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Study of in-Hospital Mortality And Complications in Acute Myocardial Infarction in A Rural Area

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Abstract
Objective: Most rural hospitals can provide medical care to acute myocardial infarction (AMI) patients, but a need for advanced cardiac care requires timely transfer to a tertiary hospital. There is little information on AMI in-hospital mortality predictors among rural transfer patients. Hence to study complications and In-hospital mortality of patients with Acute Myocardial Infarction in rural area.
Methods: Patients of Acute Myocardial Infarction admitted from rural area were studied (100 patients). This study will be carried out on rural population admitted in ICCU cardiology department S.S. Institute of Medical Sciences, Davangere, Karnataka, India, over a period of 2 years. Study includes male & female patients with Acute Myocardial infarction. On admission detailed history will be taken and a complete examination will be done. ECG will be done at the time of admission and will be repeated if necessary. The serum cardiac enzyme levels will be measured at the time of admission and at 6 hours after admission. They were also followed up for a period of 5 days of hospital stay for in hospital mortality.
Results: Among the complications noted during hospital stay the commonest were acute Pulmonary edema, Cardiogenic shock and Arrhythmias, most common Arrhythmias noted were Sinus tachycardia and VT in Anterior wall MI and Sinus Bradycardia and second and third degree heart blocks in Inferior wall MI. Overall mortality in present study is 19%. And higher mortality was observed in delayed hospitalization(>12 hours of onset of symptoms), Mortality observed in early thrombolysis is less compared to late thrombolysis. Patients with early thrombolysis had reduced complications and better outcome, Mortality rate was high in Killip's class III and class IV, and in patients with LVEF of <35%. Among arrhythmia's higher mortality was seen in VT, second degree and third degree heart block.
Conclusion: In patients with Acute Myocardial Infarction, early hospitalization is crucial where we can salvage myocardium by thrombolytic therapy with better availability of primary health care services, awareness of symptoms of AMI in public that too rural population and proper availability of transport facility will help in early hospitalization. Complications like acute pulmonary edema, cardiogenic shock and arrhythmia's are prime causes of mortality in AMI in first 48hours of onset of symptoms. Early hospitalization, early thrombolysis and better management of complication in well equipped coronary care unit will save many precious lives.

I. Introduction

Cardiovascular disease (CVD) has emerged as a major health burden worldwide. CVD contributed to 15.3 million deaths in 1996, of which 5.5 million was from developed countries and 9.77 million from developing counties[1]. A rise in the prevalence of CVD in the early half of twentieth century and a subsequent decline in the latter half have been well documented in the industrialized countries. However, the scenario is reversed in developing countries especially India with a steady escalation in prevalence of CVD.[2]

The Asian Indians whether living in their own country or elsewhere have much higher incidence of coronary heart disease (CHD) as compared to all other ethnic groups. Earlier studies on migrant Indians in the UK, USA, Canada and Trinidad showed that migrant Indians had higher rates of Coronary artery disease (CAD) compared to the indigenous population. It is consistently observed that Indians have premature CAD and that their risk for CAD was two to four times higher than the white European population.[3]The recent SHARE study showed a CAD prevalence of 10.7% among South Asians compared to 4.6% in Europeans.[4]

Within the Indian subcontinent also, there has been a rapid rise in CAD prevalence. In 1959, Padmavati[5] reported the prevalence of CAD to be 1.0% and this rose to 4.5% in the year 1975[6] and 7.9% in the year 1996 in subjects aged 20 years and above.[7] In a recent study of subjects aged 40 years and above, the prevalence was shown to be 14.3%.[8] The Chennai Urban Population Study (CUPS) carried out in 1262 individuals > 20 years of age showed the crude prevalence of CAD to be 11% while the age-adjusted prevalence rate was 9.0%.[9] Thus the prevalence of CAD appears to be ten times higher in India compared to that reported 40 years ago and the prevalence of CAD in urban Indians is fast approaching the figures reported in migrant Indians.[9] Almost 75% of the Indian population lives in rural areas.Most studies on CAD and non-communicable

diseases havebeen conducted in urban populations. A few rural studiessuggested that CAD was not a major problem in rural communities.[10,11,12] A cross-sectional survey in a rural population at Sevagram in central India (2433subjects; 1338 men) in 1988 reported the lowest prevalence of CAD in India: 14.8 per 1000.[11] Similarly, in a rural population of Thiruvananthapuram district, Kerala, of the 1253 individuals screened for CAD, 36 per 1000 were detected to have electrocardiographic (ECG) changes suggestive of CAD.[12]

The early (30 day) mortality rate from acute myocardial infarction is 30%, with more half of the deaths occurring before the individual reaches the hospital. The early in hospital mortality is due to complications like arrhythmias and cardiogenic shock occurring in first 24 hours of onset of symptoms. With the introduction of ICCU primarily meant for reducing mortality in early stages of AMI, and has promoted in early detection and management of various complications and with this mortality rate after admission of AMI has declined by approximately 30% over the past 2 decades. An attempt has been made in this study to know various modes of presentation, complications, and outcome following Acute Myocardial Infarction.

II. Objectives

To study of in-hospital mortality and complications in acute myocardial infarction in population from rural area.

III. Materials And Methods

Patients of Acute Myocardial Infarction admitted from rural area were studied (100 patients). This study will be carried out on rural population admitted in ICCU cardiology department S.S. Institute of Medical Sciences, Davangere, Karnataka, India. Study includes male & female patients with Acute Myocardial infarction. On admission detailed history will be taken and a complete examination will be done. ECG will be done at the time of admission and will be repeated if necessary. The serum cardiac enzyme levels will be measured at the time of admission and at 6 hours after admission. They were also followed up for a period of 5 days of hospital stay for in hospital mortality. Investigations such as complete hemogram, random blood glucose levels, blood urea, serum creatinine, lipid profile, cardiac enzymes, 2D echo was done and results are tabulated in graph (1-3) and table (1-6)

IV. Statistical methods

The data obtained will be analysed by descriptive longitudinal study by means of following: Percentage, Proportions , Bar charts & Pie charts

Inclusion Criteria: Patients with the evidence of Acute MI according to WHO criteria.

Either of the following criteria satisfies the diagnosis for acute, evolving, or recent MI:

1)Typical rise and/or fall of biochemical markers of myocardial necrosis with at least one of the following:

- a) Ischemic symptoms
- b) Development of pathologic Q waves in the ECG
- c)Electrocardiographic changes indicative of ischemia (ST-segment elevation or depression)
- d)Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality[13].

Exclusion Criteria: Patients with unstable angina, coagulation disorders, valvular heart diseases and congenital abnormalities of heart.

V. Discussion

Among the complications (Table1, Graph 1) noted during hospital stay the commonest were acute pulmonary oedema, cardiogenic shock and arrhythmias. Arrhythmias noted were Ventricular Tachycardia, varying degrees of heart block, atrial fibrillation. Sinus Tachycardia and VT were commonly seen AWMI which is comparable to Irwin et al[62] and Newby KH et al[64] respectively. Sinus Bradycardia, II degree Heart block and Complete heart block were common in Inferior wall MI comparable to Nicod P et al[54] and Worcester Heart Attack Study[61]

Among mechanical complications Mitral Regurgitation seen in 2% patients and is due to papillary muscle dysfunction. In present study, acute pulmonary edema was seen in 21% of patients in first 48 hours of admission, this is comparable to John G Canto et al[22] (20.5%) and Killip's et al[33] (18%) respectively. Among 21 patients, 16 patients were recovered with meticulous management with diuretics and ACE inhibitors and 5 patients expired. In present study, Cardiogenic shock was seen in 11% of patients in first 48 hours of admission comparable to study done by John G Canto el al[22]. Among them 1 patient survived with early and timely intervention with ionotropic support. 10 patients expired due to late hospitalization and failed to receive thrombolytic therapy. In present study, 33.33% of patients of Killip's I class had LVEF of>50%. 39.2% of patients with Killip's II/III class had LVEF of 35-49% and 10% of patients with Killip's IV had <35% (Table 2). In Present study, higher mortality rate observed in Class III and IV were comparable to Killip's study[33].

Table 1:

	Present Study	John G Canto et al[22]	Killip's et al[33]	Tofler GH et al[52]	Wolfe CL et al[53]	Nicod P et al[54]	Archbold RA et al[55]	Mehta SR et al[56]
Acute Pulmonary edema	21%	20.5%	18%					
Cardiogenic Shock	11%	13%	5%					
Ventricular Tachycardia	5%			2%	2%			
2 degree Heart block	5%					10%		
Complete Heart Block	1%						5.3%	
RV infarction	1%							1.5%

Table 2

	Present Study			**Killip's Study**		
LVEF (%)	**Killip's I**	**Killip's II/III**	**Killip's IV**	**Killip's I**	**Killip's II/III**	**Killip's IV**
< 35	22.22%	27.45%	10%	11.6	35.2	60
35-49	50%	39.21%	-	24.8	37.7	33.3
>50	27.77%	33.33%	-	63.6	27.1	6.7

In present study, Arrhythmia's (Table 3) were seen in 38% of patients in first 48 hours of admission. Among Arrhythmia's Anterior wall MI presented commonly with Sinus Tachycardia(19%) followed by VT (5%) and Inferior wall MI presented with sinus bradycardia (6%) followed by 2 degree heart block(5%), complete heart block and AF. In present study, VT was noted in 5% of patients (4 in AWMI and 1 in Inferior wall MI). Tofler GH et al[52] and Wolfe et al[53] noted 2% of VT in their study. Among 5 cases, 2 cases were presented in first 6 hours, and other 3 in first 24 hours of admission. All these patients were treated with asynchronised DC shock followed by Amiodarone infusion. Among them 1 patient recovered and 4 patients expired. And 5% of patients presented second degree heart block (Mobitz type I-1 patient, Mobitz type II-4 patients). Nicod P et al54 noted 10% of cases in his study. Mobitz type II patients were referred to higher centre for pacemaker. Among them 1 patient with Mobitz Type I and 2 patients with Mobitz type II expired. And 1 patient presented with complete heart block which was seen with inferior wall MI. Patient was referred for pacing, patient was followed up and patient expired, 2 patient developed Atrial Fibrillation , seen in Inferior wall MI. Both patient responded for IV Beta blocker and Digoxin

In the present study, commonest arrhythmia which are transiently noted during thrombolysis was Sinus Tachycardia with occasional VPC & Idioventricular rhythm.

Table 3:

Arrhythmia	Present Study		Irwin et al[62]		Pantridge J.F et al[63]		Newby KH et al[64]		Nicod P et al[54]		Worcester Heart Attack Study[61]	
	Ant wall	Inf wall	Ant wall	Inf wall	Ant wall	Inf wall	Ant wall	Inf wall	Ant wall	Inf wall	Ant wall	Inf wall
Sinus Tachycardia	18 %	1 %	30 %	6%								
Sinus Bradycardia	0	6 %			5%	25 %						
Ventricular Tachycardia	4%	1 %					30 %	3%				
2 degree Heart block	1%	4 %						3%	10 %			
Complete Heart Block	0	1 %									3.9 %	7.7 %

Mortality: Overall mortality in present study is 19%.

Table 4: Mortality With Time Of Hospitalization:

Duration of Presentation	Total no of Patients	No of Death	Mortality %
<1 hour	22	3	13.64
1-6 hour	39	6	15.38
6-12 hour	29	7	24.13
12-48 hour	10	3	30

	Present Study	United Kingdom Heart attack study[59]
<12hour Mortality	17.7%	16%
>12hour Mortality	30%	29%

In present study, 90% of patients with acute MI arrived at the hospital within 12 hour and 10% >12 hour. Increase in the delay was associated with increase in mortality which is comparable to United Kingdom Heart attack study[59].

Early hospitalization is crucial, where we can salvage myocardium by thrombolytic therapy. So continued medical education of primary health workers, awareness of symptoms of AMI in public that too in rural population, proper availability of transport facilities will help in early admission and better management of AMI.

Table 5: Mortality With Respect To Killip's Staging:

Killip's Class	Mortality in Present study	Mortality in Killip's study[33]
CLASS I	2.70	6%
CLASS II	9.68	17%
CLASS III	23.81	38%
CLASS IV	90.91	67%

In Present study, higher mortality rate observed in Class III and IV were comparable to Killip's study[33].
Mortality With Respect To Thrombolysis: Only 64% patients were thrombolysed. The main reason for not thrombolysing was delayed arrival to the hospital.

	Mortality in Present study	Mortality in FTT overview[60]
Thrombolysed	15.62%	8%
Non Thrombolysed	25%	14%

In present study, mortality is higher in Non thrombolysed patients which is comparable to FTT overview[60].

	In Present Study	FTT overview[60]
Early Thrombolysis	15%	8%
Late Thrombolysis	25%	11%

In Present study, the mortality observed in early thrombolysis and late thrombolysis were 15% and 25%. In FTT group[60], study early v/s late thrombolysis mortality were 8% and 11% indicating decreased mortality by thrombolysing patients earlier[60].

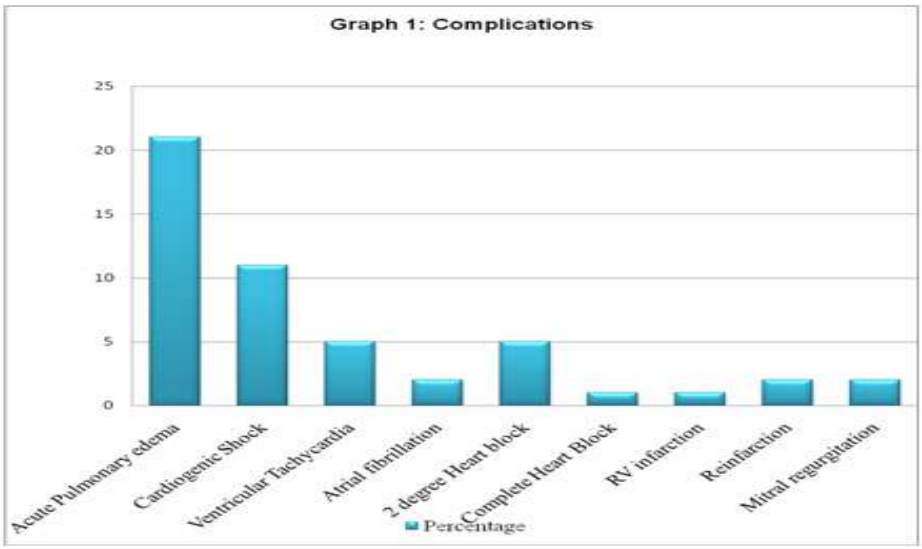
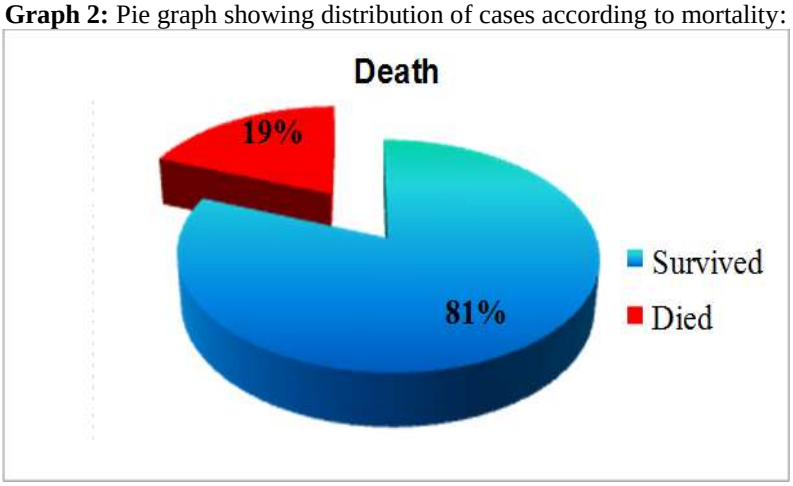


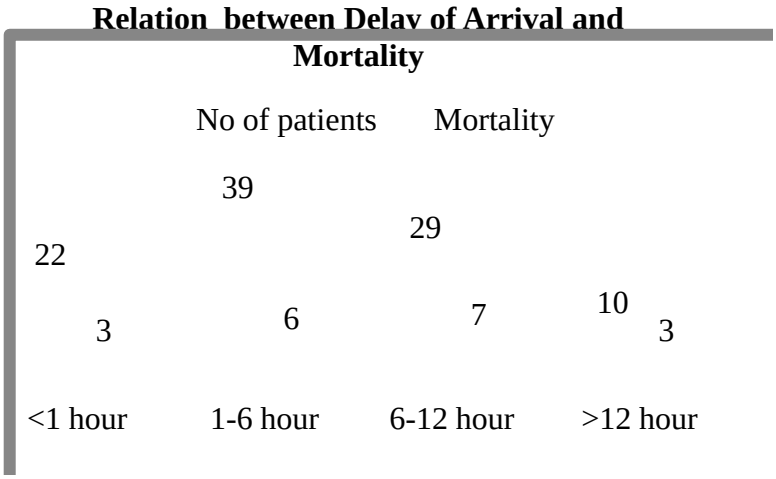
Table 6: Distribution of cases according to complications:

Complications	No of Patients
Acute Pulmonary edema	21
Cardiogenic Shock	11
Ventricular Tachycardia	5
Atrial fibrillation	2
2 degree Heart block	5
Complete Heart Block	1
RV infarction	1

Graph 2: Pie graph showing distribution of cases according to mortality:



Graph 3: Multiple bar chart relation between delay of arrival and mortality



VI. Conclusion

In patients with Acute Myocardial Infarction, early hospitalization is crucial where we can salvage myocardium by thrombolytic therapy with better availability of primary health care services, awareness of symptoms of AMI in public that too rural population and proper availability of transport facility will help in early hospitalization. Complications like acute pulmonary edema, cardiogenic shock and arrhythmia's are prime causes of mortality in AMI in first 48 hours of onset of symptoms. Early hospitalization, early thrombolysis and better management of complication in well equipped coronary care unit will save many precious lives.

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