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A Study on Vitamin C Levels – A Comparison Between Clinical Hypothyroid and Sub Clinical Hypothyroid.

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Abstract

Background :
Thyroid diseases are the commonest endocrine disorders in the world. Thyroid hormones are among the most imperative humoral factors involved in setting the basal metabolic rate on a long rate on a long-term basis in target tissues such as liver, heart. Kidney and brain. The prevalence of subclinical thyroid dysfunction is higher than that ofovert thyroid dysfunction. Antioxidants help to support absorption of thyroxine. Theyalso fight against free radicals known to cause disturbances. This study was done to compare Vitamin –C which is an non enzymatic antioxidant levels among clinical and sub clinical hypothyroids.
Materials and methods:
A total of 400 subjects were analyzed to get a total of 50 clinical hypothyroid patients;
50 subclinical and 50 healthy individuals based on their thyroid profile and detailed history. Patients were taken from out patient department at KIMS and RF with respect to inclusion and exclusion criteria and Vitamin-C levels were measured.
Results:
In hypothyroidism, it was observed that there is a decrease in antioxidant statusin hypothyroidism which is shown by a decrease in vitamin c levels in hypothyroids. This decrease is more in clinical hypothyroids compared to subclinical hypothyroids.
Conclusion :
We conclude that hypothyroidism causes decreased Vitamin –C levels more in clinical hypothyroids than in subclinical hypothyroids.
Keywords: Oxidative stress, MDA, antioxidant, lipid peroxidation.

INTRODUCTION

Hypothyroidism is a common form of thyroid disease which is highly prevalent in India, with 1 in 10 people in the country diagnosed with the condition. It is estimated that more than 200 million people at a minimum have thyroid disease worldwide. The prevalence of thyroid dysfunction in adults in the general population ranges from 1 to 10%. Thyroid disease prevalence increases with age and is more common in women. The prevalence of hypothyroidism varies from 0.9 to 17.5% in India. The prevalence of subclinical thyroid dysfunction is higher than that of overt thyroid dysfunction. Thyroid hormones are involved in the regulation of basal metabolic state and in oxidative metabolism . Oxidative process predominantly occurs in the mitochondria.

Among them the enzymatic antioxidants are glutathione reductase (GR), glutathione peroxidase (GPx), catalase (CAT) and superoxide dismutase (SOD); while the non-enzymatic antioxidants are glutathione (GSH), vitamin E and vitamin C.

Antioxidants help to support absorption of thyroxin. They also fight against free radicals known to cause disturbances. When ROS generation exceeds the antioxidant capacity of life, it means there is a continuous struggle for energy, which is required to fight against entropy. The most effective way to obtain energy is oxidation.

REVIEW OF LITERATURE

Thyroid diseases are the commonest endocrine disorders in the world. The prevalence is obvious in India also. It has been estimated that about 108 million people in India are suffering from endocrine and metabolic disorders of which thyroid disorders contribute about 42 million. Thyroid disease in its various forms is common, affecting some 5% of the population.

An antioxidant is defined as “any substance that when present in low concentration compared to that of an oxidizable substrate significantly delays or inhibits the oxidation of that substrate. Antioxidants depletion or deficiency may contribute to oxidative stress. Antioxidants not only protect against the direct injurious effects of oxidants, but also alter the inflammatory events that play an important role in thepathogenesis of oxidative stress related diseases.

AIMS AND OBJECTIVES:

To estimate and compare serum vitamin C levels in subclinical versus clinical hypothyroidism.

MATERIALS AND METHODS

Design of the Study: It is a case control study.

Patient selection:

For this study a total of 400 subjects were analyzed to get a total of 50 clinical hypothyroid patients, 50 subclinical hypothyroid patients and 50 healthy individuals based on their thyroid profile and detailed history. Patients were taken from outpatient department at KIMS and RF.

Inclusion Criteria:

Recently detected or poorly controlled hypothyroid patients.Age eligible for the study 20 years to 60 years. Males and females were taken in 1: 1 ratio.

Exclusion Criteria:

Patients with any other metabolic abnormalities - hypertension, diabetes mellitus,renal, hepatic disorders, pregnancy and lactation were excluded from the study. Subjects taking drugs effecting thyroid hormone levels, lipid profile levels, vitamin C andMDA levels were also excluded.

Clinical history was taken from all the subjects participating in the study. General examination of these patients including weight, height, heart rate and blood pressure measurement was done and recorded in a structured protocol format.

Ethical Clearance:

Before commencement of the work, ethical clearance was obtained from the Institutional Ethics committee. Written consent was taken from cases and control subjects.

Study was carried out under 3 groups:

Group A: 50 normal healthy individuals

Group B: 50 diagnosed cases of subclinical hypothyroidismGroup C: 50 cases of clinical hypothyroidism

General health characteristics such as age, smoking status etc. were investigated by a self-administered questionnaire.

Collection of blood sample:

About 5 ml of fasting venous blood from all subjects was collected aseptically from antecubital vein into clot activator containing vaccutainers. Serum was then separated by centrifugation at 3000 rpm for 10 minutes and was kept at $4^{o}C$ until analysis was carried out.

Parameters Measured :

Vitamin C by Roe & Kuether Method and measured spectrophotometrically

OBSERVATION AND RESULTS

Table Showing Correlation Of Vitamin C With Thyroid Profile (T3,T4 And Tsh) In Subclinical & Clinical Hypothyroids

CORRELATION WITH VITAMIN C	SUBCLINICAL HYPOTHYROIDS (n =50)	CLINICAL HYPOTHYROIDS (n =50)
T3 (ng/dl)	r = -0.12 ; p = 0.37	r = -0.21 ; p = 0.13
T4 (µg/dl)	r = - 0.19; p = 0.16	r = -0.01 ; p = 0.93
TSH (µ IU/dl)	r = 0.02 ; p =0.84	r = 0.17 ; p = 0.22

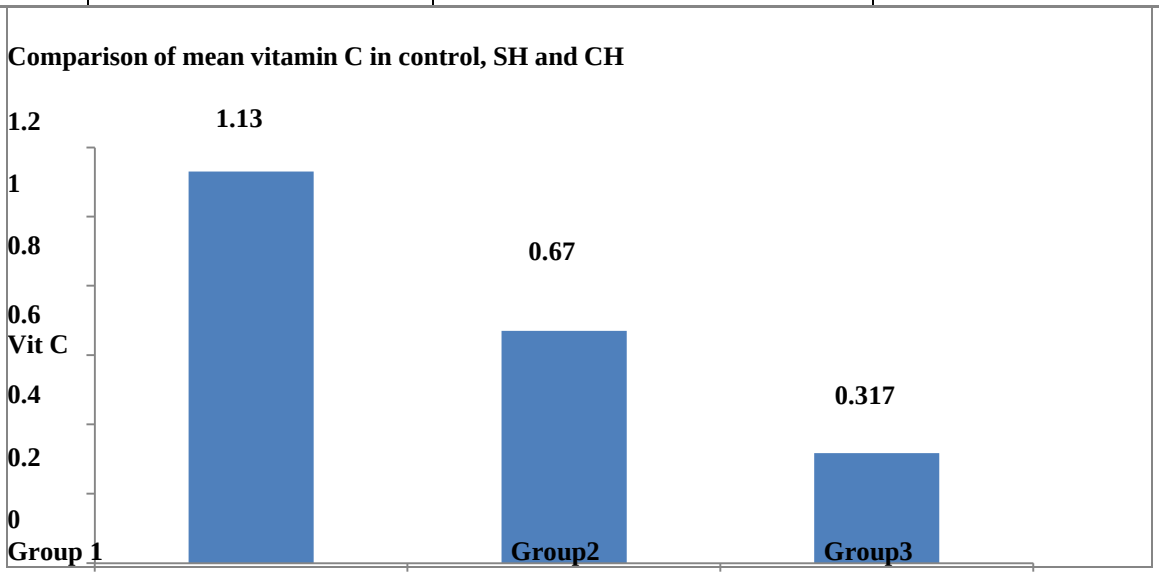
Statistical analysis showed that vitamin C was negatively correlated with T3 and T4 in subclinical hypothyroids. On the other hand, vitamin C was negatively correlated with T3 and T 4 in clinical hypothyroids.

Table Showing Comparison Of Mean Vitamin C (Mg/Ml) Among Controls, Subclinical And Clinical Hypothyroids

S.No	Controls	Subclinical Hypothyroidism	Clinical Hypothyroidism
1	1.32	0.68	0.321
2	0.99	0.70	0.322
3	1.42	0.67	0.34
4	1.27	0.59	0.36
5	1	0.64	0.29

6	1.33	0.55	0.34
7	0.94	0.69	0.35
8	1.02	0.72	0.28
9	0.98	0.82	0.34
10	1.01	0.74	0.33
11	1.24	0.69	0.32
12	1.33	0.61	0.34
13	0.99	0.73	0.29
14	1.27	0.81	0.27
15	1.34	0.77	0.30
16	1.11	0.66	0.33
17	1.08	0.69	0.31
18	1.94	0.59	0.34
19	1.22	0.64	0.32
20	1.43	0.69	0.31
21	1.20	0.77	0.32
22	1.08	0.60	0.29
23	1.09	0.66	0.34
24	1	0.60	0.34
25	0.9	0.59	0.32
26	0.99	0.58	0.30
27	1.06	0.64	0.29
28	1.24	0.64	0.35
29	1.12	0.65	0.31
30	1.11	0.69	0.29
31	1.28	0.72	0.30
32	1.20	0.74	0.31
33	1.29	0.77	0.33
34	0.89	0.69	0.34
35	0.94	0.71	0.31
36	1.21	0.65	0.29

37	1.18	0.65	0.29
38	1.04	0.66	0.28
39	1.00	0.71	0.33
40	0.99	0.62	0.37
41	1.03	0.63	0.35
42	1.09	0.68	0.33
43	1.12	0.61	0.31
44	1.4	0.66	0.30
45	1.21	0.67	0.31
46	1.2	0.64	0.29
47	1.09	0.72	0.31
48	1.7	0.71	0.33
49	1	0.64	0.34
50	1.27	0.71	0.31
Mean	1.15	0.67	0.31
S.D	0.182	0.05	0.023
P	0.04	>0.10	>0.10



Group 1 **Controls (C)**

Group 2 **Subclinical Hypothyroids (SH)** **Group 3** **Clinical Hypothyroids (CH)**

DISCUSSION

Thyroid disease in its various forms is common, affecting some 5% of the population. Hypothyroidism is more common than hyperthyroid state and carcinoma of thyroid. Yet majority of them remain undiagnosed and untreated.

An antioxidant is a molecule that inhibits the oxidation of other molecules. Antioxidants depletion or deficiency may also contribute to oxidative stress. Antioxidants not only protect against the direct harmful effects of the oxidants but also alter the inflammatory events that play an important role in the pathogenesis of oxidative stress related diseases. Studies done on the antioxidative status of the hypothyroid patients using Vit C as an antioxidant marker have shown a decrease in Vit C levels in clinical hypothyroids and subclinical hypothyroids when compared to the controls. We have also observed decreased Vit C levels in clinical hypothyroids compared to subclinical hypothyroids.

Subclinical hypothyroidism in turn also showed a decreased value of Vitamin C compared to the controls. Serum Vit C level difference was found to be highly significant ($p < 0.0001$) in both cases of subclinical hypothyroid and clinical hypothyroid when compared to the control groups.

SUMMARY

Hypothyroidism is a clinical syndrome caused due to decreased thyroid activity.

- There is a decrease in antioxidant status in hypothyroidism which is shown by a decrease in vitamin c levels in hypothyroids. This decrease is more in clinical hypothyroids compared to subclinical hypothyroids.

Screening for vitamin C can be helpful in overall management of hypothyroidism. Antioxidant supplementation along with correction of hypothyroid states can decrease the morbidity and enhance the prognosis.

CONCLUSION

Thus, we conclude that hypothyroidism causes decreased vitamin C levels more in clinical hypothyroids than in subclinical hypothyroid patients.

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