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Letter to the Editor

Acute Respiratory Failure in COVID-19 Pneumoniae: The Best Interface for an Optimal Management - A South Italian Experience

Pasquale Imitazione, Giorgio Emanuele Polistina, Anna Annunziata, Valentina Di Spirito, Maurizia Lanza, Giuseppe Fiorentino

Department of Intensive Care, AO dei Colli PO Monaldi, Naples, Italy

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Editor,

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread rapidly and has subsequently spread worldwide. Following the last WHO Guidelines, starting therapy with supplemental oxygen is recommended if the oxygen saturation pulse oximeter (SpO_2) is less than 90% and should be maintained no higher than 96% [1, 2].

For acute hypoxemic respiratory failure despite conventional oxygen therapy, use of high-flow nasal cannula (HFNC) is suggested because conventional oxygen therapy and noninvasive positive pressure ventilation (NIPPV) have a weak recommendation. If HFNC is not available, a trial of NIPPV is suggested along with close monitoring for worsening of respiratory status and early intubation if worsening occurs [2]. Continuous positive airway pressure (CPAP)support refers to the delivery a continuous level of positive pressure, meaning a continually positive pressure during both inspiration and expiration with a spontaneously breathing patient without additional inspiratory pressure support than NIPPV.

The effect of CPAP is increased functional residual capacity due to partial recruitment of collapsed alveoli, reduced shunt, and enhanced ventilation-perfusion ratio in certain forms of respiratory failure, such as acute cardiogenic pulmonary edema [3]. These effects can improve oxygenation and may further reduce the work of breathing because the respiratory system is shifted to a more compliant position on its pressure-volume curve.

Furthermore, CPAP may improve left ventricular function by virtue of an afterload-reducing effect of increased intrathoracic pressure. This effect occurs mainly in patients with dilated, hypocontractile left ventricles whose heart function is more dependent on afterload than on preload [3].

With the helmet device, a lower diffusion of dropletswas observed, resulting in the most advantageous and safe support in patients with COVID-19 pneumonia [4].

In our Department in South of Italy, 20 patients (16 male, 4 female; mean age 57.8 years; mean BMI 28kg/$m^{2;}$ 2 smokers, 4 former smokers, 16 non-smokers; PaO_2/FiO_2 (P/F) ratio ≤150) with acute COVID-19 respiratory illness pneumonia were treated with helmet CPAP support (StarMed Intersurgical) (mean positive end-expiratory pressure (PEEP) 12.5 cmH_2O; mean FiO_2 60%) at admission and tested with arterial blood gas (ABG) every 6 hours (mean P/F 173.45mmHg).

We observed that after 48 hours, patients treated with Helmet had sharply decreased tolerance and compliance because of the loud noise and subaxillary fixation system [5].

In fact, after 48 hours of use of Helmet, five patientshad a P/F ratio <100 and 10 patients between 150 and 100 mmHg, 5 patients died (3 after intubation, 2 without intubation). For this reason, we switched the remaining patients (15) to PEEP mask (StarMed Intersurgical) (mean PEEP 12.5 cmHg; mean FiO_2 60%). A large improvement was observed in tolerance and P/F ratio (mean 275 mmHg). We also observed that the patients performed pronation for 4–6 hours/day with overall reduced risk of early intubation. After 15 days of treatment, all 15 patients recovered from respiratory failure and were discharged.

Address for Correspondence: Pasquale Imitazione, Department of Intensive Care, AO dei Colli PO Monaldi, Naples, Italy
E-mail: pasquale.imitazione@gmail.com

In conclusion, we believe that patients with COVID-19 pneumonia with acute hypoxemic respiratory failure should be treated with PEEP. CPAP is the non-invasive treatment of choice, and the appropriate choice of interface could improve tolerance and outcomes in patients.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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