

The Correlation of Vitamin D3 Level and Lund Mackay Score in Patients with Chronic Rhinosinusitis

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Abstract

Background: Recently many studies have been highlighted the potential impact of impaired VD3 status in the body as it is a major fighter of inflammation, with a critical role in prevention and treatment of asthma, and a major role in chronic rhinosinusitis. In this study we evaluate relation between vitamin D3 level & Lund-Mackay score system in patients with chronic rhinosinusitis.

Patients & Methods: 34 patients (24 males and 10 females) with chronic rhinosinusitis were enrolled in the study. All patients did CT scan of nose and paranasal sinuses with assessment of their serum vitamin D3 level.

Results: Vitamin D3 level is seem to be independent on age of the patients & significant negative correlation between Lund-Mackay score & serum vitamin D3 level, no significant correlation was found between Lund-Mackay score & age & gender of the patients.

Conclusion: There is an inverse relationship between level 25 hydroxy vitamin D3 and severity of mucosal disease in chronic rhinosinusitis patients.

Keywords: Chronic Rhinosinusitis; Vitamin D3 Level

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Introduction

Besides its well-described role in calcium homeostasis, VD3 appears to play a role in modulation of the immune system by activating innate antibacterial responses while generally having a tolerogenic effect with respect to adaptive immunity. Its role in pathogenesis of chronic rhinosinusitis with polyposis is now just beginning to be better understood. It appears that Sino nasal epithelial cells express 1- α -hydroxylase and can produce 1,25VD3 locally. Absence of this molecule likely leads to reduced antibacterial responses, increased elaboration of inflammatory cytokines and increased fibroblast proliferation in patients with chronic rhinosinusitis with polyposis. While it remains unclear whether 25VD3 deficiency is causational in this disease, there is likely a role for its use as a disease-modifying agent in treatment of patients with recalcitrant chronic rhinosinusitis with polyposis and allergic fungal rhinosinusitis [1]. Approximately one third of persons with known deficiency have no identifiable risk factors for deficiency were found to have the lowest levels of vitamin D [2]. This study was to show correlation between vitamin D3 level & Lund-Mackay score in patients with chronic rhinosinusitis.

Patients and Methods

A cross sectional study, conducted in the otolaryngology

department of Al-Sader Medical City, Najaf, Iraq. The study duration was from March 2016 to September 2016 with a total number of patients were 34 (24 males-10 females), all those patients with typical features of chronic rhinosinusitis for more than 12 weeks duration. Exclusion criteria were, previous nasal surgery, benign & malignant Sino nasal tumors and revision surgery. After full history the clinical examination with rigid nasal endoscopic examination was done to assess the conditions of nasal mucosa and documents signs of chronic rhinosinusitis, CT scan of nose and paranasal sinuses (coronal, axial, sagittal, section 1 mm slices) was done to all patients. Assessment of serum vitamin D3 level (serum 25 - hydroxyl vitamin D) was done by Aia-360 automated Tosoh immunoassay analyzer. The CT findings were summarized according to Lund Mackay score.

Results

Mean age is 36.53 ± 10.64 years and the age range were 23 to 55 years. There were 24 (70.6%) males and 10 (29.4%) females (Figure 1).

The disease was significantly more frequent in male gender ($P=0.008$). Mean serum vitamin D3 was 7.09 ± 3.93 ng/ml in all patients of the study; the range was 2 to 16.9 ng/ml. as shown in Table 1.

Performing Pearson correlation test revealed no significant correlation between age of the patient and serum vitamin D3 level

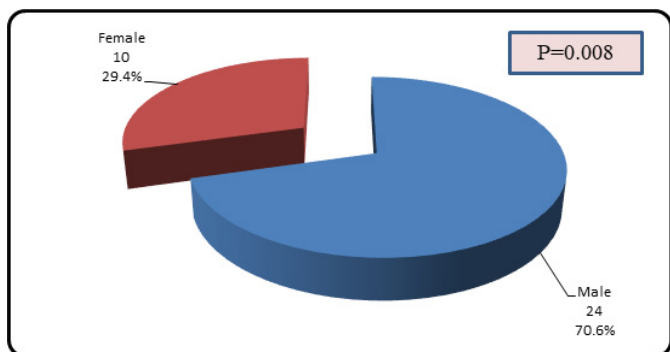


Figure 1: Gender distribution.

Table 1: Mean serum vitamin D3 according to gender of patients.

Gender	Mean Serum Vit D3 ±SD	Range	P-value
Male	8.10 ±4.11	2 -16.9	0.018*
Female	4.67 ±2.06	2 -8.1	
Total	7.09 ±3.93	2 -16.9	

*Significant at P<0.05.

($r=0.133$, $P=0.453$) and also linear regression analysis showed poor R square value of 0.018; in other words, vitamin D3 seems to be independent of age of the patients, as shown in Figure 2 (Table 2).

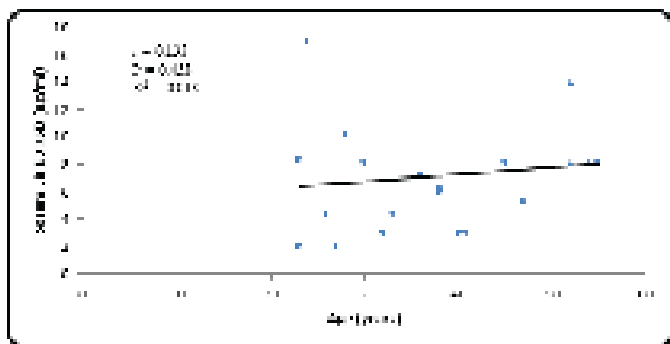


Figure 2: Correlation between age and serum vitamin D3 in patients with chronic sinusitis.

Table 2: Descriptive statistics concerning LMS.

Statistic	Value
Median (IQR)	8.5 (16.25)
Mean (SD)	12.79 (7.58)
Range	5 to 24

IQR: Interquartile Range; SD: Standard Deviation

Median value was 8.5 and the interquartile range was 16.25; mean value 12.79 ±7.58 and ranged from 5 to 24. There was significant negative correlation between LMS and serum vitD3 level ($r = -0.375$, $P=0.029$); however, regression analysis revealed poor R square value of 0.136. This result can be seen as following: the higher the vitamin D3 level, the lower would be the LMS, nevertheless the model of regression can explain only 13.6 % of cases. As shown in Figure 3.

No significant correlation was found between LMS and age and gender of patients, as shown in Table 3.

Discussion

Chronic rhinosinusitis is a public health problem that has a significant socio-economic impact. Moreover, the complexity of

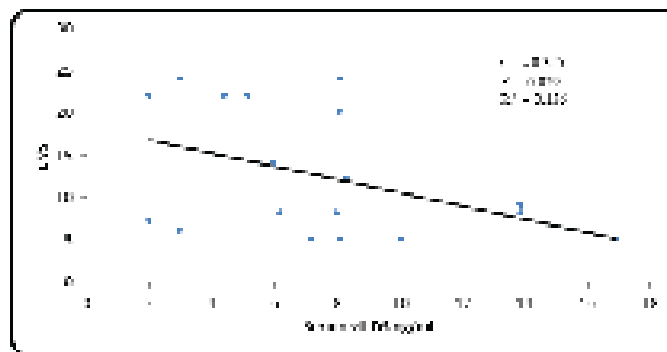


Figure 3: Correlation and regression analysis between LMS and serum vitamin D3.

Table 3: Correlation between LMS and age and gender.

Correlation parameters	Age	Gender
r	0.25	-0.103
P	0.154	0.561

this disease due to its heterogeneous nature based on the underlying pathophysiology leading to different disease variants [3].

The CT images were graded by using Lund-Mackay score system which is a most useful score system for research purposes and it is a numeric score from 0 is a minimum to 24 which a maximum, all these use to confirm and assess the disease process and make decision for the management of the patients . Vitamin D3 is a potent immunomodulatory steroid hormone, a potential mechanism by which this vitamin affect chronic rhinosinusitis is by altering local inflammatory process. Numerous studies have been reported that low level of vitamin D3 correlated with chronic rhinosinusitis .in our study chronic rhinosinusitis more frequent in male. Ference EH, et al. (2015) found that males have a higher prevalence of chronic rhinosinusitis with nasal polyposis whereas females have higher rate of chronic rhinosinusitis with nasal polyposis [4]. The higher frequency of disease in males may be due to higher awareness of women associated with frequent seeking for medical advice, and wide spread of smoking habit and exposure to gas, and dust in males more than females [5,6].

Current study found that a significant correlation between vitamin D3 level and Lund-Mackay score, which is an inversely correlated. When there is a low level of vitamin D3, the score is high ($p=0.029$). This was consistent with a study done by Schlosser RJ, et al. (2016) on 70 African American patients, which studied the impact of vitamin D3 level on chronic rhinosinusitis. They have been found that low level of the vitamin D3 was associated with high Lund-Mackay score with ($p=0.007$). This may be attributed to the role of vitamin D3 in immunomodulation especially it is relationship with allergic rhinitis [7]. In our study, there was significant difference between gender and vitamin D3 level, with mean level in male was 8.10 ± 4.11 , while in female the level was 4.67 ± 2.06 with ($p=0.018$). Although the number of female patients included in our study was less than the number of male patient. This result was supported by a study done by Abdelkarim YH, et al. (2015) performed on 61 patients 4 (7%) male and 57 (93 %) female, was aiming to evaluate the effect of vitamin D3 supplementation in patients with chronic rhinosinusitis. They found that a low-level vitamin D3 was more in female patients. This may be due to clothing style in our community that cause less exposure to sun light [8-11].

Conclusion

Chronic rhinosinusitis patients, with more severe mucosal disease



assessed by Lund-Mackay score, associated with inverse relationship with lower 25 hydroxy vitamin D3 level.

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