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Association of anti thyroid peroxidase antibody with thyroid profile in the patients of subclinical hypothyroidism

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***Abstract*---**Background: Thyroid is an endocrine gland which is ductless and plays very important roles such as metabolism of body along with maturation and growth. Subclinical Hypothyroidism is a mild form of Hypothyroidism which due to the abnormal level of TSH. Objectives: The aim of the study was to find out the correlation of anti-TPO antibody with thyroid profile in subclinical hypothyroidism. Materials and Methods: The present study was conducted on 200 cases and 200 controls who attended the OPD of Shri Guru Ram rai Institute of Medical and Health Sciences, Dehradun. The various Biochemical investigation (TSH, FT3, FT4 & Anti- TPO) of these patients were analyzed by ELISA Method with standard protocol. Data analyzed statistically by SPSS software. Results: The study observed TSH and Anti-TPO antibody level was statistically higher (p-value= <0.05) in cases as compared to control. Free T3 and Free T4 value was in normal range in both subjects. Anti-TPO antibody has positive correlation with THS. Conclusion: Out of all the investigations and observations only record of TSH is the definite prognostic marker to ensure that the patients have subclinical hypothyroidism. In cases with mildly elevated TSH and Anti-TPO level is also a helpful prognostic factor for subclinical hypothyroidism.

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***Keywords*---**subclinical hypothyroidism, TSH, anti-TPO antibody.

Introduction

Subclinical hypothyroidism (SCH) is a common thyroid gland's disorder which affects the worldwide population. It is a mild form of hypothyroidism due to the abnormal synthesis of TSH level and normal synthesis of thyroxine (T4) and tri-iodothyronine (T3). There is much confusion about whether it should be treated or not (Gupta et al., 2015). Thyroid hormones can create harmful effects by affecting various metabolic processes carried out in the body. The altered concentration of thyroid hormones can adversely affect and cause inflammatory diseases with the progression of diseases, for e.g. myocardial infarction, rheumatoid arthritis, atherosclerosis or ischemic heart disease, autoimmune thyroid disorder etc.(Satar et al., 2005,Staykova ND & Folia Medica, 2007). Anti-thyroid peroxidase (TPO) is the commonest form of thyroid dysfunction and it is an autoimmune thyroid disease which causes different forms of thyroiditis ranging from hypo-functioning of the thyroid gland to its hyper functioning, also known as Hashimoto's thyroiditis and Grave's disease respectively. The characterization of autoimmune disorders is done by the thyroid antibodies, mainly Anti-TPO and Anti-Thyroglobulin. Recently; the antibodies have been used as diagnostic markers and have shown remarkable results in diagnosis of diseases such as cancer, rheumatoid arthritis, celiac diseases. But as thyroid antibodies are only checked if any abnormality is found in thyroid hormones like TSH and FT4, and the occurrence of antibodies is not appreciated before the primary marker, which is the TSH marker (Siriwardhane et al., 2019). It is not clear that increased levels of Anti-TPO antibody influence metabolic markers without the involvement of thyroid functions or not, but increased level of anti-TPO in subclinical hypothyroidism increase the risk of autoimmune disorders. Recent studies are designed to keep in mind to find the impact of increased level of anti-TPO in subclinical hypothyroidism.

Aims and objectives

Aim

Correlation of Anti-TPO Antibody with Thyroid Profile in the patients of Subclinical Hypothyroidism.

Objectives:

- To estimate thyroid Profile
- To estimate Anti-TPO antibody
- Comparison and Correlation of thyroid profile with Anti-TPO antibody

Material and Methods

The samples were taken from the patients who attended OPD at Shri Guru Ram rai Institute of Medical and Health Sciences, Dehradun and Rohilkhand Medical College and Hospital, Bareilly for a period of one year from March 2021 to

February 2022. Subjects were selected based on a simple random sampling method that met the sampling selection criteria. The person's age from >18 years and <70 years were taken and both genders were included. Exclusion criteria were overt hypothyroidism, patients taking any anti-thyroid medication, post-thyroid surgery patients, patients who are taking iodine or iodide containing drugs, patients with a history of external radiotherapy of the neck, taking any anti-lipidemic drugs, pregnant woman and those who are on oral contraceptive pills. All the 400 subjects (200 cases and 200 controls) were analyzed for TSH, FT3, FT4 and Anti-TPO antibodies. All the parameters were estimated by an ELISA reader with standard protocols.

Statistical Analysis

The statistical software for social sciences was used for the statistical analysis (SPSS). As necessary, several statistical techniques were applied. For quantitative data and frequency for categorical variables, mean SD was calculated. On all continuous variables, the independent t-test was run. Prior to any t-test, the data were verified for normal distribution. At $p < 0.05$, differences were deemed significant

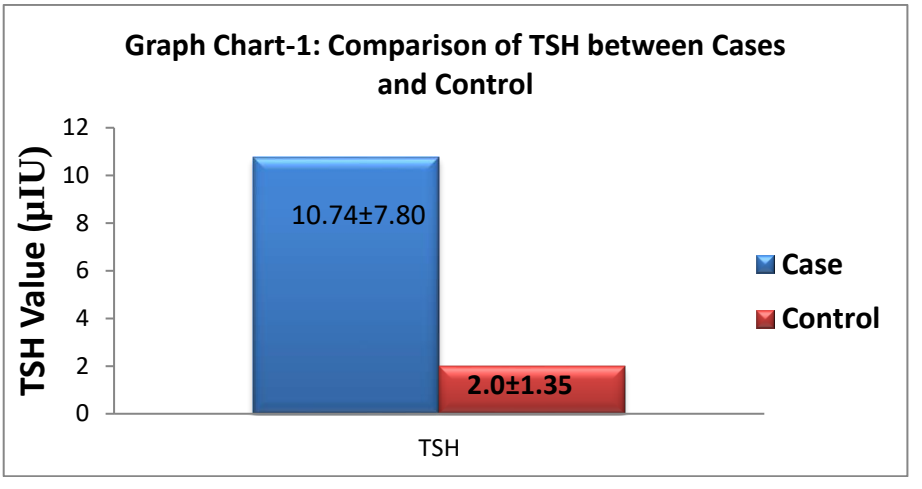
Results

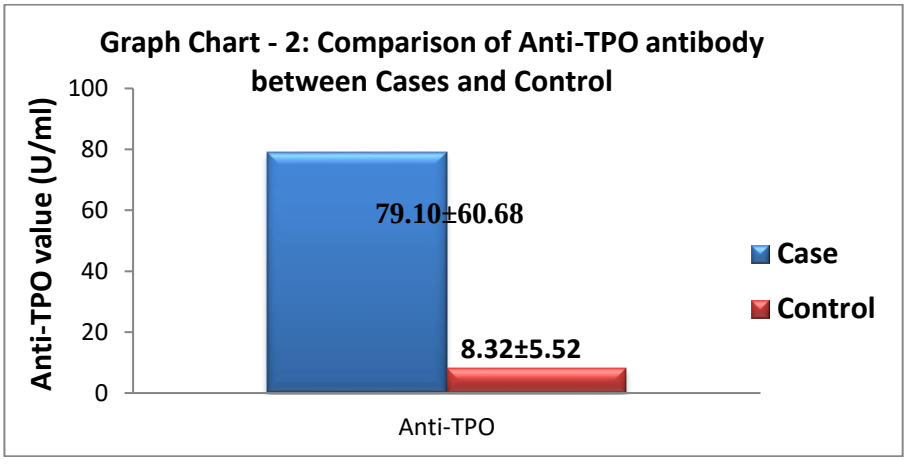
The present study was conducted on 400 subjects, including cases and controls. From 400 subjects, 200 subjects about subclinical hypothyroidism and 200 subjects were normal. The thyroid profile and Anti-TPO antibody of these patients were analyzed. The average age of the patients is 34.63±13.56 (Mean ± SD) years and the control group's average age is 36.67±14.55 (Mean ± SD) years. The no of male case is 62 (31%) and female case is 138 (69 %) out of 200 case subjects and the no male control is 63 (31.5 %) and female control is 137 (68.5%) out of 200 normal subjects. Table 1 shows the comparison of Thyroid profile and Anti-TPO antibody in both groups.

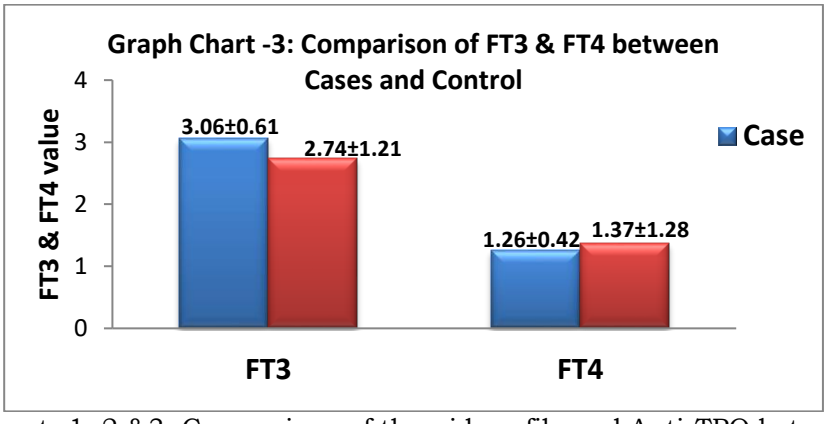
Parameter	Cases (200) MEAN±SD	Control Group (200) MEAN±SD	T-Test	p value
TSH	10.74±7.80	2.00±1.35	7.14	<0.0001
FT_3	3.06±0.61	2.74±1.21	0.032	0.97
FT_4	1.26±0.42	1.37±1.28	0.53	0.59
Anti-TPO antibody	79.10±60.68	8.32±5.52	1.99	0.047

Table: 1- comparison of thyroid profile and Anti-TPO between cases and control group. (<0.01highly significant, <0.05 significant)

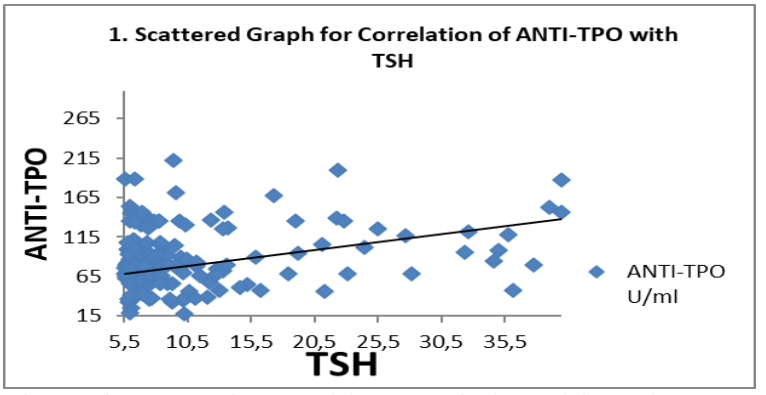
Table 1 and graph chart showing the comparison of thyroid profile and Anti-TPO between cases and control group. TSH mean value significantly higher (10.74±7.80μIU/ml) in cases than control group (2.00±1.35μIU/ml), Free T3 (3.06±0.61pg/mL) and Free T4 (1.26±0.42ng/dL) mean value is normal in both subjects and Anti-TPO antibody mean value (79.10±60.68U/ml) is significantly higher in cases than control group (8.32±5.52 U/ml).



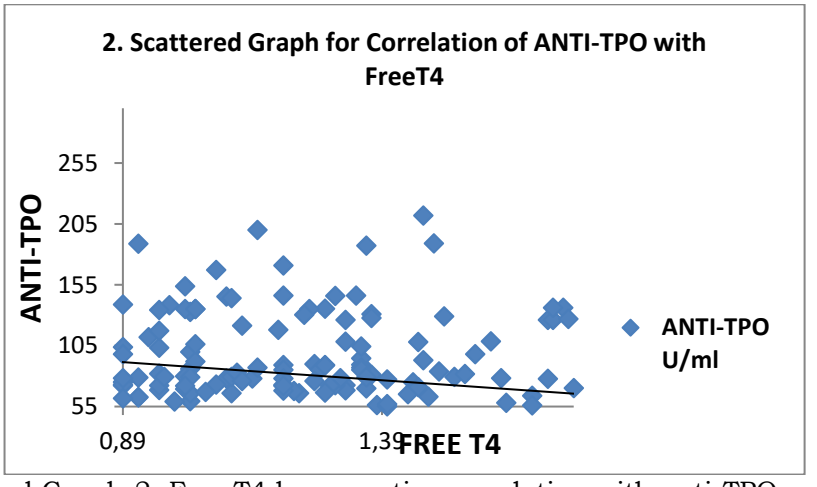




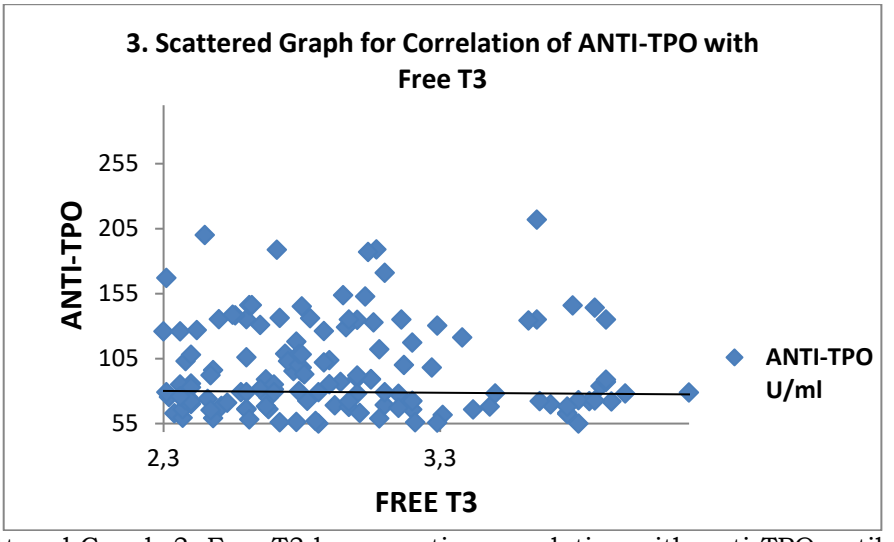
Graph Chart- 1, 2 &3: Comparison of thyroid profile and Anti-TPO between cases and control group



Scattered Graph-1: TSH has positive correlation with anti-TPO antibody.



Scattered Graph-2: Free T4 has negative correlation with anti-TPO antibody



Scattered Graph-3: Free T3 has negative correlation with anti-TPO antibody

Scattered graph 1-3 shows the individual correlation between the thyroid profile and anti-TPO antibody. Anti-TPO antibody has no correlation with Free T3 (Cr value= -0.033, p-value= 0.20), which is statistically not significant, and with free T4 has negative correlation (Cr value= -0.194, p-value= 0.0001), which is statistically significant and anti-TPO has positive correlation with TSH (Cr value= 0.25, p-value= 0.9), which is statistically not significant.

Discussion

In this study we observed higher levels of TSH and Anti-TPO antibody with normal levels of Free T3 and Free T4. In our study, the TSH mean value (10.58±7.66) was higher; the Anti-TPO antibody mean value (72.28±48.95) was also raised in the study group than normal subjects. Free thyroxine (FT4) mean value (1.35±0.41) and tri-iodothyronine mean value (2.99±0.51) are normal in both subjects. Jishna P et.al described that anti-TPO antibodies have a positive correlation with thyroid dysfunction. He reported a higher value of the anti-TPO antibody (P. et al., 2017).

Darya S. Abdulateef and Taha O. Mahwl reported higher clinical scores of anti-TPO antibody in subclinical hypothyroidism and the positive value of anti-TPO antibody was 190.88 IU/ml (±170.59) (Abdulateef & Mahwi, 2019). Vikas Kumar Srivastava and Harkaran Singh described elevated anti-thyroid peroxidase antibody level >60 U/ml in 78 % of patients of subclinical hypothyroidism (Srivastava & Singh, 2017). Atluri Sridevi et.al; described higher clinical score of anti-TPO antibody in subclinical hypothyroidism with positive relation with TSH value. He was reported anti-TPO antibody mean value was 337.0±384.2 U/ml (Sridevi et al., 2018).

Savas Guzel et.al reported an increased value of anti-TPO antibody in the patients of subclinical hypothyroidism. The mean value of the anti-TPO antibody was 195.7 ±75.2 U/ml, which has a positive relationship with TSH in subclinical hypothyroidism (Guzel et al., 2013). Myung Won Lee et.al described a slightly lower significant value (p value=0.039) of anti-thyroid peroxidase antibody in subclinical hypothyroidism. He observed the mean value of anti-TPO antibody was 220.74 U/ml (Lee et al., 2014). L.M. Silva et al reported a statistically slightly lower significant value of Anti-TPO antibody in subclinical hypothyroidism. In his study, the interquartile range of anti-TPO antibody was 290.25-1000, the median was 590.5, and p value =0.049(Silva et al., 2003).

Conclusion

Out of all the investigations and observations, only the record of TSH is the definite prognostic marker to ensure that the patients have subclinical hypothyroidism. In cases with mildly elevated TSH and Anti-TPO levels, it is also a helpful prognostic factor for subclinical hypothyroidism. Apart from TSH and anti-TPO Ab, we are trying to validate biochemical prognostic factors in this retrospective study for subclinical hypothyroidism.

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