

COVID-19-Induced Respiratory Failure and ARDS



Approximately 5% of patients infected by COVID-19 require ICU admission due to acute respiratory distress syndrome (ARDS). Invasive mechanical ventilation is required in a large majority of these patients. Proper ventilatory management during ARDS reduces the risk of ventilator-induced lung injury and can also play a role in improving patient survival.

Some reports suggest that patients with COVID-19 ARDS may have different phenotypes, and this could have an impact on ventilator management. Some experts claim that COVID-19 patients may not necessarily benefit from regular ARDS management.

In this study, the researchers assess respiratory mechanics, potential for lung recruitment and PEEP effects in mechanically ventilated patients with COVID-19 induced moderate to severe ARDS. They compared the results to patients with ARDS of other origins who underwent the same procedures. The study was conducted in an ICU of a tertiary care university hospital in Italy. A 28-day clinical outcome was recorded.

Mechanical ventilation was applied in a volume-controlled mode at tidal volume 6 ml/kg of predicted body weight, inspiratory flow 60 l/min, inspiratory pause 0.3 s, respiratory rate titrated to obtain pH > 7.30 and < 35 breaths per minute, and FiO₂ titrated to achieve SpO₂ between 90 and 96%.

Two PEEP levels were tested - 15 and 5 cmH₂O. Peak airway pressure, pressure, and total PEEP were measured. Driving pressure, respiratory system compliance, and PBW-indexed value were also computed. Ventilatory ratio was calculated. Exhaled tidal volume after PEEP lowering was recorded, and recruitment-to-inflation ratio was computed.

COVID-19 patients were compared to patients with moderate-to-severe ARDS from other aetiologies. Ventilatory ratio, compliance, and its predicted body weight-indexed value were slightly higher in COVID-19 patients than in patients with ARDS of other aetiologies. Airway closure in the COVID-19 cohort was less frequent than in other ARDS patients. Average respiratory system compliance and respiratory system compliance/PBW were slightly higher in patients with COVID-19 compared to those in the non-COVID-19 ARDS group. The PEEP-induced improvement in PaO₂/FiO₂ was greater in COVID-19 patients than among subjects ARDS from other causes. Overall, the 28-day mortality of COVID-19 patients was higher than that reported for ARDS of other causes.

These findings suggest that patients with COVID-19 show a conventional ARDS phenotype, and physiological differences between COVID-19 patients and ARDS from other aetiologies appear clinically negligible.

Source: [Critical Care](#)

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