POST THROMBOLYTIC ST-SEGMENT RESOLUTION OUTCOME IN ACUTE MYOCARDIAL INFARCTION PATIENTS

Aamir Ahmad[1], Syed Muhammad Adnan Shah[2], Raza Ullah[3], Syed Muhammad Salman Shah[4], Syed Mujeeb ur Rahman[5], Muhammad Zuhaid[6]

ABSTRACT:

***OBJECTIVES**:*

The main objective of this study was to assess post thrombolytic resolution of ST-segment and its outcome in patients with acute myocardial infarction.

METHODOLOGY:

This Prospective Comparative Study was carried out at the Cardiology Unit of Ayub Teaching Hospital, Abbottabad. All patients irrespective of gender and age with ST-Segment elevation myocardial infarction (STEMI), having no immediate access to angioplasty and thrombolysed with streptokinase, were included in this study. ECG was taken at the beginning and 90 minutes after the administration of streptokinase. Based on ST-segment resolution on ECG taken at 90 minutes these patients were classified into group A and B. Group A included patients with ST-segment resolution while group B showed no resolution of ST-segment after streptokinase administration. These patients were followed during their hospital stay for complications such as arrhythmias, cardiogenic shock, acquired ventricular septal defects (VSD) aneurysm and death.

RESULTS:

Among 115 patients, 94 were male and 21 female. Group A included 102 (89%) patients and group B included 13 (11%). In group A, only 1 (0.98 %) patient developed complications and in group B, 13 patients (100%) developed complications. Arrhythmias were the most common complication among MI patients in group A while cardiogenic shock was the commonest complication in group B.

CONCLUSION:

ST-segment resolution is a practical and applicable indicator of successful thrombolysis and has a significant correlation with clinical outcome in acute myocardial patients after thrombolysis with streptokinase.

KEYWORDS: *Acute Myocardial Infarction, Thrombolysis, ST-segment Resolution, Hospital*

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Correspondence
[3]Raza Ullah, Assistant Professor Pulmonology and Intensive Care, HMC Peshawar
: +92-301-8151944
: dr.raza127@gmail.com
[2]Resident doctor Ayub Teaching Hospital Abbottabad
[1]Resident Physician Intensive Care Medicine Sengkang General Hospital ,Sing Health, Singapore
[4]Resident doctor Khyber Teaching hospital Peshawar
[5]Resident Internal medicine, Shaukat Khanum Trust Peshawar
[6]Resident Internal medicine University Hospital Coventry UK

INTRODUCTION:

Acute myocardial infarction also called a heart attack occurs when there is reduced blood flow to the cardiac tissue. The most common presentation is chest pain that may radiate towards the shoulder, arm, back, neck or jaw. Other symptoms include dyspnea, nausea, vomiting, fainting, cold sweat or just tiredness. About 30% of people have atypical symptoms[1]. Women most often present without chest pain and instead have neck pain, arm pain or feel

tired[2]. In 5% of patients, age 75 years or above shows very few or no symptoms of MI[3]. In patients with developing acute myocardial infarction, a timely significant indicator that is comfortable to application in all patients is highly preferable. Very few studies have been conducted using Electrocardiographic ST-Segment elevation criteria as a foreshowing indicator,[4,5] in comparison to coronary reperfusion, which has been studied by many investigators. Resolution of ST-segment has been shown to be a practical predictor of ultimate infarct magnitude, left ventricular function, and clinical consequence after both thrombolytic and interventional approaches to the control of acute myocardial infarction[6,7]. ST-segment revival may be an emend marker of myocyte reperfusion[8,9]. Thrombolytic therapy for acute myocardial infarction (MI) decreases case mortality and improves clinical outcomes[10,11]. However, in up to 60% of patients, the thrombolytic therapy does not recover perfusion in the myocardium at risk and such deterioration depicts a poor prognosis[12]. Analysis of ST-segment resoluteness on ECG after fibrinolytic therapy, in cases of ST-elevation MI proposes a cheap and price serviceable resolution to assess coronary reperfusion. Schroeder et al,[13] described that absence of ST-segment resolution was the most potent self-reliant forecaster of early mortality (p=0.0001). Since ECG is frequently available, it is essential to institute its virtue as a tool for assessing reperfusion, as it will be the cheapest option for assessing restoration and myocardial salvage. We scrutinized the implications of ST-segment non-resolution after thrombolytic therapy and found diversity in ST-segment elevation resolution as a degree of the discriminating efficaciousness of thrombolytic regimens. The rationale of our study was to assess post thrombolytic resolution of ST-segment and its outcome (arrhythmias, cardiogenic shock, acquired ventricular septal defects „VSD‟ aneurysm and death) in patients with acute myocardial infarction

METHODOLOGY:

This comparative prospective study was conducted at the Cardiology Unit of Ayub Teaching Hospital, Abbottabad, from April 2020 to October 2020. The study was approved by the hospital institutional review board. We included 115 patients with ST-segment elevation myocardial infarction in our study. Patients of both gender and all ages were included in the study that presented with acute chest pain and had ST-segment elevation on presentation ECG. All those patients with a previous history of myocardial infarction (MI), those who presented with more than 12 hours of chest pain and all those with contraindications to thrombolysis were excluded from the study. After informed consent from the patient or their relative's initial history and physical examination was obtained. Pulse, ECG variation and complications were supervised until the end of the outcome either death or discharge of the patient. Statistical analysis was performed using SPSS 23.0. Frequencies and percentages were calculated for categorical variables like gender, diabetes mellitus, and hypertension. Mean and standard deviation (±SD) was calculated for continuous variables like age. A p-value of less than 0.05 was considered significant. The Chi-square test was applied for a comparison of the demographic characteristics and complications in both groups.

RESULTS:

A sum of 115 patients was registered in the study, of which 94 (82%) were male and 19 (18%) were females. The overall mean age of the study participants in groups A and B was 56.19±1.36 and 67.84±15.70 years respectively. The baseline clinical characteristics of the patients are stated in Table 1. Group “A” included 102 patients that showed ST-segment resolution after thrombolysis while 13 patients in group “B” didn‟t fulfill resolution criteria. The history of hypertension, obesity and smoking was more common in group “A”, while the history of diabetes mellitus and family history was more common in group “B”. In group “A”, 1 (1%) patients developed complications during their follow up in the hospital. While in group “B”, 13 (100%) patients developed complications during their hospital stay. The most common complications in both groups were cardiogenic shock and arrhythmias. Table 2 shows the distribution of complications between the two groups. The most common complication observed in group “B” was a cardiogenic shock, accounting for 8 (62%) patients while arrhythmias were accounting for 5 (38%) patients. In group “A” only one patient suffered from complications of arrhythmias.

Table 1: Baseline Demographic and Clinical Characteristics (N=115)

Characteristics of Patients	ST-Resolution Present (Group A) n=102	ST-Resolution Absent (Group B) n=13
Mean Age (St Deviation)	54.70±12.66	67.84±15.70
Gender	Male=83, Female=19	Male=11, Female=2
Diabetes Mellitus	23 (23%)	4 (31%)
Hypertension	76 (75%)	7 (54%)
Family History Hypertension	59 (58%)	12 (92%)
Smoking	44 (43%)	5 (38%)
Obesity	23 (23%)	2 (15%)

Table 2: Distribution of Complications Between the Two Groups (N=115)

Complications	ST-Resolution Present (n=102)	ST-Resolution Absent (n=13)	P-Value
Cardiogenic Shock	0	8 (62%)	<0.001
Arrhythmias	1 (1%)	5 (38%)	<0.001

This study focuses on the poor clinical outcome of patients without ST-segment resolution post-thrombolytic therapy, denoted by simple appraisement of the post thrombolysis electrocardiogram. ST-segment resolution has been one of the indicators utilized to assess reperfusion in ST-Elevation Myocardial Infarction in the past. Its significance cannot be declined as a prognostic indicator and the inference of our study also strengthens this fact. Early predictive indicators in patients with acute myocardial infarction should ideally be simple, applicable, hasty, noninvasive and comfortable to all patients. ECG criteria would fulfill and satisfy these all proclaims. Patients with full ST-segment resolution may be listed for timely discharge without routine angiography. Patients with failure of ST-segment resolution show poor prognosis without reperfusion and these patients will get the maximum benefit from reperfusion, early angiography and revascularization may be denoted[14]. In our study, thrombolysis was effective in terms of ST-segment resolution in 89% of patients, which is more in contrast to other studies,[17] it was successful in 53%, 54%, 43.2%, 56.4% and 68% respectively. The better result in our study could be due to early diagnosis, and lesser door to needle time, as our hospital is located in the center of the city. Our study shows the manifestation of complications, in patients with ST-segment resolution ninety minutes after management with streptokinase, to be 1% while the occurrence of complications in patients without ST-segment resolution was 100%, essentially higher in the latter. This finding, therefore, demonstrates a distinct relation between ST-segment resolution and the frequency of complications. These findings are more in comparison to a study conducted by Ahmed et al[18]. The other studies explained that the presence or absence of ST resolution after thrombolytic therapy is a practical predictor of mortality in post-myocardial infarction patients[18]. Heart failure is the major determinant of the prognosis of myocardial infarction and the most commonly identified complication in this study. In our study, we observed that the occurrence of heart failure was 0% in patients with ST resolution and 62% in patients without ST resolution ($p<0.001$) during follow up. A study reported that to accentuate the affinity between ST resolution and left ventricular revival. Their inference revealed that in patients with ST-segment resolution, LV ejection fraction and muscle contractility amended significantly[13]. While patients who did not show any ST resolution after thrombolysis, their left ventricular function remained poor and showed no improvement. ST-segment resolution is associated with restoration of normal LV systolic function and prognosis. We detected arrhythmias in 38% of the patients who had no ST resolution whereas only one patient had arrhythmias in the ST resolution group. The inference clearly shows that arrhythmias are less persistent in patients who show ST resolution in their post-streptokinase ECG.

CONCLUSION:

The study supports the statement that ST-segment resolution is a substitute marker of tissue-level reperfusion. Our study backs the record that ST-segment resolution is a serviceable and a trustworthy marker for evaluating micro vascular perfusion. This easy, noninvasive supervised technique may be of additional prognostic in the early period after acute myocardial infarction when fast decision-making belongs to the management of these patients is required. The amount of ST-segment resolution within ninety minutes post thrombolytic therapy gives valuable information

LIMITATIONS:

Our study has a few limitations and multi-variant scrutiny needs to be conducted to expel the significance of confounding elements like age, gender, number of coronary risk factors, and usage of aspirin within 7 days etc. Another restriction factor was the non-randomized kind of research and the limited number of patients enclosed in the study. The ST-segment after acute myocardial infarction is a continuously active process, and our use of static measurements could have led to errors in classifying patients as successful or unsuccessful reperfusion. Additionally, it had been one center study and therefore the researchers lacked experience contributing to its narrow magnitude.

CONFLICT OF INTEREST: None

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CONTRIBUTORS
1. Aamir Ahmad - Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
2. Syed Muhammad Adnan Shah - Concept & Design; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
3. Raza Ullah - Data Analysis/Interpretation; Final Approval
4. Syed Muhammad Salman Shah - Drafting Manuscript; Critical Revision; Final Approval
5. Syed Mujeeb ur Rahman - Drafting Manuscript; Critical Revision; Final Approval
6. Muhammad Zuhaid - Data Analysis/Interpretation; Final Approval