

Research Article

Influence of sex on the profile of acute coronary syndrome: a tertiary care hospital based study from the Sub-Himalayan region in North India

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ABSTRACT

Background: Coronary events presents about ten years later in women than men. There exist distinct gender differences in terms of presentation of symptoms, validity of diagnostic tests and complications.

Methods: The study was conducted in the department of medicine R.P. Govt. Medical College (RPGMC) Himachal Pradesh. Consecutive 300 patients of acute coronary syndrome from June 2011 to June 2012 were included in the study. Demographical profile was recorded with focused clinical examination and relevant investigation with lipid profile was done.

Results: Among the study population of 300 individuals, 201 (67%) were males and 99 (33%) were females. The mean age among male patients was 61.3 ± 11.7 years and in female patients the mean age was 65.6 ± 11.20 years. 68.8% of females presented after 60 yrs of age. Dyslipidemia was the commonest risk factor followed by hypertension and obesity. 12.2% of female patients were smokers. Chest pain was the commonest presenting symptom seen in 82% cases. There was mean delay of 31.0 ± 54.5 hrs in the presentation of females for treatment. ST Elevated Myocardial Infarction occurred less frequently in females.

Conclusions: Acute coronary syndrome is more age dependent in females. The predominance of dyslipidemia, hypertension and obesity as risk factors gives a message for primary care physicians to create awareness for the prevention of Acute Coronary Syndrome. The atypical symptoms should be recognised early which should further prevent the delay in presentation.

Keywords: Acute coronary syndrome, Sub-Himalayan, Women, Atypical, Delay

INTRODUCTION

Cardiovascular Disease has so far accounted for nearly half of all deaths in the developed world and 25 percent of deaths in the developing countries. By 2020 it has been projected that there will be an increase by almost 75 percent in the global CVD.¹

CVD has assumed epidemic proportions in India. These epidemics are driven by socioeconomic changes that have profound effects on life style. Urbanization,

Industrialization and especially globalization propelled developing countries into the worldwide epidemic of CVD. There is a strong positive correlation in the increase in CHD in India with risk factors like diabetes, hypertension, dyslipidemia, metabolic syndrome, smoking and sedentary lifestyle.²

The conventional risk factors can be modifiable and non-modifiable. Age and gender are non modifiable risk factors for coronary artery disease. Heart diseases are far more age dependent in women than in men.

It is known that distinct gender differences exist in terms of presentation of symptoms, validity of diagnostic tests, drug side effects, and complications. Women have their first cardiac event 6 to 10 years later than men do. With respect to cardiac risk factors women have higher rates of diabetes and hypertension but are less frequently smokers.

Dr. Rajendra Prasad Government Medical College (RPGMC) is situated in district Kangra of hill state of Himachal Pradesh. It is the only major referral hospital in this part of the state serving to 7 districts comprising of 60% of the state population mainly of rural background (Fig 1). RPGMC serves to inhabited areas ranging from 600-4000 meters above sea level. The study was designed to evaluate whether the clinical profile along with risk factors of acute coronary syndrome is different in females as compared to males in the hilly state where the female to male ratio is 9:10 and where the females contributes predominantly in the agricultural work.



Figure 1: Map of Himachal Pradesh with black marked area served by RPGMC, Tanda.

METHODS

The study was carried out in 300 consecutive patients of acute coronary syndrome admitted in the Department of Medicine, Dr Rajendra Prasad Medical College, Kangra at Tanda. The study was approved by the ethical committee of the institute.

Demographic profile of the patients was recorded which included age, sex, place of residence. History regarding smoking, diabetes, hypertension, prior coronary artery disease (CAD) and family history of CAD was also elicited.

Focused examination was carried out to record blood pressure, heart rate, BMI, waist circumference and signs of heart failure.

12 lead ECG was recorded in each patient at admission. Heart rate, rhythm, ST segment, T wave changes, Q waves, conduction disturbances and arrhythmia were recorded. Enzyme analysis (Troponin T) was done in selected patients as required.

Biochemical investigations, Blood Sugar level (RBS, FBS), Lipid profile, and HbA1C, were done within 24 hours of hospital admission. The biochemical parameters were done at R.P.G.M.C. by Erba Mannheim XL-300 fully automatic analyzer.

Random Blood Sugar (RBS) was taken at the time of presentation. Fasting Blood Sugar (FBS) was taken after 8 hrs overnight fast.

Lipid profile: Blood sample was collected at the time of presentation and serum centrifuged at 3000 rpm for 5 minutes, stored at 2-8°C and processed within 24 Hr.

Smokers were defined as those who had ever smoked more than 100 cigarettes or beedis in their life time and had smoked at least one cigarette/beedi per day for last three months. Obesity was determined on the basis of BMI of the patient, measured by the formula: $BMI = \text{Weight (kg)}/\text{Height (meter)}^2$

Visceral obesity was defined according to IDF criteria as waist circumference ≥ 90 cm in men and ≥ 80 cm in women. Dyslipidemia was defined as presence of any of the following³:

1. Total cholesterol >200 mg/dl.
2. Triglycerides >150 mg/dl.
3. Patients with LDL ≥ 130 mg/dl.
4. HDL < 40 mg/dl
5. Patients on lipid lowering drugs.

The data was further analysed to evaluate difference of clinical profile and risk factors related to gender differences.

Statistical Analysis

Data collected was managed on a Microsoft excel spreadsheet. 'Chi-Square test' and 'independent t test' was used as and when required. All analysis was performed with the SPSS 18.0.0 software.

RESULTS

In the present study, data regarding clinical presentation and risk factors in 300 patients with Acute Coronary Syndrome admitted at Dr R.P.G.M.C. Kangra (Tanda) was analysed in reference to gender.

The mean age of patients in the study was 62.71 ± 11.72 years. Among the study population, 201 (67%) were males and 99 (33%) were females.

The mean age among male patients was 61.3 ± 11.7 years and in female patients, the mean age was 65.6 ± 11.20

years. The difference was statistically significant (p=0.03). The distribution of age is depicted in Table 1. Elderly (>60 years) constituted 53.23% and 68.68% among males and females respectively. The difference was statistically significant (p=0.03) as shown in Table 1.

Among male patients, 135 (67.16%) had history of smoking which was significantly higher when compared to the number of smokers among female patients (N=12,

12.12%). The difference was statistically significant (p < 0.00).

Among the male patients, 26 (12.93%) and among the female patients, 17 (17.17%) were diabetics. The difference was not statistically significant (p=0.33). The mean RBS was 153.6±86.5 vs 144.2±79.6 mg/dl. The difference was not statistically significant (p=0.81).

Table 1: Age-wise distribution in males and females.

Variable	Females (N=99)	Males (N=201)	Chi-Square	p Value
Age (Years)	≤40	2(02.02%)	6.76	0.03
	41-60	29(29.29%)		
	>60	68(68.68%)		

Table 2: Risk factors: Males (N=201) vs Females (N=99).

Risk Factors	Female (N=99)	Male (N=201)	Odds Ratio	95% CI	p value
Smokers	12(12.12%)	135(67.16%)	14.0	7.6,29.0	0.00
Sedentary Life style	9(9.09%)	56(27.86%)	0.26	0.12,0.55	0.00
Established cad	18(18.18%)	37(18.40%)	1.01	0.5,1.9	0.96
Diabetes	17(17.17%)	26(12.93%)	0.72	0.37,1.39	0.33
Hypertension	43(43.43%)	44(21.89%)	0.37	0.22,0.61	0.00
Family History	7(7.07%)	16(7.96%)	1.14	0.50,2.86	0.79
Obesity	43(43.43%)	113(56.21%)	1.67	1.0,2.7	0.04
Dyslipidemia	76(76.76%)	156(77.61%)	1.02	0.5,1.9	.97
Metabolic syndrome	59(59.59%)	58(28.85%)	0.28	0.17,0.46	0.00

Among the male patients, 44(21.89%) had hypertension while 43 (43.43%) patients had hypertension among females. The difference was statistically significant (p=0.00).

The number of patients with obesity among males and females were 113 (56.21%) and 43 (43.43%) respectively. The difference was statistically significant (p=0.04).

In male patients, 156 (77.61%) had dyslipidemia and in the females, 76 (76.76%) patients had dyslipidemia. The difference was not statistically significant (p < 0.97). The mean total cholesterol among the two groups was 180.8±43.8 vs 182.3±52.5 mg/dl (p=0.68). The mean total triglyceride, HDL cholesterol and LDL cholesterol levels among the two groups were, 95.5±33.4 vs 98.9±43.5 mg/dl [the difference was not statistically significant (p=0.97)], 43.2±11.7 vs 43.3±9.4 mg/dl [the difference was not statistically significant (p =0.45)], and 151.9±70.1 vs 148.3±68.4 mg/dl respectively [the difference was statistically significant (p=0.03)].

58 (28.85%) male vs 59 (59.59%) females had metabolic syndrome. The difference was statistically significant (p=0.00).

The symptom profile among the two groups of patients, male and females was as follows: chest pain 170 (84.57%) vs 82(82.82%). [The difference was not statistically significant (p=0.70)], shortness of breath 104 (51.74%) vs 62 (62.62%) (p=0.08), vomiting 84 (41.70%) vs 51 (51.51%) [The difference was not statistically significant (p=0.11)], sweating 155 (77.11%) vs 70 (70.70%) [The difference was not statistically significant (p=0.23)], presyncope 39 (19.40%) vs 26 (26.26%) [The difference was not statistically significant (p=0.14)], syncope 9 (4.47%) vs 1(1.01%) (p=0.59) and palpitation 44 (21.89%) vs 36 (36.36%) respectively [The difference was statistically significant (p=0.01)]. PND and Orthopnea was present in 13 (6.46%) and 23 (11.44%) males and 6 (6.06%), 11 (11.11%) female. The difference was not statistically significant as shown in Fig 2.

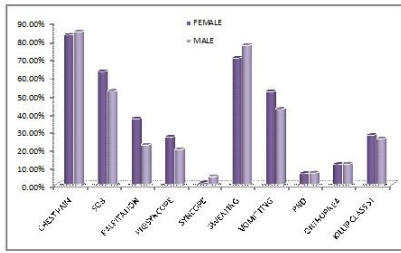


Figure 2: Clinical profile: Males Vs Females.

The time from symptom onset to the presentation in male was 20.2±32 and in female was 31.0± 54.5 hours. The difference was not statistically significant. (P=0.62) The mean heart rate, among male patients was 93, mean systolic blood pressure, mean diastolic blood pressure is depicted in Table 3.

In males, 87 (43.28%) had STEMI compared to 31 (31.31%) females with STEMI [the difference was statistically significant (p=0.01)], while the diagnosis of UA and NSTEMI was made in 22.38% vs 25.25% [the difference was not statistically significant (p=0.22)] and 34.32% and 43.43% [the difference was not statistically significant (p=0.13)] respectively among males and females. Among patients with STEMI, AAWMI was the most common type in both, males and females, 67.16% and 68.68% respectively. The difference was not statistically significant (p=0.74).

Among male patients, 18.40% and among females 15.15% (p=0.48) had AV conduction abnormalities while 2.48% vs 4.04% had rhythm disturbances. The difference was not statistically significant (p=0.46) as shown in Fig 3.

Table 3: Baseline characteristics: Males Vs Females.

Variable	MEAN±S.D		t	p value
	Females (N=99)	Males (N=201)		
AGE (Years)	65.6±11.2	61.3±11.7	2.17	0.03
Time from symptom onset to Presentation (Hours)	31.0±54.5	20.2±32.0	0.50	0.62
Heart Rate (Beats per minute)	87.5±10.3	93.6±11.0	0.69	0.49
Systolic Blood Pressure (mmHg)	125.2±32.2	122.6±30.7	0.11	0.91
Diastolic Blood Pressure (mmHg)	79.6±17.9	79.4±17.2	-4.67	0.73
Waist Circumference (cm)	85.9±18.9	84.7±21.2	-0.90	0.37
Random Blood Sugar (mg/dl)	144.2±79.6	153.6±86.5	0.25	0.81
Total Cholesterol (mg/dl)	182.3±52.5	180.8±43.8	-0.42	0.68
LDL Cholesterol (mg/dl)	98.9±43.5	95.5±33.4	0.04	0.97
HDL Cholesterol (mg/dl)	43.3±9.4	43.2±11.7	0.75	0.45
Triglycerides (mg/dl)	148.3±68.4	151.9±70.1	2.17	0.03

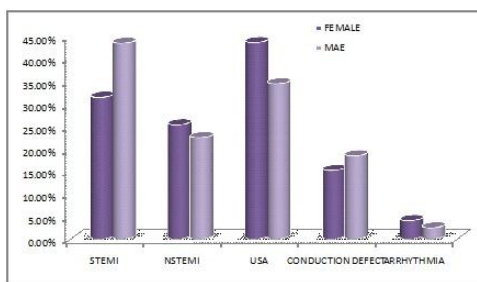


Figure 3: Spectrum of acute coronary syndrome and rhythm disturbances in males and females.

DISCUSSION

In this study there was preponderance of males. The female patients were older on presentation as compared to males. The same observation is made by K Praveen et

al,⁴ Hochmann et al,⁵ Dragana Radovanovic et al⁶ and Andra L. Blomkalns et al⁷ in their studies.

The frequency of smoking among female patients was significantly low when compared to males (12.12% vs 67.16%) which is at par with other studies by Hochmann et al.⁵

The frequency of diabetes (17.17% vs 12.93%), hypertension (43.43% vs 21.89%), and metabolic syndrome (59.59% vs 28.85%) was significantly high in females when compared to males. Dyslipidemia (76.76% vs 77.61%), obesity (43.43% vs 56.21%) was more common in males. Hochmann et al⁵ made similar observation among female patients with Acute Coronary Syndrome. In the study by Dragana Radovanovic et al⁶ the frequency of diabetes and hypertension was high among female patients (23.7% vs 18.7% and 65.2% vs

51.7% respectively). Andra L Blomkalns et al.⁷ K Praveen et al⁴ and V Jacob Jose et al⁸ also found that the frequency of diabetes and hypertension was significantly high in the female patients.

Chest pain was the most common presenting symptom in both the groups. Atypical symptoms were more common in females (17.17% vs 15.42%). In our study breathlessness (62.62% vs 51.74%), palpitations (36.36% vs 21.89%), vomiting (51.51% vs 41.70%) were the atypical symptoms which were more commonly seen in females. N. Ganeshan et al⁹ found that women presented more commonly with atypical symptoms. In the study by Dragana Radovanovic et al⁶ chest pain was present in 79.7% females as compared to 82.3% males and dyspepsia in 31.7% vs 23%.

In this study more females had Killip Class >I at presentation (27.27% vs 25.37%). In the study by Dragana Radovanovic et al⁶ (30.4% vs 22%) and Hochmann et al⁵ more females than males had Killip Class > I at presentation. In the study by V Jacob Jose et al,⁸ 48% females had Killip Class > I as compared to 40% males.

In our study, fewer women than men presented with STEMI (31.31% vs 43.28%). In the study by Hochmann et al,⁵ 27.2% women presented with STEMI as compared to 37% men.

There was no significant difference in the mean duration of prehospital delay between men and women. In STEMI in our study, the most common location of infarct was anterior wall (57.64%) followed by inferior wall (38.13%). In a study by V Jacob Jose et al,⁸ AAMI (57%) was also the commonest type followed by IWMI (39.1%). Jose and Gupta¹⁰ has reported AAMI in 57%, IWMI in 39.1% and study by Kumar et al¹¹ most common type of MI in women was AAMI.

CONCLUSION

In our study the analysis of the demographic profile in female patients revealed that the mean age of presentation was higher in females. The analysis of risk factors showed that dyslipidemia was the most common abnormality followed by hypertension and obesity. The prevalence of hypertension in females was significantly low as compared to males.

Chest pain was the most common presenting complaint. AAMI was the most common type. The prehospital delay in females was longer than the males which may be due to misinterpretation of symptoms and ignoring attitude towards symptoms in females.

It is concluded that these findings needs to be brought in the notice of Primary care physicians for prevention of acute coronary syndrome.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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