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Original Research Article

Assessing Resolution of ST-Elevation on Treatment with Streptokinase and Also to Predict Short Term Outcome

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Abstract

Aim: The aim 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: 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 Department of Cardiology, IGIMS, PATNA, Bihar, India for the period of 2 years. 150 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: In the present study, the minimum age of the patient was 30years, maximum age was 75 years. Maximum numbers of patients in between 40-59 years constitute 55%. Mean age of present study was 52.8±9.6. Male was significantly increased (P<0.000) when compared with female patients. In this study chest pain was the most common mode of presentation, present in 116 (96.66%) patients associated withsweating in 104 (86%) patients, breathlessness seen in 30 (25%) patients. Syncope was seen in 12 (10%) patients and palpitation in 6 (5%) patients. In this study anterior wall Myocardial infarction was not significant compared with inferior wall myocardial infarction. Thrombolysis time of <3 hours, 3-5 hours and more than5 hours was noted in a, b and c categories patients. B and c categories patients were significantly increased when compared with categories of patients.

Conclusion: In this present study we conclude that the efficacy of IV streptokinase for thrombolysis in acute STEMI 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.

Keywords: Acute myocardial infarction; ST segment resolution, thrombolysis

Introduction

Intravenous administration of streptokinase (SK) as a treatment for acute ST-elevation myocardial infarction (STEMI) has been applied for several decades and has been clearly established that in the early phase of STEMI results in recanalization of the infarct related artery (IRA), salvage of left ventricular function, and reduction of mortality. [1] Since the Global Use of Strategies to Open Occluded Coronary Arteries (GUSTO-I) trial, [2] no other study has demonstrated a further reduction in mortality with newer thrombolytic (TL) regimens, [3-5] although some treatments have been found to restore normal thrombolysis in myocardial infarction (TIMI) [6] flow to the IRA in a higher proportion of patients. [7,8] Time to treatment is the most important variable affecting the outcome in STEMI. [9]

Coronary artery disease (CAD) is currently most common, noncommunicable disease in India. One of the gravest complications of CAD is ST segment elevation myocardial infarction (STEMI) and sudden death. [10] Reperfusion is the key strategy in acute STEMI care and it is time dependent. [11] Among 20,468 patients enrolled in CREATE trial, over 60% (12405) patients had STEMI, a proportion that is substantially higher than registry from developed countries, which documented around 40%. The median time from the onset of symptoms to hospital arrival was 300 minutes in STEMI patients, again more than double delay reported in developed countries (range 140–170 minutes). Clinical outcomes were worse in patients with STEMI as compared with patients with non-STEMI, with lower rate of death (8.6% vs. 3.7% reinfarction

(2.3% vs. 1.2%) and stroke (0.7% vs. 0.3) P < 0.0001 for all. Approximately 59% received thrombolytic therapy and only 9% underwent percuteneous coronary intervention (PCI) during their hospitalization, suggesting substantial room for improvement in the use of acute perfusion therapy in STEMI patients in India. [12,13]

As India has grown economically, it has experienced an epidemiological transition, with mortality due to ischemic heart disease. Coronary heart disease would rise in developing nations by 137% by 2020. [14] India is going most rapid epidemiological transition from communicable to noncommunicable diseases often neglected and at third stage of the transition characterized by high burden of atherothrombotic dominated noncommunicable diseases. [15] Still there is long way to go to achieve the PCI within golden hours with hospital to balloon time 90 minutes. Review of cross-sectional survey in 2008 showed that 3%–4% and 8%–10% of rural and urban Indian dwellers, respectively, have CAD. [16] In India, CAD is the leading cause of death. [16]

The aim 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.

Materials and 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 Department of Cardiology, IGIMS, PATNA, Bihar, India for the period of 2 years. 120 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.

Inclusion criteria

Patients with diagnosis of acute ST segment elevation before and after thrombolysis with Streptokinase

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.

Based on values obtained, study population divided into three categories

A, B and C.

A. Category A: <30% resolution of the sum of STsegment elevation.
B. Category B: 30%-70% resolution of the sum of STsegment elevation.
C. Category C: >70% resolution of the sum of STsegment 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 andinterventions 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, one-way analysis of analysis of Variance (ANOVA) was used, followed by the Newman- Keuls Multiple Comparison test.

Results

Table 1: Demographic data

Age group(years)	Numberof cases	Percentage
30-40	24	20
40-59	66	55
60-74	30	25
Gender		
Male	96	80
Female	24	20

In the present study, the minimum age of the patient was 30years, maximum age was 75 years. Maximum numbers of patients in between 40-59 years constitute 55%. Mean age of present study was 52.8±9.6. Male was significantly increased (P<0.000) when compared with female patients.

Table 2: Symptoms at presentation

Symptoms	Number ofcases	Percentage	P-value
Chest pain	116	96.66	0.0000
Sweating	104	86	0.0000
Breathlessness	30	25	0.0000
Palpitation	6	5	0.0000
Syncope	12	10	0.0000

In this study chest pain was the most common mode of presentation, present in 116 (96.66%) patients associated with sweating in 104 (86%) patients, breathlessness seen in 30 (25%) patients. Syncope was seen in 12 (10%) patients and palpitation in 6 (5%) patients.

Table 3: Type of Infarction

Type of infarction	Numberof cases	Percentage	P-value
Anterior wall	72	60	
Inferior wall	48	40	0.172

In this study anterior wall Myocardial infarction was not significant compared with inferior wall myocardial infarction.

Table 4: Symptom onset to thrombolysis time

Thrombolysis time	Categories		
	A	B	C
<3 hours	6	4	44
3-5 hours	0	24	4
>5 hours	12	24	2
P-value	0.036	0.000	0.000

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 categories of patients.

Discussion

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. [17] This study is an effort to study the patients with acute myocardial infarction comparing their ECG findings on admission and subsequently after thrombolysis. [18] 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.[19]

In the present study, the minimum age of the patient was 30years, maximum age was 75 years. Maximum numbers of patients in between 40-59 years constitute 55%. Mean age of present study was 52.8±9.6. Male was significantly increased (P<0.000) when compared with female patients which was concordant with Scroder et al. [20] In this study chest pain was the most common mode of presentation, present in 116 (96.66%) patients associated with sweating in 104 (86%) patients, breathlessness seen in 30 (25%) patients. Syncope was seen in 12 (10%) patients and palpitation in 6 (5%) patients. 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 highin present study compared to other study groups (French et al, Zeymer U et al). [21,22]

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 categories of patients.

Conclusion

In this present study we conclude that the efficacy of IV streptokinase for thrombolysis in acute STEMI 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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