THE SCOPE OF THROMBOLYTIC THERAPY AMONG ST SEGMENT ELEVATION MYOCARDIAL INFARCTION IN MISURATA CENTRAL HOSPITAL

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ABSTRACT

Little is known about thrombolytic therapy patterns in patients with ST-elevation myocardial infarction (STEMI) in Libya. The objective of this study is to analyze the use of thrombolytic therapy in patients with ST-Elevation Myocardial Infarction (STEMI) in Misurata Central Hospital. The study includes 73 patients diagnosed with STEMI, from hospital admission to discharge, from a total of 125 patients with acute myocardial infraction admitted to Misurata Central Hospital cardiology care unit between January and December of 2009. RESULTS of the 73 patients with STEMI, 52% (n=38) were thrombolysed with Streptokinase, Alteplase, and Tenecteplase. 14% of eligible STEMI patients did not receive reperfusion therapy. The age of patients varied from 31 to 80 years of age, with a median age of 55.9 years, a majority of 84% being male. The overall median symptom onset- to hospital presentation was 4 hours in thrombolytic recipient patients and 20 hours in non recipient patients. The median door to needle time was 34 minutes. Poor left ventricular ejection fraction was less than 30% and reported more in non-thrombolytic recipient patients. Thrombolytic recipient patients were less likely to develop left ventricular failure. The global in-hospital mortality rate for STEMI patients in 2009 was 8%. Thrombolytic therapy is the only form of reperfusion strategy in Misurata. There was inappropriately long symptom-onset to hospital presentation as well as door- to needle times. Thrombolytic agents improve morbidity but early mortality was relatively high, which needs further exploration.

KEY WORDS: Acute coronary syndrome, STEMI, thrombolytic agents, efficacy, mortality, Misurata

INTRODUCTION

Acute myocardial infarction is the result of a ruptured atherosclerotic plaque, causing thrombosis and occlusion of a coronary artery[(1)].

Major attention has been focused on reperfusion therapy, which helps to restore coronary patency in acute ST- segment elevation myocardial infarction (STEMI) that leads to the preservation of left ventricular function and improves survival[(2)].

Current acute reperfusion therapy is available, either with primary percutaneous coronary intervention (PPCI) or with thrombolytic therapy (TT)[(3)].

The preferred option is primary percutaneous coronary intervention (PPCI) especially in those with acute ST-segment elevation myocardial infarction (STEMI) patients, patients who otherwise would receive no reperfusion, those with a bleeding risk, or those likely to have a poor result from fibrinolysis[(4)].

Unfortunately, the majority of countries do not have PPCI capability[(5)].

Misurata Central Hospital is a non invasive hospital that does not have a PPCI facility or the ability to transport patients for PPCI within the recommended time window (90-120 minute). Therefore TT remains the only reperfusion strategy in the hospital.

Several thrombolytic agents are currently being used that differ with respect to fibrin affinity, fibrin specificity, method of administration, allergic reactions and multiple other parameters[(6,7)].

In Libya, little is known about the use of various thrombolytic agents as well as their impact on morbidity and mortality.

The aim of the study is to clarify the extent of use of thrombolytic agents, to estimate the probability of timely administration of thrombolytic agents (factors associated with prolonged delay) and to assess the effect of these agents in regards to a 7-day in hospital mortality rate, complications and post AMI left ventricular functions among patients with STEMI in Misurata Central Hospital.

PATIENTS AND METHODS

In this retrospective hospital based study we reviewed the charts of all consecutive patients with a final principle discharge diagnosis of AMI, including both patients with and without ST-segment elevation who were admitted and treated in Misurata Central Hospital cardiology care unit from January to December 2009. In order to be included in the analysis patients must have presented with symptoms suggestive of myocardial ischemia and an ST-segment elevation of at least 1mm or more, contiguous electrogram leads or new LBBB. Non Libyan patients were excluded. Data was gathered regarding the age, sex, duration of AMI

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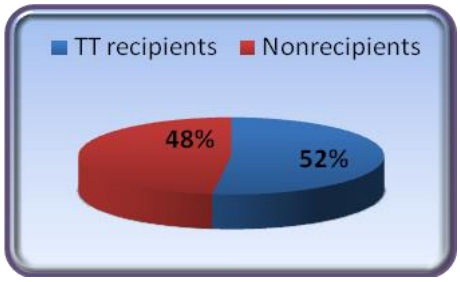
symptoms, eligibility for thrombolysis, timely administration of thrombolytic agent (door-to-needle time), ECHO-Cardiography (estimated within 24 hour of AMI event: post infarction wall motion, LVEF: normal >50%, mild to moderate impairment 31-50%, and severe impairment <30%), complications, and outcome of each patient. Any information that could not be obtained was given a designation of unknown. The information was then analyzed.

RESULT

A total of 125 consecutive patients admitted to Misurata Central Hospital during one year period 2009 with AMI, 73 patients (58%) suffered STEMI and were included in the study. Thrombolysis was applied in 38 patients (52%) (figure 1).



(Figure 1) Frequency of TT among STEMI patients

Demographic and clinical characteristics for TT recipient and non recipient patients are outlined (table 1).

(Table 1) Clinical characteristics of patients with STEMI

Characteristic	TT recipients n=38	Non recipients n=35
Age, yr, median(range)	55.9 (31-80)	61.9 (31-95)
Sex, male, %	84%	66%
Duration of AMI symptoms, hr	4hr	20hr
AMI involving ant wall, %	68%	49%
Cardiogenic shock	5%	0%

The overall median age was 55.9 (34-80) in TT recipient patients while 61.9 (31-95)in non recipient patients with majority being males, (84%) in TT recipient patients and (66%) in non-recipient patients. The overall median symptom onset to-presentation was 4 hrs in TT recipient patients and 20 hours in non-recipient patients. 68% of TT recipient patients the site of MI was involving the Anterior wall. 5% of TT recipient patients presented with cardiogenic shock.

Out of 73 patients, 18 patients did not have complete data on time of symptom onset to hospital arrival, thus we were able to analyze the duration of chest pain for 55 patients. 27% of patients presented to the hospital after 12 hrs (table 2).

(Table 2) Duration of chest pain

	n	%
180 min	17	31%
360 min	23	42%
> 12 hr	15	27%

In 29 TT recipient patients, door to needle (DTN) time was reported. The overall median door to needle time was 34 min and 66% of patients DTN time was within the recommended time (table 3).

(Table 3) Time to reperfusion therapy and factors independently associated with timely administration of TT

Variable	TT. N=29
DTN, min, median	34
DTN, administrated with in recommended time, %	66%
DTN, among patients received Alteplase, min, median	34
DTN, among patients received Tenecteplase, min, median	30
DTN, among patients received Streptokinase, min, median	90

(Table 4) presents eligibility and contraindication for TT, out of 73 patients, 35 patient (48%) did not receive TT. 7 patients was excluded because unknown chest pain duration and complete data set were available for 28 patients. We determine eligibility for TT used on American college of cardiology / American heart association (ACC/AHA) guide line, eligible patient were defined as having all indication for TT and no contraindication.

(Table 4) Eligibility and contraindication for TT

Factor	No	%
Spontaneous reperfusion	2	7%
Late presentation chest pain >12hr	15	54%
Bleeding risk	1	4%
age≥75	2	7%
LBBB	2	7%
Absent ischemic character	2	7%
Looks eligible patients	4	14%

This study revealed that 15 patients (54%) with long symptom –onset to hospital presentation time and 4 patient (14%) of eligible STEMI patient did not receive any reperfusion therapy. Echo- estimation for left ventricular function was reported in 66 patient, from our data TT recipients had median LVEF % of 56% vs. 54% for non recipients. Table 5.While poor left ventricular ejection fraction (LVEF) less than 30% observed more in non TT recipient than TT recipient patient (13% vs. 6% ; p=0.0002).

TT recipients less likely to develop LVF (3% vs. 14%, P =<0.01) but were more likely to exhibit ventricular arrhythmia (11% vs. 9%, P= NS) which may indicate the higher rate of reperfusion (reperfusion arrhythmia) (table 5).

(Table 5) ECHO estimation LV function

	TT recipients	Non recipients	P value
LVEF, median, %	56%	54%	NS
Normal LVEF >50%	71%	64%	NS
mild to moderate LVEF30-49%	23%	23%	NS
poor LVEF<30%	6%	13%	0.0002

The global in-hospital mortality for STEMI patients throughout the study period, regardless of whether reperfusion was carried out or not, was 8%. The effect of thrombolytic therapy on mortality is also shown in (table 6).

(Table 6) In-hospital mortality rate and complication regarding TT

	TT recipients	Non recipients	P value
In hospital MR	11%	6%	NS
LVF	3%	14%	0.0075
CC	5%	0%	0.0037
Vent. Arrhythmia	11%	9%	NS

DISCUSSION

The present study is the first one to review STEMI patients in our city. The registry of Myocardial infarction is important to reveal the extent of this condition in our area and could contribute to the optimal use of reperfusion therapies, with the ultimate goal of reducing mortality[8].

The main findings from this study are STEMI patients in our city are predominantly male reperfusion done only by use of thrombolytic therapy in 52% of cases.

There was inappropriately long symptom, onset to hospital presentation time, the overall median symptom-onset to hospital for TT recipient patients was 4 hours which is inappropriately long compared to 89 and 120 minutes in emergency medical services (EMS) transported and self transported patients respectively in the NCDR registry[9]. This long delay may reflect poor use of emergency medical service in our country. Increased delay times to restoration of coronary flow are associated with increased infarction size, increased risk of subsequent congestive heart failure and higher mortality[10].

The overall median door-to-needle time in this study was 34 minutes which is longer compared to 29 and 30 minutes seen in the NCDR and GRACE registry respectively[9,10]. The reasonable cause for this delay that thrombolytic therapy administered only by cardiology service unit in intensive care unit rather than emergency room. The guide line recommended optimal door-to-needle time of less than 30 minutes, was achieved in 66% which is reasonable result compared to 45%, 64% and 66% in the GRACE, Euro Heart survey ACS-III and the UK MINAP registry, respectively[10-12]. Nearly 14% of patients with STEMI who present within 12 hours and are candidates for thrombolytic therapy according to current guide lines, did in fact receive no such therapy.

This result appear to be less than reported in Brasil and Middle East, (35% and 21%) respectively [13, 14]. In this study Cardiogenic shock was not present limitation for TT use and two patient with Cardiogenic shock received TNK, in spite poor outcome; incomplete lyses in the infarct related artery and high frequency of multi vessel disease in patient with Cardiogenic shock may limit the efficacy of TT[15].

One other observation from our data relates to the poor left ventricular ejection fraction less than 30% was more in non TT recipient than TT recipient patients (13% vs. 6%, p=0.0002). and occurrence of left ventricular failure was more in non TT recipient.

This is similar to Schoming, et al[16] study which showed that patients who received TT regimen have a slightly higher global ejection fraction.

There is a curvilinear correlation between left ventricular ejection fraction and morbidity has been demonstrated for patient in both the pre thrombolytic and thrombolytic eras[17].

The global in hospital mortality for STEMI was 8% which is comparable with that reported from European and international multicenter studies (6-8%)[18-20].

A finding that needs further exploration is the relatively high mortality in TT recipient patients, which was 11% when compared with 5.7-6% reported in previous registries[21-24].

This is could be explained by occurrences of ventricular arrhythmia or by use of streptokinase. GUSTO-1 trial[25] demonstrated the superiority of alteplse over streptokinase regarding mortality. The mortality benefit seen from newer thrombolytic agents suggests that there should be a change in pattern of thrombolytic agents[20].

CONCLUSION

Just over 50% of patients suffered STEMI, were thrombolysed with Streptokinase, Alteplase and Tenecteplase. Thrombolytic therapy is the only form of reperfusion strategy in Misurata. There was inappropriately long symptom-onset to hospital presentation as well door to needle time. Thrombolytic agents improve morbidity but early mortality was relatively high, that need further exploration.

RECOMENDATION

At a national level, mortality in STEMI patients could be reduced through the following actions. First, it is important for authorities and organizations to monitor continuously the profile of STEMI patients. Second, it is very important to reduce the percentage of patients receiving no reperfusion therapy at all. Third, fibrinolysis should be administered as early as possible and ideally in pre-hospital phase[4]. Fourth, more high risk patients should be treated with primary percutaneous coronary intervention (PPCI), so the facility for that program should be established.

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