COMPARISON OF SMALL-VOLUME CONVENTIONAL MECHANICAL VENTILATION VS. HIGH-FREQUENCY OSCILLATION ON THE LUNG FUNCTIONS IN A MODEL OF MECONIUM ASPIRATION SYNDROME

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Meconium aspiration syndrome (MAS) in neonates may be treated by exogenous surfactant, antiinflammatory drugs or pulmonary vasodilators, however, suitable mechanical ventilation is fundamental for treatment. This study compared short-term effects of small-volume conventional mechanical ventilation (CMV) and high-frequency oscillation (HFO) on the lung functions of animals with experimentally-induced MAS. In conventionally-ventilated rabbits, MAS was induced by intratracheal instillation of meconium suspension (4 ml/kg, 25 mg/ml). When the MAS model was prepared, animals were ventilated either with small-volume CMV (f. 50/min, V_T 6 ml/kg) or HFO (f. 10 Hz) for following 4 hours. Blood gases, ventilatory pressures and right-to-left pulmonary shunts were evaluated in regular time intervals. After sacrificing animals, left lung was saline-lavaged and cells in the bronchoalveolar lavage (BAL) fluid were determined. Right lung was used for estimation of lung edema formation (wet/dry weight ratio) and for determination of inflammatory markers. Meconium instillation significantly worsened gas exchange, and induced inflammation and lung edema formation. Within 4 hours of the ventilatory treatment, no significant differences in oxygenation, ventilatory pressures, pulmonary shunts, number of BAL cells, or edema formation were observed between small-volume CMV and HFO. HFO improved arterial pH and elimination of carbon dioxide compared to CMV, however, slightly lower concentrations of thiobarbituric acid-reactive substances (TBARS) were detected in plasma and lung homogenates of CMV-ventilated animals. Concluding, both small-volume CMV and HFO ventilations supplied effective gas exchange, with better elimination of carbon dioxide in HFO and slightly lower lipid peroxidation in small-volume CMV. **Support:** APVV-0435-11, VEGA 1/0305/14, BioMed (ITMS 26220220187)