Summary

Multiplex immunoassay in critically ill children

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Severe lung diseases leading to respiratory failure are the most common causes of critical conditions in childhood. From the perspective of the forecasting is in many cases difficult to identify the further development of the disease and thus allow the setting of adequate therapy. Pulmonary involvement leads to system response, and the response intensity should be at the level of the cytokines directly proportional to the degree of pulmonary disability. This work aims to follow in pediatric patients, the systemic inflammatory response dependence on the degree of lung injury using a multiplex immunoassay on the one hand and clinical, laboratory and imaging parameters on the other. It should identify, if possible, expression of early systemic cytokine markers that correlate with the degree of lung injury, which was determined by standardized scoring and monitoring parameters.

This is a prospective, non-randomized observational study. The study group included 32 patients. The study included critically ill patients by PRISM III-12 and LIS with respiratory failure with the need for invasive mechanical ventilation. Patients were followed for up to 48 hours.

Correlation between clinical (and laboratory) manifestations of lung disease and the early systemic inflammatory cytokine responses has been demonstrated in the group of patients. Clear evidence of this is early and particularly significant expression of MMP-9 and followed by subsequent counter-regulatory production of TIMP-1 and early expression of adhesion molecules, especially VCAM-1.

Protective ventilation - along with complex causal and supportive resuscitation treatment – should in these critically ill pediatric patients should to not only to temporarily replace the function of the respiratory system but also as far as possible to prevent secondary pulmonary lesion, which would further worsen pre-existing injury. We were able to document it on the development of monitored ventilation, indexed and laboratory markers (paO2/FiO2, oxygenation index, alveolar-arterial difference, etc), but also on the dynamics of selected cytokine markers (MMP-9/TIMP-1, VCAM-1, ICAM-1).