



ORIGINAL RESEARCH PAPER

General Medicine

A STUDY TO IDENTIFY THE PRESENCE OF SEVERE CORONARY ARTERY DISEASE IN PATIENTS WITH NO ELECTROCARDIOGRAPHIC, BIOCHEMICAL AND ECHOCARDIOGRAPHIC EVIDENCE OF CAD USING CT CORONARY ANGIOGRAPHY

KEY WORDS: Chest pain, CT coronary angiography, ECG, Coronary artery disease, Prevalence

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ABSTRACT

INTRODUCTION: Acute chest pain is one of the most common reasons for seeking care in the emergency department (ED), accounting for approximately 10% of all visits. The difficulty lies in discriminating patients with ACS or other life-threatening conditions from those with non-cardiovascular, non-life-threatening chest pain. The diagnosis of ACS is missed in approximately 2% of patients. But it is essential to rule out cardiovascular etiology of chest pain to avoid unnecessary cost and complications of investigations and treatment. This study aims at identifying the prevalence of significant coronary artery disease in patients with no electrocardiographic and biochemical evidence of coronary artery disease. **AIM OF STUDY:** To identifying the presence of severe coronary artery disease in the patients with no electrocardiographic, biochemical and echocardiographic evidence of CAD using CT Coronary Angiography. **MATERIAL AND METHODS:** The study was conducted on 50 patients during a period of 4 months, admitted with history of chest pain without any ECG evidence of STEMI, negative cardiac markers, no evidence of RWMA on 2D ECHO, or previous history of myocardial infarction. **RESULTS:** Out of the 50 patients studied, 38 (76%) were males and 12 (24%) were females. A total of 6 patients (12%) were found to have severe stenosis in major coronary arteries (stenosis > 70%) of which 4 were males (10.5%) and 2 were females (16.67%). CADRAD score ≥3 was found in 9 patients (18%): 6 males (15.78%) and 3 females (12%). Average age of patients who presented with chest pain with no electrocardiographic and biochemical evidence of coronary artery disease was found to be 61.7 years in males and 60.1 in females. 66.7% of the female patients and 78.94% of male patients were over the age of 55 years. **CONCLUSION:** Further workup of patients with chest pain with no electrocardiographic and biochemical evidence of coronary artery disease is necessary to avoid missing diagnosis of CAD.

INTRODUCTION

Acute chest pain is one of the most common reasons for seeking care in the emergency department (ED), accounting for approximately 10% of all visits annually. Although chest pain raises the possibility of an Acute Coronary Syndrome (ACS), after diagnostic evaluation only 10% to 15% of patients with acute chest pain actually have ACS1. Acute chest pain refers to symptoms of new onset or change from previous in pattern, intensity, or duration; stable chest pain refers to symptoms that are chronic and associated with consistent precipitants. Although the term 'chest pain' is used in clinical practice, patients often report pressure, tightness, squeezing, heaviness, or burning in locations in addition to the chest, including the shoulder, arm, neck, upper abdomen, or jaw. Chest pain should be described as cardiac, possibly cardiac, or noncardiac rather than as typical or atypical².

The difficulty lies in discriminating patients with ACS or other life-threatening conditions from those with non-cardiovascular, non-life-threatening chest pain. The diagnosis of ACS is missed in approximately 2% of patients, which can lead to substantial consequences for example, the short-term mortality in patients with acute myocardial infarction (AMI) who are mistakenly discharged from the ED increases twofold over that expected for patients who are admitted to the hospital. For patients with a lower risk for complications, however, these concerns must be balanced against the cost and inconvenience of admission and against the risk for complications from tests and procedures with a low probability of improving patient outcomes.

Since the advent of computed tomography (CT) by Sir Godfrey Hounsfield in 1971, technological advances of CT systems have generated vast improvements in the detection

and exclusion of anatomic and physiologic pathology in virtually all body systems. One such improvement was the 64-detector row CT scanner in 2005, which afforded the necessary temporal and spatial resolution for capturing almost motion-free studies of the heart and coronary arteries that, when coupled with adequate volume coverage, reduced breath-hold times such that a cardiac CT study was achievable by most patients. In the last decade, further iterative improvements in CT have been introduced, which allow for comprehensive assessment of coronary and cardiac structure and function.

Coronary computed tomography angiography (CTA) is a viable alternative to functional testing with or without imaging in the evaluation of patients with acute chest pain in the emergency department (ED)^(6,7)

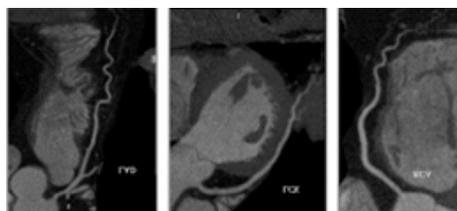


Fig.01: Normal LAD, LCX, and RCA4

CASE STUDY

An Observational cross-sectional study was carried out after getting informed consent on fifty patients over the age of 18 years admitted with complaints of typical chest pain in the Department of General Medicine for the period of 3 months, from July 2022 to September 2022. Detailed clinical history, clinical examination and investigations were carried out.

Inclusion criteria:

- Patients with cardiac or possibly cardiac chest pain reported as pressure, tightness, squeezing, heaviness, or burning in locations in addition to the chest, including the shoulder, arm, neck, upper abdomen, or jaw2.

Exclusion criteria:

1. Patients with ECG evidence of STEMI
 - Greater than or equal to 0.1 mv ST elevation in two contiguous leads other than V2-V3 where the cut-off point of ≥ 0.25 mv in men <40 yrs; or >0.15mv in women.
 - Development of pathological Q waves
2. Patients with positive cardiac marker (elevated cardiac Troponin)
3. Evidence of RWMA on 2D Echo
4. Patients with previous history of myocardial infarction (STEMI and NSTEMI)
5. Patients with deranged renal function tests or with history of contrast allergy.

After full filling the criteria total of 50 patients underwent CT Coronary Angiography and the results were analyzed. Patients were categorized on the basis of CAD-RAD score for Acute Chest Pain4.

STUDY PERIOD:

July 2022 to September 2022

STUDY DESIGN: An observational cross-sectional study to calculate period prevalence. And Nominal/categorical variables were summarized as frequency and percentage and represented as tables and graphs.

Out of the 50 patients studied, 38 (76%) were males and 12 (24%) were females.

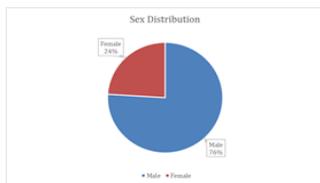


FIG. 02: Sex distribution

Out of the 50 patients studied, 66.7% of the female patients and 78.94% of male patients were over the age of 55 years. (Fig.03)

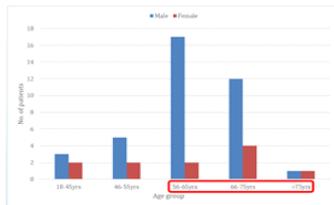


FIG. 03 Age Distribution

9 patients (18%) were found to have CADRAD score ≥ 3 of which 6 were males (12%) and 3 were females (6%).

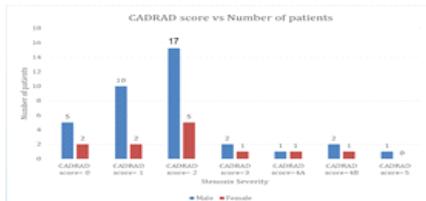


Fig. 04 CAD-RADS vs Number of Patients

6 patients (12%) were found to have severe stenosis in major coronary arteries of which 4 were males (8%) and 2 were females (4%).

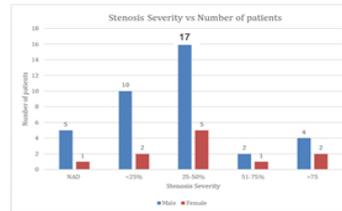


Fig. 05 Number of Patients with severe stenosis

Gender	Age	0	1	2	3	4A	4B	5	Total
Male	18-45	0	1	2	0	0	0	0	3
	46-55	1	2	1	0	0	0	0	4
	56-65	1	6	3	0	1	0	0	11
	66-75	3	1	5	2	0	0	0	11
	>75	0	0	0	0	0	0	0	0
Female	18-45	0	1	2	0	0	0	0	3
	46-55	0	0	2	0	0	0	0	2
	56-65	0	1	1	0	0	0	0	2
	66-75	0	1	1	1	0	0	0	3
	>75	0	2	2	0	1	0	0	5

CONCLUSIONS

Nearly 30% of general population in their lifetime will go to the physician with a chief complaint of chest pain3. It is highly likely that patients with normal ECG, cardiac markers and ECHO be dismissed with symptomatic management, while in reality they might be harboring significant coronary artery disease. CCTA is rapidly emerging as the best diagnostic and prognostic medical imaging modality for diagnosing the patient with clinical suspicion of CAD because of its high negative predictive value(5,6,7). Laggoune et al. 8 have previously demonstrated that CCTA is an effective and accurate imaging technique for the assessment of chest pain in old patients.

Further workup of patients with chest pain with no electrocardiographic and biochemical evidence of coronary artery disease is necessary to avoid missing diagnosis of CAD. Since CCTA helps rule out Coronary Artery Disease, it is an effective investigation to avoid unnecessary preventive treatment.

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