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A retrospective study of Yiqibushenhuoxue decoction for the treatment of chronic obstructive pulmonary disease

Zhuying Li, MD, PhD[a,b,c], Chunyan Tian, MB[b], Xuehui Wang, MD, PhD[a,b,c,*], Liqin Wang, MB[d,*]

Abstract

This retrospective study aimed to investigate the effect and safety of Yiqibushenhuoxue decoction (YQBSHXD) for the treatment of chronic obstructive pulmonary disease (COPD).

This study involved 120 cases of patients with COPD. These cases were assigned to an intervention group and a control group equally, 60 subjects each group. Patients in both groups underwent Salmeterol. In addition, the cases in the intervention group also received YQBSHXD. All cases received a total of 12 weeks treatment. The primary outcome of lung function was measured by forced expiratory volume in 1 second (FEV_1), and FEV_1/forced vital capacity (FVC). The secondary outcomes included severity of dyspnea on exertion, evaluated by 6-minute walk test (6MWT) with measurement of 6-minute walk distance (6MWD); and quality of life, assessed by the St. George's Respiratory Questionnaire (SGRQ). In addition, adverse events (AEs) were also recorded in this study. All outcome measurements were assessed before and after 12-week treatment.

After 12-week treatment, cases in the intervention group underwent YQBSHXD did not show better outcome in lung function improvement, measured by the FEV_1 ($P=.11$), and FEV_1/FVC ($P=.15$), compared with those in the control group. However, YQBSHXD may help to alleviate the severity of dyspnea on exertion, as measured by 6MWD ($P=.03$), and to improve the quality of life, as assessed by the SGRQ ($P<.01$). Additionally, no significant differences in AEs were detected between the 2 groups.

The results of this study showed that YQBSHXD may help to manage COPD after 12-week treatment, although the lung function has not been improved.

Abbreviations: 6MWD = 6-minute walk distance, 6MWT = 6-minute walk test, AEs = adverse events, COPD = chronic obstructive pulmonary disease, DOE = dyspnea on exertion, FEV_1 = forced expiratory volume in one second, FVC = forced vital capacity, SGRQ = St. George's Respiratory Questionnaire, YQBSHXD = Yiqibushenhuoxue decoction.

Keywords: chronic obstructive pulmonary disease, effect, Yiqibushenhuoxue decoction

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory lung disease that causes nonreversible airflow obstruction and intermittent exacerbations.[1–3] It mainly manifests as breathing difficulty, cough, mucus (sputum) production, and wheezing.[4–6] It is reported that such condition is a major cause of morbidity and mortality worldwide.[7,8] The report from World Health Organization estimated that approximately 62 million people with moderate to severe suffered from this condition in 2002, and this number increased to 200 million in 2010.[9] Furthermore, it accounted for about 5% of total deaths (over 3 million) globally.[9] It has also estimated that COPD has increased by >30% in the next decade, and it will became the third leading cause of death worldwide in 2030, from the fifth leading cause of death in 2002.[9]

Although several treatment options are available for this condition, many patients still experience the dyspnea and substantial limitations in daily activities, which mainly impact the quality of their life.[10,11] Moreover, such patients also suffered from many adverse events after the long term medication.[12–14] It has been reported that Salmeterol can benefit for such condition.[15,16] However, it still has insufficient efficacy.

Alternative medicine (AM), including acupuncture and Chinese herbal medicine, Tai chi Qigong and Omega-3 supplementation, is an effective alternative therapy for patients with COPD.[17–23] Despite its common use worldwide, the

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[a] Department of Respiratory Medicine, First Affiliated Hospital of Heilongjiang University of Chinese Medicine, [b] Heilongjiang University of Chinese Medicine, [c] The Key Laboratory of Ministry of Education in North Medicine Basic and Applied Research, Heilongjiang University of Chinese Medicine, [d] Department of First clinical medicine, Heilongjiang University of Chinese Medicine, Harbin, China.

[*] Correspondence: Xuehui Wang, Department of Respiratory Medicine, First Affiliated Hospital of Heilongjiang University of Chinese Medicine, No. 26, Heping Road, Xiangfang District, Harbin 150040, China (e-mail: wangxuehui1216@163.com), Liqin Wang, Department of First Clinical Medicine, Heilongjiang University of Chinese Medicine, No. 26, Heping Road, Xiangfang District, Harbin 150040, China (e-mail: wang_liqin0451@163.com).

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evidence for its efficacy and safety is still limited. Therefore, the lack of evidence for AM, especially the Chinese herbal medicine in treating COPD warrants more evidence.

Yiqibushenhuoxue decoction (YQBSHXD) has been used to treat patients with COPD in China with few adverse events.[23] It has been reported that YQBSHXD may be utilized as an adjunctive therapy to treat COPD effectively. However, limit data is available to support this therapy. Thus, in this retrospective study, we further explored the effect and safety of YQBSHXD for treating patients with COPD.

2. Methods and materials

2.1. Study design

This retrospective study was approved by the Medical Ethics Committee of The First Affiliated Hospital of Heilongjiang University of Chinese Medicine. All patients provided the written informed consent.

All the patient cases were selected from this hospital between November 2014 and October 2017. In total, 120 eligible cases of patients with COPD were included, and these cases were assigned to an intervention group or a control group at a ratio of 1:1 according to the different treatments those patients received. Patients in the intervention group received Salmeterol plus YQBSHXD, while subjects in the control group underwent Salmeterol alone for a total of 12 weeks. All outcome measurements were assessed before and after 12-week treatment.

2.2. Patients

All cases of patients were diagnosed with COPD according to the guideline of Society of COPD.[24] All patients aged between 21 and 74 years old, and experienced mild or moderate stable COPD for at least one and half month. Cases were excluded if the patients had bronchial asthma, serious organ diseases, such as cancers, surgery, allergic to the study medication, pregnant or lactating before including the study; and also incomplete data of the patient cases. Additionally, the cases were also excluded if patients received YQBSHXD or other Chinese herbal medicine one month before this study.

2.3. Intervention schedule

All patients in both groups were administrated 50 μg Salmeterol (Glaxo Smith Kline Plc, UK) inhalation, twice daily, 7 days weekly for a total of 12 weeks.

Additionally, patients in the intervention group received YQBSHXD (provided by Pharmaceutical Factory of the First Affiliated Hospital of Heilongjiang University of Chinese Medicine).[23] Each decoction consisted of 200 mL concentrated herbal medical juice and was packed with 2 bags, each bag 100 mL. The patient took it orally in the morning and evening respectively, one bag each time, for a total of 12 weeks.

2.4. Outcome measurements

The primary outcome was lung function. It was assessed by forced expiratory volume in one second (FEV_1),[25] which is a marker utilized to measure lung function and can help to monitor the COPD for patients over time; and FEV_1/forced vital capacity (FVC),[26] which is used to diagnosis the COPD with normal values of approximately 80%. It represents the ratio of an individual's vital capacity that they can expire in FEV_1 to the full, and FVC. The secondary outcomes consisted of severity of dyspnea on exertion (DOE),[27] and quality of life. Of these, DOE was evaluated by 6-minute walk test (6MWT) with measurement of 6-minute walk distance (6MWD).[28] Quality of life was measured by the St. George's Respiratory Questionnaire (SGRQ).[29] It ranges from 0 to 100, with a higher score indicating a more limitation. Additionally, adverse events were also documented in this study. All outcome measurements were assessed before and after 12-week treatment.

2.5. Statistical analysis

All data in this retrospective study was analyzed by the Statistical Package for the Social Sciences (SPSS) software (version.17.0) (SPSS Inc., Chicago, IL). Mann–Whitney rank sum test or *t*-test was utilized to analyze the continuous data. The Chi-square test was used to analyze the categorical data. A value of $P < .05$ was defined as statistically significant.

3. Results

A total of 120 eligible cases of patients with mild/moderate COPD were included in this retrospective study (Table 1). The demographics and characteristics of all included cases are summarized in Table 1. No significant differences regarding all these characteristics were found between the 2groups (Table 1).

After 12 weeks treatment, cases in the intervention group did not exert better outcome in lung function improvement, measured by FEV_1 ($P = .11$, Table 2), and FEV_1/FVC ($P = .15$, Table 2), compared with those in the control group.

After 12 weeks treatment, cases in the intervention group showed greater relief in severity of DOE, as measured by 6MWD ($P = .03$, Table 3); as well as the improvement of quality of life, as assessed by the SGRQ ($P < .01$, Table 4), compared with those in the control group.

All adverse events occurred in both groups are listed in Table 5. There were no significant differences regarding all adverse events between both the groups. In addition, no severe adverse events were documented in either group.

4. Discussion

Our previous study has reported the YQBSHXD for the treatment in patients with COPD. In that study, we included 70 patients with COPD and then divided them into 2 groups equally. We mainly assessed the symptoms improvement in those patients after the treatment. The results of that study suggested that YQBSHXD can help to improve patient symptoms.[23] The drawbacks of that study are the insufficient details of characteristics description, and small sample size.

The results of the present study are partly consistent with previous study.[23] After 12-week treatment, the results showed that YQBSHXD could not improve lung function; however, it may be help to alleviate the severity of DOE, as well as the quality of life in patients with COPD, when compared with patients in the control group. It indicates that YQBSHXD may benefit for patients with COPD.

The retrospective study has several limitations as below. Firstly, the achieved effect was the results of the synergistic efficacy of YQBSHXD with Salmeterol, not of YQBSHXD alone, although the baseline therapy was similar between both groups. Secondly, it was not easy to distinguish whether the adverse events were caused by YQBSHXD or Salmeterol, because participants in the intervention group underwent both medi-

Table 1

Characteristics of included patients.

Characteristics	Intervention group (n = 60)	Control group (n = 60)	*P* value
Mean age (SD) (year)	66.1 (5.9)	64.9 (6.3)	.28
Gender, n (%)			
Male	39 (65.0)	30 (50.0)	.10
Female	21 (35.0)	30 (50.0)	–
Race (Chinese Asia), n (%)	60 (100.0)	60 (100.0)	–
BMI, kg/m^2, mean (SD)	23.3 (3.6)	23.5 (3.9)	.77
Smoking status, n (%)			
Smokers	32 (53.3)	37 (61.7)	.36
Nonsmokers	28 (46.7)	23 (38.3)	–
GOLD criteria, n (%)			
II	36 (60.0)	39 (65.0)	.57
III	24 (40.0)	21 (35.0)	–
GOLD stage, mean (SD)	3.1 (0.9)	3.3 (1.0)	0.25
Duration of COPD (year), mean (SD)	7.1 (2.2)	6.7 (2.9)	.39
COPD medications, n (%)			
ICS	10 (16.7)	12 (20.0)	.64
LABA	13 (21.7)	16 (26.7)	.52
ICS/LABA	31 (51.7)	22 (36.7)	.10
LAMA	39 (65.0)	36 (60.0)	.57
PDE4 inhibitors	1 (1.7)	2 (3.3)	.57
Lung function, mean (SD)			
FEV_1/FVC(reduced),%predicted	2.5 (0.6)	2.6 (0.7)	.40
FEV_1,% predicted	71.1 (15.3)	68.8 (16.1)	.92
6MWD, mean (SD), m	389.7 (121.5)	401.3 (136.4)	.62
SGRQ, mean (SD)			
Total	62.4 (12.8)	63.2 (13.6)	.74
Symptom	59.7 (13.0)	61.3 (12.9)	.50
Activity	64.5 (16.6)	65.1 (17.3)	.85
Impact	63.3 (18.2)	63.9 (19.1)	.86

6MWD = 6-minute walk distance, BMI = body mass index, COPD = chronic obstructive pulmonary disease, FEV_1 = forced expiratory volume in 1 second, FVC = forced vital capacity, GOLD = Global Initiative for Chronic Obstructive Lung Disease, ICS = inhaled corticosteroid, LABA = long-acting β2-agonist, LAMA = long-acting muscarinic antagonist, PDE4 = inhibitor, phosphodiesterase type 4 inhibitor, SGRQ = St. George's Respiratory Questionnaire.

Table 2

Comparison of lung function after 12 weeks treatment (change from baseline).

Lung function	Intervention group (n = 60)	Control group (n = 60)	Difference	*P* value
FEV_1/FVC(reduced),% predicted	−1.2 (−1.9, −0.5)	−1.1 (−1.4, −0.8)	−0.2 (−0.4, −0.1)	.15
FEV_1, % predicted	8.1 (3.7, 11.2)	5.2 (2.1, 8.5)	2.9 (1.3, 4.4)	.11

FEV_1 = forced expiratory volume in 1 second, FVC = forced vital capacity.

Table 3

Comparison of DOE after 12 weeks treatment (change from baseline).

DOE	Intervention group (n = 60)	Control group (n = 60)	Difference	*P* value
6MWD, m	92.5 (51.3, 136.8)	39.7 (21.5, 62.4)	51.9 (36.8, 70.5)	.03

6MWD = 6-minute walk distance, DOE = severity of dyspnea on exertion.

Table 4

Comparison of quality of life after 12 weeks treatment (change from baseline).

SGRQ	Intervention group (n = 60)	Control group (n = 60)	Difference	*P* value
Total	−14.8 (−20.1, −7.8)	−6.1 (−9.8, −2.7)	−8.7 (−12.3, −4.4)	<.01
Symptom	−20.6 (−31.3, −11.5)	−10.8 (−18.7, −6.1)	−9.9 (−13.1, −6.6)	<.01
Activity	−13.9 (−19.2, −7.9)	−5.6 (−10.1, −2.2)	−8.3 (−11.6, −4.9)	<.01
Impact	−12.1 (−20.4, −6.7)	−4.4 (−9.1, −1.6)	−7.8 (−10.5, −5.0)	<.01

SGRQ = St. George's Respiratory Questionnaire.

Table 5

Comparison of adverse events between the 2 groups.

Adverse events, n (%)	Intervention group (n = 60)	Control group (n = 60)	*P* value
Chest pain	5 (8.3)	4 (6.7)	.73
Wheezing	4 (6.7)	6 (10.0)	.51
Fast heartbeats	5 (8.3)	3 (5.0)	.47
Tremors	2 (3.3)	3 (5.0)	.65
Shaking	3 (5.0)	1 (1.7)	.33
Skin rash	4 (6.7)	5 (8.3)	.73
Numbness	3 (5.0)	4 (6.7)	.70
Breathing problems	3 (5.0)	2 (3.3)	.65
Vomiting	5 (8.3)	1 (1.7)	.13
Nausea	6 (10.0)	0 (0)	.07
Discomfort in stomach	6 (10.0)	2 (3.3)	.16

cations. Thirdly, no follow-up assessments after 12 weeks treatment were performed in this study, because no data were available from the included patient cases. Further studies should avoid these limitations.

5. Conclusion

Although YQBSHXD could not enhance the lung function, the results of this study still suggest that YQBSHXD may benefit for patients with COPD after 12 week treatment.

Author contributions

Conceptualization: Xuehui Wang, Zhuying Li, Chunyan Tian, Liqin Wang.
Data curation: Xuehui Wang, Zhuying Li, Chunyan Tian, Liqin Wang.
Formal analysis: Chunyan Tian.
Funding acquisition: Liqin Wang.
Investigation: Zhuying Li, Liqin Wang.
Methodology: Chunyan Tian.
Project administration: Xuehui Wang, Zhuying Li.
Resources: Xuehui Wang, Zhuying Li.
Software: Chunyan Tian.
Supervision: Zhuying Li.
Validation: Xuehui Wang, Chunyan Tian, Liqin Wang.
Visualization: Xuehui Wang, Chunyan Tian, Liqin Wang.
Writing – original draft: Xuehui Wang, Zhuying Li, Chunyan Tian, Liqin Wang.
Writing – review & editing: Xuehui Wang, Zhuying Li, Chunyan Tian, Liqin Wang.

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