Different inflammatory mechanisms in lungs of severe and mild asthma: crosstalk of NF-kappa-B, TGFβ1, Bax, Bcl-2, IL-4 and IgE

ABSTRACT

Objective: To examine differences in the apoptotic, inflammatory, allergic and immunological features in the lungs of adults with asthma. Material and methods: Thirty-six patients with mild asthma (MA), 16 with severe asthma (SA) and 20 healthy volunteers (HVs) were enrolled. Bronchoalveolar lavage fluid (BALF) was processed into cell-free fluid for enzyme-linked immunosorbent assay detecting soluble TGFβ1, IL-4 and IgE and BALF lymphocytes for immunocytochemical staining of cellular Bax, Bcl-2 and nuclear factor-Kappa-B (NFκB). Results: Cellular NFκB expression was higher in SA than in MA and HVs, while extracellular TGFβ1 was high in both the SA and MA groups but low in the HVs. Bcl-2/Bax ratio was higher in SA than in MA and in MA than in HV groups and correlated significantly with NFκB level. Interestingly, the levels of IgE and, to a lesser extent, IL-4 were higher in MA than in SA and both were much higher than in HVs, and were inversely correlated with NFκB level in the SA group and with TGFβ1 level in the MA group. Conclusions: NFκB has a central role in the perpetuation of persistent inflammation in SA and might induce apoptosis via Bcl-2. The SA group appears not associated much with allergen-based IgE and IL-4 reactions as efficiently as in MA. This was supported by the lower levels of IgE and IL-4 in SA compared to MA. TGFβ1 appears to be associated with asthma pathogenesis, especially allergen-based MA.

Keyword: Allergy; Apoptosis; Atopy; BALF; Cell survival; Cytokines; ELISA; Immunocytochemistry; Inflammation; Lymphocytes