

Original article

Comparison vitamin D serum levels in allergic rhinitis patients with normal population

Comparaison des taux sériques de vitamine D des patients atteints de rhinite allergique avec ceux de la population normale

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Abstract

Background. – Allergic rhinitis is one of the most prevalent diseases worldwide and several studies have been done to investigate its risk factors. Some studies have shown that there is an association between severity of allergic rhinitis and serum level of 25 OH vitamin D, but no consensus has been yet achieved.

Objective. – Given the high prevalence of allergic rhinitis and the high prevalence of vitamin D deficiency in Iranian population, this study aimed to determine the mean serum level of vitamin D in patients with allergic rhinitis and the control group.

Materials and methods. – This is a case-control study conducted in Imam Ali Clinic in Shahrekord (Iran) during 2014–2015. Fifty-four patients with allergic rhinitis and 54 healthy person were randomly selected and their serum levels of 25 OH vitamin D were measured. Also, demographic data and the data on severity of allergic rhinitis were collected by a questionnaire and analyzed by SPSS.

Results. – The mean serum level of 25 OH vitamin D in the case and the control groups were 29.62 ± 18.44 nmoL (11.8 ± 7.4 ng/mL) and 62.18 ± 18.53 nmoL (24.9 ± 7.4 ng/mL), respectively, with a statistically difference between the two groups ($P=0.001$). Also, 4 (7.4%) patients in case group were vitamin D deficient but no one in the control group was vitamin D deficient, with a statistically difference between the two groups according to the Fisher's exact test ($P=0.003$).

Conclusion. – According to the results of this study, there is a relationship between serum level of vitamin D and suffering from allergic rhinitis. Special attention should be paid to the geographic characteristics of Chaharmahal and Bakhtiari province. Certain health programs should be implemented to cure and prevent vitamin D deficiency in allergic rhinitis patients.

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Keywords: Allergic rhinitis; Allergy; Vitamin D; 25-hydroxy-vitamin D; Allergen

Résumé

Situation. – La rhinite allergique est l'une des affections les plus fréquentes dans le monde et plusieurs études ont été effectuées pour préciser ses facteurs de risque. Quelques études ont montré l'existence d'une association étroite entre la sévérité de la rhinite allergique et les concentrations sériques de 25 OH vitamine D, mais il n'existe encore aucun consensus sur ce sujet.

Objectifs. – Étant donnée les fortes prévalences de la rhinite allergique et du déficit en vitamine D dans notre population, l'objectif de cette étude était de préciser le taux moyen de vitamine D chez les patients atteints de rhinite allergique, comparés à un groupe témoin.

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Matériel et méthodes. – Il s'agit d'une étude cas-témoins menée dans la clinique Iman Ali à Shahrekord (Iran) en 2014–2015. Cinquante-quatre patients atteints de rhinite allergique et 54 sujets sains ont été randomisés et leurs taux sériques de 25 OH vitamine D ont été mesurés. Les données démographiques et le degré de sévérité de la rhinite allergiques ont été évaluées par un questionnaire et analysées par SPSS (version 22).

Résultats. – Le taux moyen de 25 OH vitamine D chez les patients et chez les témoins était de $29,62 \pm 18,44$ nmoL ($11,8 \pm 7,4$ ng/mL) et $62,18 \pm 18,53$ nmoL ($24,9 \pm 7,4$ ng/mL), respectivement, avec une différence statistiquement significative entre les deux groupes ($p=0,001$). De plus, 4 (7,4 %) patients avaient une déficience en vitamine D contre un seulement chez les témoins, ce qui représente une différence statistiquement significative entre les deux groupes selon le test exact de Fisher ($p=0,003$).

Conclusion. – Selon les résultats de cette étude, il existe une relation entre les taux sériques de vitamine D et l'existence d'une rhinite allergique. Une attention particulière devrait être accordée aux caractéristiques géographiques des provinces de Chaharmahal et Bakhtiari. Des programmes de santé devraient être mis en œuvre pour guérir et prévenir le déficit en vitamine D chez les patients atteints de rhinite allergique.

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Mots clés : Rhinite allergique ; Allergie ; Vitamine D ; 25-hydroxyvitamine D ; Allergènes

1. Introduction

Allergic rhinitis is an immune-mediated inflammation in the mucus membrane, which can extend to the para-nasal sinuses [1]. Allergic rhinitis prevalence is about 20% in adults in the USA. Studies have shown increasing prevalence of this disease. Particularly a large number of studies on the quality of life reveal that this disease can impair quality of patients' life. It keeps down the patients' level of performance. Allergic rhinitis is clinically significant since it is associated with chronic nasal polyposis, which causes diseases such as sinusitis, hyposmia and lack of sleep [2,3]. Approximately 1.5 billion dollars is annually paid in the USA for drugs and treatments of the patients suffering from allergy [1,3,4]. The symptoms may be presented in any age with similar outbreak among men and women [5,6]. However, it is often observed in mature youths. Due to its effect on the quality of life, a large number of studies have been done on allergic rhinitis. Allergic rhinitis is the most prevalent type of rhinitis in 15% of adults and 40% of children in different regions. Male children suffer from this disease more than others. Conversely, female and male adults may equally suffer from it [5]. The severity of allergic rhinitis varies from mild to severe and occurs concurrently with diseases such as asthma and chronic rhinosinusitis. Allergic rhinitis causes significant social and economic effects. Many diseases are associated with vitamin D deficiency [7]. A large number of studies have investigated the importance of vitamin D for the treatment of allergy and asthma, but no definite finding has been yet obtained [8,9]. Perhaps, measurement of vitamin D in patients with allergic rhinitis produces satisfactory outcomes. The present study is aimed to examine the effect of vitamin D on patients' quality of life and reduction in their medical costs. This study was also conducted to determine the mean vitamin D serum level in allergic rhinitis patients.

2. Materials and methods

2.1. Study design and populations

This study is a descriptive-analytical research conducted in Imam Ali's Clinic of ENT in Shahrekord, Iran between March 2014 and January 2015. The study population consisted of

patients referring ENT sector of the clinic. The inclusion criteria were the patients consent to participate in the study, definite diagnosis of allergic rhinitis in the patients, and no diagnosis of allergic rhinitis in the control group. In cases of the dissatisfaction of patients in any stage of study and diagnosis of other diseases affecting vitamin D level (arthritis rheumatoid, Crohn's disease, cystic fibrosis, multiple sclerosis, ulcerative colitis, celiac disease, rickets, osteomalacia, sarcoidosis and thyroid dysfunction), participants were excluded from the study.

By sample size calculation equation and with respect to confidence interval 95% ($Z_{1-\alpha/2} = 1.96$), test power 80% ($Z_{1-\beta} = 0.84$), estimated prevalence of rhinitis in the community in other studies, i.e. 2% [2], and the minimum significant difference between two groups (approximately 0.2), 45 participants were selected for each group.

$$N = \frac{2(Z_{1-\alpha/2} + Z_{1-\beta})^2 P(1-P)}{d^2} \\ = \frac{2(1.96 + 0.84)^2 \cdot 0.2(1-0.2)}{(0.2)^2} = 45$$

The population are consisted of the patients referred ENT sector of the clinic under study. The initial diagnosis of allergic rhinitis was made by a history of allergy and the final diagnosis was made by microscopic nasal examination. The control group was formed by participants without any diagnosis of allergic rhinitis based on clinical examination and the data obtained from the questionnaires. For consistency of age, all participants were selected from age range of 15–55 years old.

Allergic rhinitis severity was measured by two questionnaires: the Questionnaire of Allergic Rhinitis and Its Impact on Asthma (ARIA), which was also used to diagnose allergic rhinitis [10], and standardized questionnaire derived from the well-documented questionnaires used by the International Study of Asthma and Allergies in Children (ISAAC) [11]. These questionnaires included items concerning symptoms, disease duration, medication, smoking, alcohol, etc.

Also, vitamin D serum level of case group was compared with that of control group (with same age range, gender, and regions).

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