



The Truth About CAD: Why we miss
so much disease.

CARDIAC-WIRE

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10/16/25



Disclosures

KOL: Cleerly, Arineta, Novartis, Amgen



SOUTH TAMPA CARDIOLOGY

ADVANCED IMAGING CENTER



**Focused outpatient Preventative Cardiology
Practice**



**Advanced Multimodality
Imaging Center**

Cardiac CT, MRI, Echo
Vascular CT, MR,
Ultrasound

Personal Experience Timeline

First 11 years

64 & 128-Slice Hospital CT:

- Great: stenosis & calcium
- Not Great: NCP/LAP
- Many Normal Scans
 - MISS SOFT PLAQUE
 - False reassurance

Last 4 years

Arineta Spotlight 560-Slice:

- Sub-mm resolution
- Crisp NCP & LAP
- FEW NORMALS
- **AI Enhancement- CLEERLY**
 - Registry >9,000 scans

SpotLight™ Duo

The highest performance cardiovascular and thoracic CT scanner

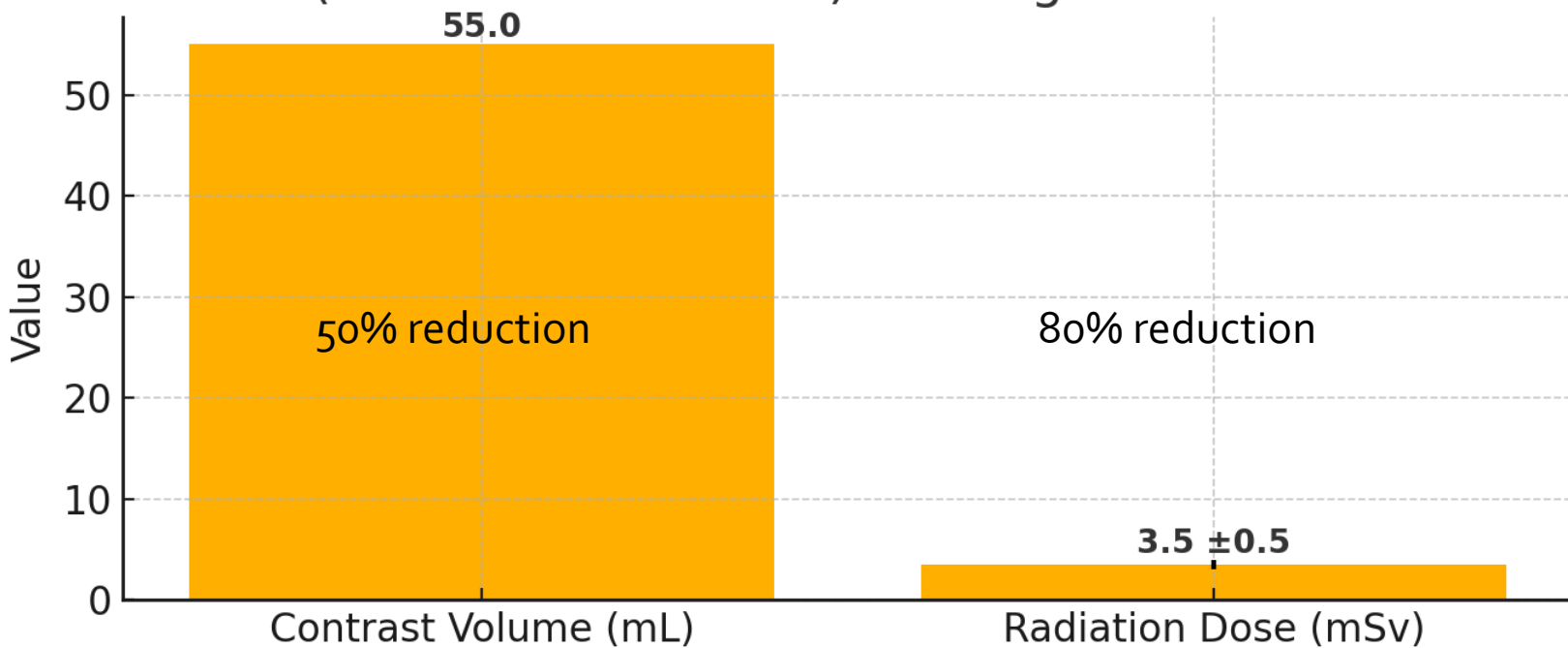
GET IN TOUCH

Installed 12/2022



- 0.24sec rot speed, 120msec temporal resolution
- 14cm whole heart coverage, 560 slices
- 0.28mm spatial resolution w/ 0.5mm detector
- 139kW effective power for SNR
- Novel Stereo CT design

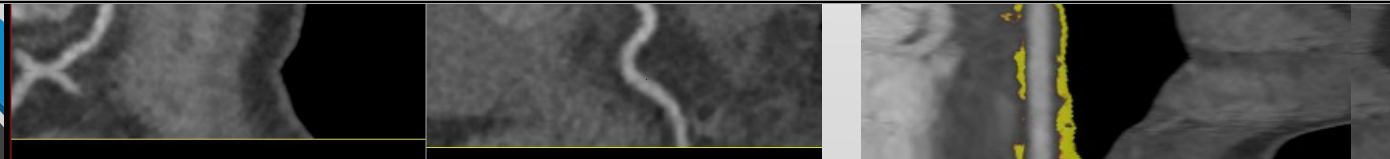
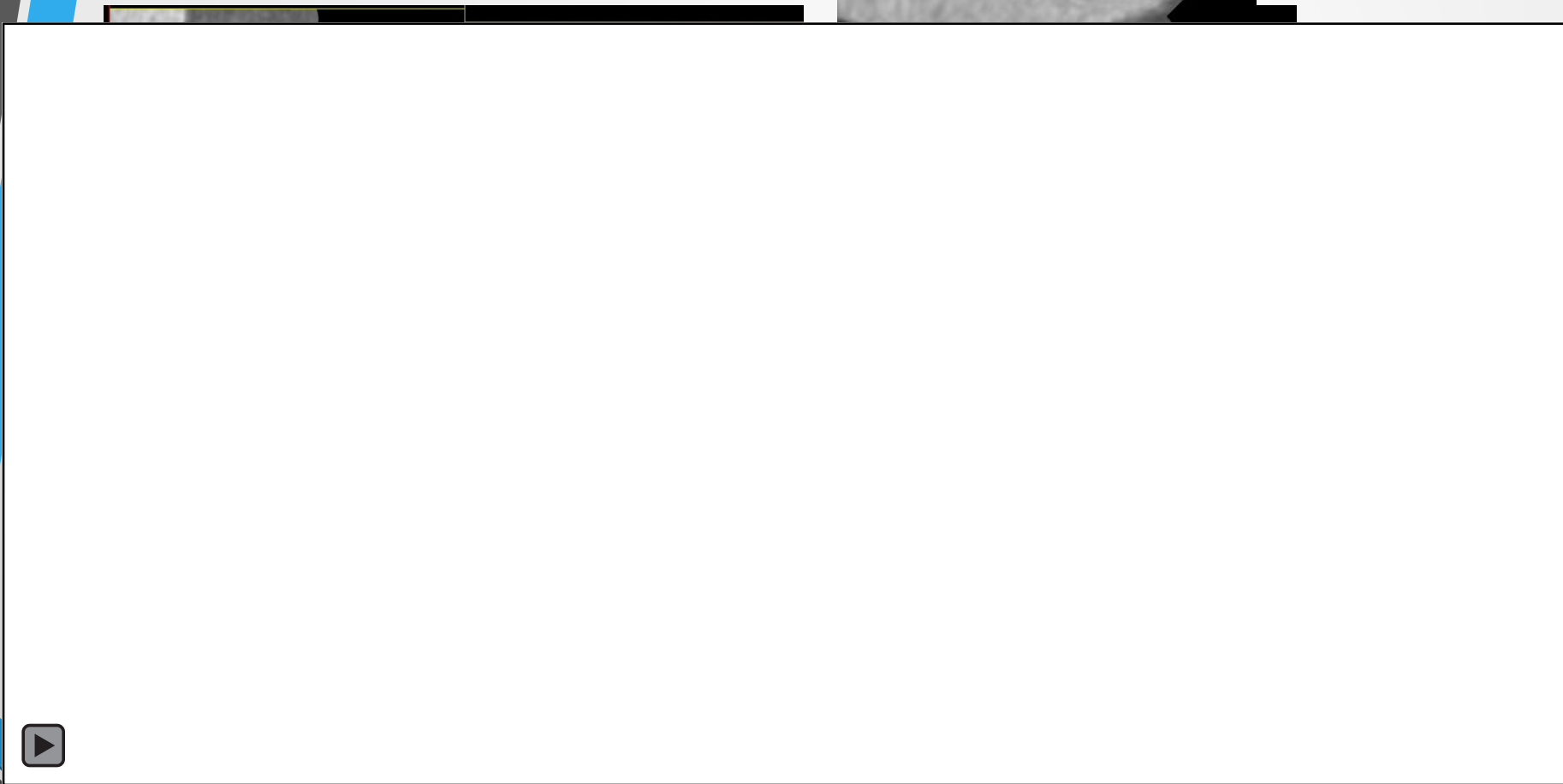
CCTA (Arineta SPOTLIGHT): Average Contrast & Dose



Contrast avg = 55 mL. Dose shows midpoint of 3-4 mSv with ± 0.5 mSv error bar.

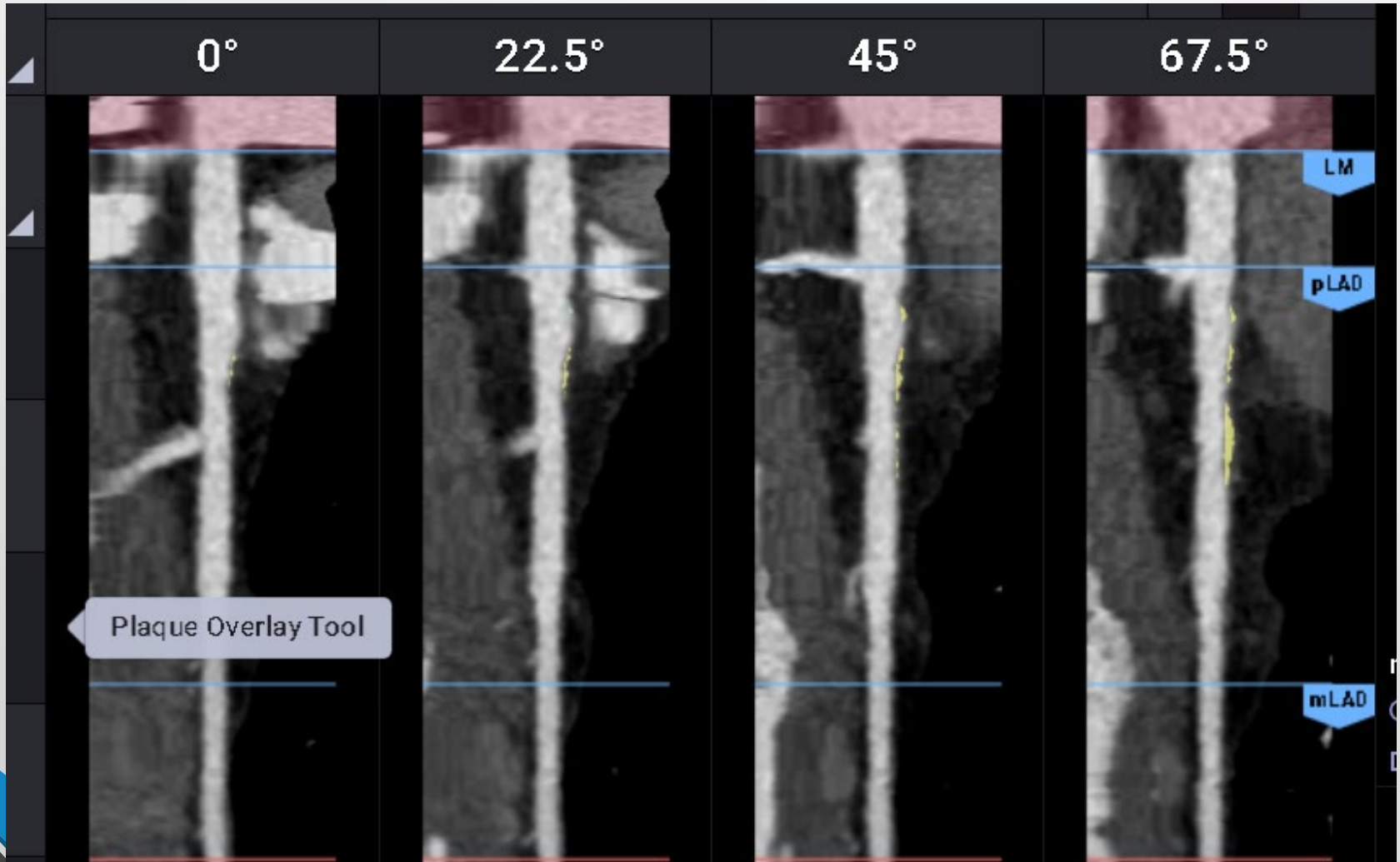
ARINETA 560 Slice

Enhance visualization of soft plaques



CLEERLY AI:

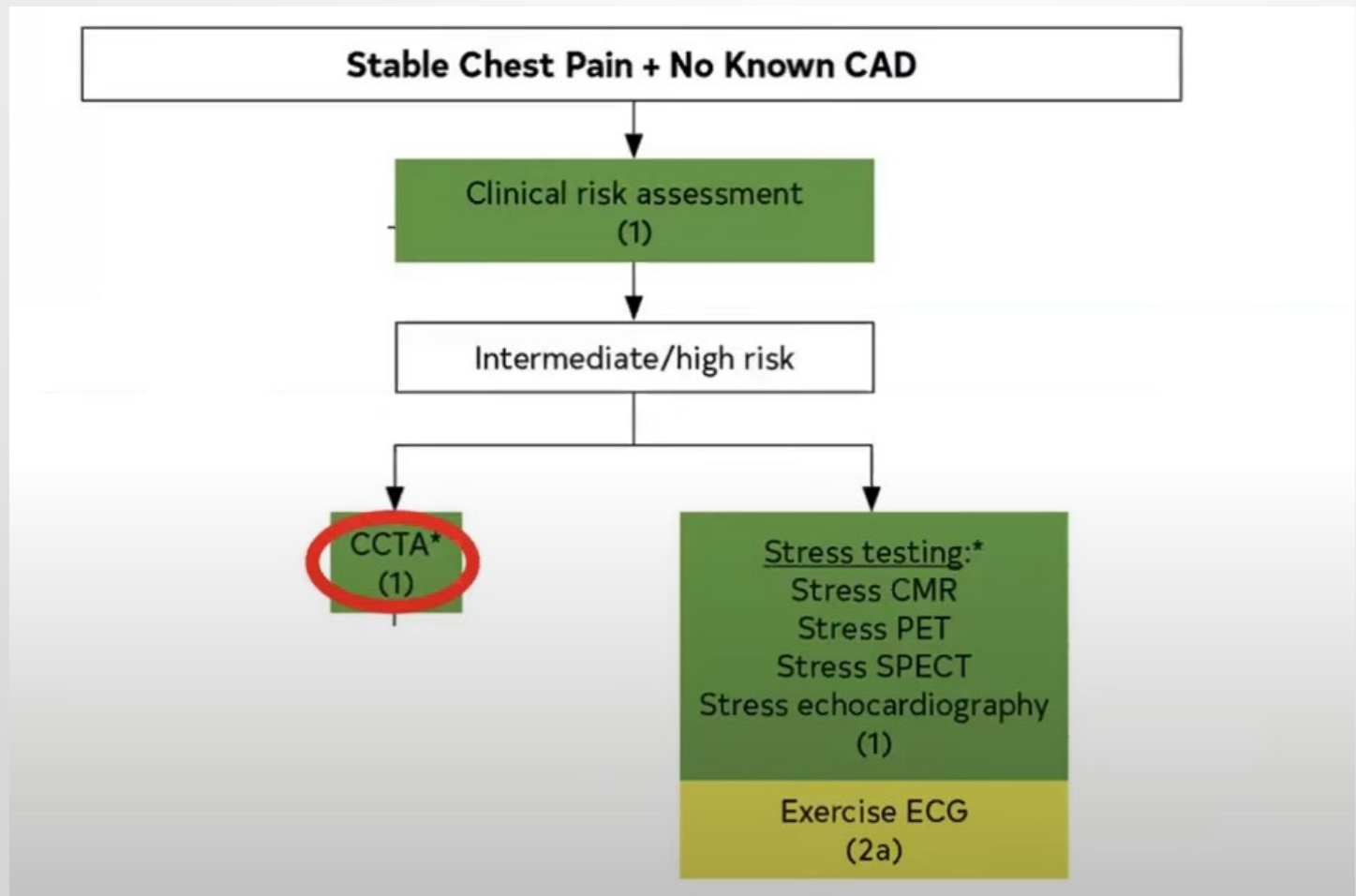
Enhance visualization of soft plaques



The 4 Blind Spots

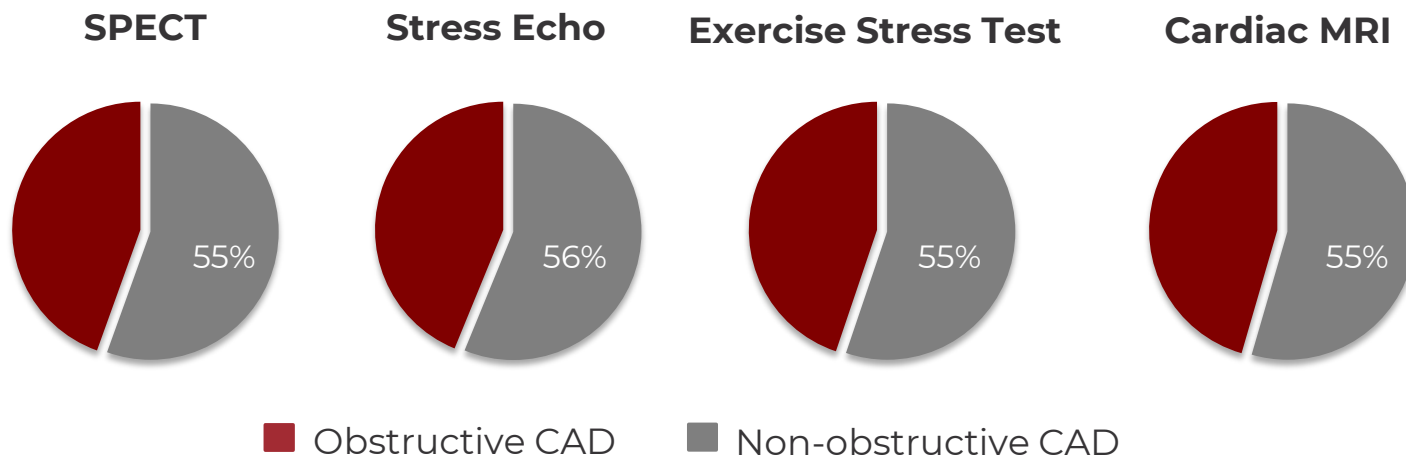
- 1. Ischemia & Percent stenosis -first mindset**
- 2. CAC $\neq$ plaque**
- 3. Risk Scores $\neq$ Reality**
- 4. Single snapshot – no longitudinal tracking**

When do we Assess for CAD



Functional Testing Prior To Cath-lab Is Inaccurate

Over half of the patients sent to invasive coronary angiography following positive functional tests have no obstructive CAD !



Data from an analysis of more than 385,000 patients at over 1,100 US hospitals

Source: Cury et al, JCCT 2014. Patel et al, Am Heart J 2014

Stress testing is **NOT** accurate



False positive functional tests lead to **60% unnecessary invasive catheterizations ***

The incidence of a **false-negative stress test** in patients with **severe** coronary artery disease (CAD) ranges from **30% to 40%**, according to the ACC and AHA guidelines.

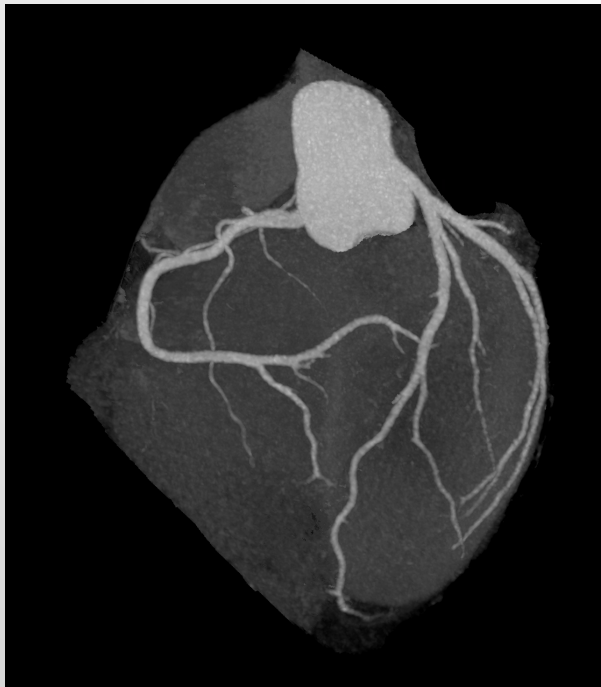
MISSES: Non-obstructive or less severe plaques.

2 Patients/ 2 Normal Stress tests



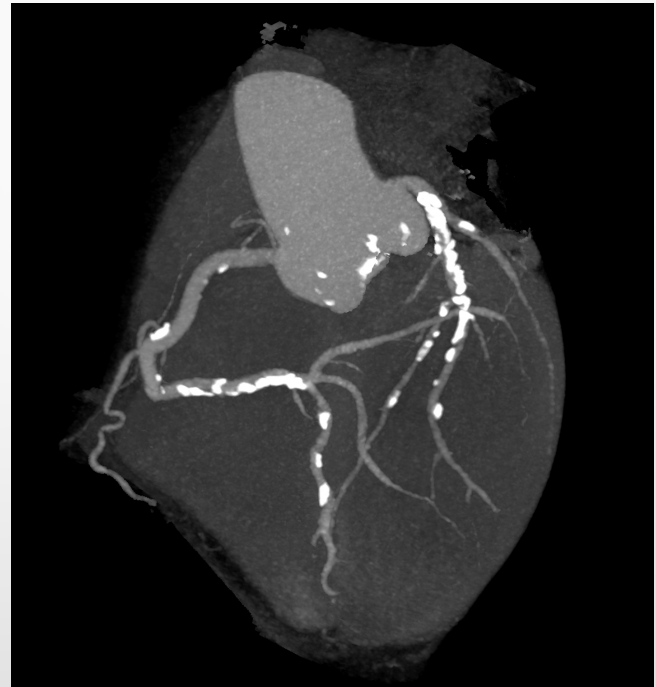
Would you treat the Same?

51 y/ Diabetic male



CCTA: No plaque

47 y/ Diabetic male



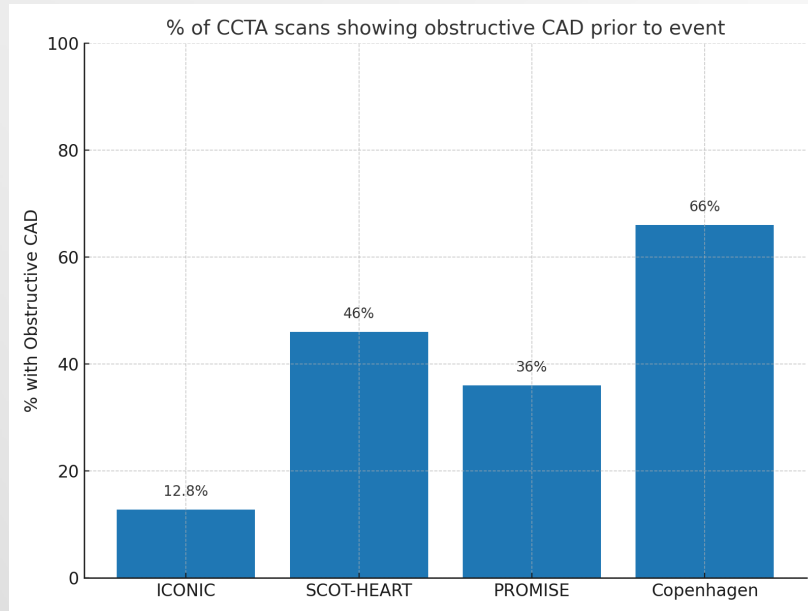
CCTA: Diffuse < 50% plaque

Waiting for Symptoms Fails

Up to **50%** of people who **die** from heart attacks had **no prior** symptoms or history of heart disease.

Supported by population-based cohorts (e.g., ARIC, Framingham), autopsy-based SCD studies (e.g., Oregon SUDS), and longitudinal trials (e.g., Zipes & Wellens review), with confirmation from large health organizations like the AHA

Coronary Events & Non-Obstructive CAD



Totals

Total events = **476**

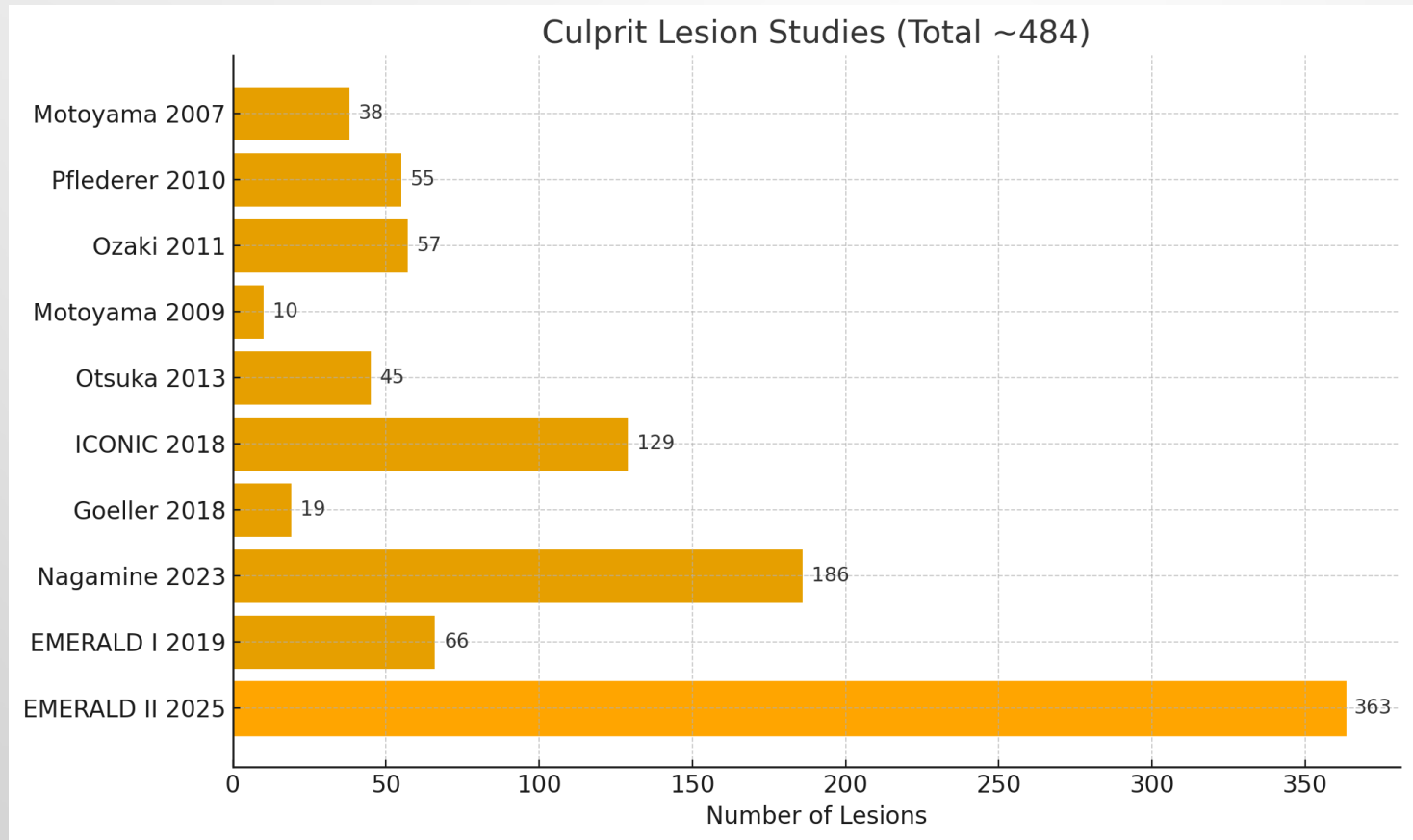
Non-obstructive lesions = **337**

71% of all coronary events occurred in patients whose prior CCTA showed non-obstructive CAD.

Data from 4 major trials: (Obstructive CAD defined as >70% stenosis)

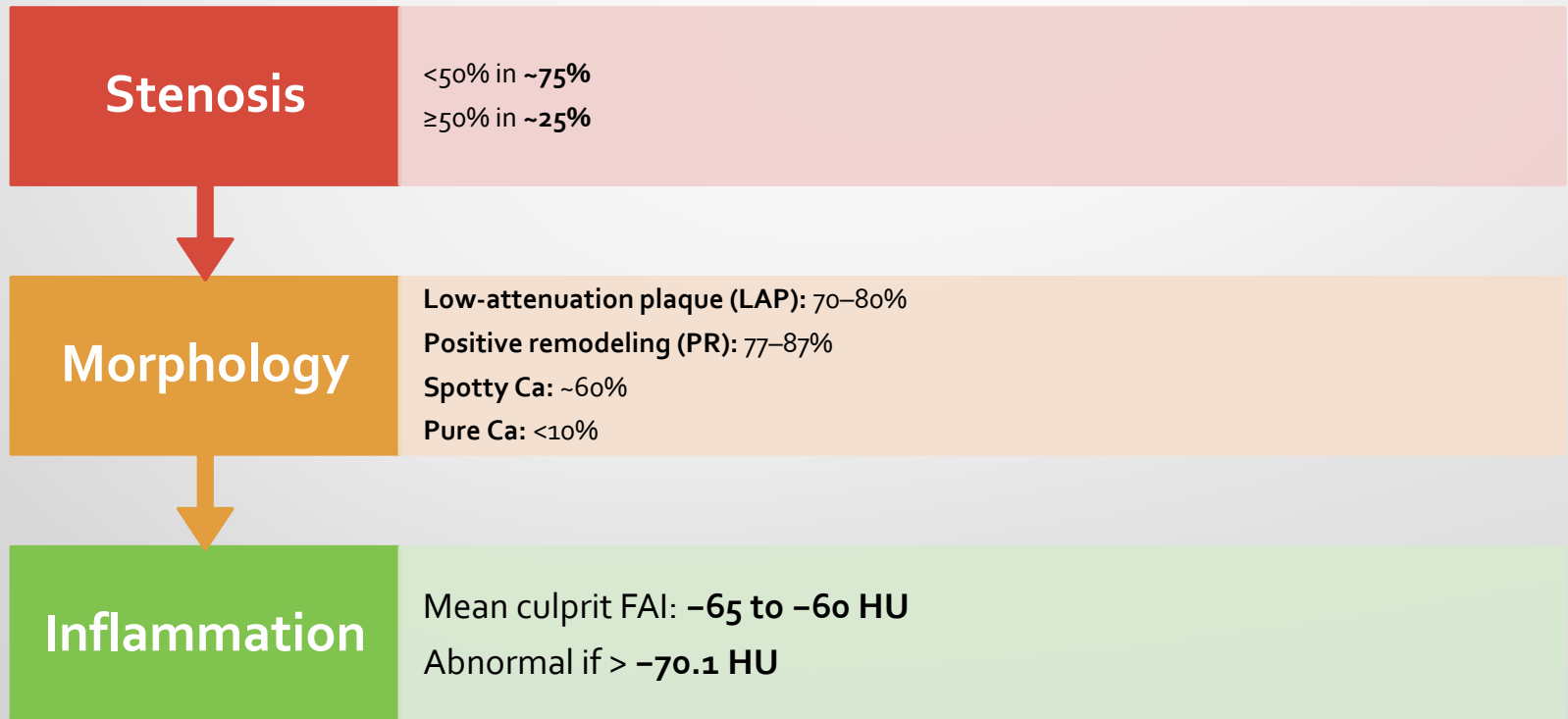
- ICONIC: 12.8% obstructive CAD before ACS
- SCOT-HEART: 46% obstructive CAD >70% before MI/cardiac death
- PROMISE: 36% CAD >70% stenosis before MI/death/UA
- Copenhagen study: 66% obstructive CAD before MI

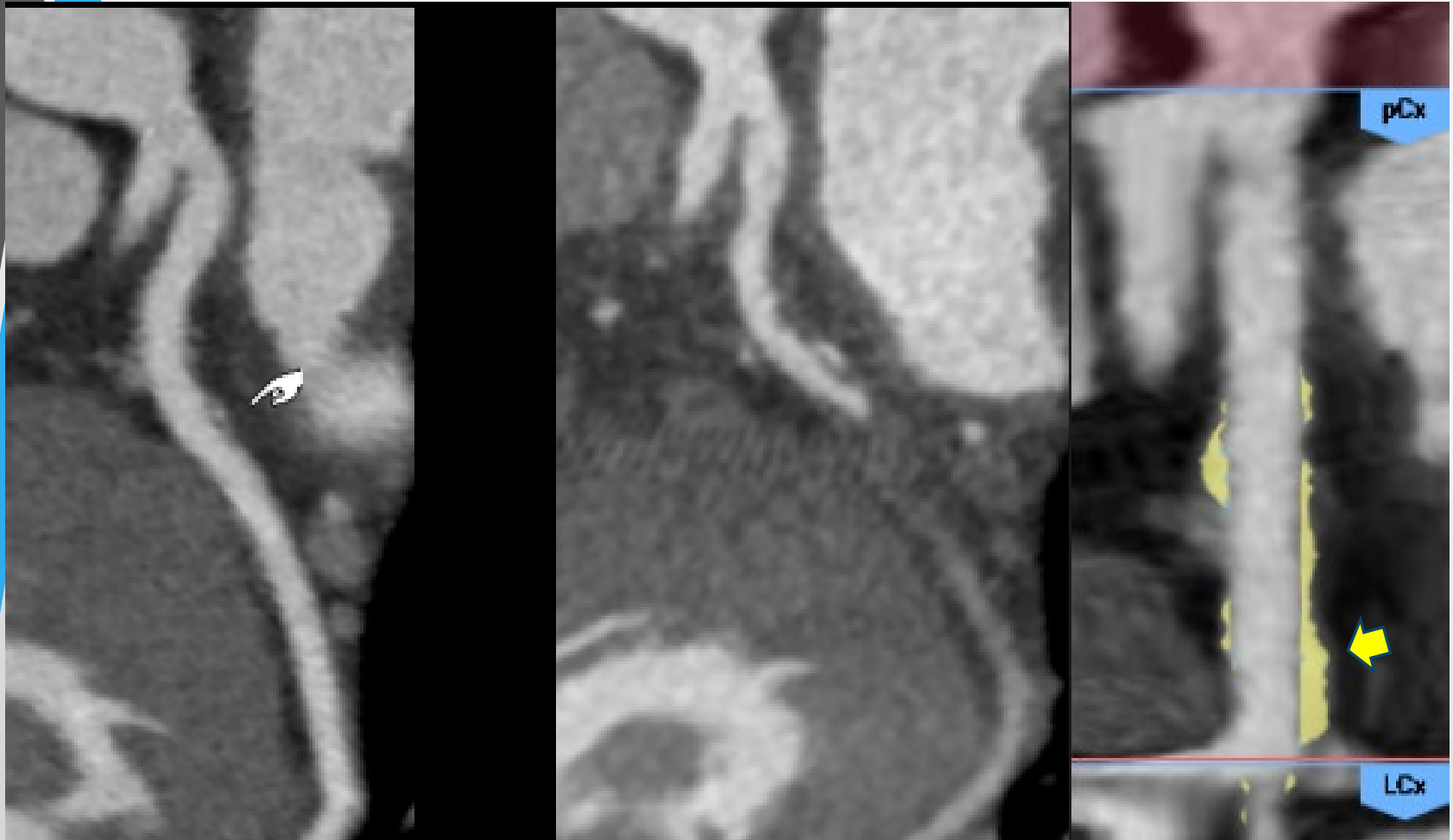
ACS Culprit Lesion Studies- 484



Consensus Culprit Phenotype

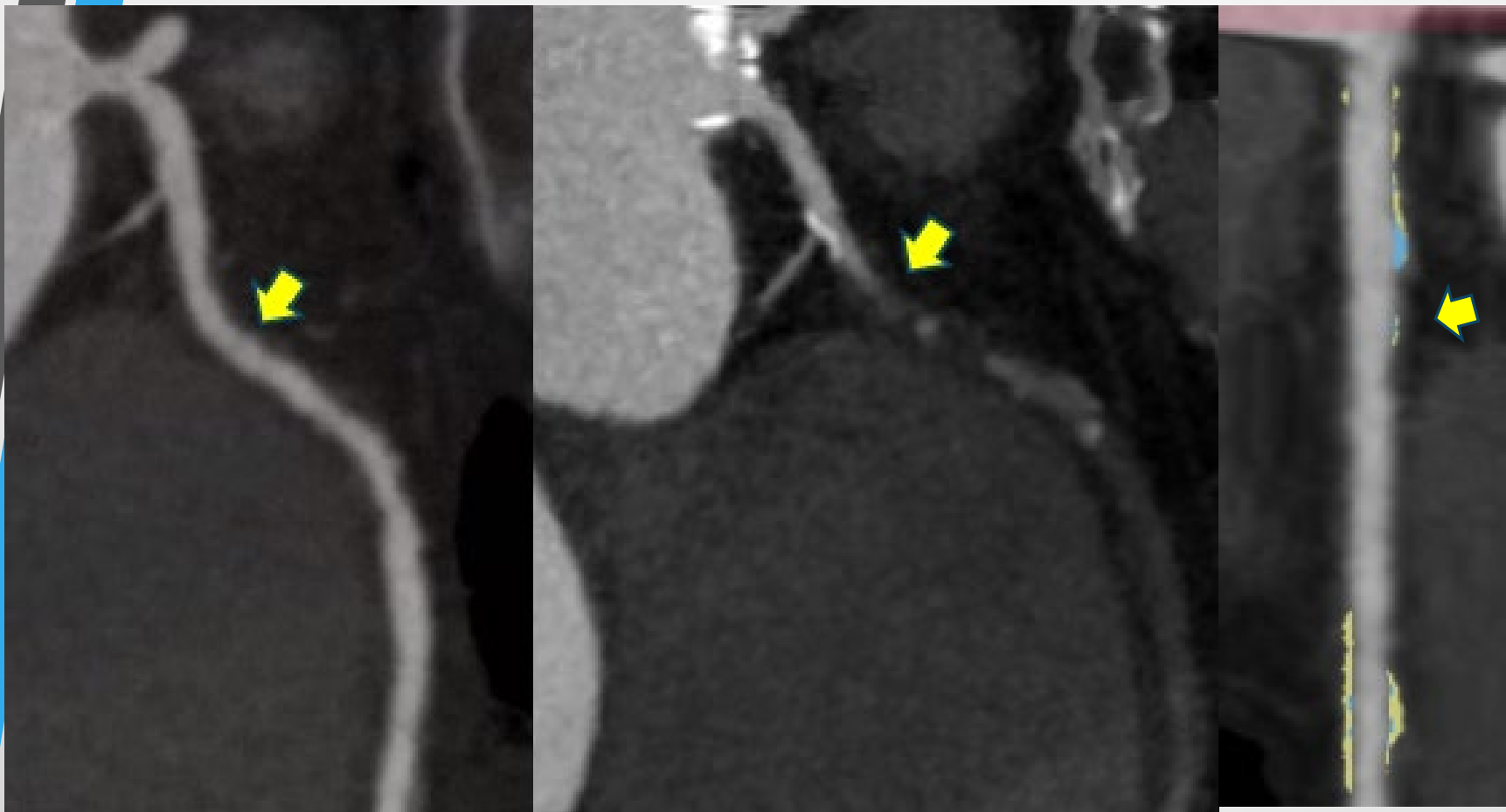
Culprits are biologically active, not obstructive





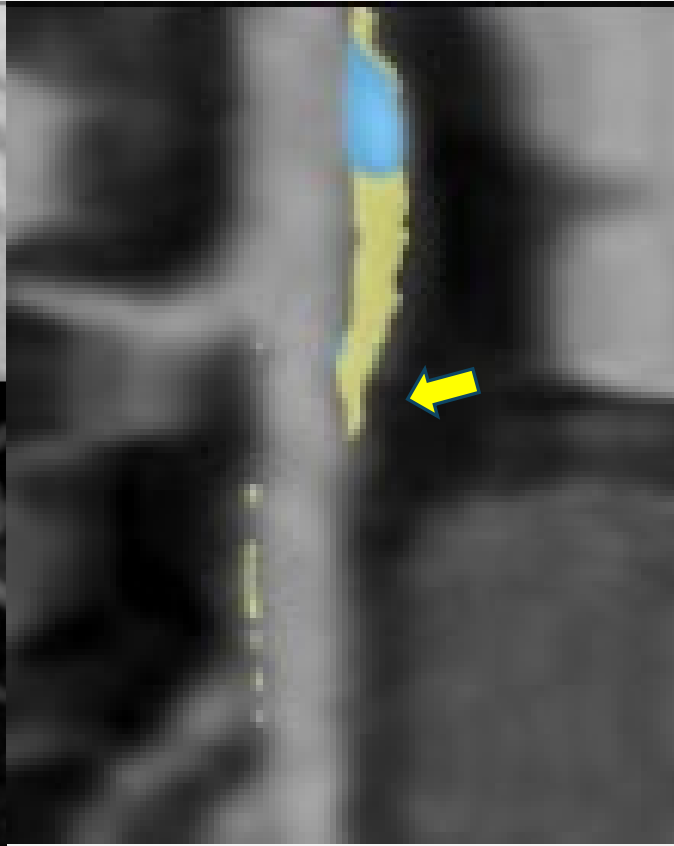
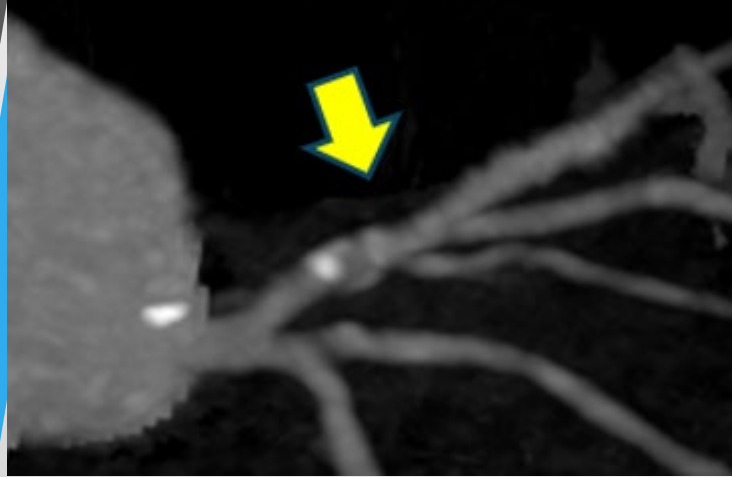
ACS Lesion

DECLINED STATINS & ASA



High LPa

ACS Lesion



ACS
Lesion

DECLINED STATINS & ASA

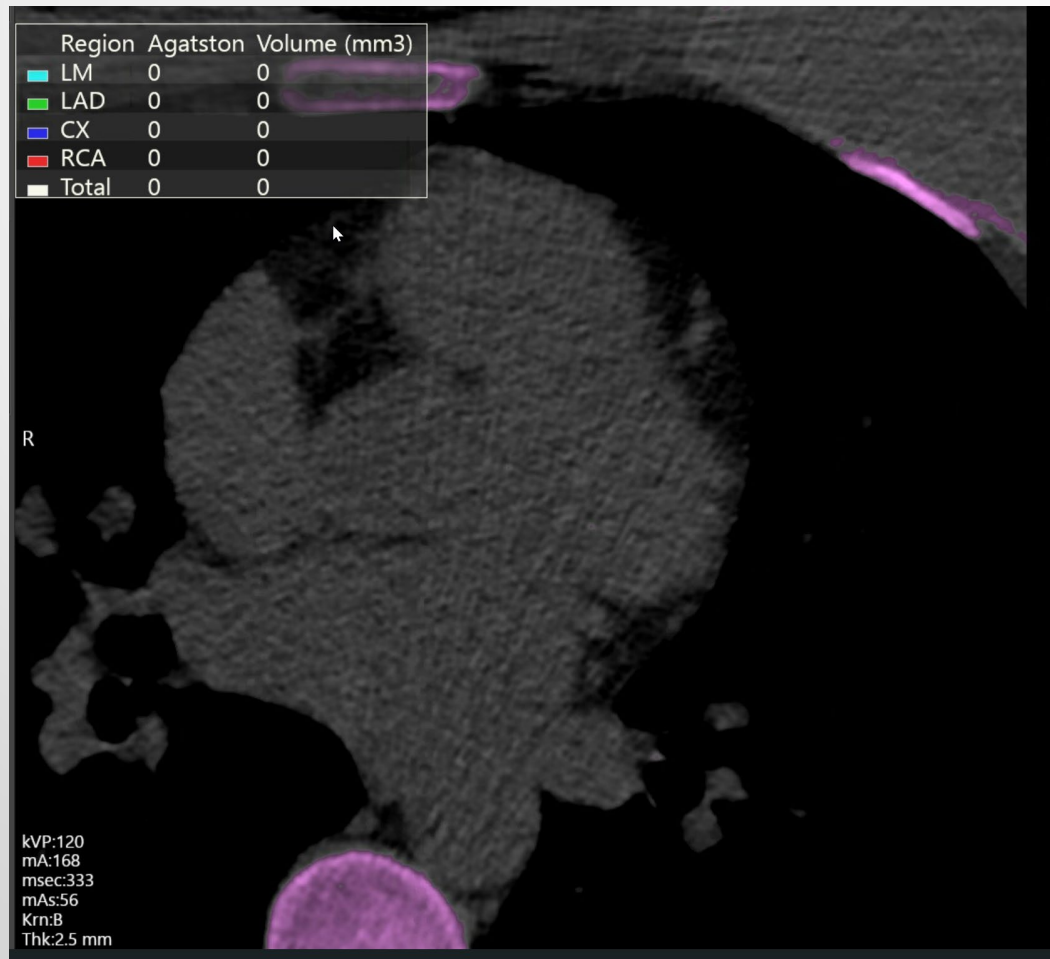
Ischemia & stenosis -first mindset

Traditional *reports* focus on stenosis and ischemia.

Events track more with plaque burden, high-risk features (NCP, LAP), and inflammation.

Over **70%** of heart attacks arise from non-obstructive (<40%) plaques that rupture unexpectedly.

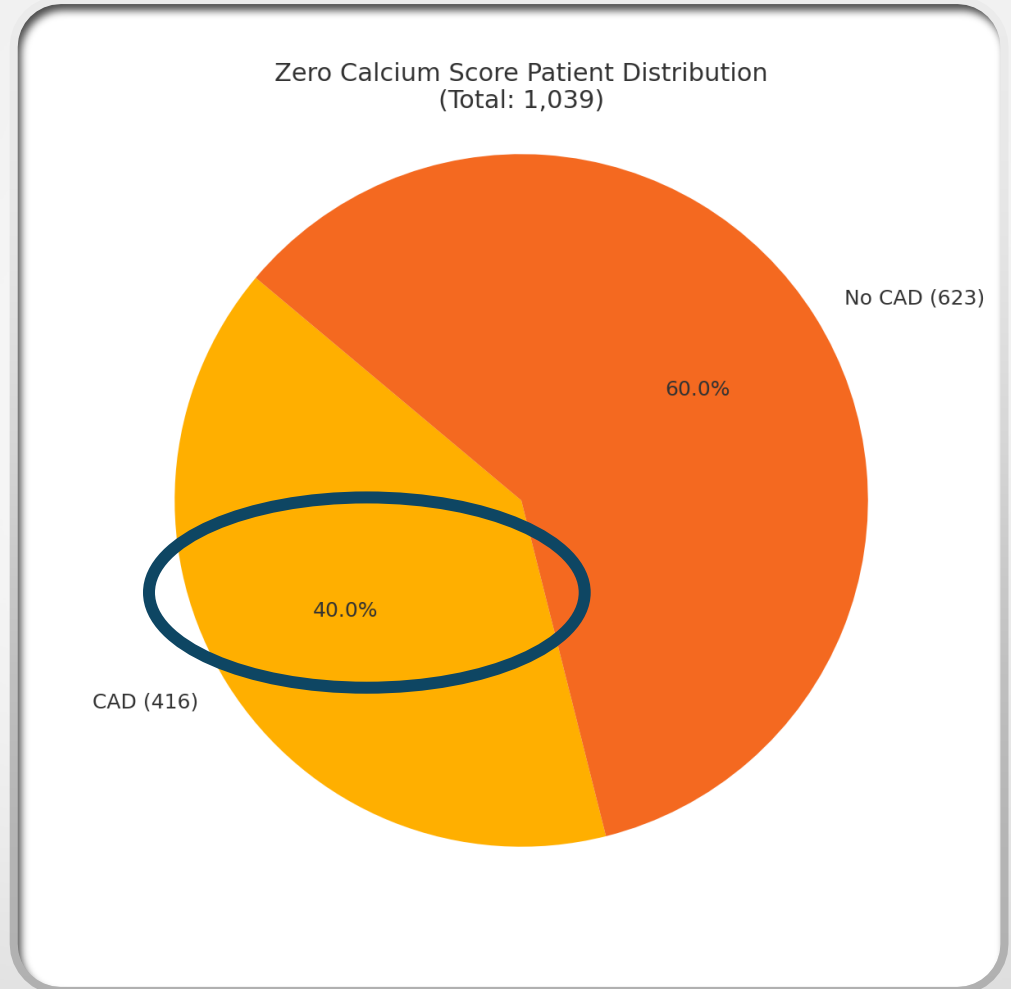
Calcium Scoring?



Tampa INSIGHT Registry

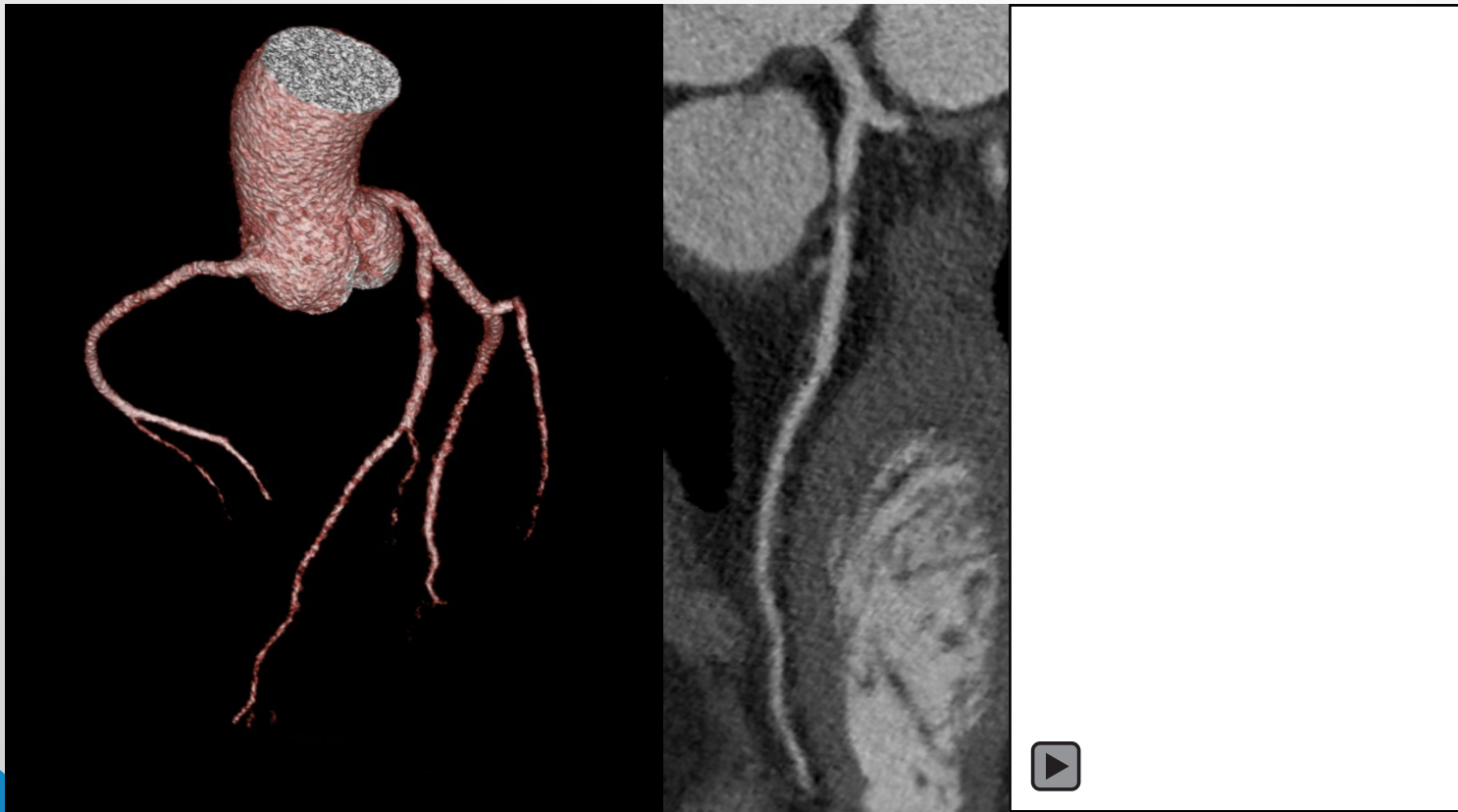
OBSERVATIONS: Zero Calcium score misses NCP

- **Study Period:**
 - Oct 2023 – Feb 2025 (17 months)
- **Cohort Size:**
 - 1,039 patients with calcium score of zero
- **CAD Detected:**
 - 416 patients ($\approx 40\%$) had **non-calcified plaque (NCP)**



SCAPIS (NEJM 2023): 40–50% with CAC=0 had non-calcified plaque

38-year-old asymptomatic female,
+ FH premature CAD



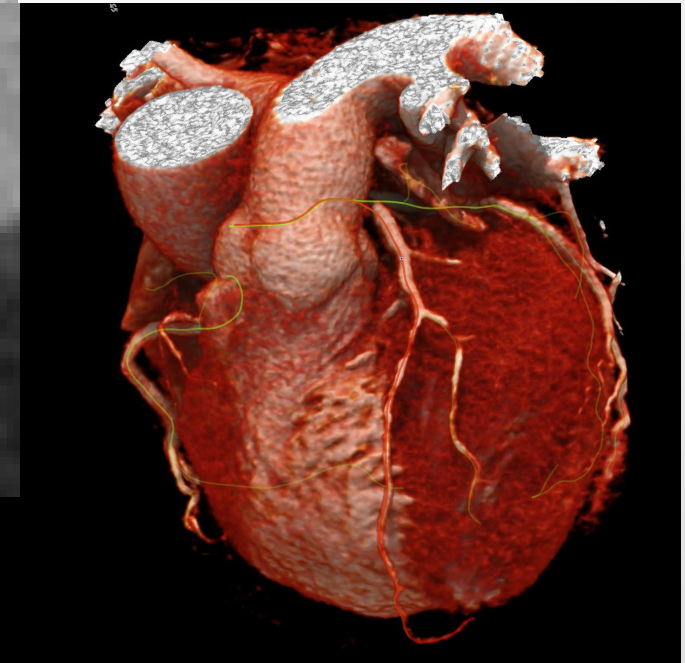
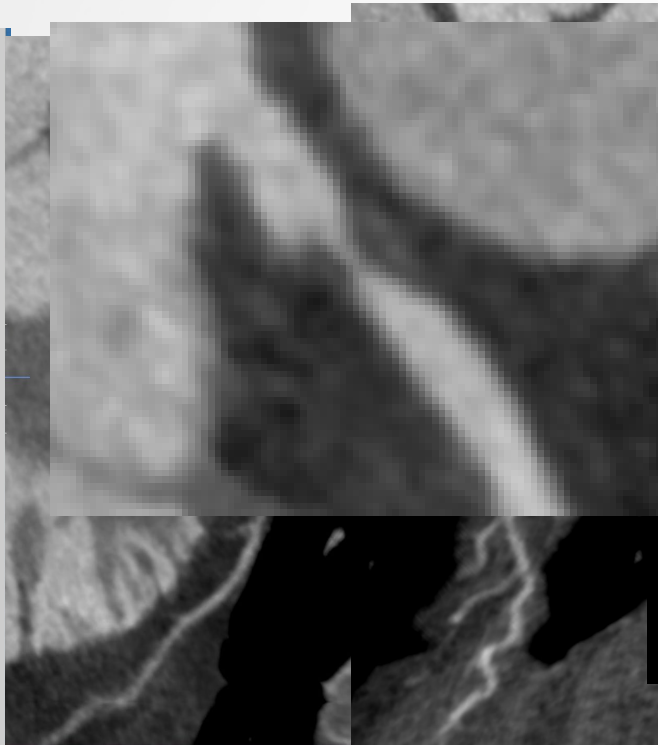
54 y/o Diabetic, mild DOE
LDL 120, not on STATINS



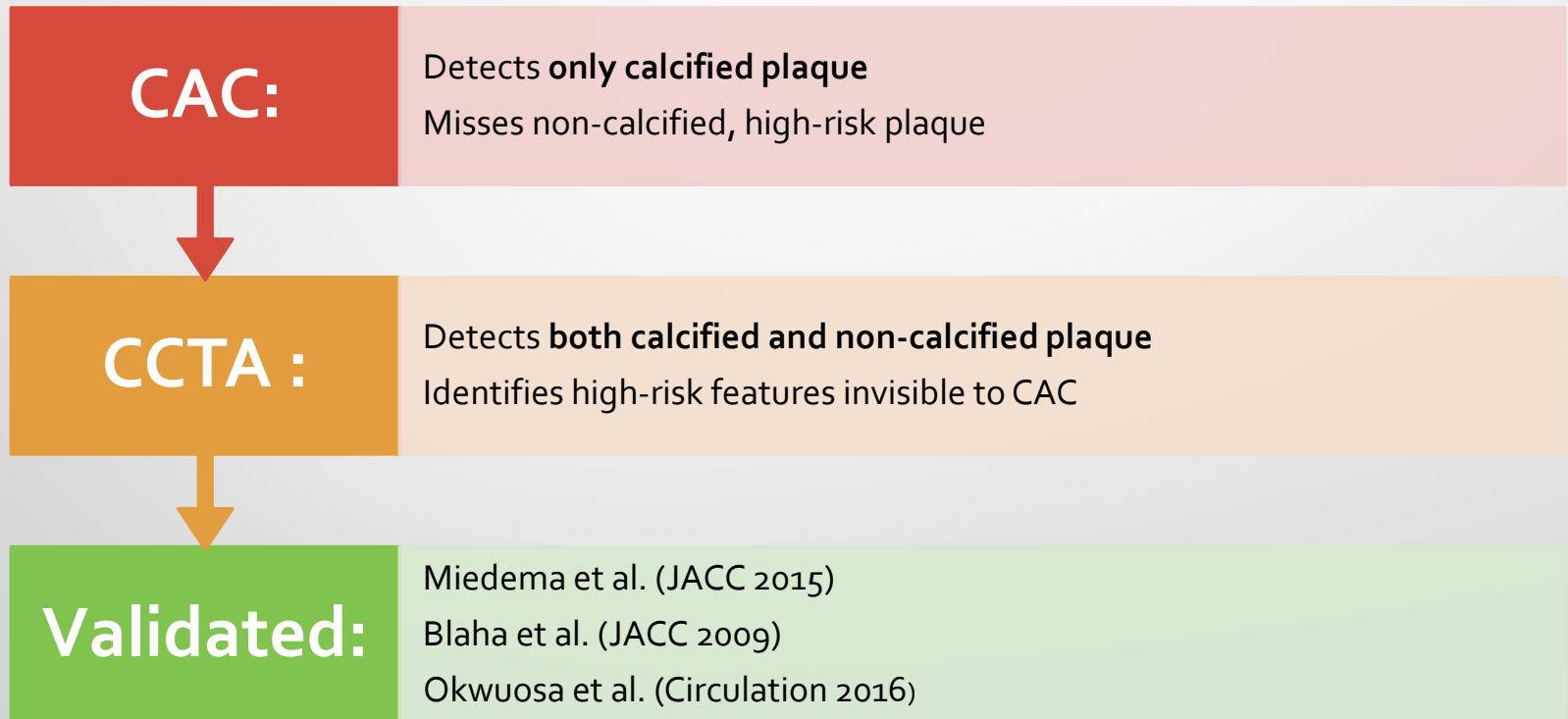
**Negative
Stress NUC**

CAC = 0

Severe MVCAD – All non-calcified



25% (1 in 4) Heart Attacks Occur with **CAC = 0**



CAC $\neq$ Plaque

Coronary artery calcium (CAC)

- reflects **calcified burden only**.
- 40-50% have NCP
- Can still have rupture-prone plaque.

25% (1 in 4) MI's occur in patients with No Standard Modifiable Risk Factors (SMuRF-less)

(SMuRF-less): Normal BMI, non-smoker, active lifestyle, healthy diet, normal LDL



Traditional CAD Markers Miss Up to 50% of Cardiovascular Events



Blood Biomarkers

- LDL-C, HDL-C, Triglycerides
- hs-CRP, ApoB, Lp(a)
- NT-proBNP, Troponin
- HbA1c, Fibrinogen
- IL-6, Adiponectin, Uric Acid



Genetic Markers

- Genetic Risk Scores
- Single Nucleotide Polymorphisms (SNPs)

? Imaging Markers

- Coronary Artery Calcium (CAC)
- Carotid Intima-Media Thickness (CIMT)
- Endothelial Function (FMD)
- LVH on Echocardiography



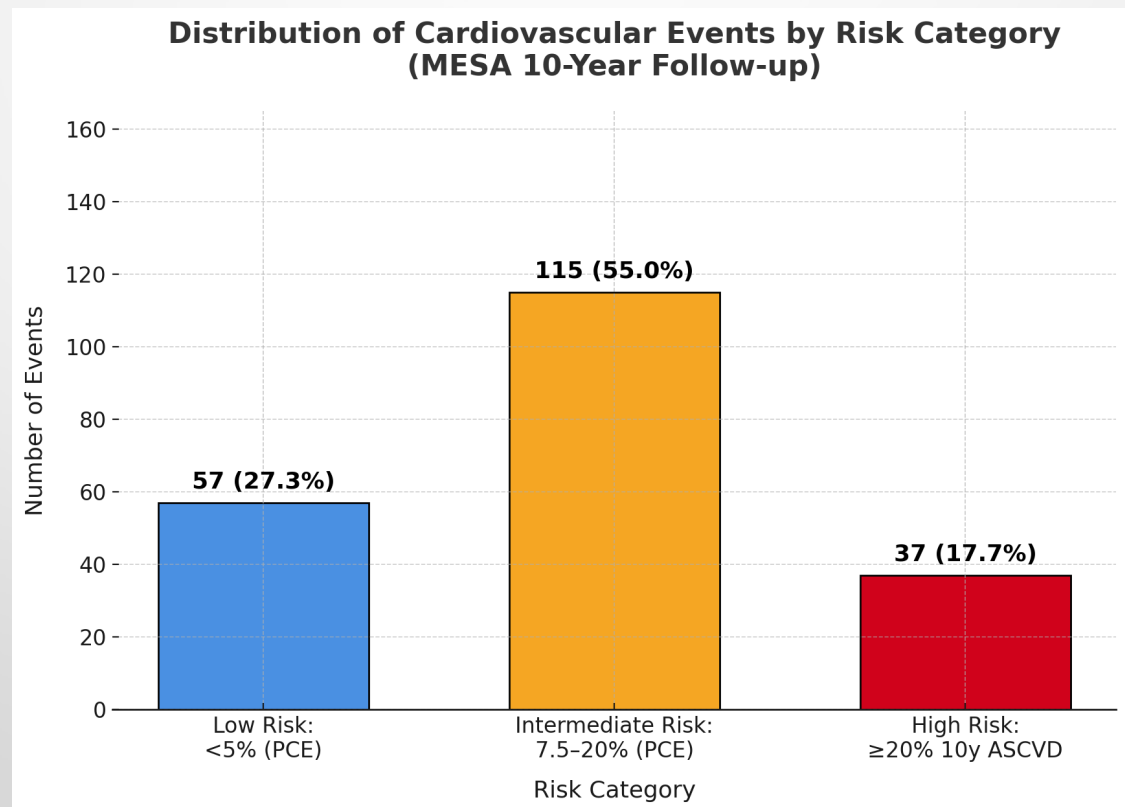
Functional Markers

- Pulse Wave Velocity (PWV)
- Ankle-Brachial Index (ABI)
- Coronary Flow Reserve (CFR)
- Heart Rate Variability (HRV)
- Brachial Artery Reactivity Test (BART)

Traditional ASCVD Risk Scores Fail

- **MESA:** 6,814 participants followed **10 years**
 - **82%** of MI patients in **LOW** and **Intermediate** RISK
 - Only **18%** of events in **high-risk** category.
- **80%** of MI patients had '**normal**' cholesterol.

Bild DE, Am J Epidemiol
2002 (MESA design);
DeFilippis AP, JACC 2011
(risk score performance).



Risk Scores $\neq$ Reality

Traditional scores use population averages.

Miss individual plaque biology and residual risk.

“Low-risk” patients may have dangerous plaque on CCTA.

Leads to false reassurance and missed prevention.



Atherosclerosis (plaque)
“is” the Disease.

Not ischemia
Not Symptoms
Not Surrogates
Not RISK

“We don’t wait for cancer to spread before diagnosing it — why do we wait for heart attacks?”

Cancer Care

Breast Exam



Mammography



Fecal Occult Blood



Colonoscopy



Chest X-ray



Lung CT Scan



Cardiac Care

Risk Factors



SURROGATES

70% who suffer heart attacks have normal cholesterol^{6,7}

Symptoms



SYMPTOMS

50% heart attack victims feel no symptoms before the event^{3,4,8}

Stress Testing



SEQUELAE

75% heart attack lesions missed by stress testing⁹

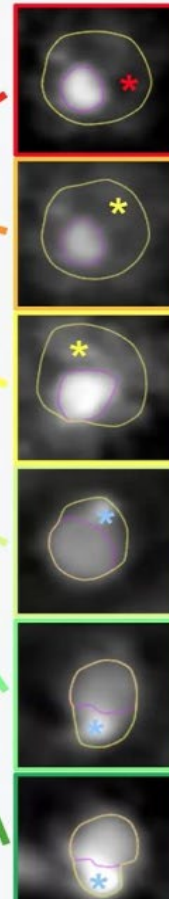
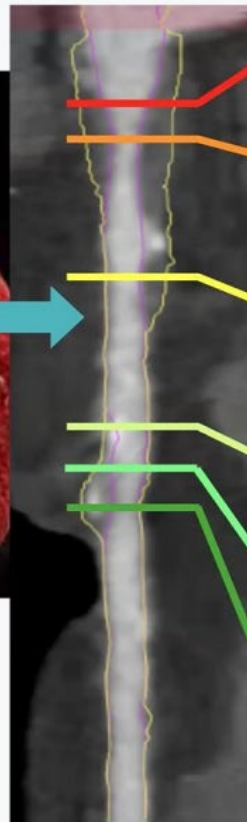
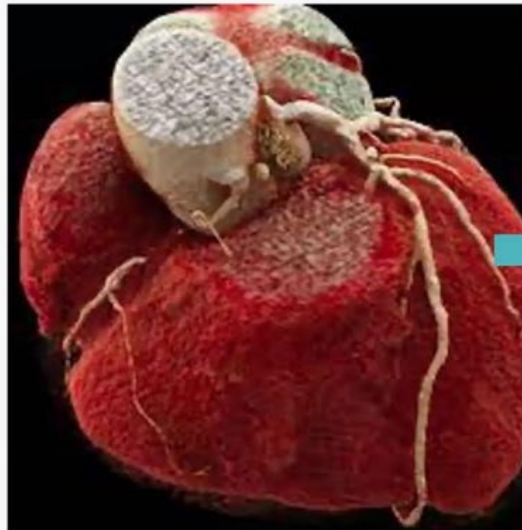
CCTA as Virtual Biopsy: AI Delivers Histology-Level Insights

CCTA Procedure

AI Virtual Biopsy
(Plaque
Quantification)

Histology-Level
Insights

Coronary CT Angiography



Necrotic Core
(<30 HU)

Fibro-fatty
($30-130$ HU)

Fibrous
($131-350$ HU)

Calcium
($351-700$ HU)

Calcium
($700-1000$ HU)

1K plaque
(>1000 HU)

Highest
risk

Lowest
risk

Source: ¹Chang HJ et al. J Am Coll Cardiol 2018; ²Ferencik M et al. JAMA cardiol 2018; ³Williams MC et al. Circulation 2020; ⁴van Rosendael AR et al. JAMA Cardiol 2020; ⁵Lee SE et al. JACC CVI 2018; ⁶Henzel J et al. JACC CVI 2021; ⁷Budoff MJ et al. Eur Heart J 2020; ⁸van Rosendael AR et al. J Cardiovasc Comput Tomogr 2021

Courtesy of J. Earls.



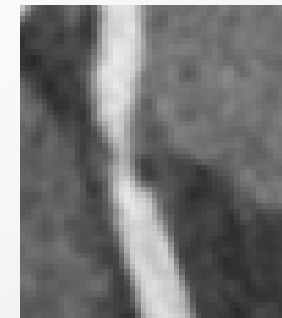
CASE

57Yo male w HTN,
HLD, Adopted

Prior CAC: 0
Prior Stress Normal
No symptoms

Date	Triglycerides	HDL	LDL	Lp(a)	Total Cholesterol	HbA1c
08/23/2024	130 mg/dL	55	108	N/A	188	N/A

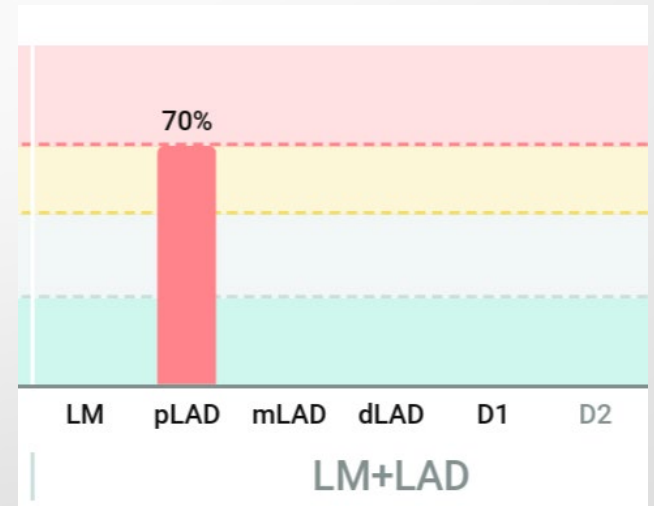
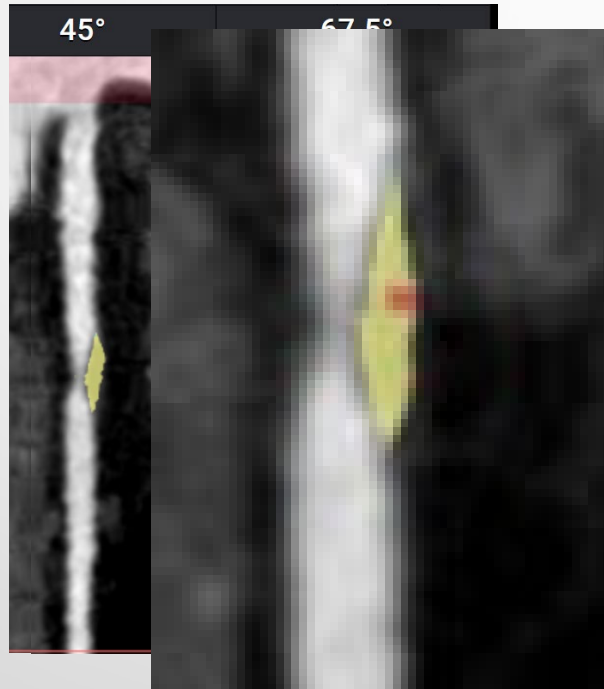
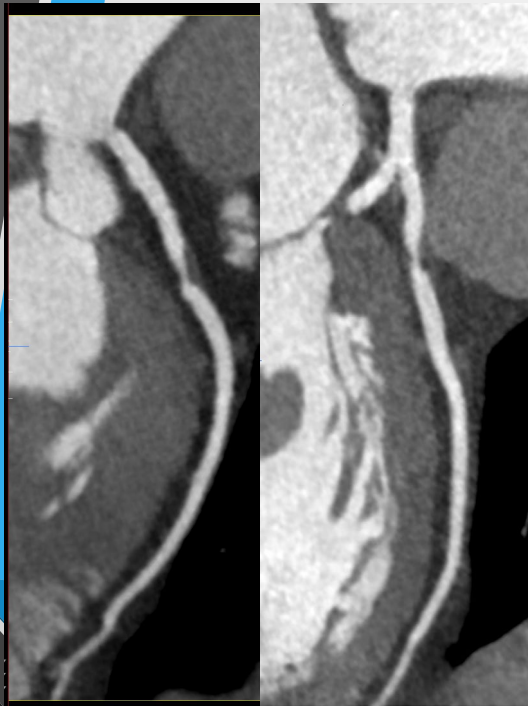
CCTA:
calcium score 0,
70% pLAD



Case

57Yo male w HTN,
HLD referred after
screening CCTA.
No symptoms

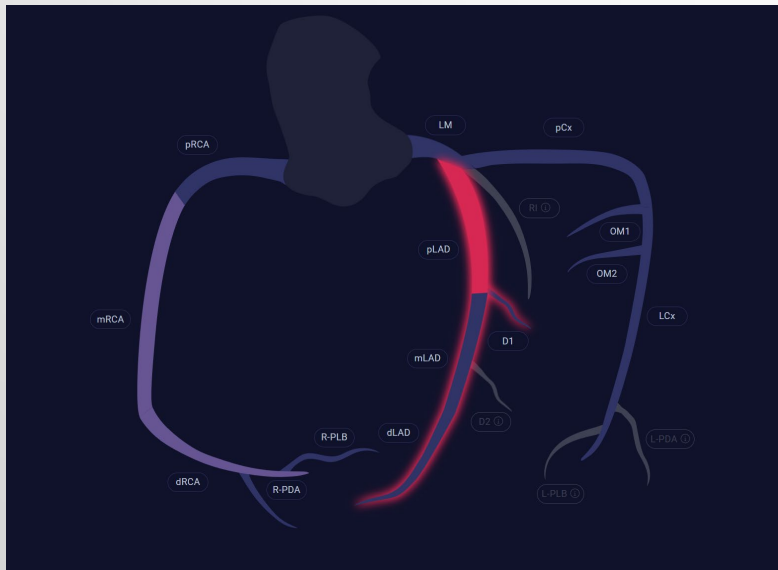
CCTA: 70% pLAD



CLEARLY
ISCHEMIA

70% pLAD

Positive in
LAD and D1



Ischemia

Likely present in:

LAD

D1

Medical Management & LABS

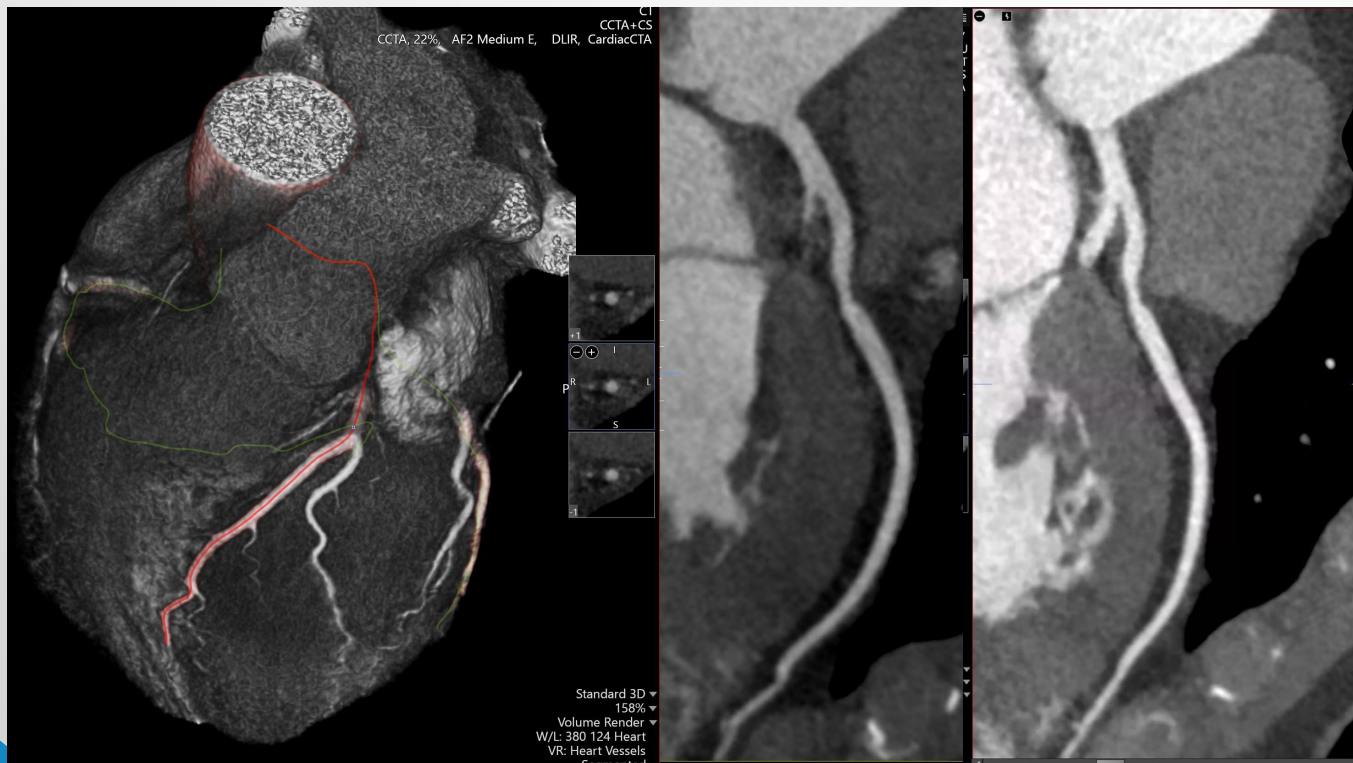
Visit Date	Weight (lb)	Statin	PCSK9 Inhibitor	GLP-1 Agonist	Antiplatelet Therapy
08/22/2024	192	Started Crestor 10 mg	Started Repatha 140 mg	No	Started Aspirin 81 mg + Plavix 75 mg
09/15/2024	188	Crestor 20 mg	Repatha 140 mg	No	Aspirin 81 mg + Plavix 75 mg

Date	Triglycerides	HDL	LDL	Lp(a)	Total Cholesterol	HbA1c
08/23/2024	130 mg/dL	55	108	N/A	188	N/A
02/18/2025	73 mg/dL	41	-10	50 mg/dl	61	5.2%

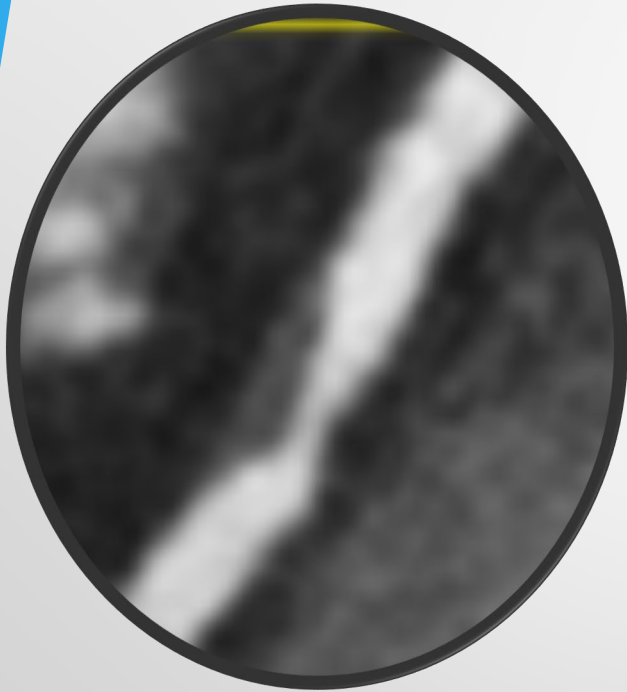
6 month
F/U CCTA

50%

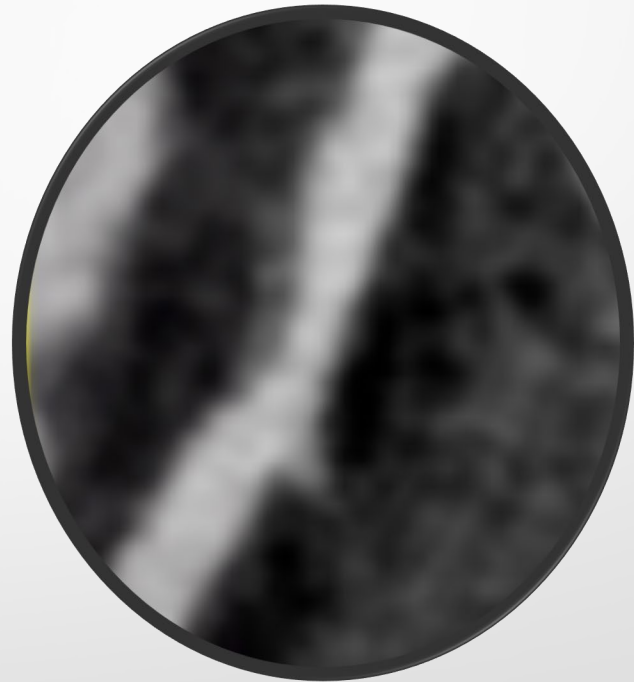
(NCP)



8/2024



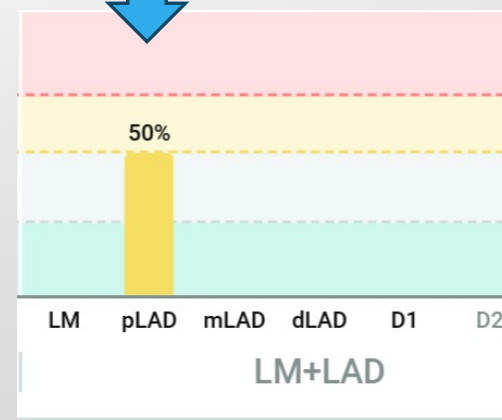
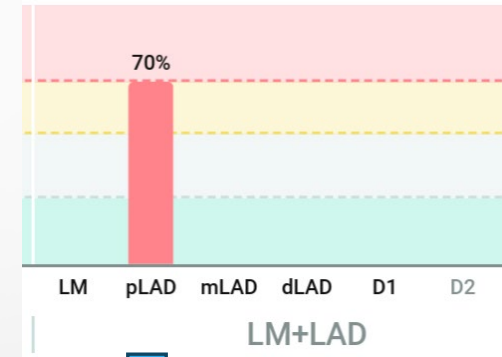
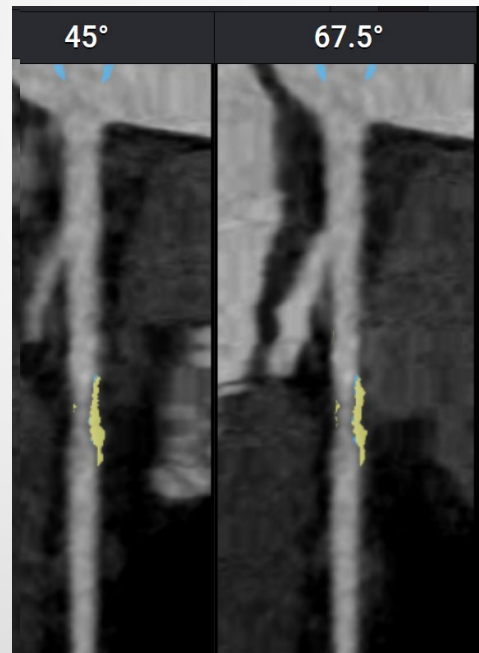
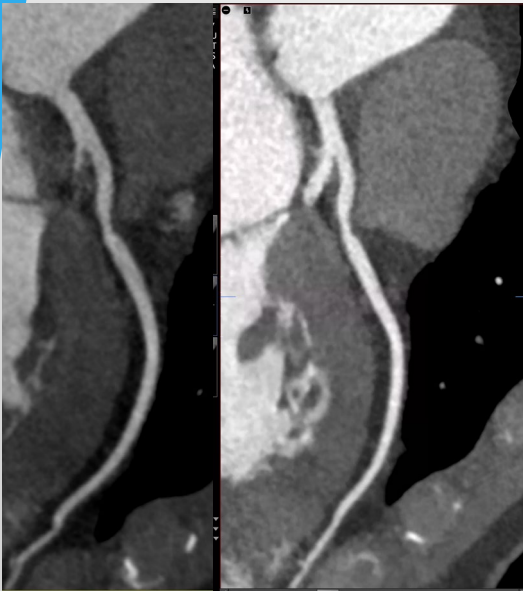
3/2025



6 month
F/U CCTA

50%

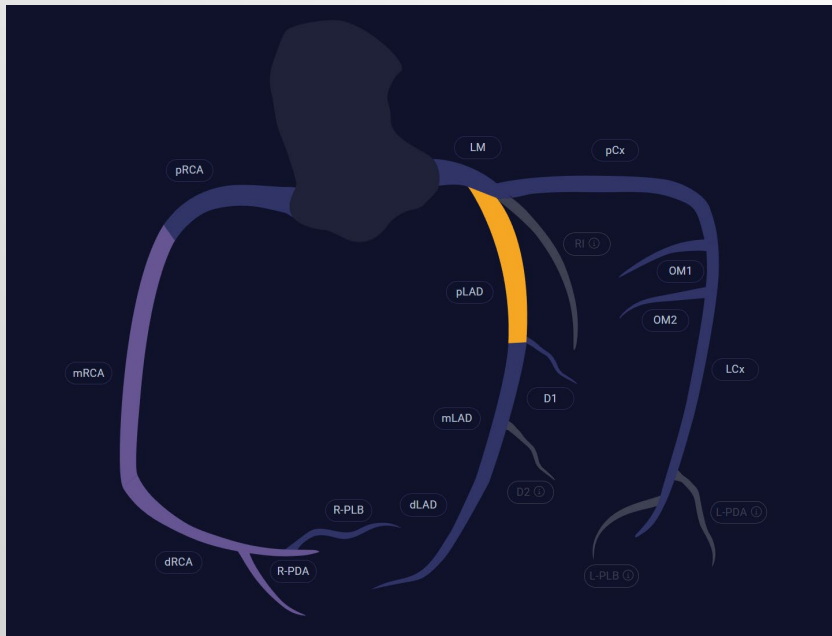
(NCP)



CLEARLY
ISCHEMIA

50% pLAD

None



Ischemia

Likely present in:

LAD

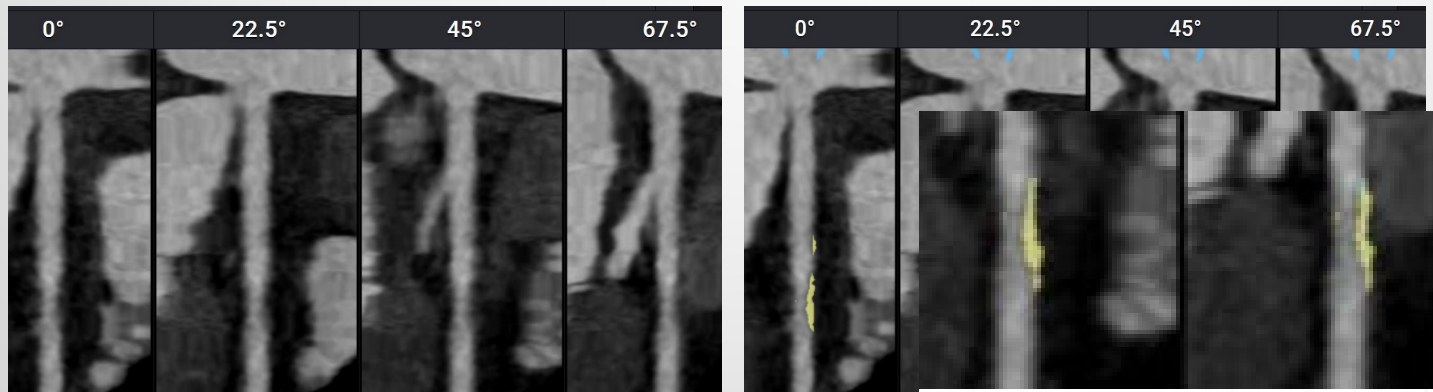
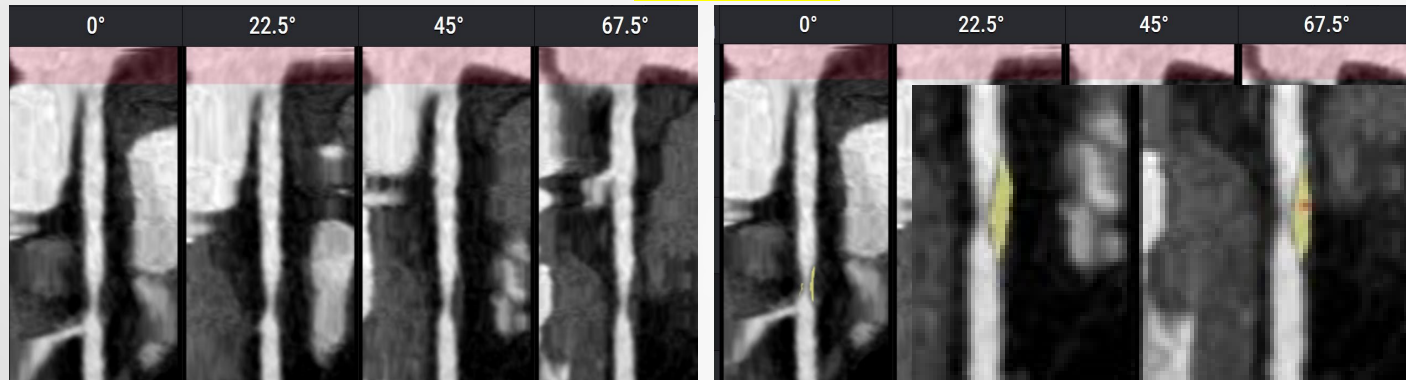
D1



Ischemia

Analyzed - No vessels are likely ischemic

8/2024



3/2025

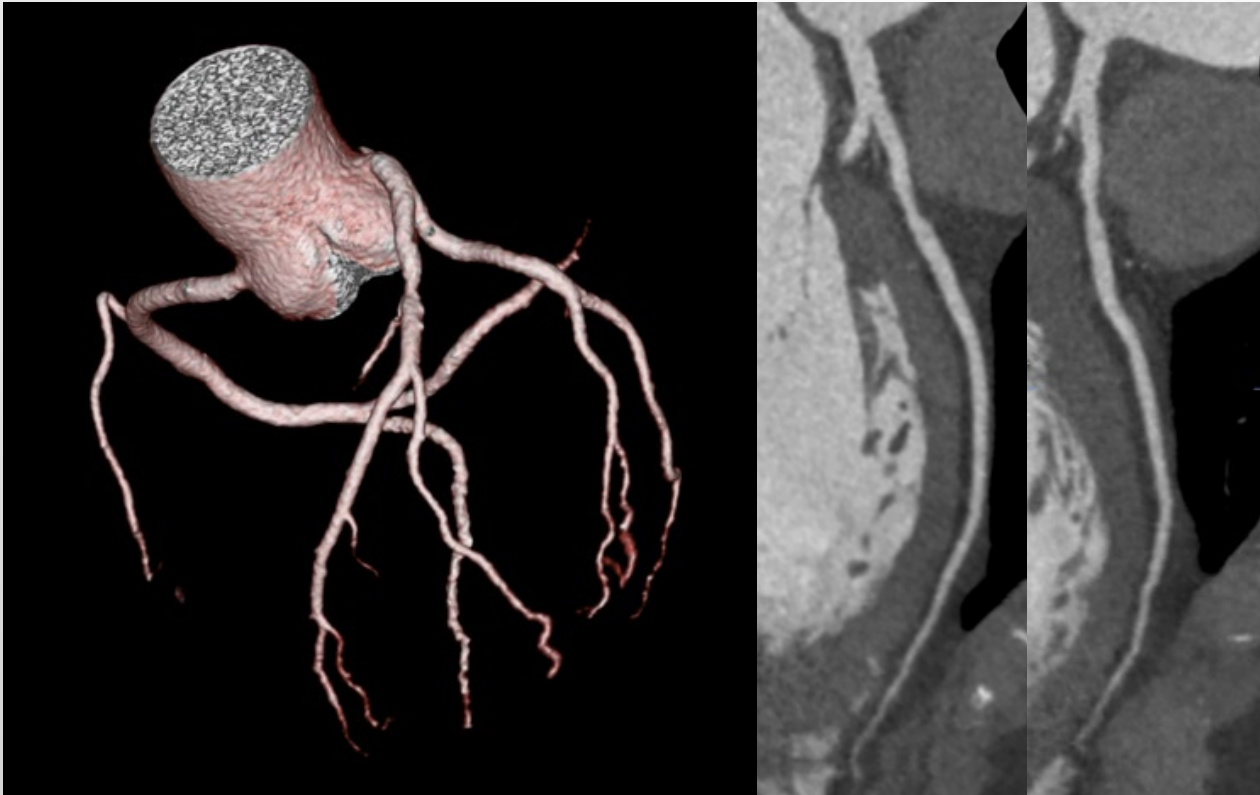
CLEERLY Quantitative Comparison

ALL	Compared		Current	
	mm ³ RAV	Cleerly ID: E727E3D5 8/20/2024	# %	Cleerly ID: 034AEE0C 3/6/2025
Total Plaque Volume (mm ³)		61.9	▲ +15.9	77.8
▶ Total Non-Calcified Plaque Volume (mm ³)		59.9	▲ +13.1	73
Low-Density - Non-Calcified Plaque Volume (mm ³)		3.2	▼ -3.2	0
Total Calcified Plaque Volume (mm ³)		2	▲ +2.8	4.8
# of Severe Stenosis		1	▼ -1	0
# of Moderate Stenosis		0	▲ +1	1
Highest Remodeling Index		1.3	▼ -0.2	1.1
Greatest Diameter Stenosis (%)		70	▼ -20	50
Greatest Area Stenosis (%)		91	▼ -15	76
Length (mm)		646	▲ +4	650

12 month
F/U CCTA

<50%

(NCP)



CLEERLY Quantitative Comparison

ALL	mm ³ RVV	Compared		Current		Current	
		Cleerly ID: E727E3D5 8/20/2024	# %	Cleerly ID: 034AEE0C 3/6/2025	# %	Cleerly ID: 62YK3R82 8/27/2025	
Total Plaque Volume (mm ³)		61.9	▲ +15.9	77.8	▲ +0.4	78.2	
▶ Total Non-Calcified Plaque Volume (mm ³)		59.9	▲ +13.1	73	▲ +0.2	73.2	
Low-Density - Non-Calcified Plaque Volume (mm ³)		3.2	▼ -3.2	0	▲ +0.1	0.1	
Total Calcified Plaque Volume (mm ³)		2	▲ +2.8	4.8	▲ +0.2	5	
# of Severe Stenosis		1	▼ -1	0	=	0	
# of Moderate Stenosis		0	▲ +1	1	=	1	
Highest Remodeling Index		1.3	▼ -0.2	1.1	▲ +0.1	1.2	
Greatest Diameter Stenosis (%)		70	▼ -20	50	=	50	
Greatest Area Stenosis (%)		91	▼ -15	76	▼ -2	74	
Length (mm)		646	▲ +4	650	▼ -46.7	603.3	

Single snapshot – no longitudinal tracking

One scan shows disease, not trajectory.

Without serial metrics (Δ TPV, Δ LAP, Δ FAI), change can't be measured.

Limits proof of therapy success or residual risk tracking.

Rethinking coronary artery disease: a call to action

The Lancet,

The Lancet, Volume 405, Issue 10486, 1203

Call to Action

“We miss disease not because it isn’t there, but because we aren’t looking with the right tools.”

Need adoption of modern CCTA, AI plaque analysis, and risk-based prevention strategies.

“If we can see it, we can treat it—before the event.”