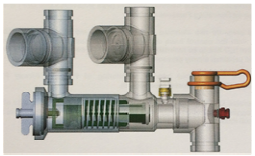

High-frequency percussive ventilation and low tidal volume ventilation in burns: A randomized controlled trial.

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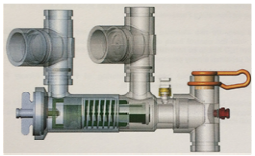
OBJECTIVES: In select burn intensive care units, high-frequency percussive ventilation is preferentially used to provide mechanical ventilation in support of patients with acute lung injury, acute respiratory distress syndrome, and inhalation injury. However, we found an absence of prospective studies comparing high-frequency percussive ventilation with contemporary low-tidal volume ventilation strategies. The purpose of this study was to prospectively compare the two ventilator modalities in a burn intensive care unit setting.

DESIGN: Single-center, prospective, randomized, controlled clinical trial, comparing high-frequency percussive ventilation with low-tidal volume ventilation in patients admitted to our burn intensive care unit with respiratory failure.

SETTING: A 16-bed burn intensive care unit at a tertiary military teaching hospital.

PATIENTS: Adult patients >/=18 yrs of age requiring prolonged (>24 hrs) mechanical ventilation were admitted to the burn intensive care unit. The study was conducted over a 3-yr period between April 2006 and May 2009. This trial was registered with ClinicalTrials.gov as NCT00351741.
INTERVENTIONS: Subjects were randomly assigned to receive mechanical ventilation through a high-frequency percussive ventilation-based strategy (n = 31) or a low-tidal volume ventilation-based strategy (n = 31).

MEASUREMENTS AND MAIN RESULTS: At baseline, both the high-frequency percussive ventilation group and the low-tidal volume ventilation group had similar demographics to include median age (interquartile range) (28 yrs [23-45] vs. 33 yrs [24-46], p = nonsignificant), percentage of total body surface area burn (34 [20-52] vs. 34 [23-50], p = nonsignificant), and clinical diagnosis of inhalation injury (39% vs. 35%, p = nonsignificant). The primary outcome was



ventilator-free days in the first 28 days after randomization. Intent-to-treat analysis revealed no significant difference between the high-frequency percussive ventilation and the low-tidal volume ventilation groups in mean (+/- sd) ventilator-free days (12 +/- 9 vs. 11 +/- 9, p = nonsignificant). No significant difference was detected between groups for any of the secondary outcome measures to include mortality except the need for "rescue" mode application (p = .02). Nine (29%) in the low-tidal volume ventilation arm did not meet predetermined oxygenation or ventilation goals and required transition to a rescue mode. By contrast, two in the high-frequency percussive ventilation arm (6%) required rescue.

CONCLUSIONS: A high-frequency percussive ventilation-based strategy resulted in similar clinical outcomes when compared with a low-tidal volume ventilation-based strategy in burn patients with respiratory failure. However, the low-tidal volume ventilation strategy failed to achieve ventilation and oxygenation goals in a higher percentage necessitating rescue ventilation.

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