

Commentary

Need of guidelines for safe transport of patients with COVID-19

The European Network for Infectious Diseases (EUNID) has defined “highly infectious diseases as those which are transmitted from person-to-person causing life-threatening illness presenting a serious health hazard requiring specific control measures to contain it”.^[1] Aerial transfer of the patient is at time required for shifting the patient from a remote area or a health-care facility with limited resources to a better equipment health-care facility. The aeromedical evacuation refers to transport of patients across long distance after initial stabilization that allows a successful relocation.^[2] Among the various concerns for such transfer, one of the concerns remains the risk of contamination. Additional concerns for transport of patient with contagious disease such as coronavirus disease-2019 (COVID-19) include safety of the involved personnel. The longer duration of secondary missions can be physically stressful and exhausting for the medical team.^[3] Highly trained teams with well-planned protocol are involved in such evacuation due to significant risks to the involved crew

and receiving community with potential for rapid deterioration of the patient. Various measures have been adopted for safe transport of patient with infectious diseases including the use of portable isolation facility. However, no guidelines are available for safe transport for aeromedical evacuation of patients with COVID-19.

The spread of infection to health-care worker during aeromedical evacuation is a possibility and related to duration of exposure, infectivity of the disease, susceptibility to the exposed person, load of infective material, and the airflow system in an enclosed cabin.^[4] The additional compressed cabin air has low relative humidity (10%–14%) that increases the infectivity and survival of few airborne viruses.^[5] Limited resources and space in the prehospital settings together with the airway procedures and mechanical ventilation that generate aerosols increases the risk of transmission of the infectious diseases to the aeromedical crew as compared to the in-hospital staff. Transport of such patients can be done via open or closed transport system.^[5-7] The open transport system such as an multipatient transport unit facilitates patient management directly and the medical crew managing these patients don with appropriate protective gears including personnel protective equipment (PPE), N-95 face mask, face shield/goggles,

protective gown.^[6,7] The closed transport system such as air transport isolator system allows separation of the patient from the attending medical crew.^[6,7] Commercially available closed isolation systems include stretcher isolators and Trexler air transport isolators. Stretcher isolators are used to transport patients exposed to infectious agents but asymptomatic and Trexler air transport isolators that are larger, closed systems are used in the transport of infected patients as it provides good patient comfort while facilitating medical care and helping to maintain containment during the transfer duration. Open transport systems have no additional benefit when used in transport of patients with COVID-19.^[7] The use of patient isolator units is beneficial in the secondary transport of patients with COVID-19 despite high costs and logistical difficulties.^[8]

This issue publishes a manuscript that describes the need of patient isolation pods for evacuation of patients with COVID-19.^[9] The authors commented that isolation pods serve as bioisolation transport and temporary holding solution alleviating the need for isolation corridors and elevators. When connected to high-efficiency particulate air (HEPA) filtration system, these pods create a negative air pressure environment and protect the medical personnel. It is made up of white polyvinyl chloride (PVC or vinyl) material which is puncture resistant with multiple access points that are wide gloved. It has nylon belt system with four hand grips on each side allowing maneuvering and transporting the patient. There are 21 air exchanges per hour and service ports that allow oxygen and intravenous lines to exit the pod. It also has waste transfer bag, clear view windows, rechargeable battery, and charger and it can be decontaminated. The various monitoring devices and other medical gadgets required for patient monitoring and management are placed within the isolator before sealing it.^[4] The limitations of such patient isolation units are communication difficulty due to poor sound transmission, noise generated by air exchange system, and background noise of aircraft. Handheld two-way radios can be used to improve communication. It is difficult to conduct physical examination of the patient, suctioning is tough with nonfeasibility of mechanical ventilation. Phlebotomy is to be minimized and needleless intravenous system may be used to reduce the risk of puncturing the isolator.

Fusco *et al.* have reported the use of a modified system for manual ventilation of patient with COVID-19 during intra- and extra-hospital transfers to minimize the aerosolization of droplets. They used a DAR reservoir bag and used a high-efficiency particulate air filter “DAR ADULT electrostatic filter” placed on the expiratory limb of the bag.

They also placed a surgical mask on the filter which reduced the possible spread of droplets and minimized the contact of the health-care worker with the airflow leaving the reservoir bag increasing the psychological satisfaction of the health-care worker.^[10]

To conclude, the use of standard infection control practices, standard operating procedures, judicious patient placement, and simulation-based training of the involved crew in these practices and further experience with the use of patient isolators would help in the successful evacuation of the patients.

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