Tri-City Cardiovascula Symposium

August 17, 2024

Sunny Jhamnani, MD

- Board Certified in Interventional Cardiology, Cardiovascular Disease, Vascular Imaging, Nuclear Medicine, Echocardiography, and Cardiovascular Computed Tomography.
- Completed his fellowships in Cardiovascular Disease, Interventional Cardiology, and Advanced Interventional Cardiology at Yale University in New Haven, Connecticut, and his Residency in Internal Medicine at Georgetown University Hospital/Washington Hospital Center in Washington, D.C.
- Prior to his residency, Dr. Jhamnani was a Research Fellow at Harvard University in Boston, Massachusetts.
- Dr. Jhamnani serves/has served on Center for Medicare and Medicaid Service committees, technical expert panels nationally, National Quality Forum, National Board of Medical Examiners, American Medical Association, American College of Cardiology, Arizona Care Network, Banner Health and CommonSpirit Health.

TRI-CITY
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Advances in Non-Invasive Cardiac Imaging Techniques: Cardiac CT

TRI-CITY
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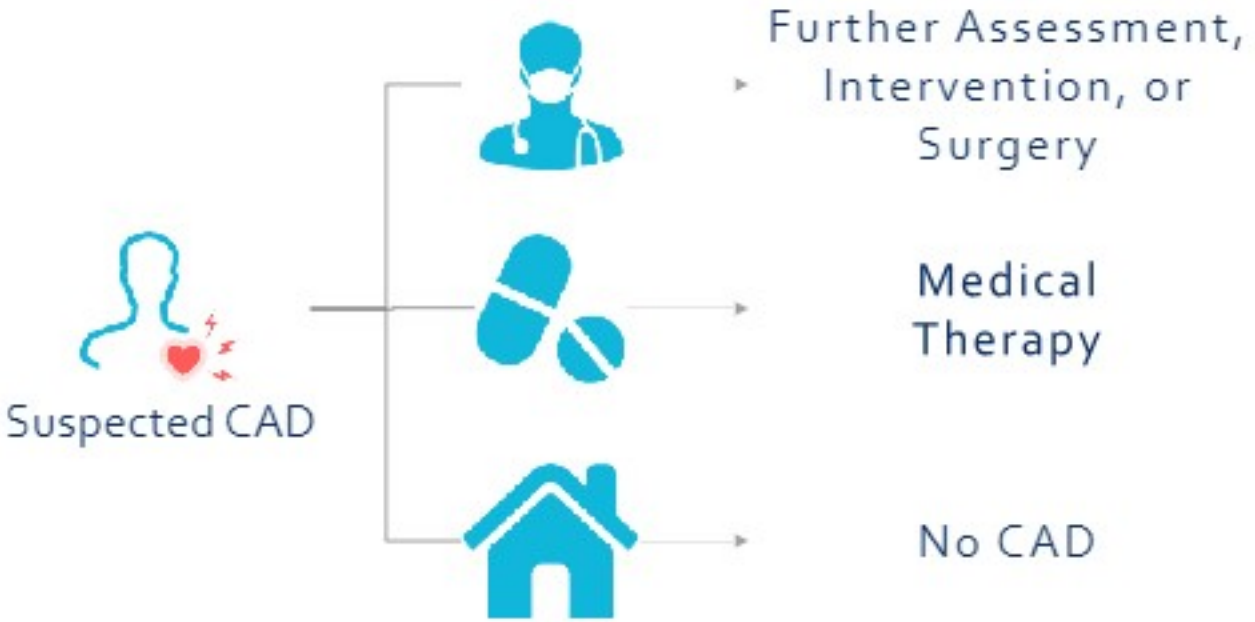
Outline

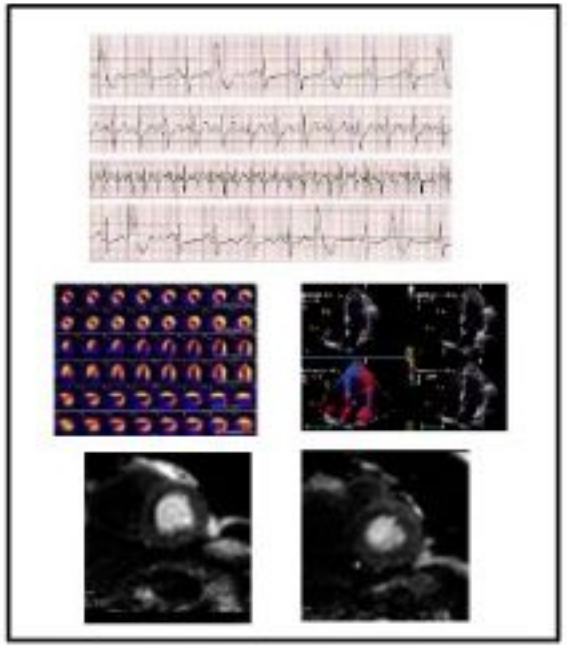
- Coronary Artery Disease
- Structural Cardiology
- EP
- Others

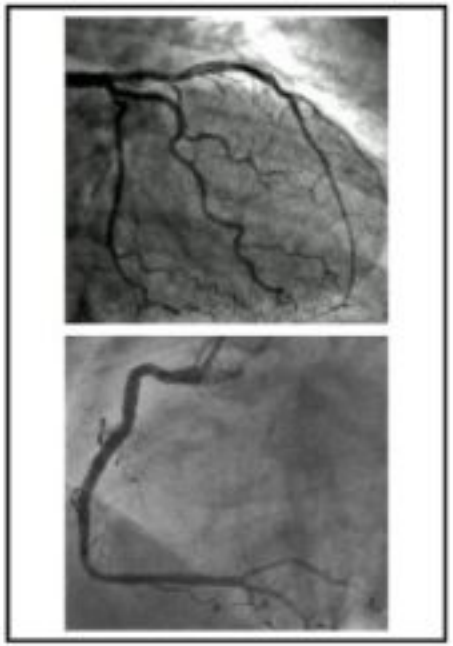
Glagov's Model

Current Paradigm

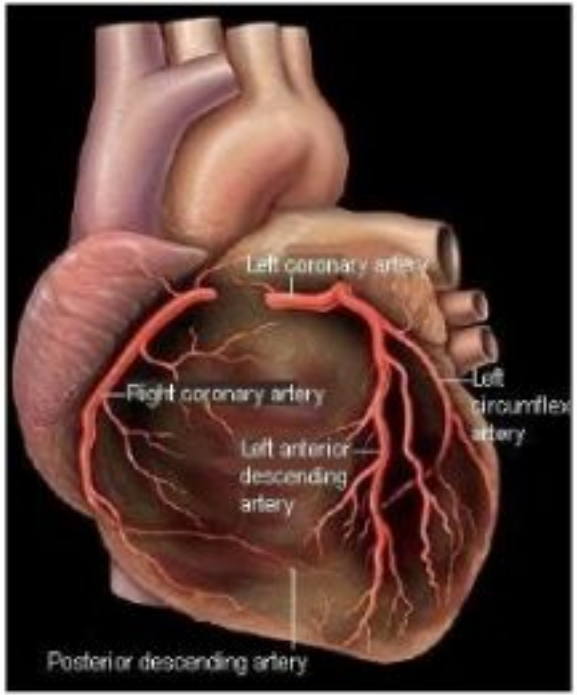


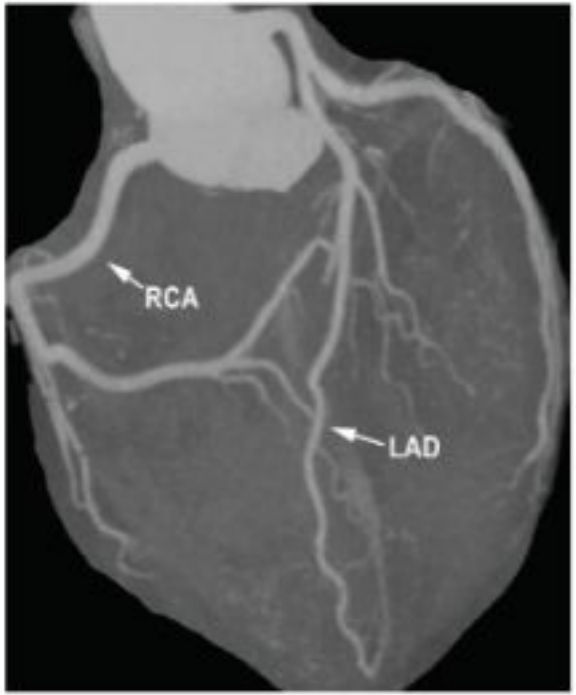
Current Paradigm

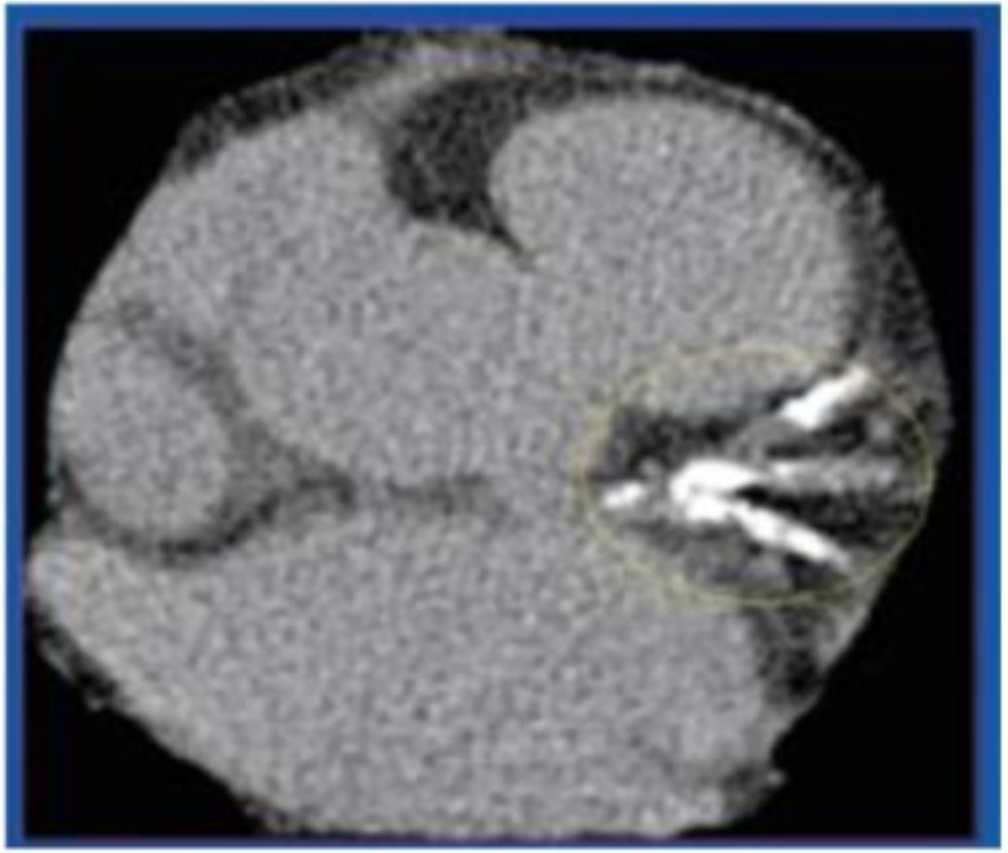




Correlation with Coronary Angiogram







CORONARY CALCIUM SCORE

Multi-Ethnic Study of Atherosclerosis (MESA)

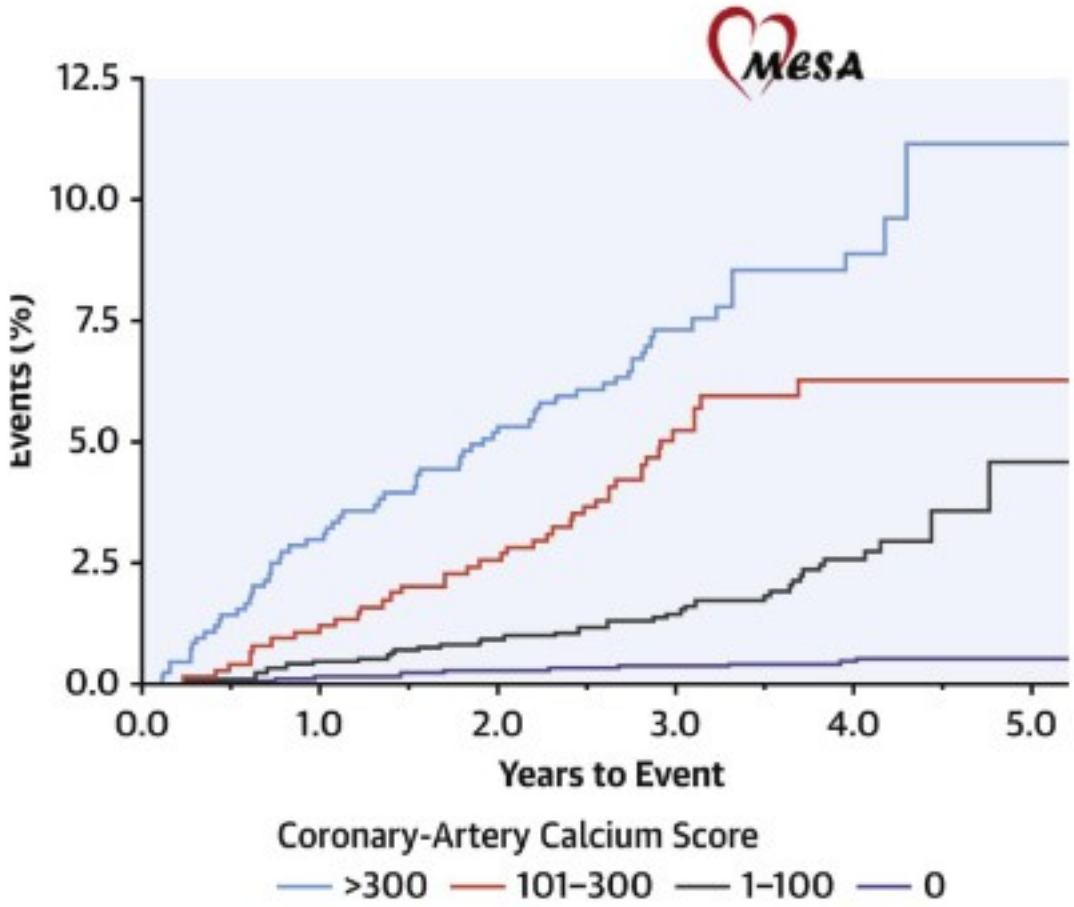
N: 6814 , 50% Women, 62 ± 10 years

Median Follow-up: 15.7 years

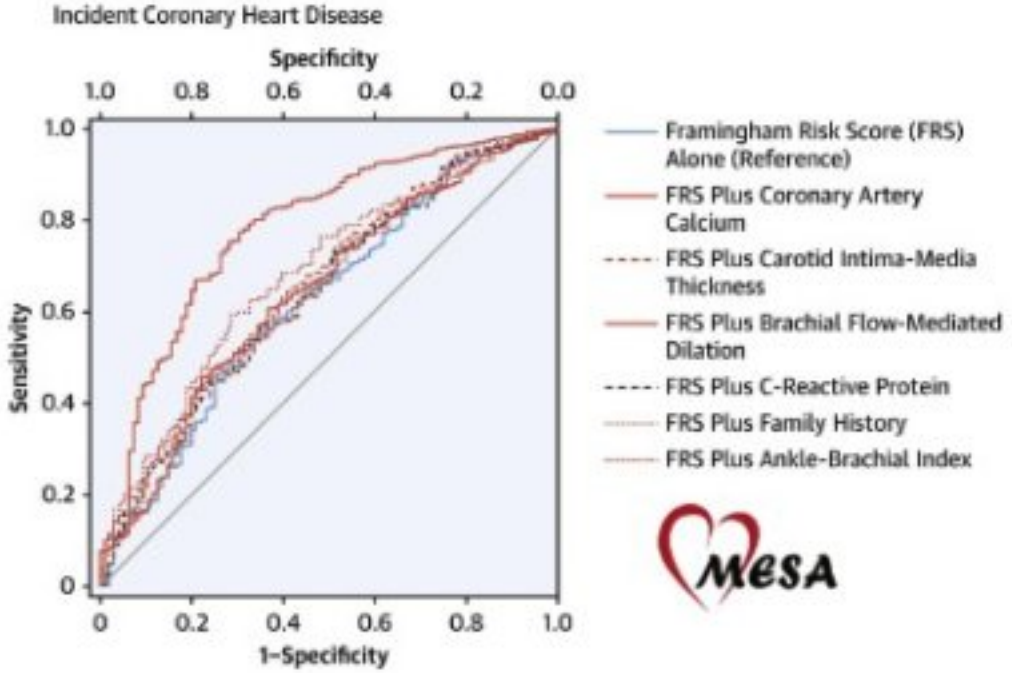
38% White, 28% Black, 23% Hispanic
11% Chinese

Calcification:
70% White, 52% Black, 57% Hispanic, 59% Chinese

CORONARY CALCIUM SCORE



UTILITY OF CORONARY CALCIUM SCORE



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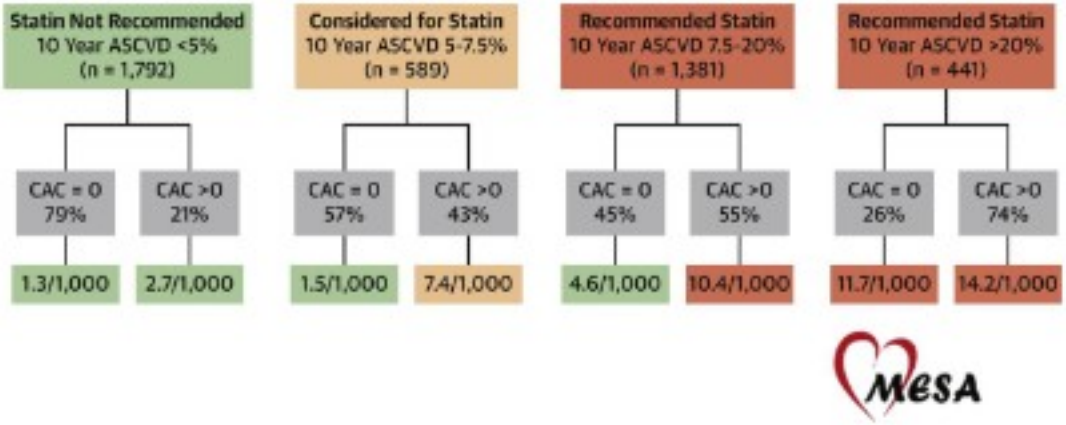

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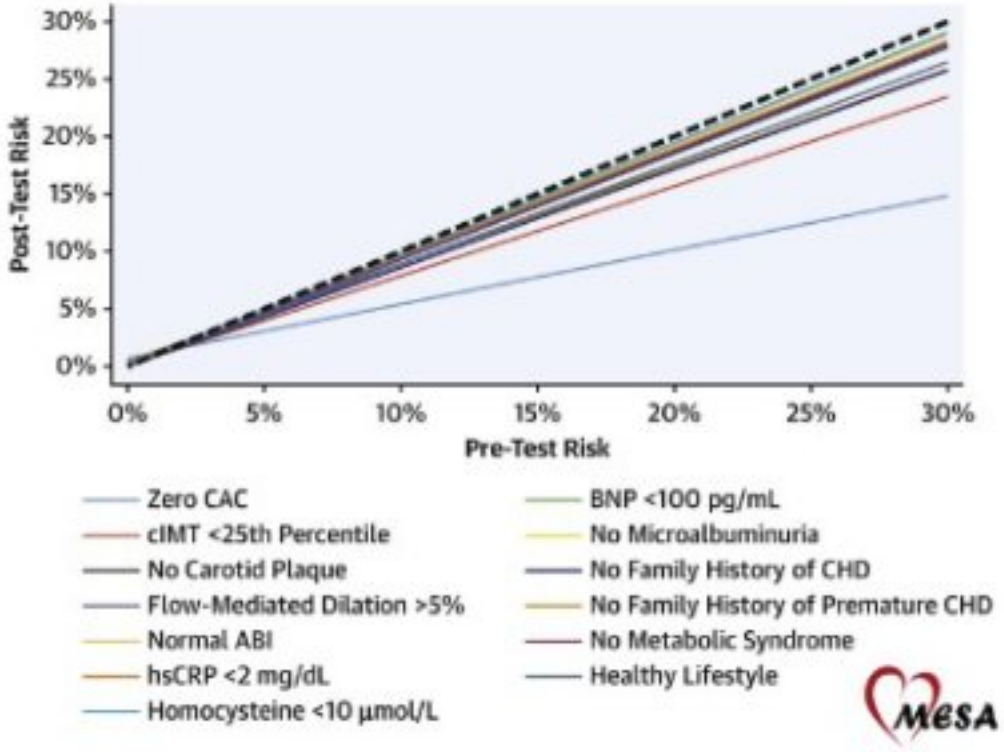

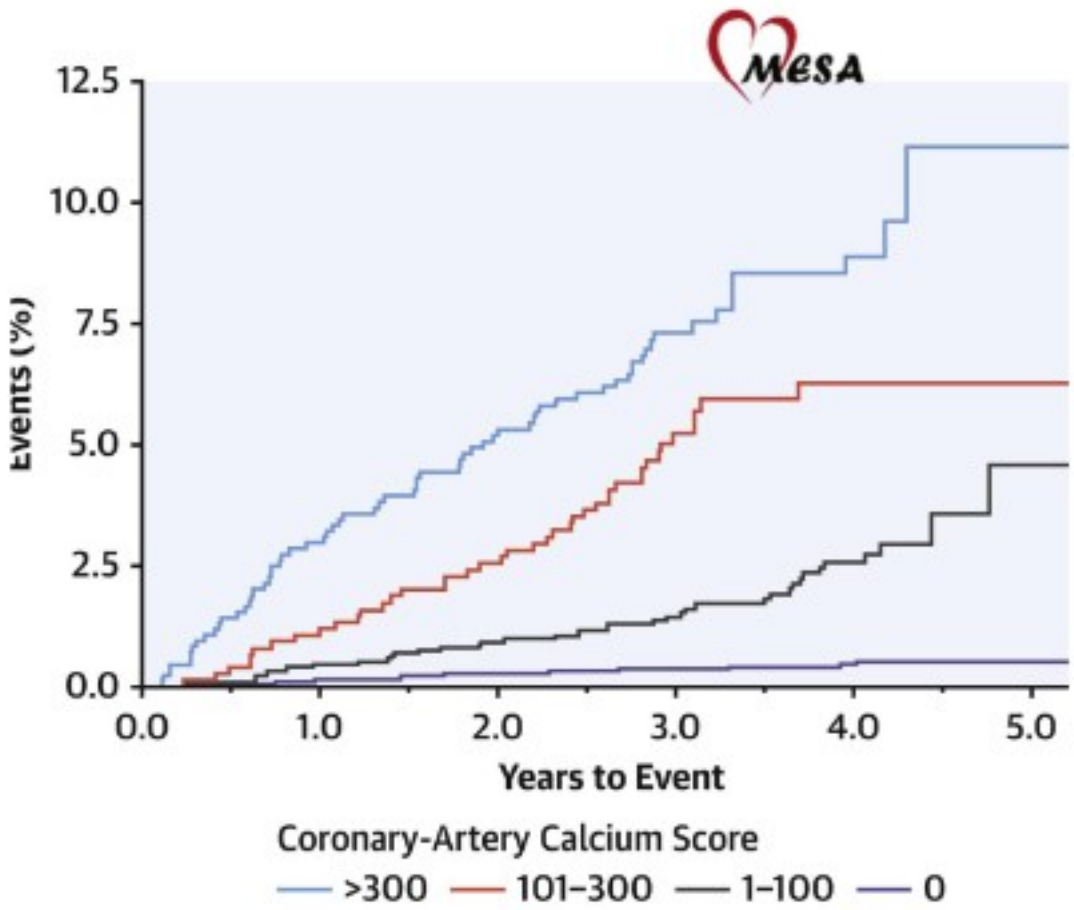

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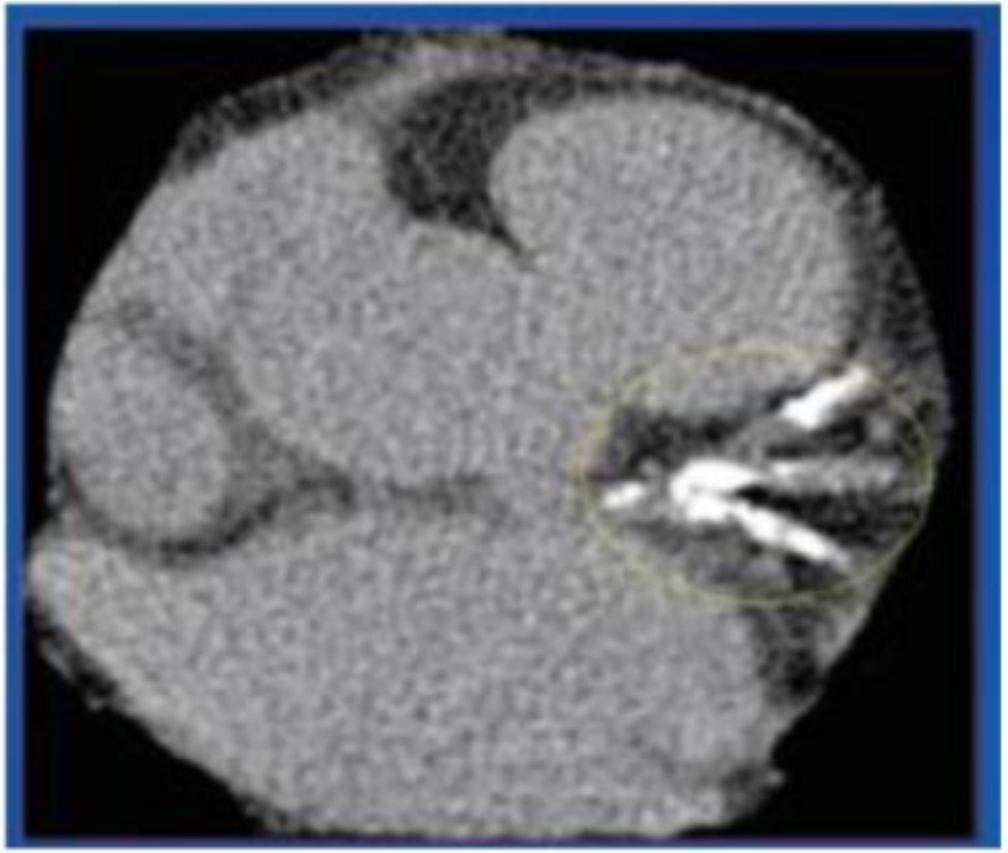
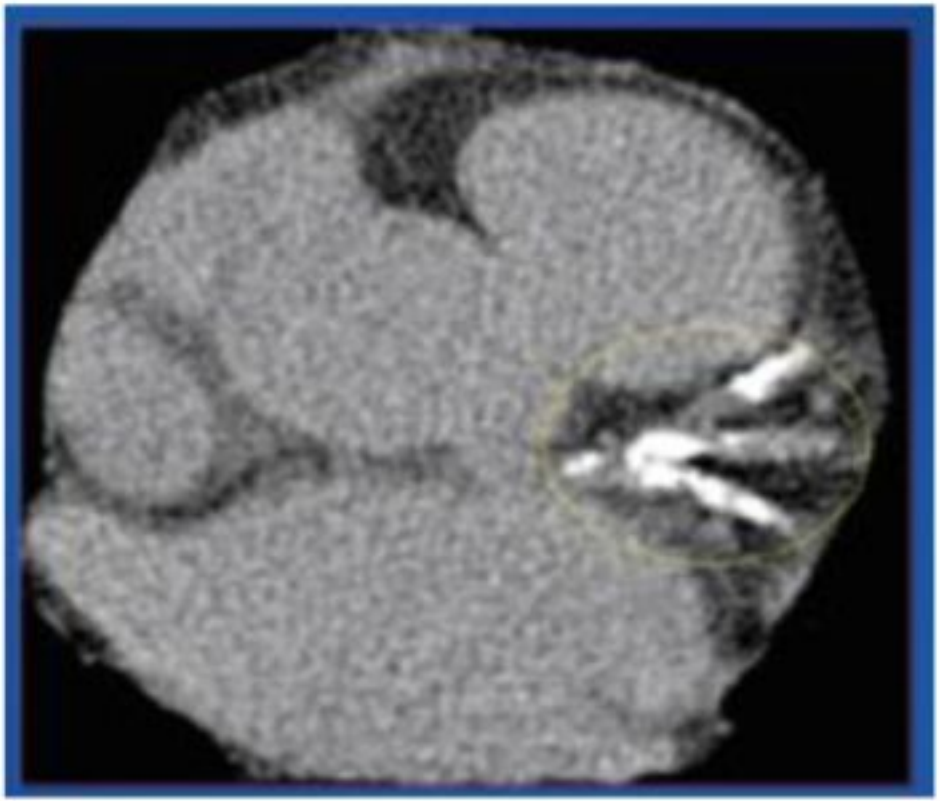


CORONARY CALCIUM SCORE

Healthy or Not

- 45 year old female, 5'3", 120 lbs
- Runs 4-5 miles, 5/week
- No HTN/DLD/DM/Tobacco
- Family History of CAD
- Asymptomatic
- Sought to see me in the office due to CCTA expertise
- CAC: 0



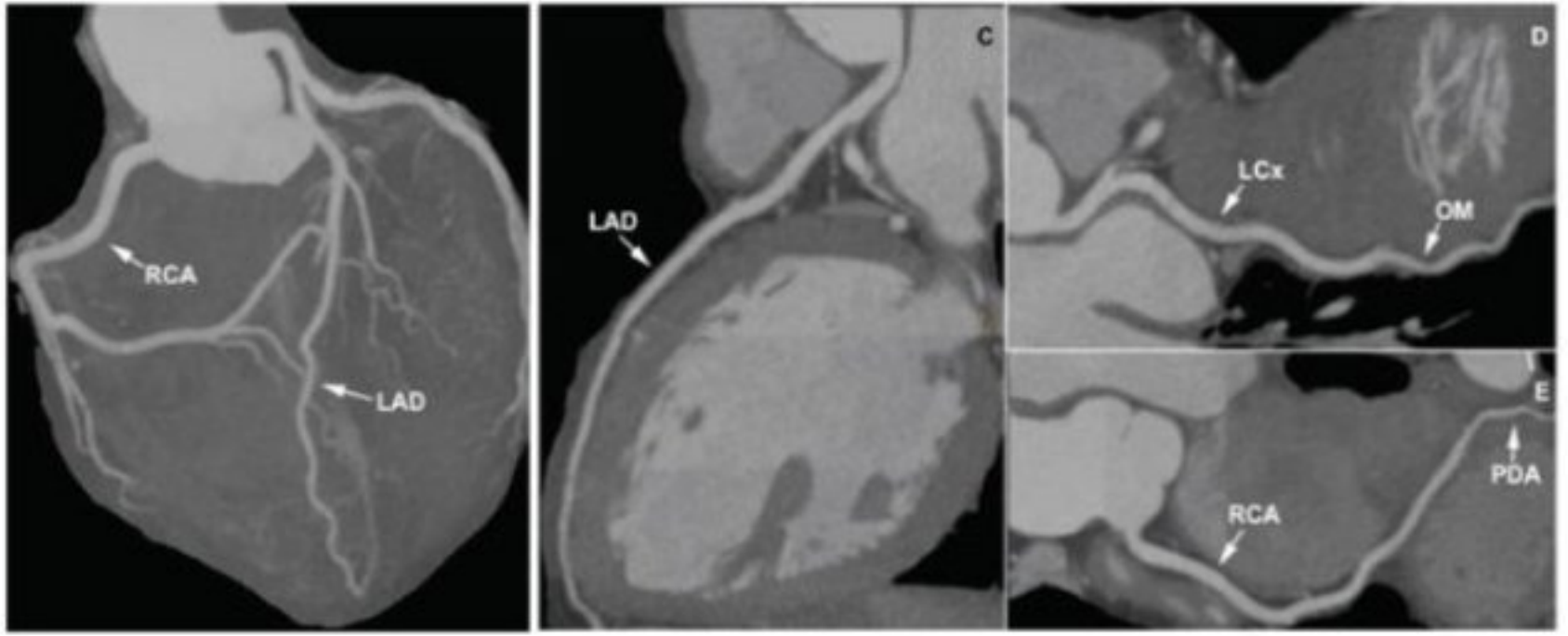
Utility of Coronary Calcium Score

- Looks at calcification only
- Can miss non calcified plaque

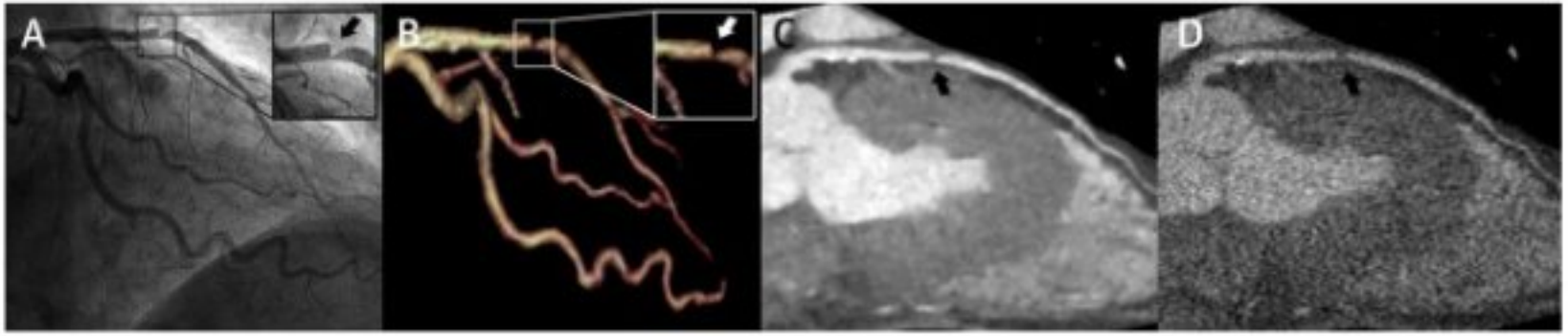
Jin- ICJI 2012

- 914 asymptomatic patients under the age of 45
- 9.4% had subclinical atherosclerosis
- 58% were non calcified

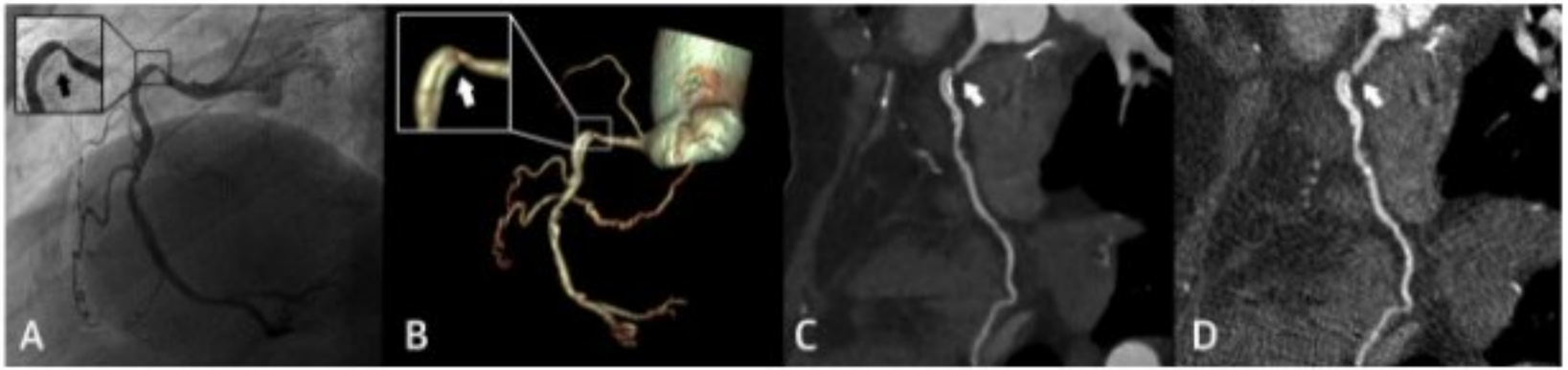
Correlation with Coronary Angiogram



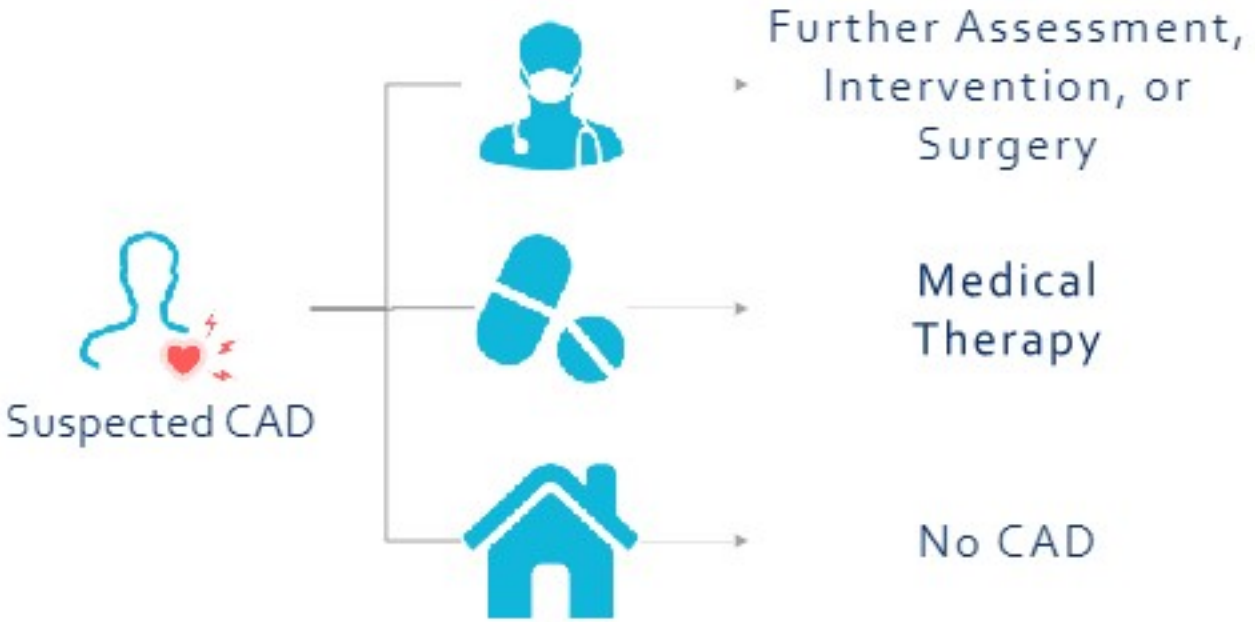
Proximal LAD Stenosis



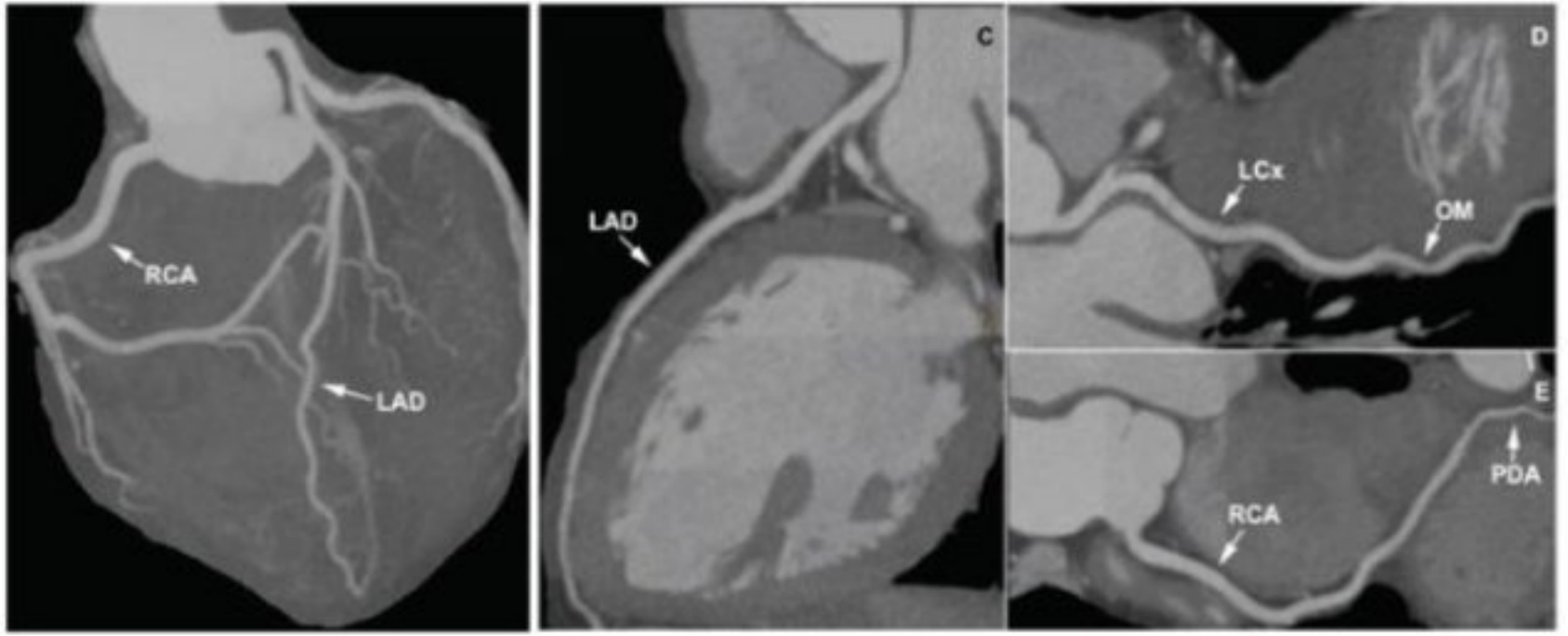
Proximal RCA Stenosis



Current Paradigm



No CAD

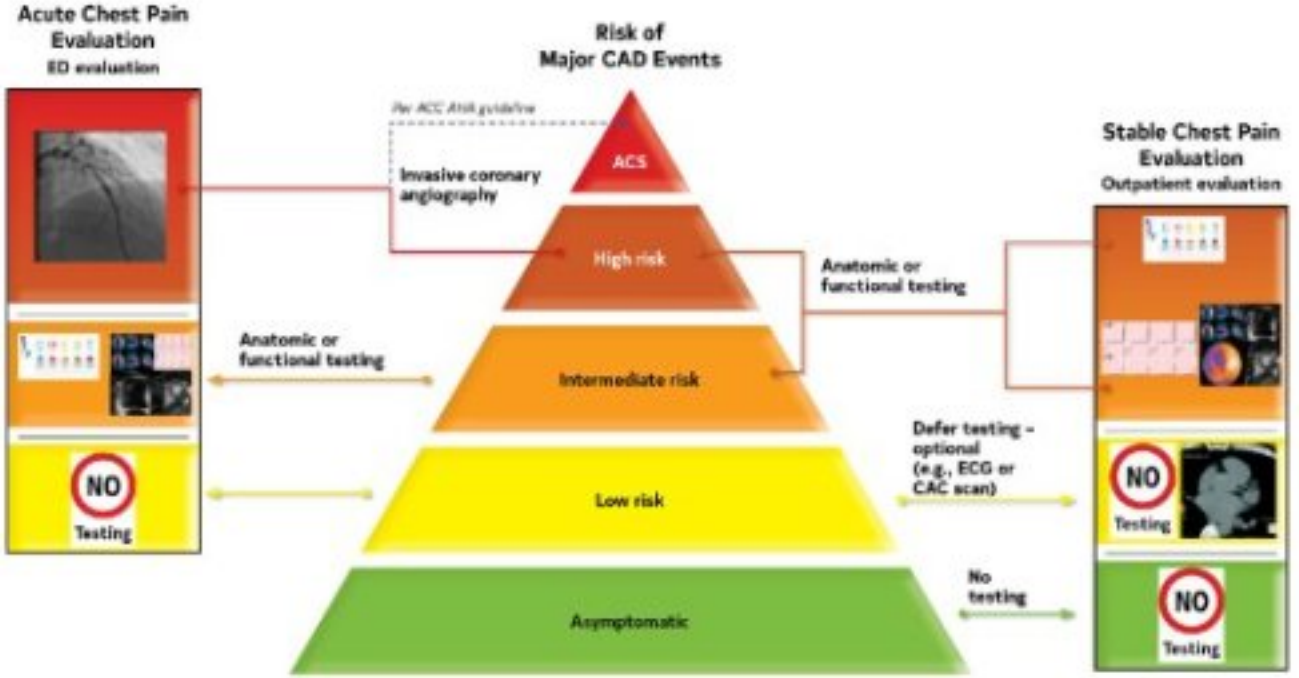


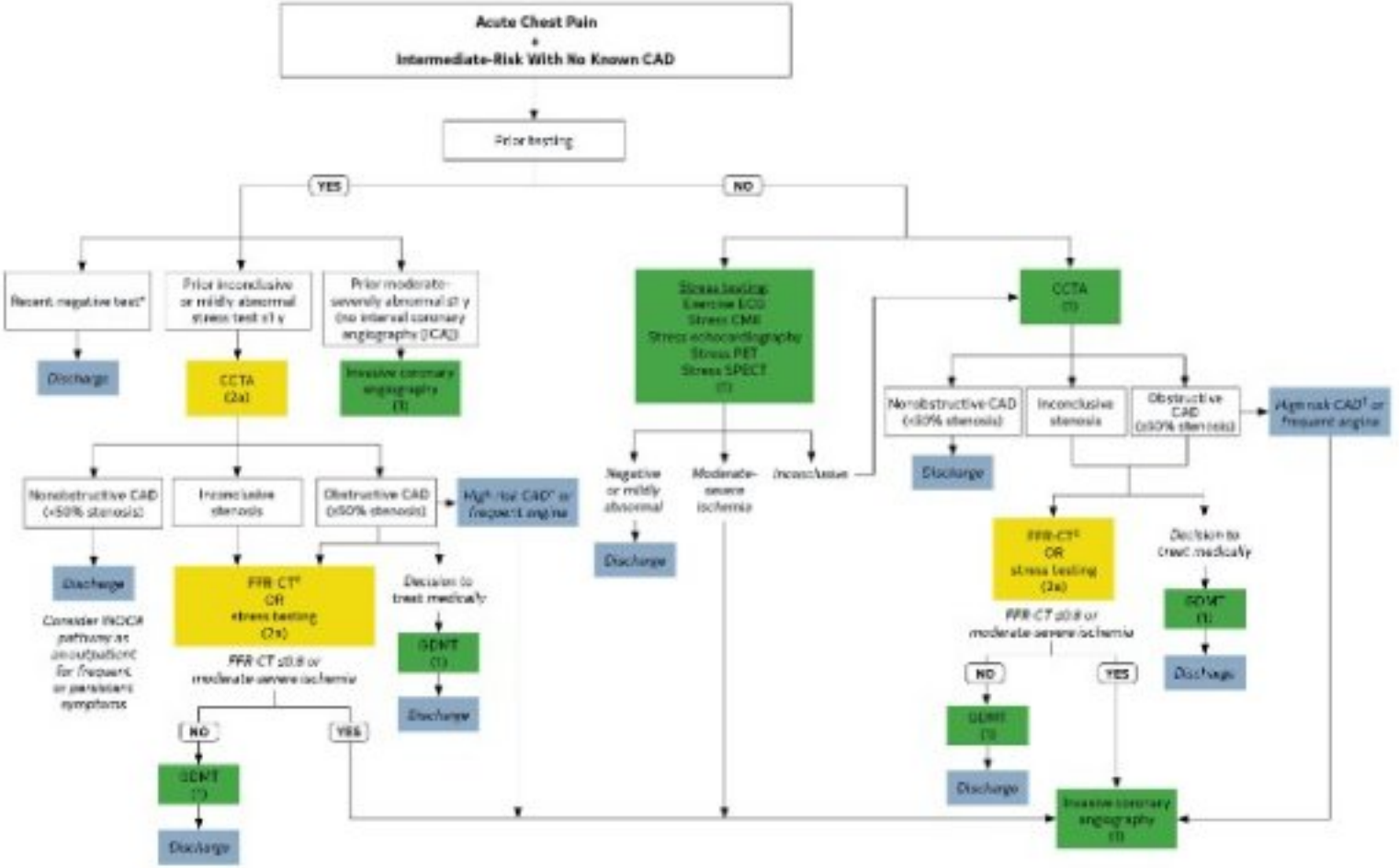
Mild → Moderate → Severe

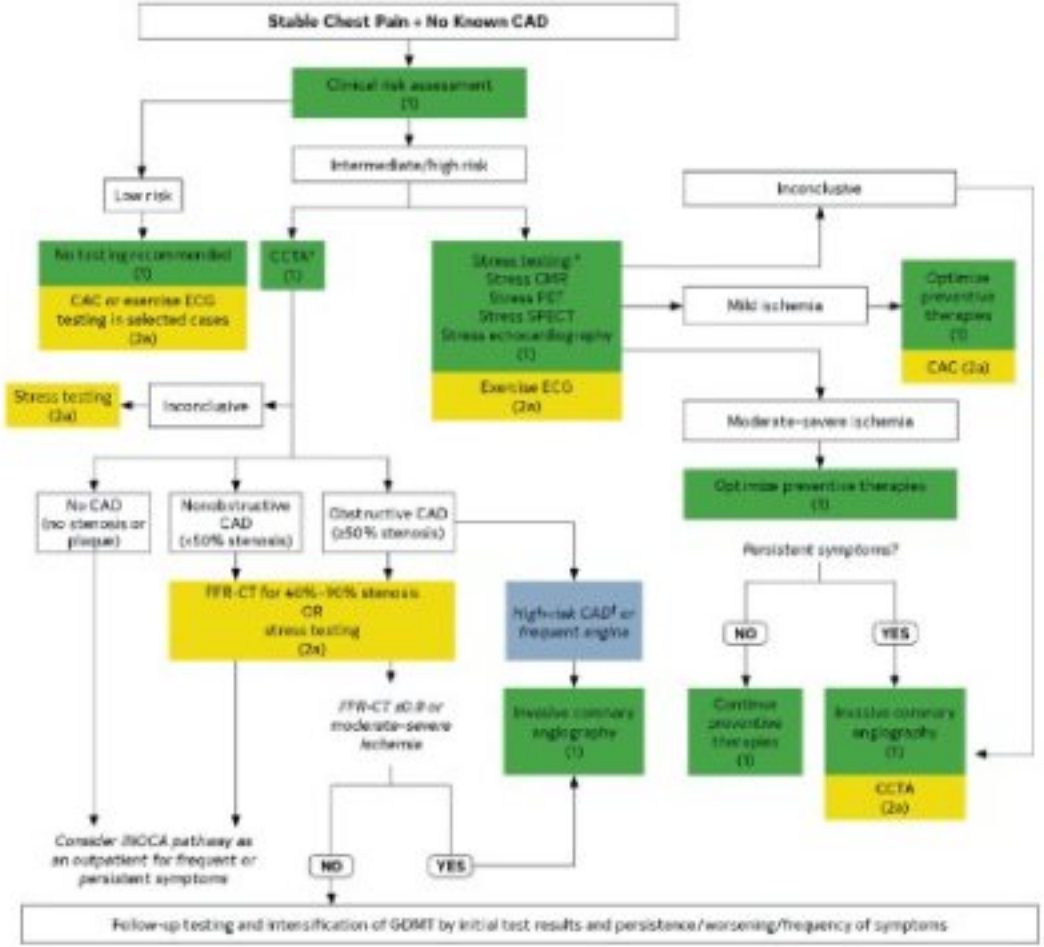
Various Diagnostic Approaches

• Non-Invasive Options	Sensitivity:	Specificity:
• Exercise ECG	45-61%	70-90%
• Exercise Echo	70-85%	77-89%
• Exercise SPECT	73-92%	63-88%
• Pharmacological Echo	72-90%	79-95%
• Pharmacological SPECT	88-91%	75-90%
• CCTA	93-99%	64-90%

2021 Chest Pain Guidelines



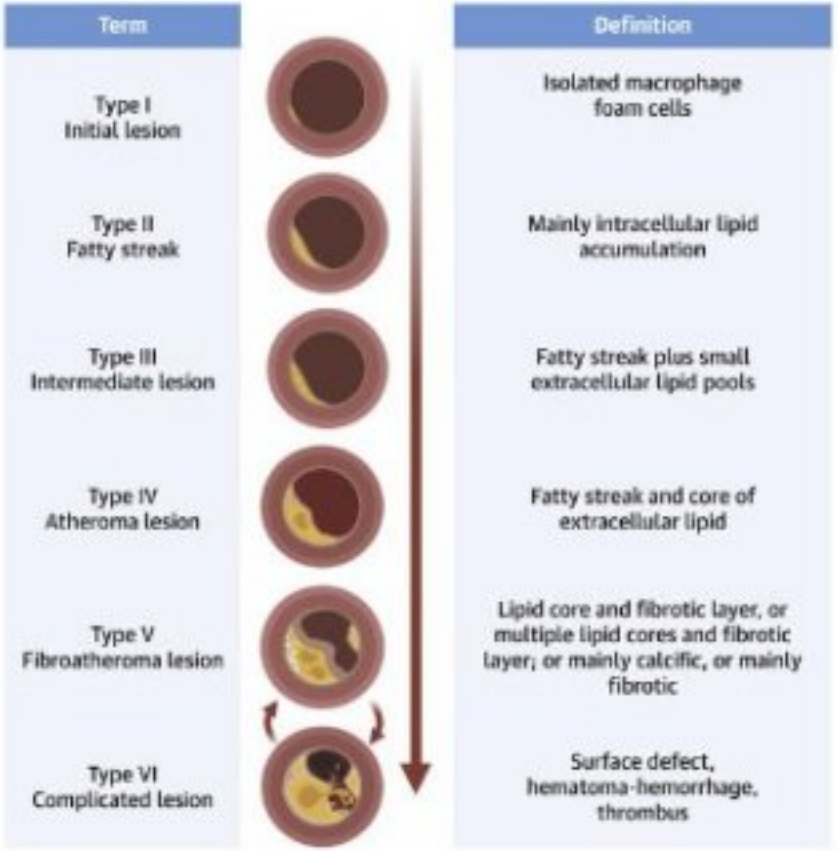

Acute Chest Pain
+
Intermediate-Risk With No Known CAD
Prior testing
YES
NO
Recent negative test*
Discharge
Prior inconclusive or mildly abnormal stress test ≤1 y
CCTA (2a)
Prior moderate-severely abnormal ≤1 y (no interval coronary angiography [CAD])
Invasive coronary angiography (I)
Nonobstructive CAD (<50% stenosis)
Inconclusive stenosis
Obstructive CAD (≥50% stenosis)
High risk for CAD† or frequent angina
Discharge
Consider INOCA pathway as precaution for frequent or persistent symptoms
FFR-CT‡ OR stress testing (2a)
FFR-CT ≤0.8 or moderate-severe ischemia
NO
YES
GDMT (I)
Discharge
Decision to treat medically
GDMT (I)
Discharge
Stress testing: Exercise ECG Stress CMR Stress echocardiography Stress PET Stress SPECT (I)
Negative or mildly abnormal
Discharge
Moderate-severe ischemia
Inconclusive
CCTA (I)
Nonobstructive CAD (<50% stenosis)
Discharge
Inconclusive stenosis
Obstructive CAD (≥50% stenosis)
High risk CAD† or frequent angina
FFR-CT‡ OR stress testing (2a)
FFR-CT ≥0.8 or moderate-severe ischemia
NO
YES
GDMT (I)
Discharge
Decision to treat medically
GDMT (I)
Discharge
Invasive coronary angiography (I)


Stable Chest Pain + No Known CAD
Clinical risk assessment (1)
Low risk
Intermediate/high risk
No test ingestion recommended (3)
CAC or exercise ECG testing in selected cases (2a)
CCTA* (1)
Stress testing * Stress CMR Stress PET Stress SPECT Stress echocardiography (1)
Exercise ECG (2a)
Inconclusive
Mild ischemia
Optimize preventive therapies (1)
CAC (2a)
Moderate-severe ischemia
Optimize preventive therapies (1)
Stress testing (2a)
Inconclusive
No CAD (no stenosis or plaque)
Nonobstructive CAD (<50% stenosis)
Obstructive CAD (≥50% stenosis)
FFR-CT for 40%–90% stenosis OR stress testing (2a)
High-risk CADf or frequent angina
FFR-CT ≤0.8 or moderate-severe ischemia
Invasive coronary angiography (1)
Persistent symptoms?
NO
YES
Continue preventive therapies (1)
Invasive coronary angiography (1)
CCTA (2a)
Consider ischemia pathway as an outpatient for frequent or persistent symptoms
NO
YES
Follow-up testing and intensification of GDMT by initial test results and persistence/worsening/frequency of symptoms

2021 Chest Pain Guidelines

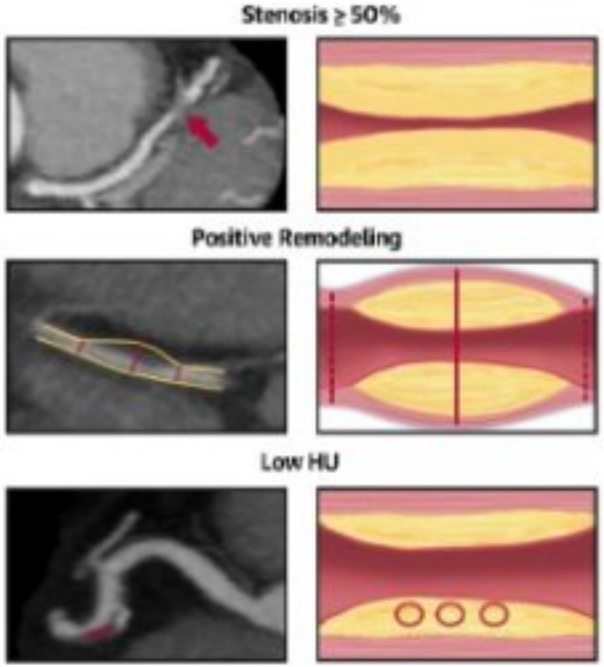
Recommendations for Intermediate-High Risk Patients With Stable Chest Pain and No Known CAD
Referenced studies that support the recommendations are summarized in Online Data Supplements 29 and 30.

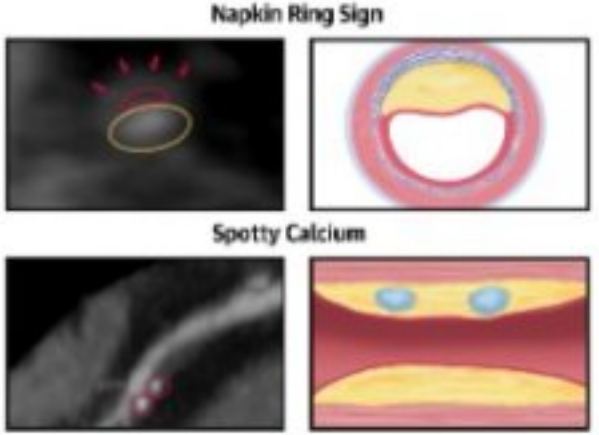
COR	LOE	RECOMMENDATIONS
		Index Diagnostic Testing
		Anatomic Testing
1	A	1. For intermediate-high risk patients with stable chest pain and no known CAD, CCTA is effective for diagnosis of CAD, for risk stratification, and for guiding treatment decisions (1-12).
		Stress Testing
1	B-R	2. For intermediate-high risk patients with stable chest pain and no known CAD, stress imaging (stress echocardiography, PET/SPECT MPI or CMR) is effective for diagnosis of myocardial ischemia and for estimating risk of MACE (8,13-35).



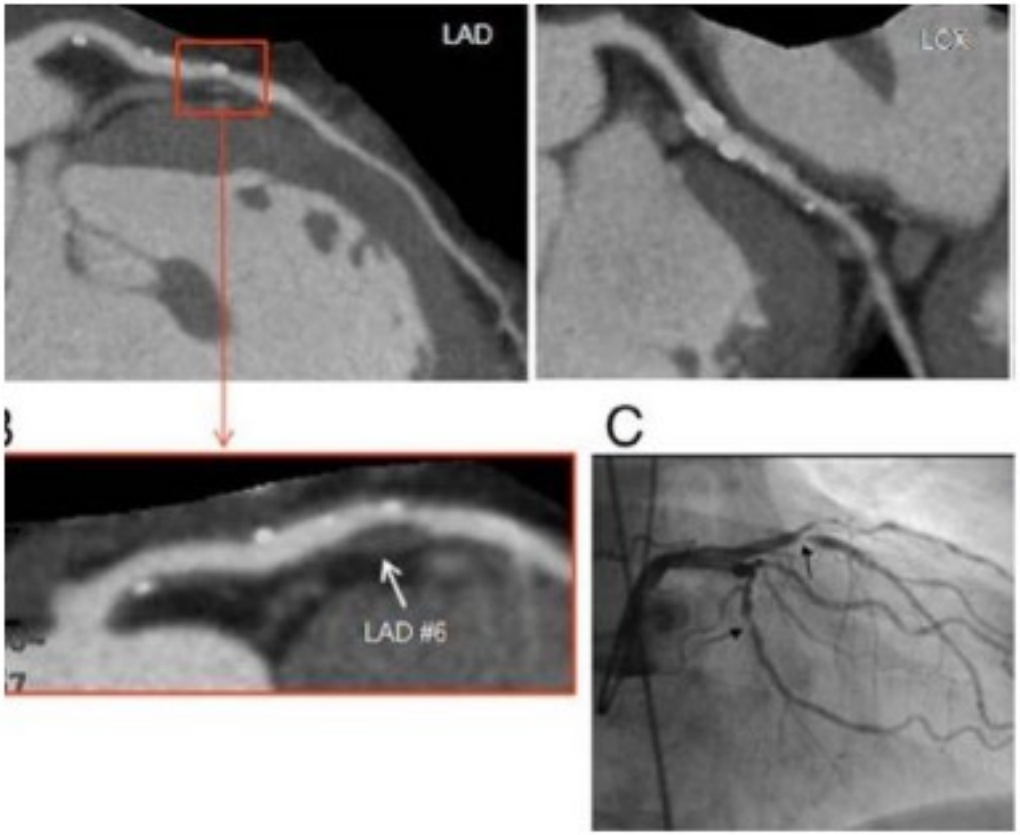
CCTA IDENTIFIES HIGH RISK PLAGUE FEATURES

CCTA Identifies High Risk Plague Features



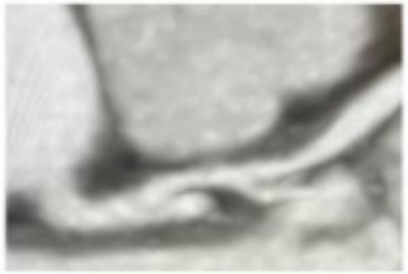


Progression to ACS



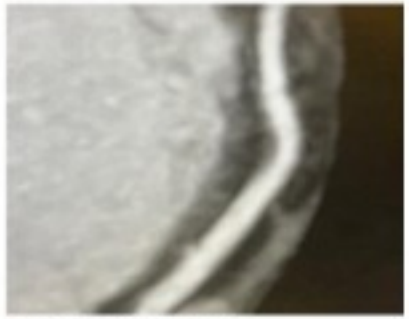
Back to our patient

2019 Prox LAD

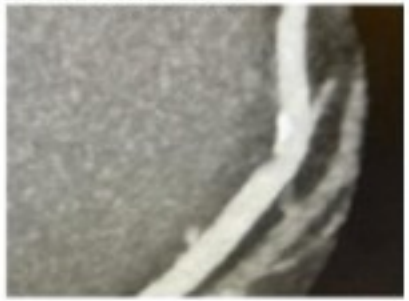


2023 Prox LAD

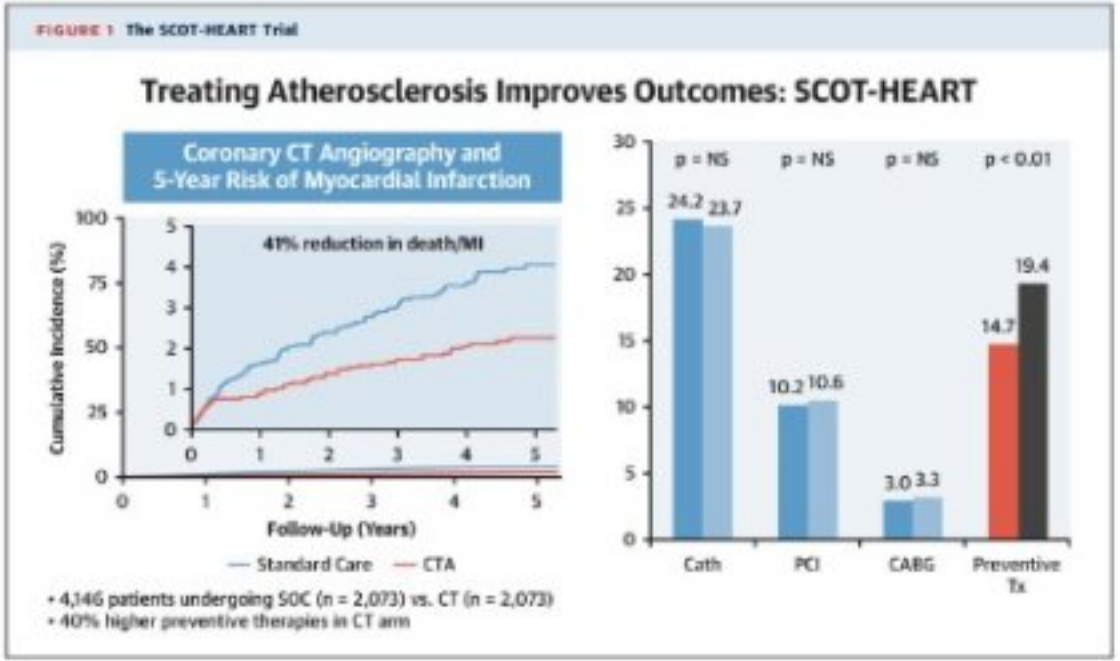
2019 Mid LAD

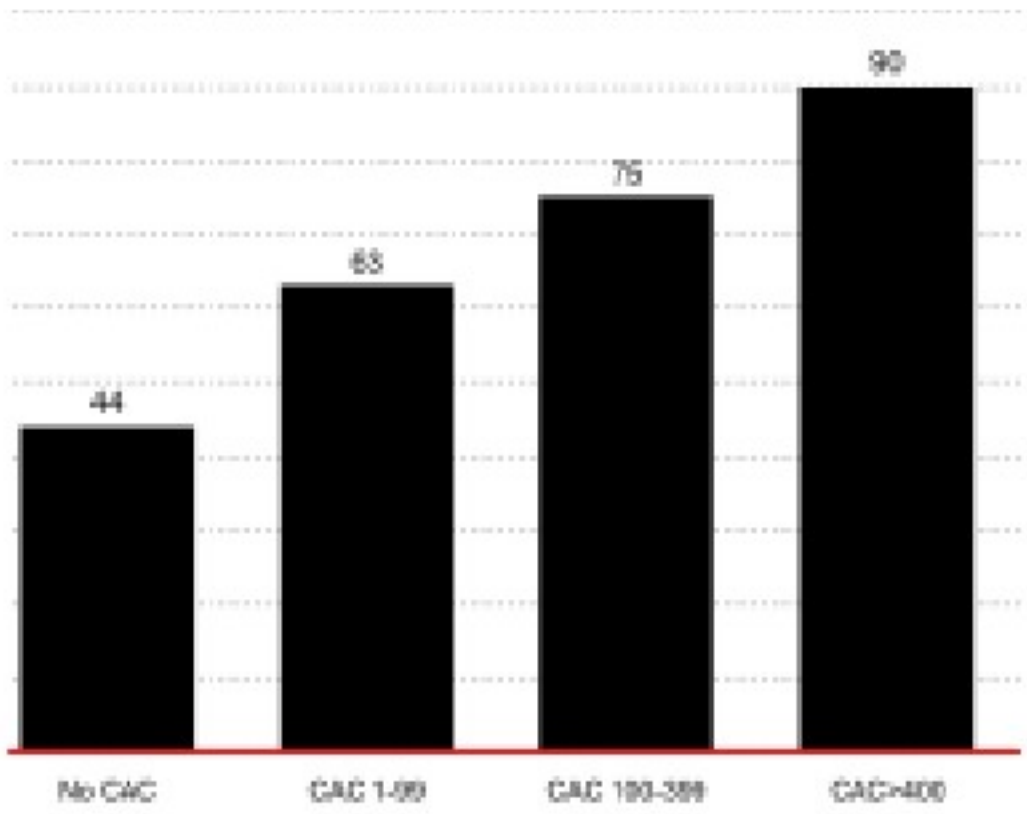


2023 Mid LAD



Coronary CTA-guided management improves outcomes





VISUALIZATION OF CAC: IMPROVED ADHERENCE TO STATIN THERAPY

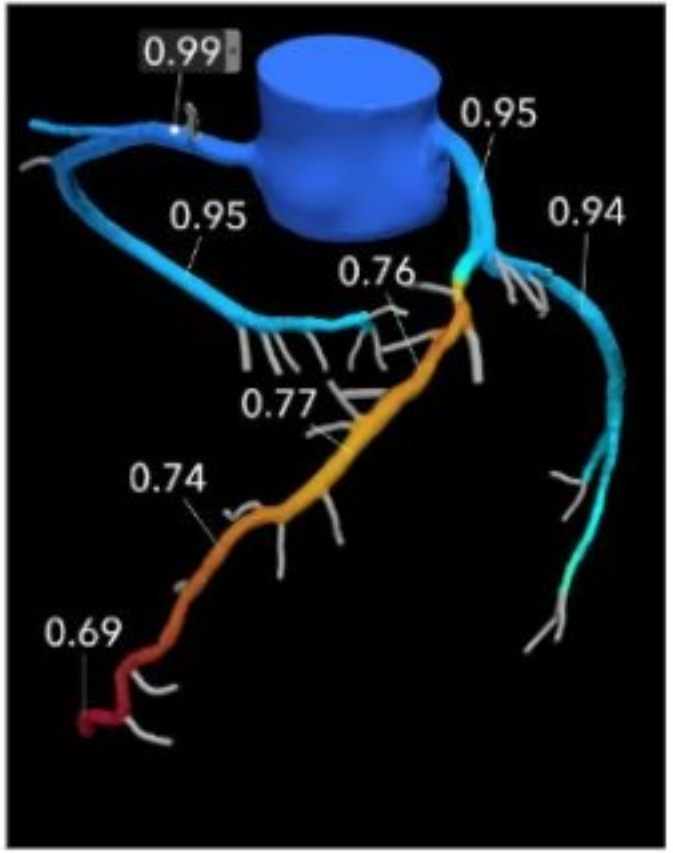
Kalia et al. Atherosclerosis 2005

Mild → Moderate → Severe

AI

- HeartFlow

Mild → Moderate → Severe



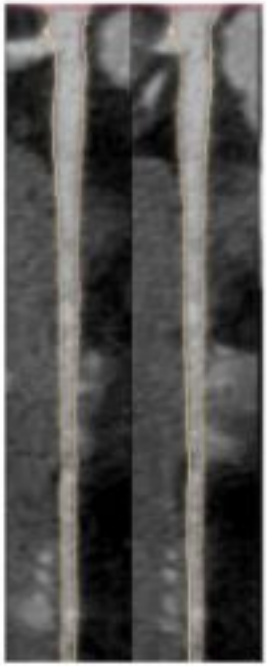
HeartFlow

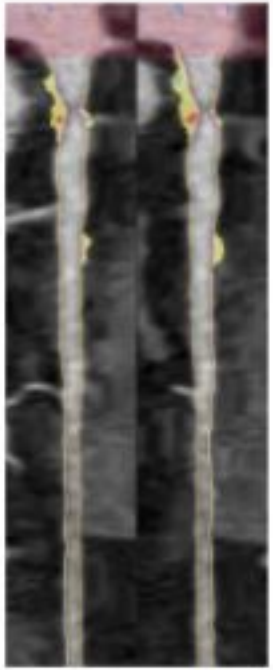
- Invasive FFR is the proven gold-standard for determining which coronary lesions require revascularization
- AI generated physiology computed FFR from CCTA
- No extra radiation
- No invasive procedure

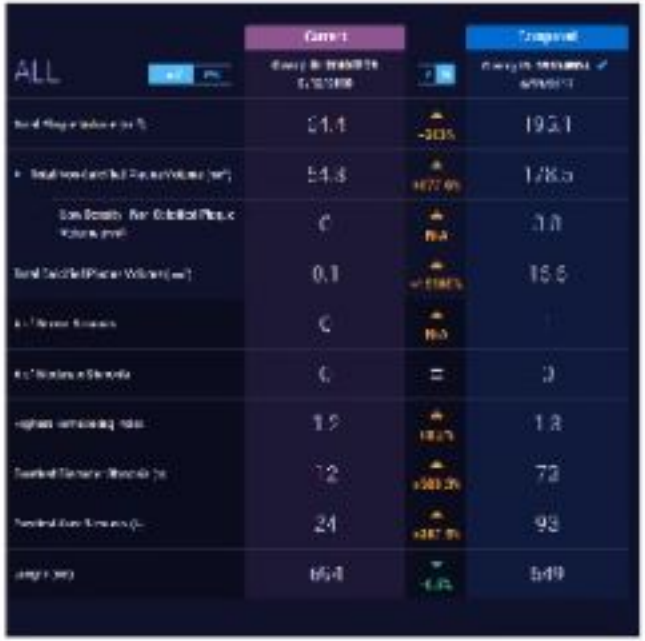
AI

- Cleerly

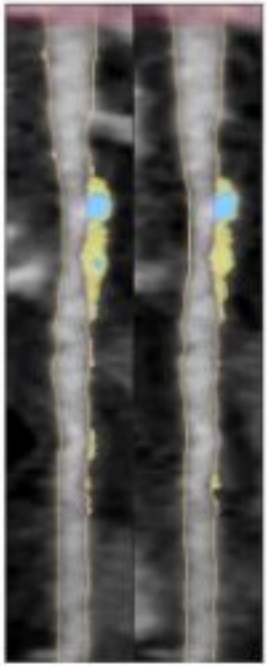
Plaque Progression: 60 year, no therapy

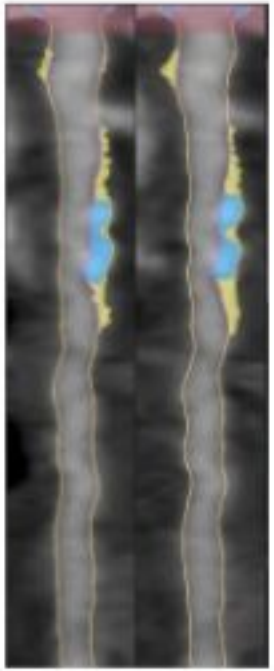






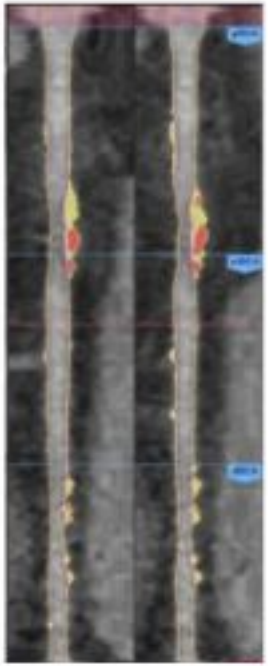
Plaque Stabilization: 56 year, high statin

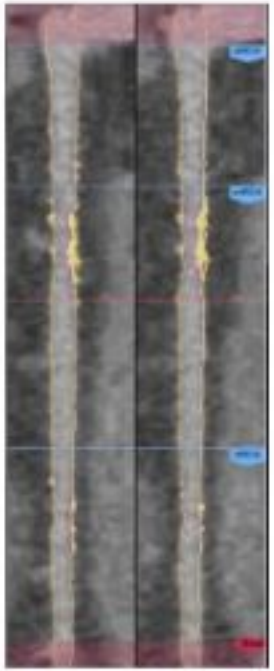


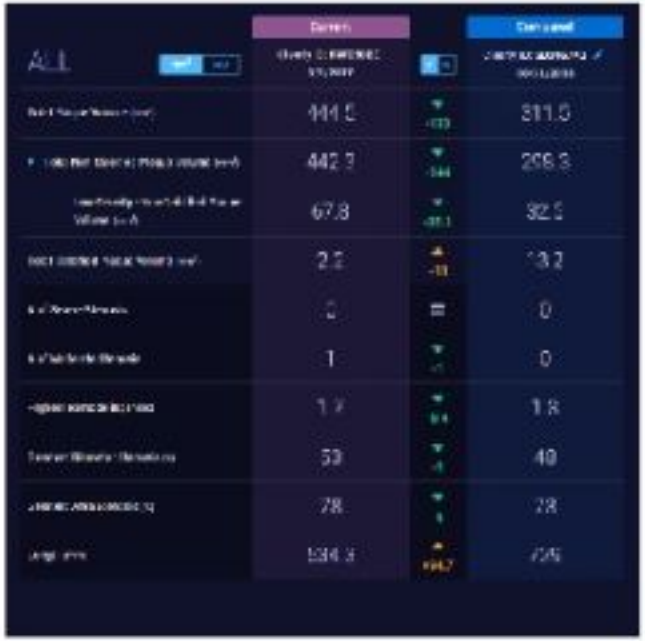


All			
	313	▲ +1.3%	316.7
	289.8	▼ -17.8%	240.2
	0	▲ N/A	0.2
	23.2	▲ +229.2%	76.5
	1	=	1
	1	▼ -100%	0
	1.3	▲ +7.7%	1.4
	71	▲ +7.0%	73
	91	▲ +2.2%	93
	6455	▲ +0.2%	6858

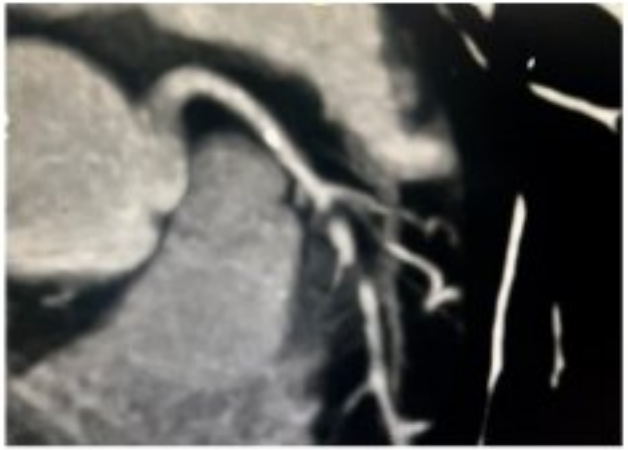
Plaque Regression: 55 year, PCSK9i



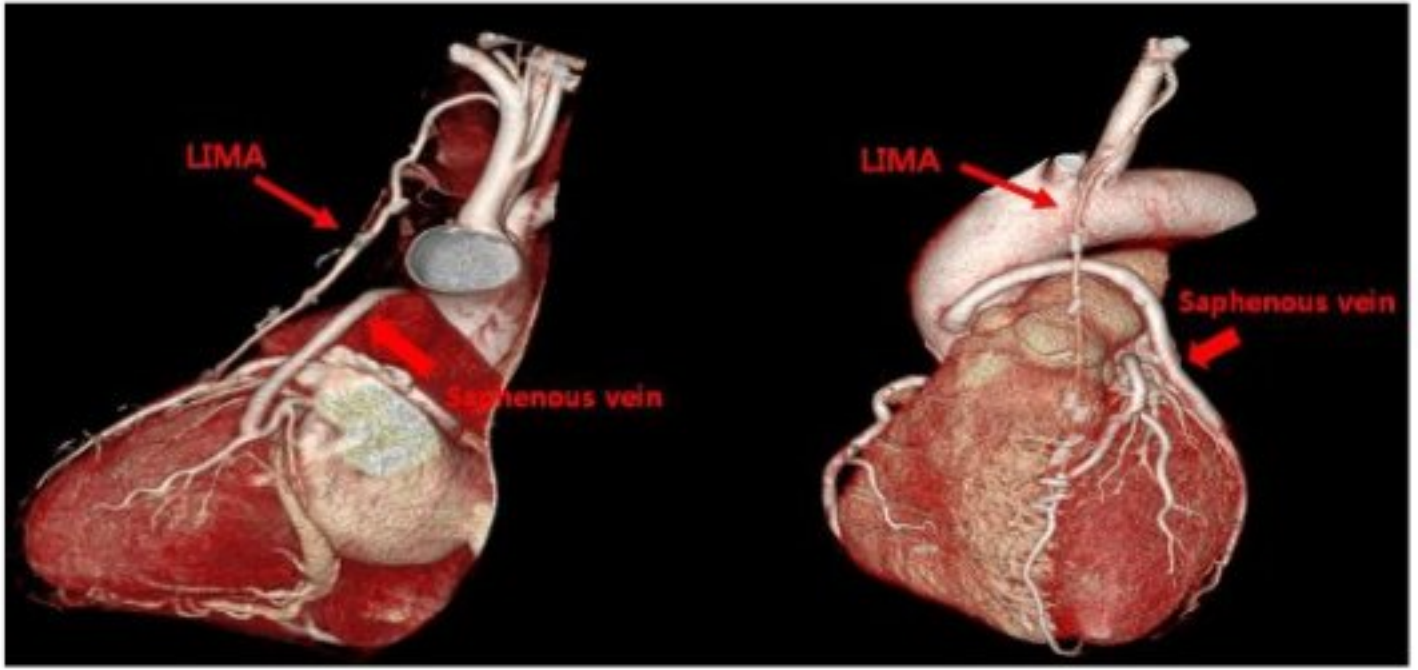




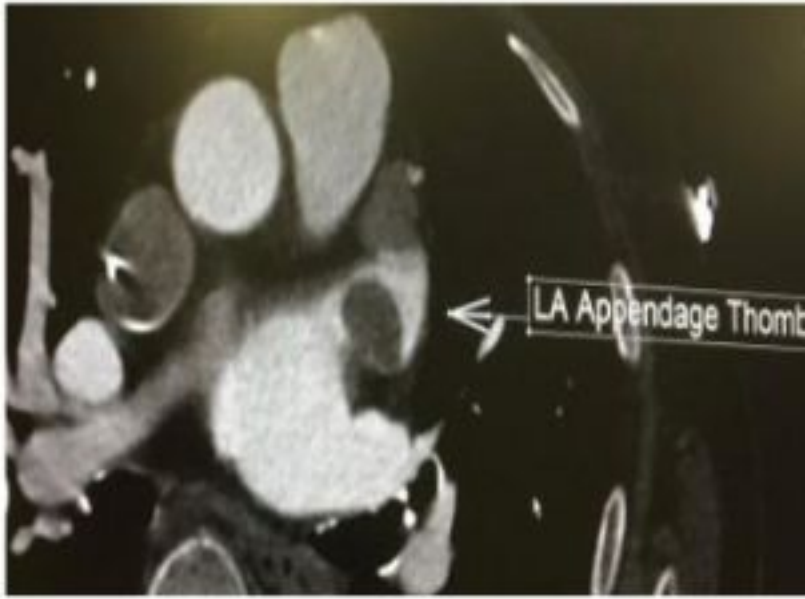
Planning Intervention



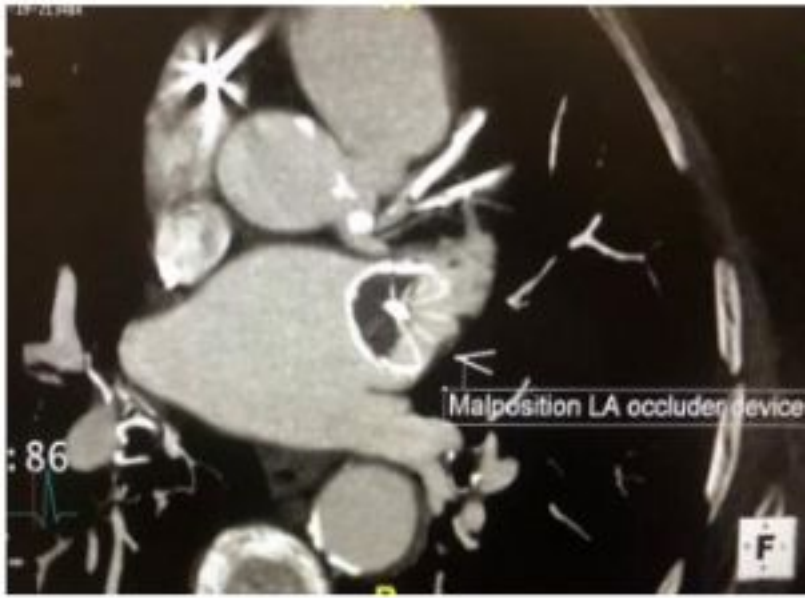
Accessing Bypass Grafts



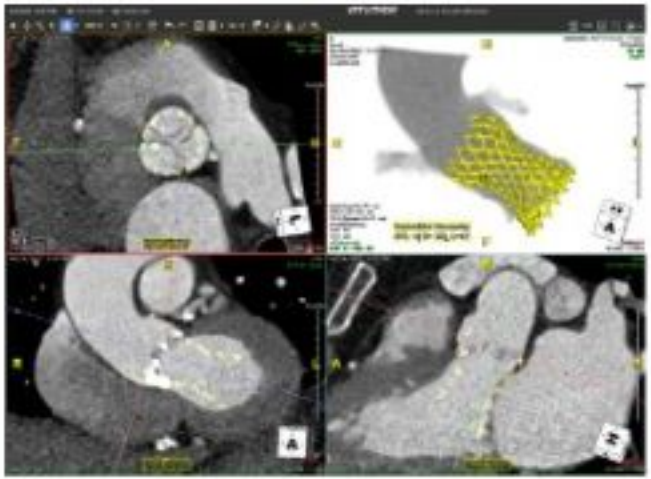
Left Atrial Appendage Anatomy and Clot

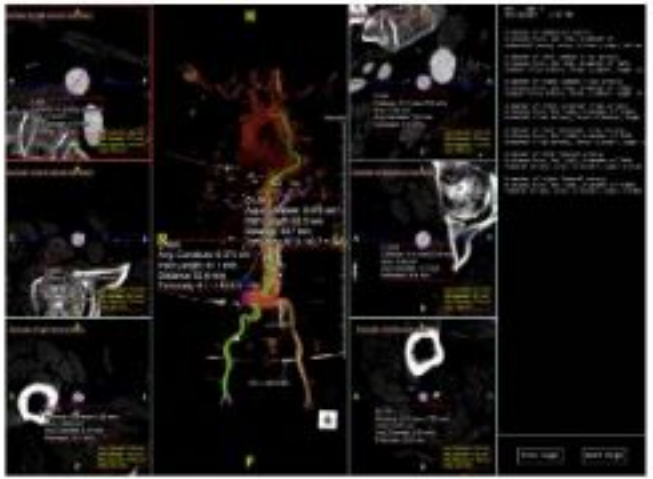


Left Atrial Appendage Occlusion

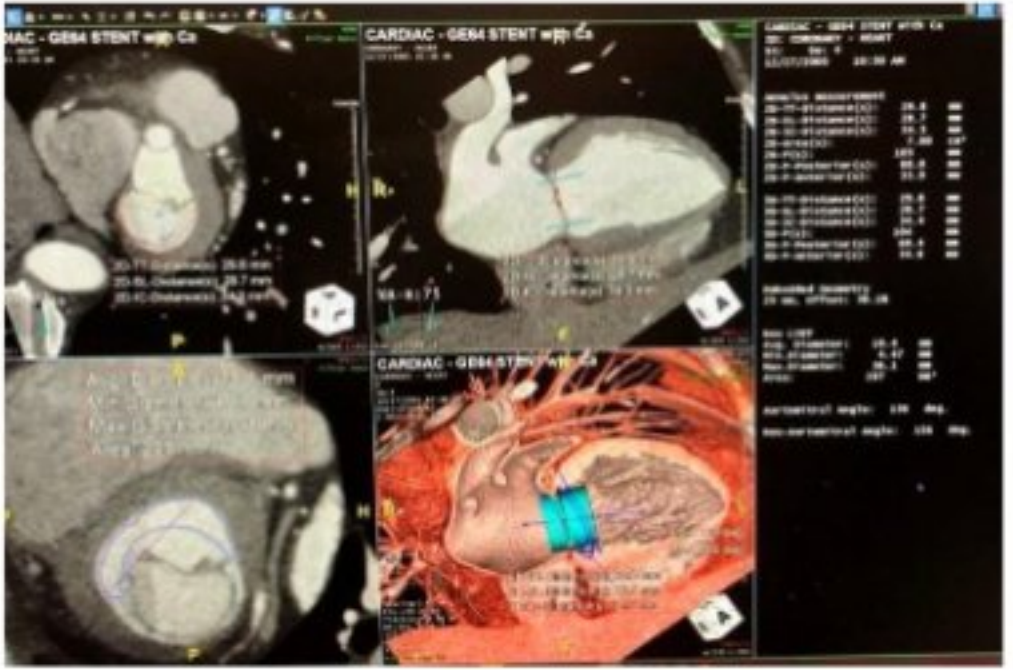


TAVR Workup





TMVR Workup

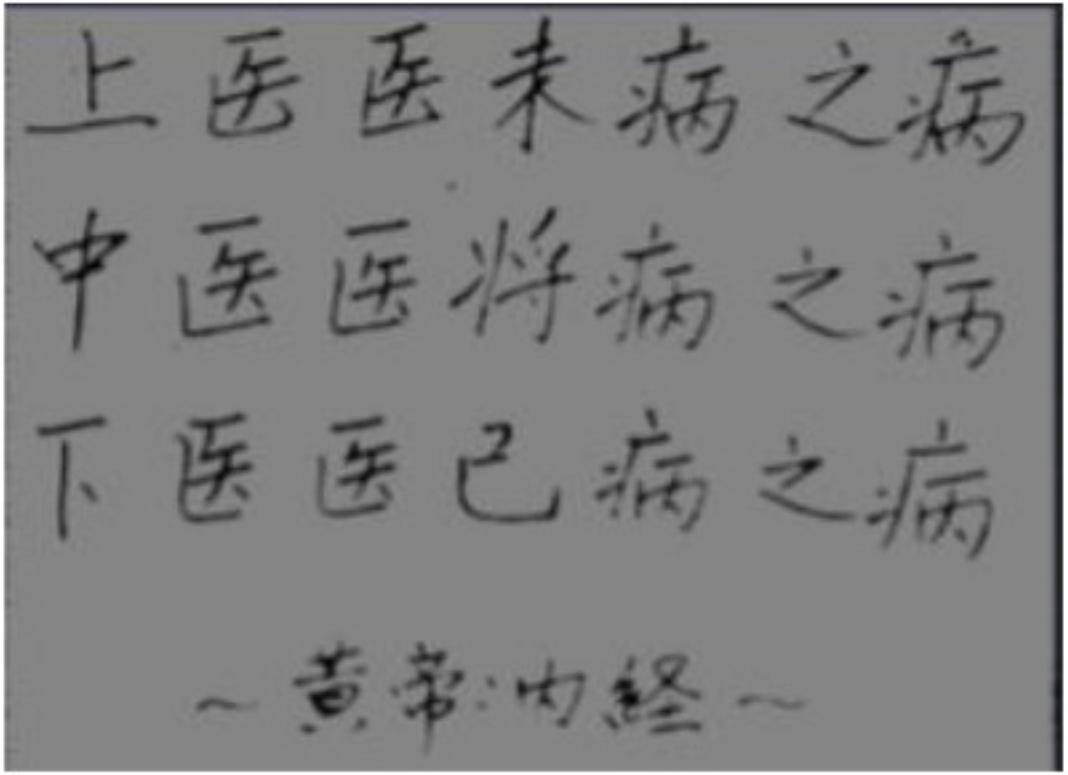


Pulmonary Vein Anatomy for Ablation

Other Indications

- Atrial Septum
- Ventricular Septum
- RV
- LV
- Great Vessels
- Pericardium
- Intracardiac Mass
- Intracardiac Thrombus

R.J. HARWELL
BORN 1914
GAVE UP SMOKING 1959
GAVE UP BOOZE 1973
GAVE UP RED MEAT 1983
DIED ANYWAY 1991



--Huang Dee: Nai-Ching
(2600 BC First Chinese Medical Text)

- Superior Doctors prevent the disease
- Mediocre Doctors treat the disease before evident
- Inferior Doctors treat the full-blown disease

Any Questions?

Please use the QR code to submit your questions.

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Thank You For Attending the Tri-City Cardiovascular Symposium

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