



Prepared in Advance Modular Medical Supply for Critical COVID-19 Patients

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To the Editor

By early May 2020, over 3.6 million coronavirus disease 2019 (COVID-19) cases were recorded. Although most patients have mild symptoms, a considerable proportion of patients require intensive care. Our hospital is a tertiary hospital which was authorized as a referral hospital of COVID-19 by Taiwan Centers for Disease Control. In order to manage these referred COVID-19 patients, we constructed two outdoor negative pressure isolation rooms outside the emergency department (ED). After primary survey and stabilization, these patients will be transferred to the dedicated COVID-19 intensive care unit or isolation ward via a planned route. In order to fulfill the essential requirements in the out-door isolation room to manage these severe COVID-19 cases who may need emergency intubation or resuscitation, we performed two high-fidelity simulations to set up our personal protective equipment (PPE) and develop different essential packages. These packages can be prepared in advance in an easily accessible area or the out-door isolation room to help us perform primary resuscitation in time and to prevent fomite transmission with other ED personnel who may need to deliver these essential medical materials without appropriate PPE.

The scenario of the simulation is a confirmed or suspected COVID-19 patient transferred from a local hospital. During a primary survey in the ED, the patient develops respiratory failure and then cardiac arrest. The simulation was performed with a specially modified intubation mannequin which was attached with an agricultural manual-pressured herbicide sprayer. The nozzle of the sprayer was placed near the mouth of the mannequin, which can spread pre-mixed color or fluorescent solution to simulate droplets or vomitus from COVID-19 patients (Fig. 1). After the primary management of ED is com-

pleted, we can investigate the contamination of personnel by identifying the color or fluorescent solution after removing the PPE. Moreover, we can set up the essential medical supplies which can fulfill the need to manage a critical COVID-19 patient. Through these simulations, we standardized our PPE including a class-C protection suite, N95 mask, powered air-purifying respirator, gown, three layers of gloves, and shoe covers. Moreover, the essential and basic equipment in the isolation room, the supplies for patient's sample collection and intravenous fluid administration, for critical airway management, and for advanced life support for cardiac arrest in managing COVID-19 patients were showed in Table 1. By proper modification, the prepared in advance modular supplies may be used in any setting of ED for primary management of critical COVID-19 patients.



Fig. 1. The specially modified intubation mannequin to simulate a COVID-19 patient who continues to cough up droplets.

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Table 1. List of the modular medical supply for a COVID-19 patient

Equipment and supplies in isolation room	N	Material	N	Patient's sample collection and intravenous fluid administration package for one COVID-19 patient.	N	Airway management and intubation package for one critical COVID-19 patient	N	Equipment or material	N	Advanced life support package for one critical COVID-19 patient
ECG monitor	1	COVID-19 naso/oropharyngeal swab	1	Oxygen nasal cannula	1	Defibrillator	1	Defibrillator	1	
Pulse oximetry	1	Influenza A/B nasopharyngeal swab	1	Oxygen mask	1	Temporary cardiac pacing	1	Temporary cardiac pacing	1	
BP monitor	1	Red top blood collection tube	1	Non-rebreathing mask	1	Mechanical CPR device	1	Mechanical CPR device	1	
Thermometer	1	Purple top blood collection tube	1	Bag valve mask	1	Epinephrine 1 mg	10	Epinephrine 1 mg	10	
Disposable ECG electrodes	6	Yellow top blood collection tube	1	High-efficiency particulate air filter	1	Amiodarone 150 mg	3	Amiodarone 150 mg	3	
Oxygen supply and flow meter	1	Gray top blood collection tube	1	Oxygen tubing	2	Lidocaine 2%, 100 mg	2	Lidocaine 2%, 100 mg	2	
Suction device	1	Blue top blood collection tube	1	Yankauer suction tip	1	Sodium Bicarbonate 20 meq	6	Sodium Bicarbonate 20 meq	6	
Wall-mounted intercom	1	Blood gas tube	1	Mucus suction catheter	1	Calcium Gluconate	4	Calcium Gluconate	4	
Suction tube	1	Blood culture tube	2	Closed suction catheter	1	Dextrose 50%, 20 mL	4	Dextrose 50%, 20 mL	4	
Medical waste trash can	1	Tongue depressor	1	Nasal airway 7#	1	Atropine 1 mg	3	Atropine 1 mg	3	
Needle waste bin	1	Normal saline 500 mL	2	Aerosol box	2	Adenosine 3 mg	6	Adenosine 3 mg	6	
Patient's sample delivery box	1	IV set and bag	2	Pentax video laryngoscopy	1	20 mL syringe	10	20 mL syringe	10	
Medical gloves (S/M/L size)	1	IV lock	1	Pentax video laryngoscopy blade	1	10 mL syringe	10	10 mL syringe	10	
Paper towels	2	IV catheter (#18 and #20)	2	AA battery for Pentax laryngoscopy	2	5 mL syringe	10	5 mL syringe	10	
		10 mL syringe	2	Direct laryngoscopy	1	1 mL syringe	1	1 mL syringe	1	
		5 mL syringe	1	Stylet	1					
		Normal saline 20 mL	1	Endotracheal tube 7#	1					
		3M Tegaderm IV Dressing Vapour-Permeable Adhesive Film	4	Endotracheal tube 6#	1					
		Sterile alcohol pad	8	10 mL syringe	1					
		3M tape	1	Laryngeal mask airway	1					
		Guaze 4 × 4 cm	1	Portable end-tidal CO ₂ monitor	1					
				Portable Ventilator	1					
				Midazolam 15 mg	1					
				Rocuronium bromide 50 mg	2					

BP: blood pressure; COVID-19: coronavirus disease 2019; CPR: cardiopulmonary resuscitation; ECG: electrocardiogram; IV: intravenous injection.