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Original Research Article.

Evaluation of Subclinical Hypothyroidism in Patients with Acute Coronary Syndrome: An Institutional Based Study

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ABSTRACT

Background: Subclinical hypothyroidism (SCH) refers to subjects who have an elevated thyroid-stimulating hormone level and a normal free thyroxine level. The subclinical hypothyroidism is associated with increased risk of cardiovascular morbidities. The present study was conducted to assess prevalence of subclinical hypothyroidism of patients with acute coronary syndrome (ACS).

Materials and Methods: The present study was a prospective study carried out among 400 patients from the attendants of Department of Medicine, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India. Complete and detailed medical history, full clinical examination was collected. Two-dimensional echocardiography and Doppler examination were performed for all patients. Venous blood samples were obtained from all patients on arrival for serum cardiac markers, liver and kidney functions, lipid profile and thyroid profile was measured. Data was collected and analysis were performed using SPSS program; version 21. A p value of ≤ 0.05 considered as being statistically significant.

Results: In the present study total patients included in the study were 400 in which patients below 60 years were 38.75% and above 60 years were 61.25%. The male and female were 50% each. 65% patients were hypertensive, 61.25% were diabetic, 60% were current smokers, 15% had family history of premature CAD, 20% presented by STEMI, 23.5% presented by NSTEMI and 37.5% presented by UA. The euthyroid status was the most prevalent among the patients 80% while subclinical hypothyroidism represents only 6%. According to age, prevalence of SCH was more in patients who are below age of sixty, and according to gender, prevalence of SCH was more in females while according to the type of ACS, prevalence of SCH was 45.83% in patients presented by UA vs. 54.16% in those presented by MI and it was 25% in patients presented by ST elevation ACS and 75% patients in those presented by Non-ST elevation ACS.

Conclusion: This study concluded that prevalence of subclinical hypothyroidism was 6%. The prevalence of SCH was more in patients who are above age of sixty and in females while according to the type of ACS, prevalence of SCH was more in patients presented by MI and in patients those presented by Non-ST elevation ACS.

Keywords: Subclinical Hypothyroidism, Thyroxine, Acute Coronary Syndrome.

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INTRODUCTION

Alteration in the level of serum thyroid hormone profile has been described in several non-thyroidal systemic illnesses including acute heart diseases in otherwise euthyroid patients. This condition has been termed as "Euthyroid Sick Syndrome" and is characterized by decreased serum T3 and /or free T3, increased serum reverse T3 (rT3), plus normal serum TSH, T4, and free T4 levels.[1]Thyroid hormone function has great impact on cardiovascular physiology that includes heart rate, blood pressure, cardiac output, systemic vascular resistance, and myocardial contractility.[2]

Subclinical hypothyroidism, also referred to as mild thyroid failure, is diagnosed when serum free thyroid hormone levels are within the normal range, but thyroid stimulating hormone (TSH) is mildly elevated.[3] Subclinical hypothyroidism increases isovolumetric relaxation time, decreases endothelial relaxation, and decreases cardiac contractility.[4] These effects are very important in the settings of acute coronary syndrome where function of parts of myocardium is impaired due to ischaemia related injury. Mild to moderate pericardial effusion which may also occur during ACS is also seen in cases of subclinical hypothyroidism.[5]

There is growing evidence that subclinical hypothyroidism is associated with increased risk of cardiovascular morbidities mainly due to dyslipidaemia, particularly in older women.[6,7] The prevalence of subclinical hypothyroidism increases with age and is approximately 10% in women aged more than 60 years and somewhat lower in men.[8-10] The present study was conducted to assess prevalence of subclinical hypothyroidism of patients with acute coronary syndrome.

MATERIALS AND METHODS

The present study was a prospective study carried out among 400 patients from the attendants of Department of Medicine, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institution and written informed consent was obtained from the patients. Patients who were admitted with the diagnosis of acute coronary syndrome, including ST-segment elevation Myocardial infarction (STEMI)/Non-ST-segment elevation Myocardial infarction (NSTEMI)/Unstable Angina (UA) irrespective of age, gender, race and clinical severity were included in the study. Patients were excluded from the study if they were using amiodarone, corticosteroids or received any iodinated contrast agent within the previous two weeks or those with diseases that are known to affect thyroid function tests, such as neoplasia, chronic renal failure, liver cirrhosis, active infection, chronic obstructive pulmonary disease requiring antibiotic therapy and diabetic ketoacidosis. Complete and detailed medical history with attention to the risk factors for developing CAD (smoking status, hypertension, diabetes mellitus, and family history of premature CAD in first degree relatives) was collected. Full clinical examination including heart rate & rhythm, systolic & diastolic blood pressure and heart & chest auscultation was done. Resting standard 12 leads electrocardiogram was done for each patient to detect any findings consistent with CAD either ST elevation or ST depression or T wave inversion or pathological Q waves or new onset LBBB. Two-dimensional echocardiography and Doppler examination were performed for all patients in the decubitus position during normal respiration using a GE Vivid 5 Ultrasound Machine to detect any wall motion abnormalities or ischemic complications. Venous blood samples were obtained from all patients on arrival for serum cardiac markers, liver and kidney functions, lipid profile and thyroid profile were measured using electrochemiluminescent method. Measured hormones and their respective reference values were: free T3 (1.3-5 pg/ml), free T4 (0.8-2 ng/dl) and TSH (0.4-4 mIU/l). Data was collected and analysis were performed using SPSS program; version 21. Comparisons were done by unpaired Student's t-test, Chi-square test. A p value of ≤ 0.05 considered as being statistically significant.

RESULTS

In the present study total patients included in the study were 400 in which patients 60 years were 38.75% and above 60 years were 61.25%. The male and female were 50% each. 65% patients were hypertensive, 61.25% were diabetic, 60% were current smokers, 15% had family history of premature CAD, 20% presented by STEMI, 23.5% presented by NSTEMI and 37.5% presented by UA.

Table 1: Demographic and clinical data

Variables	N(%)
Age (yrs)	
Below 60 years	155(38.75%)
Above 60 years	245(61.25%)
Gender	
Male	200(50%)
Female	200(50%)
Hypertension	
Present	260(65%)
Absent	140(35%)
Diabetes mellitus	
Present	245(61.25%)
absent	155(38.75%)
Smoking (history)	
Current smokers	240(60%)
Non smokers	160(40%)
Family history of premature CAD	
Present	60(15%)
Absent	340(85%)
Presentation STEMI	
Present	80(20%)
Absent	320(80%)
Presentation NSTEMI	
Present	93(23.25%)
Absent	307(76.75%)
Presentation Unstable Angina	
Present	150(37.5%)
Absent	250(62.5%)
Total	400(100%)

Table 2: Distribution of thyroid abnormalities

Thyroid state	N(%)
Euthyroid	320(80%)
Subclinical hypothyroidism	24(6%)
Overt hypothyroidism	10(2.5%)
Subclinical hyperthyroidism	30(7.5%)
Overt hyperthyroidism	16(4%)
Total	400(100%)

Table 3: Prevalence of Subclinical hypothyroidism

Variables	N(%)
Age (yrs)	
Above 60 years	14(58.33%)
Below 60 years	10(41.66%)
Gender	
Male	9(37.5%)
Female	15(62.5%)
Type of Acute coronary syndrome	
Unstable Angina	11(45.83%)
Myocardial infarction	13(54.16%)
ST segment elevation	
ST elevation Acute coronary syndrome	6(25%)
Non-ST elevation Acute coronary syndrome	18(75%)
Total	24(100%)

The euthyroid status was the most prevalent among the patients 80% while subclinical hypothyroidism represents only 6%. According to age, prevalence of SCH was more in patients who were above age of sixty, and according to gender, prevalence of SCH was more in females while according to the type of ACS, prevalence of SCH was 45.83% in patients presented by UA vs. 54.16% in those presented by MI and it was 25% in patients presented by ST elevation ACS and 75% patients in those presented by Non-ST elevation ACS.

DISCUSSION

Subclinical hypothyroidism has been associated with increased incidence of atherosclerosis and myocardial infarction in several studies.[10] Presence of antithyroid peroxidase (TPO) antibody indicates heightened risk.[11]

In the present study total patients included in the study were 400 in which patients 60 years were 38.75% and above 60 years were 61.25%. The male and female were 50% each. 65% patients were hypertensive, 61.25% were diabetic, 60% were current smokers, 15% had family history of premature CAD, 20% presented by STEMI, 23.5% presented by NSTEMI and 37.5% presented by UA. The euthyroid status was the most prevalent among the patients 80% while subclinical hypothyroidism represents only 6%. According to age, prevalence of SCH was more in patients who were above age of sixty, and according to gender, prevalence of SCH was more in females while according to the type of ACS, prevalence of SCH was 45.83% in patients presented by UA vs. 54.16% in those presented by MI and it was 25% in patients presented by ST elevation ACS and 75% patients in those presented by Non-ST elevation ACS.

A study of 400 patients of ACS by Qari FA, thyroid dysfunction was reported in 23.3% of patients.[12]

Khalil OA et al in their study of 196 patients of ACS, reported changes in thyroid hormone profile in 23% of their patients.[13]

The subclinical hypothyroidism is said to be more common in females.[14] There was high prevalence of different thyroid patterns like euthyroid sick syndrome, subclinical hypothyroidism or hyperthyroidism and low fT4 but normal TSH and fT3 in STEMI group than UA/NSTEMI. These results are comparable to studies done before.[12,15] The results of the Colorado study in which the prevalence of SCH ranged from 4 to 21% in women and 3 to 16% in men.[16] In Ertugrul et al. study, prevalence of SCH was higher among men with AMI with more prominence of severe SCH among women with AMI.[17]

CONCLUSION

This study concluded that prevalence of SCH was 6%. The prevalence of SCH was more in patients who are above age of sixty and in females while according to the type of ACS, prevalence of SCH was more in patients presented by MI and in patients those presented by Non-ST elevation ACS.

REFERENCES

1. Pimentel RC, Cardoso GP, Escosteguy CC, Abreu LM. Thyroid hormone profile in acute coronary syndromes. Arq Bras Cardiol 2006; (87): 629-34.

2. Powers A. C., Longo D. L., Kasper D. L., et al. Thyroid disorders, Harrison's Principle of Internal Medicine. Mc Graw Hill publication; 2012.

3. Cooper DS. Clinical practice. Subclinical hypothyroidism. N Engl J Med 2001; 345: 260-5.

4. Fazio S., Palmieri E. A., Lombardi G., Biondi B. Effects of thyroid hormone on the cardiovascular system. Recent Progress in Hormone Research. 2004; 59:31–50. doi: 10.1210/rp.59.1.31.

5. Biondi B., Bartalena L., Cooper D. S., Hegedüs L., Laurberg P., Kahaly G. J. The 2015 European Thyroid Association Guidelines on Diagnosis and Treatment of Endogenous Subclinical Hyperthyroidism. European Thyroid Journal. 2015;4(3):149–63.

6. Efstathiadou Z, Bitsis S, Milionis HJ, Kukuvitis A et al. Lipid profile in subclinical hypothyroidism: is L-thyroxine substitution beneficial. European Journal of Endocrinology 2001; 6: 705-10.

7. Hollowell JG, Staehling NW, Flanders WD, et al. Serum TSH, T(4), and thyroid antibodies in the United States population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). J Clin Endocrinol Metab. 2002;87(2):489-99.

8. Sawin CT, Castelli WP, Hershman JM, McNamara P, Bacharach P. The aging thyroid. Thyroid deficiency in the Framingham Study. Arch Intern Med. 1985;145(8):1386-8.

9. Surks MI, Ortiz E, Daniels GH, et al. Subclinical thyroid disease: scientific review and guidelines for diagnosis and management. JAMA. 2004;291(2):228-38.

10. Taddei S., Caracio N., Virdis A. impaired endothelial dependent vasodilatation in subclinical hypothyroidism. Beneficial effect of levothyroxine therapy. The Journal of Clinical Endocrinology and Metabolism. 2003;88:3731. doi: 10.1210/jc.2003-030039.

11. Hak A. E., Pols H. A., Visser T. J., Drexhage H. A., Hofman A., Witteman J. C. Subclinical Hypothyroidism Is an Independent Risk Factor for Atherosclerosis and Myocardial Infarction in Elderly Women: The Rotterdam Study. Annals of Internal Medicine. 2000;132(4): 270. doi: 10.7326/0003-4819-132-4-200002150-00004.

12. Qari FA. Thyroid hormone profile in patients with acute coronary syndrome. Iran Red Crescent Med J. 2015 Jul;17(7):e26919.

13. Khalil OA, Abdelaziz A, Ghoniem ME, Elagrody AI, Elgendy SA, Fawzy MS. Thyroid dysfunction in acute coronary syndrome and its relation to morbidity and mortality. International Journal of Science and Research.2015 Jul;4(7):1564-70.

14. Biondi B. Natural history, diagnosis and management of subclinical thyroid dysfunction. Best Practice & Research Clinical Endocrinology & Metabolism. 2012;26(4):431–46.

15. Bayrak A, Bayr A, Karabulut KU. Effects of Thyroid hormones on major cardiovascular risk in acute coronary syndromes. Critical Care 2011,15(Suppl 1):P1 https://doi.org/10.1186/ cc9421

16. Canaris GJ, Manowitz NR, Mayor G, Ridgway EC. He Colorado thyroid disease prevalence study. Arch Intern Med 200; 160: 526-34.

17. Ertugrul O, Ahmet U, Asim E, Gulcin HE, Burak A, et al. Prevalence of Subclinical Hypothyroidism among Patients with Acute Myocardial Infarction. ISRN Endocrinol 2011: 810251.

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