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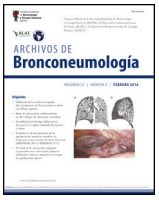

Clinical Letter

Use of Extracorporeal Carbon Dioxide Removal Therapy in an Intermediate Respiratory Care Unit

To the Director,

Extracorporeal carbon dioxide removal ($ECCO_2R$) is an advanced form of life support that is mostly used in patients with acute respiratory distress syndrome (ARDS) and severe acute exacerbations of chronic obstructive pulmonary disease (COPD) or asthma.[1,2] For the former, $ECCO_2R$ therapy allows ultra-protective lung ventilation and reduces ventilator-induced lung injury. For the latter, $ECCO_2R$ therapy may be applied to prevent intubation in patients at risk of non-invasive ventilation (NIV) failure.[3,4] Due to the need for venous cannulation and complexity of care, this technique is mainly used in Intensive Care Units (ICU).[5] We present a case of successful treatment with a peristaltic pump $ECCO_2R$ in an Intermediate Respiratory Care Unit (IRCU).

A 67-year-old male with a history of progressive pulmonary fibrosis after COVID-19 (Fig. 1), referred for evaluation for lung transplant at last pneumology follow-up, was admitted to the hospital because of severe respiratory insufficiency. His medical record included chronic lymphocytic leukaemia (in remission), pulmonary embolism and atrial fibrillation on anticoagulation. He presented with a recent onset of dyspnoea, cough with purulent sputum, fever and increased oxygen requirement. Blood pressure was 122/65 mmHg, pulse 100 bpm, SaO_2/FiO_2 112, and a respiratory rate of 40 bpm with scattered bilateral crackles. Blood gases showed respiratory acidosis (pH 7.27, pCO_2 116 mmHg, pO_2 38 mmHg, HCO_3 53.3 mM/L). A chest X-ray revealed a known interstitial pulmonary infiltrate without significant changes compared to his previous one. Laboratory studies showed an increased C-reactive protein (136.0 mg/L), leukocytosis ($14.70 \times 10\hat{3}/\mu l$), and neutrophilia ($10.90 \times 10\hat{3}/\mu l$). Since the patient had a do-not-intubate order, he was admitted to the IRCU.

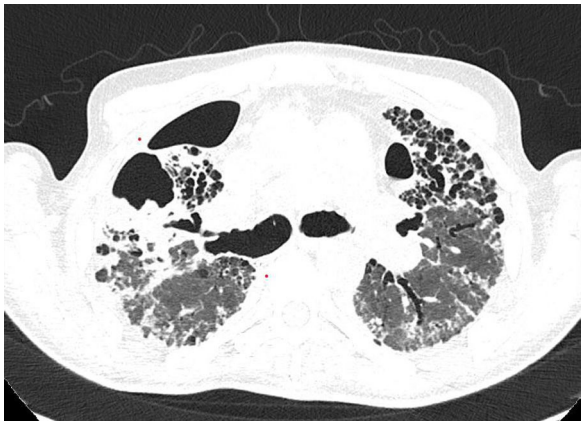

Fig. 1. Chest CT scan of the patient before admission.

NIV was started but, after 24 h, the condition of the patient did not improve. Faced with this situation of non-invasive measures failure in a patient pending evaluation for lung transplant with a potentially reversible acute worsening due to an infectious disease as the most likely cause, the patient was connected to an $ECCO_2R$ device (Prismalung+, Baxter) and empirical antibiotic treatment was started. Blood flow was kept between 250 and 300 ml/min and gas flow (oxygen) at 6–8 L/min, which was well tolerated by the patient, being able to withdraw NIV and deescalate to high-flow and finally conventional nasal cannulas. At the beginning of treatment ABG showed pH 7.4, pCO_2 93 mmHg, pO_2 88 mmHg and HCO_3 57.6 mM/L (PaO_2/FiO_2 110), with persisting tachypnea (40 bpm) and work of breathing. After 24 h, ABG improved to pH 7.43, pCO_2 60 mmHg, pO_2 54 mmHg, HCO_3 39.8 mmHg with respiratory rate around 20 bpm, PaO_2/FiO_2 135 and no dyspnoea. As the patient's clinical condition improved following medical treatment, it was possible to withdraw $ECCO_2R$ after 6 days and the patient was discharged home.

The use of $ECCO_2R$ has been reported in the ICU setting. This case represents the potential use of $ECCO_2R$ in an IRCU in reversible situations refractory to non-invasive measures. Further research is required to determine the best way to implement this therapy in IRCU, to maximize its benefits while minimizing any potential risks.

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Conflicts of interest

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