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Literature Study

Influence of acupuncture on pulmonary function of patients with asthma: a review

针刺对哮喘患者肺功能影响的研究进展

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Abstract

Asthma is a common disease with recurrent onset which severely affects patients' quality of life. Acupuncture can improve pulmonary functions in asthma patients and thus treat this disorder. To summarize the status of acupuncture treatment for asthma, we have collected clinical literatures published in the recent 10 years and analyzed the influence of acupuncture on pulmonary functions in asthma patients from the aspects of frequently used points, needling techniques, manipulation and mechanisms to provide references for treating asthma with acupuncture.

Keywords: Acupuncture Therapy; Acupuncture Points; Asthma; Respiratory Function Tests; Forced Expiratory Volume; Peak Expiratory Flow Rate; Forced Vital Capacity; Point Selection

【摘要】哮喘是一种临床常见的反复发作疾病,严重影响患者的生活质量。针刺疗法可通过改善哮喘患者的肺功能,达到有效治疗哮喘的目的。为总结针刺治疗哮喘的总体情况,对近 10 年来针刺干预哮喘肺功能的临床研究 文献进行了筛选,从常用穴位、针法、针刺手法及作用机制方面分析总结针刺对哮喘患者肺功能的影响,为指导 哮喘的针灸治疗提供参考。

【关键词】针刺疗法;针刺穴位;哮喘;呼吸功能试验;用力呼气量;呼气峰流速;用力肺活量;取穴 【中图分类号】R246.1 【文献标志码】A

Asthma, also known as bronchial asthma (BA), is a common chronic inflammatory disease of the airways involving multiple cells and cytokines. Common symptoms include recurrence of wheezing, coughing, chest tightness and shortness of breath^[1]. Research has shown that the incidence of asthma is rising by the rate of 20%-50% every 10 years^[2]. Medicine treatment is the most common therapy currently, though with major adverse reaction and strong tolerance. As a physical therapy, acupuncture can adjust pulmonary ventilation to improve pulmonary function, alleviate clinical symptoms and thus control asthma, so it is widely used in clinical treatment for asthma in recent years. Pulmonary function examination can reflect the real time pulmonary function in asthma patients, providing objective indicators for diagnosis and therapeutic evaluation^[3], such as forced expiratory volume in 1 second (FEV1), peak expiratory flow (PEF), and forced vital capacity (FVC). PEF can detect the obstruction status in airways, especially major ones in early stage, and FEV1 can reflect the severity of the disease^[4]. We have summarized the clinical studies in the recent 10

years of acupuncture for pulmonary functions of asthma patients, and the results are as follows.

1 Materials and Methods

1.1 Inclusion criteria

Clinical studies on acupuncture in treating BA between 2005 and 2016 (including personal experience and academic thesis); treatment methods included acupuncture plus medicine (Chinese or Western medicine) or acupuncture plus cupping; evaluation methods were based on indexes reflecting pulmonary function (FEV1, PEF, etc.); only one representative article was included among similar articles with the same points selection of the same first author, but included all if the points selection were different.

1.2 Exclusion criteria

Animal experiment and review articles were excluded.

1.3 Literature filtration

Two independent researchers filtrated original literature separately. If there were any doubts, discussion was allowed between two persons or asked for help of the third researcher to determine inclusion. A total of 3 268, 52 and 39 articles were retrieved from China National Knowledge Infrastructure (CNKI), Wanfang Academic Journal Full-text Database (Wanfang)

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and PubMed. By reading abstract and whole text, 3 314 articles were excluded and 45 were finally included.

2 Results

Points selection, needling techniques and acupuncture manipulations were analyzed to summarize the influence of acupuncture on pulmonary functions in asthma patients.

2.1 Influence of points on pulmonary function in asthma patients

As a traditional Chinese medicine (TCM) treatment approach, acupuncture emphasizes points selection in intervening pulmonary functions in asthma patients. In the principle of TCM pattern differentiation, points selection can be classified as single point and multiple points; and besides acupuncture alone, acupuncture plus medicine is also used according to different circumstances.

2.1.1 Single-point acupuncture on pulmonary function

Empirical single-point selection for asthma has the merit of applying less points and quick onset. Treatment of single-point acupuncture for asthma can improve pulmonary function and alleviate clinical symptoms, mainly used in acute stage of asthma.

Acupuncture alone: Cai ZH, et al[5] observed the therapeutic function of puncturing Qingchuan (Extra) [between Lianquan (CV 23) and Tiantu (CV 22), in the sunken below the medial front of cricoid cartilage, a feeling of contradiction when pressing with hand] for asthma, during which lifting-thrusting method was used, and compared with ordinary acupuncture at Dingchuan (EX-B 1), with no reinforcing or reducing manipulation. The result showed that instant wheezing time was shorter in the treatment group, and the improvement of PEF was superior in the treatment group, showing a statistical difference (P<0.01). It's indicated that puncturing Qingchuan (Extra) can rapidly relieve wheezing symptom in acute stage of asthma and improve pulmonary function, and the mechanism included reducing airway resistance and increasing pulmonary ventilation. Li W, et al^[6] observed electroacupuncture (EA) at Feishu (BL 13) for asthma, and compared it with oral administration of sulpiride. The result showed that both methods can improve PEF, FEV1, FVC and FEV1% to different degrees, but the effect in the treatment group was better than that in the control group, showing a statistical significance (P<0.05). It indicated that EA at Feishu (BL 13) has the dual function of improving airway obstruction and decreasing airway resistance, and has a better function than regular Western medicine treatment in relieving clinical symptoms and improving pulmonary functions for asthma patients in the acute stage.

Acupuncture plus Western medicine: Han J^[7] observed the effect of puncturing bilateral Yuji (LU 10)

on the basis of oxygen inhalation and azithromycin anti-infection treatment, in which lifting-thrusting reinforcing-reducing manipulation was applied, and compared it with routine treatment plus salbutamol aerosol inhalation treatment. The result showed that instant FEV1, PEF and FEV1% were improved in the treatment group, while indicators in the control group were significantly improved 5 min after inhalation, indicating that puncturing Yuji (LU 10) had immediate effect in relieving asthma, and such effect was better than salbutamol aerosol. As the Xing-Spring point of the Lung Meridian, Yuji (LU 10) can unblock yang, purge heat and thus relieve asthma, for both cold and heat wheezing, and it can also increase cyclic adenosine monophosphate (cAMP) and cAMP/cyclic guanosine monophosphate (cGMP) ratio in lung tissues, relieve spasm and improve bronchial pulmonary venticulation^[8], which may be its mechanism in treating acute asthma.

2.1.2 Multiple-points acupuncture on pulmonary function

Multiple-points acupuncture for asthma largely conforms to pattern differentiation and symptomatic point selection principle, and common points combination rules in clinical practice. Compared with single-point acupuncture, it is more widely used in clinical and mechanism studies. Multiple-points acupuncture can improve pulmonary function and alleviate symptoms of all stages and varying severities, and thus control symptoms of asthma.

Acupuncture alone: Xie YL, et al^[9] used yangwarming and qi-tonifying acupuncture to treat chronic persistent asthma, eight points including Dazhui (GV 14), Feishu (BL 13), Taixi (KI 3), Zusanli (ST 36), Danzhong (CV 17), Dingchuan (EX-B 1), Zhigou (TE 6) and Jianshi (TE 6) were used. Lifting-thrusting and twirling reinforcing manipulation was applied to the former 4 points, and lifting-thrusting and twirling reducing manipulation was applied to the latter 4 points. It was compared with seretide inhalation. The result showed that the improvements of all pulmonary function indicators were better in the observation group. Besides, clinical symptoms score and immunoglobulin E (IgE) level decreased in both groups, but with better improvements in the observation group, showing statistical significances (P<0.05), indicating that yangwarming and gi-tonifying acupuncture can regulate immune reaction, relieve airway inflammation, decrease airway reaction and thus control symptoms in chronic persistent asthma and improve pulmonary functions. Therefore, it's worth clinical popularization. Chu KA, et al^[10] found that acupuncture at Lieque (LU 7), Hegu (LI 4), Fenglong (ST 40) and Neiguan (PC 6) could instantly improve FEV1 in asthma patients, while such effect was inferior to inhalation of bronchodilator. Pai HJ, et al^[11] proved that acupuncture could alleviate

inflammation reaction and improve lung's capacity in asthma patients. They also found that sham acupuncture had the same effect as acupuncture but with shorter course of treatment, and noted that sham acupuncture could not be taken as a control group when acupuncture was the primary intervention method. Wechsler ME, *et al*^[12] also proved that when salbutamol inhalation treatment was adopted in the treatment group, sham acupuncture in the control group, the latter one could improve FEV1, and thus, sham acupuncture was not recommended for placebo treatment.

Acupuncture plus medicine: Zhang ZL, *et al*^[13] used qi-regulating and phlegm-resolving acupuncture combining routine treatment to intervene pulmonary functions of asthma patients. The result showed that the effect was better than that of routine treatment alone, and proved that such needling technique could improve pulmonary function and alleviate clinical symptoms by positive feedback of Th1 cell subset, negative feedback of Th2 cell subset, reduction of inflammatory factors and airway hyper-responsiveness.

Shao SJ, et al^[14] used Shao's five needling therapy combining oxygen and aerosol inhalation to treat asthma patients in acute attack stage, and observed its influence on pulmonary functions. The result showed a better efficacy compared to oral intake of theophylline tablets combining sustained synthesis therapy. Experimental research showed that Shao's five needling therapy can decrease the thickness of bronchial wall and smooth muscle, reduce the expression of transforming growth factor-β1 (TGF-β1) in small airways of rats, facilitate reconstruction of airway and improve the respiratory function, and thus control asthma^[15]. Wu JH^[16] observed the combination therapy of acupuncture and medicine for asthma, which showed a

better improvement of pulmonary function than Western medicine alone. It's indicated that basic Western medicine treatment plus acupuncture could adjust humoral immune response and nerves functions to build up defense, reduce allergic reaction, and produce a better effect in treating asthma and improving pulmonary functions^[17]. Zhang WP^[18] observed the effect of lung-dispersing, spleenstrengthening and kidney-tonifying acupuncture combining anti-asthma drug on pulmonary functions of asthma patients with different severities. The result showed that the combination therapy was better than anti-asthma drug alone, and the mechanism might relate to autonomic nerve regulation. Modern research has showed that the adjustment function of acupuncture on viscera was linked with autonomic nerves system^[19]. Asthma can cause the imbalance between sympathetic and parasympathetic nerve in governing lung and main bronchia, while acupuncture can mobilize organ structure and function, activate sympathetic nerve and inhibit parasympathetic nerve, control gland secretion, release bronchia spasm, alleviate asthma and improve pulmonary function.

The included literature showed that the selection of points in acupuncture therapy intervening asthma patients' pulmonary function is crucial in clinical practice, especially in the case when multiple points are used. The combination of points is not a simply sum of points, but an coordinated integrity on the basis of mastering specialties of identity and rules of integration, which is the key to improving clinical efficacy^[20]. Meanwhile, acupoint is also the foundation of acupuncture manipulation. From massive clinical reports, empirical single point and points combination are widely used in improving pulmonary functions of asthma patients (Table 1).

Table 1.	Point selection	rules of comm	on single and	d group points	(major point	s ≤5) for pulmona	ry functions in a	asthma patients
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Number	Point	Function	Principle	Pulmonary function
1	Qingchuan (Extra)	Moving qi, resolving phlegm, and relieving asthma	Specific location point selection	PEF and its' variability rate
2	Yuji (LU 10)	Unblocking yang, clearing fire, relieving asthma	Point property (Ying-Spring point, fire)	FEV1, PEF, etc.
3	Feishu (BL 13)	Regulating lung qi, relieving cough and asthma, strengthening skin barrier	Visceral and meridian pattern differentiation	PEF, FEV1, FVC, etc.
4	Feishu (BL 13), Dazhui (GV 14), Fengmen (BL 12)	Descending qi to relieve asthma, tonifying the lung to strengthen skin barrier	Nature of disease (deficiency in root and excess in symptoms)	PEF, FEV1, etc.
5	Kongzui (LU 6), Yanglingquan (GB 34), Danzhong (CV 17), Fenglong (ST 40)	Directing qi downward to relieve asthma	Cause of disease (qi counter- flow and phlegm obstruction)	FEV1, PEF, etc.
6	Zusanli (ST 36), Feishu (BL 13), Pishu (BL 20)	Tonifying earth to engender metal	Visceral pattern differentiation	PEF, etc.
7	Feishu (BL 13), Zhongfu (LU 1)	Coordinating yin and yang, harmonizing qi and blood	Combination of Back-Shu and Front-Mu points	FEV1, FVC, PEF, etc.

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2.2 Influence of needling technique on pulmonary function in asthma patients

Needling techniques are rooted in TCM theory, summarized from visceral, meridian, eight principle syndrome differentiation and clinical experience. The selection of points is conformed to syndromes or pattern differentiation or clinical experience. In this essay, we have summarized different needling techniques on pulmonary functions of asthma patients in clinical practice in Table 2.

Table 2. Summary of needling technique for pulmonary functions in asthma patients

Number	Needling technique	Principle	Items of pulmonary functions
1	Yang-warming and qi-improving flow ^[9,21]	Warming yang: reinforcing the healthy qi of spleen and kidney; improving qi flow: eliminating the pathogenic factors of phlegm and stasis	FEV1, FVC, PEF ^[9] ; FEV1 ^[21]
2	Qi-regulating and phlegm-resolving ^[13]	Regulating qi movement to resolve phlegm	FEV1, FVC, etc.
3	The seven rows of acupuncture combined with balance acupuncture ^[22]	Coordinating yin and yang, back and abdomen, and improving flow of qi and blood	FEV1, FVC, PEF
4	Lung-dispersing, spleen-strengthening and kidney-tonifying ^[18]	Treating both symptoms and root causes: dispersing lung excess, tonifying spleen and kidney	FEV1, FVC, PEF; FEV1/FVC, FEF
5	Descending qi to relieve asthma ^[23]	Directing qi downward to improve resolving phlegm and relieving asthma	FEV1, PEF
6	Strengthening the earth to engender metal ^[24]	Strengthening the spleen to cut the root of phlegm	PEF
7	Combination of Back-Shu and Front-Mu points ^[25]	Coordinating yin and yang, and harmonizing qi and blood	FEV1, FVC, PEF, etc.
8	Fu's acupuncture ^[26]	Expelling exterior pathogenesis	FEV1, FEV1%, PEF
9	Mind-regulating therapy ^[27]	Regulating spirit to improve movements of qi and blood	FEV1, FEV1/FVC

2.3 Influence of acupuncture manipulation on pulmonary function in asthma patients

Acupuncture manipulation is closely linked with clinical efficacy. Different acupuncture manipulations at the same point will exert different qualities and quantities of stimulation to human body, and disparate influence on visceral organic metabolism and functions^[28]. Selection of manipulation should be based on deficiency and excess characteristics of disease and points to generate the most appropriate stimulation, and thus improve clinical efficacy.

When using acupuncture to intervene pulmonary function of asthma patients, common acupuncture manipulations include lifting-thrusting and twirling reinforcing and reducing method, and even reinforcing-reducing manipulation. The selection of manipulation should be also based on individuals and

characteristics of diseases. For example, Feishu (BL 13) is the Back-Shu point of the Lung Meridian which can reflect deficiency and excess status of internal organs, and also the location to treat the relevant diseases. Therefore, such point is the main point to treat lung diseases no matter in the case of deficiency or excess^[14]: for acute onset, applying reducing method can dredge lung, resolve phlegm and relieve asthma; in remission stage, applying reinforcing method to such point can tonify lung qi, reinforce the healthy qi and eliminate the pathogenic factors. Therefore, when intervening pulmonary functions with acupuncture, the selection of reinforcing or reducing manipulation should be based on the sequence of symptoms and characteristics of diseases, to exert the best efficacy for pulmonary function and control of symptoms (Table 3).

Table 5: Rules of uniterent acupancture manipulations				
Number	Acupuncture manipulation	General rule		
1	Lifting-thrusting and twirling reinforcing manipulation	Deficiency in root, points for reinforcing		
2	Lifting-thrusting and twirling reducing manipulation	Excess in syndromes, points for reducing		
3	Even reinforcing-reducing manipulation	Neither the disease in deficiency and excess nor points in reinforcing and reducing is obvious		

Table 3. Rules of different acupuncture manipulations

3 Mechanism of Acupuncture in Intervening Pulmonary Function in Asthma

Acupuncture can exert a benign two-side stimulation to human body, and it brings regulation on organs and systems from multiple levels and approaches. Generally, it's manifested as reduction of inflammatory factors, decrease of airway inflammation and airway hyperresponsiveness, release of bronchial spasm, and reduction of airway resistance and increase of pulmonary ventilation volume. However, the respective long-term effect of single and group points on pulmonary functions in asthma patients still requires further investigation. The detailed mechanism is summarized in Table 4.

Table 4.	Summary	of mechanism	of acupuncture	on pulmonary	functions in asthma
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Number	Approach	Factor and change
1	Immune regulation	Decreasing interleukin-4 (IL-4), immunoglobulin E (IgE), increasing interferon- γ (INF- γ) ^[29] ; increasing IgG, IgM, CD3 ⁺ , CD4 ⁺ , CD3 ⁺ /CD4 ⁺ , decreasing CD8 ⁺ , IgE ^[9] ; regulating Th1/Th2 cell subsets ^[13]
2	Intervention on neuroendocrine- immune network	Increasing cAMP and cAMP/cGMP ^[7]
3	Anti-inflammation reaction	Down-regulating the expression of c-fos ^[30] ; decreasing TGF-β1 ^[15] ; decreasing T calcium channel (Cav3.1, Cav3.2 and Cav3.3) ^[31] ; decreasing S100A8, receptor for advanced glycation endproducts (RAGE) and S100A11, increasing clara cell 10-kDa protein (CC10), annexin A5 (ANXA5) and soluble receptor for advanced glycation end products (sRAGE) ^[32]

4 Conclusion

By summarizing clinical literatures of acupuncture in intervening pulmonary functions of asthma patients, we can conclude that acupuncture has certain clinical effect in improving pulmonary functions of asthma patients. In which, the selection of points, the needling techniques and manipulation are the manifestation of pattern differentiation principle of TCM, and the key to a satisfactory clinical effect. Modern researches have also provided solid objective proof for acupuncture treatment. Meanwhile, there are still some limitations, e.g. the interval, time and course of treatment are not unified, which will all decrease the feasibility of acupuncture treatment. Besides, Scheewe S, et al^[33] found that acupuncture can intervene instant PEF in asthma patients. After certain courses of acupuncture treatment, patients' anxiety score was decreased, while the treatment showed no improvement in FEV1/FVC. Choi JY, et $al^{[34]}$ also found that acupuncture had no obvious efficacy on pulmonary functions in asthma patients, which might be caused by limited treatment courses failing to generate an accumulated effect, incorrect pattern differentiation, poor acupuncture operation and error during pulmonary function measurement, etc. Therefore, future research needs to investigate acupuncture of different intervals, durations, times and courses to build up a treatment protocol on the one hand, and conduct laboratory research on the other hand to provide theoretical basis for such method. By doing this, after constant summing of experience, an integrated standard acupuncture treatment method can

be developed from clinical practice, and provide guidance for asthma treatment.

Conflict of Interest

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

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References

- Ge JB, Xu YJ. Internal Medicine. Beijing: People's Medical Publishing House, 2013: 302.
- [2] Moorman JE, Akinbami LJ, Bailey CM, Zahran HS, King ME, Johnson CA, Liu X. National surveillance of asthma: United States, 2001-2010. Vital Health Stat 3, 2012, (35): 1-58.
- [3] Lin CY. Clinical application of respiratory function tests in children with asthma or cough variant asthma. Linchuang Feike Zazhi, 2014, 19(5): 923-925.
- [4] Sun WL, Chen YH. Brief introduction of Global Initiative for Asthma updated in 2016. Zhongguo Yixue Qianyan Zazhi (Dianzi Ban), 2016, 8(7): 33-40.
- [5] Cai ZH, Dong YX, Liu F, Pan YP, Gao Y, Gao B, Wang W, Pan ZW, Chang FQ, Piao XY, Zhang XJ, Han CX. Multicenter controlled study on transient asthma-stopping

action of acupuncture at "Qingchuan Point". Zhongguo Zhen Jiu, 2005, 25(6): 383-386.

- [6] Li W, Tan L, Miao LY, Li PH, Chen J. Effect of electroacupuncture of BL 13 on symptoms and pulmonary function in asthma. Zhenjiu Linchuang Zazhi, 2010, 26(1): 4-8.
- [7] Han J. Observation on effect of acupuncture at Yuji (LU 10) on the pulmonary function of patients with bronchial asthma and immediate efficacy of relieving asthma. Zhongguo Zhen Jiu, 2012, 32(10): 891-894.
- [8] Li X. Treatment of 104 cases with bronchial asthma by Ma Xing Ding Chuan Tang plus acupuncture. Zhongguo Zhongyiyao Xiandai Yuancheng Jiaoyu, 2010, 8(6): 44-45.
- [9] Xie YL, Wan WR, Zhao YL, Xie JJ, Wu QY. Impacts on asthma at persistent stage and immune function in the patients treated with acupuncture for warming yang and benefiting qi. Zhongguo Zhen Jiu, 2015, 35(11): 1089-1092.
- [10] Chu KA, Wu YC, Ting YM, Wang HC, Lu JY. Acupuncture therapy results in immediate bronchodilating effect in asthma patients. J Chin Med Assoc, 2007, 70(7): 265-268.
- [11] Pai HJ, Azevedo RS, Braga AL, Martins LC, Saraiva-Romnholo BM, Martins Mde A, Lin CA. A randomized, controlled, crossover study in patients with mild and moderate asthma undergoing treatment with traditional Chinese acupuncture. Clinics (Sao Paulo), 2015, 70(10): 663-669.
- [12] Wechsler ME, Kelley JM, Boyd IO, Dutile S, Marigowda G, Kirsch I, Israel E, Kaptchuk TJ. Active albuterol or placebo, sham acupuncture, or no intervention in asthma. N Engl J Med, 2011, 365(2): 119-126.
- [13] Zhang ZL, Ji XQ, Xue L, Yu SH. Clinical observation on acupuncture for treatment of bronchial asthma at acute stage. Zhongguo Zhen Jiu, 2005, 25(3): 158-159.
- [14] Shao SJ, Quan CF, Shao SX, Zhou M, Jin XJ, Zhao YX, Ren ZX, Wang PY, Gao XY. Asthma at acute attack stage treated with "Shao's five needling therapy": a multi-central randomized controlled study. Zhongguo Zhen Jiu, 2013, 33(9): 774-778.
- [15] Li HZ, Xun XY, Shao SJ, Hua JS. Effect of acupuncture intervention on airway remodeling and transforming growth factor-β1 expression in asthma rats. Zhen Ci Yan Jiu, 2014, 39(4): 278-281.
- [16] Wu JH. Effective observation on treating 68 cases of bronchial asthma by acupuncture plus medicine. Zhongyi Linchuang Yanjiu, 2016, 8(13): 109-111.
- [17] Zhu DX. Effect of combined acupuncture and medicine on bronchial asthma and cytokine. Shanghai Zhenjiu Zazhi, 2010, 29(2): 91-93.
- [18]Zhang WP. Effects of acupuncture on the pulmonary function and heart rate variability in different state of bronchial asthma. Zhen Ci Yan Jiu, 2007, 32(1): 42-48.
- [19] Yan LC, Fang JQ, Han MM. Clinical research progress on the effects of acupuncture on heart rate variability. Liaoning Zhongyiyao Daxue Xuebao, 2015, 17(11): 123-125.
- [20] Qin QG, Wang HP, Liu K, Zhao YX, Ben H, Gao XY, Zhu B. Effects of acupuncture on intestinal motility: agonism and antagonism. Shijie Zhongyiyao, 2013, 8(3): 262-266.
- [21] Lin YR. Effects of Wen Yang Li Qi Acupuncture on Efficacy Score and Quality of Life of Patients in Chronic

Persistent Stage of Bronchial Asthma. Fuzhou: Master Thesis of Fujian University of Chinese Medicine, 2015.

- [22] Li L, Wang ZH, Ruan S, Liao X. The seven rows of acupuncture combined with balance acupuncture treatment of bronchial asthma duration: clinical observation of 60 cases. Yunnan Zhongyi Xueyuan Xuebao, 2016, 39(3): 57-58.
- [23] Zhang M, Hong JJ, Hong J, Zhu ZX, Guo H, Ba RD, Chang LP. Jiang Qi Ping Chuan acupuncture for asthma: a randomized controlled clinical study. Changchun Zhongyiyao Daxue Xuebao, 2012, 28(4): 603-604.
- [24] Piao JZ. Clinical Study on the Treatment of Bronchial Asthma with Strengthening Earth to Engender Metal. Nanjing: Master Thesis of Nanjing University of Chinese Medicine, 2013.
- [25] Jin XZ. Clinical Research of "Combination of Back-Shu and Front-Mu Points" in the Treatment of Bronchial Asthma. Nanjing: Master Thesis of Nanjing University of Chinese Medicine, 2013.
- [26] Ruan DM. Efficacy Observation on Asthma-relieving of Fu's Acupuncture for Bronchial Asthma. Nanjing: Doctor Thesis of Nanjing University of Chinese Medicine, 2009.
- [27]Qi YJ. Efficacy observation on mind-regulating acupuncture for bronchial asthma in chronic persistent stage. Zhongguo Zhongyi Jichu Yixue Zazhi, 2013, 19(12): 1451-1453.
- [28] Liu LX. Talk on the antagonism of acupoints combination. Hebei Zhongyi, 2010, 32(10): 1530.
- [29] Jiang CP, Pang JY. Effect of *Maqin Kechuan* decoction combined with acupuncture on respiratory mechanics and cellular immune function in patients with acute exacerbation of bronchial asthma. Sichuan Zhongyi, 2016, 34(8): 69-71.
- [30] Yu YY, Cui JM, Li Shuang, Han JP, Yang JH, Zhao Y, Fan ZZ. Effect of acupuncture on c-fos expression in the lung tissue of bronchial asthmatic rats. Zhongguo Zhongxiyi Jiehe Zazhi, 2016, 36(9): 1124-1127.
- [31] Wang Y, Sun J, Jin R, Liang Y, Liu YY, Yin LM, Xu YD, Yang YQ. Influence of acupuncture on expression of T-type calcium channel protein in airway smooth muscle cell in airway remodeling rats with asthma. Zhongguo Zhen Jiu, 2012, 32(6): 534-539.
- [32] Xu YD, Cui JM, Wang Y, Yin LM, Gao CK, Liu XY, Wei Y, Liu YY, Jiang YL, Shan CX, Yang YQ. Proteomic analysis reveals the deregulation of inflammation-related proteins in acupuncture-treated rats with asthma onset. Evid Based Complement Alternat Med, 2012, 2012: 850512.
- [33] Scheewe S, Vogt L, Minakawa S, Eichmann D, Welle S, Stachow R, Banzer W. Acupuncture in children and adolescents with bronchial asthma: a randomised controlled study. Complement Ther Med, 2011, 19(5): 239-246.
- [34] Choi JY, Jung HJ, Kim JI, Lee MS, Kang KW, Roh YL, Choi SM, Jung SK. A randomized pilot study of acupuncture as an adjunct therapy in adult asthmatic patients. J Asthma, 2010, 47(7): 774-780.

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