



## High-frequency percussive ventilation and initial biomarker levels of lung injury in patients with minor burns after smoke inhalation injury.

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**BACKGROUND:** Several biological markers of lung injury are predictors of morbidity and mortality in patients with acute respiratory distress syndrome (ARDS). Some lung-protective ventilation strategies, such as low tidal volume, are associated with a significant decrease in plasma biomarker levels compared to the high tidal volume ventilation strategy. The primary objective of this study was to test whether the institution of high-frequency percussive ventilation (HFPV) to patients with respiratory distress after smoke inhalation injury influenced initial biomarker levels of lung injury (just before and after using percussive ventilation).

**MATERIALS AND METHODS:** A prospective observational cohort study was conducted in the intensive care unit of the Brussels Burn Center. Fifteen intubated, mechanically ventilated patients with minor burns and ARDS following smoke inhalation were enrolled in our study. Physiologic data and serum samples were collected before intubation and at four different time points within the first 48h after intubation to measure the concentration of interleukin (IL)-6, IL-8, and tumor necrosis factor- $\alpha$  (TNF alpha). The differences in biomarker levels before and after starting HFPV were analyzed using repeated measure analysis of variance and a paired t test with correction for multiple comparisons.

**RESULTS:** Before starting HFPV under endotracheal intubation, all biological markers (IL-6, IL-8, and TNF alpha) were elevated in the spontaneously breathing patients with acute lung injury (ALI). After intubation and institution of a positive pressure ventilation with HFPV (tidal volume 5.6-6.6ml/kg per ideal body weight), none of the biological markers were increased significantly at either an early (3 $\pm$ 2h) or a later point in time. However, the levels of IL-8 had decreased significantly after intubation at a later point in time. During the post-intubation period, the PaO<sub>2</sub>/FiO<sub>2</sub> (partial pressure of arterial oxygen/fraction of the inspired oxygen) ratio increased significantly and the plateau airway pressure decreased significantly.

**CONCLUSION:** Levels of IL-6, IL-8, and TNF alpha are elevated in spontaneously ventilating patients with minor burns and ARDS following smoke exposition prior to endotracheal intubation. The institution of HFPV with percussive positive pressure ventilation enhances blood oxygenation and could not further increase the initial levels of these biological markers of lung injury after smoke inhalation injury. Copyright © 2014 Elsevier Ltd and ISBI. All rights reserved.

**KEYWORDS:** Biomarkers; Burn; Respiratory distress; Smoke inhalation injury PMID: 24986596

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