

ORIGINAL RESEARCH

To evaluate the efficacy of thrombolytic treatment with IV streptokinase in individuals with acute ST elevation myocardial infarction

¹Dr. Neeraj Chaturvedi, ²Dr. Ashish Kumar Agarwal, ³Dr. Shilpa Jalan

¹Associate Professor, Department of Cardiology, SMS Medical College, Jaipur, Rajasthan, India

²Assistant Professor, Department of Cardiology, JLN Medical College, Ajmer, Rajasthan, India

³Assistant professor, Department of Pathology JLN Medical College Ajmer, Rajasthan, India

Correspondence:

Dr. Neeraj Chaturvedi

Associate Professor, Department of Cardiology, SMS Medical College, Jaipur, Rajasthan, India

Abstract

Aim: The aim of the present study to evaluate the efficacy of thrombolytic treatment with IV streptokinase in individuals with acute ST elevation myocardial infarction.

Methods: A prospective observational study was conducted in the Department of Cardiology. In all, 105 patients with acute ST segment elevation were analysed both before and after Streptokinase thrombolysis. The study population was separated into three groups based on the values they had. 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: Male patients were substantially more prevalent (76.19%) than female patients (23.81%). In this investigation, the most prevalent mode of presentation was chest discomfort, which was present in 96 (91.43%) patients and was accompanied with sweating in 87 (82.86%) patients and dyspnea in 26 (24.76%) patients. Palpitation was seen in 7 (6.67%) individuals and syncope in 12 (11.43%). In this research, anterior wall myocardial infarction did not differ from inferior wall myocardial infarction. The ratio of anterior wall MI (57.14%) to inferior wall MI (42.86%) is quite high. Complete ST resolution was seen in 40 (38.09%) instances, partial resolution in 49 (46.67%) cases, and no resolution in 16 (15.24%) cases.

Conclusions: Patients with no ST segment resolution at 90 minutes post-thrombolysis were associated with more frequent adverse events and increased mortality compared to the partial and complete resolution group, leading us to conclude that IV streptokinase for thrombolysis in acute STEMI has an efficacy of 42.86 percent. The percentage of ST segment improvement after 90 minutes of thrombolysis is a useful diagnostic tool for determining patient risk.

Keywords: Acute myocardial infarction; ST segment resolution and thrombolysis

Introduction

ACS (Acute Coronary Syndrome) comprises the primary component of cardiovascular fatalities widely categorised as STEMI (ST raised Myocardial Infarction) and NSTEMI (Non ST elevated Myocardial Infarction) (Non ST elevated Myocardial Infarction). STEMI results in full closure of epicardial artery enabling either PCI (Percutaneous Interventions) or

fibrinolysis to be the appropriate treatment.¹⁻³ In cases of urgency when it becomes impossible to execute PCI, fibrinolysis becomes the urgent remedy to such STEMI patients averting early fatalities. Among the various fibrinolytics, Streptokinase is a non-fibrin selective fibrinolytic involved as a thrombus and lysis, to restore supply to epicardial artery.^{4,5} One in five middle aged people are known to have an underlying CAD which might escalate to MI. Most emerging nations like India are predicted to face a strong growth in Ischemic Heart Disease second to Infectious illnesses. Initiation of fibrinolytic treatment promptly within approximately 0-3 hr reduces lower the short and long term problems by 15% and 25% correspondingly, yet there is a reluctance in prescribing a fibrinolytic drug quickly. Unsuccessful reperfusion treatment with fibrinolytics might lead to its increasing adverse effects producing problems. Thus time element is critical for effectiveness in reperfusion treatment. This reperfusion treatment with fibrinolytics not only compromises flow to epicardial artery but also permits microvascular flow monitored clearly with the aid of ECG and not alone with cardiac angiography. 180 min is the predicted period for Streptokinase rescue intervention.⁶⁻⁸

Clinical results of fibrinolytic treatment would include correction of high ST segment, alleviation from coronary discomfort, early Creatinine Kinase increase (CK-MB), development of reperfusion arrhythmias, T wave inversion from ECG. Minimum of 24 hr is needed for T wave inversion and 12 hr for CK-MB peak.⁹ Complete resolution might be defined as the decrease in >70%, partial resolution as the reduction of 30% to 70% and no resolution as reduction of <30% after 180 min of post thrombolysis in ST. PCI remains better to fibrinolytic reperfusion but financial constraints and other logistic reasons makes thrombolysis more effective and first priority. Management of MI in a developing nation is still scarce owing to non-availability of numerous resources, hence needing robust primary preventive efforts at the community level.¹⁰⁻¹² The purpose of the current research is investigate the effectiveness of thrombolytic treatment with IV streptokinase in acute ST elevation myocardial infarction patients.

Material and methods

After receiving clearance from the protocol review committee and the institutional ethics committee, the Department of Cardiology undertook a prospective observational research. After obtaining informed permission, a thorough medical history was gathered either directly from the patient or, if the patient was unable to communicate, from his or her family. All patients were informed of the procedure's method, risks, advantages, outcomes, and potential problems. In all, 105 patients with acute ST segment elevation were analysed both before and after Streptokinase thrombolysis. Patients with a history of acute myocardial infarction, patients who present to the hospital more than 12 hours after the onset of symptoms, patients with conventional contraindications for thrombolytic therapy, patients with a history of valvular heart disease, cardiomyopathies, or congenital heart disease. The information was gathered using a tried and true proforma.

Based on values obtained, study population divided into three categories A, B and C

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.

After the fact hospital records were kept, and serious adverse events were defined as the occurrence of any of the following, we have the following information on the patients' conditions. Death, Killip Class II-IV left ventricular failure, cardiogenic shock, recurrent angina, severe arrhythmias (requiring definitive pharmacotherapy, DC cardioversion, and treatments like pacing), and so on. Adverse occurrences were separated into two groups: those that occurred within 48 hours after admission and those that occurred later. No serious

complications occurred throughout the patient's whole hospital stay. One-way ANOVA and the Newman-Keuls multiple comparison test were employed for the statistical analysis.

Results

The patient in the current research has a minimum age of 28 years and a maximum age of 75 years. The majority of patients (57.14%) are between the ages of 35 to 55. The current study's mean age was 52.89 ± 12.85 . (Table1).

Table1: AgeDistributionofPatients

Agegroup(years)	Numberofcases	Percentage	P-value
below 35	20	19.05	0.004
35-55	60	57.14	
55-75	25	23.81	

Table 2 depicts the gender distribution of patients. Male patients were substantially more prevalent (76.19%) than female patients (23.81%).

Table2:SexdistributionofPatients

Gender	Numberofcases	Percentage	P-value
Male	80	76.19	0.000
Female	25	23.81	

In this investigation, the most prevalent mode of presentation was chest discomfort, which was present in 96(91.43%) patients and was accompanied with sweating in 87(82.86%) patients and dyspnea in 26(24.76%) patients. Palpitation was seen in 7(6.67%) individuals and syncope in 12(11.43%). (Table 3).

Table3: Symptomsatpresentation

Symptoms	Number ofcases	Percentage	P-value
Chestpain	96	91.43	0.0001
Sweating	87	82.86	0.0001
Breathlessness	26	24.76	0.0001
Palpitation	7	6.67	0.0001
Syncope	12	11.43	0.0001

Table4: TypeofInfarction

Typeofinfarction	Numberofcases	Percentage	P-value
Anteriorwall	60	57.14	0.21
Inferiorwall	45	42.86	

In this research, anterior wall myocardial infarction did not differ from inferior wall myocardial infarction. The ratio of anterior wall MI (57.14%) to inferior wall MI (42.86%) is quite high. (Table 4).

Complete ST resolution was seen in 40 (38.09%) instances, partial resolution in 49 (46.67%) cases, and no resolution in 16 (15.24%) cases. Patients in the a, b, and c groups had thrombolysis times of 3 hours, 3-5 hours, and more than 5 hours. Those in the B and C groups had considerably higher mortality rates than patients in the A category (Table 5).

Table5:Symptomonsettothrombolysistime

Thrombolysistime	Categories		
	A	B	C
<3hours	7	5	35
3-5hours	0	18	7
>5hours	10	18	5

P-value	0.029	0.000	0.000
---------	-------	-------	-------

Table 6:Outcome

Thrombolysistime	Categories		
	A	B	C
No adverse event	--	12	30
Adverseevent excluding mortality	10	28	10
Hospital mortality	7	0	5

The A, B, and C categories of MI patients' outcomes were shown in table no. 6. Patients with no adverse events were substantially more prevalent in the B categories than in the C and A categories. Adverse events excluding hospital mortality were similarly substantially higher in B category patients compared to A and C category patients, but in hospital mortality were higher in A category patients compared to B and C category patients (table 6).

Discussion

According to the results of the current research, the standard electro-cardiographic ST segment resolution after 90 minutes post-thrombolytic treatment is a reliable predictor of coronary artery reperfusion. We found that the mean age of our patients was 52.89 ± 12.85 , which is in line with the research of Sezer et al., in which they found a resolution of $58.2 \pm 11.2\%$ in the ST segment of electrocardiograms.¹³

One-hundred-five patients, equal numbers of men and women, with acute ST-elevation MI took part in the current research. According to Scroder et al., there was a considerable disparity between the sexes, with male patients much higher (76.19%) than female patients (23.81%).¹⁴ According to French et al. and Dong et al., men are more likely to be impacted than females.^{15,16}

Our data show that among Acute ST elevation MI patients, students, the prevalence of known risk factors such smoking, hypertension, diabetes, and previous angina is 76.1%, 52.3%, 38.1%, and 17.14%, respectively. Baseline factors in the full resolution group were identical to those in the other study groups, with the exception of age and smoking status, consistent with prior research by French et al., Zeymer U et al., Dong et al., and Bhatial et al.^{17,18} Patients in this research are, on average, 10 years younger than those in previous studies. This study's demographic group roughly triple the average percentage of smokers seen in prior studies.

When compared to other studies, the present study has a much higher proportion of cases of myocardial infarction in the anterior wall (57.14%) than in the inferior wall (42.86%); furthermore, the mean time between the onset of symptoms and treatment is significantly longer in the present study than in the previous three. The full resolution group had a same rate of adverse events as the other research groups. The most common adverse effect is arrhythmia. As a study group, we give data that is similar to prior research. Then there was left ventricular dysfunction. Comparable to previous research groups, the current study reports a 10% in-hospital death rate. In the current trial, LVF was the most common adverse event in the no resolution group, followed by cardiogenic shock. LVF is the most prevalent side effect even when comparing other research groups. However, the current research group had a larger proportion of adverse events compared to earlier studies.¹⁹

Conclusion

Patients with no ST segment resolution at 90 minutes post-thrombolysis were associated with more frequent adverse events and increased mortality compared to the partial and complete resolution group, leading us to conclude that IV streptokinase for thrombolysis in acute

STEMI has an efficacy of 42.86 percent. The percentage of ST segment improvement after 90 minutes of thrombolysis is a useful diagnostic tool for determining patient risk.

References

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. De Lemos 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. De Werf FV, Ardissino D, Betriu A, Cokkinos DV, Falke 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 Surgical 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, Di Angelantonio 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, Erzen F, *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, Mehili 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. ZeymerU,SchröderR,TebbeU,MolhoekGP,WegscheiderK,NeuhausKL.Non-invasivedetectionofearlyinfarctvesselpatencybyresolution of ST-segment elevation in patients withthrombolysisforacutemyocardialinfarction.Results of the angiographic sub study of the HirudinforImprovementofThrombolysis(HIT)-4trial.EuroHeart J.2001;22(9):769-75.
18. BhatiaL,CleshamGJ,TurnerDR.ClinicalimplicationsofST-segmentnon-resolutionafterthrombolysis for myocardial infarction. J Royal SocMed.2004;97(12):566-70.
19. AndersonJL,MarshallHW,BrayBE,LutzJR,Frederick PR, Yanowitz FG, et al. A randomizedtrial of intracoronary streptokinase in the treatmentofacutemyocardialinfarction.New EngJMed.1983;308(22):1312-8