



High-frequency percussive ventilation attenuates lung injury in a rabbit model of gastric juice aspiration.

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OBJECTIVE: To test the effects of high-frequency percussive ventilation (HFPV) compared with high-frequency oscillatory ventilation (HFOV) and low-volume conventional mechanical ventilation (LVCMV), on lung injury course in a gastric juice aspiration model.

DESIGN: Prospective, randomized, controlled, in-vivo animal study.

SETTING: University animal research laboratory.

SUBJECTS: Forty-three New Zealand rabbits.

INTERVENTIONS: Lung injury was induced by intratracheal instillation of human gastric juice in order to achieve profound hypoxaemia ($\text{PaO}_2/\text{FiO}_2$ or =50). Animals were ventilated for 4h after randomization in one of the following four groups: HFPV (median pressure 15 CmH_2O); LVCMV (V_T 6ml kg⁻¹) and PEEP set to reach 15 CmH_2O plateau pressure); HFOV (mean pressure 15 CmH_2O); and a high-volume control group HVCMV (V_T 12ml kg⁻¹) and ZEEP).

MEASUREMENTS AND RESULTS: Static respiratory compliance increased after the ventilation period in the HFPV, LVCMV and HFOV groups, in contrast with the HVCMV group. $\text{PaO}_2/\text{FiO}_2$ improved similarly in the HFPV, LVCMV and HFOV groups, and remained lower in the HVCMV group than in the three others. Lung oedema, myeloperoxidase and histological lung injury score were higher in the HVCMV group, but not different among all others. Arterial lactate markedly increased after 4h of ventilation in the HVCMV group, while lower but similar levels were observed in the three other groups.

CONCLUSION: HFPV, like HFOV and protective CMV, improves respiratory mechanics and oxygenation, and attenuates lung damage. The HFPV provides attractive lung protection, but further studies should confirm these results before introducing HFPV into the clinical arena.

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