

Current clinical application of traditional chinese medicine for the treatment of hypertension

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Abstract

Background: Hypertension is the most common type of chronic non-communicable diseases, as well as being the single most important risk factor for cardiovascular disease. The use of TCM has long been used in the prevention and treatment of hypertension and is associated with effective outcomes.

Objective: Determine the current status in the clinical application of Traditional Chinese medicine (TCM) for the treatment of hypertension within the past 5 years.

Search strategy: Seven electronic databases (PubMed, EMBASE, Cochrane library, QVID, China National Knowledge Infrastructure (CNKI), Chongqing VIP (CQVIP), Wanfang Data) were systematically searched from 2012-2016 using MeSH terms such as "hypertension, high blood pressure" and "Traditional Chinese medicine, Chinese medicinal herb, Chinese herbal medicine."

Inclusion criteria: Clinical randomized controlled trials, case-control studies, and case studies.

Data extraction and analysis: All statistics were retrieved based on the type of clinical study, type of prescription and type of treatment. Subsequently, the medicine meridian, efficacy of prescription and type of syndromes were summarized.

Results: Tianma Gouteng decoction and Zhengan Xifeng decoction were used 7 times, reinforcing deficiency was used 23 times, Calming the Liver was used 22 times and Removing Blood Stasis was used 14 times. Uncaria was used 24 times, Achyranthes and Tuckahoe were used 20 times, there are 50 kinds of drugs in the liver meridian. The main common clinical symptoms of hypertension were Hyperactivity of liver Yang and Yin deficiency and Yang Hyperactivity.

Conclusion: Recent clinical application of TCM for the treatment of hypertension most frequently involve the prescriptions Tianma Gouteng decoction and Zhengan Xifeng decoction, and the components Uncaria, Achyranthes and Tuckahoe. In TCM, occurrence of hypertension is mainly attributed to Hyperactivity of liver Yang, as well as Yin deficiency and Yang Hyperactivity, and treatment of hypertension most commonly involve reinforcing deficiency, Calming the Liver and Removing Blood Stasis.

Introduction

Current treatment of hypertension is significantly dominated by Western medicine. In comparison, TCM only plays an auxiliary function in the prevention and control of hypertension. However, TCM often demonstrates greater effectiveness during prehypertension, by inhibiting the development of high blood pressure, and other clinical symptoms such as dizziness, insomnia, and chest tightness, as well as providing improved treatment of refractory hypertension. Although TCM is commonly used for the clinical prevention and treatment of hypertension, there are often significant variations in the treatment effects in relation to the specific disease, pathogenesis, and type of medication. Thus, there is a lack of normative evaluation of various TCM prescriptions in relation to their curative treatment effects. This article examines the various controlled clinical trials of TCM within the past 5 years and analyzes the current TCM prescriptions in the prevention and treatment of hypertension.

Methods

We analyzed recent literatures involving TCM and clinical application of hypertension treatment using literature retrieval. Seven

electronic databases (PubMed, EMBASE, Cochrane library, QVID, China National Knowledge Infrastructure (CNKI), Chongqing VIP (CQVIP), Wanfang Data) were systematically searched from 2012-2016 using MeSH terms such as "hypertension, high blood pressure" and "Traditional Chinese medicine, Chinese medicinal herb, Chinese herbal medicine." and retrieved studies which used TCM in the treatment of hypertension, with the inclusion criteria for clinical randomized controlled trials, case-control studies, and case studies, and

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the exclusion criteria for non-clinical research involving in vitro and animal experiments. All statistics were retrieved based on the type of clinical study, type of prescription and type of treatment. Subsequently, the medicine meridian, efficacy of prescription and type of syndromes were summarized. In total, a total of 19 clinical TCM prescriptions were selected for the treatment of hypertension. Finally, we analyzed the composition, efficacy and indications of the different prescriptions. Based on these collected data, a database was setup and subsequent statistical analyses were performed.

Results

Article retrieval and categorization

A total of 32 articles were retrieved which met the criteria, including 29 clinical randomized controlled trials, 1 case-control study, and 2 case studies. In addition, 17 articles investigated well known TCM prescriptions (Tianma Gouteng decoction, Zhengan Xifeng decoction, Banxia Baizhu Tianma decoction, Xuefu Zhuyu decoction), whereas 15 articles investigated self-made prescriptions (Table 1) [1-32].

Characteristics of TCM treatment prescriptions

The frequency of use of compound TCMs in treatment of hypertension included: Tianma gouteng decoction-7 times, Zhengan Xifeng decoction-7 times, Banxia baizhu tianma decoction-2 times, and other formulae-1 time (Table 1). The most common treatment prescription characteristics included: reinforce deficiency-23 times, Calm the Liver-22 times, Remove Blood Stasis-14 times, Clear heat-12 times, expel dampness-6 times, regulate flow of qi-4 times, tranquilize endogenous wind-3 times, and Tranquilize-1 times (Table 2).

Table 1. Prescription, Usage Counter, Study Types

Prescription	Usage Counter	Study Types	Prescription	Usage Counter	Study Types
Tianma Gouteng decoction [1-7]	7	7 Clinical Randomized Controlled Trial	Compound TCM [28]	1	Clinical Randomized Controlled Trial
Zhengan Xifeng decoction [8-14]	7	5 Clinical Randomized Controlled Trial, 1 Case Study, 1 Case-control Studies	Antihypertensive Tea [30]	1	Clinical Randomized Controlled Trial
Banxia Baizhu Tianma decoction [16,17]	2	2 Clinical Randomized Controlled Trial	Pingshen Tongluo Jiangya granula [22]	1	Clinical Randomized Controlled Trial
Xuefu Zhuyu decoction [18]	1	Clinical Randomized Controlled Trial	Xinnao Xikang [24]	1	Clinical Randomized Controlled Trial
Qingxuan Jiangya decoction [19]	1	Clinical Randomized Controlled Trial	Zhengan Xifeng Huatan Quyu TCM [26]	1	Clinical Randomized Controlled Trial
Sancao Jiangya decoction [20]	1	Case Study	Compound TCM [27]	1	Clinical Randomized Controlled Trial
Bushen Heluo fang [21]	1	Clinical Randomized Controlled Trial	Naoqingtong Granule [29]	1	Clinical Randomized Controlled Trial
Huayu Xiezhuo decoction [23]	1	Clinical Randomized Controlled Trial	Pingganjiangya Granule [31]	1	Clinical Randomized Controlled Trial
TCM Tea[25]	1	Clinical Randomized Controlled Trial	Sangji Mixture[32]	1	Clinical Randomized Controlled Trial
Self-made TCM[15]	1	Clinical Randomized Controlled Trial			

Table 2. Efficacy Prescription, Usage Counter, Syndromes

Efficacy Prescription	Usage Counter	Syndromes	Occurrence Number
Reinforcing deficiency	23	Hyperactivity of liver Yang	10
Calming the Liver	22	Yin deficiency and Yang Hyperactivity	9
Removing Blood Stasis	14	Blood stasis	7
Clearing heat	12	Phlegm-damp resistance	6
Expelling dampness	6	Zangfu Qi-Xue and Yin-Yang deficiency	5
Regulating flow of qi	4	Overabundant liver-fire	3
Tranquilizing endogenous wind	3	Stagnated heat of liver meridian	2
Tranquilization	1		

Characteristics of hypertension

The common clinical syndromes of hypertension included: Occurrences of Hyperactivity of liver Yang-10 times, Occurrences of Yin deficiency and Yang Hyperactivity-9 times, Occurrences of Blood stasis-7 times, Occurrences of Phlegm-damp resistance-6 times, Occurrences of Zangfu Qi-Xue and Yin-Yang deficiency- 5 times, Occurrences of Overabundant liver-fire-3 times, and Occurrences of Stagnated heat of liver meridian-2 times (Table 2).

Characteristics of TCM components

There was a total of 74 different types of TCM components used for the treatment of hypertension. Among these, the top three most commonly used TCM components were: Uncaria-24 times, Achyranthes-20, and Tuckahoe-20 times (Table 3).

The most common organ targets of TCM meridian included: 50 liver, 25 heart, 32 spleen, 30 lung, 18 kidney, 3 pericardial, 9 bile, 0 small intestine, 25 stomach, 9 large intestine, 5 bladder, and 1 triple energizer meridian (Table 4). When TCM usage was expanded to used more than 10 times, the most common organ targets of TCM meridian included: 9 liver, 10 heart, 5 kidney, 4 spleen, 4 lung, 2 pericardial, 3 bile, 0 small intestine, 3 stomach, 1 large intestine, 1 bladder, and 1 triple energizer meridian (Table 5). Subsequently, when TCM usage was further expanded to used more than 20 times, the most common organ targets of TCM meridian included: 2 liver, 2 heart, 2 kidney, 1 spleen, 1 lung, 0 pericardial, 0 bile, 0 small intestine, 0 stomach, 0 large intestine, 0 bladder, and 0 triple energizer meridian (Table 6).

Table 3. TCM Name, Usage Counter

TCM Name	Usage Counter	TCM Name	Usage Counter	TCM Name	Usage Counter	TCM Name	Usage Counter
Uncaria	24	Tortoise plastron	7	Fructus Aurantii	2	Rhizoma Dioscoreae	1
Achyranthes	20	Hematite	7	Fructus Ligustri Lucidi	2	Scorpion	1
Tuckahoe	20	Pinellia	7	Fructus Arctii	2	Lignum Sappan	1
Scutellaria baicalensis	18	Fossil fragments	6	Flos Chrysanthemi Indici	2	Vervain	1
Danshen Root	15	Oyster	6	ginger	2	Medulla Tetrapanacis	1
Capejasmine	13	Crataegus pinnatifida	4	Fructus Jujubae	2	Pine needle	1
Gastrodia elata	12	Chrysanthemum	4	Broadleaf holly leaf	1	Citron	1
Parasitic loranthus	12	Radix Paeoniae Rubra	4	Rhizoma Coptidis	1	Greenbrier	1
Rehmanniae	11	Alisma	3	Earthworm	1	Official Magnolia Bark	1
Licorice	11	Rhubarb	3	Radish Seed	1	Integripetal rhodiola herb	1
Chuanxiong	11	Tangerine peel	3	Rhizoma Polygonati	1	Citron fruit	1
Large-headed atractylodes	10	Selfheal	2	Fushen	1	Bile Arisaema	1
Radix Paeoniae Alba	9	Radix Puerariae	2	Chinese Angelica	1	Medicated leaven	1
Motherwort	9	Pearl shell	2	Fructus Aurantii Immaturus	1	Grassleaf Sweetflag Rhizome	1
Sickle senna seed	9	Herba Epimedii	2	Semen Persicae	1	Barbary Wolfberry Fruit	1
Figwort	9	Leech	2	Radix Platycodi	1	Pipewort	1
Concha Haliotidis	8	Radix Astragali	2	Chinese thorowax	1	Cassia	1
Caulis polygoni multiflori	8	Folium Mori	2	Rough gentian	1		
Eucommia	8	Caulis Bambusae	2	Safflower	1		

Table 4. Medicine Meridian

Medicine Meridian	Usage Counter	Medicine Meridian	Usage Counter
Liver	50	Bile	9
Heart	25	Small Intestine	0
Spleen	32	Stomach	25
Lung	30	Large Intestine	9
Kidney	18	Bladder	5
Pericardial	3	Triple Energizer	1

Table 5. Medicine Meridian, using more than 10 times (Contains 10)

Medicine Meridian	Usage Counter	Medicine Meridian	Usage Counter
Liver	9	Bile	3
Heart	10	Small Intestine	0
Kidney	5	Stomach	3
Spleen	4	Large Intestine	1
Lung	4	Bladder	1
Pericardial	2	Triple Energizer	1

Table 6. Medicine Meridian, using more than 20 times (Contains 20)

Medicine Meridian	Usage Counter	Medicine Meridian	Usage Counter
Liver	2	Bile	0
Heart	2	Small Intestine	0
Kidney	2	Stomach	0
Spleen	1	Large Intestine	0
Lung	1	Bladder	0
Pericardial	0	Triple Energizer	0

Discussion

Hypertension is the most common type of chronic non-communicable diseases, as well as being the single most important risk factor for cardiovascular disease [33,34]. In TCM, hypertension is categorized as the Vertigo and Headache class of disease. The basic pathogenesis of hypertension in TCM is the result of Yin deficiency and

Yang Hyperactivity, as well as the general symptom of asthenia. The main cause of hypertension is emotional disturbance, improper diet, blood stasis, phlegm interference, as well as occurrence of Zangfu Qi-Xue and Yin-Yang deficiency in the liver and kidneys. The use of TCM has long been used in the prevention and treatment of hypertension and is associated with effective outcomes.

The antihypertensive effects of TCM meridian was previously summarized by Huang Xiaojin [35], in particular the efficacy of TCM in the treatment of hypertension. The TCM notion for treatment of hypertension generally involves the five organs Yin principle, while its etiology and pathogenesis is mainly based on phlegm, blood stasis and heat accumulation. The law of frequency in the use of TCM for treatment of primary hypertension was outlined by Cai Yongmin [36] and involves the 6 common applications of TCM including: Reinforce deficiency, Remove Blood Stasis, Clear heat, Calm the Liver with Tranquilize endogenous wind, diaphoresis relieving superficialities and Expel dampness. Studies by Lan Hongbin [37] and Chen Jianxin [38] analyzed 864 and 310 different compounds, respectively, for the treatment of hypertension, which includes 231 and 84 different kinds of TCM, respectively, whereby the most frequently used characteristics were: Reinforce deficiency, Remove Blood Stasis, Calm the Liver and Expel dampness.

Our present study demonstrated that based on the choice of prescriptions for the treatment for hypertension, Tianma gouteng decoction and zhengan Xifeng decoction were the preferred options, whose characteristics mainly include: Reinforce deficiency, Calm the liver and Remove blood stasis. In addition, based on the choice of TCM components for the treatment for hypertension, Uncaria, Achyranthes and Scutellaria baicalensis, were the most widely used, and are mainly dominated by the TCM liver meridian. Similarly, the three most commonly used TCM meridians include the liver, heart and kidney meridian drugs. Furthermore, the main clinical syndromes of hypertension were: Hyperactivity of liver Yang, Yin deficiency and Yang Hyperactivity.

Conclusion

In conclusion, Hyperactivity of liver Yang and Yin deficiency, and Yang Hyperactivity are the two major syndromes of hypertension, while TCM treatments mainly focus on reinforcing deficiency, Calming the Liver and Removing Blood Stasis in the treatment of hypertension. The most commonly used formulas for clinical treatment of hypertension are Tianma Gouteng decoction and Zhengan Xifeng decoction, whereas Uncaria, Achyranthes and Tuckahoe are the most commonly used TCM components for clinical treatment of hypertension. TCM drugs belong mainly to the liver meridian, while TCM drugs for the treatment of hypertension mostly belong to the liver, heart and kidney meridians.

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