

MINI REVIEW

CORONA EXPERIENCE

Intra- and inter-hospital transportation of a COVID-19 patient; observing safety of the patient, the health worker and the community

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Abstract

Covid-19 is a highly infectious disease and transporting an infected patient presents a serious hazard to the public as well as the health worker therefore specific control measures are required. A guideline need to be in place to facilitate easy, safe and efficient transport system to minimize the risk of transmission of infection to the health care worker and the community.

Keywords: Corona virus; Personal protection equipment; Ambulance; Disinfection; Decontamination

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1. Introduction

Corona virus disease (COVID-19) is an infectious disease caused by a newly discovered virus that belongs to the family of the Coronaviridae.¹ This disease was reported to the World Health Organization (WHO) as a cluster of cases of pneumonia of unknown cause detected in Wuhan city, Hubei province of china on 31 December, 2019. By 7 January, 2020, the corona virus disease was identified as the causative virus by Chinese authorities. By 30 January, 2020 the outbreak has been declared as a public health emergency of international concern. On 11 February, 2020 the WHO announced a new name for the new corona virus disease as COVID-19. CO for corona, VI for virus, D for disease and 19 as the year of discovery. COVID-19 was declared a pandemic on 11 March, 2020.²

Majority of the people infected with the COVID-19 virus experience mild to moderate respiratory illness and recover without requiring special treatment, however older people and those with underlying medical problems such as diabetes, cardiovascular disease, chronic airway disease and cancer are more likely to develop serious illness and may require being moved from their point of care to either critical care unit or for investigations commonly radiological investigations.³

Transporting a COVID-19 patient which is highly infectious presents a serious hazard to the public, therefore specific control measures are required.⁴ Recent emergence of highly infectious diseases such as viral hemorrhagic fever, Ebola, Lassa fever and highly pathogenic respiratory infections such as SARS coronavirus and zoonotic influenza A viruses has

challenge hospital administrators on the need to formulate a standardized protocol for in-hospital and out of hospital protocol for transporting such patients.⁵

2. Types of transport

Generally, transportation of a COVID-19 patient can be divided into two either transport within the hospital (intra-hospital) or between hospitals (inter-hospital).⁶

Intra-hospital transport: This is the transfer of the patient within the hospital for either diagnostic or therapeutic purposes or the transfer of the patient to specialized units within the hospital. Here, the patient can be moved within the hospital from either the emergency room to operating theatre or the critical care center etc. movement of infectious patients within the hospital carry some risks especially those that are seriously sick. Apart from the risk of infecting the transporting team, there is the risk of infecting the receiving team and other hospital patients in addition to increased incidence of morbidity and mortality.

Inter-hospital transport: This type of transport exists between or involves two or more hospitals. Here, patient is transported between medical facilities without interrupting the medical treatment and monitoring due to the underlying disease by means of specific medical, technical equipment and knowledge with the objective of improved patient care.

2.1. Principles of safe patient transport

In transporting a covid-19 or other infectious disease patients, it is desirable for members of the transport team to be competent. Compassion and empathy is an excellent quality of all staff on the transport team.

Skilled and experience doctor in addition to a critical care nurse and an attendant should be the minimum requirement when transporting a COVID-19 patient. The doctor in particular should be knowledgeable in basic and advanced life support, training in intensive care in addition to excellent knowledge in organ support. Members of the team should have had some experience previously in transporting infectious disease patients. Throughout the process of transportation, the team should be able to maintain good communication with the receiving team giving them clinical update of the patient's state of health. Experienced staff ensures that basics for ensuring safe transfer are undertaken.⁷

2.2. Preparing to transport

Before embarking on transporting the COVID-19 patient, adequate preparation should be made in terms of manpower, equipment (robust, lightweight, battery powered), emergency medications, documentation and transport vehicle (ambulance). There should be a reliable back up for power, oxygen, suction machine, etc.

2.2.1. Manpower

The transport team should consist of at least a physician anesthesiologist, a critical care nurse and an attendant. All members of the team should be knowledgeable in donning and doffing of personal protective equipment (PPE). The team should have basic knowledge of the nature of the illnesses they confront to help allay fear and anxiety so that they can render safe and effective care.

2.2.2. Equipment

Equipment used for safe transportation of patients should be robust, lightweight, and battery powered. There should be a checklist of all equipment that will be needed during the transportation. A simple mnemonic like "MAID" will help; *M* for machine which represents suction machine, monitors, ventilator and defibrillator, *A* for different types of airway which include but not limited to endotracheal tubes, oropharyngeal airway, laryngeal mask airway, etc. *I* for infusion which include the infusion pumps, crystalloids, colloids, etc. and *D* for drugs mostly emergency drugs (adrenaline, ephedrine, atropine, etc.) and oxygen in addition to routine drugs patient is currently on.

2.2.3. Transport vehicle

The ambulance should be prepared in advance to facilitate decontamination and disinfection after contact with patient. There should be a separate compartment for the driver which should be regarded as a clean area. The ventilation system in the driver's compartment should be put on with the fan set on high in such a way as not to allow recirculation of air. This will create a positive-pressure environment in the driver compartment and guard against aerosol inhalation.

2.3. Transporting

During transport of COVID-19 patient, the level of care should be similar to the care obtained at the

referring hospital/ward/ICU. The privacy and dignity of patient must be adequately maintained. Record should be kept of all events that occur during the transport. Communication and reassurance of patient during transit must be maintained in the conscious patient. If condition deteriorates, the team should act appropriately.⁸

Monitoring of heart rhythm, blood pressure, oxygen saturation, temperature, and electrocardiogram should be continuous. Where facility for measuring arterial blood pressure is available on board, it is preferred as non-invasive measurement of blood pressure is affected by movement. Transfer should be undertaken smoothly and not at high speed. Despite careful preparation, unforeseen clinical emergencies may occur; the vehicle should then be stopped at the first safe opportunity to facilitate patient management.

2.4. Handing over of patient

Before embarking on the journey the receiving team should be informed. During the transport and on arrival, communication should be maintained with regular update given to the team that will assume the responsibility of the patient. Patient's full medical history, treatment regimen and important events that occur during the transport should be shared in details with the receiving team. All investigation results (laboratory and radiological) should be handed over. Copies should be retained by the referring hospital.

2.5. Decontamination, disinfection of the ambulance and doffing of PPE

The driver's compartment is considered a clean area as earlier stated, however, application of impermeable barriers (disposable leather) to keep interior surfaces of the ambulance clean facilitates easy decontamination and disinfection of the ambulance. Wastes are bagged in a biohazard bag. The interior of the ambulance, the stretcher, any exposed equipment, and all exterior surfaces of the waste bags are disinfected using 0.05% hypochlorite. Surfaces are disinfected by spraying. The responsible person should be fully kitted with PPE {(footed Tyvek (DuPont, Wilmington, DE) suit, gloves, N95 respirator, goggles for eye protection.) Special attention is given to ensuring the appropriate contact time for the selected disinfectant agent. To limit creation of multiple waste streams, all waste produced by the transport is managed by the receiving hospital's

infection prevention and control unit. The physician in-charge of the team will observe and supervise the proper disinfection of the ambulance, the collection of infectious waste, and the doffing of PPE to facilitate safety and ensure no violation of IPC measures.⁹ Prior to embarking on return journey, it is desirable for the transport team to don new PPE which should be doff at the ambulance bay upon arrival. The ambulance should be cleaned again on arrival.

3. Conclusion

COVID-19 pandemic has spared no corner of the earth. Although most of the effected patients are quarantined at their homes, those that develop advances signs and symptoms need to be hospitalized for proper management. Patients will need from to be moved from one department of the same hospital to the other or from one hospital to the other more advanced healthcare facility. Due precautions need to be taken during this transportation to contain the spread of this deadly infection to the staff as well as other non-COVID patients. The principles of containment and personal protection must be adhered at every stage.

4. Conflict of interests

None declared by the authors.

5. Authors' contribution

BA and ISA: Concept

YBJ, ZH, MI, LS: Review

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