

To Study Serum Apelin Level in Early Diagnosed Patients with Subclinical Hypothyroidism

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Abstract: The aim of study was to measure serum level of apelin in Subclinical hypothyroidism (SCH) subjects and compare with healthy control subjects. In this study 120 SCH and 120 healthy subjects (age and gender matched) were enrolled. BMI, Serum free triiodothyronine (FT₃), Serum free thyroxine (FT₄), Serum thyroid stimulating hormone (TSH) and Serum Apelin were assessed. Serum Apelin levels were higher in Subclinical hypothyroidism (SCH) subjects compared with healthy controls (4.1 ± 2.2 ng/ml vs 3.3 ± 1.3 ng/ml, respectively). These value were found to be statistically highly significant ($p < 0.0001$).

Keywords: Apelin, Subclinical hypothyroidism (SCH)

1. Introduction

Hypothyroidism is a common endocrine disorder resulting from deficiency of thyroid hormone. It is often the primary process in which the thyroid gland produces insufficient amounts of thyroid hormone.

Subclinical hypothyroidism (SCH) can be defined as a state of high serum thyroid stimulating hormone (TSH) levels (less than 10μ IU/L) with normal serum free thyroxine (FT₄) levels. Today subclinical hypothyroidism is a common biochemical finding in the general population. Overall, the population prevalence of subclinical hypothyroidism is around 3% - 8%.

Apelin (also known as APLN) is a peptide that in humans is encoded by the APLN gene. Apelin is the endogenous ligand for the G-protein - coupled APJ receptor that is expressed at the surface of some cell types. It is widely expressed in various organs such as the heart, lung, kidney, liver, adipose tissue, gastrointestinal tract, brain, adrenal glands, endothelium, and human plasma. Apelin gene encodes a pre-proprotein of 77 amino acids, with a signal peptide in the N-terminal region.

Although there are many evidences linking obesity, serum apelin and Subclinical hypothyroidism (SCH). Data about serum apelin concentration in Subclinical hypothyroidism (SCH) is limited. Therefore, present study was undertaken to evaluate serum apelin levels in patients with Subclinical hypothyroidism (SCH) and to compare it with healthy controls.

2. Materials & Methods

The present study has been conducted on 120 newly diagnosed Subclinical Hypothyroidism patients of 20-50 years age group of both sex attending the OPD of Department of Medicine, J.L.N. Medical College & Associated group of Hospitals, Ajmer from January 2020 to

December 2020. Diagnosis of thyroid disorder has been made according to the criteria recommended by the European Thyroid Association Guidelines-2013. The result has been compared with age and gender matched 120 euthyroid subjects acting as controls. Detailed history of participants including age, history of any medications, addictions has been taken. Written consent from all the subjects has been obtained for the study. Blood samples has been collected from anticubital vein by venepuncture in plain vials. Serum has been separated by centrifugation at 2500 rpm for 10 minutes.

BMI was determined following standard procedures. Biochemical analytes Serum free triiodothyronine (FT₃), Serum free thyroxine (FT₄) and Serum thyroid stimulating hormone (TSH) were measured by chemiluminescence immuno assay (CLIA). Serum Apelin were measured using an enzyme linked immunosorbent assay (ELISA) technique.

The quantitative variables were expressed as the Mean \pm SD (Standard deviation) median (range). The baseline characteristic between Subclinical hypothyroidism (SCH) and healthy subjects were assessed using student's t-test for continuous variables (as applicable). All P-values were based on a two sided test of statistical significance. Significance was accepted at the level of $p < 0.05$.

3. Results and Observation

In this study, 120 cases of impaired glucose tolerance were compared with 120 healthy controls.

Table 1: Anthropometric parameters of SCH subjects & Healthy controls

Parameters	SCH Cases (Mean \pm SD)	Healthy Controls (Mean \pm SD)	P-Value
AGE (yrs)	40.25 \pm 11.8	39.50 \pm 10.8	0.644 (NS)
WEIGHT (kg)	60.27 \pm 3.8	52.58 \pm 5.0	-
HEIGHT (cm)	156.0 \pm 4.9	154.8 \pm 4.5	-
BMI (kg/m ²)	24.5 \pm 2.6	21.9 \pm 2.8	<0.001 (HS)

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Table 2: Biochemical parameters of SCH subjects & Healthy subjects

Parameters	SCH Cases (Mean±SD)	Healthy Controls (Mean ± SD)	P-Value
Serum FT3 (pg/ml)	2.20 ± 0.55	2.42 ± 0.64	<0.0001 (HS)
Serum FT4 (ng/dl)	0.82 ± 0.14	0.90 ± 0.16	<0.0001 (HS)
Serum TSH (μIU/ML)	7.45 ± 2.5	2.84 ± 1.44	<0.0001 (HS)
Serum Apelin (ng/ml)	4.1 ± 2.2	3.3 ± 1.3	<0.0001 (HS)

P value <0.0001 is considered highly significant while p<0.01 is considered significant

Basic anthropometric parameters of SCH subjects and healthy subjects are summarized in table-1. There was no significant difference between SCH subjects and healthy subjects regarding mean age (40.25 ± 11.8 vs. 39.50 ± 10.8 yrs.). BMI mean ± SD in kg/m² in SCH and healthy subjects was (24.5 ± 2.6 vs. 21.9 ± 2.8) and it was highly significant. Biochemical parameters of SCH subjects and healthy subjects are presented in table-2. SCH subjects had higher Apelin levels compared to healthy subjects (4.1 ± 2.2 vs. 3.3 ± 1.3, P<0.0001).

4. Discussion

In the present study, SCH subjects have significantly higher levels of apelin as compared to healthy control subjects. A number of articles have reported increased levels of serum apelin in Subclinical hypothyroidism, but SCH subjects have not been studied extensively to know whether the increase in the serum apelin levels begin before the onset of Subclinical hypothyroidism. Our findings are in agreement with Zorlu et al. (2014), who found that apelin concentrations were significantly higher in Subclinical hypothyroidism group than the Normal healthy group, suggesting a possible association between serum apelin concentration and thyroid hormones. Akif dogantekin et al. (2015) also reported that plasma levels of apelin in patients with Subclinical hypothyroidism were significantly higher than these in patients with Normal healthy subjects. Results of this study suggest that plasma levels of apelin are increased in patients with SCH.

5. Limitations of Study

Our sample size was relatively small.

6. Acknowledgements

Nil

7. Conflicts Of Interest

We have no competing interests.

8. Funding

Nil

9. Conclusion

From the present study it is concluded that serum apelin levels gets increased prior to onset of hypothyroidism. apelin serve as a valuable marker along with TSH for early diagnosis of hypothyroidism. It could be considered among therapeutic agents used in the prevention of hypothyroidism and in the prevention or reduction of its critical complications.

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