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Progress of the Small Needle Knife Therapy Combined with Rehabilitation Technique for the Treatment of Shoulder-hand Syndrome (phaseI) after Stroke

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Abstract: ***To synthesize the relevant literature in recent years on the treatment of shoulder-hand syndrome (phaseI) after stroke by small needle knife therapy combined with rehabilitation technology, and to organize the treatment plan of shoulder-hand syndrome (phaseI) by small needle knife therapy combined with different rehabilitation technology, which is summarized from the aspects of PNF technology, exercise therapy, acupuncture, rehabilitation training, etc., so as to provide a more powerful basis for the selection of the plan for the treatment of shoulder-hand syndrome (phaseI) after stroke by small needle knife therapy combined with rehabilitation technology in the future. The results were summarized from the aspects of PNF technique, exercise therapy, acupuncture, and rehabilitation training.***

Keywords: Stroke, Shoulder-hand syndrome (phaseI), Small needle knife therapy, Rehabilitation techniques, Review**.**

1. Introduction

Post-stroke shoulder-hand syndrome (SHS), a common complication that occurs in patients within 1 to 3 months after stroke, is typically characterized by one or both sides of shoulder pain accompanied by hand swelling, pain, stiffness, sweating and skin color changes. Clinically, it can be divided into 3 phases [1]: Phase I: shoulder pain, activity limitation, swelling of the wrist and fingers on the same side, Phase II: pain and swelling reduced or disappeared, with obvious atrophy of the skin and muscles, Phase III: aggravation of muscle atrophy and even contracture deformity. If the condition is not detected and treated in time when the patient is in phaseI of shoulder-hand syndrome, the condition will be rapidly aggravated and transferred to phase II and III. Once the disease develops to phase III, the condition will be uncontrollable, and the patient will suffer from the symptoms of muscle atrophy and deformity of the joints on the affected side, and the physical activities will be extremely limited, and even permanent deformation of the shoulder and fingers may occur, resulting in lifelong disability, which can easily affect the daily life of the patients with stroke and even cause the patients' psychological problems. It will easily affect the daily life of stroke patients and even cause psychological trauma to them.

Modern medicine believes that post-stroke shoulder-hand syndrome is caused by early flaccid paralysis in stroke patients, soft tissue injury around the shoulder joint on the hemiplegic side, and limited shoulder joint movement due to various reasons. The pathogenesis of the syndrome is still not well understood, and there are generally several views as follows: (1)... Sympathetic nerve dysfunction [2]: After stroke, patients suffer from intracerebral lesions and vascular nerve dysfunction, leading to excessive sympathetic nerve excitation in the affected limbs, meanwhile, vascular spasms, poor blood circulation and local tissue nutritional disorders, resulting in limb oedema and pain, and the pain further produces excitatory stimulation of the nerves, aggravating the vasomotor dysfunction, forming a vicious circle [3], (2). Obstruction of shoulder-hand pump mechanism: after stroke, patients have hemiparesis of the affected limb, weakened muscle contraction ability, affecting the return of venous blood and lymphatic fluid in the upper limb, edema and bruising, further impairing the activity of the upper limb, and increasing the obstruction of venous blood and lymphatic fluid return, which aggravates the swelling of the upper limb, further weakening the shoulder-hand pump mechanism, forming a vicious circle, (3). Vicious cycle, (3). Neurogenic inflammation: when patients develop shoulder-hand syndrome after stroke occurrence, there is excessive inflammatory reaction, and under the potency of sympathetic neuropathic changes, nerve impulses on the one hand travel up the spinal cord leading to enhanced nociceptive afferents, and on the other hand conduct toward the periphery while releasing neuropeptides leading to local vasodilation to the point of increased permeability, abnormal vasodilatory function, nociceptive hypersensitivity and edema.

Although post-stroke shoulder-hand syndrome has not been named in Chinese medicine, as one of the common complications of stroke, there are many descriptions of related symptoms in Chinese medical texts. The early stroke period is called apoplexy in Chinese medicine, and the symptoms such as pain, edema, and unfavorable movement that appear after stroke belong to the Chinese medicine categories of "migraine", "migraine wind", "paralysis", "meridian tendon", and "palsy". The symptoms of pain, edema, and immobility after the disease fall into the categories of "partial paralysis", "partial wind", "paralysis", and "meridian disease" of Chinese medicine. For example, "Ling Shu - fever" puts forward "partial dryness, body partial use and pain", "Jin Gui Yao Liao" puts forward "the wind of the disease, when half of the body is paralyzed, or the arm is not attempted to..... stroke", "Stroke..... hemiplegia, or but the arm is not attempted, this is paralysis", "Acupuncture and Moxibustion A Yi Jing" in the

"Ling Shu - Heat Theory Chapter" puts forward "paralysis, arm and wrist pain, elbow flexion can not be stretched out", Acupuncture and Moxibustion Dacheng" put forward "stroke wrist acid, can not flexion and extension, finger pain can not hold things", "Suwen - regulating menstruation" put forward "hand flexion and not extended, its disease in the tendons", "Suwen yin and Yang Biexue Lecture" put forward "the three yang and three yin onset, for the These descriptions are in line with the symptomatic characteristics of post-stroke shoulder-hand syndrome. This disease is characterized by deficiency of the liver and kidney, deficiency of qi and blood as the root cause, and wind, cold, dampness, phlegm and stasis as the symptoms.

Because of the lack of understanding of the pathogenesis of shoulder-hand syndrome after stroke at this stage, intervention measures are mainly used to treat patients with shoulder-hand syndrome in stage I to prevent disease progression. Currently, commonly used treatments at home and abroad include physical therapy, local drug injection therapy, sympathetic nerve block [3], spinal cord stimulation technology, acupuncture, tuina, and traditional Chinese medicine fumigation therapy. Micro-small needle knife therapy therapy, as a new type of Chinese medicine characteristic therapy, belongs to the category of acupuncture therapy, the "small needle knife therapy" is based on the "Yellow Emperor's Nine Needles", combined with modern medicine surgical therapy derived from a new type of characteristic needle, both with the traditional Acupuncture and moxibustion therapy in the role of "needle", but also modern medicine surgery therapy in the role of "knife", small needle knife therapy treatment first with traditional acupuncture acupuncture concept will be stabbed into the human body, to play the role of dredging the meridian qi, regulating the body's qi and blood, and then play the role of the "knife", the "knife". Then, the therapeutic role of the "knife", with its unique blade in the diseased tissue for dredging, cutting, peeling and other operations, in order to play a role in loosening adhesions and contractures, pain relief.

Since the development of needle-knife medicine, a unique system of needle-knife medicine has been formed, which can now be widely applied to the treatment of a variety of diseases in the clinic compared to the past, when it could only be applied to pain and osteoarthropathy. For example, small needle knife therapy treatment of stroke patients after the onset of spasticity, increased muscle tone, hemiplegia and other complications, have achieved good results. According to the review of clinical research literature in recent years, micro-acupuncture knife combined with rehabilitation treatment of post-stroke shoulder-hand syndrome I stage is more accurate than the efficacy of a single treatment method, and it has become one of the key directions of clinical treatment of post-stroke shoulder-hand syndrome, in order to further study its therapeutic effect, by searching, analyzing, and organizing the relevant literature on the treatment of post-stroke shoulder-hand syndrome I stage by combining the micro-acupuncture knife with the rehabilitation technology on the China Knowledge Network from 2017 to 2022, we have obtained good efficacy. syndrome stage I, with a view to providing reference for subsequent clinical treatment. It is summarized as follows.

2. Small Needle Knife Therapy Combined with PNF Technique

Proprioceptive Neuromuscular Facilitation Therapy [4]-[5] (proprioceptve nuromus cular facilitabon, PNF), is a treatment method to improve and promote muscle function by stimulating the proprioceptors to enhance muscle activity based on the spiral and diagonal movement pattern as the basic feature. During the treatment process, rehabilitation exercises that can be done by the patients themselves are used to help build up their self-confidence at both physical and psychological levels, alleviate their psychological stress caused by physical health problems, and lay the foundation for subsequent treatment in order to achieve better therapeutic results.

Hu Hui [6] Forty-one patients with post-stroke shoulder-hand syndrome stage I were divided into two groups by simple random sampling method, 21 cases in the control group and 20 cases in the observation group. The patients in the two groups were first treated conventionally, and the observation group was treated with PNF and small needle knife therapy on the basis of the control group. When the patients were treated with PNF, the healthy side lying position was used, and the tip of the patient's nose was taken as the target, so that the scapula on the affected side moved toward the anterior and superior part of the tip of the nose, and the shoulder joint of the affected side carried out active flexion and inward rotational activities, at the same time, relaxation techniques were used. Let the patient look to the affected side of the upper limb, each step was carried out in 10 groups, 1 time / day, and then the patient was treated with small needle knife therapy, 1 time / week, after three consecutive weeks of treatment, the therapeutic effect of the two groups were evaluated. The results showed that after treatment, the VAS score of the control group was higher than that of the observation group, the FMA score was lower than that of the observation group, comparing the total effective rate of the two groups, the total effective rate of the observation group was 75.56%, and that of the control group was 53.33%, which was significantly higher than that of the control group, and the difference was statistically significant ($P<0.05$).

Sun Jianbing [7] 120 patients with post-stroke shoulder-hand syndrome stage I were randomly divided into an observation group and a control group, with 60 cases in each group. Firstly, both groups were treated with conventional rehabilitation therapy, including good limb position placement, centripetal compression wrapping, active and passive movement and modulated intermediate frequency electrotherapy, based on which, stellate nerve block therapy was added to the control group, and PNF technology combined with mini-small needle knife therapy therapy was added to the observation group. After 3 weeks of treatment, the therapeutic effects of the two groups were evaluated. Compared with the pre-treatment period, the VAS scores and FMA scores of the two groups improved, and the therapeutic effects of the treatment group were significantly better than those of the control group ($P<0.05$).

Sun Jianbing et al. [8] 100 patients with post-stroke shoulder-hand syndrome who met the study criteria were randomly grouped into an observation group and a control

group, with 50 cases in each group. Conventional rehabilitation treatment was first carried out for the two groups, on this basis, the observation group added PNF technology and small small needle knife therapy therapy, PNF technology was treated once a day, and small needle knife therapy therapy was once a week, and the treatment effect of the two groups was evaluated after three weeks of treatment. Compared with the pre-treatment, the FMA scores of both groups increased, and the observation group increased more significantly than the control group, the VAS scores of both groups decreased significantly compared with the pre-treatment, and the scores of the observation group decreased more significantly, the total effective rate of the observation group was 92%, which was higher than that of the control group of 80%, and the difference had a statistically significant difference ($P<0.05$).

3. Small Needle Knife Therapy Combined with Exercise Therapy

Based on biomechanics and neurodevelopmental science, exercise therapy focuses on the placement of early good limb position to maintain the normal anatomical structure of the shoulder joint, which can prevent shoulder joint injury and pain, and moderate active and passive exercises can be carried out under the premise that the shoulder joint will not be injured. The contraction and diastole of muscles can reduce edema, improve blood and lymph circulation, stretch spastic tissues, loosen adhesions, prevent muscle atrophy, reduce shoulder pain, and at the same time, increase the range of motion of the shoulder joint, further improve the motor function of the affected shoulder [2].

Qian Kun et al. [9] divided 60 patients with stage I post-stroke shoulder-hand syndrome who met the study criteria into a control group and an observation group according to the randomized numerical table method, with 30 cases in each group. Both groups were treated with exercise therapy, and the observation group was treated with small needle knife therapy on this basis, and the frequency of small needle knife therapy treatment was once every three days. After one month's treatment, the FMA and MBI scores of both groups increased, and the FMA and MBI scores of the observation group were higher than those of the control group, the VAS scores were lower than those before treatment, and the VAS scores of the observation group were lower than those of the control group, and the total effective rate of the observation group was 93.99%, which was higher than the 70.00% of the control group, and the difference was statistically significant ($P < 0.05$).

4. Small Needle Knife Therapy Combined with Intramuscular Effect Patch

Intramuscular effect patch technique, also known as intramuscular effect patch technique, is a non-invasive treatment technique widely used in the field of sports and rehabilitation, and in recent years, with the development of intramuscular effect patch technique, it has also been gradually applied to the rehabilitation of limb dysfunction in stroke patients. The pathogenesis of shoulder-hand syndrome after stroke includes shoulder-hand pump mechanism disorder, which leads to the obstruction of venous blood and lymphatic fluid return and aggravates the body movement disorder. Intramuscular effect patch can increase the gap between the skin and muscle, affect the flow of subcutaneous fascial tissue, produce sufficient permeability and mobility, promote lymphatic fluid and blood circulation [10], promote the recovery of motor function, in order to achieve the therapeutic effect of post-stroke shoulder-hand syndrome. In addition, the patch used in the intramuscular effect patch technology has stable tension and elasticity, and good breathability and adhesion, and the price is relatively cheap, which is easy to be accepted by patients.

Jin Xin [11] et al. divided 60 patients with post-stroke shoulder-hand syndrome stage I into a control group and a treatment group by randomization method, with 30 cases in each group. Both groups were treated with conventional rehabilitation therapy, and the treatment group added the use of small needle knife therapy combined with intramuscular effect patch on the basis of conventional rehabilitation therapy. In the application of intramuscular effect patch technology, the selection of muscle-fascia patch that meets the specifications, with reference to the "Essentials of Clinical Application of Soft Tissue Patching Technology" (by Chen Wenhua) [12] in the SHS patch method for operation, the specific patch method is as follows: 1) Shoulder pain point patch: the patient takes a seated position, and selects the "X"-shaped patch to be the "anchor" of the shoulder. "Anchor" (the middle of the patch) is fixed at the shoulder pain point, "tail" to the natural tension to the surrounding extension, 2) hand swelling patch: the patient takes a seated position and make the wrist slightly flexed, the selection of "claw The "anchor" (the head end of the patch) is fixed to the epicondyle of the humerus, and extended to the dorsum of the hand along the wrist extensor muscle group with natural tension, the "tail" is wrapped around the interphalangeal area to the palm of the hand and fixed with an "I" shaped patch. The "I" shaped patch was used to immobilize the wrist to prevent hyperextension or hyperflexion. (In the treatment group, 1 time per week was fixed time for small small needle knife therapy treatment, and the day after the small needle knife therapy treatment was finished, the intramuscular effect patch treatment was carried out, and each patch lasted for 3 days, and 2 consecutive patches were put on (recorded as 1 course of treatment). After 3 weeks of treatment, the therapeutic effect of the patients was evaluated. The difference between the NRS, FMA and PROM scores of the treatment group and the control group before and after the treatment was statistically significant, and the reduction of the NRS score of the treatment group was significantly larger than that of the control group, the increase of the FMA and PROM scores of the treatment group was higher than that of the control group, the total effective rate of the two groups was 90.00%, much higher than that of the control group. 90.00%, much higher than the 66.67% of the control group, the difference between the efficacy of the two groups is statistically significant ($P<0.05$), indicating that the therapeutic effect of the treatment group is better than that of the control group.

5. Small Needle Knife Therapy with Conventional Rehabilitation

Wang Qingjuan [13] et al. grouped 60 patients with post-stroke shoulder-hand syndrome stage I (SHS within 3 months) who met the study criteria into groups according to the onset time of SHS stage I. Those with SHS onset time of less than 1 month were group A, those with onset time of 1-2 months were group B, and those with onset time of 2-3 months were group C. Twenty patients were collected from each group. Groups A, B, and C were first treated with basic treatment and routine rehabilitation training. Basic treatment included routine medication for stroke, as well as regular nursing care such as regular turning and elevation of the affected limbs, etc. Routine rehabilitation training included relevant muscle strength training and joint mobility training for the patients. On this basis, the patients were treated with small needle knife therapy, and after 4 weeks of treatment, the therapeutic effects of the three groups of patients were evaluated. Compared with the pre-treatment, the VAS scores of the three groups of patients were lower than the pre-treatment after 2 weeks and 4 weeks of treatment, and after 4 weeks of treatment, the VAS scores of Group A and Group B were more significantly lower than those of Group C. The swelling degree of the affected limbs of the three groups of patients was significantly improved compared with the pre-treatment after 2 and 4 weeks of treatment, and the effect of Group A and Group B was better than that of Group C after 2 and 4 weeks of treatment, the effect of Group A and Group B was better than that of Group C after 2 and 4 weeks of treatment, and the effect of Group A and Group B was better than that of Group C after 2 and 4 weeks of treatment. Fugl-Meyer scores of the upper limbs after 2 and 4 weeks of treatment were improved compared with those before treatment, and the Fugl-Meyer scores of the upper limbs of Groups A and B after 4 weeks of treatment were elevated more significantly than those of Group C. After 4 weeks of treatment, the SCV and MCV of the median nerve of the affected side of the patients in the three groups were improved compared with those before treatment, and the differences between the three groups of patients in terms of SCV and MCV of the affected side of the median nerve were not significant (P>0.5). were not obvious (P>0.5). The results showed that the treatment of small needle knife therapy combined with rehabilitation training could significantly improve the swelling, pain and motor function of the affected limbs in patients with SHSI stage within 2 months of disease duration.

Zhu Xiaolei [14] et al. divided 60 patients with post-stroke shoulder-hand syndrome who met the study criteria into a treatment group and a control group by randomization method, with 30 patients in each group. The patients in both groups were first treated with conventional internal medicine, and the treatment group was treated with small needle knife therapy combined with rehabilitation training on the basis of the second, and the control group was treated with Cilopodium capsule (oral). After 1 month of treatment, the therapeutic effects of the two groups were evaluated. The VAS scores of the two groups were reduced compared with those before treatment, and the reduction of the therapeutic group was larger than that of the control group, the Fugl-Meyer scores of the upper limbs of the two groups were significantly higher than those before treatment, and the increase of the therapeutic group was much larger than that of the control group. The results showed that the clinical efficacy of small needle knife therapy combined with rehabilitation training in the treatment of post-stroke shoulder-hand syndrome was better than that of oral cilostro.

Shao Weifeng [15] et al. randomized 51 post-stroke shoulder-hand syndrome stage I patients who met the study criteria into a treatment group and a control group, with 26 patients in the treatment group and 25 patients in the control group. The two groups of patients were first subjected to conventional treatment and rehabilitation training, on which the treatment group was treated with small needle knife therapy therapy once a week for 4 weeks, while the control group was treated with additional acupuncture therapy 6 times a week for 4 weeks. The treatment effect of the two groups was evaluated after treatment. After the 2nd and 4th weeks of treatment, the VAS scores and hand swelling scores of the two groups were lower than those before treatment, and the Fugl-Meyer motor function scores were higher than those before treatment, after 4 weeks of treatment, the SCV and MCV of the patients of the two groups were elevated compared with those before treatment, when comparing the total effective rate of the treatment of the patients of the two groups, it was significantly higher in the treatment group than in the control group, indicating that the combination of acupuncture and knife therapy with the control group was more effective than the control group, indicating that the combination of acupuncture and knife therapy was more effective than the control group. Comparing the total effective rate of treatment between the two groups, the treatment group was significantly higher than the control group, indicating that the effect of small needle knife therapy combined with rehabilitation training treatment was better than that of needle stabbing combined with rehabilitation training treatment.

6. Conclusion

Because the pathogenesis of post-stroke shoulder-hand syndrome is not yet clear, at this stage, clinical treatment is mainly symptomatic, and there is no specific treatment plan in western medicine, relevant literature research [16]-[19] shows that the clinical efficacy of Chinese medicine in treating post-stroke shoulder-hand syndrome is outstanding, and small needle knife therapy, as a new kind of traditional Chinese medicine characteristic acupuncture therapy, has better efficacy in treating post-stroke shoulder-hand syndrome, and it has been included in the traditional Chinese medicine diagnosis and treatment plan for shoulder-hand syndrome stage III. The patient's shoulder and hand syndrome has been included in the TCM treatment program for stage III shoulder and hand syndrome. After the acupuncture treatment, the patients' upper limb pain was rapidly eliminated or relieved, which in turn laid a good foundation for the patients' rehabilitation training. Studies have shown that [20], [21], in a pain-free or pain-reduced state, the effect of rehabilitation training is often twice as effective, so that the function of the affected limb can be restored to a greater extent [14]. Compared with other therapies, small needle knife therapy combined rehabilitation training has the advantages of safety, convenience, affordability, and low operation difficulty, so acupuncture and knife combined rehabilitation training has obvious advantages in the clinical treatment of post-stroke shoulder-hand syndrome. However, the current study still has certain problems: (1) The inclusion criteria of some studies

are not rigorous enough, although the included patients meet the diagnostic criteria of post-stroke shoulder-hand syndrome stage I, but there is no clear screening for the onset time of the patients, and studies have shown that [13], the clinical efficacy achieved by different onset times of the patients is also different, which has a certain impact on the final results of the study, (2) Some of the studies are not rigorous enough to assess the final results of the study, the small needle knife therapy to acupuncture needles and surgical knives of the two strengths of the integration of some of the studies focus on the role of the small needle knife therapy as a surgical knife for the loosening of the role of the small needle knife therapy, but ignored the role of the small needle knife therapy needle effect, the small needle knife therapy in the treatment of acupuncture point stimulation to ensure that peripheral nerves and central nervous system excitation to maintain a normal state of sensory nerve conduction inhibition, in order to alleviate the sense of pain [22]. Therefore, when evaluating the clinical therapeutic effect, we should consider evaluating the SCV and MCV, so as to evaluate the clinical therapeutic effect in a more comprehensive way. (3) In clinical research on the treatment of post-stroke shoulder-hand syndrome by small needle knife therapy combined with rehabilitation technology, there is no difference in the sequence between the operation of rehabilitation and small needle knife therapy, and the research shows that [20], [21] in the case of no pain or less pain, the effect of rehabilitation will be better, therefore, we should consider the advanced treatment. Therefore, it should be considered to first carry out the small needle knife therapy treatment to relieve the patient's pain, and then carry out the rehabilitation technology treatment, in order to achieve a better therapeutic effect. (4) At present, there are fewer studies on the small needle knife therapy combined with rehabilitation training to treat the post-stroke shoulder-hand syndrome and most of them are based on the comprehensive rehabilitation treatment, and there is a lack of related traditional Chinese medicine (TCM) rehabilitation technology, such as gua sha (gua sha), moxa (moxibustion), and traditional Chinese medicine (TCM) fumigation. It is believed that with the in-depth study of small needle knife therapy combined with rehabilitation technology for the treatment of post-stroke shoulder-hand syndrome, small needle knife therapy combined with different rehabilitation techniques is expected to achieve more excellent clinical efficacy, strengthen the guiding role of clinical treatment, and alleviate the pain of patients.

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