

Original research article

## Efficacy of thrombolytic therapy with IV streptokinase in acute ST elevation myocardial infarction patients at tertiary care hospital in Gujarat

<sup>1</sup>Lochab K, <sup>2</sup>Parmar M.C., <sup>3</sup>Dabhi A.S. and <sup>4</sup>Soni A

<sup>1</sup>Junior Resident, Department of Medicine, Baroda Medical College and S.S.G. Hospital, Vadodara, Gujarat, India

<sup>2</sup>Professor, Department of Medicine, Baroda Medical College and S.S.G. Hospital, Vadodara, Gujarat, India

<sup>3</sup>Associate Professor, Department of Medicine, Baroda Medical College and S.S.G. Hospital, Vadodara, Gujarat, India

<sup>4</sup>Junior Resident, Department of Medicine, Baroda Medical College and S.S.G. Hospital, Vadodara, Gujarat, India

**Corresponding Author:** Dr. Bishal Sharma

**Received:** 15-05-2021.

**Revised:** 24-05-2021

**Accepted:** 20-06-2021

### Abstract

**Aim:** The aim of this study was to assess the efficacy of thrombolytic therapy with IV streptokinase in acute ST elevation myocardial infarction patients.

**Methods:** An observational study was conducted in the Department of Medicine, Baroda Medical College and S.S.G. Hospital, Vadodara, Gujarat. Total 90 Patients with diagnosis of acute ST segment elevation before and after thrombolysis with Streptokinase were included in this study. Based on values obtained, study population divided into three categories. Category A: <30% resolution of the sum of ST segment elevation. Category B: 30%-70% resolution of the sum of ST segment elevation. Category C: >70% resolution of the sum of ST segment elevation.

**Results:** Mean age of present study is 54.8±10.5 years. Male patients were significantly increased (77.78%) when compared with Female patients (22.22%). The chest pain was the most common mode of presentation. Complete ST resolution seen among 40% cases, partial resolution seen among 45.55% and no resolution among 14.44% cases. Thrombolysis time of <3 hours, 3-5 hours and more than 5 hours was noted in A, B and C categories patients.

**Conclusion:** For thrombolysis in acute STEMI, IV streptokinase is 40 percent effective, according to research. Adverse events were more common in patients who did not have an improvement in their ST segment 90 minutes after thrombolysis was administered to them.

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

### Introduction

ACS (Acute Coronary Syndrome) accounts for the majority of cardiovascular fatalities, which are divided into STEMI (ST raised Myocardial Infarction) and NSTEMI (non-ST elevated Myocardial Infarction) (Non ST elevated Myocardial Infarction). STEMI leads in total blockage of the epicardial artery, allowing either PCI (Percutaneous Interventions) or fibrinolysis to be the most effective treatment option for the patient<sup>[1-3]</sup>. In emergency situations when doing PCI becomes impossible, fibrinolysis becomes the urgent answer for STEMI patients, keeping them from succumbing to their injuries too soon. As an example of a non-fibrinolytic selective fibrinolytic, Streptokinase is used to dissolve thrombus and lysis, and so restore supply to the epicardial artery, among other applications<sup>[4, 5]</sup>.

One in every five middle-aged people is known to have an underlying CAD, which has the potential to develop into a MI. Most developing nations, including India, are projected to have a significant increase in Ischemic Heart Disease, which would be followed by an increase in infectious illnesses. Short-and long-term problems are reduced by 15 percent and 25 percent respectively when fibrinolytic treatment is started promptly within 0-3 hours, however physicians are reluctant to prescribe a fibrinolytic drug soon after surgery. The failure of reperfusion treatment with fibrinolytics may result in a rise in its unfavourable effects, which may cause problems. As a result, the time element continues to be critical for the

effectiveness of reperfusion treatment. Because of the use of fibrinolytics in reperfusion treatment, not only is flow to the epicardial artery compromised, but also microvascular flow may be tracked clearly with the aid of an ECG rather than just with a cardiac angiography. Streptokinase rescue intervention is anticipated to take about 180 minutes<sup>[6-8]</sup>.

Resolution of raised ST segment, alleviation from coronary discomfort, early Creatinine Kinase increase (CK-MB), development of reperfusion arrhythmias, and T wave inversion on ECG are all possible clinical consequences of fibrinolytic treatment. A minimum of 24 hours is needed for T wave inversion and a minimum of 12 hours is required for CK-MB peak<sup>[9]</sup>. In ST, complete resolution may be defined as a decrease of more than 70%, partial resolution as a reduction of 30-70% and no resolution as a reduction of 30% after 180 minutes of post-thrombolysis. However, because of cost and other logistical considerations, thrombolysis is considered more effective and should be the first option considered when PCI is performed. Because of the scarcity of many resources in a developing nation, management of MI is still in its infancy, necessitating the establishment of effective primary preventive initiatives at the community level<sup>[10-12]</sup>. Thrombolytic therapy with intravenous streptokinase was used in this research to evaluate the effectiveness of the treatment in individuals with acute ST elevation myocardial infarction.

**Materials and methods**

The present observational research was carried out for 1 year at Department of Medicine, Baroda Medical College and S.S.G. Hospital, Vadodara, Gujarat, after receiving clearance from the protocol review committee and the institutional ethics committee.

**Methodology**

After obtaining the consent from the patient total 90 patients with diagnosis of acute ST segment elevation before and after thrombolysis with Streptokinase were included in this study. Acute myocardial infarction patients with a prior history of the condition who present to the hospital within 12 hours of the onset of symptoms, patients with conventional contraindications to thrombolytic therapy, patients with a prior history of valvular heart disease, cardiomyopathies and congenital heart disease are all considered. All of the information was gathered using a pre-tested proforma.

**The study population was split into three groups, A, B and C, based on the values collected.**

Category A resolution of the sum of ST segment elevation is less than 30 percent in this category. Classification B: 30 percent to 70 percent resolution of the sum of ST segment elevation is possible. Category C: The total of ST segment elevation is resolved to more than 70% of its original resolution. Observational data was collected from the hospital records and significant adverse events were defined as any of the following occurring at any time throughout the study.

Killip Class II-IV left ventricular failure, cardiogenic shock, recurrent angina, severe arrhythmias (which need definitive pharmacological, DC cardioversion and other treatments such as pacing) and death are all possible outcomes in this situation. The timing of adverse events was split into two groups: those occurring within 48 hours of admission and those occurring more than 48 hours after admission. An uncomplicated course was defined as the absence of a significant adverse event throughout the whole inpatient stay.

**Results**

Table 1 in the present study the maximum numbers of patients in between 40-60 years constitute 55%. Mean age of present study is 54.8±10.5.

**Table 1: Age Distribution of Patients**

Age group (years)	Number of cases	Percentage
30-40	19	21.11
40-59	50	55.56
60-74	21	23.33
Total	90	100.0

Table 2 Majority of the patients affected were male (77.78%) and rest (22.22%) were female.

**Table 2: Sex distribution of Patients**

Gender	Number of cases	Percentage
Male	70	77.78
Female	20	22.22
Total	90	100.0

Table 3 in this study chest pain was the most common mode of presentation, present in 84 (93.33%) patients associated with sweating in 79(87.78%) patients, breathlessness seen in 22 (24.44%) patients. Syncope was seen in 10 (11.11%) patients and palpitation in 5 (5.55%) patients.

Table 3: Symptoms at presentation

Symptoms	Number of cases	Percentage
Chest pain	84	93.33
Sweating	79	87.78
Breathless ness	22	24.44
Palpitation	5	5.55
Syncope	10	11.11

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

Table 4: Type of Infarction

Type of infarction	Number of cases	Percentage	P-value
Anterior wall	54	60	0.218
Inferior wall	36	40	

Table 5 Complete ST resolution seen among 40% cases, partial resolution seen among 45.55% and no resolution among 14.44% cases. Thrombolysis time of <3 hours, 3-5 hours and more than 5 hours was noted in A, B and C categories patients.

Table 5: Symptom onset to thrombolysis time

Thrombolysis time	Categories		
	A	B	C
<3 hours	5	4	33
3-5 hours	0	16	5
>5 hours	8	16	3
P-value	0.029	0.000	0.000

Table 6No 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.

Table 6: Outcome

Adverse effects	Categories		
	A	B	C
No adverse event	--	10	28
Adverse event excluding mortality	8	26	9
Hospital mortality	5	0	4

Discussion

The current research establishes the efficacy of the standard electrocardiographic ST segment resolution after 90 minutes after thrombolytic treatment as a predictor of coronary artery reperfusion in patients with coronary artery disease. The mean age of the patients in our research was 54.8±10.5 years, which was consistent with the findings of Sezeret *et al.*, who similarly found a 58.2+11.2 percent electrocardiographic ST segment resolution<sup>[13]</sup>.

In this current research, 90 acute ST elevation MI patients were included, with equal numbers of male and female patients participating. As reported by Scroder and colleagues, the proportion of male patients (77.78 percent) was considerably higher than that of female patients (22.22 percent)<sup>[14]</sup>.According to French *et al.* and Dong *et al.*, men are more frequently afflicted than females, according to their research<sup>[15, 16]</sup>.

In this research, we discovered that risk factors for Acute ST elevation MI included smoking, high blood pressure, diabetes and previous angina in 77.78 percent, 50 percent, 38.89 percent, and 16.67 percent of Acute ST elevation MI patients students, respectively. This was comparable to earlier investigations<sup>[15-18]</sup>.With the exception of age and smoking, the baseline characteristics in the full resolution group were identical to those in the other research groups. When compared to previous research groups, the patients in the current study are 10 years younger on average. The percentage of smokers in the current study's population group is almost twice as high as the percentage in the other research groups.

When compared to other research groups, the ratio of anterior wall myocardial infarction (60 percent) to inferior wall MI (40 percent) was very high.

When compared to previous research groups<sup>[15-18]</sup>, the mean time from start of symptoms to therapy was similarly long in the current study.

The full resolution group in the current research had adverse effects that were comparable to those seen by

the other study groups. Arrhythmias are the most common kind of adverse event. In the current research

group, which may be compared to previous study groups, the results were positive. After then, there is left ventricular failure. In the current research, hospital mortality is 10%, which is comparable to the mortality rates in previous study groups.

LVF was the most common adverse event in the study's no-resolution group, followed by cardiogenic shock as the second most common. LVF is the most common adverse event in all research groups, even those that are not randomised. Nonetheless, the current research group has seen a greater proportion of adverse events when compared to previous study groups<sup>[19]</sup>.

### Conclusion

According to the findings of this study, the efficacy of IV streptokinase for thrombolysis in acute STEMI is 40%, and patients with no ST segment resolution at 90 minutes after thrombolysis were associated with more adverse events and increased mortality when compared to patients with partial or complete ST segment resolution. As a diagnostic tool, the percentage of individuals who have their ST segment resolved after 90 minutes of thrombolysis may be used to assist stratify their risks.

### Reference

1. Gupta MC, Mehta L, Gupta SP. Clinical profile of acute myocardial infarction with special reference to risk factors-a five-year study. *JAPI* 1989;37(1):55.
2. Dwivedi S, Anupam P, Chaturvedi A. Cardiovascular risk factors in young coronary heart disease patients around East Delhi. *South Asian J Prevent Cardiol* 1997;1:21-6.
3. Khan S, Abrar A, Abid AR, Jan T, Khan H. In hospital outcome of patients having acute myocardial infarction with and without streptokinase. *Gomal J Med Sci* 2009;7(2):31.
4. Schroder R. Prognostic impact of early ST-segment resolution in acute ST elevation myocardial infarction. *Circulation* 2004;110(21):506-10.
5. DeLemos JA, Braunwald E. ST segment resolution as a tool for assessing the efficacy of reperfusion therapy. *J Am Coll Cardiol* 2001;38(5):1283-94.
6. DeWerf FV, Ardissino D, Betriu A, Cokkinos DV, Falk E, Fox KA *et al.* Management of acute myocardial infarction in patients presenting with ST-segment elevation. *European Heart J* 2003;24(1):28-66.
7. Jajoo U, Taksande B, Yelwatkar S, Kumar R. Resolution of coronary pain and settlement of elevated ST Segment after streptokinase thrombolysis in STEMI as a marker of prognosis. *JMGIMS*. 2011;16(1):60-3.
8. Anuj RV, Swapnil C, Kamble TK, Sourya A. Clinical Markers of Reperfusion in Patients with Acute Myocardial Infarction and its Prognosis Significance. *International Journal of Recent Surgicals and Medical Sciences* 2016;2(2):90-5.
9. Rolf S, Rüdiger D, Thomas B, Karl W, Thomas L, Ulrich T *et al.* Extent of early ST segment elevation resolution: A simple but strong predictor of outcome in patients with acute myocardial infarction. *Journal of the American College of Cardiology* 1994;24(2):384-91.
10. James AL, Eugene B. ST segment resolution as a tool for assessing the efficacy of reperfusion therapy. *Journal of the American College of Cardiology* 2001;38(5):1283-94.
11. Nazif A, Kurthuluş Ö, Adnan A, Meryem UA, Mehmet AD, Mehmet AV *et al.* Prevalence of risk factors of ST segment elevation myocardial infarction in Turkish patients living in Central Anatolia. *The Anatolian Journal of Cardiology* 2009;9(1):3-8.
12. Ragupathy A, Nanda KK, Hira P, Hassan K, Oscar HF, DiAngelantonio E *et al.* Hypertension in India: A systematic review and meta-analysis of prevalence, awareness and control of hypertension. *Journal of Hypertension* 2014;32(6):1170-7.
13. Sezer M, Nisanci Y, Umman B, Yilmaz E, Olcay A, Erzenin Fet *et al.* New support for clarifying the relation between ST segment resolution and microvascular function: degree of ST segment resolution correlates with the pressure derived collateral flow index. *Heart* 2004;90(2):146-50.
14. Schröder K, Wegscheider K, Zeymer U, Tebbe U, Schröder R. Extent of ST-segment deviation in a single electrocardiogram lead 90 min after thrombolysis as a predictor of medium-term mortality in acute myocardial infarction. *The Lancet* 2001;358(9292):1479-86.
15. French JK, Andrews J, Manda SO, Stewart RA, McTigue JJ, White HD. Early ST-segment recovery, infarct artery blood flow, and long-term outcome after acute myocardial infarction. *Am heart J* 2002;143(2):265-71.
16. Dong J, Ndrepepa G, Schmitt C, Mehilli J, Schmieder S, Schwaiger M *et al.* Early resolution of ST-segment elevation correlates with myocardial salvage assessed by Tc-99m sestamibi scintigraphy in patients with acute myocardial infarction after mechanical or thrombolytic reperfusion therapy. *Circulation* 2002;105(25):2946-9.
17. Zeymer U, Schröder R, Tebbe U, Molhoek GP, Wegscheider K, Neuhaus KL. Non-invasive detection of early infarct vessel patency by resolution of ST-segment elevation in patients with thrombolysis for acute myocardial infarction. Results of the angiographic sub study of the Hirudin for Improvement of

- Thrombolysis (HIT)-4 trial. *Euro Heart J* 2001;22(9):769-75.
18. Bhatia L, Clesham GJ, Turner DR. Clinical implications of ST-segment non-resolution after thrombolysis for myocardial infarction. *J Royal Soc Med* 2004;97(12):566-70.
  19. Anderson JL, Marshall HW, Bray BE, Lutz JR, Frederick PR, Yanowitz F *et al.* A randomized trial of intracoronary streptokinase in the treatment of acute myocardial infarction. *New Eng. J Med.* 1983;308(22):1312-8.