FREQUENCY OF CORONARY ARTERY ECTASIA AS A CAUSE OF ACUTE CORONARY SYNDROME IN PATIENTS PRESENTING IN JINNAH HOSPITAL LAHORE

Madiha Ilyas,[1] Noor Dastgir,[2] Ahmad Muqeet,[3] Inam ur Rehman,[4] Laila Afzal,[5] Amna Iqbal Butt[6]

ABSTRACT

Background and Objective: In coronary artery ectasia (CAE), coronary angiography reveals a distinctive diffuse dilatation of the coronary arteries. Ectasia due to congenital or acquired reasons results in endothelial dysfunction leading to a turbulent and sluggish blood flow across the affected vessels. As a result, coronary thrombosis or micro emboli occlude the vessels and patients may present with signs and symptoms of the acute coronary syndrome. The objective of this study was to observe the frequency of CAE on coronary angiography among patients presenting with Acute Coronary Syndrome to the cardiology department of Jinnah Hospital, Lahore.

Methods: This cross-sectional study was performed in Jinnah Hospital, Lahore from July 2021 to December 2021. After IRB approval and informed consent, using non-probability consecutive sampling technique, 966 patients who underwent coronary angiography after clinical confirmation of ACS were included in the study. A semi-structured Performa was used to record the data depicting the clinical presentation, presence or absence of CAE, and socio-demographic variables. The data were transferred to SPSS 21 for analysis purposes.

Results: Out of 966 patients who presented with ACS to the cardiology department of Jinnah Hospital, Lahore, only 0.92% had CAE on coronary angiography. The age groups of the participants had a statistically significant association with their CAE status ($p < 0.05$).

Conclusion: CAE was rarely found on coronary angiography among patients who presented with ACS in the cardiology department of Jinnah Hospital, Lahore.

Keywords: Coronary angiography, Myocardial infarction, Coronary vessels.

How to cite: *: Ilyas M, Dastgir N, Muqeet A, Inam ur Rehman, Afzal L, Butt AI. Frequency of Coronary Artery Ectasia as a Cause of Acute Coronary Syndrome in Patients Presenting in Jinnah Hospital Lahore. JAIMC 2024 ; 22(2): 45-48*

In coronary artery ectasia (CAE), coronary angiography reveals a distinctive diffuse dilatation of the coronary arteries. The diameter of the affected vessel can be 1.5 times greater than the adjacent non-diseased part of the artery.[1] The predominant cause of acute coronary syndrome (ACS) is obstructive lesions in coronary arteries; however, ectasia is also not an unusual presentation in clinical practice.[2] Ectasia can occur due to congenital or acquired reasons like atherosclerotic, inflammatory, and connective tissue disorders resulting in endothelial dysfunction which leads to turbulent and slow coronary arteries blood flow. As a result, occlusion of vessels occurs due to thrombi or disseminated micro-emboli leading to signs and symptoms of ACS.[3]

The patients may present to the hospital with ST or non-ST segment elevation myocardial infarction (STEMI/NSTEMI). Coronary angiography is the gold standard test for diagnosis of CAE and the international literature reported a prevalence range of CAE diagnosed on coronary angiography from 0.3 to 5.0%.[4] In a 10-year prospective cohort study by Willner NA et al in Israel, only 0.85% of the total 20,455 coronary angio-

1. *Fatima Memorial Hospital, Lahore*
2-4. *Department of Cardiology, Allama Iqbal Medical College/Jinnah Hospital, Lahore*
5,6. *Department of Community Medicine, Sharif Medical and Dental College, Lahore*

Correspondence:
Madiha Ilyas ; *MBBS, FCPS (Cardiology) Allama Iqbal Medical College, Jinnah Hospital Lahore, Email: madihailyas73947@gmail.com*

Submission Date: 17-04-2024
1st Revision Date: 21-05-2024
Acceptance Date: 05-06-2024

graphies done on patients had CAE. The most frequently diseased vessel was reported to be the right coronary artery with diffuse ectasia morphology.[5] In another study by Malvia A et al in India, only 52 out of 4950 patients had isolated CAE on angiograms.[6] In a study done by Rashid S et al in Rawalpindi, Pakistan, the incidence of CAE was reported to be 2.54%. This study also revealed that male gender, hypertension, obesity, and smoking were predominant in patients with CAE.[7] Another study in Lahore, Pakistan conducted by Shafiq revealed, the incidence of CAE on coronary angiography to be 3.9% with NSTEMI as the most common clinical presentation.[8]

Complications like congestive heart failure, cardiogenic shock, arrhythmias, and death following ACS can be decreased with timely management.[9] The rationale of our study was to observe the frequency of CAE among patients with ACS, so that preventive measures like intense risk factor modification and administration of anti-platelets and statins may be carried out timely to reduce the burden of ACS caused by ectasia in our national setting.

METHODS

This Cross-Sectional Study was performed in Jinnah Hospital, Lahore for six months (from July 2021 to December 2021). The WHO sample size calculator was used to calculate the sample size of 966 using a 99% confidence interval, 1.8% margin of error, and prevalence of CAE taken as 5%.[4] A non-probability consecutive sampling technique was used to include the subjects in the study. This study included patients with clinical confirmation of ACS who underwent coronary angiography within 12 hours of onset symptoms. Patients with acute myocardial infarction that had already undergone coronary intervention either percutaneous or surgical, patients with obstructive coronary artery disease shown in coronary angiography, and patients of chronic kidney disease defined as creatinine > 2.0 mg/dl were excluded.

The study got ethical approval from the institutional review board of Jinnah Hospital. After getting informed consent from the subjects, they were treated according to the standard hospital protocols. Their coronary angiography was done which was evaluated for evidence of CAE as per the operational definition. A pre-conceived Performa was used to record the data depicting the clinical presentation, presence or absence of CAE, and socio-demographic variables.

The data were transferred to the Statistical Package for Social Sciences (SPSS) 21 version for analysis purposes. The continuous variables like age were narrated as mean and standard deviation. The categorical variables like gender and presence/absence of CAE were reported as frequencies and percentages. Stratification was used to address confounders like age and gender. The chi-square test was applied after stratification taking p value < 0.05 as significant.

RESULTS

The mean age ± standard deviation (in years) of our study subjects was 61.7 ± 13.4 and nearly 75% were males. Out of 966 ACS patients subjected to coronary angiography, only 7(0.92%) had CAE while the majority (99.08%) had no ectasia in their coronary arteries. The majority (80.4%) of study participants presented with STEMI. The frequency of CAE in 20-40 years age group was 71.4% and 28.6% in 40-80 years age group. There was a significant association ($p < 0.05$) between the CAE status of the study participants and their age. (Table no:1) The fre-quency of CAE was 77.1% among males and 28.6% among

Table 1: *Association of CAE status of participants with age (n=966)*

Age Group	CAE status		Total	p-value
	Yes	No		
20-40 years	05	63	68	
41-80 years	02	896	898	0.00
Total	07	959	966	

Table 2: *Association of CAE status of participants with gender (n=966)*

Gender	CAE status		Total	p-value
	Yes	No		
Males	05	714	719	
Females	02	245	247	0.80
Total	07	957	966	

females. The gender of the participants and their CAE status had no statistically significant associa-tion (p>0.05). (Table no. 2)

DISCUSSION

The results of our study regarding CAE frequency among ACS patients were mostly within the range of 0.3- 5% mentioned in most national and international literature.[3,7,8] Our study revealed that the frequency of CAE on angiography in cases with ACS was 0.92% which was analogous to 0.85% reported by Wilner et al. in Israel.[5] Doi et al. in Japan reported a slightly greater 3% incidence.[10] However, the results contradicted the 33.8% frequency of CAE reported by Farooq et al. in Lahore. This huge difference can be attributed to the fact that most of their study subjects had known risk factors for CAE i.e. male gender, diabetes, hypertension, and smoking.[11] Although CAE appears to be an infrequent cause of ACS, it is still important to keep CAE in mind when dealing with patients of ACS in clinical settings as it is associated with increased thrombogenicity and chances of cardiac death which can be prevented by timely anti-coagulation and other interventions.[12]

One of the most important non-modifiable factors predisposing people to the risk of coronary artery disease is the older age. In contrary to the results reported by Farooq et al in Lahore, the mean age of our study participants (61.7 years ± 13.4) was higher than the mean age (52.66 years ± 8.6) of their participants. The frequency of ectasia in their study was greater in less than 50 years age group similar to our results where 71.4% in 20-40 years age group had ectasia.[11] In younger age groups, CAE is known to be associated with connective tissue disorders like Kawasaki and vasculitis.[13] Our study found that age group and CAE status had a statistically significant association ($p < 0.05$). Nazim M et al also found in their study that age group has a statistically significant association with the prevalence of CAE, however, they found greater prevalence in >40 years age group in contradiction to our results.[14]

Another important risk factor for CAE is male gender.[15] In our study, most of the patients with CAE (77.8%) were males similar to those reported by Nazim et al where 68.3% of CAE patients were males.[14] Shafiq et al found similar results that CAE was more common among males.[8] Farooq et al found no statistical significance between CAE status and gender similar to our study ($p > 0.05$).[11] However, a dissimilar observation was made by Shafiq et al and Nazim et al in their studies that male gender and the presence of CAE are positively associated ($p < 0.05$).[8,14]

The STEMI presentation in CAE is linked to an increased thrombogenicity.[16] Most of our ACS patients (80.4%) presented with STEMI. In contrast to our results, Shafiq et al reported NSTEMI as the most common clinical presentation.[8] Our results were similar to those reported by Farooq et al where most ACS patients presented with STEMI. They did not observe any statistically significant association ($p > 0.05$) between the type of ACS presentation (STEMI/NSTEMI) and CAE status consistent with our results.[11]

One limitation of our study is that it was conducted in a single hospital. A multicenter study with a representative sample could lead to increased external validity of the study.

CONCLUSION

Our study inferred that CAE was rarely found on coronary angiography among patients who presented with ACS in the cardiology department of Jinnah Hospital, Lahore. Despite being rare on angiography, we recommend that clinicians should be trained to consider CAE as an important cause of ACS in all ages, and they should make timely decisions regarding start of anti-coagulant therapy and other interventions to improve the prognosis.

Ethical Approval:
The ethical Approval was obtained from Jinnah Hospital vide letter no. *ERB Ref: 53/02/03/2021-/S2ERB*

Conflict of Interest: *None*

Funding Source: *None*

REFERENCES

1. Morrad B, Yazici HU, Aydar Y, Ovali C, Nadir A. Role of gender in types and frequency of coronary artery aneurysm and ectasia. Medicine. 2016 Aug;95(31). https://doi.org/10.1097/MD.0000000000004395

2. Ozcan OU, Gulec S. Coronary artery ectasia. cor et vasa. 2013 Jun 30; 55(3):e242-247doi: 10.1016/ j. crvasa.2013.01.003
3. Tony H, Meng K, Wu B, Zeng Q. Among ectasia patients with coexisting coronary artery disease, TIMI frame count correlates with ectasia size and markis type IV is the commonest. Cardiology research and practice. 2015;2015(1):282170.https://doi.org/10.1155/2015 / 282170
4. Waqas M, Bizzocchi LL, Menegus MA, Faillace RT. Coronary artery ectasia: an insight into intraprocedural and postprocedural management strategies. Cureus. 2019 Jan;11(1). https://doi.org/10.7759/cureus.3928
5. Willner NA, Ehrenberg S, Musallam A, Roguin A. Coronary artery ectasia: prevalence, angiographic characteristics and clinical outcome. Open Heart. 2020;7(1):e001096.https://doi.org/10.1136/ openhrt - 2019-001096
6. Malviya A, Jha PK, Mishra A. Isolated coronary artery ectasia: Clinical, angiographic, and follow up characteristics. Indian Heart Journal. 2017 Jan 22.
7. Rashid S, Gul U, Ali M, Sadiq T and Kiyani AM. Coronary Artery Ectasia: Clinical and Angiographic Features. JCPSP 2018; Vol. 28 (11): 824-828
8. Shafiq F, Usman A, Sultan M, Shehzad K, Haroon N, Osama. Incidence and characteristics of coronary artery ectasia in patients undergoing coronary angiography at Army Cardiac Center, Lahore. Pak Armed Forces Med J 2020; 70 (Suppl-4): S876-80
9. Saleh M, Ambrose JA. Understanding myocardial infarction. F1000Research. 2018;7 https:// doi.org/ 10.12688/f1000research.15096.1
10. Doi T, Kataoka Y, Noguchi T, Shibata T, Nakashima T, Kawakami S, et al. Coronary artery ectasia predicts future cardiac events in patients with acute myocardial infarction. Arteriosclerosis, thrombosis, and vascular biology. 2017 Dec;37(12):2350-5.doi:10.1161/ ATVBAHA. 117.309683
11. Farooq A, Tariq A, Aslam MA, Sharif A, Ahmed W, Haider AS. Investigating the Prevalence of Ectasia in Angiographic Patients with Acute Coronary Syndrome: Ectasia in Angiographic Patients with ACS. Pakistan Journal of Health Sciences. 2024 Jan 31:100-4. https://doi.org/10.54393/pjhs.v5i01.1282
12. Gunasekaran P, Stanojevic D, Drees T, Fritzlen J, Haghnegahdar M, McCullough M, et al. Prognostic significance, angiographic characteristics and impact of antithrombotic and anticoagulant therapy on outcomes in high versus low-grade coronary artery ectasia: a long-term follow-up study. Catheterization and Cardiovascular Interventions. 2019 Jun 1;93(7):1219-27. doi: 10.1002/ccd.27929
13. Anwar M, Nadeem A, Siddique MB, Toru FK, Khawaja AZ, Malik SP, et al. Uric Acid/HDL Ratio as a Marker of Disease in Coronary Artery Ectasia Versus Normal Coronaries. Pakistan Armed Forces Medical Journal. 2024 May 30;74(SUPPL-1):S1-5.
14. Nazim M, Ali S, Asghar N, Maqbool A, Ilyas RF. Frequency of coronary artery ectasia in patients with myocardial infarction. The Professional Medical Journal. 2023 Mar 1;30(03):353-8. https://doi.org/10. 29309/ TPMJ/2023.30.03.7204
15. Patel P, Shrivastava R, Patel R, Warghane P. Coronary artery ectasia. Indian Journal of Clinical Cardiology. 2023 Mar;4(1):30-8. https://doi.org/10.1177/26324 636231157469
16. Djohan AH, Chiu J, Sia CH, Tung BW, Ng ZY, Chan KH, et al. Characteristics and outcomes of patients with coronary artery ectasia presenting with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. Cardiovascular Revascularization Medicine. 2022 Jul 1; 40: 82-9. https://doi.org/10.1016/j.carrev.2021.11.042