

# TCTAP 2024

## Case 4. Multivessel PCI in Acute Coronary Syndromes

**Shamir R. Mehta MD, MSc, FRCPC, FACC, FESC**

Douglas A. Holder Endowed Chair

Professor of Medicine, McMaster University

Senior Scientist, Population Health Research Institute

Director, Interventional Cardiology

Hamilton Health Sciences



**Population Health  
Research Institute**  
HEALTH THROUGH KNOWLEDGE



**Hamilton  
Health  
Sciences**



**McMaster  
University**  
HEALTH SCIENCES

# Disclosures

*Grant support: Abbott, Boston Scientific*

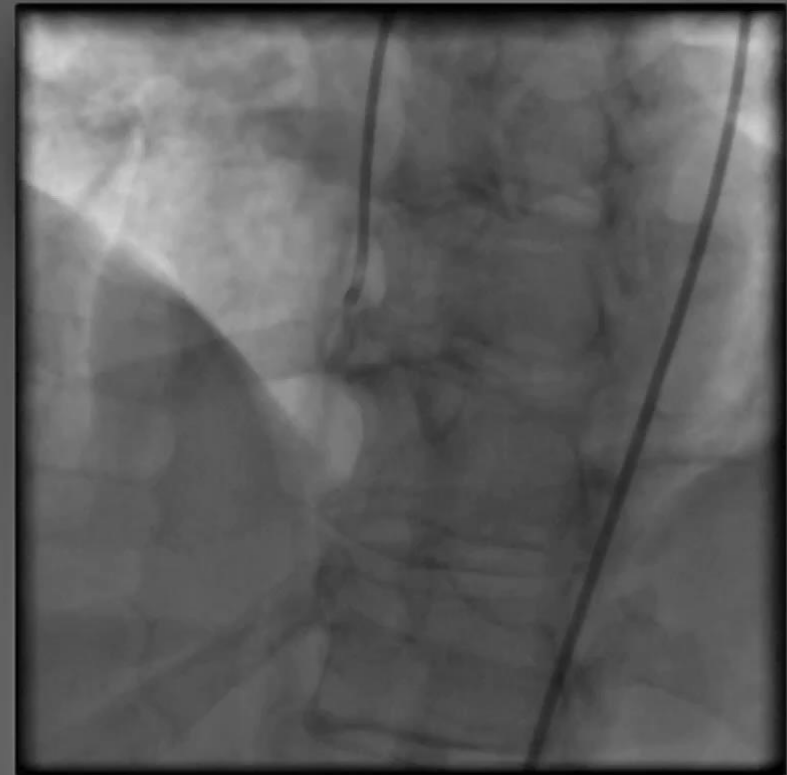
*Consultant: Abbott, Amgen, J&J, BMS, NovoNordisk*

# 49 yo male with acute Inferior STEMI, culprit lesion proximal RCA

Lossy Compression - not intended for diagnosis

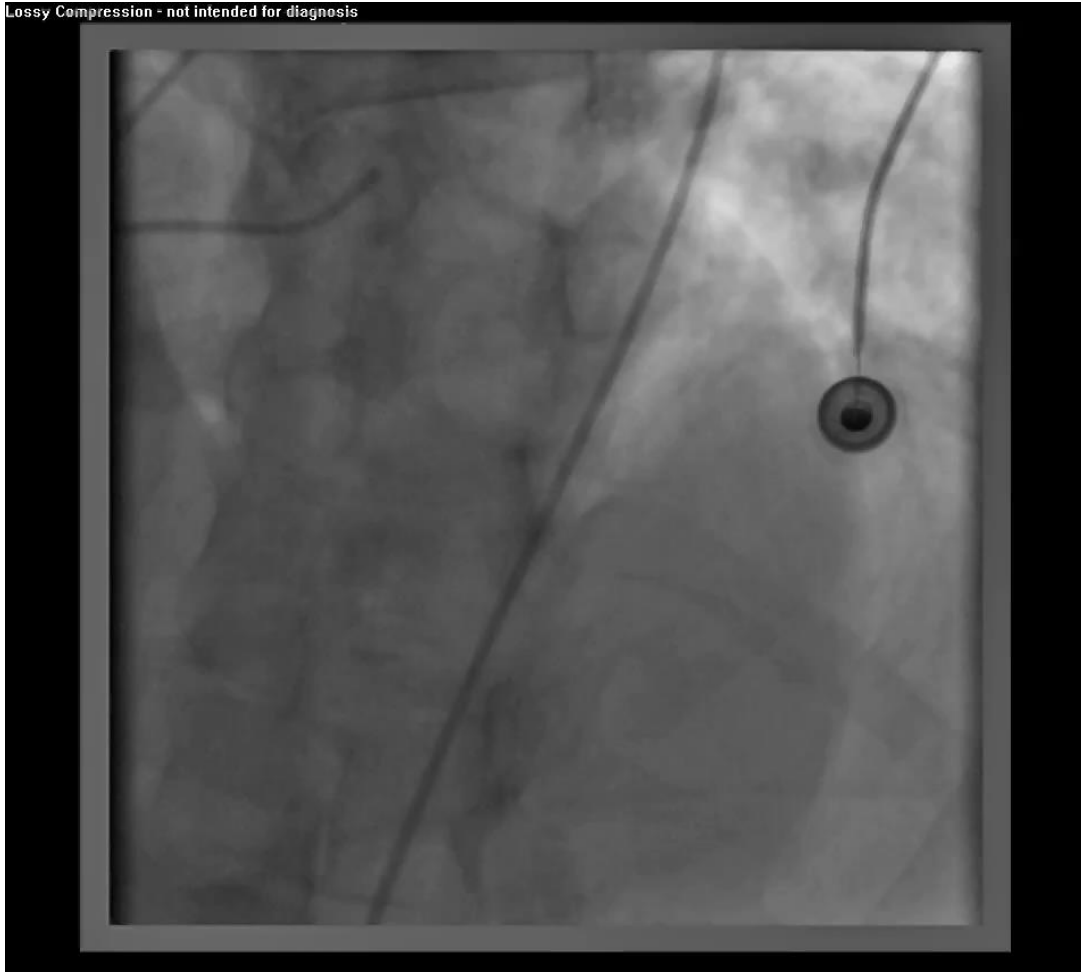


Lossy Compression - not intended for diagnosis



# 49 yo male presenting as an Inferior STEMI, non-culprit lesion 80% LAD, 70% Circ

Lossy Compression - not intended for diagnosis

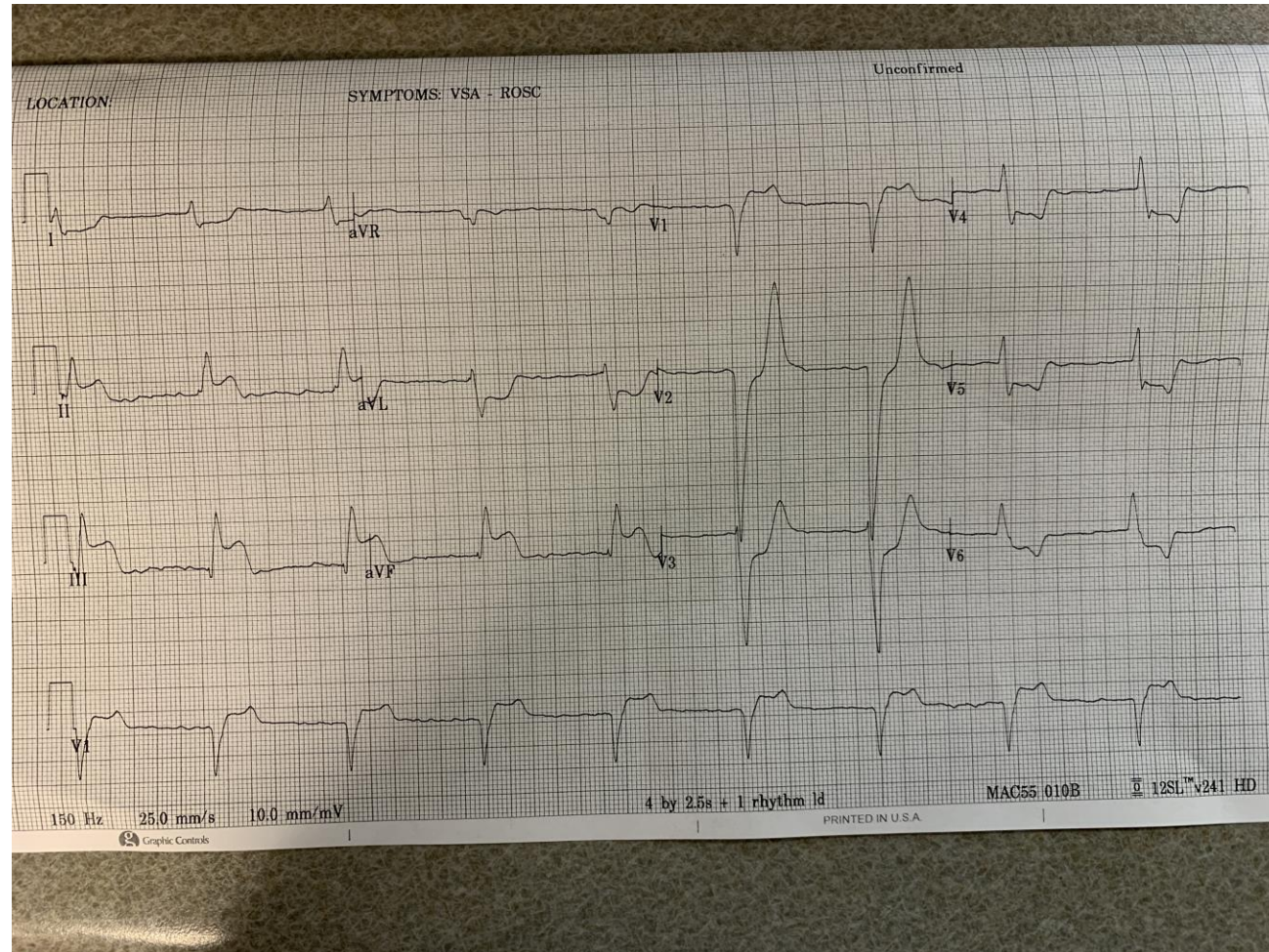


Lossy Compression - not intended for diagnosis

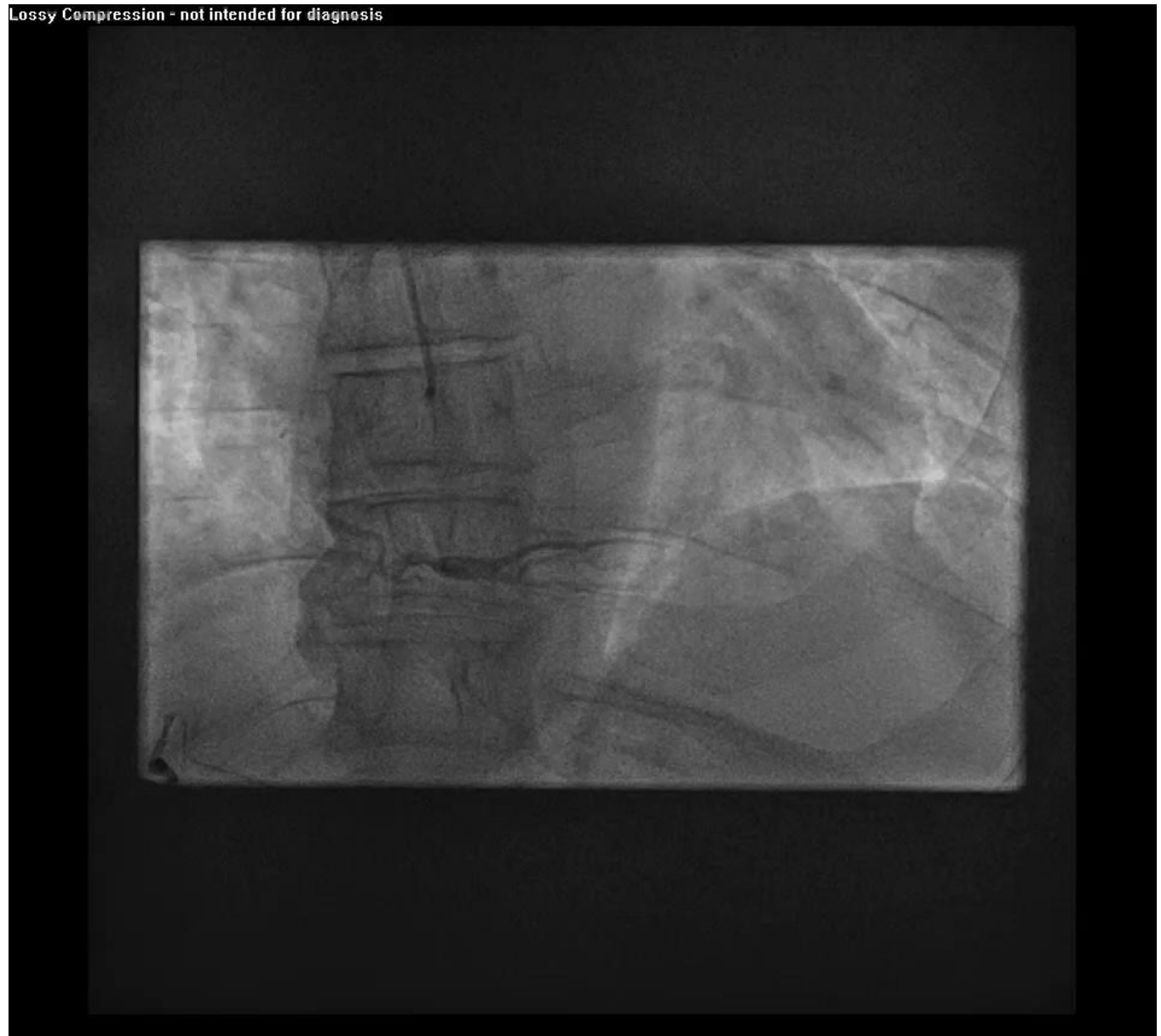


# 4 Years Later

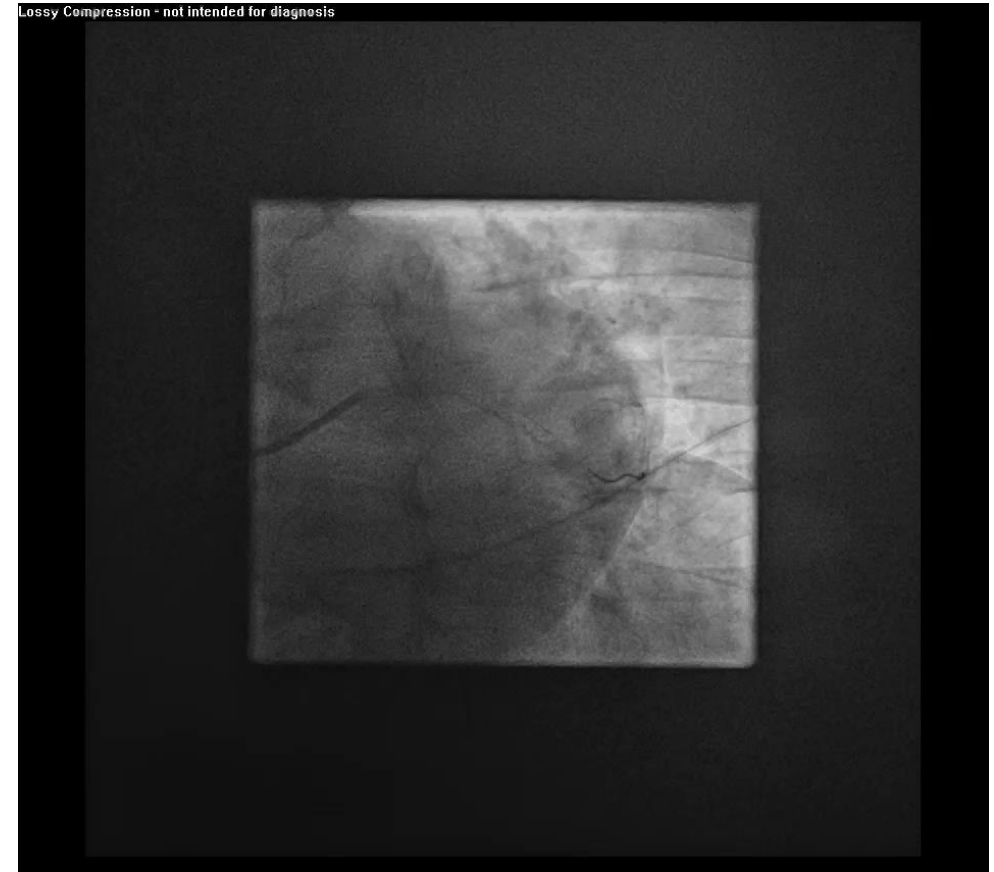
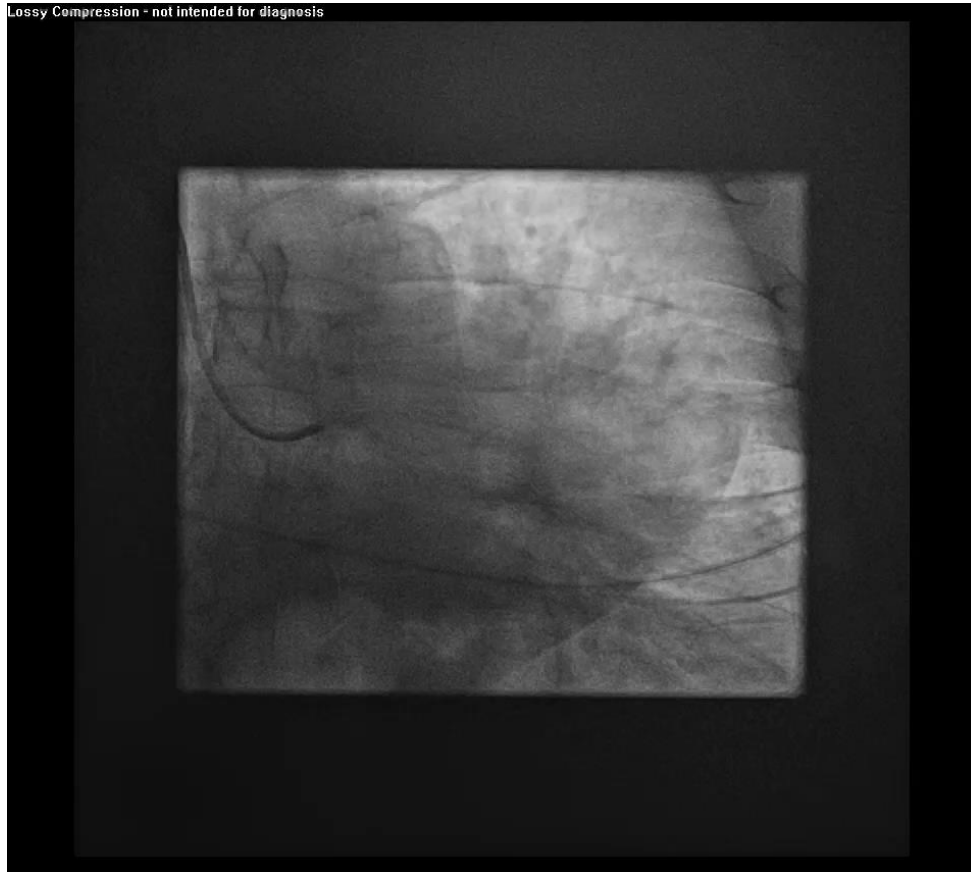
New onset severe RSCP, diaphoresis, called 911. ECG on scene



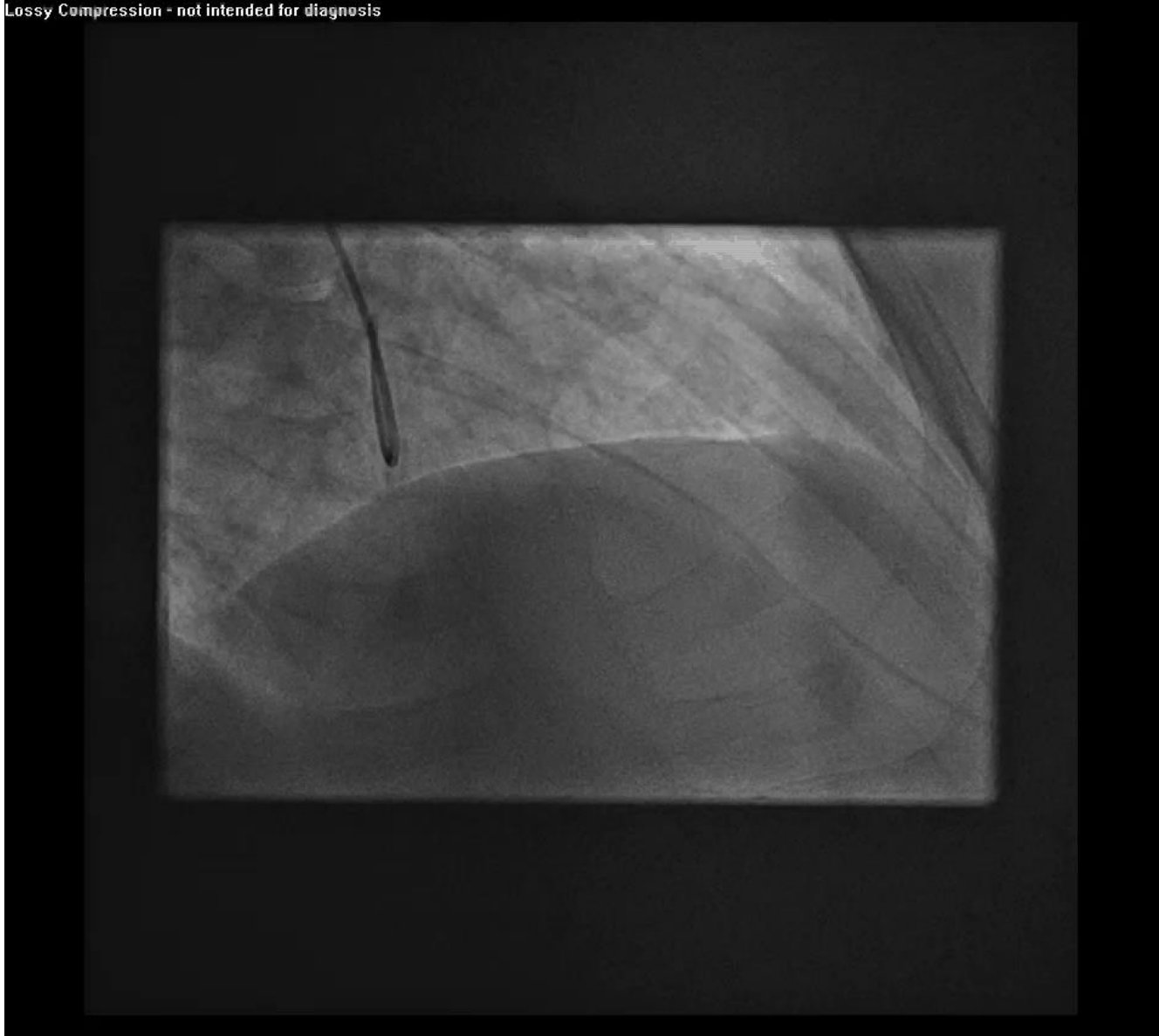
# 4 Years Later: 53 yo male presenting as an Inferior STEMI, patent RCA



## 4 Years Later: 53 yo male presenting as an Inferior STEMI, culprit lesion LCx



53 yo male presenting as an Inferior STEMI, non-culprit lesion LAD unchanged

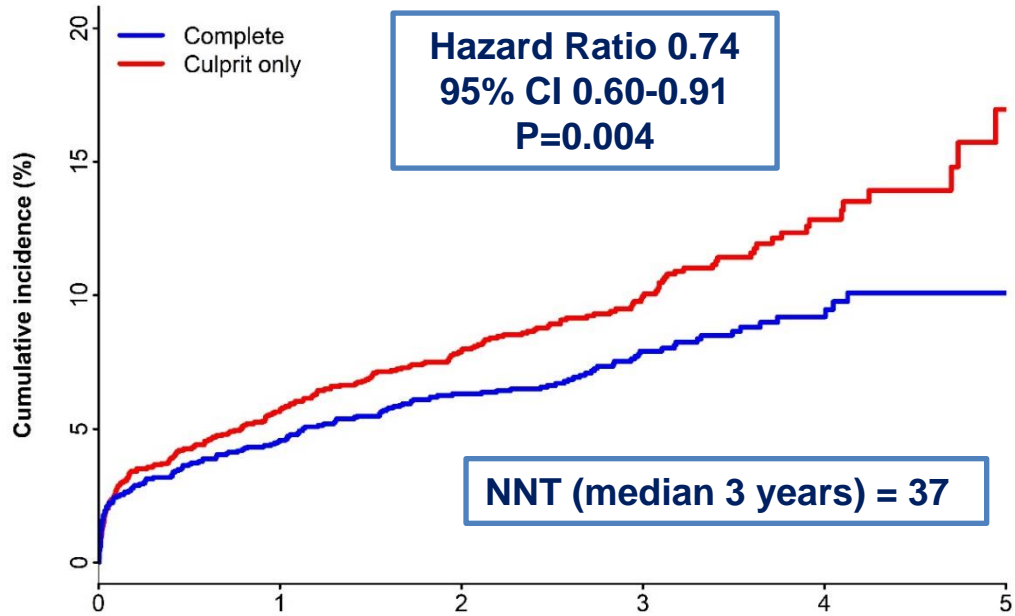




# COMPLETE Trial: Primary Outcomes

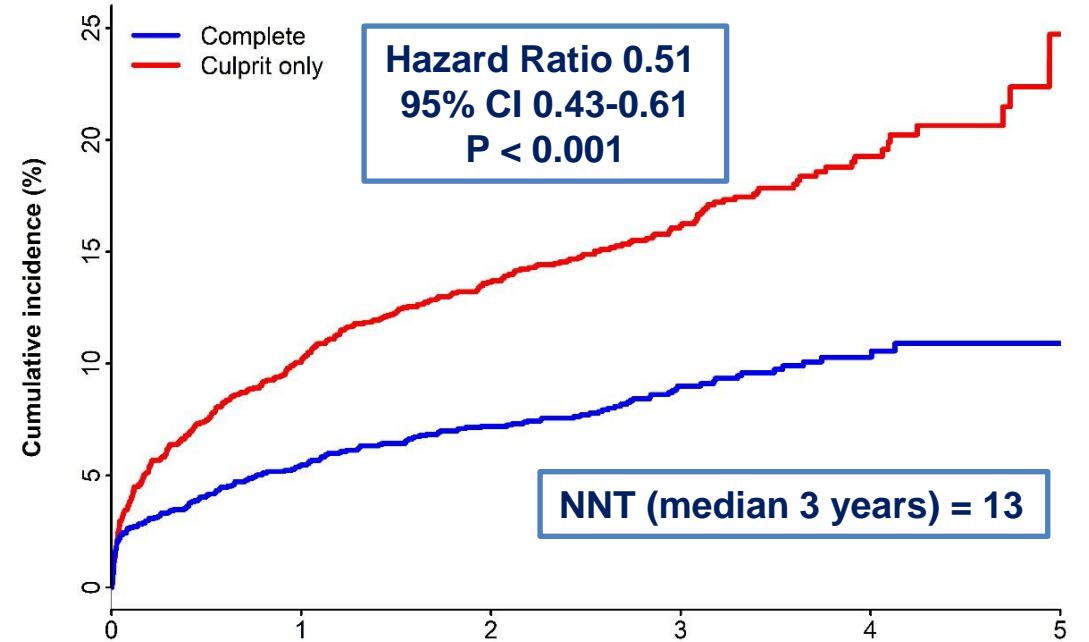
Multivessel vs Culprit Lesion-only PCI for STEMI and multi-vessel CAD

## CV Death or New MI



No. at Risk	Years of Follow-up					
	0	1	2	3	4	5
Complete	2016	1904	1677	938	337	70
Culprit only	2025	1897	1666	933	310	59

## CV Death, New MI, or IDR



No. at Risk	Years of Follow-up					
	0	1	2	3	4	5
Complete	2016	1886	1659	925	329	66
Culprit only	2025	1808	1559	865	294	57



COMPLETE-2

# Complete Revascularization Received a Class 1A Recommendation in both the ACC/AHA/SCAI and ESC Guidelines

The 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization gave staged PCI of a significant non-infarct artery stenosis a Class 1A recommendation in selected patients with STEMI and multivessel disease to reduce the risk of death or MI.

**Recommendations for Revascularization of the Non-Infarct Artery in Patients With STEMI**  
Referenced studies that support the recommendations are summarized in [Online Data Supplement 8](#).

COR	LOE	RECOMMENDATIONS
1	A	1. In selected hemodynamically stable patients with STEMI and multivessel disease, after successful primary PCI, staged PCI of a significant non-infarct artery stenosis is recommended to reduce the risk of death or MI (1-4).

The 2023 ESC Guidelines for the Management of Acute Coronary Syndromes gave complete revascularization a Class 1A recommendation in selected patients with STEMI and MVD undergoing PPCI.

## Multivessel disease in haemodynamically stable STEMI patients undergoing PPCI

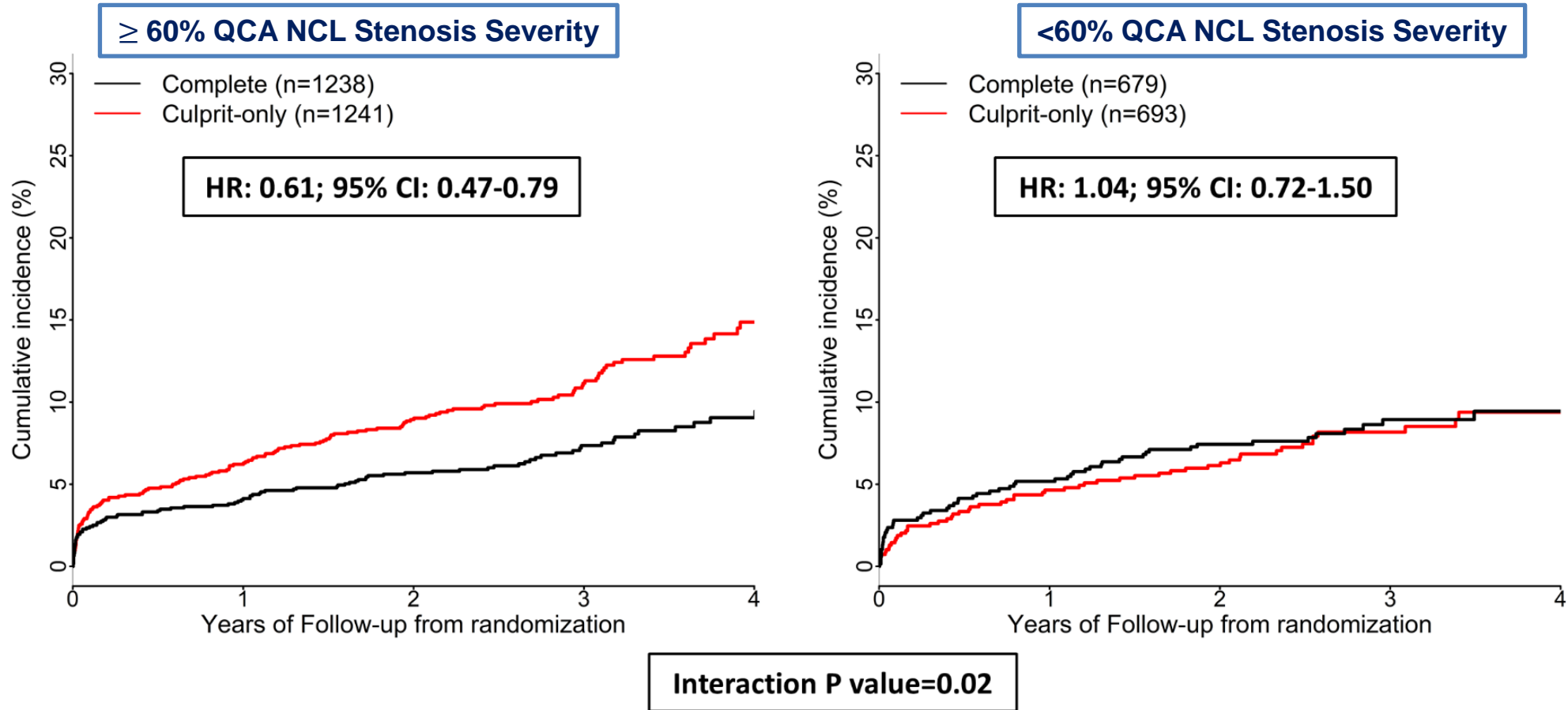
Complete revascularization is recommended either during the index PCI procedure or within 45 days.<sup>508–511,531</sup>

I

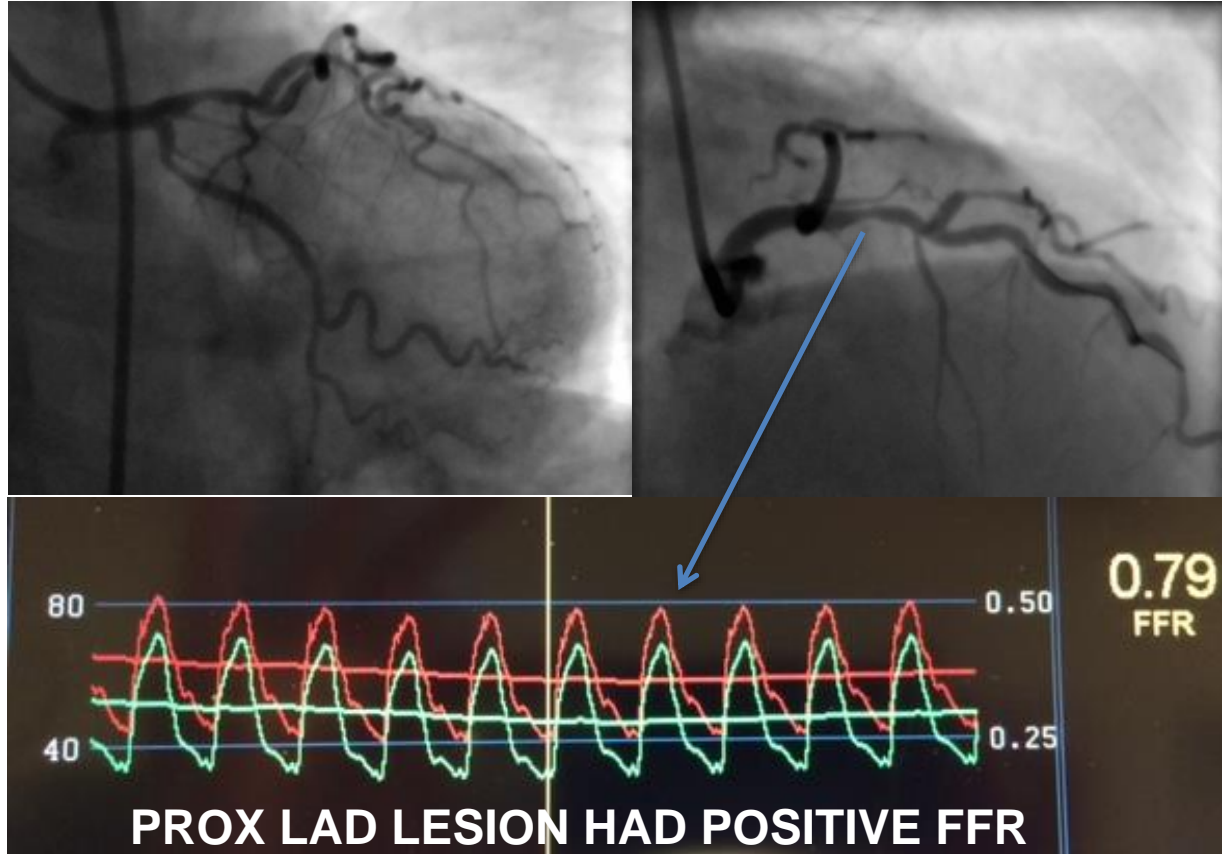
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# COMPLETE Angiographic Core Lab Analysis Results by NCL QCA Stenosis Severity

## CV Death and New MI

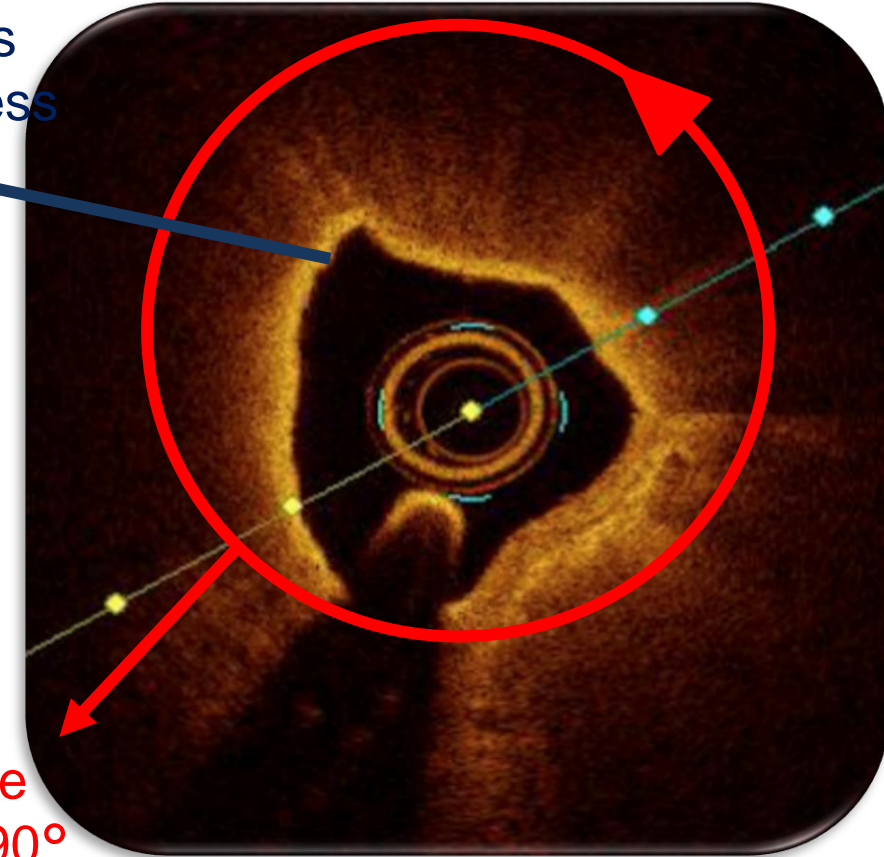


# What predicts future events from NCL's? Physiology vs Anatomy (biology)



FCT: Fibrous  
Cap Thickness  
< 65  $\mu\text{m}$

Overlying a  
lipidic plaque  
Lipid arc > 90°



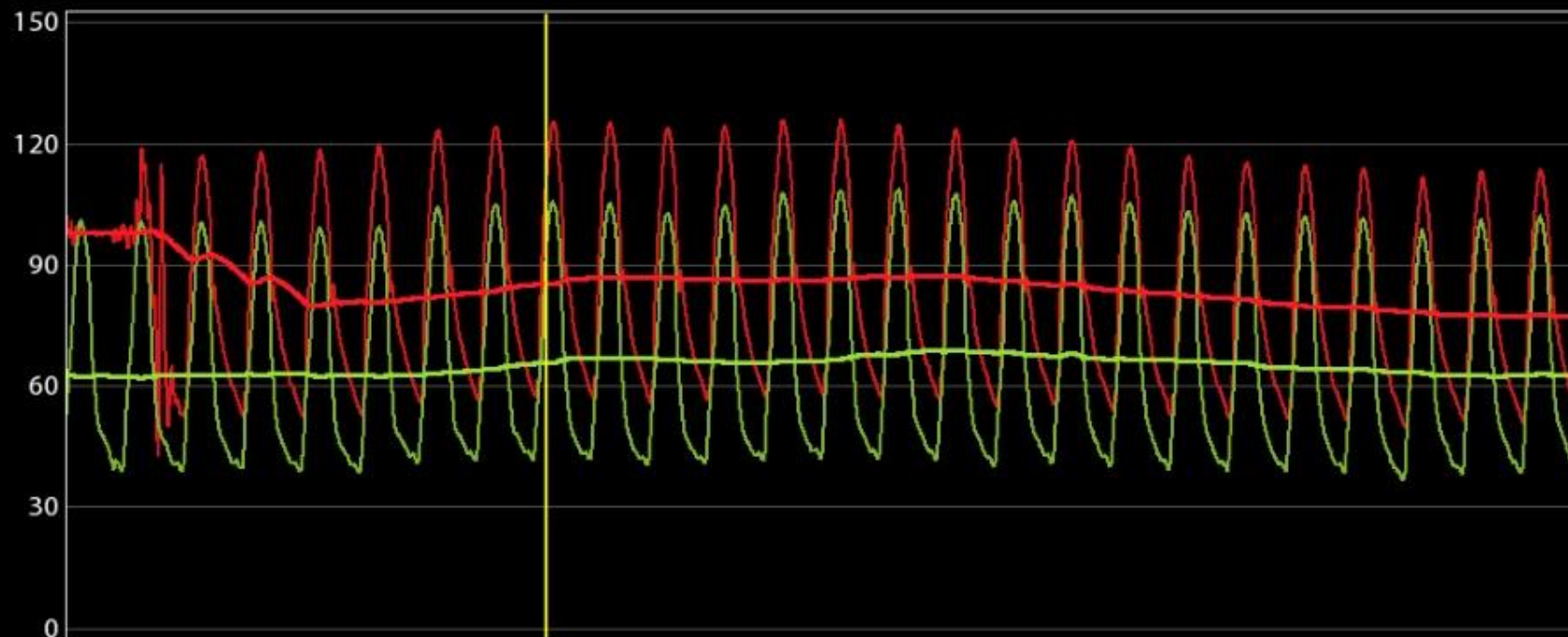
ALLAN, GRACE

1047690

Lab 1

10 22

ST. JUDE MEDICAL



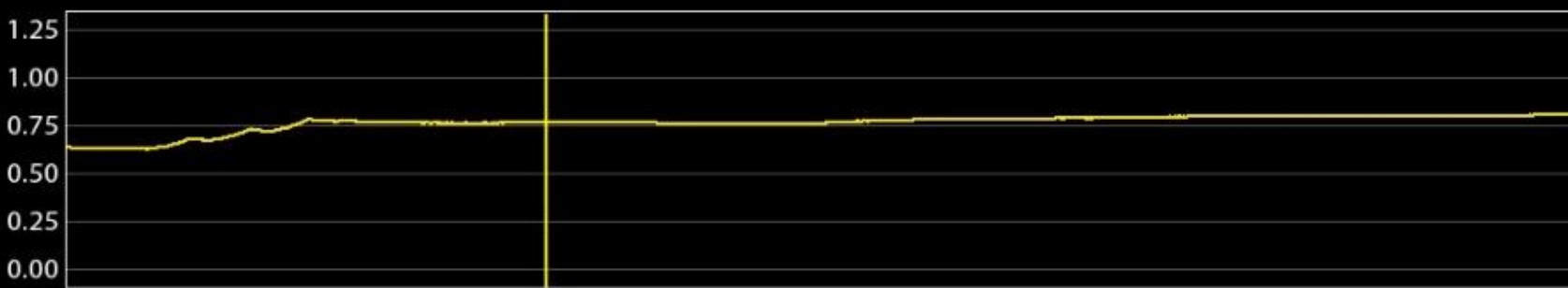
Pa  
86

Pd  
66

FFR  
0.77

Time  
6.5

10:13 FFR 0.90  
10:11 FFR 0.90  
10:06 FFR 0.77



<Vessel> <Step> <Drug>

1/3 10:06:41



Live ▶



Patient

Live

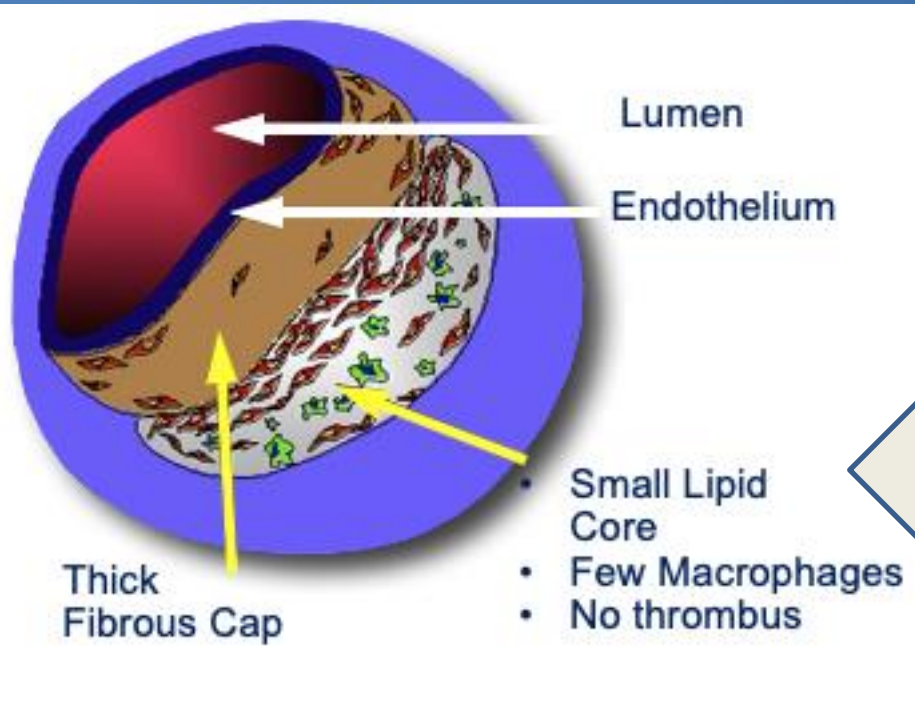
Review

Archive

# Understanding plaque morphology of non-culprit lesions in relation to physiology/angiography/image-guided revasc

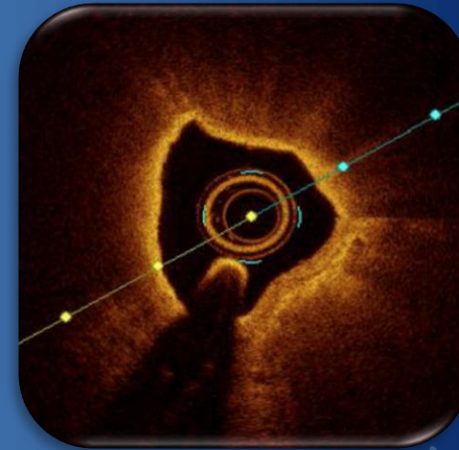
## Stable CAD

Fibro-calcific plaques  
Low Risk of Rupture



Physiology-Guided Strategy Standard

## ACS Non-culprit

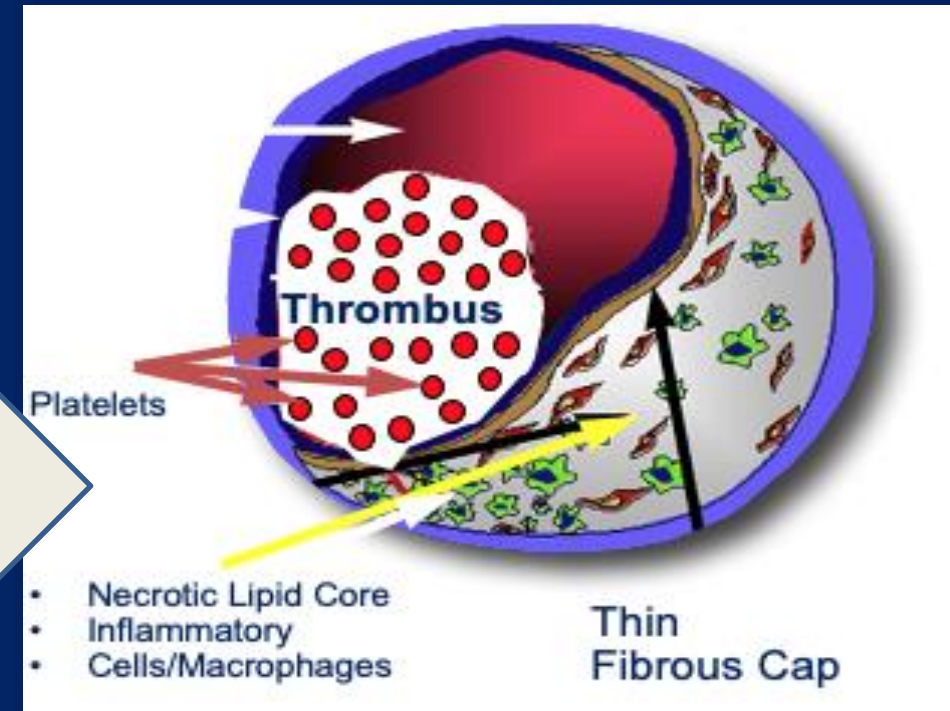


50% are TCFA  
50% are stable plaques

Physiology vs Angiography Guided Strategy?

## STEMI culprit

Plaque Rupture  
Medical Emergency



Angiography-Guided Revas Standard (PPCI)

# Anatomy vs. physiology: how should we achieve complete revascularization in acute coronary syndromes?

Shamir R. Mehta\* and Brian P. McGrath

Comparison of trials assessing FFR guided vs angiographically guided PCI of non-culprit lesions

## Primary Outcomes

Death, myocardial infarction, repeat revascularisation

## Non-culprit lesion

Epicardial coronary/major side branch  
 ≥50% stenosis  
 ≥2mm diameter

### FRAME-AMI

7.4% vs 19.7%  
 HR 0.43 (0.25-0.75)

562 patients

52.8% STEMI  
 47.25% NSTEMI

Median 3.5 years follow-up

60% index procedure  
 40% staged PCI

### FLOWER-MI

5.5% vs 4.2%  
 HR 1.32 (0.78-2.23)

1171 patients

100% STEMI

1 year follow-up

96.2% staged PCI



# COMPLETE-2 Study Design

## STEMI or NSTEMI with Multivessel Coronary Artery Disease

At least one additional non-culprit lesion  $\geq 2.5$  mm diameter and  $\geq 50\%$  stenosis

$N=5100$

### Randomization

Stratified by STEMI or NSTEMI

#### Physiology-Guided NCL PCI

Routine PCI of all physiological positive lesions with the goal of complete revascularization

$n=2550$

#### Angiography-Guided NCL PCI

Routine PCI of all angiographical suitable lesions with the goal of complete revascularization

$n=2550$

### COMPLETE-2 OCT

**Primary Objective:** Whether vulnerable plaque (lipid-rich plaque and thin cap fibroatheroma) as identified by OCT imaging predicts CV death, new MI, TLR, or unstable angina (related to a non-stented lesion)

$N=1510$

### Primary Outcomes

Median Follow-Up: 3.5 Years

**Efficacy:** Time to first occurrence of the composite of CV death, new MI, or ischemia-driven revascularization

**Safety:** Time to first occurrence of the composite of clinically significant bleeding, stroke, stent thrombosis, or contrast-associated acute kidney injury





# COMPLETE-2 OCT: A large-scale intracoronary imaging study

**Primary Objective:** To determine, in patients with STEMI or NSTEMI and multivessel CAD, whether vulnerable plaque, as identified by OCT imaging, predicts major cardiovascular events

**Design:** *Large-scale, prospective, observational, multicentre, imaging study of patients with STEMI or NSTEMI and multivessel CAD*

**Sample Size:** 1510 patients

**Primary Outcome:** Composite of CV death, new MI, unstable angina, or target lesion revascularization (TLR) related to a non-stented lesion at the *patient* level

