Evaluation of Door to Needle Time and Predisposing Factor to it in A Tertiary Care Hospital, Chidambaram

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ABSTRACT

OBJECTIVE The aim of our study is to evaluate the door to needle time for ST-segment elevation myocardial infarction and to identify factors associated with a prolonged door to needle time. STEMI most commonly occurs when thrombus formation results in complete occlusion of major epicardial coronary vessels. Percutaneous coronary intervention and Thrombolytics are the two choice of treatment available for STEMI. Where door to needle time have a significant role in determining the efficacy of thrombolytics.

METHODOLOGY This is a prospective observational study conducted at RMMCH hospital, during the period of Nov 2014 to March 2015, all patient admitted with STEMI, who were thrombolysed were included in the study. Door to needle time is measured and reason for prolongation is identified. Patients who were diagnosed as NSTEMI or unstable angina and who were diagnosed as STEMI and not thrombolysed were excluded from the study.

RESULT 100 patients were included in the study. Which comprises of 72 males and 28 females .door to needle time of < 30 minute was achieved in 27% of study population as per ACC/AHA guidelines were 73% failed to achieve. Highest number of population was observed in the age group of 61-70 which consist of 21 males and 6 females. Mean door to needle time was found to be 44 minutes. Majority of the patients were thrombolysed in between 31 – 45 minutes

CONCLUSION less than a third of patients with STEMI received thrombolytics within the prescribed time interval of 30 minutes. Delay in decision making and lack of senior medical officers was found to be predisposing factor for the prolongation of door to needle time ,which requires special attention.

Keywords: ST- Elevation Myocardial Infarction, Streptokinase,Thrombolysis

INTRODUCTION

ST- elevation myocardial infarction (STEMI) most commonly occurs when thrombus formation results in complete occlusion of a major epicardial coronary vessel. The most serious form of acute coronary syndrome, STEMI is a life- threatening, time sensitive emergency that must be diagnosed and treated promptly via coronary revascularization, usually by percutaneous coronary intervention.[1]

While primary prevention of STEMI is considered the ideal, mortality and morbidity in patients presenting with acute myocardial infarction (AMI) can be reduced with early interventions such as fibrinolysis or percutaneous coronary intervention (PCI). [2]Many studies have shown that early PCI is more advantageous in reducing mortality from re-infarction and the need for a coronary artery bypass graft (CABG) than fibrinolytic drug therapy[3-5]while PCI facility is not available in many hospitals which makes fibrinolytic treatment more accessible and common. Early resolution of ST-segment elevation has been demonstrated to be a simple and useful predictor of final infarct size, left ventricular function, and clinical outcomes after both thrombolytic and coronary interventional approaches. [6] Delaying fibrinolytic therapy by one hour increases the hazard ratio of death by 20%, and a delay of 30 minutes or more can reduce the average life expectancy by one year. [7] The American Heart Association/American College of Cardiology (AHA/ACC) guidelines recommend a door-to-needle time of 30 minutes or less for administration of fibrinolytics for STEMI patients. [8] Compliance with this time period is considered a marker of quality of

care. [9]Aim of our study was to evaluate door needle time in STEMI and to identify factors associated with a prolonged door to needle time.

MATERIAL AND METHODS

This was a prospective observational study conducted at RMMCH, Annamalai University. A 1260 bedded multispecialty tertiarycare. The study was conducted during the period of Nov 2014 – March 2015. Patients were selected based on inclusion and exclusion criteria. Patients who were diagnosed as STEMI and thrombolysed were included in the study and patients who were diagnosed as NSTEMI or unstable angina, those who were diagnosed as STEMI and not thrombolysed and patients who was thrombolysed before reached to hospital were excluded from the study. Door to needle time is calculated from the patient case history and reason for prolongation is identified from hospital records. The study was approved by the Institution Human Ethics Committee, Rajah Muthiah Medical College, Annamalai University (M18/RMMC/2015).

RESULT AND DISCUSSION

A total of 100 patients were included in the study. 72(72%) were males and 28(28%) were females. Highest number of population was observed in the age group of 61-70 which consist of 21 males and 6 females followed by age group of 51- 60 consist of 14 males and 11 females. Door to needle time of < 30 minute was achieved in 27% patients where 73% of patients were thrombolysed after 30 minutes. Mean door to needle time was 44 minutes. Majority of the patients were thrombolysed in between 31 – 45 minutes. Of the patients, 44.7% were seen and given fibrinolysis by medical officers, with 34.8 % treated by emergency medicine registrars. The remaining patients were seen and treated by post graduate students (20.5%) In most of the patients who were thrombolyzed late, a delay in taking or interpreting an ECG was responsible with the early ECG showing subtle changes and the subsequent ECG showing clear cut changes. Transfer to ICU for thrombolysis also resulted in considerable delay. Uncontrolled hypertension was also found to be second most reason for delay in door to needle time followed by delay in decision making.

Table-1
DISTRIBUTION OF STUDY POPULATION

AGE (IN YEARS)	MALE	FEMALE	TOTAL PERCENTAGE (%)
31-40	8	2	10
41-50	11	5	16
51-60	14	11	25
61-70	21	6	27
71-80	12	2	14
>80	6	2	8
Total	72	28	100

Table-2
DOOR TO NEEDLE TIME

S.No.	DOOR TO NEEDLE TIME (MIN)	NUMBER OF PATIENTS
1.	<30 min	27
2.	31- 45 min	49
3.	46- 60 min	14
4.	61-120 min	10

Table-3
REASON FOR DELAY FOR >30 MIN. AMONG THROMBOLYSED PATIENTS

S/No.	Reason	Case % N=73
1.	Subtle ST-segment changes in initial ECG	32(43%)
2.	Uncontrolled hypertension (BP > 180/110)	24(32%)
3.	Delay in decision making and starting fibrinolytic therapy	12(16%)
4.	Undefined reasons	3(4%)
5.	Cardiac arrest	2(3%)

Minimising the time between the onsets of STEMI to initiation of a reperfusion strategy is important to improve prognosis and survival. In this study, less than a third of patients with STEMI received thrombolytics within the prescribed time interval of 30 minutes. Although guidelines recommend a door to needle time of 30 minutes, most of the hospitals fail to achieve it. A study conducted by Masurka*et al* showed mean door to needle time of <30 min is achieved in only 45%.[12] similarly the study conducted by Zed *et al* at the Vancouver General Hospital showed that a door-to-needle time of <30 min was achieved in only 24.3%[13]and The study

conducted by Abba AA at King Khalid University Hospital, Riyadh identified mean door to needle time was 95minutes.[14] same scenario was observed in our study where mean door to needle time was found to be 44 minutes. This doesn't correlate as per ACC/AHA guidelines. A key modifiable factor contributing to prolonged door-to-needle times was the need for senior review or advice on ECG interpretation that contributed to almost half of the documented delays in thrombolysis. Our study shows that about 44% of delay in door to needle time which accounts due to subtle ST-segment changes in ECG and delay in decision making which also point towards the lack of physician experience and need for the senior medical officers. Other studies also identified delay in diagnosis or ECG interpretation as a contributory factor to prolonged door-to-needle times.[10,11]

CONCLUSION

The study shows that only 27 % of population complied with the ACC/AHA guidelines of door to needle time of < 30 minutes. Several factors were contributing to this extended level. Which include Subtle ST-segment changes in initial ECG, Uncontrolled hypertension (BP > 180/110), Delay in decision making and starting fibrinolytic therapy, Cardiac arrest and undefined reasons. Which point towards the need of special attention of senior medical officers for early diagnose and initiation of treatment. A repeat audit is needed once hospital systems are changed to determine if there is an improvement in the door-to-needle time.

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