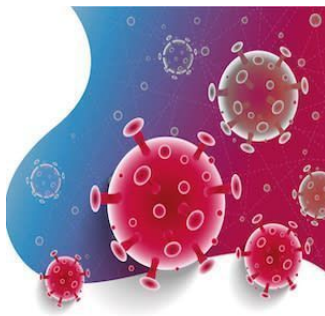


Respiratory Subphenotypes of COVID-19-Related ARDS



Patients with COVID-19 related ARDS present with distinct respiratory subphenotypes. But most phenotyping schema is limited by sample size, disregard for temporal dynamics and insufficient validation.

In the PProVENT-COVID study, researchers aimed to identify respiratory subphenotypes of COVID-19-related ARDS. This was an investigator-initiated observational cohort study at 22 ICUs in the Netherlands. COVID-19 patients, 18 years or older, who received invasive mechanical ventilation served as the derivation cohort, while similar patients from two ICUs in the U.S. served as the replication cohort. Data for 1007 patients were included in the derivation cohort, 288 patients in replication cohort 1 and 326 patients in replication cohort 2.

The cross-sectional latent class analysis did not identify and underlying subphenotypes. The longitudinal latent class analysis identified two. Subphenotype 2 was characterised by higher mechanical power, minute ventilation and ventilatory ratio over the first four days of invasive mechanical ventilation compared to subphenotype 1. However, $\text{PaO}_2/\text{FiO}_2$, pH, and compliance of the respiratory system did not differ between the two subphenotypes.

28% of patients with sub phenotype 1 and 32% of patients with subphenotype 2 died at day 28. Patients with subphenotype 2 had fewer ventilator-free days at day 28 and more frequent venous thrombotic events compared with subphenotype 1. The association between upward ventilatory ratio trajectories and 28-day mortality was confirmed in the replication cohorts.

These findings show that at baseline, COVID-19-related ARDS has no consistent respiratory subphenotype. Patients diverge from a homogeneous to a heterogeneous population with trajectories of ventilatory ratio and mechanical power being the most discriminatory.

This was the first study to evaluate the existence of respiratory subphenotypes in patients with COVID-19-related ARDS. Overall, the researchers did not find any evidence for respiratory subphenotypes using static data. However, the time-dependent analysis showed two subphenotypes that developed during the first days of mechanical ventilation.

Source: [The Lancet Respiratory Medicine](#)

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