

Clinical Research Progress of Acupuncture Combined with Modern Rehabilitation Therapy in the Treatment of Stress Urinary Incontinence

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Abstract: Stress Urinary Incontinence (SUI) refers to a type of disease in which the pelvic floor muscles and surrounding tissues are damaged or function impaired due to various reasons, leading to pelvic floor muscle relaxation and thus causing uncontrolled urine outflow. In this paper, the clinical literature of acupuncture and moxibustion combined with modern rehabilitation therapy in the treatment of female stress urinary incontinence in recent years was reviewed and analyzed. It was found that the combined application of acupuncture and modern rehabilitation therapy could more effectively improve the clinical efficacy and cure rate of stress urinary incontinence. This indicates that acupuncture combined with modern therapy has more significant curative effect and advantages in the treatment of stress incontinence, which has certain reference significance and research value for the future clinical treatment of stress incontinence.

Keywords: Stress incontinence; Urinary incontinence; Acupuncture; Pelvic floor function; Research progress; Modern therapy

1. Introduction

Stress urinary incontinence belongs to female Pelvic Floor Dysfunction (PFD). SUI refers to the pelvic floor muscle relaxation caused by injury or dysfunction of pelvic floor muscles and surrounding tissues due to pregnancy, childbirth and other reasons, resulting in uncontrolled urine outflow. Most clinical manifestations are coughing, laughing and other abdominal pressure suddenly increases when urine is not controlled by the patient from the urethral opening, severe cases can affect the patient's normal standing activities or lying position changes, greatly affecting the patient's life and social activities. The disease is mainly affected by women, clinically more common in the elderly, postpartum or obese people. Affected by age, fertility and other factors, many women have long endured SUI's indescribable impact on life and social activities, which seriously affected their physical and mental health and quality of life, so SUI is also known as "social cancer".

With the opening of the three-child policy and the advent of the aging society, the incidence of SUI has gradually increased. While the quality of life has been greatly improved, women are also encouraged to pursue the quality of life after childbirth. Therefore, postpartum rehabilitation has gradually become the focus of the majority of pregnant families, and SUI has also been paid more and more attention.

At present, stress urinary incontinence is mainly treated by surgical and non-surgical methods. The clinical efficacy of surgical treatment is reasonable, but it is mostly applicable to patients with severe stress urinary incontinence and must conform to clinical surgical indications, because it has certain risks, greater trauma, more complications, and higher costs, leading to low acceptance of patients. Non-surgical treatment includes traditional Chinese medicine treatment, acupuncture treatment, pelvic floor muscle training, electrical stimulation biofeedback therapy, magnetic electric stimulation and other modern rehabilitation therapies, which are more acceptable to patients because of their advantages of non-invasive treatment, easy operation and high safety. Among them, the exact effect of acupuncture on SUI has been confirmed by a large number of clinical studies, and the forms of acupuncture therapy are also diversified, including acupuncture therapy (including milliacupuncture therapy, electric acupuncture therapy, awn acupuncture therapy, etc.), moxibustion treatment, buried thread therapy, acupoint application therapy and auricular point therapy. Modern therapies such as electrostimulation biofeedback

are increasingly used in clinical applications and accepted by patients. Ma Guanglin et al. [1] found in the meta-analysis of randomized controlled clinical literature on the treatment of SUI by acupuncture that electroacupuncture, warm acupuncture and heat-sensitive moxibustion were common clinical acupuncture methods and had significant curative effects. This article mainly discusses the clinical research progress of acupuncture and moxibustion combined with modern therapy for stress urinary incontinence, which is widely used in clinical practice. A review of the clinical research literature on acupuncture combined with modern rehabilitation therapy in the treatment of female SUI in recent years found that compared with acupuncture alone or other rehabilitation therapy alone, the clinical application of acupuncture combined with other modern therapies can more effectively improve the clinical efficacy and cure rate of stress urinary incontinence. This indicates that the combination of acupuncture and western medicine with modern therapy has better curative effect and advantages in the treatment of female SUI, and further confirms the effectiveness of acupuncture for SUI and the superior efficacy of integrated Chinese and western medicine in the treatment of the disease, hoping to provide certain reference significance and research value for the future clinical treatment of SUI.

2. Electroacupuncture combined with modern rehabilitation therapy

Electroacupuncture is a kind of therapy which is applied to a certain part of the human body by means of the electroacupuncture instrument which outputs the current close to the human body bioelectricity after the acupoint is pierced with the millimeter needle and obtains the qi.

2.1. Mechanism of electroacupuncture therapy for SUI

Different waveforms of electroacupuncture stimulation parameters have corresponding excitatory, calming and stimulating effects on human body. For SUI, electricity can repair and regenerate the peripheral pelvic floor nerves, pelvic floor muscles and other tissues. Electroacupuncture acts on pelvic floor muscles, which can improve the strength and elasticity of pelvic floor muscles and promote the recovery of pelvic nerve muscles. The micro-current generated by the electroacupuncture instrument can stimulate sacral nerves through the needle, and the urinary sphincter can recover tension and contractile force after the feedback pathway in the spinal cord urination center is adjusted, thus enhancing the ability of self-controlling urine [2]. Related studies [3] believe that acupuncture at local bladder meridian points has the effect of warming and tonifying kidney Yang, regulating bladder opening and closing, and restricting urethra. As a safe and effective treatment method, electroacupuncture can stimulate local pelvic floor nerve, promote the rhythmic contraction of pelvic floor muscle, and make pelvic floor muscle get passive exercise.

2.2. Clinical application of electroacupuncture combined with modern rehabilitation therapy in treatment of SUI

Sun Min et al. [4] randomly divided the patients with postpartum mild stress urinary incontinence into three groups: acupuncture group, pelvic floor rehabilitation group, acupuncture and pelvic floor rehabilitation group (combined group). The muscle strength scores of Class I and Class II muscle fibers of pelvic floor muscle and the value of abdominal leakage point pressure were observed after 1 week and 24 weeks of treatment. The results showed that the muscle strength of Class I and Class II pelvic floor muscle fibers and abdominal urine leakage point pressure were significantly increased in 3 groups, and the difference was statistically significant ($P < 0.001$). The abdominal pressure leakage point pressure in combined group was higher than that in acupuncture group and pelvic floor rehabilitation group, and the difference was statistically significant ($P < 0.001$). The total effective rate of the three groups was compared and it was found that the total effective rate of the combined group was significantly higher than that of the acupuncture group and the pelvic floor function training group, and the difference was statistically significant ($P < 0.001$). This indicates that acupuncture combined with pelvic floor rehabilitation has better and more stable clinical efficacy than simple treatment for postpartum mild stress urinary incontinence. Luo Qian [5] took female patients with mild to moderate stress urinary incontinence as the research object. In the clinical study, acupuncture combined with pelvic floor magnetic stimulation was used to observe its clinical efficacy. The results showed that Kegel training, pelvic floor magnetic stimulation and acupuncture combined with pelvic floor magnetic stimulation could improve the symptoms of female patients with mild to moderate stress urinary incontinence to varying degrees. It was found that compared with single treatment, acupuncture combined with pelvic floor magnetic stimulation group had more significant effects on reducing urinary leakage and attack frequency, improving quality

of life and long-term curative effect. Hong Zhenjing et al. [6] studied the clinical observation of acupuncture combined with biofeedback in the treatment of female stress urinary incontinence, and found that compared with the simple application of biofeedback therapy to improve SUI symptoms, improve urine leakage, and reduce the frequency of urinary incontinence, the combined application of acupuncture and biofeedback therapy to a certain extent made up for the shortage of the former's long course of treatment, and its clinical efficacy was more significant. Acupuncture combined with pelvic floor functional training in the treatment of female stress urinary incontinence improves bladder compliance by increasing Valsalva leakage point pressure and maximum urethral closure pressure in urodynamics, thereby reducing the urine leakage volume of patients and effectively relieving the condition of clinical urinary incontinence patients [7].

In order to explore a more effective therapy, the combination of electroacupuncture and biofeedback electrical stimulation was applied to the clinical study of female stress urinary incontinence, and 75 female SUI patients were randomly divided into three groups: The treatment effect, bladder neck mobility, urethral rotation Angle and anal levator hiatus area of the three groups were compared in the electroacupuncture treatment group, biofeedback electrical stimulation treatment group and electroacupuncture combined with biofeedback electrical stimulation treatment group. The results confirmed that the improvement effect of electroacupuncture combined with biofeedback electrical stimulation on pelvic floor function and structure and the degree of promoting disease recovery were superior to the previous two groups, and the clinical efficacy was better [8]. Related studies [9] conducted a three-year follow-up for women with mild to moderate stress urinary incontinence after rehabilitation, aiming to review and analyze the near-term and long-term clinical efficacy and stability of pelvic floor rehabilitation. The results confirmed that pelvic floor biofeedback combined with electrical stimulation combined with electroacupuncture combined with Kegel training had more stable long-term efficacy. In particular, electroacupuncture plays an important role in the rehabilitation of female stress urinary incontinence.

3. Warm acupuncture combined with modern therapy

3.1. Mechanism of warm acupuncture in treatment of SUI

Warm acupuncture and moxibustion on the basis of warming Yang and strengthening, conditioning Chongren general treatment of points differentiation, warm acupuncture and moxibustion on the surface of acupoints produce warm heat effect, to achieve the effect of strengthening the bladder, tonifying the kidney and warming the Yang, can effectively improve the function of pelvic floor muscle and bladder blood flow, so as to promote the functional recovery of pelvic floor muscle.

The unique warming effect of warm acupuncture and moxibustion can not only promote the recovery of damaged pelvic floor muscle and local Qi-blood operation, but also stimulate the pelvic floor nerve under the action of acupuncture and improve the neuromuscular excitability, which strengthens the tension and contractile force of pelvic floor muscle. After the combination of warm acupuncture and moxibustion and pelvic floor muscle rehabilitation training, the pelvic floor muscle can get active and passive bidirectional strengthening training. The functional recovery of pelvic floor muscle group greatly strengthened the supporting role of vesicourethral structure, improved the urine control ability of patients, and significantly reduced the urinary leakage and clinical symptoms of urinary incontinence. Warm acupuncture and moxibustion has great potential and advantages in the treatment of stress urinary incontinence, and clinical researchers need to further study its internal mechanism and mechanism of action.

3.2. Clinical application of warm acupuncture combined with modern rehabilitation therapy in the treatment of SUI

Qi Pingping [10] found that the use of warm acupuncture Baliao combined with pelvic floor muscle therapy instrument (electrical stimulation combined with biofeedback therapy) to treat female stress urinary incontinence has significant clinical efficacy, which can greatly reduce the clinical symptoms of patients and reduce the incidence of stress urinary incontinence concomitant diseases. In an RCT experiment on the effect of warm acupuncture and moxibustion combined with Kegel pelvic floor rehabilitation training on postpartum stress urinary incontinence, the researchers took simple pelvic floor muscle therapy instrument as the control group, and combined warm acupuncture and moxibustion Baliao treatment on the basis of the control group as the experimental group. The warm acupuncture and

moxibustion therapy selected Shenshu, Cyishu, Qihai, Guanyuan and Zhongji as the operative acupoints. The results showed that urine leakage, urinary incontinence degree score, pelvic floor muscle strength and quality of life score of the two groups after treatment were significantly different from those before treatment, and the therapeutic effect of the experimental group was superior to that of the control group, suggesting that compared with Kegel pelvic floor rehabilitation training alone, warm acupuncture combined with Kegel pelvic floor rehabilitation training had more significant clinical effect [11]. A study on patients with early postpartum stress urinary incontinence [12] found that warm acupuncture combined with pelvic floor muscle exercise had a definite clinical effect on early postpartum SUI patients. Li Niu, Jin Shanxian [13] used warm acupuncture and acupuncture combined with pelvic floor muscle rehabilitation training to intervene patients with early postpartum stress urinary incontinence. The results showed that the pelvic floor muscle strength score of the observation group was higher than that of the control group, and the incontinence degree score and urine leakage volume were lower than that of the control group. The results showed that combined with warm acupuncture and moxibustion on the basis of pelvic floor muscle rehabilitation training could effectively improve the pelvic floor muscle strength and urodynamics indexes and reduce urine leakage.

4. Heat sensitive moxibustion combined with modern therapy

4.1. Mechanism of heat-sensitive moxibustion in the treatment of SUI

Mugwort leaves as a kind of traditional Chinese medicine, taste spicy, bitter, warm, with warm channel dispelling cold, qi activating blood and clearing the effect, moxibustion can warm and tonify kidney Yang, strengthen kidney qi, improve pelvic floor muscle function. Relevant studies [14,15] have found that the heat energy generated locally by moxibustion can effectively stimulate the pelvic visceral nerve plexus, promote the blood circulation of the bladder and the muscle tissues around the pelvic floor, reduce the pressure of the detrusor muscle, repair the urethral sphincter, increase the bladder capacity, improve the bladder compliance, and thus improve the symptoms of stress urinary incontinence. Heat-sensitive moxibustion is a new type of traditional Chinese medicine therapy based on traditional moxibustion, which is based on moxibustion hanging on acupoints to find heat-sensitive acupoints, and apply certain techniques to promote moxibustion to get qi at the acupoints.

At present, moxibustion has been widely used in the clinical treatment of SUI in various forms, including mild moxibustion, warm moxibustion, barrier moxibustion, heat sensitive moxibustion, etc [16]. The unique warming and tonifying power of moxibustion is applied to the human body, which can stimulate the operation of the whole body's channel qi and the access of Yang qi while promoting local blood flow, thus helping the recovery of bladder physiological function. Combined with modern rehabilitation therapy, moxibustion can effectively improve the muscle strength of the pelvic floor muscle and reduce the number and amount of urine leakage in patients with SUI, thus improving the cure rate of clinical patients.

4.2. Clinical application of heat-sensitive moxibustion combined with modern rehabilitation therapy in treatment of SUI

Zhu Chan [17] randomly divided postpartum patients with stress urinary incontinence into control group and observation group. Routine pelvic floor muscle rehabilitation training was used as the control group, and the experimental group was given heat-sensitive moxibustion combined with pelvic floor muscle rehabilitation instrument treatment. The experimental results were compared after 2 months of treatment. It was found that the total effective rate, pelvic floor electromyography value, pelvic floor muscle strength grade and maximum urethral closure pressure of the experimental group were higher than those of the control group after treatment ($P < 0.05$), the urine leakage in 1h urine pad test and the frequency of urinary incontinence in 24 h at different stages of treatment were lower than those of the control group ($P < 0.05$). The results showed that heat-sensitive moxibustion combined with pelvic floor muscle rehabilitation instrument had a significant effect on the recovery of pelvic floor muscle function, the improvement of urodynamics and the relief of urinary incontinence symptoms in postpartum patients with stress urinary incontinence, and played a synergistic role in the treatment of causes and symptoms.

Yang Xiaobo et al. [18] found in the clinical study of heat-sensitive moxibustion combined with Kegel exercise on mild to moderate female patients with simple stress urinary incontinence that heat-sensitive moxibustion combined with Kegel exercise had more advantages and better clinical efficacy than the Kegel exercise group alone, and the therapy could significantly improve the frequency of urinary

incontinence, urinary incontinence severity index and B-ultrasound related parameter indexes of patients. For mild to moderate female patients with simple stress urinary incontinence, heat-sensitive moxibustion combined with Kegel exercise was more significant in improving pelvic floor structure and function and relieving urinary incontinence symptoms in clinical patients.

5. Summary

There is no such thing as stress incontinence in ancient texts. "Bladder cough, cough and drowning" is the earliest record of stress incontinence in "Huangdi Neijing". Modern Chinese medicine classifies stress incontinence into "enuresis" and "bladder cough". Traditional Chinese medicine believes that the disease is located in the bladder, mainly related to the spleen, kidney and bladder, the main pathogenesis is the spleen and kidney deficiency, solid control is not right, clinical treatment from the spleen and kidney. Modern medicine believes that stress incontinence is mainly related to pregnancy, reduced hormone levels and abnormal pelvic floor anatomy.

Pelvic floor muscle training can improve the function of external sphincter and relieve the symptoms of urinary incontinence to varying degrees. This therapy is also the first-line treatment currently used in the treatment of mild and moderate urinary incontinence. However, most clinical patients cannot accurately identify the location of the pelvic floor muscle, so individual factors greatly affect the clinical efficacy of pelvic floor muscle training. The treatment requires high compliance and autonomy of patients, so the clinical effect is not stable.

As one of the emerging therapies in recent years, biofeedback electrical stimulation therapy is mainly used in pelvic floor dysfunction diseases. The treatment is to place the electrode in the patient's vagina, and the micro-current issued by the instrument can stimulate the pelvic floor muscles and nerves, causing the contraction of the treatment site, so that the patient's pelvic floor muscles can be passively exercised, and the pelvic floor nerve and muscle function can be corrected and improved. During the treatment process, the sensor and display screen can feedback the feedback information to the patient in the form of auditory and visual feedback, and further provide accurate and scientific guidance for the rehabilitation training of the patient. Relevant studies^[19] also confirmed that biofeedback electrical stimulation therapy has a significant effect on the improvement of pelvic floor structural parameters and pelvic floor muscle strength.

Pelvic floor magnetic stimulation is also an emerging muscle rehabilitation technology in recent years, mainly through a powerful pulsed magnetic field to regulate the pelvic floor nerve, promote the pelvic floor nerve recovery or improve the ability to regulate the pelvic floor muscle, so as to improve the strength of the pelvic floor muscle, to promote the rehabilitation of the pelvic floor physiological function, reduce the symptoms of stress urinary incontinence treatment effect. Currently, there are many non-surgical therapies for the treatment of SUI in clinical practice. As a relatively common treatment method, pelvic floor bioelectromyography feedback therapy mainly uses low-frequency electrical local electrical stimulation on the anal and pudendal nerves of patients to induce emission stimulation, thus achieving the purpose of strengthening sphincter contraction and improving the patient's ability to control urine. This therapy can significantly reduce the incidence of voluntary urine overflow^[20].

With the gradual increase in the incidence of female SUI in China, selecting an effective and effective treatment method to treat female stress urinary incontinence, so as to improve the quality of life of patients with stress urinary incontinence is a problem worthy of continued clinical exploration and urgent solution. Monotherapy in the actual clinical effect is limited, the extension of the course of treatment also reduces the patient's compliance and cure confidence, which is also a clinical attention must be paid to a problem. Through reviewing and summarizing the relevant literature, we found that the clinical effect of combining acupuncture with pelvic floor muscle training and other modern rehabilitation therapy is better than that of single therapy. Acupuncture and moxibustion, as the treasure of Chinese medicine, has a rich variety of clinical therapies. Whether it is electroacupuncture or moxibustion, the clinical efficacy is obvious and the long-term curative effect is relatively stable in the process of combined application with other therapies. So what kind of acupuncture and moxibustion therapy should be selected in combination with modern therapies to achieve more significant clinical efficacy? What is the mechanism of acupuncture in the treatment of stress urinary incontinence? Many scientific problems still need clinical researchers to continue to explore and practice.

According to relevant studies^[21], compared with the sole application of pelvic floor muscle rehabilitation training, Kegel training combined with acupuncture can significantly reduce the occurrence of urinary incontinence events, and the treatment of postpartum SUI has better clinical efficacy and

advantages. However, further large-scale, multi-center, double-blind and randomized controlled trials are still needed to draw more and higher value research conclusions. To provide high-quality reference basis for clinical decision makers and promote the progress of clinical female pelvic floor health care. Through literature review, we found that the current clinical research on the mechanism of moxibustion in the treatment of female stress urinary incontinence is relatively limited, and the existing relevant research results show that moxibustion has a definite clinical effect on stress urinary incontinence, but its mechanism of action and theoretical research need to be further explored. To provide more powerful theoretical support and research evidence for the clinical effect of moxibustion on stress urinary incontinence.

It is believed that the further development and improvement of acupuncture and modern rehabilitation therapy for SUI in the future will provide impetus and direction for the clinical popularization of modern rehabilitation therapy such as acupuncture and acupuncture combined with pelvic floor magnetic stimulation, thus benefiting more patients with clinical stress urinary incontinence.

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