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CHEST

PCCM at the Battlefront Against COVID-19 in Wuhan, China

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KEY WORDS: COVID-19 epidemic; Fang Cang Shelter Hospital; PCCM

ABBREVIATIONS: CHEST = American College of Chest Physicians; COVID-19 = coronavirus disease 2019; CTS = Chinese Thoracic Society; PCCM = pulmonary and critical care medicine

With its abrupt outbreak and rapid spread, coronavirus disease 2019 (COVID-19) has been an unprecedented challenge to the health-care system in China. More than 40,000 health workers from all over the country were called upon and dispatched to the Wuhan metropolitan area, the origin and center of the epidemic where the medical system was overwhelmed. Among the 78,064 confirmed cases at the time of this writing, more than two-thirds were from Wuhan, more than 8,000 are in serious condition, and more than 3,000 Wuhan health-care workers have been infected.[1-4]

In this large-scale mobilization of medical resources that has been the focus of media coverage for months, a key word frequently mentioned was that most physicians and nurses dispatched to Wuhan were from the department of "PCCM." PCCM stands for pulmonary and critical care medicine. The term remains somewhat unfamiliar and even foreign to Chinese people, as well as to much of the rest of the world. PCCM as a combined concept has, for a long time, been a "peculiarly American hybrid."[5]

Facing the sudden disastrous COVID-19 epidemic, characterized by lung infection rapidly leading to a critical condition, a well-trained PCCM specialist is the professional best suited to take on this challenge. The Chinese PCCM team has been undoubtedly serving as the mainstay from the very beginning, in defending and winning the fight against this pandemic. How did a "peculiarly American hybrid" become a well-established medical specialty and, in fact, pioneered in the subspecialty training (fellowship) in China? The American College of Chest Physicians (CHEST) has made an unparalleled contribution to this matter.

Establishment of the PCCM Subspecialty in China

Following the severe acute respiratory syndrome epidemic in 2003, Chinese leaders in the field began to recognize the importance of incorporating critical care into the practice of respiratory medicine. After careful consideration, they decided to adopt the US model of PCCM, which has proved to be successful, both in terms of addressing real-world situations and attracting promising candidates to the profession.[6]

The mission of CHEST encompasses medical education and international collaboration. In 2013, the Chinese Thoracic Society (CTS) and CHEST published an historical joint statement, declaring a collaboration in developing the PCCM subspecialty in China.[7] The China-CHEST PCCM fellowship program was launched in 2014. Curriculum and rotation structure were thoroughly planned, adapting the US model to the Chinese needs and culture. Seemingly coincidentally, the medical aspects required in the management of patients with COVID-19 encompass almost the entire curriculum content.[7-9]

Experts from CHEST visited and provided hands-on training to faculties at each participating hospital. Under the supervision of a joint steering committee consisting

AFFILIATIONS: From the Center of Respiratory Medicine (Dr Wu), China-Japan Friendship Hospital; University of Southern California, Los Angeles (Dr Qiao); and Chinese Academy of Medical Sciences and Peking Union Medical College (Dr Wang).

FINANCIAL/NONFINANCIAL DISCLOSURES: None declared.

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DOI: https://doi.org/10.1016/j.chest.2020.04.007

of leading experts from CHEST and China, 54 PCCM fellows from 12 leading hospitals have since graduated from the program.[7,8] In December 2016, the National Health Commission of China announced that formal subspecialty training (ie, National Fellowship) would become an integrated component of the postgraduate medical education system in China, and PCCM was selected as one of three pilot subspecialties. The China-Chest PCCM Fellowship naturally transitioned to the Chinese national program. Currently, more than 900 PCCM fellows are enrolled in 79 programs across China.[9]

In line with the development of a PCCM fellowship program, a detailed standard for creation of a PCCM department was established by the CTS and the Chinese Association of Chest Physicians in 2018, consisting of six components: organization of the department, scope of practice, essential space and equipment, faculty and staff, administration body, and culture. Inclusion of medical and respiratory ICUs was emphasized as a main component of a PCCM department. By September 2019, more than 1,600 hospitals in China had participated and become compliant with requirements set forth by the PCCM Department Standardized Construction Program.[9]

Thus, prior to the outbreak of the COVID-19 epidemic, the Chinese PCCM field had already become a well-organized profession. Its highly respected leaders and a core team qualified by using an established set of standards have attracted a large number of enthusiastic applicants.

PCCM Is a Main Force in Fighting COVID-19

Caught off-guard by the COVID-19 epidemic toward the end of 2019, PCCM professionals mobilized quickly. Large teams of PCCM professionals went to the front-line and took charge in most wards and units in every hospital in Wuhan. Several key leaders in PCCM have remained stationed in Wuhan, directing immediate action plans according to the rapidly changing situation. The following are some of the highlights that made a fundamental difference in turning the situation in Wuhan from turmoil into an organized counterattack.

Assessing the Severity and Impact

PCCM experts participated and led the first three groups of trained inspectors entering the epidemic area and assessing the situation. Nanshan Zhong, former president of the CTS and leader of the third group, confirmed the human-to-human transmission and the extremely high contagion of the new coronavirus on January 20, 2020. This declaration led to the development and roll out of a strict social distancing policy by the government, which included the closure of all public transportation, schools, and factories in affected areas.[4]

Organized Actions

Within 2 months, a management guideline was developed and repeatedly revised based on the rapid changes and accumulation of knowledge as the situation evolved. A standard guideline is vitally important in the management of a novel viral disease that affects the human body through unknown mechanisms and for which no specific treatment or vaccine is available. More than 100 clinical trials have been approved to test various treatment options, including the highly controversial use of corticosteroids and the efficacy of the promising antiviral agent remdesivir.

A Well-Prepared Team

Although the clinical presentation of COVID-19 is diverse, the central issues in its management mirror those encountered on a daily basis in PCCM; these issues include isolation techniques for respiratory contagious diseases, hypoxemia, respiratory failure, sepsis, hemodynamic instability, and multiorgan failure. The Chinese PCCM fellows and faculty have been trained and equipped with structured, cutting-edge knowledge plus repeated experience in oxygen therapy, rational use of antibiotics, ventilator management, hemodynamic monitoring and support, and extracorporeal membrane oxygenation.

Epidemic Control: the Fang Cang Shelters

Stemming transmission is the single most important tactic that can reverse epidemics. With a huge number of asymptomatic potential virus carriers, the initial policy of home isolation was not sufficiently effective and was complicated by growing fear and helplessness. Chen Wang, current president of the Chinese Association of Chest Physicians and former president of the CTS, initiated the construction of converted hospitals for the purpose of isolation and monitoring. Large public venues such as stadiums and college/school dorms were converted into preliminary medical facilities to admit suspected carriers and verified patients who remained asymptomatic or only mildly symptomatic. The facilities were named Fang Cang hospitals, a name derived from the concept of military container shelters. The goal was to admit at the earliest time all those who should be

isolated or monitored. Within a matter of days, 16 such facilities were functioning at capacity, with 13,000 admissions in Wuhan alone. The facilities are staffed with medical professionals who can identify clinical deterioration at the earliest stage and immediately begin necessary responses, including initiating transfers to higher level hospitals designated for treating COVID-19. Supplies are provided by government agents, and daily activities of the inpatients are organized to minimize psychological stress. The establishment of Fang Cang hospitals is the crucial measure that has begun to curb the rapidly uprising trend in the curve of accumulated cases. As the epidemic is now under control in Wuhan, all the Fang Cang facilities have been closed.

Backup Team

Outside Wuhan and Hubei provinces, PCCM departments in the rest of the country are serving as the backup for the front-line fighters. They have assumed the responsibilities of their colleagues now working on the front-lines. In addition, the standardized construction process has greatly enhanced the staffing and equipment of PCCM departments and has enabled these departments to function as the designated treating center for COVID-19, in collaboration with other departments, in almost all hospitals cross China.

International Collaboration

During the years of effort in developing the PCCM subspecialty, no one would have foreseen an outbreak of COVID-19; however, with the designed professional scope of the program, the key role of the PCCM subspecialty in such epidemics or any other epidemics characterized by respiratory disease leading to critical conditions has been very clear. PCCM in China is an excellent model for collaboration among international professional societies. The COVID-19 epidemic has seriously challenged China, while also proving to be a common threat worldwide that warrants collaboration.

CHEST, as a long-time close ally, has written to PCCM colleagues in China to express support in this extraordinary time. In the heartfelt letter is the following statement: "You are fighting not only for the Chinese people, but for the humans of the world….We firmly believe, with the well-established PCCM team we have built together over years of effort as the main force, we will definitely win this battle."[10]

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