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## Correspondence

**Cardiac arrest during emergency intubation in an elderly patient with confirmed coronavirus disease 2019**

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*Dear editor,*

Older COVID-19 patients with comorbidities like cardiovascular and pulmonary disease are the main group requiring tracheal intubation for invasive ventilation support [1,2]. Here, we report an elderly COVID-19 patient who experienced cardiac arrest during intubation. Written consent for publication was obtained from the patient's relative.

On 27 February 2020, a 60-year-old male patient with confirmed COVID-19 infection was transferred to the general ward of our hospital. His symptoms included fever, cough, and chest tightness, and he had a history of chronic bronchitis. Nine days later, he developed increased airway secretions, and sputum sounds were heard on lung auscultation. The medical staff promoted the drainage of sputum by strengthening back patting and providing intermittent manual sputum suction. Under continuous nasal catheter oxygenation (4 L/min), oxygen saturation was maintained at 90%–95%, his heart rate (HR) was 84 bpm, blood pressure (BP) was 122/78 mmHg and his respiratory rate (RR) was 20 breaths per min. At 15:00 h the same day, the patient suffered an acute shortness of breath. Lung auscultation revealed the exacerbation of bilateral wet rales, he experienced loss of consciousness, his HR increased to 145 bpm, BP decreased to 93/58 mmHg, and RR to 35 breaths per min. Blood gas analysis showed a pH of 7.091;  $pO_2$ , 96.8 mmHg;  $pCO_2$ , 94.3 mmHg;  $CHCO_3^-$ , 28.6 mmol/L, and the hospital intubation team was called immediately for emergency intubation (Fig. 1).

After 30 min, the intubation team arrived at the ward with third-level measures of medical protection. His HR was 111 bpm and BP was 74/30 mmHg with vasoactive drug support. Oxygen saturation at the tip of his finger could not be measured. The team members immediately began intubation. After 20 s of induction, the HR slowly reduced to 51 bpm, and noninvasive BP could not be detected. The intubation team

rapidly conducted intubation under the guidance of a video laryngoscope, and the intubator used a large suction tube to remove the viscous sputum covering the glottis. The patient's heart then stopped, so cardiopulmonary resuscitation was immediately begun. While completing intubation and connecting the ventilator, continuous chest compressions were administered and 1 mg of epinephrine was intravenously injected three times at 2-min intervals starting from the time of cardiac arrest. After 5 min, the patient regained sinus rhythm without defibrillation, the HR slowly returned to 138 bpm, and the BP was 115/52 mmHg. After 1 h of mechanical ventilation, 100 mL sodium bicarbonate infusion, and vasoactive drug support, blood gas analysis showed a pH of 7.036;  $pO_2$ , 192.5 mmHg;  $pCO_2$ , 68.6 mmHg;  $CHCO_3^-$ , 18.4 mmol/L.

A previous multivariate analysis found that the main predictors of intubation-related cardiac arrest were arterial hypotension (systolic BP < 90 mmHg) prior to intubation, hypoxaemia prior to intubation, an absence of pre-oxygenation, and age > 75 years [3]. In our 18 cases of emergency intubation from 1st March to 31st March 2020, we encountered 14 patients aged > 75 years with all these risk factors, each of which presented a challenge regarding emergency intubation. Based on our experience, the doctors' assessments of the patient's airway condition were biased because most of these patients were in a coma, it was not possible to perform a comprehensive difficult airway assessment before intubation. Therefore, we suggest that large suction tubes should be prepared for thorough cleaning of airway sputum before intubating COVID-19 patients. We also recommend that the support of the difficult airway management team and the cardiopulmonary resuscitation team should be readily available during the intubation of high-risk patients, and frequent teamwork exercises on cardiopulmonary resuscitation simulators are helpful to improving the quality of cardiopulmonary resuscitation in emergencies [4].



**Fig. 1.** Intubation and cardiopulmonary resuscitation in an elderly patient with confirmed coronavirus disease 2019 (COVID-19). A, pre-oxygenation was performed by manual positive pressure ventilation using a bag valve mask during rapid sequence induction. B, rapid sequence induction was applied by infusing sufentanil (0.1 µg/kg), etomidate (0.1 mg/kg), and rocuronium (0.5 mg/kg) through a peripheral vein. Approximately 20 s after anaesthesia-inducing drug infusion, the patient experienced acute cardiac arrest; at this time pre-oxygenation was still underway and the endotracheal tube had not been placed. C, the glottis was covered with viscous sputum and could not be exposed. After suction, the endotracheal tube was successfully inserted under the guidance of video laryngoscopy. D, the defibrillator was ready for use while a physician performed chest compressions, and 1 mg of epinephrine was continuously intravenously injected three times at 2-min intervals. With the support of mechanical ventilation and 5 min of continuous cardiopulmonary resuscitation, the patient recovered sinus rhythm without defibrillation.

### Patient consent

Written informed consents were received from the patient's relative both for the procedure and publishing of the case.

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### Declaration of competing interest

The authors have no conflict of interest to declare.

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