ORIGINAL ARTICLE

CLINICAL PROFILE, COMPLICATIONS AND CAUSES FOR MORTALITY IN ACUTE MYOCARDIAL INFARCTION: A STUDY IN TERTIARY CARE HOSPITAL

Nagabhushana S¹, Ranjith Kumar G. K², Ranganatha M³, Virupakshappa⁴

HOW TO CITE THIS ARTICLE:

Nagabhushana S, Ranjith Kumar G. K, Ranganatha M, Virupakshappa. "Clinical Profile, Complications and Causes for Mortality in Acute Myocardial Infarction: A Study in Tertiary Care Hospital". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 60, July 27; Page: 10406-10416, DOI: 10.14260/jemds/2015/1502

ABSTRACT: Coronary Artery Disease (CAD) remains the major cause of mortality and morbidity of mankind. It is predicted that more than half the worldwide cardiovascular disease risk burden will be borne by Indian sub-continent in the next decade according to a recent epidemiological studies.¹ There is Significant differences in the prevalence of coronary artery disease exist with respect to gender, age and ethnicity. The introduction of coronary care units decreased Acute MI mortality from 30% to 15%; while the use of thrombolytics further decreased it to 5-7%.² Prompt reperfusion of the occluded artery through Percutaneous coronary angioplasty or thrombolytic therapy decreases the duration of occlusion leading to improved mortality.³ In-hospital observation is warranted in patients at increased risk for sudden life threatening complications, such as late ventricular fibrillation, cardiac arrest or re-infarction. Present study is aimed at knowing clinical profile, early complications in AMI and causes for death.

KEYWORDS: Acute Myocardial Infarction, Arrhythmias, left ventricular failure.

INTRODUCTION:

MATERIALS AND METHODS: This study was carried out in Intensive coronary care unit (ICCU) of Mc Gann Hospital, Shimoga.

The material of study consisted of 100 consecutive patients of Acute Myocardial Infarction (AMI) admitted to ICCU of Mc Gann Hospital from April 2015 to July 2015.

Inclusion Criteria: Patients satisfying WHO definition⁴ for diagnosis of myocardial infarction were included in the study.

Diagnosis was based in Presence of at Least Two of the following Three Criteria:

1. A clinical history of ischemic type chest discomfort.
2. Changes in serially obtained electrocardiographic tracings.
3. A rise of serum cardiac markers.

Exclusion Criteria: Nil.

A detailed history was taken in all the patients and a through physical examination was done as per the proforma.

The first electrocardiogram (ECG) was recorded at the earliest after admission and subsequently at eight hourly interval on first day, daily for the duration of stay ICCU and thereafter as per need.

ORIGINAL ARTICLE

If thrombolytic therapy was given, 12 lead ECG was recorded before and after the thrombolytic therapy. Right ventricular leads were recorded whenever deemed necessary (in patients with inferior wall MI). Patients were mentioned for any clinical changes and ECG changes.

Standard lead II was used to monitor and record rhythm disturbance; modified chest lead I (MCL₁ lead or Marriot's lead) was used whenever necessary. In addition 12 lead ECG was also recorded during occurrence of arrhythmias. ECGs were recorded on BPL Cardiart 6208 view.

The other Investigations to which the Patients were subjected are as follows:

- Urine routine analysis (Sugar, Albumin and microscopy)
- Blood routine (Hemoglobin percentage, Total count, differential count, Erythrocyte sedimentation rate).
- Random blood sugar (Fasting blood sugar/Post prandial blood sugar was done whenever necessary), blood urea, serum creatinine.
- Lipid profile was done within 24 hours of admission.

Special Investigations:

- a. Echocardiography (2D).
- b. Cardiac enzymes.
- c. Chest X-ray/ screening (Whenever required).
- d. Serum electrolytes (Whenever required).

Patients were kept in ICCU for 3-5 days provided no other complication was present. From ICCU they were transferred to cardiac ward and discharged after 1-2 weeks.

OBSERVATIONS: 100 consecutive patients of Acute Myocardial Infarction admitted to ICCU of Mc Gann Hospital, Shimoga from April 2015 to July 2015 were studied. The following are the observations made from this study.

AGE DISTRIBUTION:

Age group (In years)	No. of Patients	Percentage
Less than 30	1	1
31-40	14	14
41-50	37	37
51-60	22	22
61-70	14	14
71-80	8	8
More than 81	4	4
Total	100	100

Table 1 showing age distribution

The age of patients in this study ranged from 28 years to 89 years. Mean age 44.21(±10.42) years

Figure 1: Showing age distribution

SEX DISTRIBUTION:

Sex	No. of patients	Percentage
Male	66	66
Female	34	34

Table 2 showing Sex distribution

Figure 2: Showing Sex distribution

ORIGINAL ARTICLE

SITE OF INFARCTION:

Site of Infraction	No. of Cases	Percentage
Anterior wall MI	55	55
Anteroseptal MI	26	26
Anterolateral MI	5	5
Anterior wall MI	14	14
Extensive anterior wall MI	10	10
Inferior wall MI	35	35
Inferior wall MI	20	20
Infero-lateral MI	15	15
Combined (Anterior and inferior) MI	10	10

Table 3: Showing site of Infarction

There were 9 cases of right ventricular infarction – 6 were associated with inferior wall MI and 3 cases occurred in anterior wall MI.

There were 4 cases of posterior wall MI (Associated with inferior wall MI). Q waves developed in 77 cases (77%).

Figure 3: Showing site of Infarction

COMPLICATIONS:

Complications	No. of Cases	Percentage
Arrhythmias	77	77
Left ventricular failure	21	21
Cardiogenic shock	6	6
Congestive cardiac failure	1	1
Papillary muscle dysfunction	11	11
Pericarditis	8	8
Cerebrovascular accident	3	3

Table 4: Showing incidence of complications of AMI

Figure 4: Showing incidence of complications of AMI

MORTALITY:

INCIDENCE:

Total No. of Patients	No. of Deaths	Percentage
100	15	15

Table 5: Showing incidence of mortality

The overall in-hospital mortality in this study was 15% - 10 were males (66.7%) and 5 were females (33.3%). Of the 15 patients who expired 10 patients (66.7%) had anterior wall MI and 5 (33.3%) had inferior wall MI. 8 of the 15 deaths (53.3%) occurred within 24 hours of admission and an additional 4 (26.7%) during remainder of the first week.

ORIGINAL ARTICLE

Figure 5: Showing incidence of mortality

CAUSE OF DEATH:

Cause of Death	No. of Patients	Percentage
Cardiogenic shock	6	40
Ventricular fibrillation	3	20
Asystole	3	20
Congestive cardiac failure	1	6.7
Others	2	13.3

Table 6: Showing immediate cause of death

The commonest cause of death was cardiogenic shock (40%).

Figure 6: Showing immediate cause of death

DISCUSSION: The observations made in 100 case of acute myocardial infarction, admitted to the ICCU of Mc Gann Hospital Shimoga from April 2015 to July 2015 is discussed here and the results have been compared with other studies.

ORIGINAL ARTICLE

AGE: The age distribution of these patients ranged from 28 years to 89 years with maximum number of patients in the age group 41 to 60 years. There were 59% of patients in this age group. This is consistent with findings of other authors who have quoted a similar incidence in this age group [Gupta R et al (2005)⁵ – 52%; Ghaffar A et al (2004)⁶ – 54%.

15% of the patients were aged 40 years or below. This is comparable with study of Siwach et al (1998)⁷ who have quoted an incidence of 19.2%.

SEX: There were 66 males (66%) and 34 females (34%) in the present study. The male to female ratio was 3.5:1. This findings is consistent with that of Maggioni et al (1993)⁸ – 4.65: 1; Prabhakar et al (1998)⁹ – 4.2:1, Elizabeth GC (1998)¹⁰ – 5.2:1 and P. Yadav et al¹¹ (2010) – 3.8:1.

SITE OF INFARCTION:

(In percentage)

Site	Julian et al (1964) ¹²	Jewitt et al (1967) ¹³	Subash et al (1982) ¹⁴	Gupta et al (1989) ¹⁵	P. Yadav et al (2010) ¹¹	Present study
No. of patients	100	222	4179	299	200	100
Anterior wall MI	46	55.85	58.6	68	54	55
Inferior wall MI	44	33.78	34.7	25	41	35
Combined (Anterior and inferior) MI	4	5.85	6.7	7	5	10
Subendocardial Infarction	-	-	-	-	-	-
Indeterminate	6	4.5	-	-	-	-
True posterior MI	-	-	-	-	-	-

Table showing site of infarction according to various authors

The findings of present study are comparable with above studies.

INCIDENCE OF ARRHYTHMIAS:

(In percentage)

Authors	Year	Incidence
Julian et al ¹²	1964	95
Kurland et al ¹⁶	1965	94
Fluck et al ¹⁷	1967	80
Datey et al ¹⁸	1969	84
Kundu et al ¹⁹	1982	75.44
Sharma et al ²⁰	1986	69
Jacob et al ²¹	1992	84
P. Yadav et al ¹¹	2010	60
Present study	-	77

Table showing incidence of arrhythmias

The findings are comparable with that of Fluck et al, Kundu et al, Datey et al and Jacob et al.

ORIGINAL ARTICLE

OTHER COMPLICATIONS OF MYOCARDIAL INFARCTION:

Left Ventricular Failure: Left ventricular failure was seen in 21 patients (21%) which is consistent with study of Kundu et al (1982)¹⁹ – 19.02% and Passey et al²² (1986) – 21%.

Cardiogenic Shock: Cardiogenic shock was observed in 6 patients (6%). This is comparable to study of LeFeuvre et al (1996)²³ – 8% and Goldberg et al (1992)²⁴ – 7.5%.

Congestive Cardiac Failure: This was documented in only 1 patient (1%). Subramanyam et al (1984)²⁵ has quoted an incidence of 2.6%. The present study is comparable to the study of Subramanyam et al.

Papillary Muscle Dysfunction: Papillary muscle dysfunction occurred in 11 patients (11%). This is in accordance with incidence quoted by Subramanyam et al (1984)²⁵ – 10.27%.

Pericarditis: Pericarditis was documented in 8 patients (8%). This is comparable to study of Lichsten et al (1974)²⁶ – 8% and Krainin et al (1984)²⁷ – 7.3%.

Cerebro-vascular Accident (CVA): 3 patients (3%) has suffered cerebro-vascular accident. This is comparable with studies of Kundu et al (1982)¹⁹ – 2.3%, Subramanyam et al (1984)²⁵ – 3.31% and P. Yadav et al (2010)¹¹ – 2.5%.

MORTALITY:

(In percentage)

Authors	Year	Incidence
Kundu et al ¹⁹	1982	17.05
Sharma et al ²⁰	1986	14.9
Gupta et al ¹⁵	1989	13
Arun et al ²⁸	1989	13
Kumar et al ²⁹	1991	14.9
Malhotra et al ³⁰	1991	18
Goldberg et al ³¹	1992	18.3
Elizabeth et al ¹⁰	1998	14
Prabhakar et al ⁹	1998	11.5
Joshi et al ³²	1998	12.5
M. J. van der Vlugt et al ³³	2000	12
Shimal Khan et al ³⁴	2009	12.9
Present study	2015	15
Table showing incidence of mortality		

The findings are comparable with study of Elizabeth et al., Kumar et al, Arun et al, Gupta et al and Sharma et al.

Of the 15 patients who died, 10 were male (66.7%) and 5 were female (33.7%). 10 patients (66.7%) had anterior wall MI and 5 (33.3%) had inferior wall MI.

ORIGINAL ARTICLE

(In percentage)

Cause of Death	Passey et al (1986) ²²	Gupta et al (1989) ¹⁵	Shimal Khan et al ³⁴ (2009)	Present study
Cardiogenic shock	49	34.7	-	40
Ventricular fibrillation	19	12.5	2.4	20
Asystole	9	17.3	1.2	20
Let ventricular failure	21	32.6	-	-
Congestive cardiac failure	-	-	7.6	6.7
Others	-	-	1.5	13.3

Table showing cause of death

The commonest cause of death was cardiogenic shock (40%) which is comparable to above studies.

SUMMARY AND CONCLUSION: 100 consecutive cases of Acute Myocardial Infarction admitted to ICCU of of Mc Gann Hospital Shimoga from April 2015 to July 2015 were selected for the study:

1. Age of the patients ranged from 28 years to 89 years. The mean age was 44.21($\pm$ 10.42) years.
2. There was high male preponderance with male to female ratio being 3.5:1.
3. Anterior wall infarctions (55%) were more common than inferior wall infarctions (35%). Combined anterior and inferior infarctions were seen in 10% of the cases.
4. Right ventricular infarction was seen in 11 (11%) cases, of which 10 were associated with inferior wall infarction and 1 with anterior wall infarction. Posterior wall myocardial infarction was seen in 5% of the cases associated with inferior wall infarction.
5. Incidence of arrhythmias is 77%, Left ventricular failure was seen in 21 patients (21%) and CVA in 3%.
6. The overall in-hospital mortality in this study was 15%; the commonest cause of death was cardiogenic shock (40%).

BIBLIOGRAPHY:

1. Gupta R, Joshi P, Mohan V, Reddy K S, Yusuf s. Epedemiological and causation of coronary heart disease & stroke in India. Heart 2008; 94: 16-26.
2. Waeber B, Review, Treatment Strategy to Control Blood Pressure optimally in hypertensive patients, Blood Press 2001;10: 62-73.
3. The GUSTO Angiographic Investigators. The effects of tissue plasminogen activator, streptokinase, or both on coronary-artery patency, ventricular function, and survival after acute myocardial infarction. N Engl J Med 1993; 329: 1615-22. [Erratum, N Engl J Med 1994; 330:516.]
4. Tunstall-Pedoe H. et al 1994 "Myocardial Infarction and coronary deaths in the World Health Organization MONICA Project" Circulation 90: 583-612.
5. Gupta R. Burden of coronary heart disease in India. Indian Heart J 2005; 57: 632-8.
6. Ghaffar A, Reddy KS, Singhi M. Burden of noncommunicable diseases in South Asia. BMJ 2004; 328:807-10.

ORIGINAL ARTICLE

7. Siwach S. B. et al 1998 "Profile of young acute myocardial infarction in Harayana" JAPI 46 (5): 424-6.
8. Maggioni A.P. et al 1993 "Prevalence and prognostic significance of ventricular arrhythmias after acute myocardial infarction in the fibrinolytic era. GISSI-2 Results" Circulation. 87: 312-22.
9. Prabhakar D., D.V. Vaidyanathan and K. Premkumar 1998 "Profile of acute myocardial infarction in women – our experience" JAPI 46(1): 78.
10. Elizabeth G. C. 1998 "Practise patterns in acute myocardial infarction" JAPI 46(1): 42.
11. P. Yadav et al. clinical profile & risk factors in acute coronary syndrome. National Journal of Community Medicine 2010, Vol. 1, Issue 2, 150-152.
12. Julian D.G., P.A. Valentine and G.C. Miller 1964 "Disturbances of Rate, Rhythm and conduction in acute myocardial infarction" Am.J. Me. 37: 915-27.
13. Jewitt D. E. et al 1967 "Incidence and management of Supraventricular arrhythmias after acute myocardial infarction" Lancet 2: 734-8.
14. Subhash S. Et al 1982 "First 24 hours in coronary care unit" "Indian Heart Journal 34: 299.
15. Gupta M. C., L. Mehta and S.P. Gupta 1989 "Clinical profile of acute myocardial infarction with special reference to risk factors – A five year study" JAPI 37(1): 55.
16. Kurnald G. S. and D. Pressman 1965 "The incidence of arrhythmias in acute myocardial infarction studied with a constant monitoring system" Circulation 31: 834-41.
17. Fluck D.C. et al 1967 "Natural history and clinical significance of arrhythmias after acute cardiac infarction" Brit Heart. 29:170-9.
18. Datey K. K. A. N. Nathwani and R. M. Shah 1969 "100 Patients of acute myocardial infarction treated in an intensive coronary care unit" J. Indian M.A. 52(9): 405-9.
19. Kundu S.C. et al 1982 "Profile of myocardial infarction among the Railroad workers in Eastern India – A six year study" Indian Heart J. 34(3): 151-5.
20. Sharma S.K. et al 1986 "Incidence and nature of cardiac arrhythmias in cases of acute myocardial infarction in relation to some major coronary risk factors" JAPI 34(6): 413-5.
21. Jacob et al 1992 "Study of incidence and pattern of arrhythmias complicating acute myocardial infarction correlating it to the site of infarct" Abstract: Joint Annual Conference of Association of Physicians of India and Cardiological Society of India: South Zone.
22. Passey M. N. et al 1986 "Clinical profile of ischemic heart disease (Acute Myocardial Infarction)" "Indian Heart Journal 38: 334.
23. LeFeuvre C.A. et al 1996 "Comparison of mortality from acute myocardial infarction between 1979 and 1992 in a geographically defined stable population" Am J. Cardiol. 78: 1345-9.
24. Glodberg R. J. et al 1991 "Cardiogenic shock after acute myocardial infarction" N. Engl. J. Med. 325: 117-22.
25. Subramanyam G. and B. Ramesh Babu 1984 "Clinical profile of ischemic heart disease – A study of 2579 cases" JAPI 32(1): 48-9.
26. Lichstein E., Ho-Mau Liu and P. Gupta 1974 "Peucarditis complicating acute myocardial infarction: Incidence of complication and significance of electrocardiogram on admission" Am Heart J. 87(2): 246-52.
27. Krainin F. M., A. P. Flessos and D.H. Spodick, 1984 "Infarction-associated Pericarditis" N. Engl J. Med. 311: 1211-4.

ORIGINAL ARTICLE

28. Arun K. N. et al 1989 "Retrospective analysis of 500 cases of acute myocardial infarction" JAPI 37(1): 11.
29. Kumar T. A., A. Singh and K. Thakur 1991 "Observation on Acute myocardial infarction during Hospital Stay" JAPI 39(11): 803.
30. Malhotra N. N., S. B. Khurana and A. P. S. Bhatra 1991 "A clinical study of Q wave and non Q wave myocardial infarction" JAPI 39(11): 882.
31. Goldberg R.J. et al 1992 "Prognosis of acute myocardial infarction complicated by complete heart block (the Worcester Heart Attach Study)" Am J. Cardiol. 69: 1135-41.
32. Joshi P. P. et al 1998 "Management practices and determinants of morality in acute myocardial infarction: Utilisation of thrombolytic therapy" JAPI 46(1): 60.
33. M. J. van der Vlugt et al. Prospective study of early discharge after acute myocardial infarction (short). European Heart Journal (2000) 21, 992-999.
34. Shimal Khan et al. in-hospital outcome of patients having acute myocardial infarction with and without streptokinase. Gomal Journal of Medical Sciences July-December 2009, Vol. 7, No. 2. P 96-100.

AUTHORS:

1. Nagabhushana S.
2. Ranjith Kumar G. K.
3. Ranganatha M.
4. Virupakshappa

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Medicine, Shimoga Institute of Medical Sciences, (SIMS), Shimoga.
2. Junior Resident, Department of General Medicine, Shimoga Institute of Medical Sciences, (SIMS), Shimoga.
3. Assistant Professor, Department of General Medicine, Shimoga Institute of Medical Sciences, (SIMS), Shimoga.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

4. Professor and HOD, Department of General Medicine, Shimoga Institute Medical Sciences (SIMS), Shimoga.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Nagabhushana S,
Near GK School,
Jenukalleshwari Krupa.
Aashok Nagar, 2nd Cross,
Shimoga-577201.
E-mail: sn_bhushan@yahoo.co.in

Date of Submission: 10/07/2015.
Date of Peer Review: 11/07/2015.
Date of Acceptance: 21/07/2015.
Date of Publishing: 24/07/2015.