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Original Research Article

Assessment of cardiovascular risk due to dyslipidemia by framingham score and using this information for early initiation of treatment of hypothyroidism and reducing the risk for cardiovascular events

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ABSTRACT

Materials and Methods : This study was planned and carried out in The Department of Medicine M.G.M. Medical College and M.Y. Hospital Indore, patients with subclinical Hypothyroidism not taking any treatment and patients of overt hypothyroidism not taking treatment coming to the OPD.
Study Design: Observational Study.
Result: In normal subject, the mean Framingham score was 0.89 ± 0.57%, while in subclinical hypothyroidism patients it was 1.78 ± 1.4% mg/dL showing a higher mean Framingham score in subclinical hypothyroidism patients as compared to normal subjects and the difference was found to be statistically significant (P<0.05). In normal subject, the mean Framingham score was 0.89 ± 0.57%, while in overt hypothyroidism patients it was 3.31 ± 2.82%. showing a higher mean Framingham score in overt hypothyroidism patients as compared to normal subjects and the difference came out to be statistically significant (P<0.05). In subclinical hypothyroidism, the mean Framingham score was 1.78 ± 1.4%, while in overt hypothyroidism patients it was 3.31 ± 2.82%., showing a higher mean Framingham score in overt hypothyroidism patients as compared to subclinical hypothyroidism and the difference came out to be statistically significant (P<0.05).
Conclusion: Overt and subclinical hypothyroidism both are associated with increased cardiovascular risk indicated by the higher values of Framingham risk in these patients as compared to normal controls. Mean Framingham risk was 3.31 ± 2.82% in overt hypothyroidism patients, 1.78 ± 1.4% in subclinical hypothyroidism and 0.89 ± 0.57% in normal controls all of which were statistically significant[P<0.05].

1. Introduction

Hypothyroidism is one of the significant reason of secondary dyslipidemia, which is due to decrease of cholesterol excretion & marked increase in apo-B lipoproteins resulting from decreased catabolism & turnover by a decreased number of LDL receptors on the surface of liver.[1] LDL can be cleared from plasma by receptors, which are regulated by thyroid hormone[2] through mRNA.

Secondary hypothyroidism has been associated with more atherogenic lipid profile as compared to primary hypothyroidism, likely because of lower HDL cholesterol levels. Raised levels of total and LDL cholesterol are commonly seen in hypothyroidism and may be a risk factor for cardiovascular disease. The mean cholesterol levels may be increased up to 50% above normal in hypothyroidism patients.[3] In hypothyroidism, reduced clearance[4] of TG from plasma results in accumulation of IDL. These alterations are more common in obese hypothyroid dyslipidemia type III patients.

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VLDL contains small dense particles indicating a reduced conversion of VLDL to LDL, probably due to thyroid hormone deficiency and associated deactivation of LPL responsible for catabolism of VLDL. Ratio of total to HDL cholesterol is usually increased in hypothyroid patients and it is suggestive of the fact that the increased HDL alone does not protect against coronary heart disease.

2. Materials and Methods

This study was planned and carried out in The Department of Medicine M.G.M. Medical College and M.Y. Hospital Indore from August 2019 to July 2020 (One Year) enrolling total 150 patients, out of which 75 patients were of subclinical Hypothyroidism (SCH) not taking any treatment and 75 patients were of overt hypothyroidism not taking treatment coming to the OPD or wards in M.Y. Hospital.

2.1. Inclusion criteria

1. Already diagnosed and treatment naive SCH patients based on TSH level between 5-10 micro IU/ml and normal free T4 value 0.7-2.5ng/dl.
2. Age and sex matched already diagnosed treatment naive patients of overt hypothyroidism.
3. Age and sex matched normal subjects giving consent.
4. Patients 25-60 years of age who gave consent.

2.2. Exclusion criteria

1. Patients receiving drugs which are known to cause SCH and affect lipid metabolism.
2. Patient on treatment for hypothyroidism.
3. Patients with systemic diseases like Diabetes mellitus, PCOD, Renal and Hepatic failure, Stroke, ischemic heart disease, primary or secondary dyslipidemias, pregnant women and substance abusers.
4. Patients not giving consent for the study.
5. Patients < 30 years and > 60 years.

3. Results

The above table shows the comparison of mean Framingham score between normal and subclinical hypothyroidism.

Table 1 In normal subject, the mean Framingham score was 0.89 ± 0.57%, while in subclinical hypothyroidism patients it was 1.78 ± 1.4% mg/dL, showing a higher mean Framingham score in subclinical hypothyroidism patients as compared to normal subjects and the difference was found to be statistically significant (P<0.05).

The above table shows the comparison of mean Framingham score between normal and overt hypothyroidism.

Table 2 In normal subject, the mean Framingham score was 0.89 ± 0.57%, while in overt hypothyroidism patients it was 3.31 ± 2.82%. showing a higher mean Framingham score in overt hypothyroidism patients as compared to normal subjects and the difference came out to be statistically significant (P<0.05).

The above table shows the comparison of mean Framingham score between normal and overt hypothyroidism.

Table 3 In subclinical hypothyroidism, the mean Framingham score was 1.78 ± 1.4%, while in overt hypothyroidism patients it was 3.31 ± 2.82%., showing a higher mean Framingham score in overt hypothyroidism patients as compared to subclinical hypothyroidism and the difference came out to be statistically significant (P<0.05).

4. Discussion

The FRS model has been used to predict a 10-year risk for an adverse cardiac event in patients and has stratified the patients into low-, intermediate-, and high-risk groups. Variables of the FRS model include age, sex, smoking status, systolic blood pressure, total cholesterol, high-density lipoprotein cholesterol, and diabetes. The SCORE model has been used to predict death due to cardiovascular events in patients, with patients having a risk score >5% considered to have a higher risk.

Bayar Qasim et al[5] led a case control study at the Department of medication, College of Medicine, University of Duhok, Iraq on Dyslipidemia in SCH. The examination included 120 patients out of which 60 were analyzed SCH cases and 60 were age and sex coordinated controls. Study was done from first june 2016 to first june 2017 at the endocrine facility of Azadi general consideration emergency clinic.

The middle time of patients at introduction was 47.7 years [SD 9.9] with greater part of patients between 30-39 years. Male comprises 32(52.5%), female establishes 29 (47.5%). lion's share of patients were without comorbidities (97%), while 3% of cases had related DM.[6] Predominance of dyslipidemia all in all was higher among SCH cases (TSH> 5) in contrast with control gathering (TSH≤5) (p<0.001), dyslipidemia expanded as level of TSH expanded.[7]

TC level was factually higher in cases when contrasted with controls (p<0.001). LDL levels were higher among cases in contrast with controls, anyway not to measurably critical level (p=0.087). TG was additionally factually higher among cases in contrast with controls.[8]

Concerning there was sex distinction. No noteworthy distinction, was seen among male cases and controls (p=0.653), while huge contrast was seen among female cases and controls (p=0.003).

Cardiovascular disease (CVD) leads to high morbidity and mortality rate worldwide. Therefore, it is important to determine the risk of CVD across the sociodemographic factors to strategize preventive measures.[9] The current

Table 1: Comparison of mean Framingham score between normal and subclinical hypothyroidism

	Framingham Score [Mean ± SD]	't' value	P value
Normal	0.89 ± 0.57	-5.962, df=148	0.000*
Subclinical Hypothyroidism	1.78 ± 1.4		

Student 't' test applied. P value = 0.000, Highly significant

Table 2: Comparison of mean Framingham score between normal and overt hypothyroidism

	Framingham Score [Mean ± SD]	't' value	P value
Normal	0.89 ± 0.57	-4.171, df=148	0.000*
Overt Hypothyroidism	3.31 ± 2.82		

Student 't' test applied. P value = 0.000, Highly significant

Table 3: Comparison of mean Framingham score between subclinical hypothyroidism and overt hypothyroidism

	Framingham Score [Mean ± SD]	't' value	P value
Subclinical Hypothyroidism	1.78 ± 1.4	-7.483, df=148	0.000*
Overt Hypothyroidism	3.31 ± 2.82		

Student 't' test applied. P value = 0.000, Highly significant

study consisted of 53,122 adults between the ages of 35 and 65 years from The Malaysian Cohort project during recruitment phase from year 2006 to year 2012. Sociodemographic profile and physical activity level were assessed via self-reported questionnaire, whereas relevant CVD-related biomarkers and biophysical variables were measured to determine the Framingham Risk Score (FRS).The main outcome was the 10-year risk of CVD via FRS calculated based on lipid profile and body mass index (BMI) associated formulae. The BMI-based formula yielded a higher estimation of 10-year CVD risk than the lipid profile-based formula in the study for both males (median = 13.2% and 12.7%, respectively) and females (median = 4.3% and 4.2%, respectively). The subgroup with the highest risk for 10- year CVD events (based on both FRS formulae) was the Malay males who have lower education level and low physical activity level. Future strategies for the reduction of CVD risk should focus on screening via BMI-based FRS in this at-risk subpopulation to increase the cost-effectiveness of the prevention initiatives.

5. Conclusion

Overt and subclinical hypothyroidism both are associated with increased cardiovascular risk indicated by the higher values of Framingham risk in these patients as compared to normal controls. Mean Framingham risk was 3.31 ± 2.82% in overt hypothyroidism patients, 1.78 ± 1.4% in subclinical hypothyroidism and 0.89 ± 0.57% in normal controls all of which were statistically significant[P<0.05].

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7. Conflict of Interest

The authors declare they have no conflict of interest.

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