

EVALUATION OF BRAIN DAMAGE INDUCED BY INJURIOUS MECHANICAL VENTILATION IN AN EXPERIMENTAL FOCAL ACUTE ISCHEMIC STROKE

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Introduction: Many patients with acute ischemic stroke (AIS) require invasive mechanical ventilation (MV). However, inappropriate ventilatory strategies can further exacerbate neuroinflammation and worsen brain damage. **Objective:** To evaluate the biological impact of protective, injurious, and highly injurious mechanical ventilation on the brain and lung, 24-hours after AIS. **Methods:** Twenty-four male Wistar rats (CEUA 045/24) were submitted to STROKE (focal AIS induced by thermocoagulation of pial vessels). After 24 hours, all animals were mechanically ventilated for 2 hours with PEEP of 3 cmH₂O (protective), 9 cmH₂O (injurious), and 11 cmH₂O (highly injurious), under similar VT (6ml/kg). Blood gas exchange and mechanics were evaluated to INITIAL and FINAL. Brain and lungs were removed for post-mortem analysis. **Results:** PaO₂/FiO₂ decreased over time, regardless of the PEEP level. FINAL respiratory system elastance was higher at PEEP of 11 cmH₂O compared to PEEP of 3 and 9 cmH₂O. Peak and plateau airway pressures were higher at PEEP of 11 cmH₂O throughout the experiment. In the lung, TNF- α , IL-6, IL1- β , SP-B, and VCAM-1 gene expressions were higher at PEEP of 11 cmH₂O compared with PEEP of 3 cmH₂O. In the brain ipsilateral to the lesion, IL1- β , ZO-1, and HMGB-1 gene expressions decreased, whereas on the contralateral to the lesion, IL1- β and HMGB-1 gene expression increased in PEEP of 11 cmH₂O group. In addition, increased NeuN positive cells, a surrogate of mature neurons, was observed in those animals ventilated at PEEP of 3 cmH₂O. Total protein concentration in the cerebrospinal fluid was higher in all groups (2ug/ul) compared to reference values (0.5ug/ul). **Conclusion:** High PEEP level was associated with respiratory system impairment, and increased brain and lung inflammatory markers. On the contrary, low PEEP level maintained markers of mature neurons.

Palavras-chave: Ischemic stroke, Mechanical ventilation, Neuroinflammation.