

EVALUATION OF THE DOOR-TO-NEEDLE TIME IN PATIENTS UNDERGOING FIBRINOLYTIC THERAPY AFTER ACUTE MYOCARDIAL INFARCTION

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Background: Early thrombolysis with fibrinolytic therapy has reduced mortality following acute myocardial infarction (AMI) with the major effect coming from early achievement of infarct-related artery patency. This study was carried out to determine the door-to-needle time in patients undergoing fibrinolytic therapy after acute myocardial infarction and to identify factors associated with a prolonged door-to-needle time. **Methods:** This was a cross sectional study in which patients who were thrombolysed for AMI with streptokinase at Punjab Institute of Cardiology, Lahore, from December 12, 2008 to February 18, 2009 were included. All patients admitted with AMI, who were candidates for fibrinolysis, were included. The time of infarction and time of arrival in hospital was determined with ECG changes and asking from patient and/or relatives. The reasons for delay of arrival were asked from patient and accompanying attendants where possible. **Results:** A door-to-needle time of <30 min could be achieved in 110 of our 201 patients (54.72%). Mean door-to-needle time was 55.13 (\pm 71.04) minutes. **Conclusions:** A door-to-needle time of less than 30 minutes in 54.72% is comparable to most contemporary studies however there is a need to look into factors associated with delay.

Keywords: Acute myocardial infarction, Door-to-needle time, Fibrinolytic therapy

INTRODUCTION

Fibrinolytic therapy (FT) has reduced mortality following acute myocardial infarction (AMI), with the major effect coming from early achievement of infarct-related artery patency.¹ The Grampian Region Early Anistreplase Trial (GREAT) showed that delaying thrombolytic treatment by 1 h increases the hazard ratio of death by 20%, equivalent to the loss of 43/1000 lives within the next 5 years (95% CI 7-88, P = 0.012). Delaying thrombolytic treatment by 30 minutes reduces the average expectation of life by approx 1 year.¹

The American College of Chest Physicians (ACCP) guidelines recommend that for patients with acute MI who are candidates for fibrinolytic therapy, the therapy should be administered within 30 min of arrival to the hospital or first contact with the health-care system (grade 1A).²

Thus, a short time to treatment interval must be considered as an adjunctive agent to fibrinolytic therapy. There are three components which determine the time between the onset of MI and administration of fibrinolytic therapy.

- 1) Delay in seeking medical attention
- 2) Transport delays
- 3) The door-to-needle time (the interval between the patient's arrival at the medical facility and the initiation of fibrinolytic therapy).

Efforts to reduce each of these components will lead to additive benefits in improving survival of patients with acute MI. The door-to-needle time is the easiest to modify. The rationale of study is that in our country general awareness about FT is lacking and very few patients actually know the importance of receiving early thrombolysis after MI. Therefore we decided to

carry out this study with an idea to determine door to needle time and factors causing delay in it so that prompt measures may be taken to reduce this time to save many lives after myocardial infarction.

MATERIAL AND METHODS

This was a cross sectional study of patients who were thrombolysed for AMI at Punjab Institute of Cardiology, Lahore from December 12, 2008 to February 18, 2009. All patients admitted with AMI, who were candidates for fibrinolysis, were included.

Total door-to-needle time was calculated with the help of hospital record. We also tried to find out the reason for prolonged door-to-needle time, (defined as >30 minutes) with the help of hospital record.

RESULTS

We received a total of 110 patients and recorded their door to needle time. Minimum time was 5 min, while the maximum was 420 min with mean time of 55.13 (\pm 71.04) minutes.

A door to needle time of less than 30 min could be achieved in 110 of total 199 patients (54.72%) patients.

Table-1 shows the time taken to complete each step, which constitutes the door-to-needle time. Of the patients in whom there was a delay of more than 30 min, in 50 (25%) of patients the initial ECG showed subtle ST-segment changes which did not merit thrombolysis. Subsequent ECGs showed ST elevation and these patients were thrombolysed, although door to needle time crossed 30 min. In 25 (12%) of the patients time taken between decision making about thrombolysis and starting fibrinolytic

therapy was the main reason for delay beyond 30 min. Three patients had a cardiac arrest owing to ventricular fibrillation (VF), which caused a delay. In 13 patients, we could not identify any reason for a delay.

Table-1: Details of door to needle time

Door to needle time	Number of patients (n=201)
Less than 30 min	110 (54.73%)
31-45 min	35 (17.42%)
45-60 min	31 (15.42%)
More than 60 min	25 (12.43%)

Table-2: Reasons for delay for >30 min. among thrombolysed patients.

Reason	Cases (%) n=91
Subtle ST-segment changes in initial ECG	50 (25%)
Delay in decision making and starting fibrinolytic therapy	25 (12%)
Cardiac arrest	13 (7%)
Undefined reasons	3 (1.5%)

DISCUSSION

It has been proven that a shorter door-to-needle time results in better outcome. Shuster and Dickinson³ brought out recommendations for ensuring fibrinolytic therapy for AMI. They recommended early recognition of AMI symptoms by the public and health-care professionals, early access to emergency medical services, and early action by emergency-care providers in administering thrombolytic therapy (within 30 min after the patient's arrival at the emergency department). Grunfeld⁴ added that, to dogmatically adopt 30 min as the time interval during which all eligible patients are to receive thrombolytic therapy may well result in as many as half the patients receiving less than the recommended care.

The American heart association (AHA) and American college of cardiology (ACC) jointly brought out guidelines for the management of patients with STEMI. It was recommended that the delay from patient contact with the health-care system (arrival at the ED or contact with paramedics) to initiation of fibrinolytic therapy should be less than 30 min (level of evidence: B).⁵

Although most guidelines recommend a door-to-needle time of <30 min, most hospitals fail to achieve this in most patients. A study conducted by Zed *et al*⁶ at the Vancouver General Hospital showed that a door-to-needle time of <30 min was achieved in only 24.3%. Similarly in the study conducted at King Khalid University Hospital, Riyadh mean door to

needle time was 95minutes.⁷

The study by Masurkar *et al* showed mean door to needle time of <30 min in 45%.⁸ Zed also noted that patients who arrived at the hospital during the night shifts were thrombolysed faster.⁶ There was no such difference in our study.

In most of our patients who were thrombolysed 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. The above factors need to be looked into to improve door-to-needle time at our hospital.

CONCLUSION

A door-to-needle time of less than 30 minutes in 54.72% is comparable to most contemporary studies however there is a need to look into factors associated with delay.

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