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Effect of Vitamin D Levels on Asthma Control in Adults

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Objectives: Several cross-sectional studies have shown that low serum levels of Vitamin D are linked to impaired lung function. It is thought that vitamin D may affect the course of asthma by effects such as anti-inflammatory effect, prevention of respiratory infections and reduction of steroid resistance. Vitamin D has been suggested to alter chemokine expression of human airway smooth muscle cells and additionally inhibit the expression of the steroid resistance gene.

Methods: Thirty-five healthy controls and 60 patients with asthma were included in the study between December 2016 and February 2017. Demographic characteristics and pulmonary function tests (PFT) were recorded and laboratory tests (serum vitamin D, calcium, phosphate, parathormone and alkaline phosphatase) were measured. Asthma control test (ACT) was performed to asthmatics. Participants with decreased vitamin D level were consulted with Endocrinology Department for vitamin D replacement therapy. ACT and PFT were repeated after three months therapy in asthmatics.

Results: There were 95 individuals; 76 females and 19 males, There were no significant difference between age, gender and demographic characteristics between asthmatics and control group. Smoking status and passive smoking rates were similar. Vitamin D levels were similar in participants with turban user and nonusers. There was no significant difference between daily sun exposure, calcium containing diet and menopause status. Serum phosphate, calcium, alkaline phosphatase, parathormone and 25(OH)D vitamin levels were similar in both groups. Vitamin levels were low in about 90% of both groups. On the first admission, 71,7% of asthmatics were uncontrolled, while the rate of uncontrolled patients decreased to 13,2% after the post-replacement evaluation. There was a significant increase of ACT with respect to vitamin D replacement therapy (22.4 ± 2.7 vs 16 ± 5.4 , $p=0.001$). There was also significant increase in PFT parameters including FVC (L), FVC (%), FEV1/FVC after replacement therapy and p values were respectively $p=0.007$; $p=0.014$ and $p=0.008$. The mean BMI were high in both groups (≥ 30 kg/m²). The mean ACT score was lower in obese asthmatics than in non-obese patients, but the difference was not significant (15.3 ± 5.4 vs. 17.5 ± 4.8 , $p=0.1$). Presence of controlled or uncontrolled disease was similar between the obese and non obese groups ($p=0.7$).

Conclusion: It is suggested that vitamin D replacement therapy had positive effects on asthma control and pulmonary functions but further multicentre, prospective studies with large number of cases are needed to evaluate the effect of vitamin D replacement therapy on these parameters.

Keywords: Asthma, vitamin D, asthma control test (ACT), pulmonary function test (PFT)