

Category : **Respiratory: ARDS**

**A210 - A systematic review and meta-analysis of respiratory system mechanics and outcomes in mechanically ventilated patients with COVID-19 related acute respiratory distress syndrome**

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## **Introduction:**

The respiratory mechanics, particularly static compliance of the respiratory system ( $C_{RS}$ ) in COVID-19 acute respiratory distress syndrome (ARDS) is poorly understood. Whether or not distinct ARDS phenotypes based on  $C_{RS}$  exist is still widely debated.

## **Methods:**

We conducted a systematic review and meta-analysis, searching three international databases from 1<sup>st</sup> December 2019 to 15<sup>th</sup> July 2021 for studies reporting on the respiratory mechanics of patients with ARDS. The primary outcome was the  $C_{RS}$  of both COVID-19 ARDS. Secondary outcomes included the mortality rates, lengths of stay, and ventilator free days. Random-effects (DerSimonian and Laird) meta-analyses were conducted.

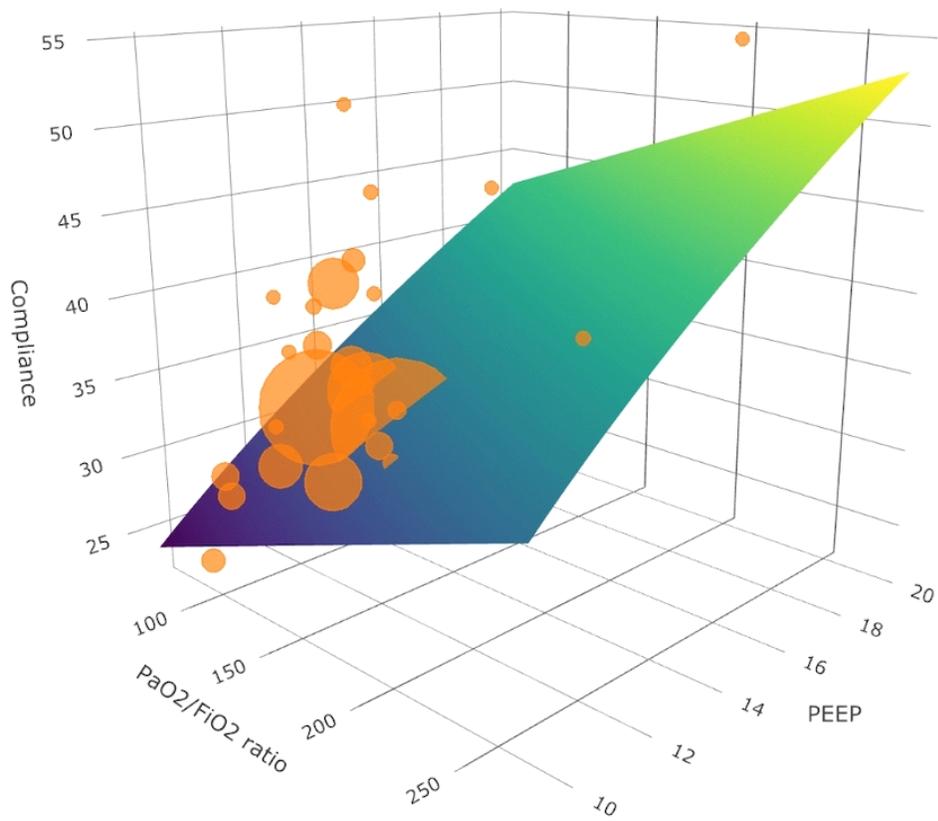
## **Results:**

45 studies (13,334 patients) were included for analysis. The pooled  $C_{RS}$  in patients mechanically ventilated for COVID-19 was 34.6 (95%-CI: 33.4-35.8), and displayed a normal distribution (Shapiro-Wilk test:  $p=0.35$ ).  $C_{RS}$  was significantly associated with an  $PaO_2/FiO_2$  ratio, positive end-expiratory pressure, and tidal volume; driving pressure was negatively associated with  $C_{RS}$ . The pooled mortality rate was 36.2% (95%-CI: 30.3%-42.4%, ICU) and 38.9% (95%-CI: 32.3%-45.7%, 28-day).

## **Conclusion:**

The respiratory mechanics of ARDS at the time closest to the initiation of invasive mechanical ventilation was normally distributed and did not reveal any distinct  $C_{RS}$ -based phenotypes. However, to what extent the proposed unique pathophysiology of ARDS affects the current definition of ARDS and “exposes” its potential limitations remains a question for a high-quality, large prospective dataset to answer. Nonetheless, from our study-level analysis,  $C_{RS}$  appears to be a heterogenous metric affected by both disease and intervention factors (Figure 1) and physicians should treat patients with personalised and precise interventions in this context.

**Image :**



*Figure 1: Respiratory static compliance is significantly associated with PaO<sub>2</sub>/FiO<sub>2</sub> ratio and positive end-expiratory pressure*