Original Research Article

Prevalence of dyslipidemia in STEMI patients with its correlation to thyroid dysfunction

Ayushi Chaudhari[1*], Hariom Gupta[2], Beerbhan Singh[3], Manoj Indurkar[2]

[1]RMO, Department of General Medicine, Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa, M.P., India

[2]Professor, Department of General Medicine, Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa, M.P., India

[3]Associate Professor, Department of General Medicine, Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa, M.P., India

Received: 10-11-2020 / Revised: 29-12-2020 / Accepted: 16-01-2021

Abstract

Introduction:Thyroid hormones play a major role in the cardiovascular system functioning and in maintaining the cardiovascular homeostasis through direct and indirect mechanisms. A slight change in the thyroid status affects cardiovascular mortality.It also regulate the enzymes involved in all steps of lipid metabolism leading to the development of qualitative and quantitative changes of lipids in thyroid disease. Wetried to evaluate the prevalence of thyroid dysfunction in STEMI patients and to study the impact of these dysfunctions on morbidity and mortality among those subjectsand also to find the occurrence of dyslipidemia in STEMI patients with its correlation to thyroid dysfunction. **Method**: We did an observational study on 200 patients from April 2019 to June 2020 in our department(SGMH,Rewa) via fulfilling the criteria. **Observation & Results**: Patients of STEMI had a statistically significant prevalence of dyslipiemia in overt and subclinical hypothyroid patients.In this study out of 200 patients 17% of patients had hypothyroidism and 8% had subclinical hypoythyroidism.**Conclusion**:With high statistical significance of dyslipidemia and thyroid dysfunction in STEMI patients,earlier risk stratification, diagnosis, lifestyle changes and management could reduce the morbidity and mortality.

Keywords : dyslipidemia, mortality, thyroid dysfunction, STEMI.

Introduction

Among all the endocrine disorders, thyroid diseases are one of the commonly occurring disorders worldwide. They can be classified as hypothyroidism, hyperthyroidism, subclinical hypothyroidism & hyperthyroidism. Cardiovascular disease risk is seen among thyroid disorder patients as thyroid hormones affect the lipoprotein metabolism and cardiovascular risk factors[1]. A linear positive association has been seen between thyroid-stimulating hormone (TSH) values and concentrations of total serum cholesterol, LDL cholesterol, non-HDL cholesterol, and TG, and a linear negative association with HDL cholesterol[2].Thyroid hormones play a major role in the maintenance of cardiovascular system function, cardiac hemodynamics, as well as to maintain cardiovascular homeostasis. Thyroid hormones affect the cardiovascular system and cardiac changes have been recognized in overt thyroid dysfunction. Various directandindirectmechanismsexertamajorinfluenceonthe cardiovascular system and, cardiovascular effects are prominent in both hypothyroidism and hyperthyroidism[3].Thyroid dysfunction also affects ventricular function, serum cholesterol levels, heart rate and rhythm, and also increases the risk of coronary artery disease[4,5].This study was conducted with the motive to document the prevalence of dyslipidemia in STEMI patients with its correlation to thyroid dysfunction.

**Correspondence*
Dr. Ayushi Chaudhari
RMO,Departmentof General Medicine,Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital,Rewa,M.P.,India
E-mail: ayushi04chaudhari@gmail.com

Material and methods

It was an observational study carried out from April 2019 to June 2020 in the Department of medicine, Shyam shah medical college and Sanjay Gandhi Memorial Hospital, Rewa, MP. We studied 200 cases fulfilling the inclusion & exclusion criteria.

Inclusion Criteria

Patients above 18 years of age, irrespective of gender, race, ethnic group or clinical severity presented in Medical ICCU SGMH Rewa. Patients newly diagnosed with acute coronary syndromeSTEMI

Exclusion Criteria

1.Age below 18years.
2.Subjects with history of Coronary heartdisease,
3.Pregnancy
5.On treatment with lipid loweringdrugs
6.Drug induced thyroiddisorder
7.Chronic liver disease and chronicpancreatitis.

Data collection and methods: Patients admitted in the Medicine ICCU, fulfilling the inclusion criteria, during the study period were taken into the study. A complete clinical, anthropometric (waist circumference, height, weight) and laboratory evaluation (CBC, LFT,RFT,RBS,ECG,2D Echo,T3,T4,TSH,LIPID PROFILE).

Obtained details were analysed by appropriate statistical methods.

Statistical method and software: SPSS software version 19 was used to analyse the data. Pages and Number from hp pavilion were used for data recording and analysis. Categorical variables were analysed using Chi square test. A "P" value <0.05 was taken as significant.

Results

During this study following data was obtained.

Table 1:Age wise distribution

AGE	NUMBER OF PATIENTS
19-28 years	3(1.5%)
29-38 years	5(2.5%)
39-48 years	35(17.5%)
49-58 years	74(37%)
Above 59 years	83(41.5%)
TOTAL	200(100%)

As shown in table no.1 majority of the patients were in the age group of more than 59 years (41.5%) followed by age group between 49- 58years (37%). Mean age of the total patients under study was 58years.

Table 2: Gender Wise Distribution

SEX	NUMBER OF PATIENTS
Female	85(42.5%)
Male	115(57.5%)
Total	200(100%)

As per table no.2 male patients were in predominance (57.5%) whereas female patients were about 42.5%.

Table 3:Association between thyroid dysfunction and diastolic blood pressure

THYROID STATUS	NORMAL DIASTOLIC BP	ELEVATED DIASTOLIC BP	TOTAL
Hypothyroid	23(67.6%)	11(32.3%)	34
Euthyroid	115(83.3%)	23(16.6%)	138
Hyperthyroidism	10(0%)	0(0%)	10
Subclinical Hypothyroidism	10(62.5%)	6(37.5%)	16
Subclinical Hyperthyroism	2(0%)	0(0%)	2
Total	160	40	200

As shown in table no.3 37.5% of subclinical hypothyroidism and 32.3% of hypothyroidism patients had elevated diastolic blood pressure. There was positivecorrelation hypothyroidism with diastolic BP with P value of 0.036 which was statistically significant. (pearson coefficient10.26)

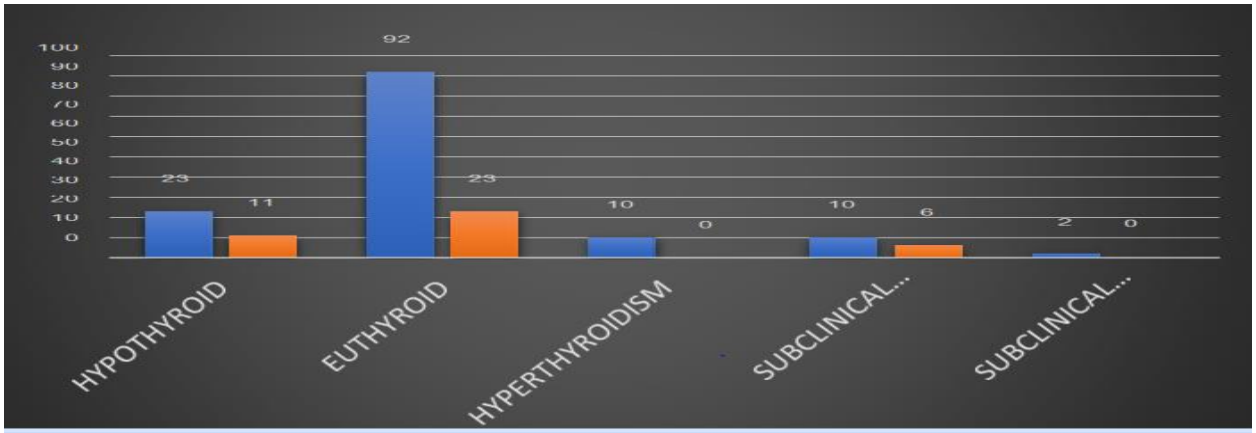

Fig 3:Association between thyroid dysfunction and diastolic blood pressure

Table 4: Association between thyroid status and BMI

Thyroid Status	ELEVATED BMI	NORMAL BMI	TOTAL NO. OF PATIENTS
Hypothyroid	19(55.88%)	15(44.12%)	34
Euthyroid	54(39.13%)	84(60.86%)	138
Hyperthyroid	2(20%)	8(80%)	10
Subclinical Hypothyroidism	5(31.25%)	11(68.75%)	16
Subclinical Hyperthyroidism	0(0%)	2(100%)	2
Total	80(40%)	120(60%)	200

As per table no. 4 55.88% of hypothyroid patients had elevated BMI. Hypothyroidism had an association with elevated BMI with a Pvalueof 0.0019 which wasstatistically significant. Pearson coefficient was 0.374 which signified positive correlation between TSH and BMI.

Table 5 :Association between thyroid status and lipids

Lipid Profile	Hypothyroid (34)	Subclinical Hypothyroid(16)	Hyperthyroid(10)	Subclinical Hyperthyroid (2)	Euthyroid (138)
Elevated Cholesterol	21(61.76%)	7(43.7%)	3(30%)	0	62(44.9%)
Elevated Triglyceride	15(44.11%)	4(25%)	1(10%)	0	66(47.8%)
Elevated LDL	18(52.92%)	5(31.25%)	2(20%)	0	40(28.9%)
Decreased HDL	9(26.4%)	14(87.5%)	7(70%)	0	42(30.4%)

As shown in table no. 5 In hypothyroid patients there was elevated total cholesterol (61.76%), elevated triglyceride (44.11%), elevated LDL (52.92%) and decreased HDL(26.4%) whereas in subclinical hypothyroidism there was elevated total cholesterol (43.7%), elevated triglyceride (25%), elevated LDL (31.25%) and decreased HDL (87.5%) which was statistically significant with P value0.041

Table 6:Association between patients with euthyroid and thyroid dysfunction in stemi groups regarding mortality

THYROID PROFILE	DECEASED	SURVIVED	TOTAL
Hypothyroidism	8(23.5)	26(76.4%)	34
Subclinical Hypothyroidism	1(6.25)	15(93.5%)	16
Euthyroidism	8(5.79%)	130(94.2%)	138
Hyperthyroidism	0	10	10
Subclinical Hyperthyroidism	0	2	2

As per table no. 6 there was 29.75% mortality in thyroid dysfunction (overt and subclinical hypothyroidism) patients. This association of higher death in thyroid dysfunction cases was statistically significant with a p value 0.048.

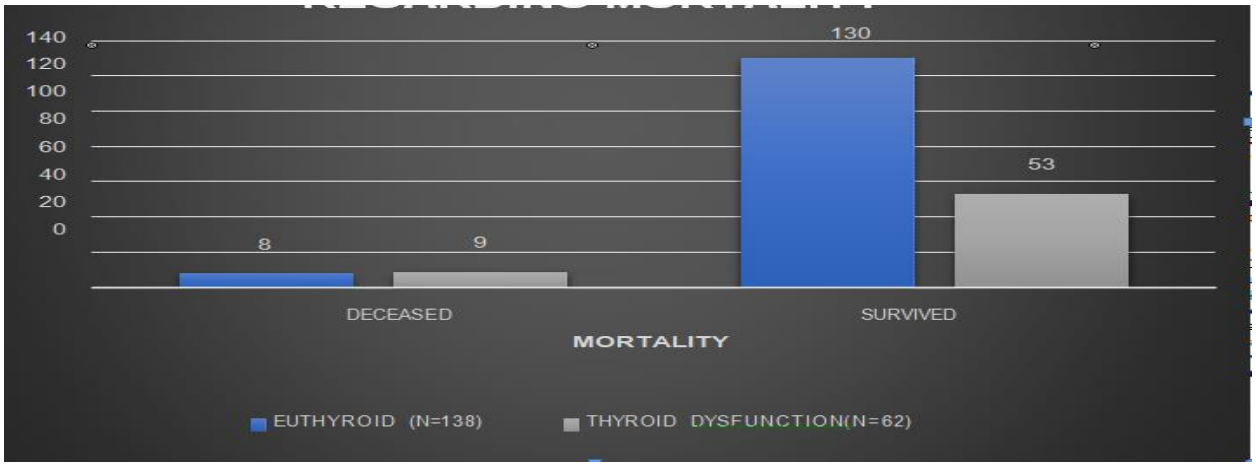

Fig 6:Association between patients with Euthyroid and thyroid dysfunction in stemigroups regarding mortality

Discussion

In this study maximum number of patients were in the age group of more than 59 years (41.5%) followed by age group 49-58years37%.The present study showed male predominance with 57.5% versus female 42.5% of total cases.

This study revealed that subclinical hypothyroidism and hypothyroidism patients had diastolic hypertension 37.5% and 32.3% respectively when compared to euthyroid (16.6%). which was statistically significant (P =0.036) with positive correlation of hypothyroidism with diastolic BP (pearson coefficient10.26). This was similar to that reported in a study by Sreevidya K. R.et al that 64.3% of hypothyroid patients were found to have diastolic hypertension when compared to euthyroid (34.9%)[6].In the present study 55.88% of hypothyroid patients had elevated BMI. Hypothyroidism had an association with elevated BMI with a P value of 0.0019 which was statistically significant with pearson coefficient 0.374 that showed positive correlation between TSH and BMI which was also comparable to study by Knudsen N et al found a positive association between BMI and category of serum TSH (P < 0.001) and a negative association between BMI and category of serum free T(4) (P < 0.001)[7].In the study sample hypothyroid patients had elevated total cholesterol (61.76%), elevated triglyceride (44.11%), elevated LDL (52.92%) and decreased HDL (26.4%) whereas in subclinical hypothyroidism there was elevated total cholesterol (43.7%), elevated triglyceride (25%), elevated LDL (31.25%) and decreased HDL (87.5%) which was statistically significant with P value 0.041. Also there was positive correlation between TSH and lipid values which was similar to the study done by Prakash, A.,and Lal, A. K. et al suggested that the effect of hypothyroidism in the lipid metabolism was more marked in patients with higher serum TSH levels. Even mild elevations of TSH were associated with changes in lipid profile significant enough to raise the cardiovascular risk. This study concluded that hypothyroidism was associated with lipid disorders that were characterized by normal or slightly elevated total cholesterol levels, increased LDL-cholestrol and lower HDL-cholesterol[8].In our study, there was 29.75% mortality in thyroid dysfunction (overt hypothyroidism and subclinical hypothyroidism) patients. This association of higher death in overt hypothyroidism and subclinical hypothyroidism was statistically significant with a p value 0.048 which showed similar results by Ning Y et. al thathypothyroidism was associated with

higher risks of cardiac mortality and all-cause mortality compared with euthyroidism in both the general public and cardiac patients[9].

Conclusion

The importance of the study lies in the fact that it revealed a distinct association of dyslipidemia and thyroid dysfunction in STEMI patients and highlights patients with dyslipidemia and thyroid dysfunction as potential targets for early intervention. This statistical significant relation found in our study was also proved in many prior studies conducted all over the world. Therefore early detection of abnormal lipid profile, thyroid abnormalities and its proper management by lifestyle modification and drugs needs to beadapted.

Limitations of the study

Sample size was achieved with less absolute precision, hence the results of the study would have wide variability. Due to limited resources and practical constraints this study was carried out with a small sample size. Thus the appropriate representation of the population and better outcomes could be attained by increasing the sample size. Study being retrospective couldn‘t find if elimination or adequate control of the risk factors ameliorated the disease progression.

References

1. Duntas L. H. Thyroid disease and lipids. Thyroid : official journal of the American Thyroid Association, 2002;12(4): 287–293.
2. Asvold BO, Vatten LJ, Nilsen TI, Bjoro T. The association between TSH within the reference range and serum lipid concentrations in a population-based study.The HUNT Study. Eur J Endocrinol. 2007; 156 (2):181-186.
3. Coceani M. Heart disease in patients with thyroid dysfunction: hyperthyroidism, hypothyroidism and beyond. Anadolukar-diyolojidergisi : AKD = the Anatolian journal of cardiology, 2013;13(1): 62–6.
4. Klein I, Danzi S. Thyroid disease and the heart. Circulation. 2007;116(15):1725–35.
5. Boekholdt SM, Titan SM, Wiersinga WM, Chatterjee K, Basart DC, Luben R, et al. Initial thyroid status and cardiovascular risk factors: the EPIC-Norfolk prospective population study. ClinEndocrinol (Oxf). 2010;72(3): 404–10
6. Sreevidya K R, and Renymol B. ―Study on Prevalence of Hypothyroidism in ST Segment Elevation Myocardial Infarction.‖ International Journal of Research in Medical Sciences, 2017;5(4):15.
7. Knudsen N, Laurberg P, Rasmussen LB, Bülow I, Perrild H, Ovesen L, Jørgensen T.―Small Differences in Thyroid Function May Be Important for Body Mass Index and the Occurrence of Obesity in the Population.The Journal of Clinical Endocrinology & Metabolism,2005; 90(7): 4019–2
8. Prakash A, Lal A.K. Serum lipids in hypothyroidism: Our experience. Indian journal of clinical biochemistry 2006; 21(2):153–155.
9. Ning Y, Cheng YJ, Liu LJ, Sara JD, Cao ZY, Zheng WP, Zhang TS, et al.What Is the Association of Hypothyroidism with Risks of Cardiovascular Events and Mortality? A Meta-Analysis of 55 Cohort Studies Involving 1,898,314 Participants .BMC Medicine, 2017;15(1): 21.

Conflict of Interest: Nil
Source of support:Nil