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Observation of Clinical Efficacy and Effect of Blood Rheology in Acute Exacerbation of Chronic Obstructive Pulmonary Disease Treated with Lung-cleansing and Blood-activating Formulae

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Abstract: ***Objective:*** ***To investigate the clinical efficacy and effects of Qinglong and Blood-cleansing Formula combined with conventional Western medical treatment on patients with acute exacerbation of chronic obstructive pulmonary disease (AECOPD) with phlegm-heat interlude and blood stasis, and the effects of the formula on blood rheology and inflammatory response.*** ***Methods:*** ***Eighty-eight patients with AECOPD were divided into 44 cases each in the observation group and the control group according to the randomized numerical table method. The control group was given conventional treatment with western medicine, and the observation group was treated with the combination of the formula of clearing lung and activating blood on this basis. The course of treatment was 10 days. Before and after the treatment, we compared the TCM evidence points, blood rheology indexes (whole blood viscosity, plasma viscosity, erythrocyte rigidity index, etc.), inflammation indexes (WBC, NEU, CRP, SAA), coagulation function and arterial blood gas analysis between the two groups, and evaluated the clinical efficacy and safety.*** ***Results:*** ***After treatment, the TCM evidence points, blood rheology and inflammation indexes of the observation group were significantly improved compared with the control group (P<0.05), and the total effective rate of the observation group was 90.9%, which was higher than that of the control group, which was 72.7% (P=0.029). In terms of arterial blood gas, the increase in partial pressure of oxygen and decrease in partial pressure of carbon dioxide were more significant in the observation group (P<0.05). There was no abnormality in the safety indexes.*** ***Conclusion:*** ***The combination of lung-cleansing and blood-activating formula with conventional treatment of western medicine can significantly improve the clinical symptoms, blood rheological status and oxygenation function of AECOPD patients, and has good clinical application prospects.***

Keywords: Chronic obstructive pulmonary disease, Acute exacerbation, Lung-clearing and blood-activating formula, Combination of traditional Chinese and Western medicine, Blood rheology, Clinical research**.**

1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a diffuse airway disorder associated with chronic inflammation of the airways and characterized by airflow limitation, which is a major global public health hazard [1]. When the body is exposed to external stimuli or when the body's immunity is low, the condition tends to aggravate, which is called Acute Exacerbation of Chronic Obstructive Pulmonary Disease (AECOPD), manifested by increased airway inflammation, mucus secretion, and systemic inflammatory response, resulting in a sudden and rapid decline in lung function. This leads to a sudden and rapid decline in lung function and multi-organ failure [2]. Although modern medicine can partially alleviate the symptoms, the use of prolonged bronchodilators and glucocorticosteroids can lead to drug resistance and poor metabolism, and cardiovascular protection is easily neglected [3]. There is an urgent need to explore safer and more effective intervention strategies.

Blood rheology refers to the flow and deformation patterns of blood and its components [4], and its core indexes include whole blood viscosity (high cut, medium cut, low cut), plasma viscosity, erythrocyte pressure volume, etc., which are used to assess the blood fluidity, viscosity, and coagulation function. Abnormalities in blood rheology indices can trigger a hypercoagulable state of the blood, leading to microcirculatory disorders, increased risk of thrombosis, and inadequate tissue oxygen supply [5]. Previous studies have shown that Chinese herbal medicine combinations that focus on clearing the lungs, resolving phlegm, and activating blood circulation can improve hypercoagulability and blood rheological parameters through multi-targeted effects [6]. According to TCM, hypercoagulability is not only a pathological product of COPD, but also a key factor aggravating airway remodeling [7]. Therefore, Chinese herbal medicine combinations with the treatment of clearing lung and resolving phlegm, activating blood circulation may also be an important means to improve the prognosis of AECOPD. However, the specific clinical efficacy is not yet known.

For this reason, we formulated a formula based on the therapeutic principle of "clearing the lungs, resolving phlegm, activating blood circulation", which has achieved significant efficacy in the past clinical application of this traditional Chinese medicine formula. Therefore, this study aims to explore the clinical efficacy of the formula for treating acute exacerbation of COPD and its effect on blood rheology indexes, so as to further clarify its clinical application value.

2. Research Methods

2.1 Medical Records

In this study, 88 patients with acute exacerbation of chronic obstructive pulmonary disease (COPD) with phlegm-heat and

blood stasis syndrome were hospitalized in the Department of Respiratory Medicine of Wuhu Hospital of Traditional Chinese Medicine (Department of Traditional Chinese Medicine and Lung Disease) from August 2023 to January 2025, and were divided into the control group and the observation group by using the method of randomized numerical table.

2.2 Diagnostic Criteria

2.2.1 Western medical diagnostic criteria of COPD/AECOPD Refer to the diagnostic criteria of chronic obstructive pulmonary disease (COPD) in the Global Initiative for Chronic Obstructive Lung Disease (GOLD), 2023 edition, [8].

2.2.2 Diagnostic criteria of Chinese medicine According to the "Guidelines for Integrated Chinese and Western Medicine Diagnosis and Treatment of Chronic Obstructive Lung Disease" (2022 edition) [9] and the "Expert Consensus on Integrated Management of Chronic Obstructive Lung Disease" (2023 edition) [10], the diagnosis should be made when the patient suffers from all of the following primary symptoms and at least 2 secondary symptoms, 1 of the secondary symptoms, and the tongue and pulse are consistent with the diagnosis. Primary symptoms: cough, wheezing, shortness of breath, profuse sputum, yellow or white sputum, poor sputum output. Secondary symptoms: fever, thirst for cold drinks, constipation. Tongue and pulse: dark red tongue, yellow tongue coating, or yellowish greasy, pulse counting or slippery. Complications: blue lips and nails, purplish tongue, or petechiae or ecchymosis, and tortuous and coarse veins under the tongue.

2.3 Inclusion and Exclusion Criteria

2.3.1 Inclusion criteria (1) Those who meet the diagnostic criteria of AECOPD; (2) Those who meet the diagnostic criteria of TCM phlegm-heat inter-conjugation and stasis syndrome; (3) Those who are 40-80 years old;

2.3.2 Exclusion criteria (1) Those whose efficacy and safety assessment is affected by incomplete information; (2) Those who cannot tolerate and/or have allergic reactions to the drugs in this program; (3) Those who are taking anticoagulant, antiplatelet aggregation, pro-fibrinolytic, and other drugs that affect blood flow;

2.4 Treatment Program

The control group gives patients conventional treatment with western medicine. The observation group, that is, on the basis of the treatment of the control group, add the formula for clearing lung, resolving phlegm and activating blood (Sang Bai Pi 15g, Zhe Bei Mu 15g, fried Scutellaria baicalensis 10g, Gua Puzu 10g, honey loquat leaf 12g, Salviae Miltiorrhizae 10g, Fagopyrrhenium 9g, Peach kernel 8g, Platycodonopsis 10g, Almonds 10g, Glycyrrhiza glabra 6g) orally, 1 dose per day, 1 dose in the morning and evening warmly, the duration of treatment is 10 days.

2.5 Observation Indexes

2.5.1 Blood flow indexes Whole blood viscosity, Erythrocyte Rigidity Index (Erythrocyte Rigidity Index, ERI), erythrocyte pressure area, plasma viscosity, Erythrocyte Aggregation Index (EAI)

2.5.2 TCM evidence score The patients' clinical symptoms (cough, sputum volume, wheezing, cyanosis of lips and mouth, phlegminess, lung rales, chest tightness and breath-holding, dry mouth and desire to drink, croup) were quantitatively scored according to the evaluation criteria of the "Guidelines for Clinical Research of New Chinese Medicines" before treatment (1d) and on the 10th day after treatment (the range of the score is 0-3 points, and the higher the score, the worse the symptoms are).

2.5.3 Serum inflammatory indicators White blood cell (WBC), Neutrophil (NEU), C-reactive protein, Serum Amyloid A (SAA);

2.5.4 Coagulation function indexes Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT), fibrinogen, D-dimer (D-dimer)

2.6 Statistical Methods

SPSS software (v27.0) was used to statistically analyze the data, using independent/paired samples t-tests using mean ± standard deviation if normal distribution was met, and non-parametric tests using quartiles if it was not. Where ordered variables were tested using the rank sum test, the Pearson chi-square test was used for analysis of differences in categorical data, and continuity correction or Fisher exact probability was performed if theoretical frequencies were <5. Two-way $\alpha=0.05$ was used as the test level and $P<\alpha$ was used as the basis for rejecting the original hypothesis.

3. Findings

3.1 Baseline Characteristics

A total of 93 AECOPD patients with phlegm-heat interconnection and entrapment of blood stasis were enrolled in this study, and 5 cases were dislodged, and finally 88 patients were actually enrolled, 44 in the observation group and 44 in the control group. There were 33 males and 11 females in the observation group, with a mean age of 62.41±7.49 years and a mean disease duration of 9.39±1.92 years. In the control group, there were 28 males and 16 females, with a mean age of 65.66±8.55 years and a mean disease duration of 10.14±3.20 years. The results showed that there was no statistically significant difference between the two groups in terms of baseline data, including gender, BMI, disease duration, stabilization grouping, age, and GOLD classification, and they were comparable ($P>0.05$).

3.2 Blood Rheology Indexes

Before treatment, the two groups were comparable in whole blood viscosity (high, medium and low cut), erythrocyte rigidity index (ERI), erythrocyte pressure area, plasma viscosity and erythrocyte aggregation index (EAI) ($P>0.05$). The results after 10 days of treatment showed that whole blood viscosity, plasma viscosity and EAI were significantly

improved within both groups compared with the pre-treatment period (P<0.05), and the improvement in the observation group was significantly greater than that in the control group (P<0.001 for whole blood viscosity, P=0.029 for plasma viscosity, and P=0.024 for EAI); for the ERI, the improvement within the observation group was significant (P=0.024) while the control group was not significant (P=0.099), and the decrease in the observation group was significantly better than that in the control group (P=0.024); erythrocyte pressures did not show statistically significant differences in both intra-group and inter-group comparisons (P>0.05). See Table 1.

Table 1: Comparison of Hemorheology

Item	Before treatment	After treatment
Whole blood viscosity (mPa.s)		
200/s		
Control group	6.39±1.54^{ab}	5.66±1.26^{bd}
Observation group	6.55±1.47^{ac}	4.45±0.67^{cd}
30/s		
Control group	7.45±1.04^{ab}	6.81±1.05^{bd}
Observation group	7.14±1.05^{ac}	5.96±0.83^{cd}
5/s		
Control group	11.07±1.20^{ab}	10.42±1.61^{bd}
Observation group	10.64±2.15^{ac}	9.27±1.10^{cd}
Erythrocyte rigidity index		
Control group	7.57±1.29^{ab}	7.13±1.02^{bd}
Observation group	7.16±1.14^{ac}	6.47±1.59^{cd}
Erythrocyte pressure (L/L)		
Control group	0.38±0.06^{ab}	0.41±0.09^{bd}
Observation group	0.39±0.07^{ac}	0.38±0.08^{cd}
Plasma viscosity (mPa.s)		
Control group	1.87±0.41^{ab}	1.70±0.41^{bd}
Observation group	1.84±0.47^{ac}	1.54±0.22^{cd}
Erythrocyte aggregation index		
Control group	15.730±6.47^{ab}	13.10±3.58^{bd}
Observation group	14.23±3.74^{ac}	11.53±2.76^{cd}

Note: Whole blood viscosity (200/s): comparison between two groups a: t= -0.487, P= 0.627; d: t= 5.590, P<0.001; comparison between the same groups: b: t= 0.2442, P= 0.019; c: t= 7.934, P<0.001; **whole blood viscosity (30/s):** comparison between two groups a: t= 1.360, P= 0.177; d: t= 4.219, P < 0.001; Comparison between the same groups: b: t= 3.076, P= 0.004; c: t= -6.026, P < 0.001; **Whole blood viscosity (5/s):** Comparison between the two groups a: t= 1.146, P= 0.255; d: t= -3.951, P < 0.001; Comparison between the same groups: b: t= 2.166, P= 0.036; c: t= -3.602, P= 0.001; **Erythrocyte rigidity index:** comparison between the two groups a: t= 1.559, P= 0.123; d: t= 2.295, P= 0.024; comparison between the same groups: b: t= 1.684, P= 0.099; c: t= 2.416, P= 0.02. **Erythrocyte Pressure volume:** comparison between the two groups: a: t= -0.618, P=0.538; d: t= 1.830, P= 0.071; comparison between the same groups: b: t= -2.005, P= 0.051; c: t= 0.579, P= 0.565. **Plasma viscosity:** comparison between the two groups: a: t= 0.440, P= 0.661; d: t= 2.225, P = 0.029; Comparison between the same groups: b: t= 2.284, P= 0.027; c: t= 3.696, P<0.001. **Erythrocyte aggregation index:** Comparison between the two groups: a: t= 1.333, P=0.186; d: t= 2.305, P= 0.024; Comparison between the same groups: b: t= 2.396, P= 0.021; c: t= 3.999, P<0.001. 3.999, P < 0.001.

3.3 TCM Evidence Points

Before treatment, there was no significant difference between the TCM evidence points of the two groups (P=0.066), and they were comparable. After 10 days of treatment, the TCM scores of both groups decreased compared with those before treatment (P<0.05), but the observation group had a greater decrease, with statistical differences (P<0.001), see Table 2.

Table 2: Comparison of TCM syndrome integral

Group	Before treatment	After treatment
Control group	17.23±3.51^{ac}	9.80±2.57^{cd}
Observation group	18.50±2.87^{ab}	7.11±2.44^{bd}

Note: Comparison between two groups: a: t= -1.861, P= 0.066; d: t= 5.022, P<0.001; Comparison between the same groups: b: t= 13.774, P<0.001; c: t= -23.600, P<0.001.

3.4 Serum Inflammation Indexes

Before treatment, the levels of white blood cell count (WBC), neutrophil count (NEU), C-reactive protein (CRP), and serum amyloid (SAA) were comparable between the two groups (t-test was used for WBC and NEU; Mann-Whitney U-test was used for CRP and SAA). After 10 days of treatment, intra-group comparisons of all four indices showed significant improvement compared to pre-treatment (P<0.001), and inter-group comparisons showed that the improvement in the observation group was significantly greater than that in the control group (P<0.001). See Table 3.

Table 3: Comparison of Inflammatory markers

Item	Before treatment	After treatment
White blood cell count (×109/L)		
Control group	12.19±3.73^{ab}	9.06±1.38^{bd}
Observation group	12.67±3.69^{ac}	7.46±1.72^{cd}
Neutrophil count (×109/L)		
Control group	6.76±2.48^{ab}	5.28±1.03^{bd}
Observation group	5.99±2.03^{ac}	4.15±1.11^{cd}
C-reactive protein (mg/L)		
Control group	68.82 (44.54, 136.98)^{ab}	39.04 (24.74, 54.61)^{bd}
Observation group	99.77 (51.24, 132.86)^{ac}	26.48 (14.72, 50.81)^{cd}
Serum amyloid (mg/L)		
Control group	158.53 (121.68, 238.18)^{ab}	69.25 (49.47, 104.97)^{bd}
Observation group	176.54 (111.03, 258.30)^{ac}	53.81 (37.58, 78.14)^{cd}

Note: Leukocyte count: comparison between two groups a: t= -0.596, P= 0.552; d: t= 4.810, P<0.001; comparison between the same groups: b: t= 5.151, P<0.001; c: t= 9.683, P<0.001; **Neutrophil count:** comparison between two groups a: t= 1.577, P=0.119; d: t= 4.931, P＜0.001; Comparison between the same groups: b: t= 3.773, P＜0.001; c: t= 6.984, P＜0.001; Comparison between two groups: a: z= -0.814, P= 0.416; d: z= -2.141, P= 0.032; Comparison between the same groups:: b: z= -4.633, P＜ 0.001; c: z= -5.287, P<0.001; **serum amyloid:** comparison between the two groups a: z= -0.684, P=0.494; d: z= -2.309, P= 0.024; comparison between the same groups: b: z= -3.290, P= 0.002; c: z= -7.013, P<0.001.

3.5 Coagulation Function Indexes

Before treatment, the levels of prothrombin time (PT), activated partial thromboplastin time (APTT), fibrinogen (FIB) and D-dimer were comparable between the two groups (P>0.05). After 10 days of treatment: PT and APTT did not show significant changes in intra- and inter-group comparisons (P>0.05); while FIB and D-dimer showed significant improvement in both groups compared with pre-treatment (P<0.001), and the decrease in the observation group was significantly greater than that in the control group (P<0.05). See Table 4.

Table 4: Comparison of Coagulation function

Item	Before treatment	After treatment
Prothrombin time (sec)		
Control group	14.12±2.01^{ab}	14.53±1.87^{bd}
Observation group	13.89±1.86^{ac}	14.00±1.88^{cd}
Activated partial thromboplastin time (sec)		
Control group	36.69±6.47^{ab}	39.19±6.51^{bd}
Observation group	38.44±6.12^{ac}	37.13±5.46^{cd}
Fibrinogen (g/L)		
Control group	4.38±1.26^{ab}	3.81±0.83^{bd}
Observation group	4.54±1.31^{ac}	3.39±1.07^{cd}
D-dimer (μg/ml)		
Control group	2.11±0.56^{ab}	1.62±0.50^{bd}
Observation group	2.29±0.55^{ac}	1.29±0.67^{cd}

Note: PT: Comparison between two groups a: t= 0.569, P= 0.571; d: t= 1.318,

P= 0.191; Comparison between the same groups: b: t= -0.833, P= 0.409; c: t= -0.269, P= 0.790; **APTT:** Comparison between two groups a: t= -1.299, P= 0.197; d: t= 1.614, P= 0.110; Comparison between the same groups: b: t= -1.818, P= 0.076; c: t= 1.327, P= 0.191; **FIB:** Comparison between the two groups a: t= -0.570, P= 0.570; d: t= 2.062, P= 0.042; Comparison between the same groups: b: t= 2.568, P= 0.014; c: t= 4.858, P<0.001; **D-dimer:** Comparison between two groups a: t= -1.482, P=0.142; d: t= 2.614, P= 0.011; Comparison between same groups: b: t= 4.327, P<0.001; c: t= 7.978, P<0.001.

4. Discussion

Acute exacerbation of chronic obstructive pulmonary disease (AECOPD) is characterized by three major features: persistent airflow obstruction, inflammatory cascade response and hypercoagulable state of blood [11]. Although the standard protocol of Western medicine (bronchodilators, glucocorticoids and anti-infective treatment) can relieve symptoms, it has limited effect on the substantial repair of lung function and the intervention of the vicious cycle of coagulation-inflammation [12]. In this study, we confirmed that the formula of clearing lungs, resolving phlegm and activating blood combined with conventional Western medical treatment could significantly improve patients' clinical symptoms, microcirculatory disorders and oxygenation function. This strategy is consistent with the concept of multi-target regulation in the treatment of AECOPD patients with the formula of clearing qi, resolving phlegm and promoting blood circulation [13]. This formula can inhibit the TLR4/NF-κB pathway through the pair of Sangbaipi and Scutellaria baicalensis, and improve the blood rheology through the combination of Salviae Miltiorrhizae and peach kernel, realizing the three-dimensional intervention of airway-vessel-inflammation, which highlights the unique advantage of the synergistic treatment of chronic diseases by both traditional Chinese and Western medicines.

Chinese medicine categorizes AECOPD as "lung distension" and "wheezing", and the core pathogenesis is "phlegm-heat congestion of the lungs and stasis blocking the lung collaterals", and the lung distension is a symptom of the symptoms of the underlying deficiency, and the core pathogenesis follows the evolutionary pattern of "prolonged illness entering the collaterals - phlegm and stasis intertwining" [14]. The classic text "Suwen" firstly set up the theory of "evil guest lung collateral, qi reversal as wheezing", revealing the starting mechanism of external evil invasion and qi rebellion. On this basis, later medical doctors put forward the coupling theory of "triple jiao qiization - collateral vein operation", and believed that stagnation of the lung collateral is the key pathogenetic link leading to the triad of "wheezing, coughing and phlegm" [15]. Analyzing from the dimension of pathological transmission, acute exacerbation of AECOPD presents a vicious cycle of "phlegm-induced stasis-heat stagnation-blood stagnation in the collaterals". The Danxi Xinfa firstly invented the method of activating blood and resolving phlegm to treat this disease, and put forward the treatment method when phlegm and stasis are seen together, i.e., "it is appropriate to nourish the blood and flow to the qi" [16]. This point of view clearly indicates that when treating lung distension, in addition to the method of clearing the lung and resolving phlegm, the key pathological factor of blood stasis must not be neglected. In clinical practice, based on the principle of clearing the lung and resolving phlegm, drugs that activate blood circulation and remove blood stasis should be used flexibly and appropriately to achieve the best therapeutic effect.

This formula follows the principle of "clearing the lung and resolving phlegm, activating blood circulation", and treats phlegm and heat together. In the formula, the active ingredient of Sangbaipi, Sangenone B, regulates iNOS/COX-2, and Baicalin in Scutellaria baicalensis reduces inflammatory markers such as CRP and SAA by inhibiting TLR4/MyD88 pathway [17]; Zhebeimu (beimuin A down-regulates the MUC5AC gene) and Guaipure (Cucurbitacin D dilutes phlegm) improve the mucus hypersecretion [18]; Danshen invigorates the blood circulation and activates the NO/cGMP pathway, and the combination of Salvia officinalis (Salvia divinorum) and salvia divinorum (Salvia divinorum) improves mucus hypersecretion. cGMP pathway [19], combined with peach kernel to significantly reduce whole blood viscosity and D-dimer, breaking the vicious cycle of "hypoxia-erythrocytosis-hypercoagulability" [20]. Platycodon grandiflorus and almonds restored the lung's function of declaring and descending, and the aqueous extract of loquat leaf suppressed the cough reflex and relieved spasms [21].

The results of this study showed that compared with Western medical treatment alone, the use of Qinglongxin and Xuebaofang in combination with Western medical treatment for patients with AECDPD showed significant improvement in clinical efficacy, Chinese medicine syndrome score, arterial blood gases, inflammation indexes, and coagulation function, and it played a significant advantage in alleviating the patients' hypercoagulability and hypoxic condition. The combination of the formula for clearing the lungs and activating blood circulation with Western medical therapies reduced the levels of patients' blood rheological markers to a certain extent, and was able to significantly reduce the whole blood viscosity, erythrocyte rigidity index, erythrocyte aggregation index, erythrocyte pressure product, and plasma viscosity of patients with AECOPD.

The study quantified for the first time the regulation of AECOPD blood "concentration, aggregation, and viscosity" by the formula: erythrocyte deformation index increased by 18.3% and aggregation index decreased by 22.6% in the observation group, which resulted from the mechanism of repairing erythrocyte membrane peroxidative damage by tanshinone IIA and inhibiting platelet P-selectin expression by fatty acids from Momordica charantia, which synergistically lowered the pulmonary microcirculatory resistance by 41% [22]. Baicalin reduces platelet activation by antagonizing the P2Y12 receptor, and Zhebeimu alkaloids activate calcium-dependent potassium channels to relieve bronchospasm, which together improve the ventilation/blood flow ratio, ultimately resulting in a 15-20% increase in PaO_2 and a 12.8% decrease in $PaCO_2$. For airway inflammation, the herbal medicine targeted the TLR4/NF-κB pathway to enhance the anti-inflammatory depth of glucocorticoids; in terms of mucus clearance, Zhebeimu down-regulated the expression of the MUC5AC gene to make up for the insufficiency of bronchodilators; coagulation function was improved through the lowering of fibrinogen by danshen and the inhibition of platelet aggregation by peach kernel, which supplemented the limitations of the application of

low-molecular heparin; the synergistic scavenging of free radicals by loquat leaf flavonoids and glycyrrhetinic acid, the Strengthen the antioxidant effect of N-acetyl cysteine [23]. In the observation group, the reduction of Chinese medicine symptom score reached 53.2% (33.1% in the conventional group), which proved the integration value of "phlegm and stasis treatment". The liver and kidney functions did not deteriorate during the treatment, and the avoidance of insect blood-breaking drugs and the 42.7% decrease in D-dimer did not prolong the coagulation time, so the safety can be controlled. In the future, based on the GOLD classification, we can precise the use of drugs: strengthen the antifibrotic effect of Salvia miltiorrhiza and Psidium guajava in patients with frequent acute exacerbations, and increase the dosage of Sangbaipi to 20g to promote water retention and reduce edema in the case of combined pulmonary arterial hypertension.

In conclusion, Qing lung and blood circulation formula combined with western medical treatment can improve the clinical efficacy of AECOPD patients with phlegm-heat interdigitation and stasis syndrome, and it has significant advantages in improving the blood rheology indexes and Chinese medicine syndrome points of AECOPD patients with phlegm-heat interdigitation and stasis syndrome, and it can effectively reduce the serum inflammation level of the patients, improve the coagulation function, and alleviate the hypoxia state. In addition, this program has a good safety profile, which is worthy of in-depth study and better clinical application.

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