

Effect of Prone Position C-ARDS



COVID-19 has resulted in the death of over 4 million people worldwide. In severe cases of COVID-19, acute respiratory infection leads to severe pneumonia, which progresses to hypoxaemia and acute respiratory distress syndrome (ARDS).

Prolonged sessions in the prone position is an effective intervention to decrease mortality in these patients. It has been adopted for the treatment of C-ARDS, both before intubation and during invasive ventilation. Observational studies show prone positioning improves oxygenation and decreases mortality rate in patients with C-ARDS. However, the mechanisms of these effects remain unclear.

In this study, researchers assessed the physiologic effects of pronation using CT scan and electrical impedance tomography (EIT). The goal was to characterise the physiologic effects of prone position on the key mechanisms of regional lung protection, including recruitment, reduced atelectrauma, and improved ventilation-perfusion matching.

Twenty-one intubated patients with moderate or severe C-ARDS in an Italian dedicated COVID-19 ICU were included in the analysis. Patients were transported to a CT scan facility where images were acquired in prone and supine position. Gas exchange, respiratory mechanics, and ventilation and perfusion EIT-based analysis were also provided back in the ICU toward the end of two 30-minute steps.

CT scan analysis showed that the non-aerated lung weight decreased significantly in the prone position. Prone position increased the normally aerated lung weight and significantly decreased hyperinflated tissue. Recruitment induced by prone position was significant.

Data from EIT showed that recruitment in the dorsal region induced increased regional ventilation and the ventral derecruited lung was characterised by reduced ventilation. Prone position did not affect the fraction of mismatched units but significantly decreased dead space/shunt ratio.

Prone positioning did not induce any change in respiratory mechanics. However, oxygenation improved and calculated pulmonary shunt decreased. No difference was observed in P_{aO_2}/F_{iO_2} nor ventilatory ratio between values at enrollment and during the study in the supine position after the cycle of pronation.

Despite mild derangement of respiratory mechanics and preserved lung aeration in the supine position, prone position induced alveolar recruitment in the dorsal regions. Alveolar derecruitment occurred in the ventral lung regions. Also, dorsal recruitment reduced the risk of regional atelectrauma.

These findings show several changes that are associated with prone position in C-ARDS. These include increased lung recruitment, decreased atelectrauma, and improved ventilation-perfusion matching.

Source: [Critical Care Medicine](#)

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