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Association of vitamin-D with hypothyroidism in adult female patients in north Indian population

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Abstract---Background: Thyroid disorder is found to be most commonly occurring endocrine disorder in females. Thyroid hormones have an imperative position in metabolic methods in human body, and several physiological and pathological stimuli are known to influence thyroid metabolism. The increased incidence of hypovitaminosis D was diagnosed in population with hypothyroidism. Objective: To check the relation of Vitamin D in adult female patients diagnosed with hypothyroidism. Method: We recruited 60 patients and divided these patients into two groups, Group-1- Hypothyroidism patients (n=30) and Group-2- Control patients (n=30). Thyroid-Stimulating Hormone (TSH), total Triiodothyronine (T3), total Thyroxine (T4), and Vitamin D levels were estimated by automated method in Abbott ARCHITECT ci8200 machine. Results: In the present study we found patients with hypothyroidism 73.3% (n=22) has low level of Vitamin D while 26.6% (n=8) of population have normal level of Vitamin D. We could not find significant association between Vitamin D and hypothyroidism ($p>0.05$). Conclusion: Our study concluded that hypothyroidism has no significant role in lowering the levels of Vitamin D but we also emphasize the fact that Vitamin D should be done as routine investigation in healthy as well as hypothyroidism patients as its value was also less in control subjects.

Keywords---hypothyroidism, vitamin D, hormones, endocrine.

Introduction

Thyroid disorders are one of the most common endocrine disorders after Diabetes mellitus globally. Recent studies indicates that three hundred million population are affected by thyroid problems and amongst them approximately forty-two million people are living in India (1). Hypothyroidism is mainly affecting 1% of the common population and 5% of the population which are over 60 years which is measured by increased level of thyroid stimulating hormone (TSH) and decreased level of triiodothyronine (T3) and thyroxin (T4). Hypothyroidism may have an impact on all organ systems, and its affecting depends upon the level of hormone deficiency (2). Study reported that ladies with each overt and subclinical hypothyroidism have high risk factor of high blood pressure during pregnancy, early and frequent pregnancy loss, failure of lactation and negative neonatal final results which is Mental illness and hereditary differences (3).

The primary role of vitamin D is to obtain calcium and phosphorus stability with bone metabolism. vitamin D receptor are present on the cells of the immune system therefore in regulation of immune system it plays an important role. In few studies the correlation between vitamin D deficiency and auto immune thyroid disorder was reported and impaired vitamin D signal were diagnosed in thyroid cancer (4). Low levels of vitamin D indicates that there is a risk for autoimmune disease, mainly in multiple sclerosis and thyroid disorder are increasing. however, TSH levels are directly related to Vitamin D levels (5). The increased occurrence of hypovitaminosis D in population with hypothyroidism

may be assigned for the development of vitamin D3 receptors and receptors for thyroid hormone from a single primordial gene originate a strong homology between these receptors(6).steroid hormone receptors binds both vitamin D and thyroid hormone. Vitamin D mediates its effects by binding to vitamin D receptor (VDR) and activate VDR responsive gene. While VDR gene polymorphism changed into companion with auto immune thyroid disease (AITDs)(7). Many studies have reported that low values of vitamin D in hypothyroid patients may cause some musculoskeletal in patients. Some studies have represented that the patients with thyroid disorder also have low levels of vitamin D. the serum level of vitamin D is low in hypothyroid patient is explained by two working mechanism , one is due to the bad absorption of vitamin D from intestine and second can be due to improper activation of vitamin D by the body of the patients (8). The purpose of the study is to check the association of vitamin D in adult female patients diagnosed with hypothyroidism.

Material and Methods

This study was prospective and observational study on out-patient department (OPD) and In-patient department (IPD). The study was conducted in two groups. Group 1 was control group and group 2 were hypothyroid patients within 13-65 age group. control group include 30 healthy females. They were not on any chronic medical history. where as in group 2, 30 hypothyroid female patients were recruited. The diagnosis was done on the basis of thyroid hormone analysis to calculate hypothyroidism in female patients. All the patients and controls were treated for the routine biochemical investigation so the pregnant and patient suffering from other chronic disease were excluded from the study. 5ml of venous blood sample was collected in serum separator tube and kept for one hour. After that, tubes were centrifuge for 15 minutes at 2500 rpm for the separation of the serum. The estimation of total thyroid profile and 25(OH) vitamin D were determined by specific electrochemiluminescence immunoassay (in Abbott ARCHITECT ci8200 machine).

Result

The study was based on comparison of two groups, hypothyroidism patients (n=30) and healthy control patients (n=30) in female population within the age group of 18-65 years. The result of study revealed that the population with hypothyroidism, 73.3% (n=22) has low level of Vitamin D while 26.6% (n=8) of population have normal values of Vitamin D. No significant association was found between the Vitamin D values of both the groups ($p>0.05$).

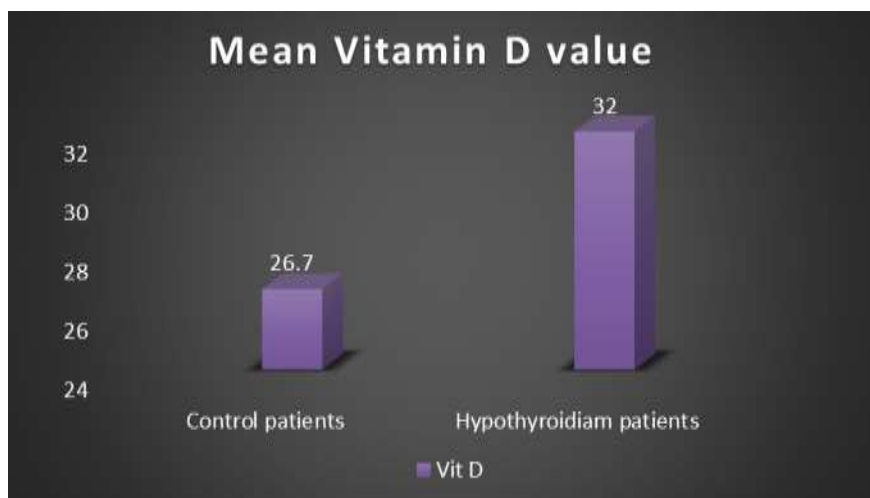


Fig.1.: Mean Vitamin D values in hypothyroidism patients and control patients

Parameters	T3 (units)	T4 (unit)	TSH (unit)	Vitamin D (L)	Age (years)
Hypothyroidism patients (n=30)	71.1±39.6	5.6±2.7	33.2±54.9	32±14.6	41.1±12.0
healthy control patients (n=30)	79.3±40.9	6.7±2.8	2.6±1.3	26.7±20.8	39.4±12.9
p-value	0.43	0.11	0.004*	0.44	0.59

Table.1: Thyroid profile and Vit D values in hypothyroidism patients and control patients

In control group total 30 patients were included where, 70% (n=21) patients have low level of Vitamin D and 30 % (n=9) of population have normal level of Vitamin D

Discussion

In this study, we did a comparison of vitamin D levels between hypothyroid patients and control patients. Both the population have similar vitamin D values. Hence there is no significant value. This goes with musa et.al., studied that there is no significant difference in the level of vitamin D when it is compared between hypothyroid and control women(9). Idiculla et.al., studied that vitamin D deficiency is common in both hypothyroid and control patients with low levels of vitamin D in Thyroid peroxidase antibody (TPO-Ab) positive hypothyroid patients. Study concluded that the lower serum vitamin D levels can be related to autoimmune hypothyroidism(10).

In a study by Kumari et.al., they showed that in both hypothyroid and euthyroid population there is deficiency of vitamin D. The decrease levels of vitamin D in hypothyroidism patients shows that there is linked between vitamin D levels and autoimmune hypothyroidism(11). A study done by Turashvili et.al., shows that according to gender analysis the more number of women are suffering from hypothyroidism then male whereas the vitamin D deficiency was significantly

found only in women, so the study indicated that there is a association between vitamin D deficiency and hypothyroidism are only in women (12).

Conclusion

Our study concluded that hypothyroidism has no significant role in lowering the levels of Vitamin D but we also emphasize the fact that Vitamin D should be done as screening test in healthy as well as hypothyroidism patients as its value was also less in control subjects. We also recommend to all the patients suffering from hypothyroidism should take sunlight to prevent from vitamin D deficiency. As sunlight is an important source of vitamin D and it is easy to be followed.

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