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Original Research Paper

Medicine

VITAMIN D DEFICIENCY AND ITS EFFECT ON SEVERITY OF ASTHMA IN ADULT

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ABSTRACT

AIM: This study aimed to assess vitamin D status in asthmatic patients and to assess the relationship between vitamin D level and asthma severity.

INTRODUCTION: Asthma is heterogeneous disease, usually characterized by variable airflow obstruction and bronchial hyper-responsiveness. The world health organization stated that approximately 300 million people have asthma. Recently the effects of vitamin D appear to have regulatory effect on every part of immune system, vitamin D deficiency being linked to an array of immunologically based disease focusing on asthma.

METHOD: The present study included 50 patients diagnosed as bronchial asthma. The asthmatic patient group was divided into group A asthma in between attack and group B exacerbated asthma, that was again divided in subgroup (I), (II), and (III) mild , moderate and severe exacerbated asthma according to symptoms and FEV1. Serum 25 hydroxy vitamin D_3 level in all groups was measured by radio immunoassay method and compared between this groups.

RESULT : This study shows statistically significant correlation between vitamin D level and severity of asthma. The mean levels of serum 25 hydroxy vitamin D_3 in asthmatic patients are: Group A 28.24 ± 1.35 ng/ml, mild persistent: 22.6 ± 11.5 ng/ml, moderate persistent: 18.33 ± 1.31 ng/ml, and severe persistent: 10.45 ± 1.84 ng/ml. P value of <0.01 which is highly significant.

CONCLUSION : There was a correlation between asthma severity and vitamin D level. Further studies are needed to determine the role of vitamin D in treatment of bronchial asthma.

KEYWORDS :

INTRODUCTION:

Asthma is heterogeneous disease, usually characterized variable airflow obstruction, chronic airway inflammation and bronchial hyper-responsiveness. Until recently bronchospasm was considered cardinal feature of asthma but now in addition to bronchospasm, airway inflammation is recognized as an essential component of the disease.

Asthma prevalence is rising in both the developed and developing world with >3 million people affected world wide.

Now a days asthma prevalence is increasing in the developing countries also.

VITAMIN D:

Vitamin D is fat soluble nutrient and a secosteroid hormone produce endogenously in the skin from sun exposure or obtained from foods that naturally contains vitamin D including cod liver oil. Vitamin D deficiency is diagnosed by the concentration of blood S.25(OH)D_3 (vitamin D) level, the primary circulatory form of vitamin D and then 1,25(OH)D_3 .low serum level of vitamin D have been linked to increased risk of asthma exacerbation in children and adults .

Vitamin D deficiency is also associated with increased risk of cardiovascular disease, allergic disorder, autoimmune disease and cancer.

Vitamin D deficiency is a risk factor for allergic disorder and immune mechanism. Vitamin D has been shown to have role in both innate and adoptive immunity by promoting phagocytosis and modulating the effect of Th1, Th2 and regulatory T cells.

This study is done to assess the relationship between the severity of asthma and severity of vitamin D deficiency.

MATERIAL AND METHOD:

This is observational study conducted at SMT. SCL Hospital on the 50 indoor patient of asthma between July 2015 to June 2016.

INCLUSION CRITERIA:

Age > 18 years, diagnosed with asthma according to GINA guideline with written consent.

The study group was divided as:

Group A: Asthma in between attack (intermittent attack) and

Group B: exacerbated asthma group, that was further divided into subgroup mild (I), moderate (II), and severe (III) exacerbated asthma according to severity of symptoms and FEV_1 (GINA criteria).

All patients were admitted and detailed history and assessment was done. All necessary investigations were done in form of complete blood count, plain chest x-ray, pulmonary function test was done by using spirometer. It included FVC % of predicted, FEV_1 % of predicted, FEV_1/FVC.

In all subjects S.25 (OH) D3 (vitamin D) was measured using the immunodiagnosis enzyme immunoassay (EIA). In this study vitamin D level were categorized as insufficient (<30 ng/ml) or sufficient (>30 ng/ml).

Data collected were tabulated and analyzed by SPSS (stastical package from the social science software).

A chi square test was performed to determine correlation between categorical variable. P value <0.5 was considered significant.

OBSERVATION & RESULT:

1. Comparison between demographic data (age, sex, smoking status) among Study Group.

		StudyGroup (%)
Age	Mean± SD	41.22 ± 9.6
Sex	male	28(56%)
	female	22(44%)
Smoking	Smoker	23(46%)
	Non-Smoker	27(54%)

This table shows that there was non significant relation between demographic data (age, sex, smoking status) among Study Group.

2. Comparison of serum Vitamin D levels between Asthma in between attack Group (A) and Exacerbated Asthma Group (B).

	Asthma in between attack Group (A)	Exacerbated Asthma Group (B)	p value
Serum Vitamin D Level	28.24 ± 1.35	16.05 ± 5.47	<0.01

This table shows that, serum vitamin D is highly significantly lower in the exacerbated asthma group (B) compared to Asthma in between attack group (A) (P value < 0.01).

P < 0.01 highly significant relation.

3. Comparison of Serum Vitamin D levels between Asthma in between attack Group (A) and Severe Exacerbated Asthma Subgroup (III).

	Asthma in between attack Group (A)	Severe Exacerbated Asthma Subgroup (III)	p value
Serum Vitamin D Level	28.24 ± 1.35	10.45 ± 1.84	<0.01

This table shows that, serum vitamin D is highly significantly lower in the Severe Exacerbated Asthma Subgroup (III) compared to Asthma in between attack group (A) (P value < 0.01).

P < 0.01 highly significant relation.

4. Comparison of Serum Vitamin D levels between Mild (I), Moderate (II) and Severe (III) Exacerbated Asthma Subgroups.

	Mild (I) Exacerbated Asthma subgroup	Moderate (II) Exacerbated Asthma subgroup	Severe (III) Exacerbated Asthma subgroup	P value
Serum Vitamin D Level	22.6 ± 11.5	18.33 ± 1.31	10.45 ± 1.84	<0.01

This table shows that serum vitamin D is highly significantly lower in moderate exacerbated asthma subgroup B compared to mild and severe compared to mild and moderate, (P value < 0.01).

P < 0.01 highly significant relation.

RESULT:

A total of 50 patients (28 males, 22 females) were enrolled in this study whose age ranged from 23 to 58 years with a mean age of 41.2 ±9.6 years. Active smoking was found in 23 cases (46%).

A total of 50 patients 20 patients were of Group A with mean age 40.75 ± 10.7 years and 30 patients were from Group B with mean age of 41.65 ± 8.3 years.

There was statistically significant negative correlation between vitamin D level and severity of asthma. The mean levels of serum $25(OH)D_3$ (vitamin D) in asthmatic patients are: Group A:28.24 ±1.35 ng/ml,Mild persistent :22.6± 11.5 ng/ml,Moderate persistent :18.33 ± 1.31 ng/ml,Severe persistent :10.45 ± 1.84 ng/ml.P value of <0.01 which is highly significant.

DISCUSSION :

Bronchial asthma is a major health problem. It has dramatically increased worldwide over last few decades, in both developed and developing countries. Vitamin D deficiency may predispose to allergic phenotype of asthma and epidemiological evidence suggests that lack of vitamin D has been linked to increased incidence of asthma in adult. Vitamin D is a potent modulator of immune system.

Result of our study shows that serum vitamin D level is significant lower in asthmatic patient and lowest value was observed in severe persistent group B (group B III).

Also Shaaban and Hashem investigated serum vitamin D levels in 75 Adults with asthma and 75 adult healthy controls and demonstrated that, Vitamin D deficiency was observed in 78.66% asthmatic patients whereas 85% of healthy control subjects expressed sufficient levels.

This study is also in agreement with that of EmanShebl et al who Conducted a study on 66 non-smoking adult asthmatic patients and 30 healthy adult volunteers and found that 40% asthmatic patients suffered from vitamin D insufficiency, while in the control group vitamin D insufficiency was present in 20% of them with a significant increase in the number of severe asthmatic patients with vitamin D insufficiency compared with those with sufficient vitamin D.

Also Stephanie Korn et al. studied serum vitamin D levels in 280 adults with asthma and found that, vitamin D concentrations in adult asthmatics were low and vitamin D insufficiency or deficiency was significantly related to asthma severity.

Similarly Montero Arias et al. demonstrated that, serum vitamin D levels were examined in 121 adults with asthma and

noted that, in asthmatic patients with low vitamin D levels, there was a significant association between vitamin D levels and the risk of severe asthma, the risk of hospitalization or visit to the emergency department due to asthma.

Shaaban and Hashem demonstrated that, there was a significant association between higher serum vitamin D concentration and better Lung function.

Vitamin D has been shown to have a role in both innate and adaptive immunity by promoting phagocytosis and modulating the effect of Th1, Th2 and regulatory T cell.

Further evidence suggests that Vitamin D alters human airway smooth muscle expression of chemokines and inhibit the expression of a steroid resistant gene.

SUMMARY AND CONCLUSION:

Vitamin D deficiency is highly prevalent in asthmatic patients. There was a correlation between asthma severity and vitamin D level. Further studies are needed to determine the role of vitamin D in treatment of bronchial asthma in terms of improvement in pulmonary function test and severity of asthma. S.25 hydroxy vitamin D should be consider as a routine assessment of patients with bronchial asthma.

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