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The Effect of Kechuanting Acupoint Application on Symptom Control and Quality of Life in Patients with Chronic Cough

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Abstract: ***Objective:*** *To observe the effect of Kechuanting acupoint application on symptom control and quality of life in patients with chronic cough caused by different etiologies.* ***Methods:*** *Between June and August 2023, 85 patients with chronic cough were enrolled, including 27 cases of cough due to chronic bronchitis, 30 cases of upper airway cough syndrome, and 28 cases of post-infectious chronic cough. All patients were treated with Kechuanting acupoint application. VAS scores, cough symptom scores, simple cough scores, and quality of life scores were assessed before and after treatment.* ***Results:*** *After treatment, VAS scores, cough symptom scores, and simple cough scores were significantly lower than before treatment in all three groups ($P < 0.01$), while Leicester Cough Questionnaire scores were significantly higher than before treatment ($P < 0.01$). However, there were no significant differences in VAS scores, cough symptom scores, simple cough scores, or Leicester Cough Questionnaire scores among the three groups either before or after treatment ($P > 0.05$).* ***Conclusion:*** *Kechuanting acupoint application is effective in controlling chronic cough caused by different reasons and can improve patients' quality of life.*

Keywords: Kechuanting acupoint application, Application therapy, Chronic cough, Different etiologies, Quality of life.

1. Introduction

In China, the prevalence of chronic cough among adults is approximately 8. 88%, and this condition accounts for over one-third of cases in specialist outpatient clinics [1, 2]. While coughing functions as a reflexive defensive mechanism to clear the airways, long-term recurrent coughing can heighten airway sensitivity, exacerbate the cough itself, and subsequently predispose patients to other respiratory diseases. Moreover, accompanying symptoms—such as chest tightness, chest pain, nausea, and stress urinary incontinence in women—often trigger negative emotions in patients, severely impairing their quality of life [3-5]. Clinically, there remains a lack of targeted therapies for chronic cough. Existing antitussive medications, such as codeine, morphine, gabapentin, and pregabalin, not only cause adverse effects on the central nervous system, including nausea, vomiting, and dizziness, but also carry a risk of significant dependence with long-term use [6-8]. This therapeutic gap highlights the need for safer and more effective alternative treatments. As a characteristic external therapy of Traditional Chinese Medicine (TCM), acupoint application therapy has been used to manage respiratory diseases. By applying medicinal formulations to specific acupoints (e.g., Dingchuan [EX-B1] and Feishu [BL13]), this therapy aims to tonify the lung and regulate qi, thereby alleviating chronic cough. Notably, our team previously developed the "Kechuanting" acupoint application, a multi-herb formulation with multi-component, multi-target, and multi-pathway properties [9]. Building on our prior research and clinical practice, we have observed that Kechuanting acupoint application improves airway function — particularly small airway function—in patients with chronic persistent cough variant asthma. This is clinically relevant because small airway dysfunction is not only the primary site of chronic inflammation and airflow limitation in asthma but also closely linked to the clinical manifestations and control of cough [10]. To further validate the efficacy of this therapy, the present study evaluated cough symptom scores, Visual Analog Scale (VAS) scores for cough, simple cough scores, and quality of life scores in patients with chronic cough (of varying etiologies) before and after treatment. The goal was to analyze changes in symptom control and quality of life, ultimately providing evidence-based references for clinical practice.

2. Materials and Methods

2.1 Study Design

A total of 85 patients who visited the Acupuncture and Rehabilitation Department of Jiangsu Provincial Hospital of Traditional Chinese Medicine between June and September 2023 were selected. Their Western medicine diagnoses were Upper Airway Cough Syndrome (UACS), chronic bronchitis cough, or post-infectious chronic cough. Among them, there were 27 cases of cough due to chronic bronchitis, 28 cases of post-infectious chronic cough, and 30 cases of Upper Airway Cough Syndrome.

2.2 Participants

2.2.1 Diagnostic Criteria

According to the 2021 Guidelines for the Diagnosis and Treatment of Cough [2], chronic cough can be dignosed by:

Upper Airway Cough Syndrome (UACS): Chronic cough, primarily occurring during the day or after postural changes,

less frequent after falling asleep; clinical manifestations and history of nasal and/or pharyngeal diseases; auxiliary examinations support the diagnosis of nasal and/or pharyngeal diseases; cough alleviates after targeted treatment of the underlying disease.

Post-infectious Chronic Cough: A clear history of respiratory tract infection, with cough persisting for more than 8 weeks after the resolution of acute respiratory symptoms.

Chronic Bronchitis: Cough and expectoration continuing for 2 consecutive years, accumulating or persisting for at least 3 months each year; other causes of chronic cough are excluded.

2.2.2 Inclusion Criteria

Participants who meet all the following conditions will be considered for registration. The inclusion criteria will be:

(1) cough as the sole or primary symptom, with a duration > 8 weeks.

(2) meets the Western medicine diagnostic criteria for chronic cough.

(3) age between 18 and 75 years, regardless of gender.

(4) patients who agree to participate in the study voluntarily and sign the informed consent form.

2.2.3 Exclusion Criteria

Participants who meet any of the following conditions will be considered for registration. The inclusion criteria will be:

(1) patients combined with severe primary diseases such as severe liver or kidney impairment, psychiatric disorders, malignant tumors, etc.

(2) patients allergic to adhesive tape, the study drug, or excipients.

(3) patients with skin lesions or broken skin at the application site, or other conditions affecting local drug application at the lesion.

(4) women who are breastfeeding, pregnant, or preparing for pregnancy.

(5) patients unable to provide fully informed consent due to intellectual or behavioral impairments.

(6) based on the investigator's judgment, presence of other conditions that may reduce the likelihood of enrollment or complicate enrollment, such as frequent changes in work environment prone to causing loss to follow-up.

(7) subjects currently participating in other clinical research projects.

2.3 Interventions

Kechuanting Acupoint Application is guided by the theories of acupuncture and Traditional Chinese Medicine (TCM). Its TCM compatibility and formula are derived from the empirical prescriptions of the Acupuncture and Rehabilitation Department, and the preparation is conducted by the Pharmaceutical Preparation Department of Jiangsu Provincial Hospital of Chinese Medicine. The preparation method of acupoint application is as follows: First, separately sieve the powders of Sinapis alba (Baijiezi), Corydalis yanhusuo (Yanhusuo), Asarum sieboldii (Xixin), Euphorbia kansui (Gansui), Ephedra sinica (Mahuang), Lepidium apetalum (Tinglizi), Cinnamomum cassia (Rougui), Syzygium aromaticum (Dingxiang), and Gleditsia sinensis (Zaojiaoci) through an 80-mesh sieve. Then, uniformly mix the sieved powders in a mass ratio of 2:2:1:1:1:1:1:1:1 in a clean container. Next, add 70 ml of fresh ginger juice and 30 ml of liquid petroleum to every 100 g of the mixed powder. Finally, after thorough mixing, shape the mixture into spherical pills with a diameter of 1 cm and a weight of approximately 0.3 g (with a tolerance of ±5%). This study enrolled three groups of patients with chronic cough, all of whom received Kechuanting Acupoint Application treatment. During each treatment session, first expose the patient's back and wipe off local sweat. Then, locate the tender points at the aforementioned acupoints, apply the medication to these acupoints, and secure it with a 5 cm × 5 cm piece of hypoallergenic adhesive tape. Each application remained in place for 6–8 hours. Applications were administered once per week, for a total of six applications. If significant discomfort (such as intense burning, itching, or stinging) occurred at the application site, the patch was to be removed immediately.

2.4 Assessments

Referring to the Guidelines for the Diagnosis and Treatment of Cough (2021) [2], the following scores were observed and compared in chronic cough patients before and after treatment: Cough Visual Analog Scale (VAS) score, Cough Symptom Score, Simple Cough Score, and Leicester Cough Questionnaire (LCQ) score.

(1) Cough VAS Score: Patients marked a corresponding point on a 0-10 cm or 0-100 mm line based on their perception to indicate cough severity. 0-3 points indicated mild, 4-7 points moderate, and 8-10 points severe cough.

(2) Simple Cough Score Sheet: Included 5 items: daytime cough severity, impact of nocturnal cough on sleep, severity of cough paroxysms, impact of cough on daily life, and psychological impact of cough. Each item was scored on a 5-point scale, where 1 point indicated no such condition and 5 points indicated frequent occurrence. The total score was calculated.

(3) Cough Symptom Score: Divided into daytime cough symptom score and nighttime cough symptom score. Symptoms were graded from none to severe into four levels, recorded as 0, 1, 2, 3 points. Daytime score, nighttime score, and total score were recorded separately.

(4) Leicester Cough Questionnaire (LCQ) Score: Contains 19 items. Each item is divided into 7 levels from "All the time" to "Never", covering the impact of chronic cough on physical, psychological, and social domains. The domain score is the

sum of item scores in that domain divided by the number of items (score range 1-7 per domain). The total score is the sum of the three domain scores (score range 3-21). A higher score indicates better health status and quality of life.

2.5 Statistical Methods

Statistical analysis was performed using SPSS 26. 0 software. Count data were expressed as percentages (%). Measurement data conforming to a normal distribution were analyzed using t-tests; non-normally distributed data were analyzed using non-parametric tests and expressed as M (P25, P75). Comparisons among multiple groups were conducted using the Kruskal-Wallis test. A P-value < 0.05 was considered statistically significant.

3. Results

3.1 Comparison of Baseline Data

There were no statistically significant differences in the general data (including gender, age, and disease duration) among the three groups of patients (P > 0.05), indicating comparability between the groups. Details are shown in Table 1.

Table 1: Comparison of General Data Among the Three Groups of Patients.

	n	sex		age (year)			course (year)		
		man	woman	min	max	M(P_{25},P_{75})	min	max	average
chronic bronchitis	27	6	21	29	73	65(48,68)	0.5	30	6(2,10)
post -infectious chronic cough	28	3	25	27	75	51(37,56.75)	0.5	5. 0	1.5(0.5,3.0)
upper airway cough sydrome	30	5	25	20	74	54.5(40.5,67.25)	0.5	30	3(2,10)

Table 2: Comparison of cough visual analog scale score, cough symptom score, simple cough score, and Leicester cough questionnaire score before and after treatment among three groups of patients.

		chronic bronchitis	post -infectious chronic cough	upper airway cough sydrome	H	P
Before	VAS	6.00(5.00, 7.00)	5.00(3.25, 7.00)	4.50(3.00, 6.25)	5.73	0.057
	CET	15.00(14.00, 18.00)	13.50(12.25, 15.00)	14.00(11.75, 16.25)	4.29	0.117
	CSS	4.00(3.00, 5.00)	3.00(2.00, 4.00)	3.00(1.75, 4.00)	6.81	0.033
	LCQ	14.44(13.04, 16.55)	15.43(14.72, 16.47)	15.72(13.01, 16.79)	1.31	0.520
After	VAS	2.00(0, 3.00)[1]	1.00(0, 2.00)[1]	1.00(0, 2.00)[1]	4.62	0.099
	CET	6.00(5.00, 10.00)[1]	5.00(5.00, 7.00)[1]	5.00(5.00, 8.00)[1]	2.42	0.298
	CSS	1.00(0, 2.00)[1]	0(0, 1.00)[1]	0(0, 1.00)[1]	3.00	0.222
	LCQ	21.00(17.07, 21.00)[1]	21.00(19.14, 21.00)[1]	21.00(17.97, 21.00)[1]	1.33	0.513

Note: 1. Compared with that before treatment, P<0.01.

3.2 Comparison of Cough Visual Analog Scale Score, Cough Symptom Score, Simple Cough Score, and Leicester Cough Questionnaire Score Before and After Treatment Among Three Groups of Patients

After treatment, the cough visual analog scale score, cough symptom score, and simple cough score of the three groups of patients all decreased compared with those before treatment, while the Leicester cough questionnaire score increased (P<0.01). However, there was no significant difference among the three groups (P>0.05).

4. Discussion

Chronic cough iscategorized as “endogenous cough” in Traditional Chinese Medicine, with its onset frequently associated with external pathogens, improper diet, emotional disturbances, and congenital insufficiency. The fundamental pathogenesis lies in pathogenic invasion impairing the lung’s function of dispersion and descent, if left untreated for an extended period, this dysfunction progresses to chronic cough. As emphasized in Su Wen • Cough Theory: “The five zang and six fu organs can all induce cough, not merely the lung.” Thus, TCM treatment of chronic cough should not focus solely on the lung but adopt a holistic approach encompassing all zang-fu organs. Recurrent, persistent coughing leads to deficiency of healthy qi and insufficiency of lung qi. This impairs water passage, causing dampness to encumber the spleen, resulting in impaired spleen transport function. Consequently, fluids are not transformed, accumulating to form dampness and phlegm, which induce cough. “Where evil pathogens gather, the qi must be deficient,” thus deficiency of healthy qi is a key factor in the onset of chronic cough.

Upper Airway Cough Syndrome (UACS), post-infectious chronic cough, and chronic bronchitis are common clinical causes of cough. UACS is caused by nasal or pharyngeal diseases, manifesting as cough, expectoration, throat clearing, increased nasal secretions, etc. [2]. Post-infectious chronic cough results from damage to the epithelial cells of the upper and lower respiratory mucosa caused by respiratory viral infections such as influenza virus and respiratory syncytial virus, inducing airway inflammation, where the cough persists after the resolution of acute phase symptoms [12]. Chronic bronchitis often occurs during climate changes or in cold winter and spring seasons, with cough, wheezing, and sputum as the main symptoms [13]. The etiology of chronic cough is complex, and clinical diagnosis primarily relies on identifying the cause. However, limited by primary healthcare conditions, determining the cause for many chronic cough patients poses certain difficulties [14]. For the etiological treatment of chronic cough, antitussives and antiallergic drugs are commonly used clinically, but patients are prone to drug resistance and high recurrence rates. Many chronic cough patients experience prolonged, unremitted conditions and seek repeated medical consultations, increasing their economic burden. Furthermore, long-term unrelieved chronic cough symptoms can easily lead to adverse emotions like anxiety and depression, while also affecting patients’ normal social activities [15].

Acupoint application therapy is commonly used to treat respiratory diseases. Zhang Lu’s Zhang’s Medical Pass from the Qing Dynasty records the “White Mustard Seed Paste Formula.” Based on the treatment principle of “nourishing yang in spring and summer” from the Yellow Emperor’s Inner

Canon, this method utilizes the natural yang qi of the dog days of summer, preparing warm and yang-tonifying herbs into cakes or pills. Through the combined effects of the medicinals and acupoints, it aims to warm the meridians and unblock collaterals, reinforce healthy qi and consolidate the exterior, and treat winter diseases in summer. The Kechuanting acupoint application contains Semen Sinapis Albae (Baijiezi), Corydalis Rhizome (Yanhusuo), Kansui Root (Gansui), Asarum (Xixin), Ephedra (Mahuang), Lepidii/Descurainiae Semen (Tinglizi), Cinnamon Bark (Rougui), Clove (Dingxiang), Chinese Honeylocust Abnormal Fruit (Zhuyazao), and Fresh Ginger (Shengjiang). Among them, Yanhusuo and Gansui promote qi and activate blood; Mahuang and Tinglizi dispel phlegm and relieve cough; Dingxiang, Rougui, and Shengjiang warm yang and dispel cold; Baijiezi warms the lung and dispels phlegm. Together, they function to regulate qi and transform phlegm, relieve cough and calm wheezing, and expel external pathogens. Relevant studies indicate that acupoint application can reduce patients' airway inflammation levels and has good efficacy in controlling chronic respiratory diseases like asthma and cough [15-20].

The results of this study show that after treatment, patients' VAS scores, cough symptom scores, and simple cough scores significantly decreased compared to before treatment ($P < 0.01$). The Leicester Cough Questionnaire (LCQ) scores after treatment were higher than before treatment ($P < 0.01$). Kechuanting acupoint application can improve the quality of life in patients with chronic cough ($P < 0.01$). The results also showed no significant differences in VAS scores, cough symptom scores, simple cough scores, or LCQ scores among the three groups of patients after treatment ($P > 0.05$).

5. Summary

In summary, Kechuanting acupoint application is effective in treating chronic cough and can improve the quality of life of cough patients. However, no significant differences were observed after treatment with Kechuanting acupoint application among the different etiological types of chronic cough. This study provides evidence for the use of Kechuanting acupoint application in treating chronic cough, but it also has certain limitations. Due to the relatively small sample size in this study, and the fact that most cases were collected from the outpatient department of the Acupuncture Department of Jiangsu Provincial Hospital of Traditional Chinese Medicine, selection bias might have occurred during patient selection. Therefore, it is necessary to conduct clinical studies with larger sample sizes in the future to further confirm the accuracy of these results.

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