Effects of Chinese Traditional Medicine Lianhuaqingwen on 51 Patients with Novel Coronavirus-Infected Pneumonia: Multicenter Retrospective Research

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【**Abstract**】Objective: To analyze the clinical efficacy of combined application of Lianhuaqingwen Granules (LH-C) in the novel coronavirus pneumonia (NCP). Method: Clinical data were collected from the common NCP patients at Puren Hospital Affiliated to Wuhan University of Science and Technology, CR & WISCO General Hospital, and Wuhan Ninth Hospital in January 2020 for a retrospective clinical study. Among patients meeting the inclusion and exclusion criteria, 60 cases receiving LH-C combined with a conventional therapy were included in the treatment group, and 60 cases receiving the conventional therapy only were included in the control group, with propensity matching 1:1. A comparison was made between the two groups in terms of disappearance rate, duration, and effective rate of cardinal symptoms (fever, weakness, and cough), disappearance rate of other symptoms, pulmonary imaging (CT) result improvement rate, etc. Result: There were no significant differences in baseline between the two groups. Patients in each group received a conventional therapy with or without LH-C for 7 days, the disappearance rate of cardinal symptom in the treatment group was 83.7%, 61.3%, and 62.2%, respectively, in contrast to 61.0%, 34.3%, and 35.9% in the control group (P<0.05). The average duration of cardinal symptom in the treatment group was (2.9±1.67) days, (3.5±1.50) days, and (3.9±1.98) days, respectively, in contrast to (3.9±1.29) days, (4.8±1.53) days, and (5.2±1.76) days in the control group (P<0.05). The cardinal symptoms relief occurred in forty-four patients of the treatment group (86.3%) and thirty-five patients of the control group (68.6%), indicating a significant difference between the two groups (P=0.033). The disappearance rate of expectoration, shortness of breath, chest distress, appetite loss, and moist rale sign was 55.0%, 61.5%, 54.6%, 34.8%, and 45.5%, respectively, in the treatment group in contrast to 15.8%, 14.3%, 15.8%, 7.7%, and 13.0% in the control group (P<0.05). Four patients in the treatment group (7.8%) and eleven patients in the control group (21.6%) progressed to the severe NCP during treatment (P<0.05). Twenty-eight patients in the treatment group

(54.9%) and twenty-three patients in the control group (45.1%) had pulmonary CT imagining improvement (P>0.05). Conclusion: LH-C combined with a conventional therapy could significantly improve clinical symptoms of NCP patients including fever, weakness, cough, expectoration, shortness of breath, chest distress, and appetite loss, alleviate pulmonary moist rale, enhance the effective rate of cardinal symptom, and reduce progression. These findings suggested LH-C could be effective in the common NCP patients.

【**Key words**】COVID-19; Novel coronavirus pneumonia; Lianhuaqingwen; Clinical investigation; Efficacy analysis; Multicenter retrospective research

Novel coronavirus pneumonia (NCP) has become one of the major epidemics that seriously endanger human health and public safety. Studies show that [1] the virus of this epidemic belongs to the virus groups of Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) and the Middle East Respiratory Syndrome coronavirus (MERS-CoV). According to the phylogenetic tree of coronavirus, because it is closely related to the Chinese chrysanthemum head bat strain SL ZC45 (Bat-SL-CoVZC45), its homology is more than 85%, and it is designated as SARS-CoV-2. On February 11, 2020, the World Health Organization officially named the disease caused by the new coronavirus (SARS-CoV-2) as "2019 Coronavirus Disease (COVID-19)" [2]. According to early case analysis, SARS-CoV-2 is less severe than SARS-CoV and MERS-CoV, however, as the number of cases continues to increase, more and more evidence of interpersonal transmission indicates that it is more contagious than SARS-CoV and MERS- CoV [3-7]. Some researchers have established a model to evaluate the "Basic Reproductive Number" (R_0) of the epidemic situation and found that it reached 2.68 [8], that is, one person infect 2 to 3 people on average. According to the data published by the National Health Commission of the People's Republic of China [9], as of 24:00 on February 17, there were 72,436 confirmed cases, 1,868 death cases, and 11,741 severe cases. A total of 560,901 close contacts were tracked. There are still 141,552 people under observation. It can be seen that SARS-CoV-2 is highly contagious, has a wide range of impacts. This raises a serious prevention and control challenge to our country and even the whole world, and the virus spread has been classified as a public health emergency of international concern [10].

The epidemic has developed rapidly, and a number of unforeseen events will cause serious consequences. A survey of 72,314 cases from 31 provinces and cities across the country found that among the 44,672 confirmed cases there were 13.8% severe cases, 4.7% critical cases, with 1023 deaths, and a crude death rate (CDR) of approximately 2.3% [11]. Another clinical study of 138 confirmed patients found that

26% of patients needed admission to the intensive care unit and the mortality rate of confirmed patients reached 4.3% [12]. There is also a study with 1099 cases from 552 hospitals in China reporting that the proportion of confirmed in-patient turning to severe conditions reaches 15.7%, and the clinical mortality rate is 1.4% [13]. As Zhong Nanshan, an academician of the Chinese Academy of Engineering, pointed out in the treatment strategy for novel coronavirus pneumonia that this epidemic is more difficult than SARS in prevention and control, especially the severe cases will cause sustained damages to the patients, causing it more difficult to treat the patient than the SARS treatment [14]. However, there is still no confirmed effective antiviral therapy for COVID-19, and symptomatic and supportive therapy is the main clinical practice [15]. Therefore, early detection, timely clinical diagnosis, rapid quarantine measures [16], and adherence to integrated Chinese and Western medicine treatment [17] have become important clinical treatment measures to combat the epidemic, which is of great significance for epidemic prevention and control.

As reported, the epidemic area in Hubei has comprehensively established a working mechanism for the prevention and treatment by integrating the traditional Chinese medicine and the western medicine, and extensively promoted its usage [18]. According to statistics, the participation rate of traditional Chinese medicine in Hubei epidemic area is over 75%, and non-Hubei epidemic area is over 90%. Another survey shows that more than 80% of patients with COVID-19 severe disease actively choose treatment of integrated traditional Chinese and western medicine, and more than 90% of light patients hope that Chinese medicine will intervene. Most of the quarantined persons expect the early intervention of traditional Chinese medicine, and patients who have been discharged from the hospital are quite satisfied with the treatment of Chinese medicine [19]. As of February 17, 2020, 85.2% of the confirmed cases involves Chinese medicine in the treatment [20]. Therefore, since the outbreak of the epidemic, the author has also adopted a treatment with combination of traditional Chinese medicine and western medicine. The combination of Lianhuaqingwen Granules (LH-C) with conventional treatment of NCP confirmed good treatment effect on patient. The clinical data of the cases are retrospectively analyzed in this report in order to provide research basis for clinical integrated Chinese and western medicine treatment.

1 Objects and methods

1.1 Subjects

Clinical data were collected from the common NCP patients at Puren Hospital Affiliated to Wuhan University of Science and Technology, CR & WISCO General Hospital, and Wuhan Ninth Hospital from January 1 to January 30, 2020, who were

determined to be NCP positive by nucleic acid tests on sputum, throat swabs, and lower respiratory tract secretions.

1.2 Inclusion criteria

Patients between the ages of 18 and 70 who met the NCP general-purpose diagnostic criteria for the "Diagnosis and treatment for novel coronavirus pneumonia (Trial Version 5)" [15] and were hospitalized for more than 6 days.

1.3 Exclusion criteria

① severe and critical NCP patients; ② with any other chronic respiratory diseases, respiratory bacterial infections such as purulent tonsillitis, acute tracheobronchitis, sinusitis, otitis media, and other respiratory diseases affecting assessment; ③ with severe interpulmonary disease, or basic diseases such as qualitative lesions, bronchiectasis, primary immunodeficiency disease, congenital respiratory malformations, congenital heart disease, lung development abnormalities; ④ accompanied by severe liver diseases (levels of aspartate aminotransferase AST, alanine aminotransferase ALT exceeds the upper limit of normal values by 5 times), or patients with severe renal insufficiency or undergoing continuous renal replacement therapy, hemodialysis, peritoneal dialysis; ⑤ there are malignant tumors, blood diseases, cachexia, activities that have multiple metastases and cannot be resected Hemorrhage, severe malnutrition, HIV, etc., or suffer from severe neurological and psychiatric diseases.

1.4 Grouping method:

Fifty-one (51) patients who met the criteria of **Inclusion and Exclusion** were treated with Lianhuaqingwen Granules (LH-C) for $\geqslant$ 5 days were collected as the treatment group. Then, using age, temperature, and course of disease as covariates. Logistic regression models were used to calculate propensity scores. 51 patients receiving conventional treatment were matched in a 1: 1 ratio as a control group.

1.5 Therapeutic method

Control group: simple nutrition support treatment, symptomatic treatment, antiviral and antibacterial treatment. Treatment group: Based on the control group, combine with LH-C (6g / bag, Shijiazhuang Yiling Pharmaceutical Co., Ltd., National Medicine Code Z20100040), 1 bag each time, 3 times a day. Collect clinical data of patients treated for 7 days.

1.6 Observation indicators

Compare the two groups in terms of disappearance rate of cardinal symptoms

(fever, weakness, and cough), days of disappearance, as well as disappearance rate of other symptoms, the effective rate of cardinal symptoms, pulmonary imaging (CT) result improvement rate, and the rate of clinical conversion to severe.

1.7 Evaluation Criteria

Disappearance rate of cardinal symptoms: The number of the case symptoms disappeared after treatment / total number of cases. ②Effective rate of main symptoms: for main symptoms (fever, fatigue, cough), 0 points for “no” and 1 point for "yes", (pre-treatment - after treatment) patient score / pre-treatment patient score is the symptom score reduction rate, when the symptom score reduction rate is> 30%, it is judged to be effective, and when ≤ 30%, it is judged to be ineffective. The number of cases judged to be effective / the total number of cases. ③pulmonary imaging (CT) result improvement rate: The number of cases showing improvement in lung imaging (CT) after treatment / total number of cases; ④the rate of clinical conversion to severe: refer to severe case diagnostic criteria in "Diagnosis and treatment for novel coronavirus pneumonia (Trial Version 5)" [15] for definition of sever cases. The rate of clinical conversion to sever is the number of cases converted from common to severe case / the total number of cases.

1.8 Statistical methods

Statistical analysis was performed using SAS 9.4 software. All statistical tests were performed using two-sided tests. Descriptive analysis of count data is described by number of cases and composition ratio. Numeric measurement data were described by mean ± standard deviation. The Student’s t-test was used to compare the measurement data between groups, and the Chi-square test or exact probability method was used to analyze the counting data. The duration of fever was analyzed by survival analysis. The difference was statistically significant when $P \leq 0.05$.

2.1 General Information

A total of 102 confirmed common patients who met the requirements were admitted (including 32 cases of Puren Hospital Affiliated to Wuhan University of Science and Technology, 18 cases of CR & WISCO General Hospital,, and 52 cases of Wuhan Ninth Hospital). In the treatment group of 51 patients, there were 26 males (51.0%), 25 females (49.0%), with average age of (55.5 ± 12.3) years old, average body temperature (38.44 ± 0.63) ℃; systolic blood pressure (122.6 ± 11.9) mmHg, diastolic blood pressure (75.0 ± 9.2) mmHg ; average heart rate (89.0 ± 11.6) beats / minute, average repiration rate (19.8 ± 2.4) breaths / minute. For medical history, 15 cases with previous hypertension (29.4%), 5 cases with coronary heart disease (9.8%), 4 cases with diabetes (7.8%), 3 cases with and cerebral infarction

(5.9%). For laboratory examination: white decreased blood cell in 13 cases (25.5%), decreased lymphocytes in 20 cases (39.2%), increased C-reactive protein in 40 cases (78.4%), increased erythrocyte sedimentation rate in 20 cases (39.2%), and increased procalcitonin in 16 cases (31.4%). ;

There were 51 cases in the control group, including 27 males (52.9%), 24 females (47.1%), with an average age of (55.8 ± 11.6) year sold, average body temperature of (38.33 ± 0.64) ℃, systolic blood pressure (127.0 ± 16.3) mmHg,;diastolic blood pressure. (74.8 ± 10.3) mmHg; average heart rate (88.7 ± 13.4) beats / min, mean respiration rate (20.0 ± 2.8) breaths / min. For medical history, 17 cases with previous hypertension (33.3%), 2 cases with coronary heart disease (3.9%), 4 cases with Diabetes history (7.8%), and 6 cases with cerebral infarction (11.8%). For laboratory examination: decreased white blood cells in 16 cases (31.4%), decreased lymphocytes in 24 cases (47.1%), and increased C-reactive protein in 42 cases (82.4%), increased erythrocyte sedimentation rate in 24 cases (47.1%), and increased procalcitonin in 17 cases (33.3%).

There were no statistically significant differences between the two groups in age, gender, and baseline data such as body temperature, blood pressure, heart rate, breathing, previous medical history, and laboratory test results (P> 0.05), so that the two groups were comparable. See Table 1.

Table 1 general information comparison between the two groups

Item	treatment group （N=51）	Control group （N=51）	Statistics t/χ^2	P-value
Age （one full year of life，$\bar{x}\pm s$）	55.5±12.3	55.8±11.6	-0.127	0.550
Male （case，%）	26(51.0%)	27(52.9%)	0.039	0.843
Body temperature（℃，$\bar{x}\pm s$）	38.44±0.63	38.33±0.64	0.848	0.398
Systolic blood pressure（mmHg，$\bar{x}\pm s$）	122.6±11.9	127.0±16.3	-1.561	0.122
Diastolic blood pressure（mmHg，$\bar{x}\pm s$）	75.0±9.2	74.8±10.3	0.101	0.920
Heart rate（beats /min，$\bar{x}\pm s$）	89.0±11.6	88.7±13.4	0.126	0.900
Respiration rate（breaths /min，$\bar{x}\pm s$）	19.8±2.4	20.0±2.8	-0.527	0.599

Medical history（case，%）	27(52.9%)	26(51.0%)	0.039	0.843
——Hypertension	15(29.4%)	17(33.3%)	0.182	0.670
——Coronary heart disease	5(9.8%)	2(3.9%)	——	0.436
——Diabetes mellitus	4(7.8%)	4(7.8%)	——	1.000
——Cerebral infarction	3(5.9%)	6(11.8%)	——	0.487
Leukocyte abnormalities（↓）（case，%）	13(25.5%)	16(31.4%)	0.434	0.510
Lymphocyte abnormalities（↓）（case，%）	20(39.2%)	24(47.1%)	0.639	0.424
C-reactive protein abnormalities（↑）（case，%）	40(78.4%)	42(82.4%)	0.249	0.618
ESR（↑）（例，%）	20(39.2%)	24(47.1%)	0.639	0.424
Procalcitonin（↑）（case，%）	16(31.4%)	17(33.3%)	0.045	0.832

Note: For male, medical history, laboratory examination result is count data, and Chi-square test was used for analysis, while the rests are measuring data, and Student's t-test was used for analysis. 1mmhg ≈0.133kpa。

2.2 Comparison of the disappearance rate of cardinal symptom between two groups

baseline data: For the 51 case in the treatment group, 43 in fever (84.3%), 31 in fatigue (60.8%) and 37 in cough (72.6%); for the 51 case in the control group, 41 in fever (80.4%), 35 in fatigue (68.6%) and 39 in cough (76.5%). After 7 days of treatment, compared with the control group, the fever symptoms disappeared in the treatment group were 36 cases (83.7%), significantly better than 25 cases in the control group (61.0%) (x^2=5.461, p =0.019), 19 cases of fatigue symptoms disappeared (61.3%), significantly better than 12 cases in the control group (34.3%) (x^2=4.813, p =0.028), 23 cases of cough symptoms disappeared (62.2%), significantly better than 14 cases in the control group (35.9%) (x^2=5.243, p =0.022). See Table 2.

Table 2 Comparison of the disappearance rate of cardinal symptom in the two groups of Patients

Item	Treatment group			Control group			Statistics χ^2	P-value
	N	cases of disappearance	rate of disappearance（%）	N	cases of disappearance	disappearance rate（%）		
Fever	43	36	83.7%	41	25	61.0%	5.461	0.019
Fatigue	31	19	61.3%	35	12	34.3%	4.813	0.028

Cough	37	23	62.2%	39	14	35.9%	5.243	0.022

2.3 Comparison of the disappearance time of cardinal symptom between two groups of Patients

There were 36 patients with fever disappeared in the treatment group, with the average duration of fever of (2.9 ± 1.67) days. There were 19 cases of fatigue disappeared, with the average duration of (3.5 ± 1.50) days. The symptom of cough disappeared in 23 cases, with an average duration of (3.9 ± 1.98). The control group consisted of 25 patients with fever disappearance, with an average duration of (3.9 ± 1.29) days, 12 cases of fatigue disappearance, with an average duration of (4.8 ± 1.53) days, and cough disappearance in 14 cases, with an average duration of (5.2 ± 1.76) days. The main symptoms (fever, fatigue, cough) disappeared in the treatment group faster than those in the control group, and the differences between the groups were statistically significant (P <0.05). See Table 3.

Table 3 Comparison of the disappearance time of cardinal symptom between two groups

Item	treatment group		control group		Statistics	P- value
	N	Result(days)	N	Result(days)	t	
fever	36	2.9±1.67	25	3.9±1.29	-2.453	0.017
fatigue	19	3.5±1.50	12	4.8±1.53	-2.342	0.026
cough	23	3.9±1.98	14	5.2±1.76	-2.083	0.045

2.4 Comparison of Effectiveness of Major Symptoms in Two Groups of Patients

After 7 days of treatment, 44 of the 51 patients in the treatment group were effective in treating the main symptoms, with an effective rate of 86.3%; 35 of the 51 patients in the control group were effective in treating the main symptoms, with an effective rate of 68.6%. The differences between the two groups were statistically significant (P = 0.033).

2.5 Comparison of the disappearance rate of other symptoms and signs between the two groups of patients

Baseline data: 51 cases in the treatment group, including 9 cases of muscle pain (17.7%), 20 cases of sputum (39.2%), 13 cases of shortness of breath (25.5%), 11 cases of chest tightness (21.6%), and 3 cases of dyspnea (5.9%), 7 cases of nausea (13.7%), 23 cases of loss of appetite (45.1%), 22 cases of wet soreness in the lungs (43.1%); 51 cases in the treatment group, including 11 cases of muscle pain (21.6%), 19 cases of sputum (37.3%), 14 cases of shortness of breath (27.5%), 19 cases of

chest tightness (37.3%), 7 cases of dyspnea (13.7%), 5 cases of nausea (9.8%), 26 cases of loss of appetite (51.0%), and 23 cases of pulmonary wetness (45.1%). There was no statistically significant difference between the groups (P> 0.05). ② After 7 days of treatment, 11 cases (55.0%), 8 cases (61.5%), 6 cases (54.6%), and 8 cases (34.8%) and 10 cases (45.5%) of sputum, shortness of breath, chest tightness, loss of appetite, and signs of dampness ,respectively, disappeared in the treatment group.), while, 3 cases (15.8%), 2 cases (14.3%), 3 cases (15.8%), 2 cases (7.7%), and 3 cases (13.0%) disappeared correspondingly in the control group. The differences were statistically significant (P <0.05); For muscle pain, dyspnea and nausea, 6 cases (66.7%), 2 cases (66.7%), and 4 cases (57.1%), respectively, disappeared in the treatment group, while 2 cases (18.2%), 2 cases (28.6%), and 2 cases disappeared in the control group (40.0%). There was no statistical difference between the two groups (P > 0.05). See Table 4.

Table 4 Comparison of the disappearance rate of other symptoms and signs between the two groups of patients

Item	Treatment group			Control group			Statistics χ^2	P-value
	N	Number of disappeared cases	Disappear-ance rate	N	Number of disappeared cases	Disappear-ance rate		
Muscle pain	9	6	66.7%	11	2	18.2%	-	0.065
Sputum	20	11	55.0%	19	3	15.8%	6.510	0.011
Shortness of breath	13	8	61.5%	14	2	14.3%	-	0.018
Chest tightness	11	6	54.6%	19	3	15.8%	-	0.042
dyspnea	3	2	66.7%	7	2	28.6%	-	0.500
Nausea	7	4	57.1%	5	2	40.0%	-	1.000
Loss of appetite	23	8	34.8%	26	2	7.7%	-	0.032
wet soreness	22	10	45.5%	23	3	13.0%	5.750	0.016

2.6 Analysis of the severity of transition between two groups of patients during treatment

Among the 51 cases in the treatment group, 4 cases (7.8%) were converted to severe in the course of treatment, while among the 51 cases in the control group, 11 cases (21.6%) were converted to severe. There was a statistically significant difference between the groups (P <0.05).

2.7 Comparison of lung imaging (CT) improvement rates between the two

groups

After 7 days of treatment, 51 patients in the treatment group showed 28 cases of lung CT improvement (54.9%), while 51 patients in the control group had 23 cases of pulmonary CT improvement (45.1%). There was no significant difference between the groups (P> 0.05).

3 Discussion

COVID-2019 is a clinical syndrome with acute respiratory infectious diseases as the main symptoms caused by SARS-CoV-2, which has been classified as Class B infectious disease and is managed according to Class A infectious disease in China. Recently, based on the lung tissue autopsy of the first death case of COVID-2019， it was found to meet the criteria for Acute Respiratory Distress Syndrome (ARDS), with the lung pathology testing results similar to SARS and MERS[22]. There is evidence that the SARS-CoV-2 is a single-stranded RNA positive-chain envelope coronavirus and its enzymes have a high level of sequence similarities to those in SARS and MERS. The analysis of protein structure shows that the drug binding "pocket"s of 2019-nCoV, SARS and MERS virus enzymes are highly conserved. So it is speculated that the former anti-SARS and MERS drugs can be used in the treatment of COVID-2019[23]. At present, the clinical medicine should focus on SARS-CoV-2 symptomatic and supportive therapies. Although the anti-viral drug development has made a great progress, however, SARS-CoV-2 is a novel virus and the development of ready-made and targeted new drugs will take a long time. This is actually one of the bottlenecks causing the delay occurence of the inflection point in prevention and control of the epidemic area. There are still concerns about the clinical valid evidence and adverse reaction of the currently clinical trials drug that is used for anti-virus or anti-malarial. In the condition of lack of effective anti-SARS-CoV-2 drugs, we should learn from the important role of the combination of traditional Chinese medicine and Western medicine in the prevention and control of SARS，and take full advantage of the holistic theory of traditional Chinese Medicine to discuss the clinical application value of Traditional Chinese Medicine in the prevention and treatment of COVID-2019.

The COVID-2019 belongs to the "Epidemic Disease" category of Chinese Medicine, many Chinese medicine experts believe that the disease is related to the following attributes of Chines medicine diagnostics, including dampness, heat, poison, blood stasis, as well as deficiency of vital energy, turbidity toxin and dampness [26-27]. The traditional Chinese Medicine Lianhuaqingwen Capsule (Granule) is a representative Chinese Innovative Medicine which applies the theory of collateral disease in traditional Chinese medicine to reveal the pattern of viral transmission in virus-induced respiratory system disease. It is composed of honeysuckle, forsythia suspense, roasted Ephedra, Bitter Almond, Gypsum, Patchouli, Rhodiola, Rhubarb and so on. The functions of these components are consistent with the

above-mentioned pathogenesis of the disease. Its formula is based on Maxing Shigan decoction in Zhang Zhongjing's treatise on Febrile Diseases of the Han Dynasty and Yinqiao powder in Wu Jutong's treatise on epidemic febrile diseases of the Qing Dynasty, aligning with the experience of treating epidemic disease by "open the door to drive away the thief" and “visiting pathogen should be expulsed as early as possible”. The first stage of using the medicine, discharge heat from the viscera and purging the lungs, the use of Rhubarb, the purging of the viscera and purging the lungs, the lowering of the lung-qi, and the combination of Patchouli with the fragrance and dampness, for this epidemic situation, there is a dampness gastrointestinal discomfort in patients with significant effective. At the same time, the compatibility of Rhodiola with its function of "making up the deficiency" ("Supplementary Records of famous doctor ") , clear the lung and remove the blood stasis, adjust the immunity, embody the three dynasties ancient prescription treatment "epidemic disease" practical experience. Studies have shown that the combination of honeysuckle and Forsythia have a therapeutic effect on COVID-2019 by blocking multiple binding sites of Angiotensin-converting enzyme and SARS-CoV-2 in the body. Patchouli can protect the structure and function of intestinal epithelial cells, improve the function of intestinal barrier, significantly improve diarrhea symptoms and visceral hypersensitivity [29]. Rhodiola in the formula can significantly improve lung function, improve hypoxia tolerance and partial pressure of blood oxygen, significantly improve lung tissue hypoxia-induced pathological damage. It can improve chronic hypoxic lung injury, alleviate pulmonary edema, and inhibit inflammatory reaction of lung tissue by inhibiting oxidative stress and apoptosis, and improve immune function. Studies showed that rhubarb could inhibit SARS-CoV-2, inhibit the over-expression of inflammatory factors in lung tissue, alleviate lung injury, and enhance anti-oxidation ability, to protect the function of pulmonary micro-vascular barrier, and reduce pulmonary edema.

Combined with the experience of basic and clinical research of Lianhuaqingwen, the results showed that Lianhuaqingwen could significantly inhibit SARS-CoV in cultured cells, in addition to H1N1, H3N2, H7N9 and other influenza viruses. It can shorten the viral nucleic acid positive period in patients with influenza a (H1N1). There was no difference in the remission time of all flu symptoms as compared with that of Oseltamivir phosphate, while the fever was significantly reduced and the symptoms of cough, muscle soreness and fatigue were effectively relieved[45-46]. Therefore, the clinical data of 102 patients with NCP were collected to analyze the effect of Lianhuaqingwen granule combined with routine treatment on fever, fatigue, cough and other major symptoms, as well as the improvement rate of Lung CT in order to provide clinical research basis for integrated Chinese and Western medicine treatment of the disease.

The clinical data of patients treated for 7 days were analyzed retrospectively with reference to the common diagnostic criteria [15] of the National Committee of Health's 2019-ncov for pneumonia. The results showed that Lianhuaqingwen granules could obviously improve the clinical symptoms of fever, fatigue, cough, phlegm, shortness of breath, chest tightness and loss of appetite. The effective rate of improving the

symptoms of fever, fatigue and cough was 86.3%. It also reduced the ratio of converting from common type to severe type effectively. The mean disappearance days of fever, fatigue and cough were 2.9 days, 3.5 days and 3.9 days respectively, which is shorter than the corresponding periods of the control group by 1 day, 1.3 days and 1.3 days. The results showed that Lianhuaqingwen granule could obviously improve the clinical symptoms. Although there was no significant difference in the improvement rate of CT in lung between the two groups, the joint application of Lianhuaqingwen Granules showed a certain positive trend. The preliminary analysis of the above results shows the close relationship of the components selections and combination based on the theory of collateral disease of TCM and the mechanism of pharmacodynamics. In the condition of lacking of effective anti-SARS-CoV-2 drugs, employment of theoretical advantages of the compound Chinese Medicine characteristic, i.e. "overall regulation, multi-target treatment" can alleviate the condition and shorten the course of the disease. It should be metioned that the study collected clinical data from the NCP confirmed patients that have been confirmed through the sputum, throat swab or lower respiratory tract secretion nucleic acid detection in January 2020. Due to the lack of kits and other status, NCP nucleic acid testing only perfromed on some patients after treatment in hospital. Ten (10) patients in the treatment group turned negative and 7 patients in the control group did. Before a solid conclusion can be made, it is necessary to carry out a prospective, randomized controlled clinical study to further evaluate clinical efficacy of the combined use of Chinese Medicine Lianhuaqingwen with conventional treatment.

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