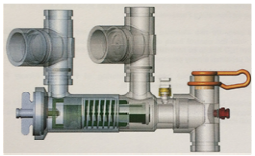

Decreased pulmonary damage in primates with inhalation injury treated with high-frequency ventilation.

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OBJECTIVE: This study compared two forms of high-frequency ventilation (HFV) with conventional volume ventilation (CON) in a primate model of inhalation injury to determine whether ventilatory mode was a determinant of pulmonary damage.

SUMMARY BACKGROUND DATA: The authors previously reported that the prophylactic use of high-frequency flow interruption in patients with bronchoscopically diagnosed inhalation injury requiring mechanical ventilatory support resulted in a significant decrement in mortality. They hypothesized that a reduction in ventilatory mode induced pulmonary damage was in part responsible for their clinical results.

METHODS: Fifteen adult baboons were randomized to one of three ventilatory modes (CON, high-frequency flow interruption [HFFI], or high-frequency oscillatory ventilation [HFO]) after moderate smoke injury. Ventilatory support was tailored to the same physiologic endpoints. After 7 days, the animals were killed and pulmonary pathologic changes were scored and compared. Repetitive physiologic and biochemical data were compared using analysis of variance for repeated measures.

RESULTS: Physiologic endpoints were achieved in CON and HFFI, but not in HFO. Hemodynamic variables did not differ between CON and HFFI. The barotrauma index was greater in CON compared to HFFI ($p < 0.05$), despite similar PO_2, FiO_2, AA gradient, and PCO_2. Animals treated with HFFI had significantly less parenchymal damage than those treated with CON ($p = 0.03$) or HFO ($p = 0.0008$).

CONCLUSIONS: The prophylactic use of HFFI led to a significant decrement in ventilatory mode induced pulmonary damage and offers an explanation for the decreased mortality in inhalation injury patients treated with HFFI.

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