

The roles of vitamin D and cathelicidin in the development of acute asthma attacks in children

Batmaz, SB¹; Arikoglu, T¹; Karaismailoglu, E²; Kuyucu, S¹

¹ Department of Pediatric Allergy and Immunology, Mersin University Faculty of Medicine, Mersin, Turkey;

² Department of Biostatistics, Hacettepe University Faculty of Medicine, Ankara, Turkey

Introduction: Recent evidence, about the various effects of vitamin D (vit D) on innate and adaptive immunity has led to search for its role in asthma and allergic diseases. The defects in the innate immune system, such as the capacity to increase the production of broad spectrum antimicrobial peptides like cathelicidin may predispose to infectious complications. The aim of this study was to determine the role of vit D and cathelicidin in the development of acute asthma attacks among 7–17 years old allergic asthmatic-children.

Material and Methods: The study included 35 patients with acute asthma exacerbation triggered by an infection, 32 children with controlled asthma and 21 healthy children, all matched by sampling season and for asthma subgroups, matched by mono-mite sensitisation and previous severity and medication score of asthma. In all groups, a comprehensive questionnaire, serum 25- OH vit D, vitamin D-binding protein (VDBP) and cathelicidin levels, markers of allergy, viral serology and spirometric indices were employed. Factors that influence serum vit D levels and the development of asthma attacks were evaluated with multivariate linear and logistic analysis.

Results: The mean serum vit D level was 14.09 \pm 5.75 in the attack group, 28.47 \pm 13.88 in the stable asthma group and 12.95 \pm 7.15 in healthy controls. The differences between attack and stable asthma groups were highly significant ($P < 0.001$). On the contrary, mean cathelicidin level was significantly higher in acute asthma group than controlled asthmatics ($P = 0.002$). Cathelicidin levels showed a negative correlation with vit D levels ($P = 0.002$, 0.380 spearman c.c). Furthermore, there was a positive correlation between the spirometric indices and the level of vit D among asthmatics ($P \leq 0.05$). Multivariate analysis of risk factors that may influence vit D levels revealed that younger age ($P = 0.046$), high BMI ($P = 0.025$), longer duration of sun exposure ($P \leq 0.001$), and high amount of dietary vit D ($P \leq 0.001$) independently increased serum vit D levels. Furthermore, multivariate analysis of risk factors that may result in acute asthma vs controlled asthmatics showed that the increase in serum levels of vitamin D significantly reduced the risk of asthma attacks ($P = 0.030$, adjusted odds ratio 0.862) independent of age, sex, allergic markers, use of inhaled steroids, BMI, time spent outside (as a marker of activity level), serum levels of cathelicidin and VDBP.