Prevention and control of coronavirus disease 2019 in Grade-III Class-A hospitals outside of Wuhan

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Now, a novel coronavirus epidemic has posed a major threat to human health. Medical staff face a high risk of occupational exposure at very early stages of an epidemic. Once the medical staff are infected, it will greatly affect the “fighting capacity” of medical institutions, and help the virus spread within hospitals. These issues strongly suggest the critical role of hospital management, prevention, and control systems in the fight against infectious diseases.

The Chinese People’s Liberation Army Strategic Support Force Characteristic Medical Center (hereafter called “the Center”) is a Grade-III Class-A hospital surrounded by large communities. Since January 1st, in fast response to the epidemic development, the medical center switched its management strategy from the conventional mode of diagnosis and treatment to the emergency mode of epidemic prevention and control. It adopted a hierarchical and resilient management strategy covering different stages of the epidemic development, namely the pre-epidemic period, the onset latency, the full outbreak, and taking targeted measures for emergency response, flow of human, material and information resources, and epidemic prevention and control at each stage. This article is an attempt to provide a reference for major epidemic prevention and control for general hospitals in non-epidemic regions.

Prevention and Control Management in Our Centre

Pre-epidemic period

Emergency response

At the end of December 2019, the Center obtained the information on pneumonia with unknown causes through the Internet. In response, a “public health emergency information group” was immediately established at the center to hold regular meetings and predict and judge the severity of the emergency.

Flow of human, material, and information resources

An emergency plan for an epidemic outbreak was created. The center also upgraded the management of medical supplies for epidemic prevention and control and expanded the amount and channels of supply procurement.

Epidemic prevention and control

Measures were taken to train all staff on severe acute respiratory syndrome (SARS)-like diseases and laboratory safety management. A preliminary “Emergency Response Plan (Reference Version)” was prepared as a guidance on consultation and treatment.

Onset latency

Emergency response

In the middle of January 2020, according to “Protocol for the Prevention and Control of Novel Coronavirus Pneumonia (Second Edition)” issued by the National Health Commission, the Center set up a leading group for the COVID-19 prevention and control, under which offices and expert groups were organized to formulate regulations on the diagnosis, prevention, control, and reporting of COVID-19. Meanwhile, the Center started preparing a medical team to support the epidemic area.
Flow of staff, material, and information resources
The center carried out flexible duty shifts for medical staff, established procurement management teams to improve the procurement of prevention and control supplies and stockpile twice that of the usual supplies, and set up a reporting system for patients with fever to screen out high-risk patients in time.

Epidemic prevention and control
Efforts are made to carry out standardized disinfection and quarantine management according to the Technical Specifications for Disinfection in Medical Institutions.[2] and hold regular coordination meetings on COVID-19 prevention and control. In addition, a Welink system is employed to enable remote group consultation so as to reduce face-to-face contact among center staff. The center also revised the prevention measures and provided medical staff with Chinese herbal decoction to prevent virus infection.

Outbreak
Emergency response
In late January 2020, according to regulations of the Beijing Municipal Health Commission, the Center identified the suspected and confirmed COVID-19 patients strictly based on the clinical standards and designated a specific route for patient transport. Specifications are formulated for the diagnosis and treatment of ordinary patients, patients with fever, and inpatients.

Flow of staff, material, and information resources
To cope with routine medical needs, the Center required outpatients to make appointments first and implemented strict control over hospitalization and the flow of people.

The Center increased the number of drugs prescribed for patients with chronic diseases (from a 1-month dose to a 3-month dose), and carried out online consultation, effectively reducing the number and frequency of non-emergency visits. In the 2 weeks both before and after the Spring Festival, the percentage of emergency cases remained almost the same or even slightly increased compared with the previous year, proving that due to the Center’s efforts, those in definite need of medical service were not affected by the epidemic.

Facing the insufficient reserves, the Center continued to increase the procurement of protective supplies by five times that of the regular purchase amount and simplified the procurement process. When inventory was found insufficient to provide 3 days of supply, the Center will start the disinfection and reuse of some used protective materials.

The leading group strictly controlled the flow of information and designated a special department as being responsible for the accurate and timely release of information to avoid panic among people. In the key anti-epidemic departments, clinical work rotated among the medical staff in a timely manner to avoid overwork.

Epidemic prevention and control
The inpatient areas were reorganized, and two other isolation wards were earmarked for a possible outbreak. Special processes are formulated to manage and treat novel coronavirus infections in pregnancy as well as children with fever.

Summary of Experience
Establishment of resilient management system at public hospitals
Building a resilient health system in all countries is recommended by the Scientific and Technical Advisory Group for Infectious Hazards, a member of the World Health Organization.[3] In line with this idea, it is essential for public hospitals to have a hierarchical management system to respond quickly and operate efficiently during emergencies. In particular, it is critical for Beijing, a key region outside the epidemic region. So, how can resilient management measures be carried out?

First, a hierarchical management system adaptable to local realities in different regions is necessary. A prioritized emergency response scheme should be formulated according to previous experience. The response level, in principle, has to be set according to the guidance documents issued by the relevant authorities and can also be set by the hospital itself according to the progress of the epidemic when no such official documents have been issued yet.

Second, adequate emergency supplies are the cornerstone. Lei et al.[4] pointed out that insufficient stockpiling was a major challenge to hospitals receiving SARS patients. However, after 17 years, this problem remains unsolved. During this COVID-19 epidemic, the protective supplies basically remain stable at the Center due to the early evaluation and preparation as well as the refined management of materials later.

Third, the rational distribution of medical resources is necessary. At the same time, hospitals should also guarantee medical service for patients in urgent need. At high-risk departments such as the emergency, obstetrics, pediatrics, and hemodialysis departments, standardized measures should be taken to improve the protection of medical staff to both prevent the spread of disease and guarantee urgent and necessary medical treatment.

Fourth, infectious disease management is necessary. The timely identification and standardized treatment of infectious diseases are the basis of epidemic prevention and control. Up to late February, two cases were diagnosed at the Center and then transferred to the designated hospital for treatment as required. The 11 suspected patients received by the Center were observed in quarantine. Targeted training and examination of epidemic control
and prevention are necessary for clinicians to strengthen their emergency response capacity.

**Using the internet to strengthen dynamic management of epidemic-related information**

WeChat has been developing rapidly in China since its launch in January 2011. It is not only a communication channel, but also an efficient method for management. We can effectively reduce occupational exposure in medical institutions through online consultation, web office, and WeChat workgroups. As early as January 1st, 2020, a WeChat early warning workgroup was set up at the Center, response level was rapidly upgraded and supplies were stockpiled. All these measures served as an important guarantee for the later-on epidemic control at the hospitals in non-epidemic regions. In addition, new media can also be used for information dissemination during outbreaks. However, in order to ensure the authenticity of the information, relevant data should be uniformly collected and released by competent authorities, and shared with the entire medical system.

A comprehensive and elaborate hospital prevention and control system with full participation of all the staff is an initial and critical step in the regional, national or even worldwide epidemic prevention and control. Therefore, medical institutions need to have in place a resilient and hierarchical system to carry out well-targeted measures for epidemic prevention and control.

**Conflicts of interest**

None.

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