Original Article

The Real-World Spectrum of Coronary CT Angiography Findings: Patterns and Vessel Distribution

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ABSTRACT

Objective: To describe the spectrum of documented CCTA findings, the extent of coronary involvement, and the distribution of involved coronary territories in a tertiary-care clinical dataset.
Study Design: Retrospective observational cross-sectional study.
Place and Duration of Study: This study was conducted at the Tertiary Cardiac Center, Saudi Arabia, from 6th May 2026 to 30th July 2026.
Methodology: This retrospective cross-sectional study was conducted in 2026 using historical clinical/procedural records from patients attending the cardiac clinic or catheterization service between 1 September and 31 December 2025. The study was approved by the Research Ethics Committee of King Faisal University in May 2026. After excluding records without a usable coronary CCTA entry and four non-coronary vascular CT entries, 172 eligible CCTA-related records remained. To avoid repeated counting, one index record per patient was used, yielding 153 patients for analysis.
Results: Among 153 index CCTA records, 113 (73.9%) documented severe stenosis, total occlusion, or explicit three-vessel disease; 29 (19.0%) documented moderate disease, 3 (2.0%) mild disease, and 3 (2.0%) normal coronary arteries. Five records (3.3%) contained other coronary findings that could not be placed in these stenosis categories. A single or isolated named coronary territory was documented in 104 patients (68.0%), while 40 (26.1%) had multi-vessel involvement. LAD territory involvement was most frequent (102, 66.7%), followed by RCA (52, 34.0%) and LCX (35, 22.9%); multiple territories could be present in one patient.
Conclusion: The analyzed tertiary-care records showed a predominance of advanced coronary findings and frequent LAD involvement. These results describe a selected clinical population and should not be interpreted as population prevalence. Standardized prospective CCTA reporting would improve future analyses of disease pattern and distribution.

Key Words: coronary computed tomography angiography; coronary artery disease; vessel distribution; multivessel disease; tertiary care; retrospective study

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INTRODUCTION

Coronary artery disease (CAD) remains a major cause of cardiovascular morbidity and mortality. CCTA has become an established non-invasive anatomical test for patients with suspected coronary disease and is incorporated into contemporary chest-pain pathways[1].

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The 2024 European Society of Cardiology guideline also places CCTA among the principal first-line anatomical tests for chronic coronary syndromes[2].

CCTA describes more than the presence or absence of an obstructive lesion. Standardized systems such as CAD-RADS 2.0 emphasize stenosis severity, plaque burden, and modifiers that can affect interpretation and management[3]. Randomized evidence from SCOT-HEART showed that adding CCTA to standard assessment can alter diagnosis and management and was associated with improved long-term coronary outcomes[4]. PROMISE demonstrated the practical role of anatomical testing in a large population with stable chest pain[5], while the DISCHARGE trial further established CT as a clinically useful anatomical strategy in selected patients referred for evaluation of stable chest pain[6].

The clinical value of CCTA also depends on the pattern of disease that is identified. Plaque characteristics on

CCTA have been associated with subsequent cardiovascular events[7], and contemporary reviews emphasize the contribution of CCTA to anatomical risk stratification[8]. Meta-analytic data support the prognostic value of CCTA findings across clinical populations[9]. Even non-obstructive CAD detected on CCTA may carry prognostic information and may influence preventive treatment[10].

The distribution of findings seen in practice is strongly influenced by referral setting. Patterns reported by a tertiary cardiac service may differ from those in lower-risk outpatient or screening populations because patients with established CAD, previous revascularization, recurrent symptoms, or complex anatomy are more likely to be represented. Geographic variation in CCTA use and referral has also been documented[11]. Changes in medical management after CCTA further illustrate why local case mix and the spectrum of recorded findings are clinically relevant[12].

For this reason, a clear description of the CCTA findings encountered in routine tertiary practice can provide useful information about local disease patterns without implying population prevalence. The present study therefore aimed to describe the spectrum of documented CCTA findings, the extent of coronary involvement, and the distribution of involved coronary territories in a tertiary-care clinical dataset.

METHODOLOGY

Study design, setting, and chronology: This retrospective cross-sectional study was conducted in 2026 at a tertiary cardiac center using historical clinical/procedural records. The study population was drawn from patients attending the cardiac clinic or catheterization service between 1 September and 31 December 2025. The study was approved by the Research Ethics Committee of King Faisal University on 5 May 2026 (KFU-REC-2026-MAY-ETHICS4265).

Study population and eligibility: The source dataset contained 471 clinical/procedural records during the study period. Records were eligible when a coronary CCTA finding was documented in the designated CCTA field. Records with a blank entry or an entry documented as "No CT" were not included. Four entries represented non-coronary vascular CT findings (aortic/abdominal aortic aneurysm or peripheral arterial findings) and were excluded. This left 172 eligible coronary CCTA-related records from 153 unique patients. Because some patients appeared more than once, the first eligible record during the study period was defined as the index record; 19 additional records from repeated patients were not counted again in the patient-level analysis.

CCTA data and classification: The analysis used the documented CCTA interpretation available in the source records. Original scanner acquisition parameters, image-quality scores, and complete CAD-RADS variables were not consistently available, and the CT images were not re-read for this study. The recorded text was therefore classified conservatively according to the information explicitly documented.

For the spectrum analysis, index records were grouped as: normal coronary arteries; mild CAD; moderate CAD/stenosis; severe stenosis, total occlusion, or explicitly documented three-vessel disease; and other coronary findings. Entries describing severe calcification without an accompanying stenosis grade, a patent stent, or a jailed branch were retained as "other coronary findings" rather than being assigned a stenosis category. No severity was inferred when it was not stated.

For anatomical distribution, LAD territory included LAD and diagonal-branch descriptions; LCX territory included LCX and obtuse-marginal descriptions; and RCA territory included RCA and posterior descending artery descriptions. Left-main, ramus intermedius, and graft findings were recorded separately. Explicit "3VD" entries were counted as involving LAD, LCX, and RCA territories. Because more than one territory could be involved in a patient, vessel-specific percentages are not mutually exclusive. Disease extent was classified as normal, single/isolated named territory, multivessel involvement, or no specific vessel named.

Statistical analysis: The analysis was descriptive and patient based. Categorical variables are reported as counts and percentages using 153 index patients as the denominator. No CCTA-versus-invasive-coronary-angiography comparison, diagnostic-accuracy calculation, or inferential model was included in the present analysis because these were outside the descriptive study objective.

RESULTS

From 471 source records, 176 contained a CT finding in the CCTA field. Four non-coronary vascular CT entries were excluded, leaving 172 eligible coronary CCTA-related records. These represented 153 unique patients; after selecting one index record per patient, the final patient-level analysis included 153 CCTA records (Figure 1).

Table No.1: Spectrum of documented CCTA findings (n = 153 patients)

Documented CCTA category	n	%
Severe stenosis, total occlusion, or explicit 3VD	113	73.9
Moderate CAD/stenosis	29	19.0
Mild CAD	3	2.0
Normal coronary arteries	3	2.0
Other coronary finding	5	3.3
Total	153	100.0

Categories were assigned from the documented CCTA text. "Other" included findings such as severe calcification without a stated stenosis grade, patent stent, or jailed branch.

Demographic and cardiovascular risk-factor fields were available for only a small minority of the index records and were therefore not summarized as cohort characteristics.

Advanced findings predominated. Severe stenosis, total occlusion, or explicitly documented three-vessel disease was present in 113 patients (73.9%). Moderate disease was documented in 29 (19.0%), while mild disease and normal coronary arteries were each documented in 3 patients (2.0%). Five patients (3.3%) had other coronary findings that could not be assigned reliably to the stenosis categories (Table 1).

Table No. 2: Extent of documented coronary involvement (n = 153 patients)

Extent category	n	%
Single/isolated named coronary territory	104	68.0
Multivessel involvement	40	26.1
No specific vessel named	6	3.9
Normal coronary arteries	3	2.0
Total	153	100.0

Multivessel involvement was based on two or more named major epicardial territories or an explicit 3VD entry.

A single or isolated named coronary territory was recorded in 104 patients (68.0%), whereas 40 (26.1%) had multivessel involvement. Six records (3.9%) described coronary disease without naming a specific vessel, and 3 (2.0%) were normal (Table 2).

Table No.3: Distribution of documented coronary territories (n = 153 patients)

Coronary territory	n	% of patients
LAD territory	102	66.7
RCA territory	52	34.0
LCX territory	35	22.9
Ramus intermedius	5	3.3
Left main	3	2.0
Coronary graft	3	2.0

Multiple territories could be documented in the same patient; therefore, percentages do not sum to 100%. LAD includes diagonal branches, LCX includes obtuse-marginal branches, and RCA includes PDA descriptions.

LAD territory was the most frequently documented location, occurring in 102 patients (66.7%). RCA and LCX territories were documented in 52 (34.0%) and 35 (22.9%), respectively. Left-main involvement was recorded in 3 patients (2.0%). Because multivessel disease was common, these vessel-specific categories overlap (Table 3).

DISCUSSION

This revised analysis addresses a single question: what spectrum and anatomical distribution of CCTA findings was documented in the selected tertiary-care population? The main observation was the predominance of advanced coronary findings. Nearly three quarters of index records described severe stenosis, total occlusion, or explicit three-vessel disease. This should be interpreted as a feature of the source population rather than as an estimate of CAD prevalence in the community.

The selected nature of the cohort is clinically plausible. CCTA is now an important non-invasive anatomical test in the assessment of suspected CAD and can influence subsequent diagnostic and therapeutic decisions[13]. Its value extends beyond identifying a single stenosis: it can define the location and extent of coronary disease, demonstrate non-obstructive atherosclerosis, and identify patterns that may guide preventive treatment or the need for further evaluation[10,14]. The clinical meaning of these findings nevertheless depends on the referral population and pre-test context, which is particularly relevant in a tertiary cardiac service[15].

LAD territory was the most frequently documented coronary location in the present dataset. A regional CCTA study has also reported substantial variation in coronary anatomical patterns and disease distribution[16]. Direct numerical comparison is difficult because populations, definitions, and reporting methods differ. In our analysis, vessel percentages were intentionally allowed to overlap so that multivessel records could contribute to each documented coronary territory rather than being forced into a single mutually exclusive vessel category.

The high proportion of advanced findings also reflects the referral profile of a tertiary clinical/procedural population. CCTA has high sensitivity for coronary disease in appropriately selected patients[17], but an anatomical estimate of stenosis on CT does not by itself establish the physiological significance of a lesion. Heavy coronary calcification and related technical limitations can impair lumen assessment and may lead to overestimation of stenosis severity[18,19]. In clinical practice, an apparently severe or equivocal lesion on CCTA may therefore require further assessment when the result will determine revascularization, including invasive angiography and, for selected intermediate lesions, physiological assessment. This distinction is relevant to the present cohort, although the current study was not designed to measure CCTA-ICA agreement or functional significance.

The present findings should therefore be interpreted as a description of what CCTA contributed anatomically in routine tertiary practice rather than as a diagnostic-accuracy analysis. The study shows that CCTA records in this setting contained information ranging from normal or mild disease to severe stenosis, occlusion, and multivessel involvement, with LAD involvement particularly common. This breadth is clinically useful because both non-obstructive and obstructive CCTA findings carry prognostic information and may influence preventive treatment and downstream

investigation[10,21]. At the same time, CCTA should be viewed as one component of clinical decision-making rather than a substitute for physiological assessment when the functional significance of a particular stenosis remains uncertain. Current international guidance continues to support CCTA as an important anatomical test in chronic coronary syndromes[2,22].

CONCLUSION

In this tertiary-care patient-level analysis, advanced coronary findings were common and LAD was the most frequently documented coronary territory. Multivessel involvement was present in approximately one quarter of patients. These findings characterize the selected clinical dataset and should not be interpreted as population prevalence. Prospective collection using standardized CCTA reporting and complete clinical variables would allow more detailed assessment of disease patterns and their clinical significance.

Limitations: This study has several limitations. It was retrospective, single-center, and based on a selected tertiary-care clinical/procedural dataset rather than a population-based CCTA registry. The source dataset did not contain complete demographic, risk-factor, indication, scanner, image-quality, or standardized CAD-RADS information for the full cohort. Consequently, these variables could not be analyzed reliably. CCTA findings were classified from documented text and the original images were not re-read. Some source descriptions were non-standardized, requiring conservative grouping; no unstated severity or vessel involvement was inferred. Although 172 eligible CCTA-related records were identified, repeated appearances of the same patient were present, so one index record per patient was used to avoid repeated counting. This choice may omit later findings recorded during the study period. The high proportion of severe disease likely reflects referral and selection patterns and should not be generalized to the wider community. Clinical outcomes were not assessed.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Emad Ali Al Khoufi
Drafting or Revising Critically:	Emad Ali Al Khoufi
Final Approval of version:	The above author
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REFERENCES

1. Gulati M, Levy PD, Mukherjee D, et al. 2021 AHA/ACC guideline for the evaluation and diagnosis of chest pain. Circulation 2021;144: e368-e454. doi:10.1161/CIR.0000000000001029.
2. Vrints C, Andreotti F, Koskinas KC, et al. 2024 ESC Guidelines for the management of chronic coronary syndromes. Eur Heart J 2024;45:3415-3537. doi:10.1093/eurheartj/ehae177.
3. Cury RC, Leipsic J, Abbara S, et al. CAD-RADS 2.0: 2022 Coronary Artery Disease-Reporting and Data System. J Cardiovasc Comput Tomogr 2022;16:536-557. doi:10.1016/j.jcct.2022.07.002.
4. Newby DE, Adamson PD, Berry C, et al; SCOT-HEART Investigators. Coronary CT angiography and 5-year risk of myocardial infarction. N Engl J Med 2018;379:924-933. doi:10.1056/ NEJMoa1805971.
5. Douglas PS, Hoffmann U, Patel MR, et al; PROMISE Investigators. Outcomes of anatomical versus functional testing for coronary artery disease. N Engl J Med 2015;372:1291-1300. doi:10.1056/NEJMoa1415516.
6. Maurovich-Horvat P, Bosserdt M, Kofoed KF, et al; DISCHARGE Trial Group. CT or invasive coronary angiography in stable chest pain. N Engl J Med 2022;386:1591-1602. doi:10.1056/ NEJMoa2200963.
7. Williams MC, Moss AJ, Dweck M, et al. Coronary artery plaque characteristics associated with adverse outcomes in the SCOT-HEART study. J Am Coll Cardiol 2019;73:291-301. doi:10.1016/j.jacc.2018.10.066.
8. van Rosendael SE, Shiyovich A, Cardoso RN, et al. The role of cardiac computed tomography angiography in risk stratification for coronary artery disease. J Soc Cardiovasc Angiogr Interv. 2024;3:102230. doi:10.1016/j.jscai.2024.102230.
9. Hulten EA, Carbonaro S, Petrillo SP, et al. Prognostic value of cardiac computed tomography angiography: a systematic review and meta-analysis. J Am Coll Cardiol 2011;57:1237-1247. doi:10.1016/j.jacc.2010.10.011.
10. Bittencourt MS, Hulten E, Ghoshhajra B, et al. Prognostic value of non-obstructive and obstructive coronary artery disease detected by coronary computed tomography angiography. Circ Cardiovasc Imaging 2014;7:282-291. doi:10.1161/CIRCIMAGING.113.001047.
11. Banashefski B, Ji R, Dhruva SS, et al. Cardiac coronary tomography angiography use across geographical regions in the USA and UK. BMJ Surg Interv Health Technol 2023;5:e000201. doi:10.1136/bmjsit-2023-000201.
12. Naue VM, Camargo G, Sabioni LR, et al. Changes in medical management after coronary CT

angiography. Arq Bras Cardiol 2015;105:410-417. doi:10.5935/abc.20150088.
13. Williams MC, Hunter A, Shah ASV, et al. Use of coronary computed tomographic angiography to guide management of patients with coronary disease. J Am Coll Cardiol 2016;67:1759-1768. doi:10.1016/j.jacc.2016.02.026.
14. Tonet E, Boccadoro A, Micillo M, et al. Coronary computed tomography angiography: beyond obstructive coronary artery disease. Life (Basel) 2023;13:1086. doi:10.3390/life13051086.
15. Camacho-Mondragon CG, Ibarrola-Peña JC, Lira-Lozano D, et al. Clinical applications of cardiac computed tomography: a focused review for clinical cardiologists. J Cardiovasc Dev Dis 2025;12:375. doi:10.3390/jcdd12100375.
16. Al Ewaidat H, Oglat AA, Al Makhadmeh A, et al. Correlation between coronary arterial dominance and the degree of coronary artery disease using computed tomography angiography. J Multidiscip Healthc 2025;18:1827-1844. doi:10.2147/JMDH.S514510.
17. Budoff MJ, Dowe D, Jollis JG, et al. Diagnostic performance of 64-multidetector row coronary computed tomographic angiography: results from the prospective multicenter ACCURACY trial. J Am Coll Cardiol 2008;52:1724-1732. doi:10.1016/j.jacc.2008.07.031.
18. Arbab-Zadeh A, Miller JM, Rochitte CE, et al. Diagnostic accuracy of computed tomography coronary angiography according to pre-test probability and severity of coronary calcification: CORE-64. J Am Coll Cardiol 2012;59:379-387. doi:10.1016/j.jacc.2011.06.079.
19. Meijboom WB, Meijs MFL, Schuijf JD, et al. Diagnostic accuracy of 64-slice computed tomography coronary angiography. J Am Coll Cardiol 2008;52:2135-2144.
20. Yu L, Liu X, Leng S, et al. Radiation dose reduction in computed tomography: techniques and future perspective. Imaging Med 2009;1:65-84. doi:10.2217/iim.09.5.
21. Košuta D, Jug B, Fras Z. Prognostic impact of nonobstructive coronary artery disease detected by coronary computed tomographic angiography. Angiol 2021;72:749-753. doi:10.1177/0003319721999494.
22. Knuuti J, Wijns W, Saraste A, et al. 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes. Eur Heart J 2020;41:407-477. doi:10.1093/eurheartj/ehz425.