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ORIGINAL ARTICLE

Frequency of coronary artery ectasia in patients with myocardial infarction.

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ABSTRACT… Objective: To determine the frequency of coronary artery ectasia in patients with MI in our population. **Study Design:** Descriptive, Cross Sectional study. **Setting:** Cardiac Catheterization Department of Ch. Pervaiz Elahi Institute of Cardiology, Multan. **Period:** 1st October 2019 to 31st March 2020. **Material & Methods:** A total of 191 patients with myocardial infarction of age 18-60 years of either gender undergoing coronary angiography were included. Patients with vulvular heart disease, cardiomyopthies, heart failure and CKD were excluded. Full demographic informations including name, age, gender and risk factors like diabetes mellitus (DM), hypertension (HTN) and smoking were noted. The coronary angiographic films were reviewed and looked for presence or absence of coronary artery ectasia. **Results:** Mean age was 49.28 ± 9.64 years in our study. Out of the 191 patients, 85.86% were male and 14.14% were females with ratio of 6:1. The %age of vessel involvement in descending order was right coronary artery in 56.02%, left anterior descending artery in 25.13%, left circumflex artery in 13.10% and left main stem in 5.76% patients. Coronary artery ectasia was found in 62.83% patients. **Conclusion:** This study concluded that there is a high frequency of coronary artery ectasia (CAE) in myocardial infarction patients with positive association with older age, male gender, hypertension, diabetes mellitus and smoking.

Key words: Acute Coronary Syndrome (ACS), Coronary Artery Ectasia (CAE), Coronary Artery Disease (CAD).

INTRODUCTION

Coronary artery ectasia (CAE) is abnormal coronary arterial dilatation which can be congenital or associated with inflammatory or connective tissue diseases but it can be presentation of atherosclerotic coronary artery disease as well as it contributes attributed to atherosclerosis.[1,2,3] CAE may either be diffuse or localized. CAE may be isolated i.e. occurs without coronary artery disease (CAD) or can coexist with CAD. In majority of the patients, ectasia coexists with CAD.[4]

Isolated CAE is not a benign condition, as it can cause acute coronary syndrome (ACS) including acute MI even without associated stenotic lesions.[5] About one third of the cases of CAE present with ACS.[6] CAE produces sluggish or turbulent blood flow, which contributes to thrombotic occlusion without preexisting CAD.[7,8,9] Patients with CAE may have benign course (15% of cases), however 39% presents with ACS and have high adverse event rate.[10,11]

Coronary artery ectasia is more common in young men, obese, smokers and hypertensive population however diabetic has inverse relation with CAE.[12,13] CAE can involve single or multiple vessel but among patients with CAD the most commonly involved vessel is right coronary artery while left main stem is least commonly involved. Angiography is most commonly used diagnostic tool for CAE to display location and number of vessels affected by the disease however intravascular ultrasound, CT coronary angiogram and magnetic resonance imaging can also analize.[14] Coronary artery ectasia is classified in four types depending upon the segment and number of vessels involved.[15]

The frequency and clinical course of CAE is variable however no significant differences was documented in clinical events with or

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without coexisting CAD but CAE may lead to exercise induced ischaemia, especially in the diffuse form.[16-20] Studies so for conducted in Pakistan showed the frequency of CAE among patients who underwent coronary angiography irrespective of their clinical presentation but showed strong correlation between ACS and CAE. This study was conducted to determine the frequency of coronary artery ectasia (CAE) in patients presented with ACS in our population.

MATERIAL & METHODS

This Descriptive, Cross Sectional study was conducted in Cardiac Catheterization Department of Ch. Pervaiz Elahi Institute of Cardiology, Multan from 1st October 2019 to 31st March 2020. Sample size of 191 cases was calculated with 95% confidence level, 7% margin of error and taking expected frequency of coronary artery ectasia in myocardial infarction as 58.1%25 by using following formula. Sample size = n = (Z (1-α/5 P (1-P)) ^ 2)/d ^ 2 . The sampling technique was Non-probability, Consecutive sampling.

Inclusion Criteria

1. Patients with myocardial infarction (defined as rise and/or fall in cardiac troponin above the 99th percentile of the upper reference limit, along with evidence of ischemia on ECG of ST segment elevation or depression) undergoing coronary angiography.
2. Age 18-60 years.
3. Both genders.

Exclusion Criteria

1. Valvular and congenital heart diseases.
2. Cardiomyopathy.
3. Decompensated congestive heart failure.
4. Renal failure or contrast allergy.
5. Previous coronary intervention.

DATA COLLECTION & ANALYSIS

After the ethical review committee approval and informed written consent, patients were elected based on the Inclusion and Exclusion criteria and the demographic data was documented. The coronary angiographic films were reviewed. The vessel segment was labeled as ecstatic if it has abnormal dilatation of 1.5 times to the adjacent normal coronary artery segment on coronary angiography. Data was collected.

SPSS version 10.0 was used to analyzed data. Quantitative variables were recorded as mean and standard deviation and Qualitative variables were presented as frequency and percentages. Stratification was done on these qualitative variables age, gender, type of vessel involved and other confounding variables like DM, smoking and HTN to see the effect of these variables on outcome variable. Post stratification chi-square test was applied to see their effect on outcome. P value ≤ 0.05 was significant.

RESULTS

The mean age was 49.28 ± 9.64 years Table-I. Figure-1 presents gender distribution. The frequency of vessel involvement was presented in Figure-2. Table-II presents frequency of risk factors. Coronary artery ectasia (CAE) was found in 120 (62.83%) patients Figure-3. Table-III & IV presents stratification of Age and Gender with respect to Coronary artery ectasia. Frequency of vessel involvement has shown in Table-V which showed no significant difference. Stratification of confounding variables was shown in Table-VI, VII & VIII respectively and p-value was statistically significant (<0.05).

Age (years)	Male	Female	Total
	No. of Patients (%)	No. of Patients (%)	No. of Patients (%)
18-30	12 (6.28%)	02 (1.05%)	14 (7.33%)
31-40	24 (12.57%)	04 (2.09%)	28 (14.66%)
41-50	38 (19.89%)	08 (4.19%)	46 (24.08%)
51-60	90 (47.12%)	13 (6.81%)	103 (53.93%)
Total	164 (85.86%)	27 (14.14%)	191 (100.0%)

Table-I. Age distribution according to gender (n=191).
Mean ± SD = 49.28 ± 9.64 years

Confounding Variables		Frequency	%age
Diabetes Mellitus	Yes	83	43.46
	No	108	56.54
Hypertension	Yes	127	66.49
	No	64	33.51
Smoking	Yes	113	59.16
	No	78	40.84

Table-II. %age of patients with status of other confounding variables (n=191)

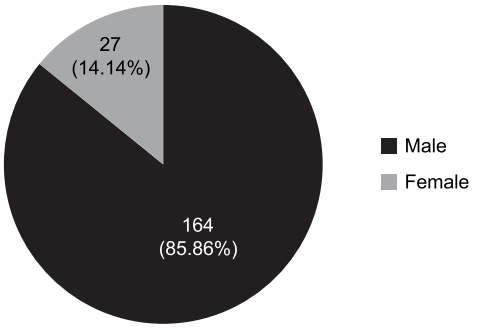

Figure-1. %age of patients according to gender (n=191).

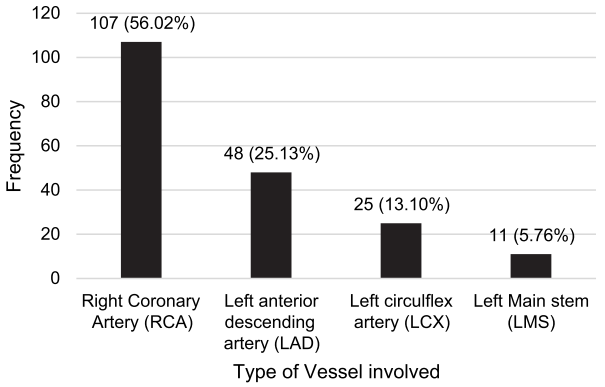

Figure2. %age of patients according to type of vessel involved (n=191).

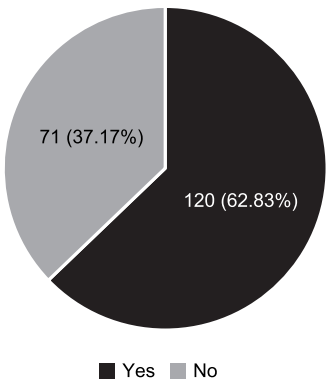

Figure-3. %age of patients with coronary artery ectasia (CAE) (n=191).

Age (years)	Coronary Artery Ectasia		P-Value
	Yes	No	
18-30	03 (21.43%)	11 (78.57%)	0.000
31-40	12 (42.86%)	16 (57.14%)	
41-50	25 (54.35%)	21 (45.65%)	
51-60	80 (77.67%)	23 (22.33%)	

Table-III. Stratification of age groups with respect to coronary artery ectasia.

Gender	Coronary Artery Ectasia		P-Value
	Yes	No	
Male	112 (68.29%)	52 (31.71%)	0.000
Female	08 (29.63%)	19 (70.37%)	

Table-IV. Stratification of gender with respect to coronary artery ectasia.

Type of Vessel	Coronary Artery Ectasia		P-Value
	Yes	No	
Right Coronary Artery (RCA)	73 (68.22%)	34 (31.78%)	0.154
Left Anterior Descending Artery (LAD)	29 (60.42%)	19 (39.58%)	
Left Circumflex Artery (LCX)	14 (56.0%)	11 (44.0%)	
Left Main Stem (LMS)	04 (36.36%)	07 (63.64%)	

Table-V. Stratification of type of vessel involved with respect to coronary artery ectasia.

Diabetes Mellitus	Coronary Artery Ectasia		P-Value
	Yes	No	
Yes	63 (75.90%)	20 (24.10%)	0.001
No	57 (52.78%)	51 (47.22%)	

Table-VI. Stratification of diabetes mellitus with respect to coronary artery ectasia.

Hyper-tension	Coronary Artery Ectasia		P-Value
	Yes	No	
Yes	109 (85.83%)	18 (14.17%)	0.000
No	11 (17.19%)	53 (82.81%)	

Table-VII. Stratification of hypertension with respect to coronary artery ectasia.

Smoker	Coronary Artery Ectasia		P-Value
	Yes	No	
Yes	96 (84.96%)	17 (15.04%)	0.000
No	24 (30.77%)	54 (69.23%)	

Table-VIII. Stratification of smoking with respect to coronary artery ectasia.

DISCUSSION

Age range was from 18 to 60 years with mean age of 49.28 ± 9.64 years. Majority of the patients 53.93% were between 51 to 60 years of age. AL-Saffar H et al and Lam CSP et al in their studies had found much larger mean age i.e. 56 and 54 years as compared to our study.[3,21] On the other

hand, Ahmad Z et al reported much lower mean age i.e. 33 years in his study.[6] Acute myocardial infarction predominantly affect males but in recent years, the incidences are increasing in women. In the present study, we have found a male predominance (85.86% were male and 27 14.14% were females with ratio of 6:1) as was also observed in many previous studies.[5,6,21] In our study, the vessel involvement in descending order was right coronary artery (RCA) in 56.02%, left anterior descending artery (LAD) in 25.13%, left circumflex artery (LCX) in 13.10% and left main stem in 5.76% patients as was also observed by Drabba ZK et al.[5]

In this study, coronary artery ectasia (CAE) was noted in 120 (62.83%) patients with myocardial infarction. This frequency was found to be very much high as compared to many previous studies. Drabba ZK et al and Swaye PS et al found this frequency of CAE in their studies as 2.8% and 4.9% respectively.[5,22] Similarly, Hartnell GG et al reported even further lower frequency of coronary artery ectasia i.e. 1.4%.[23] But Valente S et al conducted a study in which they included 55 patients of MI and found frequency of coronary artery ectasia to be 58.1%.[19] Similarly, Endoh S et al conducted a study on Japanese population in which they found frequency of CAE in MI patients to be 65%.[20] The observed frequency in these studies are very much as compare to us.

Gunes Y et al noted coronary artery ectasia (CAE) in 59% patients with myocardial infarction.[24] In another study by Yilmaz H et al a prevalence of CAE in association with coronary artery disease was found in 73.4% patients compared to isolated CAE which was seen in 26.6% patients.[25] Ahmad Z et al the reported frequency of CAE in myocardial infarction patients was very high (89.5%) as compared to our study and previously described studies.[6] Lam CSP et al has shown frequency of coronary artery ectasia in ischemic heart disease patients as 82% and Ruiz-Morales JM et al has shown this as 85% in patients with myocardial infarction.[21,26]

A study from India by Sharma SN et al analyzed 125 ischemic heart disease patients and compared with 125 older patients >40 years with ischemic heart disease.[27] He has found statistically no significant difference among these age groups in terms of prevalence of coronary artery ectasia (CAE) i.e. 10.1% versus 12% respectively. Contrary to the results of former study, we have found statistically significant difference in CAE prevalence among different age groups. We have come across this difference as 35% in younger patients (<40 years) and 70% in older patients (>40 years). Coronary artery ectasia was also found to be more common in males than in females in our study and this difference was found to be statistically significant. Similar findings are also observed in many previous studies.[21,22,23,24,25,26]

The etiology of coronary artery ectasia remains unclear and it would be interesting to determine the risk factors that might influence the origins of its pathology. Yilmaz H et al in his study has found significant difference in coronary artery ectasia prevalence among patients with any risk factor (hypertension, diabetes mellitus and smoking) compared to those that have not any risk factor.[28] These findings are quite similar to results of our study in which we have also found that prevalence of coronary artery ectasia was higher in those patients that have anyone of these (HTN, DM, Smoking) risk factors and the difference found was statistically significant. There were some studies which reported no association between risk factors and development of coronary artery ectasia. Ozbay Y et al found no significant difference between increased prevalence of coronary artery ectasia in patients with hypertension, diabetes mellitus and smoking compared to those that don't have.[29] Sen N et al reported no significant association between these risk factors (hypertension, diabetes mellitus and smoking) and coronary artery ectasia.[30] So, on the whole it was concluded that frequency of coronary artery ectasia was very high among patients with myocardial infarction and strong association was found between prevalence of coronary artery ectasia and older age, male gender, hypertension, diabetes mellitus, smoking.

CONCLUSION

This study concluded that there is a high frequency

of coronary artery ectasia (CAE) in myocardial infarction patients with positive association with older age, male gender, hypertension, diabetes mellitus and smoking.

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2	Sajid Ali	Literatue search and revision.	
3	Naeem Asghar	Manuscript writing & Data collection.	
4	Abubakar Maqbool	Data collection.	
5	Rana Faiq Ilyas	Proof read.	