CLINICAL SPECTRUM AND RISK FACTOR PROFILE OF ACUTE CORONARY SYNDROME-AN EXPERIENCE FROM A TERTIARY CARE HOSPITAL OF TRIPURA

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ABSTRACT

BACKGROUND

Cardiovascular diseases (CVD) are major global health problem and reaching epidemic proportions in the Indian subcontinent and low and middle income countries, accounting for 78% of all deaths.

The clinical spectrum, the age and gender-specific differences and the mortality rate in patients with ACS are not systematically studied in Tripura. In this background, a prospective cross sectional study was performed at Tripura Medical College and Dr. BRAM Teaching Hospital.

RESULTS

A total of 100 patients studied, out of which 75 were male and 25 were female. Mean age at presentation was 63.12±14.10 years. Cigarette smoking, dyslipidemia, obesity were the major risk factors. The prevalence of Hypertension, Diabetes mellitus, smoking, obesity, dyslipidemia and family history of CAD were 53%, 24%, 50%, 43%, 69% and 4% respectively. A significant number of patients (45%) presented late to the hospital after 6 hours' time.

CONCLUSION

STEMI is the major type of ACS prevalent in our region. The awareness of coronary artery disease in the study population appears to be low. Our study also reinforces the need to address the traditional risk factors to prevent the disease burden.

KEYWORDS

Clinical Spectrum of ACS, Tripura.

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INTRODUCTION: Cardiovascular diseases (CVD) are major global health problem and reaching epidemic proportions in the Indian subcontinent and low and middle income countries, accounting for 78% of all deaths. Coronary artery disease (CAD) is the leading cause of mortality and morbidity in the world and acute coronary syndromes (ACS), which encompass unstable angina (UA), non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI), are the commonest causes of mortality in patients with CAD. With the introduction of a huge armamentarium of invasive and non-invasive therapeutic strategies, the mortality related to ACS has significantly reduced in the developed world over the past 20 years.[1,2,3,4,5,6] But the mortality remains high among Indians.[7,8,9,10,11,12]

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CAD occurs in Indians 5–10 years earlier than in other populations around the world and the major effect of this peculiar phenomenon is on the productive workforce of the country aged 35–65 years.[13]

The prevalence of CAD and the incidence of ACS also are very high among Indians. [7, 9, 11, 12, 13] India has the highest burden of ACS in the world. [12]

The health status of North-East Indian population differs from that of other Indian states owing to lower distribution of its healthcare manpower among rural and urban areas, and paucity healthcare institutions. The clinical spectrum, the age and gender-specific differences and the mortality rate in patients with ACS are not systematically studied in Tripura. In this background, this study was performed using the data extracted from the case records of patients treated with ACS between May 2013 and August 2015 in the Department of Medicine of Tripura Medical College and Dr. B. R. Ambedkar Teaching Hospital.

AIM AND OBJECTIVES: To study the clinical characteristics and profile of risk factors in patients of acute coronary syndrome admitted at Tripura Medical College.

MATERIALS AND METHODS: Tripura is one of the 8 states of North Eastern region situated in India comprising of 8 districts with a total population of 4.4 million people, amongst which 30% belongs to tribal population. The study was conducted at Tripura Medical College and Dr. BRAM Teaching Hospital, Agartala, as a prospective cross sectional study.

Sample size has been determined after evaluating number of patients admitted with ACS in last 2 years in our hospital. A total of 100 subjects will be studied after proper informed consent.

Diagnosis of acute coronary syndrome is made based on the American College of Cardiology and European Society of Cardiology guidelines for acute MI.

INCLUSION AND EXCLUSION CRITERIA:

Inclusion Criteria:

1. Patient above 18 years of age
2. Having acute coronary syndromes including unstable angina, STEMI and NSTEMI enrolled as per ESC, ACCF, AHA, third universal definition of MI, 2012.

Exclusion Criteria:

1. Diagnosis of ACS not confirmed.
2. Subjects not willing to give consent.
3. Patients discharged before completion of the treatment or lost in follow up;

At the time of admission, a detailed clinical history, including duration of presenting complaints, risk factors, family history and clinical examination with special reference to cardiovascular system was conducted. Various anthropometric measurements (including weight, BMI, waist circumference, and hip circumference) are done and details of ECG are recorded. Height was measured to the nearest of 0.1cm with standard steadiometer and weight in light clothing to nearest to 0.1 kg with a portable standardised weighing machine. Waist circumference was measured midway between the lowest costal margin and the iliac crest and hip circumference was measured at the level of greater trochanter of femur by using standardised non elastic measuring tape and thus waist to hip ratio was calculated. Standard anatomical landmarks and appropriate methodologies were followed in recording anthropometric measurements. Body mass index (BMI) was calculated by dividing body weight in kilograms by the square of height in metres (Kg/M^2) to estimate obesity. World Health Organization (WHO) has redefined overweight ($BMI \geq 23 kg/m^2$) and obesity ($BMI \geq 25 kg/m^2$) for South Asians,[8] based on the preliminary data, which are under debate.[9] Blood pressure was recorded in sitting position from the right arm with a standardised aneroid sphygmomanometer. Two readings were taken 5 minutes apart and the mean of the two readings was taken as the final blood pressure record.

Blood sample will be collected on admission for routine parameters like Haemoglobin (Hb), Total Count (TC), Differential Count (DC), Serum electrolytes, Urea, Creatinine. Fasting Blood sample will be drawn on the day following admission for estimation of blood sugar and serum lipids. Serum cholesterol, high-density lipoprotein (HDL)-cholesterol, and triglyceride levels were measured by the enzymatic method, blood glucose assessed by oxidase- peroxidase colorimetric technique, sodium-potassium by automated analyser, haemoglobin by cyan-met method, Urea and creatinine analysed by Jaffe's method.

Patients will also be assessed for presence of Metabolic Syndrome, diagnosed as per modified ATP III criteria (at least 3/5 features). The criteria included are waist circumference ≥90 cm in males and ≥80 in females, serum HDL-C≤40 for males, and ≤50 for females, serum TG≥150 mg/dl, blood pressure ≥130/≥85 mmHg, fasting blood glucose ≥110mg/dl. Only criteria for waist circumference is modified as per IDF guidelines for South East Asian Region.

STATISTICAL ANALYSIS: Statistical analysis was performed using the Microsoft excel office 2016 and IBM SPSS software for windows version 22. Categorical variables were compared by chi square test and the continuous variables are presented as mean (+/-SD) and were compared by unpaired t test. Odd's ratios were calculated and presented wherever necessary. A probability value of <0.05 at 95% confidence interval (CI) was considered significant.

RESULTS: In our study, a total of 100 cases were studied out of which 75 were males and 25 were females. As per AHA Acute Coronary Syndrome criteria, 33% had NSTEMI, 57% had STEMI and 10% had unstable angina. Gender wise distribution of ACS showed that among males, 34.67% had NSTEMI, 54.67% had STEMI and 10.67% had UA, whereas among the females, 28% had NSTEMI, 64% had STEMI and 8% had UA. (Figure 1)

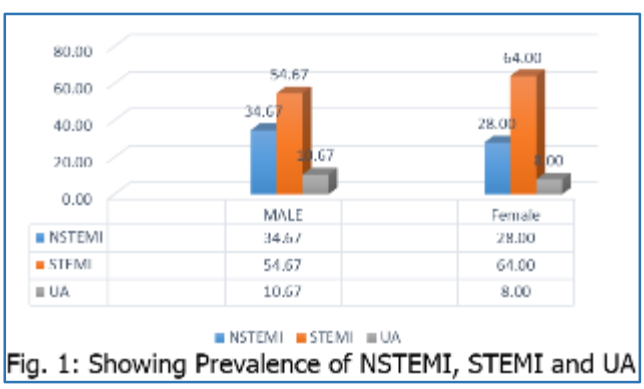
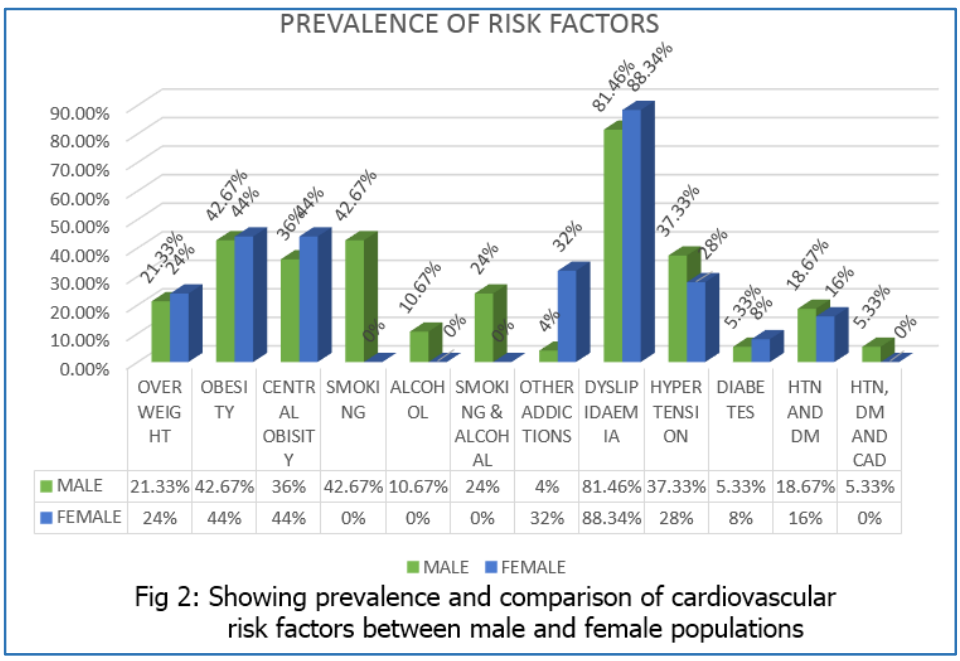


Fig. 1: Showing Prevalence of NSTEMI, STEMI and UA

Among our study population, 94% were Hindus, 5% were Muslim and 1% were Christian by religion. Racial variation shows 89% of patients belonging to ethnic Bengali and 11% belonging to aboriginal tribes.

Out of total number of ACS patients, only 6 patients (6%) were of age below 40 years. Age distribution shows that among 33 NSTEMI patients, 3patients (9.09%) were of age less than 40 years, 11 patients (33.33%) patients were between 40 and 60 years and 19 patients (57.58%)

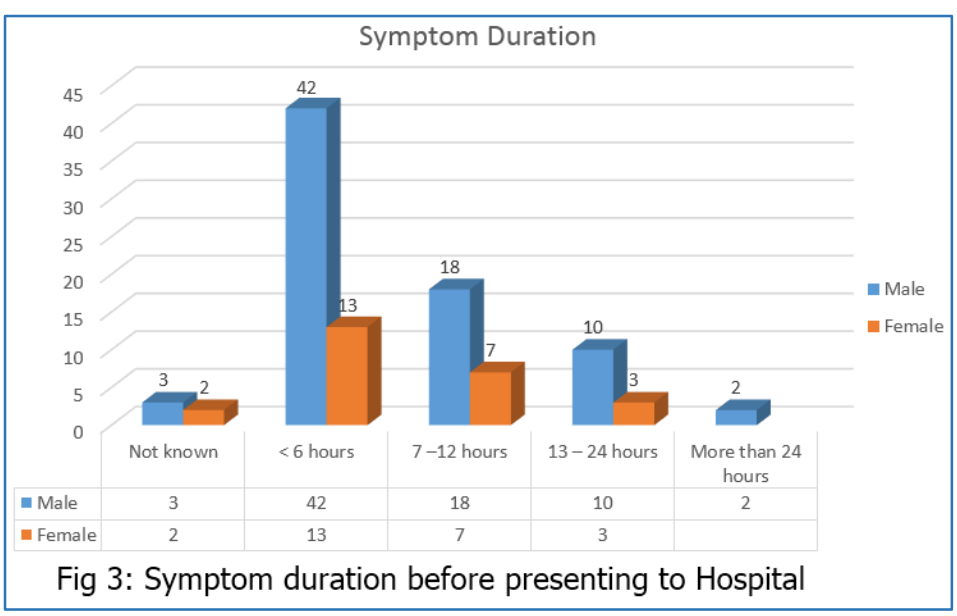
were 60 years and above. Data on STEMI shows that out of 57 patients of STEMI, 5 patients (8.77%) were of age less than 40 years, 24 patients (42.11%) belonged to age group 40- 60 years and 28 patients (49.12%) were above the age of 60 years. Out of 10 UA patients, 1 patient (10%) was below 40 years, 3 patients (30%) were between 40 to 60 years and 6 patients (60%) were 60 years and above. Out of 75 male patients, 32 patients (42.67%) were smokers, 8 patients (10.67%) were addicted to alcohol, and 18 patients (24%) were addicted to both smoking and alcohol. Out of 25 female patients, none had any kind of addiction.42.6% of the male patients and 44% of the female patients were obese individuals. Among the males, 28 patients (37.33%) were hypertensive, 4 patients (5.33%) were diabetic, 14 patients (18.67%) had both hypertension and diabetes, and 4 patients (5.33%) had multiple risk factors. Among the females, 7 (28%) were hypertensive, 2 patients (8%) were diabetic and 4 patents (16%) had both hypertension and diabetes. Out of 75 males, 27 patients (36%) had central obesity and out of 25 females, 11 patients (44%) had central obesity. (Figure 2).



	OVERWEIGHT	OBESITY	CENTRAL OBISITY	SMOKING	ALCOHOL	SMOKING & ALCOHAL	OTHER ADDICTIONS	DYSLIPIDAEMIA	HYPERTENSION	DIABETES	HTN AND DM	HTN, DM AND CAD
MALE	21.33%	42.67%	36%	42.67%	10.67%	24%	4%	81.46%	37.33%	5.33%	18.67%	5.33%
FEMALE	24%	44%	44%	0%	0%	0%	32%	88.34%	28%	8%	16%	0%

Fig 2: Showing prevalence and comparison of cardiovascular risk factors between male and female populations

The physical and biochemical profile comparison between male and female patients are depicted in Table 1. The duration of chest pain on presentation of studied population showed only 55% of patients reached hospital within 6 hours of onset of chest pain. (Figure 3)



	Not known	< 6 hours	7 –12 hours	13 – 24 hours	More than 24 hours
Male	3	42	18	10	2
Female	2	13	7	3	

Fig 3: Symptom duration before presenting to Hospital

Charecteristics	Male mean±sd	Female mean±sd	p value
Age	60.173±13.756	71.96±11.3486	<0.001
BMI	24.1659±3.12781	25.1288±3.29755	0.19
WHR	0.87±0.066	0.85±0.076	0.09
SBP	145.63±15.97	146.72±22.88	0.79
DBP	89.73±12.54	88.16±13.59	0.59
FBS	113.09±29.86	108.6±24.65	0.49
Total Cholesterol	**212.55±40.97**	**202.28±39.28**	**0.28**
LDL	142.53±29.03	136.04±28.14	0.33
HDL	30.88±8.53	30.16±7.83	0.71

Table 1: Showing comparison of Physical and Biochemical profile between male and female population

Statistically significant at p <0.05 at 95% CI.

Variables		Total (n) n=100	Male n=75	Female n=25	P Value
Mean Age		63.12±14.10(SD)	60.17±13.76(SD)	71.96±11.35(SD)	<0.01(S)
Age Group	<40 years	6	6	0	<0.05(S)
	41-60 years	37	31	6	<0.01(S)
	>60 years	57	38	19	<0.05(S)
Smoking History		50	50	0	<0.01(S)
Hypertension		53	42	11	<0.01(S)
Diabetes Mellitus		24	18	6	<0.05(S)
Dyslipidaemia		69	52	17	<0.01(S)
Family H/O CAD		4	4	0	Not Significant
Obesity		43	32	11	<0.01(S)

Table 2: Showing gender wise comparison of risk factor prevalence

Statistically significant at p <0.05 at 95% CI.

Variables		NSTEMI	STEMI	Unstable Angina	p Value
ACS events		33	57	10	<0.01 (S)
Age Group	≤40 years	1	4	3	0.223(NS)
	41-60 years	13	22	2	<0.01
	>60 years	19	31	7	<0.05
Male		26(78.8%)	41(71.9%)	8(80%)	<0.01
Female		7(21.2%)	16(28.1%)	2(20%)	<0.05
Smoking		13(39.4%)	33(57.9%)	4(40%)	<0.01
Alcoholism		10(30.3%)	15(26.3%)	1(10%)	<0.05
Hypertension		14(14.4%)	35(61.4%)	4(40%)	<0.05
Diabetes Mellitus		9(27.3%)	15(26.3%)	0(0%)	0.221(NS)
Dyslipidemia		20(60.6%)	45(78.9%)	4(40%)	<0.01

Table 3: Showing comparison on demography, risk factors and the type of ACS

Statistically significant at p <0.05 at 95% CI.

Table 2 depicts that there is significant difference in age of occurrence of ACS events between male and female subjects with females having occurrence at an older age as compared to males (p <0.001). It was also observed that the male patients experienced symptoms significantly more than females before presenting to hospital for management if chest discomfort was less than 12 hours duration (p <0.05).

In all the age groups, males have a higher preponderance of ACS events and prevalence is also significantly more in males in all the socioeconomic classes except the lower class.

History of alcoholism and smoking is significantly higher in males and hypertension (p <0.01), diabetes (p <0.05) and dyslipidaemia (p <0.01) are also significantly more prevalent in males.

As far as nutritional status is concerned, males have significantly more prevalence of overweight and obese individuals ($p< 0.05$) than females.

It was seen that STEMI was significantly more prevalent in the study population ($p <0.01$) and both males and females are significantly more prone to develop STEMI than NSTEMI or UA ($p <0.01$ and $p <0.05$ respectively). In all age groups, STEMI is more prevalent than NSTEMI or UA ($p <0.01$) except in individuals less than 40 years of age.

Patients with hypertension are more prone to develop STEMI ($p <0.01$) but this preponderance is not found in diabetic patients. STEMI is also more prevalent in dyslipidaemic patients ($p<0.01$). Obese individuals are also more likely to develop STEMI than NSTEMI or UA ($p <0.01$). (Table 3)

DISCUSSION: Epidemiological studies have revealed that the prevalence of CAD is increasing along with the rising prevalence of conventional risk factors for CAD in India. Present health transition from predominance of infections to the preponderance of cardiovascular disorders, such as hypertension, diabetes, and CAD is now responsible for 53% of all deaths.[14,15] Indians have one of the highest rates of heart disease in the world. The disease also tends to be more aggressive and manifests at a younger age.[16] We noticed in our study that in 6% patients were young ie less than 40 years of age, however, as such the mean age of presentation was 60.92±14.81 years which is comparable to other studies done in India, that is, namely the CREATE registry (56±13 years) and study by Jose and et al (57±12 years) but lower than the western population as in COURAGE trial 62±5 years conducted in USA, study by Hochman et al.[17] (69years), and Chang et al. (73years).[18] The skewed gender distribution males 75% versus females 25% of the study population can be attributed to the gender bias and atypical presentation, which is also a feature in INTERHEART study and its South Asian cohort (overall male, 76% and South Asian cohort, 85%).[19] The most common presentation among ACS patients is STEMI in comparison to UA or NSTEMI. Hypertension is a conventional risk factor implicated in CAD. In our study 53% patients were hypertensive. The prevalence of hypertension in South Asian cohort of INTERHEART study (31.1%) is comparatively lower than in our study. The higher prevalence of diabetes and hypertension in this region could explain the comparative higher development and increasing epidemic of CAD.[20]

Tobacco smoking is a known modifiable risk factor for CAD. In our study, 50% patients were smoker. Patients who were smoking had more commonly STEMI compared with UA/ NSTEMI. In our study, 33/50 (66%) of smoker patients had STEMI comparable to other studies.[21] The prevalence of obese patients was 43% which is closer to the prevalence seen in South Asian cohort of INTERHEART study (44.2%). ACS in middle-aged men and combination with smoking, the risk of coronary events increases by 5.5 times.[21]

Dyslipidaemia was present in 69% of patients presenting with ACS in our study. Hughes et al. showed an increased relative risk of MI directly with TG and inversely with HDL-C levels in Asian Indians.[22] It was also noted that only 55% of patients of ACS presented to the hospital in less than 6 hours' time, thus minimizing the scope of successful reperfusion and this reflects low level of awareness amongst the patients.

The study limitations include the non-inclusion of factors like detailed dietary habits, exercise frequency which could influence the prevalence of CAD.

CONCLUSION: In spite of the limitations highlighted above, it seems reasonable to draw some conclusion about the emerging profile of the patients presenting with ACS. Amongst the North East Indian population most common sufferers of ACS are adult males. Cigarette smoking and alcohol are the major risk factor. STEMI is the major type of ACS prevalent in the region. The majority of patients presenting with typical symptoms of chest pain are patients of STEMI. Our study also reinforces the well-established facts that obesity is one of the major risk factors in patients with ACS.

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