ORIGINAL RESEARCH PAPER

Medicine

FACTORS INFLUENCING THE OUTCOME OF THROMBOLYSIS IN ACUTE MYOCARDIAL INFARCTION

KEY WORDS:

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ABSTRACT

Coronary heart disease (CHD) is a worldwide health epidemic. It has been defined as "impairment of heart function due to inadequate blood flow to heart compared to its needs caused by obstructive changes in the coronary circulation to the heart"(1). It is the cause of 25-30% of deaths in most of the industrialized countries. In India also it is a major public health problem. It is aptly called by WHO as the 'modern epidemic'. The increasing incidence of coronary heart disease may be a reflection of increased longevity, adoption of high fat diet based on meats decreased exercise, modern lifestyle, made possible by increasing affluence. The present study is to ascertain the factors influencing outcome of thrombolysis in acute MI and concludes that Gender and Pre infarction not influence the success rate of thrombolysis, Better success rate has been seen in those consuming alcohol and smokers had a lesser success rate than non smokers but statistically not significant. Hypertensives did not show any difference with non hypertensives in the success rate. Diabetics did not differ much from non diabetics with respect to the success rate of thrombolysis. Inferior wall myocardial infarction had a better success rate than anterior wall myocardial infarctions. Those who are having short window period had a better success rate after thrombolysis. Shorter the window period higher the success rate.

INTRODUCTION

Coronary heart disease (CHD) is a worldwide health epidemic. From the 1960's to the 1990's the CAD prevalence increased two fold (from 2% to 4%)in rural India and three fold (from 3.45 to 9.45%) in Urban India. The prevalence is even higher in South India (13% urban and 7% rural).

The overall prevalence of CHD has risen in last few decades as populations age and patients survive the initial coronary or cardiovascular event. Worldwide 30% of all deaths can be attributed to cardiovascular disease of which more than half are caused by CAD.

It was the brilliant work of Herrick in 1912 who performed autopsy on acute myocardial infarction patients that put forward the new concept of thrombotic occlusion of coronary artery as the cause of downstream necrosis of the heart muscle. Definite proof for the above said concept came from angiographic studies performed during the early hours of the acute event.(2) This promoted scientists to systematically test the thrombolytic strategies to treat acute myocardial infarction. Scientists have developed many effective thrombolytic drugs like streptokinase, recombinant tissue plasminogen activator (Alteplase), Reteplase, Urokinase, Tenecteplase etc.

Evidence for the use of thrombolytic therapy came from large multicentric studies(3). GISSI and ISIS -2 confirmed reduction in mortality with the early use of streptokinase.(4) ISAM (intravenous streptokinase in acute Myocardial Infarction study group) also stands as a proof of efficacy of thrombolytic drugs to reduce mortality.

Success rate of thrombolysis and thus the overall reduction in mortality is different among different agents used.(5) The GUSTO-1 trial showed a 30 day mortality of 6.3 for accelerated t-PA verses 7.4% for streptokinase with intravenous heparin. But because of the prohibitive cost of t-PA, reteplase, and tenecteplase, streptokinase became the sheet anchor for the thrombolytic therapy. Thrombolytic therapy has revolutionised the management of acute myocardial infarction.(6) GUSTO angiographic substudy showed a success rate of 54% at 90 minutes using streptokinase and Heparin.

Thrombolytic therapy has been consistently proven to reduce the mortality and morbidity. Inspite of this, it has been recognized that thrombolytic therapy has failed in significant population. In this background we decided to look into our own patients who receive streptokinase for acute myocardial Infarction, in the coronary care unit of ASCOMS & Hospital.

AIM OF THE STUDY

1. To find out the overall success rate of thrombolysis in coronary care unit of ASCOMS & Hospital.
2. To find out whether the following parameters influence the outcome of thrombolysis.

1. Age
2. Sex
3. Pre-infarction angina
4. Alcohol intake
5. Smoking status
6. Pre existing systemic hypertension
7. Diabetes mellitus
8. Location of infarct.
9. Time interval between the onset of pain and the initiation of thrombolytic therapy.

MATERIAL AND METHODS

This Observational prospective cohort study was conducted in a coronary care unit of ASCOMS & Hospital, over a period of 1 year (April 2021 to March 2022) after obtaining approval from the institute ethical committee.

A total of 50 patients were included in the study after obtaining the informed consent from all the patients.

METHODOLOGY

Subject selection:

1. Inclusion criteria

a) Presence of typical chest pain suggestive of Acute myocardial infarction along with ECG evidence of acute myocardial infarction. Criteria for thrombolysis being 2mm or more ST elevation in two contiguous limb leads.

b) Time window of 12 hrs from the onset of pain to the initiation of thrombolysis.

2. Exclusion criteria

a) Late thrombolysis (more than 12 hrs from the onset of pain).
b) Recurrent myocardial infarction.
c) Presence of bundle branch block.
d) Development of pericarditis.

Drug Therapy

- All patients received streptokinase 1.5 million units in 100 ml of normal saline over 60 minutes.
- Aspirin was given to all patients
- Use of heparin, Beta blockers , ACE inhibitors was according to CCU protocols which was in the accordance with ACC/AHA recommendations.

Criteria For Success of Thrombolysis

Success was defined by :

1. Clinical complete subsidence of chest pain
2. Electrocardiographically more than 50% ST resolution in a lead which showed maximum ST elevation initially. ST elevation is measured manually 80 ms after J point from isoelectric line .

Patients were analyzed for success of thrombolytic therapy at 90 minutes after initiation of thrombolytic therapy, applying the above mentioned criteria. Those who underwent successful thrombolysis were grouped into group A. Those with failed thrombolysis grouped into group B.
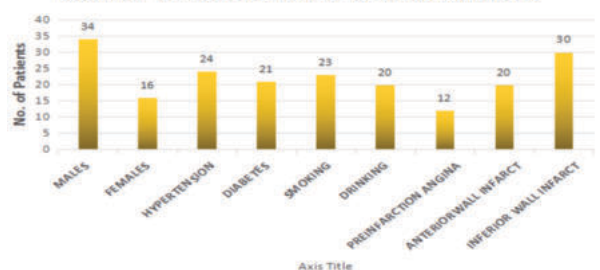
The following parameters were analyzed among them to know whether they influenced the outcome of thrombolysis:

1. Age
2. Sex
3. Preinfarction angina
4. Alcohol intake
5. Smoking status
6. Systemic hypertension
7. Diabetes mellitus
8. Location of MI
9. Time interval between the onset of pain and the initiation of thrombolytic therapy.

OBSERVATIONS AND RESULTS

- A total of 50 patients were studied.
- 34 of them were males (68%) and 16 females (32%)
- 24 of them were hypertensives (48%) .
- 21 of them were diabetics (42%) .
- 23 people were smokers (46%)
- 20 consume alcohol. (40%)
- 12 patients experienced preinfarction angina (24%) .
- 20 patients had anterior wall infarction (40%) and 30 patients (60%) had inferior infarction .

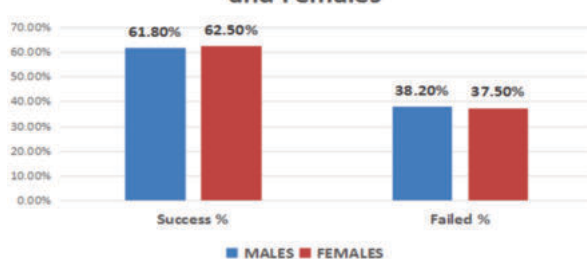**Figure 1: Number of patients under various variables**

Table 1: Outcome of thrombolysis

Thrombolysis	Success	Failed	Total	% successful
Males	21	13	34	61.8%
Females	10	6	16	62.5%
Overall	31	19	50	62%

Figure 2: Success rate of thrombolysis in males and females

Success rate in Males= 61.8 % Success rate in Females= 62.5 % Overall success rate= 62%
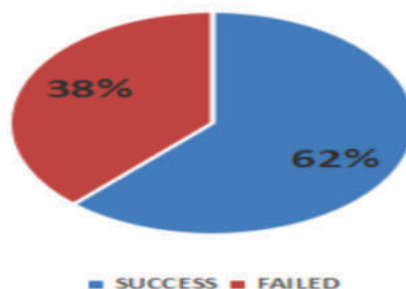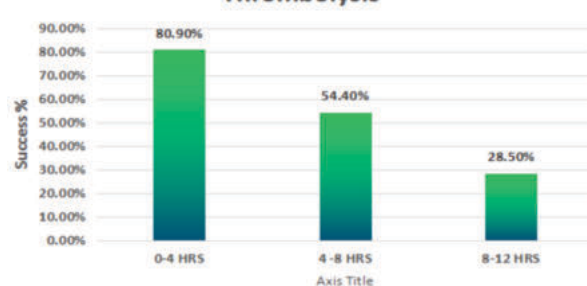

Figure 3: Overall outcome of thrombolysis

Table 2: Effect of time window on success rate of thrombolysis

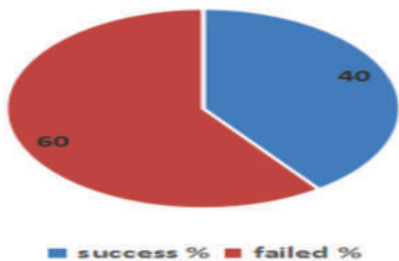| Time window	Success	Failed	Total	% successful
0-4 hrs	17	4	21	80.9 %
4 -8 hrs	12	10	22	54.5%
8-12 hrs	2	5	7	28.5 %

Figure 4 : Effect of time window on success rate of thrombolysis

80.9% patients presenting within 4 hrs window period had successful thrombolysis while 54.4% in 4-8 hrs window period and 28.5%in 8-12 hrs window period. Shorter the window period higher the success rate.

Table 3: Effect of infarct location on success rate of thrombolysis
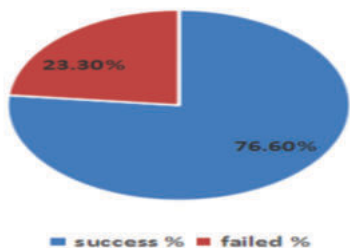
Location of infarct	Success	Failed	Total	% sucessful
Anteriorwall infarct	8	12	20	40%
Inferior wall infarct	23	7	30	76.6%

Figure 5: Success rate in anterior wall infarct
40% patients with Anterior wall infarction had successful thrombolysis.

Figure 6: Success rate in inferior wall infarct
76.6% patients with inferior wall infarction had successful thrombolysis.

Table 4: Success rate in patients with various variables

Variable	Success	Failed	Total	% successful
Hypertensive	12	12	24	50%
Diabetics	11	10	21	52.40%
Smokers	11	12	23	47.80%
Consume alcohol	12	8	20	60%
Pre-infarction angina	5	7	12	41.6%
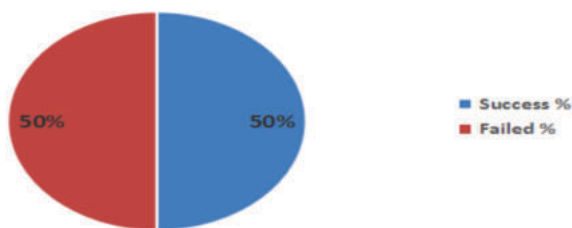
Figure 7: Success rate in patients with hypertension
50% patients with hypertension had successful thrombolysis.

Figure 8: Success rate in patients with diabetes

52.2% patients with Diabetes had successful thrombolysis.

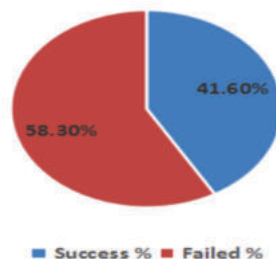**Figure 9: Success rate in patients who are smokers**
47.8% patients who are smokers had successful thrombolysis.
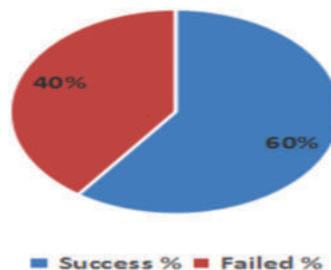
Figure 10: Success rate in patients consuming alcohol
60% patients who consume alcohol had successful thrombolysis.

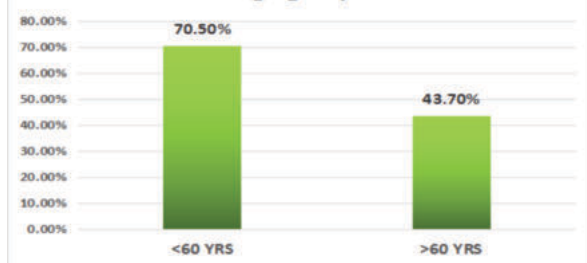**Figure 11: Success rate in patients with preinfarction angina**
41.6% patients having preinfarction angina had successful thrombolysis.

Table 5: Success rate in patients with various Age Groups

Age group	Success	Failed	Total	% successful
<60 yrs	24	10	34	70.5%
>60 yrs	7	9	16	43.7%

Figure 12: Success rate of thrombolysis according to age

70.5% patients <60y of age and only 43.7% of >60y age had successful thrombolysis.

Table 6: Uni-variate analysis for various factors

S.No.	Factors	Chi square	P value	Comment
1	Gender(female)	0.002	0.96	Not significant
2	Time window	7.040	0.029	Significant
3	Infarct location (inf. wall)	6.847	0.008	Significant
4	Hypertension	2.820	0.093	Not significant
5	Diabetes	1.422	0.23	Not significant
6	Smoking	3.63	0.056	Not significant
7	Drinking	0.056	0.81	Not significant
8	Pre-infarction angina	2.770	0.095	Not significant
9	Age <60y	3.326	0.068	Not significant

CONCLUSION

1. In this study the overall success rate of Thrombolysis was 62%.
2. Gender was not found to influence the success rate of thrombolysis much and its effect was statistically 'not significant'.
3. Those who were having short window period had a better success rate after thrombolysis. Shorter the window period higher the success rate. **(statistically significant)**
4. Inferior wall myocardial infarction had a better success rate than anterior wall myocardial infarction. **(statistically significant)**
5. Hypertensives did not show any difference from non hypertensives in the success rate and the effect of pre-existing hypertension on success of thrombolysis was statistically 'not significant'.
6. Diabetics did not differ much from non diabetics with respect to the success rate of thrombolysis and its effect was statistically 'not significant'.
7. Smokers had a slightly lesser success rate than non smokers but the effect was found to be statistically 'not significant'.
8. Better success rate was seen in those consuming alcohol but was statistically 'not significant'.
9. Patients with Pre-infarction angina had lesser success rate of thrombolysis but was statistically 'not significant'.
10. Those in age group <60y were observed to have better success rates but the effect of age on success of thrombolysis was statistically 'not significant'.

Summary

The study was conducted to evaluate the success rate of thrombolysis in acute myocardial infarction and the various factors influencing its out come. It was done by observational prospective cohort study of patients receiving streptokinase for acute myocardial infarction in coronary care unit, ASCOMS and Hospital, Jammu.

The overall success rate of thrombolysis was 62%. Patients with inferior wall myocardial infarction had a better out come than anterior wall myocardial infarction. Alcohol, smoking and age were factors which influenced the out come, but were not statistically significant. Early thrombolysis had a better out come when compared to other predictors. Success rate was 80.9% in those patients thrombolysed within 4 hours from the onset of symptoms.

Time window and Location of myocardial infarct were found to be the two significant factors influencing the outcome of thrombolysis in patients with acute myocardial infarction.

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