



A STUDY ON THROMBOLYTIC EFFECT OF STREPTOKINASE INFUSION BETWEEN DIABETIC AND NON-DIABETIC ST ELEVATION MYOCARDIAL INFARCTION PATIENTS WITH ECG AS A TOOL

General Medicine

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ABSTRACT

Background and objectives: Diabetes Mellitus is associated with myocardial infarction (MI). Diabetes is associated with a procoagulant state. In Acute coronary events, without prompt treatment, either in the form of fibrinolysis or percutaneous coronary intervention, mortality is high. ST segment elevation on ECG is a marker of myocardial injury and its resolution after thrombolysis predicts outcome. The study can be made use of, in predicting the future morbidity and mortality risk early in diabetic patients with myocardial infarction. Thereby, halt the actual occurrence of major adverse cardiac events by appropriate early intervention. **Materials and Methods:** The present 6month record based retrospective study was conducted at ASRAM medical college and hospital, Eluru during July 2023 to December 2023 among 100 patients. Diabetic and non-diabetic patients with ST elevation MI (STEMI) that presented to emergency that underwent thrombolysis within 12 hours of symptoms onset with streptokinase infusion in the study period were included. Data of the Patients who were diagnosed with STEMI and underwent thrombolysis with streptokinase was taken. Diabetic and non diabetic patients were divided based on records. ST segment resolution on ECG at 90min was noted. **Results:** Among diabetic males, 25% had successful ST segment resolution at 90min. Among diabetic females, 15 % had successful resolution. Among non -diabetic males, 55% had complete resolution. Among non-diabetic females, 50% had complete resolution. Among diabetics, failed thrombolysis (67%) is more than successful thrombolysis (18%). Among non-diabetics, successful thrombolysis (52.5%) is more than failed thrombolysis (17.5%). Successful thrombolysis (>70% ST resolution) is more in non-diabetic than diabetic STEMI patients. **Interpretation and Conclusion:** Successful thrombolysis (>70% ST resolution) is more in non-diabetic than diabetic STEMI patients. So, the outcome of thrombolysis of acute ST elevation myocardial infarction patients is affected by type 2 diabetes mellitus.

KEYWORDS

ST elevation MI; Diabetes mellitus; Thrombolysis; Streptokinase; ECG; ST segment resolution

INTRODUCTION:

Diabetes Mellitus is associated with myocardial infarction (MI) and also responsible for high morbidity and mortality following MI. Diabetes is associated with a procoagulant state. The chance of re-occlusion is also increased. Complexity of the culprit atherosclerotic plaque, microangiopathy, endothelial dysfunction, impaired fibrinolysis, increased platelet aggregatory activity and diminished flow reserve may be responsible.^(1,7,8)

In Acute coronary events, without prompt treatment, either in the form of fibrinolysis or percutaneous coronary intervention, mortality is high.⁽²⁾ Streptokinase is a readily available and cost-effective thrombolytic drug.

ST segment elevation on ECG is a marker of myocardial injury. After prompt thrombolysis within 12 hours of symptom onset, the elevated ST segment returns towards baseline. This can be identified by serial ECG monitoring. ECG taken at 90 minutes after thrombolysis is a reliable indicator of the effect of thrombolytic drug. This percentage of ST resolution correlates with the success of thrombolytic therapy.^(3,8)

Need For Study: The study can be made use of, in predicting the future morbidity and mortality risk early in diabetic patients with myocardial infarction. Thereby, halt the actual occurrence of major adverse cardiac events by appropriate early intervention.⁽⁴⁾

Aim And Objectives

Aim: To study the thrombolytic effect of streptokinase infusion between diabetic and non-diabetic ST elevation myocardial infarction patients with ECG as a tool.

Objectives:

1. To study the thrombolytic effect of streptokinase infusion in diabetic STEMI patients.
2. To study the thrombolytic effect of streptokinase infusion in non-diabetic STEMI patients.
3. To compare the thrombolytic effect of streptokinase infusion between diabetic and non-diabetic STEMI patients with ECG as a tool.

MATERIALS AND METHODS:

The present study was conducted at ASRAM medical college and hospital, Eluru during July 2023 to December 2023.

Study design:

It was an institutional record based retrospective study on myocardial infarction patients that presented to the emergency department.

Sample size: 100

Inclusion Criteria: Diabetic and non-diabetic patients with STEMI that presented to emergency that underwent thrombolysis within 12 hours of symptoms onset with streptokinase infusion in the study period.

Exclusion Criteria: Patients with STEMI who had contraindications to thrombolysis were excluded.

Data collection and Methodology:

Data of the Patients who were diagnosed with ST elevation myocardial infarction and underwent thrombolysis was taken. Diabetic and non-diabetic patients were divided based on records of random blood sugar and HbA1c levels. Electrocardiogram obtained on admission and 90 min after streptokinase infusion was considered. ST segment resolution at 90min was noted.

Calculating ST Segment resolution:

- anterior mi-
Sum(ST elev in V1-V6, I, aVL) + Sum(ST dep in II, III, aVF)
- inferior mi-
Sum(ST elev in II, III, aVF) + Sum(ST dep in V1-V4)

ST resolution =

$$\frac{[\text{Sum ST dev initially} - \text{Sum ST dev at 90min}]}{[\text{Sum ST dev initially}]} \times 100\%$$

Statistical Analysis:

Data Analysis: The collected data was entered in Microsoft Excel and analysed using IBM-SPSS version 21 software, trial version. The results were presented in the form of charts, tables. p value less than 0.05 was considered as statistically significant. Chi-square test was used wherever required to find out association between different variables.

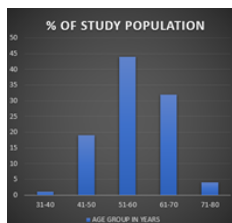
Ethical Consideration:

This study was done after obtaining institutional research committee and ethics committee approval to conduct the study by submitting the protocol.

Waiver of consent was sought from ethics committee.

RESULTS:

Age distribution:



Out of 100, 44 were in the age group of 51-60 years.

Sex distribution:

Out of 100, number of diabetics is 60, in which males are 40 ; females 20. Number of non diabetics is 40 in which males 20 and females 20.

Table 1 : St Segment Resolution In Sub Categories-sex And Diabetic Status

	COMPLETE RESOLUTION	PARTIAL RESOLUTION	FAILED RESOLUTION
DIABETIC MALES (N=40)	10 (25%)	6 (15%)	24 (60%)
DIABETIC FEMALES (N=20)	3 (15%)	2 (10%)	15 (75%)

Among diabetics subjects (n=60), 40 are males and 20 are females. Among diabetic males, 60% had failed resolution, 15 % had partial resolution and 25% had successful resolution. Among diabetic females, 75% had failed resolution, 10% had partial resolution, 15 % had successful resolution.

Table 2: St Segment Resolution In Sub Categories- Sex And Diabetic Status

	COMPLETE RESOLUTION	PARTIAL RESOLUTION	FAILED RESOLUTION
NON DIABETIC MALES (N=20)	11 (55%)	6 (30%)	3 (15%)
NON DIABETIC FEMALES (N=20)	10 (50%)	6 (30%)	4 (20%)

Among non-diabetics subjects (n=40), 20 are males and 20 are females. Among non -diabetic males, 55% had complete resolution, 30% had partial resolution and only 15% had failed resolution. Among non-diabetic females, 50% had complete resolution, 30 % had partial resolution and only 20 % had failed resolution.

Table 3: St Segment Resolution In Study Population

	FAILED RESOLUTION (<30%)	PARTIAL RESOLUTION (30-70%)	COMPLETE RESOLUTION (>70%)	P VALUE
DIABETIC (60)	40 (67%)	9 (15%)	11 (18%)	0.001
NON-DIABETIC (40)	7 (17.5%)	12 (30%)	21 (52.5%)	0.038
TOTAL (100)	47	21	32	
P VALUE	0.004		0.020	

On comparing failed and complete resolution, among diabetics, failed thrombolysis (67%) is more than successful thrombolysis (18%) which is statistically significant (p value 0.004).

DISCUSSION:

A well recognized ,effective treatment during acute MI is I.V. Streptokinase. For cardiovascular mortality , it has beneficial effect. Early and successful reperfusion is the aim of thrombolysis. The ongoing process of infarction as well as the metabolic derangement (due to ischemia) of the remaining viable cells must be reversed .

Serial monitoring of the reperfusion status , using ECG is an ideal method and is also cost effective. It tells much about the myocardial perfusion than epicardial perfusion .In fact, myocardial perfusion is a better factor which should be established at an earliest

time, so that myocardial death can be prevented. Various risk factors contribute to coronary heart disease. Hyperglycemia is an important major contributor for accentuation of coronary atherosclerosis.

The main purpose of this study is to show that diabetes as an independent factor affects the thrombolytic outcome after STEMI .This is assessed with the help of ECG as a simple tool. The thrombolytic efficacy of streptokinase is also assessed by this study. In patients without diabetes, efficacy is good ; it means that success rate of thrombolysis is more; failure rate is only less. In a diabetic patient presenting with STEMI , who are thrombolysed with streptokinase , because of extensive plaque pathology, the efficacy is poor, failure rate is more.

Therefore, in centers where definitive reperfusion is available, PCI/CABG may be a better option for diabetics presenting with STEMI.

CONCLUSION:

- On comparing the thrombolytic effect of Streptokinase , it is observed that failed thrombolysis is more in diabetic STEMI patients when compared to non-diabetic STEMI patients.
- Successful thrombolysis (>70% ST resolution) is more in non-diabetic than diabetic STEMI patients.
- Among diabetics, failed thrombolysis (67%) is more than successful thrombolysis (18%).
- Among non-diabetics, successful thrombolysis (52.5%) is more than failed thrombolysis (17.5%).
- So, the outcome of thrombolysis of acute ST elevation myocardial infarction patients is affected by type 2 diabetes mellitus . In diabetic ST elevation myocardial infarction patients , Percutaneous coronary intervention can be a better option than thrombolysis.

REFERENCES:

- Masoomi M, Samadi S, Sheikhvatan M. Thrombolytic effect of streptokinase infusion assessed by ST-segment resolution between diabetic and non-diabetic myocardial infarction patients. *Cardiology journal*. 2012;19(2):168-73.
- Khan MA, Khawaja MN, Hakeem F. Predicting clinical outcome in diabetics vs. non diabetics with acute myocardial infarction after thrombolysis, using ECG as a tool. *JPMA. The Journal of the Pakistan Medical Association*. 2011 Oct 1;61(10):1032-7.
- Shah I, Hafizullah M, Shah ST, Gul AM, Iqbal A. Comparison of the efficacy and safety of thrombolytic therapy for ST-elevation myocardial infarction in patients with and without diabetes mellitus. *Pakistan Heart Journal*. 2012;45(1).
- Araszkiewicz A, Janus M, Prech M, Grygier M, Pyda M, Olasińska-Wisniewska A, Araszkiewicz A, Mularek-Kubzdela T, Lesiak M, Grajek S. Relations of diabetes mellitus, microvascular perfusion and left ventricular remodelling in patients with acute myocardial infarction treated with primary coronary intervention. *Kardiologia Polska (Polish Heart Journal)*. 2014;72(1):20-6.
- Zairis MN, Lyras AG, Makrygiannis SS, Psarogianni PK, Adamopoulou EN, Handanis SM, Papantonakos A, Argyrakakis SK, Prekates AA, Foussas SG. Type 2 diabetes and intravenous thrombolysis outcome in the setting of ST elevation myocardial infarction. *Diabetes Care*. 2004 Apr 1;27(4):967-71.
- Hossain AM, Chowdhury MA, Dey SR, Akhtaruzzaman AK. A comparative study on the effect of streptokinase between diabetic and non-diabetic myocardial infarction patients. *Bangladesh Journal of Pharmacology*. 2008;3(1):1-7.
- Yasar AS, Bilen E, Bilge M, Arslantas U, Karakas F. Impact of metabolic syndrome on coronary patency after thrombolytic therapy for acute myocardial infarction. *Coronary Artery Disease*. 2009 Sep 1;20(6):387-91.
- de Lemos JA, Braunwald E. ST segment resolution as a tool for assessing the efficacy of reperfusion therapy. *Journal of the American College of Cardiology*. 2001 Nov 1;38(5):1283-94.
- Mak KH, Moliterno DJ, Granger CB, Miller DP, White HD, Wilcox RG, Califf RM, Topol EJ, GUSTO-I Investigators. Influence of diabetes mellitus on clinical outcome in the thrombolytic era of acute myocardial infarction. *Journal of the American College of Cardiology*. 1997 Jul;30(1):171-9.
- Strandberg LE, Ericsson CG, O'Konor ML, Bergstrand L, Lundin P, Rehnqvist N, Tornvall P. Diabetes mellitus is a strong negative prognostic factor in patients with myocardial infarction treated with thrombolytic therapy. *Journal of internal medicine*. 2000 Aug;248(2):119-25.
- Angeja BG, de Lemos J, Murphy SA, Marble SJ, Antman EM, Cannon CP, Braunwald E, Gibson CM, TIMI Study Group. Impact of diabetes mellitus on epicardial and microvascular flow after fibrinolytic therapy. *American heart journal*. 2002 Oct 1;144(4):649-56.
- Zairis MN, Makrygiannis SS, Papadaki OA, Lyras AG, Kouzanidis JP, Ampartzidou OS, Handanis SM, Argyrakakis SK, Foussas SG. Diabetes and ST Elevation Myocardial Infarction. *Diabetes Care*. 2002 Oct 1;25(10).