

**UNIONE EUROPEA**  
Fondo europeo di sviluppo regionale



Regione  
Lombardia



POR FESR 2014-2020 / INNOVAZIONE E COMPETITIVITÀ

CONSULTAZIONE APERTA CON IL MERCATO  
propedeutica all'esperimento della procedura di  
APPALTO PUBBLICO PRE-COMMERCIALE  
Fabbisogno "LA VALUTAZIONE DELLA FRAGILITA'  
DELLA PLACCA ATEROSCLEROTICA CORONARICA"

ASST di Pavia

Dott. Pietro Broglia – Direttore U.O.C. Cardiologia e UTIC

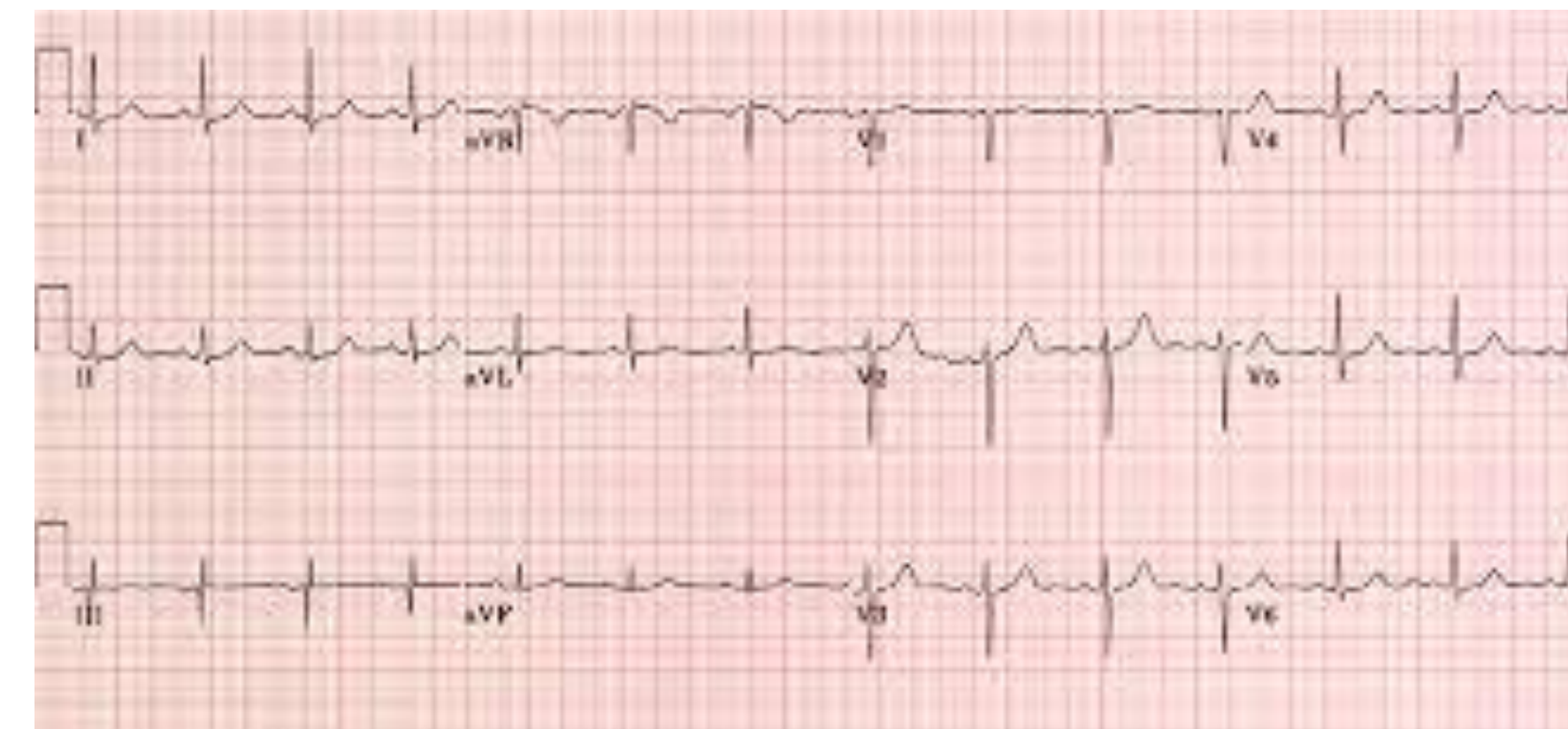
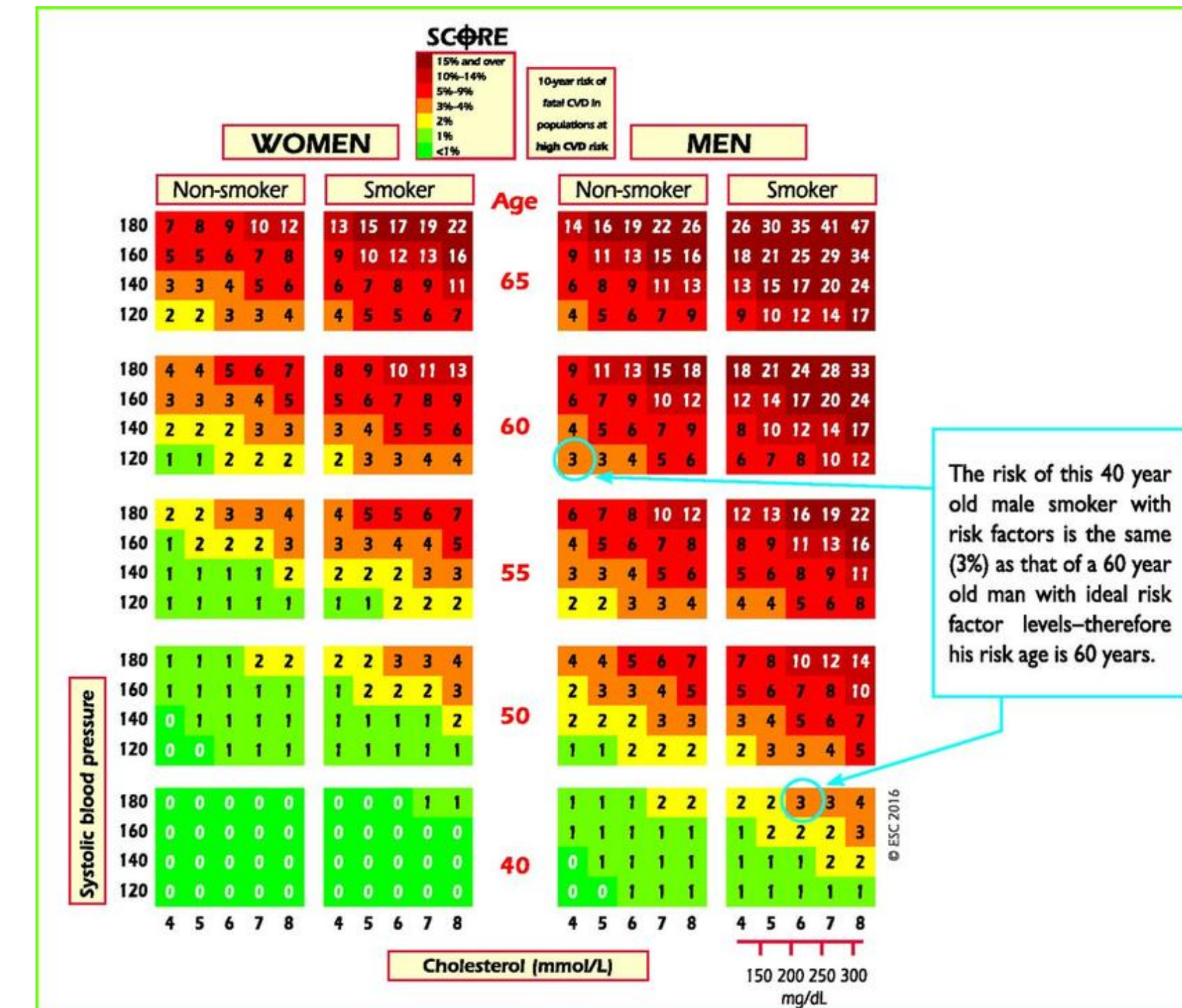
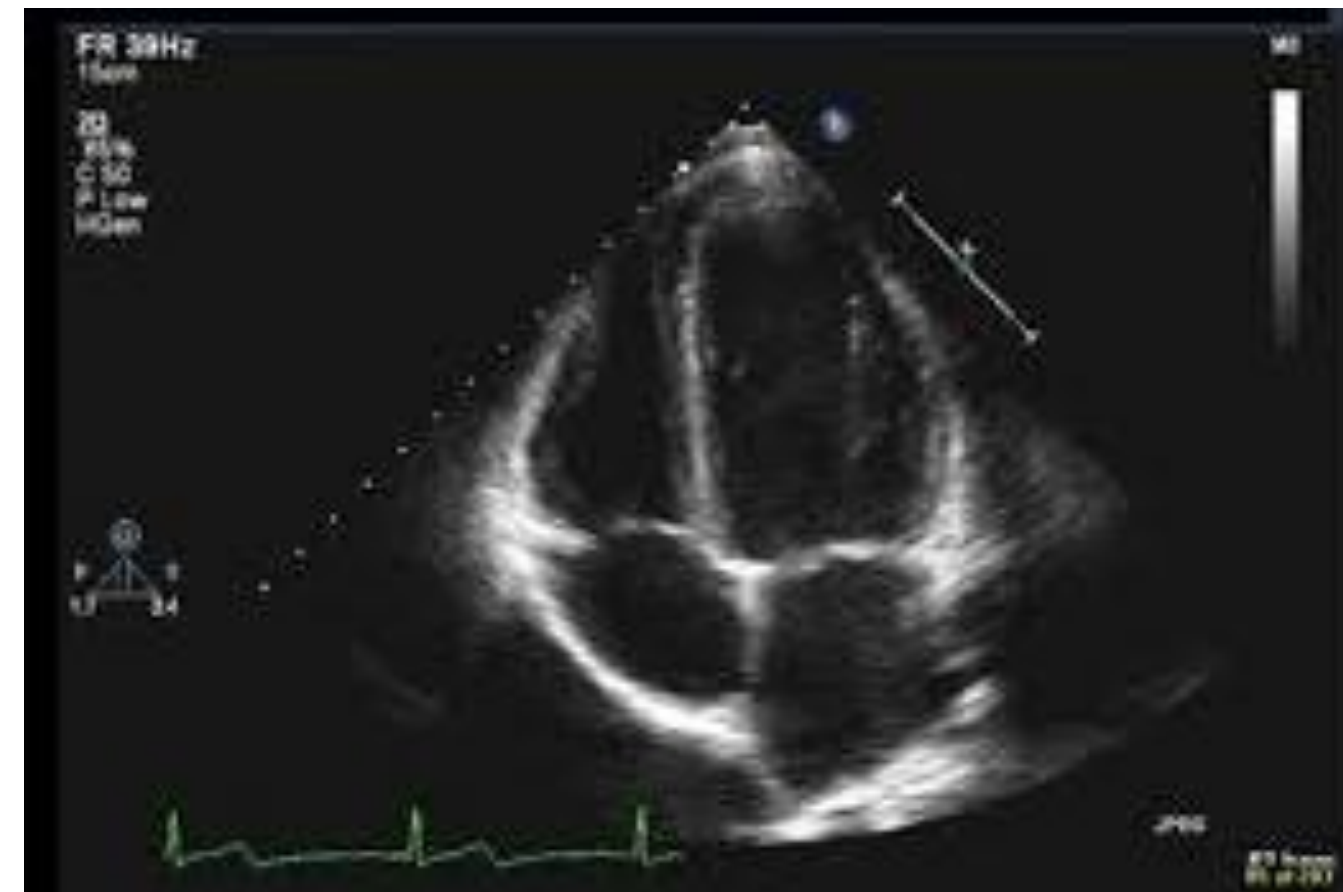
sala Valeria Solesin di Palazzo Lombardia di Regione Lombardia, 1 piano

# Introduction

- Cardio-vascular diseases are the first cause of mortality in the developed countries.
- Our aim is trying to prevent them.

# Cardiovascular Screening

- Anamnesis, risk factors
- Physical examination
- Ecg
- Echo
- Ischaemia test



**No way to predict acute CV events**



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# Coronary atherosclerosis and plaque formation

What is the myocardial infarction cause?

# The vulnerable plaque

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Plaque rupture: which plaque?

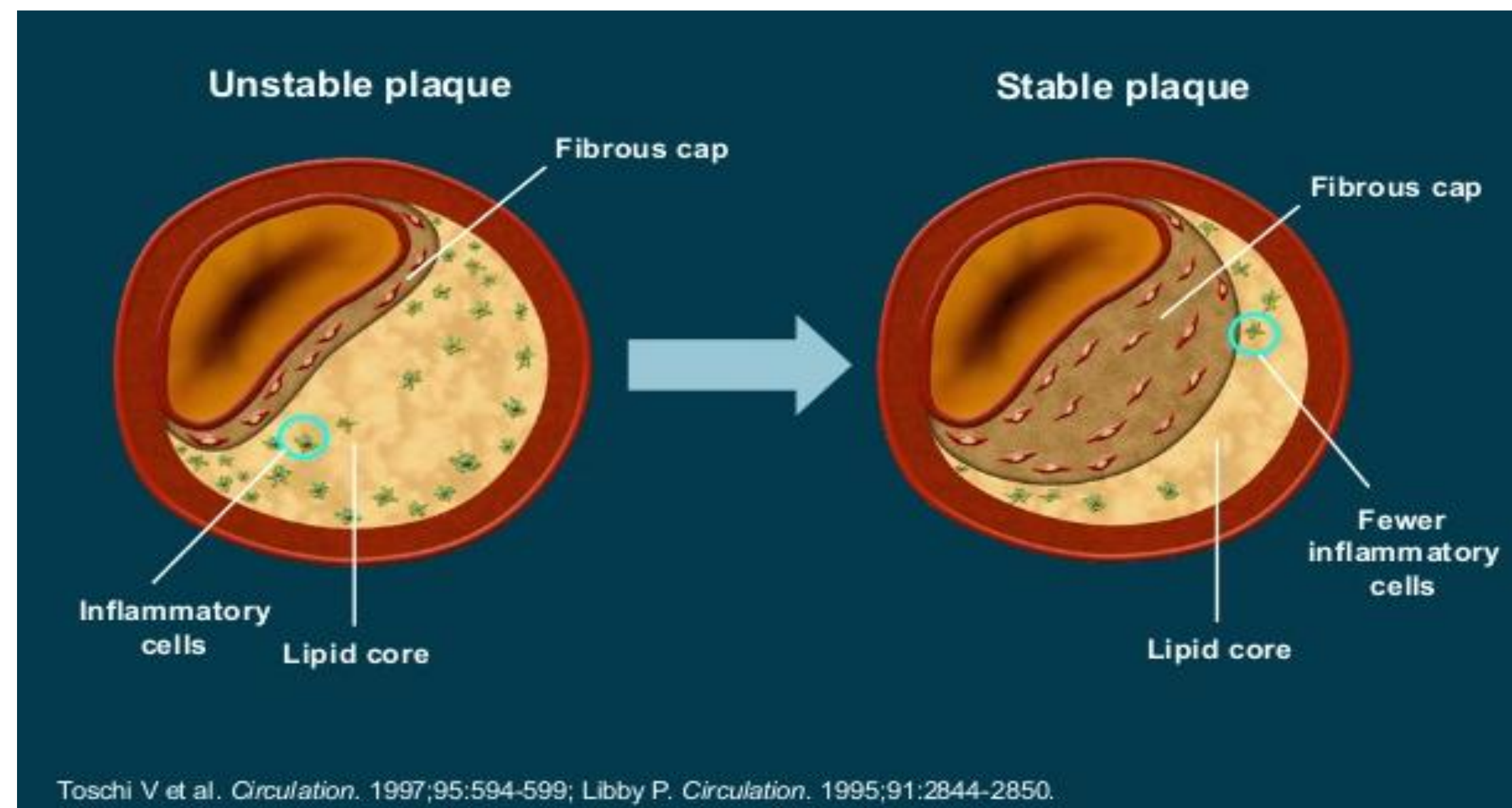
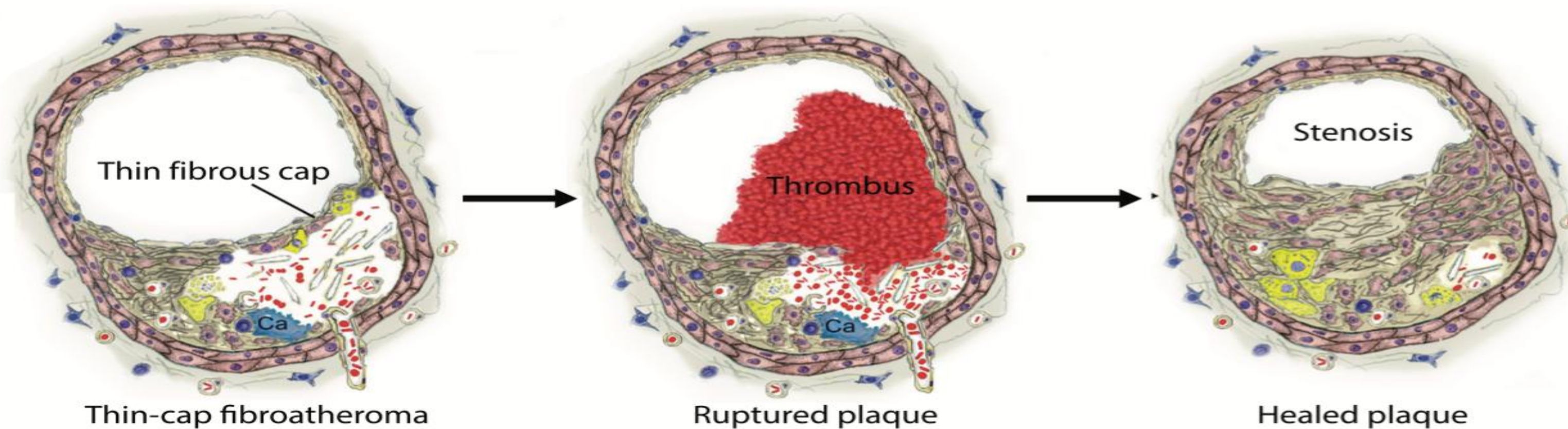
Stable vs unstable plaque → thrombosis

Lipidic core-fibrous cap

Can we prevent it?



# The healing process



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# Aim of the project

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## *The problem:*

*Nowadays we can not predict myocardial infarction before the clinical*

## *Technological requirement:*

***Non invasive*** technology to study:

- Plaque morphology (cap-lipid core) → to predict ulceration
  - Plaque inflammation



# State of the art

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- We are treating stable plaques
- Courage trial (NEJM 2007)
- Ischaemia



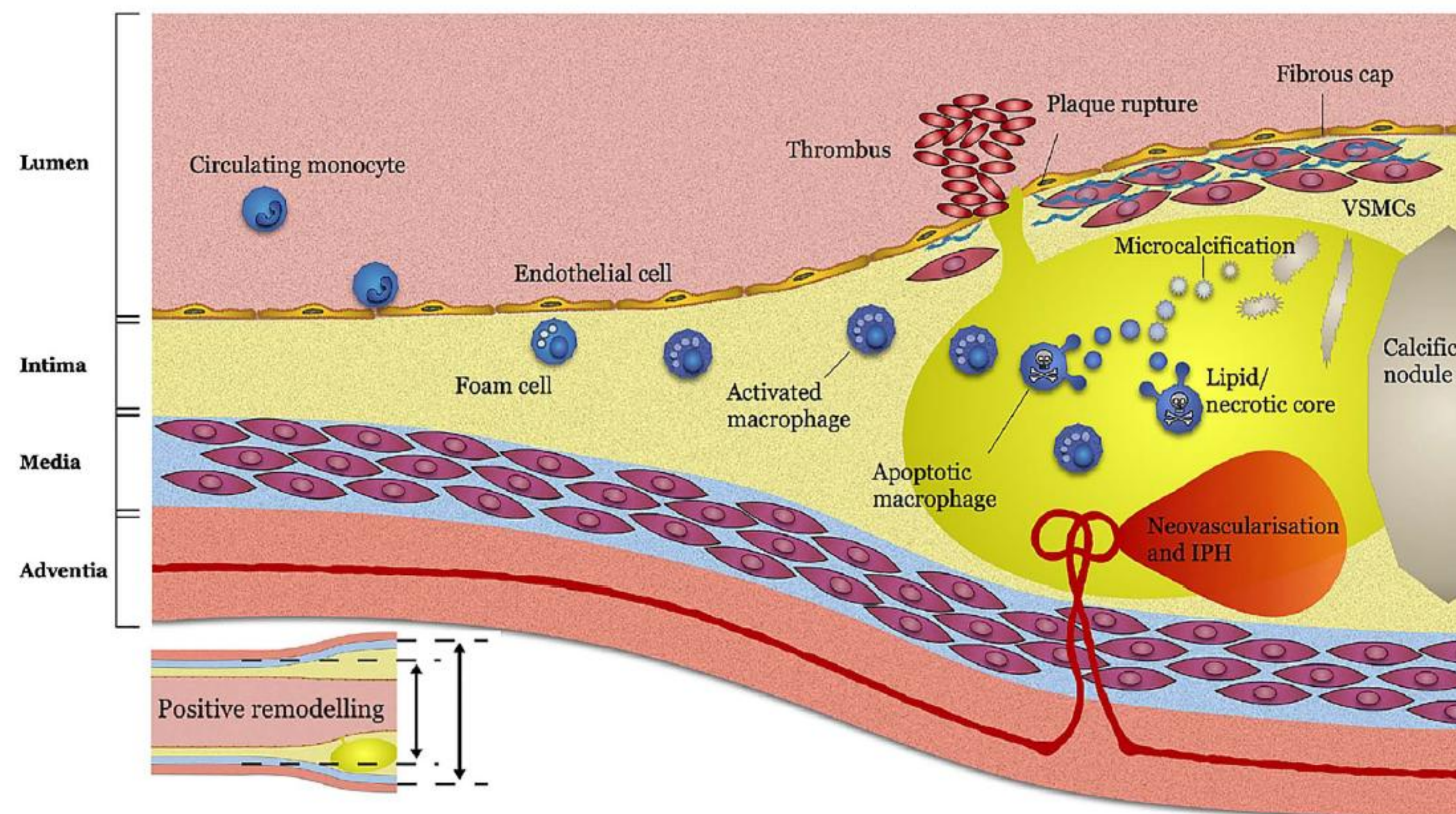
# THE VULNERABLE PLAQUE

- Thin fibrous cap (<65 micron)

- Plaque erosion

- Plaque inflammation

- Then healing process

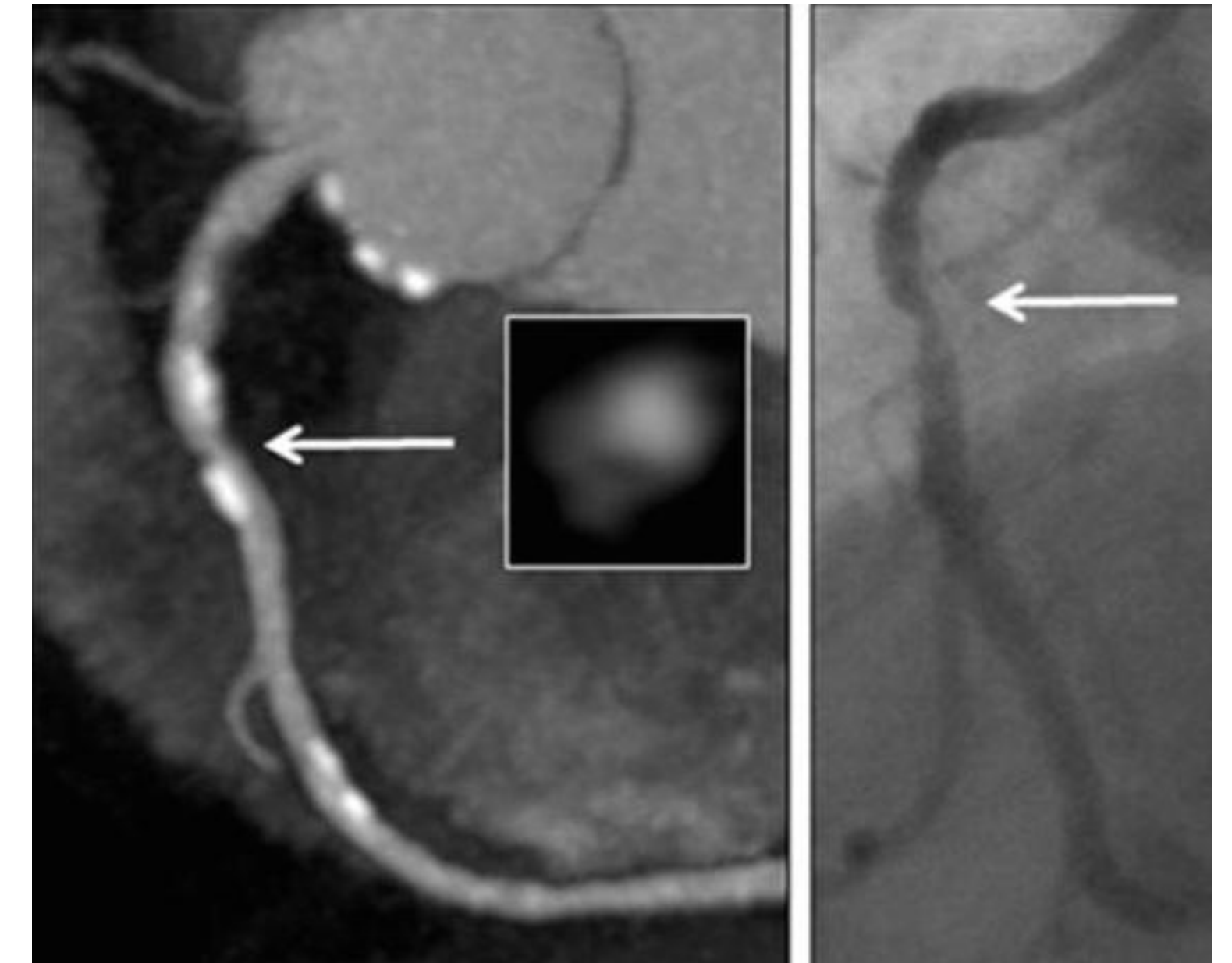




# CULPRIT LESION

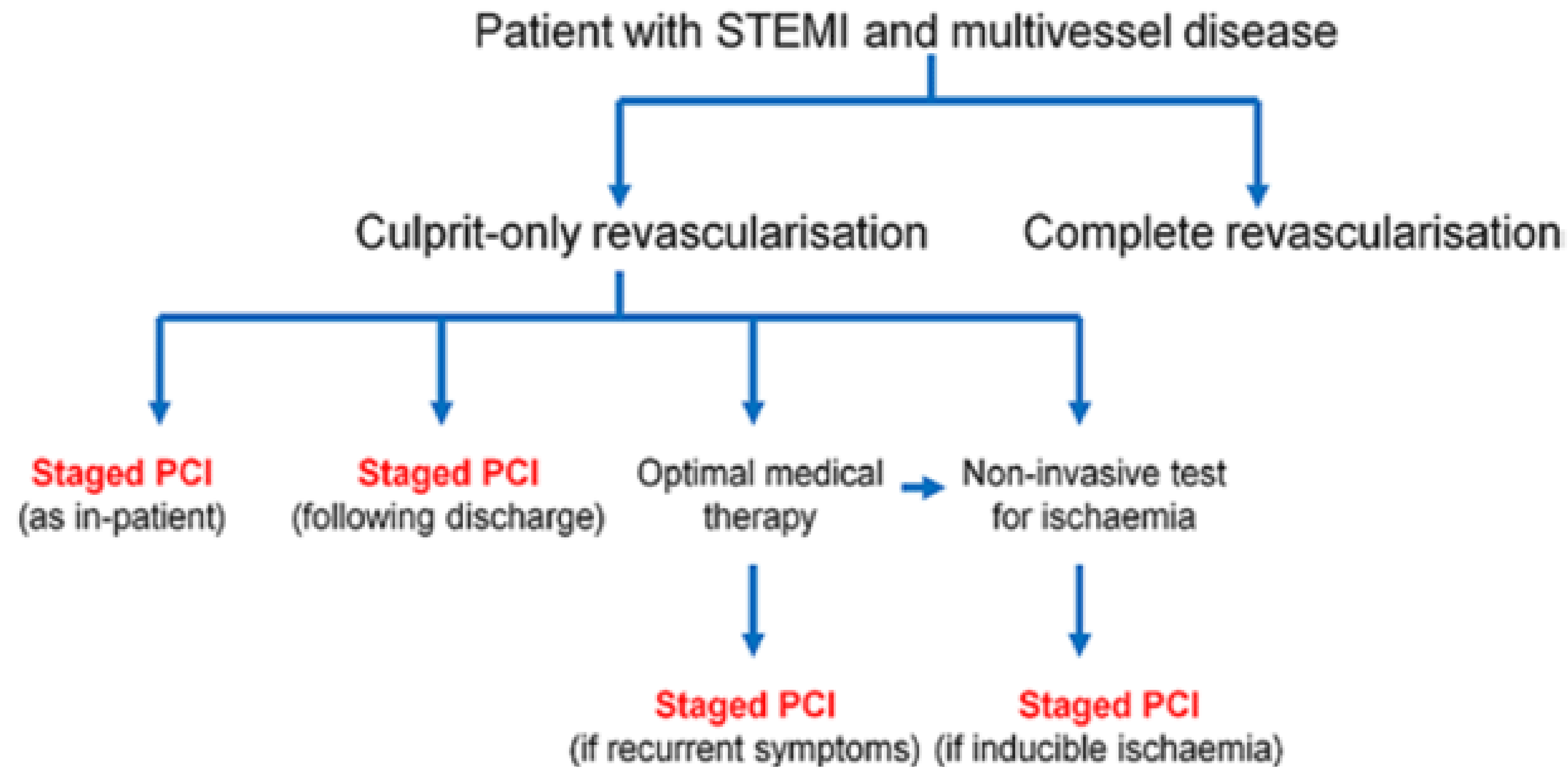


Culprit vs non culprit



PRAMI, CvLPRIT, DANAMI-3-PRIMULTI TRIAL: STILL NOT POSSIBLE TO  
PREDICT WHICH LESION MUST BE TREATED

Wald DS et al; PRAMI Trial N Engl J Med. 2013  
Gershlick AH et al. CvLPRIT trial. J Am Coll Cardiol. 2015  
Engström T, et al. DANAMI-3-PRIMULTI trial. Lancet. 2015



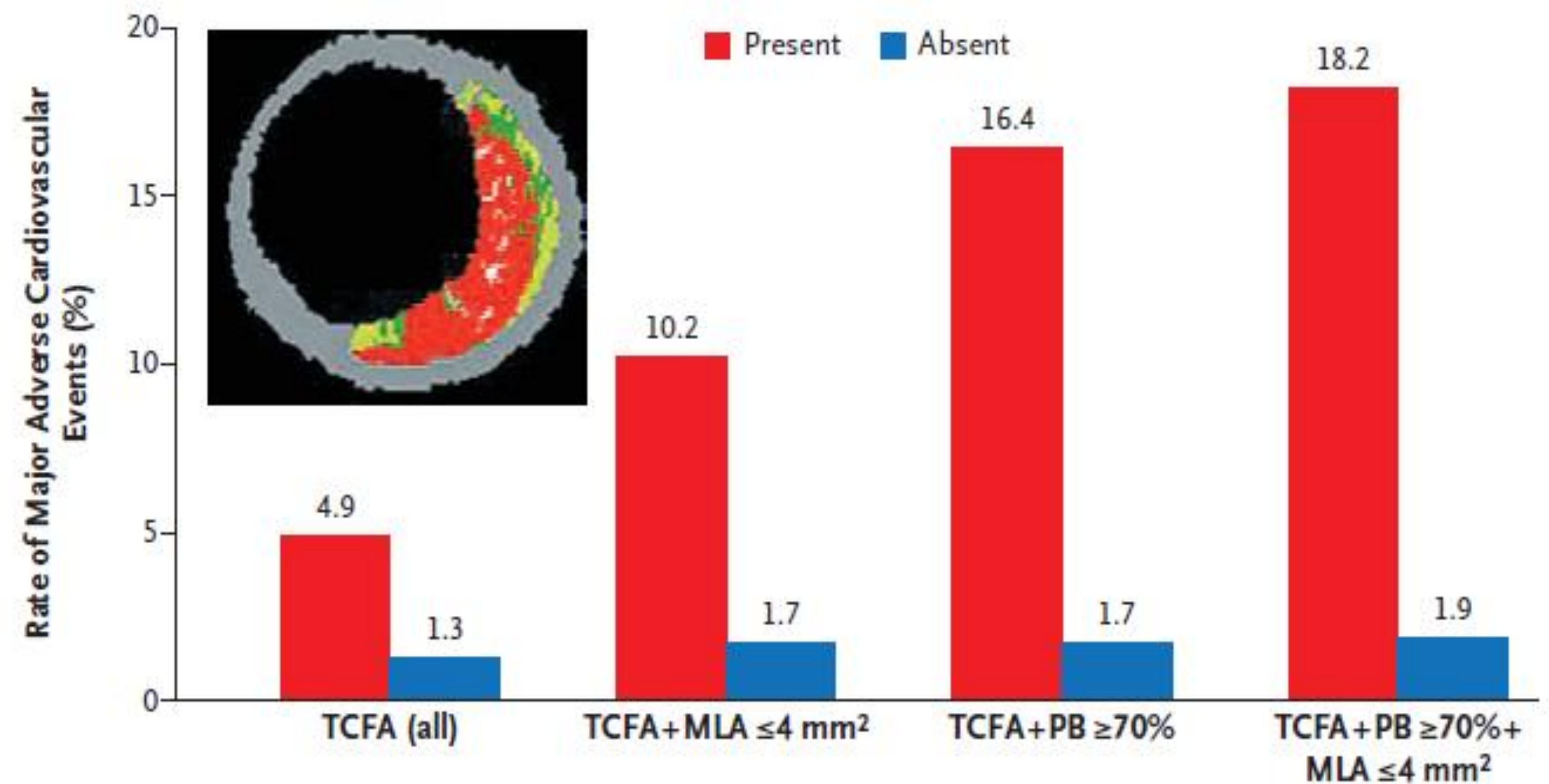
Iqbal MB, Real-world analysis of 3984 patients in London. Circ Cardiovasc Qual Outcomes 2014;7:936-43.



# PROSPECT TRIAL

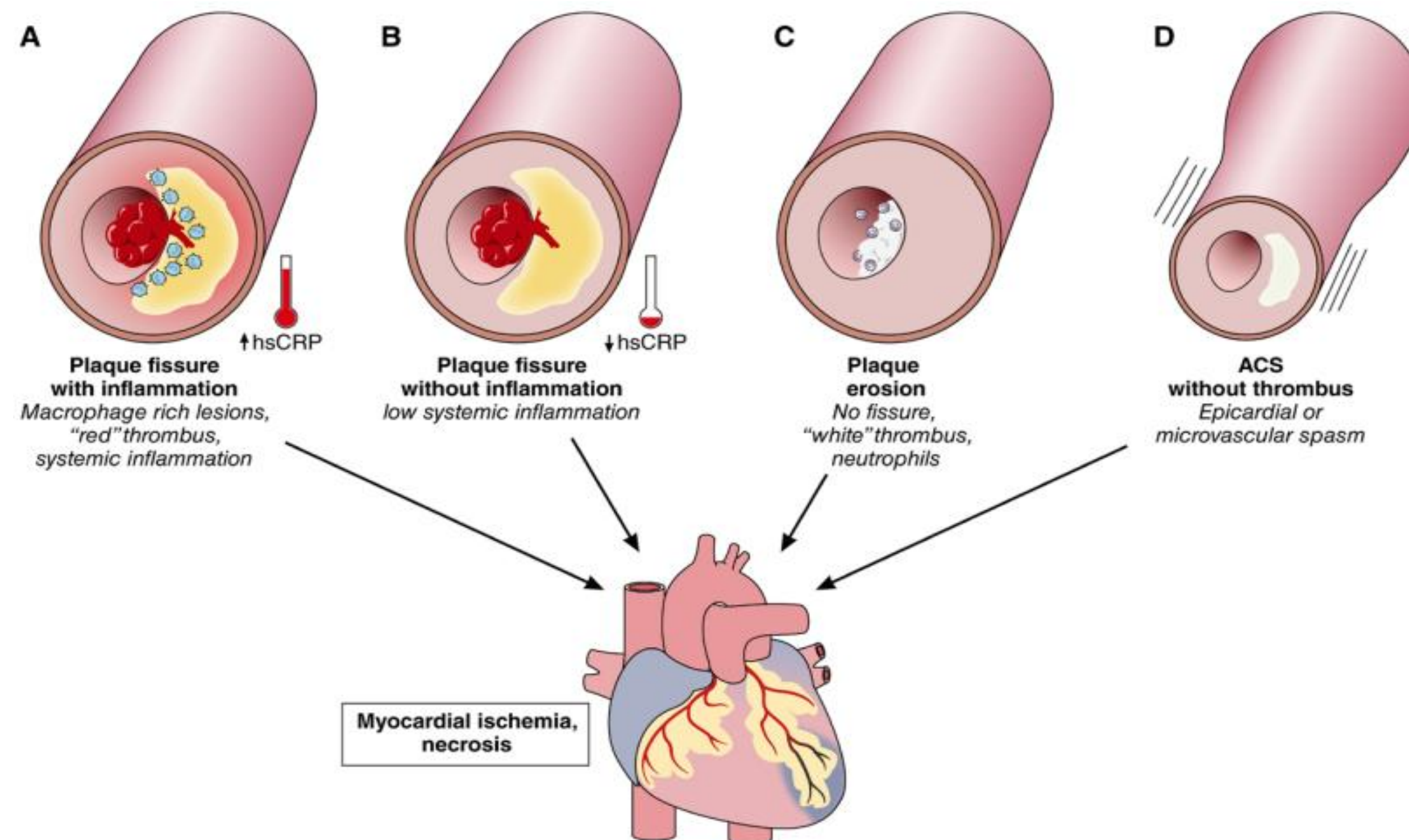
PROSPECT: 17% SUPERIOR MACE if:

- plaque >70%
- MLA < 4mm<sup>2</sup>
- Thin cap



# PLAQUE INFLAMMATION

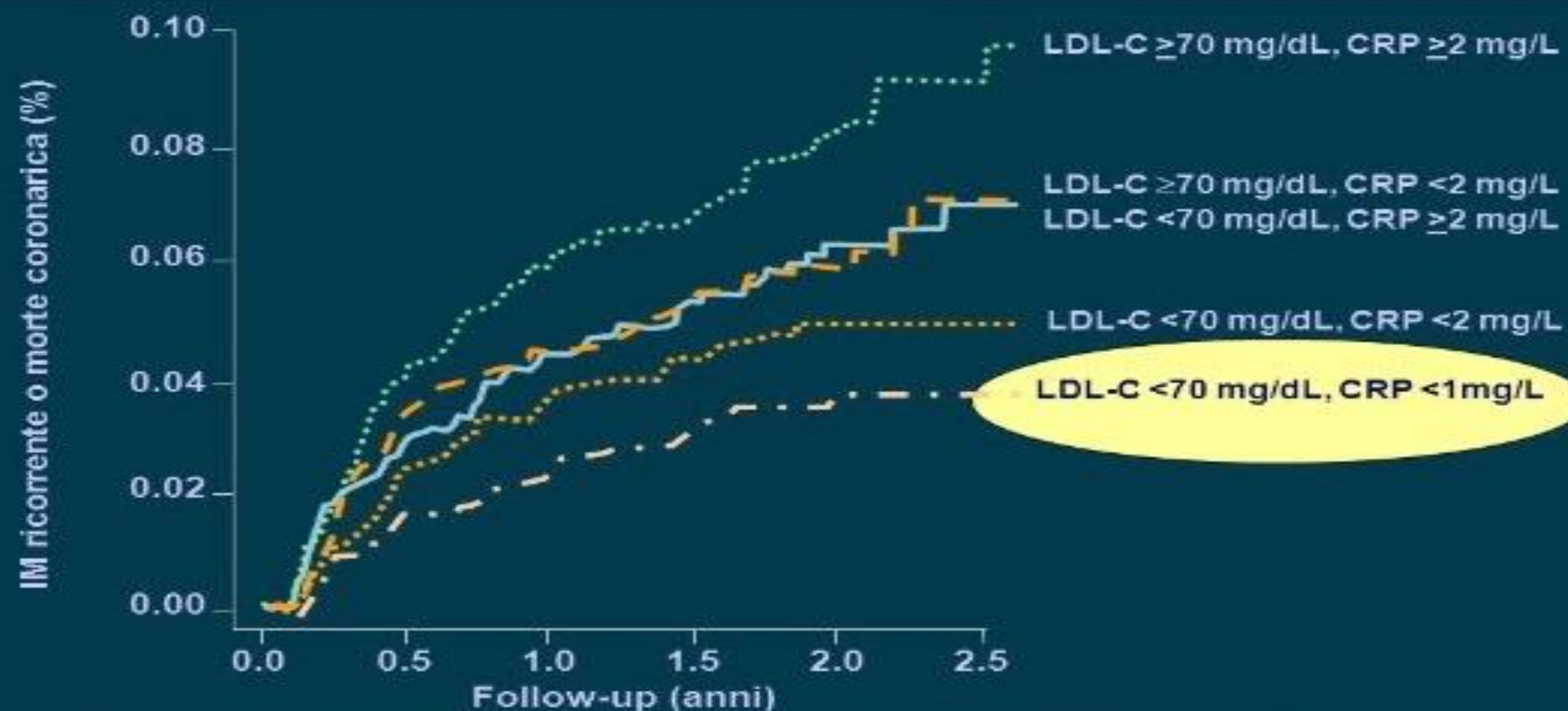
- NOT ONLY PLAQUE MORPHOLOGY, THE ROLE OF INFLAMMATION
- CRP, LDL
- Arthritis, HIV, psoriasis: increased myocardial infarction risk



Crea et al Circ 2017  
Ridker PM et al. N Engl J Med 2017



**PROVE IT sottoanalisi: i pazienti che raggiungono bassi livelli di PCR hs e bassi livelli di LDL hanno i risultati migliori in termini di eventi clinici.**



Adapted from Ridker PM et al. N Engl J Med. 2005;352:20-28. Ridker PM et al. Presented at AHA Scientific Sessions, 2004.



# CANTOS

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- Canakinumab monoclonal antibody, anti-inflammatory properties: 15% IMA reduction and 30% PTCA reduction in patients with previous AMI.



Ridker PM et al. N Engl J Med 2017



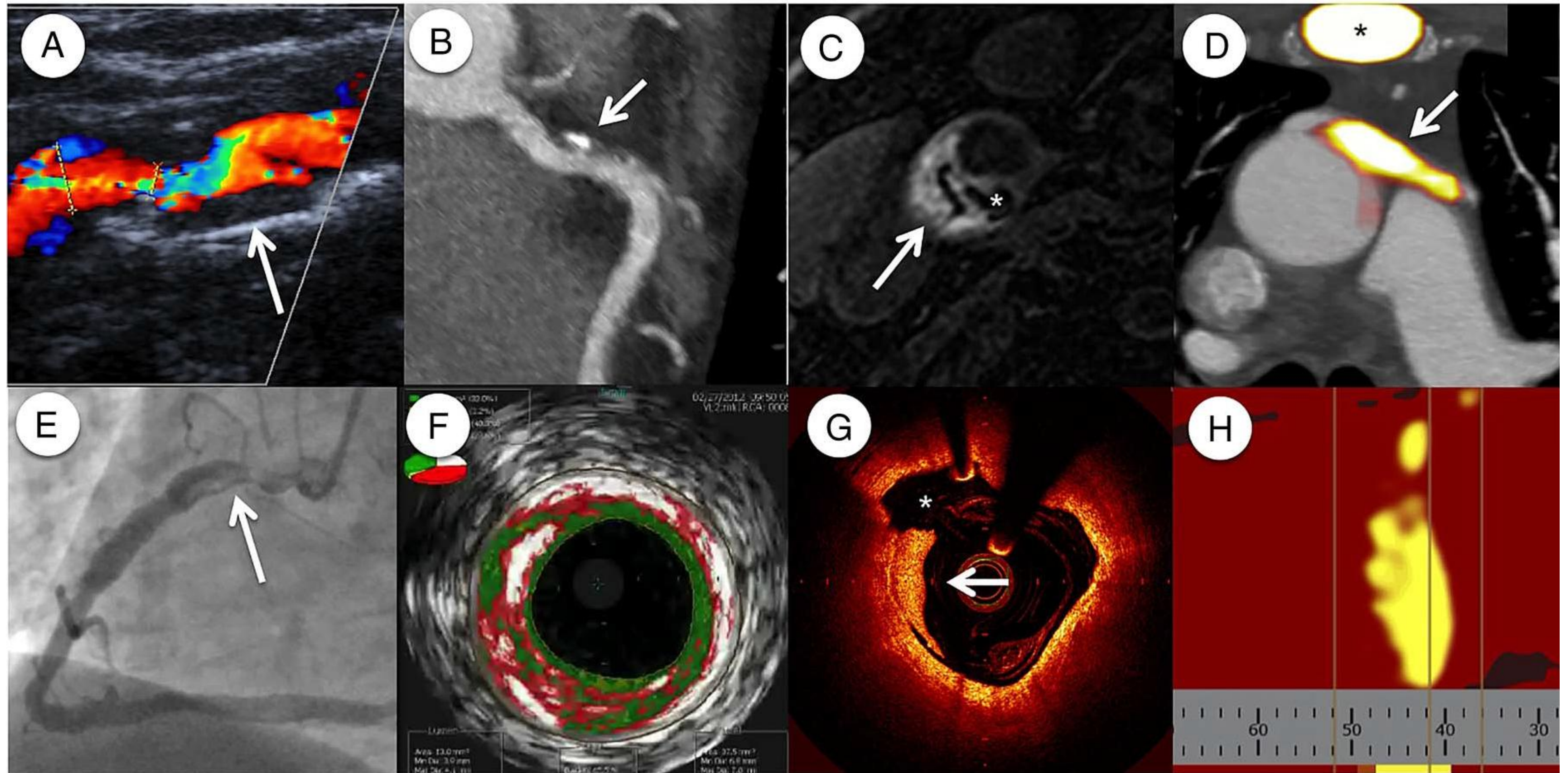
# INVASIVE TOOLS TO STUDY THE PLAQUE

. OCT

. IVUS

. FFR

. NIRS



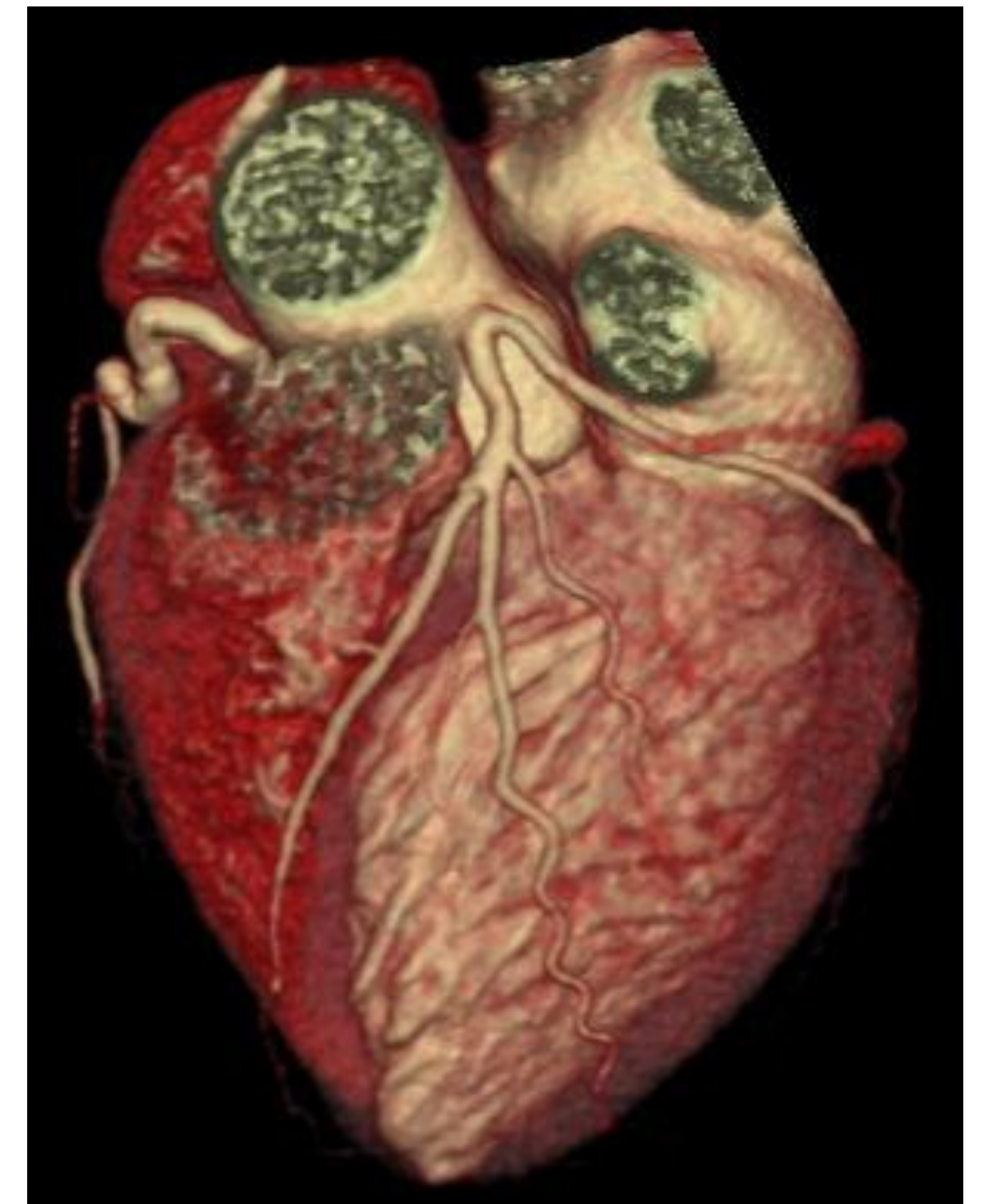
Adamson PD, et al. Heart 2015



# NON INVASIVE TOOLS

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- Coronary CT SCAN (Metanalysis Thomsen 2016: less calcification in culprit lesions)
- RMN (resolution, 7 Tesla)
- PET (FDG)

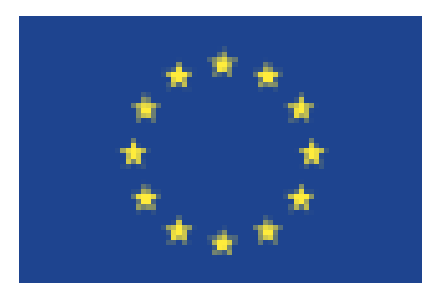




# REQUIREMENT

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- Coronary plaque characteristics definition,
- Information about plaque morphology and plaque rupture risk
- Non invasive
- Not too expensive
- Easy to access for the patients



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