

# Prevalence of Subclinical Hypothyroidism of Patients with Acute Coronary Syndrome at a Tertiary Care Hospital

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## ABSTRACT

**Background:** Cardiovascular diseases (CVDs) have now become the leading cause of mortality in India. Acute coronary syndrome (ACS) describes the range of myocardial ischemic states that includes unstable angina, non-ST elevated myocardial infarction (MI), or ST-elevated MI. Hence; the present study was undertaken for assessing the prevalence of subclinical hypothyroidism of patients with acute coronary syndrome.

**Materials & Methods:** A total of 50 patients who were admitted due to acute coronary syndrome were enrolled in the present study. Blood samples were obtained and were sent to for assessment of thyroid profile. Complete haematological and biochemical profile of all the patients was also obtained. For serum thyroid hormone profile was measured by Enzyme linked immunosorbent assay (ELISA) technique.

**Results:** Subclinical hypothyroidism was found to be present in 5 patients (10 percent of the patients). Non-significant results were obtained while correlating the presence of subclinical hypothyroidism with age and gender-wise distribution of patients.

**Conclusion:** Thyroid profile is altered significantly in patients with acute coronary syndrome.

**Key words:** Acute Coronary Syndrome, Subclinical Hypothyroidism.

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## INTRODUCTION

Cardiovascular diseases (CVDs) have now become the leading cause of mortality in India. A quarter of all mortality is attributable to CVD. Ischemic heart disease and stroke are the predominant causes and are responsible for more than 80% of CVD deaths.<sup>1-3</sup> Despite wide heterogeneity in the prevalence of cardiovascular risk factors across different regions, CVD has emerged as the leading cause of death in all parts of India, including poorer states and rural areas. The progression of the epidemic is characterized by the reversal of socioeconomic gradients; tobacco use and low fruit and vegetable intake have become more prevalent among those from lower socioeconomic backgrounds.<sup>4,5</sup>

Acute coronary syndrome (ACS) describes the range of myocardial ischemic states that includes unstable angina, non-ST elevated myocardial infarction (MI), or ST-elevated MI. ACS is associated with substantial morbidity and mortality and places a large financial burden on the health care system.

The thyroid gland is a vital hormone gland: It plays a major role in the metabolism, growth and development of the human body. It helps to regulate many body functions by constantly releasing a steady amount of thyroid hormones into the bloodstream.<sup>6,7</sup> Hence; the present study was undertaken for assessing the prevalence of subclinical hypothyroidism of patients with acute coronary syndrome.

## MATERIALS & METHODS

The present study was conducted in the Department of General Medicine, Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh (India) and it included assessment of thyroid profile in patients with ACS. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol.

A total of 50 patients who were admitted due to acute coronary syndrome were enrolled in the present study.

**Inclusion Criteria**

- Patients with acute coronary syndrome irrespective of their age and sex.
- Diagnostic criteria for Acute Coronary Syndrome

**Exclusion Criteria**

- Patients with known thyroid disease.
- Patients having history of corticosteroid administration
- Patients on previous amiodarone therapy

Electrocardiography was done in all the patients. Blood samples were obtained and were sent to for assessment of thyroid profile. Complete haematological and biochemical profile of all the patients was also obtained. For serum thyroid hormone profile was measured by Enzyme linked immunosorbent assay (ELISA) technique. The data was collected systematically and analyzed statistically according to the standard statistical methods. SPSS software was used for assessment of level of significance. Chi-square test was used. P- value of less than 0.05 was taken as significant.

**Table 1: Demographic data**

Parameter	Number of patients	
Age group (years)	Less than 30	8
	30 to 40	12
	41 to 50	13
	More than 50	17
Gender	Males	32
	Females	18

**Table 2: Prevalence of subclinical hypothyroidism**

Subclinical hypothyroidism	Number of patients	Percentage of patients
Present	5	10
Absent	45	90
Total	50	100

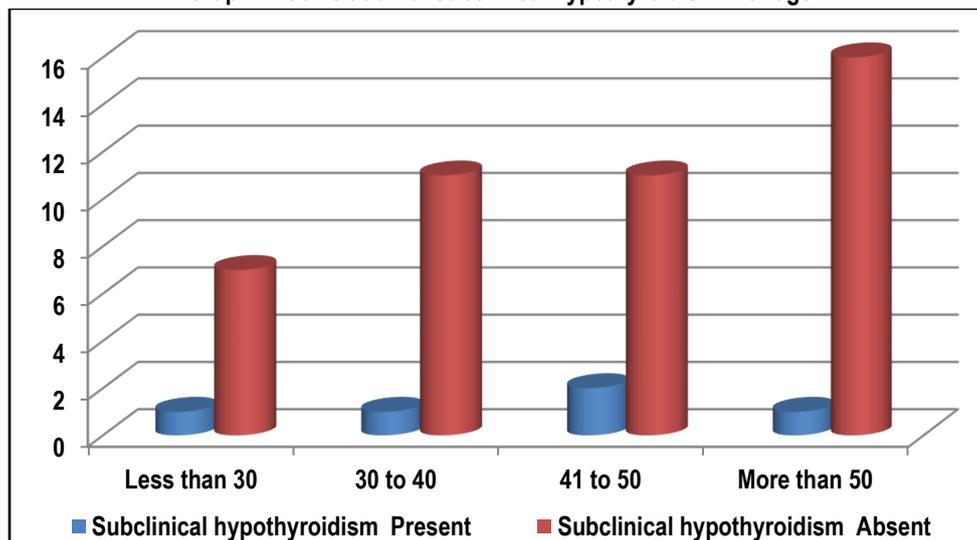
**Table 3: Correlation of subclinical hypothyroidism with age**

Age group (years)	Subclinical hypothyroidism		p- value
	Present	Absent	
Less than 30	1	7	0.450
30 to 40	1	11	
41 to 50	2	11	
More than 50	1	16	

**Table 4: Correlation of subclinical hypothyroidism with gender**

Gender	Subclinical hypothyroidism		p- value
	Present	Absent	
Males	3	29	0.658
Females	2	16	

**Graph 1: Correlation of subclinical hypothyroidism with age**



## RESULTS

In the present study, a total of 50 patients with ACS were analysed. Mean age of the patients of the present study was 52.5 years. 17 patients belonged to the age group of more than 50 years. 13 patients belonged to the age group of 41 to 50 years. 12 patients belonged to the age group of 30 to 40 years. 32 patients were males while the remaining 18 were females.

In the present study, Subclinical hypothyroidism was found to be present in 5 patients (10 percent of the patients). Among these 5 patients, 2 patients belonged to the age group of 41 to 50 years while 1 patient each belonged to the age group of less than 30, 30 to 40 and more than 40 years.

In the present study, among the 5 patients with subclinical hypothyroidism, 3 were males while the remaining 2 were females. Non-significant results were obtained while correlating the presence of subclinical hypothyroidism with age and gender-wise distribution of patients.

## DISCUSSION

The subclinical hypothyroidism and hyperthyroidism have recently been documented as clinical entities with negative effects on the cardiovascular system. Subclinical hypothyroidism is categorized by normal serum levels of FT4 and FT3, and slightly elevated serum thyrotropin (TSH) concentrations. This condition is associated with an initial reduced systolic function, diastolic hypertension, increased systemic vascular resistance, an atherogenic lipid profile, and inflammatory condition. Subclinical hyperthyroidism is related to an increased risk of supraventricular arrhythmias, hypercoagulable state, and a mild decrease of coronary reserve. Recent studies correlate both subclinical hypothyroidism and hyperthyroidism with an increased threat of cardiovascular mortality.<sup>6-8</sup>

In the present study, a total of 50 patients with ACS were analysed. Mean age of the patients of the present study was 52.5 years. 17 patients belonged to the age group of more than 50 years. 13 patients belonged to the age group of 41 to 50 years. 12 patients belonged to the age group of 30 to 40 years. 32 patients were males while the remaining 18 were females. Helmy MM et al detected the prevalence of subclinical hypothyroidism (SCH) among acute coronary syndrome patients. The study included 300 patients admitted with the diagnosis of acute coronary syndrome (either STEMI or NSTEMI or UA) with close follow up during the in hospital stay to detect any morbidity or mortality. All subjects underwent complete lipid profile (TC-TG-LDL-C-HDL-C-VLDL-C) and thyroid profile (free T3-free T4-TSH). SCH was associated with hypercholesterolemia (in 83.1% of patients), hypertriglyceridemia (in 80% of patients), increased LDL-C (in 83.3% of patients), decreased HDL-C (in 85.7% of patients) and increased VLDL-C (in 86.6% of patients). The prevalence of SCH among ACS patients was 5%. Morbidity was 34.6% in ACS patients with normal thyroid profile (euthyroid) vs. 20% in those with SCH (p value 0.7). Mortality was 2.5% in ACS patients with normal thyroid profile (euthyroid) vs. 0% in those with SCH (p value more than 0.05). Prevalence of SCH is 5% in ACS patients and it has no association with in hospital morbidity and mortality.<sup>9</sup>

In the present study, Subclinical hypothyroidism was found to be present in 5 patients (10 percent of the patients). Among these 5 patients, 2 patients belonged to the age group of 41 to 50 years while 1 patient each belonged to the age group of less than 30, 30

to 40 and more than 40 years. Abdulaziz Qari F assessed the prevalence of thyroid dysfunction in acute coronary syndrome, including Non-ST Segment Elevation Myocardial Infarction (NSTEMI), ST-segment Elevation Myocardial Infarction (STEMI), and unstable angina groups. They enrolled 400 patients admitted at the coronary care unit of King Abdulaziz University Hospital in Jeddah, Saudi Arabia. Venous blood samples were collected from patients for the evaluation of thyroid function (thyroids stimulating hormones, free triiodothyronine, and free thyroxine). 76.7% of patients admitted with acute coronary heart disease (ST-segment elevation myocardial infarction and Non-ST segment elevation myocardial infarction), and unstable angina had euthyroidism. Thyroid dysfunction was reported in 23.3% of patients with coronary heart disease. Overall hypothyroidism prevalence was 7.8%, while subclinical hyperthyroidism in our study was 2.7%. Overt hyperthyroidism and subclinical hyperthyroidism was reported 2.0% and 0.5%, respectively. Euthyroid sick syndrome was noticed in 41 (10.2%) of critically ill patients. The mortality rate was 9.8%; all death patients had low triiodothyronine (T3) syndrome and were associated with statistically significant low free triiodothyronine (FT3) ( $P > 0.001$ ). No significant variance was observed among patients underwent for cardiac catheterization, STEMI, NSTEMI, unstable angina, and atrial fibrillation with respect to FT4, FT3, and TSH levels during coronary care unit hospitalization based on their profile data.<sup>10</sup>

In the present study, among the 5 patients with subclinical hypothyroidism, 3 were males while the remaining 2 were females. Non-significant results were obtained while correlating the presence of subclinical hypothyroidism with age and gender-wise distribution of patients. Mukherjee S et al calculated the prevalence of subclinical thyroid dysfunction in patients with ACS. A retrospective chart review of 1100 consecutive patients was done who presented to Emergency Department with symptoms suggestive of ACS and admitted. They were later classified in 3 categories that includes Acute ST Elevated Myocardial Infarction (STEMI), Unstable Angina (UA), and Acute Non-ST Elevated Myocardial Infarction (NSTEMI). Thyroid function test (FT4, TSH) and antithyroid peroxidase (TPO) were done and evaluated properly. Of 1100 consecutive patients 168 (15.27%) patients had the biochemical features of subclinical thyroid dysfunction. These 168 patients include 60 STEMI, 66 NSTEMI, and 42 Unstable Angina patients. There were no statistically significant differences in terms of left ventricular ejection fraction (LVEF) and catheterisation results considering thyroid dysfunction. Subclinical thyroid dysfunction is quite prevalent in ACS patients.<sup>11</sup>

## CONCLUSION

From the above results, the authors conclude that thyroid profile is altered significantly in patients with acute coronary syndrome, thereby highlighting its role in the pathogenesis of the disease.

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