

A Cross Sectional Study on Clinical Profile, Risk Factors, and Outcome of Patients with Coronary Artery Disease in Western Odisha

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ABSTRACT

BACKGROUND

Coronary artery disease (CAD) is one of the major health problems in both developed and developing countries and is a major cause of premature death among adults in developed countries while its incidence is on an increase in developing countries as well. The purpose of this study was to describe the clinical profile, risk factors and outcome associated with CAD.

METHODS

This is a prospective observational study done among 60 patients in the Department of Medicine, VIMSAR, Burla for a period of one year from 1st January 2019 to 31st December 2019. Written informed consent from the patients and clearance from the Institutional Ethics Committee were obtained before the start of the study.

RESULTS

Maximum number of cases (40 %) was in the age group of 41 – 50 years. Male: female ratio was 7 : 3. The commonest clinical symptom was chest pain (81.25 %) followed by sweating (38.33 %) and dyspnoea (23.33 %). Commonest risk factors found in this study was dyslipidaemia (70 %) followed by hypertension (63.33 %). Electrocardiogram (ECG) changes noted were ST segment elevation in 38.33 % of the cases, Q wave in 35 % of cases, echocardiography finding of decrease EF in 38.33 % and regional wall motion abnormality (RWMA) noted in 40 % of the cases. The common complications were left ventricular (LV) failure in 52 % of the cases followed by arrhythmia in 43 %. Embolism and cardiogenic shock were noted in 23 % and 16 % of the patients respectively.

CONCLUSIONS

CAD is more common in 4th decade of life and is more common in male. Patients commonly present with chest pain, sweating and with a history of hypertension. LV failure, arrhythmias, re-infarction, and cardiogenic shock can be seen post CAD syndrome.

KEYWORDS

Acute Coronary Disease, Type 2 Diabetes Mellitus, Hypertension, Left Ventricular Failure, Arrhythmia, Electrocardiogram (ECG)

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BACKGROUND

Cardiovascular diseases (CVD), especially coronary heart disease (CHD) have reached epidemic potential worldwide. Over the past two decades now, it is observed that there has been an alarming increase in prevalence in CHD and CVD mortality in India and other South Asian countries. India seems to be undergoing an epidemiological transition where communicable diseases have been slowly decreasing, but there is a substantial rise in non communicable diseases leading to a dual burden of diseases. There has been a 4 fold rise in CHD cases in India over the past 40 years.¹

Epidemiological studies have shown that there are over 30 million cases of CHD in India.¹ Estimates from various studies show the prevalence of CHD to be between 7 % and 13 % in urban areas²⁻⁴ and between 2 % and 7 % in rural areas.^{5,6} The Global Burden of Diseases study projected that the disability adjusted life years lost due to CHD in India would be 14.4 million and 7.7 million in men and women respectively in 2020.⁷

Rise in the burden of CHD can be attributed to the rise in known risk factors like diabetes, hypertension, dyslipidaemia, smoking, obesity and physical inactivity. Rapid urbanization and subsequent change in lifestyle over the past few decades can be cited as a reason for this growing burden of CHD in India.¹

The median age of first heart attack in Indians is 53 years.⁸ Hospital-based studies have shown that patients younger than 40 years accounts for 6 - 16 per cent of patients presenting with acute coronary syndromes.^{1,9,10} Studies conducted to understand the relationship between socioeconomic status (SES) and CVD in India demonstrated that CVD is no longer a disease of the rich; it equally impacts the poor, with a higher CVD mortality among men of lower SES.^{11,12,13,14}

The typical presentation of the CHD patients is exertional or stress induced central chest pain. The episodes of pain may last from a few minutes to hours. Patients commonly describe the pain as tightness, crushing, stabbing or burning pain. Patients may also have nausea, vomiting, dyspnoea or palpitations.¹⁵ Atypical presentations include pain in the epigastrium, jaw, neck or arms.¹⁶

In India, it was reported that CVD led to 26.5 % of these deaths in men and 23 % of all deaths in women in 2019.¹⁷

There is variable clinical presentation, risk factors and outcome in different regions of the country. Hence, it is planned to study the clinical profile, risk factors and outcome of patients diagnosed to have CHD and reaching our tertiary care centre in Western Odisha.

METHODS

A hospital based cross sectional study was conducted among all 60 eligible patients with history suggestive of CAD and admitted to VIMSAR, Burla between January 2019 and December 2019. Permission from Institutional Ethics

Committee was obtained before the start of the study. A written informed consent was obtained from all participants. A proforma was used to collect all the details of the patient.

Performa included details of basic information of the patient (age, sex, residence and socioeconomic status), risk factors in the patient (hypertension, diabetes, dyslipidaemia, smoking, alcohol, and family history), examination findings [Body mass index (BMI), pulse, blood pressure, jugular venous pressure (JVP)], presenting complaints (chest pain, dyspnoea, palpitation, sweating, nausea, vomiting, syncope), relevant biochemical findings, ECG, echocardiography findings and finally the outcomes of the patient.

Inclusion Criteria

Patient between age group of 31 to 61 years and both genders who presented with complaints of chest pain, palpitation, sweating, breathlessness, vomiting and ECG features suggestive of acute coronary syndrome.

Exclusion Criteria

Patients diagnosed to have pneumonia, pleural effusion, bronchial asthma, chronic obstructive pulmonary disease (COPD), acute respiratory distress syndrome (ARDS), pericardial effusion, valvular heart disease, rheumatic heart disease, and those with hepatic and renal disease were excluded from the study.

Working Definitions^{18,19,20,21,22,23}

Tobacco use

Current smoker was defined as a person who had smoked at least 100 cigarettes over his/her lifetime and continued to smoke at the time of survey daily or occasionally. An ex-smoker was the one who had quit smoking.¹¹ Current smokeless tobacco use was defined as the daily occasional use of any form of smokeless tobacco at the time of the survey.

Alcohol Consumption

Current consumer was defined as the consumption of alcohol in the previous 12 months. The past consumer was alcohol consumption before the previous 12 months.¹²

Hypertension

BP was measured in the right arm using a digital automatic BP apparatus (Omron MX3).¹⁰ The systolic BP $\geq$ 140 mm Hg or diastolic BP $\geq$ 90 mm Hg was considered as hypertension as per World Health Organization (WHO) criteria or history of the previously diagnosed disease.¹³

Overweight

Body mass index between 25 – 29.9 Kg/m²

Obesity

Body mass index $\geq$ 30 Kg/m²

Diabetes

Fasting blood glucose ≥ 126 mg/dl or 2-hour post-load blood glucose ≥ 200 mg/dl or history of treatment for diabetes.

Dyslipidaemia

When patient has hypercholesterolaemia or hypertriglyceridaemia or decreased high density lipoprotein (HDL) or increased low density lipoprotein (LDL).

Hypercholesterolaemia

Total blood cholesterol levels ≥ 200 mg/dl

Hypertriglyceridaemia

Fasting serum triglyceride levels ≥ 150 mg/dl

Decreased High Density Lipoprotein Cholesterol (HDL)

Fasting blood HDL-cholesterol < 40 mg/dl

Increased Low Density Lipoprotein Cholesterol (LDL)

Fasting Blood LDL-cholesterol > 129 mg/dl

Statistical Analysis

The data was entered in Microsoft Office Excel 2007 and analysis was done using IBM Statistical Package for Social Sciences (SPSS) version 21. The data was expressed as frequencies, percentages, mean and standard deviation.

RESULTS

A total of 60 patients were studied, out of which, 42 (70 %) were males and the rest of them were females (Table 1). Most of them belonged to 41 -50 years age group with mean age of 45.53 ± 8.61 . The mean age of males was 46.5 ± 8.79 and it was 43.27 ± 7.93 in females.

Time elapsed from onset of symptoms to hospital admission shows that maximum number of patients (43.59 %) were brought within 3 to 6 hours while only 1.90 % of the patients reached the hospital within 1 hour of symptoms.

17 (28.33 %) of the patients had a positive family history of coronary heart disease. Regarding addictive habits, 16 (26.66 %) had the habit of smoking and were current smokers, 11 (18.33 %) consumed alcohol regularly and 9 (15 %) of them had the habit of chewing tobacco (Table 1).

38 (63.33 %) of the patients had a history of hypertension (Table 1). The mean systolic blood pressure in the study population was 145.71 ± 12.77 and the mean diastolic blood pressure was 82.66 ± 5.17 . Males had a mean systolic blood pressure of 146.85 ± 13.94 whereas it was 143.05 ± 9.29 in females. Males had a mean diastolic blood pressure of 82.80 ± 5.58 whereas it was 82.33 ± 4.18 in females. There was no statistically significant difference in blood pressures among males and females.

21 (35 %) of the study population were diabetic (Table 1). The mean HbA1c among the study population was 6.83 ± 1.67 . Among males, the mean HbA1c was 6.97 ± 1.93 and it was 6.51 ± 0.71 in females. There was no statistically significant difference in HbA1c levels among males and females.

27 (45.5 %) of patients were found to be overweight and 10 (16.66 %) were found obese based on the BMI (Table 1 and 3). The mean BMI was 26.15 ± 4.16 kg/m². The mean BMI of males was 24.57 ± 3.58 , whereas it was 26.82 ± 4.24 in females. There was no statistically significant difference in BMI among males and females.

42 (70 %) of the study population had dyslipidaemia (Table 1). The mean values of the lipid parameters are tabulated in Table 4. There was no statistically significant difference in lipid parameters among the genders.

The commonest clinical symptom was chest pain (81.25 %) followed by sweating (38.33 %) and dyspnoea (23.33 %). Other symptoms are palpitation (15 %), nausea / vomiting (16.6 %) and syncope (6.66 %) (Table 2).

	Sl. No.	Characteristics	No. of Patients No. (%)
Age in years	1	31 – 40 years	17 (28.33 %)
	2	41 – 50 years	24 (40 %)
	3	51 – 60 years	19 (31.66 %)
Gender	1	Male	42 (70 %)
	2	Female	18 (30 %)
Risk factors	1	Smoking	16 (26.66 %)
	2	Tobacco chewing	9 (15 %)
	3	Alcohol	11 (18.33 %)
	4	Family history of CAD	17 (28.33 %)
	5	Hypertension	38 (63.33 %)
	6	Diabetes	21 (35 %)
	7	Obesity	10 (16.66 %)
	8	Dyslipidaemia	42 (70 %)

Table 1. Baseline Characteristics and Risk Factors in the Study Population

Sl. No.	Presenting Symptoms	No. of Patients No. (%)
1	Chest Pain	65 (81.25 %)
2	Dyspnoea	14 (23.33 %)
3	Palpitation	9 (15 %)
4	Sweating	23 (38.33 %)
5	Nausea / Vomiting	10 (16.66 %)
6	Syncope	4 (6.66 %)

Table 2. Presenting Symptoms of the Patient

	Sl. No.	Examination Findings	No. of Patients No. (%)
Body mass index	1	< 18.5 Kg/m ²	1 (1.66 %)
	2	$18.5 - 24.99$ Kg/m ²	22 (36.66 %)
	3	$25 - 29.99$ Kg/m ²	27 (45 %)
	4	≥ 30 Kg/m ²	10 (16.66 %)
Systolic blood pressure	1	< 120 mmHg	0 (0 %)
	2	$120 - 139$ mmHg	21 (35 %)
	3	$140 - 159$ mmHg	31 (51.66 %)
	4	≥ 160 mmHg	8 (13.33 %)
Diastolic blood pressure	1	< 80 mmHg	12 (20 %)
	2	$80 - 89$ mmHg	35 (58.33 %)
	3	$90 - 99$ mmHg	7 (11.66 %)
	4	≥ 100 mmHg	6 (10 %)

Table 3. Examination Findings in Patients with CAD

The ECG changes noted were ST segment elevation in 38.33 % of the cases, Q wave in 35 % of cases, echocardiography finding of decrease EF in 38.33 % and RWMA noted in 40 % of the cases (Table 4). ECG showed that most (52%) of the infarctions were involving the

anterior wall type, followed by posterior wall type (22 %) (Figure 1). Most common complications were left ventricular failure and arrhythmia accounting for 51.66 % and 43.33 % respectively. The proportion of mortality among the study population was 1.66% (Table 6).

Sl. No.	Investigation Findings	Mean $\pm$ SD	Range
1	Fasting blood sugar	116.43 $\pm$ 47.64	58 – 223 mg/dl
2	Post prandial blood sugar	216.1 $\pm$ 84.96	122 – 424 mg/dl
3	HbA1c	6.83 $\pm$ 1.67	5.1 – 13 %
4	Total cholesterol	218.26 $\pm$ 49.41	132 – 345 mg/dl
5	Triglycerides	161.53 $\pm$ 45.63	78 – 276 mg/dl
6	High density lipoprotein	38.95 $\pm$ 7.81	23 – 57 mg/dl
7	Low density lipoprotein	142.83 $\pm$ 21.31	98 – 189 mg/dl

Table 4. Investigation Findings in the Study Population

Sl. No.	Parameters	No. of Patients No. (%)
ECG findings	1 ST elevation	23 (38.33 %)
	2 Q Wave	21 (35 %)
Echocardiography	1 Ejection fraction < 40 %	23 (38.33 %)
	2 Regional wall motion abnormality	24 (40 %)

Table 5. ECG and Echocardiogram Findings in the Study Population

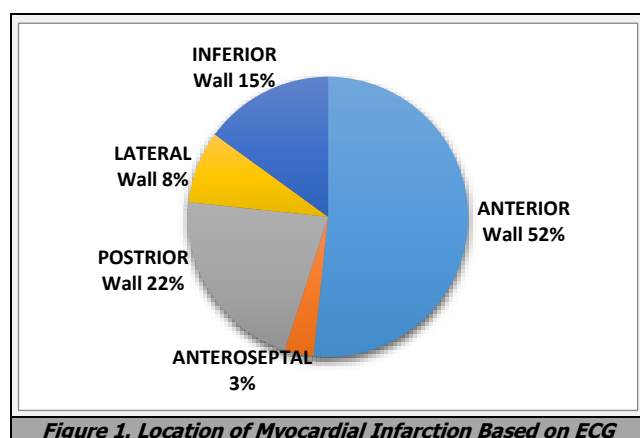


Figure 1. Location of Myocardial Infarction Based on ECG

Sl. No.	Complications / Outcome	No. of Patients No. (%)
1	LV failure	31 (51.66 %)
2	Arrhythmia	26 (43.33 %)
3	Cardiogenic shock	10 (16.66 %)
4	Pericarditis	1 (1.66 %)
5	Mitral regurgitation (MR)	1 (1.66 %)
6	Aneurysm	3 (5 %)
7	Embolism	14 (23.33 %)
8	Re-infarction	2 (3.33 %)
9	Cardiac rupture	1 (1.66 %)
10	Pericardial effusion	2 (3.33 %)
11	Death	1 (1.66 %)

Table 6. Complications and Outcome in Patients with Myocardial Infarction

DISCUSSION

Coronary heart disease is responsible for more deaths and disability in developing world. The present study aimed to evaluate the clinical profile, risk factors and outcome in patients diagnosed with coronary heart disease.

Most of the patients belonged to 41 – 50 years of age group with mean age being 45.33. The probable reasons behind the younger age of presentation could be due to change in dietary habits and use of processed food, overweight and obesity, sedentary lifestyle and decreased

physical activity. In the study done by Vasava J F et al.²⁴ the mean age of presentation was 47.1 which is similar to the age of incidence in the present study. It is well known that coronary artery disease occurs in Indians 5 – 10 years earlier.^{25,26} The average age of first myocardial infarction in Asians was 53 years; among the three Asian populations, Chinese, Malay, and Indian, the highest age-adjusted incidence of coronary events in both sexes was in Indians.²⁷

45.39 % of the patients reached the hospital within 6 hours of symptoms in the present study. In a study carried by Vaz et al.²⁸ 45.48 % had 0 - 6 hours of time gap between onset of symptoms and treatment. It is a well known fact that, earlier the presentation to the hospital, faster will be the treatment and better will be the survival.

The commonest presenting symptoms were chest pain (81.25 %) followed by sweating (38.33 %) and dyspnoea (23.33 %) in the present study. In a study done by Sancheti et al.²⁹ the incidence of chest pain was found to be slightly higher at 85 %. Out of those who had chest pain in the present study, 54 (67.5 %) of patients presented with chest pain not relieved within ten minutes followed by 21 % patients who had chest pain which relieved in ten minutes.

In the present study, family history was positive in 28.33 % of the study population. Study done by Sancheti et al.²⁹ showed positive family history in 19.59 %. In a hospital based study carried out by Sharma, et al.³⁰ positive family history of CAD was seen in 9.73 % patients. Most of the familial associations of CAD are related to common dietary habits.³¹

The incidence of overweight and obesity were reported 45 % and 16.66 % respectively. In a case-control study carried out by Gupta et al.³² out of 100 cases, 25 % patients had BMI between 25 to 29.9 and 8 % patients had BMI more than 30.

In the present study, 35 % of the patients had diabetes. DM is associated with a 2 to 4-fold increased mortality risk from heart disease. Furthermore, in patients with DM there is an increased mortality after MI, and worse overall prognosis with CAD.³³ 63.33 % of the study population had hypertension. Hypertension induces endothelial dysfunction, exacerbates the atherosclerotic process and it contributes to make the atherosclerotic plaque more unstable.³⁴ Smoking and tobacco chewing habit was seen in 26.6 % and 15 % of the patients respectively. Smokers have more chances of myocardial infarction and angina even at a much younger age than do non smokers.²⁴ People who smoke are up to four times likely to die from coronary heart disease than nonsmokers.²⁴

70 % of patients had dyslipidaemia in the present study. LDL particles can transport cholesterol into the artery wall, retained there by arterial proteoglycans and attract macrophages which engulf the LDL particles and start the formation of plaques; increased levels are associated with atherosclerosis. Over time, vulnerable plaques rupture, activate blood clotting, and produce arterial stenosis, which if severe enough results in heart attack, stroke, and peripheral vascular disease symptoms

and major debilitating events. The free radical reactions may have a primary role in the pathomechanism of atherogenesis.³¹ Manninen V et al.³⁵ in their study, showed that early lipid lowering therapy and hypertension control decreases the incidence of coronary heart disease.

The common complications of CAD were LV failure in 52 % of the cases followed by arrhythmia in 43 %. Embolism and cardiogenic shock were noted in 23 % and 16 % of the patients respectively. In a study done by Sancheti et al.²⁹ 18.58 % had cardiac failure, 2.29 % had cardiogenic shock and 1.02 % had arrhythmias.

CONCLUSIONS

Ischemic heart disease is common in middle-aged group of patients with predominantly in males. Smoking, hypertension, diabetes mellitus and dyslipidaemia are important cardiovascular risk factors for ischemic heart disease. 81.25 % presented with chest pain. Sweating and dyspnoea were the other common complaints. Those without chest pain may be missed due to non-specific clinical presentation and should be investigated by ECG and biomarkers. Time lapse between onset of symptoms and treatment is crucial for better outcome and should be reduced to less than 30 minutes. Most common clinical complication seen in patients was cardiac failure in the patients. There was only one death, suggesting that if the patient arrives to the tertiary care centre early, better outcome can be achieved.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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