ANGIOGRAPHIC FEATURES OF PATIENTS WITH CORONARY ARTERY ECTASIA COMPARED WITH STENOTIC CORONARY ARTERY DISEASE

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ABSTRACT

Objective: To determine the frequency of CAE and CAD among patients undergoing coronary angiography.
Study Design: Descriptive cross sectional study.
Place and Duration of Study: Adult cardiology department in AFIC/NIHD Rawalpindi, Six months after approval of synopsis, from Oct 2018 to May 2019.
Methodology: After meeting the inclusion criteria 300 patients were enrolled. Patients admitted in AFIC/NIHD with angina/STEMI/NSTEMI or positive ETT for Ischemia. Coronary angiogram was done by resident cardiologist. Two distinct cardiologists or resident cardiologists reported the angiograms including the coronary artery anatomy and the presence of ectatic segmentsor any stenotic lesions in each vessel. All the collected data was entered and analyzed on SPSS version 23.
Results: Patients mean age was 58.23 ± 11.73 years. The male to female ratio was 14:1. CAE was detected in 53 (17.7%) patients of coronary angiography. Stenotic CAD was most frequent in coronary arteries i.e. LAD (77.7%), RCA (72.9), LCX (50.2%) and then LMS (8.5%). Coronary artery ectasia occurred more in RCA (47.2%), followed by LAD (32.1%), LCX (17%) and LMS (3.8%).
Conclusion: Patients with CAE presents with chest pain and angina and undergo extensive intervention thus negating its benign nature. The occurrence of CAE is also different among the LAD, LCX and RCA when compared to CAD.

Keywords: Angiography, Coronary artery ectasia, Diabetes, Hypertension, Stenotic coronary artery disease.

INTRODUCTION

The considerable cause of morbidity and mortality is coronary artery disease (CAD) around the globe. Every year, around 635,000 Americans have first cardiac event (definition isnew onset hospitalized myocardial infarction (MI) or coronary artery disease related mortality) and an estimated 280,000 have multiple attacks[1].

Ectaticcoronary arteries, also known as dilated coronopathy, is a comparatively uncommon angiographic finding. This condition is seen when comparing to normal artery segment the diameter of a dilated segment of an artery is 1.5 times greater[2].

However, many investigations have advocated that connective tissue, congenital, and inflammatory disorders are possible etiologies and that the process of atherosclerosis is the root cause in maximum number of cases. Moreover, the prognosis differs significantly between studies, with the yearly mortality rate having been reported between 2% to 15%. It is estimated that atherosclerosis is the cause of CAE in 50% of cases. Stenosis of coronary arteries usually coexists with CAE[3].

CAE can affect all the three coronary vessels, however almost 75% of patients have a single artery that is ectatic. The proximal and mid segment of the right coronary artery (RCA) is the most commonly affected in patients with concomitant coronary heart disease[2]. For assessment of ectasia and anatomy of coronary arteries, coronary angiography is the gold standard test. Intravascular ultrasound (IVUS) can be used for assessment of pathologies of

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vessel wall and luminal extension. It can also be used for identification of the false aneurysms[2].

In CAE, washout and distortions in flow are common and are directly related with the severity of dilatation. Signs which can be seen on angiography are turbulent and stagnant flow including delayed antegrade filling of contrast, a segmental back flow and local stagnation of contrast in the dilated coronary segment (stasis)[4,5]. Younger male patients have more propensity towards the occurrence of ectasia. Patients with CAE presents with chest pain and angina and undergo extensive intervention thus proving its sinister nature. The layout of CAE among the LMS,LAD, LCX AND RCA also varies to that in CAD[6].

Congenital cases of coronary ectasia are approximately 25%. Acquired cases are 75%. Of the acquired cases, half of them are linked with atherosclerosis while 10% to 20% are linked with connective tissue diseases, inflammatory, syphilis, and bacterial infections[7,8].

The etiology, prognosis, morbidity, and mortality related to CAE are still a matter of debate and whether CAE is a distinctive clinical finding or a state resulting from other clinical entities is still unknown. Ectasia is observed in patients undergoing coronary angiography for assessment of coronary artery disease (CAD). It is not completely clear whether CAE is a variant of CAD or a distinct disease itself. Also there is little contemporary data available regarding CAE in our local population. This study will help to identify the patients who are at risk of infarction, thrombus formation and clogging of microcirculation as CAE is not a benign condition and there is 15% mortality rate after 7 years[9].

METHODOLOGY

It was a simple descriptive cross sectional study conducted at Adult cardiology department in AFIC/NIHD, Rawalpindi. Study duration was 6 months after the proper approval of Institutional review board. Non-probability Consecutive sampling was done, WHO calculator was used for sample size calculation i.e. a) Confidence level at 95%, b) Prevalence from the literature = 23%, c) Precision =5%; A sample of 300 patients was included in the study.

Patients Age 30-70 years, of both genders, had chest pain suggestive of angina, STEMI, NSTEMI and positive stress test undergoing coronary angiography was included in this study. Patients with completely normal vessels or <50% luminal stenosis, patients with extensive coronary artery disease (CAD), history of multi-vessel PCI or patients with congenital or valvular heart diseases were excluded.

Permission was sought from hospital ethical committee. Written informed consent was taken from participants of study. Particulars of all the patients who meet the inclusion and exclusion criteria were recorded in the Proforma. Charges of the tests were borne by hospital administration and not by the patient.

Patients admitted in AFIC/NIHD with angina or positive ETT who are to undergo angiogram was enrolled in the study. Coronary angiogram was done by resident cardiologist. Two distinct cardiologists or resident cardiologists reported the angiograms including the coronary artery anatomy and the presence of ectatic segments or any stenotic lesions in each vessel.

Statistical analysis was performed using statistical software SPSS 23. For continuous variables i.e. age, mean and standard deviation was calculated. For categorical variables i.e. gender, CAD, CAE and angiographic profile, frequency and percentages were calculated.

By applying Chi square test, clinical and angiographic profile of patients with and without CAE were observedcompared in CAE and Stenotic CAD group and *p*-values were calculated. A *p*-value ≤0.05 was taken as significant.

RESULTS

The patients mean age was 58.23 ± 11.73 years with minimum and maximum ages of 36 & 86 years respectively. 280 (93.33%) patients were males whereas 20 (6.67%) patients were females. Male to female ratio was 14:1 (fig-1).

In this study, 53 (17.7%) had CAE while 247 (82.3%) had stenotic CAD(fig-2).

For indications of coronary angiography, ACS was more common in stenotic CAD patients (10.9%) than CAE (5.7%), AWMI was more common in stenotic CAD patients (42.1%) than CAE (34.0%), ETT positive was more common in stenotic CAD patients (6.1%) than CAE (5.7%). But high lateral wall MI was more common in CAE patients (5.7%) than stenotic CAD (0.8%), IWMI was more common in CAE patients (28.3%) than stenotic CAD (21.9%) and NSTEMI was more common in CAE patients (20.8%) than stenotic CAD (18.1%). The difference was insignificant (p>0.05)(table-I).

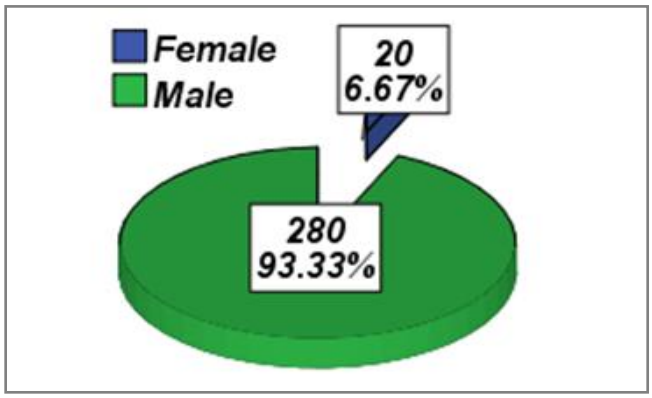

Figure-1: Frequency distribution of gender.

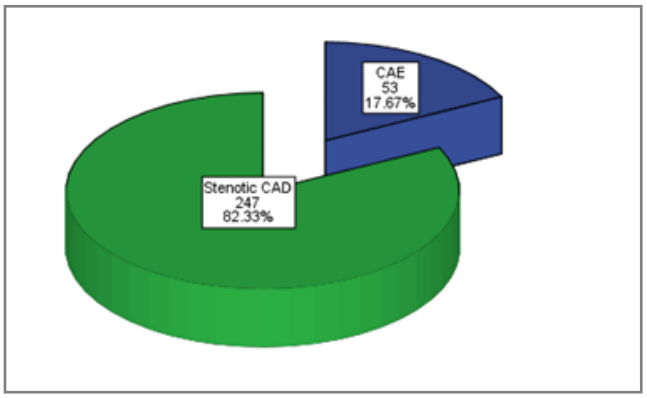

Figure-2: Distribution of CAE and CAD.

Vessels involvement was significantly high in patients with stenotic CAD as compared to CAE i.e. RCA 72.9% in CAD patients vs. in 47.2% CAE. LCX 50.2% in CAD vs. 17% in CAE. LMS 8.5% in stenotic CAD patients vs. 3.8% in CAE. LAD 77.7% in stenotic CAD patients vs. 32.1% CAE. The difference was significant and vessels

Table-I: Comparison of indication for coronary angiography.

		Group		Total	*p*-value
		CAE	Stenotic CAD		
Indications	ACS	3 (5.7%)	27 (10.9%)	30 (10%)	0.108
	AWMI	18 (34.0%)	104 (42.1%)	122 (40.7%)	
	ETT Positive	3 (5.7%)	15 (6.1%)	18 (6.0%)	
	High lateral wall MI	3 (5.7%)	2 (0.8%)	5 (1.7%)	
	IWMI	15 (28.3%)	54 (21.9%)	69 (23.0%)	
	NSTEMI	11 (20.8%)	45 (18.2%)	56 (18.7%)	
Total		68 (100%)	232 (100%)	300 (100%)	

Pearson's Chi-square test = 9.034

Table-II: Comparison of vessels involvement with study groups.

		Study Groups		*p*-value*
		CAE	Stenotic CAD	
RCA	Yes	25 (47.2%)	180 (72.9%)	0.0001
	No	28 (52.8%)	67 (21.7%)	
LCX	Yes	11 (20.7%)	124 (50.2%)	<0.001
	No	42 (79.2%)	123 (49.8%)	
LMS	Yes	2 (3.8%)	21 (8.5%)	0.392
	No	51 (96.2%)	226 (91.5%)	
LAD	Yes	17 (32.1%)	192 (77.7%)	<0.0001
	No	36 (67.9%)	55 (22.3%)	

*Fisher exact test

were more involved in stenotic CAD than CAE (p<0.05), except for LMS (p>0.05) (table-II).

DISCUSSION

This present cross sectional study was carried out at Adult cardiology department in AFIC/NIHD, Rawalpindi, to determine frequency of CAE and CAD among patients undergoing coronary angiography and to compare angiographic profile of patients having CAE with those having stenotic coronary artery disease (CAD).

An abnormal enlargement of one part of the coronary artery to 1.5 times more than the diameter of an adjacent normal segment is defined as CAE, and further enlargement is defined as coronary artery aneurysm. CAE is a rare disease which can be congenital or acquired. Symptomatic cases usually emerge in the form of effort angina. However, it may also manifest itself with rest angina.The incidence of CAE, according to CASS registry is 0.3 - 4.9%[10-13].

In our study, 53 (17.7%) had CAE while 247 (82.3%) had stenotic CAD. In CAE group RCA noted in 205 (68.3%) patients, LCX noted in 135 (45.0%) patients and LMS was found in 23 (7.7%) patients. Vessels involvement was significantly high in patients with stenotic CAD as compared to CAE i.e. RCA 72.9% in CAD patients vs. 47.2% in CAE. LCX 50.2% in CAD vs. 17% in CAE. LMS 8.5% in stenotic CAD patients vs. 3.8% in CAE. LAD 77.7% in stenotic CAD patients vs. 32.1% CAE. The difference was significant and vessels were more involved in stenotic CAD than CAE (p<0.05), except for LMS (p>0.05).

The prevalence of CAE varies according to the study population. Amirzedagan reported a prevalence of 2.3%, Pinar *et al*. reported it around 3.39%, Lam presented it around 1.2%, while Giannoglou *et al* presented it around 2.7% and Sharma found it around 12%[6,14,15].

A study by Rashid *et al* reported that males were predominant in both with & without CAE. Majority (65.4%) of CAE patients had significant CAD; whereas, only 7.4% had isolated CAE.

Most common artery involved was RCA (70.4% of total) and most common pattern was single ectatic vessel. Findings of our study were similar to Rashid S *et al* as in my study male were 93.3% and RCA (47.2%) was commonly involved in CAE group[16].

RCA 126 (60.7%) is the most commonly involved vessel in CAE, followed by LAD (39.6%) in 82 patients and least in LCX 73 patients (35.3%). However, in stenotic CAD Group LAD 477 (70.9) is the most frequently affected vessel. The maximum number of patients 175 (84.5%) had CAE in same vessels and stenosis in the same or other vessels[9].

Lam, Giannoglou and Shi-Min found predilection of ectasia to involve RCA[6,15]. One study depicted that the most commonly involved vessel was LAD[17].

One study by Yilmaz *et al* documented that coronary ectasia was isolated in 46 patients (26.6%) and was associated with significant coronary artery stenosis in 127 patients (73.4%)[18].

Another study by Theodoros A. Zografos *et al* deduced that coronary flow velocity is consistent with extent of ectasia in coronary vasculature and associated with clinical presentation independent of coexisting significant coronary stenosis[10].

CONCLUSION

We have got the local evidence and found CAE in significant number of cases (17.7%) who underwent coronary angiography. The frequency of CAE among patients undergoing coronary angiography is found to be low. But it cannot be ignored.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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