



ORIGINAL RESEARCH PAPER

General Medicine

STUDY OF ST SEGMENT RESOLUTION AFTER THROMBOLYSIS IN ACUTE MYOCARDIAL INFARCTION AS A PREDICTOR OF OUTCOME

KEY WORDS: Acute Myocardial Infarction; St Segment Resolution; Thrombolysis

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ABSTRACT

BACKGROUND : ST segment elevation resolution following thrombolysis is simple, non-invasive ,accessible tool for the assessment of coronary reperfusion. This study was to assess the resolution of ST segment elevation 90 min following thrombolysis in acute myocardial infarction as a predictor of short term outcome.

METHODS :Sixty patients with first attack of acute ST segment elevation myocardial infarction admitted in ICCU of meenakshi medical college hospital and research institute.

RESULTS : 60 patients, 9 patients (15%) had < 30% ST resolution (no STR), 26 (43.3%) had 30-70% ST resolution (partial STR), 25 (41.7%) had > 70% ST resolution (complete STR)

CONCLUSION : Patients with no resolution of ST segment 90 minutes following thrombolysis associated with more adverse events and mortality compare to partial and complete resolution group.

INTRODUCTION;-

Thrombolytic therapy with approximate 30% reduction in mortality. Non-invasive detection of reperfusion is an useful guide to future treatment. Useful predictor of left ventricular function and clinical outcome.

This study is an effort to study the patients with acute myocardial infarction comparing their ECG findings on admission and subsequently after thrombolysis ,and the outcome of thrombolytic therapy in terms of mortality and morbidity during hospital stay.

Primary goal of therapy in ST elevation myocardial infarction has been to restore normal blood flow in the occluded epicardial coronary artery as rapidly as possible. **Reduction in ST segment elevation, relief from chest pain, early peaking of serum concentration of creatine kinase and reperfusion arrhythmias are OUTCome of the non-invasive markers of reperfusion. rapid, simple and inexpensive marker for assessing the success or failure of reperfusion therapy.**

OBJECTIVES;-

1. To study ST segment resolution after thrombolysis.
2. To study ST segment resolution with its correlation to clinical outcome and early complication.

MATERIALS AND METHODS ;-

All patients with diagnosis of acute ST segment elevation admitted in ICCU of meenakshi medical college hospital and research institute enathur kanchipuram.

Sample size: 60 cases of diagnosed ST segment elevation myocardial infarction.

Sampling method: Simple random sampling

Study design;- descriptive study.

Study period;- june 2018 – November 2018

INCLUSION CRITERIA;-

All the patients with first attack of ST segment elevation myocardial infarction diagnosed according to ACC/AHA guidelines without any conventional contraindications for thrombolysis before 12 hours of onset of symptoms.

EXCLUSION CRITERIA;-

- 1) Patients with previous history of acute myocardial

infarction patients coming to hospital after 12 hours of onset of symptoms.

- 2) Patients with conventional contraindications for thrombolytic therapy.
- 3) Patients with previous history of valvular heart disease, cardiomyopathies and congenital heart disease.
- 4) Electrolyte disturbances
- 5) If patient dies before 90 minutes after thrombolytic therapy
- 6) Bundle branch block.

ETHICAL ISSUES;- no

CONFLICT OF INTEREST;- NO

METHODOLOGY.

Sixty patients with first attack of acute ST segment elevation myocardial infarction without any conventional contraindication for thrombolysis were taken for study. Consent obtained.

Data will be collected in a pre-tested proforma by meeting objectives of study, detailed history, physical examination, thorough cardiovascular and other system examination and necessary investigations are recorded. ECG was recorded at the time of admission, 90 minutes after the thrombolysis everyday subsequently for 7 days. The other investigations to which patients were subjected are as follows:

1. Blood analysis :Hb%, TC, DC, ESR
2. Urine analysis: Albumin , Sugar, Microscopy
3. Lipid profile within 24 hours of onset of chest pain
4. FBS, PPBS whenever necessary
5. B. urea
6. S creatinine
7. S. electrolytes
8. CKMB, Trop T
9. Chest X-ray PA view (whenever necessary)

ST segment was measured 80 millisecc after the J point. The summed ST segment elevation was measured by summing the ST segment amplitude in all leads. With ST elevation at base line ECG (before thrombolysis) and at 90 min ECG (post thrombolysis) using methods described by Schroder et al. The percent resolution of ST segment resolution was calculated as the sum of ST segment elevation on first ECG minus the sum of ST segment elevation on second ECG, divided by initial sum of ST segment elevation.

Based on values obtained, study population divided into three

categories:A, B and C.

- A. Category A: < 30% resolution of the sum of ST segment elevation.
- B. Category B: 30% - 70% resolution of the sum of ST segment elevation.
- C. Category C: > 70% resolution of the sum of ST segment elevation.

Clinical details were recorded prospectively. In hospital, major adverse events were defined as the occurrence of any of the following. Killip Class II-IV, Leftventricular failure, cardiogenic shock, recurrent angina, significant arrhythmias(which needs definite pharmacological, DC cardioversion and interventions like pacing) and death. Adverse events were divided according to timing < 48 hours after admission and > 48 hours after admission. An uncomplicated course was defined as no major adverse event during entire inpatient stay.

STATISTICAL ANALYSIS:

All the data were statistically analyzed using Chi-square and ANOVA.

RESULTS ;-

Mean age of population studied is 50.7±9.6. Male to female ratio 4:1 shows a clear male preponderance. Chest pain is

most common mode of presentation seen in 95% of cases, followed by sweating and breathlessness. Smoking is most common risk in the present study, followed by hypertension and diabetes respectively. Anterior wall MI constitutes 58.3% compare to inferior wall MI 41.7%. Based on percentage of ST segment resolution after 90 minutes of thrombolysis ;-

Patients divided into three categories. Patients with > 70% ST resolution (complete STR) constitute 41.7%, patients with 30-70% ST resolution (partial STR) constitutes 43.3%, patients with < 30% ST resolution (no STR) constitutes only 15%. Patients with > 70% ST resolution (complete STR) associated with less frequent adverse events during hospital stay and less inpatient mortality. Patients with 30-70% ST resolution (partial STR) associated with more frequent adverse events during hospital stay when compare to complete STR group, Patients with < 30% ST resolution (no STR group) associated with more frequent adverse events and in hospital mortality. Among adverse events, left ventricular failure is most frequent adverse events seen in 33.3% cases, followed by arrhythmias 26.7% cases recurrent angina 18.3% cases and cardiogenic shock 8.3% cases. Inpatient mortality seen in 7 cases that is 11.7% cases. Most common causes of death is cardiogenic shock 71.4% cases followed by VT /VF 28.6% cases.

Table ; 1 Base line characteristics in ST segment resolution subgroups based on age and sex

category	AGE			SEX	
	30- 40 yrs	40- 59 yrs	60 -74 YRS	male	female
A < 30%	1 (11.1 %)	7 (77.8 %)	1 (11.1%)	7 (77.8%)	2 (22.2%)
B 30- 70%	7 (26.9%)	15 (57.7%)	4 (15.4%)	20 (76.9%)	6 (23.1%)
C >70%	5 (20%)	11 (44 %)	9 (36 %)	21 (84%)	4 (16 %)
TOTAL	13	33	14	48	12
PERCENTAGE	21.7	55.0	23.3	80	20

Figure 1: AGE AND SEX DISTRIBUTION OF PATIENTS

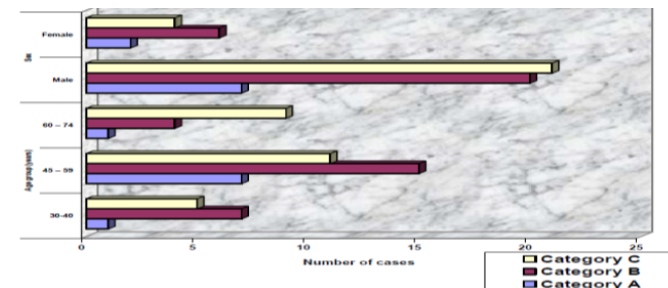


Table ; 2 Based on symptoms at presentation;-

Based on symptoms	CHEST PAIN	SWEATING	DYSPNEA	SYNCOPE	PALPITATION
A <30%	9 (100%)	7 (77.8%)	6 (66%)	0	2 (22.2%)
B 30 - 70%	24 (92.3%)	22(84.6%)	6 (23%)	5 (19.2%)	0
C >70%	24 (96%)	23 (92%)	3 (12%)	1(4%)	1(4%)
TOTAL	57	52	15	6	3
percentage	95	86	25	10	5

Figure 2;- BASED ON SYMPTOM AT PRESENTATION

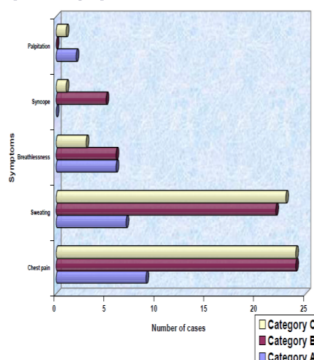


Table ; 3 BASED ON RISK FACTORS

CATEGORY	SMOKING	HYPERTENSION	DIABETES	P/O HT	F/O IHD
A <30%	7 (77.8%)	6 (66.7%)	8 (88.9%)	3 (33.3%)	1 (11.1%)
B 30 – 70%	18 (69.2%)	14 (53.8%)	9 (34.6%)	5 (19.2%)	3 (11%)
C >70%	20 (80%)	9 (36%)	4 (16%)	2 (8%)	1 (4%)
TOTAL	45	31	21	10	5
%	75	51.7	35	16	8

Figure 3 ; based on risk factors

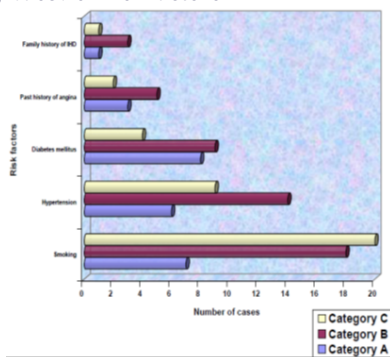


Figure 6 ; BASED ON THROMBOLYSIS TIME

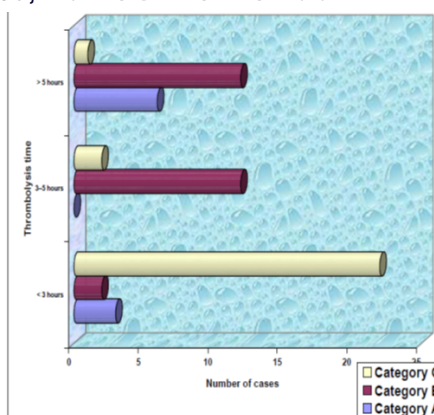


Table ; 4 Based on types of MI AND KILLIP CLASS

category	AWMI	IWMI	CLASS 1	CLASS 2,3,4	P VALUE
A	8 (88.9%)	1 (11.1%)	2 (5%)	7 (35%)	0.000
B	14(53.8%)	12(46.2%)	18 (45%)	8 (40%)	0.507
C	13 (52%)	12 (48%)	20 (50%)	5 (25%)	0.117
TOTAL	35(58.3%)	25(41.7%)			

Figure 4;Based on types of MI

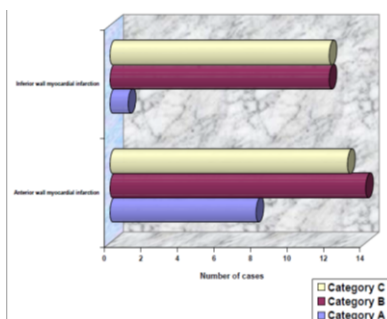


Figure 5;- Based on types of KILLIP CLASS

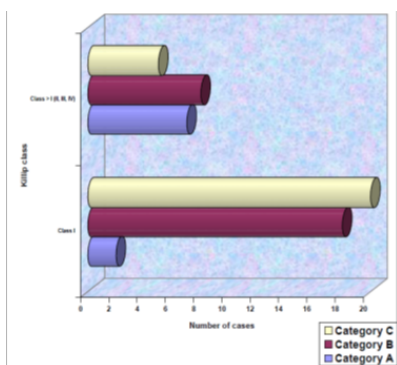


Table ; 5 Based on thrombolysis time and ST segment resolution

THROMBOLYSIS TIME	ST SEGMENT RESOLUTION 90 MIN AFTER THROMBOLYSIS			PERCENTAGE	P VALUE
	< 3HRS	3-5 HRS	>5HRS		
< 3HRS	0	6	9	15	0.032
3-5 HRS	12	12	26	43.3	0.000
>5HRS	2	1	25	41.7	0.000

Figure 7 ; BASED ON ST SEGMENT RESOLUTION AFTER 90 MINUTES OF THROMBOLYSIS

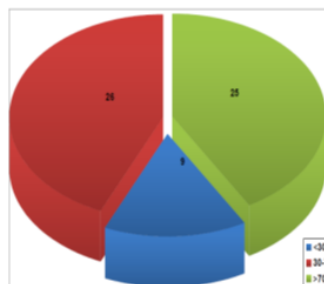


Table ; 6 BASED ON ADVERSE EVENTS

CATEGORY	NO ADVERSE EVENT	ADVERSE EVENT	HOSPITAL MORTALITY	< 48 HRS ADVERS EVENTS	>48HRS ADVERS EVENTS
A <30%	0 (0.000)	3 (33.3%) 0.445	6 (66.7%) 0.000	8 (88.9%)	1 (11.1%)
B 30 – 70%	8 (30.8%) 0.000	18 (69.2%) 0.001	0 0.014	14 (53.8%)	6 (23.1%)
C > 70%	18 (72%) 0.000	6 (24%) 0.006	1 (4%)	7 (28%)	1 (47 %)

Figure 8; Onset of adverse events

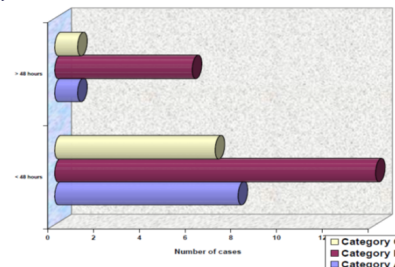


Figure 9; outcome

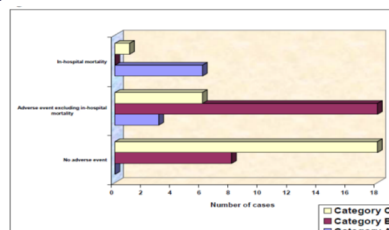
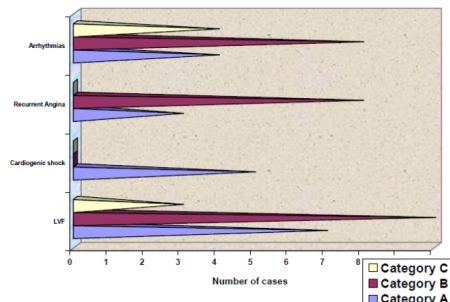


Table ; 7 ADVERSE EVENTS AFTER THROMBOLYSIS

CATEGORY	LVF	CARDIOGENIC SHOCK	RECURRENT ANGINA	ARRYTHMIAS
A <30%	7 (77.8%) P = 0.002	5 (55.6%) P= 0.000	3 (33.3%) P = 0.207	4 (44.4%) 0.191
B 30- 70%	10 (38.5%) 0.461	0 0.029	8 (30.8%) 0.029	8 (30.8%) 0.530
C >70%	3 (12%) 0.003	0 0.002	0 0.002	4 (16%) 0.114
CAUSES OF DEATH		5 (71.4%)		VT/VF 2 (28.6%)

Figure 10; types of adverse outcome



DISCUSSION

The present study documents the usefulness of the standard electrocardiographic ST segment resolution after 90 min following thrombolytic therapy as a predictor of coronary artery reperfusion.

AGE INCIDENCE AMONG DIFFERENT STUDIES ;-

In present study the mean age of patient is 50.7 years compare to other studies in present study mean age of population is 10 years younger.

SEX INCIDENCE AMONG DIFFERENT STUDIES ;-

In the present study, there is a male preponderance. There is similar male preponderance in different study groups.

RISK FACTORS AMONG DIFFERENT STUDIES;-

In present study smoking is single most common risk factor, followed by hypertension and diabetes. Percentage of diabetes high also when compare to other studies Percentage of smokers are high compare to other studies.

BASELINE VARIABLE AMONG ST RESOLUTION SUB GROUPS (COMPLETE RESOLUTION GROUP: > 70% RESOLUTION);-

Base line variables in complete resolution group similar to other study groups, except for age and smoking. Patients in the present study are 10 year younger compare to other study groups. Percentage of smokers among population group of present study almost double that of other study groups.

BASELINE VARIABLE AMONG ST RESOLUTION SUB GROUPS (PARTIAL RESOLUTION GROUP 30 – 70%);-

Majority of baseline variables in partial resolution group similar with different study groups. But mean age of present population group is at least 10 years younger compared to other studies. Percentage of smokers and diabetes are more in present population group when compare to other study groups.

BASELINE VARIABLE AMONG ST RESOLUTION SUB GROUPS (NO OF RESOLUTION GROUP < 30%);-

When compare to other study groups. No resolution group in the present study are 10 years younger. Diabetes is most frequent risk factor followed by smoking and hypertension. Percentage of risk factors are high when compare to other study groups. Ratio of anterior wall myocardial infarction to inferior wall MI very high when Compare to other study groups. Mean time of onset of symptoms to treatment also

high in present study compare to other study groups.

ADVERSE EVENTS IN SUCH GROUPS (COMPLETE RESOLUTION GROUP) AND IN HOSPITAL MORTALITY

Adverse events in complete resolution group in the present study are similar to other study groups. Arrhythmias are most frequent adverse events. In the present study group which can be comparable to other study groups. Followed by left Ventricular failure. In hospital mortality 4% on present study which is similar to other study groups.

ADVERSE EVENTS IN SUCH GROUPS (PARTIAL RESOLUTION GROUP) AND IN HOSPITAL MORTALITY;-

Most common adverse event in partial resolution group in the present study is left ventricular failure followed by arrhythmias and recurrent angina, which can be comparable to other study groups. However percentage of adverse events are higher in the present study compare to other study group.

ADVERSE EVENTS IN SUCH GROUPS (NO RESOLUTION GROUP) AND IN HOSPITAL MORTALITY;-

Most frequent adverse event in no resolution group in the present study, LVF followed by cardiogenic shock. Even in other study groups LVF is the most frequent adverse event. But percentage of adverse events in the present study group are higher compare to other study groups. In hospital mortality in the present study group is 66.7% which is also high when compare to other study group

LIMITATIONS OF THE STUDY

Sample size is small.

ST segment after acute myocardial infarction is dynamic and occur use of static measurement could have led to errors in labeling of patients as successful a failed reperfusion.

In the present study, only short term outcome assessed in the form of in hospital adverse events and in hospital mortality.

Study findings were not correlated with coronary angiography and nuclear imaging which were gold standard investigation for estimating coronary artery patency and myocardial perfusion respectively.

CONCLUSION;-

Patients with no resolution of ST segment 90 minutes following thrombolysis associated with more frequent adverse events and increased mortality compare to partial and complete resolution group.

Among adverse events, left ventricular failure is most frequent adverse events seen in 33.3% cases, followed by arrhythmias 26.7% cases recurrent angina 18.3% cases and cardiogenic shock 8.3% cases.

Inpatient mortality seen in 7 cases that is 11.7% cases. Most common causes of death is cardiogenic shock 71.4% cases followed by VT / VF 28.6%. Percentage of resolution of ST segment following 90 minutes of thrombolysis as a diagnostic test helps in risk stratification of patients.

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