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Clinical Effect of Vesiculating Cupping Therapy Combined with Moxibustion on Bronchial Asthma

Chunhua Gu[1#*] and Xiaozhi Zhu[2#]

[1]Emergency Department of Bao 'an District People's Hospital, No.118, Longjing Second Road, Bao'an District, Shenzhen

[2]Shiyan People's Hospital, Baoan District, Shenzhen, No.11, Jixiang Road, Shiyan Street, Bao' an District, Shenzhen

Keywords

Vesiculating cupping therapy, Moxibustion, Bronchial asthma, Lung function, Inflammatory response

***Correspondence**

Chunhua Gu,Emergency Department of Bao 'an District People's Hospital, No.118, Longjing Second Road, Bao'an District, Shenzhen.E-mail: 459874514@qq.com

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Abstract

Background This study aims to investigate clinical effect of vesiculating cupping therapy combined with moxibustion on patients with bronchial asthma. **Methods** 45 patients with bronchial asthma treated with vesiculating cupping therapy combined with moxibustion in our hospital from March 2022 to March 2023 were selected into observation group, and 45 patients with bronchial asthma treated with moxibustion were selected into control group during the same period. The clinical effects in the two groups were compared, and the changes of TCM symptom score, asthma control, lung function, and inflammatory response before and after treatment were observed. **Results** The total effective rate of clinical efficacy in observation group was significantly higher than that in control group (P<0.05). After treatment, the levels of TCM symptom score, hypersensitive C-reactive protein, interleukin-6, and tumor necrosis factor-α were obviously reduced in both groups, and these levels in observation group were visibly lower than those in control group (P<0.05). Chinese version of the Children's Asthma Control Test (C-CACT) score, forced expiratory volume in the first second, peak expiratory flow, forced vital capacity, and the predicted percentage of forced expiratory volume in the first second to forced vital capacity were strikingly increased in both groups, and these indexes in observation group were significantly higher than those in control group (P<0.05). **Conclusion** Vesiculating cupping therapy combined with moxibustion has a good clinical effect in the treatment of patients with bronchial asthma, which has certain effects in alleviating clinical symptoms, improving lung function, and inhibiting inflammatory response.

1. Introduction

Bronchial asthma is a chronic airway inflammatory disease, which is caused by detachment of airway epithelial cells and infiltration of pro-inflammatory cells, and clinically manifested as cough, shortness of breath, and dyspnoea [1]. Bronchial asthma is difficult to cure due to irreversible airflow limitation and persistent airway hyperresponsiveness, so clinical treatment is mostly aimed at controlling symptoms and preventing recurrence [2]. Traditional Chinese medicine (TCM) believes that bronchial asthma belongs to "gasp syndrome" and "asthma", which is caused by phlegm retention in the lungs and pathogenic factors, so its clinical treatment is mostly based on the principles of expelling phlegm to resolve mass, warming and activating meridian, freeing lung, and relieving asthma [3].

Moxibustion is a common means of treatment for bronchial asthma in TCM, with the effects of expelling cold, dredging collaterals, and regulating qi and blood. The study by Zhang et al. have showed that moxibustion is better applied in patients with bronchial asthma, which can effectively control the patient's condition, and improve lung function and immune function [4]. Vesiculating cupping therapy is a TCM treatment, which can attract and expel phlegm and blood in patient's body to the cupping, with the effects of making the pathogenic factors come out [5]. The effect of single method to treat bronchial asthma is limited. Accordingly, this study applies vesiculating cupping therapy combined with moxibustion to treat bronchial asthma, compares the clinical efficacy in the two groups, and observes the specific effects of these treatment methods on clinical symptoms, lung function, and inflammatory response, to provide more references for the clinical treatment of bronchial asthma.

2 Materials and methods

2.1 General data

45 patients with bronchial asthma treated with vesiculating cupping therapy combined with moxibustion in our hospital from March 2022 to March 2023 were selected into observation group, and 45 patients with bronchial asthma treated with moxibustion were selected into control group during the same period. The difference between the two groups of patients in terms of gender, age, duration of disease, degree of asthma, and duration of acute asthma attacks was not statistically significant (P>0.05), and was comparable. The related results were shown in Table 1.

Table 1 Comparison of general data

Groups	Cases	Gender (cases)		Age (years old)	Average age (years old)	Duration of disease (years)	Average duration of disease (years)	Degree of asthma (cases)		Duration of acute asthma attacks (days)
		Male	Female					Mild	Moderate	
Observation group	45	23	22	18-63	40.73±12.26	0.8-2.3	1.49±0.42	21	24	3.49±0.82
Control group	45	20	25	20-65	39.96±12.91	0.9-2.2	1.38±0.42	26	19	3.60±0.81
χ^2/t		0.401			0.770		1.315	1.113		0.638
P		0.527			0.293		0.192	0.291		0.525

2.2 Inclusion and exclusion criteria

Inclusion criteria

(1) Patients met the diagnostic criteria for bronchial asthma in *Guidelines for bronchial asthma prevent and management (2020 edition) Asthma group of Chinese Throacic Society* [6]. (2) Patients aged 18-65 years. (3) Patients who were not in the acute phase of bronchial asthma.

Exclusion criteria

（1）Patients with cough and wheeze caused by other

diseases such as congenital heart disease. (2) Patients with other lung diseases such as pulmonary tuberculosis and lung infections. (3) Patients with severe hepatic and renal insufficiency. (4) Patients with mental disorders and poor adherence to treatment. (5) Patients with strong immune system who were allergic to mugwort and temperature. (6) Patients with skin diseases or skin defects at the site of cupping.

2.3 Treatment and methods

Control group

Patients were treated with moxibustion. Acupoints to be taken included Zusanli, Dingchuan, Taixi, Dazhui, Danzhong, Shenshu, Xinshu, and Feishu. Operation: Moxa stick was lighted and placed 3-6 cm above the acupoints, with each acupoint being cauterized for 5-10 min until the skin turned red. Above operation was performed once a day for a total of 14 days.

Observation group

Based on the treatment in control group, patients were treated with vesiculating cupping therapy. Acupoints to be taken included Dazhui, bilateral Feishu, bilateral Gaohuang, bilateral Zhongfu, and Danzhong. Operation: Patients were kept in sitting position. After vacuum cuppers were sterilized, they were put on the acupoints, among which cupping devices with a 60 mm opening diameter were put on Dazhui, Feishu, and Gaohuang acupoints and those with a 50 mm opening diameter were put on Zhongfu and Danzhong acupoints. Vacuum cuppers were retained for 1 hour or so, and the specific time was based on the appearance of blisters at the acupoints. After the vacuum cuppers were removed, the blisters were pierced by sterilized needles, wiped clean, and then covered by sterile gauze. The above operation was performed 1 time a day, and the period of treatment was 14 days.

2.4 Observational indicators

Clinical efficacy

14 days after treatment, the clinical efficacy was evaluated according to the TCM symptom score. Criteria: Clinically cured: Reduction of TCM symptom score by ≥95% after treatment. Significantly effective: Reduction of TCM symptom score by 70-94% after treatment. Effective: 30-69 % reduction in TCM symptom score after treatment. Ineffective: ≤30% reduction or even increase of TCM symptom score after treatment. Clinical total effective rate = number of (clinically cured + significantly effective + effective) cases / total number of cases × 100%.

TCM symptom score and asthma control

Before treatment and 14 days after treatment, TCM symptom score was assessed according to the patients' symptoms (wheezing, coughing, expectoration, fullness and oppression in the chest and diaphragm, and wheezing rale) by referring to the *Guiding Principles for Clinical Research of New Chinese Medicines*[7]. The degree of absence, lightness, moderateness, and severity of the symptoms were recorded as 0, 1, 2, and 3 points, respectively, with the higher scores indicating the worse symptoms. The Chinese version of the Children's Asthma Control Test (C-CACT) was used to assess the asthma control of the patients [8], with a total score of 27. Those with ≥25 scores were considered to be fully controlled, those with 20-24 scores were considered to be well controlled, and those with ≤19 scores were considered to be uncontrolled.

Lung function

Before treatment and 14 days after treatment, levels of forced expiratory volume in the first second (FEV1), peak expiratory flow (PEF), and forced vital capacity (FVC) were evaluated in both groups using a pulmonary function tester (MedGraphics, 1085, USA), and the predicted percentage of forced expiratory volume in the first second to forced vital capacity was calculated.

Inflammatory response

Before treatment and 14 days after treatment, 5 ml of fasting peripheral venous blood was extracted from the patients of two groups in the early morning, stood at room temperature for 30-60 min, and centrifuged at 3000 r/min for 10 min. Then the serum was separated and stored at -20℃ for measurement. The levels of

high-sensitivity C-reactive protein (hs-CRP), interleukin (IL)-6, and tumor necrosis factor (TNF)-α were measured by enzyme-linked immunosorbent assay (ELISA) using specific kits (EK-H12249, EK-H10352, EK-H12145) purchased from Shanghai Enzyme Research Biotechnology Co., LTD.

All operations were carried out with strict reference to the instructions.

2.5 Statistical methods

SPSS 20.0 was used for statistical analysis, the counting data were represented by examples (%), and comparisons between two groups were made using χ^2 test. Measurement data were expressed as mean ± standard deviation ($\bar{x}$ ±s). Independent samples *t*-test was used for the comparison between two groups, and paired samples *t*-test was performed for the comparison between different time points in the same group. Differences were considered statistically significant at P<0.05.

3 Results

3.1 Comparison of clinical efficacy and TCM symptom score in the two groups before and after treatment

The total effective rate of clinical efficacy of patients in observation group was significantly higher than that in control group (*P*<0.05). Before treatment, there was no statistically significant difference in TCM symptom score between the two groups (*P*>0.05). After treatment, TCM symptom score in the two groups was visibly decreased, and the score in observation group was apparently lower than that in control group (*P*<0.05). The results were displayed in Tables 2 and 3.

Table 2 Comparison of clinical efficacy between the two groups [cases (%)]

Groups	Cases	Clinically cured	Significantly effective	Effective	Ineffective	Total effective rate
Observation group	45	4 (8.89)	30 (66.67)	10 (22.22)	1 (2.22)	44 (97.78)
Control group	45	2 (4.44)	22 (48.89）	13 (28.89)	8 (17.78)	37 (82.22)
χ^2						4.444
P						0.035

Table 3 Comparison of TCM symptom score between the two groups before and after treatment （ $\bar{x}$±s, score)

Groups	Cases	Before treatment	After treatment
Observation group	45	11.96±1.33	3.36±2.13*
Control group	45	11.84±1.19	5.47±3.31*
t		0.418	3.593
P		0.677	0.000

Note: Comparison with the same group before treatment, *P<0.05

3.2 Comparison of asthma control in the two groups before and after treatment

Before treatment, there was no statistically significant difference in C-CACT score of the two groups (*P*>0.05). After treatment, C-CACT score in the two groups was notably increased (*P*<0.05), and the score in observation group was strikingly higher than that in control group (*P*<0.05). The results were seen in Table 4.

3.3 Comparison of lung function in the two groups before and after treatment

Before treatment, there was no statistically significant difference in FEV1, PEF, FVC, and FEV1/FVC levels

between the two groups (P>0.05). After treatment, the levels of FEV1, PEF, FVC, and FEV1/FVC in the two groups were obviously elevated (P<0.05), and these levels in observation group were significantly higher than those in control group (P<0.05). The results were displayed in Table 5.

3.4 Comparison of inflammatory response in the two groups before and after treatment

Before treatment, there was no statistically significant difference in the levels of hs-CRP, IL-6, and TNF-α between the two groups (P>0.05). After treatment, the levels of hs-CRP, IL-6, and TNF-α in the two groups were visibly reduced (P<0.05), and these levels in observation group were remarkably lower than those in control group (P<0.05). The results were exhibited in Table 6.

Table 4 Comparison of asthma control in the two groups before and after treatment ($\bar{x}$±s, score)

Groups	Cases	Before treatment	After treatment
Observation group	45	15.38±1.79	21.22±2.13*
Control group	45	15.42±1.66	19.11±2.24*
t		0.122	4.583
P		0.903	0.000

Note: Comparison with the same group before treatment, *P<0.05

Table 5 Comparison of lung function in the two groups before and after treatment ($\bar{x}$±s)

Groups	Cases	FEV_1 (L)		PEF (L/s)		FVC (L)		FEV_1/FVC (%)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	45	1.43±0.40	2.57±0.71*	3.45±1.14	5.48±1.34*	2.51±0.70	3.43±0.74*	60.20±19.40	75.19±12.80*
Control group	45	1.41±0.40	2.04±0.81*	3.56±1.18	4.90±0.99*	2.42±0.72	2.98±0.94*	61.51±17.81	68.46±13.25*
t		0.246	3.314	0.450	2.331	0.557	2.524	0.335	2.448
P		0.806	0.001	0.654	0.022	0.579	0.013	0.738	0.016

Note: Comparison with the same group before treatment, *P<0.05

Table 6 Comparison of inflammatory response in the two groups before and after treatment ($\bar{x}$±s)

Groups	Cases	hs-CRP (mg/L)		IL-6 (pg/L)		TNF-α (pg/L)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	45	24.05±2.23	9.26±0.62*	11.20±1.33	4.10±0.49*	67.11±5.23	29.48±3.07*
Control group	45	24.12±2.30	13.17±1.41*	11.29±1.35	7.26±0.82*	67.32±5.59	40.53±4.18*
t		0.147	17.029	0.319	22.191	0.184	14.293
P		0.884	0.000	0.751	0.000	0.854	0.000

Note: Comparison with the same group before treatment, *P<0.05

4 Discussion

In order to find more effective ways to treat bronchial asthma, this study applied vesiculating cupping therapy combined with moxibustion or moxibustion

alone to treat 90 patients with bronchial asthma. As a result, it was found that vesiculating cupping therapy combined with moxibustion has a good clinical efficacy in the treatment of bronchial asthma.

TCM symptom score and C-CACT score are commonly used to clinically assess the severity of the patient's condition and asthma control, respectively, and FEV1, PEF, FVC, and FEV1/FVC are commonly used to clinically assess the patient's lung function. A higher TCM symptom score and lower levels of C-CACT score, FEV1, PEF, FVC, and FEV1/FVC indicated more severe condition and poorer asthma control and lung function of patients. The results of this study showed that vesiculating cupping therapy combined with moxibustion in the treatment of bronchial asthma could alleviate clinical symptoms, control the condition, and improve lung function. Compared with moxibustion treatment alone, vesiculating cupping therapy combined with moxibustion was more effective. Moxibustion treatment was performed at Zusanli, Danzhong, Dingchuan, Dazhui, Taixi, Shenshu, Xinshu, and Feishu acupoints, among which moxibustion at Zusanli and Danzhong can promote blood circulation to remove meridian obstruction, accelerate circulation of qi, and dissolve lumps, moxibustion at Dingchuan and Dazhui can relieve or prevent asthma, and balance yin and yang, moxibustion at Taixi can warm the interior, dispel pathogenic cold, nourish Yin, and tonify deficiency, and moxibustion at Shenshu, Xinshu, and Feishu can clear away heat, benefit the lung, and reduce phlegm [9]. At the same time, modern pharmacology shows that mugwort contains α-terpinenol that can relax airway smooth muscle, thus playing the roles of relieving asthma, eliminating phlegm, and improving patients' lung function [10]. Vesiculating cupping therapy can remove the causative factors of bronchial asthma fundamentally by pulling phlegm and water-dampness out of the body through the pores of the skin, thus relieving the clinical symptoms and improving the lung function of patients [11]. The study of Tao et al. has found that the application of vesiculating cupping therapy in the treatment of bronchial asthma can achieve good therapeutic effects, which can effectively control the asthma attacks of patients [12], in line with the results of our study. It can be concluded that vesiculating cupping therapy combined with moxibustion in the treatment of bronchial asthma has a certain effect on alleviating clinical symptoms, controlling the condition, and improving lung function.

Bronchial asthma is a chronic inflammatory disease with multifactorial and multicellular involvement, and the inflammatory response has an important role in the pathogenesis and regression of bronchial asthma. As common clinical inflammatory cytokines, higher levels of hs-CRP, IL-6, and TNF-α indicated a more intense inflammatory response in patients. The results of this study demonstrated that vesiculating cupping therapy combined with moxibustion in the treatment of bronchial asthma can suppress inflammatory response, and was more effective than moxibustion treatment alone. Moxibustion can thermally stimulate the corresponding acupoints, deliver the drugs into the meridians of the acupoints through the skin, and stimulate the meridian qi, thus accelerating blood circulation and metabolism and promoting the secretion of anti-inflammatory factors by the organism [13]. Animal experiments by Qiao et al. showed that moxibustion reduces the levels of inflammatory factors and decreases inflammatory infiltration and exudation, which was similar to the results of this study [14]. Vesiculating cupping therapy can pull out a large number of blisters through the superficial lymphatic vessels and skin pores. Evidence has revealed that blister liquid contains a variety of inflammatory substances, indicating that vesiculating cupping therapy can reduce body's inflammatory response by discharging inflammatory substances out of the body and reducing the levels of patient's serum inflammatory factors [15]. In conclusion, vesiculating cupping therapy combined with moxibustion in the treatment of bronchial asthma can suppress inflammatory response.

Collectively, vesiculating cupping therapy combined with moxibustion has a good clinical effect in the treatment of bronchial asthma, which can alleviate clinical symptoms, improve lung function,

and inhibit inflammatory response. Due to the limited clinical samples and observation time, there may be some limitations in this study. It is still necessary to expand the sample size, extend the observation time in the later stage, and avoid coincidence through randomized controlled trial, so as to further study the application value of vesiculating cupping therapy combined with moxibustion in the treatment of bronchial asthma.

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Conflict of Interest

The authors declare no conflicts of interest.

Author contributions

Conceptualization, C.H.G and X.Z.Z; Data curation,C.H.G; Formal analysis, X.Z.Z; Methodology, C.H.G; Writing-Original draft, X.Z.Z and C.H.G; Writing-review and editing, X.Z.Z and C.H.G; All authors have read and agreed to the published version of the manuscript.

Ethics Approval and Consent to Participate

The study was approved by the Medical Ethics Committee, and the patients were informed and consented.

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Availability of Data and Materials

The data presented in this study are available on request from the corresponding author.

Supplementary Material

Not applicable

References

[1] Toskala E, Kennedy D. Asthma risk factors [J]. Int Forum Allergy Rhinol. 2015, Suppl 1(Suppl 1):S11-16.

[2] Nakamura Y, Tamaoki J, Nagase H, et al. Japanese guidelines for adult asthma 2020 [J]. Allergol Int. 2020, 69(4):519-548.

[3] Deng Z. TCM diet therapy for bronchial asthma. J Tradit Chin Med. 2009 Sep;29(3):209-10.

[4] Xiong J, Liu Z, Chen R, Xie D, Chi Z, Zhang B. Effectiveness and safety of heat-sensitive moxibustion on bronchial asthma: a meta-analysis of randomized control trials. J Tradit Chin Med. 2014 Aug;34(4):392-400.

[5] Al-Bedah A, Elsubai I, Qureshi N, Aboushanab T, Ali G, El-Olemy A, Khalil A, Khalil M, Alqaed M. The medical perspective of cupping therapy: Effects and mechanisms of action. J Tradit Complement Med. 2018 Apr 30;9(2):90-97.

[6] Asthma group of Chinese Throacic Society. Guidelines for bronchial asthma prevent and management (2020 edition) Asthma group of Chinese Throacic Society. Zhonghua Jie He He Hu Xi Za Zhi. 2020 Dec 12;43(12):1023-1048.

[7] Zheng X. Guiding Principles for Clinical Research of New Traditional Chinese Medicine Drugs (Trial) [M]. Beijing: Chin. Med. Sci. Tech. Press, 2002:108-109.

[8] Zhang J, Zhao L, Zhao D, Chen Z, Li S, Zhang H, Zhang L, Yuan S, Tang M, Wu Y, Zhong W, Xu J, Zhao L, Liu S, Hong J, Yin Y. Reliability and validity of the Chinese version of the Test for Respiratory and Asthma Control in Kids (TRACK) in preschool children with asthma: a prospective validation study. BMJ Open. 2019 Aug 26;9(8):e025378.

[9] Xu A, Chengwei L, Xu Q. The Performance Evaluation of Traditional Moxibustion, Electronic Moxibustion and LaserAcupuncture on Apoplexy and Their Comparison Research. World Congress on Medical Physics and Biomedical Engineering 2006; 2007 2007//; Berlin, Heidelberg: Springer Berlin Heidelberg.

[10]Zhu W. The structural modification and antiasthma evaluation of natural product α-terpineol [D]. Zhejiang: Zhejiang Univ., 2016.

[11]Dan K, Wang M, Xing H, et al. Research status and discussion on clinical 'blistering' phenomenon in traditional Chinese medicine [J]. Chin J Tradit Chin Med. Pharm., 2021,36 (9): 5388-5392.

[12]Goodwin J, McIvor RA. Alternative therapy: cupping for asthma. Chest. 2011 Feb;139(2):475-476.

[13]Deng H, Shen X. The mechanism of moxibustion: ancient theory and modern research. Evid Based Complement Alternat Med. 2013;2013:379291.

[14]Li T, Shui L, Ge D, Pu R, Bai S, Lu J, Chen Y. Moxibustion Reduces Inflammatory Response in the Hippocampus of a Chronic Exercise-Induced Fatigue Rat. Front Integr Neurosci. 2019 Sep 20;13:48.

[15]Bergmann K. Asthma bronchiale-viele Formen, viele Therapien Bronchial asthma-many types, different therapies [J]. Dtsch Med Wochenschr. 2016, 141(10):687-92.