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. For instance, on 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.

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 of epidemic qi will depend on the personal resistance and the severity of epidemic qi. The treatment for acute infectious diseases is more challenging than for chronic diseases. In order to prevent the disease from spreading widely and reducing the number of patients, the following measures are necessary: preventing the spread of epidemic, controlling the source of epidemic, and taking measures to prevent the spread of epidemic. The current epidemic is brought by new species of virus, and the transmission way is mainly respiratory, such as air breathing, sneeze, cough, touch, etc., which is similar to the transmission way of respiratory infectious diseases. The Greek term for epidemic is the word “epidein” (to spread) and “mene” (the heart of). The Chinese term for epidemic is the word “epidemic” (epidemic qi).
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.”[3] 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,”[4] 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.”[5] 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 acupuncture points 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 epidemisicity 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”,[9] 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 Xiaoaochahu 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 Coronavirus 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 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 × 10^11/L, percentage of neutrophils of 57.7%, percentage of lymphocytes of 28.3%, and absolute lymphocyte count of 1.53 × 10^7/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 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 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 Glycyrrhizae) 9 g, Huang Qin (黄芩 Radix Scutellariae) 15 g, Huang Lian (黄连 Rhizoma Coptidis) 9 g, Chen Pi (陈皮 Citrus Reticulatae) 9 g, Ban Xia (半夏 Rhzoma Pinelliae) 12 g, Fu Ling (茯苓 Poria) 15 g, Su Zi (苏子 Fruits Perillae) 20 g, Bai Jie Zi (白芥子 Semen Sinapitis) 15 g, Ting Li Zi (葶苈子 Semen Lepidii) (wrap-decocted) 20 g, Gua Lou Pi (瓜萎皮 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

**Figure 1:** Chest computed tomography image of the patient before consultation (February 24)
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 Stemonaef), 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.” 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.
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 Eupatorium) 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 Forsythiae), Huang Qin (黄芩 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.
Chen and Yan: Understanding and treatment of epidemics and COVID-19 in traditional Chinese medicine

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 improves 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 R adix 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.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES
1. (Han) Xu S. Shuowen Jiezi. Shanghai: Shanghai Classics Publishing House; 2007. p. 368.
2. Dai M, Zhang SX, Lin Y and Dai YC. (Tang) Compiled by Wang B; Huang Di Nei Jing Su Wen. Nanjing: Guangxi Science and Technology Publishing House; 2016. p. 53.
3. Dai M, Zhang SX, Lin Y, Dai YC. (Tang) Compiled by Wang B; Huang Di Nei Jing Su Wen. Nanjing: Guangxi Science and Technology Publishing House; 2016. p. 3.
4. Huang ZZ. (Sui) Written by Chao YF; Zhubing Yuanhou Lun. Shenyang: Liaoning Science and Technology Press; 1997. p. 59.
5. Dai M, Zhang SX, Lin Y and Dai YC. (Tang) Compiled by Wang B; Huang Di Nei Jing Su Wen. Nanjing: Guangxi Science and Technology Publishing House; 2016. p. 55.
6. (Ming) Zhang JB. Jing Yue’s Collected Works Book II. Shanghai: Shanghai Scientific and Technical Publishers; 1959. p. 975.
7. (Qing) Wu T. Wenbing Tiaobian. Fujian: Fujian Science and Technology Publishing House; 2010. p. 76.