



Prehospital Management and Transportation Strategies for Handling COVID-19 Cases

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Dear Editor-in-Chief

Currently, a major global health issue is the outbreak of the coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Beijing has experienced three epidemics in 2020 and is one of the main epidemic region in China. Our hospital proposes several strategies for prehospital management and transportation processes to guarantee that patients with COVID-19 safely reach medical institutions to receive treatment, as well as to prevent the further spread of the virus. Hospital emergency command systems are essential for emergency management (1). Emergency incident command centers should include medical commander and medical assistants, who are responsible for formulating plans, arranging telemedicine consultations, coordinating hospitalization procedures, and making guided decisions. Prehospital rescue teams should be composed of doctors and nurses who are experts in infection, critical care, and infection control. Each transportation process involves a doctor and a nurse. When dealing with critically ill patients (level 4; patients with respiratory failure and requiring mechanical ventilation or shock or combined with other organ failure) (2), an additional critical care doctor should be present. Telemedicine consultations of infectious diseases have emerged as a useful bridge for transferring

patient information between hospitals, and also can reduce the chance of cross-infection (3). Such consultations are utilized to transmit the general information, epidemiology, vital signs, clinical characteristics, laboratory tests, imaging manifestations and the viral nucleic acid tests results of patients in the first diagnosing hospital. The emergency incident command center and the prehospital rescue team then make a preliminary diagnosis, formulate plans, and prepare vehicles and equipment in accordance with the transmitted information. Patients are divided in accordance with the clinical conditions: mild (level 1), moderate (level 2), severe (level 3) and critical (level 4) (2).

More than 3,000 health-care workers were infected by the SARS-CoV-2 in China (4). Therefore, high-level personal protective equipment should be used to ensure the safety of them not only to safeguard treatment but also to ensure they do not transmit the virus. A negative pressure ambulance is equipped with a ventilator, oxygen tank, electrocardiogram monitor, stretcher, and emergency medicines. All transportation patients are treated as confirmed cases for two reasons. First, especially during the initial stages of the outbreak, the screening of viral nucleic acid tests cannot be completed in majority of the hospitals, and the test also may get false negative results (5). Sec-



ond, identifying the confirmed and suspected cases before reviewing the results of the viral nucleic acid tests is difficult. Out of 126 suspected patients with COVID-19, only three were confirmed to be infected with SARS-CoV-2 (6). COVID-19 cannot be effectively identified only on the basis of epidemiological records and clinical manifestations. Therefore, high-level personal protective measures should be adopted when handling any suspected patient.

Appropriate prehospital management and transportation can provide the optimal level of care for patients with severe infectious diseases and improve the efficiency of the treatment (7). Patients who are in the state of shock or respiratory failure should have stable vital signs before transportation. Levels 3 and 4 patients should be prioritized because of the rapid progress and poor prognosis (8). Depending on the respiratory state, these patients should also be given effective oxy-

gen therapy through nasal catheter oxygenation or masks or mechanical ventilation during transport to ensure a stable respiratory function ($SpO_2 \geq 95\%$). Confirmed cases under both levels are transferred to the negative pressure isolation ward of the intensive care unit (ICU), whereas the suspected cases are transferred to the general isolation ward of ICU. If the viral nucleic acid of the latter patients is positive, then the patients are transferred to the negative pressure isolation ward of ICU. Levels 1 and 2 patients are required to wear N95 masks during transportation and should be monitored for changes in their conditions. Confirmed and suspected cases under these levels are transferred to the general isolation and observation wards, respectively. Suspected cases are transferred to the general isolation ward if their viral nucleic acid returns positive (Fig. 1).

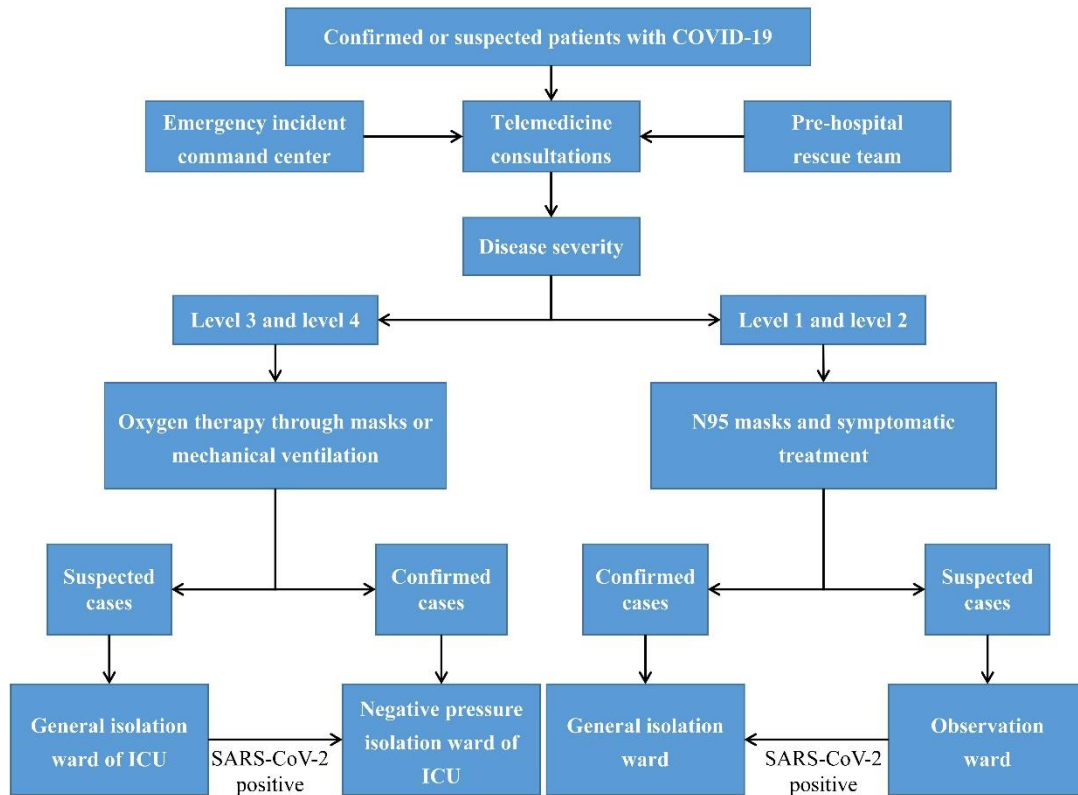


Fig. 1: Prehospital management and transportation process of the confirmed or suspected patients with COVID-19.

Rigorous infection control practices are critical in minimizing the spread of severe infectious diseases. To prevent secondary contamination or transmission of infectious agents, infection control doctors should decontaminate vehicles and equipment after each transportation. Hydrogen peroxide (3%) is used for the terminal disinfection of air, whereas 1000 mg/L of a chlorine-containing disinfectant is used for that of object surfaces. Cross-infection did not occur in our medical staff team due to strict infection control measures.

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Conflict of interest

The authors declare that there is no conflict of interests.

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