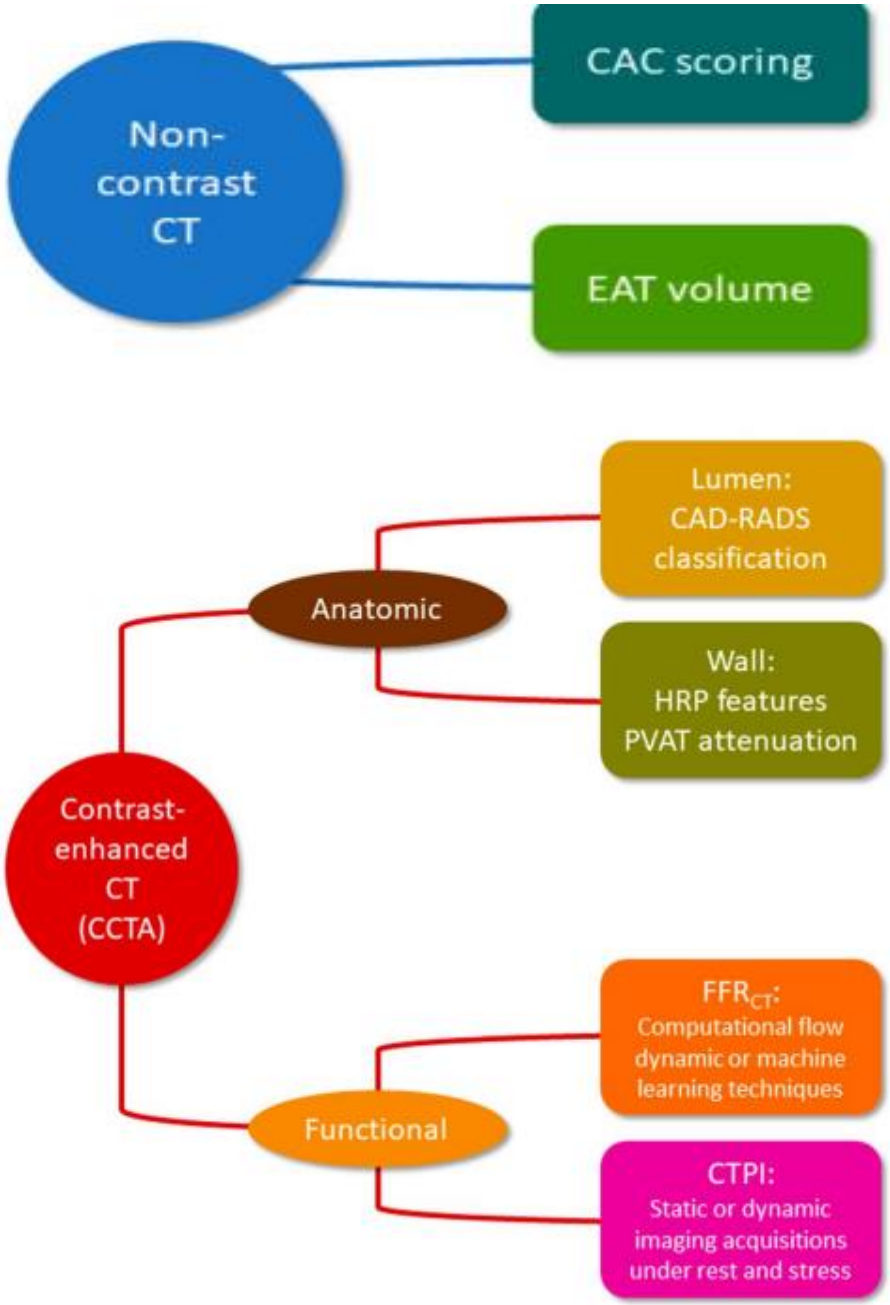
ĐÁNH GIÁ-PHÂN MỨC ĐỘ HẸP MẠCH VÀNH QUA CHỤP MSCT

TS. BS. VĂNG KIẾN ĐƯỢC

BVĐK KIÊN GIANG

NÔI DUNG

- **SƠ LƯỢC CÁC MODE CHỤP MSCT TIM MẠCH**
- **CÁC PHƯƠNG PHÁP PHÂN TÍCH HÌNH ẢNH ĐÁNH GIÁ HẸP LÒNG MẠCH**
- **ĐÁNH GIÁ MÃNG XƠ VỮA NGUY CƠ CAO**
- **PHÂN ĐỘ TỔN THƯƠNG MẠCH VÀNH** : Coronary Artery Disease-Reporting and Data System 2022-CAD-RADs 2.0



Epicardial AdipoTissue Volume

HRP High Risk Plaque
Perivascular Adipo Tissue

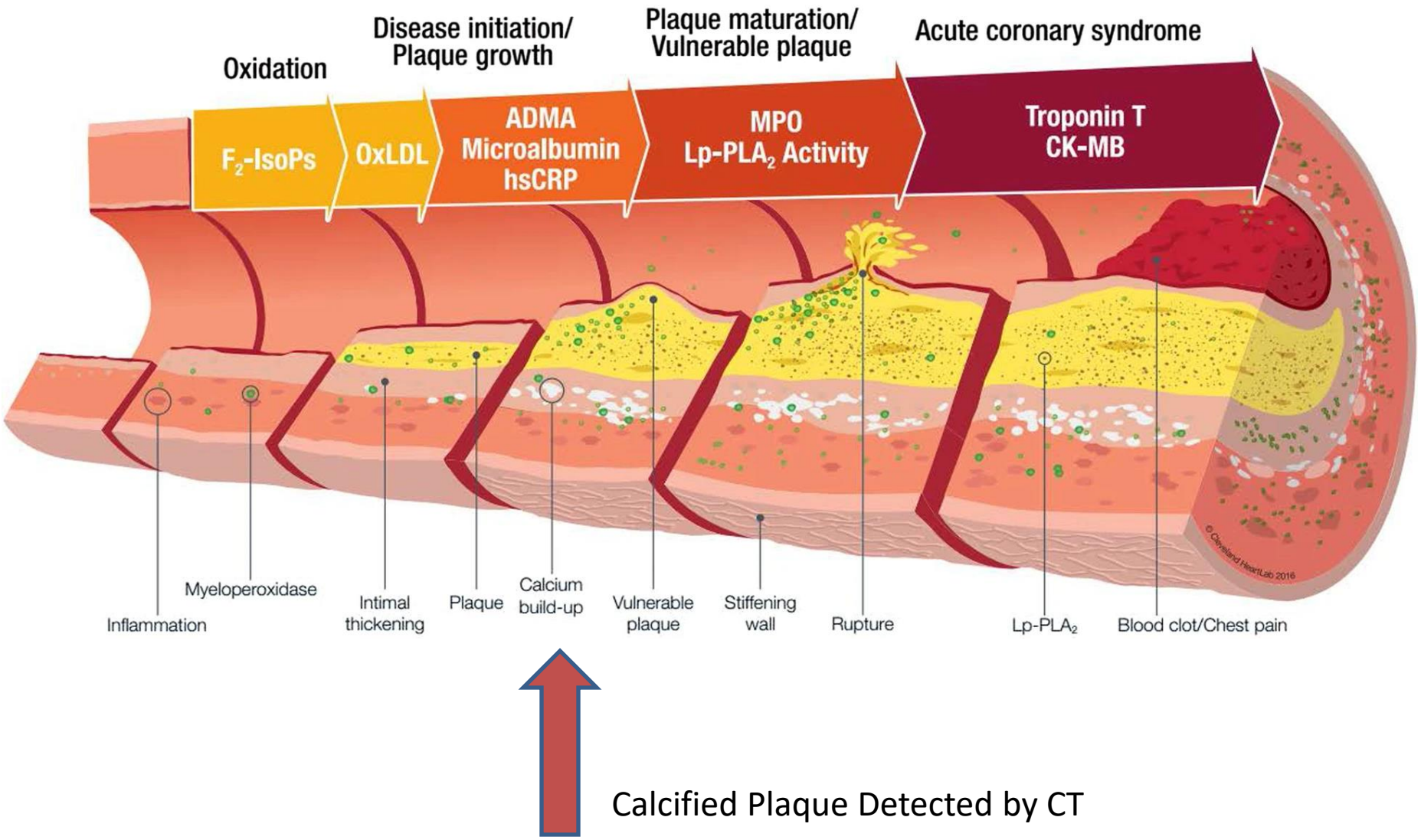
ĐÁNH GIÁ TỐT MẠCH VÀNH MSCT CẦN CÓ

YẾU TỐ KỸ THUẬT

- CHUẨN BỊ BN TỐT: TẬP NÍN THỞ
- ĐẢM BẢO CÁC YẾU TỐ KỸ THUẬT: CƯỜNG ĐỘ TIA, THUỐC CẢN QUANG

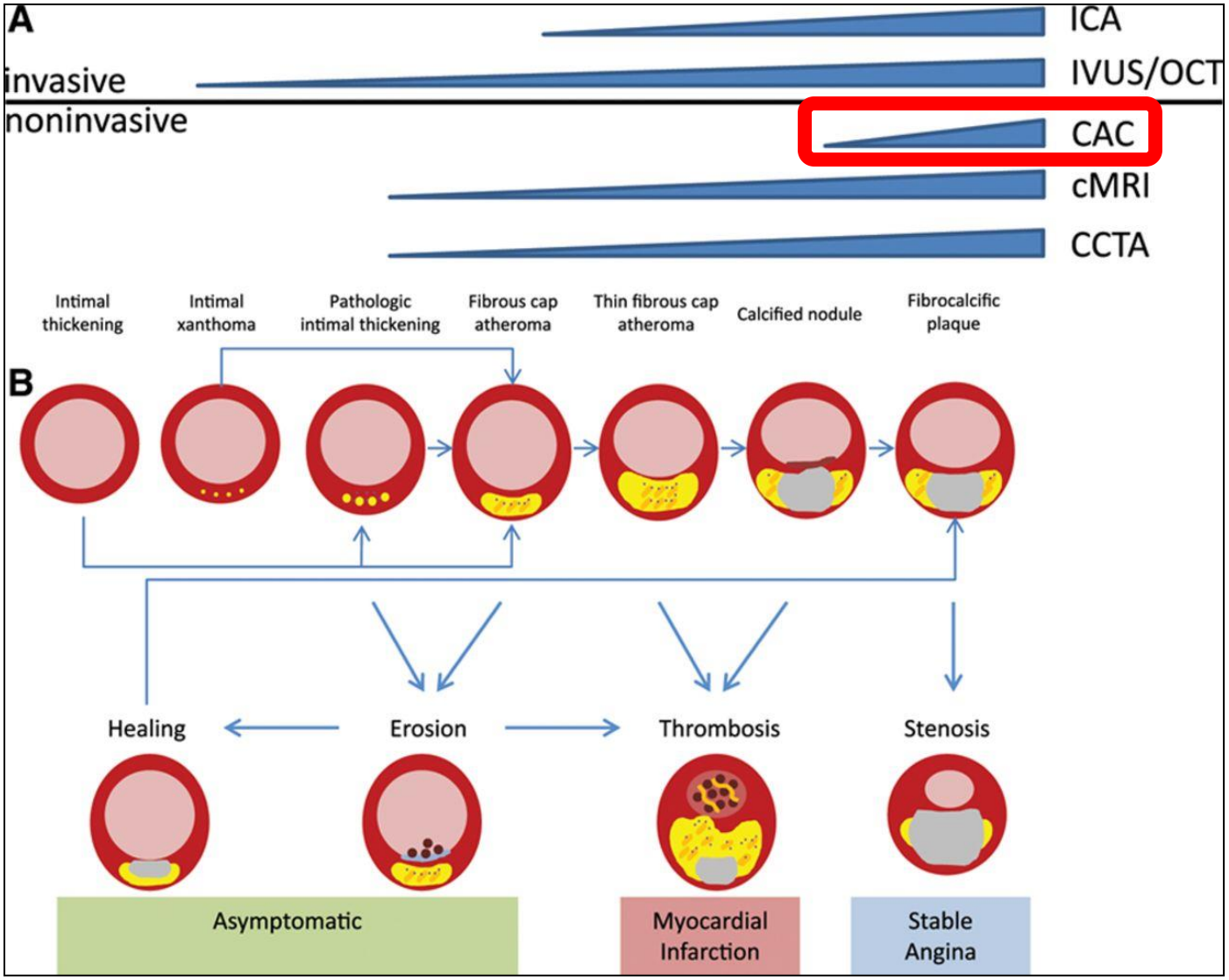
PHÂN TÍCH KẾT QUẢ

- ĐÁNH GIÁ MÃNG XƠ VỮA
- ĐÁNH GIÁ MÃNG XƠ VỮA NGUY CƠ CAO
- PHÂN ĐỘ HẸP
- PHÂN ĐỘ CAD-RADs



Calcified Plaque Detected by CT

Leta Melaku & Addisu Dabi ,The cellular biology of atherosclerosis with atherosclerotic lesion classification and biomarkers 2021. https://bnrc.springeropen.com/articles/10.1186/s42269-021-00685-w



Sandfort et al . Noninvasive Imaging of Plaque Progression . (Circ Cardiovasc Imaging. 2015;8:00-00.DOI:10.1161/CIRCIMAGING.115.003316.)

Coronary CT—lumen and wall

Morphology:

Calcified

Partially calcified

Non-calcified

A) 0% no disease

B) 1–24% minimal plaque

C) 25–49% mild plaque

D) 50–69% moderate plaque

E) 70–99% severe plaque

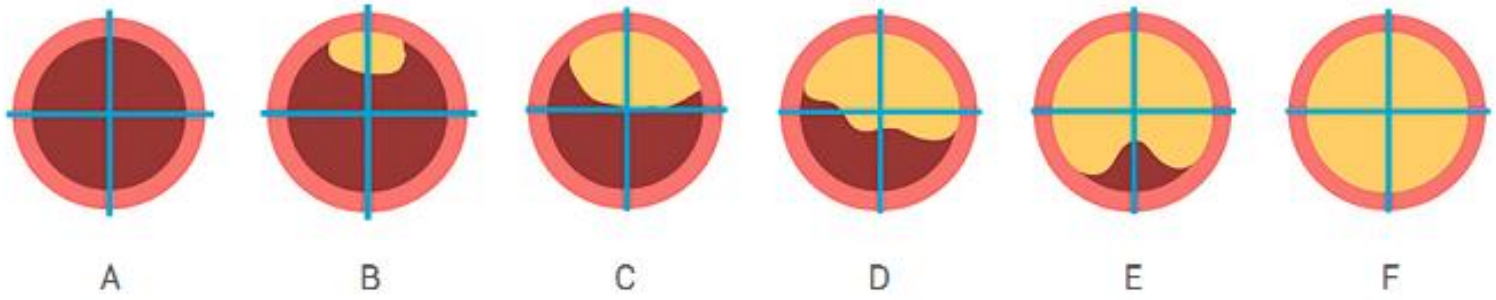
F) 100% occluded

ırtery plaques

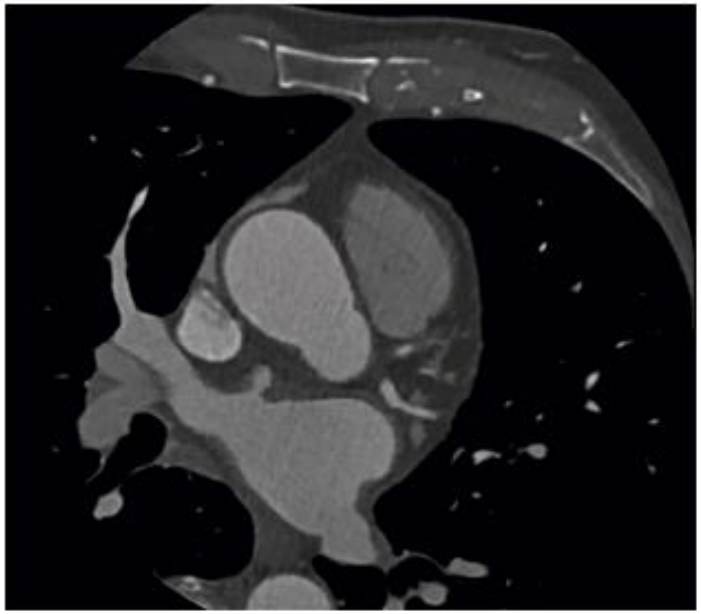
SEVERITY

OSIS

manner:



PHÂN TÍCH TRÊN WORKSTATION



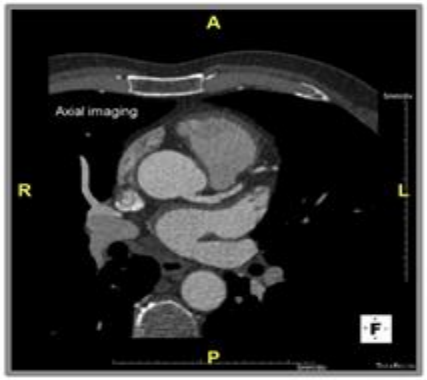
Assessing coronary artery plaques

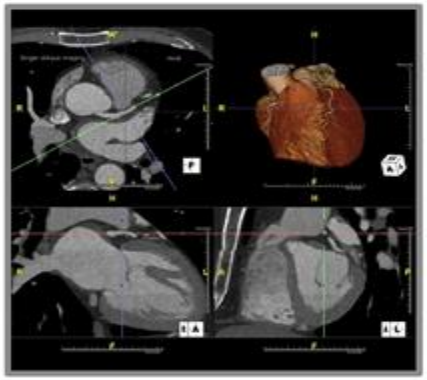
USING AXIAL IMAGING

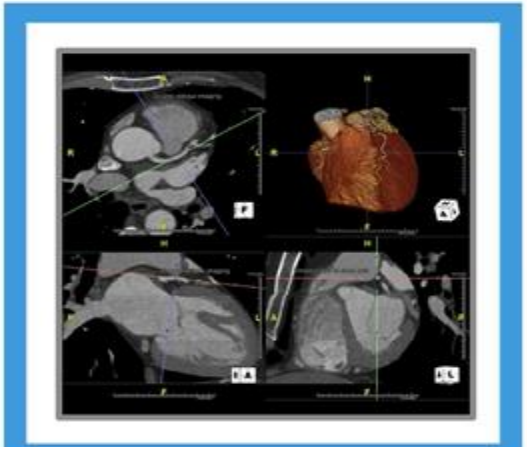
As you do this, remember the four C's:

Focus on the Coronaries.
Look at change in vessel Calibre.
Look for a drop in Contrast in successive slices.
Confirm with multiplanar reformatted images.

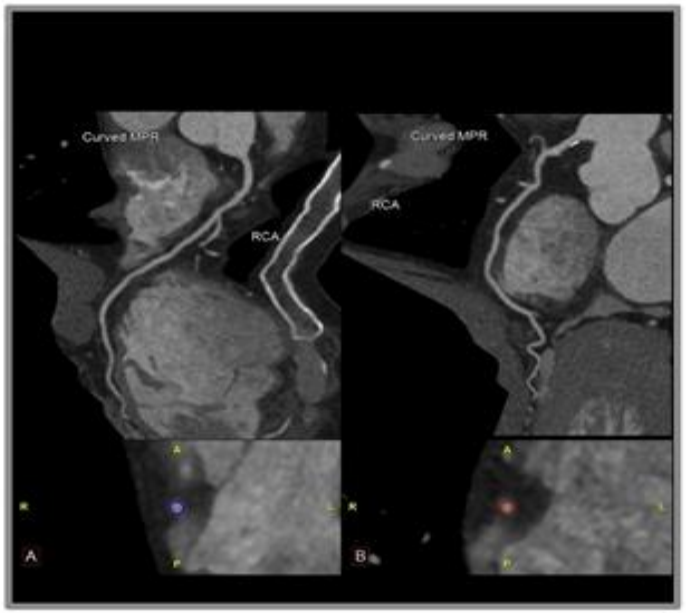
Stenosis grading—recommended techniques

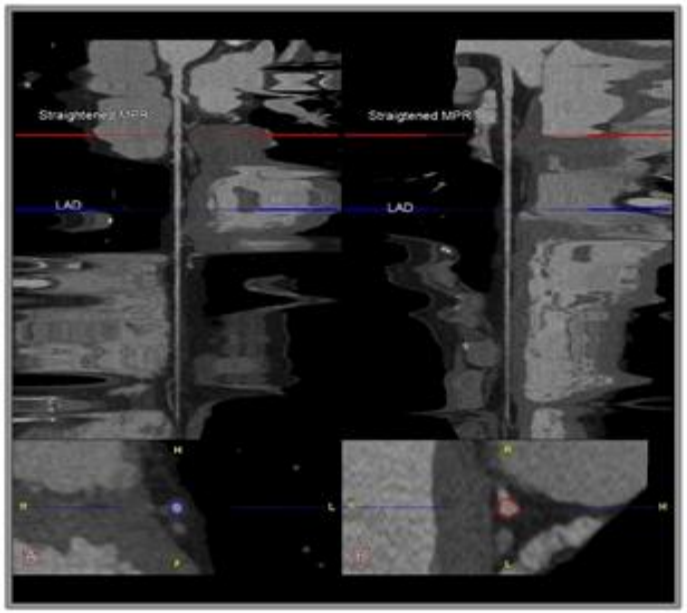






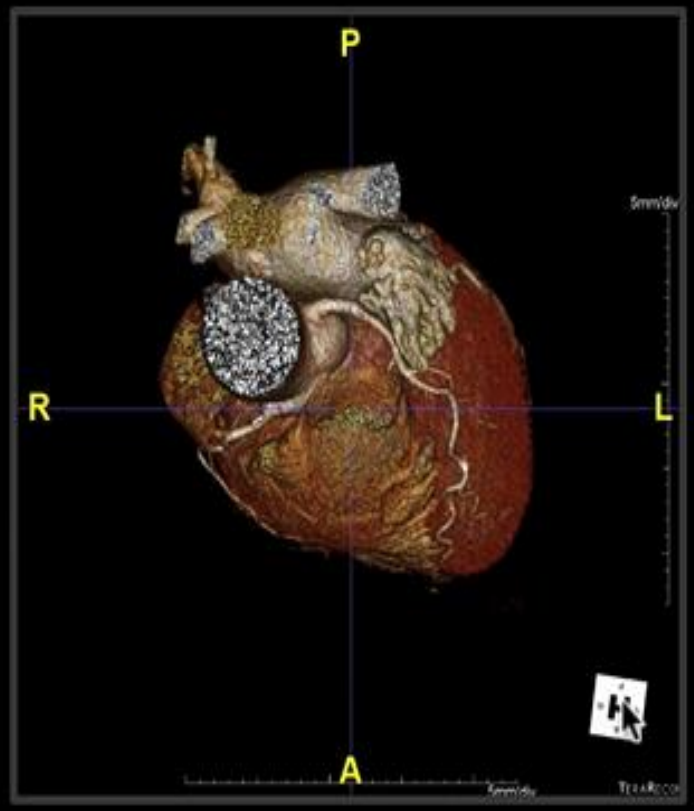
Stenosis grading—optional techniques





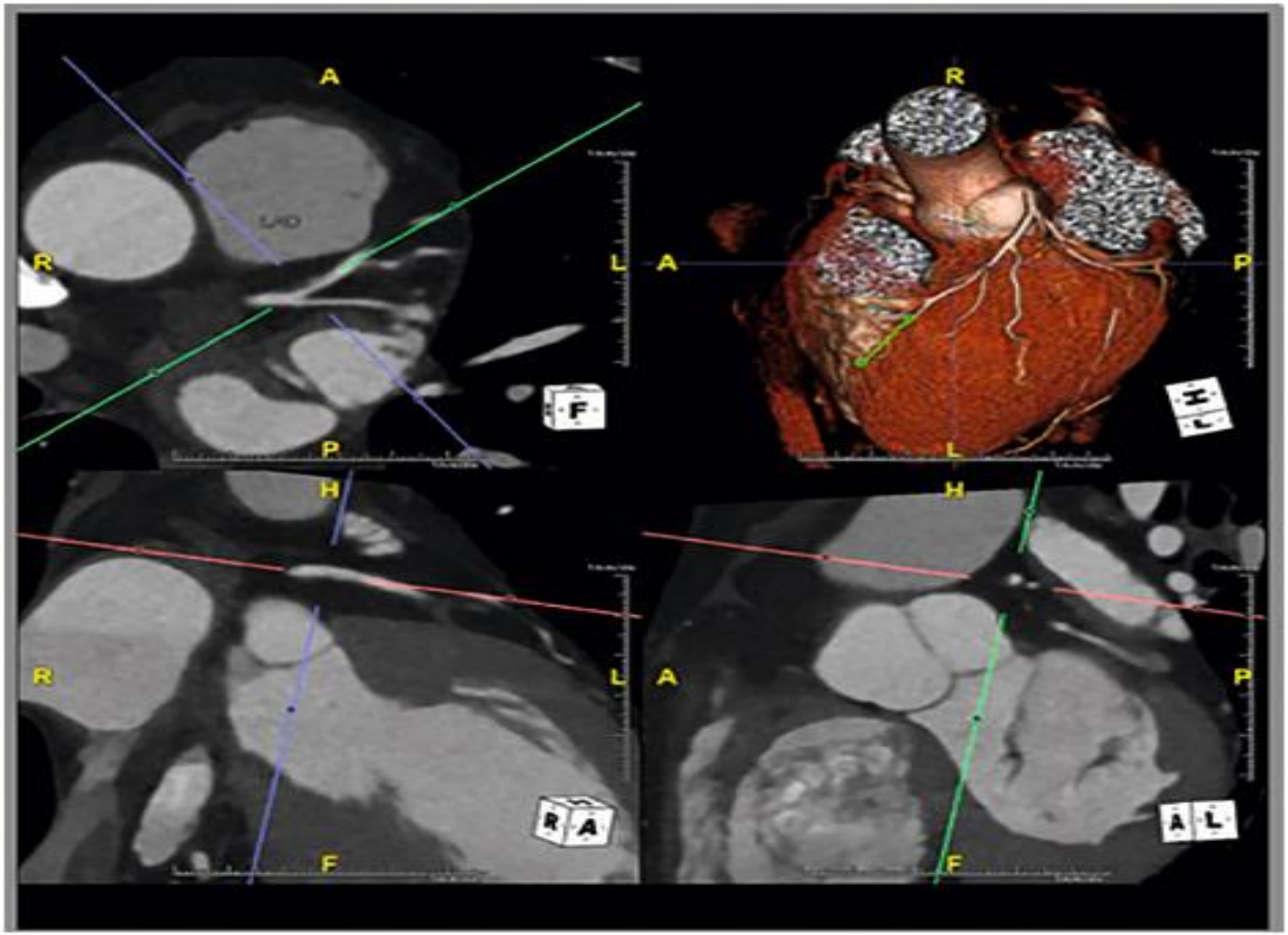
Stenosis grading—not recommended

Good for complex anatomy/grafts

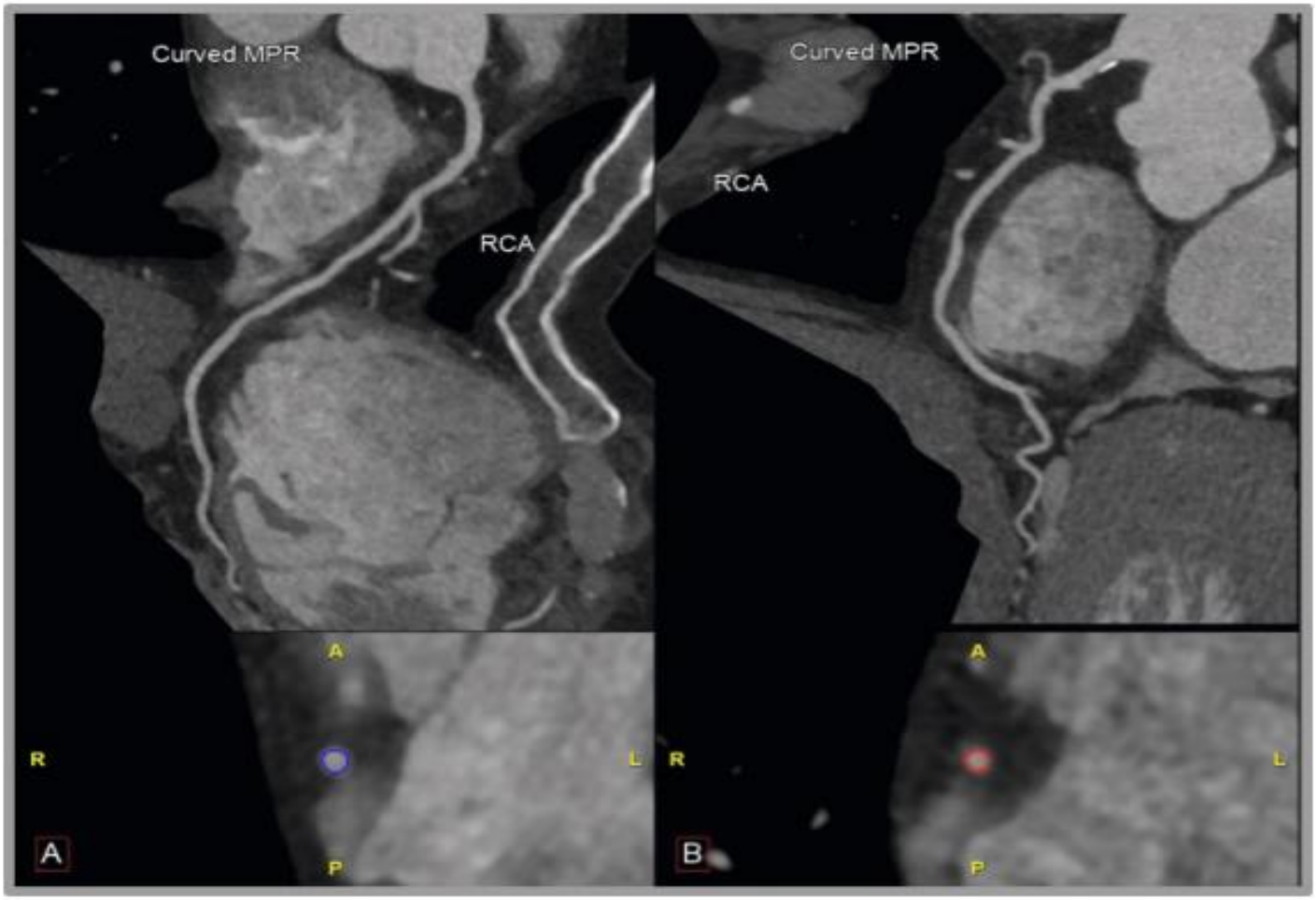


Assessing coronary artery plaques

EVALUATING PLAQUES WITH CURVED MULTIPLANAR RECONSTRUCTION

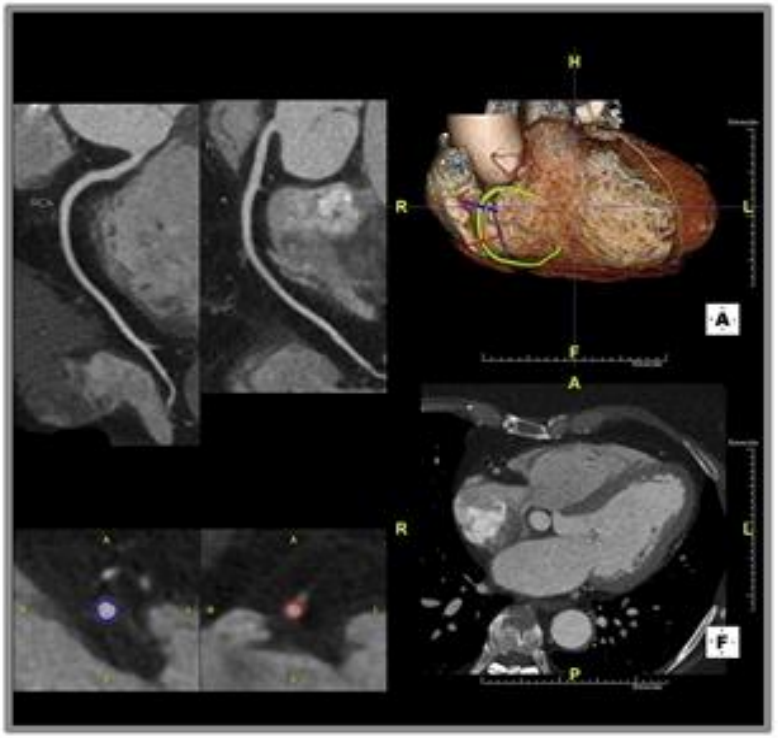


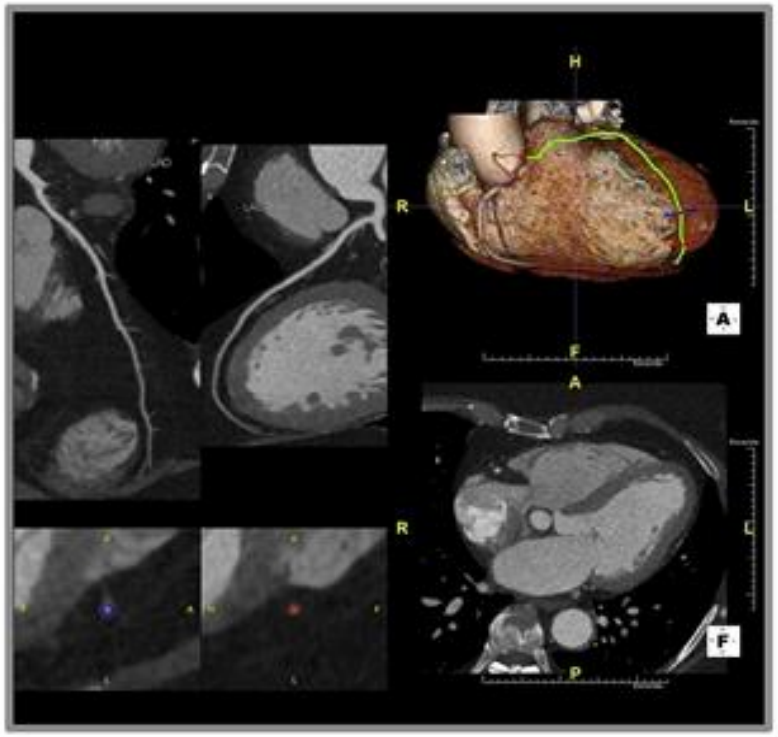
EVALUATING PLAQUES WITH CURVED MULTIPLANAR RECONSTRUCTION



ĐÁNH GIÁ MỨC ĐỘ HẸP LÒNG MẠCH (LUMEN)

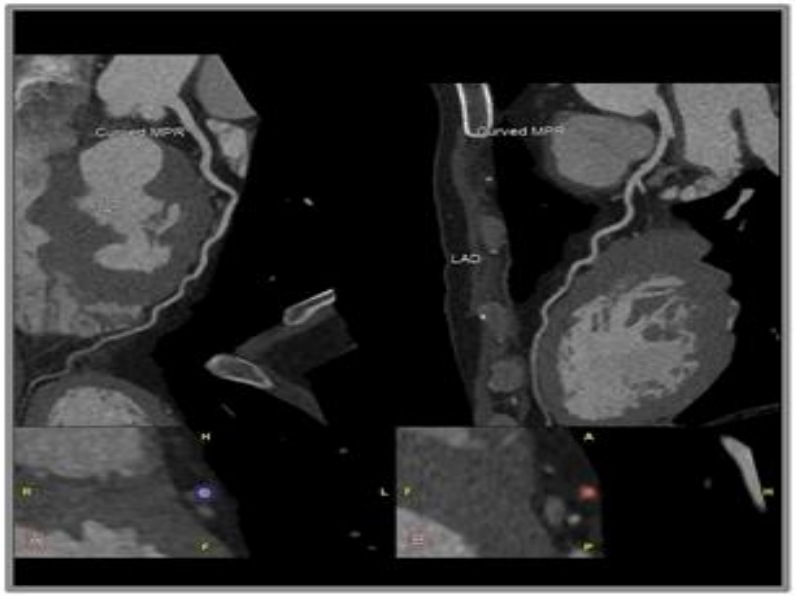
Normal



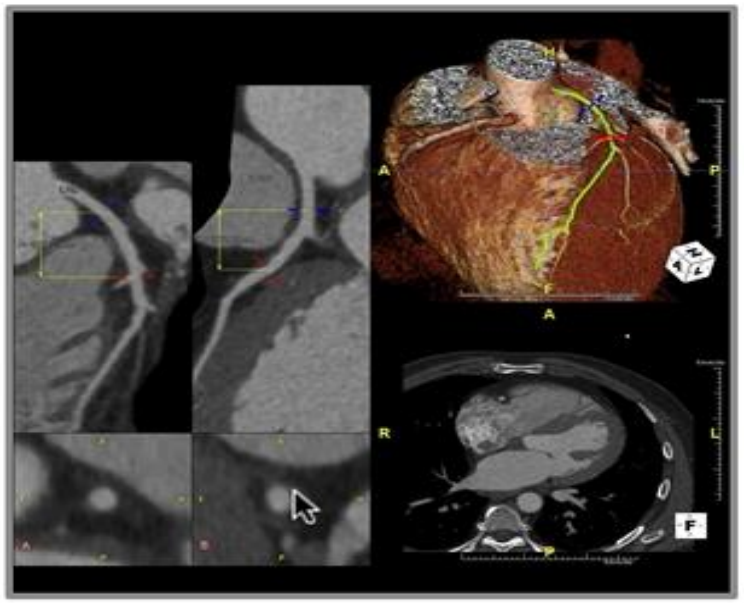


1-24%

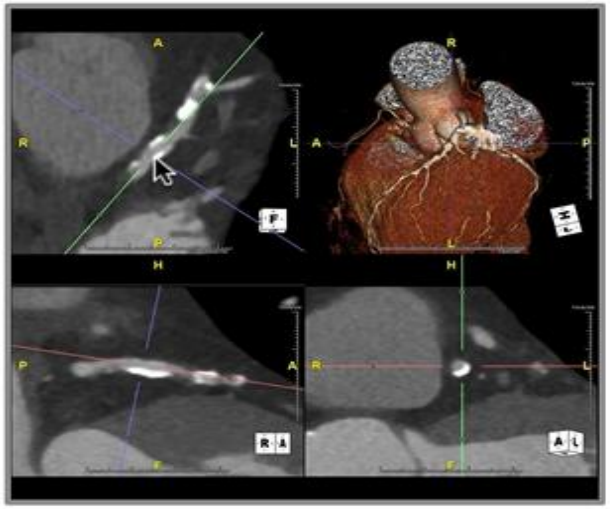
Minimal stenosis



Minimal stenosis

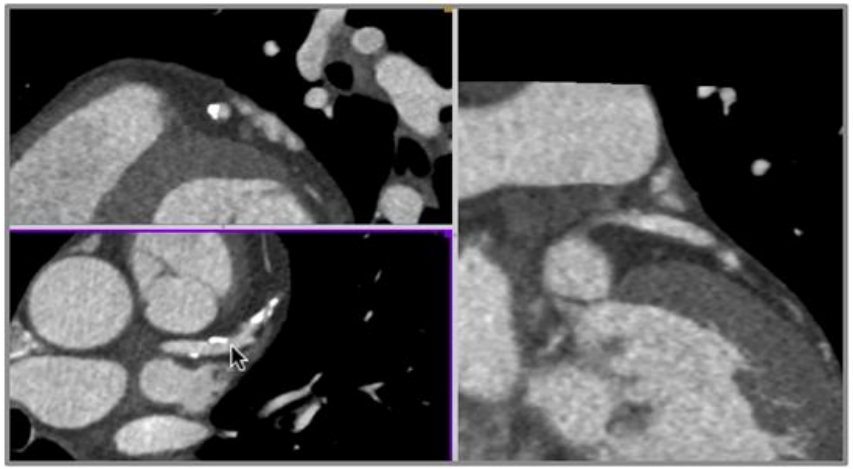


Mild stenosis



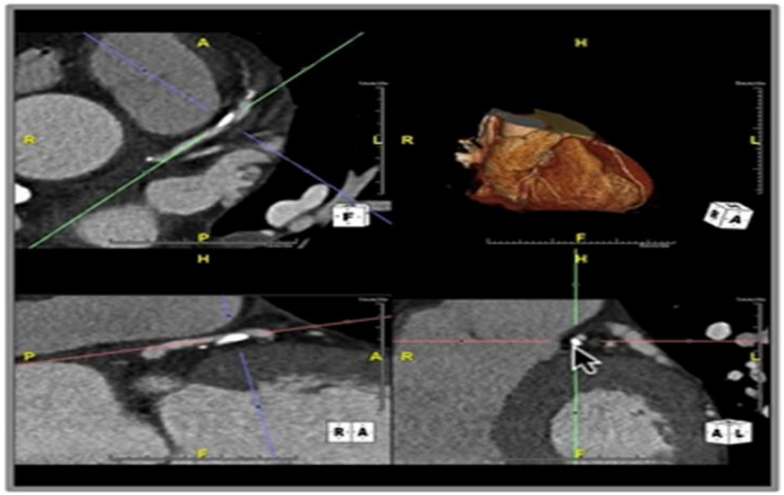
Mild stenosis

25-49 %



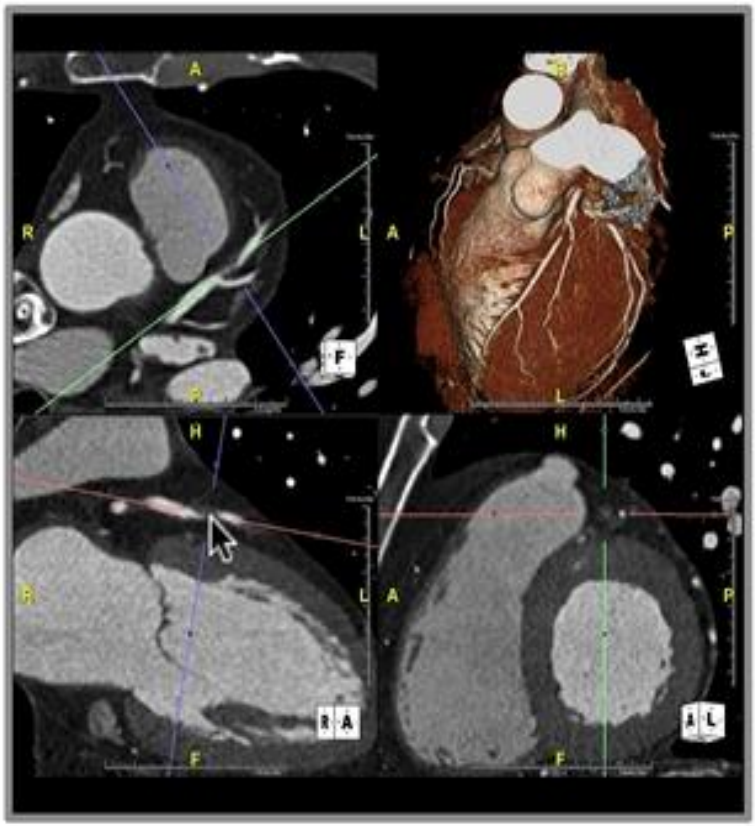
Moderate stenosis

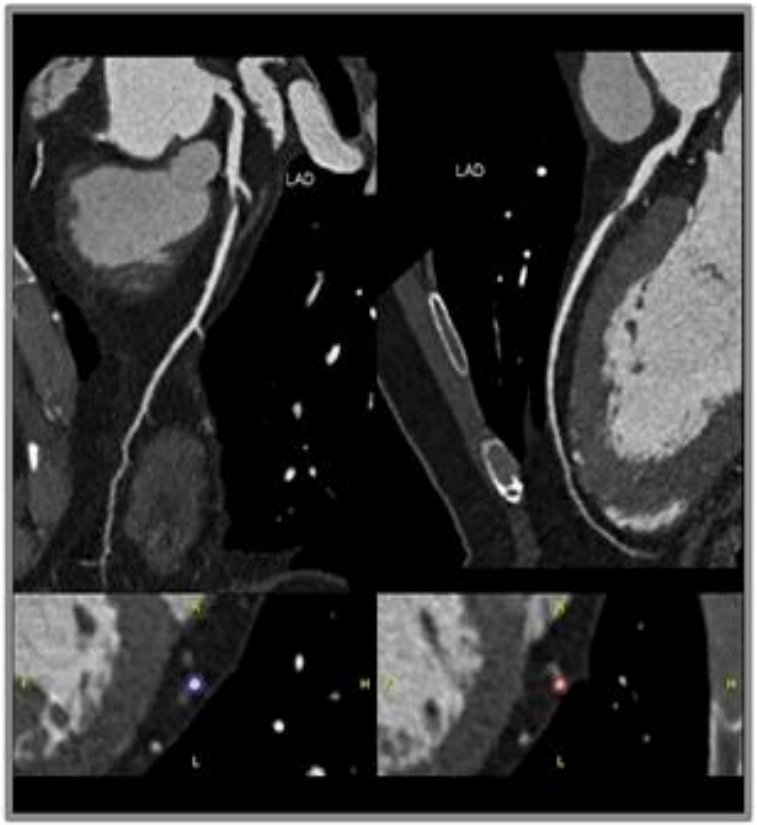
50-69%



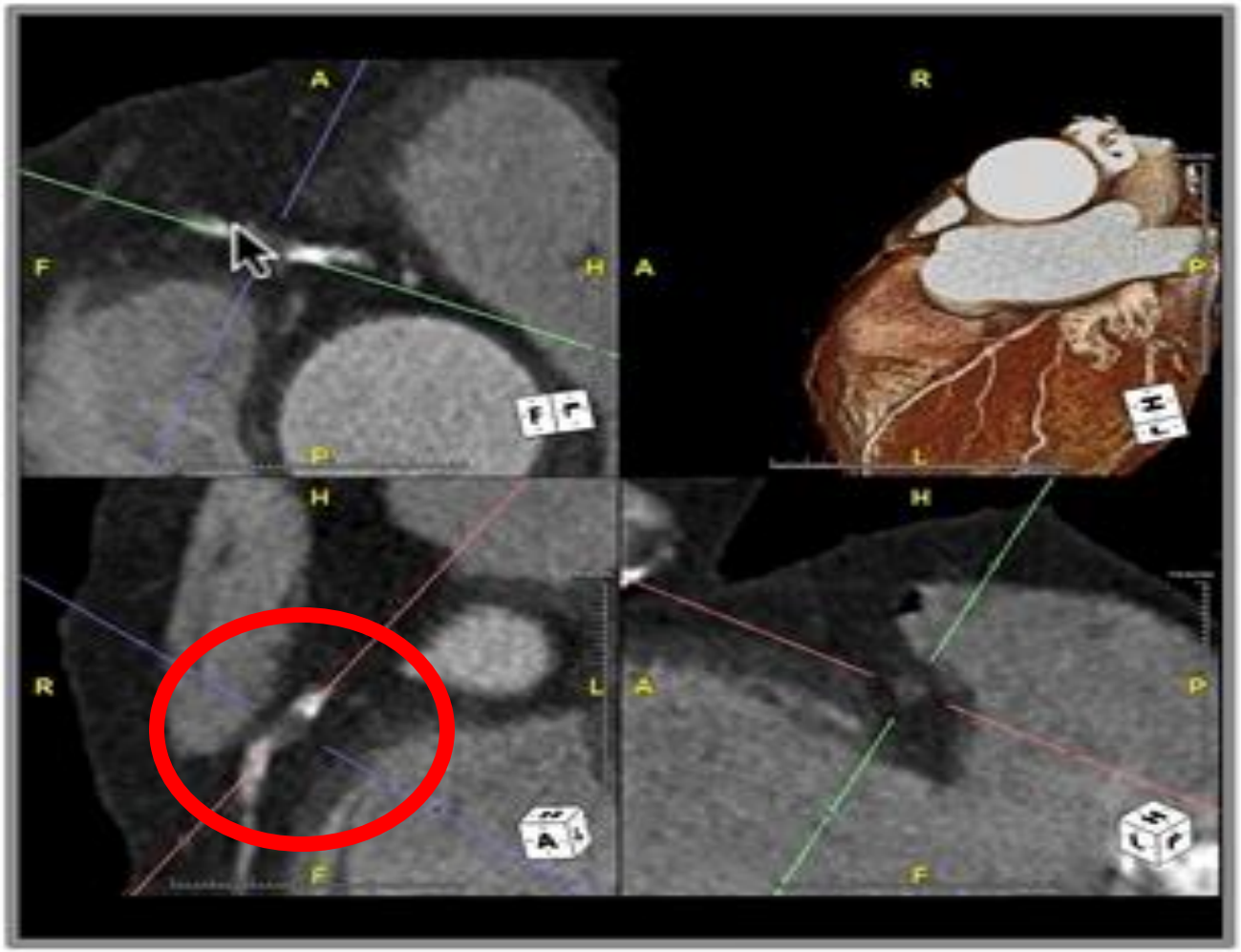
70-99%

Severe stenosis

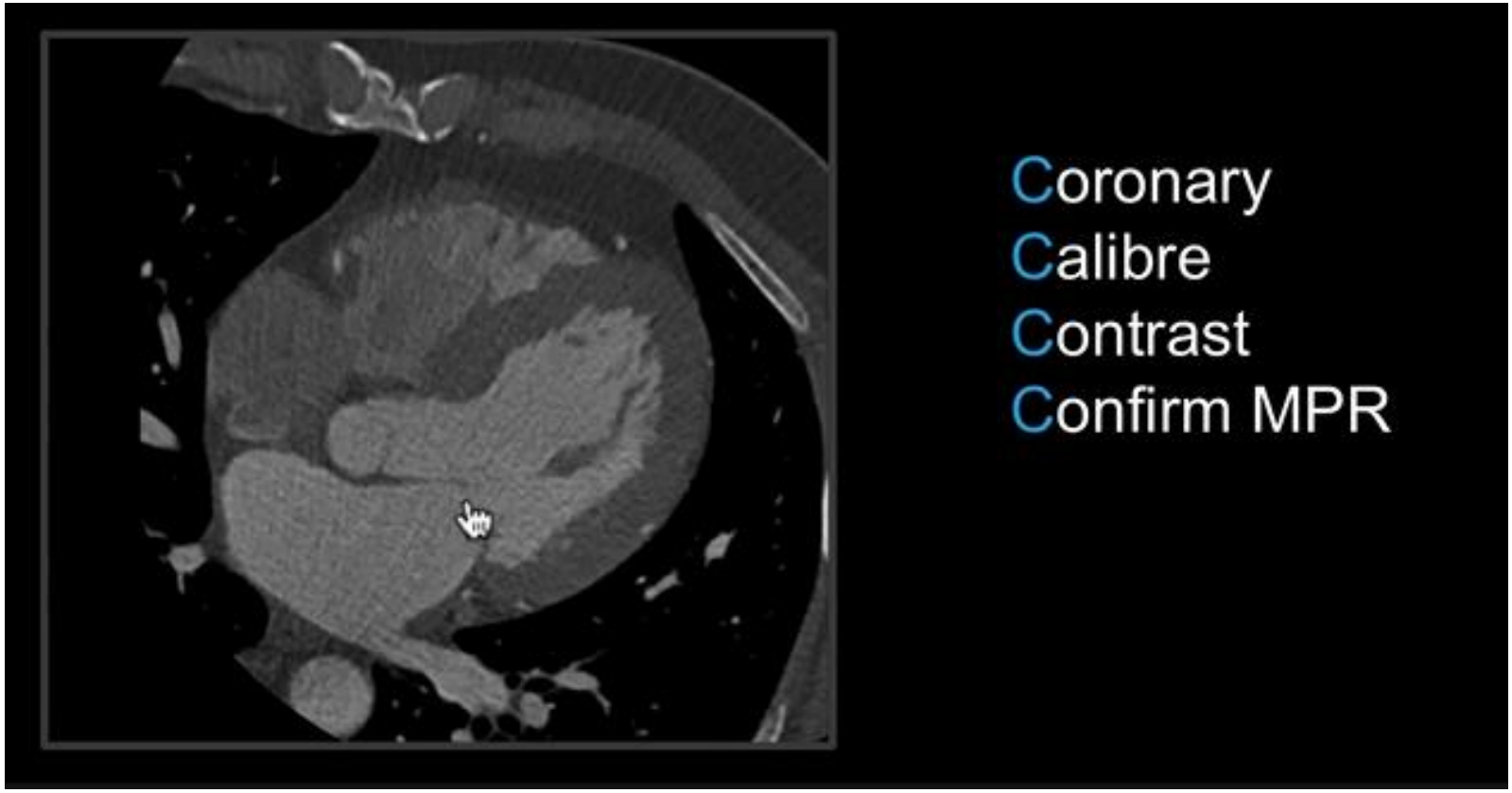


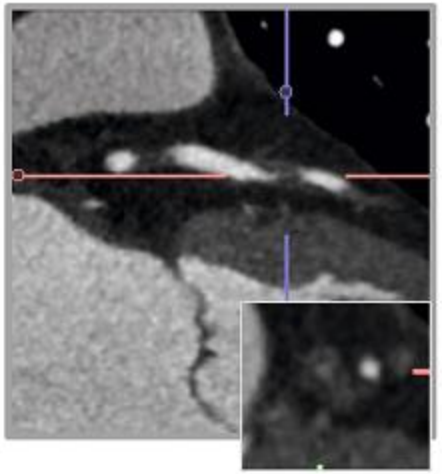


Occluded

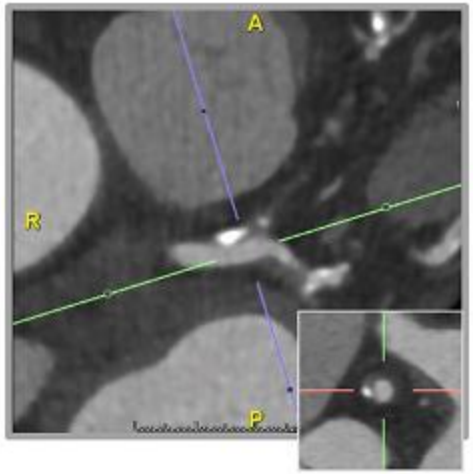


ĐÁNH GIÁ THÀNH MẠCH

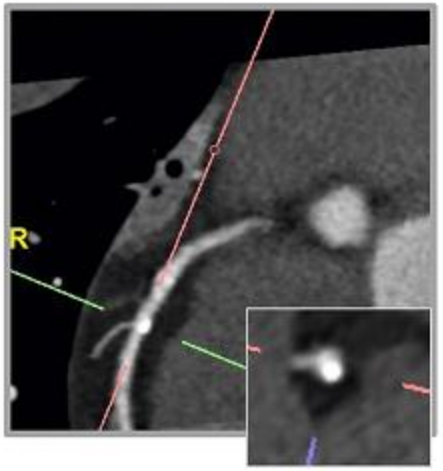




Non-calcified



Partially calcified



Calcified

Non-calcified plaque

Vessel lumen narrowing secondary to plaque with no calcium.

Partially calcified plaque

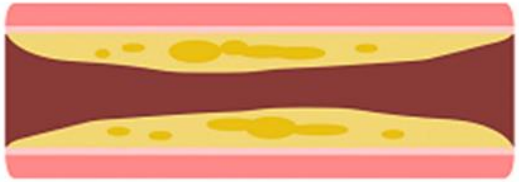
Contains both calcified and non-calcified plaque.

Calcified plaque

Plaque is predominantly calcified

IDENTIFYING HIGH-RISK PLAQUES

Low attenuation plaque



< 30 HU = low attenuation plaque

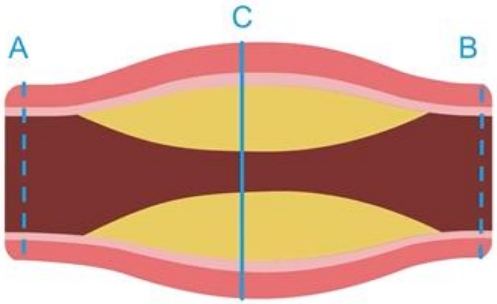
Positive remodeling

The napkin ring sign

Spotty calcification

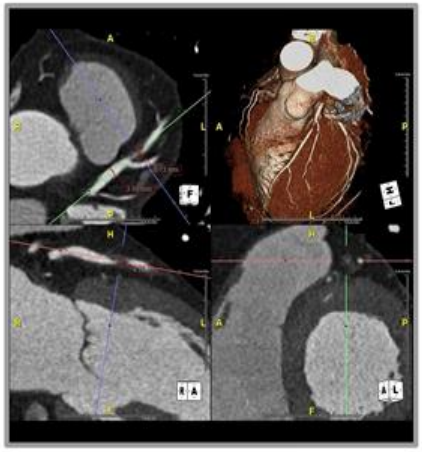
< 3 mm length and < 180 degrees circumference

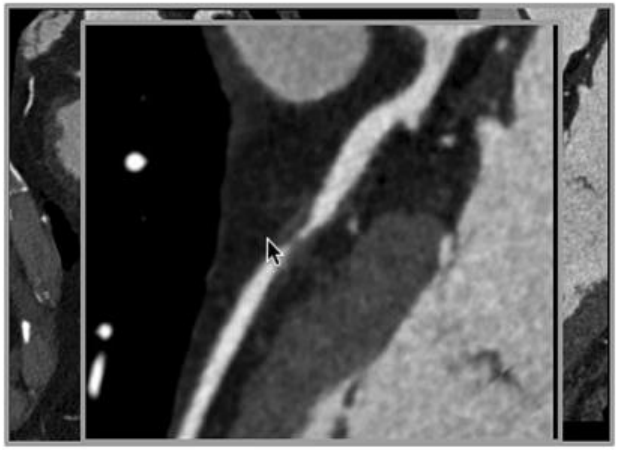
Positive remodeling



>10% = positive remodeling

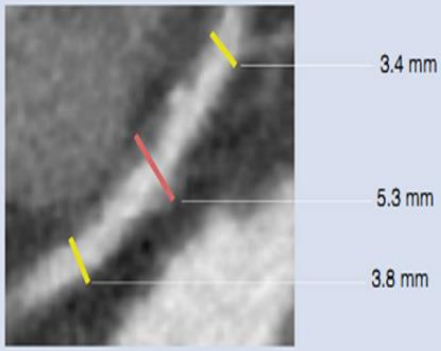
Positive remodeling





Remodeling Index

Vessel diameter (D) at lesion site
Reference diameter (RD)

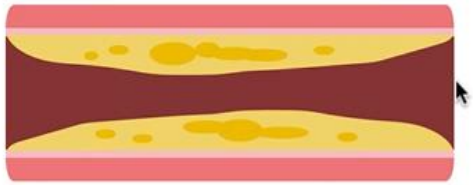


Remodeling index: 5.3/3.6 (average of proximal and distal RD) = 1.47

Tái cấu trúc dương tính (Positive remodeling)

- Thành mạch phình ra tại vị trí mảng xơ vữa
- Lòng mạch có thể chưa hẹp nhiều nhưng nguy cơ cao

Low-attenuation plaque (necrotic core)

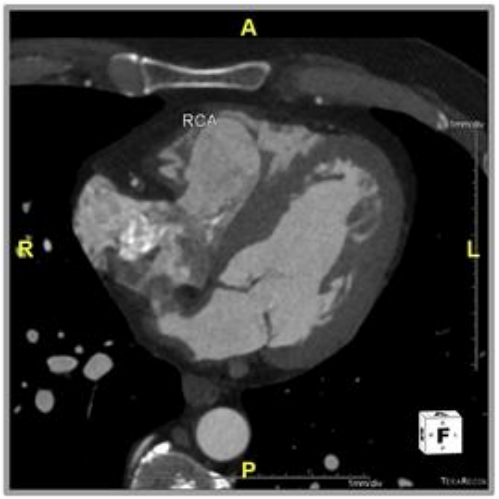


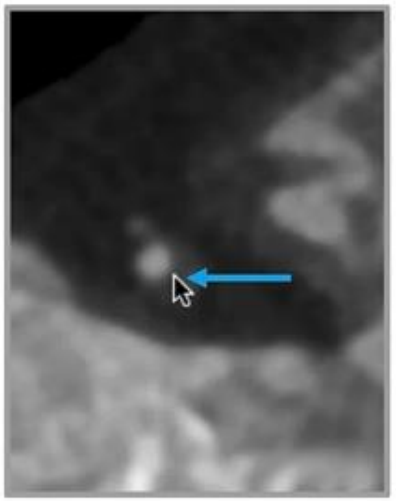
<30 HU = low attenuation plaque

Low-attenuation plaque:

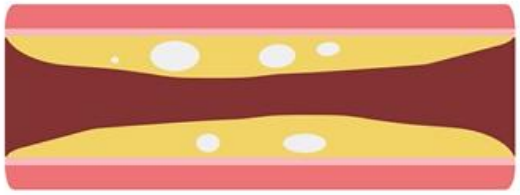
- Mảng xơ vữa có **đậm độ thấp**, thường:**< 30 HU** → rất giàu lipid (nguy hiểm cao)
- Một số tài liệu dùng ngưỡng **< 60 HU**

Low-attenuation plaque





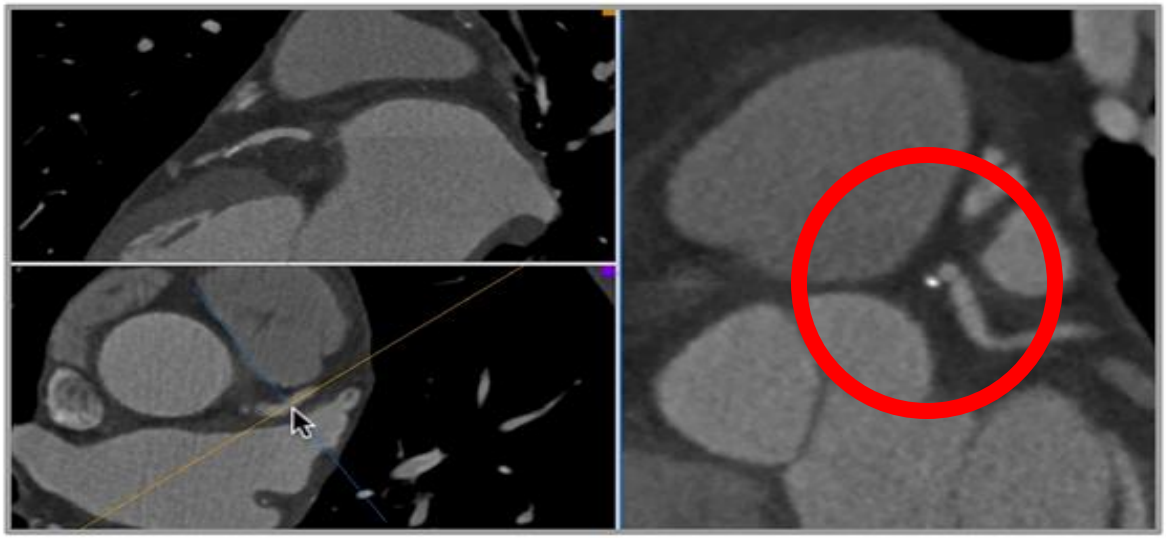
Spotty calcification



Vôi hóa lốm đốm (Spotty calcification)

- Các ổ vôi hóa nhỏ (<3 mm)
- Nguy hiểm hơn vôi hóa lớn, đồng nhất

Spotty calcification

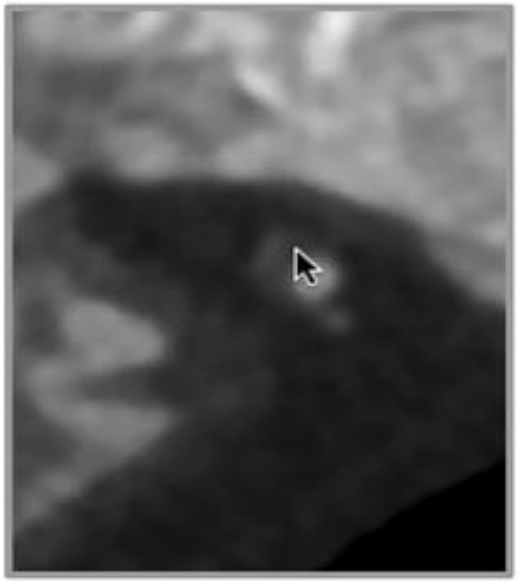


Napkin-ring sign

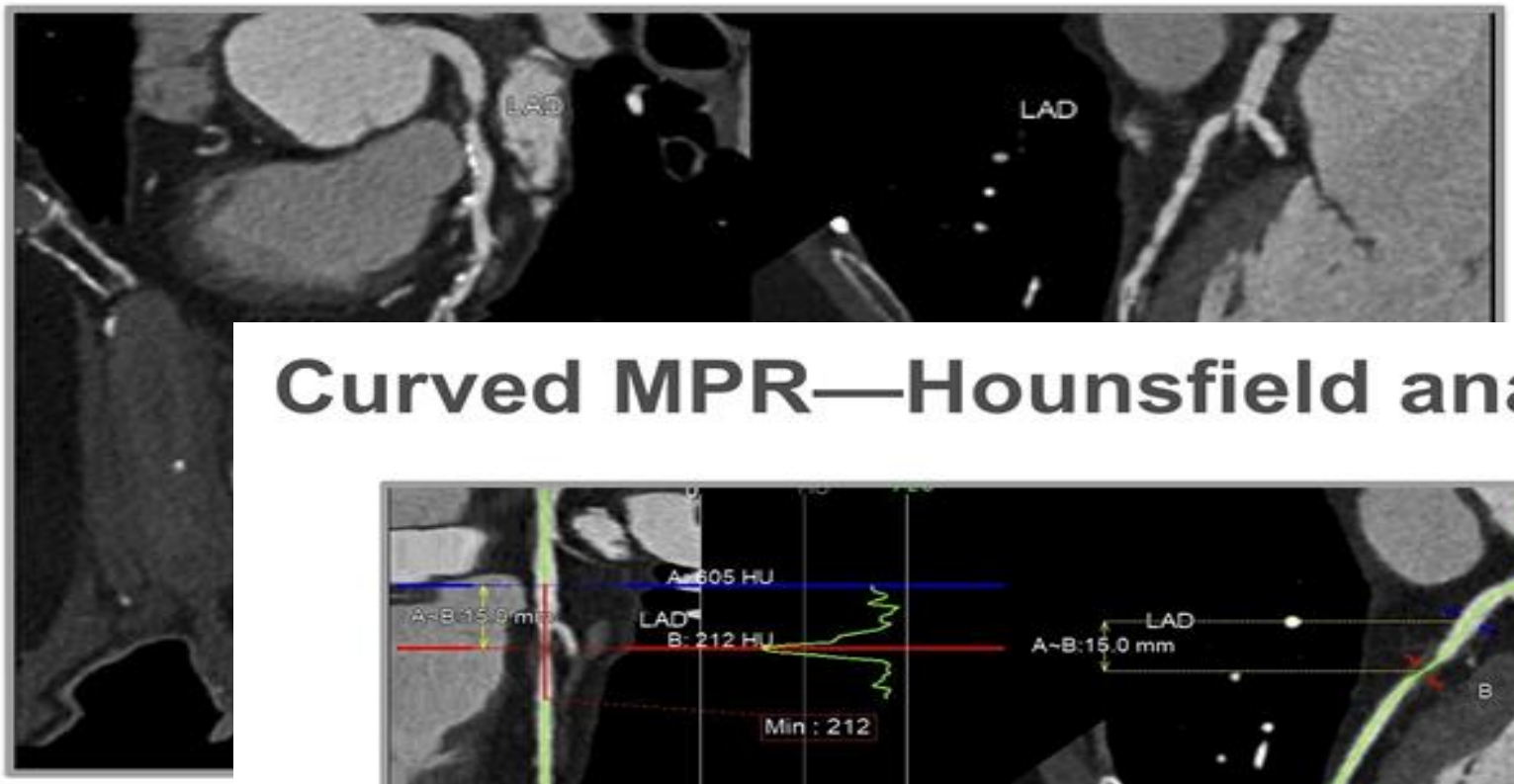
Dấu hiệu "Napkin-ring sign"

- Trung tâm giảm đậm độ, viền ngoài đậm hơn
- Là dấu hiệu khá đặc hiệu của mảng dễ vỡ

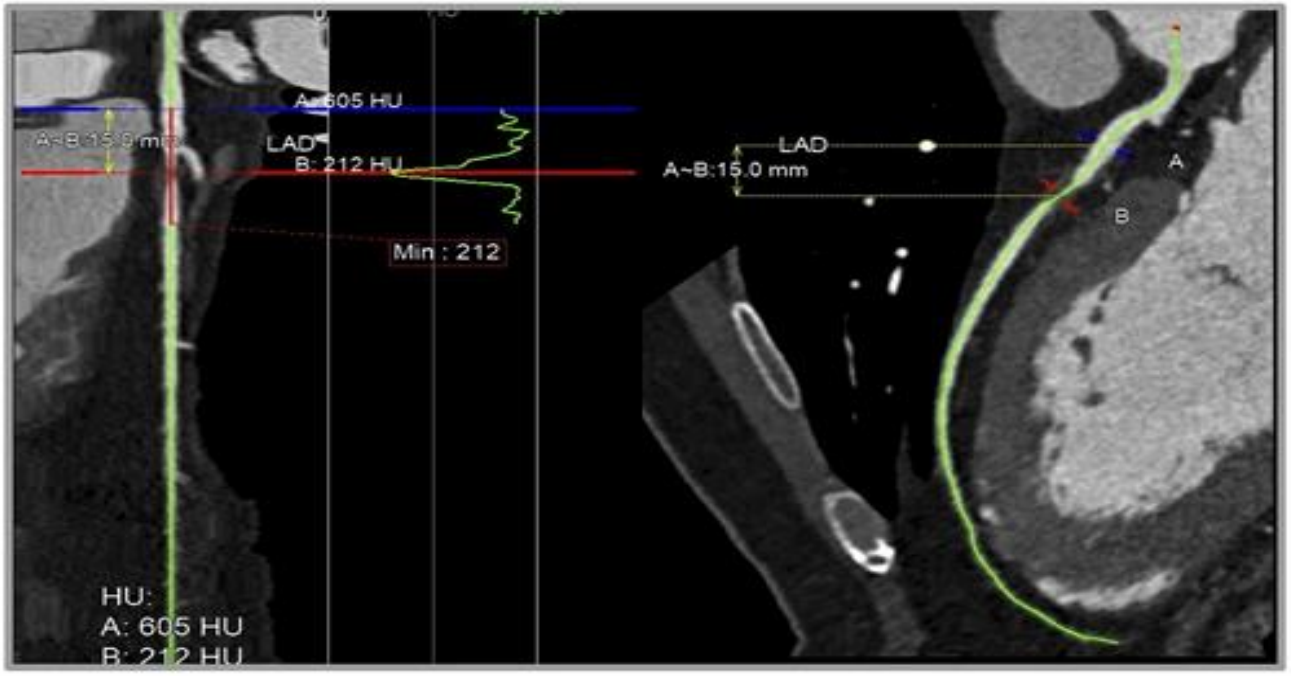
Napkin-ring sign



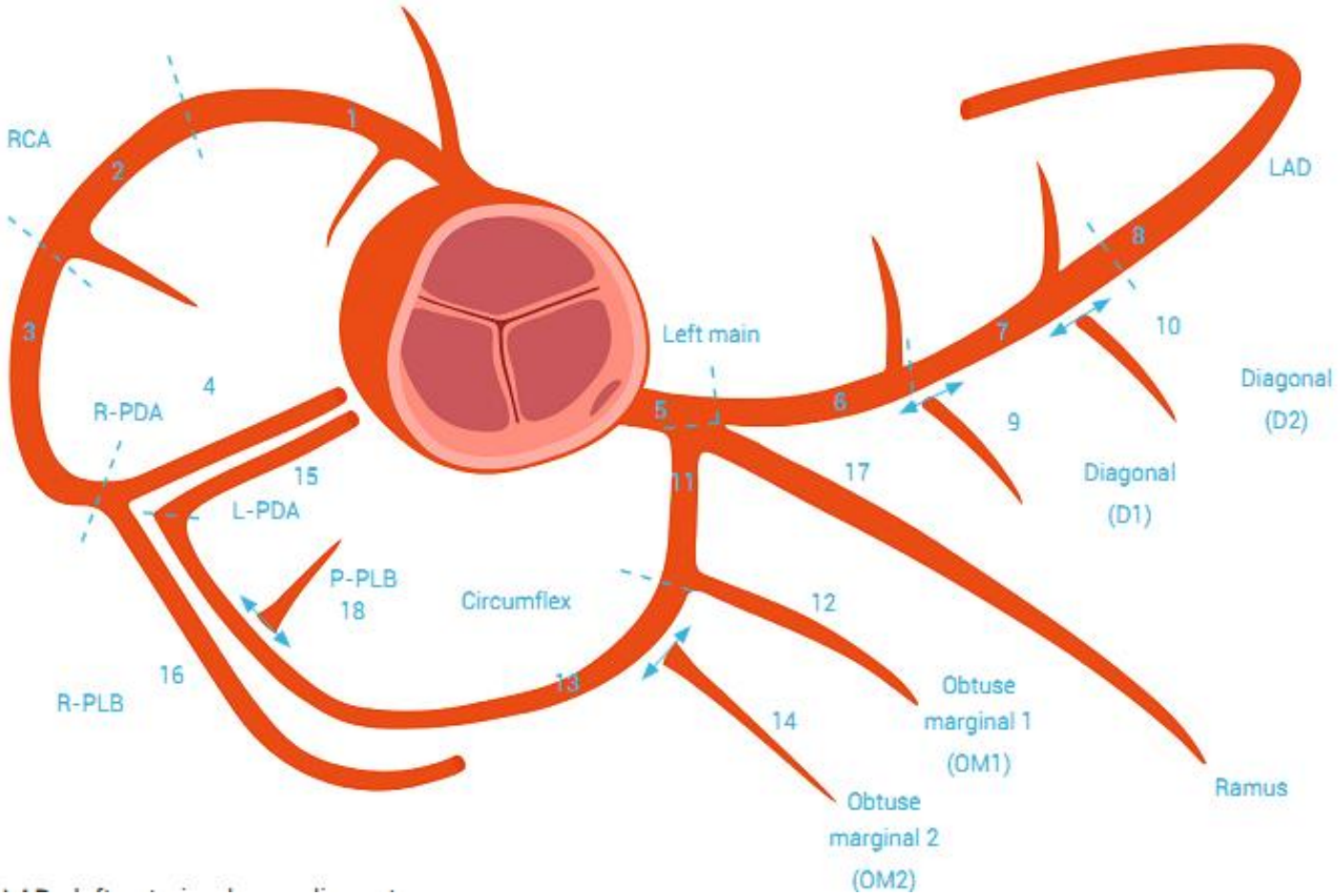
Multiple plaque types



Curved MPR—Hounsfield analysis



REPORT



SCCT 2025

CAD-RADS™ 2.0 - 2022 Coronary Artery Disease-Reporting and Data System: An Expert Consensus Document of the Society of Cardiovascular Computed Tomography (SCCT), the American College of Cardiology (ACC), the American College of Radiology (ACR), and the North America Society of Cardiovascular Imaging (NASCI).

- **Phân độ CAD-RADS** (Coronary Artery Disease – Reporting and Data System) — hệ thống chuẩn hoá báo cáo và dữ liệu cho chụp CT mạch vành (CCTA)
- **CAD-RADS 2.0 (2022)**, hiện là phiên bản cập nhật được sử dụng rộng rãi trong lâm sàng và nghiên cứu:

https://pubmed.ncbi.nlm.nih.gov/36339062/

Bảng phân độ CAD-RADS 2.0

CAD-RADS	Mức độ hẹp ĐMV	Ý nghĩa / Hướng xử trí
0	0%	Không bệnh mạch vành
1	1–24%	Hẹp tối thiểu – kiểm soát yếu tố nguy cơ
2	25–49%	Hẹp nhẹ – theo dõi, điều trị nội khoa
3	50–69%	Hẹp vừa – cân nhắc đánh giá chức năng
4A	70–99%	Hẹp nặng – cân nhắc can thiệp
4B / 5	Thân chung / tắc hoàn toàn	Nguy cơ cao – can thiệp/tái tưới máu

Phân Độ CAD-RADs

- Phiên bản mới nhất được sử dụng là **CAD-RADS 2.0 (2022)**
- Phân độ từ **0 đến 5** dựa trên mức độ hẹp (0 = không bệnh, 5 = tắc hoàn toàn)
- Có **modifiers** đánh giá tổng mảng xơ vữa (**P1–P4**), thiếu máu (**I**), và các trường hợp ngoại lệ (**E**).
- Giúp **hướng dẫn đánh giá chức năng, quản lý nguy cơ và quyết định can thiệp** sau CCTA.

Where? Ideal location

Who? Ideal operator

When? Ideal time

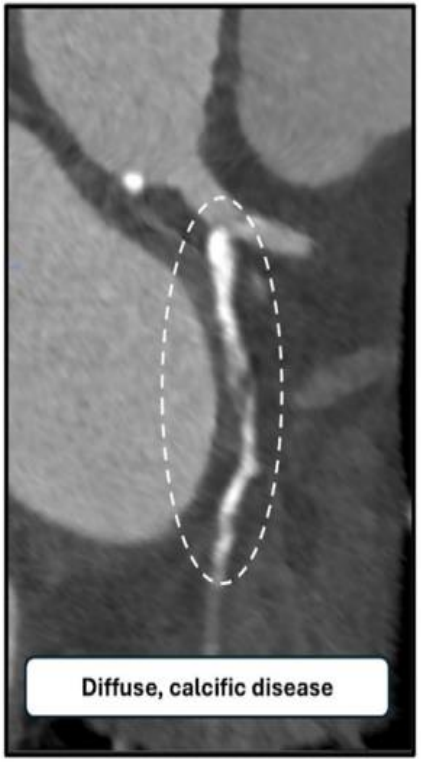
What? Ideal equipment

Where?
- Accessible PCI center

Who?
- Available interventional cardiologist (IC)

When?
- Available time

What?
- Standard PCI equipment

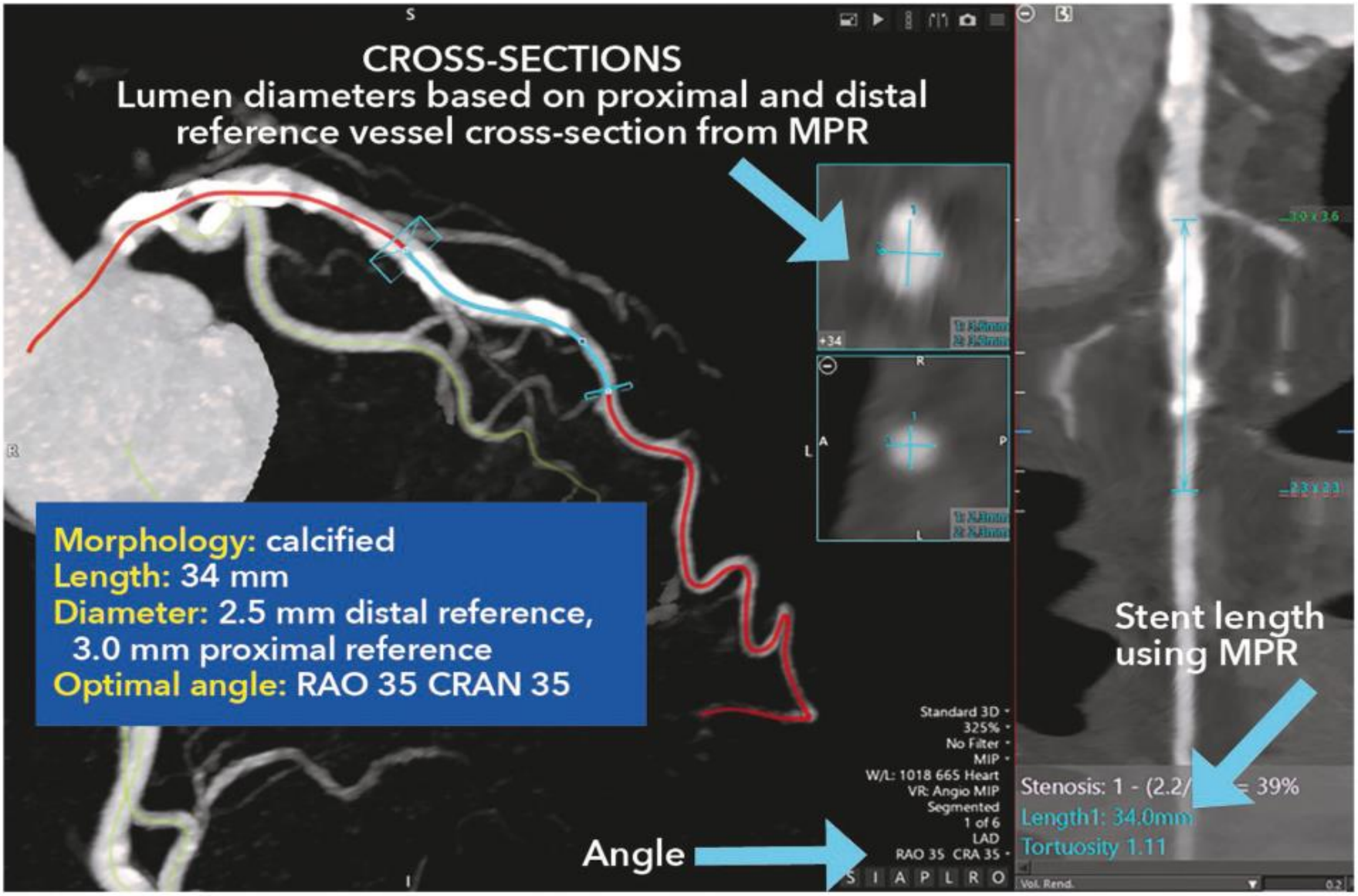


Where?
- Complex PCI center

Who?
- Complex PCI operator

When?
- Allocated time

What?
- Complex PCI equipment


CROSS-SECTIONS
Lumen diameters based on proximal and distal reference vessel cross-section from MPR
Morphology: calcified
Length: 34 mm
Diameter: 2.5 mm distal reference,
3.0 mm proximal reference
Optimal angle: RAO 35 CRAN 35
Angle
Stent length using MPR
Stenosis: 1 - (2.2/ = 39%
Length1: 34.0mm
Tortuosity 1.11
Standard 3D
325%
No Filter
MIP
W/L: 1018 665 Heart
VR: Angio MIP
Segmented
1 of 6
LAD
RAO 35 CRA 35
S I A P L R O
Vol. Rend.

KẾT LUẬN

- Yếu tố kỹ thuật chụp
- Phân tích hình ảnh
- Xác định mức độ hẹp và đánh giá tổn thương nguy cơ cao
- Góp phần phân tầng nguy cơ. Hỗ trợ đánh giá, lên phương án can thiệp mạch vành

XIN CHÂN THÀNH CẢM ƠN

QUÝ ĐỒNG NGHIỆP