Abstract

The aim of this study was to investigate longitudinal changes of the pulmonary inflammatory process as a result of mechanical stress due to mechanical ventilation (MV). The concentrations of IL-8, TNF-α, MIP-1β, nitrites/nitrates and inducible nitric oxide synthases (iNOS) were investigated indicate in bronchoalveolar lavage (BAL). 23 piglets were divided into three groups. Group I: animals breathing spontaneously; group II: MV (TV=7 ml/kg, PEEP= 5 cmH2O); group III: MV (TV=15 ml/kg ; PEEP= 0 cmH20). The focus of the study was the influence of CMV on the hemodynamics, pulmonary function, changes in certain chemokine and cytokine levels, and the inducible NOS and nitrite/nitrate production in BAL.

A significant increase in heart rate was found in Group III during the 3rd hour of the experiment – both in relation the the initial levels and to the levels of the other groups ($p = 0.01$ and 0.008 respectively). During the same time period, a significant drop in blood pressure readings was detected in this group as well. A significant increase of the CVP levels was found in Group III starting already from the 1st hour of the experiment. CMV with high tidal volumes lead to a sinificant decrease in lung compliance in Group III already from the 1st hour of the experiment ($p < 0.001$).

Concentrations of bronchoalveolar lavage nitrites/nitrates from groups II and III increased during the first hour of MV ($p= 0.03$ and 0.02). The highest expression of iNOS was observed during the first hour in groups II and III. IL-8 concentration increased significantly in groups II and III. Production of TNF-α increased in group III during the 2nd and 3rd hour ($p= 0.01$). Concentration of MIP-1β was increased in groups II and III after the 1st hour. ($p = 0.012$ resp. $p= 0.008$).