Cardiovascular risks in chronic airway disease in childhood

The aim of this thesis was to evaluate cardiovascular risk by using a combined diagnostic approach by measuring RHI and specific biochemical markers in patients with chronic respiratory disease, where we could assume a possible risk of CVD.

A total of 119 probands were examined, including 22 patients with cystic fibrosis (CF) and 52 asthma patients. We evaluated RHI using a new plethysmographic method that has a number of advantages over the ultrasonographic methods used in other studies, including non-invasiveness, high sensitivity, low biological variability and objectivity due to automatic processing. Of the biochemical parameters, we measured 4 biomarkers in relation to endothelial dysfunction (ED): hsCRP, ADMA, E-selectin, and VCAM-1. We compared RHI and biomarkers in CF and asthma patients with healthy controls and sought mutual correlations.

We did not prove a statistically significant difference in RHI between the test groups with CF children but we confirmed the decreasing trend of RHI since adolescence and significantly lower RHI values in CF adults, confirming the progressive development of atherogenesis and worsening of ED with age. Biochemical parameters showed significantly higher levels of hsCRP, sVCAM-1 and E-selectin in CF patients.

In the asthma group, we found significantly lower RHI values and at the same time significantly higher levels of hsCRP, moderate correlation of BMI with hsCRP, statistically significant difference of hsCRP according to the type of asthma, ADMA decrease with the severity of allergic asthma. We confirmed higher BMI in asthma group compared to healthy controls, more in women and more in severe forms of asthma, which may be related to the lack of sufficient physical activity in patients with severe allergic asthma, older age as well as their diet. These results confirm previous literature data [**Error! Reference source not found.**].

Significantly higher levels of hsCRP in CF and asthma groups suggest the importance of chronic systemic inflammatory process as a significant risk factor, where the progression of changes in both diseases is greatly affected by the chronic inflammatory process if not controlled adequately.

The conclusions of our study suggest a possible occurrence of ED in CF and asthma patients associated with a higher risk of premature manifestation of atherosclerosis. Elevation of three established biomarkers in CF patients already in childhood with not yet proved RHI but with significantly reduced RHI in adulthood and lipids changes indicate the possible occurrence of ED with specific risk factors in CF patients and gradual progression of endothelial changes with age-correlated RHI to established age groups. The limitations of our study were, besides the number of examined patients, also the uniformity of sensors and the absence of cut-off values of RHI and biomarkers in childhood.

The results of our research study show indicate the possibility of using this methodology for the detection of endothelial dysfunction and subsequent evaluation of cardiovascular risk of CF and asthma children and adults in the long term and prospectively its introduction into clinical practice.