

## Original Research Article

# Efficacy of thrombolytic therapy with IV streptokinase in acute ST elevation myocardial infarction patients

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### ABSTRACT

**Background:** Acute Myocardial Infarction is one of the leading causes of mortality and morbidity. Now there are a number of drugs for Thrombolysis but still Streptokinase is used in many of the centers because of the ease of availability and less cost. ST segment elevation resolution following thrombolysis is simple, non-invasive, accessible tool for the assessment of coronary reperfusion. Objective of the present study was to assess the efficacy of thrombolysis in Acute STEMI patients, with respect to resolution of ST-elevation on treatment with streptokinase and also to predict short term outcome during hospital stay in terms of adverse events and mortality.

**Methods:** 60 Acute STEMI patients who had received thrombolytic therapy with streptokinase were studied in three groups namely Category A, Category B and Category C based on ST segment resolution after administration of thrombolytic therapy.

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

**Conclusions:** In the present study we conclude that the efficacy of IV streptokinase for thrombolysis in acute STEMI is 41.7%. 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.

**Keywords:** Acute myocardial infarction; ST segment resolution and thrombolysis

### INTRODUCTION

Thrombolytic therapy has been shown in randomized controlled trials to improve the natural history of acute myocardial infarction with approximate 30% reduction in mortality. Non-invasive detection of reperfusion is a useful guide to future treatment. Resolution of ST segment elevation following thrombolytic therapy has been shown to be a simple and useful predictor of left ventricular function and clinical outcome.<sup>1</sup>

This study is an effort to study the patients with acute myocardial infarction comparing their ECG findings on

admission and subsequently after thrombolysis.<sup>2</sup> 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. Early and sustained patency of infarct related artery is necessary, to ensure optimal outcome of reperfusion therapy. So optimal goal of reperfusion therapy is to establish nutrient blood flow at tissue level.<sup>3</sup>

Reduction in ST segment elevation, relief from chest pain, early peaking of serum concentration of creatine kinase and reperfusion arrhythmias are some of the non-invasive markers of reperfusion.

ST segment elevation resolution following thrombolysis is simple, non-invasive, accessible tool for the assessment of coronary reperfusion. Objective of the present study was to assess the efficacy of thrombolysis in Acute STEMI patients with regard to symptom relief, resolution of ST-elevation on treatment with streptokinase.<sup>4</sup> This study also enables to predict short term outcome during hospital stay in terms of adverse events and mortality.

## METHODS

This study was done by analysing the ECG of patients with diagnosis of acute ST segment elevation before and after thrombolysis with Streptokinase, admitted to Mahatma Gandhi Medical College and Research Institute, Pondicherry from December 2015 to August 2018.

### Exclusion criteria

Patients with previous history of acute myocardial infarction patients coming to hospital after 12 hours of onset of symptoms, Patients with conventional contraindications for thrombolytic therapy, patients with previous history of valvular heart disease, cardiomyopathies and congenital heart disease. All the data were collected in a pre-tested proforma.

*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 retrospectively, in hospital, major adverse events were defined as the occurrence of any of the following.

Killip Class II-IV left ventricular 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

For statistical analysis, oneway analysis of analysis of Variance (ANOVA) was used, followed by the Newman-Keuls Multiple Comparison test.

## RESULTS

### Age distribution of patients

In the present study, the minimum age of the patient is 30 years, maximum age. 72 years. Maximum numbers of patients in between 40-59 years constitute 55%. Mean age of present study is 50.7±9.6. (Table 1).

**Table 1: Age Distribution of Patients.**

Age group (years)	Number of cases	Percentage	P-value
30-40	13	21.7	0.002
40-59	33	55.0	
60-74	14	23.3	

### Sex distribution

Table 2. shows that sex wise distribution of patients. Male was significantly increased (P<0.000) when compared with female patients.

**Table 2: Sex distribution of Patients.**

Gender	Number of cases	Percentage	P-value
Male	48	80	0.000
Female	12	20	

### Symptoms at presentation

In this study chest pain was the most common mode of presentation, present in 57 (95%) patients associated with sweating in 52 (86%) patients, breathlessness seen in 15 (25%) patients. Syncope was seen in 6 patients and palpitation in 3 (10%) patients. (Table 3).

**Table 3: Symptoms at presentation.**

Symptoms	Number of cases	Percentage	P-value
Chest pain	57	95	0.0000
Sweating	52	86	0.0000
Breathlessness	15	25	0.0000
Palpitation	3	5	0.0000
Syncope	6	10	0.0000

**Table 4: Type of Infarction.**

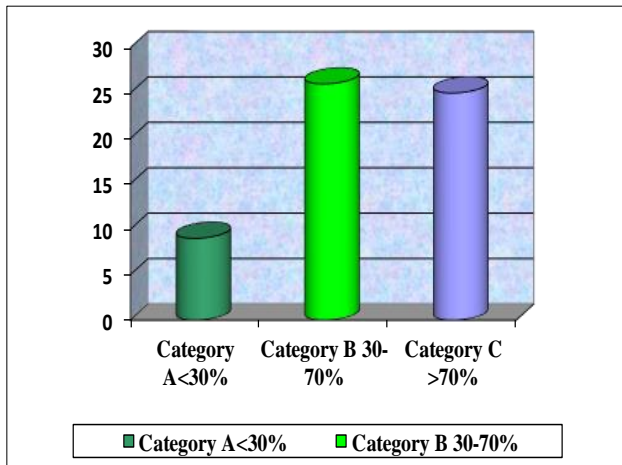
Type of infarction	Number of cases	Percentage	P-value
Anterior wall	35	58.3	0.197
Inferior wall	25	41.7	

### Type of infarction

In this study anterior wall Myocardial infarction was not significant compared with inferior wall myocardial infarction. (Table 4).

### ST segment resolution 90 minutes after thrombolysis

Complete ST resolution seen among 41.7% cases, partial resolution seen among 43.3% and no resolution among 15% cases. (Figure 1).



**Figure 1: ST segment resolution 90 minutes after thrombolysis.**

### Symptom onset to thrombolysis time

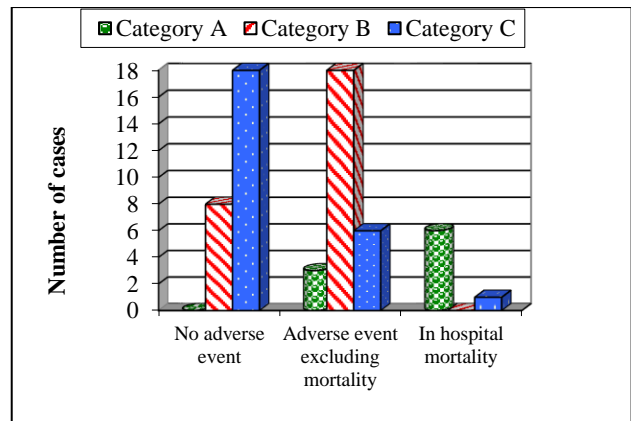
Thrombolysis time of <3 hours, 3-5 hours and more than 5 hours was noted in a, b and c categories patients. B and c categories patients were significantly increased when compared with a categories patients (Table 5).

**Table 5: Symptom onset to thrombolysis time.**

Thrombolysis time	Categories		
	A	B	C
<3 hours	3	2	22
3-5 hours	0	12	2
>5 hours	6	12	1
P-value	0.032	0.000	0.000

### Outcome

In this figure-2 showed that the A, B and C categories of MI patients outcome. In No adverse events patients were significantly present in B categories compared with C and A categories patients. Adverse event excluding in hospital mortality were also significantly present in B categories patients compared with A and C categories but in hospital mortality were significantly present in A categories patients compared with B and C categories patients (Figure 2).



**Figure 2: Outcome.**

### DISCUSSION

The present study documents the usefulness of the standard electro- cardiographic ST segment resolution after 90 min following thrombolytic therapy as a predictor of coronary artery reperfusion. In our study the mean age of patients is 50.7+9.6 which was concordant with the study done by Sezer et al, who also reported 58.2+11.2% of electro- cardiographic ST segment resolution.<sup>5</sup>

In this present study participated 60 acute ST elevation MI patients were included both male and female patients. Male patients were significantly increased (80%) when compared with Female patients (20%) which was concordant with Scroder et al.<sup>6</sup> French et al, and Dong et al, who reported males are commonly affected compared with Female.<sup>7,8</sup>

From the results obtained in our study it is clear that risk factors of smoking, hypertension, diabetes and prior angina was seen among Acute ST elevation MI patients students is 75%, 51%, 35% and 16% respectively. Which was similar with the previous studies conducted by French et al, Zeymer U et al, Dong et al, and Bhatial et al.<sup>9,10</sup> Base line variables in complete resolution group similar to other study groups, except for age and smoking. Patients in the present study are 10 years younger compared to other study groups. Percentage of smokers among population group of present study almost doubles that of other study groups.

Ratio of anterior wall myocardial infarction to inferior wall MI very high when compared to other study groups (Mean time of onset of symptoms to treatment also high in present study compared to other study groups (French et al, Zeymer U et al, Dong et al, and Bhatial et al.

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 is 4% in present study which is similar to other study groups.

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 percentages of adverse events in the present study group are higher compare to other study groups.<sup>11</sup>

## CONCLUSION

In this present study we conclude that the efficacy of IV streptokinase for thrombolysis in acute STEMI is 41.7%, and patients with no ST segment resolution at 90 minutes following thrombolysis were associated with more frequent adverse events and increased mortality compared to partial and complete resolution group. 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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