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FREQUENCY OF VARIOUS CORONARY RISK FACTORS IN PATIENTS WITH ACUTE CORONARY SYNDROME HAVING CORONARY ECTASIA

Ali Ashar[a*], Taimur Ahmad[a], Salman Munir[b], Muhammad Hassan Iqbal[a], Zameer ul Asar[c], Syed Asif Ali[a]

[a]Punjab Institute of Cardiology, Lahore. [b]Rehbar Rangers Medical College, Lahore. [c]Rawalpindi Medical University, Rawalpindi

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ABSTRACT:

BACKGROUND: *Coronary artery ectasia (CAE) is the aneurysmal dilatation of coronary arteries, which can be local or generalized. It is deliberated as the variant of coronary atherosclerosis. CAE occurs due to several risk factors of cardiovascular diseases.*

AIMS & OBJECTIVE: *To assess the frequency of various coronary risk factors in patients with acute coronary syndrome having coronary ectasia.*

MATERIAL & METHODS: *This cross sectional study was carried out at the department of Cardiology, Mayo hospital, Lahore over the duration of 6 months from 01-11-2017 to 30-04-2018. Total 135 patients fulfilling the selection criteria were recruited. History of patient regarding coronary risk factors was obtained including DM, smoking, hypertension and hyperlipidemia.*

RESULTS: *The mean age of patients was 59.70±11.29years. There were 75 (55.6%) males and 60 (44.4%) females. The mean BMI of patients was 27.43±4.77kg/m^2. In this study, 39 (28.9%) had STEMI, 45 (33.3%) had NSTEMI while 51 (37.8%) had UA. In this study, 93 (68.9%) patients had hypertension, 41 (30.4%) patients had diabetes, 43 (31.9%) patients were smokers and66 (48.9%) patients had hyperlipidemia.*

CONCLUSION: *Frequency of certain risk factors causing coronary artery ectasia in patients having acute coronary syndrome is high in local population.*

KEY WORDS: *Coronary factors, acute coronary syndrome, coronary ectasia, hypertension, diabetes, hyperlipidemia, smoking.*

Correspondence : Ali Ashar, Punjab Institute of Cardiology, Lahore. Email: aliashar47@yahoo.com

Author's Contribution: AA: Conducted the study and wrote the article. TA: Helped in conducting the study and article writing. SM: Gave frequent advises during the study and did corrections in manuscript. MHI: Helped in data collection and data analysis. ZA: Helped in rearranging the data and tables. SAA: Data analysis and proof reading.

INTRODUCTION:

When the luminal diameter of a coronary vessel dilate more than 1.5 times as compared to the adjacent part of same vessel or other vessel, it becomes ectatic and condition is known as coronary artery ectasia.[1] CAE can be generalized or local.[2] It can be detected in 3-8% cases on angiography and in 0.22-1.4% cases on autopsy.[3] It is very rare condition that may develop in around 0.3-4.9% individuals only, as reported in North America. Ectasia as already defined is dilatation of coronary artery to 1.5 times or higher than the normal diameter of a coronary vessel.[1,4] CAE remains asymptomatic for a long time and is usually diagnosed during certain procedures, which are performed to detect other diseases like angiography for coronary artery disease, stable angina and other acute coronary syndrome.[5, 6] In Pakistan, the prevalence of coronary ectasia was reported to be 11.6% on coronary angiography.[7] CAE is thought to be the indicator of coronary artery disease. It is also known as dilated coronopathy. CAE is also relatively associated with risk factors of cardiovascular diseases like high blood pressure, cigarette smoking, diabetes mellitus and deranged lipid profile.[8] According to Ipek et al., high blood pressure (Odds ratio: 1.71 (95% CI; 1.14-2.58), p = 0.01) and cigarette smoking (Odds ratio: 1.98 (95% CI: 1.32-2.99), p = 0.001) are the most significant risk factors for CAE.[9]

Rationale of this study was to assess the coronary risk factors in patients with ACS due to CAE. Literature has showed that in patients with ACS, CAE is severe condition and one of the factor for ACS. But certain factors that lead to the development of coronary ectasia include smoking, hyperlipidemia, DM and hypertension.

MATERIALS AND METHODS:

This cross sectional study was carried out at the department of cardiology, Mayo hospital, Lahore over the duration of 6 months from 01-11-2017 to 30-04-2018. Total 135 patients fulfilling the selection criteria were recruited. History of patient regarding coronary risk factors was obtained including DM, smoking, hypertension and hyperlipidemia. Sample size of 135 cases was calculated with 95% confidence level, 7% margin of error and taking expected percentage of DM i.e. 18.2% in ACS patients having coronary ectasia. Non-probability, consecutive technique was used. Patients of age 40-80 years of either gender presenting with ACS in emergency and having coronary ectasia on angiography. Were included ACS was defined as STEMI (ST elevation>1mm on ECG, troponin>100), NSTEMI (ST changes<0.5mm on ECG, troponin>100) or unstable angina (chest pain>30minutes, dyspnoea, no ST changes on ECG, troponin<100). Coronary ectasia was defined as enlargement of a coronary artery to 1.5 times or more than its normal diameter on coronary angiography. Patients with recurrent MI (on medical record), patients who had previous Pre-PCI or CABG (medical record), patients with valvular, congenital heart disease, and cardiomyopathy (on medical record and clinical examination) were excluded from the study. Patients were enrolled in the study through emergency department. Informed consent was obtained from attendants. Demographic details were also obtained. History of patient regarding coronary factors were obtained including DM, smoking, hypertension and hyperlipidemia. BP was noted by using BP apparatus. Blood sample was obtained in a 5cc BD syringe under aseptic measures with the help of a staff nurse. One drop was used to assess the current glucose level by using glucometer. Remaining sample was sent to the laboratory of the hospital for assessment of lipid profile. Reports were assessed and levels were noted and hyperlipidemia was labeled. Hypertension was defined as BP≥140/90mmHg or patient was on antihypertensive for>6month. Diabetes was defined as BSR>200mg/dl or patient taking anti-glycemic for >6months. Smoking was defined as patients is smoker >5pack year for >2years. Hyperlipidemia was defined as if total cholesterol>200mg/dl or LDL>150mg/dl at presentation. A Performa was used to collect the data. All the data was analyzed using SPSS version 21. Quantitative variables like age and BMI were presented as mean ± SD. Qualitative variables like gender and coronary factors (smoking, DM, hypertension, hyperlipidemia) were presented as frequencies and percentages.

RESULTS:

In this study, the mean age of patients was 59.70±11.29 years. There were 75 (55.6%) males and 60 (44.4%) females. The mean BMI of patients was 27.43±4.77kg/m2. In this study, 39 (28.9%) had STEMI, 45 (33.3%) had NSTEMI while 51 (37.8%) UA. In this study, 93 (68.9%) patients had hypertension, 41 (30.4%) patients had diabetes, 43 (31.9%) patients were smokers and 66 (48.9%) patients had hyperlipidemia.(Table 1)

Data was stratified for age of patients. In patients aged 40-60years, hypertension was found in 48 (67.6%) patients. In patients aged 61-80years, hypertension was observed in 45 (70.3%) patients.

Table 1: Descriptive Statistics of age of patients		
	n	135
Age (years)	Age (years)	59.70±11.29
Gender	Male	75 (55.6%)
	Female	60 (44.4%)
BMI (kg/m^2)		27.43±4.77
Type of ACS	STEMI	39 (28.9%)
	NSTEMI	45 (33.3%)
Unstable angina		51 (37.8%)
Risk Factors	Hypertension	93 (68.9%)
	Diabetes	41 (30.4%)
	Smoking	43 (31.9%)
	Hyperlipidemia	66 (48.9%)

The difference was insignificant ($p>0.05$). Data was stratified for gender of patients. In male patients, hypertension was found in 54 (72.0%) patients. In female patients, hypertension was observed in 39 (65.0%) patients. The difference was insignificant ($p>0.05$). Data was stratified for BMI of patients. In normal weight patients, hypertension was found in 33 (68.8%) patients. In overweight patients, hypertension was observed in 29 (72.5%) patients. In obese patients, hypertension was observed in 31 (66.0%) patients. The difference was insignificant ($p>0.05$). Data was stratified for type of ACS. In patients with STEMI, hypertension was found in 23 (59.0%) patients. In patients with NSTEMI, hypertension was observed in 34 (75.6%) patients. In patients with UA, hypertension was observed in 36 (70.6%) patients. The difference was insignificant ($p>0.05$). Data was stratified for age of patients. In patients aged 40-60years, diabetes was found in 27 (38.0%) patients. In patients aged 61-80years, diabetes was observed in 14 (21.9%) patients. The difference was significant ($p<0.05$). Data was stratified for gender of patients. In male patients, diabetes was found in 32 (42.7%) patients. In female patients, diabetes was observed in 9 (15.0%) patients. The difference was significant ($p<0.05$). Data was stratified for BMI of patients. In normal weight patients, diabetes was found in 19 (39.6%) patients. In overweight patients, diabetes was observed in 17 (42.5%) patients. In obese patients, diabetes was observed in 5 (10.6%) patients. The difference was significant ($p<0.05$). Data was stratified for type of ACS. In patients with STEMI, diabetes was found in 11 (28.2%) patients. In patients with NSTEMI, diabetes was observed in 16 (35.6%) patients. In patients with UA, diabetes was observed in 14 (27.5%) patients. The difference was insignificant ($p>0.05$). Data was stratified for age of patients. In patients aged 40-60years, smoking was found in 26 (36.6%) patients. In patients aged 61-80years, smoking was observed in 17 (26.6%) patients. The difference was insignificant ($p>0.05$). Data was stratified for gender of patients. In male patients, smoking was found in 43 (57.3%) patients. In female patients, smoking was observed in 0 (0%) patients. The difference was significant ($p<0.05$). Data was stratified for BMI of patients. In normal weight patients, smoking was found in 39 (81.3%) patients. In overweight patients, smoking was observed in 4 (10.0%) patients. In obese patients, smoking was observed in 0 (0.0%) patients. The difference was significant ($p<0.05$). Data was stratified for type of ACS. In patients with STEMI, smoking was found in 15 (38.5%) patients. In patients with NSTEMI, smoking was observed in 13 (28.9%) patients. In patients with UA, smoking was observed in 15 (29.4%) patients. The difference was insignificant ($p>0.05$). Data was stratified for age of patients. In patients aged 40-60years, hyperlipidemia was found in 30 (42.3%) patients. In patients aged 61-80years, hyperlipidemia was observed in 36 (56.3%) patients. The difference was insignificant ($p>0.05$). Data was stratified for gender of patients.

Table 2: Comparison of factors in effect modifiers

		Hypertension		P-value	Diabetes		p-value
		Yes	No		Yes	No	
Age (years)	40-60	48	23	0.724	7	44	0.042
	61-80	45	19		14	50	
Gender	Male	54	21	0.383	32	43	0.001
	Female	39	21		9	51	
BMI	Normal	33	15	0.806	19	29	0.001
	Overweight	29	11		17	23	
	Obese	31	16		5	42	
Type of ACS	STEMI	23	16	0.248	11	28	0.649
	NSTEMI	34	11		16	29	
	UA	36	15		14	37	
		Smoking		P-value	Hyperlipidemia		
		Yes	No		Yes	No	
Age (years)	40-60	26	45	0.210	30	41	0.104
	61-80	17	47		36	28	
Gender	Male	43	32	0.000	33	42	0.204
	Female	0	60		33	27	
BMI	Normal	39	9	0.000	25	23	0.760
	Overweight	4	36		20	20	
	Obese	0	47		21	26	
Type of ACS	STEMI	15	24	0.575	19	20	0.915
	NSTEMI	13	32		21	24	
	UA	15	36		26	25	

In male patients, hyperlipidemia was found in 33 (44.0%) patients. In female patients, hyperlipidemia was observed in 33 (55.0%) patients. The difference was insignificant ($p>0.05$). Data was stratified for BMI of patients. In normal weight patients, hyperlipidemia was found in 25 (52.1%) patients. In overweight patients, hyperlipidemia was observed in 20 (50.0%) patients. In obese patients, hyperlipidemia was observed in 21 (44.7%) patients. The difference was insignificant ($p>0.05$). Data was stratified for type of ACS. In patients with STEMI, hyperlipidemia was found in 19 (48.7%) patients. In patients with NSTEMI, hyperlipidemia was observed in 21 (46.7%) patients. In patients with UA, hyperlipidemia was observed in 26 (51.0%) patients. The difference was insignificant ($p>0.05$). (Table 2)

DISCUSSION:

CAE is a common disorder observed in cases of coronary artery disease. It is found to be associated with several cardiovascular risk factors like hypertension, cigarette smoking, and deranged lipid profile. Moreover, raised CRP concentration in patients of with CAE also endorsed the role of inflammatory processes for the development of CAE.[10] In our study, the mean age of patients was 59.70±11.29years. There were 75 (55.6%) males and 60 (44.4%) females. The mean BMI of patients was 27.43±4.77kg/m^2. In this study, 39 (28.9%) had STEMI, 45 (33.3%) had NSTEMI while 51 (37.8%) UA. In this study, 93 (68.9%) patients had hypertension, 41 (30.4%) patients had diabetes, 43 (31.9%) patients were smokers and66 (48.9%) patients had hyperlipidemia.

Tony et al., showed that the frequency of factors including DM was 28%, smoking 56%, hypertension 60% while hyperlipidemia was not assessed in ACS patients having CAE on angiography.[11] Bermúdez et al., reported that hypertension was present in 51.0%, hyperlipidemia in 49.7%, diabetes in 22.4% and smoking in 56.5% cases of CAE.[12]

Ramezani et al., reported that the frequency

of factors including DM was 9.7%, smoking 33%, hypertension 60.2% while hyperlipidemia in 41.7% ACS patients having CAE on angiography.[13] Amirzadegan et al. showed that the frequency of factors including DM was 18.2%, smoking 20.5%, hypertension was low 46.6% while hyperlipidemia was highest 63.0% ACS patients having CAE on angiography.[14] Ipek et al., showed that, hypertension (OR: 1.71 (1.14–2.58), p = 0.01) and smoking (OR: 1.98 (1.32–2.99), p = 0.001) remained significantly associated with CAE.[9]

CAE is defined as the dilatation of one or more arterial parts to about 1.5 times or more in diameter as compared to normal adjacent coronary artery.[15-17] On angiography after acute coronary syndrome, CAE was reported in around 5% cases, while in around 0.22-1.4% cases on autopsy.[18-20] It may be diffuse and disturbing the total length of coronary artery, or may be localized only to one or two segments. CAE can lead to severe atherosclerosis in around 50% cases, while 20-30% are considered as hereditary. In most of the cases, CAE concurs along with coronary artery disease. Only 10-20% CAE patients are found to be associated with inflammatory diseases or connective tissue disorders.[21]

The rate of CAE is four times higher in men as compared to women and also in the individuals with high risk factors of cardiac diseases like smoking.[4, 18, 22] While CAE is more common in patients of atherosclerosis and coronary artery disease, but it can also develop in cases without atherosclerosis and coronary artery disease and in both situations, it can lead to severe health conditions. The CAE can lead to the less blood circulation to heart and cause death of heart muscles because of reduce blood circulation, and obstructions owing to the thrombus or spasms of blood vessel.[5]

CAE can lead to different complications, like coronary spasm, stress -induced myocardial ischaemia, thrombosis in aneurysms and distal embolization, coronary artery separation, and rupture of damaged coronary wall.[23] There is disturbed coronary blood circulation with overdue ante-grade filling, segmental back-flow and stasis in dilated parts with microvascular dysfunction.[24, 25] So, dilated portions are more prone to develop thrombus which may lead to distal embolization and following acute myocardial infarctions.[26]

Dagli et al., has observed that low plasma adiponectin concentrations can lead to CAE, more attributed to the atherosclerosis, and proposed that adiponectin may be associated with etiopathogenesis and the progression of CAE. This sequentially may shows that hypo-adiponectinemia may expose the higher risk of progression of CAE. Ozbay et al., suggested based on the findings that higher concentration of high-sensitivity CRP may be one of the good prognostic marker for prediction of CAE, in patients with atherosclerosis. Moreover, Kozar et al., proposed that the TIMI frame count assessment, based on size or ration of CAE; thus a higher CAE ratio is significantly associated with reduced TIMI frame counts and poor prognosis in CAE patients.[27-29]

CONCLUSION:

Frequency of certain risk factors causing coronary artery ectasia in patients having acute coronary syndrome is high in local population.

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