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中医药诊疗新冠肺炎经验专辑(I)

Special Issue: Experience in Diagnosing and Treating
COVID-19 with Traditional Chinese Medicine(I)

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《中医药文化 (英文)》 (*Chinese Medicine and Culture*) Special Issue “The Experience in Treating COVID-19 with Traditional Chinese Medicine”

Call For Papers



Dear experts or scholars:

Chinese Medicine and Culture (ISSN: 2589-9627 CN:31-2178/R9) is a peer-reviewed academic journal dedicated to publishing new and original research and their results both at home and abroad. Since the outbreak of COVID-19, traditional Chinese medicine has played an important role in the process of fighting the epidemic disease in China, and has shown remarkable clinical efficacy. In this process, we have accumulated significant medical experience. With the worldwide spread of COVID-19, traditional Chinese medicine has attracted considerable attention and received positive evaluation from the international community for its excellent performance in fighting COVID-19. Therefore, *Chinese Medicine and Culture* plans to publish a special issue “The Experience in Treating COVID-19 with Traditional Chinese Medicine”, which aims to timely summarize the research results of TCM in treating COVID-19, and provide reliable TCM diagnosis and treatment methods for the whole world. For this purpose, here is the call for papers and the following are the explanations of the requirements.

1. Scope of papers

Potential topics include but are not limited to:

- (1) Study on the key and difficult points of traditional Chinese medicine in treating COVID-19
 - (2) The clinical experience and advantages of traditional Chinese medicine in treating COVID-19
 - (3) Based on the experience in treating COVID-19 in Wuhan, exploring the ancient classical prescriptions of traditional Chinese medicine and study on its mechanism
 - (4) Study on the antiviral pharmacology of traditional Chinese medicine based on ancient traditional Chinese medicine classics
 - (5) Study on the history of TCM in comprehending epidemic diseases and the diagnosis and treatment experience of doctors in past dynasties
 - (6) Study on the academic history of the theoretical construction and development of TCM warm diseases
 - (7) Study on the history of traditional Chinese medicine in treating epidemic diseases from an interdisciplinary perspective
-

2. Requirements for papers

We cordially invite researchers and experts to contribute original research articles as well as reviews on the above topics!

The text of original articles amounts 3000 to 6000 words.

Submissions must include title, abstract (150-200 words), keywords (5-8 keywords), author(s).

3. Submission Website

Manuscripts can be submitted through <https://mc03.manuscriptcentral.com/cmac>

Your contributions will be much appreciated.

Last but not least, you are expected to submit your papers 25th December 2020, I am looking forward to your reply.

Managing editor: Li Haiying

Tel: 86+13764545822 86+021-51322295 (office)

E-mail: editor_lhy@126.com

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Thoughts on Coronavirus Disease 2019 Based on JingFang Medicine (Classical Chinese Formula) Solutions for COVID-19

Huang Huang

International JingFang Institute, Nanjing University of Chinese Medicine, Nanjing, China

Abstract

This article aims to provide some thoughts on the prevention and treatment of Coronavirus Disease 2019 (COVID-19) from the perspective of JingFang Medicine (Classical Chinese Formula). It is believed that the vague theoretical understanding of COVID-19 in Traditional Chinese Medicine does not hinder the precise treatment of the disease by following the rule of “With this Zheng, prescribe this Fang.” According to the principle of “Fang-Zheng Correlation” and the knowledge gained from the thousands of years of experience in treating febrile diseases, Xiao Chai Hu Decoction (小柴胡汤) and its modifications are recommended with the emphasis on individualized treatment. As another form of practicing “Fang-Zheng Correlation,” generalized group treatment should also be paid attention to. Giving considerations to the historical medical data, Jing Fang Bai Du Powder (荆防败毒散) and Shi Shen Decoction (十神汤) are recommended for group prevention treatment. Assisting the Zheng (Upright) Qi and using tonic formulas are two entirely different concepts. According to the principle of “Fang-Zheng Correlation,” tonics abuse should be avoided in the prevention of COVID-19, and the using of Huang Qi (黄芪 *Radix Astragali seu Hedysari*) should also be very carefully done.

Keywords: Classical formula, coronavirus disease 2019 (COVID-19), Fang-Zheng correlation, Huang Qi, Jing Fang Bai Du Powder, *Radix Astragali seu Hedysari*, Xiao Chai Hu Decoction

Jing Fang (经方), or classical Chinese herbal formulas, has been in use for thousands of years. Ancient doctors accumulated a great deal of clinical experience in treating febrile diseases that were similar to Coronavirus Disease 2019 (COVID-19). Written by Professor Huang Huang, Dean of the International JingFang Institute, Nanjing University of Chinese Medicine, the current article, “Thoughts on COVID-19 Based on JingFang Medicine” identifies JingFang solutions for the pandemic according to the principles of Fang-Zheng Correlation (方证相应 the correlation between formula and syndrome), and suggests that for specific treatment methods, we should tonify when it is appropriate to tonify, and attack when it is appropriate to attack.

A VAGUE THEORETICAL UNDERSTANDING DOES NOT HINDER PRECISE TREATMENT

How do we, as JingFang practitioners, understand COVID-19? Terms such as cold, heat, dampness, and dryness represent

theoretical concepts in Traditional Chinese Medicine (TCM), which have been used to explain the nature and status of diseases, and their meanings have been quite vague throughout the long history of TCM. However, the vagueness of these explanations does not hinder the precise prescription of herbs in JingFang Medicine, because the key to JingFang Medicine is the treatment, and its clinical guiding principle is known as Fang-Zheng (formula syndrome)—that is, “With this Zheng, prescribe this Fang.” Fang refers to the formula, and Zheng describes how the disease manifests in the body (i.e., the syndrome or presentation— a collection of symptoms, signs, and presently even the physical and chemical abnormalities that can be found through modern medical examinations). Fang-Zheng is precise, with very little ambiguity.^[1]

Address for correspondence: Prof. Huang Huang,
International JingFang Institute, Nanjing University of Chinese Medicine,
Nanjing, China.
E-mail: hhuang54@163.com

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The pathogens behind many diseases are constantly changing^[2]— influenza viruses and coronaviruses are all results of virus mutation— and ancient Chinese doctors also discovered these characteristics. Therefore, instead of focusing on identifying the ever-changing pathogens, they shifted to focus on the human body, matching the manifestations of disease with specific medicines, thereby establishing a vast number of Fang-Zheng.^[3] This is how ancient doctors dealt with complex diseases; this model of dealing with the disease is known as Fang-Zheng Correlation. By following the principles of Fang-Zheng Correlation, we can precisely grasp the pathological status of many diseases such as COVID-19, and at the same time, we prescribe the formula and herbs that correspond to the Zheng to give the maximum assistance and support to the whole body, which counts the real advantage and specialty of TCM.

ANCIENT FORMULAS CAN TREAT MODERN DISEASES

Although named by modern medicine as such, COVID-19 should be classified as a febrile disease in TCM according to its pathogenesis, as it is epidemic and infectious. Ancient Chinese doctors accumulated rich experience in the treatment of this type of disease. It is feasible to differentiate and treat COVID-19 by following the treatment principles for febrile diseases in TCM, especially if we apply the principles of Fang-Zheng Correlation.

First of all, Xiao Chai Hu Decoction (小柴胡汤) serves as the basic formula. Xiao Chai Hu Decoction (小柴胡汤) is composed of Chai Hu (柴胡 *Radix Bupleuri*), Huang Qin (黄芩 *Radix Scutellariae*), Ban Xia (半夏 *Rhizoma Pinelliae*), Ren Shen (人参 *Radix Ginseng*), Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*), Gan Cao (甘草 *Radix Glycyrrhizae*), and Da Zao (大枣 *Fructus Jujubae*). According to the original text of the *Shang Han Lun* (《伤寒论》 *Treatise on Cold Damage Diseases*), the formula presentation of Xiao Chai Hu Decoction (小柴胡汤) includes: alternating chills and fever, fullness in the chest and hypochondriac area, vexation with or without nausea, possible thirst, possible abdominal pain, possible obstruction and rigidity in the hypochondriac area, possible pulsations in the upper abdomen, possible inhibited urination, possible mild generalized heat, and possible cough. Statistics show that among 1,099 COVID-19 cases confirmed in 552 first-class hospitals in 31 provinces and cities in China, the most common symptoms are fever (87.9%) and cough (67.7%), while diarrhea (3.7%) and vomiting (5.0%) are rare. According to information from the Internet, the fever that some COVID-19 patients exhibit tends to recur continually in waves, which is consistent with the “alternating chills and fever” of Xiao Chai Hu Decoction (小柴胡汤) Zheng; and the chest stuffiness and cough are consistent with the “fullness in the chest and hypochondriac area” and “cough.”^[4] Xiao Chai Hu Decoction (小柴胡汤) and its modifications are especially suitable for COVID-19 patients with symptoms such as low mood and loss of appetite.

Xiao Chai Hu Decoction (小柴胡汤) and its modifications are often used to treat febrile diseases. To name a few modifications: Chai Hu Gui Zhi Gan Jiang Decoction (柴胡桂枝干姜汤) including Chai Hu (柴胡 *Radix Bupleuri*), Gui Zhi (桂枝 *Ramulus Cinnamomi*), Gan Jiang (干姜 *Rhizoma Zingiberis*), Huang Qin (黄芩 *Radix Scutellariae*), Gan Cao (甘草 *Radix Glycyrrhizae*), Mu Li (牡蛎 *Concha Ostreae*), and Gua Lou Gen (瓜蒌仁 *Semen Fructus Trichosanthis*), is used in the treatment of malaria and fever of unknown cause; Chai Hu Gui Zhi Decoction (柴胡桂枝汤), including Chai Hu (柴胡 *Radix Bupleuri*), Huang Qin (黄芩 *Radix Scutellariae*), Ban Xia (半夏 *Rhizoma Pinelliae*), Ren Shen (人参 *Radix Ginseng*), Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*), Gan Cao (甘草 *Radix Glycyrrhizae*), Da Zao (大枣 *Fructus Jujubae*), Gui Zhi (桂枝 *Ramulus Cinnamomi*), and Bai Shao (白芍 *Radix Paeoniae Alba*), is used for febrile diseases and infectious diseases with neuromuscular pain; Da Chai Hu Decoction (大柴胡汤), including Chai Hu (柴胡 *Radix Bupleuri*), Huang Qin (黄芩 *Radix Scutellariae*), Ban Xia (半夏 *Rhizoma Pinelliae*), Zhi Shi (枳实 *Fructus Aurantii Immaturus*), Shao Yao (芍药 *Paeonia lactiflora Pall*), Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*), and Da Zao (大枣 *Fructus Jujubae*), is used for febrile diseases characterized by alternating chills and fever, and sweating that does not bring resolution of the fever; Chai Ling Decoction (柴苓汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Wu Ling Powder (五苓散) including Gui Zhi (桂枝 *Ramulus Cinnamomi*), Fu Ling (茯苓 *Poria*), Zhu Ling (猪苓 *Polyporus*), Bai Zhu (白术 *Rhizoma Atractylodis Macrocephalae*), and Ze Xie (泽泻 *Rhizoma Alismatis*), is used for febrile diseases, dysentery, malaria, measles and smallpox in children, etc.; Chai Po Decoction (柴朴汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Banxia Houpo Decoction (半夏厚朴汤) including Ban Xia (半夏 *Rhizoma Pinelliae*), Hou Po (厚朴 *Cortex Magnoliae Officinalis*), Fu Ling (茯苓 *Poria*), Zi Su Ye (紫苏叶 *Folium Perillae*), and Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*), is used for fever with cough and white sputum; Chai Xian Decoction (柴陷汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Xiao Xian Xiong Decoction (小陷胸汤), including Huang Lian (黄连 *Rhizoma Coptidis*), Ban Xia (半夏 *Rhizoma Pinelliae*), and Gua Lou (瓜蒌 *Fructus Trichosanthis*), is used for fever, cough, chest pain and yellow sputum; Chai Ping Decoction (柴平汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Ping Wei Powder (平胃散), including Cang Zhu (苍术 *Rhizoma Atractylodis*), Hou Po (厚朴 *Cortex Magnoliae Officinalis*), Chen Pi (陈皮 *Pericarpium Citri Reticulatae*), and Gan Cao (甘草 *Radix Glycyrrhizae*), is used for fever with a heavy sensation in the whole body and a thick greasy tongue coating; Chai Hu Si Wu Decoction (柴胡四物汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Si Wu Decoction (四物汤), including Dang Gui (当归 *Radix Angelicae Sinensis*), Chuan Xiong (川芎 *Rhizoma Ligustici Chuanxiong*), Shao Yao (芍药 *Paeonia lactiflora Pall*) and Di Huang (地黄 *Radix Rehmanniae*), is used for irregular menstruation,

cough or chest pain with underlying blood stasis after an onset of fever or prolonged illness; Chai Gui Decoction (柴归汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Danggui Shaoyao Powder (当归芍药散), including Dang Gui (当归 *Radix Angelicae Sinensis*), Shao Yao (芍药 *Paeonia lactiflora* Pall), Chuan Xiong (川芎 *Rhizoma Ligustici Chuanxiong*), Bai Zhu (白术 *Rhizoma Atractylodis Macrocephalae*), Fu Ling (茯苓 *Poria*), and Ze Xie (泽泻 *Rhizoma Alismatis*), is used for scant menstrual flow, skin itchiness, aversion to cold and edema; Chaihu Jiegeng Decoction (柴胡桔梗汤), the combination of Xiao Chai Hu Decoction (小柴胡汤) and Jie Geng (桔梗 *Radix Platycodonis*), is used for cough and sore throat; the combination of Xiao Chai Hu Decoction (小柴胡汤) and Yin Qiao Powder (银翘散) including Jin Yin Hua (金银花 *Flos Lonicerae*), Lian Qiao (连翘 *Fructus Forsythiae*), Jie Geng (桔梗 *Radix Platycodonis*), Gan Cao (甘草 *Radix Glycyrrhizae*), Bo He (薄荷 *Herba Menthae*), Zhu Ye (竹叶 *Folium Phyllostachys nigrae*), Jing Jie (荆芥 *Herba Schizonepetae*), Niu Bang Zi (牛蒡子 *Fructus Arctii*), and Dan Dou Chi (淡豆豉 *Semen Sojae Preparatum*) is used for fever, cough, dry throat, and sweating that does not bring resolution of the fever; Chaihu Jia Mangxiao Decoction (柴胡加芒硝汤), Xiao Chai Hu Decoction (小柴胡汤) plus Mang Xiao (芒硝 *Natrii Sulfas*), is used for fever, nausea and vomiting, constipation and a thick tongue coating; the combination of Xiao Chai Hu Decoction (小柴胡汤) and Bai Hu Decoction (白虎汤) including Zhi Mu (知母 *Rhizoma Anemarrhenae*), Sheng Shi Gao (生石膏 *Gypsum Fibrosum Recens*), Gan Cao (甘草 *Radix Glycyrrhizae*) and japonica rice is used for fever, excessive sweating, and a rapid, slippery pulse.

According to my own experience, a large dose of Chai Hu (柴胡 *Radix Bupleuri*) has a better antipyretic effect; when combined with Gan Cao (甘草 *Radix Glycyrrhizae*), Huang Qin (黄芩 *Radix Scutellariae*) and Lian Qiao (连翘 *Fructus Forsythiae*), it is especially effective for fevers associated with viral diseases. My experiential formula Tui Re Formula (退热方) is composed of Chai Hu (柴胡 *Radix Bupleuri*) 40 g, Huang Qin (黄芩 *Radix Scutellariae*) 15 g, Sheng Gan Cao (生甘草 *Radix Glycyrrhizae Recens*) 10 g, and Lian Qiao (连翘 *Fructus Forsythiae*) 50 g—bring the herbs to a gentle boil with 1,100 ml of water, simmer until 500 ml of fluid is left, divide into 100–150 ml per dose, and take every 2–3 h; use half the dosage for children. Tui Re Formula (退热方) is pungent and cool and can induce sweating to relieve fever; it is suitable for viral colds with persistent fever, unsmooth sweating, and a red face with excessive body heat, possibly with a sore throat, cough or headache. You should stop taking Tui Re Formula (退热方) once the fever is relieved. If there is not enough sweating to reduce the fever after three doses of Tui Re Formula (退热方), the formula should be changed. The Chaihu-based formulas mentioned above can be considered for the treatment of mild, typical, or early-stage cases of COVID-19.

Fang-Zheng can be understood as to how the body's reaction to the disease is reflected in the formula throughout the course

of the disease's development. In other words, although we are discussing Fang-Zheng, we are actually analyzing the state of the disease. Changes in Fang-Zheng reflect the progression and development of the disease in a specific individual. Therefore, it is very important to be familiar with each Fang-Zheng and its relationship to other associated Fang-Zheng. It is even necessary for every doctor to have a Fang-Zheng map in their mind, so they can understand the origin and outcome of the disease and intervene in a timely manner. The following is a Fang-Zheng map of Chaihu-based formulas, with Xiao Chai Hu Decoction (小柴胡汤) as the center, using the concepts of exterior and interior, cold and heat, deficiency, and excess.

Going to the exterior: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Gui Zhi Decoction (桂枝汤) or Cong Chi Decoction (葱豉汤); alternative formulas include Chai Ge Jie Ji Decoction (柴葛解肌汤) and Ge Gen Decoction (葛根汤). Going to the interior: The disease will become complicated with many possible changes; prescribe according to the Zheng, for example, Da Chai Hu Decoction (大柴胡汤), Sheng Ma Bie Jia Decoction (升麻鳖甲汤), Ma Huang Sheng Ma Decoction (麻黄升麻汤), etc., Turning into heat: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Huang Qin Decoction (黄芩汤), Ma Xing Shi Gan Decoction (麻杏石甘汤), Xiao Xian Xiong Decoction (小陷胸汤), Ge Gen Qin Lian Decoction (葛根芩连汤), Huang Lian Jie Du Decoction (黄连解毒汤), Liang Ge Powder (凉膈散), Bai Hu Decoction (白虎汤), Xi Jiao Di Huang Tang (犀角地黄汤), etc., Turning into cold: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Li Zhong Decoction (理中汤), Si Ni Decoction (四逆汤), Zhen Wu Decoction (真武汤), etc.; alternate formulas include Ma Huang Fu Zi Gan Cao Decoction (麻黄附子甘草汤), Ma Huang Fu Zi Xi Xin Decoction (麻黄附子细辛汤), Xiao Qing Long Decoction (小青龙汤), etc., Turning into excess: Add Mang Xiao (芒硝 *Natrii Sulfas*) to Xiao Chai Hu Decoction (小柴胡汤), or combine with Cheng Qi Decoction (承气汤) or Tao He Cheng Qi Decoction (桃核承气汤); alternate formulas include Da Xian Xiong Decoction (大陷胸汤), Fang Feng Tong Sheng Power (防风通圣散), etc., Turning into deficiency: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Gui Zhi Decoction (桂枝汤), Xiao Jian Zhong Decoction (小建中汤), Si Jun Zi Decoction (四君子汤), Dang Gui Shao Yao Power (当归芍药散), etc.; alternate formulas include Zhi Gan Cao Decoction (炙甘草汤), Bu Zhong Yi Qi Decoction (补中益气汤), Zhu Ye Shi Gao Decoction (竹叶石膏汤), San Jia Fu Mai Decoction (三甲复脉汤), Shu Yu Pill (薯蓣丸), etc., Combining with wind: Add Jing Jie (荆芥 *Herba Schizonepetae*), Fang Feng (防风 *Radix Saposchnikoviae*), Ju Hua (菊花 *Flos Chrysanthemi*), Qiang Huo (羌活 *Rhizoma et Radix Notopterygii*), Du Huo (独活 *Radix Angelicae Pubescentis*), etc., to Xiao Chai Hu Decoction (小柴胡汤); alternate formulas include Jing Fang Bai Du Powder (荆防败毒散), Ren Shen Bai Du Power (人参败毒散), etc., Combining with dampness: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Wu Ling Power (五苓散), Ma Xing Yi Gan Decoction (麻杏苡甘汤), San Ren

Decoction (三神汤), Huo Po Xia Ling Decoction (霍朴夏凉汤), etc., Combining with dryness: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Xuan Mai Gan Jie Decoction (玄麦甘桔汤), San Xian Decoction (三仙汤), etc., Combining with phlegm: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Ban Xia Hou Po Decoction (半夏厚朴汤) or Wen Dan Decoction (温胆汤); alternative formulas include She Gan Ma Huang Decoction (射干麻黄汤). Combining with blood stasis: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Si Wu Decoction (四物汤) or Gui Zhi Fu Ling Pill (桂枝茯苓丸); alternate formulas include Xue Fu Zhu Yu Decoction (血府逐瘀汤), Bie Jia Jian Pill (鳖甲煎丸), etc., Combining with Qi stagnation or depression: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Si Ni Powder (四逆散); alternate formulas include Chai Hu Jia Long Gu Mu Li Decoction (柴胡加龙骨牡蛎汤). Combining with upward-rushing counterflow: Xiao Chai Hu Decoction (小柴胡汤) can be combined with Gui Zhi Gan Cao Long Gu Mu Li Decoction (桂枝甘草龙骨牡蛎汤), Ben Tun Decoction (奔豚汤), etc., [Figure 1].

Second, individualized treatment is very important. Because of differences in the constitution and the different body parts affected by the disease, many patients may not exhibit the Fang-Zheng of Xiao Chai Hu Decoction (小柴胡汤) or its

associated formulas. Then in these cases, we should prescribe according to the specific Zheng. The organs that have been affected the most in COVID-19 patients are the lungs. Most patients have cough, chest stuffiness and dyspnea, and patients in severe cases may even have Acute Respiratory Distress Syndrome and so on. JingFang that relieves cough and wheezing may be considered, such as Ma Huang Decoction (麻黄汤), Ma Xing Shi Gan Decoction (麻杏石甘汤), She Gan Ma Huang Decoction (射干麻黄汤), Xiao Qing Long Decoction (小青龙汤) and Ze Qi Decoction (泽漆汤). Ban Xia Hou Po Decoction (半夏厚朴汤), Fu Ling Xing Ren Gan Cao Decoction (茯苓杏仁甘草汤), San Ren Decoction (三仁汤), Xuan Bi Decoction (宣痹汤), etc., can help to transform phlegm and regulate Qi. For patients with diarrhea and other gastrointestinal symptoms, Ge Gen Qin Lian Decoction (葛根芩连汤), Gan Cao Xie Xin Decoction (甘草泻心汤), Huang Qin Decoction (黄芩汤), Wu Ling Powder (五苓散), etc., can stop diarrhea and harmonize the spleen and stomach. For patients with severe fatigue, prescribe Ma Huang Fu Zi Xi Xin Decoction (麻黄附子细辛汤), Fu Zi Li Zhong Decoction (附子理中汤), Zhen Wu Decoction (真武汤), etc., to warm the meridians and dispel cold. For patients with kidney damage and proteinuria, consider Huang Qin Decoction (黄芩汤), Huang Lian Jie Du Decoction (黄连解毒汤), Chai Ling Decoction (柴苓汤), etc., Since many patients with mild cases will also experience extreme fear, anxiety, and depression, consider intervening with Wen Dan Decoction (温胆汤), Chai Hu Gui Zhi Gan Jiang Decoction (柴胡桂枝干姜汤), Chai Hu Jia Long Gu Mu Li Decoction (柴胡加龙骨牡蛎汤), Ban Xia Hou Po Decoction (半夏厚朴汤), Ban Xia Xie Xin Decoction (半夏泻心汤), etc., In a nutshell, we must follow the principle “With this Zheng, prescribe this Fang” to choose the appropriate formula.

INDIVIDUALIZED PRESCRIPTIONS VERSUS GENERALIZED PRESCRIPTIONS

While we emphasize the importance of precise treatment with individualized prescriptions, we do not reject the use of generalized prescriptions for group treatment. If the disease characteristics are identical among all patients, using a generalized prescription for groups is also in accordance with Fang-Zheng Correlation.^[5] In Chinese history, there are numerous examples of using generalized prescriptions during epidemics, taking a few well-known formulas used in group treatments as examples: Fang Feng Tong Sheng Power (防风通圣散), Jing Fang Bai Du Powder (荆防败毒散), Gan Lu Xiao Du Pill (甘露消毒丹), Shi Shen Decoction (十神汤), Feng Yin Decoction (风引汤), and Ren Shen Bai Du Powder (人参败毒散).^[6,7] The National Health Commission of the People's Republic of China together with the National Administration of TCM recommended “Qing Fei Pai Du Decoction (清肺排毒汤)” for the treatment of COVID-19. Qing Fei Pai Du Decoction (清肺排毒汤) consists of a combination of Xiao Chai Hu Decoction (小柴胡汤), Ma Xing Shi Gan Decoction (麻杏石甘汤), Wu Ling Powder (五

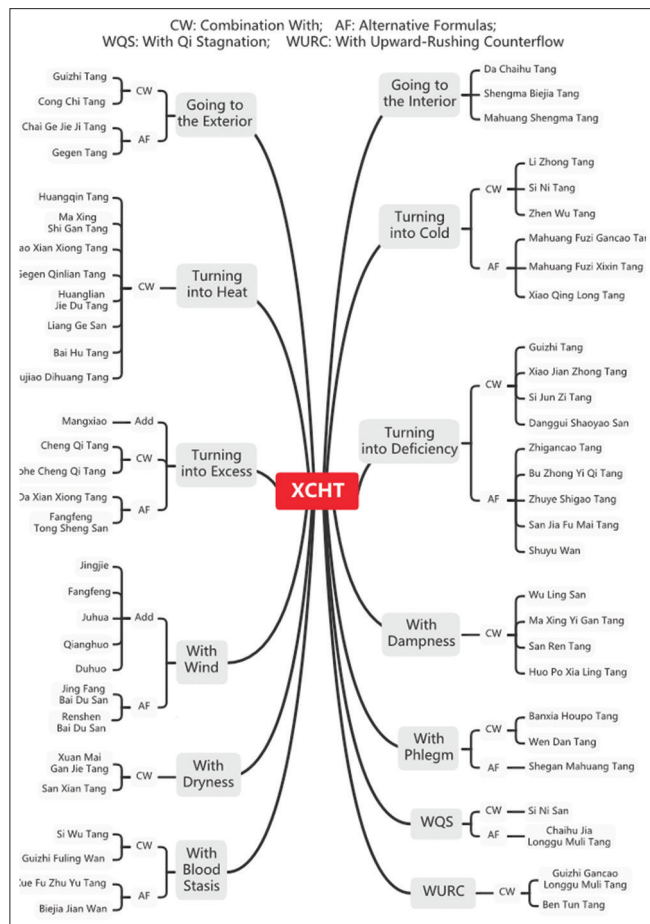


Figure 1: Tracking Map of XCHT Fang-Zheng

苓散), She Gan Ma Huang Decoction (射干麻黄汤) and Ju Zhi Jiang Decoction (橘枳姜汤), all of which are JingFang that have been used for thousands of years and whose use has been verified both by classical texts and by the clinical experience of past physicians. At present, there is a great need for formulas like this. Of course, one formula is not enough; using formulas for group treatment, we still need to follow the principle “With this Zheng, prescribe this Fang” in dealing with more complex cases.

Currently, the international situation regarding the COVID-19 pandemic appears grim, with the number of newly confirmed cases increasing daily; one of our most urgent tasks is to find suitable formulas for group treatment. According to the ancient writings and my own clinical experience, and giving consideration to recently reported COVID-19 cases, I recommend two formulas for group prevention treatment: Jing Fang Bai Du Powder (荆防败毒散) and Shi Shen Decoction (十神散).

Jing Fang Bai Du Powder (荆防败毒散) including Jing Jie (荆芥 *Herba Schizonepetae*), Fang Feng (防风 *Radix Saposhnikoviae*), Qiang Huo (羌活 *Rhizoma et Radix Notopterygii*), Du Huo (独活 *Radix Angelicae Pubescentis*), Chai Hu (柴胡 *Radix Bupleuri*), Qian Hu (前胡 *Radix Peucedani*), Jie Geng (桔梗 *Radix Platycodonis*), Zhi Ke (枳壳 *Fructus Aurantii*), Fu Ling (茯苓 *Poria*), Gan Cao (甘草 *Radix Glycyrrhizae*), Chuan Xiong (川芎 *Rhizoma Ligustici Chuanxiong*) treats epidemic diseases with headache, aversion to cold, fever, nasal congestion, cough, red eyes, mouth ulcers, itching skin diseases, etc.. The famous doctor Zhang Gongrang has commented that Jing Fang Bai Du San is a very effective antipyretic formula—better than Chai Hu Gui Zhi Decoction (柴胡桂枝汤) for treating epidemic febrile disease—and that it is also very effective in treating dermatitis, acne, etc.

Shi Shen Decoction (十神汤) includes Ge Gen (葛根 *Radix Puerariae*), Sheng Ma (升麻 *Rhizoma Cimicifugae*), Chen Pi (陈皮 *Pericarpium Citri Reticulatae*), Gan Cao (甘草 *Radix Glycyrrhizae*), Chuan Xiong (川芎 *Rhizoma Ligustici Chuanxiong*), Zi Su Ye (紫苏叶 *Folium Perillae*), Bai Zhi (白芷 *Radix Angelicae Dahuricae*), Ma Huang (麻黄 *Herba Ephedrae*), Chi Shao (赤芍 *Radix Paeoniae Rubra*), Xiang Fu (香附 *Rhizoma Cyperi*), Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*), and the white part of green onions. Then, mix and grind all the herbs except Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*) into powder, and cook 10 g of the powder with five slices of Sheng Jiang (生姜 *Rhizoma Zingiberis Recens*) for each dose to treat all types of epidemic disease and this can prevent disease changes and progression.

Jing Fang Bai Du Powder (荆防败毒散) emphasizes clearing heat and dispersing wind, while Shi Shen Decoction (十神汤) emphasizes dispersing cold and eliminating dampness. If these two formulas could be processed into powders or herbal tea bags and distributed to households in areas with outbreaks, it would facilitate the observation and verification of results, not to mention that this format would also be low in cost, and easy to prepare and administer.

TONIFY WHEN IT IS APPROPRIATE TO TONIFY, AND ATTACK WHEN IT IS APPROPRIATE TO ATTACK

In terms of preventing COVID-19 as well as assisting patients in the recovery phase, and based on the statement in the *Huang Di Nei Jing* (《黄帝内经》 *Huangdi's Internal Classic*) that “wherever pathogenic factors gather, the Qi must be deficient,” some doctors advocate using tonic herbs and formulas such as Yu Ping Feng Powder (玉屏风散), Sheng Mai Powder (生脉散) and so on. This might work for some patients, but not for all. Assisting the Zheng (Upright) Qi and using tonic formulas are two entirely different concepts. Dr. Xia Yijun commented: “When pathogenic factors gather in a place of deficiency, the disease must be excessive,” and emphasized that tonic herbs should not be used indiscriminately. Once the disease is contracted, the keys are to remove the etiology and to eliminate the pathological state, which means that we still need to follow the principle “With this Zheng, prescribe this Fang.”^[8]

What makes the formulas of the *Treatise on Cold Damage Diseases* effective? The essence lies not in tonification, but in regulation. Regulation means to adjust and regulate the body according to the Zheng and the development of the disease. For example, the *Treatise on Cold Damage Diseases* advocates “urgent purgation” in six places, three of which are in the Yangming chapter and the other three are in the Shaoyin chapter. When there is “heat knotting in Yangming,” it is easy to understand the use of Da Cheng Qi Decoction (大承气汤) to drain downward; but what about when there is Shaoyin syndrome with depleted Yin fluids, and dryness in the mouth and throat? The patient in this situation exhibits Da Cheng Qi Decoction (大承气汤) Fang-Zheng: “abdominal distention and lack of bowel movements,” “abdominal fullness and pain,” etc.. The purpose of using Da Cheng Qi Decoction (大承气汤) in Shaoyin syndrome is to purge in order to preserve the Yin. Thus, we can see the importance of the principle “With this Zheng, prescribe this Fang” in the *Treatise on Cold Damage Diseases*.

Huang Qi (黄芪 *Radix Astragali seu Hedysari*) is an important Qi tonic, widely used in ancient times for treating XueBi (Blood Impediment) syndrome, excessive sweating, edema, sores, etc.. Astragalus Polysaccharides can enhance immune function, promote the proliferation of lymphocytes and promote the secretion of interferon-gamma. However, based on TCM clinical experience, Huangqi formulas are rarely used in febrile diseases. There are no Huang Qi (黄芪 *Radix Astragali seu Hedysari*) formulas recorded in the *Treatise on Cold Damage Diseases*—all of Zhang Zhongjing’s Huangqi formulas are recorded in the *Jin Gui Yao Lue* (《金匮要略》 *Synopsis of Prescriptions of the Golden Chamber*). Therefore, it is not appropriate to use Huang Qi (黄芪 *Radix Astragali seu Hedysari*) for COVID-19 patients, especially in cases presenting fever, cough, and asthma. Misuse of Huang Qi (黄芪 *Radix Astragali seu Hedysari*) may aggravate the condition, especially in symptoms such as chest stuffiness and abdominal

distention. As for Yu Ping Feng Powder (玉屏风散), which could be used for prevention, we must be cautious— it should not be used too much except in people with thick adipose tissue, loose flesh and a Qi-deficient constitution. When taken by individuals who are muscular and lean, Huang Qi (黄芪 *Radix Astragali seu Hedysari*) can cause fullness in the chest.

In summary, although we still don't have a thorough understanding of COVID-19, the manifestation of the pathogen in the body is consistent with febrile diseases, which are described in the *Treatise on Cold Damage Diseases* and *Synopsis of Prescriptions of the Golden Chamber*. At this critical point in time, rereading classical texts such as the *Treatise on Cold Damage Diseases*, *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*) and *Wen Re Jing Wei* (《温热经纬》 *Warp and Weft of Warm Heat Disease*) can provide us with ideas and inspiration. JingFang is a treasure that has been passed down to us for thousands of years. Fang-Zheng Correlation is the main principle for using JingFang, as well as an original mode of thinking created by the Chinese, which must be preserved and refined, especially when facing complex and constantly changing diseases such as COVID-19. TCM practitioners are encouraged to make the most of our strengths to contribute to the treatment of COVID-19.

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Conflicts of interest

There are no conflicts of interest.

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Epidemic Diseases and Chinese Medicine: Example of SARS and COVID-19: Part Two

Jean-Claude Dubois

Georges Pompidou European Hospital Anti-Pain Center, Faculty of Medicine, Paris V René Descartes University, Paris, France

Abstract

Along with the legends about epidemic demons, China has developed over the centuries a medical approach to epidemic diseases based on the teachings of *Huang Di Nei Jing* (《黄帝内经》 *Huangdi's Internal Classic*), *Nan Jing* (《难经》 *Classic of Difficult Issues*), and *Shang Han Lun* (《伤寒论》 *Treatise on Cold Damage*). Other doctors and scientists participated in this evolution of knowledge, like Wang Shuhe (王叔和), Ge Hong (葛洪), Chao Yuanfang (巢元方), Sun Simiao (孙思邈), and Liu Wansu (刘完素). However, it was in the 17th century, after the great break of the Song, Jin, and Yuan eras that an innovative spirit, Wu Youke (吴又可 1582–1652) first foresaw the existence of microorganisms as we know them now. His *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*) foreshadows an original approach to epidemic diseases, particularly emerging infectious diseases of the 21st century. After them, traditional Chinese medicine developed a comprehensive method of diagnosing and treating of these diseases (Epidemic Diseases Theory 瘟疫学说) within the School of Heat Diseases (温病学派). In a third article, we will examine some applications in the treatment of the SARS 2003–2004 epidemic (非典型肺炎) and the current COVID-19 (新型冠状病毒肺炎) pandemic.

Keywords: Chinese medical history, epidemic diseases theory, SARS, COVID-19, *Sun Zi Bing Fa* (《孙子兵法》 *Art of War*), *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*), Wu Youke (吴又可)

THE MEDICAL APPROACH IN *HUANG DI NEI JING* (《黄帝内经》 *HUANGDI'S INTERNAL CLASSIC*) AND *SUN ZI BING FA* (《孙子兵法》 *ART OF WAR*)

In parallel to the legends about epidemic demons, a medical approach was developed, based on observation and analysis. *Huang Di Nei Jing* (《黄帝内经》 *Huangdi's Internal Classic*) was its foundation. This fundamental work is composed of texts written between the 4th century B.C. and the 3rd century A.D., with possible additions up to the 4th century.

It includes two parts: *Su Wen* (《素问》 *Basic Questions*) compiled in the Tang dynasty with the comments of Wang Bing (王冰) and *Ling Shu* (《灵枢》 *Miraculous Pivot*) compiled in the Song dynasty (Note 1). There are also the two so-called “lost” chapters of the *Basic Questions* because they are not in the Wang Bing edition and are believed to have been “found”

in the Song Dynasty. They are very important for the analysis and understanding of Epidemic Febrile Diseases (Note 2): the chapter 72 “Discussion on Acupuncture Methods” of *Basic Questions* and the chapter 73 “Discussion on the Diseases Caused by Abnormal Changes of Qi-Motion” of *Basic Questions*.^[1] These two chapters are therefore perhaps apocryphal. The problem of their authenticity is not resolved. They are particularly valuable for a global approach to the cosmological and climatic circumstances which govern the outbreak of epidemic diseases (运气学说) (Note 3).

Chapter 72 offers a division by five of the epidemic diseases – “the five miasmas (五疫)” – named with reference to the five substances of the ancient tradition: metal, wood, water, fire, and earth. This distribution seems to have had its

Address for correspondence: Dr. Jean-Claude Dubois,
Georges Pompidou European Hospital Anti-Pain Center, Faculty of Medicine,
Paris V René Descartes University, Paris, France.
E-mail: jclaudedubois3@gmail.com

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limits – unless certain keys to understanding were lost – and was not further developed. However, the main lesson of this text evokes the means of avoiding contagion:

“I’ve heard (Yellow Emperor) that five kinds of pestilence can be all spread among people from adults to children with the similar manifestations; if the therapies are not applied, how to prevent the infection?”

Qibo said: “if one isn’t infected, there would be healthy Qi inside the body so that the evil Qi cannot invade; in addition one should avoid the toxic Qi, which could be inhaled and exhaled through the nose; if the healthy Qi flows out of the brain continuously, the evil Qi cannot invade.”^[1,2]

The so-called healthy Qi originating from the brain is just to concentrate the mind in the room and imagine that heart is as bright as the sun.^[1,2]

余闻五疫之至，皆相染易，无问大小，病状相似，不施救疗，如何可得不相移易者？

岐伯曰：不相染者，正气存内，邪气可干，避其毒气，天牝从来，复得往，气出于脑，即不邪干。气出于脑，即室先想心如日。

At the end of the sentence, there is a clear reference to visualization techniques known to doctors to prevent contamination when visiting a patient:

“After finishing the visualization of five-Qi of protecting the body, one should also imagine that there is shining Big Dipper over the head and then could enter the pestilence room” [Figure 1].

五气护身之毕，以想头上如北斗之煌煌，然后可入于疫室。

This process will be underlined in the commentaries of Zhu Bing Yuan Hou Lun (《诸病源候论》 Treatise on the Pathogenesis and Manifestations of Various Diseases) (巢元方 Chao Yuanfang AD 610), a treatise which needs discussion again:

“If you want to ward off all evils Qi and a hundred ghosts, you always keep your heart blazing like the Big Dipper, with sparkling clarity, then the hundred evils Qi dare not intervene and you can enter the epidemic.”^[3]

欲辟却众邪百鬼，常存心为炎如斗，煌煌光明，则百邪不敢干之，可以入瘟疫之中。

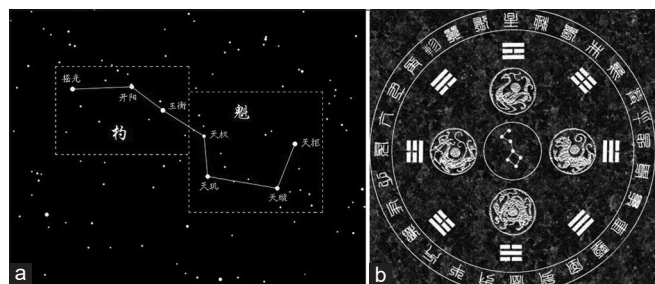


Figure 1: (a and b) The Big Dipper in ancient Chinese astronomy

The text of the chapter 72 of *Basic Questions* then sets out couplings of acupuncture points capable to treat patients with weak constitution or aged according to the nature of the disturbances of the “celestial circumductions”. These are complex practices that would need to be reassessed of the present time. We will come back to this in the third part of this article.

Anyway, faced with the risk of an epidemic in particular, prevention is better than cure, just as is explained in the second chapter of the same book:

“A sage would always pay less attention to treating the developed disease but emphasize treating predisease and pay less attention to treating the developed disorder but emphasize treating predisorder, which is the information concerned.

After the disease has been developed, it is given medication, or after the disorder has been formed, it is given treatment, which is just like digging a well when one feels thirsty, or making weapons when a war is breaking out; isn’t it too late !”^[4]

是故圣人不治已病，治未病，不治已乱，治未乱，此之谓也。

夫病已成而后药之，乱已成而后治之，譬犹渴而穿井，斗而铸锥，不亦晚乎！

This wise precept still commands the approach of traditional Chinese doctors at war against COVID-19 to detect, diagnose, and treat it. Medicinal plants and drugs have definite advantages in terms of prevention and early treatment.^[5] For people in direct contact with the virus, taking Chinese patent medicine reduces the risk or prevents getting sick. Because as the *Huangdi’s Internal Classic* teaches:

Where evils attack, there would be deficiency.^[1]

“邪之所凑，其气必虚”。

It would certainly be the same with several European medicinal plants, sometimes of modest appearance, which were still well known and used in the 19th century against intermittent fevers or during epidemics.^[6]

Doesn’t traditional Chinese medical art share the same principles as those of the *Art of War*, theorized by Sun Zi? It was the opinion of Xu Dachun (徐大椿 1693–1771) who declared:

“The Thirteen Articles of Sun Zi fully reflect the healing processes” [Figure 2] (Note 4)

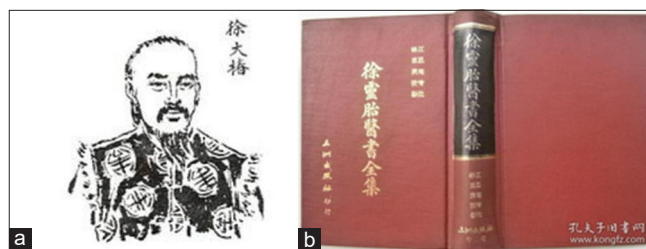


Figure 2: (a and b) Xu Dachun (徐大椿 1693-1771)

孙武子十三篇 治病之法尽之矣

Chapters 31, 32, 33, and 34 (which make up Book 9 of the *Basic Questions*) are all devoted to the different types of heat diseases, their particular forms, and the acupunctural methods, which are applicable to them (Note 5).

Chapter 31 begins as follows as a strange *résonnance* of what has been observed during the current COVID-19 epidemic:

“Nowadays febrile diseases are categorized as cold damage, some of which are cured and some cause death; the dead cases have the course no more than six to seven days while the survival cases, more than ten days, and why?”^[1]

今夫热病者，皆伤寒之类也，或愈或死，其死皆以六七日之间，其愈皆以十日以上者，何也？

It is the primary definition of acute febrile pathologies, a fortiori contagious, in antiquity. All acute or epidemic febrile illnesses are then considered from the angle of cold attacks. However, this notion of “cold” is very broad in scope because it encompasses the following five forms: attack by the wind, attack by the cold itself (that is to say in a strict sense), lukewarm humidity, heat illnesses, and lukewarmness. This is why *Nan Jing* (《难经》 *Classic of Difficult Issues*), legendarily attributed to Bian Que – a doctor of the Warring States era (475 BC to 221 BC) – in fact from the 1st century AD, will come back to it in particular (Difficulty 58):

(The disease of) Attack by Cold takes 5 forms: morbid wind, harmful cold, damp warmth, heat sickness, lukewarm sickness^[7]

寒有五：有中风、有伤寒、有湿温、有热病、有温病。

Only the last three of these pathologies would later be recognized as “diseases of exogenous heat,” which include epidemic diseases. This apparent contradiction with cold etiology will be explained by the theory of quiescent perverse energies (伏邪) which manifest themselves in another season than that of the initial attack. This theory was developed in the 19th century and applied in our time to epidemic outbreaks like that of SARS and COVID-19, which we will be discussed later.

There is the same theme in chapter 61 of *Basic Questions* and chapters 21, 23, and 70 of *Miraculous Pivot* where lukewarm or hot diseases are often epidemic diseases. However, chapters 4, 53, 72, and 73 of *Basic Questions* attribute several to the pathogenic cold. Hence, the distinctions remain relatively vague at this time. And, remember to avoid any confusion that Shanghan (伤寒) in ancient medical language is not typhoid fever nor typhus at all, which is only its contemporary name. Thus, Shang Han Gan Jun (伤寒杆菌) is the name of the typhoid bacillus, bacillus of Eberth, which was obviously unknown to the ancients.

POSTERITY OF HUANGDI'S INTERNAL CLASSIC UNTIL THE BEGINNING OF THE 20TH CENTURY MAIN SCIENTISTS, DOCTORS, AND RESEARCHERS

Wang Chong (王充)

The era of the Eastern Han (AD 25–220) experienced many epidemic episodes. Scholar Wang Chong noted in his critical essay:

“Hot epidemic diseases cause the destruction of a thousand homes” (Note 6)

温气疫病，千户灭门。

Zhang Zhongjing (张仲景 AD 150–219)

The repetition of these epidemics determined the vocation of Zhang Zhongjing – one of the most famous doctors that China has known, often nicknamed the Chinese Hippocrates. Living in the 1st and 2nd centuries of our era, he had to give credence to the concept of the attack of cold in a book of extraordinary subtlety that every Chinese doctor must have studied: *Shang Han Za Bing Lun* (《伤寒杂病论》 *Treatise on Cold Damage and Miscellaneous Diseases*) (Note 7). His influence was such that there have been no less than 400 books whose title refers to attacks by cold.

In his preface, Zhang Zhongjing states that he started studying medicine after losing two-thirds of his family in a few years, including seven out of ten killed by cold:

“My clan had always been numerous, with more than two hundred members, but from the period of Jiàn Ān's reign (AD 196–220) and in less than ten years two-thirds of them disappeared among whom seven out of ten death caused by Cold. I was saddened by so many deaths that I had been unable to prevent. This is why I applied myself to the study of the teachings left by the elders, I collected a large number of antidotes.

I wrote the Shànghán Zābìnglùn in 16 rolls. Although I cannot cure all illnesses, good observation helps to understand the causes. Using my book we will already find more than half of the solutions.”

However, it is necessary to defy routine and use reasoning:

“There were great masters of medicine in ancient times. (Unfortunately) doctors these days do not pay attention to the true meaning of the Classics and therefore cannot profit from them as they should. Everyone keeps his own family techniques and treatments, always the same. We speak to the patient and give him a prescription, neglecting to examine his pulse.” [Figure 3].

Zhang Zhongjing therefore highlights the “cold effects (伤寒 Shang Han)” of a vast synthesis built on classical data, medical knowledge from previous centuries, procedures and treatments in vogue in his time, and knowledge from his own experience. This unique book is also the oldest Chinese treatise on the therapy of febrile illnesses. Note, however, that the

concept of attacks by cold is more complex than it seems, hence the difficulty in translating or paraphrasing it into Western languages, such as “Body injured by great cold,” “Progressive diseases of the 3 Yin and 3 Yang,” “Treatise on harmful cold,” and “Treaty of Cold Snaps” (Note 8).

Inspired by chapter 31 of *Basic Questions*, the method of Zhang Zhongjing describes the establishment and the progression of the diseases according to six levels, corresponding to the Six Great Meridians, and recommends remedies appropriate to each stage and each evolution toward death [Figure 4]. His prescriptions meet very specific observation and decision-making criteria.

One of the best known is the decoction based on Ma Huang Decoction (麻黄汤) which is set out in several ways depending on the situations encountered, by adding or subtracting one or more of its components. Combining Ma Huang (麻黄 *Herba Ephedrae*) (3–9 g), a sudorific, diuretic, and anti-dyspneic plant with Gui Zhi (桂枝 *Ramulus Cinnamomi*) (3–9 g), Xing Ren (杏仁 *Semen Armeniacae Amarum*) (3–9 g), and honey-fried Gan Cao (甘草 *Radix Glycyrrhizae*) (3–6 g), offers an astonishing series of synergies, making it possible to treat acute bronchitis, bronchial asthma, frank lobar pneumonia or rheumatic arthritis, as soon as the signs of “external fullness due to cold wind (外感风寒表实证)” are met: headache, low back pain, arthralgia, fear of the cold but absence of sweating, moderate fever, dyspnea, floating and tight pulse, and the tongue thin and pale with a whitish coating.

But it is contraindicated in attacks of the wind-heat type and for subjects of weak constitution with sweating. In addition, this syndrome is actually quite different from that seen in SARS-CoV-2, as we will see in Part 3 of this study.

Wang Shu He (王叔和 AD 210–285)

Succeeding Zhang Zhongjing, Wang Shu He (AD 210–285) who had reorganized the *Treatise on Cold Damage and Miscellaneous Diseases* was also the author of the famous *Mai Jing* (《脉经》 *Pulse Classic*), the influence of which went far beyond China [Figure 5].

However, Wang Shu He also paid close attention to the influence of seasonal climatic disturbances that may have caused epidemics. The idea was also in germination in *Huangdi's Internal Classic*. The author noted that in the years when cold prevails in the Spring, when normally the weather should be mild, or when heat prevails in the Autumn, usually a cool season, or when unexpected cold occurs in the Summer, or conversely, when lukewarm Qi replaces the cold of winter: in these years, identical discoveries are observed in adults and children. These seasonal epidemics are due to out-of-season Qi, called “off-season Qi.”

Terms such as Tian Xing (天行), Yi Bing (疫病), and Yi Li (疫痢) created or redefined by Wang Shu He have become classic. They all mean roughly the same thing to describe particular climatic conditions that can cause seasonal



Figure 3: (a and b) Zhang Zhongjing: Preface to the *Treatise on Cold Damage* (reprinted from an old edition)



Figure 4: (a and b) Schematic representation of the Six Great Meridians (*Treatise on Cold Damage*)



Figure 5: (a and b) Wang Shu He (王叔和 AD 210–285)

epidemic diseases. Hence, Wang Shu He is rightly regarded as the founder of the “theory of epidemic factors linked to seasonal Qi (时行之气)”

Great progress was then made in the differential diagnosis and the prevention of the contagious diseases by two famous doctors of whom the first lived at the time of the Eastern Jin (AD 317–420) and the second under the Sui dynasty (AD 581–618): Ge Hong and Chao Yuanfang.

Ge Hong (葛洪 AD 281–341)

Ge Hong perfected the observations of his predecessors on seasonal influences and paid attention to the role of the prevailing winds in a year [Figure 6]. He spotted the years of unusual epidemic miasma, when “pestilence accompanied by toxic genius” raged (戾气兼挟鬼毒), as he called them. As such, he was the instigator of a “toxi-infectious” approach before the letter of epidemic diseases which was taken up and developed many centuries later by the School of Heat Diseases.

“Attacks by Cold, Seasonal Qi, Heat Epidemics are three names to say a kind of disease, with little difference as to their nature. in a year on which there are miasmas accompanied by a toxic genius, we speak of Hot Diseases”

伤寒, 时气瘟疫三名同一病耳, 而源本小异 其年岁中有戾气, 兼挟鬼毒相注, 名为温病。

Ge Hong is, therefore, considered to be the founder of the “miasmatic theory (疠气说).” His observations of great scientific value were accompanied by important discoveries in the field of parasitic and infectious diseases. He recommended the use of *Artemisia annua* against malaria. His *Zhou Hou Bei Ji Fang* (《肘后备急方》Handbook of Prescriptions for Emergencies) was the source of the discovery of artemisinin which won a Nobel Prize for Mrs. Tu Youyou (屠呦呦) in 2015 (Note 9) [Figure 7]. Very recently, the Max-Planck Institute announced that *A. annua* had an antiviral effect against the coronavirus. A clinical study should begin very soon in the USA. The country is still severely affected by COVID-19.

For him, however, as for Wang Shu He, these diseases remained within the very general framework of “Attacks of Cold (伤寒),” as already defined by *Huangdi’s Internal Classic*.

Chao Yuanfang (巢元方 AD 550–630)

Chao Yuanfang [Figure 8], who lived at the time of the Sui dynasty, began to distinguish more clearly the affections caused by cold in the strict sense and the hot contagious diseases:

“In diseases caused by Cold, when contagion can be related to a cold poison, individuals are not contagious. But when the weather of a year is unbalanced, when warmth and freshness are disturbed, individuals are infected by pestilence; contagion is very violent. We must protect ourselves from this by taking medication and other prophylactic measures.”

伤寒之病, 但人有自触冒寒毒之气生病者, 此则不染着他人。若因岁时不和, 温凉失节, 人感乖戾之气而发病者, 此则多相染易。故须预服药, 乃为方法以防之。(Note 10)

This passage is revealing. Unknown expressions such as *Guai Li Zhi Qi* (乖戾之气) which carry the idea of a transgression of the natural order and *Duo Xiang Ran Yi* (多相染易) which draws attention to very contagious factors, suggest the emergence of new conceptions concerning the etiology of epidemic diseases.



Figure 6: (a and b) Ge Hong (葛洪 AD 281–341): Learned alchemist and doctor



Figure 7: Discovery of artemisinin through reading a page of Ge Hong by Ms. Tu Youyou



Figure 8: (a and b) Chao Yuanfang (巢元方 AD 550–630)

In the context of a comparative study of the medical currents of the East and West, one might not fail to notice a relationship between these Chinese observations and those reported in the first and third books of the *Epidemics* of Hippocrates; the same intuition is expressed and the same concern to unravel the mystery of the links exists between the “constitution of the atmosphere of a year” and the occurrence of epidemic diseases [Figure 9].^[8]

Today, despite all the advances in medical science, these ideas are still very topical. The seasonality of infectious diseases remains a mysterious problem, much debated by contemporary doctors and researchers. Professor Didier Raoult, director of the Mediterranean Hospital Institute for Infectious Diseases in Marseille (France), mentioned this problem

several times during his audio-visual presentations. His prophylactic method, which combines hydroxychloroquine and azithromycin, appears to have been particularly effective in blocking the progression to the severity stages of COVID-19.

Prof. D. Raoult spontaneously applied the first principle of Chinese medicine, which is to treat disease before it appears (治未病), which also means vigorous preventive action upon the detection of disease or the onset of its first symptoms (未病先防) and thus prevent its progression (已病防变). His method is, therefore, very much in line with that of a Chao Yuan Fang. His defense of clinical medicine was expressed in the following formula: “the doctor can and must think like a doctor, not like a methodologist.”^[9]

Zhang Zhongjing, Wang Shuhe, Ge Hong, and Chao Yuanfang are essential links in the history of Chinese medicine in search for the causes and mechanisms of epidemic. Their treatments were renowned and inspired doctors practicing in the following centuries.

Sun Simiao (孙思邈 AD 581–682) Wang Tao (王焘 about AD 670–755)

Under the Tang (AD 618–907), two other doctors marked the evolution of medicine in the face of epidemic febrile illnesses: Sun Simiao (Note 11) and Wang Tao.^[10] Their recommendations and prescriptions are always cited and commented on in specialized books and reviews. They too forged terminology that has passed into the technical language of traditional Chinese medicine.

However, a real break was to occur under the Southern Song and Jin dynasties (AD 1127–1279).

Pang Anshi (庞安时 11th century), Guo Yong (郭雍)

Obligated to have a better understanding of the nature of epidemic diseases, authors like Pang Anshi (AD 1043–1100) (Note 12) and Guo Yong (approx. AD 1106–1187) discussed the theses advanced in antiquity by Wang Shuhe, Ge Hong, and Chao Yuanfang by completing them or even allowing the addition of new pathologies to *Treatise on Cold Damage* accompanied by treatments adapted to each seasonal variation (Note 13). This made them, in a certain way, the precursors of modern chronobiology.

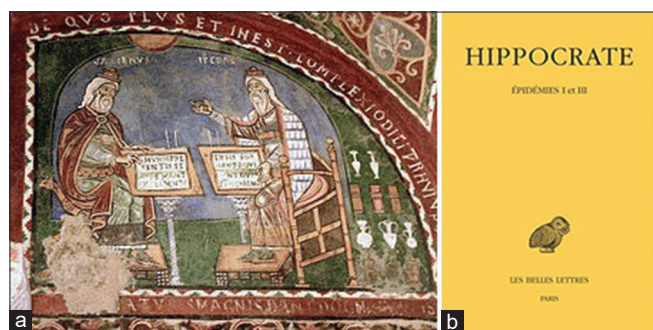


Figure 9: (a and b) Mural depicting Galen and Hippocrates 12th century Anagni, Italy

Liu Wansu (刘完素 about AD 1120–1200)

With Liu Wansu, alias Liu Hejian (刘河间), the break was more radical. Also faced with the epidemics which occurred during his lifetime, probably different in their symptoms of those known in antiquity, Liu Wansu who was to become one of the four leaders in medicine of the Jin Yuan era (金元四大家) came to systematically relate the etiopathogeny of febrile epidemic diseases to a fire-heat contagion. For him, none of the usual exogenous factors, that is to say, none of the six atmospheric agents (六气) could become a cause of an epidemic without having previously undergone a transformation so that only “cold” remedies could remedy it [Figure 10]:

“The six pathogenic energies can be involved as soon as they turn into fire”

六气皆能化火

He thus came to design new treatments and gave birth to the School known as “Cold and Fresh (寒凉派).”

Liu Wansu had many disciples. His doctrine is very subtle. One of these disciples, Wang An Dao, probably too enthusiastic, advised to:

“Let go of Attacks caused by Cold and think only of Heat illnesses!”

脱却伤寒, 辨证温病

The toxi-infectious epidemic theory

Finally, the toxi-infectious epidemic theory (毒邪致疫说) initiated by Ge Hong in ancient times came back in favor. *Miraculous Pivot*, it was true, had paved the way in its chapter 70 where descriptions of fistulars (鼠瘻) bring to mind those of tuberculous lymphadenitis. Toxic agents (毒气) of a cold or hot nature are said to spread and become embedded in the lymph nodes of the lymphatic vessels.^[11] This is the Chinese version of our famous “scavengers,” of which the Kings of France were healed.

The character 毒 (Du): “poison,” “venom,” and “toxins,” would require a long analysis which does not belong here. It crosses the entire field of Chinese medicine and pharmacopoeia, conveying an idea of density, massive, and dominant encompasses of substances particularly harmful to humans: discomfort, disgust, and nausea being the first in such manifestations. It should be examined in the context of a comparative study, for example



Figure 10: (a and b) Liu Wansu. Founder of the School “Cold and Fresh (寒凉派)”

with some ideas from Renaissance doctors like Paracelsus (AD 1493–1541) concerning “viruses.”^[12] In addition, a more precise examination of toxic and reputed “inferior” drugs (下药) of the Chinese pharmacopoeia would be necessary because they are suitable for certain aggressive diseases. “Fighting the poison with poison (以毒攻毒)” is, therefore, not a new idea in China...

The 400-year period from the beginning of the Song dynasty to the beginning of the Ming dynasty (AD 960–1368) was very rich from the point of view that concerns us. The teachings of Zhang Zhongjing, in spite of their prestige, no longer seemed sufficient on their own to face the new epidemics, the number of which continued to grow with economic boom, trade, and population growth. Perhaps, also China knew then of these climatic changes which countries of Western Europe were experiencing at the same time and which had a considerable impact on demography and economic development and on the other hand the health of populations.

This intense emulation ends up producing its effects (Note 14). It was under the Ming dynasty that the first books appeared, dealing specifically with contagious diseases, and it was in AD 1642 that the *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*) was published by Wu Youke, the true starting point of the School of Heat Illnesses (温病学派), which was organized throughout the 268 years of the Qing dynasty (AD 1644–1912).

AN INNOVATIVE SPIRIT WU YOUKE (吴又可 AD 1582–1652)

The socioeconomic changes of the Ming dynasty were accompanied by a large number of epidemics: 64 outbreaks in the 276 years of reign, and under the Qing dynasty which succeeded it, 74 outbreaks in 266 years (Note 15). The view of doctors of these diseases changed. Many observations were recorded, and new knowledge arose, helped by contributions from abroad. All fields of medicine were affected. It was then that Wu Youke (AD 1582–1652) appeared, a specialist in epidemiology whose insights concerning in particular the role of infectious factors in the transmission of diseases deserve to be given in detail.

In 1641, the 14th year of the reign Chóng Zhēng, a Wenyi (瘟疫)-type epidemic, in other words epidemic infectious disease (流行性传染病 in modern Chinese), devastated the provinces of Shandong, Jiangsu, Hebei, and Zhejiang. Wu Youxing, a native of Jiangsu province, directly confronted with the problem, realized that the therapy roughly remained the method of Zhang Zhongjing (*Treatise on Cold Damage*). Doctors simply repeated his prescriptions; however, people died by thousands. This epidemic left a deep mark on him. He had a classic medical training which allowed him to understand what was going on; he was convinced that the cause of these diseases had remained unknown until then and that it would soon be necessary to discover it.

Wu Youke was an excellent observer. He undertook to collect his experiences and wrote in 1 year the two chapters of his *Treatise on Pestilence* published in 1642.^[13] This small volume was to become widely known afterward. It contains many observations and very precise thoughts if not premonitory of all subsequent discoveries on infectious diseases [Figure 11].

Wu Youke begins by challenging the theory of seasonal influences as an etiological explanation for epidemic diseases. This is the first paragraph of his treaty:

“*Epidemic febrile illnesses do not come from wind, cold, summer heat, or humidity, but are caused by infestations by different Qi (异气) “found in nature”*”

...夫温疫之为病，非风、非寒、非暑、非湿，乃天地间别有一种异气所感^[13]

What does he mean by “different Qi”? Above all, “Qi” of another nature, different from seasonal Qi, atmospheric Qi.

The character 异 (Yi) indeed has the meaning of “dissimilar, strange, dissident, and rebellious.” It even refers in traditional philosophy to the idea of “a spectacular and terrifying phenomenon that Heaven sends to men when their conduct is contrary to natural order and that they have disregarded the first warnings.”^[14]

And 气 (Qi), it is to be noted, has a very broad meaning in Chinese. George Soulié de Morant (1878–1955), the great introducer of acupuncture in the West, had noted the Ancients having remarked the existence of “something” which passes in a meridian when a point is excited. He gave this influx the name of “Tsri” (Qi) which he translated for lack of anything better by the word “energy.” Soulié de Morant explains this ideogram as representing “strength of the steam lifting the lid of a pot where rice boils.” It is used constantly in everyday language to express vapor, strength, energy, respiration, breath, and by extension life. But, also anger, and in our time nerve impulse, electric impulse, TSF waves etc., The basic idea is that of immaterial, subtle force; it is the “Prana” of the Hindus “he adds.^[15] Marcel Granet, for his part, speaks of “breath,” “influence,” “what in the individual and in the universe constitutes the power of life (the k’i-breath).”^[16]

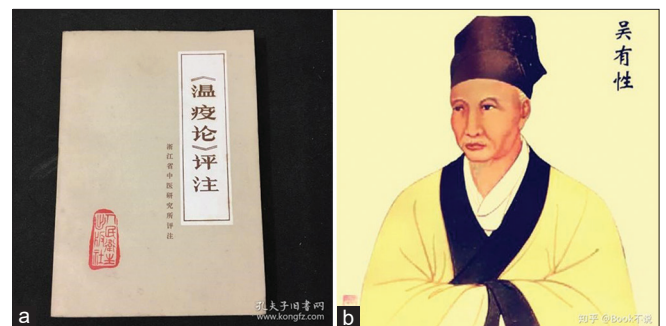


Figure 11: (a and b) Wu Youke (alias Wu Youxing 吴有性) and the *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*)

In medicine, the character 气 (Qi) characterizes the “vital spirits” in a sense quite close to that which this word had in Europe in the 17th century, for example in the works of Michel Ettmuller (Note 16). It also means, added with various qualifiers, fluids or humors, the movement of breath; in physics: vapors, exhalations, atmospheric air, etc.

Wu Youke calls these different “Qi” “pestilences”: Li Qi (戾气), Yi Li (疫戾), or even Za Qi (杂气 impure Qi), for lack of anything better and failure to see them. However, under his description, the meaning of these terms, which were already found among the ancients, has changed. If we compare with the seasonal agents (时行之气) by Wang Shuhe or the miasmatic Qi (乖戾之气) by Chao Yuanfang, we can see the difference. In the authors of antiquity and the Middle Ages, the causes of epidemics were not really distinguished from the influence specific to the four seasons: cold, heat, lukewarmness, and freshness or the six cosmic energies: wind, cold, summer heat, humidity, dryness, and fire. Their distortion, their transformations, or their “impropriety” was the direct cause of the epidemics (Note 17). In short, the Ancients were especially interested in what is called epidemic seasonality and not specific agents.

On the contrary, for Wu Youke, the causes of epidemics are very specific; they have nothing to do with air itself, seasonal or cosmic energies, or whatever name they are given. Present in the environment they are imperceptible to our ordinary senses:

“Without form (which would make it possible to see them), without odor (which would make it possible to smell them), without vibrations (which would make it possible to hear them) one cannot observe or know them” [Figure 12].

然气无形可求，无象可见，况无声复无臭，何能得睹得闻。^[13]

Although elusive, they are however material, substantial, they are not “intangibles.” Besides, what is the difference between energy and matter?

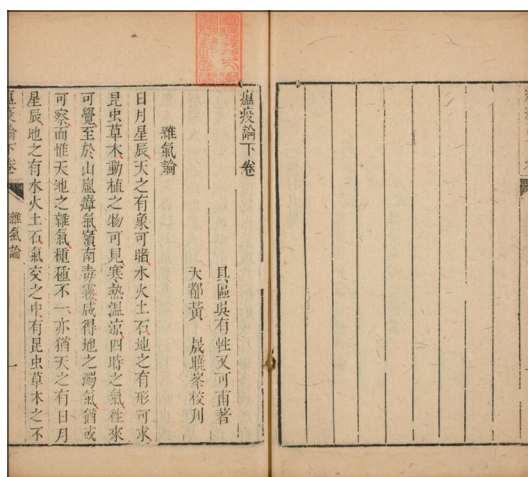


Figure 12: *Wen Yi Lun* “Za Qi Lun” (《瘟疫论·杂气论》) *Treatise on Pestilence* “Impure Qi Theory”

“Matter is only a transformation of energy, energy a change of state of matter. In fact the Qi are substance and the substance is Qi”.

夫物者气之化也，气者物之变也，气即是物，物即是气。^[13]

Wu Youke comes to describe the characteristics of these pathogenic agents as he conceives them. Their first characteristic is that they are of all kinds:

“Diseases are very varied, difficult to enumerate. But each has its own tendency; if in all families and in a lot of people the symptoms are the same, it is because Impure Qi settled in clusters. If there are so many different diseases, it is because these pestilences are not unique !.”

...为病种种难以枚举。大约病偏于一方，延门合户，众人相同，皆时行之气，即杂气为病也，为病种种是知气之不一也。^[13]

Or again:

“When a whole population is in contact with them, the disease they develop conform to its own specificity”

众人有触之者，各随其气而为诸病焉。^[13]

Then, he considers that these “pestilences” have specific visceral tropisms:

“Where such pestilence enters such zangfu jingluo, it will trigger such disease”

盖当其时，适有某气专入某脏腑经络，专发为某病，众人之病相同。^[13]

In addition, they have species affinities, affecting not only humans but also animals: cows, sheep, chicken, and ducks can be infected, so epidemics are not limited to humans as we have seen recently in the world with swine and avian flu (Note 18):

“But when cows are infected we see that sheep are not, when chickens are reached ducks are not and when the men are infected poultry are not. Why? Because these pestilences are not identical”

然牛病而羊不病，鸡病而鸭不病，人病而禽兽不病，究其所伤不同，因其气各异也，知其气各异，故谓之杂气。^[13]

Wu Youke still clearly discussed the mode of transmission of pathogens; he pinpointed the relevance of the airways, the mouth, and the nose (air and saliva) exactly as we do nowadays for influenza viruses and other respiratory viruses such as coronavirus:

“When these Influences arrive, whether young or old, robust or weak, the slightest touch makes you sick, these pathogens penetrate through your mouth and nose”

此气之来，无老少强弱，触之者即病，邪自口鼻而入...^[13]

Wu Youke paid great attention to postsurgical infections and nosocomial diseases. He attributed their polymorphism to the same “pestilences” that we now know to be microbes. But in

his day he could obviously only observe the effects. This led him to criticize the traditional phenomenological description of the “Fire of the Heart,” in his time quoted is any situation.

In addition, he observed and understood the existence of sporadic forms. He explains:

“Some years, pestilence is in massive quantities with serious damage and very high contagiousness, even the very young know it’s an epidemic...”

Yet, in some villages, one or two people developed some symptoms are not like the others. And when you look at them carefully you find that they develop symptoms already seen in previous years, in other places, with a striking resemblance. We don’t treat them any other way. It is in fact the Za Qi (impure Qi) of those years, but whose load is less massive, the attacks less numerous; However, it should not be concluded that this is not Za Qi.”^[13]

其年疫气盛行，所患者重，最能传染，即童辈皆知其为疫……

其时村落中，偶有一二人，所患者，虽不与众人等，然考其证，甚合某年某处众人所患之病纤悉相同，治法无异。

此即当年之杂气，但目今所重不厚，所患者稀少耳，此又不可以众人无有，断为非杂气也。

Wu Youke was however disappointed with the therapeutic means at his disposal, although in this area too he introduced some innovations within the traditional Chinese medicine.

He was undoubtedly too much enthusiastic in search of specific remedies to apply meticulously classic prescriptions, which showed their limits in infectious diseases. Now, it would be enough, he says, for a single remedy to make a disease disappear completely and there would no longer be any need to worry about matching the so-called “sovereign, minister, ambassador, and assistants” drugs, by adding or deducting them according to each particular case!

能知以物制气，一病只有一药之到病已，不烦君臣佐使品味加減之劳矣。^[13]

Also, he is sad about this misfortune of having to suffer:

“from illnesses caused by tiny impure QI which are not even shaped and without the possibility of neutralizing them!”

至于受无形杂气为病，莫知何物之能制矣。^[13]

This was enough to make some serious enemies among the supporters of this millennial tradition.

It is not possible to repeat here all the remarks made by this author concerning infectious agents, of which he almost perceived the presence. His deductions on surgical wound infection and gangrene are also premonitory. They will not be found in the West until 300 years later with the English surgeon John Lister (1827–1912) equipped with the theory of germs formulated by Louis Pasteur (1822–1895). Lister needed it to imagine that we could kill these microorganisms present in the

ambient air. Thanks to this theory, he was able to understand that the atmosphere was septic for wounds not because of oxygen but because of tiny organisms. We could therefore avoid the decomposition of injured or operated areas without removing the air, but by applying as a dressing substance capable of destroying these “floating particles” (Note 19). This was also the reasoning of Wu Youke who, however, could not draw the consequences.

However, it would be necessary to translate and comment on the whole of the Treaty of Wu Youke. The interest for us is to compare his ideas with Western data at the same time. In 1642, Leeuwenhoek (1632–1723) who lived in Delft and who is rightly considered to be one of the forerunners of microbiology and cell biology, was only 10 years old! He was not a medical doctor. He was an informed cloth merchant who was not to make his first microscope until 1668, to count the threads of his fabrics. His optical instruments reached such quality and power – unknown in his time – that he discovered by chance and made known a quantity of microscopic living beings, such as red blood cells (1673), sperm, protozoa, and especially bacteria including bacilli, shells, and spirals. These discoveries were made 30 years after the publication of the *Treaty of Pestilence* [Figure 13].

Unfortunately for China, Wu Youke’s most original observations and ideas could not be based on such scientific discoveries. Various historical, sociological, and cultural factors prevented China, then closed in on itself, from opening a kind of “Pastorian era” before the letter (Note 20). However, some followers of Wu Youke continued to enrich his observations and helped to systematize, within the School of Heat Diseases, a doctrine of epidemic diseases.^[17]

DEVELOPMENT OF THE EPIDEMIC DISEASE THEORY (瘟疫学说)

A few key figures are behind the current treatments for epidemic diseases in Chinese medicine. Let us quote the main ones.

Dai Tianzhang (戴天章 1624–1722): He was a great admirer of Wu Youke; he completed his work *Guang Wen Yi Lun* (《广瘟疫论》 *Discussion of Pestilence*), around 1722, by specifying

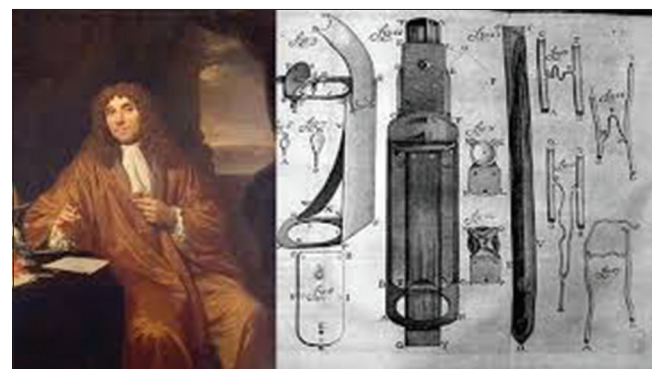


Figure 13: Antonie van Leeuwenhoek (1632–1723), The father of microbiology

the diagnostic signs which make it possible to distinguish “epidemic diseases” from “cold attacks” [Figure 14]. He indicated five methods of treating these diseases (治疫五法). His work was taken up and extended in 1866 by Lu Maoxiu (陆懋修) in a treatise devoted to heat diseases (*Discussion of Pestilence*) reissued in 1909 and then in 1960.

Ye Tianshi (叶天士 1667–1746) was also very influenced by Wu Youke. He excelled in the art of diagnosis and treatment. His teaching was recorded by his disciples in a treaty entitled *Wen Re Lun* (《温热论》 *Treatise on Warm-Heat Disease*). A new diagnostic process is exposed, known as the “Four Layers (四分) Diagnostic” Defensive, Energetic, Nourishing and Blood (卫气营血辨证), better suited to infections of the heat type, that is to say to a large number of infectious and epidemic diseases of modern nosology. He also attached great importance to the theory of Meridians.^[18] These Four Layers (四分) are no more anatomical than the Six Meridians. Rather, they represent a continuation of lines of defense of the organism, raising specific pathologies, of which the theory of the Six Meridians gives a poor rendering of its specificity [Figure 15].

The genius of Ye Tianshi was to affect them the semiology of acute febrile illnesses, of which he had previously recognized the evolutionary rules. Also, he was to be inspired, as his great predecessor Zhang Zhongjing had been, by a concept of the Internal Classic that the application to this new object completely transformed. So, that the theory of the Four Layers is no less original, and no less decisive than that of the Six Meridians for the understanding, diagnosis, and therapeutic management of these diseases.

Wu Jutong (吴鞠通 1758–1836) supplemented this new approach by introducing the theory of the Three Warmers (三焦辨证) in his *Wen Bing Tiao Bian* (《温病条辨》 *Systematized Identification of Warm Diseases*) (1798) [Figure 16].^[19]

Other authors also made important contributions to the treatment of epidemic diseases, notably Yang Xuan (杨璩) and Xu Lin (余霖) active at the end of the 18th century (publications of 1784 and 1794). Their therapeutic technique deserves to be studied exhaustively.^[17]

Finally, Wang Mengying (王孟英 alias 王士雄 1808–1866) wrote an explanation presentation of epidemic pathologies due to heat, *Wen Re Jing Wei* (《温热经纬》 *Warp and Weft of Warm-Heat Disease*), of which the “Jing (经warp)” is formed by Zhang Zhongjing’s theory and the “Wei (纬weft)” through, in particular, the teachings of Ye Tianshi (1667–1746) [Figure 17]. He also wrote in 1838 a two-volume book on cholera, *Huo Luan Lun* (《霍乱论》 *Discussion on Cholera*), completed in 1862. He recognizes that the real cause of this disease is a particular toxi-infectious agent, a “foul poison (臭毒).” About the same time, the Italian Filippo Pacini described vibrio cholerae (1854) to be followed by Robert Koch in 1883.

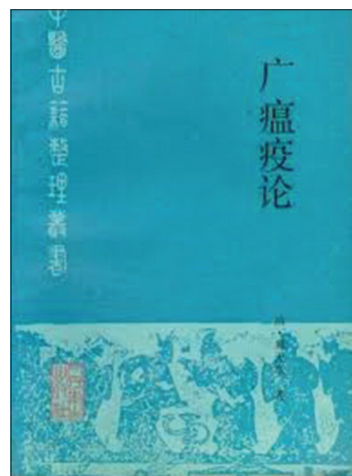


Figure 14: Dai Tianzhang (戴天章 1624–1722), *Guang Wen Yi Lun* (《广瘟疫论》 *Discussion of Pestilence*), around 1722



Figure 15: (a and b) Ye Tianshi (叶天士 1667–1746)



Figure 16: (a and b) Wu Jutong (吴鞠通 1758–1836)

It is all this knowledge accumulated over centuries that now allows the traditional Chinese medicine to offer a number of alternatives to the treatment of emerging infectious diseases such as SARS 2003–2004 or COVID-19 [Figure 18].

Notes

Note 1: *Huang Di Nei Jing Su Wen* (《黄帝内经素问》)



Figure 17: (a and b) Wang Mengying (王孟英 alias 王士雄 1808–1866)

Huangdi's Internal Classic Basic Questions). Beijing: People's Medical Publishing House; 1963, 1998. *Ling Shu Jing* (《灵枢经》 *Classic of Miraculous Pivot*). Beijing: People's Medical Publishing House; 1963, 1981.

Note 2: For research on the origin of Neijing, by Western researchers cf. Bridgman RF. *Medicine in Ancient China in Chinese and Buddhist Miscellaneous*, Bruxelles; 1955. p. 13.

For readers interested in translations of the Neijing into French, let us quote mainly, Husson A. *Huang Di Nei Jing Su Wen*, Scientific Association of acupuncturist physicians in France, Paris; 1973, 1987. p. 14 (in French). Nguyen Van Nghi and collaborators: *hoang Ti Nei King So Ouenn*, Vol. 1-2 (1975), Vol. 3 (1988), Vol. 4 (1991) Editions N. V. N. Marseille. For chapter 72, see the notes by Nguyen Van Nghi and Christine Recours-Nguyen volume IV pp. 317 and 341.

Note 3: This approach is indeed based on the relations of the concomitant cycles of the Five Agents and the Six Qi (五运六气) with the pathologies of each period. Their usefulness would be especially in the prevention of diseases.

Note 4: *Xu Lingtai Medical Book Collection* 《徐灵胎医书全集》 (*The Origin of Medicine* 《医学源流论》 *Using Medicine as Using Soldier* 《用药如用兵论》) Vol. 1 p. 186, cited by Dubois J. C.: "Art of healing and art of war," conference given within the framework of the Symposium "Understanding China, Chinese Thought and European Philosophy" Strasbourg, November 2005.

Note 5: See about these 4 chapters the relevant remarks by Patrick Nguyen, preceded by a long introduction of books IX to XVIII of Suwen: "Approach of pathological reality in ancient China. in Nguyen Van Nghi, Nguyen Patrick: *Huangdi Neijing Suwen*, tome III, NVN Edition Marseille; 1988. p. 9-25.

Note 6: Wang Chong: *Wang Chong Lun Heng* (《王充论衡》 *Theories Put in the Balance*) written in 83 of our era where the author discusses current opinions and criticises the superstitions of his time.

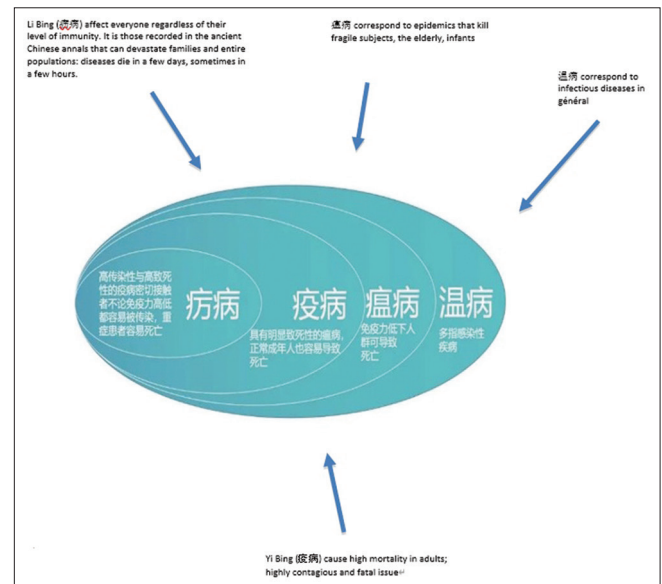


Figure 18: Current table of pestilences according to the traditional Chinese medicine, drawn up during the coronavirus pneumonia COVID-19 (冠状病毒肺炎). COVID-19 is assimilated to a pestilence of the moisture-heat type of the lung (太阴肺湿热瘟病) (according to TMR 出版集团)

Note 7: Zhang Zhongjing (张仲景) or Zhang Ji (张机). The *Shang Han Za Bing Lun* (《伤寒杂病论》 *Treatise on Cold Damage and Miscellaneous Diseases*) was rearranged by Wang Shuhe (265–316) who brings together the first ten volumes in a single book the *Shang Han Lun* (《伤寒论》 *Treatise on Cold Damage*). The remaining six volumes were not brought together until the Song era under the title of *Jin Kui Yao Lue* (《金匱要略》 *Synopsis of the Golden Chamber*). See Dedao J. *Brief History of Chinese Medicine*. Taiyuan: Shanxi People's Publishing House; 1979. p. 92-6.

Note 8: Dabry P. *Medicine among the Chinese*. Paris; 1863. p. 146. This author speaks of Diseases resulting from a sudden cooling of the body and translates *Shanghan* by "body infected by a great cold." Other French translations of "Shang Han Lun:" Wong M. *Shang-Han-Lun "Treatise on harmful cold," translation and comments*, Masson Paris; 1983. Despeux C. "Shanghanlun, Treaty of Cold Snaps," Edition of La Tisserande, Paris; 1985. Van Nghi N, Nguyen-Recours C. *Progressive diseases of the 3 Yin and 3 Yang*. Editions NVN Marseille; 1987.

Note 9: Ge Hong 葛洪 (281? A.D.– 341 A.D.) *Zhou Hou Bei Ji Fang* (《肘后备急方》 *Handbook of Prescriptions for Emergencies*), see chapter "Treatments for healing hot illnesses in periods of cold weather (治伤寒时期温病方)" cited by Wang Wenyan thesis 2011 see supra.

Note 10: cf. Chao Yuanfang: *Zhu Bing Yuan Hou Lun* (《诸病源候论》 *Treatise on the Pathogenesis and Manifestations of Various Diseases*) (compiled by Chao Yuanfang and others in 610 A.D.). Commented version of this work- 《诸病源候论校释》, under the direction of the Nanjing Institute of

Chinese Medicine. Vol. 1. Editions Renmin Weisheng; 1980. p. 299-300 (伤寒令不相染易侯).

Note 11: Sun Simiao: *Qian Jin Fang* (《千金方》 *Prescriptions Worth a Thousand Gold Pieces*), including *Bei Ji Qian Jin Yao Fang* (《千金要方》 *Essential Prescriptions Worth a Thousand Gold Pieces for Emergencies*) and *Qian Jin Yi Fang* (《千金翼方》 *Supplement to the Essential Prescriptions Worth a Thousand Gold Pieces*). There are annotated Chinese editions of these texts which show their relevance; that of Liu Gengsheng and Zhang Ruixian after an edition of the Song dynasty, Editions Hua Xia, Beijing 1993 and that of Li Jing Rong. 《孙真人千金方》 Beijing: People's Medical Publishing House; 1996. French translation of the part acupuncturale by Catherine Despeux: *Prescriptions of acupuncture worth a thousand ounces of Gold Treatise on acupuncture by Sun Simiao of the 7th century*, Paris: Guy Trédaniel Éditeur; 1987. pp. 299–312.

Note 12: Pang Anshi: *Shang Han Zong Bing Lun* (《伤寒总病论》 *General Treatise on Illnesses Caused by Cold*)

Note 13: Guo Yong: *Shang Han Bu Wang Lun* (《伤寒补亡论》 *Complements to Treatise On Cold Damage*) (1181), in which the author insists on “treating according to seasonal etiologies” 各因其时而治之.

Note 14: It would be interesting also to examine the ideas of Zhang Jiebin (张介宾 1563–1640 A.D.) one of the most relevant of all the commentators of the *Neijing*. Although he was not an innovator in the field of epidemic febrile illnesses, he devoted an entire section to them. 瘟疫 (wenyi) from his *Jing Yue Quan Shu* (《景岳全书》 *Complete Works of Jing Yue*).

Note 15: History of Chinese Medicine. Manual of History of Medicine, Institute of Chinese Medicine, Beijing; 1978. p. 47. Other sources report 39 epidemic episodes between 1408 and 1643 and three hundred and twenty-eight between that date and the end of the Qing dynasty (1911); Cf. Dedao J. (贾得道) Brief history of Chinese medicine. Taiyuan: Shanxi People's Publishing House; 1979. p. 222-30.

Note 16: Ettmuller M. *New Institutes of Medicine*. Thomas Amaulry, Lyon; 1693.

Note 17: Similarly, the notion of “poison (毒 Du)” in Ge Hong and Wu Youke could be discussed. Ge Hong said: “the miasmas of epidemic heat come from toxic Qi (天行瘟疫是毒病之气)” and Wu Youke: “pestilential attacks are like the poisons of Heaven-Earth (今感疫气者，乃天地之毒也).” The terms are almost identical but it is not certain that the meaning is still the same.

Note 18: Louis Pasteur will discover the chicken cholera vaccine in 1879 and the rabies vaccine in 1885. With the word “vaccination” will be born immunology, the concept of cellular immunity (Metchnikoff 1884), the discovery of therapeutic

effects of the fungus *penicillium notatum* (1928), then of the active agent of penicillin against staphylococcus (1939). Berche P. History of Syphilis, DU History of médecine Paris Descartes University, Course 12-12-2015.

Note 19: Berche Patrick: History of a great plague: Tuberculosis, DU History of médecine Paris Descartes University, Course 26-5-2016.

Note 20: Cf. Brief history of Chinese medicine, work cited on p. 226.

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There are no conflicts of interest.

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Doc Hay: A Chinese Herbalist Combating the 1918–1919 Influenza Pandemic in America

Yemeng Chen

New York College of Traditional Chinese Medicine, Mineola, NY, USA

Abstract

This is a story about a Chinese herbalist Ing “Doc” Hay who combated the 1918–1919 influenza pandemic in the America West. As an immigrant, he came to the States as a laborer, but he had knowledge of Chinese herbal medicine due to his family heritage. This made it possible for him to start practicing in the Chinese community in John Day, Oregon, until 1948 when he retired. During the time of the pandemic running wild in the 1910s, he prescribed formulas aimed at flu and boiled herbal decoction, personally delivering it to a working site for those Chinese laborers as well as non-Chinese patients. None of the laborer patients treated by him died during this deadly pandemic. Due to his success and fame, his practice was booming even after the Chinese community disappeared in John Day in later years. Doc Hay is always remembered in the history of earlier development in eastern Oregon, so that the site of his practicing, Kam Wah Chung and Co. Building, is now a national historic landmark. And more importantly, he has also been remembered by Chinese herbal medicine practitioners in the United States.

Keywords: 1918–1919 Flu, Chinese herbalist, combated epidemic, COVID-19, Ing “Doc” Hay

INTRODUCTION

COVID-19 pandemic in 2020 is a century catastrophe, which caused over 12.5 million positive cases confirmed while the death toll climbed over 560 thousand (as of July 12, 2020) in the world. A similar memory dated back to the 1918–1919 influenza pandemic which caused a total of 50 million deaths.^[1] Chinese medicine has successfully been applied to combating COVID-19 pandemic in China, and the therapeutic outcome was significant during the pandemic period, the first quarter of 2020. A few people knew that Chinese medicine was also applied to combating epidemic a hundred years ago in the United States. One book on my library shelves introduced this story about a Chinese herbalist Doc Hay during that time in the America West. The title of this book is *China Doctor in John Day*, which was published by Binford and Mort Publishers in 1979. Jeffery Barlow and Christine Richardson were the authors [Figures 1 and 2].

STORY ABOUT DOC HAY

As described in this book, the name of Doc Hay was Ing Hay (1862–1952) [Figure 3], born in Xiaping Village, Taishan

County, Guangdong Province, China, who wanted to seek fortune abroad and came to the US as a young man to work as a gold miner at the beginning. Since he was so knowledgeable about herbology and posology in the community of John Day and beyond, he was respected as “Doc Hay.”

As introduced by Nancy Yao Maasbach, President of the Museum of Chinese in America (MOCA), Doc Hay’s real surname was ING. His full name was ING Hay Wah (伍于念, Chinese name order with surname first), but his descendants were mistakenly given the surname “Wah” instead of “Hay.” From April 26, 2018 to September 16, 2018, this museum presented a special exhibition named *On the Shelves of Kam Wah Chung and Co.: General Store and Apothecary in John Day, Oregon*.^[2] Doc Hay once again emerged into the public attention [Figures 4 and 5].

After the Gold Rush (1848–1855) and transcontinental railroad construction (1863–1869), Ing Hay, together with

Address for correspondence: Yemeng Chen, Ph.D.
New York College of Traditional Chinese Medicine, Mineola, NY, USA.
E-mail: yemeng.chen@nyctcm.edu

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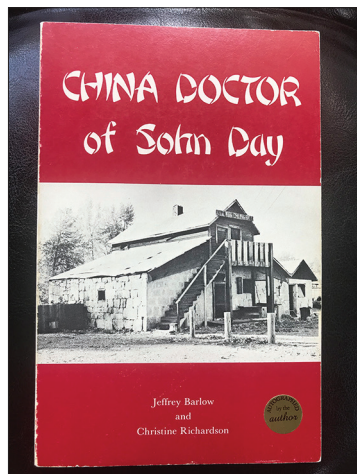


Figure 1: Book cover

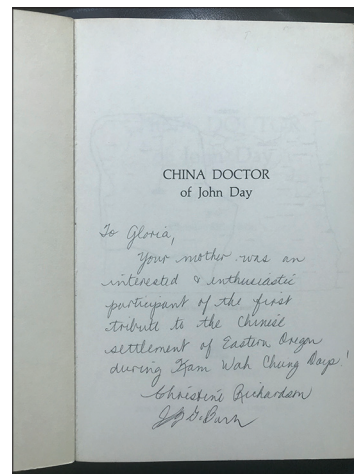


Figure 2: Authors' handwriting



Figure 3: Photo of Ing Hay (from *China Doctor in John Day*)



Figure 4: Exhibition poster on the Shelves of Kam Wah Chung and Co.

his father, followed his five uncles to the United States around 1883. Then in 1885, Hay and his father moved to Walla Walla, southeast of the Washington state, which had a thriving Chinese community. Hay's father returned to China in 1887, but Hay remained in the United States. In that year, he relocated himself to John Day where he became acquainted with a fellow Chinese immigrant named Lung On (梁光荣 or 梁安), a well-educated merchant. Grown up from a family of herbalists, Ing Hay also learned from an old Chinese Doc Lee in John Day, who gave him his own book of medicinal herbs and formulas.

John Day is a small and distant city in Grant County of the eastern Oregon, about 1669 residents in 2017,^[3] and now, it still takes a five-hour drive to the largest city in the state, Portland. An 1885 fire in nearby Canyon City's Chinese quarter swelled the number of John Day's resettled Chinese workers, closed to a thousand inhabitants. However, in 1887, when Ing Hay arrived, this city accommodated around five to six hundred Chinese inhabitants, who were closely tied to the development of gold mining in the area. Furthermore, at that time, a new road construction project was under way and many Chinese laborers

were hired for it. The majority of Chinese miners in there were from Taishan County, Ing Hay, too, spoke their dialect. Ing Hay intended to practice Chinese medicine in the mining frontier as a "China doctor," as he was known to the white community. Lung On then recognized in Ing Hay – "Doc Hay" – a major asset to the frontier Chinese miners and laborers. No wonder Lung On asked the young man to go into the partnership of Kam Wah Chung and Co.

In 1888, Ing Hay and Lung On purchased the Kam Wah Chung and Co. Building, which later became a center of the local Chinese community. Lung On played a role as a general store proprietor and businessman and Doc Hay had been a practitioner of Chinese herbal medicine in this building until he retired in 1948.

By 1940, Doc Hay's eye sight was all but gone, and with his partner Lung On being dead, it is hard to imagine what loneliness must have beset him in the old Kam Wah Chung and Co. Building, which had once been the scene of so much noisy ceremony and of a friendship which spanned two eras and two cultures. (P. 91)



Figure 5: Exhibition poster in Museum of Chinese in America, 2018

Iny Hay's nephew, Bob Wah, came to John Day from Portland in 1940. With his assistance, Ing Hay began in the next year to practice once more. Bob later took over the herbal medicine business of his uncle in the early 1950s. In 1948, Doc Hay fell and broke his hip, so he moved to a nursing home in Portland for 4 years until he passed away.

In 1955, Bob Wah deeded the Kam Wah Chung and Co. Building and its contents to the City of John Day, as Ing Hay instructed with the provision that building be made into a museum, a monument to the contribution of the Chinese community of John Day to the development of eastern Oregon. The book mentioned that “For many years nothing was done.” In 1967, the City found that it owned the building and its contents while surveying the land around this building to develop a city park. In 1973, the Kam Wah Chung and Co. Building was added to the National Register of Historic Places; the store opened as a museum in 1975. In 2005, The Kam Wah Chung Company site was named a National Historic Landmark.^[4]

The honor continued. In 2014, Robert Wah, M.D., the grandson of Bob Wah, was elected the 169th President of American Medical Association, the largest association of physicians in the United States.^[5] As one of the top leaders of medical profession, Dr. Robert Wah was the only one Chinese–American who once led this organization in its 173 years of history.

STORY ABOUT DOC HAY AS AN HERBALIST

The Kam Wah Chung and Co. (literally, the “Golden Flower of Prosperity”) Building was a hub of the then Chinese community. Besides a Chinese medicine clinic, the building also was functioning as a grocery store, post office, social center, and even a Buddhism religion site. The number of Chinese in John Day at that time was roughly 2000, making it the third-largest Chinatown in the US at the time. However, later on, gold mines in the region had largely diet out, and the need of Chinese miners and laborers greatly decreased, so a majority of the Chinese population moved out of John

Day. There were fewer Chinese people later on in John Day. However, Kam Wah Chung and Co. not only just survived but also boomed. It was due to Doc Hay's fame of skillful practice that its influence was not only within the Chinese community but also among the non-Chinese patients throughout Oregon as well as many others from such states as distant as Alaska and Oklahoma.

The book authors respected Doc Hay as “Herbalist and pulsologist” and described his medical skills in pulse diagnosis and use of Chinese herbal remedies called “Herbal brew” in this book. Doc Hay was far more successful in treating the illnesses and injuries of the frontier than were the conventional physicians of his time. Some of his cures were truly remarkable, and some of the diseases with which he was so successful continue to defy medical practitioners even today. Doc Hay became very famous since he successfully treated blood poisoning (septicemia), meningitis, lumbago, mumps, colds, stomach ailments, hemorrhaging, and influenza. The book introduced that one-third of Doc Hay's patients were women who were suffering from complications resulting from childbirth or menstrual problems. He also sent herbs to the nonlocal patients through mail correspondence.

Most often, though, Hay prescribed herbs that were to be boiled into a broth. It is remembered that, at first, he would cook up the medicine right in the Kam Wah Chung and Co. Building. This required patients to remain in John Day so they could go down to Chinatown for their daily dose of medicine. In later years, he would prepare the prescriptions in packages so the patient themselves would boil up the brew at home. (P. 60)

Even now, the museum of Kan Wah Chung and Co. still collected over 500 varieties of herbs and other medications left by Doc Hay. It could be the most extensive collection of Chinese herbs and their products in the Western Hemisphere. The book chapter introduced several herbs and their clinical applications such as Ren Shen (人參 *Radix Ginseng*), Da Huang (大黃 *Radix et Rhizoma Rhei*), and Ma Qian Zi (马钱子 *Semen Strychni*). During the exhibition of *On the Shelves of Kan Wah Chung and Co.*, I saw the raw herbs displayed like Wang Bu Liu Xing (王不留行 *Semen Vaccariae*), Ma Huang (麻黄 *Herba Ephedrae*), Ban Xia (半夏 *Rhizoma Pinelliae*), Ba Ji Tian (巴戟天 *Radix Morindae Officinalis*), and Chuan Xiong (川芎 *Rhizoma Ligustici Chuanxiong*). One scholar^[6] visited the Kam Wah Chung and Co. Museum and discovered some valuable herbs such as Ren Shen (人參 *Radix Ginseng*), San Qi (三七 *Radix et Rhizoma Notoginseng*), and Chen Xiang (沉香 *Lignum Aquilariae Resinatum*). This old herbal dispensary also contained some animal species included She Xiang (麝香 *Moschus*), Xiong Zhang (熊掌 *Ursidae*), Ling Yang Jiao (羚羊角 *Cornu Saigae Tataricae*), Qi She (蕲蛇 *Agkistrodon*), Wu Shao She (乌梢蛇 *Zaocys*), Ge Jie (蛤蚧 *Gecko*), Lu Rong (鹿茸 *Cornu Cervi Pantotrichum*), Yan Wo (燕窝 *Cubilose*), Mu Li (牡蛎 *Concha Ostreae*), Wu Ling Zhi (五灵脂 *Troglodyteri Faeces*), and Ren Zhong Bai (人中白 *Calamitas urinae hominus*), the last one can never be seen now.

At the end of the book, there is an appendix of 62 types of herbs which was intended as a sample listing of some more than five hundred different types of herbs and medications found in Doc Hay's collection. Those herbs were classified as Familiar herbs and medications, exotic herbs and medications, herbs used to treat wounds, abscess and sore, herbs used especially in the treatment of female ailments, and Miscellany (herbs used in treatment of variety of conditions and illness). In the category of wounds, abscess, and sore treatment, it listed Dong Kui Zi (冬葵子 *Malvae Fructus*), Shi Wei (石韦 *Folium Pyrrosiae*), Ba Dou (巴豆 *Fructus Crotonis*), Hu Huang Lian (胡黄连 *Rhizoma Picrorhizae*), Liu Ji Nu (刘寄奴 *Artemisiae anomala Herba*), Qing Xiang Zi (青葙子 *Semen Celosiae*), and Zi Cao (紫草 *Radix Lithospermi*). In the book, it mentioned that many miners and laborers suffered from injuries and infection with abscess, so those herbs were listed as a special category.

A lot of listed herbs were related to draining water and reducing swelling, such as Gan Shui (甘遂 *Kansui Radix*), Dong Kui Zi (冬葵子 *Malvae Fructus*), Shi Wei (石韦 *Folium Pyrrosiae*), Da Ji (大戟 *Radix Euphorbiae*), and Ba Dou (巴豆 *Fructus Crotonis*) which are also poisoning with cautions. I am sure that Doc Hay had rich experiences in using those very strong action herbs. Interestingly, there were many herbs for parasite treatment such as Li Lu (藜芦 *Veratri nigri Radix et Rhizoma*), He Shi (鹤虱 *Fructus Carpesii*), Shi Liu Pi (石榴皮 *Pericarpium Granati*), Bian Xu (篇蓄 *Polygoni avicularis Herba*), and Shi Jun Zi (使君子 *Fructus Quisqualis*). Some herbs for skin itching and irritation were also listed, such as She Chuang Zi (蛇床子 *Fructus Cnidii*), Di Fu Zi (地肤子 *Fructus Kochiae*), Bai Bu (百部 *Radix Stemonae*), and Ku Shen (苦参 *Radix Sophorae Flavescentis*). Some herbs were external applicants such as Mu Jin Pi (木槿皮 *Hibiscus syriacus*), Peng Sha (硼砂 *Borax*), and Mang Xiao (芒硝 *Natrii Sulfas*). Many local herbs in southern China, different from common classical herbs, were used which mainly for activating blood circulation and removing stasis due to traumatic injuries such as Mian Hua Zi (棉花子 *Gossypium Herbaceum*), Feng Xian Hua (凤仙花 *Impatiens balsamina*), Zi Jin Pi (紫荆皮 *Cercis chinensis*), and Bi Ma Zi (蓖麻子 *Ricinus communis*). Thus, it was understandable that the common indications at that time in Kan Wah Chung and Co. were mainly trauma, skin lesion, swelling, and parasite infection, etc.

During his about 60 years of practice, Doc Hay faced some legal troubles and was alleged to practice medicine without a license. However, all three cases were dismissed by the court.

In 1905, Ing Hay was charged by local white doctors for practicing medicine illegally, yet one eyewitness said that there was no jury in Grant County that would convict him. The respectable local community, at least, accepted Hay and Lung On and wanted them to remain. Hay's nephew said that Hay never worried about malpractice charges: "They'd never convict him anyway... they tried him, but he has never done

anything wrong. They couldn't get any man to stand up against him, so he had no fear." (P. 66)

In his old bed in the Kam Wah Chung and Co. Building, the heirs and friends who cleaned up after his death found more than \$23,000 in uncashed checks from patients which were written between 1910 and 1930. How generous Doc Hay was!

STORY ABOUT DOC HAY IN COMBATING EPIDEMIC

The 1918–1919 influenza pandemic was the most severe disaster in the world history in the beginning of the 20th century. One-fifth of the world's population was affected by this deadly H1N1 virus. At least 50 million people had died worldwide, including approximately 550,000 in the United States.^[1] When this influenza appeared in the United States in the fall of 1918, many cities shut down their essential services. Pandemics typically unfold across a wide spectrum of communities that are diverse in race, ethnicity, age, gender, and socioeconomic means. However, young adults, under 40 years of age, were hit hardest who were severely impacted by infections, complications, and death.

The pandemic was widely spread to both urban and rural areas both in the densely populated East Coast and in the remotest part of Alaska. In Oregon, the situation was also serious. Death certificates held by the Oregon State Archives document thousands of influenza deaths from 1918 to 1919.^[7]

During that time in the John Day area of the eastern Oregon, the highway construction was on the progress, which connected the mountain passing through the north and southwest of the Grant County. It was tough work in that the roads were unpacked and dirt and it was extremely cold in winter, <22°F (Note: –22°F equals to –30°C) in John Day. People worried about the flu which could hit together with spring rains; thus, the road construction could be on hold for another year, then the funds would be exhausted.

It was inevitable that again this year the flu would strike among the road crew, and this it did. These laborers – who were forging the final transportation link between Grant County and Portland – were of a hardy and determined breed, many of them being former miners. They all knew that modern medicine was helpless before the flu. Medical doctors did not agree on the cause of the diseases and had no real treatment except to send the patient to bed and hope for the best. Many of them did not trust doctors, in any event, remembering the quacks who had followed the miners into the gold fields in the nineteenth century, and seeing the failure of doctors to prevent the thousands of deaths in Portland alone in the epidemics of 1918–19. (P. 1)

Doc Hay delightedly got involved in epidemic combating. He made a prescription and then personally boiled herbal decoction. When it was ready, he even delivered those herbal decoctions together with his partner Lung On to the working site for fellow laborers. The laborers were among the flu hit hardest age group and the road work project really relied on them.

When the flu got back to Ing hay and his partner Lung On in John Day, Lung On drove out to the work camps with Hay and his medicines. Ing Hay took along literally gallons of bitter herbal mixture which he warmed over stoves in the shabby shelters of the road crews. Trusting Ing hay from their own personal experience with his during previous illness, or from the wisdom passed down by their fathers, they drank the brew, although it smelled and tasted bitter. (P. 2)

We do not know the composition of the herbal formula, but we do know that it worked very well. Recently, it has become popular to take Chinese herbal teas or premade granules as prevention during the flu epidemic. However, Doc Hay was already practicing this way one century ago. It is clear that his herbal formula was not only effective for prevention but also for treatment. The book mentions, “*Though many of the men fell ill with the flu, none became bedridden and all continued to work.*” It is said that in the 1918 and 1919 flu epidemic, none of Doc hay’s patients and his community died. Thanks largely to Doc Hay and his “bitter brew,” the highway was completed in the schedule that was indeed good news to the eastern Oregon.

So, because of the two Chinese and the trust between them and the road crew, in the later February in 1920, the goods truck came up the long grade, and with it, the twentieth century came to Grant County, Oregon, in the form of a truckload of potatoes... The newly opened highway which now linked Grant County – with its economic at John Day and its county seat at Canyon City – with Portland. (P. 2)

During the epidemic, Doc Hay not only took care of his fellow Chinese community but also treated patients in the white community. One woman stated that Doc Hay successfully treated her, her mother, her aunt, and her brother during the first epidemic. She even wrote about Doc Hay’s successful treatment of meningitis to her another brother. From her introduction, we know that Doc Hay’s therapeutic methods were not limited to Chinese herbal medicine. He used a therapy like Guasha, “*He’d take a small white disc and go down the spine and all at once here would pop blood out of some place along the spine.*” We are not sure whether Doc Hay ever applied

acupuncture or moxibustion, but it is highly probable. It would be a big query if I could personally visit Kam Wah Chung and Co. Building in the future.

CONCLUSION

It was an amazing story about a Chinese herbalist Ing “Doc” Hay who effectively combated 1918–1919 influenza pandemics in the American West. During this pandemic, his community and patients survived and no one died from the deadly flu. Due to his success, he was famed of his practice not only in the local Oregon and Washington states but also in distant areas. It set a good reputation of Chinese herbal medicine even though it faced legal challenges. In the 21st century, it is unfortunately that practicing Chinese herbal medicine still has a bar for widely using even now in the historical pandemic of COVID-19 in America. Hence, it will have a long way to go for the legalization of Chinese herbal medicine in the United States.

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Conflicts of interest

There are no conflicts of interest.

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Understanding the Treatment of COVID-19 and other Epidemics in Traditional Chinese Medicine

Liyun Chen, Shiyun Yan

Institute of Science, Technology and Humanities, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

Epidemics spread quickly and are highly contagious. And there has been a profound understanding of etiology, pathogenesis, prevention, and treatment of these diseases in traditional Chinese medicine (TCM). Coronavirus disease 2019 (COVID-19) falls into the category of “epidemic dampness”, and the core pathogenesis is that latency of externally-contracted dampness turbidity and epidemic toxin in pleurodiaphragmatic interspace provokes Shaoyang ministerial fire and causes concomitant attack of external and internal pathogens, resulting in wood fire tormenting metal and the upward rushing of dampness fire (toxin), ultimately leading to a syndrome of epidemic toxin blocking the lung. Throughout the treatment of COVID-19, Professor Shiyun Yan uses the “harmonizing” method and sticks to the basic principles of “protecting middle qi, pectoral qi and yin fluid” to consolidate the root, dispersing externally and clearing internally and using in combination drugs cold and warm in property. The specific treatment approaches include ventilating lung and expelling pathogens, clearing heat and removing the toxin, tonifying qi and nourishing yin, activating blood and resolving stasis, resolving dampness, and dredging collaterals, to prevent the patient’s condition from getting worse and save the dying.

Keywords: COVID-19, dampness epidemic, epidemics, harmonizing method, protecting middle qi, protecting pectoral qi, protecting yin fluid

UNDERSTANDING OF EPIDEMICS IN TRADITIONAL CHINESE MEDICINE

Epidemics spread quickly and are highly contagious. According to *Shuo Wen Jie Zi* (《说文解字》 *Explanation of Simple and Compound Graphs*), the first Chinese dictionary, “In epidemics, all people get ill.”^[1] The Chinese character “瘟” has the same meaning as “疫”, which refers to any acute infectious disease that spreads quickly.

Etiology and pathogenesis of epidemics

Epidemics are caused by contraction with “epidemic qi,” which is a class of virulent pathogens with high infectivity. Epidemic qi was put forward in *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*) by Wu Youke in the Ming Dynasty, and this book offered unique insights into epidemics. For instance, on etiology, the traditional opinion of “six excesses” causing the disease was refuted and the idea of epidemic qi causing epidemics was raised; in pathogenic pathways,

invasion of pathogens into the body through the mouth and nose was emphasized, and two routes of transmission were summarized, close contact and airborne. In treatment, dredging and disinhibiting were carried out to eliminate pathogens. Many doctors of later generations developed traditional Chinese medicine (TCM) based on Wu’s academic insights, and a unique school of epidemics study was taking shape, i.e., the epidemic school. The original ideas of the epidemic school accurately reveal the cause of acute infectious diseases, which is a creative viewpoint in etiology. Epidemic qi causing disease is characterized by high infectivity, sudden occurrence of disease, rapid transmission and change of disease, dangerous conditions of patients, and high mortality, etc.

There are many factors responsible for the occurrence and spread of epidemics. Whether a person gets ill after contraction

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Address for correspondence: Prof. Shiyun Yan,
Institute of Science, Technology and Humanities, Shanghai University of
Traditional Chinese Medicine, Shanghai, China.
E-mail: ysy@shutcm.com

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with epidemic qi depends on not only the amount and virulence of the qi, but also healthy qi of the body, the natural environment, and society, just as what was said in *Su Wen* “Ci Fa Lun” (《素问·刺法论》 *Basic Questions* “Discussion on Acupuncture Methods”), “Pathogens cannot cause disease when healthy qi is sufficient.”^[2] Meanwhile, it is also related to climatic, environmental, and regional factors.

Prevention of epidemics

The prevention of epidemics was discussed by ancient Chinese doctors long time ago. It was proposed in *Su Wen* “to treat a disease before its occurrence instead of after,”^[3] indicating that the importance of prevention was sufficiently realized over two thousand years ago. Based on the medical thoughts in *Huang Di Nei Jing* (《黄帝内经》 *Huangdi's Internal Classic*), doctors in later dynasties accumulated abundant knowledge of disease prevention based on their own clinical practice and experience. In *Zhu Bing Yuan Hou Lun* (《诸病源候论》 *Treatise on Causes and Manifestations of Various Diseases*) by Chao Yuanfang in the Sui Dynasty, it was made clear that “Epidemics can be prevented by premedication and other approaches.”^[4] There were over 20 prescriptions for treating epidemics in *Zhou Hou Bei Ji Fang* (《肘后备急方》 *Handbook of Prescriptions for Emergency*) and *Qian Jin Yao Fang* (《千金要方》 *Important Prescriptions Worth a Thousand Gold for Emergency*). There are many detailed and effective methods in TCM to prevent infection. The immediate measure that is the most proactive and effective to prevent infectious diseases is immunization, which was pioneered by TCM doctors, as can be proved by the book *Li Shi Mian Yi Lei Fang* (《李氏免疫类方》 *Li's Immunization Prescriptions*) in the 18th century. It is worth mentioning that the invention of variolation in China is the beginning of artificial immunization, which is one of the significant achievements in the history of medicine worldwide.

As regards specific measures for epidemic prevention, healthy qi of the body is consolidated first and foremost to improve the ability of the body to resist invasion by pathogenic qi, so that the latter fails to invade the body, or causes no disease even though it penetrates the body, or causes mild disease that is easy to be cured of and recover from.

The specific measures are as follows. First, adapt to natural climate changes. Second, do traditional Chinese physical and breathing exercises, including Taijiquan (太极拳) and Wuqinxi (五禽戏), which relieve physical and mental fatigue and improve the resistance of the body to invasion by external pathogens. Third, wear herbal sachets and carry out herbal fumigation, which dispels filth with aroma and invigorates spleen to resolve dampness. Fourth, often massage acupoints Yingxiang (LI 20), Fengchi (GB 20), and Zusanli (ST 36). etc. to reinforce healthy qi and unblock collaterals for disease prevention and health protection. Fifth, use diet to regulate and nourish the body so that “Pathogens cannot cause disease with sufficient healthy qi in the body.” Appropriate diet therapy, tea drinks, and other external treatment methods should be

selected according to body constitutions. Finally, premedicate the possibly vulnerable population during an epidemic to effectively prevent outbreak and spread of epidemics. The commonly-used prescriptions for reinforcing healthy qi and dispelling pathogenic qi include Yupingfeng Powder.

Treatment of epidemics

In TCM, corresponding treatment methods are used for different syndromes of epidemics. Only when the nature of syndrome is identified can the appropriate treatment be selected, which is a prerequisite for selecting prescriptions and drugs and determining dosage and usage. The selection of treatment methods for epidemics mainly depends on the type and nature of the pathogen, the type of syndrome and pathogenesis, and certain specific treatments may be used based on some special symptoms.

UNDERSTANDING OF COVID-19 IN TRADITIONAL CHINESE MEDICINE

Characteristics of coronavirus disease 2019

Coronavirus disease 2019 (COVID-19) belongs to “epidemics” in TCM and is mainly caused by external contraction with dampness turbidity and filthy qi. It shares many characteristics with diseases caused by epidemic qi, but it also has unique characteristics of its own. For instance, the COVID-19 virus invades the body through the skin, muscular interstice, and collaterals, which is what “(The virus) enters the body through the skin and hair” means in TCM. In addition, the disease caused by epidemic qi occurs to anyone regardless of age, but COVID-19 mostly occurs in the elderly with poor prognosis, and young adults and children can also be infected. Moreover, the COVID-19 virus is highly infectious and spreads rapidly. The disease broke out first in Wuhan, spread to the surrounding areas and occurred continuously in other provinces and cities. At the same time, the COVID-19 virus causes infection by invading the oral cavity, nasal cavity, and ocular mucosa through the pathways, including droplet and contact transmission. However, in this outbreak of COVID-19, most of the patients have shown favorable prognosis, and some of the patients have been critically ill and others died.

Etiology and pathogenesis of corona virus disease 2019

Considering that COVID-19 is mainly caused by pathogenic dampness, Professor Yan points out that it should be categorized into “dampness epidemic” since it both has distinctive infectivity and epidemicity and the same etiological and pathogenesis characteristics and clinical features with dampness epidemic. Based on the diagnosis and treatment of COVID-19, Professor Yan believes that although the treatment of epidemics has its particularities, it is still within the framework of TCM theories, methods, prescriptions and medication, which is the source of the vitality of TCM in treating epidemics. As is the case in the treatment of other internal diseases, the cause, location, nature, and tendency of the coronavirus disease must be identified, so that treatment

methods and prescriptions can be determined and therapeutic effect can be expected.

First, COVID-19 is caused by dampness turbidity and filthy qi. Based on the symptoms of hiding fever, poor appetite, nausea, vomiting, loose stools, fatigue, and a greasy tongue coating at the early stage in most patients, the syndrome is differentiated to find out the cause, and it is concluded that the main etiology and pathogenesis are of blockage by dampness turbidity and filthy qi. Secondly, in terms of location of disease, it is a latent pathogen in pleurodiaphragmatic interspace (qi aspect) that upwardly trespasses Shaoyin, invades Shaoyang in the middle and ultimately damages the liver and kidney. A long latent period is observed in most patients, with distinctively scanty, turbid, and thick tongue coating. Apart from the concomitant syndrome of disturbed ascending and descending in qi movement of spleen and stomach in the middle energizer, symptoms such as chest tightness, shortness of breath and bitter taste in the mouth are often observed; thus, the disease occurs in multiple locations and shows the characteristic of dampness clouding the triple energizer. Third, the disease is cold and heat complex in nature. Aversion to cold and fever occurred at the early stage, then fever and dry cough prevail, and the tongue coating turns from greasy white to greasy yellow. As the condition progresses, the patient has a thirst, dark red tongue and dry tongue coating with little fluid, indicating stagnation of dampness turbidity in the lung at the early stage and later transforming into heat and even dryness, hence the pathogenesis of cold and heat in complexity, which is why we pay attention to using in combination drugs cold and warm in property. Fourth, the tendency of the disease is changeable and unpredictable. This disease shows mild symptoms at the early stage, but it worsens suddenly in some of the patients and even turns into critical illness, resulting in a poor prognosis. In addition, the infectivity of people with asymptomatic infection and recurrence after rehabilitation suggests unpredictability of the disease and poses a challenge to the prevention and treatment of it.

Based on both classical elaborations and clinical practice, we believe that the core pathogenesis of COVID-19 is that with the latency of externally-contracted dampness turbidity and epidemic toxin in pleurodiaphragmatic interspace and internal frenetic stirring of Shaoyang ministerial fire, interaction between the external and internal causes leads to the transformation of dampness turbidity into the toxin that obstructs lung qi, and together with wood fire tormenting metal and the upward rushing of dampness fire (toxin), a syndrome of epidemic toxin blocking the lung occurs ultimately.

Prevention and treatment of coronavirus disease 2019

It was pointed out in *Huangdi's Internal Classic* that "Invasion of pathogen must be due to deficiency of essential qi",^[5] thus enhancing healthy qi can improve the ability of the body to resist invasion by pathogenic qi, so that it fails to invade the body, or causes no disease even though it enters the body, or causes the mild disease that is easy to cure of and recover from. All

above-mentioned preventive measures can be applied, including adaptation to natural climate changes, home quarantine, building a proper balance between work and rest, physical and breathing exercise, wearing herbal sachets, premedication with preventive prescriptions and developing vaccines. However, the characteristic of COVID-19, i.e., pathogenic dampness causing disease, should also be considered, and attention is paid to reinforcing healthy qi, dispelling filth with aroma and invigorating spleen to resolve dampness, etc.

Considering the cause, pathogenesis, location, tendency, and characteristics of transmission, change, and outcome of COVID-19, treatment is given at the early stage to open the pleurodiaphragmatic interspace and clear Shaoyang, and the prescriptions selected are Dayuan Decoction and Xiaochaihu Decoction combined with Haoqin Qingdan Decoction. In case of concurrent external contraction of pathogenic wind, treatment should be given to disperse wind and eliminate dampness, regulate qi and vanquish toxin, and the prescription used is Renshen Baidu Powder or Jingfang Baidu Powder; in case of predominance of dampness overheat when dampness obstructs the defensive qi, treatment is given to promote diffusion with aroma, disperse qi and resolve dampness, and the prescription selected is Huopo Xialing Decoction or Sanren Decoction; in syndrome of dampness heat and amassing toxin, treatment is given to clear heat, resolve dampness and remove toxin, and the prescription used is Ganlu Xiaodu Pill; in case of pathogenic heat blocking the lung, treatment is given to clear heat, ventilate lung and relieve dyspnea, and the prescription selected is Maxing Shigan Decoction; and in case of disease of both defense and qi aspects, treatment is given to release the exterior and clear the interior, and the prescription used is Zengsun Shuangjie Powder.

ANALYSIS OF A CLASSIC MEDICAL RECORD OF PROFESSOR YAN'S TREATMENT OF CORONA VIRUS DISEASE 2019

Professor Yan is good at using the harmonizing method to treat externally-contracted heat diseases and miscellaneous diseases. As for COVID-19, Professor Yan suggests understanding the etiology and pathogenesis in the scope of "dampness epidemic" and using the harmonizing method in treatment, and hopes to broaden clinical perspectives based on various TCM treatment regimens nowadays to improve the therapeutic effect and prognosis. Recently, Professor Yan has treated a COVID-19 patient through remote consultation, and a summary analysis of a classical medical record was given below to explore the way of thinking in treatment and to sum up the treatment approaches and principles, in the hope of understanding the disease better and improving the therapeutic effect and prognosis.

A classical medical record

Chuan, female, 51 years old. She was a farmer. Date of the first visit: 20 February 2020.

Complaints: cough, chest tightness, and shortness of breath for more than a month.

History of present illness: On January 14, 2020, the patient began to cough with no obvious cause, which worsened at daytime. She had scanty, white, and slightly sticky phlegm, felt tight in the chest and was short of breath upon physical exertion. On January 22, she had a chest computed tomography (CT) scan in a hospital in Wuhan that showed diffuse infectious lesions in both lungs; on January 30, chest CT scan showed diffuse infectious lesions in both lungs, mediastinal lymphadenopathy, bilateral pleural effusion absorbed as compared to before and some lesions with slightly lower density than at the last CT scan; on February 2, she was positive in a COVID-19 nucleic acid test; on February 16, chest CT scan showed diffuse infectious lesions in both lungs. During hospitalization, despite symptomatic supportive treatment, including antiviral treatment and oxygen inhalation, the patient still had a cough, chest tightness, difficulty in breathing, and shortness of breath upon physical exertion. Then, she was admitted to Ward 5 of Infectious Diseases Department 3 in Leishenshan Hospital.

At admission, the patient had a body temperature of 37.2°C, oxygen saturation of 95%, respiratory rate of 27 breaths/min and blood pressure of 125/80 mmHg; blood routine showed white blood cells of $5.41 \times 10^9/L$, percentage of neutrophils of 57.7%, percentage of lymphocytes of 28.3%, and absolute lymphocyte count of $1.53 \times 10^9/L$. Chest CT [Figure 1] scan showed multiple patchy ground-glass density shadows and streak-like high-density shadows in both lungs, especially under the pleura, with inflammation accounting for 60%~70% of the lungs.

Diagnosis at the moment

Frequent cough with scanty, white and slightly sticky phlegm; chest tightness with shortness of breath upon physical exertion; no pain in the head, body or limbs, no pain in the chest, no nasal congestion or runny nose, and normal appetite, sleep, bowel

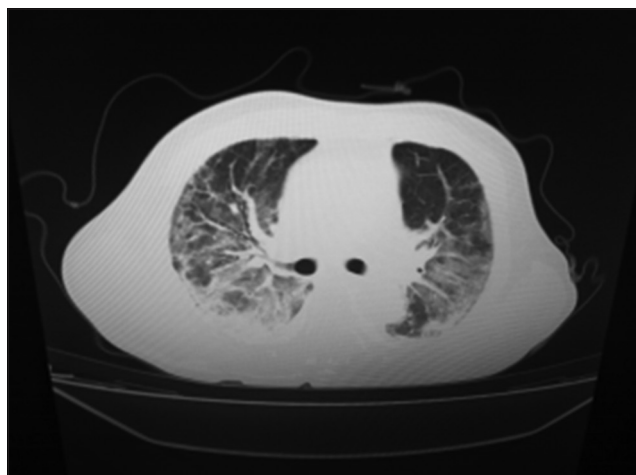


Figure 1: Chest computed tomography image of the patient before consultation (February 24)

and bladder movements; pale red tongue and thin, yellow and greasy tongue coating.

Diagnosis in Western medicine

COVID-19 (severe); diagnosis in TCM: Wind-warmth disease with lung heat (phlegm-heat stagnated in the lung).

For treatment, oral moxifloxacin tablets (0.4 g, qd) and favipiravir (taken orally, 1600 mg on day 1 1600 mg on days 2–7, bid) were given. Chinese medicines were used to clear heat and remove toxin, ventilate lung, and resolve phlegm. Despite active antiviral and anti-infective treatment, clearing lung and resolving phlegm with Chinese medicines and supportive symptomatic treatment, chest CT scan of the patient showed scattered patchy shadows in both lungs with no obvious absorption compared to before, and cough was not relieved, with shortness of breath after movement. Professor Yan was invited for consultation, and the treatment regimen was adjusted.

Visit 1 (February 23)

The patient had a course of disease of over 50 days. There was obvious shortness of breath upon physical exertion despite treatment. CT scan showed 60%~70% of inflammation in the lungs, with obvious exudate. Just at that moment, the patient still coughed, with scanty phlegm that was difficult to expectorate; had shortness of breath, panting and mild chest tightness after 6-min indoor walking; had no nasal congestion or runny nose, no fever, no sore throat, and no chest pain; had poor appetite, normal feces, and urine and basically normal sleep; and had pale red tongue, thin, yellow and greasy tongue coating and fine pulse. Diagnosis in TCM: dampness epidemic (phlegm-heat obstructing lung).

Prescription: Sheng Ma Huang (生麻黄 *Herba Ephedrae*) 12 g, Xing Ren (杏仁 *Semen Armeniacae*) 15 g, Sheng Shi Gao (生石膏 *Gypsum Crudum*) 30 g, Gan Cao (甘草 *Radix Glycyrrhizae*) 9 g, Huang Qin (黄芩 *Radix Scutellariae*) 15 g, Huang Lian (黄连 *Rhizoma Coptidis*) 9 g, Chen Pi (陈皮 *Pericarpium Citri Reticulatae*) 9 g, Ban Xia (半夏 *Rhizoma Pinelliae*) 12 g, Fu Ling (茯苓 *Poria*) 15 g, Su Zi (苏子 *Fructus Perillae*) 20 g, Bai Jie Zi (白芥子 *Semen Sinapis Albae*) 15 g, Ting Li Zi (葶苈子 *Semen Lepidii*) (wrap-decocted) 20 g, Gua Lou Pi (瓜蒌皮 *Pericarpium Fructus Trichosanthis*) 15 g, Sang Bai Pi (桑白皮 *Cortex Mori*) 15 g, Zi Yuan (紫苑 *Asteris Radix et Rhizoma*) 15 g, Sheng Huang Qi (生黄芪 *Radix Astragali seu Hedysari*) 30 g, Dan Shen (丹参 *Radix Salviae Miltiorrhizae*) 20 g, Jin Yin Hua (金银花 *Flos Lonicerae*) 15 g, Lian Qiao (连翘 *Fructus Forsythiae*) 15 g, Sheng Ma (升麻 *Rhizoma Cimicifugae*) 20 g, Bai Bu (百部 *Radix Stemonae*) 15 g, Yi Yi Ren (薏苡仁 *Semen Coicis*) 20 g, Kuan Dong Hua (款冬花 *Flos Farfarae*) 15 g and Sheng Shai Shen (生晒参 *Radix Ginseng*) 7 g. One dose a day, 3 doses in total. Decocted in water and taken twice a day in the morning and evening.

Visit 2 (February 26)

Cough was relieved significantly, and shortness of breath and panting upon physical exertion were improved. The patient had no chest tightness, fever or throat discomfort; had normal

appetite, feces, urine, and sleep; and had a pale red tongue, some scattered petechiae, thin yellow tongue coating, and thready pulse. Bai Bu (百部 *Radix Stemonae*), Kuan Dong Hua (款冬花 *Flos Farfarae*), Sheng Ma (升麻 *Rhizoma Cimicifugae*) and Huang Lian (黄连 *Rhizoma Coptidis*) were removed from the above prescription and the following herbs were added: Shu Di Huang (熟地黄 *Radix Rehmanniae Preparata*) 15 g, Shan Zhu Yu (山茱萸 *Fructus Corni*) 12 g, Shan Yao (山药 *Rhizoma Dioscoreae*) 15 g, Tao Ren (桃仁 *Semen Persicae*) 15 g and San Leng (三棱 *Rhizoma Sparganii*) 15 g. 5 doses.

Visit 3 (March 2)

Cough, panting, and shortness of breath were improved significantly. The patient had no chest tightness, fever or throat discomfort; had a normal appetite, bowel and bladder movements and sleep; and had pale red tongue, some petechiae, thin tongue coating and thready pulse. On February 27, normal results were obtained for blood routine and liver and kidney functions, and the COVID-19 nucleic acid test showed negative results. Chest CT scan revealed multiple patchy ground-glass density shadows and streak-like high-density shadows in both lungs, especially under the pleura; no thickening of bilateral pleura and signs of effusion in bilateral pleura; and no enlarged lymph nodes in the mediastinum. Compared to the chest CT scan results on February 24, lesions in both lungs were slightly absorbed. Jin Yin Hua (金银花 *Flos Lonicerae*) and Lian Qiao (连翘 *Fructus Forsythiae*) were removed from the above prescription and Xia Ku Cao (夏枯草 *Spica Prunellae*) 12 g and Mu Li (牡蛎 *Concha Ostreae*) 30 g were added. 7 doses.

Visit 4 (March 13)

The symptoms were improved significantly, and the COVID-19 nucleic acid test showed negative results. Chest CT scan [Figure 2] showed multiple patchy ground-glass density shadows and streak-like density shadows in both lungs, especially under the pleura; and no thickening of bilateral pleura and signs of effusion in bilateral pleura. The effusion was absorbed obviously compared to that at admission, and

the symptoms were improved. Fourteen doses of the above prescription were dispensed to the patient at discharge.

Analysis of the medical record

Focus on the harmonizing method in treatment based on syndrome differentiation

Zhang Jiebin in the Ming Dynasty said that “Using the harmonizing prescriptions, the disharmony is harmonized. In diseases with concomitant deficiency, the tonifying approach is used for harmonization; in those with concomitant stagnation, the moving approach is used for harmonization; in those with concomitant cold, the warming approach is used for harmonization; and in those with concomitant heat, the cooling approach is used for harmonization.”^[6] It can be seen that the harmonizing method corrects the imbalance of qi, blood, yin and yang in the body. Professor Yan is skillful at using the harmonizing method to treat various externally-contracted heat diseases and miscellaneous diseases and suggests paying attention to the harmonizing method in the treatment of this dampness epidemic.

In this case, Professor Yan differentiated the syndrome meticulously and thoroughly. The patient had serious pulmonary inflammation that was severe COVID-19. She coughed with phlegm that was difficult to expectorate; had the red tongue and sparse but thin yellow tongue coating; and had obvious shortness of breath and lung exudate. Deep-lying phlegm-heat was considered instead of simple dampness epidemic that damaged lung yin with the passing of time. Therefore in treatment, the approaches of clearing heat and resolving and draining phlegm were used, and Huanglian Wendan Decoction was selected to resolve phlegm-dampness, and Xiaoxianxiong Decoction was used to resolve phlegm-heat. The lung is the dominator of qi, and the kidney is the root of qi. The Lung governs ascent and dispersion, purification and descent of qi, and the kidney governs reception of qi. The patient had rapid panting on exertion, and the cause was that deficient qi of the lung led to the failure of the Zang organ to govern qi, together with the inability of the kidney to receive qi because of damage to the Zang organ by prolonged illness. Therefore, drugs like Shu Di Huang (熟地黄 *Radix Rehmanniae Preparata*) and Shan Zhu Yu (山茱萸 *Fructus Corni*) were selected for nourishing kidney yin and tonifying kidney to promote receiving qi. It was also considered that the key to the treatment of this disease was protecting middle qi and pectoral qi, and healthy qi was deficient due to prolonged course of the disease, so Ren Shen (人参 *Radix Ginseng*) and Sheng Huang Qi (生黄芪 *Radix Astragali seu Hedysari*) were used to tonify pectoral qi, and healthy qi was reinforced throughout the treatment. Meanwhile, the patient had scattered petechiae in the tongue, so treatment was given to activate blood and resolve stasis, and the herbs used included Tao Ren (桃仁 *Semen Persicae*), San Leng (三棱 *Rhizoma Sparganii*) and Dan Shen (丹参 *Radix Salviae Miltiorrhizae*). Drugs such as Xia Ku Cao (夏枯草 *Spica Prunellae*) and Mu Li (牡蛎 *Concha Ostreae*) soften hardness and dissipate mass and can be used to prevent pulmonary fibrosis at the later stage.

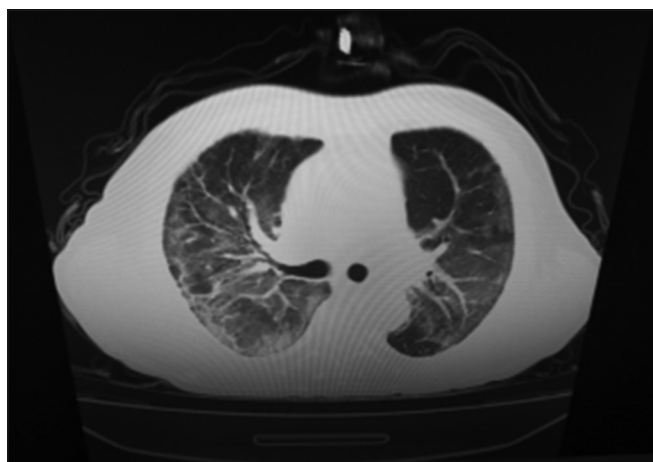


Figure 2: Chest computed tomography image of the patient before discharge (March 13)

In addition, Professor Yan carried out accurate, comprehensive, and balanced medication. For instance, Yi Yi Ren (薏苡仁 *Semen Coicis*) that is mild in the property was used instead of Cang Zhu (苍术 *Rhizoma Atractylodis*) and Pei Lan (佩兰 *Herba Eupatorii*) that are warm in property to resolve dampness; drugs promoting to receive qi were used to check and balance the effect of Sheng Ma Huang (生麻黄 *Herba Ephedrae*) to disperse qi; Su Zi (苏子 *Fructus Perillae*) and Bai Jie Zi (白芥子 *Semen Sinapis Albae*) that resolve phlegm with pungent-warm were used as well as Lian Qiao (连翘 *Fructus Forsythiae*), Huang Qin (黄芩 *Radix Scutellariae*) and Huang Lian (黄连 *Rhizoma Coptidis*) that clear heat. The pathogenesis in this case was complicated and Professor Yan used both drugs cold and warm in property based on the core pathogenesis of dampness epidemic to nourish yin and activate blood, reinforce healthy qi and eliminate pathogenic qi, resolve dampness and dredge collaterals for a combined effect and the harmonizing method was used throughout the treatment, just as what was said by Professor Yan: “Although many and diverse drugs are used, the core pathogenesis should be identified in treatment, so that ‘The disharmony is harmonized.’”

Protection of middle qi and protection of the lung (simultaneous treatment of the spleen and lung)

At the early stage of COVID-19, there are unobvious fever manifestations and the main clinical manifestations of fatigue, cough, chest tightness, and greasy tongue coating. There are mainly panting, feeling of suffocation, dyspnea, and greasy tongue coating during disease. During recovery, qi deficiency of lung and spleen is predominant, consistent with the characteristics of the evolving pathogenesis of dampness epidemic.

As regards the formation of dampness-heat, Wu Jutong in the Qing Dynasty pointed out in his *Wen Bing Tiao Bian* “Zhong Jiao” (《温病条辨·中焦》Detailed Analysis of Warm Diseases “Middle Energizer”) that “(Dampness-heat) transfers from channels and collaterals to the viscera, and from the lung to spleen and stomach.”^[7] In COVID-19, dampness-heat mainly transfers from lung to spleen and stomach, resulting in disease of both lung and spleen. Spleen and stomach play an important role in the evolution of the disease. The spleen is the source of phlegm, and the lung is the container of phlegm. Phlegm turbidity blocking the lung is the main pathogenesis of COVID-19. Firstly, protecting middle qi is to eliminate spleen disorder and remove the root cause of phlegm, allowing for ascent and dispersion of lung qi; then, exuberance and debilitation of middle qi determines transformation of the pathogenic dampness heat. Dampness-heat is caused by “pathogenic dampness,” and the tendencies of the disease include cold transformation due to damage to yang and heat transformation that damages yin. In syndrome differentiation, some patients with COVID-19 had cold-dampness, and some had dampness-heat, and as a matter of fact, the patients’ body constitution determined the transformation of cold or heat. Therefore, protecting middle qi is to protect yang qi, and excessive cooling and

reckless purging are discouraged, otherwise, yang qi will be damaged seriously, resulting in the collapse of yang qi despite eliminated dampness-heat, just as what was said by Ye Tianshi in the Qing Dynasty, “Although dampness heat is eliminated, yang qi declines too.” Such protection of middle qi allows for preventing or slowing further development and aggravation of the condition.

The occurrence of dampness epidemic is the consequence of the interaction between the external and internal causes. The pathogenesis focus of dampness epidemic is lingering in the qi aspect, with central lesions in the spleen and stomach. In case of disturbed ascending and descending in qi movement of spleen and stomach, the symptoms including stuffiness and swelling in the epigastrium and abdomen, nausea, vomiting, loose stool, and greasy tongue coating are seen clinically. Based on the clinical fact that symptoms and signs of disorder of spleen and stomach are prominent in COVID-19, some scholars suggest dispersing lung qi from three points of view, namely the exterior, lung, and spleen and stomach, paying attention to the simultaneous treatment of lung and spleen, and taking the approaches of ventilating lung and expelling pathogen, invigorating spleen and removing dampness, dispelling filth and resolving turbidity, removing toxin and dredging collaterals and so on.

In this case, although the patient was negative in the nucleic acid test, there were prolonged cough, panting, and phlegm and poor absorption of inflammation in the lung. Through syndrome differentiation, Professor Yan believed that the patient’s long course of disease led to deficient middle qi, so Sheng Huang Qi (生黄芪 *Radix Astragali seu Hedysari*) and Sheng Shai Shen (生晒参 *Radix Ginseng*) were added to reinforce healthy qi and eliminate inflammation, with remarkable therapeutic effect. He also suggested adding Liu Qu (六曲 medicated leaven) or stir-fried Gu Ya (炒谷芽 *Fructus Setariae Germinatus*), stir-fried Mai Ya (炒麦芽 *Fructus Hordei Germinatus*) or Baohe Pill (保和丸) decocted together to reduce food accumulation and promote transportation for patients with poor appetite due to deficient middle qi.

Protection of pectoral qi and protection of lung (simultaneous treatment of heart and lung)

According to TCM, the lung absorbs celestial qi, which integrates with essential qi generated from water and grain transported and transformed by spleen and stomach and accumulates in the chest, hence known as pectoral qi. Pectoral qi flows up to the throat and governs respiration, runs through the heart vessels and distributes all over the body, as was described in *Ling Shu* “Xieke” (《灵枢·邪客》Ling Shu “Evil Visitors”) that “(Pectoral qi) runs up to the throat, penetrates through the heart vessels and propels respiration.” Therefore, pectoral qi is generated in the lung and spleen, it is the product of the shared functional activity of the heart and lung and the motive force of the physiological activities of the two Zang organs.

Spleen and stomach are the root of the generation of pectoral qi, and phlegm-dampness amassing lung is closely related to pectoral qi. Pathogenic dampness-heat attacks the lung and causes depression of defensive qi by pathogens, leading to failure of lung qi to ascend; thus protection of pectoral qi is to protect lung qi and resolve dampness and turbidity. In this dampness epidemic, patients have prolonged course of disease, and most of them have symptoms of cough, weakness, fatigue and panting and chest tightness on exertion, which are generally associated with deficient pectoral qi that is unable to assist the heart and lung to move qi, disinhibit water and activate blood.

In this case, the patient was short of breath on exertion, and Su Zi (苏子 *Fructus Perillae*) and Bai Jie Zi (白芥子 *Semen Sinapis Albae*) were used to resolving phlegm and relieve dyspnea, Ting Li Zi (葶苈子 *Semen Lepidii*) was used to purge lung and relieve dyspnea, Gua Lou Pi (瓜蒌皮 *Pericarpium Fructus Trichosanthis*) was used to resolve phlegm, disinhibit qi and soothe the chest, and Sheng Ma (升麻 *Rhizoma Cimicifugae*) was used to clear heat, remove toxin and raise yang qi. The drugs used in combination tonify pectoral qi, resolve phlegm-dampness, and protect the heart and lungs. At the same time, Huang Qi (黄芪 *Radix Astragali seu Hedysari*) is effective in both tonifying qi and raising qi, and its combination with the above drugs improved the symptom of panting significantly at visit 2.

Protection of yin fluid and protection of the lung (simultaneous treatment of lung and kidney)

Patients with a blue complexion and weight loss are often diagnosed as fire hyperactivity due to yin deficiency. In contraction with pathogenic dampness-heat, dampness has a tendency to form dryness and heat, consuming more yin fluid. In treatment, attention should be paid to protecting yin fluid, and medicinals with clearing and cooling property are often used to reduce fever (60-70%). When fever abates, and the body cools down, care should be taken not to mistake it for deficiency-cold syndrome and use drugs warming and tonifying, otherwise, there is a risk of relapse just like dying embers that flare-up.

The presence of heat in dampness is a major sign of dampness epidemic. When dampness-heat obstructs the middle energizer for a long time, excessive heat tends to consume yin fluid, causes damage to yin and forms dryness, and also enters blood and causes damage to collaterals, or results in fresh blood in feces, and even death due to qi collapse following blood loss. This unique pathogenesis may also be the crux of this epidemic that despite a long latent period, the disease transmits and changes rapidly, and it is prone to developing into the critical syndrome of heat toxin blocking lung or internal block and external collapse.

In this dampness epidemic, many patients had thin white or white greasy tongue coating at the early stage, but it turned into yellow greasy tongue coating rapidly. Meanwhile, some patients had symptoms of fatigue, dry mouth and tongue, dry

tongue texture with scanty fluid, or fissured tongue and prickly tongue at the early stage. At the later stage of heart disease, damage to both qi and yin is easily seen, and it is especially easy for toxic heat to damage qi and yin, so many patients show obvious dryness of fluid at the later stage.

Yan Cangshan, a modern medical expert in TCM, has proposed using the method of nourishing yin and generating fluid to treat warm disease by saying that “Warm disease is caused by yang pathogens that tend to consume fluid. If there are dry tongue texture, scanty fluid and thirst at the early stage, drugs generating fluid must be used, such as Sheng Di (生地 *Radix Rehmanniae Recens*) and Shi Hu (石斛 *Herba Dendrobii*).” The lung is a delicate Zang organ and is easily damaged by dryness. Upper attack of warm pathogens starts from the lung, so in most of the warm diseases and in this epidemic, consumption of fluid is the commonly seen pathological feature, and protection of fluid is also important in the protection of lung. The pathogenesis characteristic of warm disease is that warm pathogens enter the interior and exuberant heat damages fluid and consumes nutrient-blood, therefore, the treatment focus of warm disease is to dispel pathogens to rescue yin, which means protecting yin fluid while dispelling pathogens, taking care in inducing sweat to preserve fluid, and avoiding excessive sweating lest yin fluid be damaged.

In general, Mai Dong (麦冬 *Radix Ophiopogonis*) and Nan Sha Shen (南沙参 *Radix Adenophorae*) are preferred among the yin-nourishing drugs that are used to treat warm disease. In this medical record, Professor Yan observed red tongue, thin tongue coating and fine pulse in the patient at visit 2, which were caused by damage to yin fluid because of a prolonged course of the disease, so Shu Di Huang (熟地黄 *Radix Rehmanniae Preparata*) and Shan Zhu Yu (山茱萸 *Fructus Corni*) were used to protect yin fluid, and good therapeutic effect was obtained.

CONCLUSION

Since ancient times, experts on epidemics have always paid attention to the qi aspect in epidemic treatment. For instance, in the Qing Dynasty, Wu Youke treated the pleurodiaphragmatic interspace and stomach; Yu Lin treated the stomach; and Yang Lishan used prescriptions and drugs to clear heat, remove toxin and purge with cold- and bitter-property ingredients, with focus on the qi aspect. Wu Youke learned from clinical practice that “Pathogens in the qi aspect are easy to be dispelled, whereas those in the blood aspect are mostly sticky and stagnant (and difficult to be dispelled).”

Therefore, it has undoubtedly positive significance for epidemic prognosis to focus on the qi aspect and proactively dispel pathogens to prevent them from going into deeper aspects. In the treatment of this “epidemic dampness,” Professor Yan suggests guarding the qi aspect and taking the approaches of moistening the lung and resolving phlegm, ascending and descending qi, reinforcing healthy qi and dispelling stasis to prevent disease progression.

In conclusion, in the treatment of COVID-19, based on the classical theories on warm diseases, learning from the academic thoughts of famous doctors and using the harmonizing method, we propose the approach of “triple protection,” i.e., protection of middle qi, pectoral qi and yin fluid, to prevent disease progression and avoid pathogens from getting deeper. We further point out that for this disease, treatment should be given in the framework of syndrome differentiation and treatment in TCM, identifying the cause, location, nature, and tendency of disease in order to select the appropriate methods and prescriptions and to better understand and treat COVID-19 and improve the therapeutic effect and prognosis.

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Conflicts of interest

There are no conflicts of interest.

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Discussing the Dietary Regimen and Disease Prevention and its Application as an Anti-epidemic Measure

Jianhe Fang, Weifeng Zhu¹, Hongning Liu²

School of Traditional Chinese Medicine and School of Life Sciences, Jiangxi University of Traditional Chinese Medicine, Nanchang, ¹Jiangxi University of Traditional Chinese Medicine, Nanchang, Jiangxi, ²Institute of Science, Technology and Humanities, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

This article discusses the role of dietary regimen in the traditional culture of Chinese medicine according to its origin. Dietary regimen is a technique that inherits the traditional culture of Chinese medicine. Through analysis of the characteristics of the dietary regimen and the discussion of the idea of disease prevention, the application of the dietary regimen in disease prevention is sought. Under the guidance of three key factors, the application of the dietary regimen in disease prevention is mainly manifested in two aspects. First, the dietary regimen can be used to guide the daily reasonable diet to maintain the human body in a balance of Yin and Yang, which could prevent the occurrence of diseases. Second, on the basis of minimizing health loss, it can be used for disease treatment, adjuvant treatment, and rehabilitation. Finally, taking preventive treatment as the guiding ideology, the application of a dietary regimen as an “anti-epidemic” was briefly discussed.

Keywords: Anti-epidemic, dietary regimen, disease prevention, three categories of etiologic factors, traditional culture of Chinese medicine

Dietary regimen in short is based on the theory of Chinese medicine as a guide to develop a reasonable diet so as to nurse an individual back to health. Dietary regimen originated in the pre-Qin period of China, and as an indispensable part of the cultural system of traditional Chinese medicine, it grew up and sophisticated along with the Chinese civilization. The development of the dietary regimen can be divided into two historical stages: raising health at the pre-Qin period to the end of the Sui dynasty, where raising health and healing were combined after the Tang dynasty.

POSITION OF THE DIETARY REGIMEN IN THE CULTURAL SYSTEM OF TRADITIONAL CHINESE MEDICINE

As part of the cultural system of traditional Chinese medicine, dietary medicine essentially upholds the art of adhering to the Dao and the law of Chinese medicine. The Dao of Chinese medicine, which is the yin and yang of nature, is composed of the five elements, and has its own order. The law of traditional Chinese medicine considers the human body as a small universe, which is under the guidance of

the law of yin and yang, where the five elements are set up in a series of methods. It includes^[1] the understanding of the physiology of the human body and the structure of the five elements, such as the biological structure of zang fu, the cycle of the diminishing of the five elements in between zang fu, the understanding of superficial and inner, the distribution of the meridians, collaterals and acupoints of zang fu organs,^[2] and the methods of maintaining health, including emotional health maintenance, seasonal health maintenance, guidance health maintenance, and diet health maintenance. Diagnostic methods include inspection, listening and smelling, inquiry, and pulse taking based on, six meridian differentiation, zang-fu syndrome differentiation, eight principle syndrome differentiation, defensive qi and blood syndrome differentiation, and Sanjiao syndrome differentiation. Treatment methods include tonifying, purging, sweating, and vomiting.

Address for correspondence: Dr. Hongning Liu,
Institute of Science, Technology and Humanities, Shanghai University of
Traditional Chinese Medicine, Shanghai, China.
E-mail: 13803506857@139.com

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These three categories of etiologic factors are the main law which should be obeyed. The Chinese medicine method consists of specific technical measures formulated under the guidance of law, such as the use of specific traditional Chinese medicine prescriptions, the implementations of acupuncture, moxibustion, and the application of a dietary regimen.

DIETARY REGIMEN

The specifications and unique content of the dietary regimen could supplement other Chinese medicine methods, but it could also replace other methods to maintain the health of the human body under certain circumstances. The dietary regimen mainly consists of two parts: food that should be avoided and food that could be consumed.

Dietary restrictions include healthy diet restrictions, seasonal diet restrictions, food consumption restrictions, food quality (i.e., whether or not spoiled) restrictions, food collocation restrictions, and disease dietary restrictions.

Appropriate food refers to, according to the health of the individual, to determine what to eat, what kind of ingredients to choose, what kind of processing and production methods to use, and so on.

Appropriate foods are mainly obtained through the formulation of the daily general diet and prescription formulation to achieve health maintenance. The food regimen prescription is the prescription composed mainly of ingredients. Compared with the traditional prescription, the prescription of the food regimen is more interesting and acceptable, which also makes food and nourishment encompass the function of “regulating the heart and treating illness” in the form of porridge, soup, cake, and other forms of common diet or medicinal meals and other forms such as tea.

THE DIETARY REGIMEN IS AN IMPORTANT METHOD OF DISEASE PREVENTION

Disease prevention is not treatment. At present, we basically agree that disease prevention mainly consists of preventing disease, preventing change from illness, and recovering after illness. Specifically, the first focus of maintaining health is to grasp the initiative of health, to prevent the occurrence of disease and, to prevent the deterioration of the body from disease, and to prevent the recurrence of disease after cure, in order to minimize the loss of health caused by illness or treatment. Therefore, the so-called “disease prevention,” that is, to use a corresponding method to prevent the occurrence, development, and recurrence of diseases, is in fact fundamentally put forward as the way to maintain human health, a way to actively guide the body to develop in the direction of being healthy.

Due to the neutral nature of food, it acts as the main source of nutrients needed for normal physiological activities of the

human body. Food is different from drugs, which have deviated from nature and which easily cause side effects [Note 1]. As long as the method is proper, the dietary regimen can prevent disease, and it can also help the body recover from diseases on the basis of reducing the loss of health caused by the side effects of drug treatment. This feature makes it one of the most important methods to realize disease prevention in traditional Chinese medicine. As Lou Juzhong, a famous doctor in the Song Dynasty, said, “Body is treated when food is controlled,”^[1] “it’s the method of a good doctor in disease prevention.”

THE APPLICATION OF THE DIETARY REGIMEN IN THE PREVENTION OF DISEASE

The dietary regimen can be used to guide the daily diet, aid recuperation, and maintain the healthy human body in a state of harmonized Yin and hidden Yang. It is one of the most important methods to prevent diseases. It is mainly suitable for generally healthy people and sub-healthy people. Some healthy or sub-healthy people in a special physiological stage, such as the old, the young, and pregnant women, should pay special attention to the rationality of the diet structure and methods.

According to the above-mentioned factors, as a part of the art of traditional Chinese medicine, food and nourishment is based on the general guiding principle of “three-factor adaptation.” The guiding effect of “three-factor adaptation” on food and feeding is mainly manifested in the formulation of different dietary regimens because of individual, seasonal, and geographic differences.

Individual adaptation is the need to make different dietary plans according to the physical condition of the individual. For example, some people often have symptoms such as fatigue, lower energy, and shortness of breath, but examination shows that the physiological indicators are within the normal range. These kinds of people are most likely to belong to the sub-healthy group with qi deficiency. People with qi deficiency can be nurtured by eating more food that can benefit qi and invigorate the spleen, such as soybeans, lentils, chicken, loach, *Lentinus edodes*, jujube, cinnamon, and honey. At the same time, they should eat less food that cause gas, such as betel nut, cabbage, and lettuce. For the old, young, pregnant, and other special groups, we should pay more attention to the rationality of the dietary plan.

Seasonal change adaptation is the need to make different dietary plans according to the climate. Traditional Chinese medicine holds that: spring budding, summer growing, autumn harvesting, and winter storing. For example, in the spring, the Ginkgo biloba sprouts; in the summer, it produces fruit; in the autumn, it ripens and its leaves fall; and in the winter, there is only a bare trunk. The Zang-fu organs of the human body will also have different physiological reactions in different seasons, especially the five Zang organs of the liver, heart, spleen, lung, and kidney (and the correlated six

Fu organs) will have the exuberant performance of qi in the corresponding spring, summer, long summer, autumn, and winter, respectively. Therefore, the dietary regimen should follow the law of nourishing the liver in spring, nourishing the heart in summer, nourishing the spleen in summer, nourishing the lung in autumn, and nourishing the kidney in winter, often with half the effort and belonging to the important part of seasonal health.

Take nourishing the liver in spring as an example. It is stated in *Su Wen* “Ying Yang Ying Xiang Da Lun” (《素问·阴阳应象大论》 *Basic Questions Comprehensive Discourse on Phenomena Corresponding to Yin and Yang*) that “Wind is originated from the east and promotes wood, wood promotes sourness, sourness promotes the liver (东方生风，风生木，木生酸，酸生肝)....”^[2] Hence, spring belongs to wood, wood qi can produce a sour taste for nourishing the liver. It is not so correct that people think to replenish the liver in spring. According to *Su Wen* “Si Qi Tiao Shen Da Lun” (《素问·四气调神大论》 *Basic Questions Comprehensive Discourse on Regulating the Spirit (in Accordance with) the Qi of the Four Seasons*), spring is a new birth season; people should act according to the “budding” characteristics of spring; the so-called “sprouting gradually, giving birth instead of killing, giving instead of taking, rewarding instead of punishing (披发缓行，以使志生，生而勿杀，予而勿夺，赏而勿罚)” in order to correspond to the spring spirit. What happens if you don’t do it? “Reverse damage to the liver, getting cold in summer, less dedication for growing (逆之则伤肝，夏为寒变，奉长者少).”^[2] Therefore, the author believes that, like emotion, Qi guidance, and other health maintenance methods, the main responsibility of the dietary regimen in seasonal health is to maintain the Zang-fu organs in a healthy seasonal physiological state, such as the liver governs free flow of qi and prefers free activity. The key point of spring liver is to maintain the liver in a state of adjustment to correspond to the birth of spring, and at the same time to prepare for the arrival of the next season. This is also the embodiment of the thought of disease prevention in traditional Chinese medicine.

Seasonal feeding does not blindly replenish, but depends on the physical state of people to decide whether to replenish or purge, how to replenish, and how to purge, in order to help the Zang-fu organs adapt to the characteristics of the season. For example, traditional Chinese medicine has the method of “replenishing form,” but the “synopsis of the *Jin Gui Yao Lue* (《金匱要略》 *Synopsis of the Golden Chamber*)” puts forward that “spring does not eat liver, summer does not eat heart, autumn does not eat lung, winter does not eat kidney, the four seasons do not eat spleen (春不食肝，夏不食心，秋不食肺，冬不食肾，四季不食脾).”^[3] Taking tonifying the liver as an example, Zhongjing explains that there are two main reasons why liver is not eaten in the spring: (1) Spring is the season of exuberant liver qi, if eating liver to replenish liver, it will lead to excessive exuberance of liver wood qi and the restraint of the spleen and soil. (2) The liver of the animal will

lead to “dead gas into the liver and fear of hurting the soul.” According to the above, attention should be paid to maintaining the physiological function of the liver in the state of catharsis and adjustment in spring; the liver of the animal may increase the burden of the human liver, which is not conducive to the regulation of the liver. Therefore, for people with a deficiency of liver and qi, spring is not the best season to replenish the liver with liver. So, how should this kind of person with a deficiency of liver and qi deal with spring? The author thinks that we should pay attention to the following two points:

1. Eat more vegetables. In spring, vegetables are full of woody gas, which can help the liver qi, and does not lead to overreplenishment like animal liver does. The method of “replenishing the liver with the liver” can depend on the situation in other seasons
2. Winter replenishment. *Nan Jing* “Liu Shi Jiu Nan” (《难经·六十九难》 *Classic of Difficult Issues The Sixty-ninth Issue*) “deficiency is to supplement its mother (虚则补其母),”^[4] kidney water is the mother of liver wood, so, if you want to replenish the liver, we must first do a good job in the maintenance of the kidney, and the best season to nourish the kidney is winter.

Adaptation according to places mainly refers to the characteristics of an individual’s long-term geographical environment and selection of the correspondingly appropriate dietary regimen. The dietary customs are different in different parts of China, so is the embodiment of “adjustment measure to local conditions” where Sichuan people like to eat peppers because of the high humidity and hot weather of Sichuan. Hot peppers could dispel the spleen’s dampness, resulting in people’s relaxation. The unique features of the local environment always give special characteristics to its inhabitants. Our ancestors, to some extent, had the wit to adapt to the local geography and climate in life.

According to *Bei Ji Qian Jin Yao Fang* (《备急千金要方》 *Essential Prescriptions Worth a Thousand Gold Pieces for Emergencies*),^[5] beriberi is caused by failure to adapt to local conditions. When the Jin Dynasty moved to the south [Note 2], those northern aristocrats who moved there usually did not work in their daily life, but indulged in sumptuous dishes with a generous amount of meat and fish while ignoring the humidity and hot climate in the south, so they suffered from beriberi.

The concept of three-factor adaptation (individual, season, and place) is an overarching concept, and all the three factors should be combined in their application in daily life.

As the saying goes, when you nourish yourself in the winter, you could get a stronger body in the spring. On the other hand, the climate turns cold after the start of winter; in solar terms, the Yang Qi is hidden inside the body, where the cold evil from the outside environment would invade the inside. At this time, especially the elderly and people who have a Yang deficiency, should consume nourishing and warm food such as mutton, beef, and longan to resist the cold pathogens

and also take medicine when necessary. However, nourishing the body could cause irritability, nose bleeding, constipation, loss of appetite, and other symptoms to youngsters that have exuberant Yang. On the other hand, the kidney should be nourished in winter because the kidney qi is exuberant in winter and will accumulate essence to boost the liver blood. The kidney belongs to water, water promotes wood, the liver belongs to wood, and corresponds to spring. When the kidney is nourished in the winter, it could help the liver qi in spring and it could also reserve the body's strength for spring. At the same time, China has a vast territory, in which the climate varies greatly from place to place, where the time for nourishing the body and the proportion of supplements should be considered.

The dietary regimen can be used in the treatment or auxiliary treatment of disease, and is one of the important methods to realize the ideas of “preventing and curing disease” and “preventing and recovering from disease.” The therapeutic effect of the dietary regimen is called food treatment, which is what we often call food therapy now. Food treatment was put forward by Sun Simiao, a famous medical scientist in the Tang Dynasty in *Bei Ji Qian Jin Yao Fang* “Shi Zhi” (《备急千金要方·食治》 *Essential Prescriptions Worth a Thousand Gold Pieces for Emergencies Diet Therapy*).^[5] Its main intention is to convey that herbs that could be used as drugs are poisonous, their nature is often strong, and the use of medicine is like using an army to fight, where even if it wins, there would be a certain amount of injury. Moreover, if there is a lack of clear command, the consequences will be even more serious. Therefore, it is best to treat disease using neutral food. The treatment of disease should still be based on its priorities and one should decide whether to treat it with food or medicine. Generally, diet therapy is mainly suitable for chronic or mild disease, or auxiliary treatment, as well as in the recuperation or rehabilitation stage of the disease.

The effect of diet therapy is mainly realized through feeding prescriptions. After Sun Simiao put forward the theory of food and treatment, a large number of food and nourishing prescriptions appeared, especially in the Song Dynasty. There are 294 diet feeding prescriptions in *Tai Ping Shen Hui Fang* (《太平圣惠方》 *Taiping Holy Prescriptions for Universal Relief*), which cover 28 diseases and draw a conclusion on the effect of the diet treatment.

1. “Good mood will clear disease.”^[6] As stated above, the dietary regimen should be effective enough to get the patient to a good mood, which would help in recovery
2. “Should be treated with a dietary regimen.”^[6] For some diseases, the dietary regimen could be considered the first choice. When the dietary regimen could not cure the disease, then medicine therapy should be considered. It can be seen in the book that mainly chronic diseases, non-severe diseases, and some special populations such as pregnant women and the old and young can be treated with dietary therapy. Taking the elderly as an example, Chen Zhi, a famous doctor in the Song Dynasty, pointed

out^[7] that the qi and blood of the elderly usually decline. If the elderly still use strong drugs to attack evil qi after they get sick, perspiration will easily lead to the leakage of Yang Qi. Vomiting will easily lead to the inversion of stomach qi. Purging will easily lead to the loss of vital energy. Therefore, the treatment of the elderly patients should involve some gentle and neutral herbs that could smooth qi and tonify the deficiency. The dietary regimen method could also be used as a treatment to help them restore their health

3. “To increase the power of medication.”^[6] For some diseases, the dietary regimen could improve the curative effect. When some diabetic patients have symptoms such as upset stomach, reverse of stomach qi, and loss of appetite, they could have some almond cheese porridge to assist the treatment. It has almond cheese, milk, and barley as its recipe
4. “In order to help acute disease.”^[6] At that period of time, the dietary regimen is more convenient than drug treatments, so it can play a role in helping acute disease as a first-aid management.

It must be pointed out that the dietary regimen in *Taiping Holy Prescriptions for Universal Relief* and *Sheng Ji Zong Lu* (《圣济总录》 *Comprehensive Recording of Sage-like Benefit*), *Shou Qin Yang Lao Xin Shu* (《寿亲养老新书》 *New Book of Life Related for the Aged*), and *Yin Shan Zheng Yao* (《饮膳正要》 *Principles of Correct Diet*) that appear after *Sheng Ji Zong Lu* has ingredients that are considered herbs according to our modern classifications. The main reason is that the boundary between food and medicine in ancient China was relatively blurred, and many local ingredients often eaten by the ancients, such as common food in Henan province, are not in the category of food or herbal food in the sense of modern classifications. Some food could protect the body and slow down the stimulation of rigid herbs. The topic will be discussed in another article.

APPLICATION OF THE DIETARY REGIMEN AS AN ANTI-EPIDEMIC MEASURE

Modern medicine has proved that the outbreak is mainly due to some infectious and highly pathogenic viruses or bacteria that appear in a crowd and catch people off guard. However, under what conditions and how these strange viruses and bacteria are being produced is unknown, which leads to a slightly helpless situation that people could not predict, preventing them from dealing with it as soon as possible.

From a general point of view, the qi circulation theory of traditional Chinese medicine points out that if human beings are not well prepared to deal with climate change, they will be prone to illness, especially according to *Su Wen* “Qi Jiao Bian Da Lun” (《素问·气交变大论》 *Basic Questions Comprehensive Discourse on Changes Resulting from Qi Interaction*), “over and insufficient”^[2] will often cause more disease. There is also the theory that “pandemic will be formed due to 3-year accumulations (三年化疫)”^[2] in *Su Wen* “Ci

Fa Lun” (《素问·刺法论》 *Basic Questions Discussion on Acupuncture Methods*). In the Ming Dynasty, Wu Ke wrote *Wen Yi Lun* (《瘟疫论》 *Treatise on Pestilence*) which put forward the theory that “epidemic disease” is caused by “feeling the lethargy of heaven and earth (感天地之疠气).” He further pointed out that the pestilent qi was miscellaneous qi, which was not among the normal seasonal qi, so it was difficult to prevent. Hence, what is the cause of the miscellaneous gas? The author believes that “the healthy qi mechanism should stay in flowing equilibrium instead of steady to be healthy.” Wu thinks that the emergence of miscellaneous gas is the combination of external climate change with the special natural environment and hygiene. These strange viruses and bacteria may not only be brought by wild animals from nature but may also be the result of a variation of the “safer” viruses and bacteria that originally existed in the population or animals. Therefore, to prevent epidemic disease, the primary task is to devote oneself to the management of the public health environment and the natural environment and to formulate health maintenance measures to deal with the changes in the natural environment.

The dietary regimen still can be used as a preventive treatment that is anti-epidemic, and even more specific measures can be adopted.

1. Disease prevention. As the *Basic Questions* “Discussion on Acupuncture Methods” stated, “when there is vital qi inside the body, the pathogen could not invade (正气存内,邪不可干).” When the body’s immunity is increased, it is not easy for disease to invade or even if the invasion occurs, the damage done to the body could be reduced. In addition to the first point of preventive treatment mentioned above, the application of the dietary regimen to fight an epidemic should consider the climate and the impact of the environment on people’s health and take appropriate dietary regimen measures to avoid the body’s being in an imperceptible sub-health state. With regard to this, the movement and qi theory in TCM culture, modern medical meteorology and public health science can be used for guidance.
2. Prevent inversion of disease and reoccurrence after recovery. *Su Wen’s* “Wu Chang Zheng Da Lun” (《素问·五常政大论》 *Basic Questions Comprehensive Discourse on the Five Regular Policies*) states that “a stronger poisonous drug could treat disease at a scale of 6 out of 10, a normal drug could treat disease at a scale of 7 out of 10, a milder drug could treat disease at a scale of 8 out of 10. When using non-poisonous drug, it could treat disease at a scale of 9 out of 10. Grains, vegetables, meat and fruits are considered as dietary regimen where there would be no harm to vital qi.”^[2] The treatment with drugs will eventually damage the health, over which one should have a certain degree of control and introduce a dietary regimen to help patients recover. This is one of the main concepts of Chinese medicine, through

which you could expel pathogenic qi without harming the vital qi. Taking this coronavirus as an example, many patients have experienced a higher intensity of drug therapy where a reasonable dietary regimen could help patients in their recovery. It has high application value to the health maintenance work of prevention of disease, inversion of disease, and prevention of reoccurrence after recovery.

CONCLUSION

Dietary regimen, as part of traditional Chinese medicine, is a method of disease prevention that is safe, convenient, interesting, and feasible. The promotion of the dietary regimen is also conducive to the inheritance and promotion of Chinese medicine culture. Modern civilization is gradually changing the way of life and living environment of human beings, with the warming of the global climate, the emergence of new viruses, the use of air conditioning and electronic products, and so on, which are affecting human health and even genes. As President Xi Jinping emphasized in the important instructions for the work of Chinese medicine in October 2019 to the effect that to promote the development of Chinese medicine, we must follow the law of development of Chinese medicine, inherit the essence, and maintain integrity and innovation. In my opinion, maintaining the integrity is the expression of national cultural confidence, while innovation requires the development of the times and civilization, and the essence of traditional culture should be made use of for the people. For the dietary regimen, what needs to be solved the most is the safety of traditional food materials and how to effectively apply food culture to modern civilization.

Note

Note 1: Food also has the same warmth, coldness, and heat characteristics as medicines, but most foods are not as strong as medicines, and long-term partial eclipse can also cause health damage.

Note 2: It refers to the historical phenomenon that a large number of the Han people from the North moved to the South in order to avoid war during the Yongjia period under the reign of the Jin and Yuan Emperors (307–311).

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The Idea and Application of Tuina in the Prevention and Treatment of COVID-19

Zhengyu Li

Department of Tuina Therapeutics, School of Acupuncture and Moxibustion and Tuina Therapy, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

While traditional Chinese medicine has displayed a positive and effective role in saving lives of COVID-19 patients, Tuina, which is an important component in Chinese medicine, has also shown its merits in enhancing the immune function and relieving symptoms in COVID-19 patients. This article elaborates the long history of Tuina in treating and preventing epidemic diseases and its effect in improving the immune function. It also introduces some special Tuina methods, for instance, sputum drainage by the back-patting method to enable the discharge of sputum; slant-scrubbing method applied on the hypochondriac regions to bring the effect of soothing the liver to regulate qi, which may also relieve anxiety of patients with COVID-19; and spine-pinching method to enhance human resistance to diseases, which is more suitable for the elderly and for children with mild or common types of COVID-19 and can also be used for health care and disease prevention among the general population. Tuina methods for children using the common children's specific Tuina points and manipulations to improve children's body constitution are also mentioned in the article. Self-acupoint Tuina for health care, including acupoints for prevention purposes, acupoints for early clinical stage (mild stage) and recovery stage, as well as acupoints for children health care and specific operations, is also illustrated in the article. Moreover, basic exercises for health care, such as eight-section brocade, Shaolin internal exercises, six-character formula, and change of tendons, are also presented. In the final analysis, this article is aimed at some ideas and feasible applications of Tuina therapy in the prevention and treatment of COVID-19, in the hope to provide some worthy experience and introduce methods in preventing and fighting against COVID-19 to people all over the world.


Keywords: Acupoint, COVID-19, idea and application, immune function, prevention and treatment, special Tuina method, specific Tuina points, Tuina

In the campaign against COVID-19 in China now, traditional Chinese medicine (TCM) has displayed a positive and effective role in saving lives of COVID-19 patients, especially in preventing patients with mild symptoms from developing to critical conditions, and has made a relatively important contribution to the recovery of COVID-19 patients and enjoyed great popularity among the Chinese people. And this, in turn, has provided some worthy experience and ways in fighting against COVID-19 to people all over the world. Tuina is an important component in Chinese medicine, which has long been used in treating diseases and improving bodily health [Figure 1]. It has contributed a lot to the prevention and treatment of epidemic diseases in Chinese history. This article is aimed to probe into some ideas and feasible applications of Tuina therapy in the prevention and treatment of COVID-19.

LONG-TERM INVOLVEMENT OF TUINA IN TREATING AND PREVENTING EPIDEMIC DISEASES

Tuina, known as Anmo (按摩) in ancient times, belongs to the category of external treatment within Chinese medicine theory. There are records of inscriptions about Tuina on bones or tortoise shells in the Shang Dynasty (16th–11th century B. C.). In *Han Shu* “Yi Wen Zhi” (《汉书·艺文志》 *Chronicles of the Han Dynasty* “Literature and Arts”), there is not only a treatise on *Huang Di Qi Bo An Mo Shi Juan* (《黄帝岐伯按摩十卷》 *Ten Volumes on Tuina Therapies Developed by Huangdi and Qi Bo*), but also a contemporary Tuina physician named Yu Fu.

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Address for correspondence: Prof. Zhengyu Li,
Department of Tuina Therapeutics, School of Acupuncture and
Moxibustion and Tuina Therapy, Shanghai University of Traditional
Chinese Medicine, Shanghai, China.
E-mail: lzy1855@aliyun.com

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More than 2000 years ago, *Huang Di Nei Jing* (《黄帝内经》 *Huangdi's Internal Classic*) had already recorded the method called “persistent manipulation on certain points” (Anmo) to treat “mild ailments”. A mild ailment is an early stage of a disease. In the early stage of mild ailments, Tuina can be applied to the meridian points of the human body to unblock the meridians and promote the circulation of qi and blood, hence to prevent the occurrence or development of diseases.

COVID-19 falls under the category of epidemic diseases in TCM. It is highly contagious and susceptible to a wide range of diseases, primarily characterized by fever, fatigue, and dry cough. It is mentioned in the article on *Su Wen* “Ci Fa Lun” (《素问·刺法论》 *Plain Question* “Discussion on Acupuncture Methods”) that “all the five epidemics are easily infected by people, no matter how old or young they are, and the symptoms are similar (五疫之至，皆相染易，无问大小，病状相似),” and “people not being infected are those with a healthy qi stored inside the body, so that the pathogenic qi will not invade their body (不相染者，正气存内，邪不可干).” Some basic thoughts and applications can be found in the monograph of the needling method in *Huangdi's Internal Classic*, involving acupuncture (including Anmo, and Anmo tools, i.e., round needle and sword-sharpened needle of the nine needles, tools of that time) to improve the function of human resistance to diseases. Thereby, Tuina (or acupuncture) can be helpful in the early stages of mild ailments of COVID-19.

In his book *Zhou Hou Bei Ji Fang* (《肘后备急方》 *Handbook of Prescriptions for Emergencies*), Ge Hong in the Jin Dynasty discussed the typical symptoms and epidemic characteristics of the disease that seriously endangers children's lives, “Tianxing lupus” (smallpox), and put forward the method of “saving shock apoplectic attack” by pinching Renzhong with the fingernails. Epidemics frequently occurred in the Ming and the Qing Dynasties, and Tuina practitioners of that time took an active part in fighting against epidemics and summarized their experiences in the book *Yi Zhi Ding Chan* (《一指禅》 *Special Meditation in Tuina with the Thumb*). *Song Feng Shuo Yi* (《松峰说疫》 *Songfeng's View on Epidemic Diseases*) elaborated the eight methods of epidemic disease treatment and enriched the practice of external treatment of epidemic diseases. In addition, in August 1934, Ta Kung Pao published an article on the treatment of epidemic diseases by Tuina, as well as records on the treatment of tuberculosis by internal

power Tuina, which were recorded in the 1959 edition of the “Chinese Tuina” textbook.

To sum up, it can be seen that Chinese Tuina therapy has long been involved in the practice of improving human viscera function and preventing and controlling diseases.

TUINA'S EFFECT ON IMPROVING THE IMMUNE FUNCTION

The onset of COVID-19 is closely related to the human immune function. If the immune function is strong, the body's resistance will be strong and the disease is less likely to occur or the disease will only be mild or will not develop further. It is recorded in *Huangdi's Internal Classic* that “when the healthy qi is stored inside the body, the pathogenic qi will not invade the body” (正气存内，邪不可干) and “when the pathogenic qi invades the body, it will result in a deficiency of healthy qi in the body” (邪之所凑，其气必虚). Thus, it can be seen that the “healthy qi” in the human body can help resist diseases. If the “healthy qi” is deficient, “the pestilent qi” can invade the body and disease will occur; if the “healthy qi is sufficient,” people will not easily get sick, or even if disease occurs, symptoms will be mild, recovery will be quick, and the prognosis is good.

Tuina therapy is widely used to improve immunity. Consider the three major schools of Tuina in Shanghai, the Academic School of Yi Zhi Chan (一指禅) Tuina, the Academic School of Rolling Tuina and the Academic School of Internal Power (内功) Tuina. In clinical applications, the Academic School of Yi Zhi Chan (一指禅) Tuina follows the operational principles of “soft as tonic, strong as purgative, soft and strong combined, soft as imperative, penetrating the bone gap (sutura), and harmonizing Ying (营) and Wei (卫).” It attaches great importance to assisting the vital qi, adjusting the functions of viscera, harmonizing Ying and Wei, following the meridians and collaterals, and pushing acupoints to enhance the immune function of the body. Clinically, it is able, through *Yi Zhi Chan*, to push manipulation [Figure 2] on Zusanli (ST 36), Zhongwan (CV 12), Qihai (CV 6) acupoints to treat leukopenia.

The rolling manipulation (揉法) [Figure 3], belonging to the Academic School of Rolling Tuina, is used to perform on the back bladder meridian on the first line, dredge channels and collaterals, invigorate qi, and promote the circulation

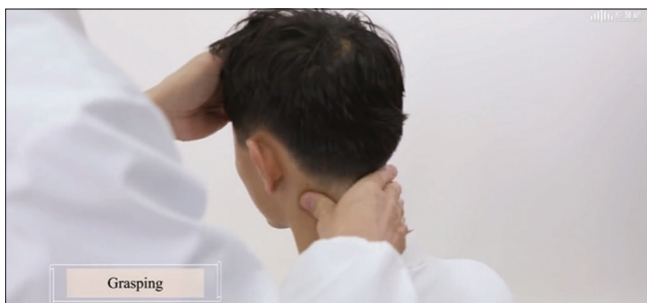


Figure 1: Illustration of Tuina Therapy in treating neck pain



Figure 2: Illustration of Yi Zhi Chan pushing manipulation

of blood. It can stimulate the back-Shu points (背俞穴) and improve the function of the viscera, thus improving the overall human function and immune function, which is usually clinically applied to treat a susceptible person with low immune function. In addition, the pinching manipulation on both sides of the spine, from the lumbosacral to Dazhui (GV 14), known as ridge pinching, can also improve the immune function of the body.

The Academic School of Internal Power (内功) Tuina emphasizes the importance of strengthening body resistance and eliminating evil and attaches great importance to holism. It not only requires doctors to practice special exercises but also requires patients to do so as well, to improve their “healthy qi.” After a period of exercises, patients’ physique is improved, and then combined with manipulation treatment, the result will be more effective. The internal power Tuina manipulation is noted for its scrubbing method (擦法), which is partial to warm tonification and can be used in the treatment of fatigue syndrome and low-level function of the viscera with satisfactory results.

Experimental studies have also been carried out on the improvement of the immune function by Tuina. Researchers once found that after 10 mins of pushing the bladder meridian on both sides of the back with the whorl surface of the thumb, the total number of white blood cells in normal people could be slightly increased, and the phagocytic index of leukocytes (cellular immunity) was significantly increased. Serum complement titer (serum immunity) was significantly increased and remained so for 4 hours. Spine-pinching therapy has been used to treat infantile rotavirus diarrhea, shortening the natural course of the disease. Someone has observed the effect of *Yi Zhi Chan* pushing on transplanted sarcoma LDR mice after using Zhongwan (CV 12), Guanyuan (CV 4) and Zusanli (ST 36) points, and found that *Yi Zhi Chan* Tuina could inhibit the growth rate of mouse sarcoma, because the natural killer cells in mice after Tuina were higher than those in the control group, with statistical significance. It can be seen that *Yi Zhi Chan* Tuina can improve the immune function of mice and help to inhibit the growth of tumor cells.

In conclusion, the effect of Tuina therapy in improving the human immune function has been confirmed both clinically

and experimentally. Tuina will surely play a more significant role in improving the human immune function and is expected to achieve some satisfactory effects in the prevention of COVID-19.

SPECIAL TUINA METHODS

With thousands of years of advancement, Tuina therapy has developed many operational methods and special manipulations and has been widely used in the treatment of diseases. In the prevention and treatment of mild cases of COVID-19, these methods can also be applied in different situations.

Sputum drainage by the back-patting method

In patients with COVID-19, sputum is difficult to discharge, so a prone position can be used to pat the back of the patients to enable the discharge of sputum, the method of which has been widely used in the treatment of patients with COVID-19. The operating procedures: The doctor gently pats the patient’s back with a hollow palm, from the bottom of the back to the top, from outside in to perform the operation, which is conducive to the discharge of lung sputum.

Sputum drainage by chest-patting method

The operating procedures: The patient takes a sitting position, whereas the doctor closes the fingers naturally, using the whorl surface of the index finger, middle finger, and the ring finger to pat the chest to help the discharge of sputum.

Palm-vibrating Method on the Back

The operating procedures: The patient takes a sitting position, whereas the doctor places the palm gently on Feishu (BL 13) on the back and concentrates his mind on the palm. The forearm muscles are primarily used to make a static contraction, and then a rapid and strong vibration is generated, thus bringing the effect of relieving chest stuffiness and regulating the flow of qi.

Palm-flapping method on the abdomen

The operating procedures: The patient takes a sitting or supine position. The doctor places the palm gently on the abdomen with Qihai (CV 6) and Guanyuan (CV 4) as the center. The doctor concentrates his mind on the palm and the forearm muscles are used to make a static contraction and then a rapid and strong vibration is generated, thus bringing the effect of tonifying the vital qi and building up the body.

Palm-vibrating method on the low back

The operating procedures: The patient takes a sitting or prone position. The doctor places the palm gently on the central part of the low back, Mingmen (GV 4) and Shenshu (BL 23), and concentrates his mind on the palm. The forearm muscles are used to make a static contraction, and then a rapid and strong vibration is generated, thus bringing the effect of warming the kidney and supplementing Yang.

Finger-vibrating method on Zhongwan (CV 12)

The operating procedures: The patient takes a supine position; the doctor gently places the middle finger on Zhongwan (CV 12) and concentrates his mind on the middle finger. The

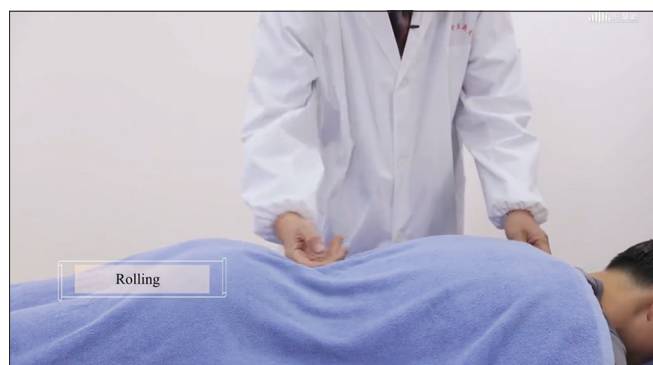


Figure 3: Illustration of rolling manipulation

forearm muscles and hand muscles are used to make a static contraction, which makes the middle finger vibrate strongly and quickly, thus bringing the effect of warming and strengthening the spleen.

Palm-scrubbing method on the back

The operating procedures: The patient takes a sitting or prone position, and the doctor puts the whole palm surface on the back of Dazhui (GV 14), Feishu (BL 13), or Shenshu (BL 23) on the low back for straight and to-and-fro friction movement to generate a sense of warmth [Figure 4]. Palm-scrubbing the upper back has the function of warming the lung and reducing phlegm while palm scrubbing the low back has the effect of warming the kidney and supplementing Yang. It may also enhance the overall function of patients with COVID-19.

Slant-scrubbing method on hypochondriac regions

The operating procedures: The doctor stands behind the patient in a sitting position and scrubbing the patient's upper hypochondriac regions down to the lower front with the palms of both hands, thus bringing the effect of soothing the liver to regulate qi, which may also relieve anxiety of patients with COVID-19.

Spine-pinching method

The operating procedures: The patient takes a prone position, exposing the back, and the doctor pinches the spinal skin continuously and moves from the bottom to the top of the spine 3–5 times [Figure 5]. This method has the effect of adjusting the function of the viscera, strengthening the function of the spleen and stomach, and enhancing resistance to diseases. This method may be more suitable for the elderly or children with mild and common types of COVID-19. It can also be used for health care and disease prevention among the general people.

Palm-rubbing method on the abdomen

The operating procedures: The patient takes a supine position, and the doctor uses the palm of the hand to make a clockwise (or counterclockwise) circular motion on the abdomen of the patient for about 5 mins, thus bringing the

effect of regulating the stomach as well as gastrointestinal function, and relieving food stagnation.

Pointing-pressing method

The operating procedures: The patient selects an appropriate body position according to the operating sites, and the doctor uses the tip of the thumb to press the corresponding acupoints, such as Dazhui (GV 14), Quchi (LI 11), and Feishu (BL 13) to bring the effect of improving the circulation of qi and dredging collaterals, and regulating the viscera.

Tuina methods for children

The operating procedures: The child selects an appropriate position according to the operating sites, or is held by a parent, the doctor applies a corresponding manipulation to operate on the children's Tuina specific points. Common children's specific Tuina points and manipulations for treating COVID-19 include “opening Tianmen (天门), pushing Kangong (坎宫), kneading Taiyang (太阳), tonifying Pijing (脾经), tonifying Shenjing (肾经), clearing Feijing (肺经), pressing-kneading Banmen (板门), rubbing the abdomen, pushing up Sanguan (三关) [Figure 6], pushing down Liufu (六腑), pressing-kneading Zusanli (ST 36), Dashui (GV 14), pinching the spine, etc.” This approach can also be used for preventive care or for mild cases of COVID-19 in children (especially when no specific medications are available).

The above special manipulation methods of Tuina can be combined with other therapeutic methods, which are especially suitable for patients in mobile cabin hospitals, with mild cases, as well as for children.

SELF ACUPOINT TUINA FOR HEALTH CARE

It is recorded in *Huangdi's Internal Classics* that “superb doctors treat patients before diseases really occur” (上工治病, 不治已病治未病). This fully embodies the concept of disease prevention in the Chinese medicine theory. Self-acupoint Tuina for health care can be a relatively important role in strengthening the body and preventing diseases in the Chinese medicine theory. Ancient people had long attached great importance to acupoints for health care. They called some acupoints that could strengthen the body



Figure 4: Illustration of palm-scrubbing method on the back



Figure 5: Illustration of spine-pinching method

“health care acupoints.” They are Dazhui (GV 14), Qihai (CV 6), Guanyuan (CV 4), Shenshu (BL 23), Mingmen (GV 4), Zusanli (ST 36), etc. Relevant clinical and animal experiments have also confirmed that these acupoints can improve the immune function. Here are five methods illustrated as follows:

Acupoints for prevention purposes

Pressing Yingxiang (LI 20), Taiyang (EX-HN 5), Zhongwan (CV 12), Zhongfu (LU 1), Qihai (CV 6), Zusanli (ST 36) and other acupoints, for 1 min per acupoint; scrubbing Shenshu (BL 23) and Dazhui (GV 14), until the acupoint regions are warm.

Acupoints for early clinical stage (mild stage)

Pressing-kneading Yunmen (LU 2), Chize (LU 5), Fenglong (ST 40), Yuji (LU 10), Quchi (LI 11), Zusanli (ST 36), Dabao (SP 21), Guanyuan (CV 4), Neiguan (PC 6), Zhangmen (LR 13), Qimen (LR 14), Tanzhong (CV 17), for 1–2 mins per acupoint, rubbing the abdomen clockwise for 3–5 mins.

Recovery stage

Pressing-kneading Guanyuan (CV 4), Qihai (CV 6), Tanzhong (CV 17), Zusanli (ST 36), Sanyinjiao (SP 6), Neiguan (PC 6), Taiyuan (LU 9), Taixi (KI 3), Fuli (KI 7) and other acupoints for 1–2 mins per acupoint, scrubbing Shenshu (BL 23), until the points are warm.

Points for children health care and operations

Opening Tianmen (天门), pushing Kangong (坎宫), kneading Taiyang (太阳), kneading Huangfengchudong (黄蜂出洞), pushing up Sanguan (三关), pressing-kneading Banmen (板门), moving Neibagua (内八卦), rubbing the abdomen, kneading Ershanmen (二扇门) [Figure 7], pressing-kneading Zusanli (ST 36), part-pushing shoulder blades, pinching the spine, etc.

Basic exercises for health care

Eight-section brocade (八段锦), Shaolin internal power exercise (少林内功) [Figure 8], six-character formula (六字诀), and change of tendons (易筋经), etc.

In conclusion, self-acupoint Tuina and basic exercises for health care are very cost-effective in health economics and are beneficial to bodily health and can be used to enhance the immune function and prevent epidemic diseases.

Since there are no specific medications for COVID-19 and no vaccines successfully developed or applied up to now, the treatment of COVID-19 will resort to a multidisciplinary cooperation, the combination of both Chinese and Western medicine and certain accurate treatment measures in order to achieve success. Tuina, as a way of external treatment in Chinese medicine, will surely play a significant role in the fight against COVID-19, and it may be highly recommended to be applied in improving the human immune function, body function recovery as well as self-health care.

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Nil.



Figure 6: Illustration of pushing up Sanguan



Figure 7: Illustration of kneading Ershanmen



Figure 8: Illustration of pushing eight horses from the front of Shaolin internal power exercise

Conflicts of interest

There are no conflicts of interest.

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International Communication of Traditional Chinese Medicine in the Context of COVID-19 Pandemic by Analogy of Directional Solidification

Yingwen Cai¹, Xueyong Shen²

¹School of Materials Science and Engineering, Shanghai Jiao Tong University, ²School of Acupuncture-Moxibustion and Tuina, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

According to the phenomenon-taking of classified analog, directional solidification can be an excellent approach for international communication of traditional Chinese medicine (TCM) in the context of COVID-19 pandemic. Attitudes toward TCM by Western Medicine (WM) can be represented by various morphologies of the solid/liquid interface. COVID-19 has created an urgent need for the worldwide spread of TCM. To counter any doubts and objections against TCM, COVID-19 pandemic provides a good opportunity, meanwhile a steady and firm pace forward should be kept. It is also necessary to resolve domestic controversies and to lower cultural shock. The philosophy of TCM can agree fairly well with dialectical materialism; the scientific connotation of pentacy in TCM can be explained through the symptoms of COVID-19-infected patients. A TCM understanding compatible with WM will accelerate its international acceptance, which could help to better elaborate the significance of humanity in TCM. Holistic medicine under the guidance of TCM principles is an important trend in medical development, whose framework is illustrated in a 4C+T diagram.

Keywords: COVID-19, directional solidification, international communication, traditional Chinese medicine

INTRODUCTION

It had been reported that up to 19,869,127 people had been infected by COVID-19, and among them, 731,453 had died throughout the world as of August 10, 2020. What is worse, everyday, there are still more than 100,000 new cases.^[1] On June 22, 2020, the World Health Organization's director-general, Tedros Adhanom Ghebreyesus, told an online conference that the novel coronavirus pandemic was still accelerating and its effects would be felt for decades.^[2] It can even be regarded as the Third World War between human beings and COVID-19 pandemic.^[3]

Just as Sweden pathologist Folke Henschen wrote in *The History and Geography of Disease*, "Human history is also the history of diseases." The Athens Plague outbreak in 430 BC resulted in the decline of Greece; the five plagues which had started in 165 AD led to the collapse of the Roman Empire,

but then to the rise of Christianity; smallpox, communicated by African slaves in 1507, caused the deaths of large numbers of American Indians and the white settlers in America; the Black Death caused by pestilence originated in Central Asia but spread throughout Europe, and it lasted for nearly 300 years, resulting in almost 300 million deaths which was more than twice the number of deaths during the two world wars, till the termination of the 100-year war between Britain and France.^[4]

Five hundred and fifty seven plagues have been reported in the written history of China.^[5] In recent decades, severe plagues also occurred in China, such as Hepatitis A in Shanghai in 1988 and severe acute respiratory syndrome (SARS) in Guangzhou in 2003. Traditional Chinese medicine (TCM) has been used to fight effectively against these terrible outbreaks; outstanding

Address for correspondence: Associate Prof. Dr. Yingwen Cai, Shanghai Jiaotong University, Shanghai, China.
E-mail: ywcai@sjtu.edu.cn

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TCM books, such as *Shang Han Za Bing Lun* (《伤寒杂病论》 *Treatise on Cold Damage and Miscellaneous Diseases*) by Zhang Zhongjing (张仲景) and *Wen Bing Tiao Bian* (《温病条辨》 *Systematized Identification of Warm Diseases*) by Wu Tang (吴塘) recorded the successful experience and formulas for plagues.

In the fighting against COVID-19 pandemic, various western medicines have been tried but have not yet showed satisfactory curative effects; vaccines are being developed through arduous efforts, but still it takes a long time before they may be effective. However, clinical application of TCM medicines, especially the three medicines: Jin Hua Qing Gan Granule (金花清感颗粒), Lian Hua Qing Wen Capsule (连花清瘟胶囊), Xue Bi Jing Injection (血必净注射液) and three formulae: Qing Fei Pai Du Decoction (清肺排毒汤), Hua Shi Bai Du Formula (化湿败毒方), Xuan Fei Bai Du Formula (宣肺败毒方), have exhibited curative effects in more than 90% of treatments. Other TCM applications such as acupuncture and moxibustion, Tuina, and Tai Chi also contributed to early stage treatments and recovery. No mild symptoms have become severe after such TCM treatment.^[6]

On the other hand, modern technology and Western Medicine (WM) play important roles in the early detection of fever and nucleic acid, as well as the utilization of life-support systems, such as extracorporeal membrane oxygenation in the intensive care unit (ICU). Other effective measures include wearing masks, social distancing, and washing hands.

Although TCM has achieved outstanding curative effects, it is not yet recognized worldwide because of the theoretical gap between TCM and WM and the complexity of TCM formulas. According to a recent survey sponsored by the China Foreign Languages Publishing Administration, TCM is the second most representative symbol of Chinese culture.^[7] With TCM international communication and mutual understanding between TCM and WM, TCM will surely play a key role in the development of future medicine, and in the development of community of common health for mankind.

Therefore, it is necessary to have a “third eye” on the general framework for the international communication of TCM during COVID-19 pandemic, from which related factors can be analyzed and summarized logically. From the traditional thinking of phenomenon-taking of classified analog, directional solidification (DS) in science and technology can be an excellent approach to improve the international communication of TCM.

A BRIEF INTRODUCTION TO DIRECTIONAL SOLIDIFICATION

In DS, a material is first melted by heating, then a cooling medium (such as a chill plate) is used at the bottom to release the heat; thus, a temperature gradient is built up and the material will solidify along with its movement from the bottom to another end [Figure 1].^[8]

S/L interface plays a key role in DS, whose morphology determines the microstructure of the solidified material into its various properties. Figure 2 explains the reason for the morphological change of the S/L interface. The real temperature gradient and liquidus temperature depends on the solute composition being together in order to determine the supercooling in the liquid ahead of the S/L interface.

Planar solidification is most important in the growth of single crystals, including semiconductors for integrated circuit chips, oxides for laser systems, and also other optical applications, such as oxides for jewels and so on.

The condition necessary to maintain a planar S/L interface (no supercooling) is:

$$\frac{G_L}{R} \geq -\frac{m_L C_0}{D_L} \frac{(1-k_0)}{k_0} z \quad \text{Eq. (1)}$$

where, G_L is the temperature gradient ahead of the interface, R the interface moving rate, m_L the liquidus slope, C_0 the original composition or impurity content of the material, D_L the diffusion coefficient of solute in liquid, k_0 the partition coefficient defined by C_S/C_L .

Hence, if it is required to maintain a planar interface, G_L should be high, R slow, m_L not steep, C_0 not high, solute diffusion in liquid (D_L) rapid, and solute partition k_0 approaches unity.

ANALOG OF INTERNATIONAL COMMUNICATION OF TRADITIONAL CHINESE MEDICINE WITH DIRECTIONAL SOLIDIFICATION

It is the traditional thinking in TCM to take phenomena by classified analog. After a careful analysis of TCM international communication, according to the attitude of WM, it can be determined that DS can be a good analog to explore various factors that affect TCM communication [Figure 3].

In DS, for different solute concentrations, with the change of G_L/R , the morphology of the S/L interface undergoes a variation from planar to cellular, cellular dendrites, columnar

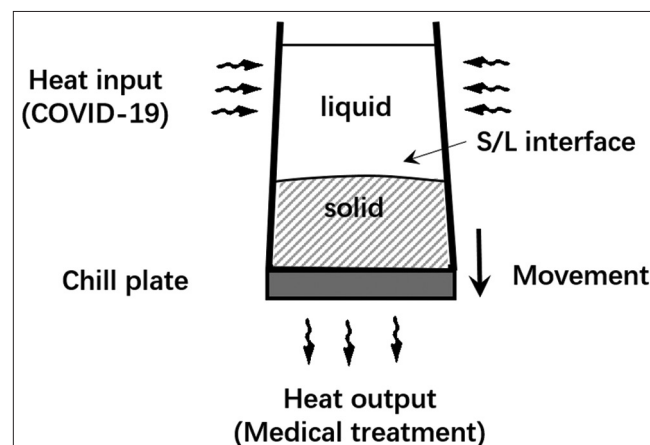


Figure 1: Illustration of directional solidification technique

dendrites, and equiaxed dendrites, which are illustrated in Figure 3. Equiaxed dendrites have a chaotic morphology, which can be likened to the ostracizing attitude of WM that sees TCM as a pseudoscience to be thoroughly abolished; columnar dendrites have a certain direction but there are a lot of sub branches, which is like the controversial attitude of WM in thinking of TCM as mysterious metaphysics and considering TCM to be irrational although it is proved to be effective in the treatment; cellular dendrites are a separated parallel array, which is similar to the complementary medicine of TCM, such as acupuncture and moxibustion, cellular morphology is a very shallow separation, which can be represented as alternative medicine in which not only medicine and techniques but also

TCM theory can be an alternative choice of WM; finally, planar morphology to grow a single crystal is like holistic medicine in which TCM and WM are organically integrated into one totally new medicine.

Furthermore, factors which influence TCM international communication resemble the terms in Eq. (1) as follows:

G_L , COVID-19 pandemic has brought about a chaotic world which has an urgent demand for TCM;

R , the pace (methods and actions) for TCM international communication;

m_L , culture shock incurred by TCM communication;

k_0 , controversies between China and the Western world;

D_L , acceptance of TCM terms by the Western world;

C_0 , domestic disagreements about TCM.

COVID-19 pandemic has stimulated an urgent demand for TCM, which had been so effective before the successful development of western medicines and vaccines. A steady and gradual pace is necessary to help TCM communication, but those efforts to communicate TCM like flood irrigation are harmful. It is necessary to clear domestic disagreements concerning TCM's various aspects. Because of the outstanding achievements of the Chinese government to put down COVID-19 by combining applications of TCM and WM, foreign countries will feel quite uneasy when facing their own serious situations. This represents a kind of cultural shock for those who feel they have civilization superiority. To dissolve the culture shock, identification of TCM by WM is of particular importance to develop community of common health for mankind. Thus, the understanding of TCM terms and theory in the Western world requires significant improvement.

HOW TO ACCELERATE TRADITIONAL CHINESE MEDICINE INTERNATIONAL COMMUNICATION

By an analog of DS, various complicated factors which influence TCM communication can be taken into account

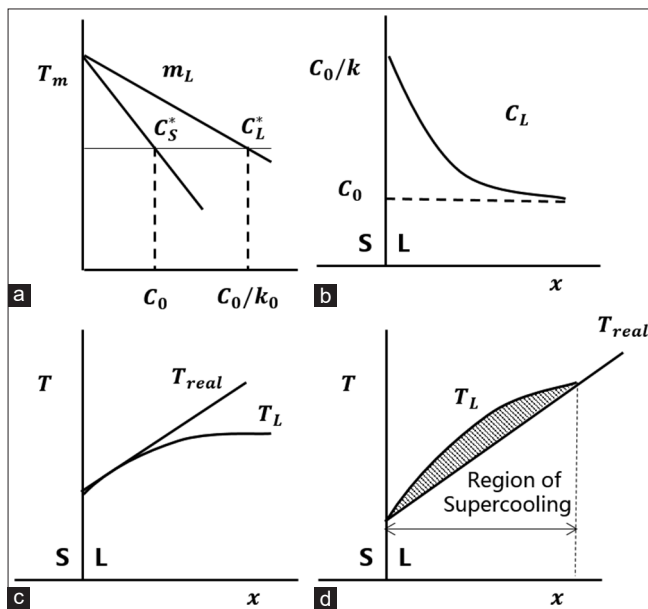


Figure 2: Temperature and composition distribution during directional solidification. (a) phase diagram to show the solute partition to maintain chemical potential equilibrium between liquid and solid phase; (b) solute distribution in front of the solid/liquid interface; (c) if the real temperature distribution T_{real} is not lower than the melting temperature of liquid T_L , the solid/liquid interface will be planar; (d) if the real temperature distribution T_{real} is lower than the melting temperature of liquid T_L in a certain region, supercooling will occur and affect the solid/liquid interface morphology

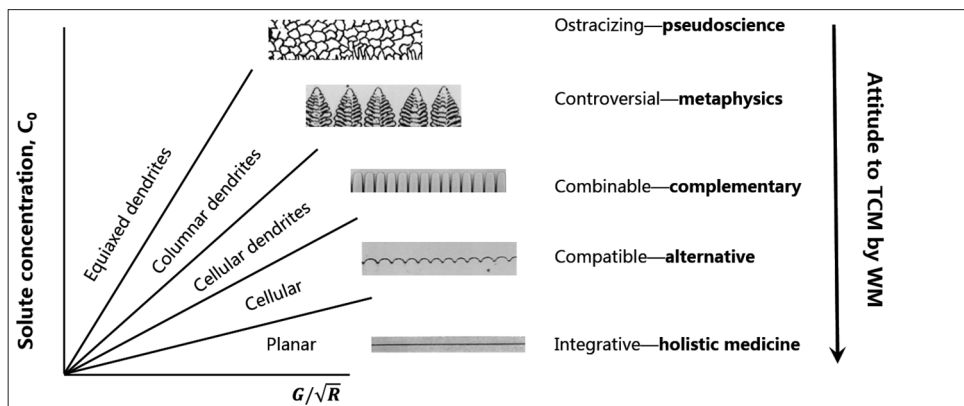


Figure 3: Analogy between Traditional Chinese Medicine international communication and directional solidification

by an equation, and the present attitude of WM toward TCM can be illustrated pictorially. Furthermore, it is necessary to identify specific solutions to accelerate TCM international communication. Why does TCM have such magical effects against COVID-19? The reasons may be listed as follows.

Traditional Chinese medicine philosophy is in a nature equivalence to dialectical materialism

The most fundamental philosophy of TCM is “unity between man and nature balanced Yin and Yang,” which is perfectly depicted by the diagram of Tai Ji (DTJ), a wonderful visualization of dialectical materialism.^[9] This can be understood as follows:

- The world is connected universally: If we regard DTJ as the entire world, then any being is either Yin or Yang, and there must be another corresponding being to keep the balance of Yin-Yang
- The world is in eternal moving and changing: DTJ circles around ad infinitum, moving and changing ceaselessly
- Consciousness originates from matter, and reacts on matter: Consciousness is invisible which can be regarded as Yin; matter is visible which can be regarded as Yang. Since Yin and Yang are mutually rooted, so consciousness can change into matter, and matter into consciousness
- Law of unity and conflict of opposites: Yin is both inside and opposite to Yang, always maintaining a balance which is unified by DTJ
- Law of the passage of quantitative changes into qualitative changes: Extreme Yang leads to Yin, and extreme Yin leads to Yang
- Law of the negation DTJ changes from Yin to Yang, and then Yin again.

This statement will help the Western world understand TCM more easily, so the cultural shock could be lessened.

Scientific connotation of traditional Chinese medicine

Clinically, in WM, drugs or vaccines are developed to attempt to kill the virus or infected tissue. This is identified as targeted therapy in precision medicine, similar to a laser guided missile used to bomb the enemy, which needs a very long period for research on the medicine or vaccine, but may become useless once the virus mutates.

However, the most fundamental principle of TCM treatment is to reinforce the healthy qi and eliminate the pathogenic factors, that is to say, TCM stimulates the patient's own vitality and immune ability to fight against virus or diseases.

According to the theory of Wu Xin (五行 five elements or five phases), the underlying scientific logic of COVID-19 symptoms^[10] can be explained in Figure 4.

When COVID-19 first invades the respiratory system, the human immune system will react with fever to kill the virus and with heat or cough to spit the virus out through phlegm. Because the respiratory function is damaged, not enough oxygen can be transported to human body to maintain normal metabolism, and the patient will often feel

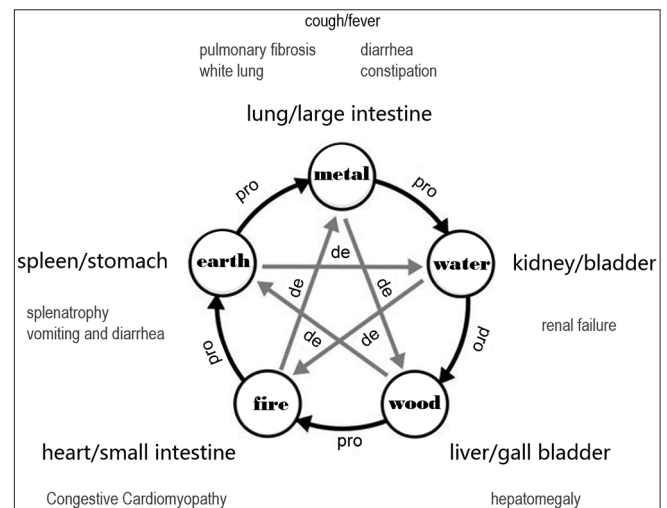


Figure 4: Pentacycle to explain COVID-19 symptoms and traditional Chinese medicine treatment principle

weak. The reproduction of COVID-19 is so rapid that their dead bodies may not be cleared away in time while massive immune antibodies are transported to the lungs, which will usually cause alveoli cysts (white lung) or immune hyperactivity. Since the lungs and large intestines are exterior-interior related, loose stool or constipation would happen. The activity of the kidney is directly connected by lung activities (kidney is very sensitive to oxygen), so the malfunction of the lung could lead to serious renal failure, and eventually into hepatomegaly. Renal failure will reduce the vitality of the heart, causing congestive cardiomyopathy. Hepatomegaly could result in atrophy of the spleen, and also cause exterior-interior related stomach issues, such as vomiting and diarrhea. The nerve system is closely related to meridians and channels which transport pneuma-hemo (Qi and blood) throughout the human body, so it can also be seriously infected by the virus.

During the treatment with TCM, the most important thing is to prevent the immediate malfunction of the lungs in case of the secondary harm to the other viscera organs. In Edition 7 of TCM therapies recommended by National Health Commission,^[11] Ma Huang (麻黄 *Herba Ephedrae*) is commonly used, which has mild effect and tastes spicy and bitter. It is attributed to the lungs and urocyt channel in TCM, which has the functions of releasing muscles and skin to prompt sweating, dissolving phlegm and stopping coughs, nourishing Yin and astringing the lungs, transporting water and dispelling dampness. Sweating can excrete the metabolic waste and lessen the burden on the kidney, dissolving phlegm and stopping the cough will help to prevent over activity of the immune system.

TCM is different from WM in that it is a holistic treatment aimed at several human systems according to their correlations rather than a precise targeted therapy. This is often termed as multi-centered and multi-targeted treatment.

To clarify the scientific connotation of TCM is another way to reduce culture shock.

Traditional Chinese medicine discourse compatible with Western medicine

It is necessary to clarify the connotation of TCM for the foreigners. TCM terminology translation at present are not satisfying. Many TCM terms are not easily understood by Westerners, such as Yin-Yang, five elements, Zang-Fu, channel (meridian), even some simple words are different from Western terms, for example, xin (心) is different from heart.

This results in even greater cultural differences and controversies about TCM. As mentioned by Xuesen Qian, “The weakness of the TCM doctrine is that it cannot agree with modern science and technology, there are two sets of languages and concepts,”^[12] so it is of great significance to develop a TCM dialogue compatible with WM. As illustrated in Figure 5, the present translation is to find Yang in Yin (to explain the scientific connotation in terms of TCM cultural circumstances), a better translation might be to find Yin in Yang (to explain the cultural meaning of TCM in terms of WM scientific circumstances).

Each term in TCM discourse is like a solute atom in the melt, its diffusivity reflects the acceptance by WM. Therefore, TCM terms that are compatible with WM can increase D_L so as to maintain a positive communication of TCM.

To construct holistic medicine under the guidance of traditional Chinese medicine theory

The outstanding clinical effects against COVID-19 by the combined application of TCM and WM with the integrated traditional and Chinese medicine indicate the future of the modern medical system. Holistic medicine can be constructed following the framework illustrated in Figure 6.^[13]

In Figure 6, holistic medicine can be constructed by a 4C+T framework (where 4C refers to the four circles, T is short for

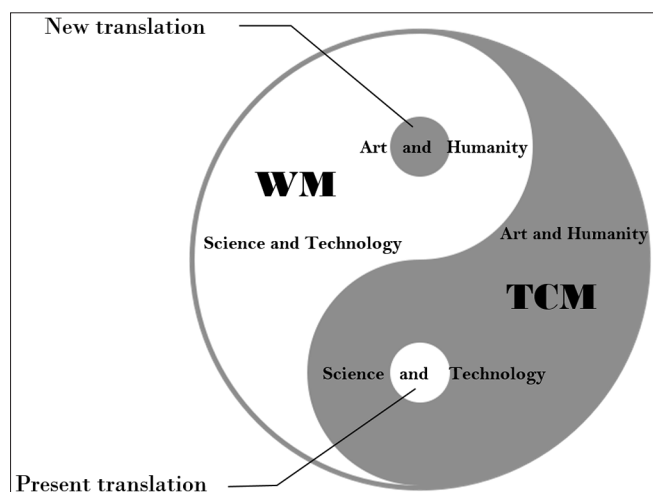


Figure 5: To develop a traditional Chinese medicine dialogue compatible with Western medicine in its scientific circumstances

translational medicine) under the guidance of TCM principles, such as wholeness, balance of Yin-Yang, to treat ahead of disease, differentiation by three factors, health care, and so on.^[14] In the center of the four circles is evidence-based medicine, which is crucial to verify these theories. The first circle is 5P medicine (predictive, participative, preventive, personalized, and precision) which coincidentally agrees with pentacy. The overall goal of 5P medicine is a system medicine based upon cell biology and molecular biology. Then it is holistic integrated medicine that tries to bridge the gap between TCM and WM, for example, time medicine. According to the rule of differentiation by three factors, there is also a need for geography medicine, such as endemic disease. Outside the four circles is translational medicine which translates research results into clinical practice.

The construction of holistic medicine is like a single crystal growth during DS, as shown in DS by lowering m_L , increasing G_L and D_L , and letting k_0 approach unity. Holistic medicine is of great significance to the mutual understanding between TCM and WM, which is crucial to develop community of common health for mankind and build a human community with a shared future.

CONCLUSION

In summary, DS can be a good analog for TCM international communication facing COVID-19 pandemic. Morphologies of S/L interface vary in terms of the ratio of G_L/R which are planar, cellular, cellular dendrites, columnar dendrites, and equiaxed dendrites respectively. The phenomenon-taking of the classified analog of these morphologies, with a fair attitude toward TCM for WM, corresponds to holistic medicine, alternative medicine, complementary medicine, metaphysics, and pseudoscience.

COVID-19 can be thought of as heat input which pushes the present world to be chaotic and an urgent need (G_L) against the worldwide spread of TCM. To help remove the doubts and objections against TCM, a steady and firm pace R should be kept. On the other hand, domestic controversies (C_0) should be

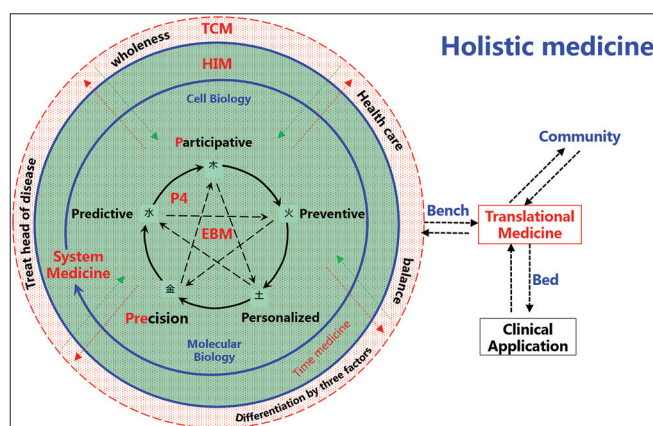


Figure 6: General framework to construct holistic medicine

resolved. It is necessary to lower the culture shock (m_L), thus the philosophy of TCM can be addressed to agree perfectly with dialectical materialism; the scientific connotation of pentacy in TCM can be clearly understood based upon symptoms of COVID-19 infected patients. A TCM dialogue compatible with WM will accelerate its international communication (D_L), so it is necessary to determine the art and humanity implications of TCM terms in Western scientific circumstances. Holistic medicine (k_0) under the guidance of TCM principles is the greatest trend of medicine development as illustrated by a 4C+T diagram, which can significantly help TCM international communication.

To maintain a constant and positive international communication of TCM is crucial for the construction of community of common health for mankind and a human community with a shared future.

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Conflicts of interest

There are no conflicts of interest.

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Key to Treating COVID-19: Removing Phlegm from Small Airways

Qingqi Wang

Neijing Teaching and Research Office, School of Basic Medicine, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

According to autopsy reports, patients who died from COVID-19 had a lot of mucus in the lung that obstructed the airways, reduced the effect of mechanical ventilation, and even led to pulmonary failure. Traditional Chinese medicine literature mentions that “Inability to remove phlegm impairs the lung, which leads to death.” Hence one of the most urgent problems to be solved is to remove phlegm from the small airways. This article elaborates ten methods to remove phlegm for clinical reference.

Keywords: Autopsy, COVID-19, methods to remove phlegm, traditional Chinese medicine (TCM)

AUTOPSY REPORTS: A LOT OF MUCUS IN THE LUNG

According to a report in the *Journal of Forensic Medicine* [Figure 1], a research team led by Liu Liang pointed out in *Gross Observation Report of Autopsy of Patients Dead from COVID-19* that “There were obvious lung injuries in the body. The lung looked patchy to the naked eyes, with pale foci and dark red bleeding. The plane of section showed a large amount of thick secretion overflowing from the alveoli since there was a lot of mucus in the lung, which caused inability of oxygen to enter the alveoli for air exchange and failure of oxygen therapy, ultimately leading to suffocation. It indicates that the novel coronavirus causes mainly inflammatory reactions characterized by damage to deep airways and alveoli” [Figures 2 and 3].^[1] Academician Zhong Nanshan also said that by comparing the pathological biopsy results of patients with SARS and those with COVID-19, the most significant difference was that there was a large amount of sticky mucus in bronchioles and alveoli of patients with COVID-19, which obstructed the airways. He believed that “The mucus may be one of the causes of death in critical patients. The mucus present in alveoli and bronchioles is very sticky and reduces the effect of mechanical ventilation. How to remove the mucus from small airways is a problem to be solved urgently.”

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SU WEN “PING RE BING LUN PIAN” (《素问·热病论篇》BASIC QUESTIONS “DISCOURSE DELIBERATING UPON HEAT DISEASE”): INABILITY TO REMOVE PHLEGM CAUSES LUNG INJURY, WHICH LEADS TO DEATH

As regards “Laofeng disease (common cold due to overstrain),” it was discussed in *Basic Questions* “Discourse Deliberating upon Heat Disease” that “The patients may cough up bluish and yellowish sputum like pus and the size of a marble from the mouth or nose. If it is not coughed up, it impairs the lung. If the lung is impaired, the patients will die (咳出青黄涕，其

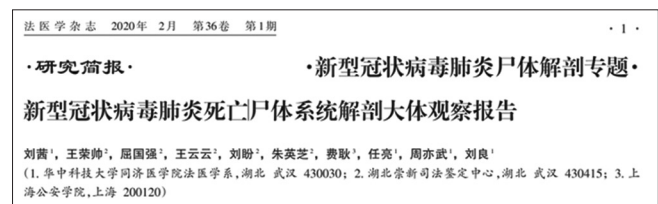


Figure 1: The report published in *Journal of Forensic Medicine*

Address for correspondence: Prof. Qingqi Wang,
Neijing Teaching and Research Office, School of Basic Medicine, Shanghai
University of Traditional Chinese Medicine, Shanghai, China.
E-mail: wang_qin_qi@sina.com

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状如脓，大如弹丸，从口中若鼻中出，不出则伤肺，伤肺则死也。”^[12] It suggests that in pulmonary diseases, failure to remove phlegm timely may obstruct the airways and lead to suffocation and even death. It indicates that phlegm should be treated by making the best use of the disease condition, that is, giving the pathogens a way out, lest qi of the zang organs be damaged. In *Du Yi Sui Bi* (《读医随笔》 *Informal Essay about Medicine*) by Zhou Xuehai (周学海) in the Qing Dynasty, it was described that “In treatment of disease, it is better to give the pathogens a way out. For pathogens to leave the body through evacuation of the bowels, purgation methods should be used; for those to leave the body from the body surface, dispersion methods should be used.”^[13] In the treatment of COVID-19 with traditional Chinese medicine (TCM), removal of phlegm from the respiratory tract to give the pathogen a way out is an important link in improvement of unobstructed respiratory tract and repair of pulmonary injury and a key to therapeutic effect.

TEN METHODS TO REMOVE PHEGM IN TRADITIONAL CHINESE MEDICINE

Phlegm is a substance secreted by the stimulated respiratory tract and is composed of mucus, foreign matter, pathogenic microorganism, various inflammatory cells, and necrotic and exfoliated epithelial cells, etc. It is a product of inflammatory reactions in COVID-19, and how to remove it from the airways is a major problem to be solved quickly in treatment of the disease. According to TCM, “Phlegm is generated in the spleen, stored in the lung and rooted in the kidneys.” It was warned in *Jing Yue Quan Shu* (《景岳全书》 *Complete Works of Jingyue*) [Figure 4] that “Do not be hasty to treat phlegm the moment it is observed (见痰休治痰).”^[14] It does not mean that phlegm needs no treatment in phlegm diseases, but the source of phlegm should be identified before treatment so that “phlegm is generated no more” or all possible means

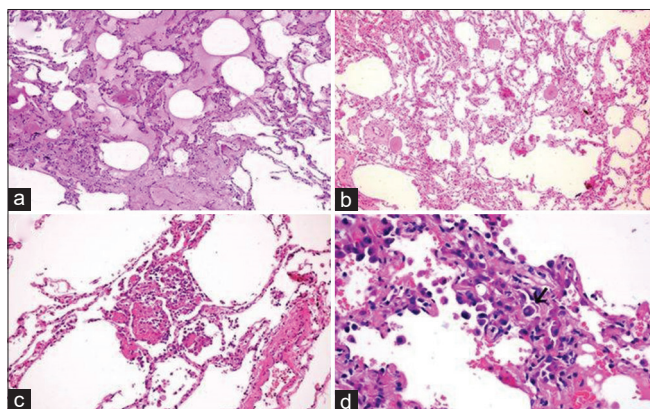


Figure 2: Pathological sections of the lungs of COVID-19 patients. Source: <https://www.meipian.cn/2vvhmvr1>. (a) The alveoli have a thick layer of gelatinous mucus. (b) The alveoli have a thick layer of gelatinous mucus. (c) After viral infection, there are congestion, edema of lung interstitium and inflammatory cell infiltration. (d) In severe condition of COVID-19, there is alveolar hemorrhage

should be tried to remove phlegm – the pathological product that has already been formed so that the respiratory tract is unobstructed again. The methods to remove phlegm are introduced as follows.

Ventilating the lung and resolving phlegm

The lung dominates qi and governs ascent and dispersion, purification and descent. In case of an attack of the lung by external pathogens, the lung qi fails to ascend, leading to clinical manifestations including cough, asthma, copious phlegm, chest tightness, and thin and white tongue coating. The method of ventilating the lung and resolving phlegm should be used for treatment. Recipes such as San Ao Decoction (三拗汤) and Tong Xuan Li Fei Pill (通宣理肺丸) can be used. Herbs including Ma Huang (麻黄 *Herba Ephedra*), Bei Xing Ren (北杏仁 *Armeniacae Semen Sceptentrionale*), Jie Geng (桔梗 *Radix Platycodonis*), Zi Su (紫苏 *Caulis Perillae*), and Jin Fei Cao (金沸草 *Herba Inulae*) can be selected to diffuse the lung qi, together with Xiang Bei Mu (象贝母 *Fritillariae Verticillatae Bulbus*), processed Ban Xia (半夏 *Rhizoma Pinelliae*), and Qian Hu (前胡 *Radix Peucedani*) that resolve phlegm and relieve cough used as adjuvants. In *Yi Men Fa Lü* “Ke Sou” (《医门法律·咳嗽》 *Precepts for Physicians* “Cough”), it was written that “To treat cough due to exuberant pathogens, astringent drugs that stop coughing are forbidden and they can only be used for prolonged and weak coughing.”^[15]

Clearing the lung and resolving phlegm

When pathogenic heat invades the lung or high fever lasts for several days after pathogenic wind or cold attacks the lung, fluids are consumed, leading to yellow sticky phlegm.

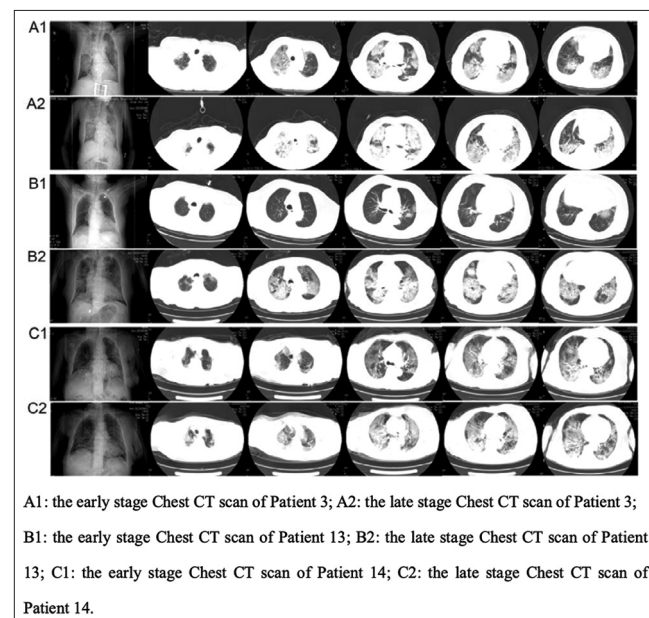


Figure 3: Chest computed tomography scans. Zuojiang Gong *et al.* Clinical characteristics of 25 death cases infected with COVID-19 pneumonia: a retrospective review of medical records in a single medical center, Wuhan, China. Available from: <https://www.sciencedirect.com/science/article/pii/S1201971220301867>

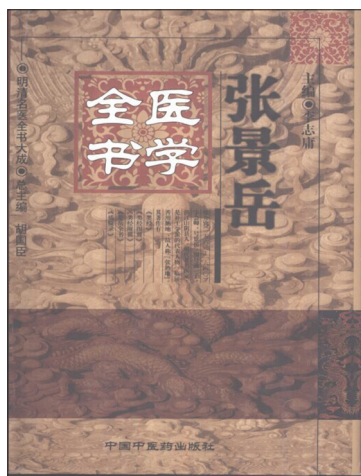


Figure 4: Zhang Jingyue Yi Xue Quan Shu 《张景岳医学全书》 Zhang Jingyue's Complete Medical Book

The patients complain of fear of heat and liking for cool drinks, with the symptoms of red tongue, slimy yellow tongue coating, and surging and forceful pulse. Herbs such as Huang Qin (黄芩 *Radix Scutellariae*), Yu Xing Cao (鱼腥草 *Herba Houttuyniae*), Kai Jin Suo (开金锁 *Fagopyri Cymosi Radix et Rhizoma*), Shan Zhi (山梔 *Gardeniae Fructus*), Sheng Shi Gao (生石膏 *Gypsum Crudum*), Xing Ren (杏仁 *Armeniacae Semen*), She Gan (射干 *Rhizoma Belamcandae*), Chuan Bei Mu (川贝母 *Bulbus Fritillariae Cirrhosae*), and Zhu Ru (竹茹 *Caulis Bambusae in Taenia*) can be selected. Bamboo sap can be used by nasal feeding or gavage. In *Yi Xue Ru Men* “Ke Sou” (《医学入门·咳嗽》 *Introduction to Medicine* “Cough”), it was written that “External contraction for a long time leads to depressed heat and prolonged internal damages lead to flaming fire. The treatment is to open depression and moisten dryness.”^[6]

Warming and resolving cold-phlegm

As pathogenic cold invades the lung, fluids in the lung coagulate into phlegm that is white and thin, and the tongue coating is thin white or slimy white. In *Jin Gui Yao Lue* “Tan Yin Pian” (《金匱要略·痰飲篇》 *Synopsis of the Golden Chamber* “Phlegm-Fluid Retention”), it was suggested that “For patients with phlegm-fluid retention, drugs warm in property can be used for harmonization (病痰飲者，當以溫藥和之).”^[7] In *Yi Bian* (《医編》 *Stepping Stone to Medicine*), it was written that “Cold-phlegm is ascribed to the kidney, and shows the symptoms of sunken pulse, dark complexion, cold feet, fear and flusteredness, glomus blockage, bone impediment and inability to move the limbs. Jiang Gui Pill (姜桂丸) and Ju Fang Hu Jiao Li Zhong Pill (局方胡椒理中丸) can be used for treatment. Gan Jiang (干姜 *Zingiberis Rhizoma Exsiccatum*) is indispensable, and Gui (桂 *Cinnamomi*), Ma Huang (麻黃 *Herba Ephedrae*) and Xi Xin (細辛 *Herba Asari*) are added for serious disease. Phlegm originates from water that is rooted in the kidney.”^[8] Modified Xiao Qing Long Decoction (小青龍湯) can be used. Herbal drugs such as Ma Huang (麻黃 *Herba Ephedrae*), Gui Zhi (桂枝 *Ramulus Cinnamomi*),

processed Ban Xia (半夏 *Rhizoma Pinelliae*), Gan Jiang (干姜 *Zingiberis Rhizoma Exsiccatum*), Xi Xin (細辛 *Herba Asari*), Xing Ren (杏仁 *Armeniacae Semen*), and Bai Jie Zi (白芥子 *Semen Sinapis Albae*) can be used with ginger juice for better effect.

Moistening the lung and resolving phlegm

As pathogenic dryness invades the lung or lung heat transforms into dryness, phlegm is thick and hard to cough up, often accompanied by hemoptysis. The patient complains of dry mouth, nose, and throat and shows thin yellow tongue coating. Then, Qing Zao Jiu Fei Decoction (清燥救肺湯) and Wu Zhi Decoction (五汁飲) can be used. Herbal drugs such as Xi Yang Shen (西洋參 *Radix Panacis Quinquefolii*), Nan Sha Shen (南沙參 *Radix Adenophorae*) or Bei Sha Shen (北沙參 *Radix Glehniae*), Tian Dong (天冬 *Radix Asparagi*), Mai Dong (麥冬 *Radix Ophiopogonis*), Bai He (百合 *Bulbus Lilii*), stir-fried Pi Pa Ye (枇杷葉 *Folium Eriobotryae*), Tian Hua Fen (天花粉 *Radix Trichosanthis*), Lu Gen (芦根 *Rhizoma Phragmitis*), Sheng Di (生地 *Radix Rehmanniae Recens*), Xian Shi Hu (鮮石斛 *Dendrobii Caulis Recens*), Chuan Bei (川貝 *Bulbus Fritillariae Cirrhosae*) powder, and Yu Zhu (玉竹 *Rhizoma Polygonati Odorati*) can be used with fresh fruit juice for good effect.

Softening hardness and dispersing phlegm

Lingering pathogens in the lung cause glue phlegm-qi, with the manifestations of thick phlegm that leads to difficulty to cough up, dry mouth, and tongue with scanty fluid. This is frequently observed in patients suffering from senile chronic bronchitis with lung and kidney deficiency. In *Su Wen* “Zang Qi Fa Shi Lun” (《素問·臟氣法時論》 *Basic Questions* “Discourse on How the Qi in the Depots Follow the Pattern of the Seasons”), it was stated that “Since the heart needs to be softened, the treatment of heart disease requires immediate use of salty flavor to soften it (心欲軟，急食咸以軟之).”^[2] Drugs such as Zhe Bei Mu (浙貝母 *Bulbus Fritillariae Thunbergii*), Hai Zao (海藻 *Sargassum*), Kun Bu (昆布 *Thallus Laminariae*), Mu Li (牡蠣 *Concha Ostreae*), Hai Fu Shi (海浮石 *Pumex*), vinegar-soaked Bie Jia (鳖甲 *Carapax Trionycis*), Qing Meng Shi (青礞石 *Lapsi Chloriti*), and Sang Bai Pi (桑白皮 *Cortex Mori*) can be selected against that. Drugs salty in taste can soften hardness and resolve old and stubborn phlegm. Tian Hua Fen (天花粉 *Radix Trichosanthis*), Lu Gen (芦根 *Rhizoma Phragmitis*), Xian Shi Hu (鮮石斛 *Dendrobii Caulis Recens*), and Bai He (百合 *Bulbus Lilii*) that engender fluid can be used as adjuvant drugs to liquefy old phlegm and help expel phlegm.

Disinhibiting qi and resolving phlegm

Phlegm is tangible turbid matter and its movement is promoted by qi. According to TCM, “Phlegm must be resolved before cough can be treated and qi must be disinhibited before phlegm can be resolved (治咳先治痰，治痰先利氣).” In *Yi Xue Zheng Zhuan* “Ke Sou” (《医学正传·咳嗽》 *Orthodox Lineage of Medicine* “Cough”), it was written that “To treat cough, phlegm should be resolved first, and to resolve phlegm, disinhibition of qi is held essential. Therefore, Nan Xing (南星 *Pinelliae Massa*)

Fermentata) and Ban Xia (半夏 *Rhizoma Pinelliae*) resolve phlegm and cough clears up of its own accord; Zhi Qiao (枳壳 *Fructus Aurantii*) and Ju Hong (橘红 *Citri Exocarpium Rubrum*) disinhibit qi and phlegm moves down by itself.”^[9] Pang Anchang (庞安常), a medical scholar in Northern Song Dynasty said that “There should be no phlegm moving up in the human body as no water runs upward in nature. So, doctors good at resolving phlegm treat qi instead of phlegm. Once qi is disinhibited, fluids in the body can move smoothly in pace with qi. Half amount of drugs in Perilla Fruit Qi-Descending Decoction and of those in Phlegm-Abducting Decoction is decocted together. Or, Xiao Ban Xia Fu Ling Decoction (小半夏茯苓汤) Plus Zhi Shi (枳实 *Fructus Aurantii Immaturus*) and Mu Xiang (木香 *Radix Aucklandiae*) can be used.”^[10] Drugs such as processed Ban Xia (半夏 *Rhizoma Pinelliae*), Hua Ju Hong (化橘红 *Exocarpium Citri Grandis*), and Xiang Bei Mu (象贝母 *Fritillariae Verticillatae Bulbus*) can be selected, and drugs including Su Zi (苏子 *Fructus Perillae*), Lai Fu Zi (莱菔子 *Semen Raphani*), Hou Po (厚朴 *Cortex Magnoliae Officinalis*), Zhi Qiao (枳壳 *Fructus Aurantii*), and Mu Xiang (木香 *Radix Aucklandiae*) can be added accordingly.

Dispelling wind and clearing up phlegm

As pathogenic wind invades the lung, the patient coughs with thin white sputum, which then becomes yellowish thick phlegm, and shows fear of wind, as well as white at the beginning and then thin yellowish tongue coating. Modified Xing Su Decoction (杏苏饮加减) can be used. Drugs such as Xing Ren (杏仁 *Armeniacae Semen*), Su Ye (苏叶 *Folium Perillae*), Jing Jie (荆芥 *Herba Schizonepetae*), Qian Hu (前胡 *Radix Peucedani*), Jie Geng (桔梗 *Radix Platycodonis*), and Bai Qian (白前 *Rhizoma Cynanchi Stauntonii*) can be selected. As regards deepgoing and stubborn pathogens, it was described in *Stepping Stone to Medicine* that “Wind phlegm is ascribed to the liver and has the manifestations of string-like pulse, bluish complexion, stuffy pain and numbness of the limbs, constipation, depressed anger in the heart, or even paralysis, convulsion and vertigo.”^[8] Drugs such as processed Nan Xing (南星 *Pinelliae Massa Fermentata*), processed Ban Xia (半夏 *Rhizoma Pinelliae*), Tian Ma (天麻 *Rhizoma Gastrodiae*), Tian Zhu Huang (天竺黄 *Concretio Silicea Bambusae*), Ya Zao (牙皂 *Gleditsiae Fructus Parvus*), Jiang Can (僵蚕 *Bombyx Batryticatus*), and Qin Jiao (秦艽 *Radix Gentianae Macrophyllae*) can be selected, together with the adjuvants including Wu Yao (乌药 *Radix Linderae*), Zhi Qiao (枳壳 *Fructus Aurantii*), and Jiang Zhi (姜汁 *Zingiberis Rhizomatis Succus*).

Clearing intestines and draining phlegm

There is an interior–exterior relationship between the lung and large intestine. The lung govern ascent and dispersion, purification and descent. Qi of the Fu organs runs smoothly because of purification and descent of lung qi. Phlegm-heat brewing internally leads to failure of lung qi to descend, resulting in deteriorated syndromes. Xuan Bai Cheng Qi Decoction (宣白承气汤) in *Wen Bing Tiao Bian* (《温病条辨》 *Systematized Identification of Warm Diseases*) can be

used. Drugs such as raw Shi Gao (生石膏 *Gypsum Crudum*), raw Da Huang (大黄 *Radix et Rhizoma Rhei*), Xing Ren (杏仁 *Armeniacae Semen*), and skin of Gua Lou (瓜蒌 *Fructus Trichosanthis*) can be selected, added with Huang Qin (黄芩 *Radix Scutellariae*), Sang Bai Pi (桑白皮 *Cortex Mori*), Hou Po (厚朴 *Cortex Magnoliae Officinalis*), Zhi Shi (枳实 *Fructus Aurantii Immaturus*), Ma Ren (麻仁 *Cannabis Semen*), Xiang Bei Mu (象贝母 *Fritillariae Verticillatae Bulbus*), and so on to clear the lung and arrest panting, relieve constipation, and purge phlegm-heat. It was reported that in Shanghai, varied Qi-Infusing Decoction for enema was used to treat COVID-19 patients with heat binding in Yangming and good efficacy has been obtained.

Invigorating the spleen and moving phlegm

Invasion of the lung and spleen by pathogenic dampness or improper diet that causes irregular transportation and transformation leads to internal generation of phlegm dampness. The manifestations include white watery sputum, which is copious and easy to cough up, as well as body heaviness, fatigue or loose stool, and thin white or slimy white tongue coating. It was written in *Stepping Stone to Medicine* that “Damp phlegm is ascribed to the spleen, and the manifestations include slow pulse, sallow complexion, limb heaviness, fatigue, weakness, somnolence, abdominal distension, indigestion, diarrhea, or lumps and numbness. White Atractylodes Pill can be used. Drugs like Bai Zhu (白术 *Rhizoma Atractylodis Macrocephalae*), Cang Zhu (苍术 *Rhizoma Atractylodes Rhizome*), Nan Xing (南星 *Pinelliae Massa Fermentata*), Ban Xia (半夏 *Rhizoma Pinelliae*), Fu Ling (茯苓 *Poria*) and Ze Xie (泽泻 *Rhizoma Alismatis*) can be selected.”^[8] Er Chen Decoction (二陈汤) and Ping Wei Powder (平胃散) can be taken. Herbal drugs such as Dang Shen (党参 *Radix Codonopsis*), Cang Zhu (苍术 *Rhizoma Atractylodes Rhizome*), Bai Zhu (白术 *Rhizoma Atractylodis Macrocephalae*), Ban Xia (半夏 *Rhizoma Pinelliae*), Ju Pi (橘皮 *Citri Exocarpium*), Fu Ling (茯苓 *Poria*), Yi Yi Ren (薏苡仁 *Semen Coicis*), and honey-fried Gan Cao (蜜制甘草 *Radix Glycyrrhizae*) can be selected.

Tonifying qi and dispelling phlegm

The lung governs qi and has the functions of ascent and dispersion, purification and descent. Phlegm is a product of inflammation when the lung is attacked by pathogenic qi. Qi is invisible and phlegm is visible. That phlegm can be coughed up is depended on ascent and dispersion, purification and descent of lung qi, and when lung qi is weak, phlegm is difficult to be removed. Patients with chronic obstructive pulmonary disease and old patients with COVID-19 are commonly seen clinically and they have root (ben 本) deficiency and branch (biao 表) excess. Therapeutic effect is poor when phlegm is resolved only for treatment and qi must be tonified simultaneously. Herbs such as Tai Zi Shen (太子参 *Radix Pseudostellariae*), Dang Shen (党参 *Radix Codonopsis*), Huang Qi (黄芪 *Radix Astragali seu Hedysari*), Fu Ling (茯苓 *Poria*), and Gan Cao (甘草 *Radix Glycyrrhizae*) can be used, and Chen Pi (陈皮 *Pericarpium Citri Reticulatae*), Ban Xia (半夏 *Rhizoma Pinelliae*), Bei Mu (贝母 *Bulbus Fritillariae*), and processed Nan Xing (南星 *Pinelliae Massa Fermentata*) can be used

to resolve phlegm. Many years ago, I treated a patient with senile chronic bronchitis, who was short of breath the moment he moved and could not cough up phlegm. Both Chinese and Western medicines were used with poor efficacy. Then, 6 g of powder of sundried Shen (参 *Ginseng Radix*) and 6 g of powder of Chuan Bei Mu (川贝母 *Bulbus Fritillariae Cirrhosae*) were taken by the patient with warm water. Three days later, there was no difficulty to remove phlegm and no shortness of breath was observed. The method of banking up earth to generate metal was used for rehabilitation.

In addition, for patients with difficulty to remove phlegm, back-patting can be performed to help dispel phlegm. The patient lies prone like a frog, the caregiver or paramedic pats gently on his/her back bottom-up, then the patient coughs, and phlegm is often easy to be removed. The patient is instructed to drink a lot of water so that thick secretion is diluted and coughed up, which is helpful for relieving cough and dispelling phlegm, and throat is moisturized and physically treated, which promotes resolution of local inflammation. Besides, the steam method can also be used. Boiling water is poured into a jar with a big opening or a teacup, and the patient turns his or her nose and mouth toward the rising steam and absorbs it so that phlegm is thinned and easy to be coughed up, congestion and edema of tracheal and bronchial mucosa can thus be relieved, and cough can be reduced.

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Conflicts of interest

There are no conflicts of interest.

Translator: Shuna Zhang (张淑娜)

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Research Progress and Analysis of Moxibustion in Prevention and Treatment of Acute Infectious Diseases

Haiyan Li, Chao Zhang

Department of Acupuncture-Moxibustion Literature, Acupuncture-Moxibustion and Tuina School, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

To introduce and evaluate current research progress of moxibustion in the prevention and treatment of acute infectious diseases, related literature in CNKI, Wanfang Data, and SinoMed was retrieved and analyzed by the present study. Results showed abundant studies on the mechanism of action of moxibustion in the prevention and treatment of acute infectious diseases with remarkable clinical efficacy. The present study also summarizes the commonly-occurring problems and found out the deficiencies in existing studies in hope of providing more reference for further research.

Keywords: Acute infectious diseases, Chinese medicine, experimental research, literature research, mechanism of moxibustion

INTRODUCTION

With advances in modern medicine, various infectious diseases have been largely brought under control, but some have not completely eliminated and some are still emerging.

Moxibustion therapy has played an important part in the prevention and treatment of epidemics in traditional Chinese medicine (TCM). In moxibustion, moxa smoke kills germs and cauterizing reinforces healthy qi and eliminates pathogenic factors, so as to harmonize Yin and Yang, “prevent disease before its onset, control development of existing disease and prevent disease relapse after recovery.”^[1]

In the last half century, although moxibustion therapy was used to prevent and treat major outbreaks of severe infectious diseases, its value is controversial in intervention of related diseases. Studies on the infectious diseases treated by moxibustion included epidemic hemorrhagic fever (EHF), influenza, and dysentery have been published, but there has been insufficient systematic review of studies on moxibustion in the prevention and treatment of acute infectious diseases. The authors hope to provide more reference for future research, thus to retrieve and analyze related literature to introduce research progress of

moxibustion in the prevention and treatment of acute infectious diseases and supplement the deficiencies in existing studies.

MATERIALS AND METHODS

Literature sources and retrieval strategy

Databases including CNKI, Wanfang data and SinoMed were searched for and the diseases searched for were acute infectious diseases included in *Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases* (revised after Announcement No. 1, 2020 by the National Health Commission of the People's Republic of China). Advanced search was carried out using the computer retrieval formula of “灸法” or “艾灸” or “针灸”+ the name of acute infectious disease (“灸法” and “艾灸” refer to moxibustion, “针灸” refers to acupuncture and moxibustion).

Inclusion criteria

(1) Medical records of moxibustion for the prevention and treatment of acute infectious diseases; (2) animal

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Address for correspondence: Mr. Chao Zhang,
Acupuncture-Moxibustion and Tuina School, Shanghai University of
Traditional Chinese Medicine, Shanghai, China.
E-mail: zc1467@163.com

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experiment on moxibustion for the prevention and treatment of acute infectious diseases; (3) clinical observation of moxibustion in the prevention and treatment of acute infectious diseases; and (4) studies on the mechanism of action of moxibustion in the prevention and treatment of acute infectious diseases.

Exclusion criteria

(1) Literature review; (2) studies with unspecified diagnosis of disease; (3) studies that used acupuncture combined with moxibustion and had only pre- and post-treatment comparison and no intergroup comparison; and (4) moxibustion studies that used sulfur or medicated threads instead of moxa.

Studies included

The above databases were searched for and full-text literature that met the inclusion criteria was read, and 25 eligible papers were obtained after screening by the exclusion criteria. Study subjects and methods are shown in Table 1. One of the papers involved two kinds of studies, namely case studies and clinical case series observation.^[2] Twelve diseases were identified, with EHF occurring frequently.

Literature analysis and summary

Mechanism of action of moxibustion in epidemic prevention

In terms of study subjects, there were a total of 9 papers about the mechanism of action of moxibustion in intervention of acute infectious diseases that included EHF, leptospirosis, dysentery and influenza virus pneumonia, and all of the studies were animal randomized controlled trials. After full-text reading, the authors analyzed and summarized the pathways at different levels in the mechanism of action of moxibustion in the prevention and treatment of acute infectious diseases.

Enhancing the immune activity of body cells

In an experimental study by Song Xiaoge on moxibustion in the treatment of rats with EHF,^[3] the activity of erythrocyte C3b receptor rosette (E-C3bRR) was investigated. 33 Wister rats were used in the study. The number of yeast rosettes in 200 erythrocytes observed under a microscope was counted experimentally, converted to percentages and used as indicator of the erythrocyte C₃b receptor activity. Virus

inoculation and treatment were not performed for rats in the blank group, and EHF virus was inoculated in both the infection group and the treatment group. Moxibustion was not given in the infection group. Animals in the treatment group were treated as follows: At day 2 after EHF virus inoculation, moxibustion was performed at the kidney acupoint area for 30 min, once daily for 7 days. At 14 days after inoculation of EHF virus, the E-C3bRR rate was calculated as shown above.

The E-C3bRR rate ($\bar{X} \pm$ standard deviation [SD]) was 4.23 nda. 07, 6.55 nda. 76 and 9.13 nda. 67 in the normal (blank) group, infection (control) group and treatment (moxibustion) group, respectively. It was higher in the infection group than in the normal group ($P < 0.05$) and was higher in the treatment group than in the infection group ($P < 0.02$), indicating that the activity of E-C3bRR was increased in the rats infected with EHF virus compared to that in the healthy rats, and moxibustion was effective in enhancing the activity of E-C3bRR.

In a study of the same type by the same authors,^[4] percentage of peritoneal macrophage (PM) phagocytosis was used as another indicator. Twenty-two rats were used in the study. With exactly the same experimental design with the previous study, 120–160 macrophages were obtained experimentally and counted under a microscope at 14 days after viral inoculation, and the percentage of PM phagocytosis was calculated.

The percentage of PM phagocytosis ($\bar{X} \pm$ SD) was 27.63 goc. 78, 19.00 goc. 20 and 29.8 dgo. 20 in the normal (blank) group, infection (control) group and treatment (moxibustion) group, respectively. It was higher in the treatment group than in the infection group ($P < 0.05$), indicating that moxibustion could significantly enhance the phagocytic function of PMs in rats infected with EHF virus.

The E-C3bRR rate was one of the indicators reflecting erythrocyte immune function, and PMs themselves participated in cell immunity. Moxibustion improved the activity of E-C3bRR and the phagocytic function of PMs, suggesting its potential in boosting immunity of the body.

Correct fluid disorders and stabilize the inner environment of the body

There was a total of 4 papers on this subject and all studies were animal randomized controlled trials that used EHF virus as the challenge virus. Immunofluorescence assay and radioimmunoassay were performed. There were a normal (blank) group, an infection (control) group and a treatment (moxibustion) group in the trials, with 10 rats in each group. Except for the number of animals and the indicators, the study design was the same with the previous studies. Comparison of indicators in the three groups was described below with the following data.

In a study with norepinephrine (NE) and dopamine (DA) as indicators ($\bar{X} \pm s$, ng/ml),^[5] NE and DA were 192.66 emlt. 79 and 840.02 emlt. 73, respectively, in the normal group; 265.91 uplt. 33 and 1159.07 9plt. 01, respectively, in the

Table 1: Percentages of subjects and methods of the studies included

Study subjects	Study methods	Number of papers (%)
Mechanism of action	Animal randomized controlled trial	9 (37.50)
Efficacy evaluation	Clinical randomized controlled trial	6 (25.00)
	Clinical case study	3 (12.50)
	Clinical case series observation	6 (25.00)
	Animal randomized controlled trial	1 (4.17)

infection group; and 194.74 ± 56.12 and 816.50 ± 560.91 respectively in the treatment group. The levels of NE and DA were significantly higher in the infection group than in the normal group ($P_{NE} < 0.01$, $P_{DA} < 0.001$) and they were significantly lower in the treatment group than in the infection group ($P_{NE} < 0.05$, $P_{DA} < 0.001$), with no significant difference between treatment and normal groups ($P > 0.05$). The above data indicated that the levels of NE and DA increased in rats infected with EHF virus, and moxibustion reduced the levels, hence able to promote the levels of NE and DA to return to normal.

In a study with 5-hydroxytryptamine (5-HT) and 5-hydroxyindoleacetic acid (5-HIAA) used as indicators,^[6] the data also suggested that the levels of 5-HT and 5-HIAA were significantly higher in the infection group than in the normal group ($P_{5-HT} < 0.05$, $P_{5-HIAA} < 0.001$), and the levels were significantly lower in the treatment group than in the infection group ($P_{5-HT} < 0.001$, $P_{5-HIAA} < 0.05$). The level of 5-HT was not significantly different ($P_{5-HT} > 0.05$) and the level of 5-HIAA was significantly different ($P_{5-HIAA} < 0.05$) between treatment and normal groups. In addition, it was shown in a related study^[7] that the level of 5-HT had the same pattern of changes in lung and kidney tissues as in the above plasma samples. These data indicated that the level of 5-HT in plasma increased in rats infected with EHF virus, and moxibustion reduced the level, hence able to promote the level of 5-HT in plasma and lung and kidney tissues to return to normal.

The same pattern of changes was revealed in studies using the metabolite (TXB₂) of thromboxane (TXA₂), the metabolite (6-K-PGF₁) of prostacyclin (PGI₂), and the TXB₂/6-K-PGF₁ ratio as indicators as in the above studies.

Studies under this category were performed by Tang Zhaoliang *et al.* In these studies, the roles of the two catecholamine adrenergic neurotransmitters – NE and DA, the two monoamine neurotransmitters – 5-HT and 5-HIAA, and the two prostaglandins – TXB₂ and 6-K-PGF₁ in the body were described in detail. Results of the studies suggested that in the treatment of experimental animals with EHF, moxibustion had the effects of correcting fluid disorders and stabilizing the inner environment of the body, but there were few descriptions of the correlation between moxibustion and the disease course of EHF. Whether this mechanism of action can be supported in the treatment of other acute infectious diseases is to be further investigated.

Inducing production of interferons and exerting antiviral effects

There was a total of 3 papers on antiviral effects of moxibustion in the treatment of acute infectious diseases. The diseases in question were influenza, leptospirosis, and bacillary dysentery, and the studies were animal randomized experimental studies.

In one of the studies,^[8] there were four groups, namely acupuncture group, treatment group, infection (control) group and blank control group. Potency of serum interferon in mice was used as the indicator and microdose cytopathogenic

effect inhibition assay^[9] was carried out to determine serum interferon in mice. Animals in the moxibustion group were treated as follows: The Guanyuan point was selected for direct moxibustion with a 10–15 mg moxa cone, 4 cones at a time, once daily for 3 days. At day 3, mice were anesthetized lightly with ether after moxibustion, and under this condition, the nasal cavity of mice was attacked with influenza virus PR₈. Then, mice were treated with moxibustion for 3 times using the same method as above. Blood was collected from the mice after 48 h for the detection of serum interferon. It is worth mentioning that in the studies on mechanism of action that were included in this review, the experimental method in this study was one of the few methods in which moxibustion was carried out before viral inoculation for animals, and its results were significant for explaining the mechanism of action of moxibustion in the prevention of infection with influenza virus.

Based on experimental results, the potency of interferon ($\bar{X} \pm SD$) was 4.22 erf. 23, 2.63 erf. 22 and 2.93 erf. 19 in the moxibustion, infection and blank control groups, respectively. It was lower in the infection group than in the blank control group ($P < 0.05$), and was significantly higher in the moxibustion group than in the infection group ($P < 0.001$), indicating that moxibustion increased the potency of interferon in mice.

It is well-known that as a cytokine, serum interferon has broad-spectrum antiviral activity.^[10] Inducing production of interferons is an important approach of moxibustion to exert its antiviral effects. In this paper, the phagocytic function of PMs in mice was also investigated experimentally, and a possibility was proposed that interferons activated macrophages to improve immune function, thus it can be reasonably inferred that further investigation of the correlation between the antiviral effects of moxibustion in the prevention and treatment of acute infectious diseases and the mechanism of immune response is another approach to studying the mechanism of action of moxibustion. In mechanism studies on moxibustion exerting antiviral effects in intervention in other infectious diseases, there were also studies with other indicators demonstrating the antiviral mechanism of moxibustion, including studies on indicators of antibody titer^[11] and on endotoxins.^[12] Although further mechanism studies were not as definite as studies on interferons, they affirmed the antiviral effects of moxibustion in the prevention and treatment of acute infectious diseases.

Efficacy evaluation of moxibustion in the prevention and treatment of acute infectious diseases

In terms of study subjects, there were a total of 15 papers on efficacy evaluation of moxibustion in the prevention and treatment of acute infectious diseases and the study designs were clinical randomized controlled trial, clinical case study, clinical case series observation, and animal randomized controlled trial. Eleven diseases were involved, including EHF,^[13] viral hepatitis,^[14] hand-foot-and-mouth disease,^[15] malaria,^[16] rubella,^[17] hepatic echinococcosis,^[2] COVID-19,^[18] severe acute respiratory syndrome (SARS), amoebic dysentery, epidemic parotitis,^[19] and leptospirosis.^[20] It can be seen that

Table 2: Improvement of functions of various systems by moxibustion

Systems	Functions improved	Diseases involved	Number of papers (%)
Digestive	Hepatic functions (nausea, vomiting, abdominal distension, fatigue, ascites and liver echinococci calcification) and gastrointestinal functions (constipation, diarrhea, abdominal pain, poor appetite, and emaciation)	Viral hepatitis, hand-foot-mouth disease, hepatic echinococcosis, SARS, amoebic dysentery and COVID-19	8 (66.67)
Respiratory	Cough and chest tightness	COVID-19	1 (8.30)
Urinary	Renal functions (oliguria, dysuria, and proteinuria)	Epidemic hemorrhagic fever	3 (25.00)

SARS: Severe acute respiratory syndrome

moxibustion had a broad spectrum of disease in the prevention and treatment of acute infectious diseases.

Clinical efficacy of moxibustion in the treatment of acute infectious diseases

In clinical observations included in the review, the total effective rate of moxibustion was 88.07% in the treatment of diseases. The effects mainly included improving symptoms and shortening the course of disease (Take a study on moxibustion in the treatment of 6 patients with acute amoebic dysentery as an example),^[21] as well as reducing sequelae (Take a study on moxibustion in the treatment of SARS as an example. In this study by Zhao Hong, moxibustion was used to treat 9 SARS patients in recovery, and it was shown that moxibustion significantly improved sequelae of SARS, including low fever, chest tightness, fatigue, head and body aches, chest and abdominal distension pain, anorexia, constipation).^[22] In treatment of diseases, functions of the respiratory, digestive and urinary systems were improved, especially those of the digestive system, accounting for 66.67% [Table 2].

The assessment of study design in trials on moxibustion in intervening acute infectious diseases

According to preliminary classification of literature, there were only 6 clinical randomized controlled trials, accounting for 42.86% in clinical studies. In nonrandomized controlled studies, there were narrative reports of small-scale case series and case studies, and one of the papers were about two types of studies, namely case series observation and case study. Diseases involved are shown in Table 3. The study design was assessed considering several elements by further analyzing the literature.

1. Diagnostic criteria and efficacy indicator design: In all of the clinical trials included in the review, only 42.86% of the trials had definite criteria of disease diagnosis and efficacy indicator judgment, among which the trials on COVID-19 accounted for 50%. In most of the trials, there were shortcomings as follows: lack of diagnostic criteria; lack of standardization in efficacy indicator judgment, i.e., using subjective indicators and not using current reference standards formulated in guidelines or by international conferences.
2. Design of control group: In all of the clinical observations included in the review, the controlled studies and the randomized controlled studies accounted for 42.86% each, and the rest of the studies had indefinite control

groups. In addition, in six of the randomized controlled studies, there were 4 studies with strictly balanced control and statistical methods to support insignificant inter-group differences, accounting for 66.67%. The rest of the studies were flawed in design of control group and thus less persuasive.

3. Design of treatment group: In self-controlled studies, since it was considered in exclusion of literature that the controlled studies using treatment with not only moxibustion could not support the effectiveness of moxibustion, the studies using treatment with only moxibustion were included in the review, accounting for 42.86%. Design of treatment group in randomized controlled studies is shown in Table 4. There were mainly a moxibustion group, a Western medicine group, and a group of moxibustion combined with Western medicine. It can be seen from the study conclusions that apart from efficacy, the superiority of the combined therapy was demonstrated in the treatment of acute infectious diseases. However, in the studies with a Western medicine group, there was a common problem that there was various but no specifically described treatment with Western medicine. Besides, in all of the designs of moxibustion, treatment based on syndrome differentiation was performed in only 2 of the studies, and there was a lack of explanation for acupoint selection, so it was difficult to make a further conclusion on TCM treatment.

In addition, there was also an animal randomized controlled trial that was one of the few studies included in the review in which moxibustion was carried out before attack of pathogens. The disease studied was leptospirosis and expression of the c-Fos gene in the medulla oblongata of guinea pigs infected with leptospira was used as an indicator to show the degree of injury in the animals (expression of the c-Fos gene indicates noxious stimulation in the central and peripheral nervous system).

OmpL39 antigen injection was performed in the trial except for moxibustion (The Zusanli and Guanyuan points were selected. The Zusanli point was used for grain-sized moxibustion, 3 moxa cones at a time, 0.5 mg per cone; and the Guanyuan point was used for suspended moxibustion for 5 min. Moxibustion was carried out once every other day). There were a group of moxibustion + OmpL39 antigen injection, an OmpL39 antigen injection group, a moxibustion group and a control group. The effect of different prevention methods

was observed on visceral bleeding and c-Fos expression in guinea pigs attacked by viable leptospira. Results showed that visceral bleeding and c-Fos expression were reduced in the moxibustion group, the group of moxibustion + OmpL39 antigen injection and the OmpL39 antigen injection group compared to the control group ($P < 0.05$); they were reduced in the group of moxibustion + OmpL39 antigen injection and the OmpL39 antigen injection group compared to the moxibustion group ($P < 0.05$); expression of the c-Fos gene was significantly reduced in the group of moxibustion + OmpL39 antigen injection compared to the OmpL39 antigen injection group ($P < 0.05$). It was suggested that therapy with moxibustion alone was effective and moxibustion combined with antigen injection was more effective in reducing the noxious manifestations in the course of leptospirosis. However, since it was an animal trial that could not provide evidence for clinical efficacy, it could only support the therapeutic effect of moxibustion in the treatment of animals infected with leptospira and provide reference for further clinical study.

Discussion

Although it was revealed that^[23] infectious disease was not the high-frequency disease in the spectrum of disease intervened by moxibustion, it was found out in the studies included in this review that there was a wide scope of acute infectious diseases intervened by moxibustion, and moxibustion showed effect generally in the treatment of these diseases. According to this review, there were still shortcomings in the studies on moxibustion in the treatment of acute infectious diseases as follows: (1) There were few homogeneous studies evaluating the efficacy of moxibustion in treating certain disease, making it difficult to thoroughly evaluate the efficacy of moxibustion

in the prevention and treatment of acute infectious diseases and to obtain evidence for evidence-based treatment of each disease. (2) There was almost no study on different diseases that elaborated the same mechanism of action, making it difficult to show universality of the epidemic prevention mechanism. There is currently no solution to the above two problems, thus apart from the approaches proposed in this paper, new methodology is needed concerning this subject for more objective and reliable data evaluation on existing studies.

Moreover, the studies on the diseases involved in this review were still isolated except those wide-scope and standard studies on EHF. Therefore, the authors believe that studies on other diseases may learn from the experience as follows. (1) After selection of a disease, the study protocol is designed based on an evaluation indicator with high disease relevance or commonly used in guidelines. (2) In performance of a mechanism study, efficacy indicators can also be used. For instance, in a study on the effect of moxibustion on 5-HT in lung tissue of rats infected with EHF virus, evaluation on pulmonary index can be included to explore the relevance between the therapeutic effect and the mechanism of action, so that the epidemic prevention mechanism of moxibustion can be more convincing. (3) In performance of related studies, correlation study can be performed on several indicators for which satisfactory effect has been obtained. For instance, evaluation indicators of relevance between different mechanisms can be added, or, further study can be carried out on current study results about the prevention mechanism of moxibustion for a certain disease (EHF), in hope of elaborating the relationship among and the focus in the antiviral mechanism, neurohumoral regulatory effect, and immunity-enhancing effect. After outbreak of the COVID-19, papers discussing the feasibility of using moxibustion to prevent and treat this disease proposed that the immunity-enhancing effect might be the basis of the antiviral effect of moxibustion. As is known to all, the nervous, endocrine, and immune systems have an impact on each other, but it can be seen from this review that there was no correlation study on such mechanism in specific infectious disease, warranting further investigation.

In addition, it is noticed that in previous studies, although various diseases were involved in clinical studies on moxibustion in the prevention and treatment of infectious diseases, high-quality studies with efficacy observation were few, thus, it is difficult to provide a reliable and systematic study basis for a persuasive result. The reasons lie in inadequate

Table 3: Categories of clinical studies on moxibustion in intervening acute infectious diseases

Types of literature	Diseases involved	Number of papers (%)
Clinical randomized controlled trial	EHF, viral hepatitis and hand-foot-mouth disease	6 (42.86)
Case series observation	COVID-19, SARS, amoebic dysentery, epidemic parotitis and hepatic echinococcosis	6 (42.86)
Case study	Malaria, rubella and hepatic echinococcosis	3 (21.43)

EHF: Epidemic hemorrhagic fever, SARS: Severe acute respiratory syndrome

Table 4: Categories of design of treatment group

Groups	Diseases involved	Number of papers (%)
Western medicine group and group of moxibustion combined with Western medicine	EHF	2 (14.29)
Moxibustion group, Western medicine group and group of moxibustion combined with Western medicine	EHF and hand-foot-mouth disease	3 (21.43)
Moxibustion group and group of moxibustion combined with Western medicine	Viral hepatitis	1 (7.14)

EHF: Epidemic hemorrhagic fever

emphasis on methodology and nonstandard study design that were common to these studies. Most studies included in this review were observations on symptom improvement and statistics about cure rate, and few of them included prevention observations, which indicates that clinical study on moxibustion in the prevention of acute infectious diseases is still a challenge.

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Conflicts of interest

There are no conflicts of interest.

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The Role of the “Traditional Chinese Medicine Proclamation” in Cholera Prevention and Control in Modern China

Jie Ma, Xi Wang¹

School of Traditional Chinese Medicine, Beijing University of Chinese Medicine, ¹School of Humanities, Beijing University of Chinese Medicine, Beijing, China

Abstract

During the period of social transformation in modern China, the sudden onslaught of malignant infectious diseases, the helplessness of the public, and the impact of the modern Western medical system promoted the profound self-revolution of traditional Chinese medicine (TCM). Multiple factors, including politics, economy or religion contributed to the formulation of paper-based “TCM proclamation”. This paper, based on the prevention and control of cholera advocated in TCM proclamation, analyzes the new ways of cholera spread in China in early modern times and the complicated “country-region-medical institutions-other institutions-individuals” correlations.

Keywords: Cholera, epidemic prevention and control, traditional Chinese medicine, proclamation

In the early Qing Dynasty, the spread of smallpox in Beijing not only urged the government to have a new understanding of how to prevent and control epidemics, it also raised the level of awareness and participation of the whole society in the prevention and control of the spread of public diseases. Although modern China did not establish a perfect public disease prevention and control system as defined by Western medicine, traditional Chinese medicine (TCM) did perform well in preventing and controlling the spread of many epidemic diseases, reflecting the TCM wisdom in this field. In the late Qing Dynasty and the early Republican period, malignant infectious diseases followed the frequent international trade exchanges and foreign invasions. Cholera, plague, scarlet fever, diphtheria, and other malignant infectious diseases spread throughout the country. During this period, TCM practitioners developed many effective prescriptions, but most of them could only be read in medical books by elites. The TCM proclamation became an important way of introducing public health knowledge to average people because it was written on a single page with simple language that allowed rapid transmission and recommended easy application with satisfying effect. Likewise, during the social transformation

in modern China, the TCM proclamation played an important role in preventing and controlling the spread of major diseases in various regions.

INTRODUCTION

The term “cholera” can be derived from *Huang Di Nei Jing Ling Shu* “Wu Luan” (《黄帝内经灵枢·五乱》 *Miraculous Pivot of the Huangdi's Canon of Medicine* “The Five Disturbances.”) Cholera was called “Chu E (触恶)” in this book, which referred to the disease of sudden and violent vomiting and angina pectoris.^[1] It can be regarded as an acute gastroenteritis in Western medicine.

Scholars believe that from 1817 to 1823, British colonists invaded Burma from India, and spread cholera into the southern Yangtze region in 1820. At that moment, the “cholera” defined in Western medicine appeared in China.^[2] Cholera is an acute and fast-spreading infectious intestinal disease caused by

Address for correspondence: Associate Prof. Jie Ma,
School of Traditional Chinese Medicine, Beijing University of Chinese
Medicine, Beijing, China.
E-mail: majiefor1982@163.com

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Vibrio cholerae. It is a Class A infectious disease in China and a quarantine infectious disease in the world. What the Chinese in early modern times named “Huo Luan (霍乱)” is exactly the same disease as cholera.

The government and public institutions joined hands with TCM practitioners to build hospitals and treat patients nationwide. A large number of TCM prescriptions and methods for the prevention and control of the spread of infectious diseases emerged, such as “Bi Wen Pill (避瘟丹)” and “Moxa fumigation.” Local governments and social organizations at all levels used print media to popularize the knowledge of these prevention and control methods, publishing medical books and newspapers, issuing proclamations, etc.

THE ROLE OF THE “TCM PROCLAMATION” IN CHOLERA PREVENTION AND CONTROL

The TCM proclamation was the most effective and most widely used tool in epidemic prevention. It included information on disease diagnosis and treatment, and prescriptions and preventive measures formulated by national medical institutions or donated to the government or the public by local medical institutions and individuals.^[3] It was usually a single-page print that included simple but complete TCM medical information, especially the methods of the prevention and treatment of epidemic diseases recommended by the government, TCM doctors and even the folks. It was simple to read and easy to carry, so it has various kinds of readers from all walks of life, including those who were suffering from epidemic diseases.^[4]

The “TCM proclamation” usually comprises the name of the disease, main symptoms, prescription (name and dosage), medication method, nursing method, the recording date, the spreading place, and the contributors who came from state and county government, temples, pharmacies, and charity organizations, and who are individual practitioners of TCM (prestigious doctors, travelling doctors, and doctors who learned medical knowledge from the older generations of the family) [Figure 1].

THE APPLICATION OF THE “TCM PROCLAMATION” IN THE PREVENTION AND CONTROL OF CHOLERA

Application of “TCM proclamation” by social groups in the prevention and control of cholera

In the late Qing Dynasty, various organizations participated in epidemic prevention, such as the government, the medical institutions like Imperial Academy of Medicine, and the others. In modern times, the social structure has been transformed, and new social groups such as chambers of commerce and cleaning committees emerged.^[5] At the same time, medical institutions in various regions (pharmacies, charity organizations, publishing houses, and other social institutions), as well as religious

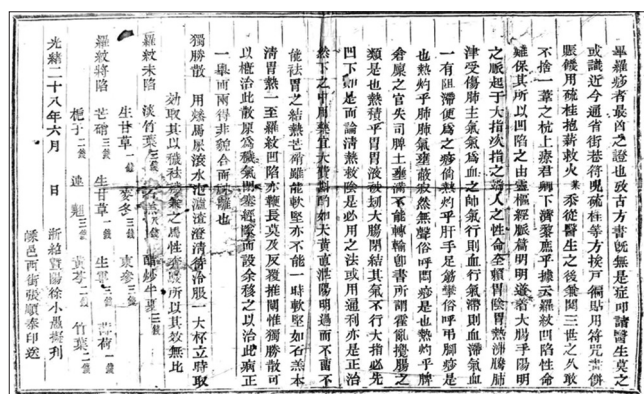


Figure 1: Traditional Chinese medicine proclamation *Bi Luo Sha Fang Zhi Fang An* (《毕罗痧防治方案》 *Cholera Prevention and Control Plan*), 51 cm × 35 cm, in “Jing He Zhai (景和斋)”

institutions (Buddhist temples, Taoist temples) used paper media (TCM proclamation) to assist the prevention and control of the regional spread of infectious diseases.

More TCM proclamations were published in the pharmacies. The TCM proclamation became the main paper-based channel for cholera prevention and control. Shao Cheng Road Pharmacy and Zhejiang Shaoxing Pharmacy jointly published *Lei Gong Pi Li Wan* (《雷公霹靂丸》 *Lei Gong Pi Li Pill*), which recorded the treatment plan of “Diao Jiao Sha (吊脚痧 cramp in cholera morbus).” Predicted from the textual content, there were two purposes for the publication of the proclamation: One was to publicize the TCM prescription for cholera prevention and control, and the other was to advertise the pharmacies to establish the public image [Note 1] [Figure 2].

Social charity groups seeking to prevent and control the spread of cholera also focused on TCM. They collected and published the prescriptions of local prestigious doctors. The prescriptions described the usage accurately, so that the general public could obtain them easily. The TCM proclamation *Le Shan Hui Zhi Yi Lang Fang Liang Zhong* (《乐善会治疫良方两种》 *Two Effective Prescriptions for Epidemic Diseases from Le Shan Committee*) was based on the TCM prevention and control plan for cholera in Chengdu, which described how cholera was transmitted in detail, reflecting the active participation of social charity groups in the prevention and control of the spread of cholera [Note 2] [Figure 3].

The TCM proclamation *Hu Yi Zhi Jian Dan You Xiao Zhi Fa Bing Shi She Ling Yao* (《虎疫之简单有效治法并施舍灵药》 *Simple and Effective Treatment and Medicine for Cholera*) published by the Taiyuan Branch of the World Red Swastika Society introduced the experience and prescriptions of a doctor named Zhang Mingxuan (张明轩) [Note 3]. In this TCM proclamation, the treatment methods of “Shi Huo Luan (湿霍乱 damp cholera),” “Gan Huo Luan (干霍乱 dry cholera)” and “Huo Luan Zhuan Jin (霍乱转筋 cholera with muscular spasm)” were introduced, with relevant medicines for patients included [Figure 4].

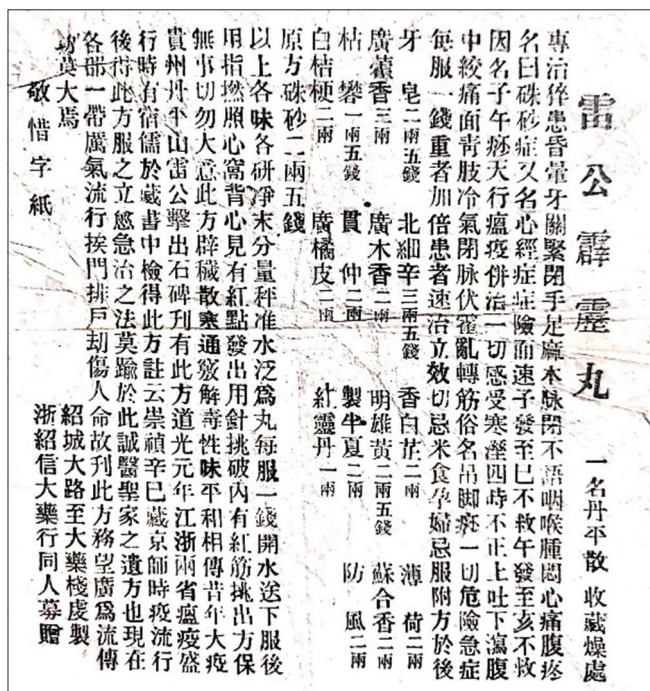


Figure 2: Traditional Chinese medicine proclamation Lei Gong Pi Li Wan (《雷公霹靂丸》 Lei Gong Pi Li Pill), 15.5 cm × 14 cm, in "Jing He Zhai"

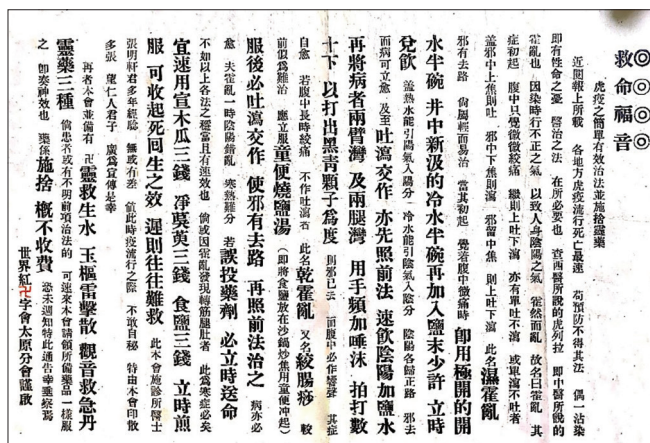


Figure 4: Traditional Chinese medicine proclamation Hu Yi Zhi Jian Dan You Xiao Zhi Fa Bing Shi She Ling Yao (《虎疫之简单有效治法并施舍灵药》 Simple and effective treatment and medicine for Cholera), 32 cm × 23.5 cm, in "Jing He Zhai"

Application of "TCM proclamation" in cholera prevention and control by traditional Chinese medicine practitioners

In early modern times, few people were aware of epidemic prevention. The governments were corrupted and alternated frequently, hence the prevention and control of the epidemic diseases were merely slogans. However, from the TCM proclamations, we can find out that TCM played a role in the prevention and control of regional epidemic diseases. TCM proclamations recorded the occurrence of epidemic diseases and the prevention and control methods as well. The main prescriptions and dosages of cholera treatment, as well as the specific prevention methods were elaborated in detail.

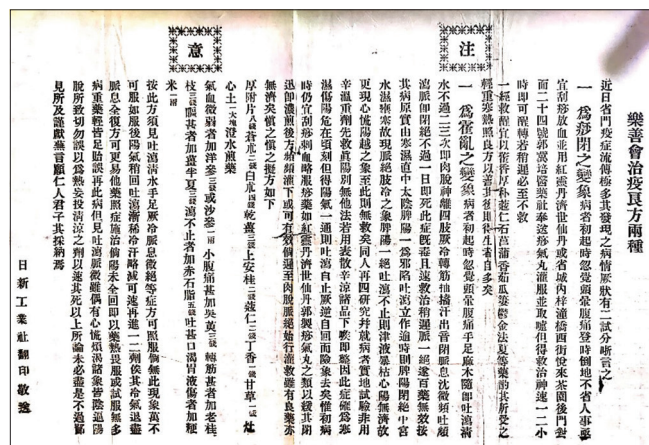


Figure 3: Traditional Chinese medicine proclamation Le Shan Hui Zhi Yi Lang Fang Liang Zhong (《乐善会治疫良方两种》 Two effective prescriptions for epidemic diseases from Le Shan Committee), 33 cm × 23.5 cm, in "Jing He Zhai"

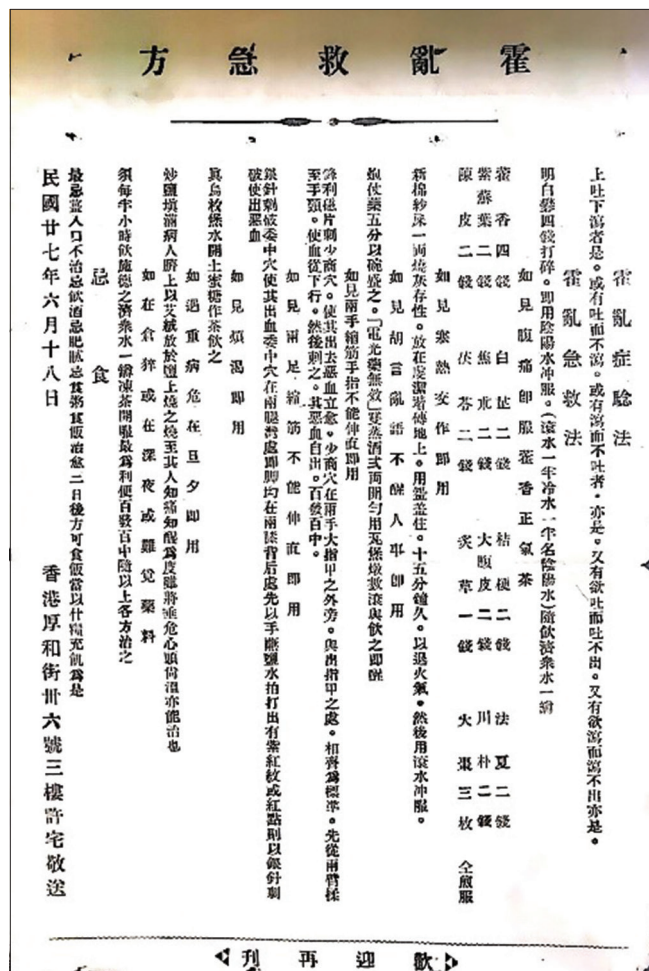


Figure 5: Traditional Chinese medicine proclamation Xiang Gang Huo Luan Jiu Ji Fang (《香港霍乱救急方》 Hong Kong Cholera First-aid Prescriptions), 26 cm × 17 cm, in "Jing He Zhai"

In 1938, a doctor surnamed Xu (许) recorded the prevention and treatment of cholera during the cholera epidemic in Hong Kong, including the TCM syndrome differentiation

method “Huo Luan Zheng Yan Fa (霍乱症验法 cholera testing method),” TCM treatment method “Huo Luan Ji Jiu Fa (霍乱急救法 cholera first-aid method)” and prevention method “Ji Shi (忌食 taboo food)” [Note 4] [Figure 5].

Cao Bingzhang (曹炳章), a prestigious doctor in Shanghai, introduced the treatment of cholera in his proclamation *Cao Bingzhang Xian Sheng Huo Luan Fang Zhi Fa* (《曹炳章先生霍乱防治法》 Sir Cao Bingzhang's Cholera Prevention and Treatment Methods). The proclamation included internal treatment and external treatment for cholera. At the same time, it portrayed the differentiation of the cold and heat of cholera syndromes, and made a detailed identification of cholera from tongue coating, lips and mouth, eyes, limbs, fingers, chest and stomach, voice, spontaneous sweating, vomiting, abdominal pain, dysentery and diarrhea, urination, spasm, and pulse. The application of Chinese and Western medicine in cholera treatment at that time was also differentiated [Figure 6].

THE NEW FORM OF CHOLERA TRANSMISSION CAUSED BY THE DEVELOPMENT OF MODERN CHINA

Yu Xinzhong (余新忠) pointed out that “the introduction and repeated epidemics of cholera were related not only to the Western expansion to the East, but also to the regional characteristics of the southern Yangtze, the social and economic development in the late Qing Dynasty, the prosperity of maritime and inland river traffic, the increasingly serious environmental damage and pollution.”^[6] As a result, “traffic” became another important way to spread the epidemics.

Epidemic transmission radiating from a population center

With its important geographical location, epidemics in the capital often spread to other provinces. At the same time, prevention and control methods could also be conveyed to other provinces and become effective ways to treat epidemic diseases. These contents were also reflected in the TCM proclamations. In describing the epidemic, the TCM proclamation often recorded details of the prescriptions used in treating the epidemics in the capital. *Lei Gong Pi Li Pill* was a prescription that was transmitted from Beijing to Guizhou,

Jiangsu, and Zhejiang. After being examined and approved effective in many places, this prescription was finally formed and published as a TCM proclamation in Zhejiang Province.

Another prescription was originally handed down from Xu Hengchang (徐恒昌), a doctor in Paifang Street, Laohekou City, Hubei Province. It was used in combination with acupuncture and was published in many places as a part of the TCM proclamation *Huo Luan Zhuan Jin Zhi Fa* (《霍乱转筋治法》 Cholera Spasm Treatment Methods). This proclamation recorded the full text of Xu's prescription to save the people in Tianjin County [Figure 7].

Rapid epidemic transmission after railway construction

From the geographical point of view, the ancient mode of epidemic transmission was contact diffusion. With the emergence of modern transportation in China such as trains and ships, the mode of the spread of epidemic diseases changed to hierarchical diffusion in a much higher speed. The diseases travel among regional central cities, along with railway lines and wharfs. For example, in the late Qing Dynasty and during the period of the Republic of China, the construction of railway lines promoted economic development and facilitated the spread of epidemic diseases. Epidemics were widespread in China during the period of the Republic of China. Epidemics occurring in one county could infect another 100 counties due to the development of modern transportation.^[7] In her study, Shan^[8] mentioned the influence of the modern transportation system on the spread of cholera. Cholera germs entered Tianjin from the port, and then spread to Liaoning, Jilin, Heilongjiang, Beijing, Hebei, Shandong, and other places through railways and ships. The transmission path of cholera became very complex and wide. The TCM proclamation *Huo Luan Fang Zhi Fang* (《霍乱防治方》 Cholera Prevention and Control Prescriptions) published by Longhai Railway Accounting Office recorded this phenomenon [Figure 8].

CONCLUSION

In the period of social transformation in modern China, the sudden malignant infectious diseases, the helpless state of the

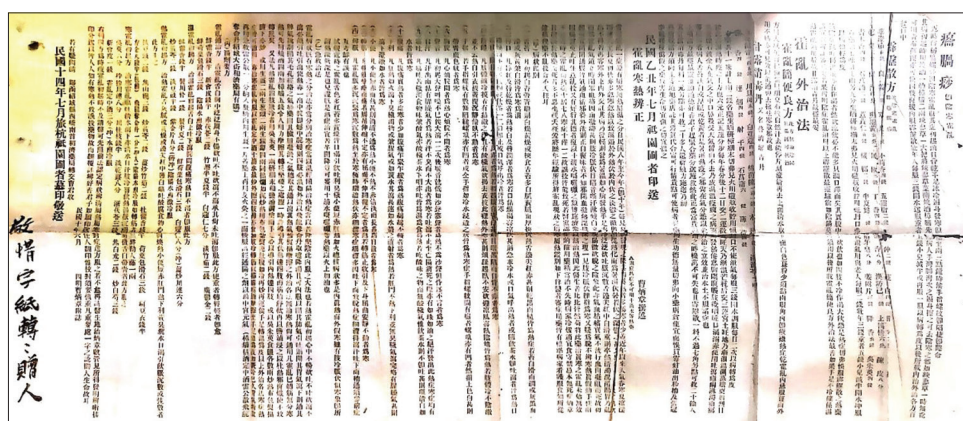


Figure 6: Traditional Chinese medicine proclamation Cao Bingzhang Xian Sheng Huo Luan Fang Zhi Fa (《曹炳章先生霍乱防治法》 Mr. Cao Bingzhang's Cholera Prevention and Treatment Methods), 69 cm × 31.5 cm, in “Jing He Zhai”

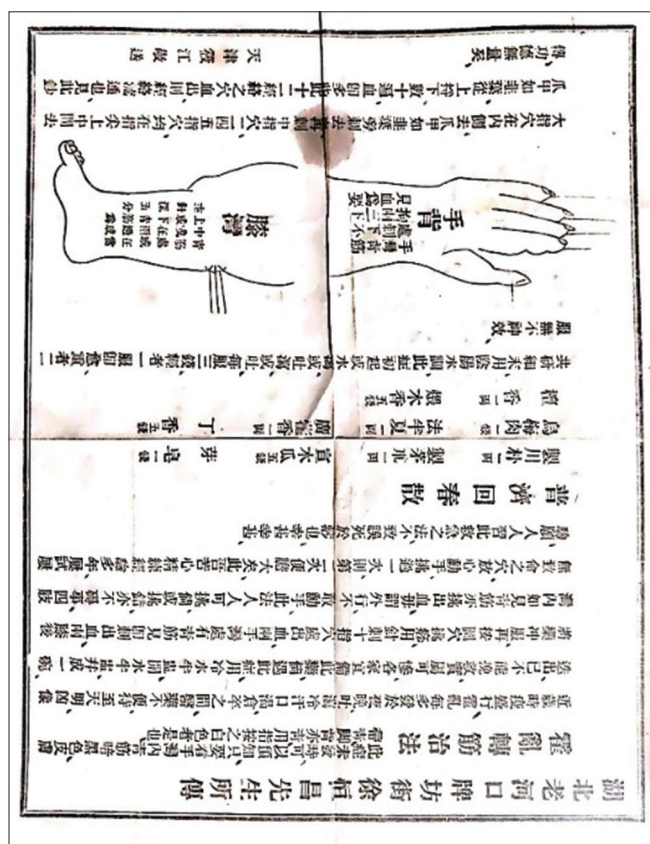


Figure 7: Traditional Chinese medicine proclamation Huo Luan Zhuan Jin Zhi Fa (《霍乱转筋治法》 Cholera Spasm Treatment Methods), 27 cm × 21 cm, in “Jing He Zhai”

public, and the impact of the modern Western medical system promoted the profound self-revolution of TCM. We can see not only the TCM self-revolution, but also the tremendous efforts TCM made to adapt to the modern social transformation. TCM practitioners and social institutions made considerable contributions to this process. Faced with foreign epidemics, TCM doctors found their own ways and methods not only to continue their traditional mode of treatment, but also to standardize it. TCM became favored by more and more patients due to its simplicity, convenience, low cost, and effectiveness.

Notes

Note 1: According to Li Wenbo’s “Zhong Guo Huo Luan Fen Sheng Tong Ji Biao (中国霍乱分省统计表 Statistical table of cholera in different provinces of China)” in *Zhong Guo Chuan Ran Bing Shi Liao* (《中国传染病史料》 *Historical Materials of Infectious Diseases in China*), from 1840 to 1949, there were 39 cholera epidemics in Zhejiang Province, second only to Shanghai.

Note 2: In this paper, “Sheng Men (省门)” refers to the provincial capital. At the end of the paper, we can find that “Ri Xin Industry Organization (日新工业社)” was a famous modern printing factory in Chengdu, also known as “Ri Xin Printing Industry Organization (日新印刷工业社).” A large number of books were printed and published by it.

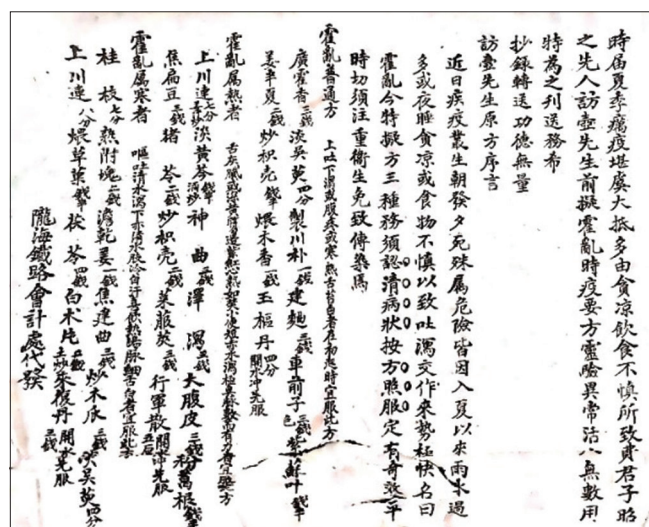


Figure 8: Traditional Chinese medicine proclamation Huo Luan Fang Zhi Fang (《霍乱防治方》 Cholera prevention and control prescriptions), 32 cm × 28 cm, in “Jing He Zhai”

Therefore, through textual study, the location of its recorded TCM prevention and control of cholera is in Chengdu, the provincial capital of Sichuan Province. At the same time, it is also consistent with the records in *Zhong Guo San Qian Nian Yi Zai Shi Liao Hui Bian Min Guo Juan* (《中国三千年疫灾史料汇编 (民国卷)》 *Collection of Historical Materials on Epidemic Disasters in China for Three Thousand Years. The Volume of Republic of China*).

Note 3: In September 1922, the preparatory meeting of the World Red Swastika Society was held in Daming Lake, Jinan City. After being approved and filed by the Ministry of Internal Affairs of the Beijing government, the Chinese Federation of the World Red Swastika Society was officially established in Beijing in 1922. The World Red Swastika Society originated from Daoyuan (道院). Daoyuan was a folk religious organization founded by Liu Fuyuan (刘福缘) and others in Jinan City. It was named Daoyuan because of its “purpose of promoting morality and charity.” The purpose of the Chinese Federation of the World Red Swastika Society was to “promote world peace and relieve disasters.” It founded the *Wan Zi Ri Ri Xin Wen* (《卅字日日新闻》 *Daily News*) and the TZU CHI Printing Office (慈济印刷所) to print charity materials. In addition, it also carried out a wide range of charity activities, such as donating gruel, clothes, diagnosis, and coffin for poor people.

Note 4: On April 9, 1938, *Shun Pao* (《申报》) reported that in 1937, Hong Kong experienced a cholera pandemic. Therefore, the whole of Hong Kong attached great importance to the epidemic, and all social classes participated in cholera prevention and control.

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Conflicts of interest

There are no conflicts of interest.

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Prevention and Treatment of “Epidemic Toxin, Pathogenic Dampness, and Lung Deficiency” after COVID-19 Recovery Based on the Theory of “Preventive Treatment of Diseases” in Traditional Chinese Medicine

Jing Ai^{1,2}, Linguangjin Wu³, Ting Wang³, Wanli Deng³, Xiaotian Zhang^{1,2}

¹Center for Preventive Treatment of Disease, Shuguang Hospital, Shanghai University of Traditional Chinese Medicine, ²Center for Preventive Treatment of Disease, Institute of Characteristic Diagnosis and Treatment Technology, Shanghai Institute of Traditional Chinese Medicine, ³Department of Oncology, Shuguang Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai, China

Abstract

Due to the sequelae and recurrence in patients with COVID-19 after recovery. This article, based on the theory of “preventive treatment of diseases” in traditional Chinese medicine, which believes that the three pathogenic factors of epidemic toxin, dampness, and lung deficiency are the fundamental causes of the recurrence of COVID-19. The treatment strategies are to remove pathogenic factors, strengthen qi, nourish yin, clear heat, moisten dryness, and at the same time, reinforce the lung, spleen and kidney, and soothe the liver. Through a variety of treatments such as oral administration, external treatment, and skin absorption, it provides a new idea and method for the management of the recurrence of COVID-19.

Keywords: COVID-19, pathogenesis, preventive treatment of diseases, recurrence prevention, therapeutic principle

In December 2019, a new coronavirus disease (COVID-19) broke out in Wuhan. Moreover, it took nearly 2 months for the outbreak to drop to zero [Figure 1]. Until now, the pathogen has not been present in human society, and very little was known about it at the time of onset. COVID-19 is an acute febrile pneumonia. The disease is spread by both droplets and contact among the people. In addition to these two main routes of transmission, the disease may also spread through fecal or aerosol channel.^[1] Moreover, the disease has the characteristics of susceptibility, making the virus have a strong human-to-human transmission property. Novel coronavirus patients mainly have fever, dry cough, fatigue, and other symptoms. Patients with severe conditions will have difficulty breathing and other critical signs 1 week after the onset, and even can rapidly develop into acute respiratory distress syndrome, sepsis shock, or end up in death, which seriously endangers the health of the general public. As of today, there

are more than 80,000 confirmed cases of COVID-19. Antiviral treatment such as lopinavir/ritonavir regimen has been used in Western medicine.^[2] The method to tonify qi and remove pathogenic factors in traditional Chinese medicine (TCM)^[3] and symptom-oriented treatment has cured 67,000 people of the disease. With the number of patients cured increasing, the patients were released from isolation and met the outgoing criteria. However, due to the damage of new coronavirus to heart, liver, kidney, spleen and lung,^[4,5] the corresponding organ function of some freed patients has not yet fully recovered, and

Address for correspondence: Prof. Xiaotian Zhang,

Center for Preventive Treatment of Disease, Shuguang Hospital

Affiliated to Shanghai University of Traditional

Chinese Medicine, Shanghai, China.

Institute of Characteristic Diagnosis and Treatment Technology, Shanghai

Academy of Traditional Chinese Medicine, Shanghai, China.

E-mail: zhxiaotian@hotmail.com

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some of them still have symptoms of deficiency of lung and spleen. At present, many countries are undergoing an outbreak of the epidemic; the number of infections increased sharply, while the number of imported cases is also increasing in China.^[6] Therefore, such groups of patients do not rule out the risk of re-infection. The National Health Commission issued the latest^[1] report in view of the fact that the problem of positive nucleic acid test was found in the re-examinations of a small number of discharged patients, and in order to strengthen the health management and isolation of the discharged patients, these patients should continue to be isolated and monitored for 14 days. Therefore, at present, it is urgent to prevent the recurrence after recovery, and it is crucial to find the corresponding treatment through the theory of TCM to protect the patients from being infected again.

Based on the theory of “prevention and recovery after treatment,” this article discusses the characteristics of pathogenesis and prevention and treatment strategies.

CHARACTERISTICS OF COVID-19 SYMPTOMS

The *Su Wen* “*Ci Fa Lun*” (《素问·刺法论》 *Basic Questions* “*Discourse on Acupuncture Methods*”) states that “the five plague are similar where they are easily transmitted no matter whether or not it is major or minor sickness where they share similar symptoms (五疫之至，皆相染易，无问大小，病状相似).” COVID-19 is characterized by similar symptoms in all patients, and the disease is developing rapidly. At first, there were only symptoms of fever and cough, or gastrointestinal reactions in the early stage. In severe conditions, patients may experience high fever, asthma, and even respiratory failure. After different treatments, most COVID-19 patients can be cured of, but after treatment, some patients will still have some changes in interstitial pneumonia, as well as varying degrees of cardiopulmonary dysfunction, and even pulmonary fibrosis. Like other serious diseases, when the patients first recover, they often suffer from deficiency of qi, blood and body fluids, especially qi deficiency of the lung and spleen. The patients may have shortness of breath, fatigue, stomach fullness and loose stools. Most of them have an enlarged pale red tongue with a white, greasy coating. For patients with yin deficiency or

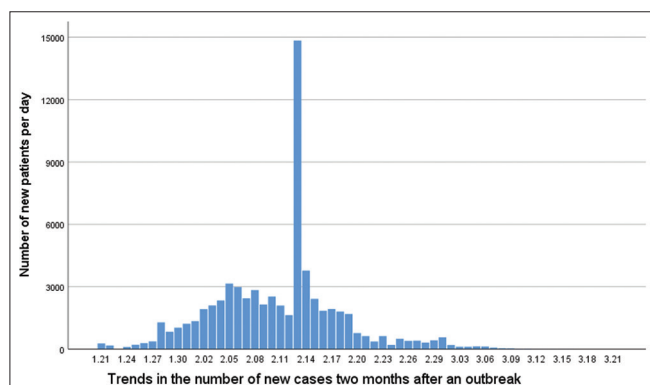


Figure 1: Trends in the number of new cases 2 months after an outbreak

patients living in dry, hot areas, the above factors may consume qi and further damage yin. The common clinical symptoms are fatigue, shortness of breath, palpitations, sweating, and thirsty. In addition, patients often complain of dry cough with little phlegm. They often have a dry tongue and a thin, weak pulse. In addition, there are some depressed and anxious patients often suffer from chest tightness and discomfort, frequent sighing, loss of appetite and insomnia and dizziness, which also need to be paid attention to from the point of view of “physical and mental treatment” [Figure 2].

PATHOGENESIS OF RECURRENT PNEUMONIA AFTER CORONAVIRUS

The occurrence of a disease is often associated with changes of weather and changes of horizon. In TCM theory, COVID-19 occurs because of an abnormal seasonal climate. Although the patient has recovered from the disease, the abnormal seasonal climate still exists. Therefore, patients still need to be careful after recovery.

The external epidemic is not clear, the internal poison is still there

The novel coronavirus pneumonia is caused by the SARS-CoV-2 virus. This epidemic began at the end of Ji Hai Year (2019), and the TCM theory of ‘five elements and six pathogens’ suggests that the climate this year will be very changeable. By the year of Geng Zi (2020), the dry nature of the climate will continue, whereas the second half of the year would be metal according to the five-element theory. The first half of the year would have excessive fire that would

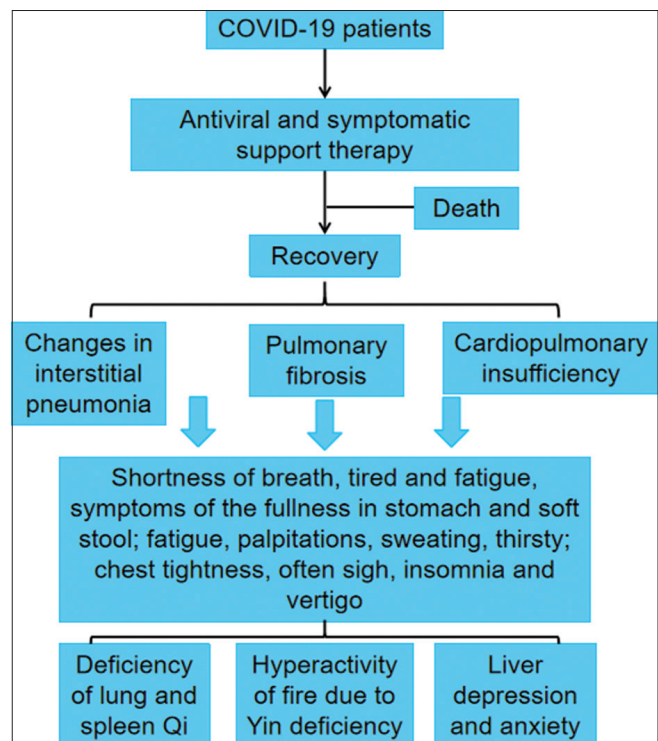


Figure 2: Characteristics of symptoms after new coronavirus

result in higher temperature. The second half of the year would have dryness that would result in cooler weather. This shows that the current abnormal climate still exists. There is still a need to take precautions for those who are cured of COVID-19. At the same time, their bodies had not yet been cleared of pathological factors. This is not a moment to fully relax. *Jin Gui Yao Lue Xin Dian* (《金匱要略心典》 *Personal Scriptures of the Synopsis of the Golden Chamber*) explains about “poison” where it is believed that the poison is the product of the accumulation of pathogenic qi. *Su Wen “Wu Chang Zheng Da Lun”* (《素問·五常政大論》 *Basic Questions “Comprehensive Discourse on the Five Regular Policies”*) states that “poison” is caused by over excessive and strong qi of the five elements. Over time, excessive pathogenic factors may accumulate and transform into toxic dampness or fire to block the flow of qi or consume qi, blood and body fluids and affect the zang-fu organs. Review of cases in the epidemic found that the novel coronavirus infection after rapid replication in vivo, high titer of the virus induced the body to produce excessive immune response. Some of the causes of severe pneumonia are not caused by viruses, but by an imbalanced cytokine system in the body. This phenomenon, known as “cytokine storm”^[7-9] that accelerates lung injury, will work along with the abnormal “cytokine storm” that further leads to dysfunction and damage to multiple organs throughout the body.^[10] [Figure 3] Chen Qian, et al.^[11] reviewed 25 patients that died of the novel coronavirus. In the case of this study, 90.5% of the patients had elevated procalcitonin levels. Procalcitonin in the presence of bacterial infection will be significantly increased, but in viral infection there are no obvious increase or decrease that are applicable to the identification of bacteria and viruses. Bacterial infection may be an important factor in the death of coronavirus patients. In addition, the blood C-reactive protein and serum amyloid A content distribution increased significantly till the patient died, reaching 85% and 100% respectively. It suggests that there is a cascade of inflammation in the course of new coronary pneumonia. In TCM theory, these pathological products caused by stress reaction belong to the category of “internal poison” in TCM. “Internal poison” mainly includes heat toxin, blood stasis toxin formed by blood stasis for a long time, dampness toxin formed by dampness and turbid accumulation for a long time, and phlegm toxin formed by phlegm turbid depression for a long time. The prognosis of new crown patients is very important..

湿邪粘滞，缠绵难愈

Pathogenic dampness is the main cause of the epidemic, which is closely related to the geographical environment, climate change, and the physical fitness of the patients.

Su Wen’s “Liu Yuan Zheng Ji Da Lun” (《素問·六元正紀大論》 *Basic Questions “Comprehensive Discourse on the Policies and Arrangements of the Six Principles Qi”*) states that “the sun rules the sky, dampness will occur during the exchange of qi and usually people will fall sick due to coldness and dampness (太阳司天之政.....寒湿之气，持于气交，

民病寒湿).” If the living environment is too humid, people will fall sick easily. In addition, nowadays, the spleen and stomach will be damaged due to the consumption of high-fat food and high-sugar ingredients and uncooked food as well as smoking and drinking, plus their sedentary lifestyle. This leads to health disorders. Experts from various regions said in terms of the clinical characteristics and tongue of epidemic patients, most people believe that the cause of the disease lies in “dampness” and “toxic”. This is also the reason that causes the death of too many people. The recent pathological report of postmortem examination confirmed this statement where on February 18, academician Zhong Nanshan released the report of postmortem examination which showed that COVID-19-infected patients’ lungs showed no serious fibrosis but a large amount of mucus. Recently, the team of Liu Liang’s research on a case of coronavirus exhibits that lung damage on the dead is the most obvious. A large amount of mucous secretions were found spilling out from the alveoli. Pathological changes and pathological products such as mucus, exudation, edema, and hyaline membrane in the lung are very similar to the characteristics of dampness and turbidity in TCM.

As mentioned in *Dan Xi Xin Fa’s “Zhong Shi”* (《丹溪心法·中濕》 *Danxi’s Experiential Therapy “Dampness Stroke”*) by Zhu Danxi of the Ming Dynasty, “when there is dampness, the dampness could come from outside and inside and should review its source (湿之为病，有自外入者，有自内出者，必审其方土之病源).” In the theory of traditional Chinese medicine, endogenous dampness is caused by body fluid metabolism disorders. It is one of the five endogenous evils and belongs to the category of pathogenesis. However, due to the dysfunction of the patient’s viscera, damp, as a pathological product of the intermediate link in the pathogenesis, can also be attributed to the category of etiology. Dampness belongs to yin pathogen, and it has the characteristic of turbid, heavy and sticky, which would block clear qi to move around. Dampness could hurt the body on its own but it could mix with wind, cold, heat, phlegm, and food retention. Dampness is diffuse in

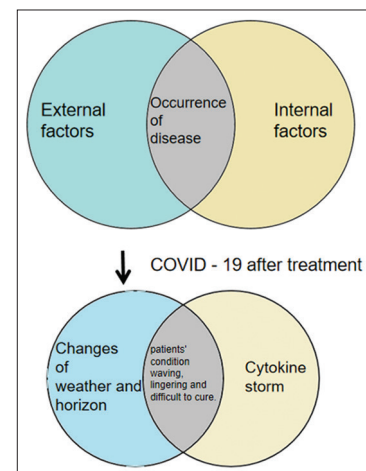


Figure 3: Pathogenesis of recurrent pneumonia after coronavirus

nature and could be found all over the body, which can reach the viscera, block up the viscera and qi, and the skin muscles and veins, limbs, and bones, leading to adverse qi. Irrespective of whether it is inside or outside, both the inside and outside as well as the San-Jiao can be invaded by dampness which is sticky glue and difficult to dispel in nature. The course of disease will be long while the symptoms tangled with each other, and the transmission is slow. The clinical treatment of the disease should not be too drastic, we should give slight sweating, moderate tonic, mild detoxification drugs to let the patient gradually recover the vital energy and complete recovery.

Deficiency of Lung qi and Vital qi waiting to be restored

The lung is the birthplace of qi and the leader of the five internal organs. The lung and the heart live together on the upper Jiao. And the lung covers other internal organs, hence the name canopy. Ye Tianshi states that when warm pathogen invades it would firstly affect the lung. The coronavirus is an aspiration infection where the lung is the first organ to be affected in the whole course of disease. The lung is responsible for breathing; the formation and operation of the whole-body qi and blood are inseparable from the control of the lungs, so the lung plays a decisive role in the body's vital qi production. *Supplement to Basic Questions* "Discourse on Acupuncture Methods" states that "when vital qi is strong, the pathogenic qi would not disturb the balance of the body (正气存内, 邪不可干)." It means that the transmission of disease in the human body is conditional. In addition to the strength of the disease, the body's vital qi also plays an important role. If vital qi could not contain the resist evil, then it will easily lead to febrile disease.

The transmission of the disease is in accordance with the law of transmission of febrile disease. Wu JuTong states in *Wen Bing Tiao Bian* (《温病条辨》 *Systematized Identification of Warm Diseases*) that "febrile disease came from mouth and nose, and nose is connected to lung while the mouth connects to stomach. When lung disease propagates back, it also affects the pericardium. If the upper jiao is not treated, it will be transmitted to the middle jiao, which are stomach and spleen. If the middle jiao is not treated, then it will transmit to the lower jiao which includes liver and the kidney. It starts at the upper jiao and ends at the lower jiao." Lung is located in the upper jiao and has the ability to regulate the water channels, which is the source of producing qi. The dispersing and descending of lung qi will generate distribution of body fluid. It is known as "the source of water". The spleen mainly transports water and dampness, and has the closest relationship with water and liquid metabolism. If the lung loses its function, it will directly affect the formation and operation of qi, which includes "zong qi" and "whole body qi," thus directly affecting the generation of vital qi, and could result in the deficiency of vital qi. When the coronavirus begins to heal, the lung is damaged and weak, and the vital qi is insufficient. In the course of the disease, the function of the zang-fu organs in the three jiaos is impaired, and the body fluid metabolism is impaired, while dampness comes from endogenesis, fatigue, anorexia, shortness of breath and

cough can be observed clinically. For patients that are newly recovered from coronavirus, the disease would have reduced, but the vital qi is not strong yet. At this point, if there is lack of nursing care, lung qi cannot be restored; this will not only increase the possibility of recurrence, but will also affect the restoration of systemic body function. Therefore, only when the dispersing and descending functions of lung is at a normal level, can normal respiratory movement be maintained, so as to transport water grain essence and weiqi, participate in the regulation of water and liquid metabolism, and ensure the normal progress of human metabolism through continuous ascending and descending movements of qi mechanism.

STRENGTHENING VITAL ENERGY AND DISPELLING PATHOGENIC FACTORS IS THE TREATMENT PRINCIPLE OF PREVENTION AND RECOVERY AFTER CORONA VIRUS

Patients who meet the criteria for quitting isolation and discharge, but still have related symptoms, are the focus of attention. The pathological results of postmortem examination showed that CD8+T cells showed high concentration of cytotoxicity particles in the peripheral blood samples of novel coronavirus patients, suggesting that the immune mechanism *in vivo* was activated and led to serious immune injury in the patient.^[12] Recent recommendations for the treatment of severe and critically ill patients with the novel corona virus should include the use of glucocorticoids in the treatment of these two groups of patients through their immunosuppressive effect to control the role of cytokine storm in patients to improve symptoms.^[13] However, the use of glucocorticoids may induce or aggravate adverse reactions such as ulcer and infection, hypocalcemia, hypertension, osteonecrosis of the head, osteoporosis, psychosis, seizures, and hyperglycemia, and other adverse reactions occur after withdrawal of the drug.

Currently, the official release of discharge criteria for coronavirus treatment^[1] is as follows: (1) the patient's temperature should return to normal in at least 3 days; (2) respiratory symptoms should improve significantly; (3) the patient's lung radiographs should show a significant improvement in acute exudative lesions; and (4) the nucleic acid test results of sputum and nasopharyngeal swabs should be negative in patients for two consecutive times. If patients meet the above conditions, patients can be discharged. After discharge, it is recommended that patients continue to be isolated for 14 days and undergo health monitoring. It is not difficult to see that there is a risk of recovery and reinfection after discharge from the hospital for critically ill patients. TCM believes that the coronavirus's pathogenic qi is not clear yet. The pathological products in the process of pathological changes on the contrary will become a new pathogenic factor. Therefore, while dispelling the pathogenic factors, we should pay attention to protecting the vital qi. It is important to provide guidance for the rehabilitation intervention of patients in the recovery stage with the principle of supporting the healthy and dispelling pathogenic factors.

TRADITIONAL CHINESE MEDICINE TREATMENT OF CORONAVIRUS

After the coronavirus, the main symptoms of the patients are fatigue, poor appetite, insomnia, anxiety, and so on. Reasonable syndrome differentiation and treatment can effectively improve the postoperative state of the patients and achieve the purpose of rehabilitation.

Invigorating the spleen and removing dampness, warming the kidney, and benefiting the lung

The novel coronavirus pneumonia is caused by exogenous pathogenic factors, including cold and dampness. It attacks the exterior of the lung, and it extends to Sanjiao, involving the spleen and kidney. The novel coronavirus pneumonia later, the damp poison evil damage the lung, the lung is the source of water, governing the dispersing and descending, while the external pathogen phlegm and retained fluid in the lung, leading to the dispersing and descending function of lung loses balance, cannot regulate the water channels. As a result, the body fluid is damaged and the lung qi is unfavorable; in addition, the son steals the mother qi, the spleen qi weakens, and the lung and spleen qi deficiency syndrome occurs. It is not difficult to analyze the diagnosis and treatment plans of TCM in various places. It is not difficult to find that most of the patients in the convalescent period of COVID-19 showed burnout and fatigue, chest tightness and shortness of breath, poor epigastric tolerance, cough and expectoration, inhibited defecation, and so on. The tongue is red with greasy coating, indicating lung qi stagnation, cold dampness and spleen stagnation [Figure 4]. At the same time, after the serious disease, dampness is difficult to clear; the treatment should be based on invigorating the spleen, removing dampness and detoxification, tonifying the lung, and warming the kidney and invigorating the qi, Xiang Sha Liu Jun Zi Decoction (香砂六君子汤), Ling Gui Zhu Gan Decoction (苓桂术甘汤), Shen Ling Bai Zhu Decoction (参苓白术汤), and San Zi Yang Qin Decoction (三子养亲汤) were used as the main prescriptions. The principle of individualized and dialectical treatment was advocated in order to achieve rapid recovery and prevent recurrence.

Enhance qi and yin, clear the heat, and nourish the dryness

Some patients with coronavirus not only have symptoms such as repeated coughing, expectoration, and dyspnea, but some have acute, life-threatening conditions. At this time, many patients were accompanied by hypoxemia, carbon dioxide retention, pulmonary hypertension, as well as cardiac insufficiency and other symptoms. The treatment of antibiotics and hormones mentioned in the coronavirus treatment plan has not only achieved good results but also left a lot of side effects, which includes shortness of breath, fatigue, dry mouth, palpitations, sweating, and other qi deficiency symptoms, as well as poor appetite, low or no fever, dry cough, and phlegm. After treatment, the patient's pulse is thin or weak. Although the disease due to cold and dampness trapped the lung and spleen, the dampness evil enters into the interior depression



Figure 4: Tongue coating and tongue inspection in patients with COVID-19

and turns into heat, which consumes qi and damages yin. At the recovery stage, although the epidemic virus gradually subsides, the qi and yin consumption is serious in the whole process. And the toxin is not clean, the waste heat injures yin, the symptoms include lack of energy, shortness of breath, thirst and sweating. Therefore, the treatment is commonly used to replenishing qi and nourishing yin method, mainly with the Sha Shen Mai Dong Decoction (沙参麦冬汤), Sheng Mai Yin Decoction (生脉饮). In addition, when a patient recovers from a serious illness, he or she must suffer from impairment of both qi and body fluid, so that he or she can not nourish his body and bones. Therefore, most of the patients are weak. In addition, qi deficiency will lead to lack of middle qi and lack of qi for breathing. The patient's stomach yin will also have a certain degree of injury which will show in reverse qi, causing vomiting. These symptoms are due to qi and body fluid damage when the stomach heat has not yet been cleared from a serious illness. As stated in *Shang Han Lun* (《伤寒论》 *Treatise on Cold Damage Diseases*) "when Shang Han is been clear, 虚羸少气, qi are inverse and causing vomiting where Zhu Ye Shi Gao Decoction (竹叶石膏汤) to mainly treat it (伤寒解后, 虚羸少气, 气逆欲吐, 竹叶石膏汤主之)." It can be seen that the theory of preventive treatment of disease has rich experience in the prevention and rehabilitation of serious illness.

Dredging the liver and regulating qi and treating heart and body together

Novel coronavirus pneumonia is highly infectious due to its high incidence rate, and is highly infectious and has a certain death rate.^[14] The anxiety and impatience caused by isolation cannot be eliminated in time. However, some patients are prone to psychological problems, such as nervousness, fear, depression, and despair. For some coronavirus patients who have lost their relatives due to coronavirus. These patients will have emotional abnormalities, dryness and bitterness in mouth, irritability, palpitation, insomnia, fullness of chest and hypochondrium, always sighing, and low fever. The patient's tongue is red and has a less coating [Figure 5]. According to the analysis of the causes, during the evolution of coronavirus, the

pathogenic factors spread from the outside to the inside. In the process, if the disease invades Shao Yang, contention between good and pathogenic will lead to the cardinal's disadvantage and would result in Shao Yang gallbladder disease. *Su Wen* "Ci Jin Lun" (《素问·刺禁论》Basic Questions "Discourse on Prohibitions in Piercing") states that "liver ascending from left, lung descending from right, left side monarch the ascending while right side monarch the descending (肝生于左, 肺降于右, 左主升而右主降)." Liver and lung share the same complete circle of ascending and descending activity. If the lung qi is insufficient, the liver and lung qi will rise and fall abnormally. It can damage the liver yin due to the lack of lung qi decline function, but also cause lung yin damage due to the abnormal upward movement of liver qi and the lungs. Psychological counseling should be the main treatment, but we could still dredge the liver and regulate qi. For patients recovering from a serious illness and having a relapse due to overwork, *Treatise on Cold Damage Diseases* states that Zhi Shi Zhi Zi Chi Decoction (枳实栀子豉汤) could treat this. After the initial recovery of COVID-19 patients, there are still pathological factors in the body due to the poor physical condition of the patients at that time. If the patient at this time is in the lack of improper adjustment, or too tired, longitudinal diet, this may lead to the recurrence of the disease, fever, upset, chest tightness and other symptoms. The treatment should be based on the method of clearing away heat and exercising qi. Treatment should eliminate symptoms by clearing heat and exercising qi. After recovery from Shang Han and having fever, use Xiao Chai Hu Decoction (小柴胡汤). If the patient's pulse is buoyant, sweating should be encouraged to restore vitality. For patients with pulse sinking, patients should be allowed to diarrhea for treatment. In clinical practice, we should choose the prescription according to the disease and use it flexibly to avoid treating the disease using only those prescriptions.

Simultaneous treatment of the five-zang organs

The holistic view of zang-fu organs in TCM is reflected in the fact that the physiology and pathology of the five zang-organs can influence each other, and the occurrence and development of diseases and their transmission have certain rules to follow. *Su*

Wen's "Ke Lun" (《素问·咳论》Basic Questions "Discourse on Cough") states that "the five depots and six palaces, they all may let a person cough, not only the lung (五藏六府皆令人咳, 非独肺也)." *Su Wen's "Yu Ji Zhen Chang Lun"* (《素问·玉机真藏论》Basic Questions "Discourse on the Jade Mechanism and the True Depots") states that "five zang are connected to each other and there is sequence on transferring sickness. When five zang having sickness, they will pass to the fu organ that they control (五脏相通, 移皆有次, 五脏有病, 则各传其所胜)." The clinical manifestations of this disease in critically ill patients are mostly seen in patients with high fever, dizziness and delirium. In severe cases, faintness, tongue numbness, cold limbs, and other symptoms may occur. The disease is a critical syndrome of "Retrograde pericardium febrile diseases epidemic" mixed with deficiency and excess, often involving the liver and kidney organs. This type of syndrome is caused by the invasion of the pathogen through the mouth and nose. In the first place, there is Weifen syndrome, which shows the symptoms of aversion to cold and fever. The normal sequence of transmission of the disease should be followed by transmission to Qifen. This is due to the patient's body Yin deficiency or heart deficiency or blood stasis. At this time, the pathogenic qi is too strong and powerful, and it is difficult to overcome the evil, leading to the invasion of the evil poison by the evil poison, and heat-toxic invasion of the pericardium and phlegm turbidity obscure consciousness. The pathogenesis mainly focuses on the endogenicity of heat toxin and the blocking of phlegm stasis and turbidness toxin. The clinical treatment with high-dose antibiotics and hormones can partly turn the crisis into safety. The part that feels evil spirit must have qi deficiency expression. In some cases, the immune system may be disrupted. Even if the patient is out of danger, there are still many after-effects. Therefore, patients should take into account after the recovery of nourishing heart yin, filling organs qi, blood, yin and yang deficiency, so as to timely supplement and recuperate, and prevent relapse.

Multi-dimensional, comprehensive treatment

The treatment methods of TCM for diseases are various and based on the holistic concept of TCM and the theory of syndrome differentiation and treatment. Some suitable techniques are not only simple and feasible, but also effective, including acupuncture, moxibustion, massage, sachet, fumigation foot bath, traditional techniques, and diet therapy [Figure 6]. Selecting acupuncture and moxibustion at acupoints of lung meridians and bladder meridians can play an important role in warming the lungs and dissipating cold, and has a good promoting effect on the recovery of vital qi. Meridional massage can help to improve the symptoms of patients with lung and spleen deficiency, so as to promote the recovery of disease. The technique can be used to strengthen body and eliminate pathogenic factors. The way of drug action is multi-directional, and the use of TCM sachet can also play a certain role in promoting the recovery of the COVID-19. Often, Cang Zhu (苍术 *Rhizoma Atractylodis*), Ai Ye (艾叶 *Folium Artemisiae Argyi*), Bai Zhi (白芷 *Radix Angelicae*



Figure 5: Red tongue and less coating in patients with COVID-19

Dahuricae), Huo Xiang (藿香 *Herba PogoStemonis*), Pei Lan (佩兰 *Herba Eupatorii*), and other herbs are being used. Fragrant herbs of TCM could relieve dampness through mouth and nose inhalation and also relieve liver qi, release qi movement, stimulate lung qi, and can also help prevent the recurrence of coronavirus. Aromatherapy foot bath is another way to learn about TCM on preventing the recurrence of coronavirus by transdermal absorption. The implementation of traditional work method is also an effective means to prevent recurrence, including Tai Ji Quan (太极拳), Wu Qin Xi (五禽戏), and Ba Duan Jin (八段锦), which is not only beneficial to the unobstructed respiratory tract, but also can improve the vital capacity of patients, maintain a good respiratory depth, and can increase and make sure that the tidal volume of patients is at a good level.^[15,16]

CONCLUSION

Although the coronavirus epidemic situation is fierce, due to the integrated TCM and Western medicine treatment, it has been effectively controlled. For many patients with coronavirus, full management is essential. The concept of TCM preventive treatment coincides with the treatment goal of recovery period, which is to improve the prognosis and promote rehabilitation at the same time and pay attention to the recurrence of disease. The characteristics of initial recovery of corona virus were analyzed in this article, which are closely related to “poison, dampness, and deficiency”. The pathogenesis of coronavirus was discussed based on the theory of “prevention of disease.” On prevention and cure measures, the TCM treatment focus in removing damp pathogens produced by the spleen, warming the kidneys and benefiting the lungs. On the basis of replenishing qi and nourishing yin, clearing away heat, and moistening dryness, it is emphasized to dredge liver and regulate qi and treat heart and body simultaneously. In the treatment method, it is effective by taking orally, external treatment, mouth and nose skin and so on, which enriches the treatment method of preventing the recurrence after COVID-19 recovery. This not

only helps to improve the treatment of the epidemic patients, but also enriches the theory of COVID-19 disease prevention.

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Conflicts of interest

There are no conflicts of interest.

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Figure 6: Suitable techniques for patients with COVID-19

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