

Cardiorespiratory functions

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Early oxidative and inflammatory changes in the extra-pulmonary organs caused by acute lung injury

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Question: Acute lung injury (ALI) is characterized by diffuse lung damage, inflammation, edema, and surfactant dysfunction leading to hypoxemia. Severe ALI leads to injury of other organs what can worsen the patient's status. Whereas a direct effect of ALI on extra-pulmonary organs is poorly known, this study evaluated oxidative and inflammatory changes in the heart and liver in two different experimental models of ALI compared to healthy controls (C).

Methods: ALI was induced in young anesthetized rabbits by 1) intratracheal instillation of neonatal meconium (25 mg/ml, 4 ml/kg; Mec-ALI model), or by 2) repetitive saline lung lavage (30 ml/kg, 6-12 times; Lav-ALI model). Animals with ALI were oxygen-ventilated for additional 5 hours. Total and differential blood leukocytes, concentrations of markers of inflammation (tumor necrosis factor alpha, TNF α ; galectin-3, Gal-3), oxidative damage to lipids (thiobarbituric acid reactive substances, TBARS) and proteins (3-nitrotyrosine, 3NT), ischemic heart injury (cardiac troponin T, cTnT), vascular damage (receptor for advanced glycation end products, RAGE) in the heart and liver homogenates were determined.

Results: In both animal models of ALI, increased total leukocyte and neutrophil blood counts and elevated markers of inflammation, oxidative and vascular damage in the heart and liver were detected compared to controls.

Conclusion: Severe ALI showed early direct effects on extra-pulmonary organs what can potentially deteriorate their function.

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