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Study of the Effect of Zhuang Medicine Aponeurotic System Triple Therapy on Lumbar Disc Herniation and Alpha-1 Acid Glycoprotein Level

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Abstract: *Objective:* To analyze the application effect of Zhuang medicine aponeurotic system triple therapy in the treatment of lumbar disc herniation and its effect on the level of alpha-1 acid glycoprotein (alpha-1 AGP). *Methods:* 200 patients with lumbar disc herniation were selected and randomly divided into a treatment group and a control group, 100 cases in each group. The control group was given conventional acupuncture, and the treatment group was treated with manipulation + fire needling + cupping. The alpha-1-AGP levels before and after treatment, as well as the lumbar spine function and pain scores before and after treatment, and the adverse reactions occurred during treatment between the two groups were compared. *Results:* Before treatment, there was no significant difference in alpha-1 AGP levels, lumbar function, and pain scores between the two groups ($P > 0.05$). After treatment, the lumbar function scores of the two groups were significantly increased, with the treatment group having higher scores than the control group ($P < 0.05$); the incidence of adverse reactions in the treatment group was 2.00%, which was much lower than the control group ($P > 0.05$). *Conclusion:* Appropriate application of Zhuang medicine aponeurotic system triple therapy in the clinical treatment of lumbar disc herniation can promote the improvement of alpha-1 AGP index level, reduce the pain degree of patients, and improve their lumbar spine function. At the same time, Zhuang medicine also has significant advantages in terms of safety, while ensuring the efficacy and safety of the treatment.

Keywords: Zhuang medicine aponeurotic system triple therapy; Lumbar disc herniation; Application effect; Alpha-1 acid glycoprotein

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1. Introduction

Lumbar disc herniation is a relatively common disease that affects one's health and life, with high treatment cost, and protracted recovery. In recent years, due to various factors such as lifestyle and work, lumbar disc herniation has become more common among young people [1-2]. In modern medicine, lumbar disc herniation can be treated by surgical or non-surgical methods. Non-surgical treatment includes non-steroidal painkillers and other commonly used drug treatments that can relieve pain and reduce inflammatory reactions. The patients are then instructed to rest on a hard board bed and undergo physiotherapy and traction and other auxiliary treatment measures [3-4]. However, non-surgical treatment mainly serves to relieve the patient and related symptoms and does not cure the disease. The patient's symptoms will recur some time after the treatment. Surgical treatment can be adopted for patients who have achieved significant

results after conservative treatment for more than three months, or whose condition has worsened [5-6]. However, it is worth noting that traditional surgical treatment causes great trauma to the patient's body and has a high risk of concomitant occurrence, while minimally invasive surgery has certain limitations and costs a lot, resulting in ineffective treatment [7-8].

Zhuang medicine aponeurotic system therapy is based on the guidance of the classical theories of the twelve aponeurotic systems, combined with the prevalent folk tendon regulation technique of Guangxi's Zhuang people, which resulted in the formation of an extra-systemic treatment method of "touching knots through tendons" for diagnosis and "relaxing tendons and knots" for treatment. The theory of diagnosis and treatment of aponeurotic systems in Zhuang medicine believes that pain caused by tendon knots is the cause of aponeurotic system diseases. The principle of "loosening tendons and untying knots," in which "when knots are untied, the tendons will become loose, when tendons are loose, they will become smooth, when tendons are smooth, they will be active, when tendons are active, they will be unobstructed," is combined with the original technique of pulling, pinching, and twisting tendons of Zhuang medicine, and also combined with Zhuang medicine fire needle warming therapy and cupping therapy to relax the tendons, so as to achieve the purpose of relaxing tendons and dredging collaterals [9-10]. The aponeurotic system therapy of Zhuang medicine has obvious characteristics of folk medicine, the theory is novel with remarkable effects, and it will not cause great financial burden on the patients and their families. In the past, the aponeurotic system therapy of Zhuang medicine has achieved remarkable effects in the treatment of patients with aponeurotic system diseases and has been widely applied. Therefore, it should be reasonably applied in the treatment of patients with lumbar disc herniation [11]. In this study 200 patients with lumbar disc herniation were selected, the clinical efficacy of different treatment modes were compared, and the application effect of Zhuang medicine aponeurotic system triple therapy in lumbar disc herniation and its effect on alpha-1 acid glycoprotein (Alpha-1 AGP) level were analyzed.

2. Materials and methods

2.1. Research subjects

200 patients with lumbar disc herniation treated in Mingxiu Branch of International Zhuang Hospital Affiliated to Guangxi University of Traditional Chinese Medicine from June 2019 to June 2020 were selected at research subjects and were divided into a treatment group and a control group by digital random grouping method, with 100 cases in each group. The male to female ratio of patients in the treatment group was 58:42, ranging from 33 to 65 years old, the average (38.24 ± 4.35) years old, and the average duration of disease was 8.74 ± 2.02 months. The male to female ratio of patients in the control group was 54:46, ranging from 35 to 63 years old with an average of 36.34 ± 4.87 years old, and the average duration of disease was 8.52 ± 2.34 months. There was no significant difference in baseline data between the two groups ($P > 0.05$), and they were comparable.

Inclusion criteria: (1) patients who informed and agreed to the study; (2) patients who are diagnosed with lumbar disc herniation; (3) patients who are conscious, able to participate and cooperate with the treatment.

Exclusion criteria: (1) patients with coagulation dysfunction; (2) patients with heart, kidney, and other vital organ failure; (3) patients with nervous system diseases or lumbar spine tumors; (4) pregnant and lactating women.

2.2. Method

The control group underwent conventional acupuncture treatment. The patient chose the left or right lying position depending on their condition, exposing the acupoint area and the surrounding skin. 75% alcohol was used to disinfect the acupoints, and acupuncture was performed with a filiform needle: Shenshu 0.5-1

cun (1 *cun* =1/3 dm), Dachangshu 0.8–1.2 *cun*, Huantiao 2-3 *cun*, Weizhong 1–1.5 *cun*, Yanglingquan 1–1.5 *cun*, Kunlun 0.5–0.8 *cun*. The direct needling method was adopted for the aforementioned 6 acupoints, and Huantiao was needled until a radiation sensation was felt at the lower extremities. The needle was retained for 20 minutes and was inserted once at an interval of 10 minutes until there was sensation at the acupoints, including soreness, tingling, swelling, and heaviness.

The treatment group underwent manipulation + fire needling + cupping treatment.

2.2.1. The aponeurotic system manipulation of Zhuang medicine

The principle of the manipulation — loosening tendons and untying knots. According to the size, hardness and location of tendon knots, light knots are usually loosened, medium knots are usually untied, and heavy knots are usually broken. (1) The patient lied in a prone position. According to the direction of the Meridian of Foot-Taiyang, starting from the heel, the patients foot was pressed with the tip of the elbow of the physician. After the foot was heated and the heat flowed upwards, the elbow method was applied (comprehensive application of compound techniques such as tapping, kneading, pressing, rubbing, separating tendons, and smoothing tendons) from the foot to the waist along the direction of the Meridian of Foot-Taiyang to relax the tendons and untie knots, focusing on pressing the tendon knots of the heel, gastrocnemius, hamstring, biceps femoris, and gluteus maximus, as well as the gluteus medius muscle knots, iliocostalis muscles, and Huatuo Jiaji tendon knot (sacral spinous muscle, three transverse processes of the lumbar region, next to the spinous process between lumbar 4 and 5 or lumbar 5 and sacrum 1). The manipulation requires a combination of rigidity and softness so that the qi reaches the disease area. (2) The patient lied on his side, the Meridian of Foot-Shaoyang was then pressed and kneaded with the pulp of the thumb and the elbow according to the movement of the Meridian of Foot-Shaoyang, focusing on loosening the extensor hallucis longus knot, peroneus longus tendon knot, peroneal nerve, quadriceps lateral muscle knot, rabbit tendon knot (semimembranosus, sartorius), iliotibial band, tensor fasciae latae, piriformis muscle knots, and many more, to fully loosen and soften these muscles. (3) The patient lied at a supine position: the whole line from the back of the foot along the direction of the Meridian of Foot-Yangming was loosened by applying pressure using the thumb, four fingers and the forearm focusing on the tendon knots of medial head muscles, Qichong tendons (inguinal nerve, femoral artery point), psoas major muscle knots, and many more. (4) The lumbar oblique pull reduction method was carried out. Firstly, the patient lied on his/her side, with the upper lower limbs flexed and lower limbs straightened. Generally, this procedure can be performed by one person, or two persons with the assistant being responsible for fixing the position of the patient. The operator stood on the back of the patient, pulled the shoulder back with one hand, pushed the sacroiliac joint forward with the other hand, and pulled obliquely in opposite directions at the same time, which may result in a “clicking” sound.

2.2.2. Fire acupuncture of Zhuang medicine

The principle of fire acupuncture is to rapidly insert and remove needles from the knots, which are the acupoints. In this procedure, the selected tendons, lumbar intervertebral spaces, exits of paraspinal nerves, and exits of sciatic nerves was rapidly disinfected. Then a 2–3-inch Zhuang medicine fire needle was held in the right hand, and the needle tip was burned until red on an alcohol lamp. The needle was then pierced into the acupoint quickly, and then rapidly removed after getting qi; the depth of acupuncture depends on the condition, constitution, age, muscle thickness at the acupuncture site, and the distribution of nerves and blood vessels. Damage to large blood vessels and nerves was avoided.

2.2.3. Cupping

The acupuncture point was covered with a cup for 8-10 minutes. The ideal effect was to pull out dark yellow

liquid or dark red blood stasis.

2.3. Observation indicators

(1) 5 ml of fasting venous blood was collected from the patients in the morning before and after treatment. The supernatant was obtained after anticoagulation and centrifuge. The levels of alpha-1 AGP before and after treatment were detected by double-antibody sandwich method.

(2) The lumbar function and pain degree of the two groups were compared before and after treatment. The lumbar function score was calculated using the lumbar function score table, with 15 points for clinical signs and 15 points for subjective symptoms. The higher the score, the better the lumbar function of the patient. Visual Analogue Scale (VAS) was used to count the degree of pain of patients before and after treatment, with a total score of 10 points: 0 indicated no pain feeling; 1–3 indicated mild pain; 4–6 indicated moderate pain; 7–10 indicated severe pain.

(3) The adverse reactions such as infection at the acupuncture site, waist pain, and general fatigue in after treatment were evaluated, and the incidence of adverse reactions of the two groups were calculated and compared.

2.4. Data processing method

The data was tabulated using Excel, the personnel and equipment used were recorded, and SPSS 22.0 software was used for data analysis. For the measurement data, the mean and standard deviation was used for statistical description, and one-way analysis of variance was used for statistical inference. For the enumeration data, frequency and percentage were used for statistical description, and a chi-square test was performed for statistical inference. The test level is $\alpha = 0.05$, and $P < 0.05$ is considered statistically significant.

3. Results

3.1. Comparison of alpha-1 AGP level and lumbar function and pain scores before and after treatment

There were no significant differences in alpha-1 AGP levels, lumbar spine function and pain scores between the two groups ($P > 0.05$) before treatment. The spine function scores of the two groups were significantly increased after treatment, and the scores of the treatment group were higher than those in the control group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of alpha-1 AGP levels, lumbar function, and pain scores between the two groups before and after treatment (mean ± SD)

Group	Number of cases	alpha-1 AGP (mg/l)		Lumbar function (points)		VAS (points)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Treatment group	100	418.64 ± 49.85	161.62 ± 26.78*	12.64 ± 3.45	22.78 ± 2.48*	6.78 ± 1.64	1.92 ± 0.45*
Control group	100	420.78 ± 52.38	221.45 ± 38.49*	11.97 ± 3.52	21.42 ± 3.05*	6.45 ± 1.71	2.15 ± 0.68*
t		0.296	12.760	1.359	3.460	1.393	2.821
P		0.768	< 0.001	0.176	0.001	0.165	0.005

Note: * $P < 0.05$ before and after treatment of the same group

3.2. Comparison of adverse reactions between the two groups

It can be seen from **Table 2** that the incidence of adverse reactions of the treatment group was 2.00%, which was lower than that of the group, which was 9.00% ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of the incidence of adverse reactions between the two groups [*n* (%)]

Group	Number of cases	Infection	Lower back pain	Fatigued	Total incidence
Treatment group	100	1 (1.00)	0 (0.00)	1 (1.00)	2 (2.00)
Control group	100	2 (2.00)	3 (3.00)	4 (4.00)	9 (9.00)
χ^2		–	–	–	4.714
P		–	–	–	0.030

4. Discussions

Lumbar disc herniation is a relatively common chronic lumbar spine disease. After the onset, patients will experience symptoms such as sciatica and low back pain. If targeted treatment is not received in time, it may even lead to serious complications such as severe paralysis and incontinence, which will severely affect the patient's health and quality of life [12]. In recent years, much research have been done on the analysis and treatment of lumbar disc herniation based on the characteristics of Chinese medicine, and significant curative effects have been shown. The theory of Chinese medicine classifies lumbar disc herniation into the category of lumbago and leg pain, while Zhuang medicine refers to this disease as "*He Ga Yin*" (Zhuang language, means a disease of pain in waist and lower extremities) [13]. Zhuang medicine believes that the occurrence and development of lumbar disc herniation is due to the excessive strain of the waist, the invasion of wind, cold and dampness, which leads to the imbalance of the meridians and tendons, resulting in the formation of tendon knots, the blockage of the *longlu* (blood meridians) and the *huolu* (sensation path), resulting in the disease. Therefore, it is advocated that the treatment should be based on the Meridian of Foot-Sanyang for targeted treatment [14]. The results of this study showed that the alpha-1 AGP levels and pain scores of both groups were significantly lower after treatment, with the treatment group showing a bigger decrease; the lumbar spine function scores of the two groups significantly increased, with the treatment group having higher scores than the control group ($P < 0.05$); the incidence of adverse reactions in the treatment group was 2.00%, which was lower than that of the control group, which was 9.00% ($P < 0.05$). According to the study, the rational application of Zhuang medicine aponeurotic system triple therapy in the clinical treatment of lumbar disc herniation can promote the improvement of alpha-1 AGP index level, reduce pain, and improve lumbar function. At the same time, Zhuang medical therapy also has significant advantages in terms of safety, while ensuring the effectiveness and safety of treatment.

Alpha-1 AGP is an acute reaction protein, which is synthesized by the human liver. The index level will increase after the body has an acute inflammatory response, but it may be affected by the immune function, and its specific mechanism of action is yet to be determined [15]. An inflammatory response will cause white blood cells to release a large number of endogenous inflammatory factors, which will accelerate the formation of acid glycoprotein, and its expression level in serum will increase, which results in a protective effect. After the inflammatory response subsides, the level of alpha-1 AGP will also gradually decrease. In this study, the level of alpha-1 AGP index decreased significantly after treatment, with the treatment group showing a larger decrease compared to the control group. This indicates that after Zhuang medicine aponeurotic system therapy, the inflammatory response of the patient's body decreased more significantly, and the treatment effect was more prominent [16]. This is because the triple therapy of meridians and tendons of Zhuang medicine adopts the combined treatment of tendon massage, acupuncture,

and cupping, which can effectively loosen the knots of patients, and helps in promoting blood circulation, removing blood stasis, dispelling cold and relieving pain.

Massage technique in the aponeurotic system triple therapy of Zhuang medicine can relieve the spasm of the aponeurotic systems, loosen the compression and adhesion of the nerve roots by loosening the nodules of the tendons, thereby eliminating the edema of the nerve roots and promoting the disappearance of the inflammatory response, and promote qi and blood flow. Acupuncture therapy can directly penetrate specific acupoints through acupuncture needles, and stimulate the acupoints to loosen adhesion tissues, relieve muscle spasms and muscle stiffness, and eliminate pain. Cupping can promote blood circulation and remove blood stasis, warm the interior, and dispel coldness. The combination of three treatment methods can achieve the purpose of releasing the adhesion and dredging the two channels. In this way the nerve root compression can be relieved, leading to the relive of the inflammation symptoms, and the reduction in the level of related indicators. At the same time, it reduces muscle tension, improves spinal stability, promotes blood circulation, and removes blood stasis. Lastly, it also promotes microcirculation and relieves pain.

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Disclosure statement

The authors declare no conflict of interest.

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