



ANGIOGRAPHIC CORRELATION OF ECG CHANGES AND DISEASE BURDEN OF TMT-STRONG POSITIVE CASES

Dr. E. Elavarasi Manimegalai*	MD.,DM .Assistant Professor Institute Of Cardiology,madras Medical College & Rajiv Gandhi Govt General Hospital,chennai-600003 *Corresponding Author
Dr. S. Kumaran	MD.,DM.,Assistant Professor Institute Of Cardiology,madras Medical College & Rajiv Gandhi Govt General Hospital,chennai-600003
Dr. G. Justin Paul	MD .,DM.,Professor Institute Of Cardiology,madras Medical College & Rajiv Gandhi Govt General Hospital,chennai-600003
Dr. Venkatesan Sangareddi	MD.,DM. , Senior Assistant Professor Institute Of Cardiology,madras Medical College & Rajiv Gandhi Govt General Hospital,chennai-600003
Dr. N. Swaminathan	MD.,DM., Director and Professor Institute Of Cardiology,madras Medical College & Rajiv Gandhi Govt General Hospital,chennai-600003

ABSTRACT This study was done to evaluate whether there are any angiographic correlation between ECG changes and disease burden in TMT strong positive patient.108 Patients with effort angina class 2 underwent TMT with standard Bruce Protocol and the ECG changes and angiographic profile of strong positive cases were studied.78 % patients had significant disease requiring intervention either PCI or CABG.ST depression in V5 V6 was the commonest ECG change found.TMT strong positive is an important marker of disease burden in the coronary arteries although ECG changes did not have any localisation value.

KEYWORDS :TMT Strong positive ,Selzer criteria, ECG changes,Coronary angiogram

1.INTRODUCTION :

TMT is a non-invasive test to detect coronary artery disease. It is easy to administer, perform, interpret, physiological, adaptable, flexible, reliable and inexpensive. It differs according to age, sex, heredity, exercise habits, cardiovascular status. TMT has got so many limitations. In spite of these limitations, TMT strong positive is an important marker of disease burden of coronary arteries. This study was done to find out the angiographic correlation of TMT Strong positive patients.

2.METHODS :

2.1 STUDY DESIGN :

This is a prospective observational study.

2.2 STUDY PLACE :

It was done in Department of Cardiology, Rajiv Gandhi Government General Hospital, Chennai, during the period January 2016 to Dec 2016.

2.3 PARTICIPANTS:

700 patients with effort angina from OPD were subjected to TMT. 108 patients had TMT strong positive according to SELZER criteria. They were subjected to coronary angiogram and the angiographic profile of these 108 patients were studied.

2.4 PROTOCOL:

Bruce protocol

2.4.1 INCLUSION CRITERIA

Patients with effort angina class 2 who attended OPD between Jan 2016 to Dec 2016

2.4.2 EXCLUSION CRITERIA

- Acute myocardial infarction within two days
- High risk unstable angina
- Uncontrolled cardiac arrhythmias and haemodynamic compromise
- Active endocarditis
- Symptomatic severe Aortic stenosis /Moderate Aortic stenosis with uncertain symptoms
- Decompensated heart failure
- Acute Pulmonary embolism

- Acute myocarditis or Pericarditis
- Physical disability precluding safe and adequate testing
- Known left main disease
- Acquired complete heart block
- HCM with severe resting gradient
- Mental impairment with limited ability to cooperate

2.4.3 PATIENT PREPARATION :

- Patient should refrain from food, alcohol, caffeine, tobacco products within 3 hours of testing
- Avoid exertion on the day of testing
- Free clothing ,
- One male attendant,
- List of medications to be noted
- Preparation of chestpats

2.4.4 SELZER CRITERIA :

MILD POSTIVIE	Horizontal ST depression of 1 to 1.5 mm / slowly rising junctional depression which remains depressed 1.5 mm or more than 80 ms after Jpoint
MODERATE POSITIVE	Horizontal ST depression of 1.5 to 2.5 mm/slowly rising ST depression which remains depressed more than 2.5 mm 80 ms after Jpoint and downsloping ST depression with J point depressed 1-2 mm
STRONG POSTIVIE	Flat ST depression of 2.5 mm / more slowly rising ST depression at J point of 2 mm or more / horizontal or downsloping ST depression appearing in first stage of exercise and remaining for more than 8 min into recovery.

2.4.5 TERMINATION OF EXERCISE :

• Acute MI	• Severe shortness of breath
• Onset of moderate to severe angina	• CNS symptoms
• Decrease in systolic BP	• Technical inability to monitor ECG
• Serious arrhythmias	• Patients request
• Features of poor perfusion	

2.4.6 CORONARY ANGIOGRAM :

TMT strong positive patients underwent coronary angiogram and angiographic profile were correlated with the ECG changes.

3.RESULTS:

Table 1 : Patient characteristics of TMT strong positive patients

Age Group	No of Patients			Smoker	Diabetes	HT	Exercise Stage				Angiographic Profile				
	Male	Female	Total				I	II	III	IV	N	Min CAD	SVD	DVD	TVD
31-40	8	14	22	6	7	6	0	2	10	10	10	5	5	0	2
41-50	24	16	40	20	29	20	2	8	26	4	3	5	23	2	7
51-60	30	8	38	24	24	19	10	16	10	2	1	0	4	5	28
61-70	8	0	8	6	5	3	4	2	2	0	0	0	0	1	7
TOTAL	70	38	108	56	65	48	16	28	48	16	14	10	32	8	44

Patient characteristics were studied and it showed that the incidence of coronary artery disease was higher in 40-60 (75 %) years age group. As well known the comorbidities of diabetes and hypertension were present in more than 50 % patients..Smoking also contributed as a major risk factor.Most of the younger patients had normal coronaries or minimal coronary artery disease.Triple vessel disease was least in younger age group.

ST depression in leads V5 and V6 and II, III, aVF was the commonest ECG change in these patients .Diffuse ST depression was found only in four patients and these patients had either a double or triple vessel disease.One patient with ST elevation in V1 to V4 had LAD disease.Another patient with ST depression in V1 to V4 also had LAD disease.ECG changes did not have any localizing value although they definitely had great value in deciding the disease burden.

Table 2 : ECG CHANGES & ANGIOGRAPHIC DISEASE

ECG CHANGES	NO OF PATIENTS	NORMAL CORONARIES	MINIMAL CAD	SINGLE VESSEL DISEASE				DVD	TVD
				LAD	RCA	LCX	TOTAL		
ST ↓ V5 V6	42	4	5	5	0	3	8	2	23
ST ↓ V3 to V6	9	0	0	4	0	2	6	2	1
ST ↓ II, III aVF	11	7	3	0	1	0	1	0	0
ST ↓ II, III aVF, V5, V6, aVR	40	3	2	6	5	4	15	3	17
Diffuse ST ↓	4	0	0	0	0	0	0	1	3
ST ↓ V1 to V4	1	0	0	1	0	0	1	0	0
ST ↓ V1 to V4	1	0	0	1	0	0	1	0	0
TOTAL	108	14	10	17	6	9	32	8	44

Table 3 : ANGIOGRAPHIC PROFILE & EXERCISE STAGES

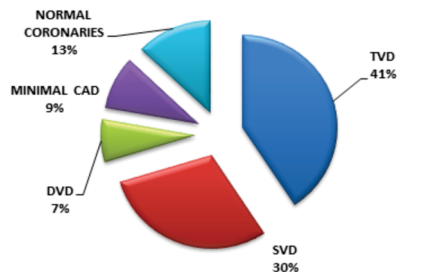
BRUE PROTOCOL COMPLETED STAGE	NO OF PATIENTS	NORMAL CORONARIES	MINIMAL CAD	SINGLE VESSEL DISEASE				DVD	TVD
				LAD	RCA	LCX	TOTAL		
STAGE I	16	0	0	1	0	0	1	2	13
STAGE II	28	1	0	0	0	0	0	5	22
STAGE III	48	3	4	16	6	9	31	1	9
STAGE IV	16	10	6	0	0	0	0	0	0
TOTAL	108	14	10	17	6	9	32	8	44

Lower the exercise stage completed higher was the disease burden. Patients with triple vessel disease were able to complete only the first or second stage of the disease.Most of the patients completing stage III had single vessel disease.LAD was the commonest vessel affected followed by LCX and RCA.

• Lower the METS and stage performed, higher was the disease burden

4DISCUSSION:

Fig 1: ANGIOGRAPHIC PROFILE OF TMT STRONG +VE PATIENTS



In our study, out of 108 patients, 44 patients had Triple Vessel Disease, 32 patients had Single Vessel Disease, 8 patients had Double Vessel Disease 10 patients had minimal coronary artery disease and 14 of them had normal coronaries.

- 84 out of 108 patients (78%) needed intervention either CABG or PTCA.
- None of these patients had LMCA disease.
- 65 out of 108 patients (60%) were diabetics
- TVD(44) was common in > 50 years (35), Diabetics (32), Males (35) and Smokers (34)
- Patients with normal coronaries were younger < 50 years (13/14), Non-diabetic (12/14), Females (10/14) and non-smokers (11/14)
- ECG changes did not have any localisation value

Fig 2: ECG CHANGES & ANGIOGRAPHIC DISEASE

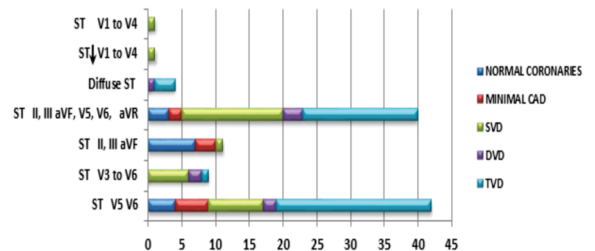
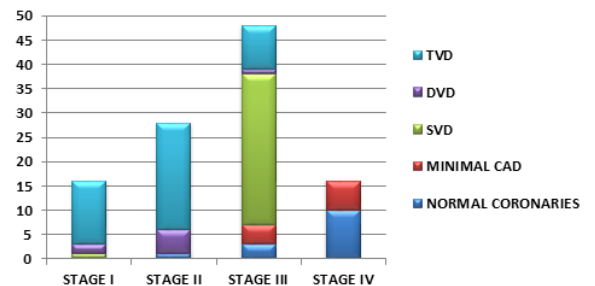


Fig 3 : ANGIOGRAPHIC PROFILE & EXERCISE STAGES



5. CONCLUSION:

78% of TMT strong positive cases had disease burden needing intervention – CABG/PTCA. TMT strong positive is an important marker of disease burden in the coronary arteries although ECG changes did not have any localisation value.

6. LIMITATIONS:

Individual patients differences in functional capacity to perform TMT is a major limitation .Patients with rest angina were not taken up for the study.

CONFLICT OF INTEREST

The authors have none to declare

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