

Atherosclerotic Plaque Characterization by Coronary CT: Relation to Ischemia

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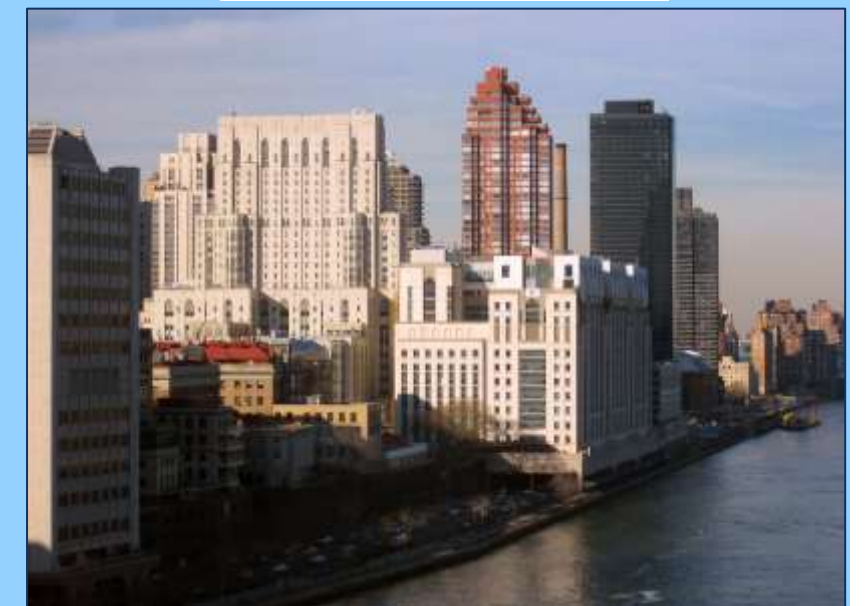
Director, Dario Institute of Cardiovascular Imaging

NewYork-Presbyterian Hospital

Director, Non-invasive Imaging

Cardiovascular Research Foundation

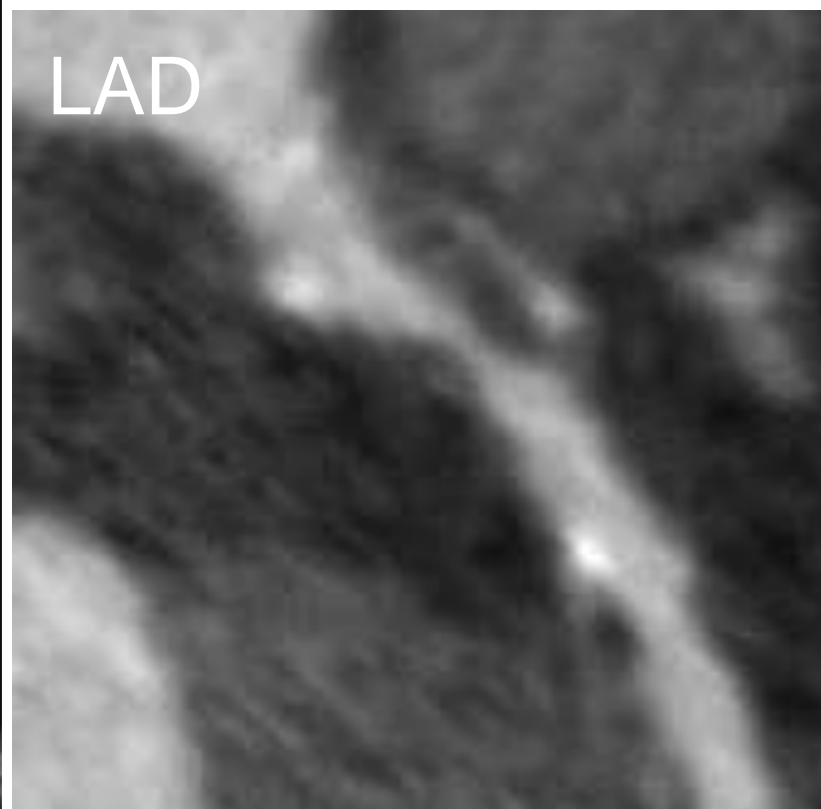
New York, New York



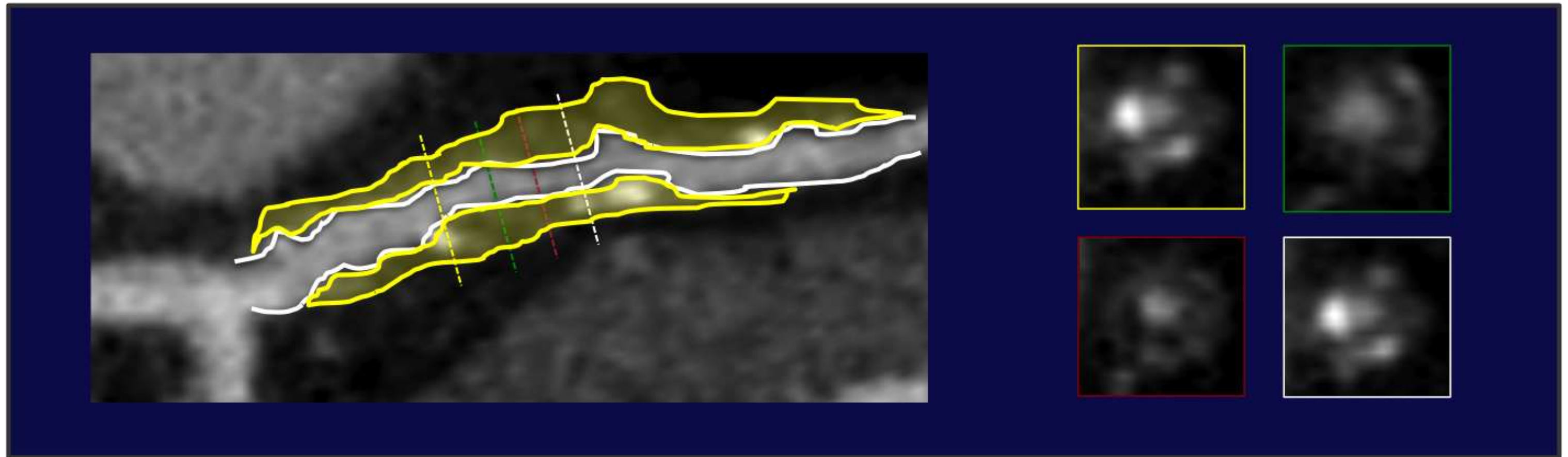
Disclosures

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- **Consultant / Medical Advisory Board:** Abbott Vascular, Arineta, Astra Zeneca, Cardiovascular Research Foundation, GE Healthcare, HeartFlow, Myokardia

What can we learn about this lesion?

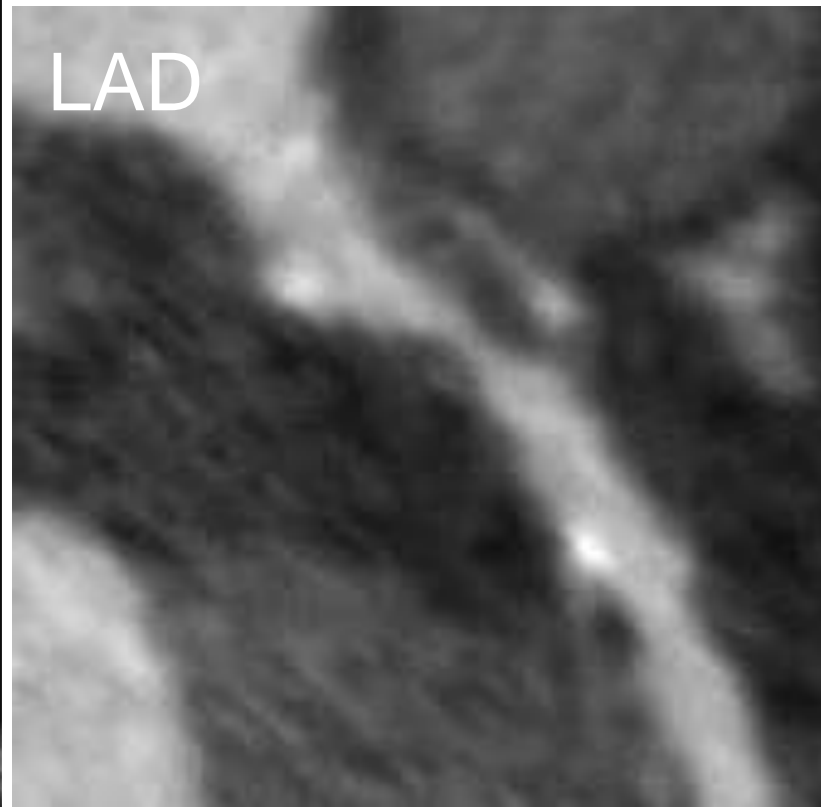


Atherosclerotic Plaque Characteristics



- Luminal narrowing (%DS, %AS, MLD, MLA)
- Location
- Plaque burden (thickness, area, volume)
- Arterial remodeling (positive, negative, intermediate)
- “Lipid dense” intraplaque core (low attenuation)
- Spotty calcification

What can we learn about this lesion?

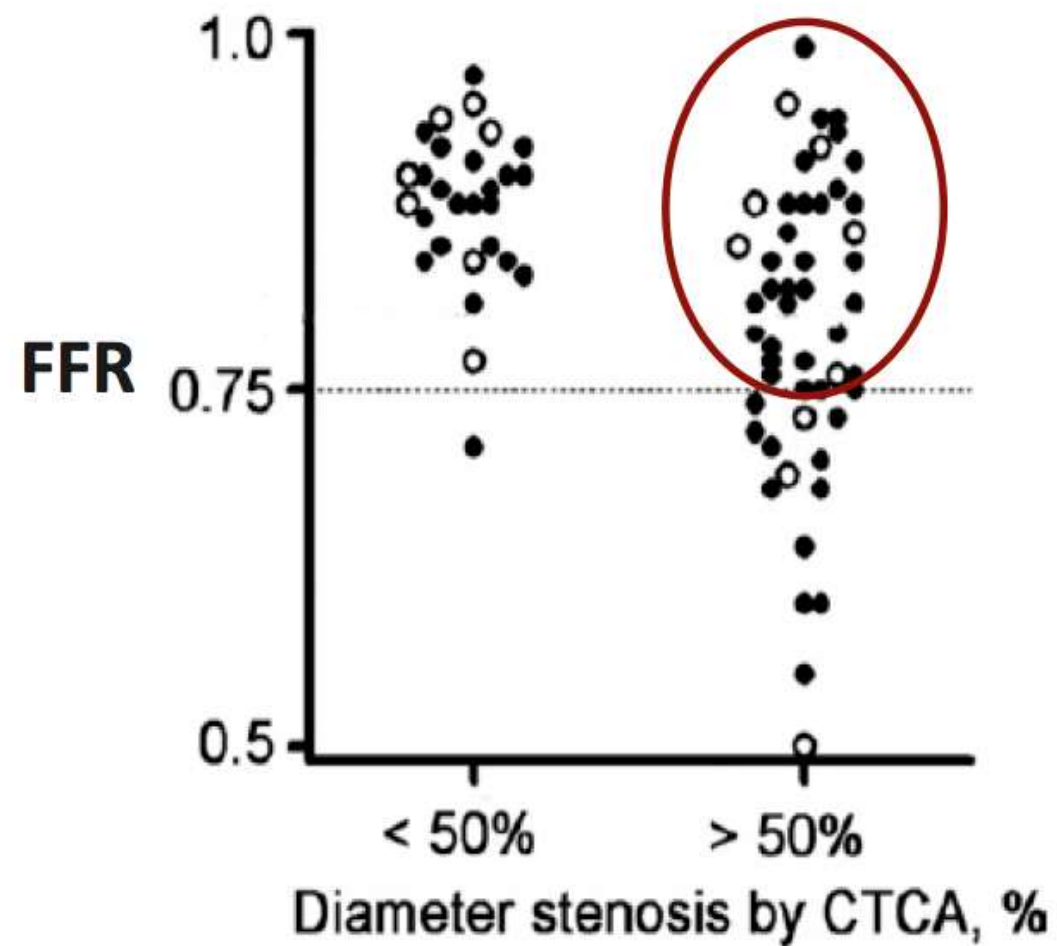


- High-grade stenosis

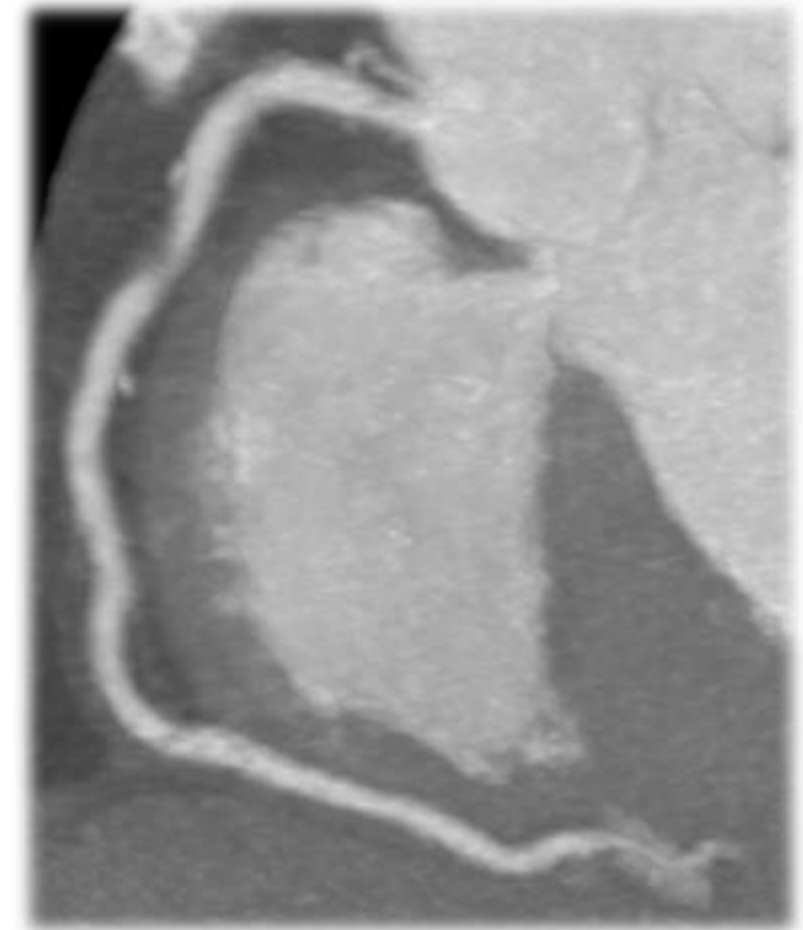
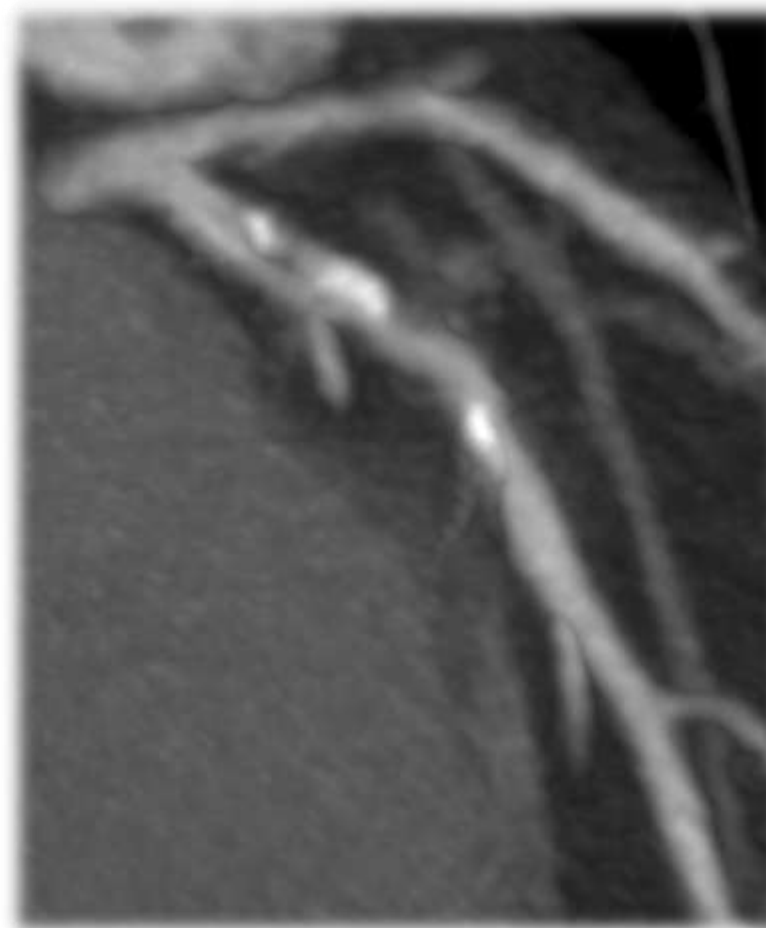
CT to Diagnosis and Exclude Lesion Ischemia

Only one of these patients has hemodynamically significant CAD.

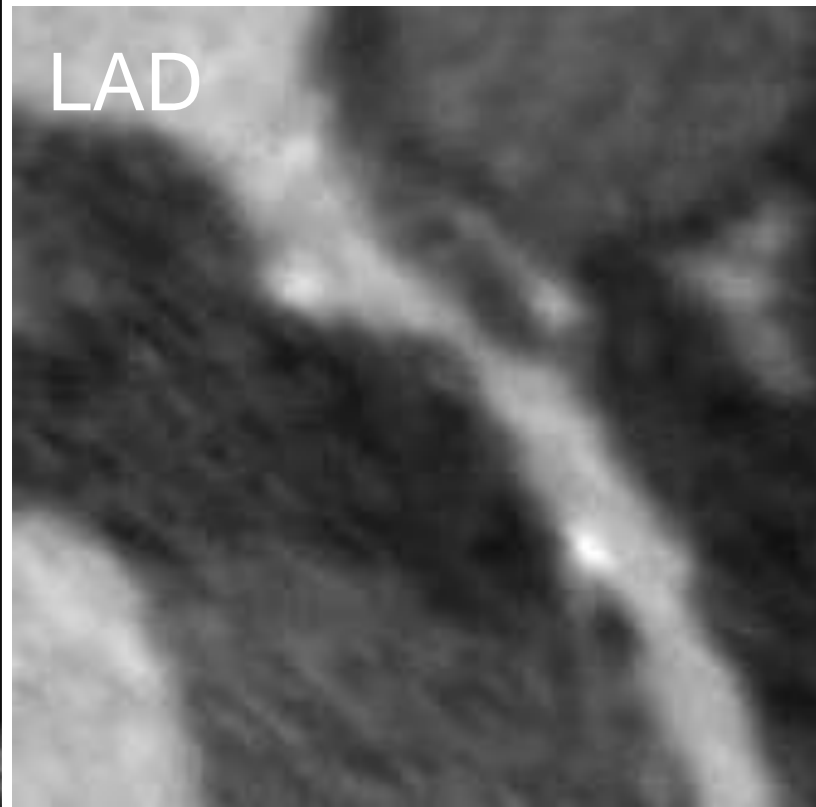
Who has ischemia?



75% false positives

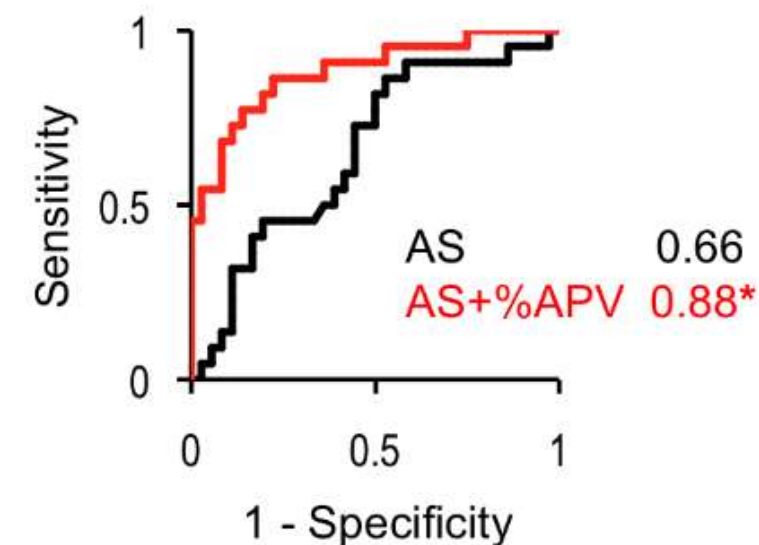
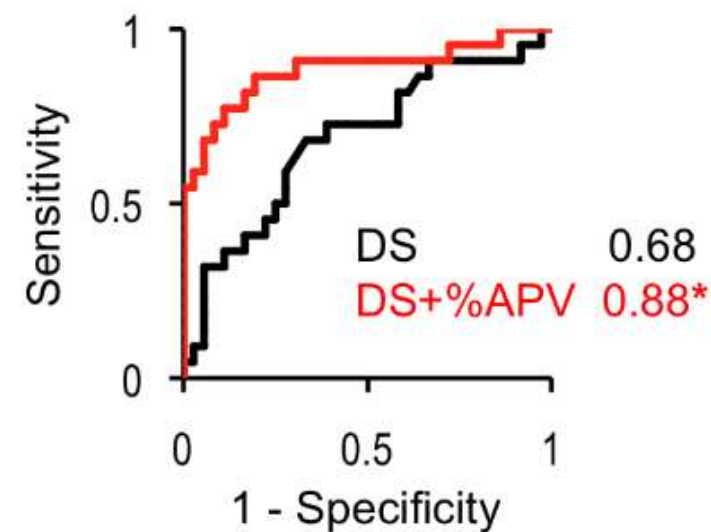
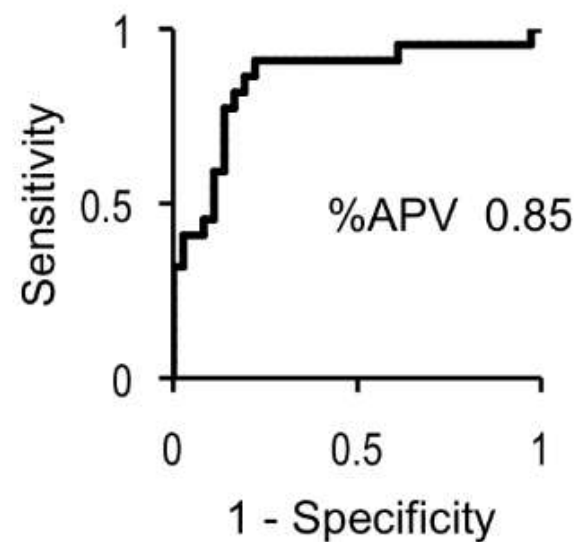
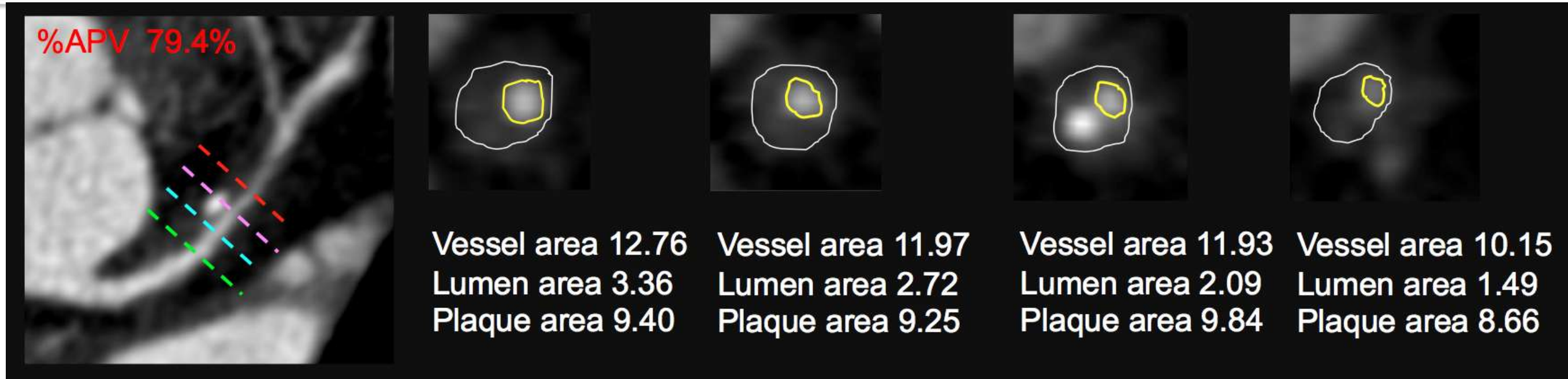


What can we learn about this lesion?

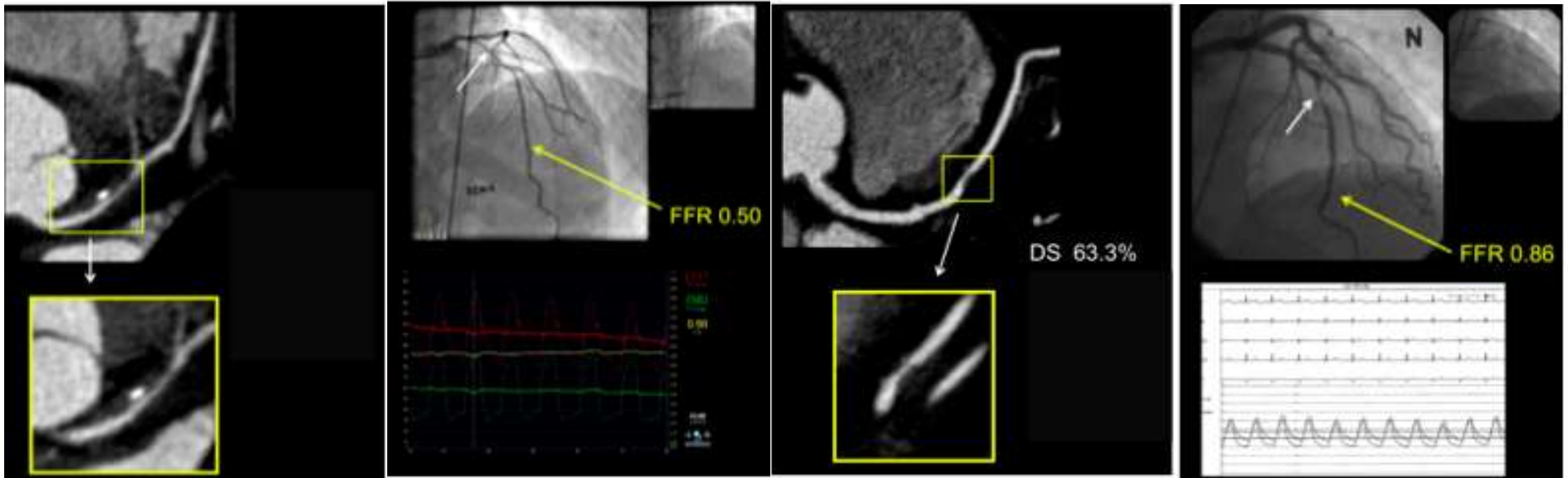


- High-grade stenosis
- Plaque Burden

% Aggregate Plaque Volume



% Aggregate Plaque Volume



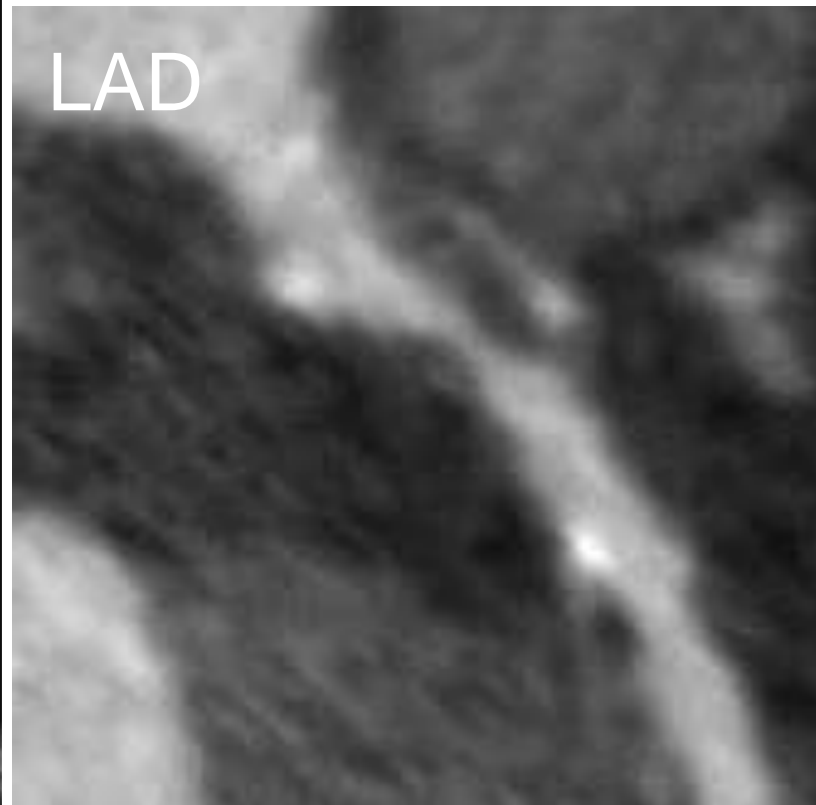
Ischemic
Lesion

DS: 55.6%
AS 59.5%
%APV 60.2%

Non-Ischemic
Lesion

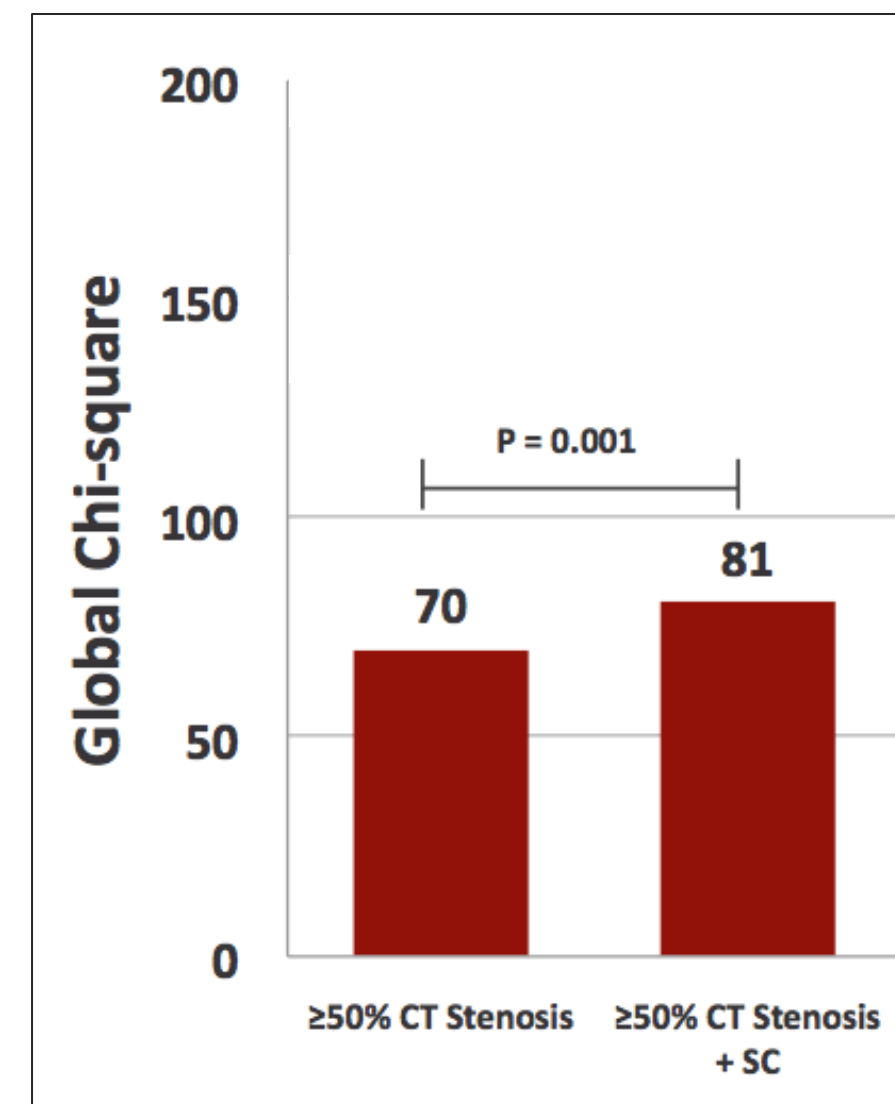
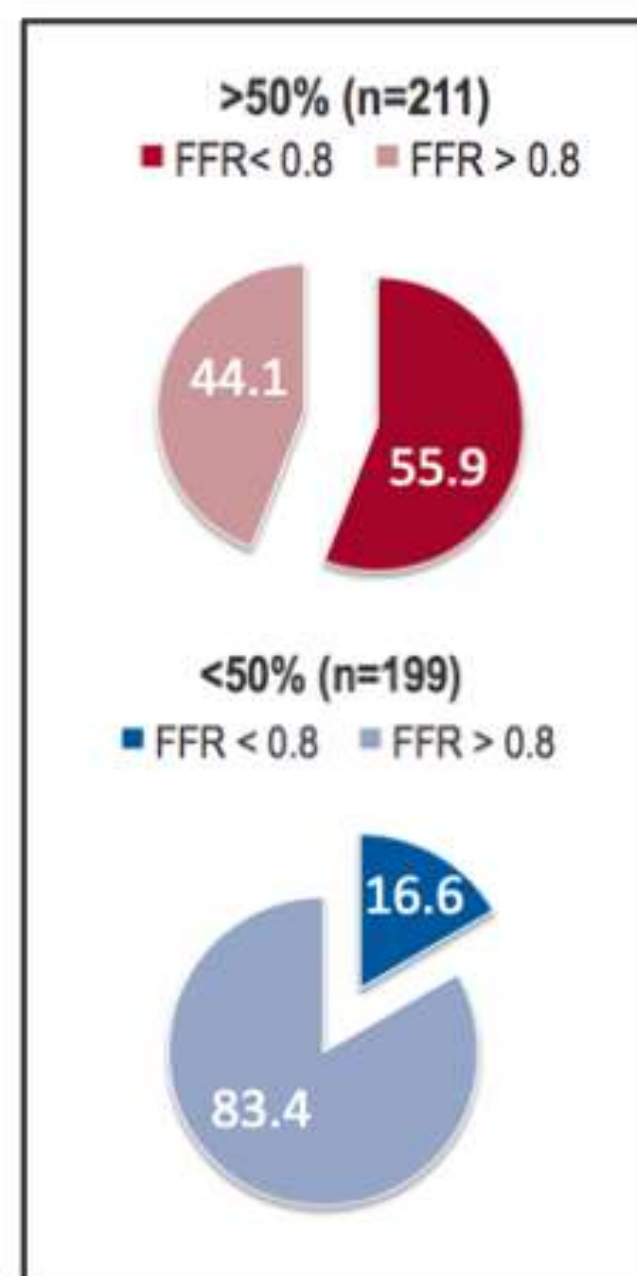
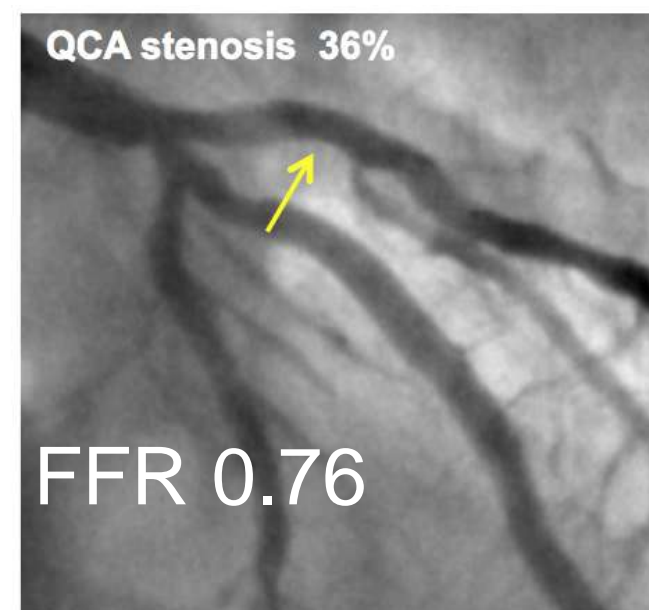
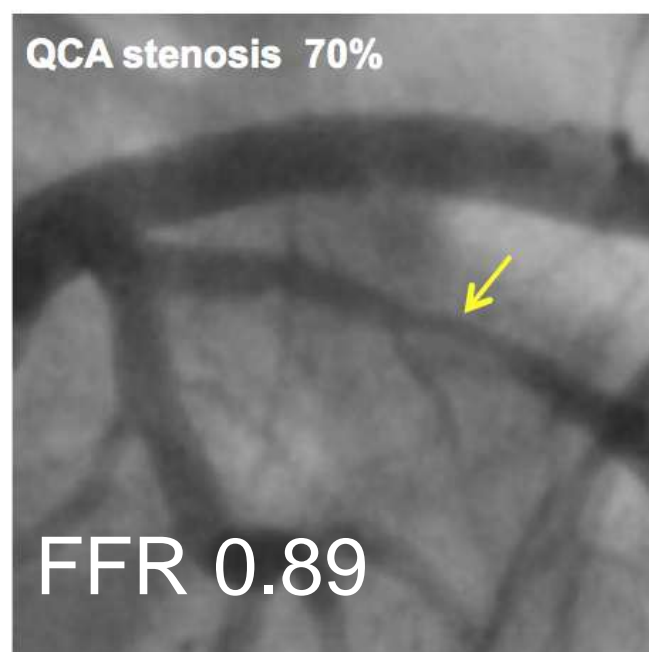
DS 63.3%
AS 72.2%
%APV 27.8%

What can we learn about this lesion?

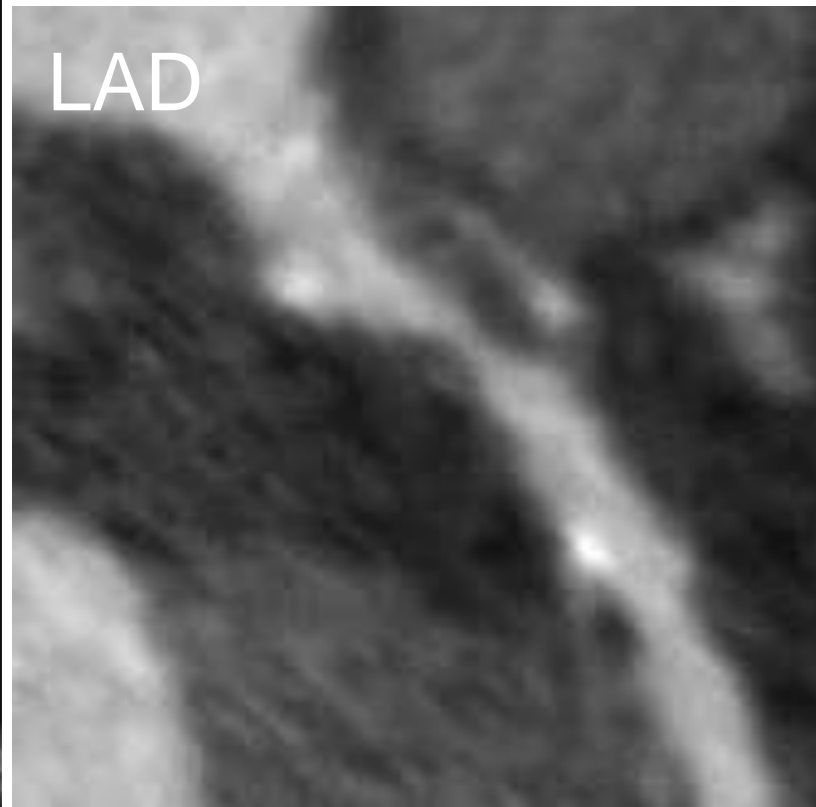


- High-grade stenosis
- Plaque Burden
- Spotty calcifications

Plaque composition: Spotty calcification

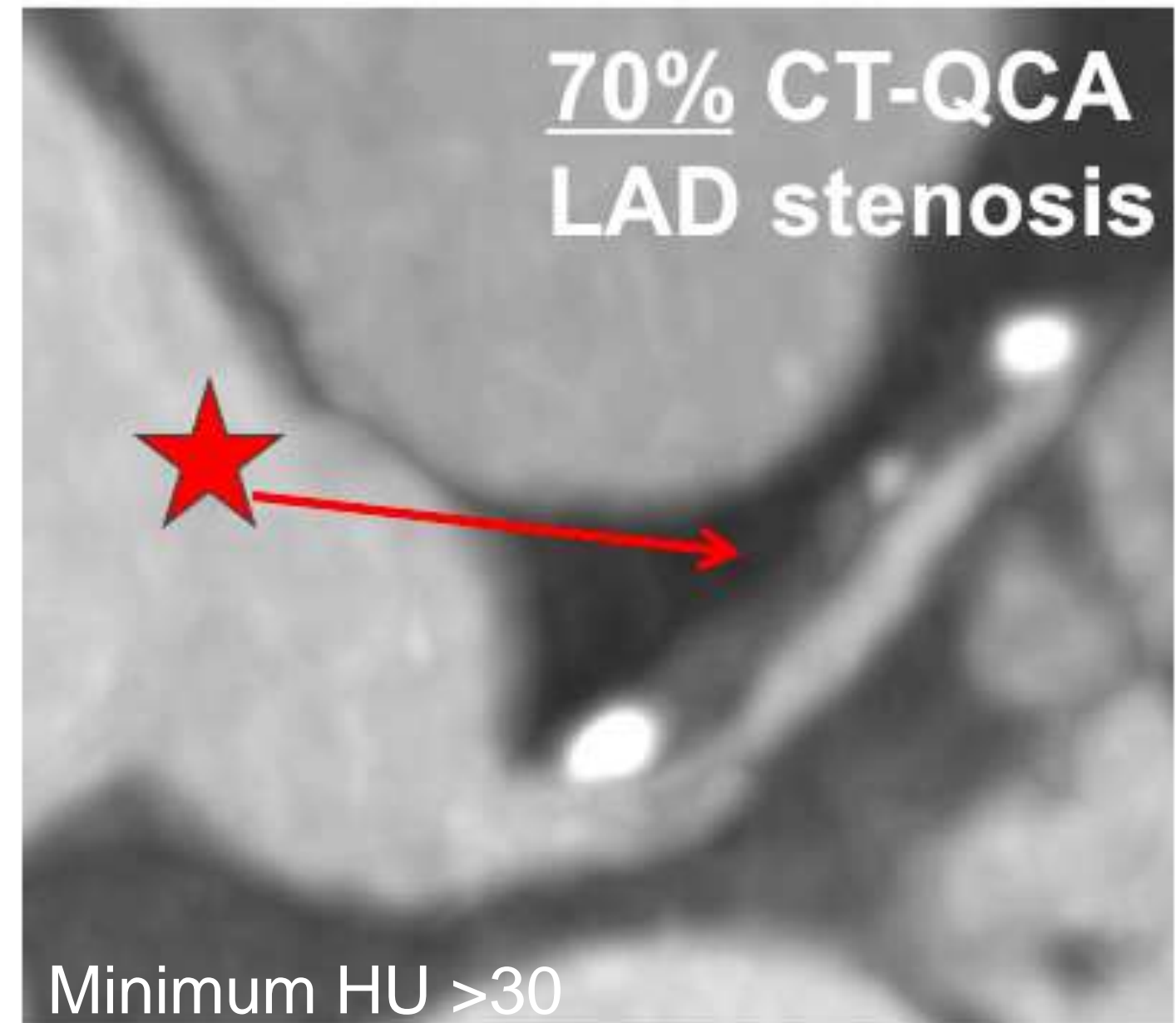
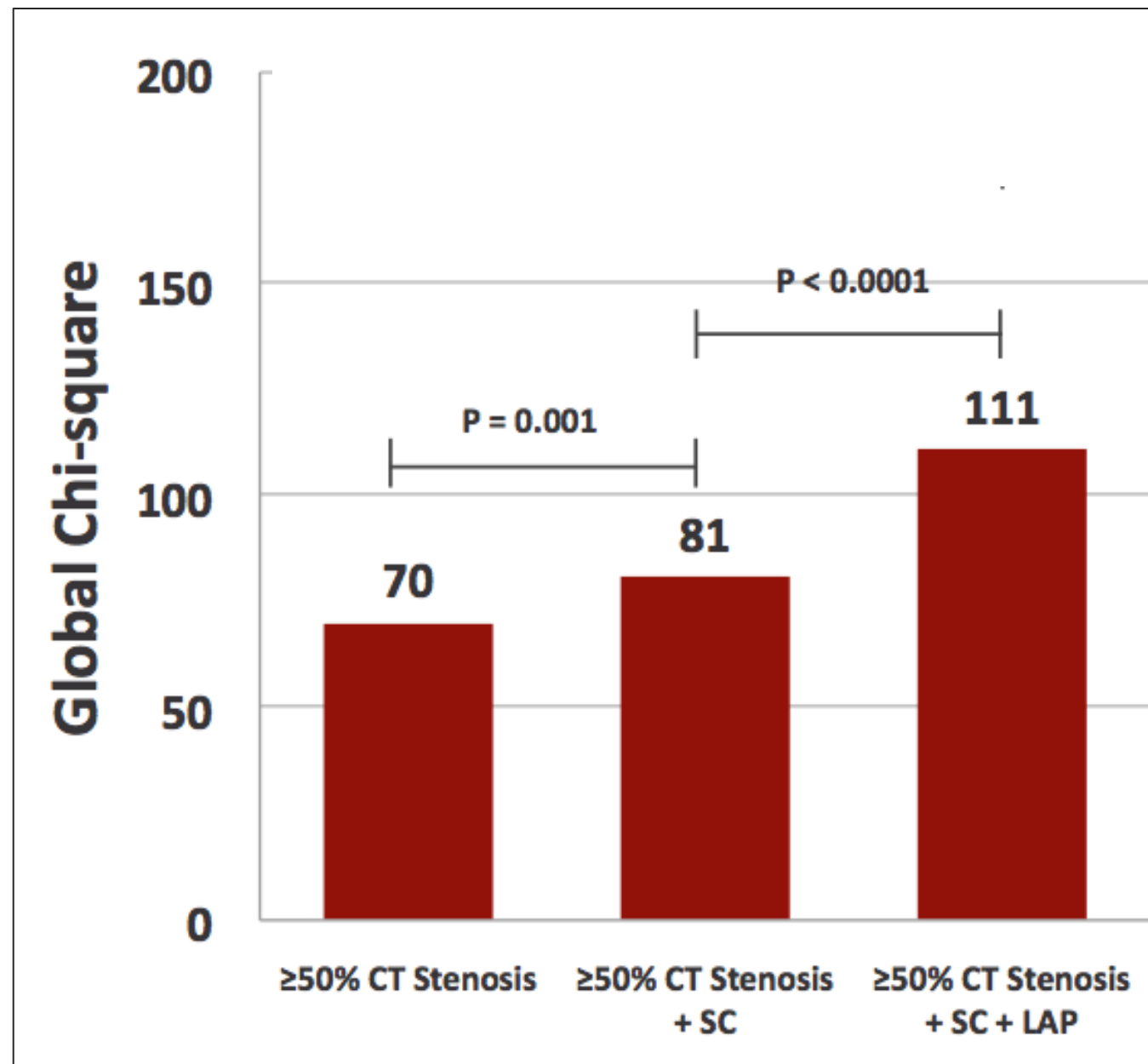


What can we learn about this lesion?



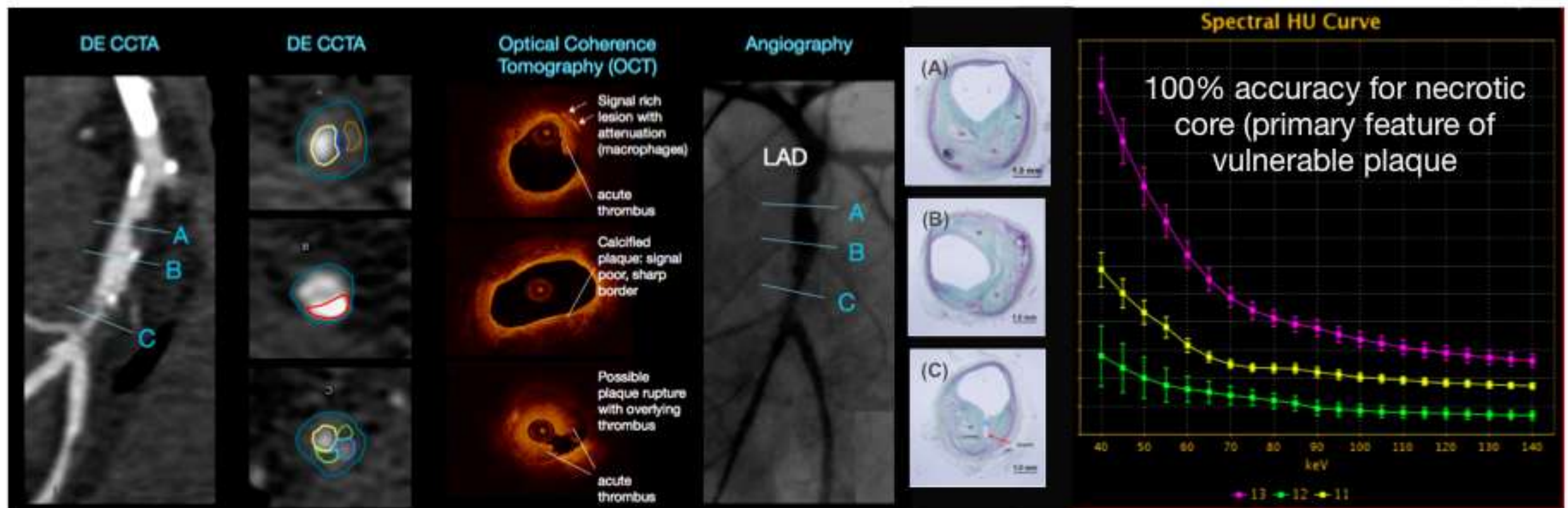
- High-grade stenosis
- Plaque Burden
- Spotty calcifications
- Necrotic core

Necrotic Intraplaque Core

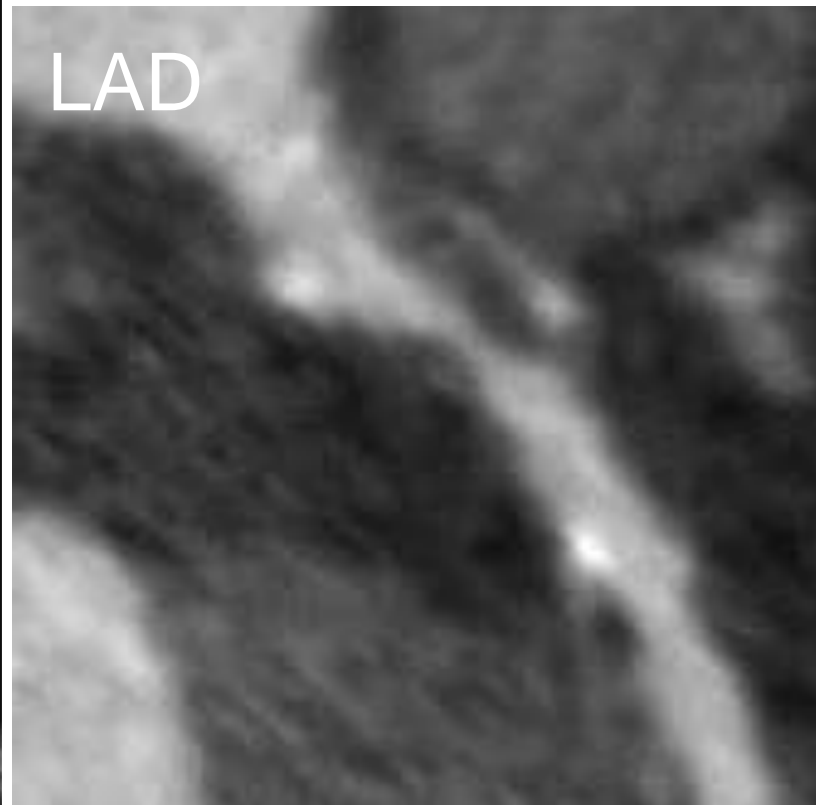


Necrotic Intraplaque Core

Dual Energy CT for Material Composition

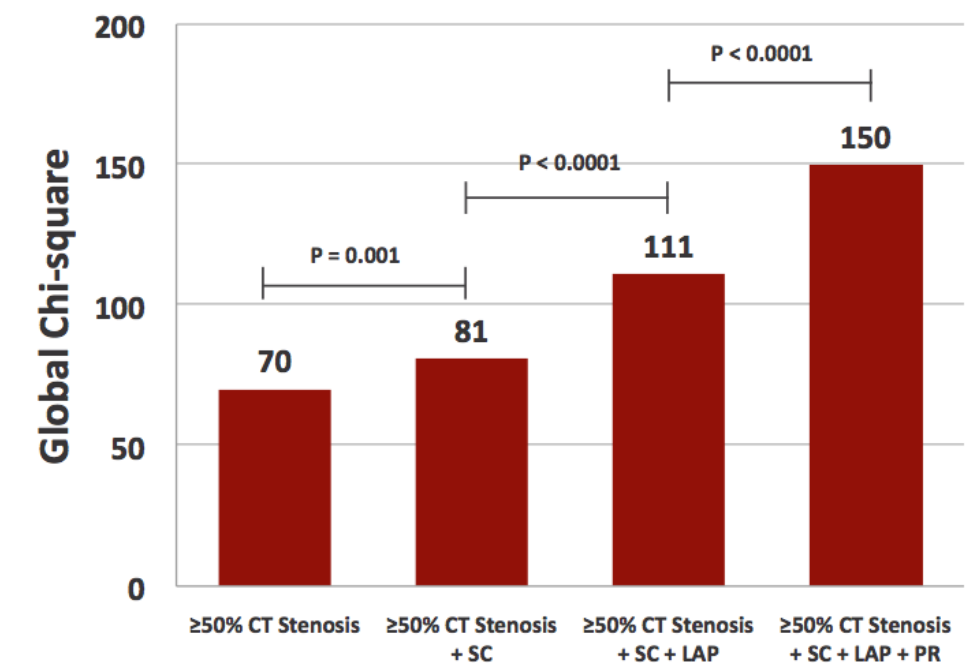
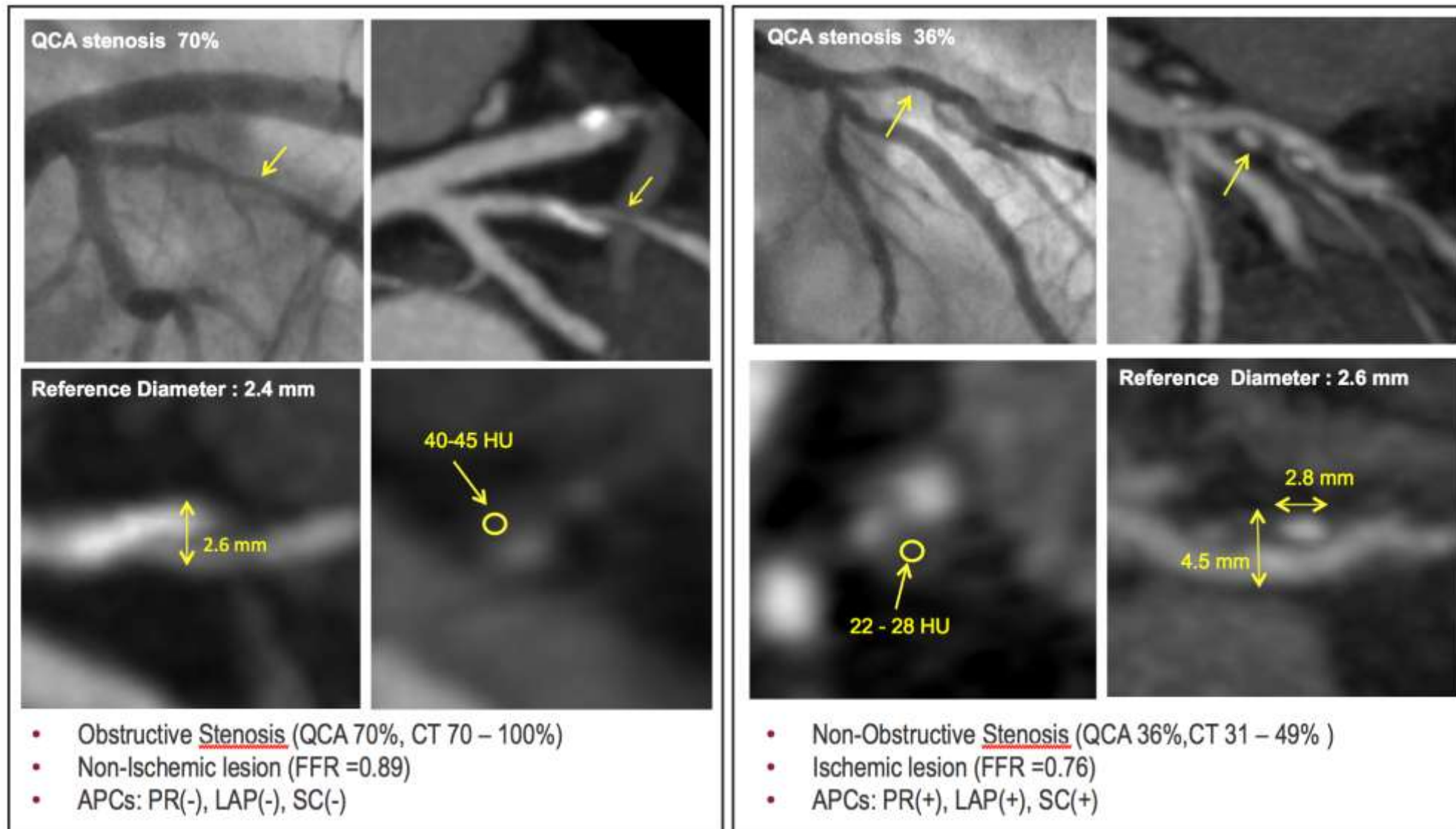


What can we learn about this lesion?

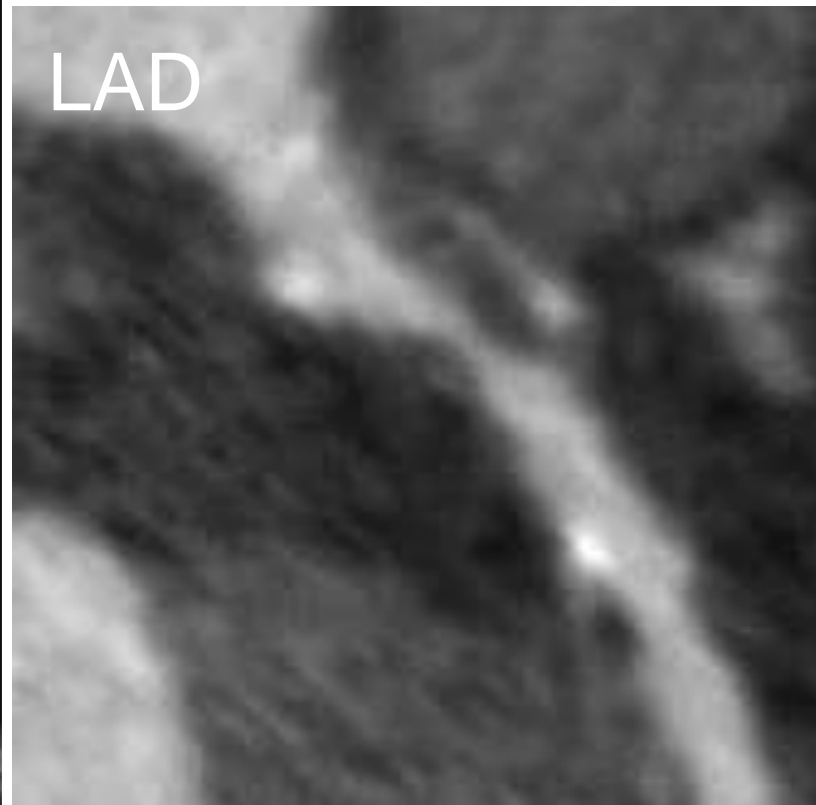


- High-grade stenosis
- Plaque Burden
- Spotty calcifications
- Necrotic core
- Positive remodeling

Positive arterial remodeling

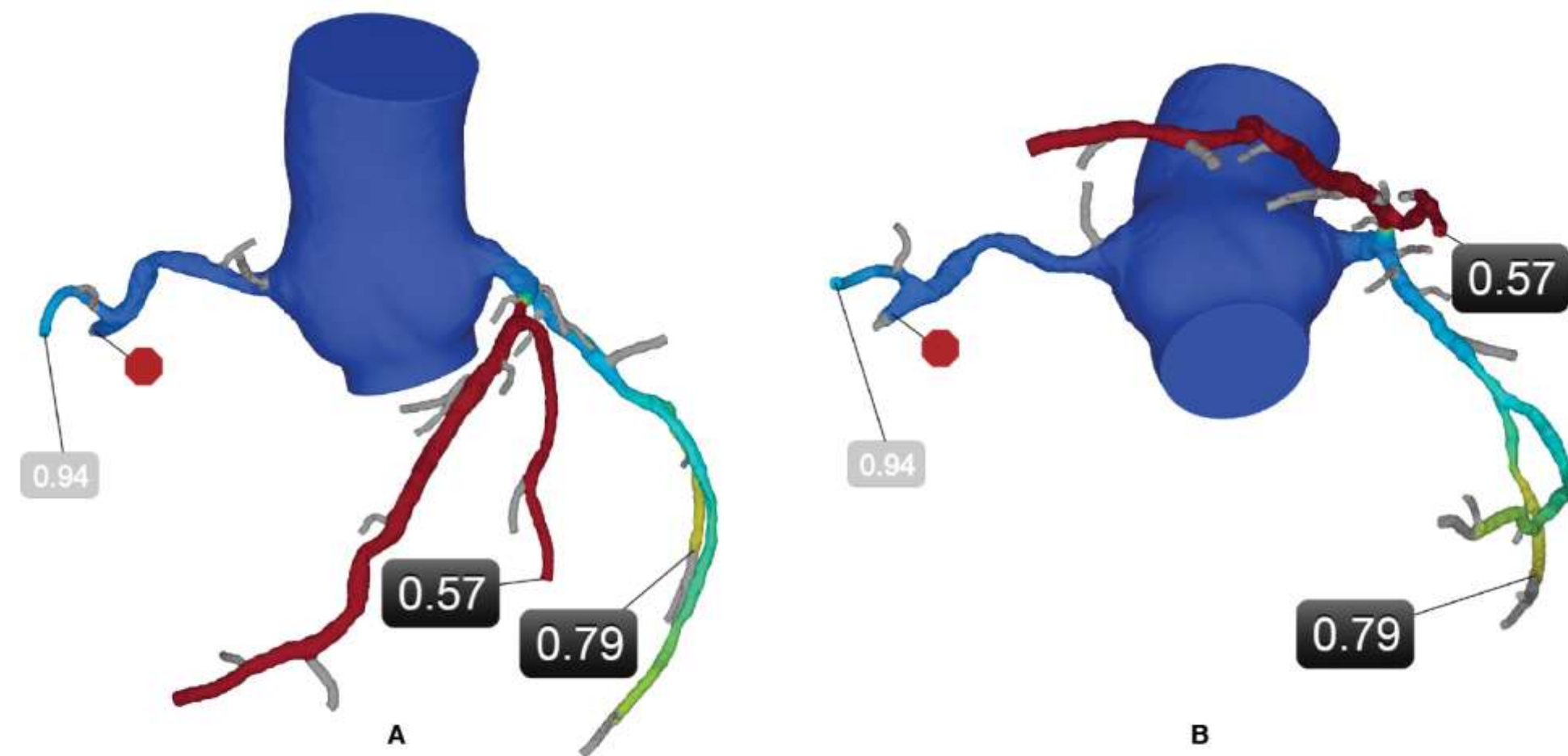


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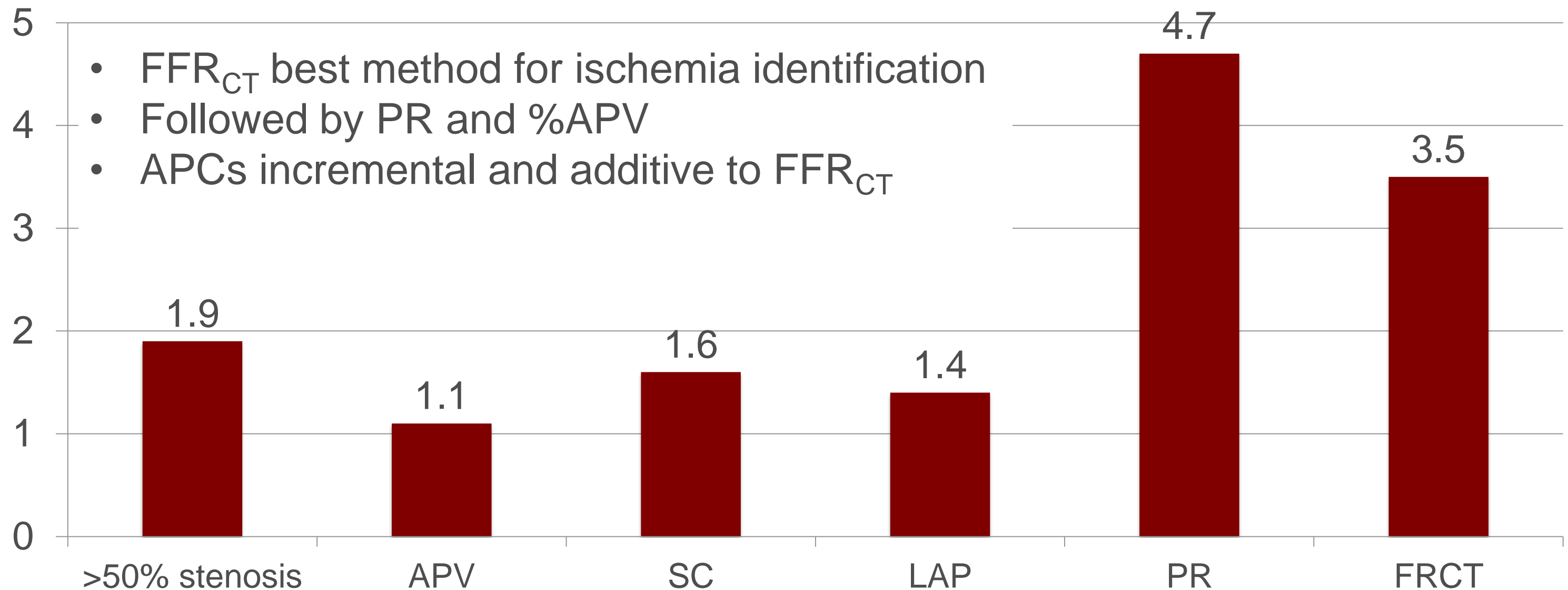
- High-grade stenosis
- Plaque Burden
- Spotty calcifications
- Necrotic core
- Positive remodeling
- FFR_{CT}

Non-invasive FFR_{CT}

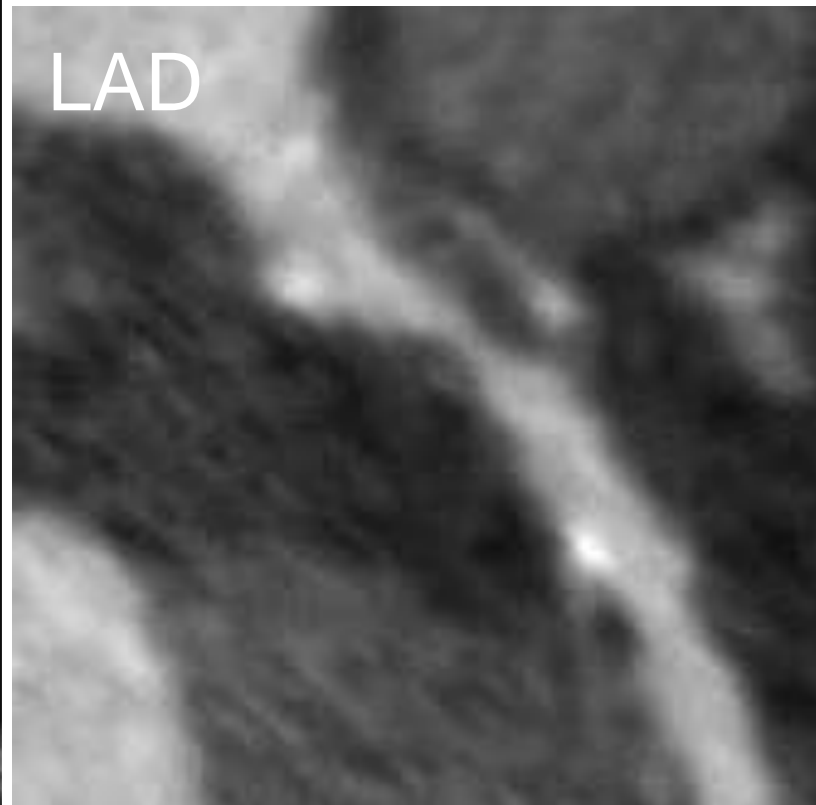


Importance of Atherosclerosis

Odds Ratio



What can we learn about this lesion?



- High-grade stenosis
- Plaque Burden
- Spotty calcifications
- Necrotic core
- Positive remodeling
- FFR_{CT}