

Clinical study on tuina for acute cervical radiculopathy

推拿治疗急性期神经根型颈椎病临床研究

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Abstract

Objective: To observe the clinical efficacy of Ba-pulling and Qian-traction manipulation with neck suspension and movement for acute cervical radiculopathy.

Methods: A total of 85 patients who met the inclusion criteria were randomized into an observation group and a control group by random numbers, with 43 cases in the observation group and 42 cases in the control group. The observation group was treated with Ba-pulling and Qian-traction manipulation with neck suspension and movement; while the control group was treated with Bashen-pulling and stretching manipulation in a supine position. The treatment was performed once a day, 10 times as a treatment course. The therapeutic efficacy was evaluated after 1 treatment course, and the changes in the scores of visual analog scale (VAS) and neck disability index (NDI) were observed.

Results: The total effective rate was 97.7% in the observation group, and 83.3% in the control group, and the difference between the two groups was statistically significant ($P < 0.05$). After treatment, the VAS and NDI scores of both groups were significantly decreased (both $P < 0.01$), and the differences in the VAS and NDI scores between the two groups were statistically significant (both $P < 0.01$).

Conclusion: Both Ba-pulling and Qian-traction manipulation with neck suspension and movement and Bashen-pulling and stretching manipulation in a supine position can relieve pain and improve cervical function in patients with acute cervical radiculopathy, and Ba-pulling and Qian-traction manipulation with neck suspension and movement can produce more significant efficacy than Bashen-pulling and stretching manipulation in a supine position.

Keywords: Tuina; Massage; Visual Analog Scale; Pain Measurement; Neck Pain; Radiculopathy; Cervical Spondylosis; Syndrome of Blood Stasis and Qi Stagnation

【摘要】目的: 观察“悬动拔牵”手法治疗急性期神经根型颈椎病的临床疗效。**方法:** 将符合纳入标准的85例患者按随机数字分为两组, 观察组43例采用“悬动拔牵”手法治疗, 对照组42例采用仰卧拔伸手法治疗。每日治疗1次, 10次1疗程。治疗1个疗程后进行疗效评定, 并观察视觉模拟量表(VAS)评分和颈椎功能障碍指数(NDI)评分的变化情况。**结果:** 观察组总有效率为97.7%, 对照组总有效率为83.3%, 两组总有效率差异有统计学意义($P < 0.05$)。治疗后, 两组VAS及NDI评分均较治疗前显著下降(均 $P < 0.01$); 观察组VAS及NDI评分与对照组有统计学意义(均 $P < 0.01$)。**结论:** “悬动拔牵”手法和仰卧拔伸法均能改善急性期神经根型颈椎病患者的疼痛和颈椎功能, “悬动拔牵”手法的疗效优于仰卧拔伸法。

【关键词】 推拿; 按摩; 视觉模拟量表; 疼痛测评; 颈痛; 神经根病; 颈椎病; 血瘀气滞

【中图分类号】 R244.1 **【文献标志码】** A

Cervical radiculopathy belongs to the neck Bi-impediment syndrome in traditional Chinese medicine (TCM). It is clinically characterized by neck pain and numbness, frequently accompanied by pain in the shoulder and arms^[1-2]. The TCM patterns include blood stasis and qi stagnation, wind-cold-damp Bi-impediment, phlegm-dampness obstructing meridians,

deficiency of the liver and kidney and qi and blood deficiency^[3-4]. According to the disease stage, it can be divided into acute stage, remission stage and rehabilitation stage. In acute stage, the most common pattern is blood stasis and qi stagnation is the most common type in clinic. Patients often have strong desire for treatment and higher expectation for clinical efficacy due to severe pain and obvious limited functional activities^[5].

For the treatment of such diseases, Western medicine mainly emphasizes the treatment of pain^[6], while TCM emphasizes a combined therapy (including acupuncture, tuina, physiotherapy and traction) for the

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treatment of neck muscles and joints and can obtain better efficacies^[7]. We applied Ba-pulling and Qian-traction manipulation with suspended neck flexion for acute cervical radiculopathy due to blood stasis and qi stagnation. More specifically, we used modern suspension technology to relax the neck muscles, relieve the sufferings of the patients, and restore the location of cervical vertebrae. In addition, we combined manipulations such as joint mobilization, Bashen-pulling and stretching, and Qianshen-traction and stretching. The results are summarized as follows.

1 Clinical Materials

1.1 Diagnostic criteria

Met the expert consensus on the classification, diagnosis and non-surgical treatment of cervical spondylosis (2018)^[8]; had typical radiculopathy symptoms (numbness and pain in the arm) with the range consistent with the cervical spinal nerve innervation area, with positive Eaten test or Spurling's test; imaging findings were consistent with clinical manifestations; characterized by upper limb pain but caused by non-cervical vertebral diseases (thoracic outlet syndrome, tennis elbow, carpal tunnel syndrome, scapulohumeral periarthritis, tenovaginitis of long head of brachial biceps, tumor of apex of lung); belonged to pattern of blood stasis and qi stagnation (fixed stabbing pain in neck, shoulder and upper limb, accompanied by limb numb, a purplish tongue, and a stringy pulse)^[4].

1.2 Inclusion criteria

Those who met the above diagnostic criteria; aged 35 to 70 years old; agreed to participate in this trial and signed informed consent.

1.3 Exclusion criteria

Those with other diseases that caused cervical vertebral pain such as cervical fracture or dislocation, tumor, and severe osteoporosis; those with severe cardio-cerebrovascular disease or with carotid plaque; patients with significant mental disorders^[9].

1.4 Statistical methods

All data were statistically analyzed by SPSS version 17.0 statistical software. Measurement data were expressed as mean ± standard deviation ($\bar{x} \pm s$). Paired sample *t*-test was applied to the intra-group comparisons. Independent sample *t*-test was applied to the comparison between groups. Chi-square test was applied to the comparison of counting data. *P*<0.05 was considered to indicate a statistically significant difference.

1.5 General data

A total of 85 patients diagnosed with acute cervical radiculopathy due to blood stasis and qi stagnation were selected from the Rehabilitation Department of Changzhou TCM Hospital Affiliated to Nanjing University of Chinese Medicine between June 2017 and August 2018. All patients were randomly divided into two groups by the random numbers generated by SPSS statistical software, with 43 cases in the observation group and 42 cases in the control group. The protocol was reviewed and approved by the Ethics Committee of Changzhou TCM Hospital Affiliated to Nanjing University of Chinese Medicine.

There were no statistically significant differences in age, gender, body mass index (BMI) and comorbidity (other chronic diseases such as hypertension and diabetes mellitus) between the two groups (all *P*>0.05), indicating that the two groups were comparable (Table 1).

Table 1. Comparison of general data between the two groups

Group	n	Gender (case)		Average age ($\bar{x} \pm s$, year)	BMI ($\bar{x} \pm s$, kg/m ²)	Comorbidities		
		Male	Female			1 kind	2 kinds	More than 2 kinds
Observation	43	23	20	52.8±10.0	21.5±3.9	24	10	9
Control	42	23	19	53.1±7.5	20.8±5.2	22	10	10
Statistics value		0.011 ¹⁾		0.84 ²⁾	0.71 ²⁾	0.128 ¹⁾		
<i>P</i> -value		0.91		0.40	0.10	0.938		

Note: 1) χ^2 value; 2) *t*-value

2 Treatment Methods

2.1 Observation group

Patients in the observation group were treated with Ba-pulling and Qian-traction manipulation with neck suspension and movement.

The patient took a supine position with neck in suspension. A suitable cervical flexion angle was selected during suspension to make the patient

tolerable and comfortable (Figure 1-A).

The physician first An-pressed and Rou-kneaded, Tanbo-plucked the transverse processes on both sides from top to bottom to relax the neck muscles. Then, according to the segmental lesions of the neck, the physician put the thumb against the transverse process of the contralateral side of the segment, and made the cervical vertebrae laterally flexed to the healthy side (Figure 1-B).

The physician held the patient's lower jaw with his right hand, with the patient's cheek close to his forearm and patient's upper neck held in his left hand, then Bashen-pulled and stretched the neck for traction. Meanwhile, the forward flexion and backward extension movements and left and right lateral flexion movements were performed focusing on the lesion segment. And then, the physician rotated the cervical vertebrae by 45° to the healthy side to perform the

above manipulations. It should be noted that the operation should be slow, the manipulation should be within a proper range, and it was not necessary to require a 'click' sound (Figure 1-C).

The physician held the affected side of the patient's head with his right hand and left hand against the patient's shoulder of the same side, with two hands against with each other for extension and traction (Figure 1-D).

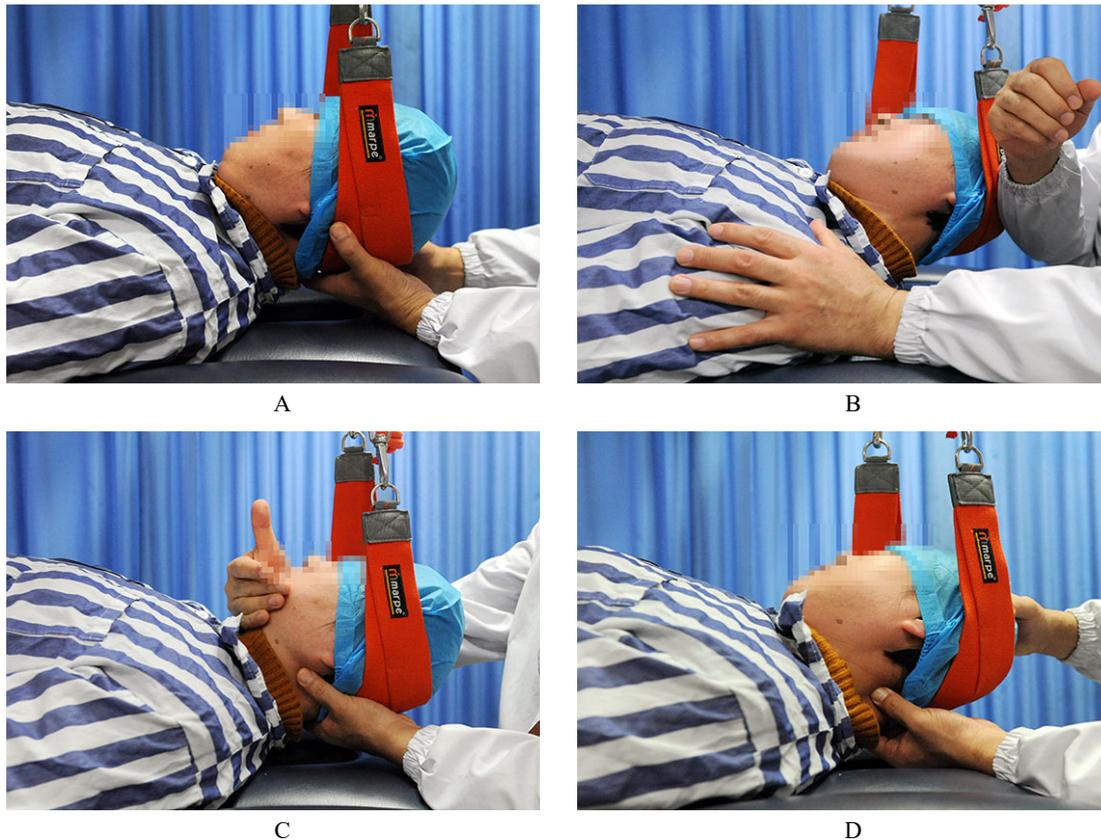


Figure 1. Ba-pulling and Qian-traction manipulation with suspended neck flexion

2.2 Control group

Patients in the control group were treated with Bashen-pulling and stretching manipulation in a supine position, which referred to the manipulations in the treatment of cervical radiculopathy by Wang X, *et al*^[10].

The patient took a prone position. The physician one-thumb Tui-pushed, Gun-rolled, An-pressed and Rou-kneaded the neck, shoulder and back as the routine manipulations for 10 min.

The patient took a supine position. The physician stood to the patient's head, overlapped his hands under the 3rd and 4th cervical vertebrae and lifted the patient's neck slightly, Bashen-pulling and stretching at an angle of 15° to 20° in the horizontal direction, with the force targeting between spinous processes. The Bashen-pulling and stretching manipulation should last for at least 1 min and repeat 5 times (Figure 2-A).

The physician Tui-pushed the neck part straight from

the bottom to the top, along the Governor Vessel and Bladder Meridian on both sides, using the finger belly of the index finger, middle finger and ring finger as the force points. The physician performed with two hands cooperating and alternating with each other, Tui-pushing 6 times on each side, for a total of 12 times (Figure 2-A).

The physician performed Tanbo-plucking along the ligamentum nuchae and on both sides from the bottom to the top, using the finger belly of the middle finger as the force point with moderate strength. The physician performed with two hands alternately, and repeated the manipulation 5 times (Figure 2-A).

The physician Gourou-crooked and kneaded Fengchi (GB 20), Fengfu (GV 16) and Ashi point with moderate strength, and An-pressed and Rou-kneaded Jianjing (GB 21). Each manipulation was performed for 2 min (Figure 2-B).

Under Bashen-pulling and stretching, the cervical spine was rotated left and right to the limit position (about 45°), and Ban-pulling manipulation was not performed. The manipulation was repeated 5 times (Figure 2-C).

The physician lifted the cervical spine slightly from the base of the neck, then Bashen-pulled and stretched

the neck with both hands which simultaneously to the hairline. This manipulation was repeated for 5 times (Figure 2-D).

The total treatment time for both groups was about 20 min each time. The treatment was performed once a day, 10 times as a treatment course. The efficacy was evaluated after 1 treatment course.



Figure 2. Bashen-pulling and stretching manipulation at a supine position

3 Observation of Clinical Efficacy

3.1 Observation items

3.1.1 Pain evaluation

The visual analog scale (VAS) was applied to evaluate the degree of pain before and after treatment^[11]. VAS score ranged from 0 to 10 points. The higher the score, the worse the pain.

3.1.2 Cervical function evaluation

The neck disability index (NDI) was applied to evaluate the function of cervical vertebrae before and after treatment^[12]. NDI score ranged from 0 to 50 points. The higher the score, the worse the function of the cervical vertebrae.

3.1.3 Cervical spondylopathy score

Ten symptoms and signs of cervical spondylosis (including neck pain, shoulder and back pain, upper limb pain, upper limb numbness, neck and shoulder tenderness, neck movement, Spurling's test, sensory

disorder, upper limb muscle strength and tendon reflex) were scored. The scores were 0, 2, 4 and 6 points from mild to severe^[13].

3.2 Criteria of therapeutic efficacy

The efficacy index was calculated according to the efficacy score of cervical spondylosis. According to the *Guidelines for Diagnosis and Treatment Regimens for 22 Professions and 95 Kinds of Diseases in Chinese Medicine Symptoms*^[14], the criteria of curative efficacy of this study were developed.

Efficacy index = (Cervical spondylopathy score before treatment – Cervical spondylopathy score after treatment) ÷ Cervical spondylopathy score before treatment × 100%.

Clinically controlled: After treatment, the clinical symptoms and physical signs disappeared, the cervical vertebrae turned normal, the symptom score was 0-1 point, and the efficacy index was >90%.

Markedly effective: After treatment, the clinical symptoms and physical signs basically disappeared. The

cervical vertebrae movements were basically normal that allowed normal activities and work. The efficacy index was >70%, but ≤90%.

Effective: After treatment, the clinical symptoms and physical signs were improved. The cervical vertebrae movements were basically normal, and the ability to participate in normal activities and work was improved. The efficacy index was >30%, but ≤70%.

Invalid: No obvious improvements in clinical symptoms or physical signs, and the efficacy index ≤30%.

3.3 Results

3.3.1 Clinical efficacy comparison

The total effective rate was 97.7% in the observation group and 83.3% in the control group. The difference

between the two groups was statistically significant ($P < 0.05$), suggesting that the efficacy of the observation group was superior to that of the control group (Table 2).

3.3.2 Comparison of VAS and NDI scores

After 1 treatment course, the scores of VAS and NDI decreased significantly in both groups (both $P < 0.01$). VAS and NDI scores in the observation group were significantly different from those in the control group, indicating that both methods could relieve patients' pain and improve the function of cervical vertebrae, and Ba-pulling and Qian-traction manipulation with neck suspension and movement had a better effect than Bashen-pulling and stretching manipulation in a supine position (Table 3).

Table 2. Comparison of clinical efficacy between two groups (case)

Group	<i>n</i>	Clinically controlled	Markedly effective	Effective	Invalid	Total effective rate (%)
Observation	43	11	27	4	1	97.7
Control	42	9	17	9	7	83.3

Table 3. Comparison of VAS and NDI scores between the two groups before and after treatment ($\bar{x} \pm s$, point)

Group	<i>n</i>	VAS		<i>t</i> -value	<i>P</i> -value	NDI		<i>t</i> -value	<i>P</i> -value
		Before treatment	After treatment			Before treatment	After treatment		
Observation	43	7.46±1.08	2.74±1.07	11.236	0.00	24.88±2.53	12.09±2.20	5.87	0.00
Control	42	7.33±1.03	4.62±0.96	8.580	0.00	24.02±2.38	14.10±1.56	6.58	0.00
<i>t</i> -value		1.87	7.54			2.02	4.29		
<i>P</i> -value		0.14	0.00			0.24	0.04		

4 Discussion

The TCM theory on sinews and bones is the theoretical foundation for spine-related tuina manipulations. 'Misaligned sinews and bones' is the core element of pathological changes in spinal diseases and the important target of clinical manipulation of spine^[15]. As a result, 'misaligned sinews and bones' is the core element of pathological changes in cervical spondylosis and an important target of clinical tuina manipulation for cervical vertebrae, in other words, it falls under the scope of targeted therapy, or precise treatment^[1,16].

As a major feature of TCM, tuina manipulation therapy can produce satisfactory efficacy for acute cervical radiculopathy due to blood stasis and qi stagnation. Wang X, *et al*^[10] performed a randomized controlled study of 120 patients with cervical radiculopathy, and found that Shi's manipulation had a higher clinical efficacy and improved patients' clinical satisfaction. The efficacy of tuina manipulation for cervical radiculopathy had also been reported in other literatures^[17].

Ba-pulling and Qian-traction manipulation with neck suspension and movement is a special therapy that we use for Bi-impediment syndrome. It is a combination of modern suspension techniques and traditional Bashen-pulling and stretching manipulation for injured soft tissues. 'Suspension' refers to cervical suspension technique. Some scholars believe that the dynamic balance of the anterior flexor group, posterior extensor group and rotator muscle group of the neck were very important for the stability of the cervical vertebrae. The imbalance would aggravate the degeneration of the cervical vertebrae and cause pain. The cervical suspension technique could enhance the coordination of the neck muscles, improve the mechanical equilibrium and stabilize the spine^[18]. 'Movement' refers to cervical joint relaxation technique, which is to increase the mobility of the joint through the mechanic action on the joint, prevent the joint from degeneration due to the decrease of activity caused by pain, and inhibit the release of pain-causing substances and enhance the pain threshold^[19]. 'Ba-pulling' refers to Bashen-pulling and stretching manipulation for cervical vertebrae in a supine position. It adjusts the internal

and external balance of the spine by Bashen-pulling and stretching and rotating the cervical vertebrae, and promotes the restoration of the small joints. As for the position selection in Bashen-pulling and stretching treatment, Shi XL, *et al*^[20] considered that the efficacy of supine extension was better than sitting position for the patients with decreased cervical curvature and posterior arch of cervical vertebrae. 'Qian-traction' refers to the cervical spine stretching technique. The stretching of the neck can increase the intervertebral foramen and intervertebral space, relieve the spasm of the neck muscles, and promote the elimination of soft tissue congestion and edema^[21]. Moreover, the stretching manipulation is easy to perform and control the strength. With the cervical vertebrae in suspension, manipulations are labor-saving, flexible and gentle, and the adjustment is more in place with such low load state, the dislocated cervical joints are easy to be loosed and reset^[17]. Combining the four treatment methods of 'suspension', 'movement', 'Ba-pulling' and 'Qian-traction' can improve the mechanical balance and joint activity of the neck, promote the restoration of small joints, and relieve the congestion and edema of local soft tissues, and thus improve the symptoms of the patients^[22-23].

In this study, we used modern suspension technique combined with cervical joint movement, Bashen-pulling and stretching and Qian-traction for the treatment of acute cervical radiculopathy. And the results indicated that Ba-pulling and Qian-traction manipulation with neck suspension and movement had a better effect than Bashen-pulling and stretching manipulation in a supine position in the treatment of acute cervical radiculopathy due to blood stasis and qi stagnation. However, the study was still in the stage of single center and small sample clinical efficacy observation. Related researches of multi-center, large sample and action mechanism need to be further conducted in the future.

Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

Acknowledgments

This work was supported by Social Development Project of Changzhou Science and Technology Bureau (常州市科技局社会发展项目, No. CE20175034); Science and Technology Project of Jiangsu Bureau of Traditional Chinese Medicine (江苏省中医药局科技课题, No. YB201832).

Statement of Informed Consent

Informed consent was obtained from all individual participants.

Received: 28 April 2019/Accepted: 25 May 2019

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