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Special Topic Study

Therapeutic observation on tuina for primary hypertension due to liver-fire flaming-up

推拿治疗肝火上炎型原发性高血压病疗效观察

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Abstract

Objective: To compare the antihypertensive effects of tuina at Taichong (LR 3), Neiguan (PC 6) and Qiaogong (Extra) to screen the best tuina protocol for primary hypertension due to liver-fire flaming-up.

Methods: A total of 102 patients with primary hypertension due to liver-fire flaming-up were randomly divided into a Taichong (LR 3) group, a Neiguan (PC 6) group and a Qiaogong (Extra) group according to the random number table, with 34 cases in each group. Patients in the three groups received 4-week tuina treatment with the corresponding acupoint respectively. The blood pressure was recorded by benchtop mercury sphygmomanometer before tuina, immediately after tuina treatment, 30 min and 60 min after tuina treatment with the patient in a supine position in a quiet treatment room. The total effective rate was observed.

Results: The systolic and diastolic blood pressures of the three groups all decreased after treatment (all P<0.05). The decrease of systolic and diastolic blood pressure at different time points after treatment in the Qiaogong (Extra) group and the Taichong (LR 3) group were better than those in the Neiguan (PC 6) group (all P<0.05). Qiaogong (Extra) group had the highest total effective rate though there was no statistical difference in the total effective rate among the three groups (P>0.05).

Conclusion: Treating primary hypertension due to liver-fire flaming-up with tuina at Taichong (LR 3), Neiguan (PC 6) and Qiaogong (Extra) can reduce systolic and diastolic blood pressure respectively, among which Qiaogong (Extra) has the highest total effective rate.

Keywords: Tuina; Massage; Point, Taichong (LR 3); Point, Neiguan (PC 6); Point, Qiaogong (Extra); Liver-fire Flaming-up; Hypertension

【摘要】目的：比较推拿太冲、内关和桥弓穴对肝火上炎型原发性高血压的降压疗效，筛选推拿治疗原发性高血压的最佳方案。**方法：**将肝火上炎型原发性高血压病患者102例根据随机数字表法随机分为太冲组、内关组和桥弓组，每组34例。三组患者分别接受4周的相应穴位推拿。分别于推拿前、推拿后即刻、推拿后30 min以及推拿后60 min采用台式水银柱血压计在休息室于静息、平卧状态下记录患者血压，并观察总有效率。**结果：**三组收缩压、舒张压均较同组治疗前下降(均P＜0.05)；推拿后各时间点桥弓组和太冲组收缩压和舒张压下降程度均优于内关组(均P＜0.05)。桥弓组总有效率最高，但组间疗效差异无统计学意义(P＞0.05)。**结论：**推拿太冲、内关和桥弓穴均有降低收缩压和舒张压的作用，以桥弓穴降压总有效率最高。

【关键词】推拿；按摩；穴，太冲；穴，内关；穴，桥弓；肝火上炎；高血压

【中图分类号】R244.1　　**【文献标志码】**A

Hypertension is a chronic non-communicable disease with high prevalence, disability rate and economic burden in China. According to the monitoring results of chronic diseases and risk factors in China, the number of hypertension in people aged ≥18 years old is about 290 million, and the prevalence rate is 27.8%. It is more frequent in men and urban population; however, the number of hypertension in rural population is rising rapidly[1-4]. Tuina is a safe, effective, comfortable, low-cost, and easily accepted therapy to the patients. While the current literature has reported many effective acupoints for primary hypertension, it is difficult to make a choice in clinical operation. Acute blood pressure rise leading to serious harm to people mostly due to mood swings, is regarded as liver-fire flaming-up pattern in traditional Chinese medicine (TCM). After

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screening the literature[5], we selected the top three acupoints on the frequency list for treating primary hypertension due to liver-fire flaming-up with tuina, which were Taichong (LR 3), Neiguan (PC 6) and Qiaogong (Extra), to compare the therapeutic efficacy. It is reported as follows.

1 Clinical Data

1.1 Diagnostic and grading standards

1.1.1 Western medicine diagnosis and classification

According to the *Guidelines for the Prevention and Treatment of Hypertension in China*[6], systolic blood pressure ≥140 mmHg (1 mmHg=0.133 kPa) and/or diastolic blood pressure ≥90 mmHg without the use of antihypertensive drugs.

Grade 1: Systolic blood pressure 140-159 mmHg or diastolic blood pressure 90-99 mmHg.

Grade 2: Systolic blood pressure 160-179 mmHg or diastolic blood pressure 100-109 mmHg.

Grade 3: Systolic blood pressure 180 mmHg or above, or diastolic blood pressure 110 mmHg or above.

1.1.2 TCM diagnosis and pattern differentiation[7]

The patient suffered from dizziness, irritability, redness in face and eyes; accompanied by tinnitus, hypochondriac pain, bitter taste, constipation, and yellow urine; a red tongue with yellow coating, and a string-like and rapid pulse.

1.2 Inclusion criteria

Aged 18-60 years old; met the diagnostic criteria of Chinese and Western medicine and had no serious disease history of heart, brain, kidney, etc.; taking antihypertensive drugs but blood pressure was not well controlled; willing to receive tuina treatment.

1.3 Exclusion criteria

Hypertension nod due to liver-fire flaming-up; patients with secondary hypertension; patients with severe disease history of heart, liver, kidney, etc.; patients with poor compliance.

1.4 Drop-out criteria

Those requested the discontinuation of the test; the condition was aggravated during the trial and it was not appropriate to continue the treatment.

1.5 Statistical processing

All data were statistically analyzed using SPSS version 20.0 software. Measurement data were described as mean ± standard deviation ($\bar{x} \pm s$). Normal distribution analysis was performed between groups at first, and then one-way analysis of variance was used for those fitting normal distribution. The non-parametric test was used under the non-normality situation. Categorical data were expressed in terms of rate and Chi-square test was used. $P<0.05$ indicated that the difference was statistically significant.

1.6 General information

A total of 102 patients with primary hypertension due to liver-fire flaming-up were randomly divided into a Taichong (LR 3) group, a Neiguan (PC 6) group and a Qiaogong (Extra) group according to the random number table, with 34 cases in each group. They were admitted to the Acupuncture and Tuina Department of the First Affiliated Hospital of Hunan University of Medicine between May 2015 and May 2017. Patients taking antihypertensive drugs before tuina treatment maintained the original drug and dose during treatment. There were no significant differences in baseline data among the three groups (all $P>0.05$), indicating that the three groups were comparable (Table 1).

Table 1. Comparison of general data of three groups

Group	*n*	Gender (case)		Average age ($\bar{x} \pm s$, year)	Mean duration ($\bar{x} \pm s$, year)	Grading (case)		
		Male	Female			Level 1	Level 2	Level 3
Taixchong (LR 3)	34	18	16	59.2±6.1	5.4±3.4	14	15	5
Neiguan (PC 6)	34	17	17	60.9±5.8	5.7±3.0	13	15	6
Qiaogong (Extra)	34	19	15	58.6±7.2	5.6±3.3	17	13	4

2 Treatment Methods

2.1 Taichong (LR 3) group

Acupoints: Taichong (LR 3) on both sides.

Method: The patient took a supine position, with one acupoint being selected at first. Tuina therapist conducted An-pressing and Rou-kneading manipulations with thumb belly at the maximum force that the patient could bear. The sequence of the manipulation was three times Rou-kneading with one time An-pressing. After 3-minute operation, Taichong (LR 3) on the other side was operated; the same operation was conducted for another 3 min as mentioned above (Figure 1).

2.2 Neiguan (PC 6) group

Acupoints: Neiguan (PC 6) on both sides.

Method: Patient took a supine position, with one acupoint being selected at first. Tuina therapist conducted An-pressing and Rou-kneading manipulations with thumb belly at the maximum force that the patient could bear. The sequence of the manipulation was three times Rou-kneading with one time An-pressing. After 3-minute operation, Neiguan (PC 6) on the other side was operated; the same

operation was conducted for another 3 min as mentioned above (Figure 2).

2. 3 Qiaogong (Extra) group

Acupoints: Qiaogong (Extra) on both sides.

Method: The patient took a supine position, and turned his head to the left side when the right-side acupoint was operated. Tuina therapist used the belly of the 2nd and the middle finger to Tui-push Qiaogong (Extra) from the top to the bottom at a slow speed for 3 min, and then the patient's head turned to the right side when Qiaogong (Extra) of the left side was Tui-pushed for another 3 min with the same manipulation (Figure 3).

Figure 1. An-pressing and Rou-kneading Taichong (LR 3)

Figure 2. An-pressing and Rou-kneading Neiguan (PC6)

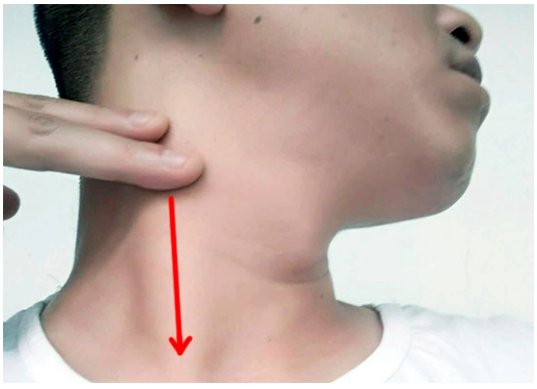

Figure 3. Tui-pushing Qiaogong (Extra)

The three groups of patients were treated once a day, and the therapeutic efficacy was observed after 4-week treatment.

3 Therapeutic Efficacy Observation

3.1 Blood pressure measurement specifications

Blood pressure was measured before and immediately after tuina treatment, 30 min and 60 min after tuina treatment. The measurement was carried out in a quiet clinical room (temperature: 25 ℃; humidity: 50%). The patient took a supine position when the blood pressure was measured. The left upper arm was for the measurement using a GB 3053-93 benchtop mercury sphygmomanometer (Yuyue Medical Equipment Co., Ltd., Jiangsu Province, China).

3.2 Efficacy criteria

According to the *Guiding Principles for Clinical Study of New Chinese Medicines*[8], the efficacy evaluation criteria for hypertension were made.

Significantly effective: After treatment, the diastolic blood pressure dropped to normal level, or the diastolic blood pressure decreased by 20 mmHg or more though not reaching the normal level.

Effective: After treatment, diastolic blood pressure dropped to normal level; or diastolic blood pressure dropped by 10-19 mmHg, but not yet to the normal range; or systolic blood pressure dropped by more than 30 mmHg.

Invalid: The above criteria were not reached.

3.3 Treatment results

After treatment, 2 cases dropped out from the Taichong (LR 3) group because of taking antihypertensive drugs and outing, respectively. Three cases dropped out from the Neiguan (PC 6) group because of family affairs interrupting treatment (2 cases) and self-administering with antihypertensive drugs (1 case). Two cases dropped out from the Qiaogong (Extra) group because of outing interrupting treatment. A total of 95 patients were included in the statistical analysis.

3.3.1 Clinical therapeutic efficacy

After 4 weeks of treatment, the total effective rate of the Qiaogong (Extra) group was the highest, Taichong (LR 3) group was the second, and Neiguan (PC 6) group was the lowest. The Chi-square test showed that there was no statistical difference in the total therapeutic efficacy among the three groups (P>0.05), which might be related to the small sample size. See Table 2 for details.

3.3.2 Change in systolic blood pressure

There were no significant differences in systolic blood pressure among the three groups before treatment (P>0.05). After tuina treatment, the systolic blood pressure of the three groups at each time point decreased compared with those before treatment (all P<0.05), indicating that tuina therapy at the three

acupoints had the effect of reducing systolic blood pressure. After treatment, the systolic blood pressures of the Taichong (LR 3) group and the Qiaotong (Extra) group were lower than those of the Neiguan (PC 6) group at different time points (all $P<0.05$). There were no significant differences between the Taichong (LR 3) group and the Qiaogong (Extra) group at each time point (all $P>0.05$). See Table 3 for details.

3.3.3 Change in diastolic blood pressure

There were no significant differences among the three groups of diastolic blood pressure before treatment ($P>0.05$). At each time point after tuina treatment, the diastolic blood pressures of the patients in the three groups were lower than those before treatment (all $P<0.05$), indicating that tuina at the three acupoints had the effect of reducing diastolic blood pressure. After tuina treatment, the diastolic blood pressures at each time point of the Taichong (LR 3) group and Qiaogong (Extra) group were lower than those of Neiguan (PC 6) group (all $P<0.05$). Immediately and 30 min after tuina treatment, the diastolic pressures of the Qiaogong (Extra) group were lower than those of Taichong (LR 3) group (both $P<0.05$). 60 min after tuina treatment, the diastolic pressure of the Taichong (LR 3) group was lower than that of Qiaogong (Extra) group ($P<0.05$). See Table 4 for details.

Table 2. Comparison of clinical efficacy of the three groups (case)

Group	*n*	Significantly effective	Effective	Invalid	Total effective rate (%)
Taichong (LR 3)	32	8	17	7	78.1
Neiguan (PC 6)	31	4	16	11	64.5
Qiaogong (Extra)	32	10	16	6	81.3

Table 3. Comparison of systolic blood pressure of the three groups ($\bar{x}\pm s$, mmHg)

Group	*n*	Before tuina	Immediately after tuina	30 min after tuina	60 min after tuina
Taichong (LR 3)	32	152.43±13.71	141.23±6.42[1)2)]	143.42±4.81[1)2)]	142.81±4.66[1)2)]
Neiguan (PC 6)	31	155.12±7.25	147.99±7.01[1)]	147.11±5.47[1)]	146.01±4.32[1)]
Qiaogong (Extra)	32	152.81±8.23	141.07±5.32[1)2)]	142.73±4.37[1)2)]	141.88±4.95[1)2)]

Note: Compared with the same group before tuina, 1) $P<0.05$; compared with the Neiguan (PC 6) group at the same time point, 2) $P<0.05$

Table 4. Comparison of diastolic blood pressure of the three groups ($\bar{x}\pm s$, mmHg)

Group	*n*	Before tuina	Immediately after tuina	30 min after tuina	60 min after tuina
Taichong (LR3)	32	98.23±4.12	92.03±3.11[1)2)]	86.09±3.15[1)2)]	85.98±3.37[1)2)4)]
Neiguan (PC6)	31	99.04±3.01	96.05±2.16[1)]	89.02±2.36[1)]	86.99±3.25[1)]
Qiaogong (Extra)	32	97.63±4.17	91.25±4.32[1)2)3)]	84.02±2.84[1)2)3)]	86.27±3.38[1)2)]

Note: Compared with the same group before tuina, 1) $P<0.05$; compared with the Neiguan (PC 6) group at the same time point, 2) $P<0.05$; compared with the Taichong (LR 3) group at the same time point, 3) $P<0.05$; compared with the Qiaogong (Extra) group at the same time point, 4) $P<0.05$

4 Discussion

Primary hypertension belongs to dizziness, stroke or headache in TCM, mostly due to long-term mental stress, irritability, exhaustion or body weak[9-10]. Its pathogenesis is yin-yang disorder of the liver and kidney, and disturbance of the clear mind[11]. The direction of the movement of liver-qi is mainly up-rising. If the liver-qi moves excessively high, it can lead to dizziness and headache, so primary hypertension due to liver-fire flaming-up is commonly seen in clinic.

To apply tuina therapy to treat the disease, acupoints and manipulations that have the function to soothe and reduce liver-qi, and extinguish liver-wind are often selected. Taichong (LR 3) is the Yuan-Primary and Shu-Stream point of the Liver Meridian, and it can remove liver-heat, soothe liver-qi and calm liver-wind. Yuan-Primary points are where the Yuan-primordial qi of Zang-fu organs accumulates, and they are used to treat diseases of Zang-fu organs according to the corresponding meridian[12-16]. An-pressing and Rou-kneading Taichong (LR 3) can regulate the dysfunction of the Liver Meridian directly and dredge the heat produced from the accumulation of qi and blood, which helps to soothe liver-qi, nourish the liver to extinguish liver-wind and calm the liver to suppress liver-yang, in this way restoring the normal level of blood pressure[17]. Neiguan (PC 6) is one of the Confluent Points of the Eight Extraordinary Meridians, connecting to the Yin Link Vessel. It has the function to treat diseases of the

stomach, heart and chest. Neiguan (PC 6) has no direct connection with the liver, but the Liver Meridian and the Pericardium Meridian are all Jueyin Meridians, which means they are both running along the chest and hypochondrium areas. Therefore, Neiguan (PC 6) has the function of soothing liver-qi, nourishing the liver to calm liver-yang, promoting liver-qi, and reducing liver-fire, which can be beneficial to the improvement of symptoms such as headache and dizziness[18-19]. Qiaogong (Extra) is a experienced point for treating hypertension since ancient times[20-21].

This study aimed at patients with primary hypertension due to liver-fire flaming-up, which is rooted in the liver. The liver is in charge of soothing qi and adjusting emotions. It is exteriorly-interiorly related to the gallbladder. The liver qi rises, and the gallbladder descends qi to keep the balance of qi to prevent excessive ascending of liver-qi[22-23]. Tui-pushing Qiaogong (Extra) can stimulate the pathway of the Gallbladder Meridian in the neck, thereby regulating the movement of qi in the Gallbladder Meridian, and finally achieve the effect of calming liver-qi and reducing liver-wind[23]. Therefore, Tui-pushing Qiaogong (Extra) has a targeted antihypertensive effect on hypertensive patients, especially those due to liver-fire flaming-up. Western medicine has done researches on the antihypertensive function of Qiaogong (Extra). Most of the scholars believe that the antihypertensive function of Qiaogong (Extra) is related to its unique physiological anatomic structure. In the inner layers of Qiaogong (Extra), there are sternocleidomastoid, carotid artery and brachial plexus. Tui-pushing manipulation on Qiaogong (Extra) can effectively stimulate the above anatomic structures, thereby alleviating vasospasm, improving regional blood circulation and innervation ability[20,23-24]. Studies have shown that stimulating Qiaogong (Extra) can directly activate sympathetic nerve fibers through muscle-nerve conduction and reduce the excitability of sympathetic nerves, thereby alleviating arterial spasm and reducing the resistance index of arteries[25]. Besides, some scholars have found that Tui-pushing Qiaogong (Extra) can improve the hemodynamic force of animal's arteries[26]. The most important factor in blood pressure reduction of Qiaogong (Extra) is the carotid sinus. The manipulations performed on Qiaogong (Extra) can directly stimulate the carotid sinus, which introduces nerve impulse into the central nervous system, afterwards further stimulate the vagus nerve to perform the function of heart rate reduction and vasodilatation. That is the mechanism of Qiaogong (Extra) in reducing blood pressure[27]. In addition to the carotid sinus, the deep layers of Qiaogong (Extra) distribute many complex receptors including the internal jugular vein, the common carotid artery, the sympathetic nerve, and the vagus nerve. Tui-pushing Qiaogong (Extra) can produce a complex series of neuro-physiological changes[28]. Some scholars believe that the manipulation can be a benign regulation for the sympathetic and parasympathetic nerves that govern the myocardium, thus weakening the contraction of the myocardium to reduce the blood pressure[29].

The results of this study show that tuina at Taichong (LR 3), Neiguan (PC 6) and Qiaogong (Extra) respectively can reduce the blood pressure due to liver-fire flaming-up, among which Qiaogong (Extra) should be the best choice, for its function of soothing liver-qi to calm liver-yang and reversing liver-qi to extinguish liver-wind and special anatomic structure.

The experiment compared the effects of the three acupoints of Taichong (LR 3), Neiguan (PC 6) and Qiaogong (Extra) on diastolic and systolic blood pressures respectively in patients with primary hypertension due to liver-fire flaming-up. The selection of acupoints and the operation of manipulations provided a scientific basis for treating primary hypertension due to liver-fire flaming-up. However, the sample size was rather small. We will expand the sample size and further study the long-term antihypertensive effect of acupoints in order to serve patients with hypertension in a better way.

Conflict of Interest

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

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Statement of Informed Consent

Informed consent was obtained from all individual participants in this study.

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