Abstract 1448

The association of serum vitamin D and vitamin D related gene polymorphisms with asthma control parameters in asthmatic children: a prospective one-year study

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Background: There is scarce data about the role of vitamin D (vitD) levels on long term control of asthma in relation to seasons and other confounders. The aim of this prospective study was to determine the association of serum vitD levels and vitD related gene polymorphisms(VDRGP) with clinical and allergic outcome measures through all the seasons among 7-17 year old asthmatic children.

Method: The study included 30 patients with chronic asthma who were evaluated every three months for 12 months duration. Also, 30 healthy children were enrolled for comparative analysis of VDRGPs (VDR, GC, CYP2R1, CYP27B1, CYP27A1, CYP24A1). At each visit the children were evaluated by a questionnaire inquiring about previous one months' health and lifestyle factors related to vitD and asthma, asthma control test(ACT), spirometry and bronchial provocation test. Also, serum vitD, vitD binding protein (VDBP) and allergic parameters were simultaneously sampled. The relation between mean annual and seasonal levels of vitD and major outcomes such as ACT, atopic markers, lung function tests(LFT) and bronchoprovocation were evaluated. The effects of VDRGPs on vitD levels and asthma control were also analyzed.

Results: Significant positive linear correlations were detected between the mean levels of vit D at winter, summer and spring samples and ACT scores. The highest correlation was observed for winter values (r:0,606, p< 0,001). In pooled data analysis, vitD levels showed a positive correlation with ACT scores and FEV1% pred values and a negative correlation with body mass index (BMI), VDBP, serum IgE, and bronchodilator reversibility (Table 1). Multivariate regression analyses revealed that the mean of annual vitD level was significantly and positively associated with ACT score, and FEV1 % pred value and negatively with serum IgE level, after adjusting for age, sex, BMI, inhale corticosteroid (ICS) use, daily sun exposure, VDBP and VDRGPs. Genetic analyses showed that VDR fokI polymorphism F allel was significantly higher in asthmatic group than controls(OR:2,97 CI: 1,2-6,8), but VDRGPs were not related to vitD levels or ACT scores.

Conclusion: This study revealed that serum vitD levels significantly affected asthma control measures, LFTs and IgE levels independent from age, gender, BMI, ICS use and daily sun exposure. Table 1. The correlation between vitamin D level and asthma control test, allergic parameters, spirometric indices and bronchial provocation response in pooled analysis.