

ROLE OF CTA AND CAC SCORING TECHNIQUES TO ENHANCE CAD DIAGNOSIS IN STABLE CHEST PAIN PATIENTS

Fiza Latif¹, Ms. Nageen Waris², Almas Nadeem³, Khadijat Ul Kubra⁴, Sawera Daulat⁵, Rabia Tariq⁶

¹Leader, Student, Bachelor of Medical Imaging Technology, Superior University Lahore

²Supervisor, Lecturer, Faculty of Allied Health Sciences, Superior University Lahore

^{3,4,5,6}Member, Student, Bachelor of Medical Imaging Technology, Superior University Lahore

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Corresponding Author: *

Fiza Latif

Abstract

Introduction:

CAD can be fatal and occurs in the form of stable chest pain. The disease may not necessarily manifest symptoms that would confirm its presence in an individual. The detection of the disease at its onset is crucial since the symptoms may be inaccurate. One of the measures to detect the disease is the coronary artery calcium score, which calculates the amount of plaque in the coronary arteries and predicts the risk. Additionally, CT angiography produces clear images of the coronary arteries and plaques. The integration of the two measures improves the effectiveness of detecting CAD.

Aim of the Study: To determine how CTA and CAC scoring techniques enhance the diagnosis of CAD in stable chest pain patients referred for angiography.

Methodology: Cross sectional Analytical study was conducted at Farooq Hospital Lahore for four months, to determine how CTA and CAC scoring enhance the diagnosis of CAD. A total of 73 patients underwent scans using a computed tomography (128 slice Toshiba), with all observations recorded by radiologists. Data analysis was performed using SPSS 27.0 to determine distribution, frequency, percentage, and diagnostic accuracy.

Results:

There were 73 participants involved in the research, most of whom were males. Several participants exhibited stenosis symptoms. In addition, most of the clinical findings observed indicated either stenosis or absence of any abnormality. Most of the participants in this case had a zero CAC score but suffered from CAD. The statistical analysis conducted via Pearson Chi-Square indicated that there was a significant relationship between chest pain and CAC ($p=0.021$), indicating that there was a significant relationship between CAC and chest pain. However, there was no significant relationship between chest pain and CAD ($p=0.493$). In addition, there was a highly significant relationship between clinical findings and CAC ($p=0.010$), and CAC and CAD ($p=0.020$).

Conclusion: The usefulness of the coronary CTA and CAC scoring techniques can be demonstrated on those patients who have stable chest pain and undergo coronary angiography. As found in this study, coronary CTA and CAC score are efficient imaging techniques, which help significantly improve diagnosis of CAD.

The presence of calcium correlates well with coronary atherosclerotic plaque, since, as shown in the study, an increase in the CAC score leads to a higher probability of the presence of CAD. With the aid of coronary CTA technique, the accuracy of the diagnosis improved further due to providing an accurate visualization of coronary anatomy and detection of stenosis, which would remain invisible during clinical examination. Although CTA was more helpful for anatomical analysis of the coronary arteries, the CAC score could serve as a risk stratification tool prior to CTA.

INTRODUCTION

Coronary heart disease (CHD) continues to be the top cause of mortality worldwide, accounting for 16% of total fatalities in 2019[1]. Cardiovascular diseases remain the single largest cause of death globally, accounting for roughly one third of all fatalities recorded each year across the world. The sheer scale of this burden has made early and accurate identification of coronary artery disease a clinical priority that no healthcare system can afford to ignore. (2) Atherosclerosis or coronary artery disease (CAD) is the most common form of cardiovascular disease (CVD) where the main component is lipid accumulation and inflammation of the large arteries, which eventually may lead to its clinical complications, myocardial infarction (MI) and stroke. As a disease of slow progression, clinically significant atherosclerosis occurs primarily in older individuals and, despite declining incidence in some countries, remains the leading cause of mortality worldwide [3].

Stable angina, also called the typical angina or angina pectoris, It is a symptom of the myocardial ischemia. It is characterized by a feeling of chest discomfort or equivalent symptoms that occur during physical exertion and are relieved by rest or by the medication such as nitroglycerin. This condition is often one of the initial indicators of underlying coronary artery disease. Angina impacts about 10 million individuals in the United States; therefore, recognizing the signs and symptoms and assessing the risk and managing these patients is very crucial [4].

Among all causes of death tracked globally, heart disease is first and when cardiologists trace most of those deaths back to their origin, they find the same culprit: plaques that built up silently inside coronary arteries over years before anyone knew

they were there. Calcium in the coronary walls is essentially a footprint of that process. Where plaque has grown, calcium follows, and the more of it a patient carries, the harder their arteries have been working against a growing atherosclerotic load. What CT brought to this picture was the ability to actually count and measure that calcium without opening anyone up a straightforward scan that produces a number, and that number, study after study has shown, predicts who goes on to have a heart attack or die from cardiac causes better than cholesterol levels or blood pressure readings alone ever could [5]. Coronary calcium scoring is done with computed tomography scans. It does this by measuring and adding up how much sedimented plaque has formed in the coronary arteries. The score is then totaled, also known as the Agatston score, which estimates the cumulative calcified burden in the heart 's blood vessels. [6] Coronary artery calcium is a sensitive indicator of subclinical coronary atherosclerosis, middle-aged persons can measure their risk using calcium scoring, an established reclassification technique [7]. People with a CACS of zero have a very low chance of experiencing CV events in the following five to ten years, while people with a CACS of more than 100 have event rates that are comparable to those of patients with established ASCVD [8]. The likelihood of obstructive CAD is increased when CAC is present, and its absence is linked to a low (<5%) prevalence of the condition [9]. As its use has increased, debate has arisen regarding the appropriate application of CAC scores in risk assessment, particularly with reference to its function in ruling out obstructive disease in individuals who exhibit symptoms [10]. CAD risk factors can be divided into two main categories: modifiable and non-modifiable.

Ethnicity, age, gender, and family history of CAD are non-modifiable risk factors. A sedentary lifestyle, poor diet, smoking, obesity, diabetes, hypertension, hyperlipidemia, and stress are examples of modifiable risk factors [11]. Heart attacks, congestive heart failure, ventricular free wall rupture, mitral regurgitation, pericarditis, aneurysm growth, and mural thrombi are the most common complications related to coronary artery disease [12].

Coronary computed tomography angiography (CTA), as a non-invasive imaging modality, may provide information on the structure of the coronary artery wall. The presence and composition of atherosclerotic plaques may also be assessed, even in the absence of flow-limiting disease. In coronary CTA, positive remodeling, low attenuation plaque, spotty calcification, and the “napkin ring” sign can be assessed, which have been observed to be associated with harmful plaque characteristics such as large necrotic core, microcalcifications, and thin fibrous cap. These plaque characteristics are associated with an increased risk of future acute coronary syndromes [13]

Coronary CT angiography (CCTA) is a reliable substitute for invasive coronary angiography (ICA) in the diagnosis of obstructive coronary artery disease (CAD) in patients with stable chest pain and intermediate pretest probability for obstructive CAD [14]. Twenty years later, it has become more well-known as a primary source of information for diagnosing and making decisions [15]. For individuals exhibiting cardiovascular symptoms, determining the pre-test probability (PTP) and the risk of developing coronary artery disease is an essential first step, as the result dictates which test to perform for a confirmatory diagnosis [16].

In the DISCHARGE trial, patients with stable chest pain and an intermediate pre-test probability of CAD were referred for IVC. The trial found a lower frequency of major procedure-related complications for a computed tomography scan and no significant difference in the rates of major cardiovascular events between an IVC and a CT scan [17]. When assessing coronary artery disease, computed tomography angiography (CTA) has a

high sensitivity (CAD). Its specificity is only at most mediocre for detecting hemodynamically severe CAD, though [18]. In this population, coronary CTA has produced short-term benefits such as increased precision in diagnosis, decreased rates of normal coronary arteries at the time of invasive coronary angiography, and enhanced targeting of prophylactic and preventive treatments [19].

CCTA has played a major role in the development of cutting-edge multi-slice CT over noncardiac CT imaging. Over the past ten years, several approaches have been developed to minimize radiation exposure to “As Low As Reasonably Achievable” (ALARA) while optimizing the trade-off between the scan parameters that determine image quality: pitch, temporal resolution, and spatial resolution [20]. With time, improvements in CCTA have made it possible to characterize coronaries effectively, take comprehensive pictures of atherosclerosis, and expose patients to less radiation [21]. With numerous potential clinical uses, dual-energy computed tomography, or DECT, has become a promising diagnostic imaging technology [22]. Regarding this, the invention of the wide-area-coverage (16-cm) CT scanner has made it possible to volumetrically image the whole heart in a single cardiac cycle without the presence of stair-step artifacts [23]. Using lower tube voltages (80 kVp and 100 kVp) is a useful tactic that lowers the radiation dosage as well as the contrast dose [24]. PCD-equipped CT scanners may be able to help with some of the issues that cardiac CT still faces, including poor spatial resolution and a dearth of high-quality spectral data [25].

Stable chest pain often masks underlying coronary disease whose future risk is difficult to predict from symptoms alone. CAC reflects long-term plaque burden, while CTA shows plaque features linked with progression. Using both offers a clearer picture of disease behavior, enabling timely intervention and better risk-based management. Limited evidence exists in local settings, making this study valuable in improving clinical decision pathways and long-term outcomes.

OBJECTIVE

To determine how CTA and CAC scoring techniques enhance the diagnosis of CAD in stable chest pain patients referred for angiography.

METHODOLOGY

The descriptive cross-sectional study took place in the radiology department of a tertiary care hospital for a period of _ months. A total of 73 patients suffering from stable chest pain with CAD suspicion participated in the study. Participants were recruited based on their age of being ≥18 years, having undergone CAC scoring and CCTA, without known history of CAD or coronary interventions, acute coronary syndromes, severe arrhythmia, renal insufficiency, and pregnant women. The patients first went through non-contrast CT scanning for CAC scoring according to the Agatston score, followed by contrasted CT angiography scanning using a multi-detector CT scanner. The imaging results for CCTA were assessed for the presence of CAD, luminal stenosis, and characteristics of plaques. The demographic and clinical data were collected based on age, sex, chest pain status, CAC scores, and results from imaging. Data was analyzed using

SPSS version _, which represented quantitative measures in mean ± SD and qualitative data in frequency and percentage forms. The statistical association of variables was calculated based on Chi-square tests with $p < 0.05$ being statistically significant. Ethical clearance and consent were provided.

Results

There were 73 participants involved in the research, most of whom were males. Several participants exhibited stenosis symptoms. In addition, most of the clinical findings observed indicated either stenosis or absence of any abnormality. Most of the participants in this case had a zero CAC score but suffered from CAD. The statistical analysis conducted via Pearson Chi-Square indicated that there was a significant relationship between chest pain and CAC ($p=0.021$), indicating that there was a significant relationship between CAC and chest pain. However, there was no significant relationship between chest pain and CAD ($p=0.493$). In addition, there was a highly significant relationship between clinical findings and CAC ($p=0.010$), and CAC and CAD ($p=0.020$).

Table 4.1 Table of Gender Distribution:

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	16	21.9	21.9	21.9
	Male	57	78.1	78.1	100.0
	Total	73	100.0	100.0	

This table shows the Gender distribution of the sample population, with females (16)

accounting for 21.9% and males (57) for 78.1%, for a total of 73 participants. The cumulative percentage of both genders is 100%.

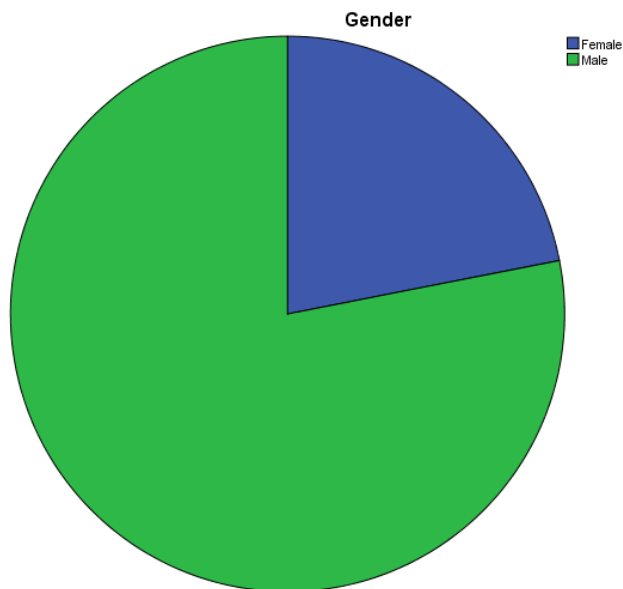


Figure # 4.1 This figure describes the gender distribution of the sample population, with females (16) accounting for 21.9% and males

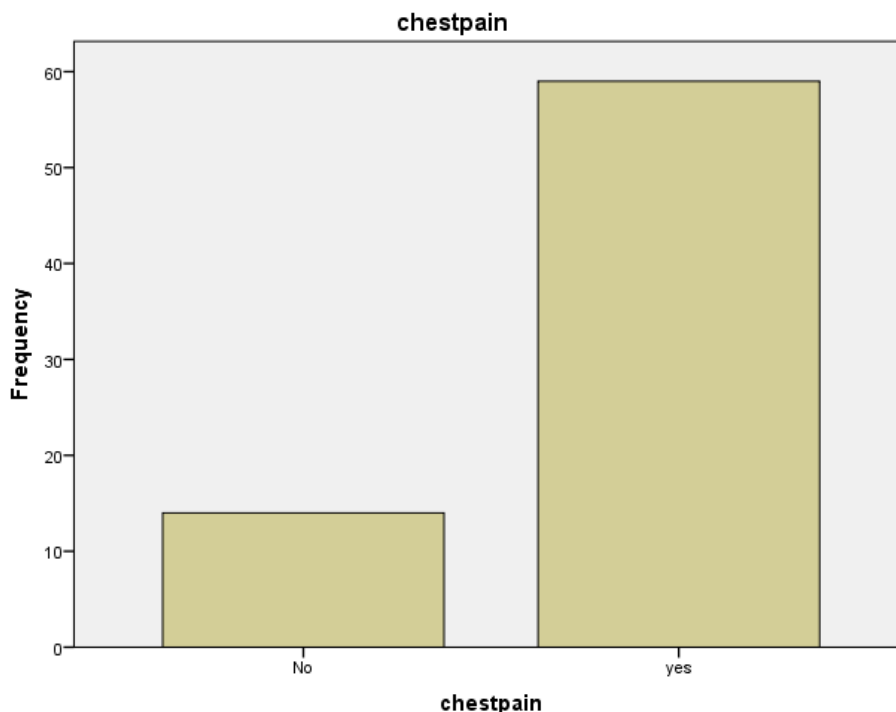
(57) for 78.1%, for a total of 73 participants. The cumulative percentage of both genders is 100%.

Table 4.2 Frequency Table of Chest Pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	20.5	20.5	100.0
	Yes	58	79.5	79.5	79.5
	Total	73	100.0	100.0	

According to Table 4.2, among the 73 patients assessed, 15 had no chest pain with a percentage

of 20.5%, while 58 with a percentage of 79.5% patients had chest pain.



According to Figure 4.2, among the 73 patients assessed, 15 had no chest pain with a percentage of 20.5%, while 58 with a percentage of 79.5% patients had chest pain.

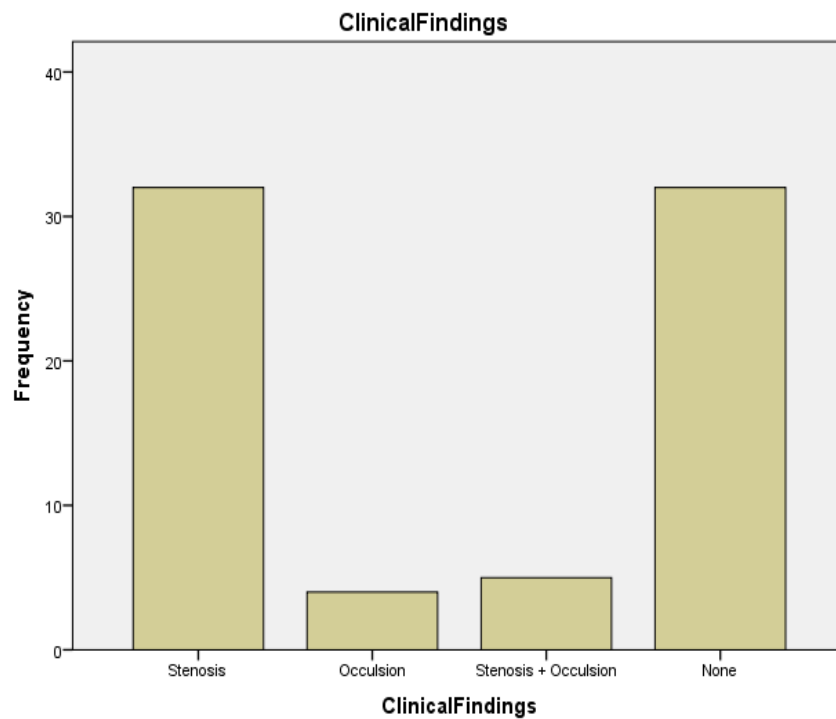
Table 4.3 Frequency Distribution of Clinical Findings

Clinical Findings

	Frequency	Percent	Valid Percent	Cumulative Percent
Stenosis	32	43.8	43.8	43.8
Occlusion	4	5.5	5.5	49.3
Valid Stenosis + Occlusion	5	6.8	6.8	56.2
None	32	43.8	43.8	100.0
Total	73	100.0	100.0	

Regarding table 4.3, there were 73 patients noticed, 32 showed stenosis with a percentage of 43.8%, 4 presented with occlusion with a percentage of

5.5%, 5 had both stenosis and occlusion with a percentage of 6.8%. 32 had no symptoms of stenosis and occlusion with a percentage of 43.8%.



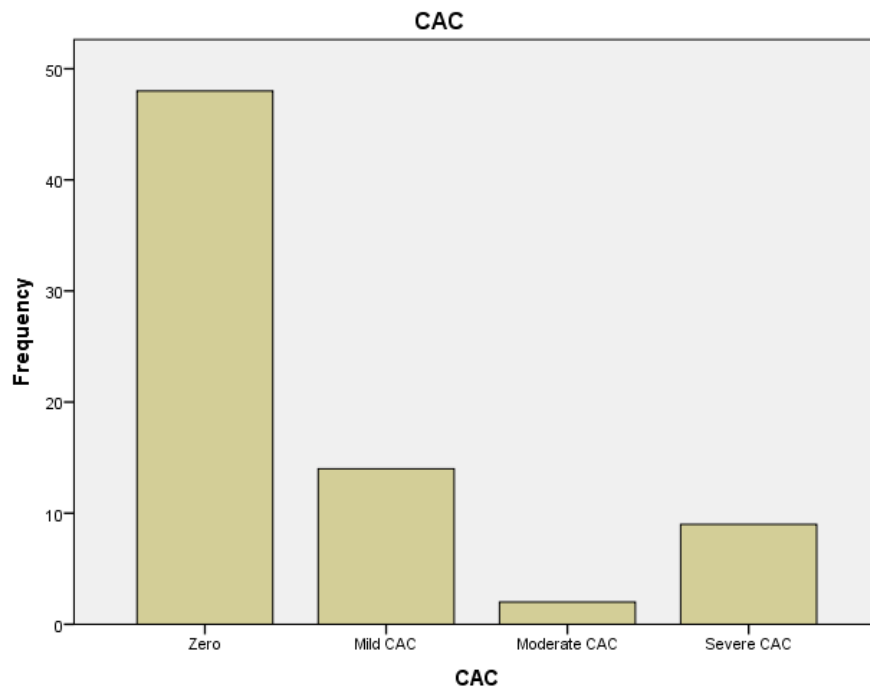
According to Figure 4.3 there were 73 patients noticed ,32 showed stenosis with a percentage of 43.8%, 4 presented with occlusion with a percentage of 5.5%, 5 had both stenosis and occlusion with a percentage of 6.8% .32 had no symptoms of stenosis and occlusion with a percentage of 43.8%.

Table 4.4 Frequency Distribution of CAC

	Frequency	Percent	Valid Percent	Cumulative Percent
Zero	48	65.8	65.8	65.8
Mild CAC	14	19.2	19.2	84.9
Moderate CAC	2	2.7	2.7	87.7
Severe CAC	9	12.3	12.3	100.0
Total	73	100.0	100.0	

In relation to Table 4.4, the total number of patients in the population sample is 73. Out of which, 48 patients were found to have zero CAC with a percentage of 65.8% , 14 were with mild

CAC with a percentage of 19.2%, 2 were presented with moderate CAC with a percentage of 2.7%, and 9 patients have Sever CAC with a percentage of 12.3%.



In relation to Figure 4.4 the total number of patients in the population sample is 73. Out of which, 48 patients were found to have zero CAC with a percentage of 65.8%, 14 were with mild

CAC with a percentage of 19.2%, 2 were presented with moderate CAC with a percentage of 2.7%, and 9 patients have Severe CAC with a percentage of 12.3%.

Table 4.5 Frequency Distribution of CAD

CAD		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	30	41.1	41.1	41.1
	Yes	43	58.9	58.9	100.0
	Total	73	100.0	100.0	

Table 4.5 shows the total number of patients in the population sample is 73. Out of which, 43 patients were found to have CAD with a

percentage of 58.9%, whereas 30 did not show any signs of CAD with a percentage of 41.1%.

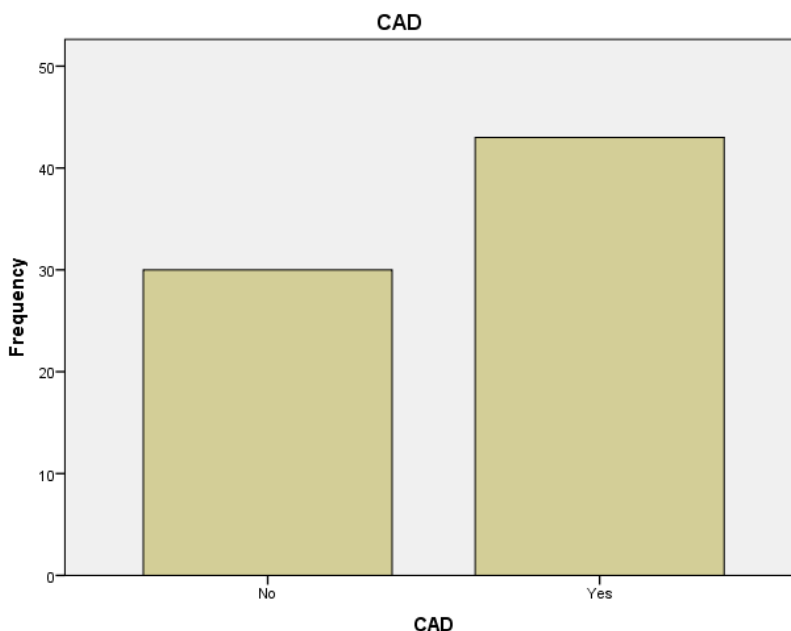


Figure 4.5: Frequency Distribution of CAD

Figure 4.5 the total number of patients in the population sample is 73. Out of which, 30 did not show any signs of CAD were found to have CAD with a percentage of

58.9%, whereas 43 patients with a percentage of 41.1%.

Table 4.6 Chest Pain * Stenosis Crosstabulation

		Stenosis		Total
		No	Yes	
Chest Pain	Yes	34	24	58
	No	5	10	15
Total		39	34	73

Table 4.6 shows the sample size was 73 participants. 34 participants had no stenosis, whereas 24 participants had stenosis. On the other

hand, out of those who were having chest pain, 5 participants had no stenosis, whereas 10 participants had stenosis.

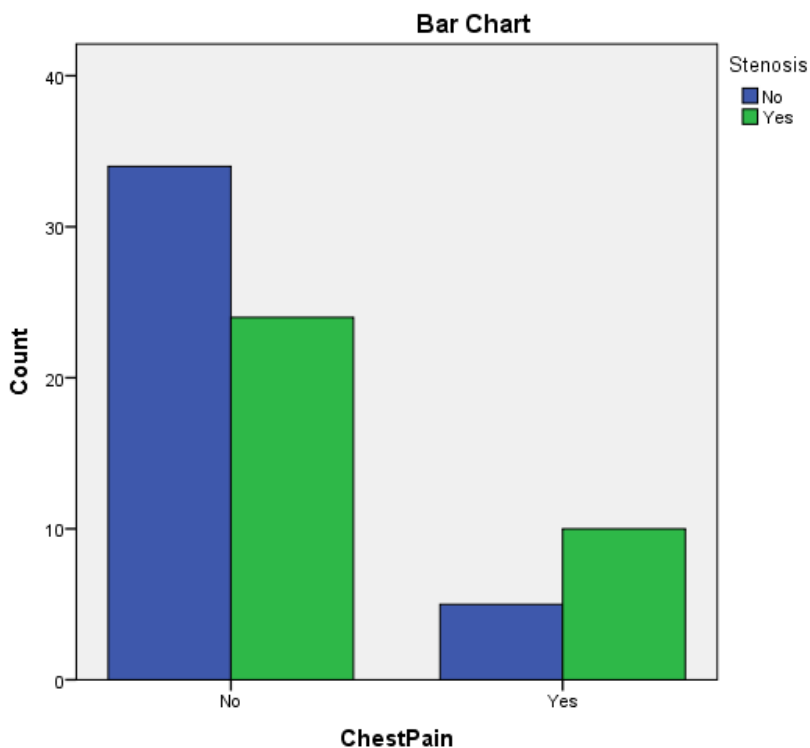


Table 4.6 shows the sample size was 73 participants. Among the patient presenting with chest pain, 5 participants had no stenosis, whereas 10 participants had stenosis. On the other hand, out of those who were not having chest pain, 34 participants had no stenosis, whereas 24 participants had stenosis.

Table 4.7 Crosstab of Chest Pain * Clinical Findings

		Clinical Findings				Total
		Stenosis	Occlusion	Stenosis Occlusion	+None	
Chest Pain	No	23	1	5	29	58
	Yes	9	3	0	3	15
Total		32	4	5	32	73

Table 4.7 shows that In this study, there were 73 participants altogether. Among those who did not suffer from any chest complaints, 29 were found

normal, 23 suffered from stenosis, five had stenosis along with another problem, and one person had occlusion.

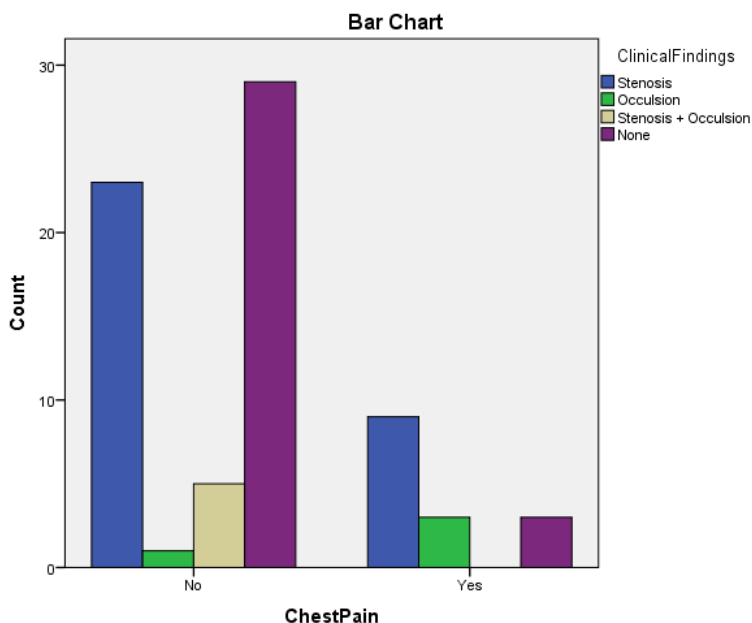


Figure 4.7 shows that in this study, there were 73 participants altogether. Among those who did not suffer from any chest complaints, 29 were found

normal, 23 suffered from stenosis, five had stenosis along with another problem, and one person had occlusion.

Table 4.8: Crosstab of Chest Pain and CAD

		CAD		Total
		No	Yes	
Chest Pain	No	25	33	58
	Yes	5	10	15
Total		30	43	73

Table 4.8 shows the total number of patients in the study was 73. Among those who did not suffer

from chest pain, there were 33 patients with CAD and 25 without.

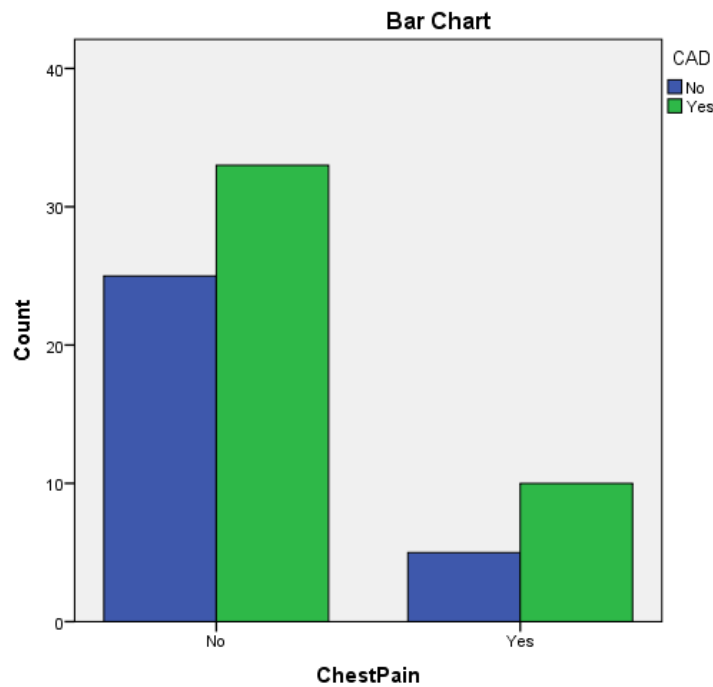


Figure 4.8 shows the total number of patients in the study was 73. Among those who did not suffer

from chest pain, there were 33 patients with CAD and 25 without.

Table 4.9 Chi-Square Test Chest Pain and CAD
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.470 ^a	1	.493
Likelihood Ratio	.479	1	.489
Linear-by-Linear Association	.464	1	.496
N of Valid Cases	73		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.16.

Table 4.9 shows that Pearson’s Chi Square Test was performed in order to explore whether or not there is any connection between the presence of chest pain and CAD. However, there were no statistically significant correlations identified from the results ($\chi^2 = 0.470$, $df = 1$, $p = 0.493$).

Moreover, the same goes for linear-by-linear association (0.464, $p = 0.496$) as well as for likelihood ratio (0.479, $p = 0.489$). All assumptions for performing the Chi Square Test were fulfilled as there were enough cases in every cell.

Table 4.10: Crosstab of Clinical Findings and CAC:

Count		CAC				Total
		Zero	Mild CAC	Moderate CAC	Severe CAC	
Clinical Findings	Stenosis	12	13	0	7	32
	Occlusion	1	1	2	0	4
	Stenosis + Occlusion	4	0	0	1	5
	None	31	0	0	1	32
Total		48	14	2	9	73

Table 4.10 shows this study included 73 subjects. The majority of the subjects (48), especially the one who didn't present any clinical symptoms (31), exhibited 0% CAC. There were a few severe cases (7), where the majority of the subjects with stenosis

condition had no (12) or mild CAC (13). There were very few subjects with occlusion or combined conditions, whose CAC score was either mild or severe.

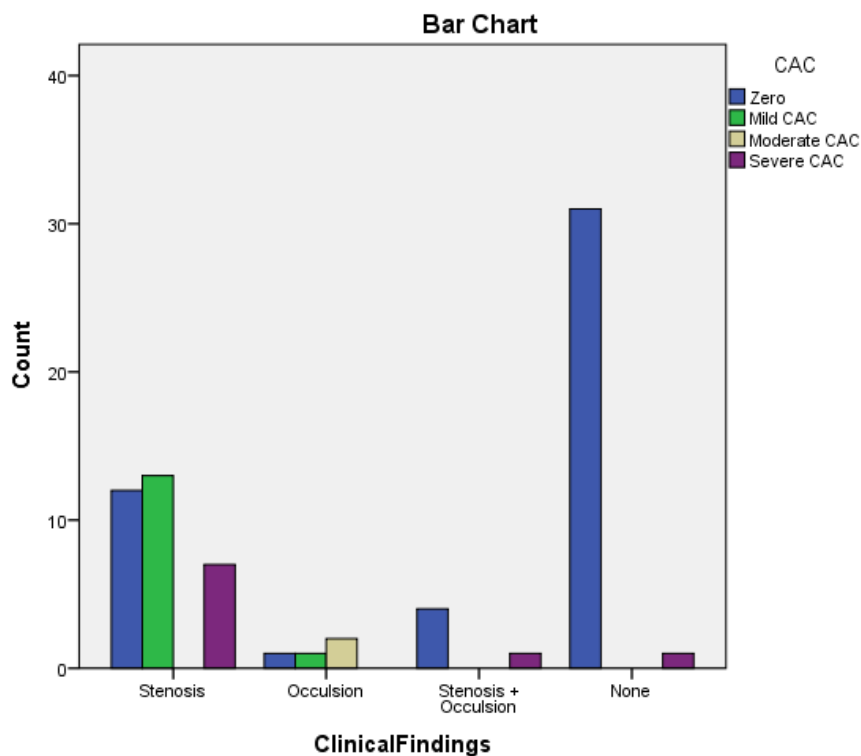


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condition had no (12) or mild CAC (13). There were very few subjects with occlusion or combined conditions, whose CAC score was either mild or severe.

**Table 4.11 Chi-Square Test of Clinical Finding and CAC:
Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	64.401 ^a	9	.010
Likelihood Ratio	48.096	9	.020
Linear-by-Linear Association	14.952	1	.010
N of Valid Cases	73		

a. 12 cells (75.0%) have expected count less than 5. The minimum expected count is .11.

Table 4.11 shows that Pearson’s Chi-Squared Test was applied to determine the relationship between clinical finding and CAC. The test revealed a significant relationship between the variables ($\chi^2=64.401$, $df=9$, $p=0.010$). Other statistically significant tests were linear by linear association (14.952, $p=0.010$) and likelihood ratio (48.096,

$p=0.020$). However, many cells contained expected frequencies of less than 5; hence, this may have an impact on the validity of the results. In conclusion, this study found out that there exists a significant relationship between clinical findings and CAC.

**Table 4.12: Crosstab of CAC and CAD:
CAC * CAD Crosstabulation**

Count		CAD		Total
		No	Yes	
CAC	Zero	29	19	48
	Mild CAC	1	13	14
	Moderate CAC	0	2	2
	Severe CAC	0	9	9
Total		30	43	73

Table 4.12 shows that the research comprised 73 patients. The majority of patients with zero CAC had no CAD (29), but mild (13), moderate (2), and

severe (9) CAD increased with greater CAC levels. In general, the presence of CAD was correlated with increased CAC.

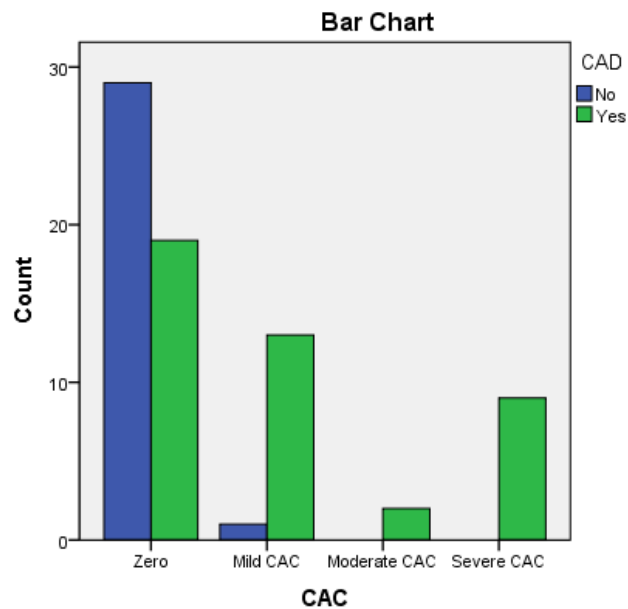


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severe (9) CAD increased with greater CAC levels. In general, the presence of CAD was correlated with increased CAC.

Table 4.13 Chi-Square Test of CAC and CAD:
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.744 ^a	3	.002
Likelihood Ratio	27.224	3	.001
Linear-by-Linear Association	16.567	1	.030
N of Valid Cases	73		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .82.

Table 4.13 shows that Chi-Square test of independence was done to assess the correlation between CAC and CAD. The results showed that it is a statistically significant correlation between CAC and CORONARY ARTERY DISEASE ($\chi^2 = 21.744\%$; $df = 3\%$; $p = 0.002\%$). Significant values of linear-by-linear association and likelihood ratio were 16.567% ($p = 0.030$) and 27.224% ($p = 0.001$), respectively. Reliability could be slightly affected since some cells had expected count less than five.

DISCUSSION

Seventy-three subjects with stable chest pain that were undergoing investigation using coronary

angiography were recruited in this study. It was aimed at assessing the role played by coronary artery calcium (CAC) scoring and coronary CT angiography (CTA) in augmenting diagnostic efficacy of coronary artery disease (CAD). Diagnostic power of these modalities was evaluated in terms of association between observations obtained from each patient, CAC score and presence of CAD. From the findings obtained from this current study, it was evident that a significant relationship existed ($p = 0.002$) between presence of CAD and increase in CAC scores. Subjects with CAC = 0 were associated with very low disease burden, but an increase in the CAC scores was associated with increased

likelihood of CAD. Subjects having stenosis and greater radiological burden were associated with severe coronary disease as observed through CTA. These findings indicate that whereas CTA enhances diagnostic ability through morphological depiction of coronary disease, CAC score predicts atherosclerotic burden.

As per Newby et al., the findings of the SCOT-HEART trial revealed that the addition of CTA to the usual treatment regime led to a significant increase in the certainty of diagnosis in patients with stable chest pain, improved the detection of coronary disease, and consequently reduced the incidence of myocardial infarction during follow-up periods [26]. The results obtained in the current study support the above statement since it was found that CTA aids in detecting CAD patterns during examination.

In another study conducted by Budoff et al., it was stated that the use of CAC scoring can predict coronary events independently and also correlates highly with CAD. Additionally, the authors pointed out that a zero CAC score implies a very low likelihood of any CAD being present [27]. This finding is supported by the current research as well, in which patients with a zero CAC score had almost negligible CAD.

Moreover, Douglas et al. demonstrated in the PROMISE trial that CTA-based anatomical testing was superior to traditional functional tests in identifying clinically significant CAD among symptomatic patients [28]. It was noted that, apart from improving diagnosis accuracy, CTA can also assist in formulating appropriate treatment plans in the future. The findings of this paper are also congruent with the current study since it proved that the application of CTA together with CAC scoring led to improved identification of CAD patients.

Also, it became evident from the current study that there is a strong correlation between the severity of CAD and high CAC scores. However, there is a considerable overlapping with low CAC scores, which suggests that there is a possibility for symptoms to develop even at the stage of early non-calcified plaques. This fact underscores one of the main limitations of using only the measurement of CAC scores, as the problem with the non-calcified

coronary plaque is underestimated. This is why it is crucial to conduct CTA imaging to receive additional insights about CAD. Combining CAC score and CTA for diagnosis and risk assessment of CAD in stable chest pain patients is an effective way to significantly improve patient management. While CTA provides detailed information concerning anatomical changes and enables the accurate diagnosis of coronary disease, CAC score is helpful for determining the risk factor. The combination of the two methods will allow making an informed decision about conducting further coronary angiography.

CONCLUSION

The usefulness of the coronary CTA and CAC scoring techniques can be demonstrated on those patients who have stable chest pain and undergo coronary angiography. As found in this study, coronary CTA and CAC score are efficient imaging techniques, which help significantly improve diagnosis of CAD. The presence of calcium correlates well with coronary atherosclerotic plaque, since, as shown in the study, an increase in the CAC score leads to a higher probability of the presence of CAD. With the aid of coronary CTA technique, the accuracy of the diagnosis improved further due to providing an accurate visualization of coronary anatomy and detection of stenosis, which would remain invisible during clinical examination. Although CTA was more helpful for anatomical analysis of the coronary arteries, the CAC score could serve as a risk stratification tool prior to CTA.

Limitation

One needs to highlight the restrictions of this investigation. The representativeness of the obtained outcomes may be affected by the small number of patients involved in the research, which was only 73 patients. The selection bias may occur in the single-center nature of this study. In addition, proving a causality relation between the presence of any anomalies identified via CAC/CTA and CAD is challenging because of the cross-sectional design of the research. Diagnostic accuracy may be affected by technical factors like motion artifacts or differences in

interpreting CT images. Moreover, the noncalcified plaques may not be fully assessed through the CAC scoring, and image quality may affect CTA results. The analysis of the outcomes is also restricted by the lack of longitudinal data available. Nonetheless, despite some disadvantages, the study provides valuable insights regarding the role of CTA and CAC scoring for diagnosing CAD.

Recommendations

In order to ensure generalizability and reliability of the study findings, it would be prudent that future studies adopt a multicentric methodology and larger sample sizes. For the purposes of evaluating the predictive capacity of CAC and CTA in the prediction of future cardiovascular outcomes in patients suffering from stable chest pain, it would be essential for a prospective longitudinal study to be performed. In addition, in order to minimize variations, standardization of the imaging techniques and methods of interpretation is recommended. In addition, in order to develop more accurate and comprehensive diagnostic tools for coronary artery disease, future studies should focus on combining CAC score with CTA and other clinical markers.

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