Original Research Paper

A Comparative Study of Streptokinase V/S Tenecteplase in Hyper Acute Stage of Myocardial Infarction

Medical Science

* Dr. Vismay R. Deshani	Third year resident, Department of Medicine, M.P. Shah Medical College and G.G. Hospital, Jamnagar * corresponding author
Dr. Manish N. Mehta	Professor and Head, Department of Medicine, M.P. Shah Medical College and G.G. Hospital, Jamnagar
Dr. N.R. Rathod	Additional Professor, Department of Medicine, M.P. Shah Medical College and G.G. Hospital, Jamnagar

ABSTRACT *Acute myocardial infarction with ST elevation in ECG is a medical emergency with its life threatening and chronic complications. A retrospective, observational study was conducted in a total of 60 patients with acute ST-segment elevated myocardial infarction and administered with fibrinolytics Streptokinase & Tenecteplase. Based on the efficacy monitoring parameters, ST segment resolution of > 50% was observed in 76.67% of patients treated with streptokinase. It was higher 86.67% in Tenecteplase group. Tenecteplase definitely has better efficacy and safety than Streptokinase.*

INTRODUCTION

Morbidity and mortality from cardiovascular causes have a high prevalence in countries like India. The Incidence has been steadily increasing because of the modern lifestyle and stressful daily routine.

Acute myocardial infarction with ST elevation in ECG (STEMI) is a medical emergency with its life threatening and chronic complications. The early (30-day) mortality rate from AMI is 30%, with more than half of these deaths occurring before the stricken individual reaches the hospital.1 Although the mortality rate after admission for AMI has declined by 30% over the past two decades, approximately 1 of every 25 patients who survives the initial hospitalization dies in the first year after AMI. Mortality is approximately fourfold higher in elderly patients (over age 75) as compared with younger patients.2-4 Thus, myocardial infarction remains an important health concern. It merits continued attention from basic and clinical researchers, epidemiologists and practicing physicians.5,6

The aim of the study was to compare the efficacy and safety parameters of the thrombolytic drugs Streptokinase and Tenecteplase in treating the patients of hyper acute ST Elevation Myocardial Infarction who presented within 6 hours to our hospital, during the period of 1.5 years from May 2014 to November 2015.

MATERIAL AND METHODS:

A retrospective, observational study was conducted in a total of 60 patients with acute ST-segment elevated myocardial infarction and administered with fibrinolytics Streptokinase & Tenecteplase. The study population was divided into 2 groups based on the fibrinolytic drug received as STK group, TNK group containing 30 patients in each group.

The study was conducted with the approval of the Institutional Ethics Committee and consent of the study population.

OBSERVATIONS:

In this study there is linear increase in incidence of MI with increasing age. No patients were below 30 years of age, while 26.67 % were between 31 to 45 years of age, 40 % were between 46 to 59 years of age and 33.3 % were >60 years of age. Incidence is highest in 46 to 59 year of age (Table-1).

Table-1: Incidence of MI in comparison with age in this study

Age (years)	No. of patients	Percentage
<30	0	0
31-45	16	26.67
46-59	24	40
>60	20	33.33
Total	60	100%

Myocardial Infarction is classified depending upon the involved area of the myocardium. Here 33 (55%) patients suffered from subgroups of Anterior wall MI which include 17(28.33%) pure anterior wall, 6(10%) Antero-lateral wall, 3 (5%) Antero-septal wall, 6 (10%) Extensive Anterior wall MI. Inferior wall MI consisted of 27 (45%) patients in which, 14 (23.33%) pure Inferior wall, 5(8.33%) infero-posterior wall, 4 (6.67%) infero-post-right wall MI.

Table-2: Ejection Fraction comparison by 2D Echo

EF (%)	STK		TNK	
	No. of patients	%	No. of patients	%
<40%	8	26.67	11	36.67
>40%	22	73.33	19	63.33

2D-Echo is a tool to assess the cardiac contractility especially left ventricular function and conditions of cardiac valves. We have taken the cutoff value of 40% of Ejection fraction. <40% indicates significant LV dysfunction. Total 19 (31.66%) patients had EF <40% (Table-2).

Table-3: Efficacy parameters for STK and TNK

Efficacy parameters	STK		TNK		p-value
	No. of pts	%	No. of pts	%	
Symptom relief >50%	23	76.67	26	86.67	0.99
ST segment resolution >50% in most leads	24	80	27	90	

In our study, 76.67% of patients who received STK have reported symptoms relief of more than 50%. For patients thrombolysed with TNK the percentage were 86.67. While in STK group ST segment resolution of more than fifty percent in most of the leads were 80% and in TNK group, it was 90%. Here p-value of overall comparative efficacy is 0.99 which is considered as statistically insignificant. (Table-3)

Table-4: Safety parameters in STK v/s TNK

Safety Parameters (Complications)	STK		TNK		P-value
	No. of pts	%	No. of pts	%	
Cardiogenic Shock	5	16.67	3	10	
Arrhythmia (VPCs, V.Tach., AV Blocks)	7	23.33	6	20	1.00
Anaphylaxis	0	0	0	0	
Stroke/Bleeding	0	0	0	0	

Safety parameters which were taken into considerations include development of arrhythmias like VPCs, Ventricular Tachycardia, AV blocks etc., Anaphylaxis (allergy), Stroke or bleeding tendencies (hemetemesis, hemoptysis, epistaxis, injection site bleeding etc) and cardiogenic shock or hypotension. Data suggests that anaphylaxis or Stroke were not observed in any of the study population receiving STK or TNK. Incidence of various arrhythmias was 23.33% in STK group while20% in TNK group. Cardiogenic shock was a complication in 16.67% of patients in STK group. TNK group had 10% incidence of cardiogenic shock. When we applied the Fisher's exact test to the findings which is a variant of Chi-square test, p-value was 1.000 which is statistically insignificant. (Table-4)

Overall mortality observed in STK group is 4 (13.33%) which is significantly higher than TNK group 2 (6.67).

26 patients were discharged after the treatment period from STK group while 28 patients were discharged from TNK group. p- Value in current study mortality comparison was 0.670.

DISCUSSION:
Fibrinolytic therapy has become the mainstay of treatment for acute transmural myocardial infarction.3,4,5 A comparative study was conducted to assess the efficacy and safety of fibrinolytic drug therapy (Streptokinase and Tenecteplase) for 60 patients with acute STEMI.

Streptokinase was administered to 30 patients and Tenecteplase was given to 30 patients for fibrinolysis. Based on the efficacy monitoring parameters, ST segment resolution of > 50% was observed in 76.67% of patients treated with streptokinase. It was higher 86.67% in Tenecteplase group. 24 patients with STK had > 50 % ST segment resolution out of 30 patients where as 27 patients with TNK had > 50 % ST segment resolution out of 30 patients. The study observed that TNK had better ST segment resolution than STK. Although results were not statistically significant on using chi square test. Symptoms relief was better in patients with TNK (86.67%), compared with STK (76.67%) group {TNK>STK}

CONCLUSIONS:
The evolution of thrombolytic drugs over the last 2 decades has seen transition from first generation (SK, urokinase) to fibrin-specific, nonantigenic, second (alteplase, t-PA) and third generation thrombolytics (rPA, TNK) with longer half lives, resistance to PAI-1, better 90 minutes patency rates and TFG3.

Tenecteplase is a third generation fibrinolytics. The above study identified Tenecteplase as the more safe and efficacious fibrinolytic agent as compared to Streptokinase. These agents should be considered in all patients presenting with ST elevation MI. The recommended guideline of door to needle time of 30 min is observed in the minority of all the groups. If these guidelines are adhered to better results with thrombolytics can be anticipated.

Thus, in the setting of STEMI, fibrinolysis continues to be an option for reperfusion in non-PCI centers and in patients presenting early ($\leq$ 6 hours) where delay to invasive strategy is expected.

In a given clinical setting, the choice of thrombolytic agent should depend upon the risk of mortality, ICH, age, timing of thrombolytic treatment and cost effectiveness in a given health care system. Future research might see development of optimal thrombolytic strategy with ability of maximal reperfusion and with minimal bleeding and re occlusion complications.

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