



(RESEARCH ARTICLE)



Study of vitamin D levels in patients with allergic rhinitis

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Abstract

Allergic rhinitis (AR) is the most common type of chronic rhinitis, affecting 10-20% of the population. Severe allergic rhinitis has been associated with significant impairments in quality of life, sleep, and work performance. Vitamin D and its role in regulation of immune function was first proposed after the identification of vitamin D receptors in lymphocytes. There are recent researches linking vitamin D to various immune-related conditions, including allergy, although the pattern of this relationship is still yet to establish.

Methods and materials: an observational descriptive study conducted in the Outpatient Department of ENT of Sri Siddhartha Medical College, Tumkur, Karnataka, over a period of 1 year comprising of around 40 patients from 18-65 years of age suffering from allergic rhinitis patients were scored using Total nasal symptoms scoring system (TNSS) based on nasal symptoms. Also, Vitamin D levels are measured and based on these levels patients are graded.

Results: Among 40 patients, male predominance with 23(57.5%) cases with mean age of 38.4 +/- 6.8. Majority of patients were in 7-10 TNSS with 15 patients accounting for 37.5%. Patients with severe allergic symptoms had mean vitamin D level about 19.6 +/- 4.2 ng/dl, patients with moderate symptoms were seen with mean vitamin D level 28.6 +/- 3.6 ng/dl and with mild symptoms 34.4 +/- 2.8 ng/dl and the p value was significant (<0.04) in our study.

Conclusion: Vitamin D could improve allergy symptoms directly or indirectly by potentiating the anti-inflammatory effects of the medications used to treat allergy.

Keywords: Allergic Allergic rhinitis (AR); Total Nasal Symptom Score (TNSS); Vitamin D levels; Immune- related condition; quality of life.

1. Introduction

Allergic Rhinitis is the most-commonest disease seen all over the world. Even though it is not life-threatening condition but still it causes burden on patient personal life as well as has an impact on society and public health by affecting the economy. AR is an immune mediated reaction which occurs after an individual is exposed to an allergen. Prevalence will vary globally as allergens will differ geographically¹. In India, allergic rhinitis is considered as a minor problem even though 75% of children and 80 % asthmatic adults affected². Patients who suffer from allergic rhinitis have very disturbing symptoms, such as nasal symptoms (watery rhinorrhea, itching and excessive sneezing), eye symptoms (itching and watering), along with associated symptoms such as headaches, dryness of throat, sleep disturbance and fatigue due to excessive sneezing³. Of late it has been observed that all the allergic disorders like allergic rhinitis, allergic bronchitis and food allergy have been associated with low vitamin D levels, this is not coincidental findings. It has been proposed that lymphocytes have vitamin D receptors on them. Active form of vitamin D that is Calcitriol has direct effects on naive and activated helper T cells, regulatory T cells, activated B cells and dendritic cells⁴. Exact relationship between vitamin D and allergic rhinitis is not yet fully established and is quite controversial⁵.

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Aim

To study vitamin D levels in patients with allergic rhinitis

Objective

To determine total nasal symptom score in allergic rhinitis patients To determine vitamin D level in allergic rhinitis patients

2. Materials and methods

This is an observational descriptive study conducted in the Outpatient Department of ENT of Sri Siddhartha Medical college, Tumkur, Karnataka, over a period of 1 year from July 2022 to July 2023 comprising of around 40 patients from 18-65 years of age suffering from allergic rhinitis. An appropriate informed written consent is taken. Detailed history of the patient is taken. Thorough ENT and systemic examination are done after which patients are given a score using Total nasal symptoms scoring system (TNSS). Also, Vitamin D levels are measured and based on these levels patients are graded. Patients who were include are: patients with history of allergic rhinitis, age 18-65 years and no previous medical intervention for AR and Vitamin D deficiency. Patients suffering from other forms of rhinitis (vasomotor rhinitis, chronic rhinosinusitis), with other co-morbidities that could affect serum vitamin D level (ulcerative colitis, crohn's disease, rheumatoid arthritis, cystic fibrosis, multiple sclerosis, celiac disease, rickets, osteomalacia, sarcoidosis, thyroid dysfunction) and who have received drug intervention- corticosteroids, barbiturates, bisphosphonates, sulfasalazine, omega 3 and vitamin D containing medications were excluded from the study.

Patients were scored based on nasal symptoms i.e., rhinorrhea, nasal blockage, sneezing, nasal itching and anosmia using four point scale as follows: 0 = No symptom evident, 1 = symptom present but not bothersome, 2 = definite symptom that is bothersome but tolerable, 3 = symptoms that is hard to tolerate. Each patient's TNSS were calculated by summing that patients' nasal symptoms with a maximum score of 15⁴.

Vitamin D deficiency is defined as 25(OH) D levels <20 ng/ml, vitamin D insufficiency defined as 25(OH) D levels between 20 and 30 ng/ml and serum vitamin D levels >30 ng/ml is considered as normal⁴.

3. Results

A total of 40 patients were included in our study out of which 23(57.5%) were male and 17(42.5%) were female. Patients were divided based on age group that is from 18-30 years with 7(17.5%) patients, 31-40 years with 14(35%) patients, 41-50 years with 12(30%) cases and 51-65 years with 7(17.5%) cases. The mean age in our study was 38.4 +/- 6.8 was noted.

Table 1 Patient distribution based on TNSS

TNSS	Number of cases	Percentage (%)
>11	12	30
7-10	15	37.5
3-6	8	20
0-2	5	12.5

In our study it was observed that TNSS >11 with severe symptoms were 12(30%) patients of the total cases and of score falling between 7-10 were considered as moderate symptoms with 15(37.5%) patients. In the range of 3-6 with mild symptoms were 8(20%) patients and for score between 0-2, there were 5(12.5%) patients of the total cases used in the study.

The patients with deficiency of vitamin D level were seen in 10 patients accounting for 32.5% and patients with insufficiency of vitamin D was 22 (55%), normal vitamin D level was seen in 7(12.5%) patients.

It was seen that patients with severe allergic symptoms had mean vitamin D level about 19.6 +/- 4.2 ng/dl, patients with moderate symptoms were seen with mean vitamin D level 28.6 +/- 3.6 ng/dl and with mild symptoms 34.4 +/- 2.8 ng/dl

and the p value was significant (<0.04) in our study this shows that there is significance between vitamin D levels with allergic rhinitis and its symptoms.

Table 2 Patient distribution based on vitamin D level

Vitamin D levels	Number of cases	Percentage (%)
>30 ng/dl	7	12.5
20-30 ng/dl	22	55
<20 ng/dl	10	32.5

4. Discussion

Several studies have demonstrated that vitamin D is an important regulator of adaptive and innate immune responses in addition to its role in calcium homeostasis and bone health. T cells, monocytes, dendritic cells, and other cells essential to innate immune defense, such as epithelial cells, express the vitamin D receptor. On activation of the vitamin D receptor in these cell types, the expression of an array of target genes is altered. This, in turn, can modify inflammation and immune defense⁵.

A study done by Moradzaeh et al., where sample included patients from five different countries. Total 5239 patients were included. This study was done to demonstrate what is the level of vitamin D deficiency seen in patients with allergic rhinitis in comparison to those of normal population which reported prevalence of severe vitamin D deficiency to be significantly greater in patients with allergic rhinitis than in the normal population.

Another study conducted by Saba Arshi et al., in Iran where 50 patients with allergic rhinitis were used as subjects. Vitamin D of these patients was calculated and it was concluded that patients with allergic rhinitis have low vitamin D levels which was same when compared with our study

Datt Mohd et al., study reported There is a correlation between serum vitamin D levels and allergic rhinitis. The level of vitamin D being low in patients of allergic rhinitis. Supplementation of vitamin D in such patients alters natural course of allergic rhinitis toward significant clinical improvement.

5. Conclusion

The assessment of vitamin D is rapidly becoming an important tool in the diagnosis and management of many diverse pathologies. Therefore, measuring serum levels of vitamin D should be considered in the routine evaluation of all patients with allergic rhinitis. Vitamin D supplementation should be prescribed according to the status of deficiency. This could improve allergy symptoms by potentiating the anti-inflammatory effects of the medications used to treat allergy.

Compliance with ethical standards

Disclosure of conflict of interest

All authors have no conflicts of interest to declare.

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