In hospital Mortality and correlates among patients admitted for Acute Coronary Syndrome in South India

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Abstract

Context: Acute Coronary Syndromes (ACS) is one of the most common causes of a visit to the emergency department among adults. Majority of the Acute Coronary Syndromes are managed in Govt facilities. However, studies on the outcome of ACS among patients treated in these settings are rare. Hence, this study was planned to estimate in-hospital mortality and to identify the factors associated with death among patients admitted in a tertiary teaching institute in South India. **Methods:** This study was conducted among consecutive patients admitted in the emergency dept with acute coronary syndrome during July-November 2017. All eligible adults more than 30 years were included in the study. After the administrative approval, data on patient characteristics, risk factors, laboratory investigations and therapy measures were extracted through structured proforma. Time to reach hospital after the onset of pain, time to thrombolysis and in-hospital all-cause mortality was considered to be the outcome measures. **Results:** Total of 100 patients were enrolled in the study where the majority of them were males (78%). Mean (SD) age of presentation with ACS was 57.2 (12.4) years. Median hour of presentation from the onset of chest pain to attending emergency OPD was 5 (3-7) Hours. The average median (Inter Quartile range) time delay between the onset of pain and thrombolysis was 5.6 (3.5-8.5) Hours which included 1.5 hours of delay after reaching the hospital. The median duration of hospital stay was 5 (3-6) days. The death rate among patients admitted and treated for ACS was 21 %(13.4-30.2%). After the adjusted analysis factors namely diabetes mellitus [adjusted RR (95% CI): 4.6 (1.3-1.7)], need for inotropic support [adjusted RR (95% CI): 5.0 (1.4-1.8)] and advanced Killip grading [adjusted RR (95% CI): 2.1 (1.6-7.0)] were found to be independent predictors of in-hospital ACS mortality. **Conclusions:** More than 30% of ACS patients did not reach the treating facility within the golden period of six hours. In-hospital mortality was very high(21%) and factors such as diabetes, increased severity of diseases at the time of presentation are independently increased the risk of all-cause mortality among these patients.
Key Words: Coronary Artery Disease, Acute Coronary Syndrome, Myocardial infarction, time delay, STEMI, Non STEMI, in hospital mortality.

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INTRODUCTION

Cardiovascular diseases are the major cause of deaths worldwide which contributes to around one-third of total deaths in the world. Of the 7.1 million deaths reported worldwide more than three fourth of deaths occurred from low and middle-income countries.[1-3] Noncommunicable diseases contribute to 53% of mortality in India. Around 3-4% and 8-10% of rural and urban Indian is affected due to Coronary Artery Disease (CAD).[4] The rising incidence of hypertension and diabetes is expected to increase the rate of myocardial infarction (Acute Coronary Syndrome- ACS) to manifolds in the future. The time to reach the health facility from the onset of pain and the time to administer thrombolytic therapy is found to be the independent determinants of survival among patients suffered from the acute coronary syndrome.[5,6] Management of ACS is often

associated with high out of pocket expenditure.[7] Hence, the most common provider for ACS in India is Government hospitals and Govt Teaching hospitals. Patient load and demand for cardiac care from these facilities often become unmanageable. However, there is a scarcity of literature on the outcome of patients with ACS managed in these settings. In this context, this study was aimed to determine the mortality rate and to find the clinical factors associated with mortality among patients attending to the emergency department due to the acute coronary syndrome in one of the tertiary care teaching institute in Tamilnadu.

MATERIAL AND METHODS

This study is a hospital based prospective cohort study. It was carried out in one of the tertiary care teaching hospitals in Tamilnadu. Thanjavur Medical College is one of the high load tertiary care teaching institutes in Tamilnadu. This hospital acts as a referral hospital to nearby 4-5 districts located in the coastal region of Tamilnadu. On an average around 4000, 1000 patients are attending to the OPD department and emergency department respectively. All the consultation services by specialists, diagnostic services, drugs including surgical procedures are provided free of cost by Government of Tamilnadu. The study site has the emergency department where 24x7 services are available. This study included patients who attended the emergency department from July 2017 to November 2017 and diagnosed to have acute coronary syndrome regardless of the outcome. The Acute Coronary Syndrome was provisionally diagnosed as per ECG findings. All patients were subjected to echocardiography. During admission, for all admitted patients laboratory investigations namely serum urea, creatinine, lipid profile (LDL, HDL, Triglycerides, total cholesterol) were also performed. After confirmation of diagnosis, patients were managed as per the standard clinical guidelines. Depends upon the previous treatment and time of onset patients were subjected to further thrombolytic therapy. Data on patient characteristics, substance use, associated co-morbidities, echocardiographic findings, time to door, and door to drugs were extracted from patient treatment charts. Tobacco use was defined as consuming smoke or smokeless forms of tobacco irrespective of the quantity in the past year. Similarly, alcohol use is considered if the person has consumed alcohol which amounts to at least one standardized drink of alcohol. Diabetes is considered to be an associated co-morbidity if the person reported a past history of diabetes and on treatment with oralhypoglycemic agents/ insulin or the random blood sugar estimated during the admission was more than 200mg/dl. Hypertension was diagnosed based on self-reported hypertension and systolic blood pressure of more than 140 mmHg &/ more than 90mmHg of diastolic blood pressure. Data were entered in Excel and analysed using STATA. Patients age, the time delay between the onset of pain to reaching the health facility, the time delay between the onset of pain to administration thrombolytic agents were summarized as mean (SD) or median (interquartile range) depends on statistical distribution of data. Patients' gender, site of MI and echo cardiographic findings are summarized as frequencies and proportions. The mortality rate is presented as a percentage with 95% CI. Time to death was represented in the form of Kaplan Meier survival plots and the difference based on diabetes Mellitus and Inotropic support was tested using log-rank test. Factors associated with mortality are analysed using chi-square test. The adjusted Relative risk with 95% CI is given to present the effect of association with various factors and mortality due to ACS. P value was considered at 0.05 level.

RESULTS

Total of 100 patients were included in the study and predominantly they were males (78%). Mean (SD) age of presentation among the patients included were 57.7 (12.4) years. The major occupation was an unskilled labourer (30%) followed by agriculture (24%). There were 27%, 37% history of reported diabetes and hypertension respectively. About half of the patients had reported ever use of tobacco including 40% history of smoking. Alcohol use and Dyslipidemia was reported among 40%, 5% of patients respectively. Median hour of presentation from the onset of chest pain to attending emergency OPD was 5 (3-7) Hours. The average median (Inter Quartile range) time delay between the onset of pain and thrombolysis was 5.6 (3.5-8.5) Hours which included 1.5 hours of delay after reaching the hospital. The most common site of lesion was the anterior wall (40%) followed by the inferior wall (34%). Patients were predominantly belonged to Killip stage 1 (73%). Total of 22% required inotropic support. The median duration of hospital stay was 5 (3-6) days. The death rate among patients admitted and treated for ACS was 21 %(13.4-30.2%). Among 73 patients who did not have diabetes, four of them showed blood sugar more than 200mgs/dl. Raised creatinine (>=1.5mg/dl), Urea (>40mg/dl) was observed among 32%, 6% respectively. Similarly, 38% of the patient had values in the range of hyperlipidemic status. Hypokinesia (Ejection fraction <60% in echocardiography) was commonly observed among females (52.9% Vs 28.3%). However, this observation was not statistically found to be significant. (Table 1)

Table 1: Characteristics of patients admitted and treated for acute coronary syndrome in tertiary care teaching hospital, South India

Characteristics	Male (%) N=78	Female (%) N=22
Age in years Mean (SD)	56.5 (50-65)	64 (54-69)
Occupation		
Farmer	24 (30.8)	0 (0)
Unemployed	13 (16.7)	17 (77.3)
Unskilled labourer	32 (41)	5 (21.7)
Govt employees	9 (11.5)	0 (0)
Diabetes Mellitus		
Absent	58 (74.4)	11 (50)
Present	20 (25.6)	11 (50)
Hypertension		
Absent	53 (68)	10 (45.5)
Present	25 (32.1)	12 (54.5)
Tobacco use		
Absent	30 (38.5)	17 (77.3)
Present	48 (61.5)	5 (22.7)
Alcohol use		
Absent	38 (48.1)	22 (0)
Present	40 (51.3)	0(0)
Hyperlipidemia		
Absent	29 (54.7)	4 (22.2)
Present	24 (45.3)	14 (77.8)
Urea		
<40mg/dl	48 (65.8)	13 (65)
>=40mg/dl	25 (34.2)	7 (35)
Creatinine		
<1.5mg/dl	69 (94.5)	18 (90)
>=1.5mg/dl	4 (5.5)	2(10)

There was a median (IQR) delay of 5.5(3.5-8hrs) hours among patient who were alive compared to median (IQR) delay of 6 (4-7.6hrs) among patients who died. However, this difference was not statistically significant. After the adjusted analysis factors namely diabetes mellitus, need for inotropic support and advanced Killip grading were found to be independent predictors of in-hospital ACS mortality. Risk of death was 4.6 times higher among patient who had diabetes compared to those who did not have diabetes. Similarly, Killip stage 2 had twice the risk of death compared to stage 1. When the patient required inotropic support after thrombolysis it increased the risk of death to five times. (Table 2). The time to death Kaplan Meier survival function based on diabetes and inotropic support also reiterated the same. (Fig 1 & 2)

Table 2: Factors associated with mortality among hospitalised patients treated for acute coronary syndrome in tertiary care teaching hospital, South India July-November 2017

Factor	Mortality (%)	Unadjusted RR	Adjusted RR	P value
Sex				
Male	14 (17.9)	1.0	-	
Female	7 (31.8)	1.8 (0.8-3.8)		
Age group			-	
30-59 years	7 (13.5)	1.0		
60-70	10 (29.4)	2.2 (0.9-5.2)		
71-90	4 (28.6)	2.1 (0.7-6.2)		
Tobacco use			-	
Absent	9 (19.1)	1.0		
Present	12 (22.6)	1.2 (0.5-2.6)		
Alcohol use			-	
Absent	9 (22.5)	1.0		
Present	12 (20)	1.1 (0.5-2.4)		
Diabetes				

|				
Absent	10 (14.4)	1.0	1.0	0.0001
Present	11 (35.4)	2.5 (1.2-5.2)	4.6 (1.3-1.7)	
Hypertension				
Absent	13 (20)	1.0	-	
Present	8 (21.6)	1.04 (0.5-2.3)		
Hyperlipidemia			-	
Present	5 (13.1)	1.4 (0.4-5.6)		
Absent	3 (9)	1.0		
Raised serum creatinine			-	
Present	1 (16.6)	1.1 (0.2-7.2)		
Absent	13 (14.9)	1.0		
Inotrope support				0.0001
Required	69 (57.1)	5.0 (2.4-10.1)	5.0 (1.4-1.8)	
Not required	9 (11.5)	1.0	1.0	
Disease classification				
Killip Stage 1	10 (13.7)	1.0	1.0	
Stage 2	4 (28.6)	2.1 (0.8-5.7)	2.1 (1.6-7.0)	0.0001
Stage 3	2 (50)	3.7 (1.2-11.4)	1.0 (1.001-1.10)	0.8
Stage 4	2 (62.5)	4.6 (2.1-10)	0.7 (0.3-1.7)	0.4
Hypokinesia				
Present	4 (15.4)	7.8 (0.9-66.7)	2.5 (0.4-15.2)	0.3
Absent	1 (2)	1.0	1.0	
Left ventricular dysfunction			-	
Nil	1 (2)	1.0		
Moderate to severe Left ventricular dysfunction	4 (15.4)	7.8 (0.9-66.7)		
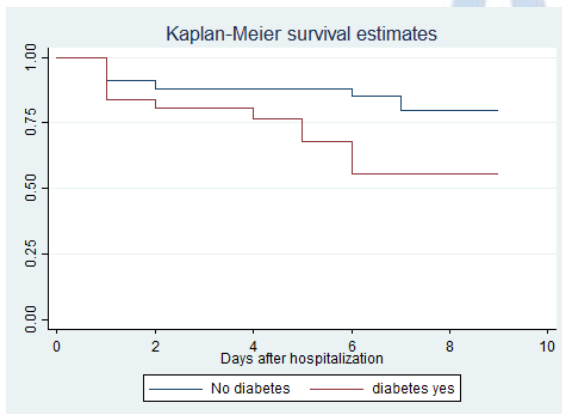
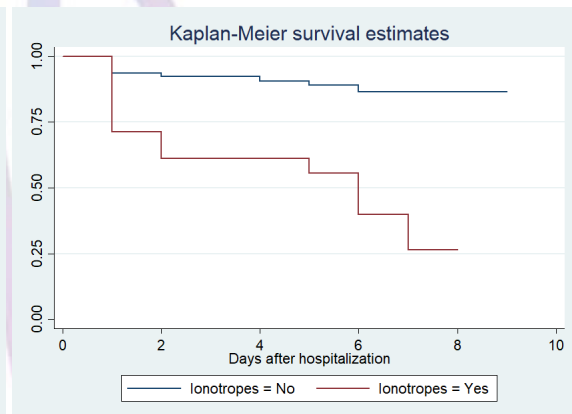**Figure 1:** Time to death based on Diabetes status

Figure 2: Time to death based on inotropic support

DISCUSSION

This study carried out among patient admitted in one of the emergency teaching care hospitals in south India showed the mortality rate of 21%. This is high compared to other studies reported from the South –Asia as well as the results reported from a few ACS registries in India.[8-10] Kerala based ACS registry has shown 8.2% all-cause in-hospital mortality[11] whereas a study from one of the tertiary care hospital in Port Blair had reported the in-hospital mortality of 15%.[12] The create ACS registry from India had reported 30- day mortality to be 8.6%[13] whereas the study from Indonesia cardiac centre has reported a 13.4% mortality on 30 days follow-up period.[10,14] In contrast to all these studies, the report from one of the tertiary care specialised cardiac centre has reported the all-cause mortality of 2.5% at the end of one year follow-up period.[15] The differences across the studies majorly occur due to difference in the outcome measurement. Few studies focus on in- hospital mortality whereas the other group of studies focuses on 30 days mortality, one year and five-year mortality. In view of the required data for mid-term and long term outcomes among ACS patients the working group on CAD patients suggested the need for systematically recording the outcome at the hospital, 30 days thereafter the annual follow up till five years.[16,17] In this study, factors namely diabetes, high-grade Killip staging of ACS and hypokinesia / anterior wall motion abnormality observed during echocardiography was found to be independently

associated with all-cause mortality. Similar observations were also seen from other studies.[12,13] In contrary to the previous studies, the present study did not report any difference based on age or gender.[18] The smaller sample size of this study might have precluded the statistical significance. This study is one of the few studies which reported the in-hospital mortality outcomes of ACS from government tertiary care high load teaching institute. This study has the following limitations. Prospective data on patient characteristics and investigation reports were extracted from patient clinical records. Hence, a complete case analysis could not be possible in view of missing data. This study did not report the results based on the type of ACS (STEMI/Non-STEMI). Also, this study did not report on the influence of anti-fibrinolytic and other anti-lipid and anti-hypertensive drugs or percutaneous coronary intervention status. Since the standard of care could differ across different type of providers and patient load observations from this study cannot be generalized to other settings. Though several factors such as time from chest pain to reach hospital and hospital to thrombolysis time differ between died and alive patients due to smaller sample size the statistical significance could not be achieved. Hence, the future studies should attempt similar studies with larger representative samples.

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