CORRESPONDENCE

Transport of critically ill COVID-19 patients

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Dear Editor,

As the COVID-19 pandemic evolves, some important challenges have surfaced due to the contagious nature of the virus. These challenges include protecting health-care workers (HCWs) with appropriate PPEs and developing strategies to minimize nosocomial spread. Ensuring local and regional preparations are in place and developing policies addressing different aspects of patient care may ensure staff and patient safety [1, 2].

Safe transportation of critically ill patients is always challenging and primarily depends on staff training, pre-defined hospital transport protocols and checklists, the availability of appropriate transport equipment and the timing of transport [3]. Critically ill patients are generally at risk for instability during transfer [4]. During the current COVID-19 pandemic, patient inter- or intra-hospital transfer is indicated in many situations involving multiple sites (wards, emergency department, intensive care unit, radiology suites and from non-COVID hospitals to COVID hospitals in some countries). Critically ill COVID-19 also pose the challenge of controlling viral transmission. Careful execution of infection control measures is necessary to minimize nosocomial spread to

other patients and HCWs during their management [5]. Conducting COVID-19 patient transport safely is therefore important. Haphazard transportation can compromise the safety of patients, staff members and bystanders [6]. Efforts to avoid potential breaches in infection control should therefore be based on pre-defined protocols and guidelines for patient transport.

Kuwait has designated centers for the management of confirmed COVID-19 cases. Transfer of patients with confirmed disease from non-COVID centers to COVID centers represents a major challenge. Management of the environment after transporting an infected patient (e.g. equipment, ambulance) represents another such challenge. The department of Anesthesia and critical care-Al Adan hospital in Kuwait, developed a transportation protocol for critically ill COVID-19 patients (Table 1) to ensure safe patient transport. During the current worldwide crisis, we hope that our protocol will assist others in managing safe transportation of COVID-19 patients.

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Table 1 Safe transportation of critically ill COVID-19 patients

Protocol for transporting critically ill COVID 19 patients	
Transport equipment to be pre-arranged	Portable ventilator connected to oxygen cylinder Extra oxygen cylinder with key Portable monitor with defibrillator Disposable or sterilizable bag-valve-mask with oxygen tubing COVID Intubation and emergency medication Kit (see below*) Infusion pumps- with extended tubing Transparent drape to cover the patient (such that enables easy access to the airway) Transparent protective covers for equipment Closed suction system
Preparations before transport	Coordinate the timing of transport and the final location of patient placement with the receiving department Coordinate the transport route with the transport team, with infection control and with public relation officers/hospital security. Ensure that the transport route is clear of bystanders and other hospital staff before transport Limit personnel for patient transport. The in-hospital transport team should include 3 members -1 doctor, 1 nurse and a porter. Inter-hospital transport teams should include 4 members—1 doctor, 1 nurse and 2 emergency medical system crew Ensure closed loop communication can be conducted between team members Wrap transport equipment in the transparent covers Ensure functionality of wrapped transport equipment after attaching to the patient Clearly label an emergency IV access
Transport process	Transport team should don appropriate PPE outside the patient room before transport Transport team must adhere to contact/ droplet precautions throughout transport Intubated patients—cover intubated patient with a plastic transparent drape and non-intubated patients should don a surgical face mask
After arrival	Ensure patient delivery to the relevant professionals in the designated COVID area Remove all protective equipment covering Doff PPE in a nearby clinical area. An observer is recommended to overlook appropriate donning and doffing Wear new PPE for the return journey Complete patient handover outside the patient's room Return the equipment by the same ambulance Return all the transport equipment to the area of initiation of transport for decontamination (see below)
Post transfer decontamination	Dedicate a housekeeping team equipped with appropriate PPE to decontaminate the transfer route (including elevator), the room of the patients and all transport equipment. Decontaminate the transport ambulance Prepare all the equipment for the next transport

*Content of COVID intubation and emergency medication kit: The kit should only include single use disposable or sterilizable items. (Endotracheal tubes size 7.0/7.5/8.0/8.5 one each, oropharyngeal airway sizes 3, 4, 5 one each, one tube tie, lubricant, one scalpel, one HME filter, one disposable laryngoscope sizes 3 and 4 each, one 10-ml syringe, one plastic drape, one bougie, one disposable air-bag-valve-mask and the one each of the following medications: atropine, adrenaline, saline flush, ketamine or propofol, suxamethonium or rocuronium)

Compliance with ethical standards

Conflicts of interest

On behalf of all authors, I would like to state that there is no conflict of interest for these correspondences.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Accepted: 12 May 2020

Published online: 25 May 2020

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