

# Usefulness of OCT in Ambiguous Lesion Angiographic Haziness

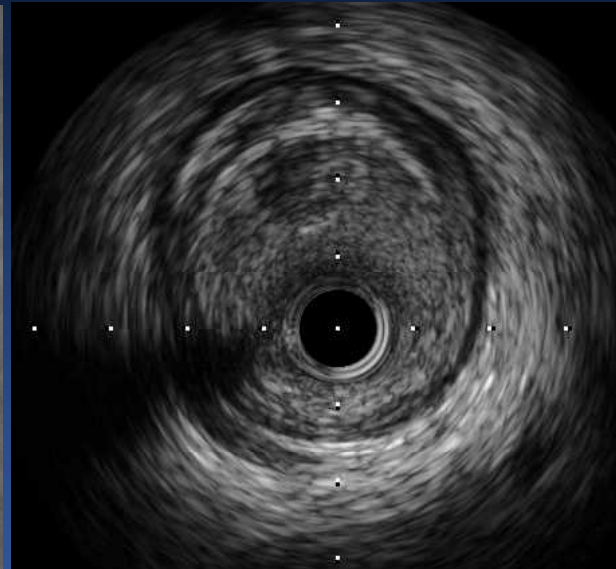
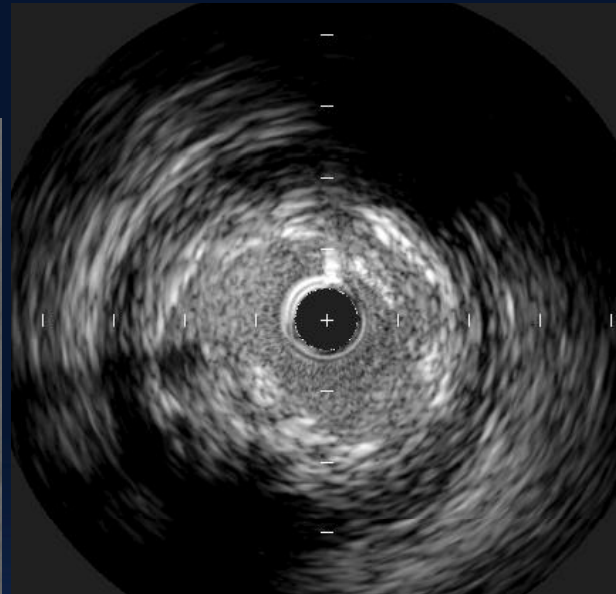
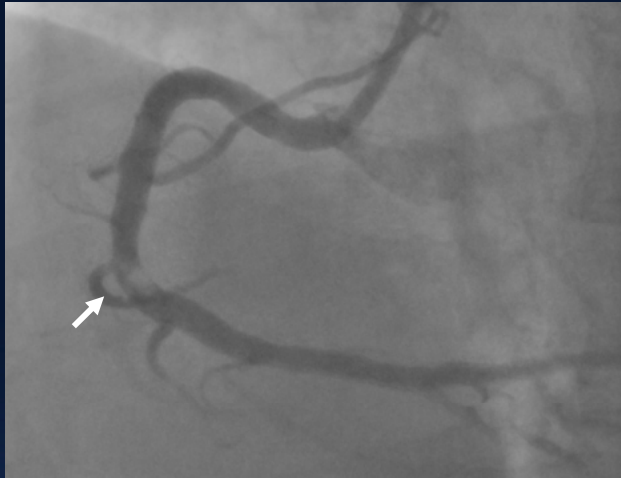
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# Disclosure

I have nothing to disclose

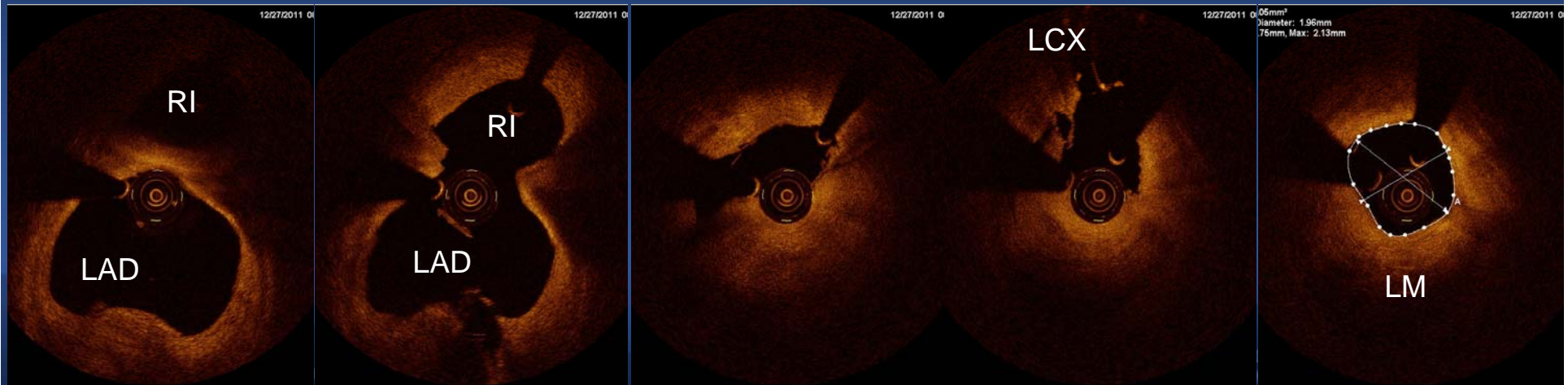
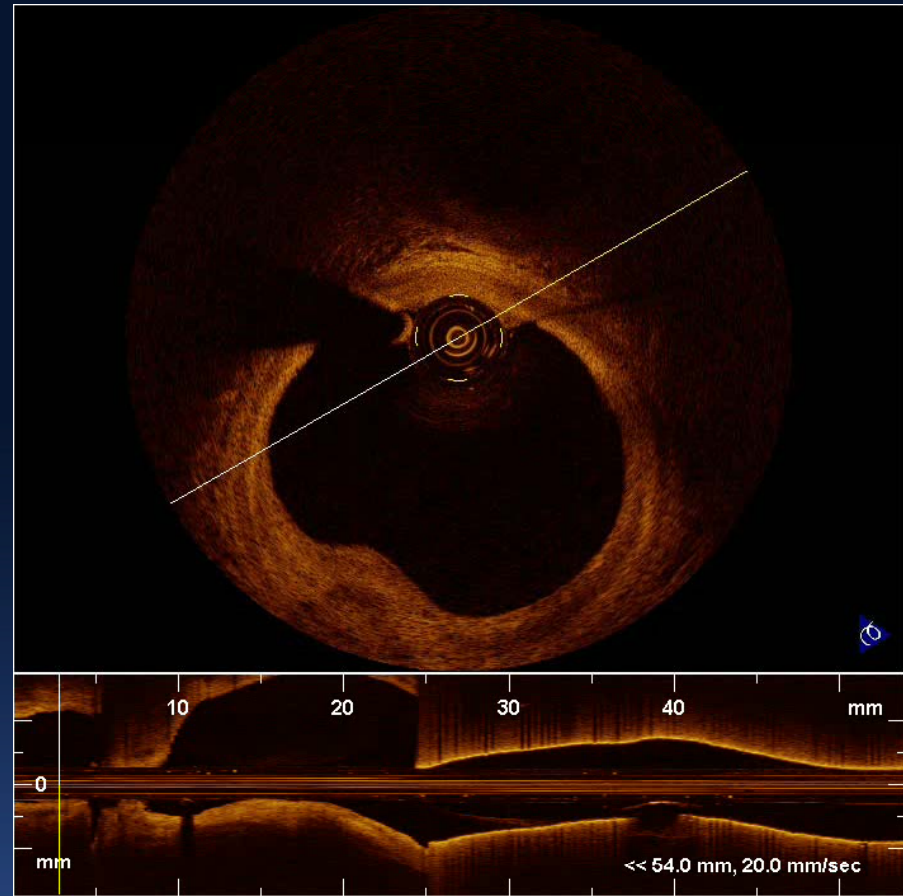
# Thrombus



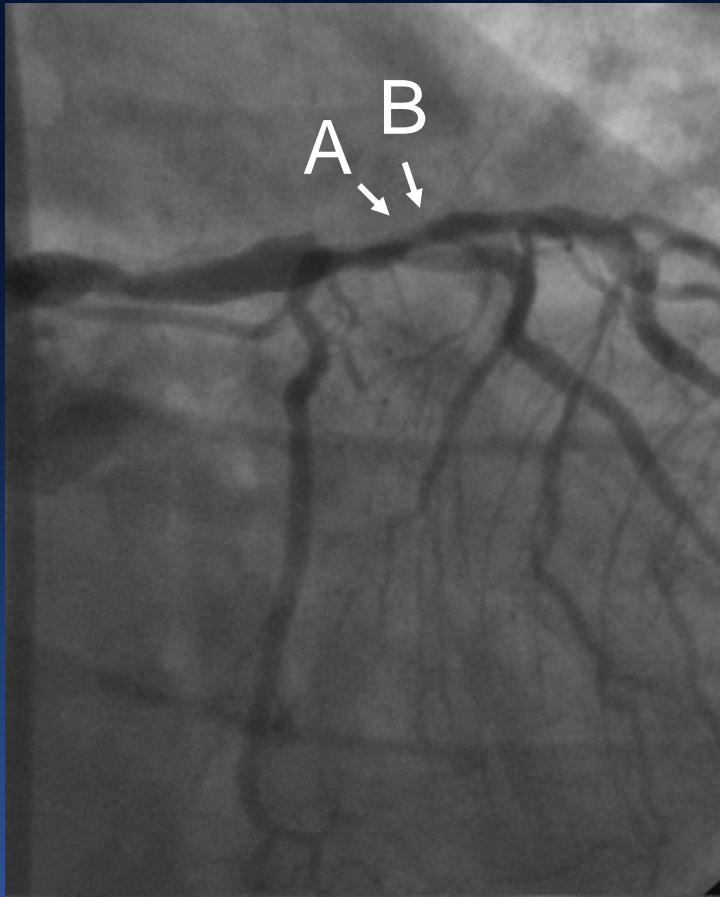
Angiographic haziness is common and often diagnosed as thrombus, but “non-specific”

# Thrombus in LM

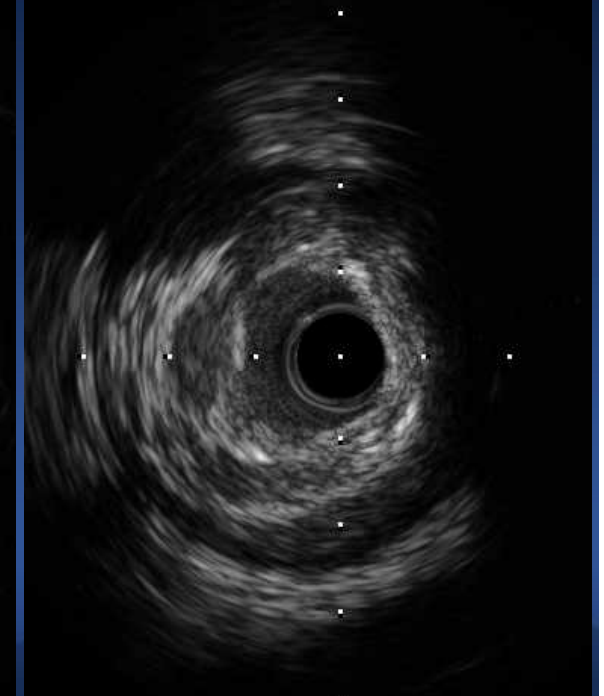
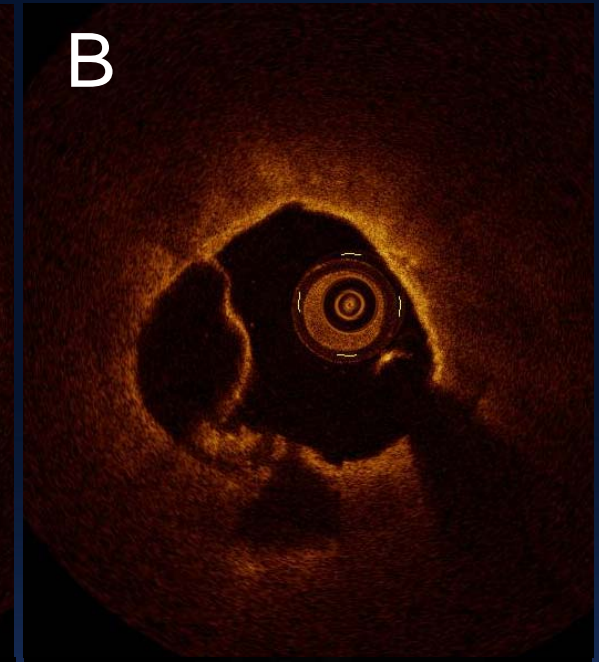
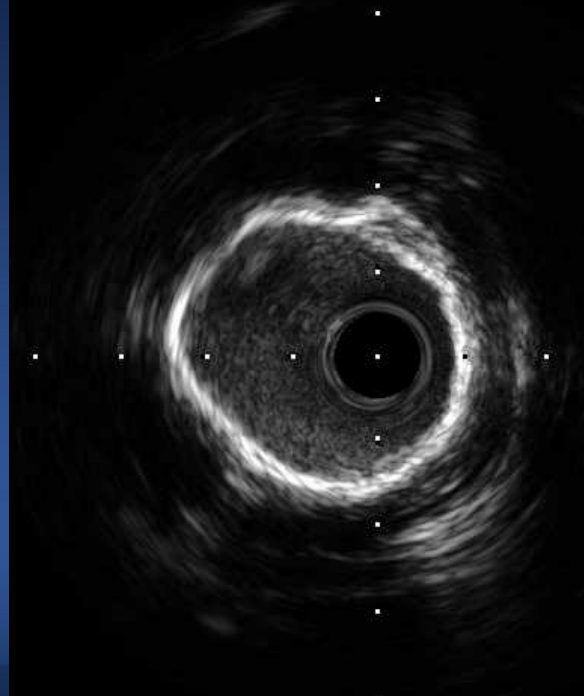
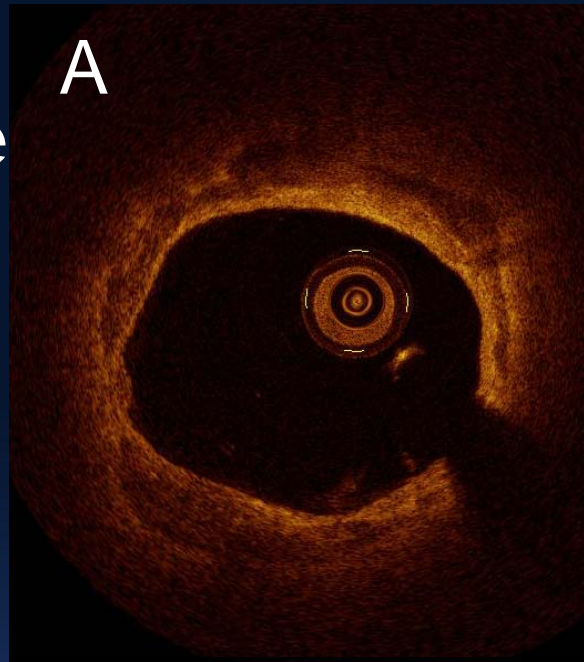
48 years/ Male, UA



# Calcification Plaque rupture



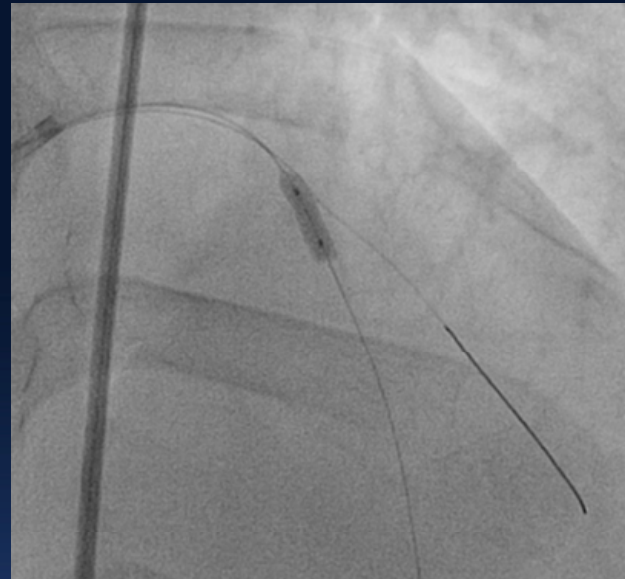
*Angiographic haziness  
does not always signify  
a fresh thrombus*



# Dissection



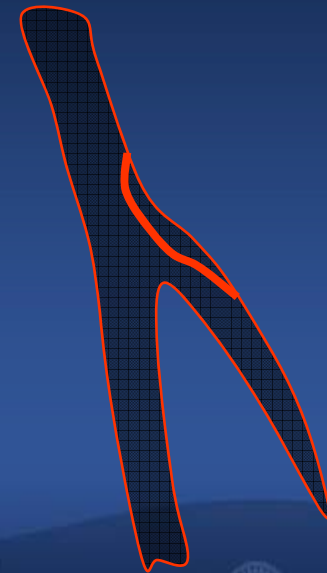
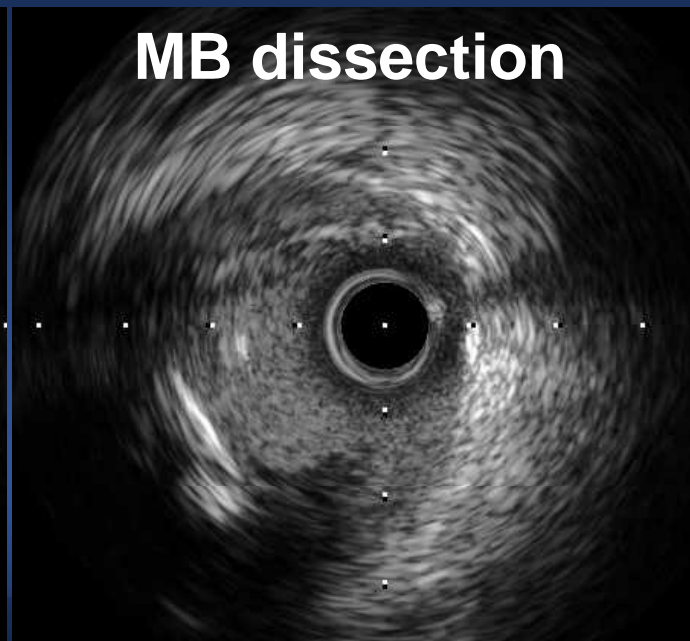
Balloon at mLAD



SB ostial dissection



MB dissection

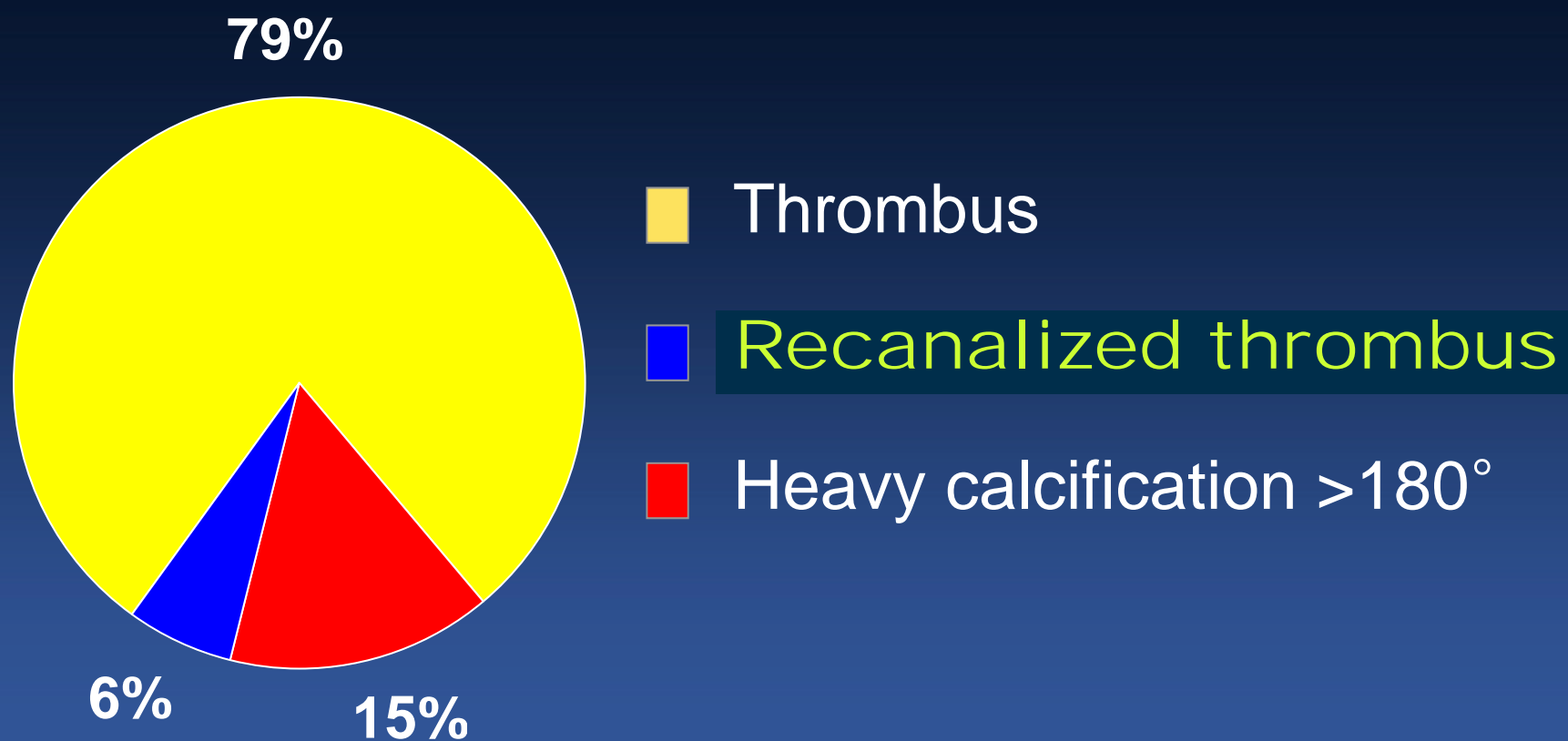


# Angiographic Haziness

OCT in 34 patients with angiographic filling defect (85% ACS)

|                      | IVUS (40MHz)                  | OCT   |
|----------------------|-------------------------------|---|
| MLA, mm <sup>2</sup> | 1.7 (1.3 – 2.8)               | 1.3 (0.9 – 2.1)   |
| Plaque rupture       | 21 (62%)                      | 19 (56%)  |
| Thrombi              | 27 (79%)                      | 32 (94%) <ul style="list-style-type: none"><li>▪ Red 8 (24%)</li><li>▪ White 7 (20%)</li><li>▪ Mixed 17 (50%)</li></ul> |
| Arc of calcium >180° | 9 (27%)                       | 6 (18%)   |
| Plaque type          | Attenuated plaque<br>27 (79%) | TCFA 17 (50%)   |

# OCT-defined Main Mechanisms of Angiographic Haziness





# CASE 1 55 Year-Old Female

## Chief complaint

- Chest pain

## Present illness

- Previously healthy
- 2MA Severe resting chest pain for 30 min
- Echo - Akinesia of LAD territory, EF=50%

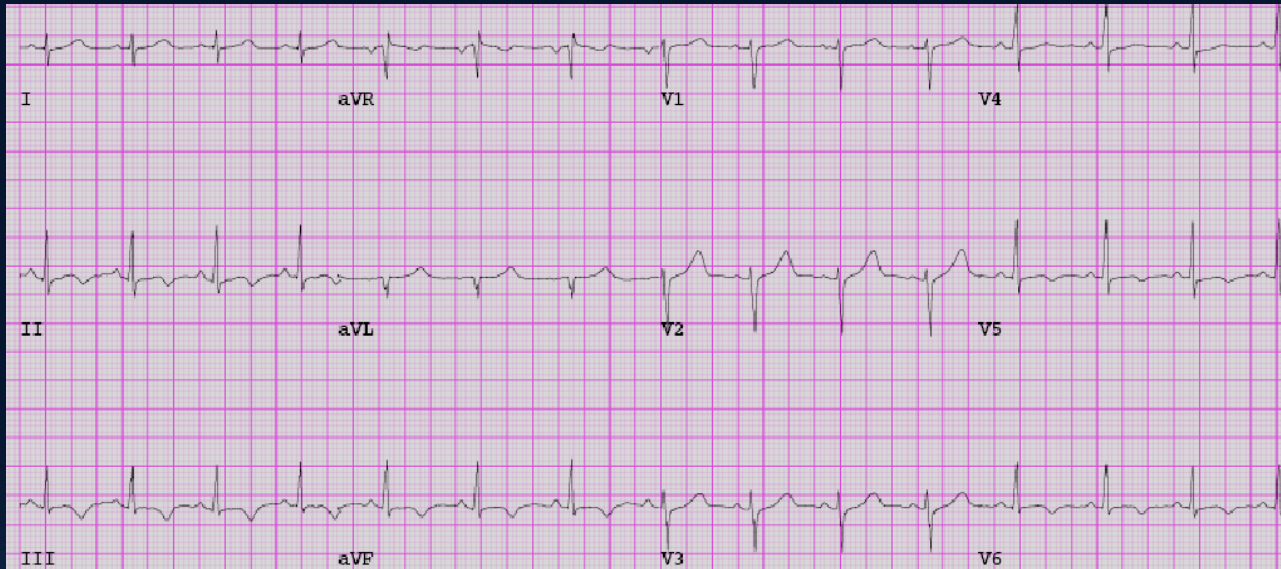
**Risk factors** None

## Past Medical History

No history of PCI or chest trauma

# EGK

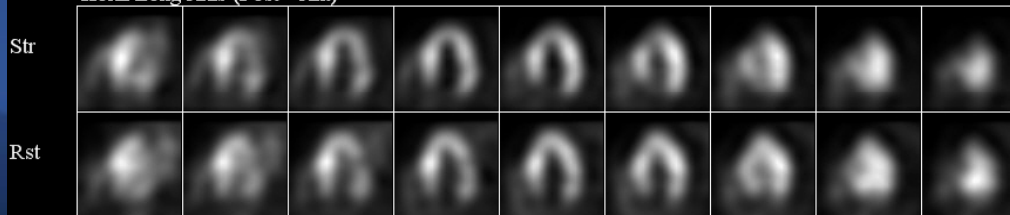
Poor R progression  
T-inversion of  
II, III, aVF, V5-6



Short Axis (Apex->Base)



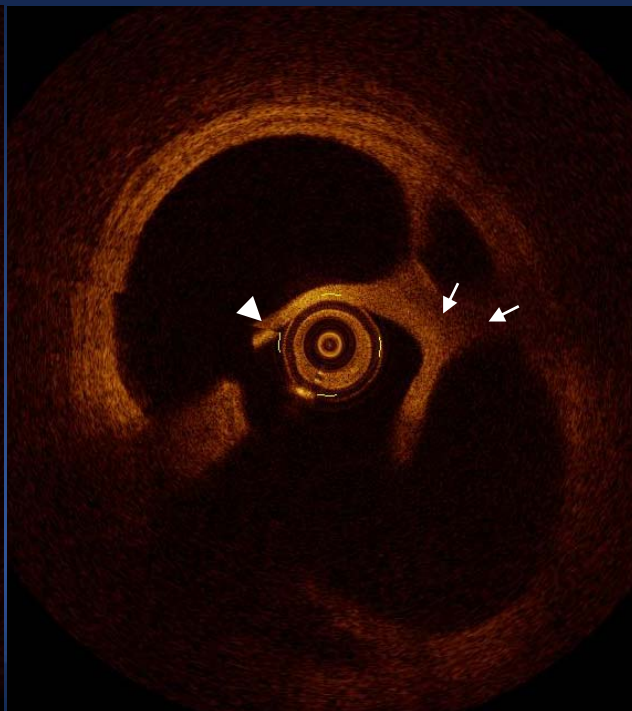
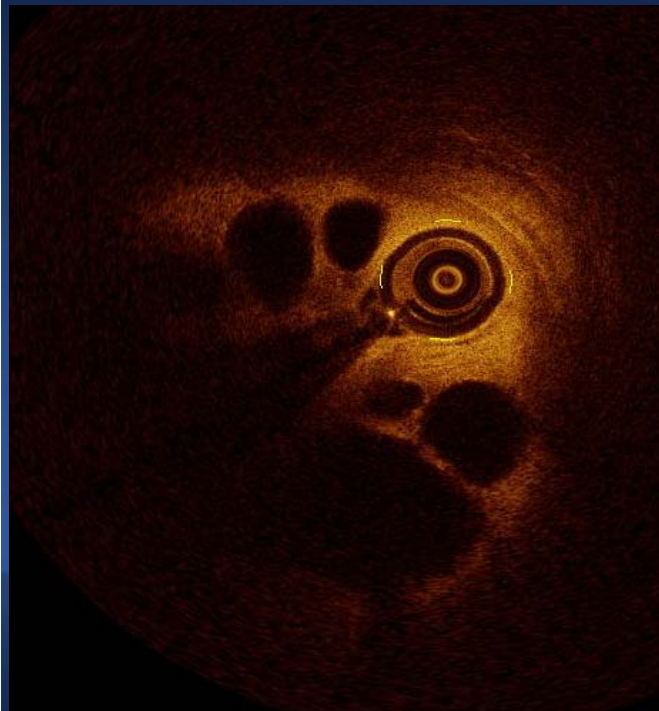
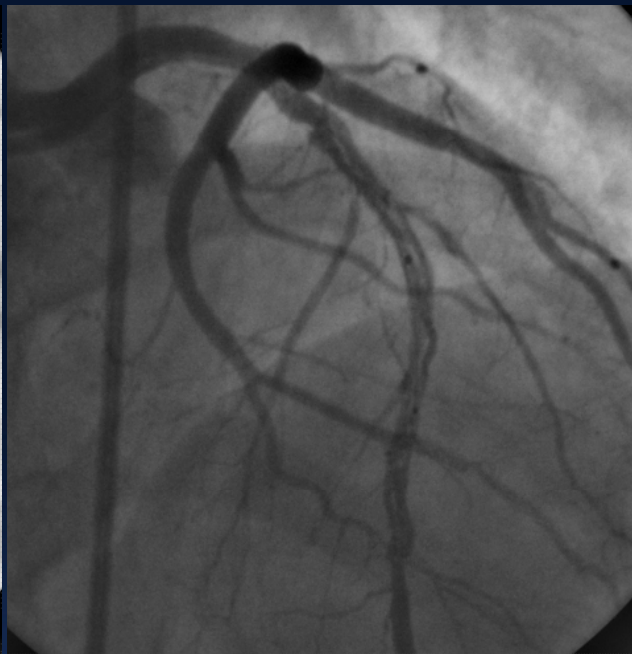
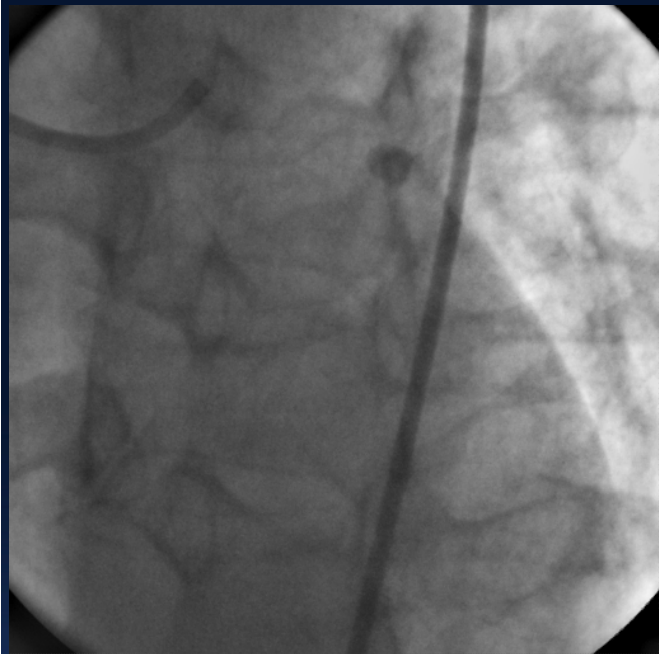
Horiz Long Axis (Post->Ant)



# Thallium scan

Partially reversible medium size, moderately decreased perfusion in LAD territory

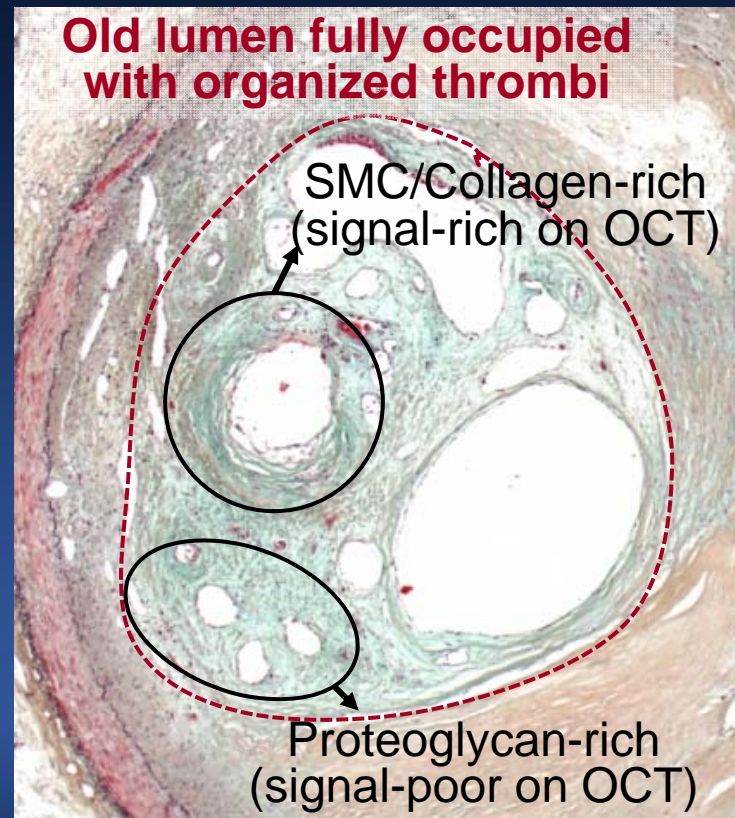
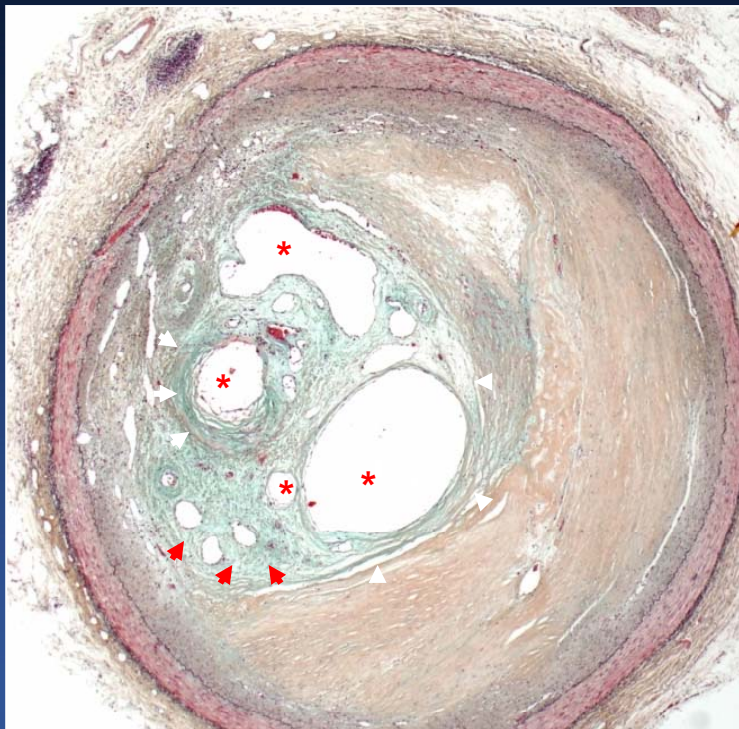




NOBORI 3.5 x 18mm  
NOBORI 3.5 x 28mm  
NOBORI 3.0 x 28mm

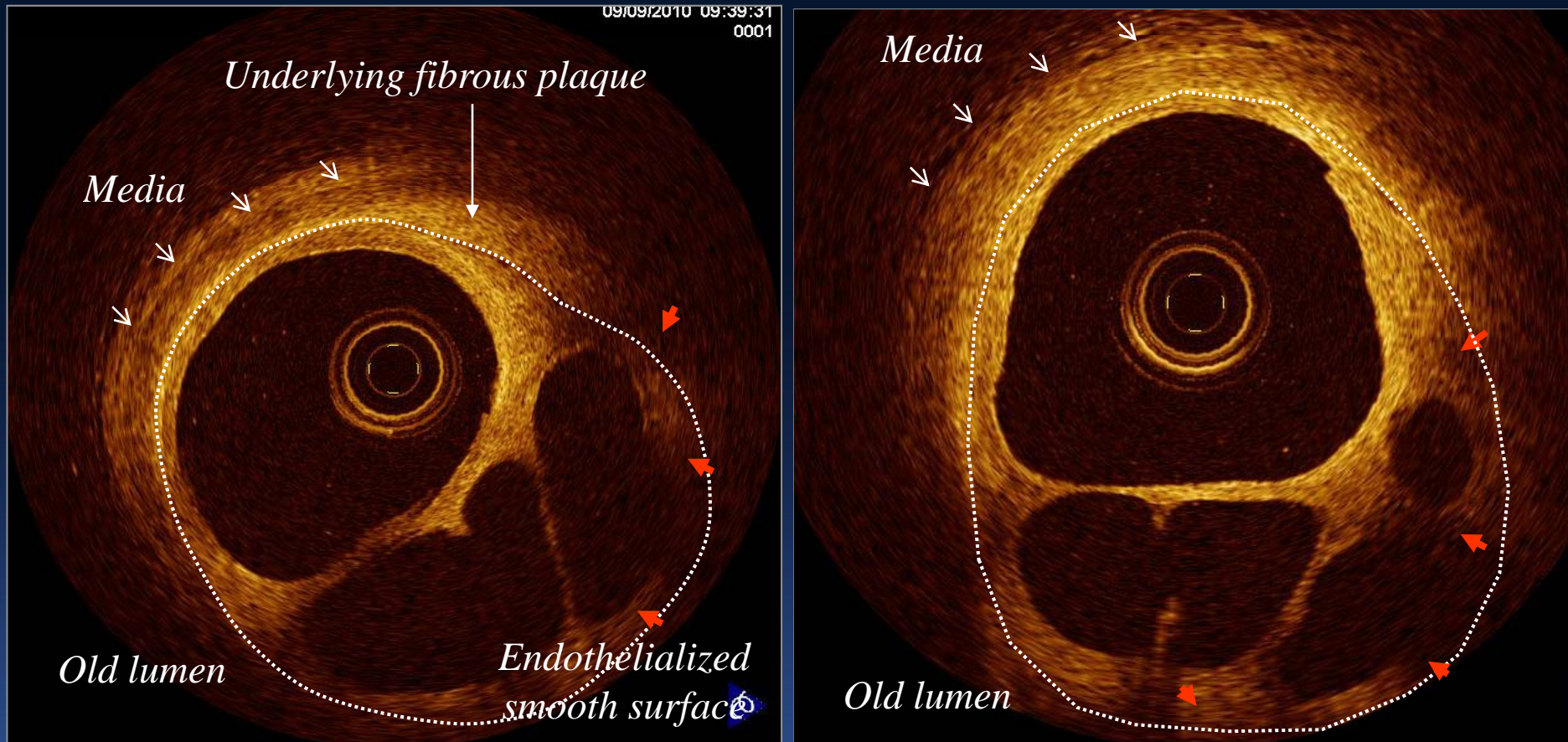
# OCT Findings in Patients with Recanalization of Organized Thrombi

- rarely recognized in real practice. Histologically, defined as multiple channels divided by thin septa



by R Virmani and M Nakano, CVPath

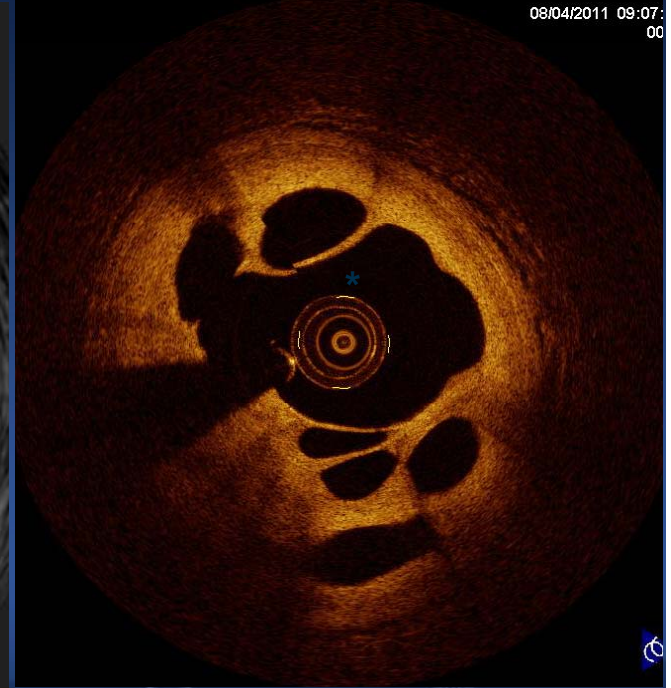
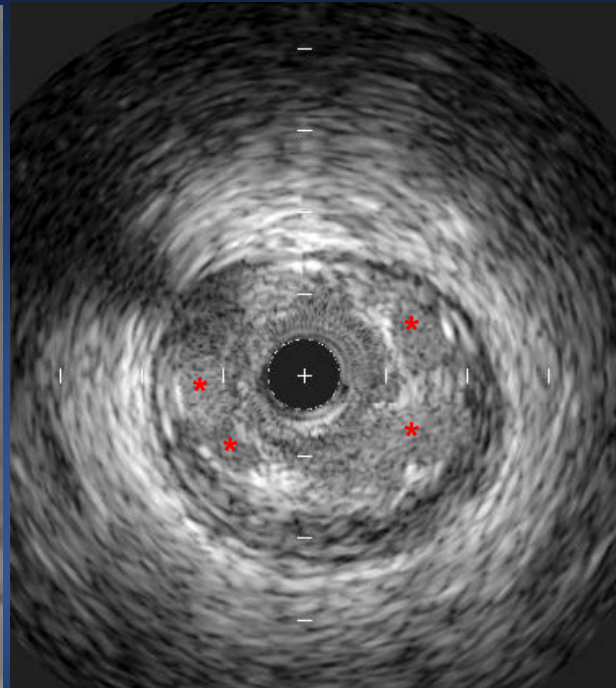
# Neo-angiogenesis within Organized Thrombi



- Signal-rich high backscattered septa dividing the lumen into multiple cavities communicating with each other *'Swiss-cheese'*
- Darker tissue in deeper portion, brighter area near the lumen

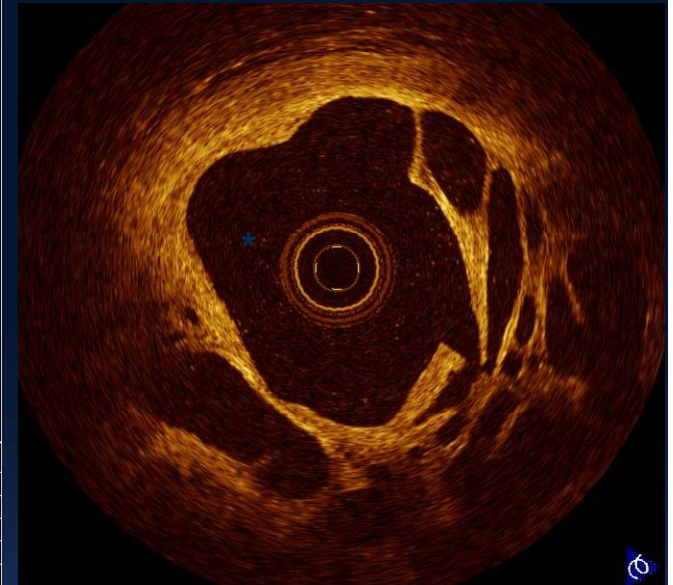
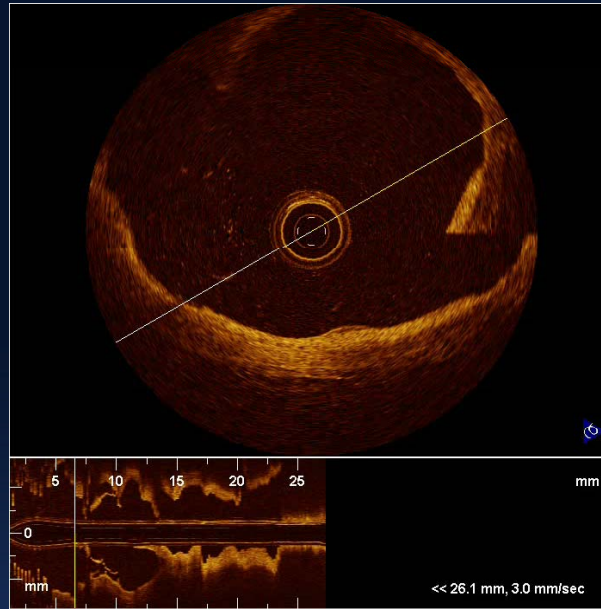
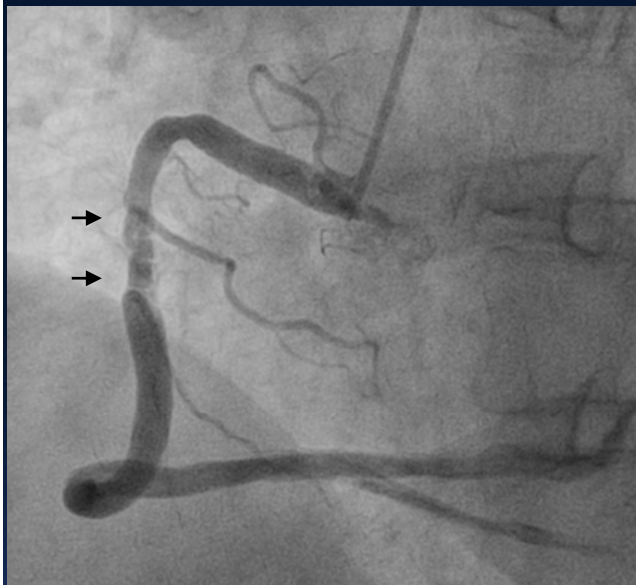
# CASE 2 F/63

- Unstable angina
- **EKG** T-inversion II, III, aVF
- **Echo** akinesia of inferior wall
- **FFR 0.65**

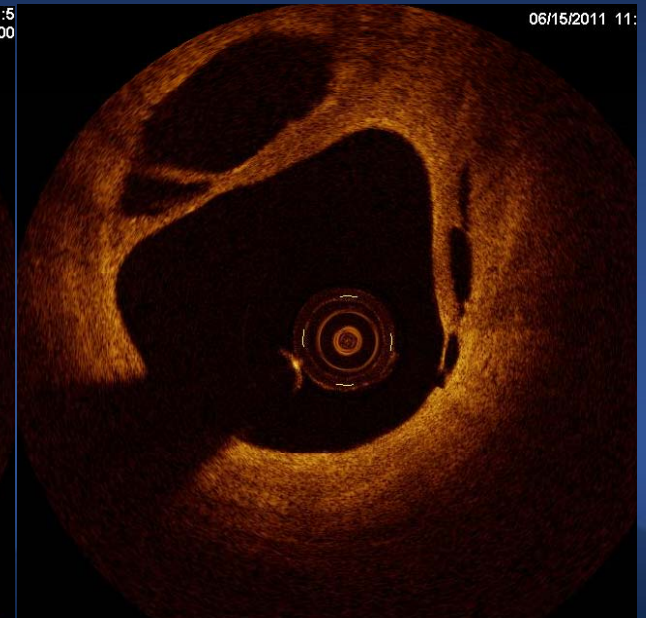
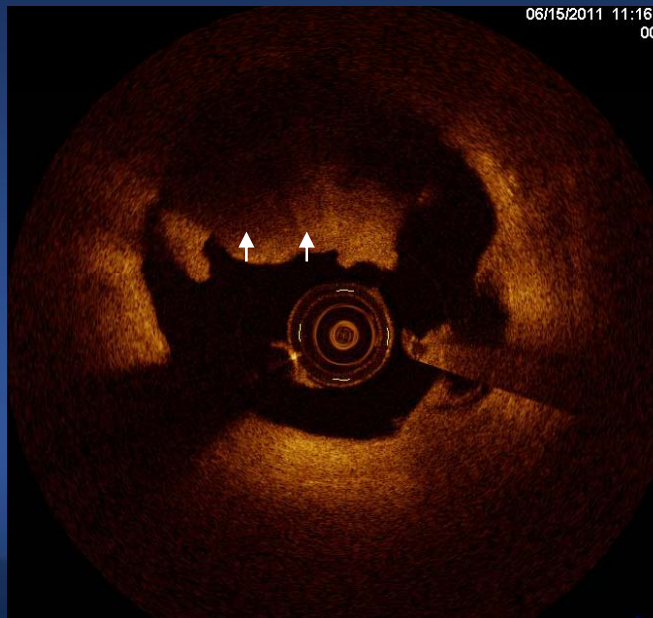


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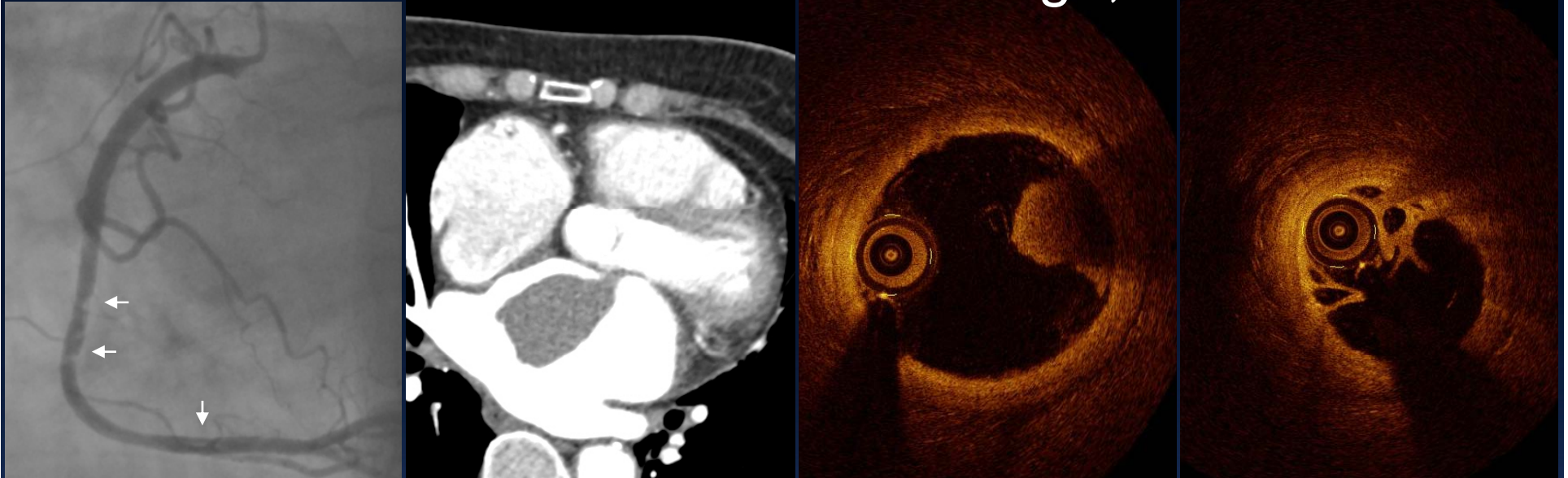
# CASE 3 M/72 UA, Thallium positive in inferior wall



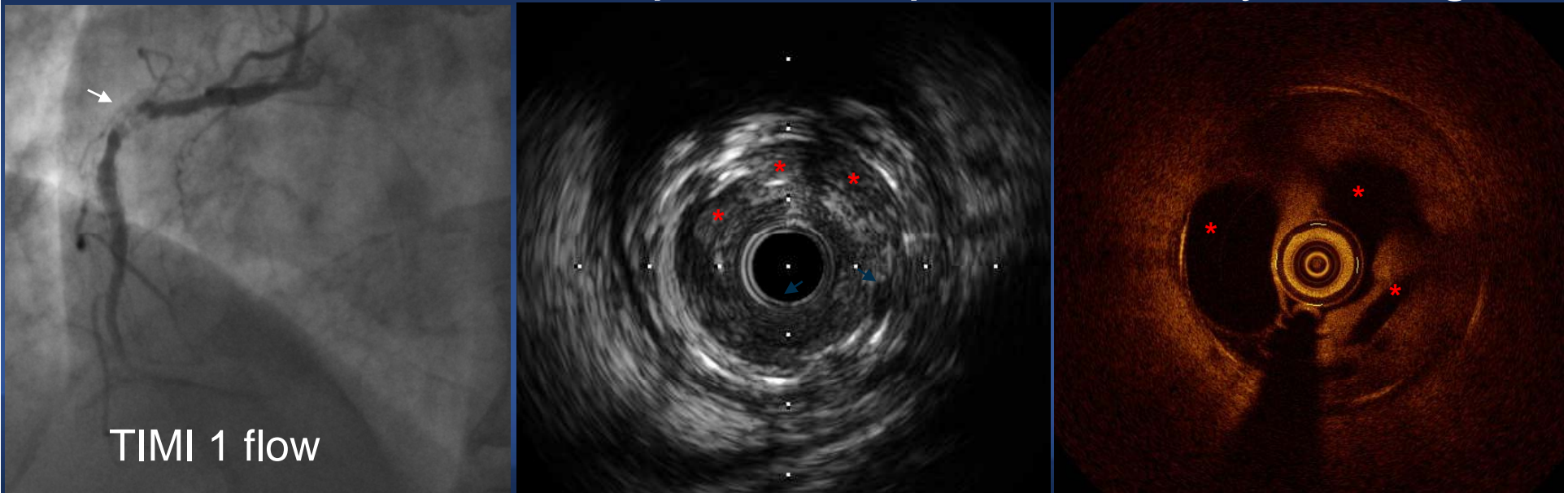
# CASE 4 M/55 SA, Thallium positive in LAD territory



# CASE 5 M/63 NSTEMI 5 weeks ago, Severe MS



# CASE 6 M/73 SA, s/p DES implantation 4 years ago



TIMI 1 flow



|  | Clinical presentation   | Dx  | Risk factor             | Non-invasive tests  |
|--|---|-----|-------------------------|---|
| <b>F/54</b>  | New onset chest pain for 4 wks                                | UA  | none                    | <b>EKG:</b> T-inversion in II, III, aVF<br><b>Echo:</b> akinesia of anteroseptum<br><b>Thallium:</b> reversible perfusion defect in apical septum, anteroseptum |
| <b>M/63</b>  | 5 year history angina 1 wk ago                                | UA  | smoking<br>hypertension | <b>EKG:</b> T-inversion in V4-6<br><b>Echo:</b> posterior wall akinesia   |
| <ul style="list-style-type: none"> <li>▪ Age ranged 54-73</li> <li>▪ 50% Female</li> <li>▪ UA in 3 patients</li> <li>▪ Stable angina in 2</li> <li>▪ Post-infarct in 2</li> <li>▪ T-wave inversion in 4</li> <li>▪ Q wave in 1</li> <li>▪ RWMA in 4</li> </ul> |   |     |                         |   |
| <b>M/55</b>  | Chest pain for 1 year   | SA  | hyperlipid<br>Smoking   | <b>Thallium:</b> reversible, large perfusion defect in apical septum, ant wall  |
| <b>F/63</b>  | NSTEMI 5 wks ago<br>Post-infarct angina<br>MS with LA thrombi | OMI | hypertension            | <b>EKG:</b> T-inversion in II, III, aVF<br><b>Echo:</b> severe MS, LA thrombi<br>hypokinesia of inferior wall   |
| <b>M/73</b>  | s/p DES 4 yrs ago<br>recurrent angina                         | SA  | Diabetes                | <b>EKG:</b> T-inversion, in II, III, aVF<br><b>Angiography:</b> TIMI 1, <b>Echo:</b> normal   |

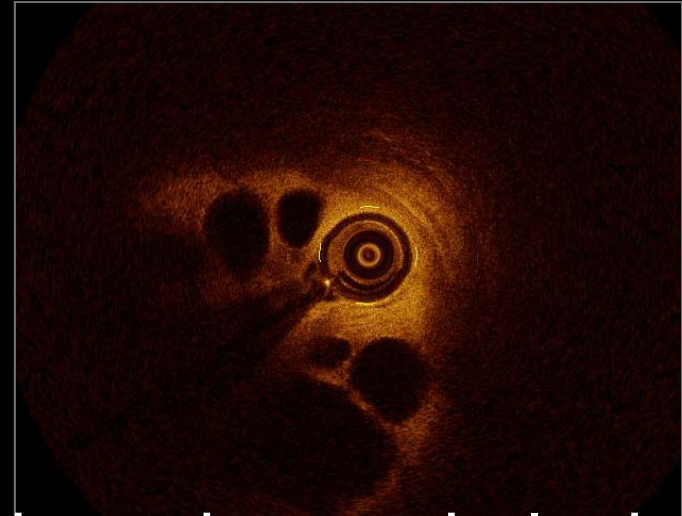
# QCA Analysis

| Case No         | 1       | 2      | 3       | 4        | 5*      | 6         |
|-----------------|---------|--------|---------|----------|---------|-----------|
| Lesion site     | LAD     | RCA    | RCA     | LAD      | RCA     | RCA       |
| Length, mm      | 65.0    | 19.5   | 29.3    | 15.9     | 20.4    | 11.2      |
| %DS             | 36%     | 42%    | 65%     | 100%     | 41%     | 100%      |
| TIMI flow       | 3       | 3      | 3       | 1        | 3       | 1         |
| Collaterals     | –       | –      | –       | From RCA | –       | From LAD  |
| Visible thrombi | –       | +      | –       | –        | +       | –         |
| Filling defect  | +       | +      | +       | +        | +       | +         |
| Calcification   | –       | –      | –       | –        | –       | –         |
| Dissection      | +       | +      | +       | +        | +       | +         |
| Stress tests    | MPI (+) | FFR(+) | MPI (+) | MPI (+)  |         | Slow flow |
| Treatment       | PCI     | PCI    | PCI     | PCI      | Surgery | PCI       |

\*With restored coronary flow, the patient underwent MVR and LA thrombectomy

# SUMMARY

- Regarding angiographic haziness, OCT is helpful to differentiate various pathologic conditions
- OCT finding of recanalization of organized thrombus is characterized by multiple small channels divided by thin septa
- Despite the neovascularization process, most of the lesions were still functionally significant
- We did not demonstrate various stages of evolving thrombi over time and how recanalization affects early and long-term prognosis



Although neovascularization is based on pathologic diagnosis, OCT clearly demonstrates the unique features *in vivo*, as “Swiss cheese-like” appearance

