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CLINICAL SIGNIFICANCE OF SERUM VITAMIN D LEVEL IN PATIENTS OF VITILIGO AT TERTIARY CARE CENTRE, SURAT, INDIA

Dermatology

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ABSTRACT

Background: Vitiligo is an acquired, idiopathic, heritable depigmentary disorder of the skin and/or mucous membranes. Autoimmunity plays an important role in pathogenesis of vitiligo which is also evident by coexistence of various autoimmune disorders with vitiligo. In turn, vitamin D levels have been found to be reduced in various autoimmune disorders, thus pointing to a plausible association between vitiligo and vitamin D levels. Few reports have evaluated serum vitamin D levels in vitiligo and their results are conflicting.

Aim: To study clinico-epidemiological profile and to evaluate serum vitamin D levels of vitiligo patients and compare vitamin D level with control.

Methods: Total 25 patients clinically diagnosed with vitiligo were enrolled in study and 25 age and sex matched control were included. Results were carried out using STATA version 14.2

Results: The patients had lower serum vitamin D levels than the controls, but this difference was not statistically significant. (p = 0.557)

Conclusions: Significantly lower vitamin D levels were found in majority of vitiligo patients, but this was not significant.

KEYWORDS

Vitiligo Vulgaris, Vitamin D

INTRODUCTION:

Vitiligo is a common, disfiguring autoimmune disease that negatively affects patients' self-esteem and quality of life and it affects approximately 1% of the general population[1]. Vitiligo is caused by a dynamic interplay between genetic and environmental risks that initiates an autoimmune attack on melanocytes in the skin. Patients with vitiligo and their relatives have an increased risk of developing other autoimmune diseases suggesting that vitiligo is also an autoimmune disease. In turn, vitamin D levels have been found to be reduced in various autoimmune disorders, thus pointing to a plausible association between vitiligo and vitamin D. In addition, vitamin D3 increases tyrosinase activity and melanogenesis via a nuclear hormone receptor – the vitamin D receptor (VDR) in melanocytes levels. Vitamin D and its analogues are used to treat skin disorders, including psoriasis and vitiligo. Patients with vitiligo have been treated with topical calcipotriene. Few studies have investigated the association between vitiligo and reduced vitamin D levels, but these studies yield conflicting results.

Aim of our study is, to know the clinico-epidemiological profile of vitiligo patients and to detect serum vitamin D levels and determine whether patients with vitiligo have lower serum vitamin D levels compared to controls.

METHODS:

After approval of institutional ethics committee an observational cross sectional study was carried out at dermatology outpatients department, tertiary care Centre, Surat, for period of 1 year. Total 25 patients clinically diagnosed with vitiligo were enrolled in study and 25 age and sex matched control were included.

Participants with liver or kidney disorders, hyperparathyroidism, hypoparathyroidism, those taking vitamin D or calcium or any systemic or topical treatment for vitiligo within the previous month were excluded from the study. Controls were recruited from the partners or relatives of patients. Detailed history, complete clinical examination was carried out and all patients were investigated for complete blood count (CBC), urine analysis, fasting blood sugar (FBS), thyroid stimulating hormone (TSH), serum vitamin D level.

STATISTICALANALYSIS:

Data of all patients were noted in excel sheet, and analysis of data was done by using STATA version 14.2. Group comparisons were performed using Student's t-test for continuous variables and a [2] test for categorical variables.

RESULTS:

Out of 25 case group 15(60%) were male and 10(40%) were female; among control group out of 25, 11(64%) were male and 9(36%) were female. The mean ages of the patient and control groups were 13.1736 ±5.7106 and 14.204±6.59164 years, respectively. There was no significant difference between the patients and **TABLE 1 TWO SAMPLE T TEST WITH EQUAL VARIANCES** controls in terms of age ($p = 0.313$) or gender ($p = 0.234$).

Regarding type of vitiligo, maximum number of patients belonged to focal-11 cases (44%), followed by 9(36%) case of generalized vitiligo, 2(8%) cases of mucosal vitiligo and 1(4%) each case of acrofacial, unisgmental and multisegmental vitiligo. (Chart 1)

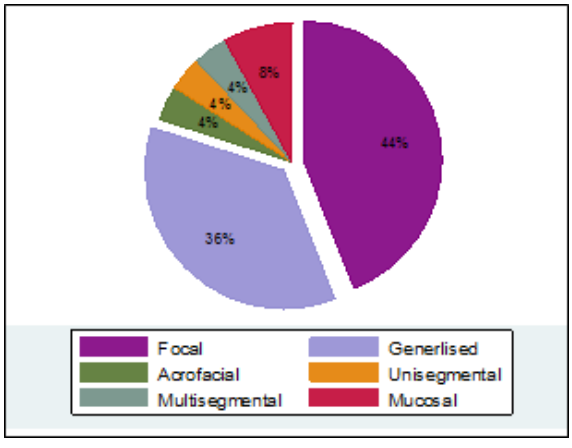

Chart 1 Type of Vitiligo

Patient's serum vitamin D level ranged from 3 ng/ml to 27.68 ng/ml (mean 13.17±5.71 ng/ml), while control patients serum vitamin D level ranged from 3ng/ml to 26.8ng/ml (mean 14.20±6.59ng/ml). (Chart 2, 3)

Table 1: Two-sample t test with equal variances

Variable	Observation	Mean	Standard error	Standard deviation
Vitamin D case	25	13.17	1.14	5.71
Vitamin D control	25	14.20	1.31	6.59
Combined	50	13.69	.87	6.12
Difference		-1.03	1.74	
Degree Of Freedom = 48				
Confidence Interval = 95%				
T test = -0.5907				
p value = 0.5575			p value >0.05	

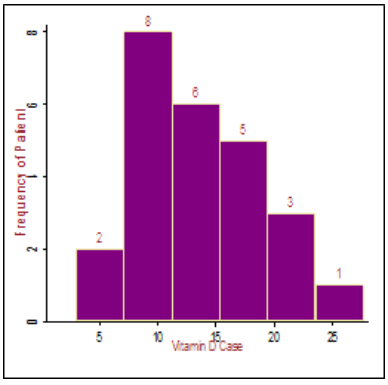

Chart 2 - S. Vitamin D level - Case

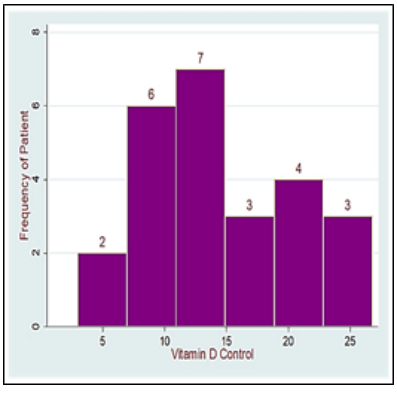

Chart 3 - S. Vitamin D level - Control

We have used two-sample t test with equal variances to test our hypothesis and found that patients had lower serum vitamin D level than control, but this was not statically significant (*p* value=0.5575) (Table 1).

DISCUSSION:

Vitiligo is an acquired depigmentary disorder having social and psychological aspects. Current research data suggest that complex interplay between genetic, autoimmune aberrations and oxidative stress are the key pathways mediating the destruction of melanocytes in vitiligo.

The population prevalence is estimated to be 0.14-2% in different countries based primarily on clinical records of hospitals and dermatology clinics[2]. The observation that vitiligo was more prevalent in the immediate relatives of patients. The risk of a patient's sibling developing the disease is 6% and for an identical twin it is 23%[3].

Vitiligo can develop at any age, in most of the studies from India age of onset of vitiligo was mainly in second and third decade; but in our study, 60 % of patients had vitiligo in first and second decade of life; this was comparable to study done by Agarwal et. al. [2]. Both sexes are equally affected although the greater number of reports among females is probably due to the greater social consequences to women and girls affected by this condition. Out of total case group 60 % were female and 40 % were male; which was comparable to other studies[4].

Clinically, vitiligo is classified depending upon the site and extent of involvement into following types: generalized which is the most common, segmental, focal, acro-facial and mucosal type[2]. In our study, 44 % of patients were of generalized vitiligo followed focal (36 %), and other vitiligo; which was comparable to other studies[2][5].

Vitiligo results from the destruction of epidermal melanocytes by autoreactive cytotoxic T cells. Melanocyte-specific autoimmunity in vitiligo is a result of interplay among multiple factors, including genetic predisposition, environmental triggers, melanocyte stress, and innate and adaptive immune responses[6]. Patients with vitiligo and their relatives have an increased risk of developing other autoimmune diseases, including autoimmune thyroiditis, type 1 diabetes mellitus, pernicious anemia, and Addison disease, suggesting that vitiligo is also an autoimmune disease[7]. In turn, vitamin D levels have been found to be reduced in various autoimmune disorders, thus pointing to a plausible association between vitiligo and vitamin D[8]. Vitamin D may affect both innate and adaptive immune responses through receptors in T and B lymphocytes, macrophages and dendritic cells. In addition, vitamin D3 increases tyrosinase activity and melanogenesis via a nuclear hormone receptor – the vitamin D receptor (VDR) in melanocytes levels. Vitamin D and its analogues are used to treat skin disorders, including psoriasis and vitiligo. Patients with vitiligo have been treated with topical calcipotriene[9]. Few studies have investigated the association between vitiligo and reduced vitamin D levels, but these studies yield conflicting results. Ustun et al.found that vitamin D levels were insufficient (<30 ng/mL) or very low (<15 ng/mL) in most of the patients with vitiligo vulgaris, but not statistically significantly different as a group when compared to the controls[10]. These investigators stated that a large number of studies had reported low levels of circulating vitamin D in autoimmune diseases, but it remains unclear whether this is a cause or result of autoimmune diseases. Another study by Sahel et. found that deficient serum 25(OH) D levels were present in vitiligo patients with and without systemic autoimmune diseases. Accordingly, screening for vitamin D deficiency seems of value in vitiligo patients for the possibility of vitamin D supplementation[11]. Another study concluded that significant relationship between low 25-hydroxyvitamin D levels and vitiligo, but does not prove causation; further studies will be needed to establish whether vitamin D supplementation in this population improves the outcome of vitiligo[12]. Study done by Ebru K et.al. concluded that further study is required to know the causal relationship between vitamin D deficiency and vitiligo[13].

CONCLUSIONS:

Significantly lower vitamin D levels were found in majority of vitiligo patients, but this was not statistically significant. Limitation of our study is small sample size; hence to depict low level of serum vitamin D is a causative factor in vitiligo and supplements of vitamin D would help in prevention and treatment of vitiligo, further study is required.

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