



Clinical profile of Acute Myocardial Infarction patients from Rural India

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Abstract

Introduction: Prevalence of coronary heart disease (CHD) is rising at rapid pace among urban as well as rural population in India due to rise in prevalence of major cardiovascular risk factors. An important change in risk factor pattern is more rapid rise in risk factors for CHD among rural and slum population in comparison with urban population in India. Present hospital based study was conducted to evaluate the clinical profile, presentation, risk factors and lipid profile of patients with AMI from rural area.

In this observational study, 50 patients with definite evidence of acute myocardial infarction (AMI) were studied with reference to clinical profile and risk factors. In detail medical, personal, family and past history was explored and socio-demographic data was recorded. After complete physical examination and ECG, blood samples were collected for biochemical assays.

Results: Out of 50 patients, 41 were male and 9 female with mean age 54.74 +/- 21.3 years. Sweating with chest pain was the most common presenting symptom. Either single or multiple risk factors like smoking, hypertension, dyslipidemia, are more prevalent. Surprisingly 74% of the cases were non-obese. Inferior and anterior wall infarcts were more common. Rhythm disturbances and left ventricular failure (LVF) were the most common complication.

Our study findings suggest clustering of multiple traditional risk factors. There was clustering of multiple traditional risk factors like smoking, hypertension, dyslipidemia, diabetes, male sex, and advanced age.

Keywords: Acute myocardial infarction, rural India, dyslipidemia, hypertension, clinical profile.

Introduction

Prevalence of coronary heart disease, an important contributor of morbidity and mortality is rising at an alarming rate in India. It has been reported that over the last 60 years, its prevalence has been raised from 1% to 9-10% among urban and <1% to 4-6% among rural Indian population.⁽¹⁾ Clinical presentation and outcome of CHD among Indians

is different because of premature CHD, and high mortality rates. Numerous studies identified and reported several risk factors responsible for increasing burden of CHD among Indians. Dyslipidemia, smoking, hypertension, type 2 Diabetes Mellitus (T2DM), physical inactivity, low intake of fruits and vegetables and psychological distress are common risk factors

identified in more than 90% cases of acute myocardial infarction (AMI) in INTERHEART study involving south Indian and Indian population.⁽²⁾ There is a dearth of literature about clinical presentation, risk factors of CHD among rural population from India.

An important change in the risk factor pattern is a more rapid rise in risk factors for CHD among rural and slum population in comparison with urban population in India. Several surveys have been conducted on CVD across India, but most of them reported clinical picture, risk factors and outcome among urban population.⁽³⁻⁶⁾ There is scarcity of literature about clinical profile of AMI and associated risk factors among rural region of India. Hence present hospital based study was conducted to evaluate the clinical profile, presentation, risk factors and lipid profile of patients with AMI from rural area. Also we aimed to study the ratio of serum total cholesterol to high-density lipoprotein (TC/HDL-C) among the cases of AMI.

Material and Methods

Present observational study included all consecutive incident AMI patients admitted to intensive coronary care unit of Swami Ramanand Teerth Rural Medical and Hospital, Amgajogai. In detail medical, personal, family and past history was explored and socio-demographic data was recorded. After complete physical examination and ECG, blood samples were collected for biochemical assays. Biochemical investigations included serum creatinine phosphokinase-MB, blood sugar, serum total cholesterol; LDL, HDL, TG, serum bilirubin, Alanine and Aspartate transaminase. Patients on lipid lowering drugs, presented only with angina, cardiogenic shock, and other significant major illness and pregnancy were excluded from the study.

Total 50 patients with definite evidence of AMI were studied with reference to clinical profile and risk factor pattern. Diagnostic criteria for AMI was according to World Health Organization guidelines which depend on the presence of at

least two of the following- typical chest pain for more than 20 minutes, ECG changes with development of Q waves, bundle branch block or ST segment elevation or depression of at least 0.1 mv for 24 hours and increased cardiac enzymes (Creatinine phosphokinase, Troponins.).⁽⁷⁾

Patients were observed at least for 72 hours in ICCU and if necessary for more period. Even after shifting patients from ICCU to their rooms, they were observed for the complications till discharge.

Results

Total 50 patients (41 males and 9 female- 82% vs 18%) diagnosed as AMI were enrolled in the study. Mean age of the cases was 54.74 +/- 21.3 years with range of 30 to 80 years.

Table 1 shows distribution of cases according to age group:

Sr No	Age group (years)	No. of cases	Percentage (%)
1	30-40	6	12
2	41-50	14	28
3	51-60	18	36
4	61-70	9	18
5	71-80	3	6
		Total (50)	100

The incidence of AMI was found to be highest in age group of 51-60 years (36%) while lowest among age group of 30-40 years (12%).

Table 2 shows the pattern of clinical symptoms at the time of presentation:

Sr No.	Clinical symptoms	No of cases	Percentage
1	Chest pain	46	92
2	Sweating	47	94
3	Palpitations	23	46
4	Breathlessness	34	68
5	Vomiting	22	44
6	Cough	13	26
7	Giddiness/syncope	25	50

This shows sweating with chest pain as the most common presenting symptom followed by breathlessness, giddiness, palpitations, vomiting followed by cough. Only one patient was reported only with abdominal pain without chest pain.

On analysis of past medical history, hypertension was present in 17 cases (34%), T2DM among 9 (18%), ischemic heart disease in 9 (18%), chronic

obstructive pulmonary disease among 4 (8%), pemphigus in 2 (4%), pulmonary tuberculosis in 1 (2%) and pregnancy induced hypertension among 1 (2%) cases. Family history of CHD in first-degree relatives was positive among 7 patients (14%).

Table 3 shows frequency of different types of addictions among cases.

Sr No.	Addictions	No. of patients	Percentage
1	Tobacco-chewers	16	32
2	Alcoholics	13	26
3	Smokers-Bidi	23	46
	Cigarette	12	24
		11	22
4	Snuff inhalers	2	4
5	Ganja smokers	1	2

Smoking was found to be the most common type of addiction among cases followed by tobacco chewing, alcoholism, snuff inhalation and ganja smoking.

Dietary history showed, 60% of the cases were strictly vegetarian and 40% consuming mixed type of diet.

Table 4 shows clinical signs observed among cases of AMI.

Sr No	Clinical sign	No. of patients	Percentage
1	Basalrales	23	46
2	Hypertension	19	38
3	COPD	10	20
4	Irregular pulse	9	18
5	Tachycardia	7	14
6	Murmur	3	6
7	Clubbing	3	6
8	Bradycardia	2	4
9	Hypotension	2	4
10	Pemphigus	2	4
11	Gallop	1	2
12	Papilloedema	1	2

Clinical examination revealed basal rates most common sign (46%), followed by hypertension (38%), irregular pulse (18%), tachycardia (14%), murmur, clubbing, bradycardia, and hypotension. Analysis of BMI of patients showed, 37 (74%) cases non-obese with BMI less than 25 kg/m² and 13 cases were obese with BMI between 25-30 kg/m². Mean BMI for male was 21.53 kg/m², for females 21.63 kg/m² and for all cases 21.55 kg/m².

Severity of the disease was assessed by Killip classification.

Table 5 shows distribution of patient according to severity of the disease.

Sr No.	Killip Class	No of cases	Percentage
1	I	23	46
2	II	21	42
3	III	04	8
4	IV	02	4

Table 6 shows the proportion of site of infarction among the cases.

Sr No	Wall of infarction	No of cases	Percentage
1	Inferior	16	32
2	Anterior	15	30
3	Anteroseptal	7	14
4	Anterolateral	5	10
5	Inferiolateral	3	6
6	Inferioposterior	2	4
7	Posteriolateral	1	2
8	posterioinferiolateral	1	2

We noted and managed the complications during hospital stay of each patient from admission to discharge.

Table 7 shows different complications occurred among cases.

Sr No	Complications	No of patients	Percentage (%)
1	Rhythm disturbances	24	48
2	Left ventricular failure (LVF)	23	46
3	Blocks	13	26
4	Cardiogenic shock	9	18
5	Reinfarction	5	10
6	Congestive cardiac failure (CCF)	4	8
7	Death	5	10

Rhythm disturbances and LVF were the most common complication followed by blocks, cardiogenic shock, re-infarction and CCF. Out of 50 patients, 5 patients died due to AMI. Among arrhythmias observed, 42% cases had ventricular premature beats, 22% had supraventricular premature beats, 14% had left anterior hemi block, 4% had ventricular tachycardia and 4% had complete heart block. Prevalence of right bundle block, bifascicular and trifascicular block was 2% each. Total incidence of different types of arrhythmias was 68%.

Table 8 shows the lipid profile pattern of patients of AMI.

Sr No.	Lipid variable	No of patients	Percentage	Mean +/-SD (mg%)
1	HDL <40 mg%	26	52	36.38+/10.11
	> /= 40 mg%	24	48	Male- 32.3+/-5 Female-37.43+/-12
2	Serum TG <150mg%	21	42	178.6+/-32
	> 150 mg%	29	58	Male 181.21+/-23 Female 166.6+/-31
3	Serum TC <200 mg%	5	10	203+/-51 mg%
	>200 mg%	45	90	Male 209.8+/-32 Female 177.7+/-21
4	Serum LDL<130 mg%	15	30	102+/-23mg%
	>130 mg%	35	70	196+/-31mg%
5	TC/HDL <3.5	9	18	6+/- 3.9
	3.51-7	27		Males- 6.24+/-2.8
	7.01-10.5	11		Females- 4.88+/-2.1
	> 10.51	3		

Lipid profile pattern of the patients of AMI was deranged and dyslipidemia seems to be major traditional risk factor among this rural population. National Cholesterol Education Program (NCEP) guidelines are used to define dyslipidemia.⁽⁸⁾

Discussion

Present study comprised of 50 cases of AMI from rural population of India. Soci-demographic characteristics, clinical features, complications and risk factors were observed and analyzed. Our study findings show high prevalence of multiple traditional risk factors among rural population. Maximum numbers of patients were in the age group of 51-60 years (36%) suggesting advanced age as a risk factor for rural patients with AMI with male preponderance. Previous studies also reported more percentage of CHD and associated mortality with rising age.⁽⁹⁾ Other prevalent traditional risk factors were positive family history of CHD in first-degree relatives, smoking, hypertension and T2DM. Age, sex, family history, ethnicity are non-modifiable risk factors for CHD. Hypertension epidemiological studies reported increased prevalence of hypertension from 10-12% in 1990s to 22-25% presently among rural population of India.⁽¹⁰⁾

There is lot of controversies about association of dietary pattern with CHD. In the present study, 60% of the cases were strictly vegetarian and 40% consuming mixed type of diet. Dyslipidemia is a major risk factor for CHD. In our study subjects,

prevalence of hypercholesterolemia was 48%, hypertriglyceridemia was 28%, low HDL 52%, high LDL 46% and TG/HDL>3.5 among 68% of the patients. These findings show that deranged lipoproteins profile play an important role in the causation of CHD. Clara KC et al observed hypercholesterolemia and low HDL as significant risk factor among rural region from Andhra Pradesh of India.⁽¹¹⁾ Few studies reported prevalence of different types of dyslipidemia ranging from 10-73% among Indians. Atherogenic dyslipidemia include high/borderline LDL, low HDL and hypertriglyceridemia.⁽¹²⁾ Dyslipidemia is a major risk factor for developing CHD. Abnormalities in LDL, HDL, TG, VLDL metabolites, lipoprotein remnants and lipoprotein a play an important role in the etiopathogenesis of CHD. Number of studies from different parts of India documented role of conventional risk factors in causation of cardiac diseases.⁽³⁻⁶⁾

In our rural patients, obesity (BMI>25kg/m²) was observed among 26% cases while 74% patients were non-obese. In fact obesity is a major risk factor for CHD, but we found more non-obese having AMI. Occurrence of AMI among non-obese group may be due to accumulation of intra-abdominal visceral fat without development of generalized obesity. Indians have more prevalence of centralized obesity for given level of BMI in comparison with western counterparts.⁽⁹⁾

At the time of admission, sweating with chest pain was the most common presenting symptom

followed by breathlessness, giddiness, palpitations, vomiting followed by cough. On clinical examination basal rales, tachycardia, irregular pulse, hypertension were the common findings. Inferior wall was the most common site of infarction (32%) followed by anterior (30%), Anteroseptal (14%) anterolateral (10%), inferiolateral (6%), inferioposterior (4%), posteriolateral (2%), posterioinferiolateral (2%). Severity of the disease was assessed by Killip's classification. AMI was of I and II severity class at the time of presentation among most of the patients. We observed and noted the complications till patients discharged from the hospital. Frequencies of different complications are depicted in table 7. Reported mortality in this group is 10%.

CHD has become a major public health problem not only in urban but in rural population of India imposing huge economic burden on the healthcare system. India is undergoing through epidemiologic transition from rising prevalence of non-communicable diseases. Over past 40 years, prevalence of CHD has been raised four-fold in India.⁽¹³⁾ Changed pattern of risk factors for CHD among rural people like smoking, tobacco chewing, sedentary lifestyle with consumption of calorie-dense food, abdominal obesity and other cardio-metabolic factors are attributing to escalate prevalence of CHD.⁽¹⁴⁾

Atherosclerosis is a multifactorial disease involving interplay of various genetic and environmental factors. Rising prevalence of coronary risk factors and CHD among rural population is a serious concern in India, since majority of Indians stay in rural area. One of epidemiological survey conducted in 45 villages of India, reported 32% of deaths due to CHD.⁽¹⁵⁾ This emphasizes need of development, validation of risk prediction models for rural population in India. Cardiovascular risk stratification of rural people will help to identify moderate and high-risk subjects for development of cardiovascular diseases to implement preventive strategy.

Conclusion

Patients from rural region have clustering of multiple traditional risk factors. Smoking, hypertension, dyslipidemia, diabetes either single or in combination are more prevalent. Hence there is urgent need of awareness about risk factors for AMI and lifestyle modifications in rural regions also.

References

1. Rajeev Gupta, Indu Mohan, Jagat Narula. Trends in Coronary Heart Disease Epidemiology in India Annals of global health 2016. 82(2) 307-315.
2. Yusuf, Salim et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study The Lancet , Volume 364 , Issue 9438 , 937 – 952
3. Zodpey Sanjay P, Shrikhande Sunanda N, Negandhi Himanshu N, Ughade Suresh N, Joshi Prashant P Risk factors for acute myocardial infarction in Central India: A case-control study Indian Journal of community medicine 2015;40:19-26
4. Sushma Pandey , Suresh Pandey , Purushottam Jhanwar ,. Anshul Jhanwar A prospective study of Myocardial Infarction patients admitted in a tertiary care hospital of south-eastern Rajasthan Int J Biol Med Res. 2012; 3(2): 1694-1696
5. Deb S, Dasgupta A .A study on risk factors of cardiovascular diseases in an urban health centre of Kolkata. Indian J Commun Med 2008; 33: 265-7.
6. Shantirani CS, Pradeepa R, Deepa R. Prevalence and risk factor of hypertension in a selected south Indian population. The Chennai urban population study. 2003; 51:20-7.
7. Bonita R, Courten M, Dwyer T, Jamrozik K. Surveillance of Risk Factors for Non-communicable Disease; WHO STEP wise Approach. Geneva: WHO, 2001.

8. Executive summary of the Third Report of the National Cholesterol Education Program (NCEP) (2001) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA 285: 2486–2497.
9. Nag T, Ghosh A. Cardiovascular disease risk factors in Asian Indian population: A systematic review. Journal of Cardiovascular Disease Research. 2013;4(4):222-228. doi:10.1016/j.jcdr.2014.01.004.
10. Y. Wang, H.J. Chen, S. Shaikh, P. Mathur. Is obesity becoming a public health problem in India? Examine the shift from under- to over-nutrition problems over time Obes Rev, 10 (2009), pp. 456-47.
11. Clara KC, Naidus S, Raju K. Significant lipid, adiposity and metabolic abnormalities amongst 4535 indians from a developing region of rural Andhra Pradesh. 2008;196:193-200.
12. Misra A., Luthra K., Vikram N.K. Dyslipidemia in Asian Indians: determinants and significance. J Assoc Physicians India. 2004;52:137–142. [PubMed]
13. Krishnan MN. Coronary heart disease and risk factors in India – On the brink of an epidemic? Indian Heart Journal. 2012;64 (4):364-367. doi:10.1016/j.ihj.2012.07.001.
14. Misra, N. Singhal, B. Sivakumar, N. Bhagat, A. Jaiswal, L. Khurana. Nutrition transition in India: secular trends in dietary intake and their relationship to diet-related non-communicable diseases J Diabetes, 3 (2011), pp. 278-292
15. Joshi R., Cardona M., Iyengar S. Chronic diseases now a leading cause of death in rural India—mortality data from the Andhra Pradesh Rural Health Initiative. Int J Epidemiol. 2006;35:1522–1529. [PubMed]