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Research Article

**FINDINGS OF COMPUTED TOMOGRAPHY ANGIOGRAPHY
RESULTS IN STENOSIS OF LEFT MAIN CORONARY ARTERY**Dr. Muhammad Rizwan Khan^{1*}, Dr. Hira Naveed², Dr. Madeha Arshad³, Dr. Ali Arshad⁴¹MO, BHU Thamywali, Mianwali.²PGR, Shaukat khanum Memorial Hospital, Lahore.³WMO, DHQ Hospital, Kasur

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Abstract:

Stenosis of Left main coronary artery is a subgroup of risk for high disease of coronary artery however, its appearance may be misinterpreted by CT angiography. In five patients with clinically very suspicious and angiographically limited LMCA disease Coronary CT angiography was performed. CCTA cross-sectional image was used to measure the diameter.

Objective: *To know the findings of CT Angiography of Left Main Coronary Artery.*

Place and Duration: *The Study was performed in Nishtar Hospital, Multan for the period of 1 year from Jan 2016 to Jan 2017 after the approval from the ethical committee.*

Patients and Methods: *This is an observational Study Performed on 130 Individuals with Changes in ECG due to left main coronary artery stenosis and findings of CT Angiography were compared for the correlation.*

Conclusion: *On our observations based study, we believe that CCTA may have very important diagnostic role in LMCA patients with lesions of CT angiographic ally uncertain or unresponsive AMC lesions and should be considered for the evaluation of patients selected for study before undergoing bypass coronary surgery. A suitable gold standard such as IVUS is required to confirm the CCTA for the main root stenosis.*

Key words: *CT Angiography, LMCA, Stenosis.*

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INTRODUCTION:

The gold standard investigation for the measurement of coronary artery disease is Coronary angiography (CA). However, many reported studies show that there is a non-satisfactory correlation between angiographic and histological findings, especially in evaluating LMCA. In addition, ostium LMCA injuries may be misdiagnosed by patients most of whom are LMCA moderate patients. LMCA Presence of disease, significant therapeutic and prognostic effects. In patients having LMCA disease significantly present with 50% stenosis diameter, bypass coronary surgery significantly improves survival rate. Not needed bypass coronary surgery can reveal improper use of existing premature and grafts occlusion of natural vessels or grafts. CCTA who used multidetector CT scanner is a blood free three-dimensional technique of imaging that gives an excellent view of the heart and in vivo coronary arteries.

Coronary Artery unusually is the transverse nature of the ECCT may allow an evaluation of the plaque, vessel wall display, and the LMCA precise lesion accurately. In addition, the reference diameter (RD) assessed by the CCTA required to calculate the stenosis degree and the minimum diameter of the lumen (MLD) without forcing it. Caussin et al recently measures the adequacy and precision of measuring the minimum lumen area (MLA) of AKST (using 64-line MDCT) and determining the severity of the lesion in the mid-stenosis compared with the intravascular ultrasound (IVUS). According to the results, CCTA could quantify stenosis of coronary artery with good correlation when have IVUS comparison, and measure the injury severity in patients with moderate lesions due to Coronary Artery disease. In this article, we describe AKST findings in five patients who are clinically very likely to be affected but angiographically limited disease by LMCA who were able to assess fully the involvement of LMCA's and help me make treatment decisions.

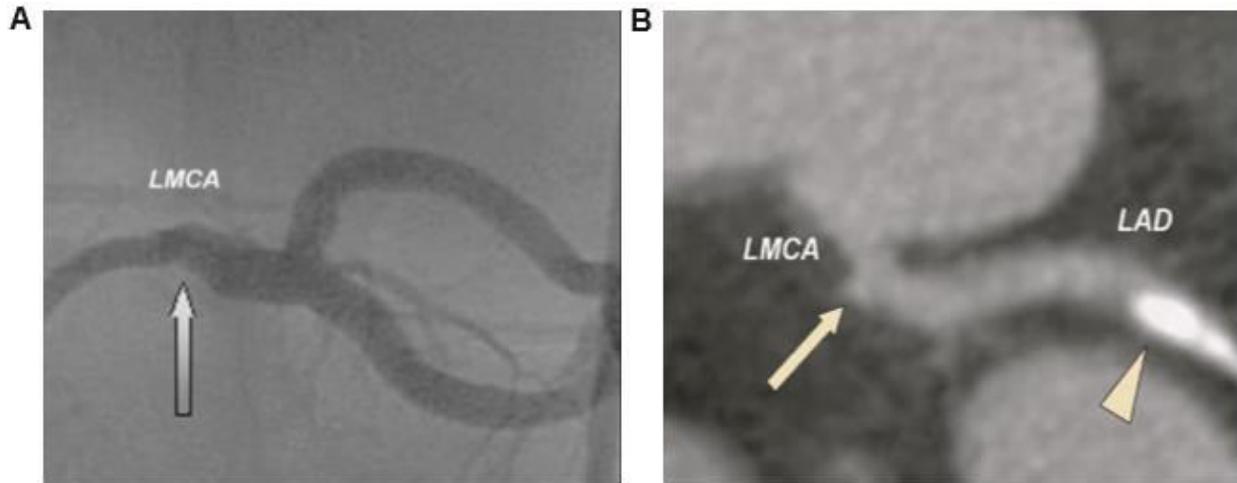
MATERIALS AND METHODS:

During a 4 months period, five patients (47-70 years) underwent LMCA angiographic evaluation and CCTA. These coronary disease patients had ischemic symptoms prior to angiography of diagnostic

purpose, and the severity of the lesion of LMCA was not assessed angiographically (Three patients ostial, distal: one patient and half: one patient). Four of them were female. In patient No. 1, bypass coronary surgery was performed 2 years ago due to LMCA ostium disease. In four patients, the default treatment option was CABG. The time duration between CCTA and CA is five to ten days. Consent in written from all subjects included in the study was obtained.

Multi detector CT scanning concurs was performed using ECG-protected Coronary computed tomography angiography, (TCMD) multidetector computed tomography scanner, Milwaukee, WI). The following parameters for scan were used: collimation detector 64.0×0.635 mm, rotation hook time 0.36 seconds, thickness cut was 0.7 mm, tube voltage 120 kV, step interval 0.3-0.39. If the resting heart rate was above 70 beats per minute in individuals taking β -blocker 2 hours before the test (50 to 100 mg atenolol oral). Nitroglycerin sublingually to all subjects was given before they were scanned. Bolus intravenous (4 ml / sec) was injected from a gauge catheter of 18 placed in Ven into a Iomeron 71-81 ml, iomeprol 400 mgI / ml, Milano, Bracco. antecubital, followed by 40 ml bolus saline solution. The delay in scan was measured as per of the Smart Readiness program (out zone, automatic bolus test, ascending aorta). Subjects were asked to teach inspiratory breathing, where CT data and ECG monitor were made. 40%, 70% and 80% of data sets were obtained at the R-R cycle. On a separate workstation image data set was organised.

By two experienced radiologists coronary arteries were seen who were unknown to the results of QCA. The morphology, diameter, and concomitant changes of the atheromatous wall of the LMCA were evaluated. Maximum projection intensity and multi-plane rebuilding were used to select the most corrected region. In arterial reconstruction of the section measurements recorded. RD and MLD were manually pulled in transverse section reconstruction. RD and MLD were accessed in the diastolic period. Manually contrast window set to visualize the optimal arterial walls. Objective deformity was differentiated with the reference segment. In Figures 1 and 2 Clinical examples are given.



Coronary angiography:

As standard Coronary angiography was implemented prior to CA, all patients received intracoronary nitroglycerin (200 µg). During ventricularisation pressure was checked. QCA (Quantitative coronary angiography) was done by two experienced and independent technicians who were unaware of the results of the CCTA using authenticated and MDQM-QCA automated edge detection software according to a pre-approved and protocols of publications. On at least 5 projections LMCA was shown per patient. In the enddiastolic frame the MLD was calculated from angiographic projections showing the Bad view. RD angiographically used to measure normal segment.

RESULTS: Total sections of LMCA were evaluated as evaluable. CCTA and CA features are shown in Table 1. The table shows a good relation between CCTA RD and QCA RD and a large

difference of CACE and CCTA in terms of stenosis and MLD grade. In particular, in 3 patients with LMCA ostial disease and pressure ventriculosis, CCTA did not find significant ostial stenosis. Morphologically, however, each patient had minimal changes in osteoporosis of the LMCA (aortic-coronary junction acute detachment angle) and atheromatous eccentric wall (Fig. 1). The left internal mammary artery (LIMA) graft was completely obstructed in the (LAD) after CABG (# 1). LMCA (# 4) patient angiographically mediated disease, ECCT revealed the biconcave image of the main left vessel without any wall deformity. The angiographic LMCA intermediate distal stenosis (n = 5) according to CCTA showed a mild stenosis. Morphologically LMCA diminishing with minimum changes in the vessel wall of atheromatous type in the lesion area (Figure 2).

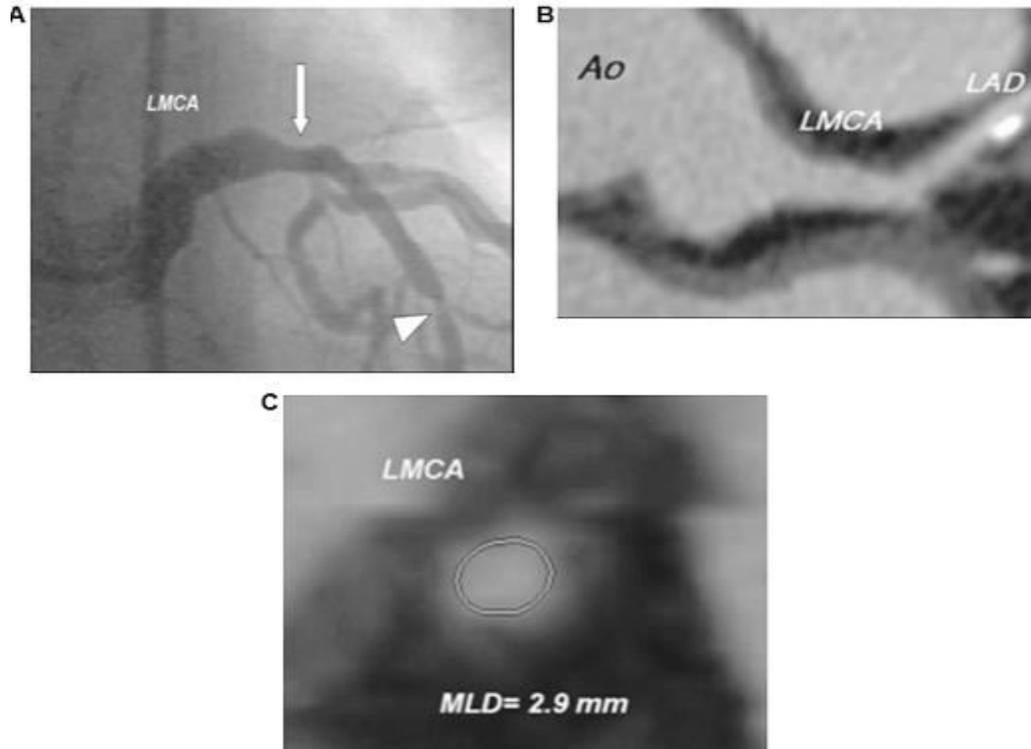


Figure 2. A 55-year-old patient with angiographically intermediate distal LMCA stenosis (arrow) (A). The arrowhead shows a significant mid LAD stenosis. The LMCA had a tapering morphology on CCTA and only minimal atheromatous changes (B). The cross-section image represents the MLD at lesion site (C). Result of analysis of AKST, all the patients were medically treated. In one of the patient (# 5), percutaneous coronary intervention (PCI) was performed for a significant mean stenosis of DA. The damage was diagnosed by both diagnostic modalities. During the follow-up period (16-24 months) there was no myocardial infarction or death.

DISCUSSION:

The angiographic specification of stenosis of LMCA has clear limitations in terms of evaluation of the degree of quantification and narrowing of changes as atheromatous in the vessel wall. In addition, the investigated motorways are It has been reported that LMCA is mildly sick, and these cases are often markedly stenosis by angiography. Several studies have shown that there is a limited relationship between luminal dimensions of IVUS and CA. Abizaid et al. reported that DS and MLD IVUS were poorly differentiated with DS and QCA MLD in patients with LMCA stenosis. Interestingly, in the patients we assessed, CA was overestimated as having 3 LMCA ostial lesions and 1 hemangiopericytic lesion and 1 division. Stenosis can be prevented in the ostial and bifurcation lesions by overlaying structures with contrast-filled. By knowing the objective LMCA disease is confused with the "sit" the lesion beyond of the catheters; this requires a contrast reflex for adequate visualization in the aorta. The reflux in contrast fills the CUSPS of aorta, which can hide the damage. Moderate stenosis (ranging from 40% to 75% on angiography) are

problematic particularly in patients who have difficulty assessing their symptoms. Some of these patients undergo an unwanted revascularization surgery by the cardiologist based on the pressure ventricularization observed during AC.

In fact, a very early operation of this type of patients in our patient (case 1) caused closing of the LIMA-LAD graft prematurely, which further highlighted the angiographic insignificance findings of the LMCA. Morphologically, there was an ostial opening in LMCA AKST in this patient; Such an anatomical point may affect the angiographic assessment. Same findings were found in two other LMCA angiographically ostial (cases 2 and 3) patients. Limitation of angiography was previously explained in various studies. In addition, AC and CCTA difference may be because of the evidence that in the CA eccentric stenosis depends on the presence of a projection which shows real MLD. For this reason, a true 3D reference standard is required. Although, the esterage of the proximal LMCA is sometimes caused by a thin ostial membrane.

Table 1. Characteristics of patients and LMCA angiographic and CCTA findings.

Patient/ sex/age	CA					CCTA				Treatment	Follow-up
	PV	RD (mm)	MLD (mm)	DS (%)	Site	RD (mm)	MLD (mm)	DS (%)	Morphology		
1/F/52	+	3.8	1.8	53	Ostial	3.4	3.0	12	Ostial angulation	Medical	24 Mo
2/F/70	+	4.4	2.0	55	Ostial	4.5	3.1	31	Ostial angulation	Medical	16 Mo
3/F/46	+	3.2	2.0	38	Ostial	3.5	3.0	14	Ostial angulation	Medical	18 Mo
4/F/52	-	4.7	2.9	38	Mid	5.5	5.0	9	Biconcave	Medical	16 Mo
5/M/55	-	5.0	2.7	46	Distal	4.2	2.9	31	Tapering	Medical	24 Mo

This membrane may be too thin to be displayed correctly by the CCTA; This may explain some inconsistencies between CAE and CCTA. Recently, Zeina et al. CCTA has identified three-dimensional configurations of the aortocoronary junction and the LMCA ostium in normal subjects. In this study, the normal LMCA had several anatomic configurations: the appearance of biconcave (type 1). LMCA is often obscured Angiographically at the distal the effects of the LAD, left circumferential and medial branch descending arteries. The overlap may explain the mistake of being assessed by stenosis. In addition, a decrease in the morphology of the LMCA observed in a patient with distal LMCA disease (case 5) may cause the DS to miscalculate using the "very large" proximal segment as the normal reference diameter. Atheromatous plaques responsible for LMCA lesions and adjacent normal vessels can be well visualized by the CCTA. For this reason, it is not difficult to precisely determine the normal reference diameter using this reference modality. Although the mean LMCA lesion was an intracoronary nitroglycerin injection, the fourth case was a stable angiographic finding; For this reason, the mean left main stenosis was a convincing angiographic finding for the accompanying cardiologist.

We think that the anatomic configuration of the LMCA biconcave in the 3D MDCT reconstruction images is misinterpreted as a half-disease of the LMCA in CA. According to the AKST evaluation, completely normal wall and vessel sizes are an important diagnostic result for the cardiologist who is helping in decision-making and monitoring of care. Other possible limitations of CA in assessing LMCA disease are as follows: 1) A short LMCA makes it difficult to identify a normal reference segment. 2) Glagov et al. As shown, there is a compensatory dilation (positive remodeling) of the blood vessel as the plaque burden increases to preserve the lumen's dimension. The two-dimensional silhouette method of angiography representing the contrast-filled light

can not detect the diffuse concentric plate due to the lack of a reference segment that is not selected for comparison. Assessment of coronary artery stenosis with new generation MDCT scanners significantly improved diagnostic performance and reduced the percentage of unevaluated segments. It is noteworthy that previous studies correlated well with CCTA reference standards. The use of cross-sectional reconstruction for measurement provides localization of light-based calcification. For this reason, the light and the plate are well defined for an acceptable contour plot. However, some difficulties may be encountered when the calcification and contrast matter are at the same density range. By direct visualization of the vessel wall and providing a cross-sectional tomographic viewpoint, the CCTA can come from above the CA's limitations. 3-D, non-spreading This technique has been well diagnosed to analyze coronary artery disease, making it possible to assess the size, plate location and composition of the lumen (Calcified or not).

CONCLUSION:

Stenosis of Left main coronary artery is a subgroup of risk for high disease of coronary artery however, its appearance may be misinterpreted by CT angiography. In five patients with clinically very suspicious and angiographically limited LMCA disease Coronary CT angiography was performed. CCTA cross-sectional image was used to measure the diameter. The Study was performed in Nishtar Hospital, Multan for the period of 1 year from Jan 2016 to Jan 2017 after the approval from the ethical committee. On our observations based study, we believe that CCTA may have very important diagnostic role in LMCA patients with lesions of CT angiographic ally uncertain or unresponsive AMC lesions and should be considered for the evaluation of patients selected for study before undergoing bypass coronary surgery. A suitable gold standard such as IVUS is required to confirm the CCTA for the main root stenosis.

REFERENCES:

1. Ahmadi, Amir, James Min, Adam Berger, Stephan Achenbach, Shalan Alaamri, Mouaz Al-Mallah, Daniel Berman et al. "Does prognosis change depending on number and composition of non obstructive plaques? Results from the multinational coronary CT angiography evaluation for clinical outcome: an international multicenter registry (CONFIRM)." *Journal of the American College of Cardiology* 63, no. 12 Supplement (2018): A980.
2. Parikh, K.H., Parikh, P., Shah, D., Bhatt, P., Thakar, P., Naik, A., Baxi, H. and Banai, S., 2018. CORONary Sinus Reducer™ Retains Patency And Efficacy At Twelve Years: A First In Man Prospective Cardiac Ct Angiography Outcome Study. *Journal of the American College of Cardiology*, 71(11 Supplement), p.A261.
3. Arsanjani R, Nakazato R, Shalev A, Gomez M, Gransar H, Leipsic J, Berman D, Min J. Diagnostic Accuracy, Image Quality and Patient Comfort for Coronary CT Angiography Performed Using Low Versus High Iodine Content Contrast: A Prospective Multicenter Randomized Controlled Trial. *Journal of the American College of Cardiology*. 2018 Mar 12;61(10 Supplement):E1104.
4. Kato N, Kishi S, Zadeh A, Rybicki F, Tanimoto S, Aoki J, Asami M, Watanabe M, Horiuchi Y, Furui K, Shinohara M. Relative Atherosclerotic Plaque Volume By Ct Coronary Angiography Trumps Conventional Stenosis Assessment For Identifying Flow-Limiting Lesions. *Journal of the American College of Cardiology*. 2018 Mar 13;65(10 Supplement):A1103.
5. Lam, J., Trost, B. and Druz, R., 2018. Comparative efficiency of coronary ct angiography, myocardial perfusion imaging and exercise treadmill testing in observation care of patients with chest pain. *Journal of the American College of Cardiology*, 63(12 Supplement), p.A1267.
6. Park, Hyung Bok, Ryo Nakazato, Matthew Budoff, Jonathon Leipsic, Yuka Otaki, Daniel Berman, and James Min. "Adverse Plaque Characteristics Within Non-Obstructive And Intermediate Lesions By Coronary Ct Angiography Are Associated With Lesion-Specific Ischemia By Noninvasive Fractional Flow Reserve Derived From Ct:
7. Results From The Prospective Multicenter Defacto (Diagnostic Accuracy Of Fractional Flow Reserve From Anatomic Ct Angiography) Study." *Journal of the American College of Cardiology* 61, no. 10 Supplement (2018): E1039.
8. Stoebner, R.A., Diaz-Zamudio, M., Cheng, V., Thomson, L., Hayes, S., Friedman, J., Slomka, P., Berman, D. and Dey, D., 2018. Automated stenosis quantification from coronary CT angiography: comparison with invasive coronary angiography. *Journal of the American College of Cardiology*, 63(12 Supplement), p.A1053.
9. Alexandrov AW, Bryndziar T, Rike J, Swatzell V, Dusenbury W, Koury D, Rogers K, McCormick S, Carlow J, Rhudy J, Maleki AH. Ultra-Fast Performance and Yield of a High-Resolution CT With Head and Neck CT Angiography on a Mobile Stroke Unit.
10. Arbab-Zadeh, A., George, R., Miller, J., Texter, J., Godoy, G., Ostovaneh, M., Vavere, A., Dewey, M., Rochitte, C., Niinuma, H. and Chen, M., 2018. CT Myocardial Perfusion Imaging Fails To Improve Diagnostic Accuracy Of Ct Coronary Angiography To Determine Stent Patency. *Journal of the American College of Cardiology*, 71(11 Supplement), p.A1639.