Acceleration of Chest Pain Center Construction and Improvements for the Treatment of Acute Myocardial Infarction in China

Yong Huo¹, Junbo Ge²*

¹. Peking University First Hospital; 2. Zhongshan Hospital, Fudan University.

ABSTRACT

At present cardiovascular disease prevention and control in China is in crisis. The level of acute coronary syndrome (ACS) treatment and the establishment of modern treatment guidelines in China lag behind those other developed countries. The Chinese Medical Association, the Chinese Association of Cardiovascular Health and the Cardiovascular Health Alliance have developed a program to accelerate the construction of China Chest Pain Centers (CCPC) and stringent certification requirements. The program includes: (1) establishing demonstration centers in 60 cities throughout China; (2) development of guidelines for the construction and certification of regional and primary chest pain centers; (3) expansion of the number of training instructors and certification experts; (4) expansion of the scale and frequency of training; (5) quality improvements to the overall training system, and (6) quality improvements to key assessment indicators (KPI) information systems and related initiatives. We propose the establishment of 40 chest pain center demonstration bases through the provision of guidance and training to 2500 hospitals toward the goals of promotion, construction and certification of 1000 chest pain centers in China between 2016 and 2018.

KEY WORDS: Chest pain center; Acute myocardial infarction; Emergency cardiac care

The 2015 China Cardiovascular Disease Report indicates there are 290 million patients in China with cardiovascular disease (CVD), including coronary heart disease, stroke, heart failure, hypertension, and a trend of rapid growth. Mortality from CVD is the leading cause of death in China, which is higher than that of cancer and other diseases. Two out of every 5 deaths in China are related to CVD.

The 2015 Lancet article, “Assessment of the Medical Treatment Results in Coronary Heart Disease and Clinical Translational Research (China PEACE)¹”, reported no significant improvement in the total hospital mortality of ST-segment elevation myocardial infarction (STEMI) patients between 2001 and 2011. Furthermore, emergency percutaneous coronary intervention (PCI) rates rose from 10.6% to 28.1%; intravenous thrombolysis rates decreased from 42% to 18%; and STEMI hospital mortality rates maintained at 10-11% in tertiary hospitals in China. World Bank estimates that by 2030, the number of people suffering from myocardial infarction in China will surge to 22.63 million...
from the current 8.1 million\(^2\). In western countries, the CVD mortality rate has declined gradually over the past 20 years as the incidence and mortality of in China has increased rapidly. Improving the treatment level of acute myocardial infarction and creating access to higher quality medical services in China has become imperative. The China Chest Pain Center (CCPC) model of emergency rescue and treatment of acute CVD offers patients with acute coronary syndrome (ACS) a reduction in treatment time, a decreased rate of mortality and a decreased incidence of complications.

In 1981, the first U.S. chest pain center was established at St. Agnes Hospital. The Society of Chest Pain Centers (SCPC) in the United States were founded in 1998 followed by the SCPC Certification Committee in 2001. As of this writing, there are nearly 1000 accredited chest pain centers in the U.S. A total of 1374212 patients with STEMI from 2157 hospitals were treated with PCI in the U.S. between 1990 and 2006. The average time interval of infarct-related blood vessels re-opened (Door-to-Balloon or D-to-B) decreased from 111 minutes per patient in 1994 to 79 minutes in 2006 (<0.001 P), while the overall mortality rate decreased from 8.6% to 3.1% (<0.001 P)\(^3\). Since 2009, the CPC model has achieved positive results with an average D-to-B interval of 67 minutes for patients with STEMI in the U.S.\(^4\). Since then, the CPC model has been established in hospitals throughout Britain, France, Canada, Australia and Germany. Today, Germany’s CPCs are the most advanced internationally. Results from a German chest pain unit (CPU) registration study published in 2012 showed the average time of STEMI patients presenting disease symptoms to the first medical contact (FMC) was 2.08 hours. 97% of STEMI patients received emergency PCI treatment with an average D-to-B interval of 31 minutes\(^5,6\).

The China Chest Pain Center Independent Certification System (CCPICS) was established in September 2013. The medical affairs authority of China’s National Health and Family Planning Commission authorized the cardiovascular disease branch of the Chinese Medical Association to oversee China’s chest pain center certification process. As of this writing, CCPICS is the third such certification system in the world. Basing its model on the certification standards developed by the Association of Society of Chest Pain Centers and the German Heart Association, the China Chest Pain Center Committee (CCPCC) established its own certification system to address the health crisis in China. The first version of the chest pain certification standards for China was developed in 2013 and continues to be updated annually\(^7\). In February 2014, 5 chest pain centers achieved certification in China. Since September 2016, 8 groups totaling 84 chest pain centers achieved certification. Nearly 300 hospitals are registered for construction and currently await verification and certification. In 2016, CCPCC developed its first primary chest pain center certification standards to guide and assist primary medical institutions applying for chest pain center certification\(^8\). Data from certified chest pain centers in China suggest the average D-to-B times for STEMI patients is between 60 and 90 minutes. First medical contact (FMC) to myocardial reperfusion time was also reduced significantly in most of these chest pain centers. These events suggest the chest pain center model dramatically improves the quality of acute myocardial infarction (AMI) treatment in China\(^9,10\). Nevertheless, only 84 chest pain centers obtained certification in the past 3 years—an unsatisfactory rate considering the growing health crisis. Therefore, we strongly recommend escalating the importance of the promotion and certification of chest pain centers in China.

The construction of chest pain center systems will: (1) allow more CVD and other critical-to-severe patients timely and more effective treatment, (2) relieve the current chest pain center "supply and demand" imbalance, and (3) enhance acute cardiovascular disease treatment and medical service capacity for patients in China. In April 2016, at the 19th National Interventional Cardiology Forum, the Chinese Cardiovascular Health Alliance/Chest Pain Center Committee signed a strategic cooperation agreement to accelerate the development of chest pain centers across China according to following aims:

1. Build regional demonstration centers in 60 cities across China;
2. Guide and establish regional and grassroots chest pain center construction and certification;
3. Expand the number of training instructors and certification experts;
4. Expand the type, scale and frequency of training;
5. Continuously improve the quality of the training system and key assessment indicators (KPI);
6. Assist in the evaluation and certification system of chest pain centers;
7. Establish an information quality control system and regional collaborative treatment platform; and
8. Develop a grass roots chest pain assessment system.

The China Chest Pain Center Committee (CCPCC) goals for 2016-2018 are to:

1. Establish 40 demonstration centers;
2. Promote 1000 hospital certifications;
3. Conduct 1500 onsite hospital chest pain centers inspections;
4. Train 2500 hospital chest pain center faculty and staff.

The China Chest Pain Center Independent Certification System (CCPICS) current goals are to:
1. Certify 150 chest pain centers in 2016;
2. Certify 350 chest pain centers in 2017; and

China has unique national healthcare conditions. The allocation of medical resources is severely challenged given the large size of its rural population. In May 2015 there were 922,000 primary health care institutions and 26,000 hospitals in China. Among those, primary percutaneous coronary intervention (PPCI) is conducted for the treatment of acute myocardial infarction in only 1,200 medical institutions most of which are concentrated in large and medium-sized cities. In order to improve the quality of the treatment of ACS patients in China, greater importance must be attached to the construction of chest pain centers in primary hospitals. It is essential to establish primary chest pain centers in suitable locations to: (1) optimize collaborations with nearby county municipal medical institutions, (2) promote achievement of the standards established for chest pain centers, (3) simplify chest pain center reporting and the certification process, (4) streamline the medical institution application and certification process, (5) strengthen the guidance and supervision of chest pain centers, (6) standardize surgical procedures within chest pain centers, and (7) promote quality improvement among all chest pain centers. Through the efforts of the CCPCC and the construction of chest pain centers throughout China the treatment of acute myocardial infarction (AMI) patients in China will improve significantly.

REFERENCES