

Original Article

The effects of modified Guizhi plus Gegen decoction combined with the blade needle therapy on TCM syndromes, cervical curvature and levels of inflammatory factors in patients with cervical spondylotic radiculopathy

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Abstract: Objective: To explore the effect of modified Guizhi plus Gegen decoction combined with the blade needle therapy on traditional Chinese medicine (TCM) syndromes, cervical curvature, and inflammatory factor levels in patients with cervical spondylotic radiculopathy. Methods: In this retrospective study, 114 patients with cervical spondylotic radiculopathy who visited Pain Clinic, Hangzhou Fuyang Hospital of TCM Orthopedics and Traumatology from January 2020 to December 2022 were selected as the study subjects. According to different treatment methods, these patients were divided into an observation group (n=57, treated with blade needle therapy) and a control group (n=57, treated with modified Guizhi plus Gegen decoction combined with the blade needle therapy). Patients in both groups were treated for 3 courses. The treatment effects, TCM syndrome scores, cervical curvature, hemorheology indexes, inflammatory factors and adverse reactions were analyzed and compared between the two groups. Results: The effective rate of patients in the observation group was 94.74%, which was significantly higher than 82.46% in the control group (P<0.05). After treatment, TCM syndrome scores, hemorheology indexes, and inflammatory factors levels in both of groups were significantly decreased in contrast to before treatment, while the cervical curvature was obviously increased. Compared with the control group, after the treatment, TCM syndrome scores, hemorheology indexes, inflammatory factors levels after treatment in the observation group were obviously lower, while the cervical curvature in the observation group being significantly increased (all P<0.05). No statistical differences were found for the incidence of adverse reactions between two the groups. Conclusion: Modified Guizhi plus Gegen decoction combined with the blade needle therapy effectively improved the TCM syndrome scores, restored the curvature of the cervical spine, improved the hemorheology of patients, inhibited the levels of inflammatory factors and it also has few adverse reactions, with a significant treatment effect in patients with cervical spondylotic radiculopathy.

Keywords: Cervical spondylotic radiculopathy, Guizhi plus Gegen decoction, blade needle, TCM syndrome, cervical curvature, inflammatory factors, hemorheology, effects, adverse reactions

Introduction

Cervical spondylosis is a common orthopedic disease, which is caused by degenerative changes in the cervical spine or changes in surrounding tissues and structures. Patients with this disease are characterized by pain in the neck and shoulder, radiation pain in the upper limbs, stiffness in the neck and back, numb-

ness in limbs and so on [1]. Recently, with the changes in people's lifestyle and the widespread use of computers and air conditioners, the probability of neck flexion and cold exposure has been greatly increased, leading to a significant upward trend in the prevalence of cervical spondylosis and a trend towards younger average age. Cervical spondylosis has a negative impact on the work and life of patients,

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and also brings harms to the physiology in patients [2]. Some scholars pointed out that according to different symptoms and affected tissues, cervical spondylosis can be divided into vertebral artery type, nerve root type, spinal cord type, cervical type, and mixed type. Among them, nerve root type cervical spondylosis is the most common in clinical practices, due to degenerative changes and protrusion of cervical intervertebral disc, or hyperosteo-geny. The pain and numbness in patients with cervical spondylotic radiculopathy are along the affected nerve root and the incidence is far more than other types, accounting for about 60%-70% [3]. For western medicine, there are various methods for treating cervical spondylotic radiculopathy; however, the purpose is to advocate conservative treatment, such as traction and symptomatic intervention with anti-inflammatory and analgesic drugs. Although western medicine can alleviate some pain, it treats the symptom instead of the underlying problem, with a high recurrence rate [4]. Therefore, it is necessary to find the optimal method for treating the cervical spondylotic radiculopathy.

According to the clinical manifestations of cervical spondylotic radiculopathy, traditional Chinese medicine classifies it into the category of "arthralgia". Traditional Chinese medicine has unique insights in treating this disease and can avoid the disadvantages such as toxic side effects caused by Western medicine treatment. Research has reported that traditional Chinese medicine has relatively good effects on cervical spondylotic radiculopathy, but there are still poor treatment effects in some patients [5]. As a common method for treating cervical spondylosis, blade needle therapy can effectively alleviate the compression of local nerves and blood vessels on the cervical spine, promote the physiological balance of the neck and the disease prognosis [6]. Many studies reported that blade needle therapy alone cannot achieve ideal therapeutic effects [7]. Modified Guizhi plus Gegen decoction is considered as one of effective methods for treating the cervical spondylotic radiculopathy. Many pharmacological studies show that modified Guizhi plus Gegen decoction can inhibit the inflammation, reduce pain, promote the absorption of local edema, improve the blood circulation and relieve the compression of nerve roots [8]. Some studies reported that modified Guizhi

plus Gegen decoction could significantly improve the total effective rate in these patients who underwent cervical traction alone [9]. Another study showed that modified Guizhi plus Gegen decoction with the acupoint catgut embedding could obviously improve the efficacy in patients receiving the conventional acupuncture alone [10]. However, at present, there are few trials about the effects of modified Guizhi plus Gegen decoction combined with the blade needle therapy on the patients with cervical spondylotic radiculopathy. In this context, in order to further explore the clinical effects of modified Guizhi plus Gegen decoction combined with the blade needle therapy in the treatment of cervical spondylotic radiculopathy, 114 patients with cervical spondylotic radiculopathy admitted to Hangzhou Fuyang Hospital of TCM Orthopedics and Traumatology from January 2020 and December 2022 were selected as the research subjects in this study, and the clinical efficacy of modified Guizhi plus Gegen decoction combined with the blade needle therapy and the blade needle therapy alone were compared and analyzed. The possible mechanism was also investigated. The results of this study provide some clinical evidence for the treatment of cervical spondylotic radiculopathy.

Materials and methods

General information

In this retrospective study, from January 2020 to December 2022, a total of 114 patients with cervical spondylotic radiculopathy, who were treated in the Pain Clinic, Hangzhou Fuyang Hospital of TCM Orthopedics and Traumatology were selected as the study subjects. According to the method of treatment, these patients were assigned into an observation group and a control group with 57 cases in each group. The patients in the observation group underwent modified Guizhi plus Gegen decoction combined with the blade needle therapy, while those from the control group received the blade needle therapy alone. The Hospital Ethics Committee approved this research (No. 2019-144).

Inclusion criteria: ① Patients met the diagnostic criteria for cervical spondylotic radiculopathy [11]: (a) cervical pain and stiffness; (b) heaviness in the affected upper limbs and

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decreased grip strength; (c) intervertebral foramen compression test (+); (d) symptoms of numbness and pain that were mostly along the affected nerve roots. ② Imaging examination revealed that cervical degenerative lesions caused intervertebral foramen stenosis. ③ Patients with an age of 47 to 67 years old. ④ Patients with imbalanced intervertebral joints. ⑤ Patients with normal intelligence and normal communication. ⑥ Patients with complete medical records.

Exclusion criteria: ① Patients accompanied with other cervical diseases or who underwent cervical surgery before. ② Patients who were unable to cooperate with examination and treatment, due to mental abnormality. ③ Patients with abnormal functions of heart, brain, kidney and liver. ④ Patients who received other medications within 4 weeks. ⑤ Patients with severe cardiovascular and cerebrovascular diseases or malignant tumor diseases. ⑥ Patients with bone and joint tuberculosis or spinal canal tumor. ⑦ Patients who suffered from shoulder and back pain or upper limb numbness due to other reasons.

Methods of treatment

In control group, patients were treated with blade needle therapy alone: ① Patients were instructed to lie prone on the treatment bed with a soft pillow bellow the chest, and both hands were folded on the forehead, fully exposing the shoulder and neck regions. ② According to the specific situation of the patients and the imaging examination results, the needle insertion points were along the neck sideline, vertebral sideline, scapular region, and the locations of tender to the touch. ③ After determining the location, the needle entry points were disinfected and the painful locations were massaged with the left thumb. The blade needle was held with the right hand (Manufacturer: Beijing Characteristic Oriental Hospital Research Institute Co., Ltd.; Specification: 0.5 mm × 50.0 mm). The cutting and releasing operation were performed, paralleling to the longitudinal axis of the body with the edge direction, and the blade needle was rotated by 90° to cut and release horizontally for 2-3 times.

In the observation group, the patients received modified Guizhi plus Gegen decoction combined with the blade needle therapy. The for-

mula was as follows: Pueraria lobata 20 g, Guizhi 5 g, Paeonia lactiflora 15 g, raw licorice 5 g, ginger 10 g and jujube 6 pieces. According to the specific situation of the patients, the decoction formula was adjusted. For example, 10 g of peach kernel, 6 g of safflower and 8 g of ligusticum wallichii were added for patients with limited upper limb activity; 10 g of turmeric, 6 g of myrrh and 10 g of corydalis were added for patients with neck and back pain; 6 g of Notopterygium root, 10 g of zaocysdhumade and 10 g of radix clematidis were added for patients with obvious hand numbness and limb cold. All the traditional Chinese herbs were purchased from Beijing Tong Ren Tong Group, China. A volume of 700 ml of water was used to soak these herbs for 30 minutes before being boiled slowly for 30 minutes, and then, 200 ml of decoction was taken. It was consumed while warm twice, once in the morning and evening, as one dose per day. The patients were given 3 courses of treatment, with 10 days as a course of treatment.

Observed indices

In this research, the primary index was the curative effect. The secondary indices included TCM syndromes scores, cervical curvature, levels of inflammatory factors, hemodynamic indexes and adverse reactions.

① The therapeutic effects were compared between the two groups [12]. The evaluative criteria were as follows: the therapeutic outcomes included cured, effective and no effects. Cured: the symptoms and signs disappeared, the functions of the neck and upper limbs completely recovered, and patients were able to return to normal life; Effective: the symptoms and signs basically disappeared, and the functions of the neck and upper limbs basically recovered, which slightly affected work and life; No effects: the condition was not improved or even worsened. Effective rate = [(number of cases with cured and effective)/total number of cases] × 100%. ② TCM syndrome scores were compared between the two groups. TCM syndrome scores were evaluated according to the Guiding Principles of New drugs in Traditional Chinese Medicine [13], which included 5 items: neck pain, movement disorders, limb numbness, dizziness, and soreness and weakness of waist and knees. Higher score indicated more severe symptoms. ③ Cervical

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Table 1. The comparison of basic information between the observation group and control group

Parameters	Observation group (N=57)	Control Group (N=57)	t/ χ^2 value	P value
Gender			0.322	0.570
Male	31	34		
Female	26	23		
Age (years)	49.7±5.9	49.9±5.8	0.164	0.870
Course of disease (years)	6.9±0.9	6.9±0.8	0.122	0.903
BMI (kg/m ²)	22.9±2.1	22.8±2.0	0.393	0.695
The pressured nerve root			1.078	0.720
C4	8	6		
C5	10	9		
C6	12	10		
C7	11	12		
C8	9	9		
T1	7	11		
Education background			0.937	0.627
Middle school and below	21	18		
High school	19	20		
College and above	17	19		

Note: BMI: Body mass index.

vertebra curvature was compared between the two groups. In the X-ray film of the cervical vertebra, a line was connected between the posterior lower corner of the C7 vertebral body and the posterior upper corner of Dens axis. The arc line was drawn at the posterior edge of each vertebral body. The vertical transverse line at the widest point between these two lines is defined as the distance of arc [(12±5) mm]. If D value was less than 7 mm, the curvature was considered to be reduced, while if D value was greater than 17 mm, the curvature was considered to be increased. ④ The levels of inflammatory factors were compared between the two groups. Before and after treatment, 4 ml of fasting veins blood was collected, and the serum was isolated through centrifugation. The serum levels of cyclooxygenase 2 (COX-2) (Lot number: E0699h), interleukin-6 (IL-6) (Lot number: E0079h), tumor necrosis factor- α (TNF- α) (Lot number: E9636h) and 5-hydroxytryptamine(5-HT)(Lotnumber:E0808Ge)weremeasured by enzyme-linked immunosorbent assay (ELISA). These test kits were purchased from Wuhan EIAab Technology Co., Ltd. The test was conducted according to the kit instructions. ⑤ Hemorheology indexes were compared between the two groups. The vein blood was obtained as mentioned above. Fully automatic hemorheology instrument (manufacturer: Zhejiang Jingjinheng Technology Co., Ltd.; model: MP-210) was used to detect the whole

blood high shear viscosity, the whole blood medium shear viscosity, the whole blood low shear viscosity and plasma viscosity of these patients. The procedure was performed according to the instrument instructions. ⑥ The incidence of adverse reactions was compared between the two groups. The adverse reactions included mild abdominal distension, nausea and sleepiness. The incidence of adverse reaction was calculated according to the following formula: The incidence of adverse reaction = [(number of cases with adverse reactions)/total number of cases] \times 100%.

Statistical methods

All the clinical data collected in this study were analyzed using Statistic Package for Social Science (SPSS) version 23.0. The measurement data were expressed as mean \pm standard deviation, and the comparison was performed by independent t test. The count data was expressed as percentages/cases. The comparison among groups was performed using χ^2 test. P<0.05 indicated significantly statistical differences.

Results

Comparison of general information

As shown in **Table 1**, there were 57 patients who received modified Guizhi plus Gegen

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Table 2. Comparison of therapeutic effects between the two groups

Groups	Cases	Cure	Effectivity	No effects	Total effective rate (%)
Observation group	57	39	15	3	94.7
Control group	57	26	21	10	82.5
χ^2 value					4.254
P value					0.039

Table 3. Comparison of TCM syndromes scores between the two groups

Parameters		Observation group (N=57)	Control group (N=57)	t value	P value
Neck pain	Before treatment	4.28±0.78	4.31±0.81	0.201	0.841
	After treatment	0.82±0.11*	1.92±0.51*	15.917	<0.001
Movement disorders	Before treatment	4.78±0.83	4.71±0.79	0.463	0.644
	After treatment	0.91±0.11*	1.93±0.31*	23.411	<0.001
Limb numbness	Before treatment	3.69±0.59	3.73±0.62	0.353	0.725
	After treatment	0.94±0.10*	1.42±0.28*	12.188	<0.001
Dizziness	Before treatment	3.61±0.44	3.59±0.39	0.257	0.798
	After treatment	1.01±0.19*	1.82±0.38*	14.394	<0.001
Soreness and weakness of waist and knees	Before treatment	3.87±0.72	3.80±0.81	0.487	0.627
	After treatment	0.98±0.12*	1.72±0.37*	14.363	<0.001

Note: TCM: Traditional Chinese medicine; Compared with those before treatment in the same group, *P<0.001.

Table 4. Comparison of cervical vertebra curvature between the two groups

Groups	Cases	Before treatment	After treatment
Observation group	57	5.91±1.28	10.88±2.37*
Control group	57	5.86±1.10	8.27±1.83*
t value		0.223	6.581
P value		0.823	<0.001

Note: Compared with those before treatment in the same group, *P<0.001.

decoction combined with the blade needle therapy and 57 patients who underwent the blade needle therapy alone in this study. There was no significant difference in gender, age, course of disease, BMI, the condition of pressured nerve root and education background between the observation group and control group, indicating that the two groups were comparable (all P>0.05).

Comparison of therapeutic effects

As shown in **Table 2**, in the observation group, 39 patients were cured, 15 achieved effective results and 3 had no effects, while in the control group, 26 patients were cured, 21 had effective results and 10 had no effects. The

total effective rate in the observation group was 94.7%, which was higher than that in control group (82.5%) (P=0.039).

Comparison of TCM syndromes scores

As shown in **Table 3**, before treatment, there was no significant difference in the scores of neck pain, movement disorders, limb numbness, dizziness, and soreness and weakness of waist and knees between the two groups (all P>0.05). However, these scores were obviously decreased after the treatment in both groups (all P<0.05); and the scores in the observation group were obviously lower than those in the control group (all P<0.001).

Comparison of cervical vertebra curvature

As described in **Table 4**, before treatment, there was not any significant difference regarding cervical vertebra curvature between the observation group and the control group. After the treatment, the curvature in both of groups were remarkably increased (all P<0.05); and the cervical vertebra curvature in observation group was obviously larger than that in the control group (10.88±2.37 vs 8.27±1.83, P<0.001).

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Table 5. Comparison of inflammatory factor levels between the two groups

Parameters		Observation group (N=57)	Control group (N=57)	t value	P value
COX-2	Before treatment	72.19±4.28	72.03±4.81	0.187	0.852
	After treatment	29.31±5.09*	38.17±5.28*	9.121	<0.001
IL-6	Before treatment	44.01±3.01	44.28±3.87	0.416	0.678
	After treatment	15.29±2.91*	21.37±2.70*	11.563	<0.001
TNF-α	Before treatment	18.69±3.14	18.29±3.09	0.686	0.494
	After treatment	5.18±0.92*	9.47±1.04*	23.326	<0.001
5-HT	Before treatment	209.31±19.34	208.98±20.16	0.089	0.929
	After treatment	131.89±16.28*	163.29±18.31*	9.676	<0.001

Note: COX-2: Cyclooxygenase-2; IL-6: Interleukin-6; TNF-α: Tumor necrosis factor-α; 5-HT: 5-hydroxytryptamine; Compared with those before treatment in the same group, *P<0.001.

Table 6. Comparison of hemorheology indexes between the two groups (mPas)

Parameters		Observation group (N=57)	Control group (N=57)	t value	P value
Whole blood high shear viscosity	Before treatment	5.19±0.72	5.23±0.81	0.279	0.781
	After treatment	2.98±0.47*	3.87±0.39*	11.002	<0.001
Whole blood medium shear viscosity	Before treatment	5.99±0.62	6.01±0.57	0.179	0.858
	After treatment	2.17±0.42*	3.87±0.53*	18.979	<0.001
Whole blood low shear viscosity	Before treatment	20.89±3.29	20.91±4.21	0.028	0.978
	After treatment	10.31±2.19*	15.28±3.29*	9.494	<0.001
Plasma viscosity	Before treatment	1.98±0.31	1.93±0.27	0.918	0.361
	After treatment	0.91±0.10*	1.32±0.12*	19.817	<0.001

Note: Compared with those before treatment in the same group, *P<0.001.

Comparison of inflammatory factor levels between two groups

As seen in **Table 5**, before treatment, no significant differences were found in the term of COX-2, IL-6, TNF-α, 5-HT levels between the observation group and the control group. However, these levels in both groups were obviously decreased after treatment (all P<0.05); and these levels of in the observation group were obviously lower than those in the control group [COX-2: (29.31±5.09 vs 38.17±5.28, P<0.001); IL-6: (15.29±2.91 vs 21.37±2.70, P<0.001); TNF-α: (5.18±0.92 vs 9.47±1.04, P<0.001); and 5-HT: (131.89±16.28 vs 163.29±18.31, P<0.001)].

Comparison of hemorheology indices

As seen in **Table 6**, before treatment, there was no significant difference regarding the whole blood high shear viscosity, the whole blood medium shear viscosity, the whole blood low shear viscosity and plasma viscosity between the two groups (all P>0.05). However, these

indices were all remarkably decreased in both groups after the treatment (all P<0.05). Moreover, the whole blood high shear viscosity (2.98±0.47 vs 3.87±0.39, P<0.001), the whole blood medium shear viscosity (2.17±0.42 vs 3.87±0.53, P<0.001), the whole blood low shear viscosity (10.31±2.19 vs 15.28±3.29, P<0.001) and plasma viscosity (0.91±0.10 vs 1.32±0.12, P<0.001) in the observation group were obviously less than those in the control group.

Comparison of the incidences of adverse reaction

As seen in **Table 7**, in observation group, there was 1 patient with mild abdominal distension, 2 patients with nausea and 1 patient with sleepiness, while in control group, there were 2 patients with mild abdominal distension, 3 patients with nausea and 2 patients with sleepiness. The total incidence rate of adverse reactions in the observation group was slightly lower than that in control group, but without

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Table 7. Comparison of the incidence of adverse reactions between the two groups

Groups	Cases	Mild abdominal distension	Nausea	Sleepiness	Total incidence rate (%)
Observation group	57	1	2	1	7.02
Control group	57	2	3	2	12.28
χ^2 value					0.906
P value					0.341

statistical difference (7.02% vs 12.28%, $P=0.341$).

Discussion

Cervical spondylosis is considered as the results of a long-term interactions of multiple factors, which mainly manifested as pathological changes in intervertebral disc degeneration. With the change of lifestyle, more and more people have been working at their desks and lowering their heads for a long time, leading to the increased prevalence of cervical spondylosis, which affects both the work and life of patients [14]. Cervical spondylotic radiculopathy is the most common type of cervical spondylosis, and its physiological mechanisms are very complex, including occupation, lifestyle, genetics, etc. [15].

In the term of traditional Chinese medicine, cervical spondylotic radiculopathy belongs to the category of "arthralgia" according to the clinical signs. It was believed that the occurrence of cervical spondylotic radiculopathy was associated with wind-cold damp pathogen, leading to the onset of meridian blockage. Therefore, it is considered that the key to treat cervical spondylotic radiculopathy is to tonify and activate qi and blood and dredge the meridians, and reinforce liver and kidney as a supplement [16]. Blade needle is a product of the combination of traditional Chinese acupuncture treatment and modern muscle anatomy, which can directly act on the lesion site, relieve muscle fascia, effectively alleviate nerve compression, and play a role in promoting clinical symptom remissions in patients [17]. Modified Guizhi plus Gegen decoction is a commonly used traditional Chinese Medicine for clinical treatment of cervical spondylotic radiculopathy. In this prescription, Gegen belongs to the sovereign drug, which can play the role of resolving the flesh and promoting the secretion of saliva or body fluid. It was reported that Gegen can effectively promote blood flow and dredge the blocked

blood vessels when it was used to treat neck stiffness caused by wind-cold damp pathogen [18]. The ministerial drugs included Guizhi, ginger, and white paeony root, all of which have the effects of warming the meridians and dispersing cold, and unblocking the meridians, effectively alleviating the symptoms of neck, shoulder and waist back pain in patients. Jujube has the effects of nourishing blood, supplementing qi, and mitigating the properties of the medicine. Safflower and myrrh could promote blood circulation, remove blood stasis, reduce swelling and relieve pain. Radix clematidis has the effects of dispelling wind, dampness and cold. Turmeric has the effects of internally promoting qi and blood, and externally dispersing wind and cold, inducing menstruation to relieve menalgia. The combined use of the above drugs in patients with cervical spondylotic radiculopathy can play a combined role in tonifying the liver and kidney, smoothing the meridians to relieve pain, and removing blood stasis and unblocking collaterals, which has a significant effect on relieving the symptoms and signs of these patients [19]. The results of this study showed that the total effective rate in the observation group was 94.74%, which was significantly higher than that of the control group (82.46%), and the improvement in the TCM syndrome score was also better than that of the control group, indicating that the treatment effect of modified Guizhi plus Gegen decoction combined with blade needle therapy on cervical spondylotic radiculopathy was more optimal. This may be because that the combination of these two methods could play a synergistic effect and treat cervical spondylotic radiculopathy more comprehensively.

Previous studies showed that patients with cervical spondylosis often had abnormal inflammatory cytokines levels, and the pain symptom was closely related to various inflammatory factors, especially after inertia injury of the patient's neck muscles. Local TNF- α , IL-6 and 5-HT can accumulate and become the main

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mediators that cause pain in these patients [20]. COX-2 also abnormally expresses in cervical spondylosis, and the increased level can induce a large amount of secretion in monocytes and macrophages in the tissues of the body, ultimately synthesizing a large amount of PGE₂, leading to local vasodilation, thereby exacerbating local pain [19, 21]. This study showed that after the treatment, the levels of TNF- α , IL-6, 5-HT and COX-2 were all decreased in the observation group, which were significantly lower than those in the control group, indicating that both treatment methods inhibited the expression of inflammatory factors, but the combined treatment had a better effect. The reason was that the combination of traditional Chinese medicine decoction and blade needle therapy can play a role in addressing both symptoms and root causes, so the combination application can more significantly inhibit the secretion and expression of inflammatory factors. Modern pharmacological research [22] found that *Paeonia lactiflora* can expand local blood vessels, promote blood circulation in pathological tissues and help injured nerve roots to recover from ischemia and hypoxia conditions. It was reported that *radix clematidis* had the effect of promoting the absorption of lumbar disc herniation [23], while blade needles can specifically expand the blood vessels in the neck, improving the blood circulation disorders in the local tissues [17]. The results showed that the improvement in hemorheology and cervical curvature in the observation group was better than those in the control group, indicating that combined treatment was better for promoting the smooth local blood circulation in these patients. From the perspective of safety, there was no difference in the incidence of adverse reactions between the two groups, indicating that combined treatment would not increase adverse reactions and the safety was trustworthy.

In summary, for patients with cervical spondylotic radiculopathy, modified Guizhi plus Gegen decoction combined with the blade needle therapy can effectively improve TCM syndrome scores, restore cervical curvature, enhance the hemorheology indexes and inhibit the expression levels of inflammatory factors, with small adverse reactions. It is worth promoting and applying in clinical practices. However, there are still some limitations in this study, such as it

being a single-center study, having small sample size, no subgroup comparison, no long-term follow-up results, and no reports of the related mechanism. Multicenter controlled long-term follow-up studies with larger sample sizes are still required for future study.

Disclosure of conflict of interest

None.

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