

Ischemia Modified Albumin in Hypothyroidism Patients



Medical Science

KEYWORDS : Ischemia modified albumin, hypothyroidism, oxidative stress

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ABSTRACT

Aim: The aim of this study was to assess the study was conducted to estimate the levels of Ischemia Modified Albumin in hypothyroidism patients. Ischemia Modified Albumin (IMA) is an ischemia/reperfusion injury marker which has been considered to be formed under oxidative stress conditions. Thyroid is one of the largest endocrine gland in the body. The thyroid gland, so named by Thomas Wharton in 1965. It is larger in females than in males. The structure and function of the thyroid change in different stages of the sexual cycle in females. Its function is slightly increased during pregnancy and lactation and is decreased during menopause. **Materials and methods:** A cross sectional study was done with 30 newly diagnosed hypothyroid patients as cases and 30 age and sex matched healthy controls. Serum levels of IMA were estimated by colorimetric methods and thyroid profile was done by CLIA methodology. **Results :** Ischemia Modified Albumin levels were found to be significantly decreased in hypothyroid patients (0.18 ± 0.01 ODU) when compared to healthy controls (0.29 ± 0.01 ODU) ($p=0.00$).

Conclusion: We conclude that there was decrease in IMA levels which could be due to the consequence of ischemia which is present in hypothyroidism.

I. Introduction

Hypothyroidism results from under secretion of thyroid hormone from the thyroid gland. The result is "slowing down" of physical activity. There are many disorders that result in hypothyroidism. These disorders may directly or indirectly involve the thyroid gland. Because thyroid hormone affects growth & development, and many cellular processes, inadequate thyroid hormone has widespread consequences for the body. Of the nearly 25 million people suffering from a thyroid condition, most have hypothyroidism¹.

Ischemia modified albumin (IMA) is considered as one of the marker of ischemia/ reperfusion injury in clinical conditions which include ischemic events in their pathophysiology. The human serum albumin has the ability to bind to certain metal ions particularly cobalt and copper at the N-terminus. On exposure to ischemic environment, structure of albumin N-terminus is changed such that it can no longer bind to cobalt. It also acts as a mortality predictor in renal disorder and myocardial ischemia^{2,3,4}. Studies have shown that hypothyroidism can aggravate neurological damage due to cerebral ischemia and modulates the outcome of ischemic reperfusion injury. Free thyroid hormone levels are found to be decreased in ischemic stroke patients⁵. Sheu et al., found that the complications of ischemic stroke was 1.44 times greater in hypothyroidism patients^{6,7}.

This study was done to know the IMA levels are found to be affected by ischemic changes that occur in hypothyroidism and not many studies are found in literature hence we undertook this study. Here we evaluated the levels of IMA, as a markers of ischemia.

II. Materials and Methods

Iia. Experimental Design

The present study was under taken in the Department of pathology, Meenakshi Medical College, Tamil Nadu, India for a period of two years from Jan 2013 -December 2015. Patient sample collected for TFT was utilized for study. Approximately 5ml of blood is collected before treatment. Serum was separated immediately by centrifugation at 3000rpm for 10 minutes at 4°C. 100 patients sample selected for study age ranging between 25±10 of which 30 were hypothyroid patients. They were compared with 30 healthy control subjects. The study was conducted with 2 groups.

Group-1, 30 newly diagnosed hyperthyroid patients and Group-2, 30 healthy controls. Patients with history of chronic smoking, alcoholism, diabetes mellitus, liver, kidney, cardiac, endocrinal and immunological diseases were excluded in both the groups.

III. Statistical Analysis

Data were analyzed using the SPSS software package, version 17.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed using range, mean, SD, and median, whereas qualitative data were expressed as frequency and percentage. P value was assumed to be statistically significant at 0.05.

IV. ETHICAL CONCERN

Ethical clearance was obtained from the Ethical committee meeting conducted at Meenakshi Medical College and Research Institute, Kanchipuram, Tamil Nadu, India

V. RESULTS:

Table:1. IMA AND THYROID PROFILE IN HYPOTHYROIDISM

Groups	Control	Cases	p-value
Number(n)	30	30	0.000
FT ₃ (nmol/L)	2.57±0.26	0.12±0.01 ^{a*}	0.000
FT ₄ (pmol/L)	1.25±0.12	0.08±0.01 ^{a*}	0.000
TSH (μIU/ml)	4.35±0.51	37.05±3.9 ^{a*}	0.000
IMA (OD units)	0.29±0.01	0.18±0.01 ^{a*}	0.000

Each value is expressed as mean ± SD for thirty patients in each group.

a: as compared with control

Statistical significance: * $p < 0.001$; @ $p < 0.01$; # $p < 0.05$.

Table.1. shows that Ischemia Modified Albumin levels were found to be significantly decreased in hypothyroid patients (0.18 ± 0.01 OD units) when compared to healthy controls (0.29 ± 0.01 OD units) ($p = 0.00$). Ischemia modified albumin was negatively correlated with TSH levels ($r = -0.564$, $p < 0.001$), and positively correlated with FT4 and FT3 levels ($r = 0.517$, $p < 0.001$ and $r = 0.315$, $p = 0.000$, respectively).

VI. DISCUSSION:

Serum IMA initially emerged as a marker of ischemia thought to be of possible use in the identification of acute coronary syndromes. However, IMA is not specific to heart, IMA levels have also been shown to rise in conditions such as pulmonary embolism, cerebral ischemia, diabetic ketoacidosis, chronic kidney disease and liver disease⁸.

Hypothyroidism is associated with atherosclerosis and a chronic ischemia process. Hypothyroidism is also related to atherosclerotic disorders and oxidative damage⁹. Ma SG et al¹⁰ have detected that flow-mediated dilatation of the brachial artery, which is a surrogate marker for coronary artery endothelial function is decreased in patients with hypothyroidism. The degree of atherosclerosis has been reported to rise independent of age, sex or other risk factors in hypothyroid patients. The present study showed raised levels of IMA in hypothyroid patients as compared to healthy controls. There was significant decrease in the levels of IMA in hypothyroid patients.

VII. CONCLUSION:

From the study we can conclude, decrease in IMA levels may be due to the consequence of oxidative stress and ischemia which is prevailing in hypothyroidism status.

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