

A STUDY OF OUTCOME AND COMPLICATIONS OF THROMBOLYSIS IN PATIENTS WITH ST SEGMENT ELEVATION MYOCARDIAL INFARCTION IN A TERTIARY CARE HOSPITAL IN MANDYA

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Abstract

Background: STEMI a medical emergency caused by abrupt decrease in coronary blood flow after thrombotic occlusion of coronary artery. Cardiovascular diseases account for high morbidity and mortality all over the world. The mortality due to STEMI has declined dramatically over past decades and is attributed to the introduction of aspirin, thrombolytic therapy, b-blockers, ACE inhibitors and PCI. Access to primary PCI is limited and not affordable especially in India. Thrombolytic therapy in golden hours(1-3hrs) is still gold standard treatment when instituted at the earliest. Fibrinolytic therapy can reduce the relative risk of in-hospital death by 50%. When appropriately used, fibrinolytic therapy reduce infarct size, incidence of serious complications and limit LV dysfunction. The objective is to assess the outcome of thrombolysis in patients with STEMI, to assess the complications of thrombolysis in patients with STEMI. **Materials and Methods:** Cross sectional study conducted at MIMS, Mandya involving 80 patients who presented with STEMI. Data collection was done by history taking, clinical examination, laboratory and radiological investigations. SPSS V22 was used for statistical analysis. **Result:** Mean age of patients was 48.61. Males had higher incidence of STEMI compared to females(3.2:1). Commonest presenting symptoms being chest pain(63.8%). Majority of patients had risk factor of hypertension(53.8%). AWMI was most common among study group. Successful thrombolysis was observed in 78.8% and was more in patients thrombolysed within 3hrs of symptom onset. Hypotension was most common complication. Incidence of adverse events was more in patients thrombolysed after 6hours and LV dysfunction being in majority. In-hospital mortality of 3.8% was observed. **Conclusion:** Thrombolysis, an life saving revascularisation procedure especially if administered within first 3hours of symptom onset and reduces occurrence of adverse events and mortality significantly. Hence can be used in hospitals with PCI limited settings to improve health outcome of patients.

INTRODUCTION

ST-segment elevation myocardial infarction (STEMI) which is a part of acute coronary syndrome is a medical emergency caused by abrupt decrease in coronary blood flow after a thrombotic occlusion of a coronary artery previously affected by atherosclerosis.

Slowly developing, high-grade coronary artery stenosis does not typically precipitate STEMI

because of the development of a rich collateral network over time. Instead, STEMI occurs when a coronary artery thrombus develops rapidly at a site of vascular injury. This injury is produced or facilitated by factors such as cigarette smoking, hypertension and lipid accumulation.

In most cases, STEMI occurs when the surface of an atherosclerotic plaque becomes disrupted (exposing its contents to the blood) and conditions (local or systemic) favour thrombogenesis.^[1]

Cardiovascular diseases account for high morbidity and mortality all over the world. Approximately 15.5 million cardiovascular deaths occur every year. Of these, about half are likely to be due to acute myocardial infarction (MI), with the majority occurring in low- and middle-income countries. The mortality due to STEMI has declined dramatically over the past three decades. This decline has been attributed to the introduction of aspirin, thrombolytic therapy, beta-blockers, and angiotensin-converting enzyme (ACE) inhibitors and primary percutaneous coronary angioplasty (PCI) offers benefits over thrombolytic therapy, but access to primary PCI is limited and not affordable to the majority of patients in the India. Combinations of newer antiplatelet regimens or direct thrombin inhibitors appear to reduce reinfarction but do not reduce mortality. Despite therapeutic advances, large scale randomized clinical trials reported 6-9% early mortality rates (30-35 days), even for patients receiving thrombolytic therapy within 6h of symptom onset because Post MI complications continue to pose major threat to recovery in some patients.^[2]

Thrombolytic therapy in this golden hours (1-3hrs most beneficial) is still the gold standard treatment for STEMI when instituted at the earliest reducing mortality and morbidity. Fibrinolytic therapy can reduce the relative risk of in-hospital death by up to 50% when administered within the first hour of the onset of symptoms of STEMI, and much of this benefit is maintained for at least 10 years.

When appropriately used, fibrinolytic therapy appears to reduce infarct size, limit LV dysfunction, and reduce the incidence of serious complications such as septal rupture, cardiogenic shock, and malignant ventricular arrhythmias. The 12-lead electrocardiogram (ECG) is a pivotal diagnostic and triage tool since it is at the centre of the decision pathway for management. It permits distinction of those patients presenting with STEMI and NSTEMI.^[1]

Allergic reactions to Streptokinase occur in approximately 2% of patients. Minor degree of hypotension occurs in 4-10% of patients. Haemorrhage is most frequent and potentially most serious complication. Haemorrhagic stroke is most serious complication and occurs in 0.5-0.9% of patients.^[1]

MATERIALS AND METHODS

This cross sectional study was conducted in patients admitted to Intensive Cardiac Care Unit, Department of General Medicine in Mandya Institute of Medical Sciences, MIMS, Mandya will be taken for study considering inclusion and exclusion criteria. Duration of study was Jun 2019 to May 2020.

Sample Size: As per the records of the previous one year, in our hospital 80 cases of STEMI were

thrombolysed. Hence sample size is considered to be 80.

Sampling Method: Purposive Sampling

Inclusion Criteria

All patients presenting to ICCU, MIMS, Mandya diagnosed as STEMI with chest pain of less than 12 hrs of onset and who are willing to give informed consent with any of the following,

1. ST $\uparrow \geq 1$ mm in \geq two contiguous limb leads.
2. ST $\uparrow \geq 2$ mm in \geq two contiguous precordial leads.
3. New onset left bundle branch block.

Exclusion Criteria

1. Acute coronary syndrome without ST elevation.
2. Active internal bleeding H/O.
3. H/O Bleeding disorder
4. Head injury
5. Suspected aortic dissection, reinfarction
6. Pregnancy
7. History of Cerebrovascular accident.
8. Allergic to Streptokinase

Methods of collection of data

All patients who are diagnosed with STEMI in our hospital shall be explained about this study and request them to participate in this study. Informed consent shall be obtained from those who agree to participate in the study.

Information will be collected through a pre tested and structured proforma for each patient.

In the first part, data regarding identifier details like name, age, phone number, inpatient number etc, will be obtained.

In the second part, information about the chief complaints, history of presenting illness, past history, etc will be obtained. Details regarding the general condition of the patient and investigation reports will be obtained.

In the third part, patient is assessed after thrombolysis with improvement in symptoms and resolution of ST segment on ECG.

In the fourth part, all the details of post thrombolysis shall be entered. This shall include the complications during the procedure. The recovery and complications of the procedure till 24hrs shall be recorded.

Statistical Analysis

Data obtained will be analysed by descriptive statistics like percentage, proportions, mean, SD and inferential statistics like chi-square to know the association and t-test to know difference between 2 means and other suitable tests will be applied and depicted via bar charts, pie charts.

RESULTS

In the present study minimum age of patient is 28years. The maximum age of the patient is years. Maximum number of patients is in between 41-50years constituting 38.8%. Mean age of present study is 48.61 ± 9.82 . In the present study sex distribution shows clear male predominance. In this

study chest pain was the most common mode of presentation, present in 51 patients, breathlessness seen in 30 patients, accompanying sweating in 28 patients, syncope was seen in 11 patients and palpitation in 13 patients

In the present study hypertension is seen in 53.8% cases, diabetes is seen in 50%, Alcohol consumption

is seen in 40% cases, smoking history in 35%. Family history of IHD seen in 5% and other risk factors including dyslipidemia is seen in 30%.

In the present study majority of patients were diagnosed with anterior wall MI constituting 68.8%. IWMI seen in 26.3% and new onset LBBB in 5%.

Table 1: Diagnosis distribution of patients studied

Diagnosis	No. of patients	%
AWMI	55	68.8
IWMI	21	26.3
LBBB	4	5.0
Total	80	100.0

In the present study majority of our patients were thrombolysed between 3-6 hours from onset of symptoms constituting 42.5%. In the present study ST segment resolution i.e., >50% resolution after thrombolysis is seen in 78.8%.

Hypotension is the most common complication observed in thrombolysed patients in about 13.8% followed by immune mediated reaction in 12.5%, bleeding in 5%, CVA in 1.3%.

LVF is the most common adverse event occurring in thrombolysed patients in our study constituting 25%. CS is seen in 10%, arrhythmia in 10%, recurrent angina in 3.8% followed by death in 3.8%.

Table 2: Outcome distribution of patients studied

Outcome	No. of patients (n=80)	%
Successful thrombolysis	63	78.8
Failed thrombolysis	17	21.3
Complications	22	27.5
No adverse effects	53	66.3
Adverse effects	27	33.8
Death	3	3.8

Table 3: Diagnosis frequency distribution in relation to outcome Of Thrombolysis

Diagnosis	Outcome		Total
	Successful thrombolysis	Failed thrombolysis	
AWMI	43(78.2%)	12(21.8%)	55(68.8%)
IWMI	18(85.7%)	3(14.3%)	21(26.3%)
LBBB	4(100%)	0(0%)	4(5%)
Total	65	15	80(100%)

P=0.126, not Significant, Fisher Exact Test

In our study 23 patients out of 55 patients with AWMI had adverse events constituting 41.8%. 14.3% of IWMI and 25% of new onset LBBB had adverse events

In present study the occurrence of adverse events was minimum in patient's thrombolysed within 3 hours of symptoms onset in 11.1%. And was significantly higher i.e., 51.9% in patients thrombolysed after 6 hours.

Table 4: Diagnosis frequency distribution in relation to adverse events of patients studied

Diagnosis	Adverse Effects		Total
	No	Yes	
AWMI	32(58.2%)	23(41.8%)	55
IWMI	18(85.7%)	3(14.3%)	21
LBBB	3(75%)	1(25%)	4
Total	53	27	80

P=0.185, Significant, Fisher Exact Test

Table 5: Time lag frequency distribution in relation to adverse events among patients studied

Time lag Between	Adverse Effects		Total
	No	Yes	
<3hr	27(50.9%)	3(11.1%)	30(37.5%)
3-6hr	24(45.3%)	10(37%)	34(42.5%)
>6hr	2(3.8%)	14(51.9%)	16(20%)
Total	53(100%)	27(100%)	80(100%)

P=0.0001, Significant, Chi-Square Test

Table 6: ST seg resolution @ 90min frequency distribution in relation to adverse events of patients studied

	Adverse Effects		Total (n=80)	P value
	No(n=53)	Yes(n=27)		
St seg resolution @90min				
<50%	5	12	17(21.3%)	0.000527
>50%	47	16	63(78.8%)	

P value 0.000527 (statistically significant), Chi-Square/Fisher Exact Test

Table 7: Time lag in relation to death of patients - frequency distribution.

Time lagBetween	Death		Total
	No	Yes	
<3hr	28(93.3%)	2(6.6%)	30
3-6hr	34(100%)	0(0%)	34
>6hr	15(93.75%)	1(6.25%)	16
Total	77	3	80(100%)

P=0.315, Not Significant, Fisher Exact Test

DISCUSSION

In present study a total of 80 patients who presented with STEMI were included. The mean age of patient is 48.6 years compared to other studies in present study mean age of population is 10 years younger. Study conducted by sezer et al,^[3] mean age who presented with STEMI were in 6th decade.

In the present study male patients constituted 76.3% and females 23.7%. There is clear male predominance in present study. In the study conducted by Sezer et al,^[3] male patients outnumbered females and male patients were 70%. Similar results were observed in our study.

Regarding the risk factors in our study hypertension was found in 53.4%, diabetes in 50%, alcohol consumption among 40% and smoking among 35% of patients.

Hypertension was major risk factor found followed by diabetes. In a study conducted by Bhatial et al,^[4] hypertension was found in 45.5% patients followed by smoking in 39.5% and diabetes in 24% of patients. In their study smoking was major risk factor observed in contrast to our study which has hypertension as predominant risk factor.

Among the presenting complaints around 51 patients presented with chest pain, 30 patients presented with breathlessness. Syncope was presenting feature in 11 patients, palpitations in 13 and sweating in 28 patients. Other atypical symptoms like loose stool, epigastric discomfort was also present in 15 patients. Major presenting complaint in our study was chest pain. Similar result was seen in study conducted by bhatial et al,^[4] in which chest pain was major presenting complaint in patients with CAD. Majority of our patients presented within 6 hours of symptom onset (80%)

Majority of patients were diagnosed with AWMIL. Anterior wall was involved in around 68.8% of patients constituting majority of cases followed by inferior wall involvement in 26.3% of patients. New onset of LBBB was found in 5% of patients. Which was similar to results in a study conducted by Anderson et al,^[5] in which anterior wall was found to involve in majority of cases.

In present study hypotension is major complication following thrombolysis observed in 13.8% of patients followed by immune mediated reaction in 12.5%, bleeding manifestation in 5% and CVA which occurred in 1.4% of patients. In study by Aslanabadia et al,^[6] hypotension was major complication following thrombolysis and was observed in 34.6%. Hypotension and immune mediated reactions following thrombolysis is lower when compared to other study.

In present study of 80 patients, ST segment resolution (>50%) is seen in 78.8% and non-resolution in 21.3%. Result of ST segment resolution is higher when compared to study conducted by Bhatia L et al,^[4] where out of 85 patients studied successful thrombolysis was seen in 53%.

Successful thrombolysis occurred in majority of patients who presented within symptom onset (86.1%). Only 8 patients out of 64 patients who presented within 6 hours had failed thrombolysis. In the study conducted by French J K et al,^[7] ST segment resolution was found in 85 of patients who presented within 6 hours of symptom onset (42.5%) and no ST segment resolution in 11.5% of patients within 6 hours of thrombolysis. Our study group had higher rate of successful thrombolysis in patients presenting early.

In present study of 80 samples adverse events occurred in 27 patients (33.8%). Major adverse event found in our study was LV dysfunction in 25% of patients followed by cardiogenic shock in 10% and arrhythmia in 10%. Our result was consistent with the adverse events observed in study by schrodwe et al,^[8] in which LV dysfunction was major complication observed in 52% of patients. Our study result showed lesser extent of adverse events when compared to previous study.

Adverse events were greater in patients who were thrombolysed after 6 hours of symptom onset (51%). Adverse events were lowest in group who were thrombolysed within 3 hours of symptom onset (11.1%) and had better outcome. Results in study by French JK et al,^[7] had showed that adverse events occurred in majority of patients who were thrombolysed after 6 hours (46.5%).

Death as an adverse event occurred in 3.8% of patients in our study and occurred thrombolysed after 6 hours of symptom onset. However death rate was lower when compared to study by French JK et al,^[7] where death was observed in 9% of patients. But in this study mortality was equal in both groups who had thrombolysis within or after 6 hours of presentation.

CONCLUSION

Patients who were thrombolysed earlier had better ST segment resolution and better outcome than who were thrombolysed later. Patients with no resolution of ST segment 90 minutes following thrombolysis were associated with more frequent adverse events and increased mortality compared to 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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