Original Research Paper

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General Medicine

DYSLIPIDEMIA IN SUBCLINICAL HYPOTHYROIDISM IN TERTIARY HEALTH CARE CENTRE

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ABSTRACT **BACKGROUND:** Subclinical hypothyroidism is defined as normal serum Total T4 /free T4 and Total T3 /free T3 levels in the presence of raised serum thyroid stimulating hormone (TSH) levels. The association between subclinical hypothyroidism and dyslipidemia has been widely investigated, but the findings remain controversial. **AIM AND OBJECTIVE:** To assess lipid abnormalities in patients diagnosed with subclinical hypothyroidism. **MATERIALS AND METHODS:** A cross sectional study was carried out in 100 patients of subclinical hypothyroidism at Rama Medical College Hospital and Research Centre. Blood samples were collected and analysed for thyroid-stimulating hormone (TSH), free thyroxine (FT4), total cholesterol, serum triglycerides, low-density lipoprotein-cholesterol (LDL), and high-density lipoprotein-cholesterol (HDL). **RESULTS:** In this study total cholesterol (TC) was significantly elevated (p value <0.05) in patients with subclinical hypothyroidism. Triglycerides (TG) and low density lipoprotein cholesterol (LDL) were also high in these patients but the difference was not statistically significant. High density lipoprotein cholesterol (HDL) was significantly reduced. **CONCLUSION:** SCH is associated with dyslipidemia, increased total cholesterol, TG, LDL, and decreased HDL are observed. We strongly recommend biochemical screening for thyroid dysfunction for all patients with dyslipidemia.

KEYWORDS : Dyslipidemia, Subclinical hypothyroidism, Free thyroxine

INTRODUCTION:

Subclinical hypothyroidism is defined as high levels of serum thyroid stimulating hormone (TSH) along with normal levels of serum thyroxine (T4) and triiodothyronine (T3) with few or no signs/symptoms of hypothyroidism [1]. The discussions regarding the management of subclinical thyroid dysfunction have been controversial. The prevalence of subclinical hypothyroidism is about 4-8.5% worldwide and maybe as high as 20% in women of age more than the 60 years [2].

Hypothyroidism accounts for approximately 2% of all cases of hyperlipidemia and is second most common cause after diabetes mellitus of secondary hyperlipidemia[3]. Levels of total and LDL cholesterol (LDL) tend to rise as the thyroid function declines. Therefore, hypothyroidism accounts as a significant cause of secondary dyslipidemia[4].

When the subclinical hypothyroidism is related with antibodies against thyroid peroxidase (TPO), annual risk of developing overt hypothyroidism is about 4% [5,6].

It is also associated with dyslipidemia and adverse cardiovascular risk profile and there are no universally accepted recommendations for the management of subclinical hypothyroidism. Now the most recent as well as practical approach of treatment of subclinical hypothyroidism is levothyroxine therapy for persons with serum TSH of more than 10mIU/L and the therapy is individualized for patients with a TSH value of less than10 mIU/L [7].

MATERIALS AND METHODS: This study was a hospital based cross sectional study performed in Rama Medical College Hospital and Research Centre. One hundred patients diagnosed with Subclinical Hypothyroidism over a period of one year from Medicine OPD and IPD were selected.

AACE GUIDELINES FOR DYSLIPIDEMIA used are as follows:-
Total cholesterol: Normal: <200 mg/dl
Borderline: 201-239 mg/dl
High: >240 mg/dl

LDL: Optimal: <100 mg/dl
Near optimal: 100-129 mg/dl
Borderline high: 130-159 mg/dl
High: 160-189 mg/dl
Very high: >189 mg/dl

Triglycerides: Normal: <150 mg/dl
High: 150-199 mg/dl
Hypertriglyceridemia: >200 mg/dl
HDL: Normal: >50 mg/dl

PATIENT SELECTION

Inclusion Criteria: All newly detected cases of subclinical hypothyroidism {Normal t3, t4, free t4 and TSH > 5.5 mU/L}

Exclusion Criteria:
1. Patients aged twelve or less.
2. Patients on thyroxine
3. Known case of diabetes and hypertension
4. Chronic renal failure
5. Chronic liver disease
6. Primary adrenal failure
7. On medications like beta blockers, diuretics, steroids, OCP
8. Patients already on hypolipidemic drugs.

The collected data was analysed with SPSS V27 version. To describe about the data descriptive statistics, frequency analysis, percentage analysis were used for categorical variables. To assess the relationship between the variables Pearson's Correlation was used. To find the significance in categorical data Chi-Square test was used. In both the above statistical tools the probability value .05 is considered as significant level.

RESULTS The study included 100 patients of either sex in the age group of 16–73 years. From the data, it was clear that SCH is more common in females than males. 35% cases had above normal BMI. The correlation between TSH and BMI is statistically significant with p value 0.020213 and chi square value of 7.8028.

There was a positive correlation between TSH and TC values showing in Fig:-1, that is within the subclinical patients, the TC level increased as the TSH value increased. The relation is statistically significant with a p value of 0.005819 and chi square value of 10.2932. We found positive correlation between TSH and LDL levels with p value of 0.162346 and chi square statistic of 6.5391 depicted in Fig:- 2.

There was positive correlation between TSH and TG showing in Fig:-3. The correlation is not statistically significant with a p value of 0.87837 . However, there was negative correlation between TSH levels and HDL levels of SCH patients, that is, as the TSH levels increased in these patients the HDL levels decreased. The correlation between TSH

and HDL is statistically significant with a p value of 0.016687 and chi square value of 0.5729 in Fig:- 4

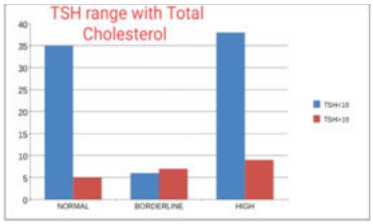

Fig 1: Correlation of TSH with total cholesterol

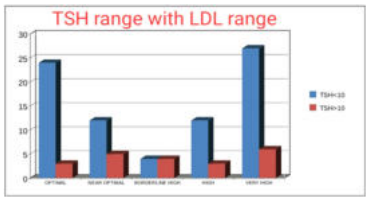

Fig 2: Correlation of TSH with LDL

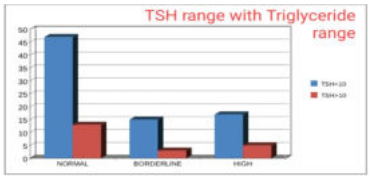

Fig 3: Correlation of TSH with triglyceride

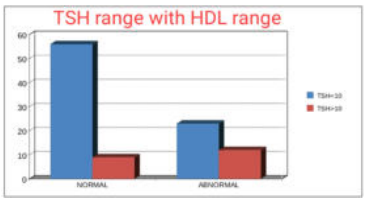

Fig 4: Correlation of TSH with HDL

DISCUSSION : In this study, I screened patients for subclinical hypothyroidism and evaluation of dyslipidemia in these patients was done. On evaluating TSH distribution, it was found that among 100 cases, the mean TSH value was 7.935mIU/L. Previously done studies like Marwaha et al supported this study by observing that atherogenic lipid abnormalities was found in adult subjects of SCH with TSH>10mIU/L[8].

However, in our study TC was significantly high (p value<0.05) in SCH patients. Similar results shown by Sharma et al. showing statistically significant positive correlation with total cholesterol. TG, and LDL were higher in SCH patients but the difference was not statistically significant. HDL was lower in SCH patients. Similar results found in study by Milionis et al and Toruner et al. They have delineated an increased triglyceride and decreased HDL levels in SCH. Asranna A et al reported a positive correlation between mean LDL levels in SCH compared to controls[9]. Laway et al also observed significantly high serum total cholesterol (TC), triglycerides (TG) and very low-density cholesterol (VLDL) in patients with SCH as compared to controls (P<0.05)[10]. Singh K et al, 2011 showed significant increase in triglycerides and VLDL cholesterol and nominal increases in serum cholesterol, LDL and HDL levels in SH patients as compared to controls[11]. Bandyopadhyay et al, 2006 reported significant elevations in SH patients as compared to controls, and increased levels of total cholesterol, triglyceride and LDL in age groups of 40-50 years[12].

CONCLUSION:-

We conclude that in SCH, the increase in TSH level increases the lipid parameters mainly TG and total cholesterol. As they are more prone to atherosclerosis and other cardiovascular risk so screening of lipid profile in all subclinical hypothyroid patients is recommended.

As SCH is a reversible condition we can take measures at an early stage to halt the progression of the disease and improve quality of life. Significant elevation of total cholesterol and triglyceride levels seen in subclinical hypothyroidism. There is positive correlation of TSH with total cholesterol and triglyceride. Stastistically significant correlation also observed between TSH and HDL. The recent approach for treatment of subclinical hypothyroidism is levothyroxine therapy for patients with serum TSH of more than 10mIU/L and the therapy is individualized for patients with a TSH value of less than10 mIU/L.

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