A study on Abnormal Movement Mode of Spasm After Release Shock Wave Intervention Stroke

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Abstract: Most stroke patients will have significant abnormal movement of spasms, such as lower leg triceps spasm, which can have a serious adverse effect on the physiological life movement of patients. After clinical treatment, it can be seen that the use of release shock wave intervention treatment, can effectively alleviate the poststroke spasm a movement, is a very good adjuvant treatment program. In this paper, the biological characteristics of shock wave and its related medical mechanism are analyzed and studied.

1. Introduction

The application of release shock wave in medicine was first traced back to the 1990s, when diseases such as bladder stones in urology needed to be treated with surgical shock wave by increasing energy through the iliac bone. Through the study of clinical medicine, shock wave can effectively promote the healing of soft tissue and bone, and can realize the "arousal" effect on osteoblasts.[1]In 1993, the release shock wave was formally applied in clinical medicine. In 1999, the first release shock wave therapeutic instrument was developed.

2. Scattered Extracorporeal Shock Waves

2.1. Biological Characteristics of Shock Waves

When the shock wave acts on the human tissue, the bubble gas in the human tissue expands at a very fast rate, and when the bubble expands to the limit of Chengdu, it collapses and produces the phenomenon of high-speed micro-spray, which is also called the cavitation effect of shock wave. When shock waves act on areas of biological pain, strong stimulation of axons can enhance the pain domain, stimulate the body's myelin-free X fiber and so on to play an analgesic role.[2]In different media, the propagation of shock wave will produce different stress effect, which may destroy the object in the organism because of the shear force, which is also caused by the slight damage caused by the shock wave to the biological tissue. Shock wave can also promote the body's local blood circulation, accelerate the body's metabolism, can change tissue membrane permeability. When shock waves act through cell suspensions, most cells are able to maintain their own activity and grow normally, but if they continue to increase the dose, number and duration of shock waves, they can cause nearly 95% of the cells to become fragments. If the time and times of treatment are controlled well, then in a certain range of theory, the longer and more times of treatment, the better the effect of treatment.[3]

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Figure 1 Scattered shock wave

2.2. Applicability of Discrete Shock Waves

At present, scattered shock wave is widely used in our country, the most commonly used is in sports rehabilitation, such as the general administration of sports training, sports center hospital, volleyball center, judo team, rehabilitation center of background sports university and so on. The main diseases suitable for releasing shock wave are anterior neck pain, plantar fasciitis, trochanter bursitis, humeral medial ankle inflammation and so on. Different diseases need to adopt different treatment plan to adjust the time, times and intensity of shock wave during treatment, and get the best shock wave performance parameter through clinical trial.[4]Because of the biological treatment characteristics of shock wave, there are also very obvious taboos in application, for severe heart disease, important organ dysfunction, tumor, pregnant women, skin allergy, acute injury and other diseases are not suitable for release shock wave treatment program. In the course of clinical treatment, we should pay attention to the possible complications of the disease, such as possible soft tissue swelling, skin breakage, pain, neuropathy, etc., after the treatment, the patient should minimize the strength, for the treatment of local ice, muscle stretching training, after the treatment of regular imaging review.

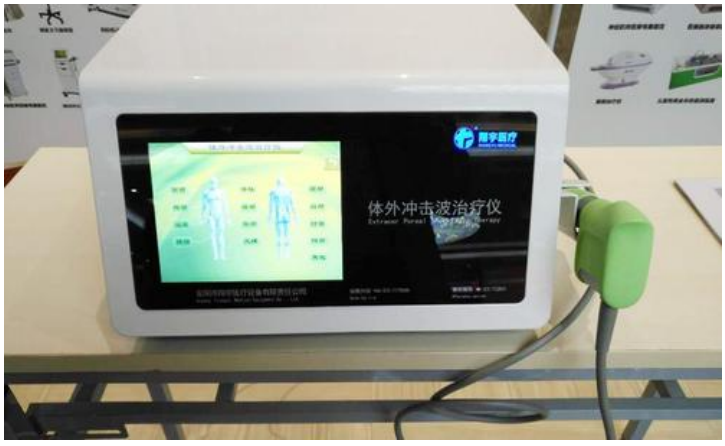

Figure 2 Excavating shock wave instrument

3. Abnormal Movement of Spasm After Stroke

The number of stroke patients in our country is millions every year, once the disease, then most of the patients are difficult to live independently, stroke patients have the characteristics of high mortality, high morbidity and high disability. Evidence-based medicine has confirmed that the best treatment for stroke patients is rehabilitation treatment, which is a very important part of stroke management model. Common stroke patients have problems such as limb stiffness, pain, and the

difficulty of straightening their fingers. During the night, the patient will have significant pain, severe will twitch difficult to fall asleep, poor sleep quality, stroke patients muscle spasm and muscle tension abnormal increase. For stroke patients with hemiplegia, more than 65% of the patients will experience spasms, which will not only affect the patient's motor function, but also severely restrict the patient's self-care ability, and make the recovery process longer. Long-term spasms can have a very serious impact on patients, resulting in a lot of pain and discomfort symptoms and so on, so that patients have a very serious insomnia, pessimism and anxiety mentality, patients'social participation ability is very low.

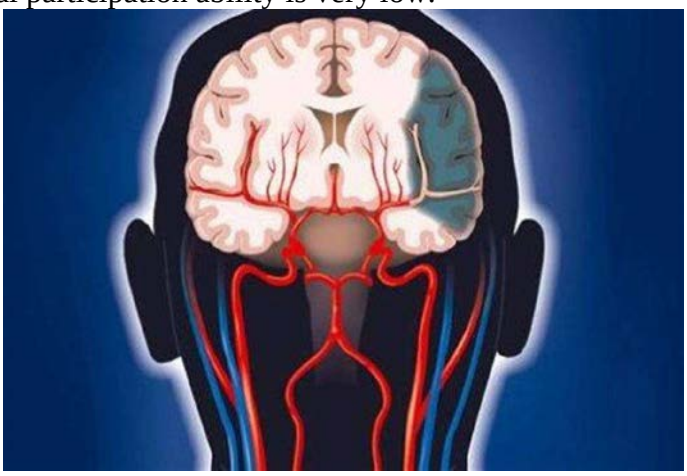

Figure 3 Cerebral apoplexy

Stroke patients spasm is a manifestation of central nervous system damage, which can manifest itself in a spasm-based abnormal movement pattern, no longer a normal movement pattern, and will reflect an abnormal increase in muscle tone. The reason why there are spasms, because stretch reflex excitability increased, originally because of the speed of tension stretch reflex hyperactivity becomes a motor dysfunction. The speed of the spasm depends on the speed of the muscle's drafting, and if the muscle's stretching speed is higher, then the muscle's spasm degree is higher. In clinical manifestations, it is a kind of muscle spasm, increased lateral muscle tension, pathological reflex, muscle group coordination is broken, abnormal movement.

4. Intervention of Release Shock Wave on Abnormal Movement of Poststroke Spasm

4.1. Routine Treatment

In the treatment of stroke patients, we should pay attention to improve the patient's posture and posture, improve the posture control ability and motor function, the purpose of the treatment should be to relieve the pain caused by the patient's spasm, should pay attention to the muscle and joint contracture, reduce the possible complications. In the course of treatment, early detection and early treatment should be done as far as possible, and the treatment should be divided into stages from the early stage, according to the different stages of treatment to formulate treatment plan, according to the procedures for comprehensive treatment, properly grasp the indications. In general, exercise therapy can be used to treat post-stroke spasm symptoms, such as standing training, anti-spasmodic posture, passive joint movement training, passive stretch training, etc. In addition, physical therapy can be used for labor pain, spasmolysis, and improving joint elasticity to relieve spasms by changing muscle extensibility. Commonly used physical therapies are cold therapy, hyperthermia, functional electrical stimulation, biofeedback therapy, including the proposed release shock wave intervention. In addition, traditional Chinese medicine treatment methods, such as acupuncture, massage, traditional Chinese medicine fumigation and so on, can be used in modern medicine to use analgesics, neurotrophic agents, muscle relaxation and other muscle toxin treatment. It can also be treated by surgery, such as nerve cutting, high selective spinal nerve root cutting, etc. The use of orthosis can also fix the spastic limb, reduce the contracture to the minimum, improve the balance of the body, and restore the patient's walking ability.

4.2. Release Shock Wave Therapy

Extracorporeal shock wave can effectively treat calcified tendinitis and osteomuscular diseases of joints, and has achieved very good results, which also shows that it has a very good effect in the treatment of spasms in both studies. as a pulse acoustic wave capable of peak pressure of 100 mpa in a very short period of time, in vitro shock wave can produce torsional tension between different density tissues after entering the human body, and then produce physical and biological effects and play a good therapeutic role. these therapeutic effects are due to the cavitation of in vitro shock wave, mechanical action and so on, which can increase the permeability of cell membrane and stimulate the release of multiple growth factors. For patients with spasticity, the muscle tension of patients will be increased after upper motor neuron injury, which is due to the reflex-mediated mechanism and non-rejection-mediated mechanism. Both studies have shown that divergent extracorporeal shock has a very good therapeutic effect on the treatment of lower limb spasm in patients with cerebral palsy, and the effect can reach 2 months, which can play a lasting clinical effect.

In foreign studies, shock wave can treat spasms because it can stimulate the synthesis of no, and no is involved in the formation of peripheral nerve muscle joint, thus completing the important physiological function of the central nervous system, including memory, nerve transmission and other physiological functions. When using shock wave therapy, it is necessary to avoid the main nerve and blood vessel position, and the denervating caused by shock does not reduce the muscle tension, so it can be speculated to induce the synthesis of no and participate in the physiological function adjustment of the central nervous system. Shockwaves produce mechanical stimulation of adjacent tendon muscle fibers, which can continue to compress the tendon, reducing spinal cord excitability, but this physiological effect on nerves is not lasting.

5. Conclusion

The use of release shock wave therapy can effectively relieve the spasmodic reaction of stroke patients, is a convenient and quick treatment method, with the characteristics of simple and quick effect, and the use of this method after the treatment of less adverse reactions, is a widely used minimally invasive physical therapy. Shock wave therapy can be used as an important adjuvant therapy in the course of treatment, but it is necessary to determine the best treatment parameters according to the needs of clinical treatment, and further analyze the mechanism of shock wave on spastic therapy in subsequent studies.

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