Lung function

Effects of nitric oxide donor on inflammation, iNOS activity and apoptosis in an experimental model of acute lung injury

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Aim: Acute lung injury (ALI) is characterized by lung edema, surfactant dysfunction, and inflammation. Main goal of our study was to evaluate effects of S-nitroso-N-acetyl-penicillamine (SNAP) on inflammation, inducible NO synthase (iNOS) and migration of cells into the lung and their activation in experimental ALI.

Methods: In adult rabbits, ALI was induced by repetitive lung lavage by saline. Animals were then divided into 3 groups: healthy animals (Control), without therapy (ALI) and treated with SNAP (ALI+SNAP). After 5 hours of ventilation, total and differential counts of cells in blood and bronchoalveolar lavage fluid (BAL) were measured. Lung edema was expressed as wet/dry weight ratio. Concentrations of interleukins -1ß, -6, and -8, esRAGE, S1PR3, mRNA expression of iNOS in the lung tissue and nitrites/nitrates in plasma were analysed. In right lung, apoptotic cells were evaluated by TUNEL assay and caspase-3 immunohistochemically.

Results: In ALI vs controls, higher counts of cells, mainly neutrophils, in the BAL fluid were found, as well as extensive formation of lung edema and production of pro-inflammatory substances. SNAP therapy reduced leak of cells into the lung and concentrations of pro-inflammatory markers, decreased mRNA expression of iNOS, elevated immunoreactivity of caspase-3 in lung tissue, but increased apoptotic index in alveoli, and had no effect on edema formation.

Conclusion: SNAP showed some anti-inflammatory action, but had controversial effect on apoptosis and no effect on lung edema. Therefore, its potential use in the treatment of ALI is questionable.

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