Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

risk of infection. When air leaks into a chest drain bottle, it causes the fluid inside to bubble, and the aerosolization that likely is to occur inside the drain bottle then then escapes through the suction port or safety valve, potentially becoming an important mode of viral transmission. Therefore, to overcome this potential mode of transmission, we modified a underwater seal system (Romo Seal; Romsons Disposable Medical Devices, New Delhi, India) by attaching the heat and moisture exchanger filter with a cut endotracheal tube to the unit that is open to the atmosphere. In addition, we filled the chest drain bottle with 100 mL of 1% sodium hypochlorite solution in place of water (Fig 1). In COVID-19 patients with a chest drain and persistent air leak, the British Thoracic Society[2] recommends strategies to minimize droplet exposure via the chest drain circuit, such as connecting it to wall suction or a digital drain circuit. The British Thoracic Society also advises reducing the frequency of intercostal chest drain drainage to twice weekly. However, attaching the chest drain to the wall suction compromises mobilization of the patient.

There are several advantages of using sodium hypochlorite solution in an underwater seal drain, including the following:

1. The prevention of aerosolization that likely occurs inside the drain bottle and may escape through the suction port or safety valve.
2. If the safety valve is connected with wall suction, there is always potential risk of increasing intrathoracic pressure, which is minimized by using this hypochlorite solution.
3. Because the pleural fluid is presumed to be disinfected by sodium hypochlorite, it reduces the chance of viral transmission during its disposal.

Conflict of Interest

None.

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Percutaneous Dilatational Tracheostomy in Coronavirus Disease 2019 Extracorporeal Membrane Oxygenation Patients: A Case Series

To the Editor:

THE coronavirus disease 2019 (COVID-19) pandemic has devastated the world. About 15% of infected patients need intensive care.[1] A small proportion of these patients could benefit from extracorporeal membrane oxygenation (ECMO).[2] Performing a tracheostomy on these patients is considered to be a high-risk aerosol-generating procedure, with implications for staff safety.[3] Guidelines to mitigate the risks associated with tracheostomy in COVID patients[4] have not reported actual experience but delay of the procedure.[5] The risk of bleeding also is greater in patients on ECMO who require tracheostomy.[6] Nevertheless, tracheostomy can facilitate tracheal toilet, reduce sedative requirements, and decrease the duration of mechanical ventilation.

Case Series

At the start of the COVID-19 surge, we established a prospective tracheostomy database. In addition, we modified the procedure to reduce risk of aerosol spread to staff, as described in the following: (1) all procedures are performed in the patient's own intensive care unit (ICU) isolation room; (2) minimization of staff present (operator, bronchoscopist, nurse) and minimization of the number of operators as recommended by Tay et al.[7]; (3) use of disposable bronchoscopy equipment on a single trolley; and (4) discontinuation of mechanical ventilation during tracheostomy.

We performed 38 percutaneous tracheostomies in mechanically ventilated patients on ECMO during 8 weeks of the COVID-19 pandemic in our institution (March 27-May 15, 2020) (Table 1). We are 1 of the 5 designated ECMO centers in the United Kingdom and admitted more than 40 patients supported with ECMO during the COVID-19 pandemic. The decision to perform tracheostomy was made by the duty day intensivist. The average time of tracheal intubation before tracheostomy was 11.66 days. All procedures were successful.

Complications and Safety

Complications were minimal. No immediate complications, such as pneumothorax or tracheostomy malposition, were observed. No transfusion of blood products was required for tracheostomy bleeding, but 2 patients needed additional skin sutures to stop skin bleeding. We asked medical staff to report any sickness after the procedure, and to date there have been no reports of sickness or sick leave among medical staff relating to the tracheostomies.

Procedure

The percutaneous dilatational method was used for all tracheostomies, which were performed at the bedside in an ICU with isolation rooms. A preprepared trolley with all equipment

Table 1
Clinical Characteristics of COVID ECMO Tracheostomy Patients.

Demographics			
Age		Mean	SD
		45.50	9.59
Sex		Number	Percent
Male		31	81.58%
Female		7	18.42%
BMI		Mean	SD
		28.21	11.30
Comorbidity		Number	Percent
None		11	28.95%
Asthma		7	18.42%
Diabetes mellitus		9	23.68%
Hypertension		9	23.68%
Obesity		13	34.21%
Obstructive sleep apnea		2	5.26%
Current smoker		2	5.26%
Hypothyroidism		3	7.89%
Encephalitis		1	2.63%
Postpartum		1	2.63%
Sickle cell trait		1	2.63%
Sarcoidosis		1	2.63%
Duration of intubation before tracheostomy		Mean	SD
		11.66	4.63
Duration to cessation of invasive mechanical ventilation		Mean	SD
Still ventilated	25		
Successful (tracheostomy mask/speaking valve)	13	18.85	11.42
Duration to decannulation/ length of stay		Mean	SD
Ongoing care	27		
Successful	6	18.00	5.87
Repatriated with tracheostomy	5	24.75	10.61
Outcome/length of stay		Mean	SD
Discharged to ward/repatriated	10	23.50	8.12
Ongoing care in the hospital	22	32.87	10.41
Deceased	6	19.44	9.29
Cause of death			
Intracranial hemorrhage	2		
Multiorgan failure	4		
Complications	Number	Percent	
Bleeding from skin	2	Both had anticoagulant stopped for the procedure Both needed a purse string suture	
Anticoagulant stopped perioperatively	Number	Percent	
Yes	23	60.53%	
No	15	39.47%	

Abbreviations: BMI, body mass index; COVID, coronavirus disease; ECMO, extracorporeal membrane oxygenation; SD, standard deviation.

necessary for the surgery was prepared in a sterile area outside the ICU (Fig 1). Family consent was obtained, the World Health Organization safe surgical checklist procedure was followed, and rescue airway equipment was placed outside the room before commencement of the procedures. Full personal protective equipment included an FFP3 facemask, visor, gown, and gloves for the tracheostomy team and bedside nurse.

In all patients, anesthesia was maintained with a propofol infusion, 1% at 4 mg/kg/h, which already was running usually at a lower rate. Muscle relaxation was achieved by a single dose of atracurium, 50 mg, or rocuronium, 50 mg. Local anesthesia with 10 mL of 1% lidocaine with 1:200000 epinephrine was used for skin, subcutaneous tissues, and tracheal mucosa. A disposable Ambu bronchoscope (Ambu, Ballerup, Denmark) was used in all patients. Ventilation was discontinued during withdrawal of the endotracheal tube, dilator exchange, and tracheostomy tube insertion. Ventilation then was resumed, and position was confirmed bronchoscopically and via capnography. All tracheostomies were performed using TRACOE twist kit sizes 7- to- 10 (TRACOE Medical GmbH, Nieder-Olm, Germany). Skin incision with a scalpel was avoided if possible. More than half of the tracheostomies were performed by the same duo of operator and bronchoscopist.

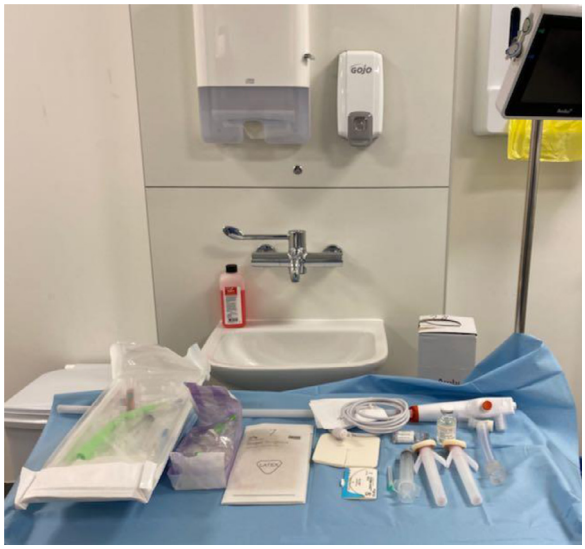

Fig 1. Preprepared tracheostomy and fiberoptic bronchoscopy trolley.

In our previously published experience in the *Journal of Cardiothoracic and Vascular Anesthesia*, we described stopping heparin infusions routinely 2- to- 4 hours before tracheostomy to prevent bleeding in ECMO patients. However, we found that COVID-19 patients are in a hypercoagulable state[8] and that anticoagulation does not need to be stopped routinely. The Activated Prothrombin Time (APTT) ratio of 1.5- to- 1.8 was deemed safe for the procedure. One patient was receiving argatroban because of heparin-induced thrombotic thrombocytopenia, and this was not discontinued. As our experience grew, anticoagulation was not discontinued in 15 patients, without bleeding complications.

Perspective

Tracheostomy remains a valuable procedure for mechanically ventilated patients. ECMO support allows for the discontinuation of mechanical ventilation for a short period without further worsening of hypoxia and therefore reduction of risk of aerosolization. We found that continuing anticoagulation during dilatational percutaneous tracheostomy for ECMO-supported COVID-19 patients did not lead to bleeding complications. Limiting the number of operators allows for concentration of expertise.

Conflict of Interest

None.

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Anesthetic Management of Patients Undergoing Aortic Dissection Repair With Suspected Severe Acute Respiratory Syndrome Coronavirus Disease 2019 (COVID-19) Infection

To the Editor:

We read with great interest the recent article on the anesthetic management of aortic dissection repair in patients with suspected severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. We would like to call your attention to our case, which sheds additional light on this topic. We report a case of a 50-year-old man admitted to the emergency department of A. Gemelli University Hospital in Rome, Italy, on March 11, 2020 for acute aortic dissection, who developed disseminated intravascular coagulation (DIC) in the immediate postoperative period. His symptomatology was characterized by syncope on the day before, without chest pain or dyspnea. Emergency computed tomographic scan showed a DeBakey II aortic dissection and pericardial effusion (Fig 1). No pulmonary alteration was observed. Afebrile at admission, he had traveled in Northern Italy, deemed to be at high risk for COVID-19 spread, and had a mild fever for the week before. Due to epidemiologic criteria, a nasopharyngeal swab was obtained for SARS-CoV-2 RNA test according to local protocol at the time, which ultimately was negative. The patient immediately underwent emergency surgery and all medical staff adopted third-level medical protection measures for COVID-19 safety procedures, including properly wearing disposable protective clothing, medical-grade masks such as N95, disposable surgical caps, medical-grade goggles, disposable latex gloves, and disposable shoe covers. The ascending aorta was replaced, requiring 20 minutes of hypothermic (28°C) circulatory arrest and selective brain perfusion. The patient was transferred to an isolation intensive care unit room and specific measures for infection containment were established despite the admission test being negative. In the intensive care unit, the patient presented massive bleeding from chest drainage. Rotational thromboelastometry (Tem GmbH, Germany) tests showed a hypercoagulable state, with secondary fibrinolysis, suggestive for a DIC condition like blood tests.[1] Coagulation derangement was treated and after 2 surgical revisions, without evidence of the surgical source of bleeding, a mediastinal packing was performed. Bleeding reduced substantially during the first postoperative day, and sternosynthesis was performed. Four days after surgery, the patient developed shock associated with multiorgan failure, fever, and increased Sequential Organ Failure Assessment score. Due to worsening of gas exchange and chest x-ray evidence of interstitial strengthening, a deep bronchoalveolar lavage (BAL) was performed for a second

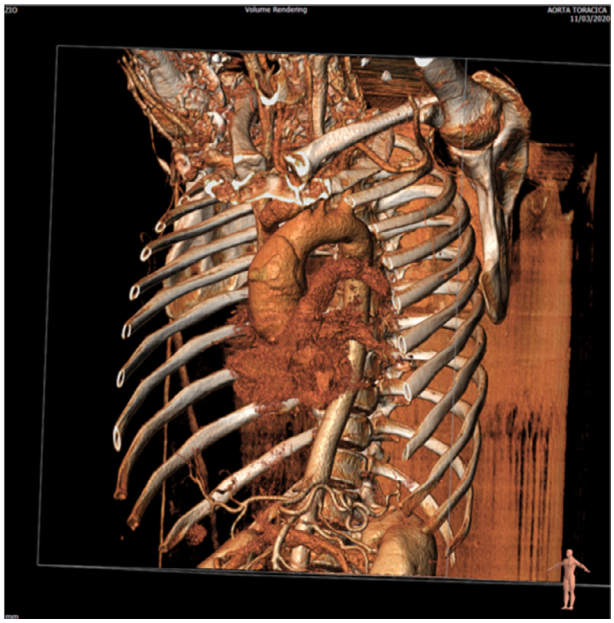

Fig 1. CT scan images. CT scan of the aorta shows 3-dimensional image reconstruction of thickened aortic wall originating from the sinotubular junction, ascending portion with a maximum diameter of 45 mm, without involvement of the epiaortic arterial branches. Without involvement of arch of aorta. Ascending aortic dissection and thickened aortic wall with pericardial and pericardial effusion. No pulmonary alteration in progress. CT, computed tomography.