DIFFERENCES IN ANGIOGRAPHIC CHARACTERISTICS OF YOUNG AND THE ELDERLY PATIENTS UNDERGOING PRIMARY PERCUTANEOUS CORONARY INTERVENTION IN AFIC

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ABSTRACT

Objective: To assess the differences of angiographic features of young and old with STEMI.
Study Design: Descriptive cross sectional study.
Place and Duration of Study: This study was conducted at Department of Cardiology, AFIC & NIHD Rawalpindi from Jan to Aug 2017.
Material and Methods: A total of 602 patients with STEMI who underwent Primary PCI from Jan 2017 to Aug 2017, were included in this study. Two groups were formulated on the basis of age group. Group-A were younger age group with 40 years of age or less. Group-B included patients older than 40 years. They were compared with respect to risk factors and angiographic characteristics.
Results: A total of 602 patients with STEMI under gone primary PCI. Fifty three patients were in group-A while 549 patients were in group-B. Males were predominant in this cohort with 83% and 87% in group-A and B respectively. Family history of premature CAD was predominate in group-A, i.e. About 12 (22.6%) as compared to group-B i.e. 54 (9.9%). The most common infarct related artery was LAD in group-A. Single vessel disease was common in group-A 34 (64.15%) while triple vessel disease was common in group-B 195 (35.6%). There was no mortality in younger group while mortality rate in group was 16 (2.9%).
Conclusion: Single vessel coronary artery disease and anterior wall STEMI was common in younger group. Family history of premature CAD, smoking and dyslipidemia were the associated risk factors in young patients with STEMI.

Keywords: St segment elevation myocardial infarction, Primary percutaneous coronary intervention.

INTRODUCTION

Myocardial infarction (MI) is one of the major causes of morbidity and mortality in Pakistan[1]. It is a disease that is usually found to be prevalent in the elderly, but now a days the incidence is seen to be increasing in the younger population i.e. in patients of age less than 40 years[2]. The recent internationally conducted studies have demonstrated the incidence rates of MI in young ranging between 2% and 10%, based on the local statistics and relevant risk factors[3-5]. Pakistan has a distinct racial cohort with increasing incidence of ischemic heart disease and morbidity associated with it. There is limited established data till date on the frequency and clinical presentation of ischemic cardiac events in young population. Analysis of the clinical characteristics and overall frequency of ST segment elevation MI, can help elaborating the major determinants of risk in this particular age group and how it is distinct from those who present at an older age. The inferences derived from such analysis can lead to formulation of screening and prevention strategies in our population. Therefore, the objective of the current study was to evaluate the frequency and overall clinical as well as angiographic characteristics of young patients presenting with myocardial infarction. It has been observed, that in western countries, a large number of young patients developing ST elevation MI are cocaine and amphetamine addicts and eventually they were found to have normal coronary angiograms[6-9]. In our country, such causes are found to be rare. Despite the before cited difference, there is

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increased frequency of younger patients presenting with ST segment elevation MI in our region[10]. In the presence of distinct predictors of risk in both the societies, a difference in the angiographic and clinical profile is expected.

MATERIAL AND METHODS

This descriptive cross sectional study was conducted at the Department of Cardiology, AFIC/NIHD, Rawalpindi. We included consecutive 602 patients with ST segment elevation Myocardial infarction undergoing PPCI, presented in emergency department from Jan to Aug 2017. All patients (20-90 years) of both gender presented were included in the study. The inclusion criteria was first episode of acute ST segment elevation MI diagnosed on the basis of history of chest pain lasting >30 minutes associated with an ST-elevation of ≥1 mm in ≥2 contiguous leads or new left bundle branch block plus time from symptom-onset to presentation ≤24 hours. Their coronary angiograms followed by Primary PCI were performed in Catheterization Laboratory of AFIC/NIHD between Jan 2017 and Aug 2017 with standard protocol. The patients with a past history of stenting were not included in the study. The recruited patients were segregated in two groups on the grounds of their respective ages. Group-A comprised of patients who were of age 40 or younger, whereas group-B comprised of patients who were more than 40 years of age. Their coronary angiograms were obtained and analyzed. The extent and severity of coronary artery disease was categorized as minor irregularities of the vessel, insignificant disease i.e. stenosis <50% and significant disease i.e. stenosis >50%. Significant disease also included totally occluded vessels. In addition, the disease severity was also described on the basis of the number of diseased vessels, number and type of lesions as defined by the AHA. If more than 50% reduction of vessel diameter was observed in comparison to a normal vessel, the vessel was declared to be diseased. The comparison of the two groups was done on the basis of their gender, presence of co-morbids such as diabetes and hypertension, obesity, dyslipidemia, family history of ischemic heart disease, smoking, and angiographic characteristic of coronary artery disease. Myocardial infarction was defined according to the third universal definition of myocardial infarction[11].

The relevant data were collected on a structured proforma. Procedural data was

Table-I: Clinical Characteristics of study population.

Characteristics	GROUP-A Stemi in younger ≤40 years (n=53) (8.8%)	GROUP-B Stemi in older >40 years (n=549) (92.2%)	*p*-value
Age	34.46 ± 4.4	63.17 ± 8.65	
Gender			
Male	44 (83.0%)	477 (87.0%)	0.473
Female	9 (17.0%)	72 (13.0%)	
CO MORBIDS			
Hypertension	8 (15.09%)	148 (26.95%)	0.05
Diabetes mellitus	4 (6.6%)	93 (17%)	0.07
Smoking	28 (52.8%)	193 (35.15%)	0.01
Family history of CAD	12 (22.6%)	54 (9.9%)	0.004
BMI	29.7 ± 6.1	29.1 ± 5.8	0.6
HTN+DM	1 (3.5%)	53 (9.6%)	0.05
Dyslipidemia			
Low HDL levels	31 (58.49%)	236 (42.98%)	0.03
High Cholesterol	20 (37.77%)	289 (52.64%)	

assessed from the database at the time of the PPCI, and hospital outcomes was be assessed from chart reviews in the previous records. Risk factors were obtained from reviews of medical records and telephone contact.

Data Analysis

Statistical analysis was performed using statistical software SPSS version 23. Mean and standard deviation was calculated for continuous variable while Categorical variables were expressed as frequencies and percentages. Statistical analysis were performed with chi square tests for dichotomous data and independent t-tests for continuous data. For all statistical analyses a *p*-value <0.05 was considered significant. Data analysis was performed using SPSS-23. Associations were calculated applying chi-square test.

RESULTS

Clinical characteristics of the patients are given in table-I. A total of 602 patients were included in our study (table-I). Mean ± SD age of the patients was 34.46 ± -4.4 years in younger group and 63.17 ± -8.65 in older group. Fifty three patients were in younger age group while 549 patients were more than 40 years of age. About 44 (83%) vs. 477 (87%) were male and 9 (17%) vs 72 (13%) were female in the younger and older age group respectively. In group-A, 8 (15.09%) patients were hypertensive and 4 (6.6%) were diabetic, while only 1 (3.5%) was both diabetic and hypertensive. In group-B, 174 (31%) patients were hypertensive and 93 (17%) were diabetic while 53 (9.6%) were both hypertensive and diabetic. Rate of Smoking and dyslipidemia 28 (52.8%) vs 193 (35.15%, and 29 (54.71% vs 340

Table-II: Comparison of angiographic characteristics of the two groups.

Characteristics		GROUP-A Stemi in younger ≤40 years (n=53) (8.8%)	GROUP-B Stemi in older >40 years (n=549) (92.2%)	*p*-value
Infarct Related artery	LMS	0(0%)	8 (1.4%)	0.005
	LAD	36 (67.92%)	307 (55.7%)	
	RCA	13 (24.5%)	197 (35.8%)	
	LCX	4 (7.5%)	36 (6.5%)	
	Recanalized	2 (3.7%)		
Number of vessels involved	No vessel involved	2 (3.7%)	0 (0%)	<0.0001
	SVCAD	34 (64.15%)	160 (29%)	
	DVCAD	14 (26.41%)	194 (35.3)	
	TVCAD	5 (9.43%)	195 (35.6%)	
Target lesionLength (mm)	LAD	30 ± 6.5	33 ± 9.5	0.08
	RCA	28 ± 10	33 ± 8.5	
Number of lesions	None	2 (3.7%)	0	
	One	30 (56.6%)	60 (11%)	
	Two	10 (18.86%)	211 (38.43%)	<0.0001
	Three	6 (11.3%)	157 (28.59%)	
	Four or more	5 (9.4%)	121 (22.04%)	
Thrombus aspiration		2 (3.5%)	29 (5.14%)	0.59
Access site	Radial	53 (100%)	545 (99.4)	0.75
	Femoral	0 (0%)	4 (0.6%)	
Types of stent				
	DES	51 (96.22%)	449 (81.7%)	
	BMS	0	88(16.02%)	

(61.93%) were high in both group-A and group-B respectively and both are statistically significant (*p*-value 0.01 and 0.03 for smoking and dyslipidemia). Family history of premature CAD was prominent in group-A 12 (22.6%) as compared to group-B 54 (9.9%). Table-II shows the angiographic characteristics: the most common infarct related artery was LAD although the preponderance was high in Younger age group as compared to older age group 36 (67.92%) vs 307 (55.7%) respectively. Single vessel disease was common in group A 34 (64.15%) while triple vessel disease was common in group-B 195 (35.6%). Significant lesion was defined as when it causes >50% stenosis of vessel. One lesion disease was predominant in group-A (56.6%) while two or more lesion disease was common in group-B patients (table-II). Target lesion length was long in group-B as compared to group-A (33 ± -8.5 vs 30 ± -6.5 mm). Use of thrombuster due to high thrombus burden was statistically in significant in both groups. Radial or ulnar access was used in all patients of group-A and 99.4% patients of group-B. Similarly DES was used in all patients with younger age while in group-B 449 (81.7%) and 88 (16.02%) patients were implanted DES and BMS respectively. Twelve patients needed temporary pace maker due to complete heart block in group-B. There was no mortality during stay in hospital and follow up up to 30 days in younger group while mortality rate in group was 16 (2.9%).

DISCUSSION

Myocardial infarction occurred with acute onset and if it happened in younger age it leads to trauma to the family and increased morbidity. STEMI is one of the leading causes of cardiac mortalities[15], it is important to look into the clinical characteristics and risk factors involved in STEMI among young adults. In western world, myocardial infarction in young with normal coronary angiogram is highly prevalent[12]. However, in our study, the younger patients with STEMI were having many characteristics similar to older patients in quite many respects. In our study 8.8% of the patients were 40 years or younger. This is a slightly high percentage of patients compared to previously published data. Hosseini et al[12] studied patients with acute STEMI aged ≤40 years. Of the total admissions for myocardial infarction, only 5.4% of the patients were ≤40 years. This may be explained by the reason that the mean age for first MI among south Asians is lower when compared to individuals in other countries[13]. We studied both the groups with respect to the gender distribution, presence of hypertension, diabetes mellitus, smoking, BMI, Family history of premature CAD, lipid profile and angiographic characteristics. The higher proportion of males in the younger MI group (83%) in our study is not surprising as the coronary artery disease is usually occur 7 to 10 years earlier in men than women[18]. Sevnteen percent of the patients in younger MI group and 13% in older MI group were females. This is in consistency with previous studies which showed the prevalence of 3–25% female sex in young patients[17,18]. There were very few studies in the past which have compared the gender distribution among young[19]. In this study, smoking and premature CAD in family (52.8% and 22.6% respectively) was the most important medical history factor in younger group. This is closely in line with recent studies of young STEMI patients from the Indian subcontinent[20]. The frequency of diabetes and hypertension were found to be lower in the younger STEMI group compared to the older group (15.09% vs 26.95% and 6.6% vs 17% respectively) and it is not statistically significant (*p*-value 0.05 for hypertension and 0.07 for diabetes mellitus). This is a known fact that incidence of both diabetes mellitus and hypertension increases with age and is in relevance with the previous studies[20].

Premature CAD is strongly associated with dyslipidemia especially when in combined with smoking[21]. In our study, few patients in younger group had a history of dyslipidemia. However, at the time of presentation, 58.49% of patients in younger group and 42.98% in older group had low HDL levels (*p*-value 0.03). Screening of

dyslipidemia and then early intervention can prevent acute cardiac events among individual aged <40 years with other risk factors. Young age group in our study had higher frequency of single vessel disease (64.15%) when compared with their older counterparts (29%). The present finding of single vessel disease in young patients versus multivessel disease in the older patients is in accordance with the previous studies[22]. Similarly the number of lesions per patient in older age group were more as compared to younger age. Young patients with acute STEMI had a predominance of acute anterior STEMI due to occluded left anterior descending artery (67.92%). These findings are similar to previous study[23]. Use of thrombuster for thrombus aspiration in younger and older groups were 3.5% and 5.1% respectively and was statistically in significant. We used radial site for PPCI in majority of patients (table-II). Similarly DES was implanted in all younger group patients and in 81.9% of older group. There was no documented mortality in younger patients where as in older age group it was 2.9%.

CONCLUSION

Anterior wall STEMI was common in younger group. Family history of premature coronary artery disease, smoking and dyslipidemia were the main risk factors in young patients with STEMI. Early intervention to treat dyslipidemia in high risk younger population along with smoking cessation can decreased the disease burden in this age.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author

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