CASE REPORT INTERNATIONAL JOURNAL OF PURE MEDICAL RESEARCH

Cardiology

KEYWORDS: Acute Coronary Syndrome (ACS), ST Elevated Myocardial Infarction (STEMI), Non ST Segment Elevated Myocardial Infarction (NSTEMI), Percutanious Transluminar Coronary Intervention (PTCI), Coronary Artery Bypass Graft (CABG).

GENDER RELATED DIFFERENCES OF RISK FACTORS AND ANGIOGRAPHIC PROFILE IN PATIENTS WITH ACUTE CORONARY SYNDROME (ACS): *A SINGLE CENTRE STUDY*

Volume-4, Issue-3, March - 2019 ISSN (O): 2618-0774 | ISSN (P): 2618-0766

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Article History
Received: 04.01.2019
Accepted: 29.01.2019
Published: 10.03.2019

ABSTRACT:

OBJECTIVE: The aim of the study was to assess gender related differences of risk factors, clinical biomarker levels (troponin I) and angiographic profile of patients with Acute Coronary Syndrome (ACS).

METHODS: - A single centre prospective cohort study was carried out for a period of one year. A total of 125 patients who underwent angiogram were selected for the study. Data were obtained on demographics, risk factors, angiogram results, troponin I levels and treatment modalities adopted.

RESULTS: - The study showed a significant male predominance (73.6%) with mean age of males, lower as compared to females. 54 (43.2%) male patients & 23 (18.4%) female patients were diagnosed with Non ST Elevated Myocardial Infarction (NSTEMI) whereas STEMI was diagnosed in 38 (30.4%) male & 10 (8%) female patients. Among various risk factors hypertension, diabetes mellitus were higher in women compared to men. Males had higher proportion of smokers (32.6%) which was found to be statistically significant. Single and double vessel diseases were commonly found in men compared to women. Among different treatment modalities women preferred medical treatment more and were not referred for urgent bypass surgery and angioplasty as often as men.

CONCLUSION:- Various risk factors for the development of ACS were identified from this study. This study also helped to explore the relationship between various risk factors, Troponin I levels, angiographic severity and treatment modalities of patients with ACS according to their gender.

INTRODUCTION

Coronary Artery Diseases (CAD) are a major health problem worldwide [1]. Coronary Artery Disease is a condition in which atherosclerotic plaque is formed inside the coronary arteries which blocks the blood flow to the heart. CAD leads to Acute Coronary Syndrome (ACS), it is characterized by sudden reduction of blood flow to the heart due to Myocardial Infarction and/ or Myocardial Ischemia [2]. Symptoms of ACS occur due to the partial or complete blockage of coronary arteries. NSTEMI and UA are the results of partially or intermittent thrombus formation in the coronary artery whereas STEMI is due to the complete occlusion of coronary artery [3]. Prevalence of ACS is very high at younger age in Indians with more extensive modifiable and non modifiable risk factors. Several epidemiological studies have revealed that, incidence of ACS is increasing along with the increase in the number of risk factors [4]. Risk factors for Acute Coronary Syndrome have been very well established. Systemic arterial hypertension, smoking, dyslipidemias, obesity, diabetes mellitus, and family history of ACS are the well established modifiable risk factors. The identification of major risk factors and their control can reduce the incidence of Coronary Artery Disease and further coronary events [5].

In this context, the aim of the study was to identify the gender related differences between cardiovascular risk factors, clinical biomarker levels (troponin I) and angiographic profile of patients with Acute Coronary Syndrome (ACS) who underwent an angiogram.

MATERIALS AND METHODS

This was a prospective observational study conducted in the department of cardiology. 125 patients who were diagnosed with Acute Coronary Syndrome were included by random sampling method. Ethical clearance from the institutional ethical committee and informed consent were taken from the study subjects. Semi structured questionnaire was administered to the patient in order to collect data about socio demographic factors. Clinical characteristics and cardiovascular risk factors were collected from the patient medical records. Data on ACS severity and intervention at the time of diagnosis were collected from the angiogram reports.

Risk profile of each patient was investigated. Diabetes Mellitus (DM) was defined as self reported, or as patients taking oral hypoglycemic drug and/or insulin. Hyper Tension (HT); self reported or as patients on antihypertensive drugs, history of systolic blood pressure more than 140mm or diastolic blood pressure more than90 mmHg. Hyperlipidemia was defined as a history of hyperlipidemia and/or as patients taking lipid lowering drugs. High BMI; people with BMI more 25Kg/m^2. Under the smoking category were included people who were current smokers or left smoking within three months of diagnosis of ACS. Family history; myocardial infarction, or sudden cardiac death in first-degree relatives at age less than 65 years in females and less than 55 age in males. Prior Aspirin use; aspirin therapy at the time of admission. Cardiac Troponin I levels were measured which had a lower detection limit of 0.4ng/dL. Levels of Troponin I in between 0.4ng/dL to 2ng/dL were deemed intermediate and above 2ng/dL considered as high value. Levels were checked at the time of evaluation.

Inclusion criteria specified all patients within the age group of 30-75 yrs, both men and women, with acute coronary syndrome according to the current guidelines, all patients who visit emergency department with classical chest pain, ECG and angiographic changes suggestive of acute coronary syndromes. Patients with STEMI and NSTEMI were included for the study.

Exclusion criteria were those cases with proven non- cardiac chest pain and those who were discharged before completion of the

treatment for any reason were excluded from the analysis. Patients with renal or hepatic failure were excluded. Patients in the status of post renal transplant, pregnant women, brain ischemia and sepsis were excluded from the study because these conditions may alter the troponin value. Patients who were not clinically stable enough for evaluation were excluded from the study.

STATISTICAL ANALYSIS

Statistical analysis was done using Statistical Package for Social Sciences (SPSS 19.0) and Microsoft Excel 2010 Version. Continuous variables were described in mean and standard deviation. Demographic variables, risk factors and clinical characteristics were analyzed in terms of frequency and percentage. The baseline characteristics of patients were described by mean, and standard deviations. Association between demographic, clinical characteristics and cardiovascular risk with gender was carried out using Pearson Chi square test. A probability value (p-value) of < 0.05 was considered as statistically significant.

RESULTS AND DISCUSSION

The purpose of the study was to assess gender related differences of cardio vascular risk factors, clinical biomarker level (Troponin I) and angiographic profile of 125 patients who presented with Acute Coronary Syndrome (ACS) and underwent coronary angiography.

A total of 125 patients were enrolled in this study of which, 92 (73.6%) were males and 33 (26.4%) were females. The majority of the respondents were males, with a male to female ratio 2.8:1. This result was similar from the outcome obtained from other studies [6-11]. Multiple risk factors like smoking and alcoholism would be the reasons behind the incidence of ACS in males [12]. Mean age of the subjects was found to be 61.91 ± 11.32 with a range of 30 to 85 years. Mean age of men and women were found to be 59.76 ± 10.84 and 67.91 ± 10.49. The mean age of female was found to be more compared to men. This may be due to the protective role of female sex hormone estrogen [13]. Similar results were also observed from the study by Stahli et al in 2015 [14]. The majority of patients (n=40) were in the age group 51-60 years, followed 61-70years. Similar result was also observed from other study [15] Distribution of subjects based on their age group is shown in figure I.

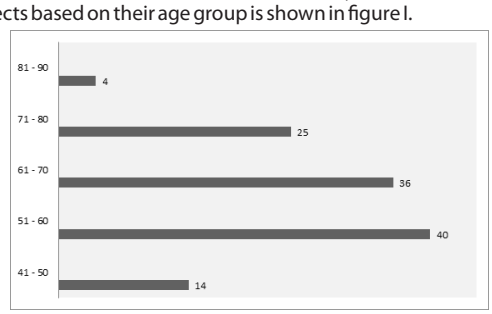

Figure I : Distribution of subjects based on their age group

With respect to the severity of ACS, the majority of patients presented with NSTEMI (61.6%) and 38.4% had STEMI. The result clearly reveals that, incidence rate of STEMI was high in males (30.4%) patients compared to females (8.0%). Chest pain was reported in more than 66% of patients followed by dyspnoea (61%) and sweating (30%). This result was found to be similar from the result obtained from other studies [16]. Socio demographic and clinical characteristics of patients is shown in Table : 1

Baseline characteristics of study population

Variable	Category	Frequency (N)	Percentage (%)
Sex	Male	92	73.6
	Female	33	26.4
Age	30 - 40	6	4.8
	41 – 50	12	9.6
	51 – 60	40	32.0
	61 – 70	38	30.4
	71 – 80	25	20.0
	81 - 90	4	3.2
Risk Factors	Hypertension	67	53.6
	Diabetes Mellitus	62	49.6
	Dyslipedimea	25	20
	Smoking	31	24.8
	High BMI	16	12.8
	Prior Aspirin use	13	10.4
	Prior Angina	24	19.2
	Family History	28	22.4
Troponin Value	High Value	13	10.4
	Intermediate Value	15	12.0
	Low Value	97	77.6
Type of Disease	NSTEMI	77	61.6
	STEMI	48	38.4
Intervention at the Time of Diagnosis	Medical	39	31.2
	PTCI	69	55.2
	CABG	17	13.5
Angiographic severity	Normal	3	2.4
	Mild	7	5.6
	Moderate	20	16
	Single Vessel	44	35.2
	Double vessel	28	22.4
	Triple Vessel	23	18.4

Table: - 1, NSTEMI: Non ST Segment Elevated Myocardial Infarction, STEMI: ST Segment Elevated MI, PTCI: Percutanious Transluminar Coronary Intervension, CABG: Coronary Artery Bipass Graft. BMI: Body Mass Index.

Prevalence of cardio vascular risk factors was high in this study population. Hypertension (67%), Diabetic Mellitus (62%) and smoking (31%) were most commonly associated risk factors in the study population. Hypertension and Diabetes Mellitus were predominantly seen with females compared to males. Of these, hypertension was found to be statistically significant in female patients with ACS in agreement with the study conducted by Taha et al [17]. Smoking was the most common risk factor found to be associated with males that were statistically significant. These result found to be similar from the results obtained from other studies [18-23]. Thirteen percent of male patients had high BMI with equal female (12.12%) prevalence. Family history of ACS was less frequently observed in female patients than in male patients. Other cardiovascular risk factors including Diabetes Mellitus, Dyslipedimia, high BMI, prior aspirin use, angina and family history of ACS was not statistically significant between genders. Distribution of various risk factors by gender is shown in figure: 2.

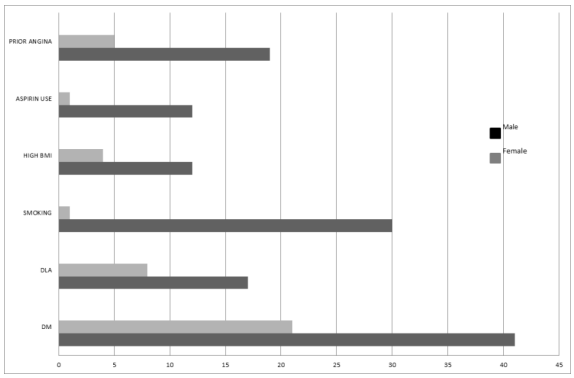

Figure 2: Distribution of risk factor by sex

Low value of Troponin I was most commonly seen in female patients compared to males. High and intermediate value of Troponins was mostly found in male ACS patients. Among various treatment modalities PTCI and CABG were higher in males when compared to females. Percutanious coronary revascularization and bypass surgery was found twice more in males when compared to female patients. During hospitalization, females (57.57%) prefer medical treatment more compared to males (21.7%) that was found to statistically significant.

Association of Clinical Characteristics and Risk factors of patients with Gender

Variable	Category	Male (N=92)	Female (N=33)	χ2 , df	P Value
Risk Factors	Hypertension	44 (47.8)	23 (69.6)	4.671, 1	0.031*
	Diabetes Mellitus	41 (44.5)	21 (63.6)	3.534, 1	0.060
	Dyslipedimea	17 (18.4)	8 (24.24)	0.504, 1	0.478
	Smoking	30 (32.6)	1 (3.0)	11.394,1	0.001**
	High BMI	12 (13.0)	4 (12.12)	0.019, 1	0.892
	Prior Aspirin use	12 (13.0)	1 (3.0)	2.613, 1	0.106
	Prior Angina	19 (20.6)	5 (15.15)	0.474, 1	0.491
	Family History	19 (20.6)	9 (27.27)	0.612, 1	0.432
Troponin Value	High Value	11 (11.9)	2 (6.06)	0.906	0.341
	Intermediate	12 (13.0)	2 (6.06)	1.191	0.271
	Value	68 (73.1)	29 (87.8)	2.725	0.099
	Low Value				
Intervention at the time of Diagnosis	Medical	20 (21.73)	19 (57.57)	14.531	0.000*
	PTCI	57 (61.95)	12 (36.36)	6.433	0.011*
	CABG	15 (16.30)	2 (6.06)	2.169	0.141
Angiographic severity	Normal	2 (2.17)	1 (3.03)	0.076	0.783
	Mild	5 (5.43)	2 (6.06)	0.018	0.893
	Moderate	11 (11.9)	9 (27.27)	4.239	0.039*
	Single Vessel	33 (35.8)	11 (33.33)	0.063	0.794
	Double vessel	24 (26.08)	4 (12.12)	2.725	0.099
	Triple Vessel	17 (18.47)	6 (18.18)	0.001	0.970

Table: - 2, PTCI: Percutanious Transluminar Coronary Intervention, CABG: Coronary Artery Bypass Graft. BMI: Body Mass Index. Pearson's chi – squared test, P < 0.05 (* Significant), df = degree of freedom.

In coronary angiography single vessel disease was more commonly found and it is comparable to a study done by Laudari S et al in 2013 [24] . Single vessel disease (35.8%) is more commonly found in male ACS patients followed by double vessel disease (26.08%). Whereas in female patients, moderate ACS (27.27%) were more common after single vessel disease (33.33%) and was found to be statistically significant.

There was a similar incidence of triple vessel disease in males (18.47%) compared to females (18.18%). But normal epicardial coronary artery (3.03%) and mild occlusion of artery (6.03%) were common in females compared to males. Association of clinical characteristics and risk factors of patients with gender is shown in Table: 2.

This prospective observational study has a few limitations. The key limitation is, it is a single center study conducted in a tertiary care hospital with a relatively small sample size. Hence, the result cannot be generalized. Large multicentre investigations are necessary to confirm our study results.

CONCLUSION

The result of the study explored the gender wise relationship between various risk factors, Troponin levels, angiographic severity and treatment modalities of patients with Acute Coronary Syndrome. The study confirmed that, prevalence of modifiable cardiovascular risk factors were high in ACS patients. Therefore, knowing these risk factor profiles will allow planning and prioritization of interventions associated with reducing the risk of occurrence of further coronary events. In addition it can provide support for proper management of condition, helps in clinical decision making, and also in providing proper pharmaceutical care to the patients.

ACKNOWLEDGEMENT

We would like to acknowledge Doctors and all other staff of department of Cardiology and Cardiac Care Unit (CCU). We would like to thank all the patients who were involved in the study.

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