



Study of Correlation of TMT Results with Angiogram Findings in Coronary Artery Disease Predictability in Patients with Angina Equivalents in DAE Hospital

Author

Dr Sridevi Sitaraman MD (Internal Medicine) Physician

Department of Atomic Energy Hospital

Introduction

Coronary artery disease is leading cause of mortality and morbidity worldwide. The early detection and treatment of CAD is vital to prevent complications with non invasive tests like stress tests. Exercise treadmill testing (ETT) is a well-validated, inexpensive test that can be used for the evaluation of patients with suspected coronary artery diseases (CAD). In addition to identifying patients who have exercise-induced ECG changes suggestive of ischemia, ETT also provides important data on exercise capacity, blood pressure, and heart rate response to exercise, symptoms, and the presence of exercise-induced arrhythmias. In a person at high risk for coronary heart disease (e.g., advanced age, multiple coronary risk factors), an abnormal TMT is very predictive of the presence of coronary heart disease (> 90% accurate). In the present study, we studied the patients with changing risk factor profiles along with increasing incidence of CAD in younger population (even as young as 30-35 years), in females versus males by TMT and also the correlation of TMT results with angiogram findings in the predictability of CAD.

Study Methodology

This was a retrospective study done in our Institution from March 2023-march 2024 of 35 patients after obtaining ethical clearance and informed consent from all patients who had symptoms of chest pain, dyspnoea on exertion, palpitations with normal ECHO findings.

Risk factors taken into consideration for the study included weight, presence/absence of HTN, presence/absence of diabetes mellitus (DM), dyslipidemia, smoking, and family history of coronary artery disease. TMT was done using modified Bruce protocol, and results were evaluated as negative, inconclusive, positive [high probability for inducible ischemia]

Inclusion Criteria- In this study, we included male and female patients of age 25 and above who had symptoms of chest discomfort, dyspnoea on exertion, palpitations with normal echo findings with positive TMT

Exclusion Criteria- Patients already done with valvular heart disease, those with pacing devices, COPD patients, arthritis patients, old and fragile patients, patients on cytotoxic cancer therapy,

anxiety neurosis and those with abnormal echo findings were excluded

Results

In our study we included 35 patients with symptoms and studied for the prevalence of coronary artery disease. We found that 21 patients were male and rest 14 were female (table 1).25 pts had chest pain as the predominant symptom and 9 had dyspnoea on exertion and 1 pt had palpitations (table3). It was found that younger patients were more prone to CAD as 18 of them were less than 60 yrs and rest 17 were greater than 60 yrs (table2).It was also found that risk factor

predominance was associated with coronary artery disease as 31 patients had risk factors like hypertension, DM, dyslipidemia with positive family history and rest 4 patients had only positive family history and no risk factors (table5). Regarding Coronary angiogram correlation with TMT positive patients we found that all patients with positive TMT had coronary artery disease out of which 13 of them had minimal disease 18 of them had single vessel disease ,3 of them had triple vessel disease and rest 1 had double vessel disease thus confirming the dependability of the test(table4)

Table 1 According to sex

Male	female
21	14

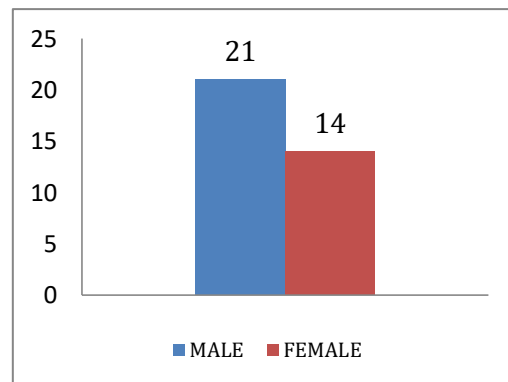
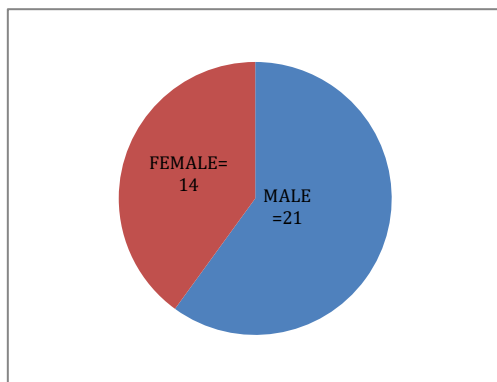


Table 2 According to age

<60 years	>60 years
18	17

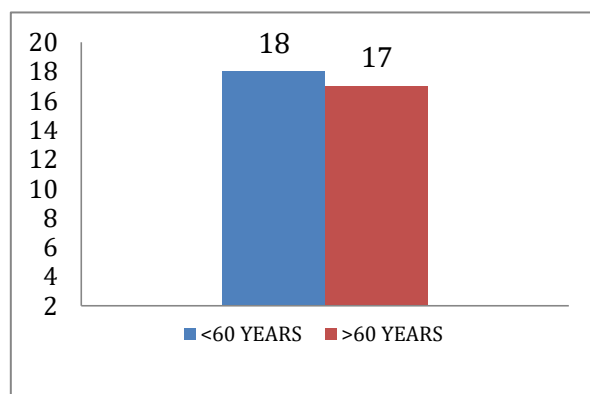
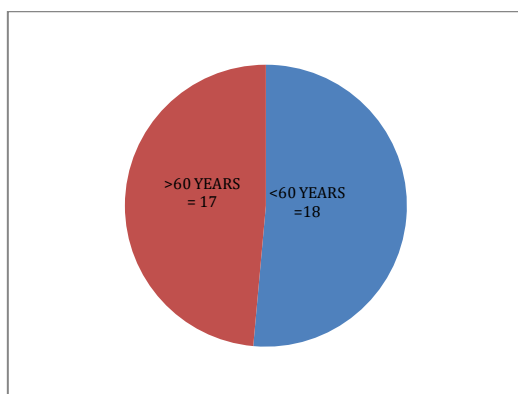


Table 3 According to symptoms

Chest pain	Dyspnoea on exertion	Palpitation
25	9	1

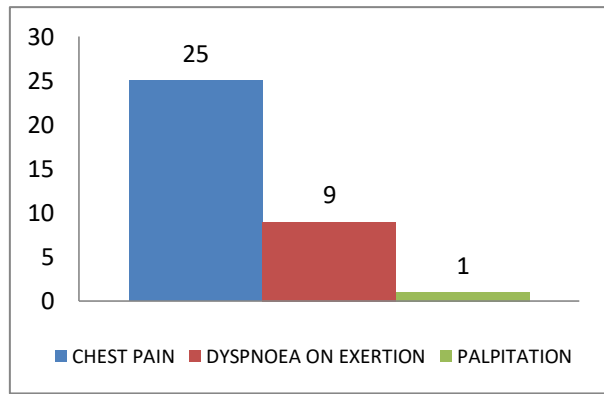
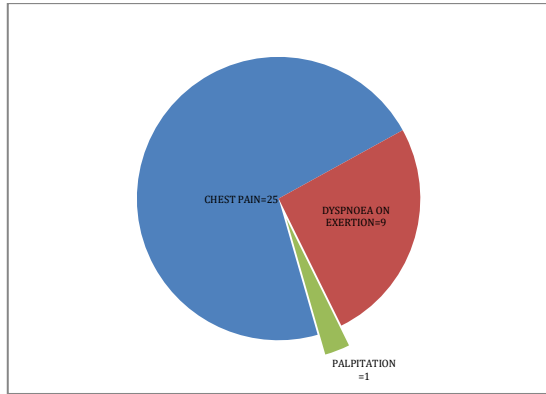


Table 4 CAG correlation with positive TMT

Minimal CAD	Single vessel disease	Double vessel disease	Triple vessel disease
13	18	3	1

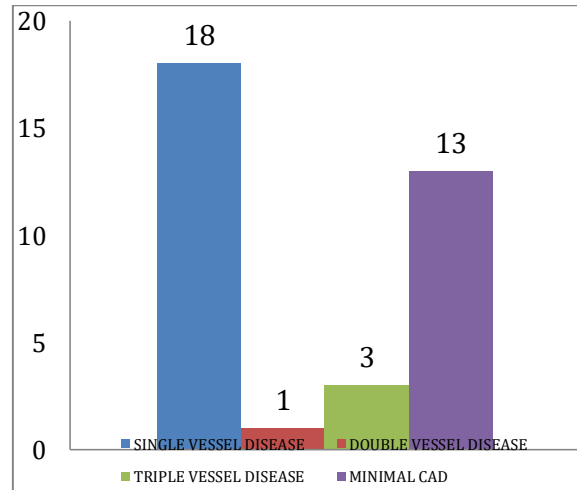
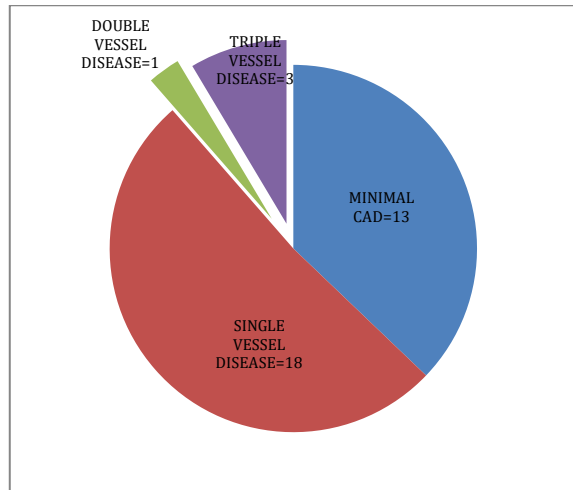
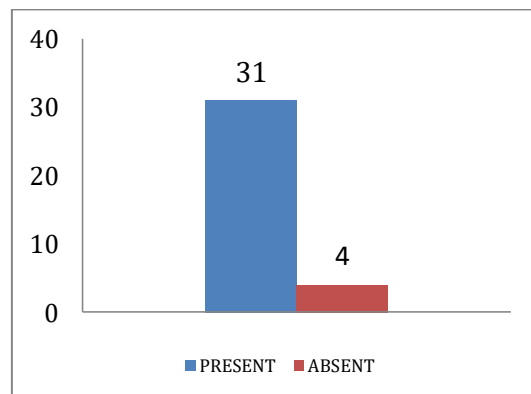
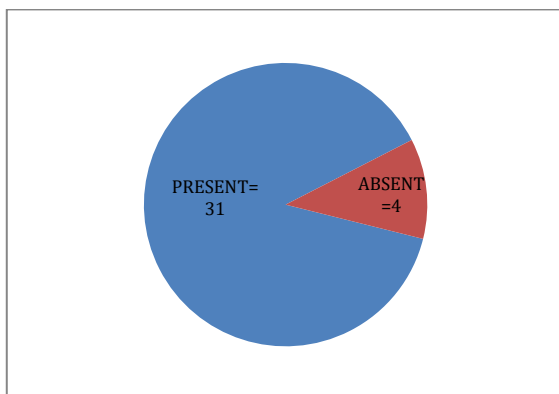


Table 5 according to risk factors (hypertension, DM, dyslipidemia)

present	absent
31	4



Comparison with national study data

In the present study, in comparison with national data males exceeded females in coronary artery disease which is in correlation, also the most predominant symptom being chest pain which also matches with national data. In our study younger patients (<60 years) are most affected with coronary artery disease which also correlates with national data as mean age affected was found to be 51+/-7 years. The presence of risk factors was mostly associated with CAD which also matches with national data

Comparison with international study data

As far as the relationship of CAG with TMT, there was statistically significant correlation between CAD and TMT. In our study there is a strong correlation between the TMT positive and coronary angiogram findings as 22 patients were detected with vessel disease significantly and management (stenting/CABG) done which correlates with international data. The risk factors like hypertension, diabetes mellitus were found to be more associated in patients with obstructive CAD which also correlates with international data. So the diagnostic yield of TMT (NON-INVASIVE) test was more significant and its correlation with coronary angiogram led to proper management of the patients of coronary artery disease which is in line with international data

Limitations

Many people like fragile patients, arthritis patients, valvular heart disease patients, COPD patients were not able to perform the stress test so they were deputed for angiogram test directly. Thus TMT can be used as a tool for functional assessment, while invasive coronary angiography (CAG) for anatomical assessment

Conclusion

Our study supports the fact that in patients with symptoms like chest pain, dyspnoea on exertion,

palpitations with positive TMT with suspicion of coronary ischemia along with CAG provides an important diagnostic tool for diagnosis and management of coronary artery disease. TMT is a good test for functional assessment of patients, also an important aid in management of CAD

Implications on society- Our study of TMT correlation with angiogram findings in concordance with national and international study data has proved that TMT is a reliable and sensitive tool which is noninvasive to detect CAD and it properly guides us with management at the earliest without any delay

References

1. AHA Guidelines for Exercise Testing: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing): *Circulation*. 1997; 96: 345-354.
2. Summary article: A report of ACC/AHA task force on practice guidelines (committee to update the 1997 Exercise Testing Guidelines). *J Am Coll Cardiol* 40: 1531, 2002.
3. Exercise stress testing in Braunwald's Heart Disease, 9th edition, Elsevier; chapter 14; page 168- 197.
4. Kumar AS, Sinha N. Cardiovascular disease in India: A 360 degree overview. *Med J Armed Forces India*. 2020;76:1-3.
5. Sanchis-Gomar F, Perez-Quilis C, Leischik R, Lucia A. Epidemiology of coronary heart disease and acute coronary syndrome. *Ann Transl Med* 2016; 4 (13) 256-2
6. Ben-Shlomo Y, Brookes S, Hickman M. Epidemiology, Evidence-Based Medicine and Public Health. 6th ed. Oxford, UK: Wiley-Blackwell; 2013 3.