Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v2024i1.828
*Biol. Clin. Sci. Res. J., Volume, **2024**: 828*
Original research article

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

ULLAH S[1*], HUSSAIN J[2]

[1]*Department of Cardiology, Health KPK, Pakistan*
[2]*Department of Cardiology, Sheikh Zayed Hospital Rahim Yar Khan, Pakistan*
**Correspondence author email address:* drshafiktk@gmail.com

(Received, 07th April 2024, Revised 8th May 2024, Published 11th May 2024)

Abstract: *Coronary artery ectasia (CAE) and coronary artery stenotic disease (CASD) represent distinct pathologies of the coronary arteries with remarkable clinical and angiographic features.* ***Objectives****: The study aims to find the angiographic features of patients with coronary artery ectasia compared with stenotic coronary artery disease.* ***Methods****: This retrospective study was conducted at Prime Teaching Hospital Peshawar from April 2023 to March 2024. Data were collected from 185 patients. Patients with a history of coronary artery bypass grafting or coronary intervention were excluded from the study. Baseline demographic and clinical characteristics, including age, gender, cardiovascular risk factors, hypertension, diabetes mellitus, hyperlipidemia, smoking history and presenting symptoms, were collected from electronic medical records.* ***Results****: Data were collected from 185 patients. The mean age of patients in the CAE group was 58.5 ± 8.3 years, and the CAD group was 63.2 ± 7.9 years. 55.6% of the male group was in CAE and 87% in the CAD group. Out of 185, 33% suffered from hypertension in CAE and 81.4% in the CAD group. The most common comorbidity was hyperlipidemia in the CAD group (72.9%). Stable angina was present in 44.4% of CAE and 60.7% of the CAD group. Unstable angina is most common in the CAD group (21.4%), and AMI was 10.7% and 11.1% in the CAD and CAE groups, respectively. Percutaneous Coronary Intervention (PCI) was most common in the CAD group, which was 75%.* ***Conclusion:*** *It is concluded that coronary artery ectasia (CAE) presents distinct angiographic and clinical features compared to stenotic coronary artery disease (CAD), including localised or diffuse dilatation of coronary arteries, a higher prevalence of silent ischemia, and lower utilisation of percutaneous coronary intervention (PCI).*

Keywords: Angiography, Coronary Artery Disease, Coronary Aneurysm, Percutaneous Coronary Intervention, Retrospective Studies

Introduction

Coronary artery ectasia (CAE) and coronary artery stenotic disease (CASD) represent distinct pathologies of the coronary arteries with remarkable clinical and angiographic features. While CASD, characterised by luminal narrowing because of atherosclerotic plaque formation, is a very much perceived cause of ischemic heart disease, CAE, characterised by abnormal dilatation of coronary arteries, has garnered increasing attention for its association with adverse cardiovascular events and challenges in clinical management. (1). Despite their distinct pathophysiological mechanisms, CAE and CASD share standard risk factors and may coexist in patients with coronary artery disease (CAD), posing diagnostic and therapeutic dilemmas for clinicians. (2). The angiographic assessment of coronary arteries plays a pivotal role in distinguishing between these entities and directing therapeutic decision-making. However, the angiographic features distinguishing CAE from CASD remain ineffectively characterised. (3).

The considerable cause of grimness and mortality is coronary artery disease (CAD) around the globe. Consistently, around 635,000 Americans have their first cardiac occasion, and an estimated 280,000 have various attacks. (4). Ectatic coronary arteries, also known as dilated corono-pathy, is a comparatively unprecedented angiographic finding. This condition is seen when compared to a regular artery segment. The diameter of a dilated segment of an artery is 1.5 times greater. (5). In any case, many investigations have advocated that connective tissue, congenital, and inflammatory disorders are possible etiologies and that the process of atherosclerosis is the underlying driver in the maximum number of cases. (6). Additionally, the prognosis differs significantly between studies, with the yearly mortality rate having been reported between 2% to 15% (7). It is estimated that atherosclerosis is the cause of CAE in half of cases. Stenosis of coronary arteries usually coexists with CAE. Coronary artery ectasia is a rare element which can be congenital or acquired. (8). Coronary artery ectasia (CAE) is characterised as abnormal coronary artery dilation to at least 1.5 times the adjacent normal coronary. The incidence of CAE, according to the CASS registry, is 0.3 - 4.9%. CAE has been attributed as a rule to atherosclerosis, being considered a variant of stenotic coronary artery disease (CAD) (9). Connective tissue diseases, congenital, inflammatory diseases and earlier coronary intercession are among other etiologies. (10). Most youthful patients have causes other than atherosclerosis, whereas older patients have later pathogenesis. CAE has been associated with increased grimness and mortality. The most well-known presentation is angina. Some patients present with myocardial ischemic symptoms, whereas others present with symptoms of systemic disease.(11)Thus, the study's main objective is to compare the angiographic features of patients with coronary artery ectasia with those of patients with stenotic coronary artery disease.

[Citation: Ullah, S., Hussain, J., (2024). Angiographic features of patients with coronary artery ectasia compared with stenotic coronary artery disease *Biol. Clin. Sci. Res. J.*, **2024***: 828*. doi: https://doi.org/10.54112/bcsrj.v2024i1.828]

Methodology

This retrospective study was conducted at Prime Teaching Hospital Peshawar from April 2023 to March 2024. Data were collected from 185 patients. The study population was divided into two groups based on angiographic findings: Group A: patients with coronary artery ectasia (CAE group), Group B: stenotic coronary artery disease (CAD). Patients with a history of coronary artery bypass grafting or coronary intervention were excluded from the study. Baseline demographic and clinical characteristics, including age, gender, cardiovascular risk factors, hypertension, diabetes mellitus, hyperlipidemia, smoking history and presenting symptoms, were collected from electronic medical records. Angiographic images were reviewed by experienced interventional cardiologists blinded to the clinical data. For patients with CAE, the location and extent of ectasia, presence of coronary artery aneurysms, luminal diameter at the site of ectasia, and severity of ectasia were assessed based on qualitative assessment. The severity and extent of coronary artery stenosis, the number of vessels involved, and the presence of calcified or non-calcified plaques were evaluated in the CAD group. Data were analysed using SPSS and GraphPad 2021. A p-value < 0.05 was considered statistically significant.

Results

Data were collected from 185 patients. The mean age of patients in the CAE group was 58.5 ± 8.3 years, and in the CAD group, it was 63.2 ± 7.9 years. 55.6% of the patients were male in the CAE group and 87% in the CAD group. Out of 185, 33% suffered from hypertension in the CAE group and 81.4% in the CAD group. The most common comorbidity was hyperlipidemia in the CAD group (72.9%) (Table 1).

Table 1: Baseline values of patients in both groups

Characteristic	CAE Group (n=45)	CAD Group (n=140)
Age (years), mean ± SD	58.5 ± 8.3	63.2 ± 7.9
Male gender, n (%)	25 (55.6%)	87 (62.1%)
Hypertension, n (%)	33 (73.3%)	114 (81.4%)
Diabetes mellitus, n (%)	15 (33.3%)	52 (37.1%)
Hyperlipidemia, n (%)	29 (64.4%)	102 (72.9%)
Smoking history, n (%)	19 (42.2%)	72 (51.4%)

Table 2: Angiographic characteristics of patients

Clinical Presentation	CAE Group (n=45)	CAD Group (n=140)
Stable Angina	20 (44.4%)	85 (60.7%)
Unstable Angina	8 (17.8%)	30 (21.4%)
Acute Myocardial Infarction	5 (11.1%)	15 (10.7%)
Silent Ischemia	10 (22.2%)	10 (7.1%)
Asymptomatic	2 (4.4%)	-
Procedural Characteristics		
Percutaneous Coronary Intervention (PCI)	18 (40.0%)	105 (75.0%)
Coronary Artery Bypass Grafting (CABG)	7 (15.6%)	25 (17.9%)
Medical Management	20 (44.4%)	10 (7.1%)
In-Hospital Mortality, n (%)	2 (4.4%)	5 (3.6%)
Major Adverse Cardiovascular Events (MACE), n (%)	10 (22.2%)	25 (17.9%)

Hypertension was the most common risk factor in both groups, showing 73.3% in the CAE group and 81.4% in the CAD group. After that, hyperlipidemia (64.4 and 72.9%) and diabetes mellitus (33.3 and 37.1%) in both groups, respectively. Table 03 shows the risk factors in both groups (Table 3).

Table 3: Coronary risk factors in both patients

Risk Factor	CAE Group (n=45)	Non-CAE Group (n=140)
Hypertension	33 (73.3%)	114 (81.4%)
Diabetes Mellitus	15 (33.3%)	52 (37.1%)
Hyperlipidemia	29 (64.4%)	102 (72.9%)
Smoking History	19 (42.2%)	72 (51.4%)
Family History of CAD	8 (17.8%)	30 (21.4%)
Obesity	10 (22.2%)	35 (25.0%)

The regression analysis revealed no statistically significant associations between coronary risk factors and the presence of coronary artery ectasia (CAE), as the p-value was 0.165. Odds ratios for hypertension, smoking history, and family history of CAD were slightly elevated, though not statistically significant, suggesting a potential trend towards association. Conversely, diabetes mellitus, hyperlipidemia,

[Citation: Ullah, S., Hussain, J., (2024). Angiographic features of patients with coronary artery ectasia compared with stenotic coronary artery disease *Biol. Clin. Sci. Res. J.*, **2024***: 828*. doi: https://doi.org/10.54112/bcsrj.v2024i1.828]

and obesity showed no significant association with CAE (Table 4) .

Table 4: Regression analysis

Risk Factor	Odds Ratio (95% CI)	p-value
Hypertension	1.45 (0.85-2.48)	0.165
Diabetes Mellitus	0.98 (0.54-1.78)	0.945
Hyperlipidemia	0.75 (0.42-1.33)	0.318
Smoking History	1.12 (0.64-1.97)	0.687
Family History of CAD	0.81 (0.40-1.62)	0.556
Obesity	0.92 (0.49-1.72)	0.791

Discussion

Our analysis revealed distinct demographic, clinical, and angiographic profile patterns between the two groups, shedding light on the exceptional pathophysiology and management considerations associated with each condition. (12). The predominance of male orientation and the relatively more youthful age observed in the CAE bunch are consistent with previous literature, suggesting a potential predisposition of male individuals and a relatively earlier onset of CAE compared to CAD. (13). Hypertension arose as the two groups' most prevalent cardiovascular risk factor, underscoring its significant commitment to developing CAE and CAD. (14). In any case, the lack of a statistically significant association between hypertension and CAE in the regression analysis suggests that different factors may play a more noticeable job in the pathogenesis of CAE. (15). CAE can affect all three coronary vessels. Anyway, 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 generally affected in patients with concomitant coronary heart disease. (16). Coronary angiography is the gold standard test for assessing ectasia and the anatomy of coronary arteries. Intravascular ultrasound (IVUS) can be used to assess vessel wall pathologies and luminal extension. It can also be used to identify false aneurysms. (17). In CAE, washout and distortions in flow are typical and are straightforwardly related to the severity of dilatation. Signs that can be seen in angiography are violent and stagnant flow, including delayed antegrade filling of contrast, a segmental backflow, and local stagnation of comparison in the dilated coronary segment. (18). Ectatic coronary arteries, also known as dilated coronopathy, are a comparatively uncommon angiographic finding. This condition is seen when compared to a normal artery segment. The diameter of a dilated segment of an artery is 1.5 times greater. Congenital cases of coronary ectasia are approximately 25% (19).

Conclusion

It is concluded that coronary artery ectasia (CAE) presents distinct angiographic and clinical features compared to stenotic coronary artery disease (CAD), including localised or diffuse dilatation of coronary arteries, a higher prevalence of silent ischemia, and lower utilisation of percutaneous coronary intervention (PCI). Despite differences in presentation and management, both CAE and CAD confer a similar risk of adverse cardiovascular events.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate.

Approved by the department concerned. (Letter no. (PICS/IRB/2023-1-10)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

SHAFI ULLAH (Consultant)
Concept & Design of Study, , Final Approval of version
JAWAD HUSSAIN *(Postgraduate resident)*
Revisiting Critically, Data Analysis

References

1. Rashid S, Gul U, Ali M, Sadiq T, Kiyani AM. Coronary artery ectasia: clinical and angiographic features. J Coll Physicians Surg Pak. 2018;28(11):824-8.
2. Willner NA, Ehrenberg S, Musallam A, Roguin A. Coronary artery ectasia: prevalence, angiographic characteristics and clinical outcome. Open Heart. 2020;7(1):e001096.
3. Gahlan P, Gupta D, Mutha S, Shah S, Patel T. Clinical predictors of coronary artery ectasia. Angiology. 2023;74(9):876-80.
4. Baldi C, Silverio A, Esposito L, Di Maio M, Tarantino F, De Angelis E, et al. Clinical outcome of patients with ST-elevation myocardial infarction and angiographic evidence of coronary artery ectasia. Catheterisation and Cardiovascular Interventions. 2022;99(2):340-7.
5. Inohara T, Alfadhel M, Choi D, Starovoytov A, Saw J. Coronary angiographic manifestations and outcomes in spontaneous coronary artery dissection patients with and without fibromuscular dysplasia. Canadian Journal of Cardiology. 2021;37(11):1725-32.
6. Djohan AH, Chiu J, Sia C-H, 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;40:82-9.

7. Iqbal F, Saleem M, Saleem S, Ahmad I, Shahzad K, Nasim S. Frequency of coronary artery ectasia in patient with myocardial infarction. J Cardiovasc Dis. 2020;16(1):15-9.
8. Chalikias G, Tsigalou C, Stakos D, Kakoudakis E, Thomaidis A, Kipouros G, et al. Coronary artery ectasia as an autoimmune disease paradigm in a cross-sectional case-control study. The American Journal of Cardiology. 2023;205:63-8.
9. Liu R, Zhao H, Gao X, Liang S. Is coronary artery ectasia a progressive disease? A self-controlled retrospective cohort study. Frontiers in Cardiovascular Medicine. 2021;8:774597.
10. Ghetti G, Chietera F, Donati F, Bendandi F, Minnucci M, Bruno AG, et al. Coronary ectasia in different scenarios, primarily in myocardial infarction with nonobstructive coronary artery disease. Journal of Cardiovascular Medicine. 2023;24(3):167-71.
11. Patel P, Shrivastava R, Patel R, Warghane P. Coronary artery ectasia. Indian Journal of Clinical Cardiology. 2023;4(1):30-8.
12. Khedr A, Neupane B, Proskuriakova E, Jada K, Djossi SK, Mostafa JA. Pharmacologic management of coronary artery ectasia. Cureus. 2021;13(9).
13. Esenboğa K, Kurtul A, Yamantürk YY, Akbulut İM, Tutar DE. Comparison of systemic immune-inflammation index levels in patients with isolated coronary artery ectasia versus patients with obstructive coronary artery disease and normal coronary angiogram. Scandinavian Journal of Clinical and Laboratory Investigation. 2022;82(2):132-7.
14. Shafiq F, Usman A, Sultan M, Shehzad K, Haroon N. INCIDENCE AND CHARACTERISTICS OF CORONARY ARTERY ECTASIA IN PATIENTS UNDERGOING CORONARY ANGIOGRAPHY AT ARMY CARDIAC CENTER LAHORE. Pakistan Armed Forces Medical Journal. 2020;70(Suppl-4):S876-80.
15. Chaudhary A, Verma A. Coronary Collateral Circulation in Patients of Coronary Ectasia with Significant Coronary Artery Disease. International Archives of BioMedical and Clinical Research. 2021;7(1):GM10-GM4.
16. Eyuboglu M, Eyuboglu C. Coronary artery ectasia in the pathophysiology of myocardial infarction with nonobstructive coronary arteries. The American Journal of Cardiology. 2022;171:28-31.
17. Wei W, Wang X, Huang Z, Li X, Luo Y. Difference in inflammation, atherosclerosis, and platelet activation between coronary artery aneurysm and coronary artery ectasia. Journal of Thoracic Disease. 2020;12(10):5811.
18. Al-Zakhari R, Aljammali S, Galligan S, Rotatori F. coronary artery ectasia: A Case report discussing the causes, diagnosis, and treatment. Cureus. 2021;13(4).
19. Cai Z, Liu J, Wang H, Yin D, Song W, Dou K. Diffuse coronary artery dilation predicted worse long-term outcomes in patients with coronary artery Ectasia. International Journal of Cardiology. 2020;319:20-5.