

Outcomes of Fibrinolytics in Patients of Acute Myocardial Infarction

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ABSTRACT

Objective: The aim of our study was to determine outcomes of fibrinolytics in patients of acute MI in a setup where streptokinase is the sole fibrinolytic used and where the facility of primary PCI is not available.

Study Design: Descriptive cross sectional study

Place and Duration of Study: This study was conducted at the Department of Cardiology, Mardan Medical Complex Teaching Hospital, Mardan from January 2011 to December 2014.

Materials and Methods: This study included 3,000 patients using non probability purposive sampling technique. The study was approved by the Hospital Ethical Committee. An informed written consent was obtained. Out of these, 2100 (70%) were non diabetic and 900 (30%) diabetics.

Results: Those who presented within 6 hours of the index chest pain, streptokinase therapy was successful in 1709 (57%) patients and unsuccessful in 197 (6.6%) patients. Streptokinase was successful only in 771 (25.7%) patients and unsuccessful in 323 (10.8%) patients who presented in 6-12 hours of the index pain. Reinfarction occurred in 193 (6.4%) patients whereas 2807 (93.6%) were free of reinfarction. Hemorrhagic Stroke occurred 50 (1.7%) patients whereas 2 (0.1%) developed ischemic stroke.

Conclusion: Our study convincingly showed that intra cranial hemorrhage was relatively low with this fibrinolytic.

Key Words: Fibrinolytics, Acute Myocardial Infarction, Patients

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INTRODUCTION

Acute myocardial infarction (MI) remains a leading cause of morbidity and mortality worldwide. The Mortality of Acute MI is higher in women than in men (11% Vs 9%).¹ Fibrinolytics are highly effective when the door to needle time is less than 30 min in patient who cannot be shifted to PCI facility within 90 minutes.² Streptokinase given in the first hour saves 65 lives/1000 patients treated as compared with only 10 lives/1000 patients treated within 6-12 hours.³ After 12 hours, the risk associated with thrombolytic therapy outweighs any benefit.⁴ Streptokinase is a cost-effective thrombolytic strategy with a lower incidence of stroke than alteplase.⁵

Reperfusion success is assessed by resolution of chest pain and ST segment on ECG. ST-segment resolution by >50% or 70% within the first 60-180 minutes after therapy provides excellent insight into the ultimate infarct size, left ventricular function, and survival.⁶

Reocclusion of the culprit artery is an important issue seen in 5-30% of patients after successful fibrinolysis.⁷ Seventy eight percent of reocclusions are not associated with clinically overt symptoms or apparent reinfarction.⁸ Reinfarction rates are the same for

different fibrinolytics like 4.1% for streptokinase and 4.3% for alteplase. Advanced age, prior MI or angina, female sex, anterior MI, and lower systolic blood pressure are associated with a higher rate of reinfarction.⁹ Twenty percent of patients who continued smoking developed reinfarction as compared to only 5.1% in those who stopped so.¹⁰

Stroke is another complication of fibrinolytics carrying a worst outcome. Previous trials showed an extra 4 strokes/1,000 patients with fibrinolytics versus placebo.⁴ An excess risk of intracranial hemorrhage was observed with tissue-type plasminogen activator compared with streptokinase.¹¹ Hemorrhagic stroke with fibrinolytics carries 60% mortality whereas it is 17% with ischemic stroke.^{12,13}

MATERIALS AND METHODS

This was a descriptive cross sectional study from January 2011 to December 2014 conducted in the Department of Cardiology, Mardan Medical Complex Teaching Hospital, Mardan. This study included 3,000 patients using non probability purposive sampling technique. The study was approved by the Hospital Ethical Committee. An informed written consent was obtained.

Inclusion Criteria: Patients of any age and gender with acute myocardial infarction

Exclusion Criteria:

- Severe hypertension (>180/110)

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- Cerebral neoplasm, Previous stroke
- Recent history of surgery (<3 weeks), Peptic ulcer disease,
- Coagulation defects, Active internal bleeding, Ulcerative colitis
- Hypersensitivity, Pregnancy

Acute Myocardial Infarction patients who presented to our unit were given aspirin (300mg), clopidogrel (75-300mg) and IV streptokinase (1.5MU) ± Subcutaneous Enoxaparin. Data regarding successful fibrinolysis, reinfarction over a period of 1 month and stroke during the index hospitalization were documented.

Outcomes of fibrinolytics were defined as successful fibrinolysis, reinfarction and stroke.

Acute myocardial infarction was defined two out of three of the following:

- Central chest pain for more than 30 minutes ±radiating to arms or jaws
- ST segment elevation of ≥ 1 mm in 2 consecutive ECG leads with reciprocal ST depressions
- Increased cardiac enzymes (troponin I or T or CK-MB)

Successful fibrinolysis was defined as relief of chest pain associated with ST segment resolution by $\geq 50\%$ from the baseline in ECG performed after 90 minutes of starting the fibrinolytic therapy.

Reinfarction was defined as least 2 of the following 3 criteria:

- (1) Recurrent ischemic symptoms lasting >20 minutes or longer after resolution of symptoms of the index myocardial infarction,
- (2) Occurrence of new ST-T wave changes, new left bundle branch block or new Q waves,
- (3) A second elevation in cardiac enzymes to over the normal upper limit (or by a further 20% if already over the normal upper limit)¹⁴

Stroke was defined as sudden new onset neurological deficit with radiological evidence of hemorrhage or ischemia on CT brain

The statistical analysis was performed using the statistical software for social sciences (SPSS Ver. 16).

RESULTS

A total of 3000 patients of Acute Myocardial Infarction who were eligible for streptokinase were enrolled in the study. There were 1875 (62.5%) males and 1125 (37.5%) females. The mean age of the patients was 59.93 ± 10.21 years. The age of the study population ranged between 38 years to 87 years and majority of the patients were between 55-70 years (Fig.1). Out of these, 2100 (70%) were non diabetic and 900 (30%) diabetics. Those who presented within 6 hours of the index chest pain, streptokinase therapy was successful in 1709 (57%) patients and unsuccessful in 197 (6.6%) patients. Streptokinase was successful only in 771 (25.7%) patients and unsuccessful in 323 (10.8%) patients who presented in 6-12 hours of the index pain (Fig.2).

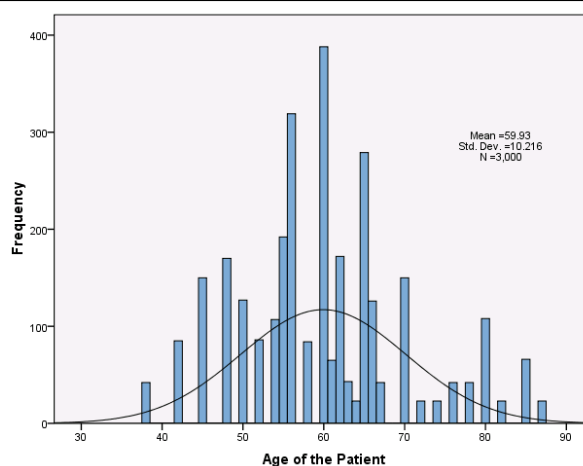


Figure No.1: Age Distribution of the Patients Fibrinolysed

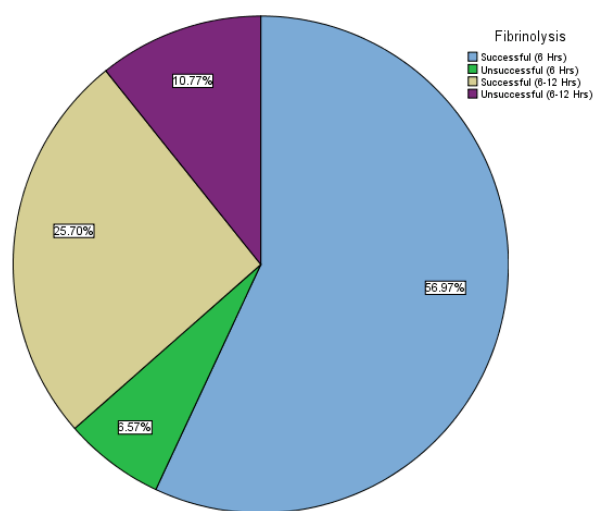


Figure No.2: Results of Fibrinolysis

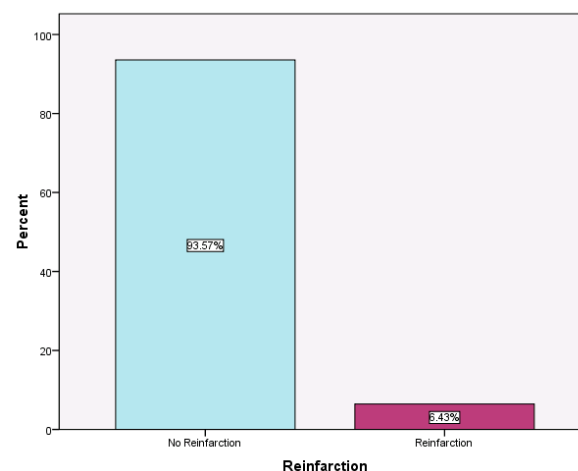


Figure No.3: Reinfarction with Streptokinase

Reinfarction occurred in 193 (6.4%) patients whereas 2807 (93.6%) were free of reinfarction (Fig.3). Hemorrhagic Stroke occurred 50 (1.7%) patients whereas 2 (0.1%) developed ischemic stroke (Fig.4).

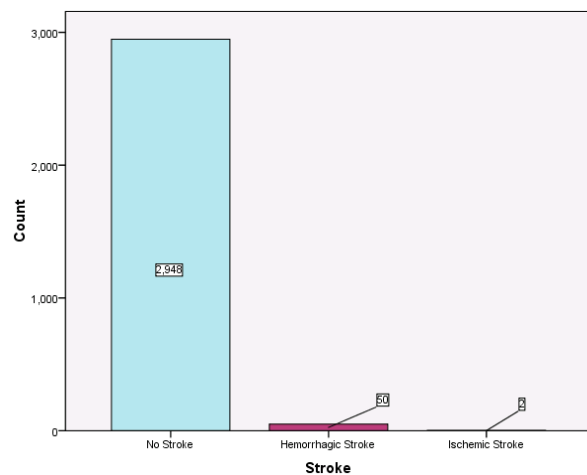


Figure No.4: Stroke with Streptokinase

DISCUSSION

Primary PCI has revolutionized clinical outcomes in STEMI patients but it is not readily available everywhere. The first generation fibrinolytic Streptokinase is still commonly used in the developing nations for the treatment of acute myocardial infarction.¹⁵ This improves survival in patient of ST elevation myocardial infarction but complications like failure of therapy, reinfarction and minor or major bleeds are still matters of concern.^{16,17}

ST segment is a better indicator of prognosis and successfulness of therapy.¹⁸ Using this tool in our study, Fibrinolysis was successful in 57% patients who presented within 6 hours of the chest pain. The results were almost similar to those quoted by GUSTO-I trial which was 54% and Goldhammar et al which was 56.4%.^{19,20} In our study, expectedly the success rate was low, that is 25.7% in patients who presented within 6-12 hours of the index pain. Despite late presentation, the success rate is still reasonably good as the necrosis of myocardium in animal model is almost 71% complete at 6 hours of the infarction.²¹

One quarter of all myocardial infarction patients suffer reinfarction within 10yrs.²² The incidence has dropped down to an average of 4.7% as reported by Donges et al.²³ This is because of the early use of Aspirin, Clopidogrel, Beta-blockers and fibrinolytics. The rate of reinfarction in our study was 6.4% almost the same as reported by Rivers et al where it was 5.7% and Malacrida et al who reported it to be 3% in men and 4.6% in females.^{24,25} The reinfarction rate in patients with primary PCI is 2.1% which is quite lower than with the fibrinolytics.²⁶ Most of the reinfarction in our study occurred within a week's time. The previous studies like the GUSTO I and ASSENT 2 showed that reinfarction is more prevalent in diabetics and inferior myocardial infarction patients although no such correlation is shown in our study.²⁷ Six month mortality with reinfarction is 16% and this can be lowered with

reperfusion therapies without increasing the incidence of hemorrhagic strokes.^{26,28}

Hemorrhagic stroke is the deadliest complication feared the most with the fibrinolytics. The conventional risk factors are a low BMI, elderly patients and those presenting with hypertension as reported by Simoon et al.²⁹ The incidence of hemorrhagic stroke in our study was 1.7% a bit higher than reported by Gore et al. They reported an incidence of 1.19% irrespective of age.³⁰ Most of hemorrhagic strokes occurred in our study in those above the age 70 years. White et al showed the incidence of hemorrhagic stroke to be 0.8% in patients <65 years of age and 3.4% in patients aged 75-84 years.³¹ This incidence is quite higher than that of our study. Although age is not a barrier to the use of fibrinolytics nowadays, we need to be careful in the elderly patients.¹⁶ There occurred only 2 ischemic strokes in our study. Two percent of patients with myocardial infarction develop LV thrombus formation. Ischemic strokes in our study might have occurred from the embolization of this LV thrombus to the brain.

CONCLUSION

We found streptokinase to be an effective drug in a setup where primary percutaneous intervention facility is not available and where it is the sole agent available to us. The reinfarction rates were within an acceptable range. Above all, our study convincingly showed that intra cranial hemorrhage was relatively low with this fibrinolytic.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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