 days after treatment improve obviously compared with that measured before treatment; The curative effect of routine comprehensive treatment combined with SGB is significantly better than routine comprehensive treatment alone, and the combined treatment can lower the VAS score, improve upper limb movement function, lower pain, edema and be beneficial to the recovery of hands. This treatment is of high security because the adverse reaction caused by SGB gets better automatically without extra treatment. In addition, the author found that patients with mild syndrome recover quickly and completely than patients with severe syndrome, and their upper limb function recover quickly after pain alleviation.

The pathogenesis of SHS[16] is indefinite. It may be related to dyskinesia of sympathetic nervous system and vasomotor function caused by central nerve injury, impairment of shoulder hand pump mechanism, retardation of blood reflux caused by abnormal buckling of wrists joint with cerebrovascular disease. Nowadays, there are no definite therapeutic methods, just routine comprehensive treatment like rehabilitation training and target therapy. SGB takes effect on SHS[17-20] through weakening function of sympathetic preganglionic neurofibers and postganglionic neurofibers, thus to inhibit vasomotion, muscular tension and pain conduction. In addition, SGB can take regulating curative effect on autonomic nervous system, cardiovascular system and immune system through hypothalamus feedback mechanism. It can enhance ability of disease resistance through central and peripheral effects. The improvement of blood circulation of injury parts promotes absorption of inflammatory exudation and algogenic substance, blocks metabolism intensively, relieve adhesion of fiber and connective tissue, eliminate inflammatory reaction and improve ischemia of muscle tissue; SGB blocks partial sympathetic nervous system, thus partial sympathetic nervous systematic tension is eliminated and the level of norepinephrine decreases, thereby upper limb vessels dilate, increase of partial blood amount relieves partial vasospasm, accelerates nutrition metabolism of partial tissue, reduces the production of inflammatory mediator caused by stress response. Consequently, it terminates vicious circle to cure SHS. This research both take advantages of central effect and peripheral effect to relieve pain, fade edema, accelerate the recovery of upper limb function of hemiplegia side and improve activities of daily living.

In conclusion, early treatment of SHS has good curative effect, routine comprehensive treatment combined with SGB have significant effect on SHS. There are some adverse reactions clinically, so this treatment must be operated by experienced clinicians with strict and standard operating procedure. SGB is a safe and effective method to cure SHS, and is worthy of being generalized.

Corresponding Author:
Yuming Xu
The Fourth Affiliated Hospital of Zhengzhou University
Zhengzhou 450043, Henan Province, China
E-mail: xuyuming@zzu.edu.cn

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