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The role of soluble vascuolar cell adhesion molekule-1 in the formation of the inflammatory process in children with asthma

Bronchial asthma (BA) is a major public health problem worldwide. It is regarded as a chronic inflammatory disease of the airways.

Objective:to evaluate the role of soluble Vascuolar Cell Adhesion Molekule-1 (sVCAM-1) in the inflammation formation in children with asthma.

Materials and Methods: 69 children aged from 6 to 17 years with persistent BA in exacerbation were examined. Among them 34 patients with mild persistent BA (1^{st} group), 22 patients with moderate persistent (2^{nd} group) and 13 patients with severe persistent (3^{rd} group). 15 healthy children were included in the controls. Ultrasonography has been used to investigate the thickness of the intima-media (I-M) complex. The serum levels of sVCAM-1 was determine enzyme-linked immunosorbent assay (ELISA, catalog #BMS232, Austria). The level of circulating immune complexes (CIC) was determine by V.Haskova. Statistical analyses were performed with StatSoft STATISTICA Version 8 (Tulsa, OK). Non-parametric variables are given as median (interquartile range). Differences between groups were tested using Mann-Whitney test.

Results: The thickness of I-M complex was significantly increased in the patients of the 1^{st} , 2^{nd} and 3^{rd} groups, compared with controls (respectively 0,85 (0,70; 1,05)mm; 1,00 (1,05; 1,20)mm; 1,20 (1,10; 1,30)mm, compared controls (0,60 (0,50; 0,70)mm, $p<0,001$). The serum sVCAM-1 was significantly increased in the patients of the 1^{st} , 2^{nd} and 3^{rd} groups, compared with controls (respectively 1020,36 (900,52; 1140,08) ng/ml; 1265,08 (1100,81; 1380,62) ng/ml; 1700,73 (1550,38; 1900,32) ng/ml, compared with 745,60 (690,82; 790,19) ng/ml, $p<0,001$). It was proved levels of sVCAM-1 ($H=52,11$, $p=0,0001$) and I-M complex ($H=54,02$, $p=0,0001$) depend on BA severity. It is expected that I-M complex thickens due to adhesion to the vascular endothelium of biologically active substances such as CIC, which takes place with the participation of sVCAM-1. The correlation between levels of sVCAM-1 and CIC ($r=+0,79$, $p=0,0000$) was determined.

Conclusions: the thickness of I-M complex in children with asthma was increased. It is proved that the degree of thickening depends on the severity of the disease. Significant increase in serum sVCAM-1 was revealed that provokes adhesion of the CIC on the vascular endothelium, which in its turn supports the local inflammatory process. This is also confirmed by the presence of a direct correlation between the levels of the CIC and the I-M complex.