

ASSOCIATION OF ACID AND ALKALINE PHOSPHATASE AMONG THE THYROID PATIENTS**U. PRATHYUSHA AND B.DHARANI PRIYA***

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ABSTRACT

Thyroidism is becoming one of the most prevalent diseases due to the malfunctioning of the thyroid gland. The objective of the present study is to observe the association of acid phosphatase and alkaline phosphatase with thyroid disorder. From the present work the concentration of acid phosphatase among the hypo and hyperthyroid patients is more than the controls, where as alkaline phosphatase levels are low in hypothyroid patients than the controls but in case of hyperthyroid condition more or less equal to normal in both the patients and controls

Keywords: Thyroid disease, Thyroid stimulating hormone (TSH), Acid phosphatase (ACP), Alkaline phosphatase (ALP), Association

INTRODUCTION

Though the thyroid gland is as it is small but its releasing hormone has an enormous function in control metabolism and growth. The thyroid needs a chemical element called iodine. Whatever the amount the iodine absorbed the body can store only about 50 milligrams and 1/5 to 1/3 of that is stored in thyroid. The thyroid combines the iodine with tyrosine to make important hormones.

Thyroid disease occurs when the thyroid gland doesn't supply proper amount of hormones needed by the body. Hyperthyroidism (over active thyroid) and hypothyroidism (under active thyroid) are the most common problems of the thyroid gland. Although they are two different conditions, but in both conditions thyroid can become larger than normal. The present study is aimed to observe the association of acid and alkaline phosphatase enzymes among hypo and hyper thyroid patients.

According to the epidemiology of thyroid disease, disease may be non-specific and makes diagnosis more difficult. It may be caused by environmental factors, such as levels of iodine incidence rates have been found to vary between locations and over the period. As per to American medical women's association 20 million Americans are suffering with thyroid disorder and the life time risk for thyroid disorder in US is estimated at 1 in 8 [1, 2]. Thyroid disorders are amongst the most common endocrine diseases in India. The prevalence and pattern of thyroid disorders depends on age, sex, ethnic and geographical factors and especially on iodine intake [3]. The profile of thyroid disorders encountered in pediatric and adolescent age groups in India is similar to that seen in most parts of the world except for the prevalence of iodine deficiency disorders in certain endemic regions of this country. Clinical presentation is most commonly for hypothyroidism and goiters and infrequently for hyperthyroidism [4]. A high intake is associated with lower prevalence of hyperthyroidism. Low intake is associated with a higher prevalence of hyperthyroidism [5]. Hypothyroidism is more common in older women and 10 times more common in women than men. The prevalence of hyperthyroidism is also reported as more common in women than men [6]. The total burden of thyroid disorders in India is 42 million [7].

Acid phosphatase (ACP) is a type of enzyme manufactured by the body. It is classified as a hydrolase enzyme because its purpose is to catalyze the hydrolysis of a chemical bond. Specifically, it targets and breaks the molecular bonds of phosphate groups. It can be found in blood cells, bone marrow, the spleen, pancreas, liver, and kidneys. Especially its concentration is more in prostate and up to 1,000 times greater in seminal fluid than any other bodily fluid. Alkaline phosphatase is released into the blood during injury and

during normal activities as bone growth and pregnancy. The liver makes more ALP than the other organs or the bones. Some conditions cause large amounts of ALP in the blood. These conditions include rapid bone growth during puberty, bone disease etc.

According to literature it was observed that subacute thyroiditis transient rise in serum alkaline phosphatase values. These studies leads to the hypothesis of a transient parathyroid hyper-activity induced by the inflammation of the thyroid tissue in which the parathyroid may be embedded may be the reason for the change of the levels of ALP [8]. The normal level of Acid Phosphatase is <5.5 mu/l and for Alkaline Phosphatase it is 2-4.5 mu/l. These levels vary among the diseased individuals either by increasing or decreasing the concentration of it in serum. Cooper et al found that among the 36 hyperthyroid patients 15 had elevated levels of serum alkaline phosphatase activity. When the serum alkaline phosphatase levels are increased then the T₄ levels declined [9].

The present study is aimed to observe the association of alkaline and acid Phosphatase with thyroiditis.

MATERIALS AND METHODS

The present study involves the estimation of acid and alkaline Phosphatase levels among 50 hypo and hyper thyroid patients and also 50 age and sex matched control population. The demographic data and samples collected from these patients of King George hospital. The analysis of these samples was done in the department of Human Genetics, Andhra University. For estimating the levels of Acid Phosphatase and Alkaline Phosphatase the samples are analyzed by using a standard procedure of Gutman and Gutman.

RESULTS AND DISCUSSION

About 50 thyroid cases data and samples have been collected in a period of four months from King George Hospital, Visakhapatnam. The collected data from the patients comprises about the details of demographical and clinical information like age, sex, type of marriage, height, weight, onset of the disease, blood group distribution, thyroid profile etc. At the same time the blood samples collected from the patients and controls to estimate the levels of acid and alkaline phosphatase.

The fig -1 depicts the frequency distribution of hypo and hyper thyroidism according to the sex. It is more prevalent in females (78%) than in males (22%). It can be also observed that hypothyroid cases are more (74%) than that of hyperthyroid cases (26%).

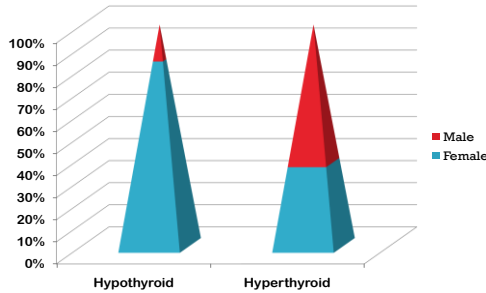


Fig- I: Frequency distribution of hypothyroid and hyperthyroid According to the Sex

Table 1: Mean and standard deviation of the onset of disease among the Hypothyroid and Hyperthyroid patients

Age	10-30	30-50	50-70
Hypothyroid			
Female	19 ± 8.34	30 ± 4.86	36.66 ± 5.32
Male	13.25 ± 1.26	34.5 ± 0.70	42 ± 0.60
Hyperthyroid			
Female	18 ± 1.23	29.2 ± 5.54	38.6 ± 6.42
Male	13.5 ± 0.70	42 ± 2.25	32 ± 0.30

The mean and standard deviation for the onset of disease among the hypothyroid and hyperthyroid of males and females were calculated and the values are depicted in the Table-1. It is clear from this table is that the female hypothyroid patients are affected at an early age than that of males. As in case of hyperthyroid the onset of disease is independent of the sex distribution. Usually the thyroid condition appears during the hormonal shift period like in pubertal period, in pregnant time, in menopausal stage and so on. In the present study the average age of onset is observed among the hypo and hyper thyroid is in the range of 19 to 38 years

The mean and standard deviations of alkaline phosphatase and acid phosphatase among the thyroid patients are presented in table-2&3.

Table 2: Acid phosphatase levels among the thyroid patients

Type of disease	Concentration of Acid Phosphatase
Hypothyroid	6.241 ± 2.396
Hyperthyroid	6.77 ± 2.314
Control	3.52 ± 0.76

From the above given table it can be concluded that the concentration of acid phosphatase among the thyroid patients is more than that of the controls. In case of hypo and hyperthyroid the mean levels of ACP are 6.24 and 6.77 respectively, where as for controls it is 3.52.

Table3: Alkaline phosphatase levels among the thyroid patients

Type of disease	Concentration of Alkaline Phosphatase
Hypothyroid	1.486 ± 0.89
Hyperthyroid	2.73 ± 1.48
Control	2.31 ± 0.67

From the above table the concentration of alkaline phosphatase among the hyperthyroid patients is somewhat more than that of the normal, where as its levels are decreased in the hypothyroid patients. In case of hyperthyroid and hypothyroid, the distributions of mean concentrations are 2.73 and 1.486 respectively, but in controls it is observed as 2.31.

CONCLUSION

So thus an increased level of acid phosphatase is found in hypo and hyper thyroid patients (Normal: ACP <5.5 mu/l). At the same time it was observed there is a low concentration of the alkaline phosphatase enzyme in only hypothyroid patients, but it is near to normal in hyperthyroid patients⁽¹⁰⁾ (Normal: ALP 2-4.5 mu/l).

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