



Early Short-Term Application of High-Frequency Percussive Ventilation Improves Gas Exchange in Hypoxemic Patients.

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Background: Hypoxemia in acute lung injury/acute respiratory distress syndrome (ALI/ARDS) patients represents a common finding in the intensive care unit (ICU) and frequently does not respond to standard ventilatory techniques.

Objective: To study whether the early short-term application of high-frequency percussive ventilation (HFPV) can improve gas exchange in hypoxemic patients with ALI/ARDS or many other conditions in comparison to conventional ventilation (CV) using the same mean airway pressure (P_{aw}), representing the main determinant of oxygenation and hemodynamics, irrespective of the mode of ventilation.

Methods: Thirty-five patients not responding to CV were studied. During the first 12 h after admission to the ICU the patients underwent CV. Thereafter HFPV was applied for 12 h with P_{aw} kept constant. They were then returned to CV. Gas exchange was measured at: 12 h after admission, every 4 h during the HFPV trial, 1 h after the end of HFPV, and 12 h after HFPV. Thirty-five matched patients ventilated with CV served as the control group (CTRL).

Results: PaO_2/FiO_2 and the arterial alveolar ratio (a/A PO_2) increased during HFPV treatment and a PaO_2/FiO_2 steady state was reached during the last 12 h of CV, whereas both did not change in CTRL. $PaCO_2$ decreased during the first 4 h of HFPV, but thereafter it remained unaltered; $PaCO_2$ did not vary in CTRL. Respiratory system compliance increased after HFPV.

Conclusions: HFPV improved gas exchange in patients who did not respond to conventional treatment. This improvement remained unaltered until 12 h after the end of HFPV.

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