

OCT Findings in Very Late Stent Thrombosis

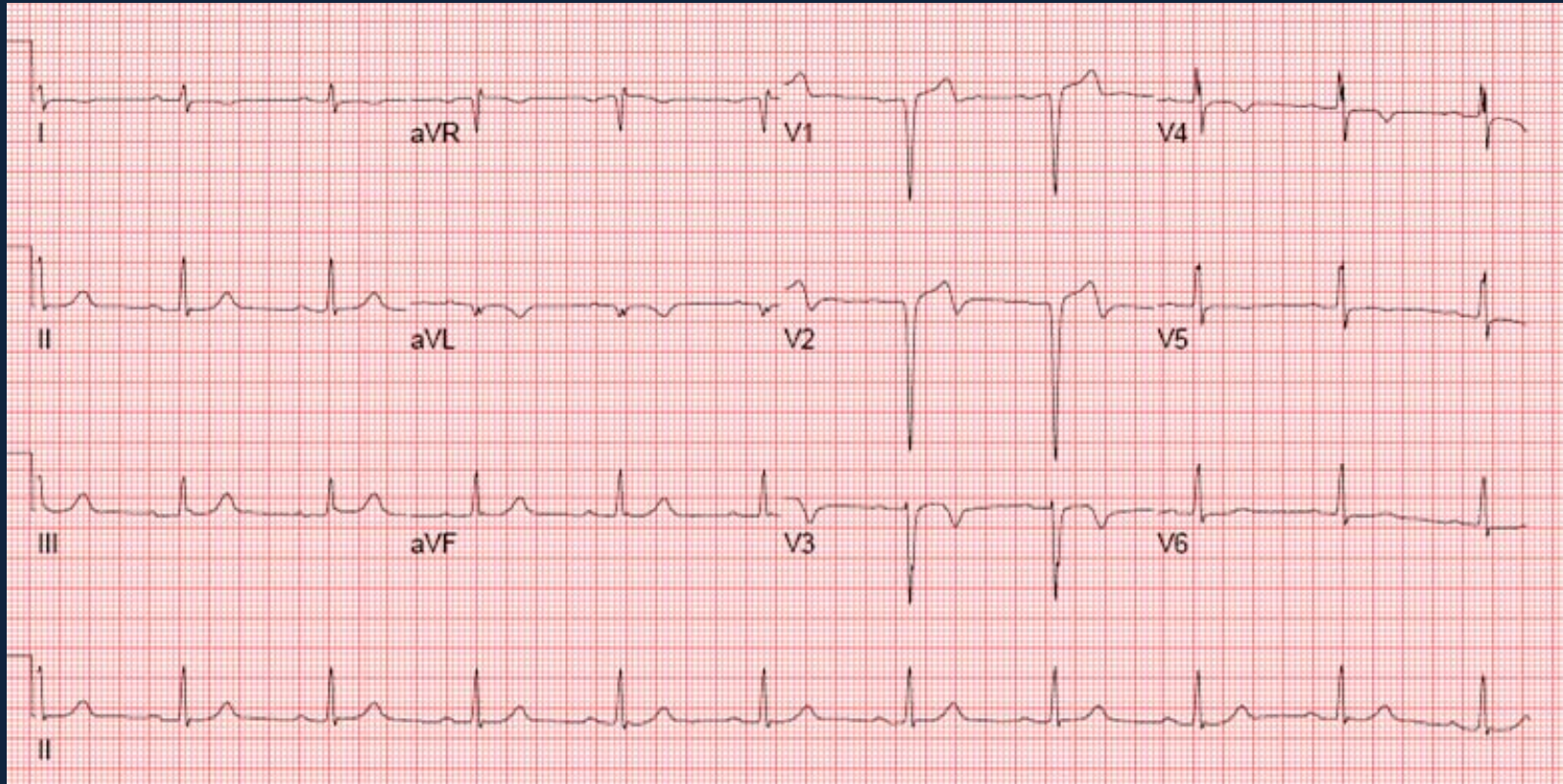
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**Could incomplete stent strut
coverage in OCT be a
possible cause of VLST ?**

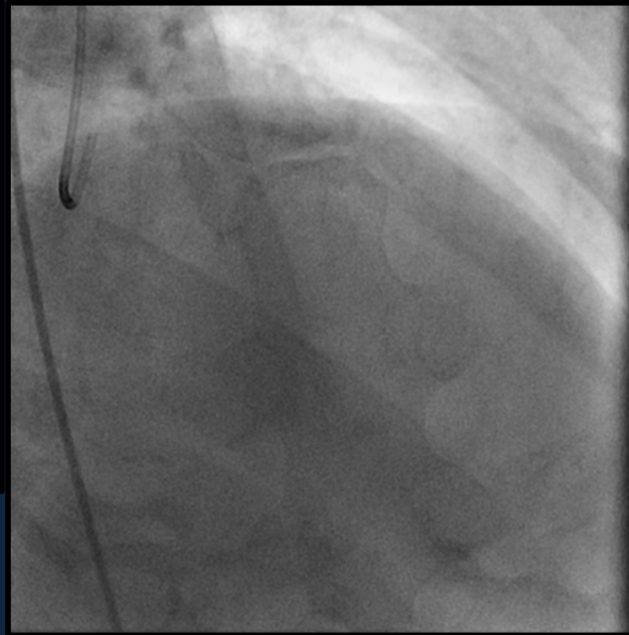
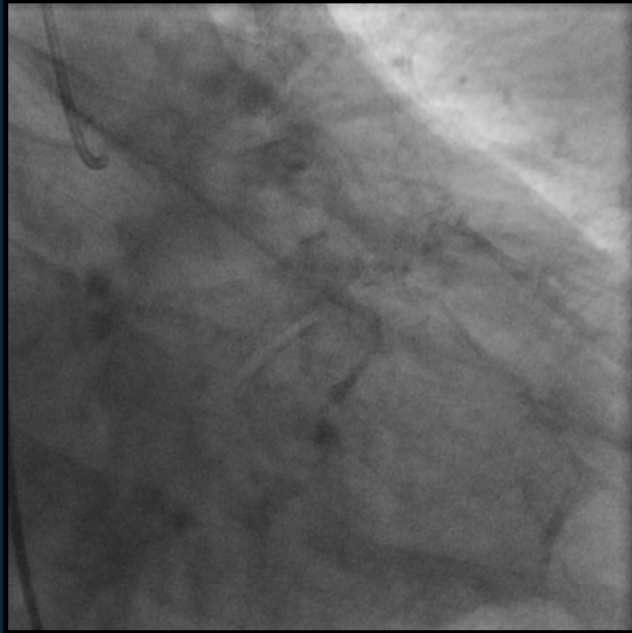
- **M/62**
- **C/C: chest pain at 7 days ago**
- **Risk factors: dyslipidemia (+)**
- **14 months ago; stable angina, TMT (+)**
 - PTCA c stent insertion at proximal LAD
(2.75 x 24 mm DES; Endeavor Resolute)
- **5 month ago; 9-month follow-up angiogram**
 - Patent stent

EKG on admission

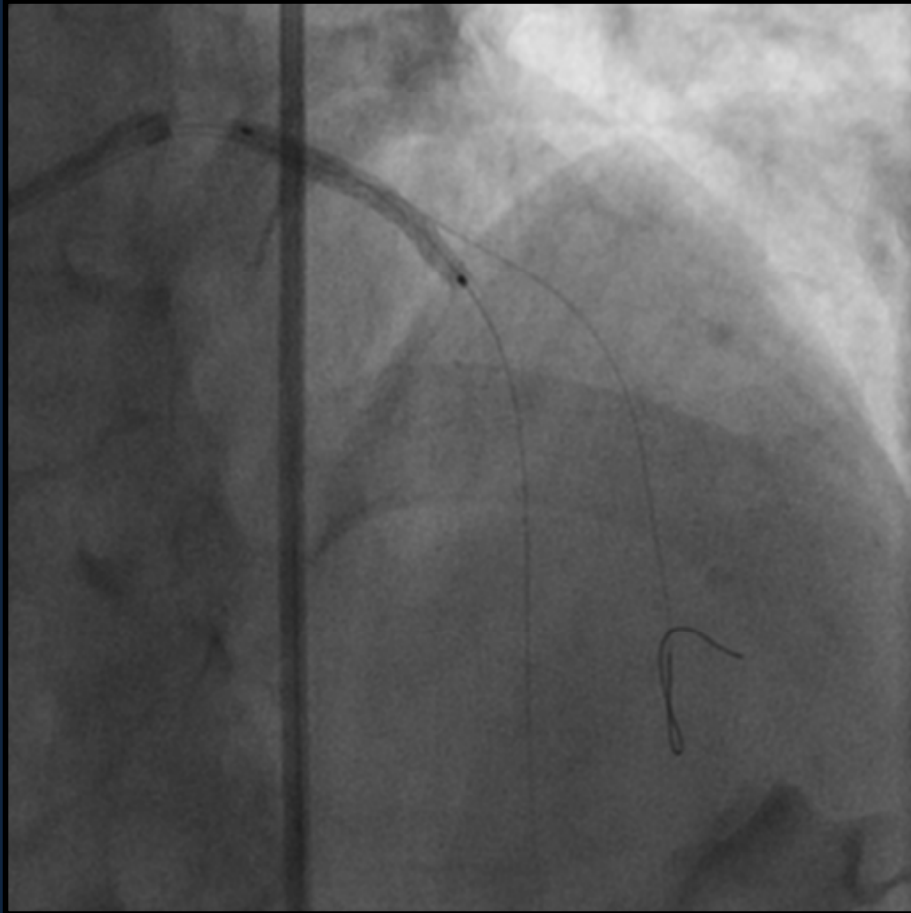


- V/S: BP – 90/50mmHg, HR – 62
- Cardiac enzyme: CK / CK-MB / cTnT - 149 / 3.69 / **0.389**

Initial Coronary angiography



PTCA c stent



**Endeavor Resolute
(2.75 x 24 mm)**



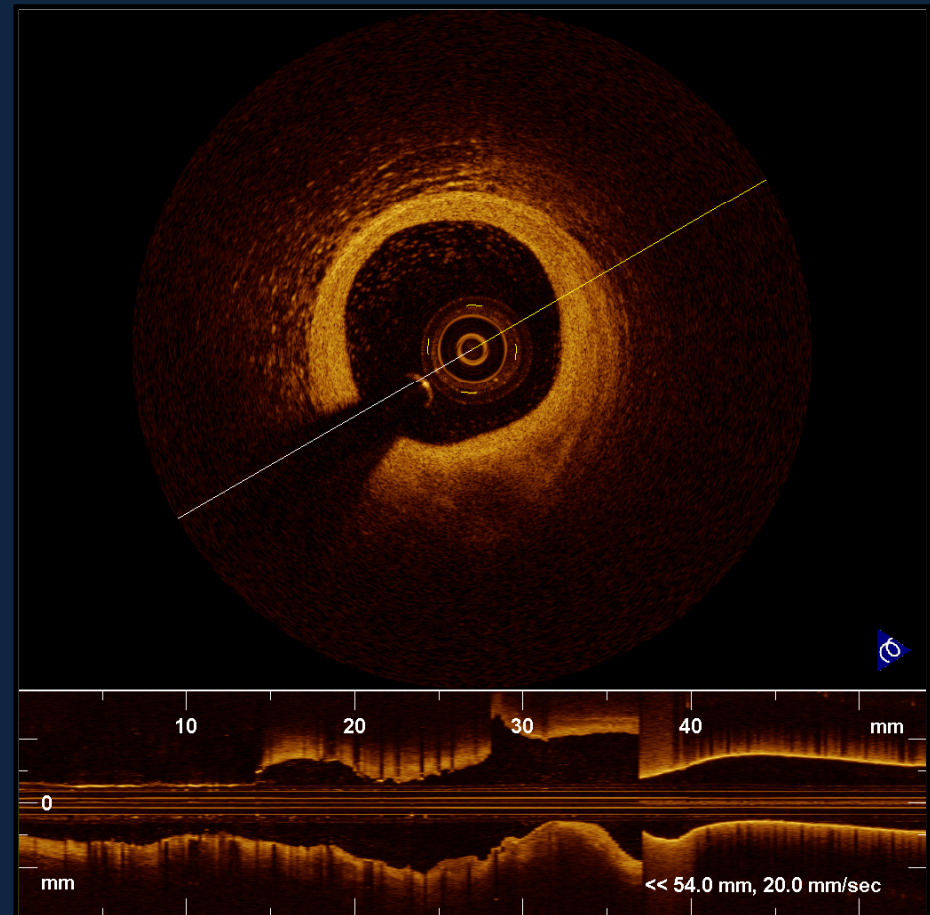
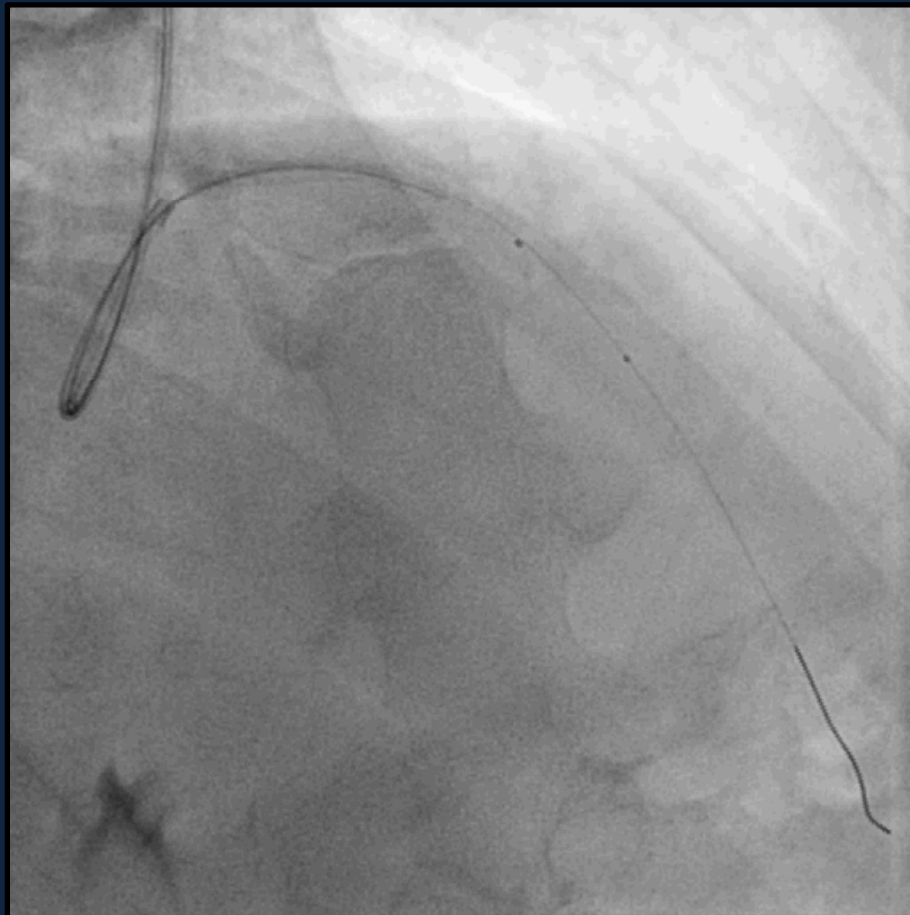
Final Angiogram

9-month follow-up
; No chest pain during follow-up

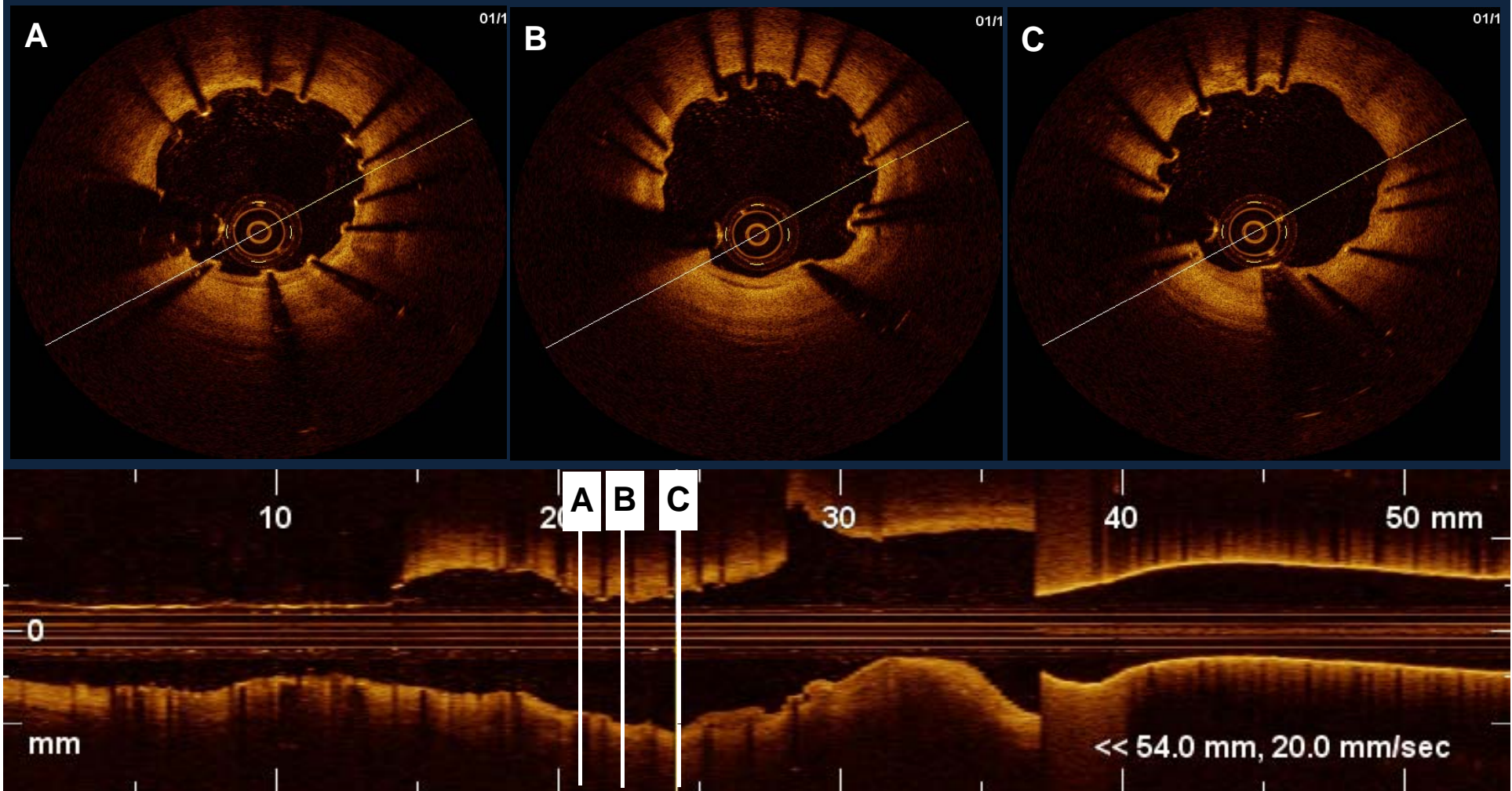


Patent LAD stent

9-month follow-up OCT



9-month follow-up OCT

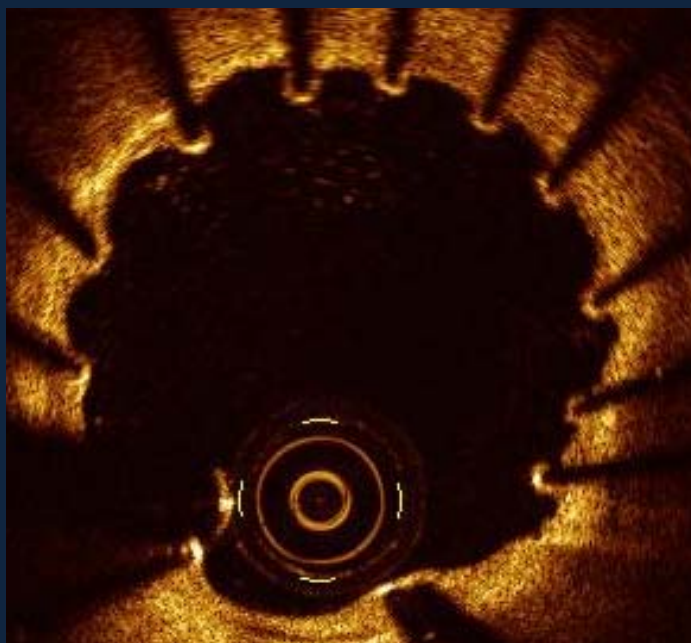


9-month follow-up OCT

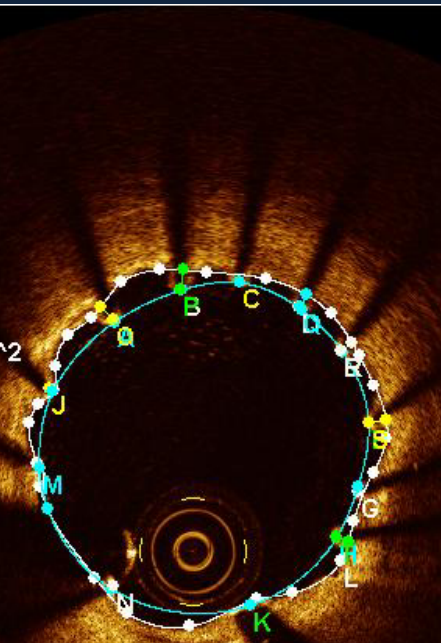
• Analysis of strut

- No. of total analyzable struts: 200
- No. of malapposed struts: 11 → % malapposed struts = 5.5%
- No. of uncovered struts: 43 → % uncovered struts = 21.5%

Cross-section with the most uncovered and malapposed struts



A Length: 0.00mm
B Length: 0.00mm
C Length: 0.00mm
D Length: 0.00mm
E Length: 0.00mm
F Length: 0.00mm
G Length: 0.00mm
H Length: 0.00mm
I Length: 0.00mm
J Length: 0.03mm
K Length: 0.00mm
L Extra Lumen Area: 7.31mm²
M stent area: 6.42mm²
N Length: 0.00mm
O UN Malapposition: 0.15mm
P UN Malapposition: 0.17mm
Q UN Malapposition: 0.12mm
R UN Malapposition: 0.11mm
S UN Malapposition: 0.15mm
T UN Malapposition: 0.12mm

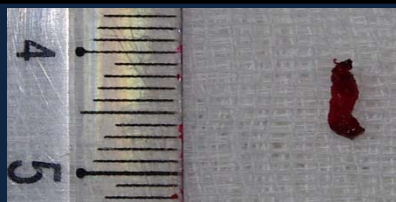


Patient complaint chest pain at 10 days after discontinuation of Plavix (14 months after stent implantation)

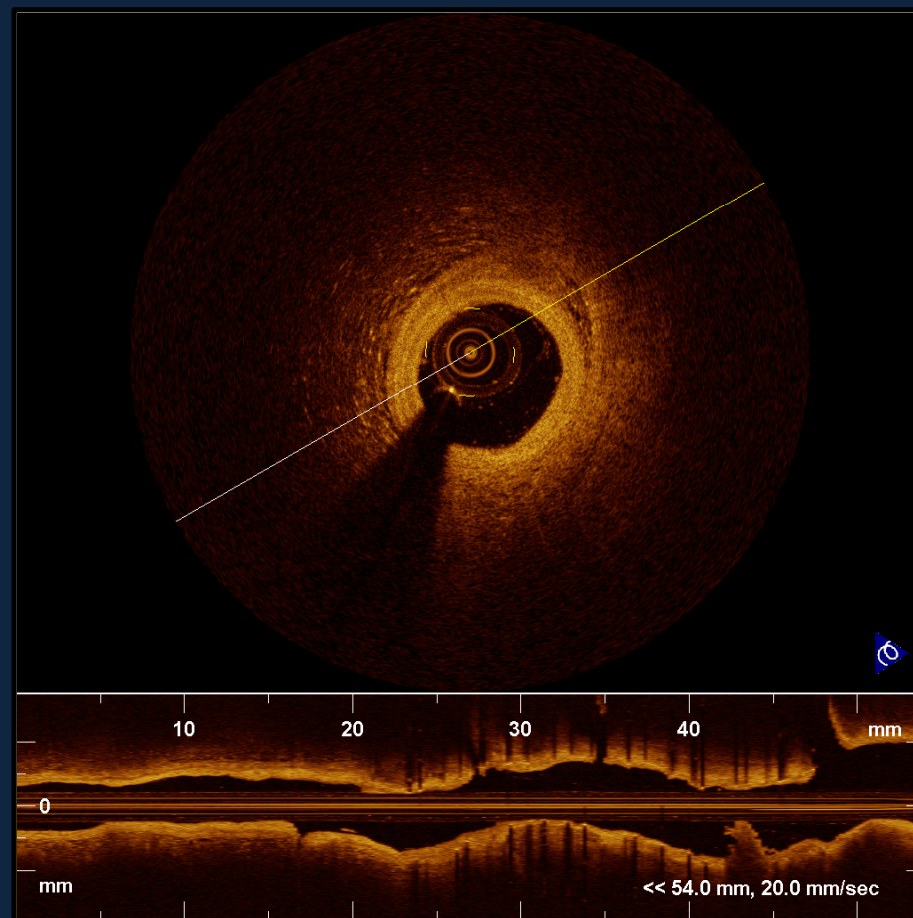


ST at previous DES site

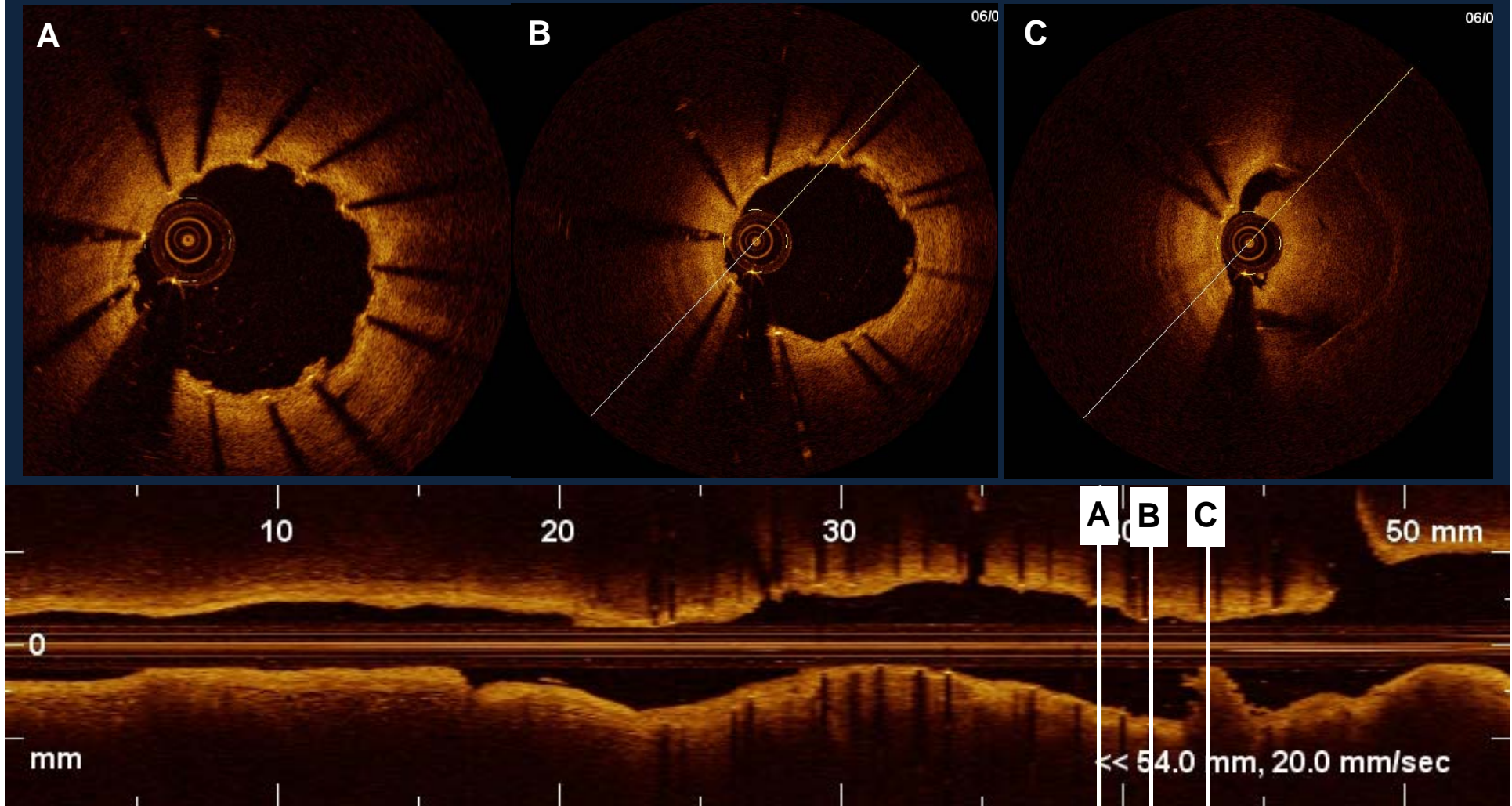
Thrombuster (Kaneka Corp, Japan)



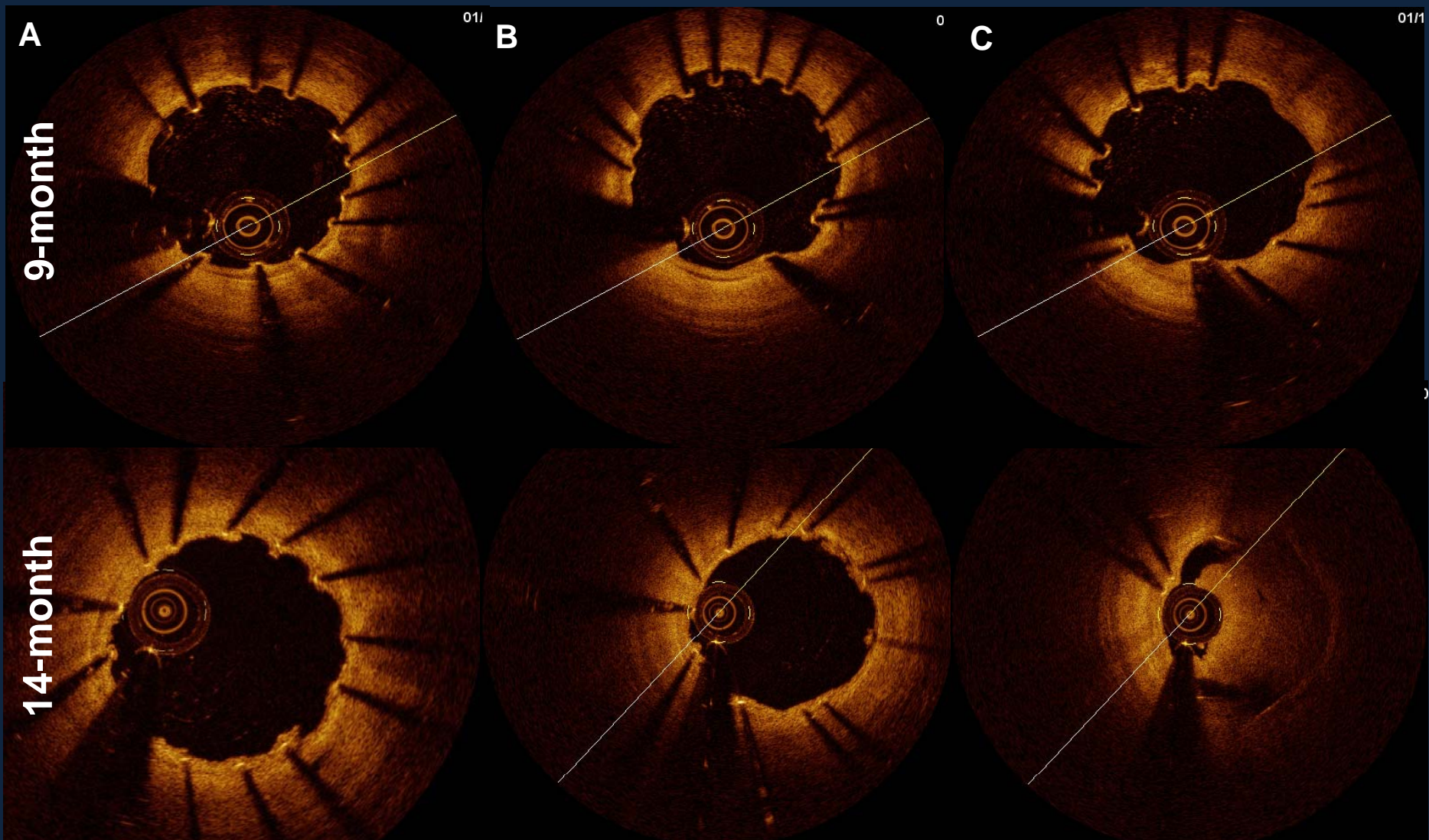
OCT after thrombectomy



OCT after thrombectomy



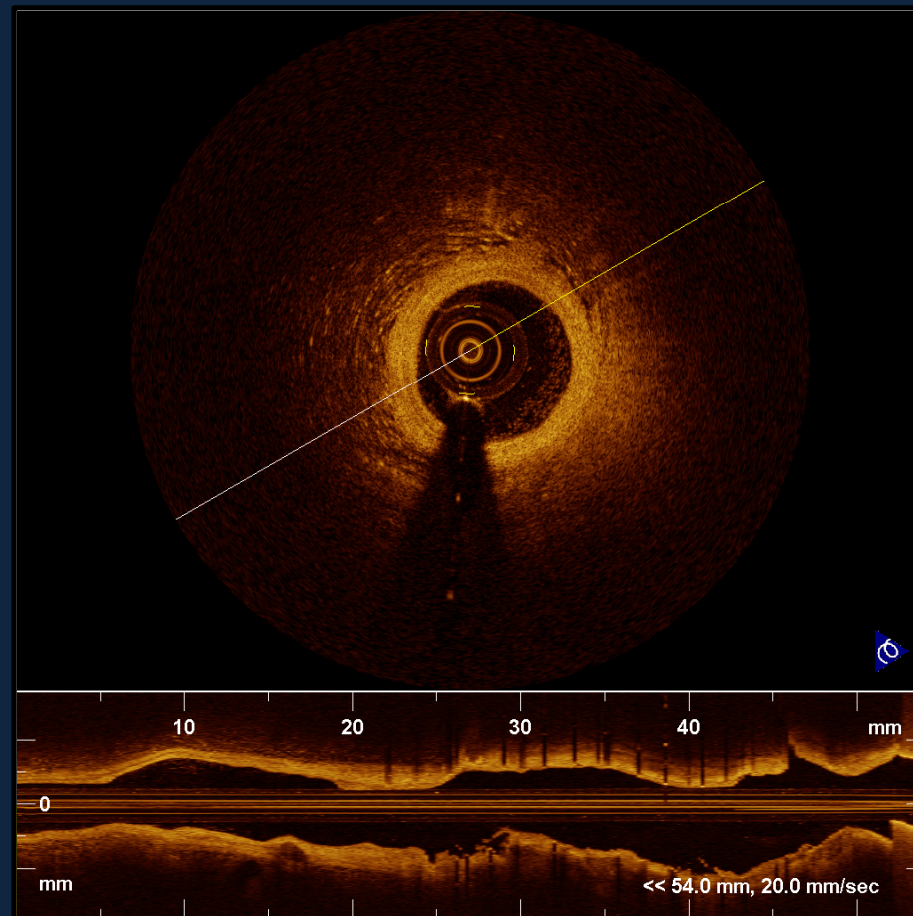
Serial OCT



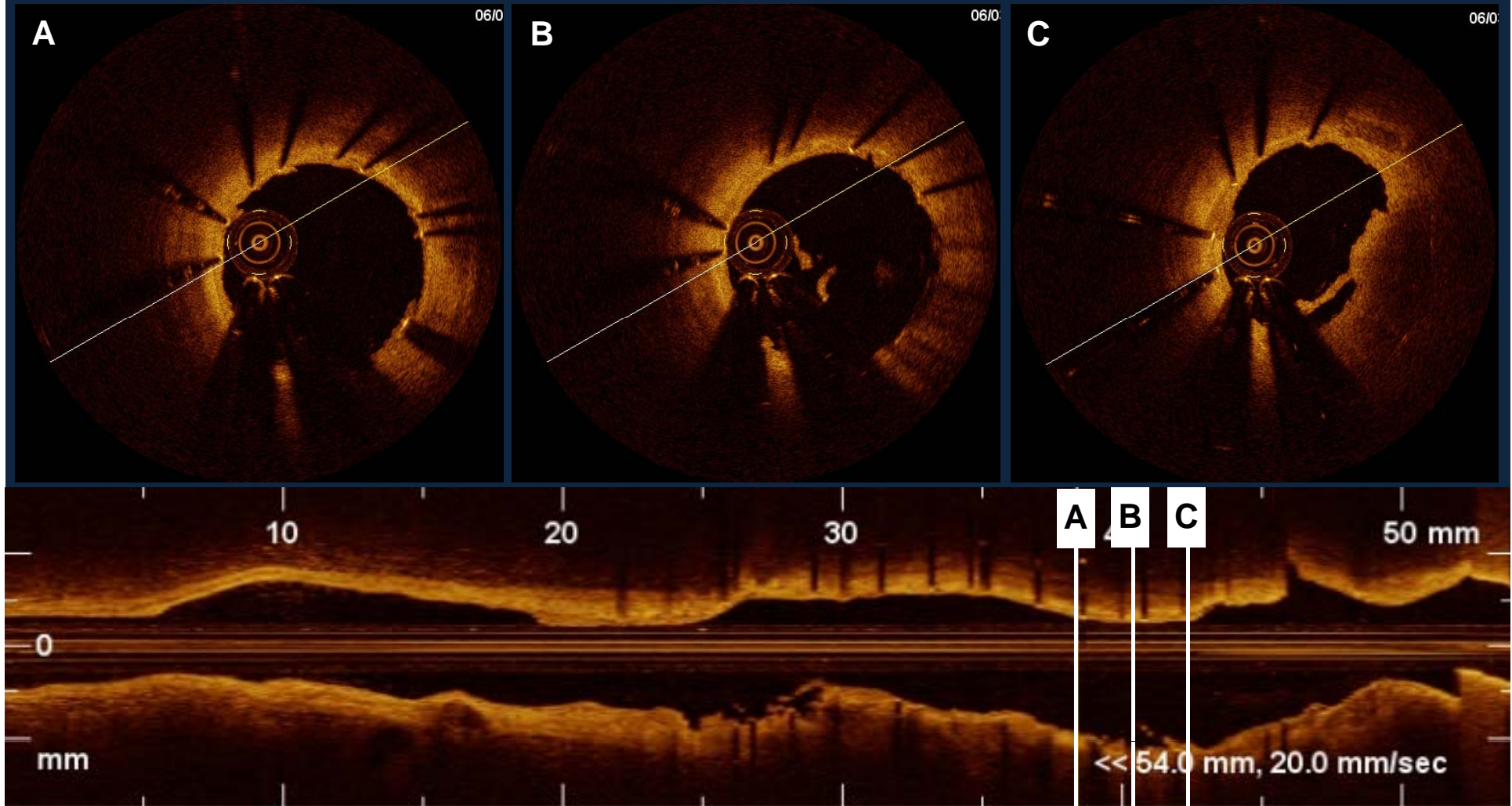
POBA with 3.0 x 12 mm
balloon



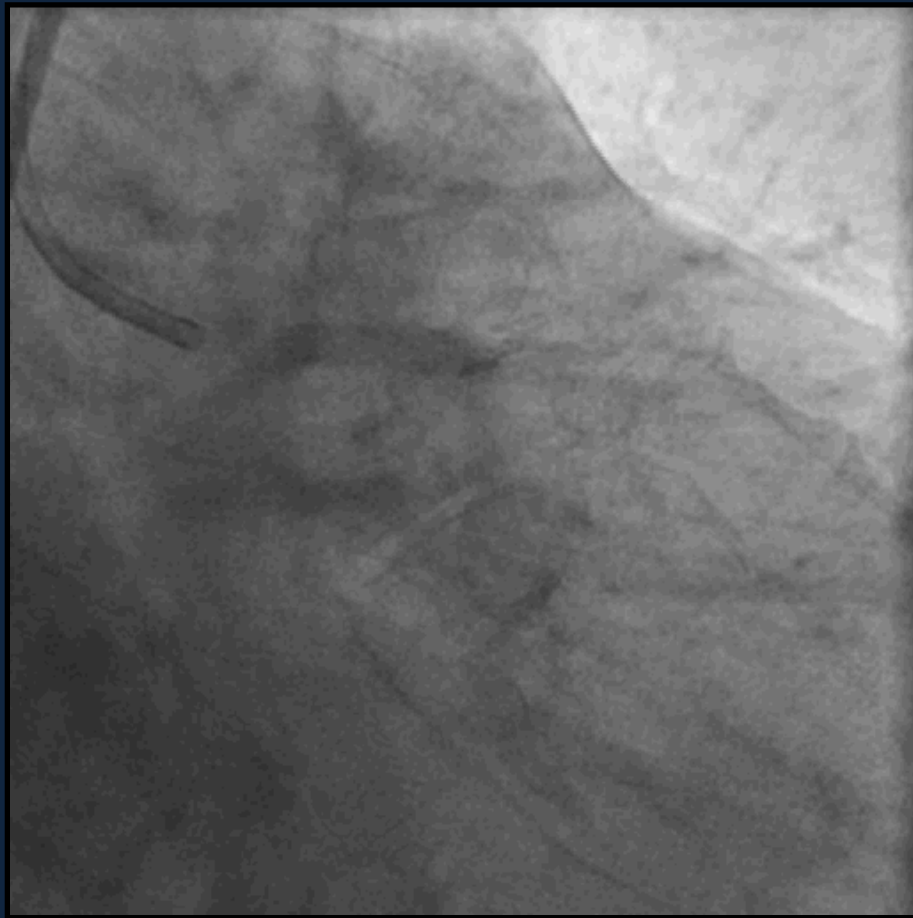
OCT after POBA



OCT after POBA



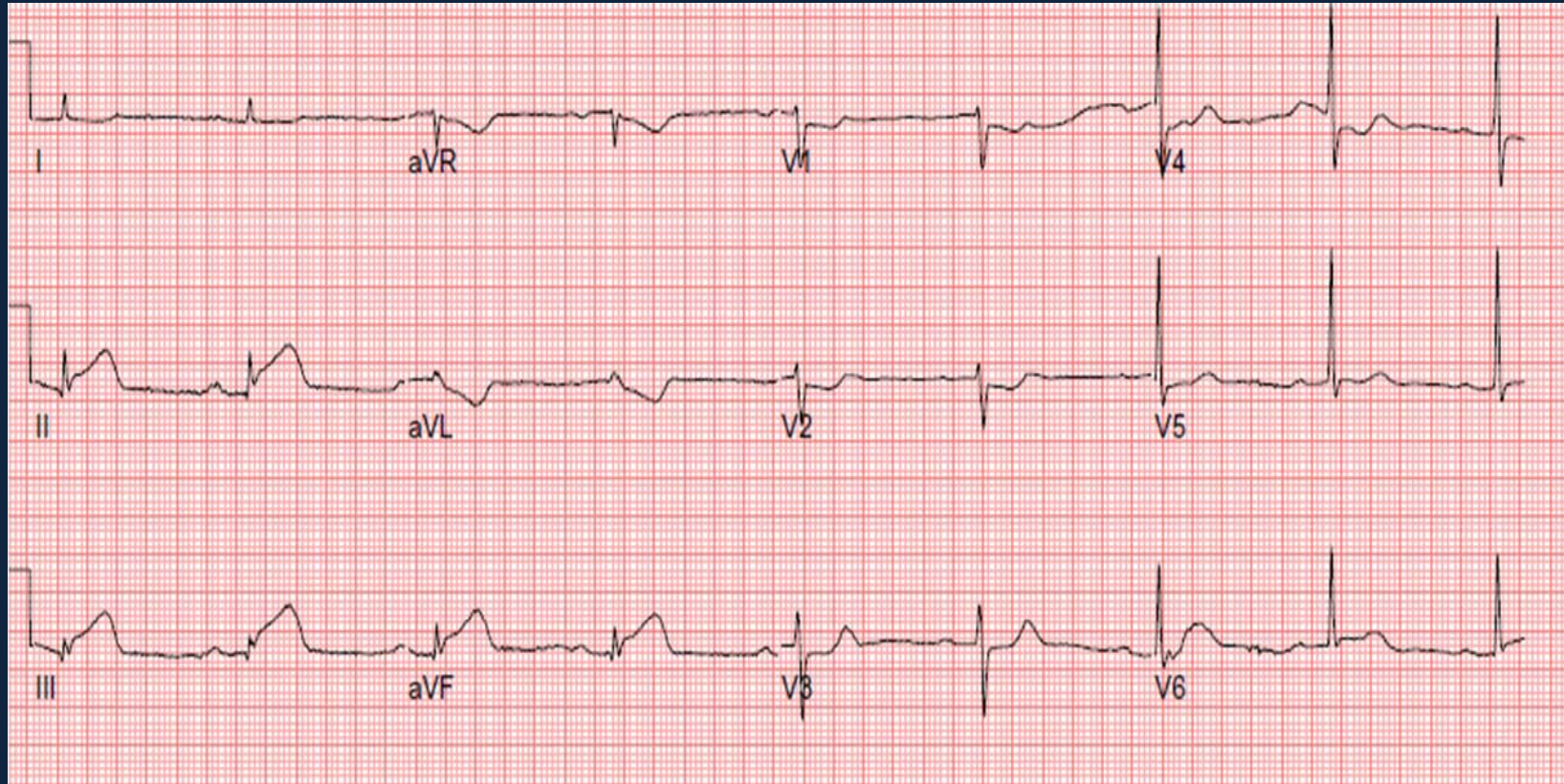
Final Angiogram



**Could neointimal rupture in
OCT be another possible
cause of VLST ?**

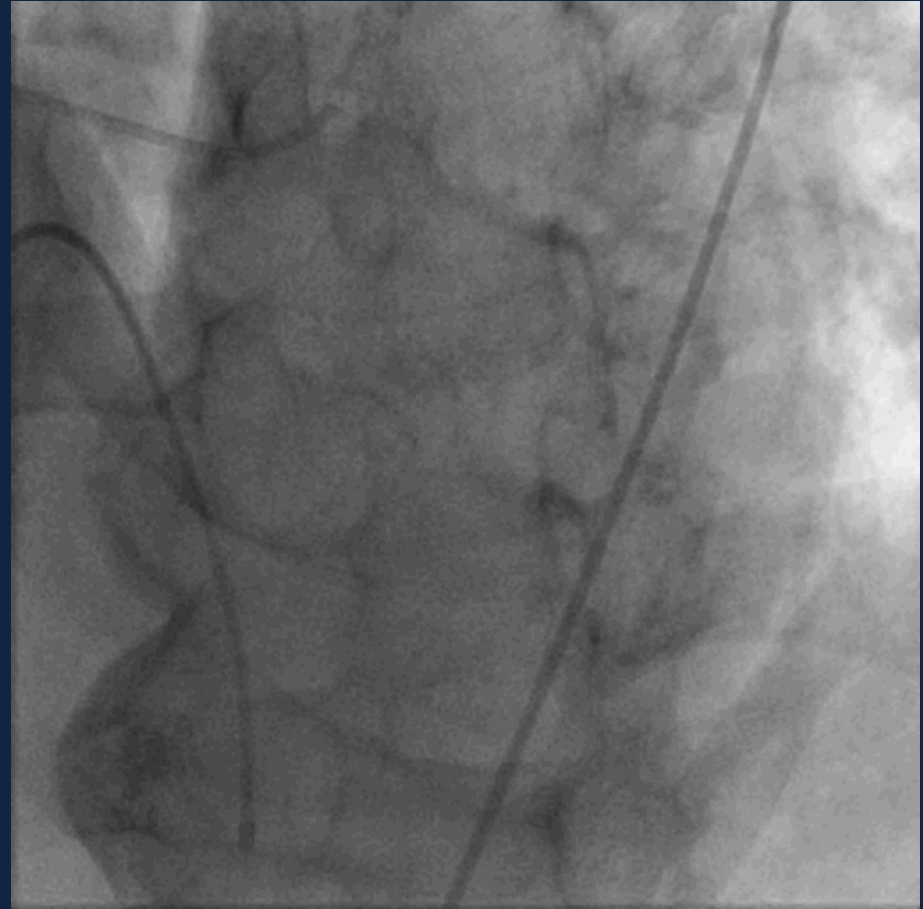
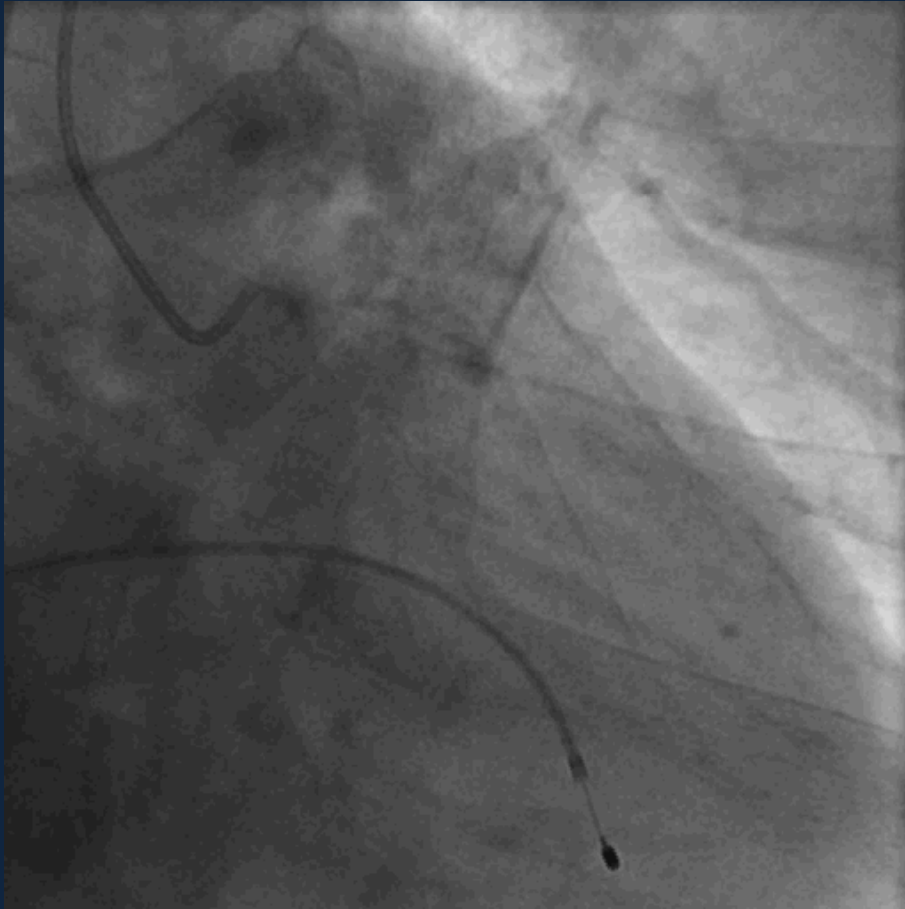
- **M/73**
- **C/C: ongoing chest pain
(Recent; 1 hours ago)**
- **Risk factors: Hypertension (+), current smoker**
- **11 years ago (2000); AMI
→ BMS implantation at distal RCA
(3.5 x 15 mm BMS; NIR Primo)**

EKG on admission (February 2011)



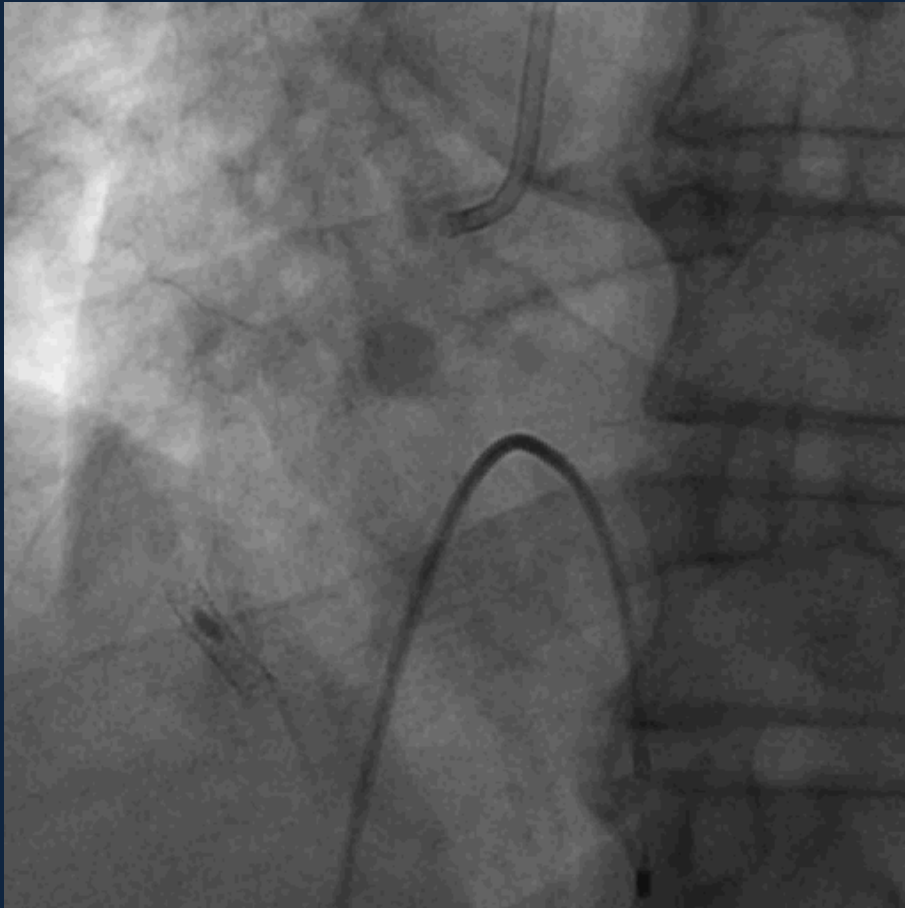
- V/S: BP – 90/50mmHg, HR – 50 bpm
- Cardiac enzyme: Peak CK-MB – 77.68

Emergent coronary angiography

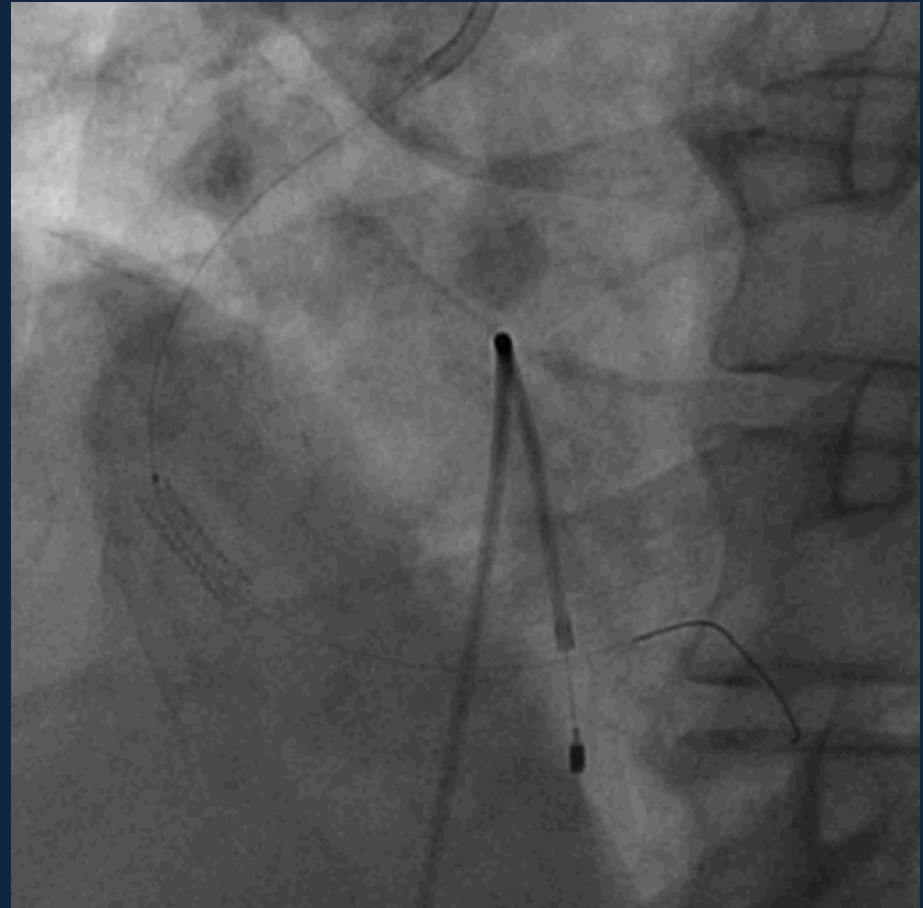


Emergent coronary angiography

Thrombectomy

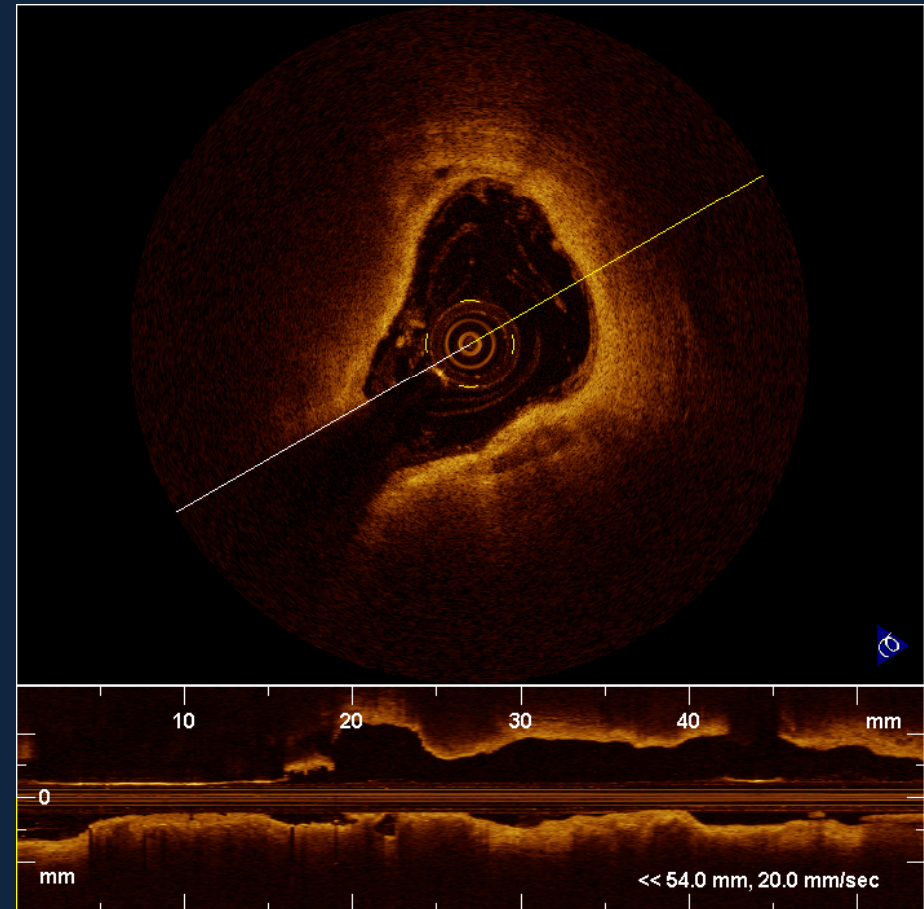
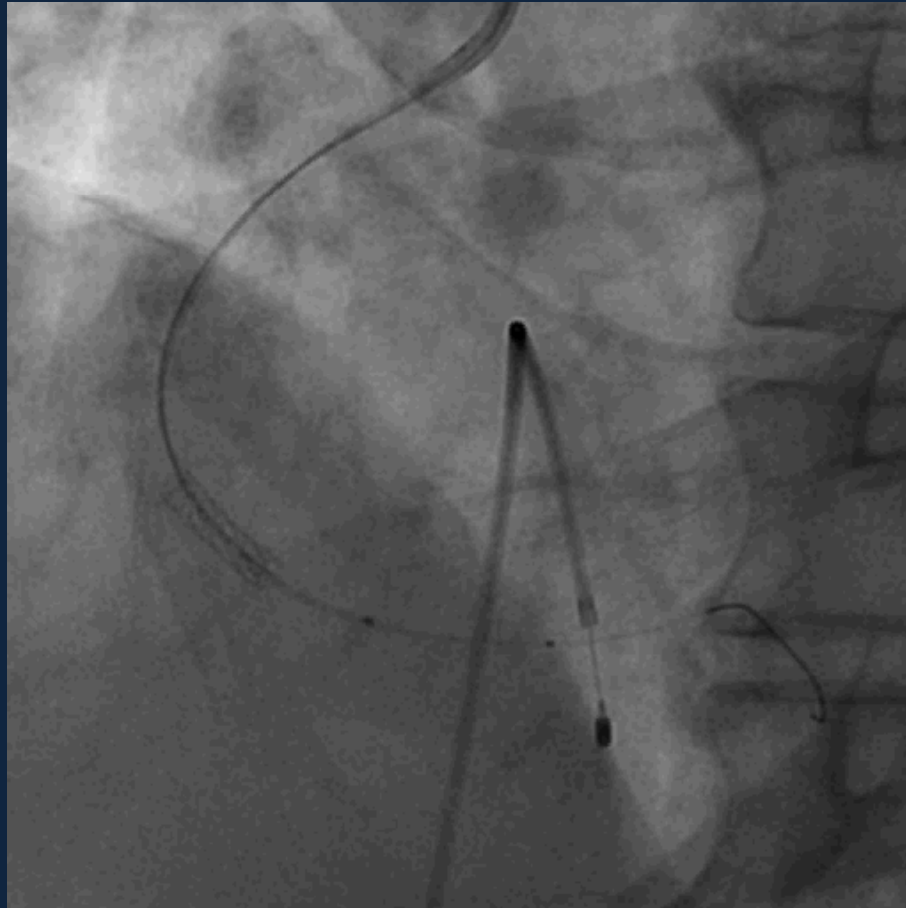


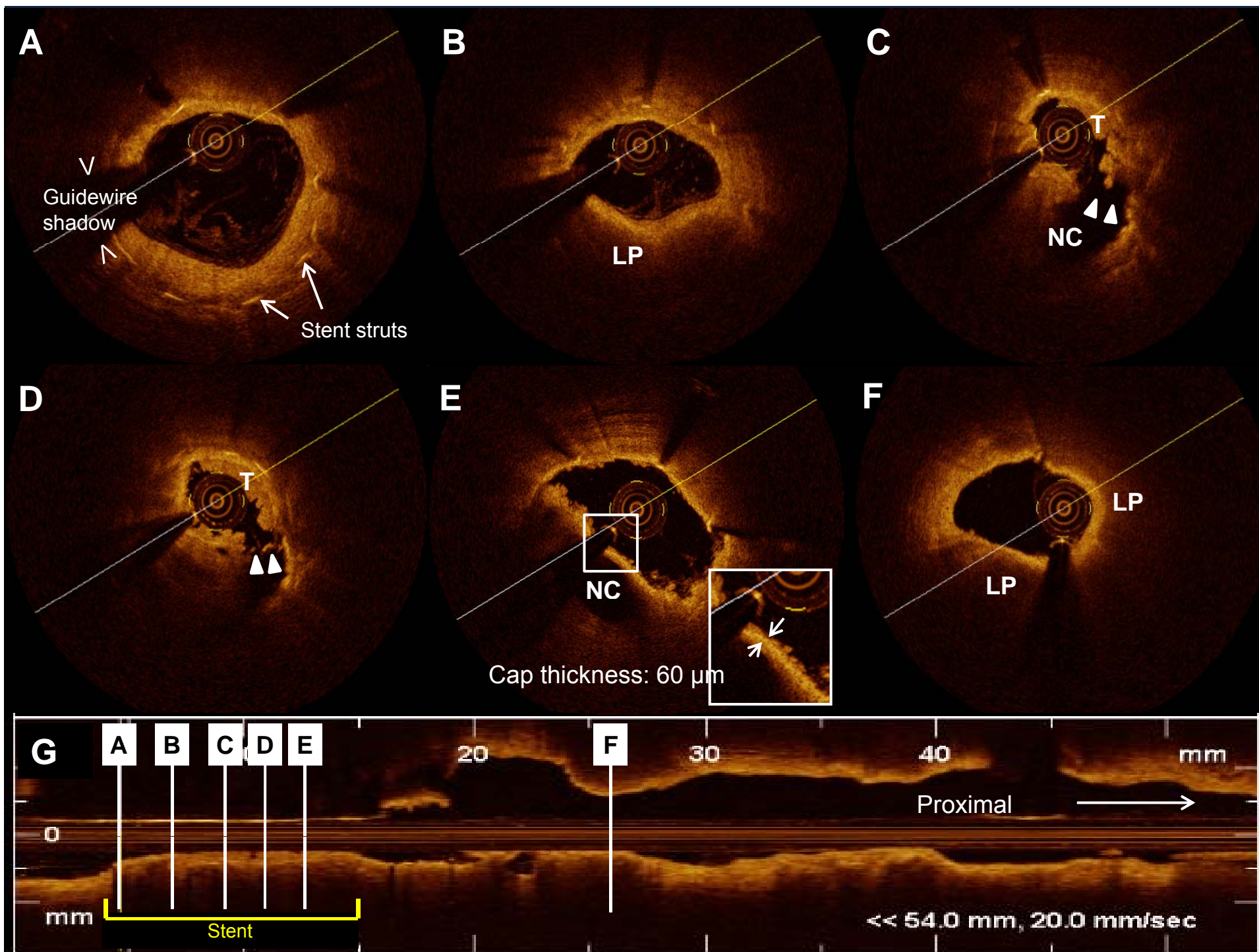
ST at previous BMS site



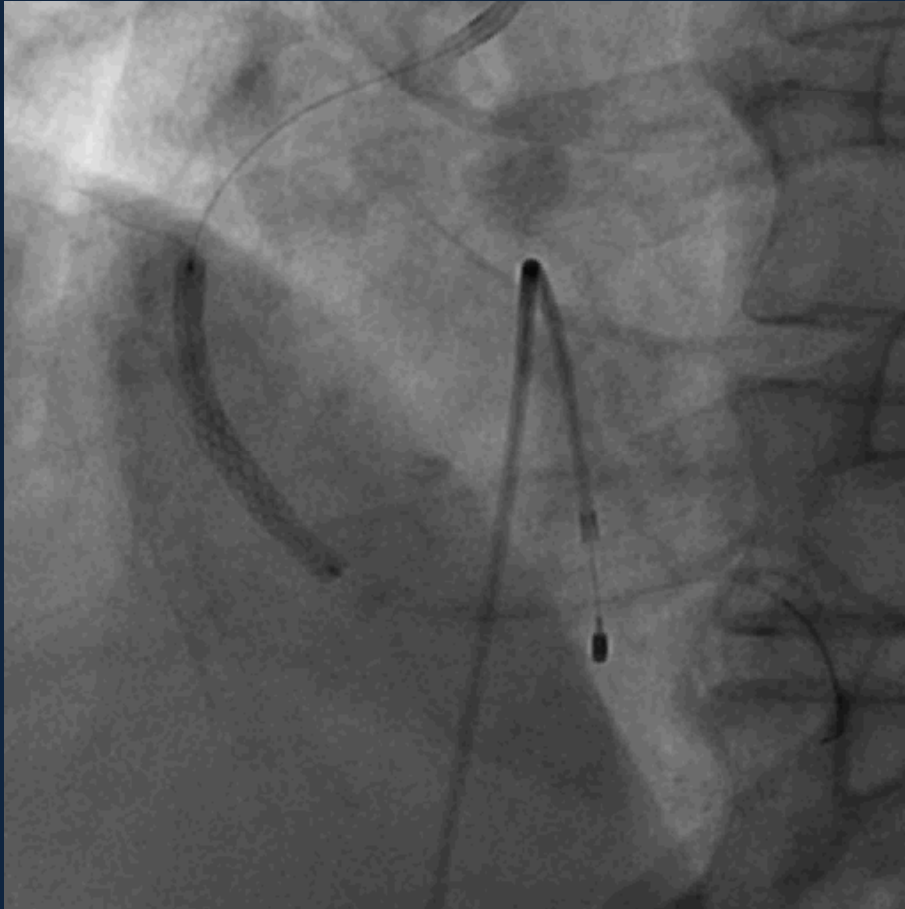
Thrombuster (Kaneka Corp, Japan)

OCT after thrombosuction

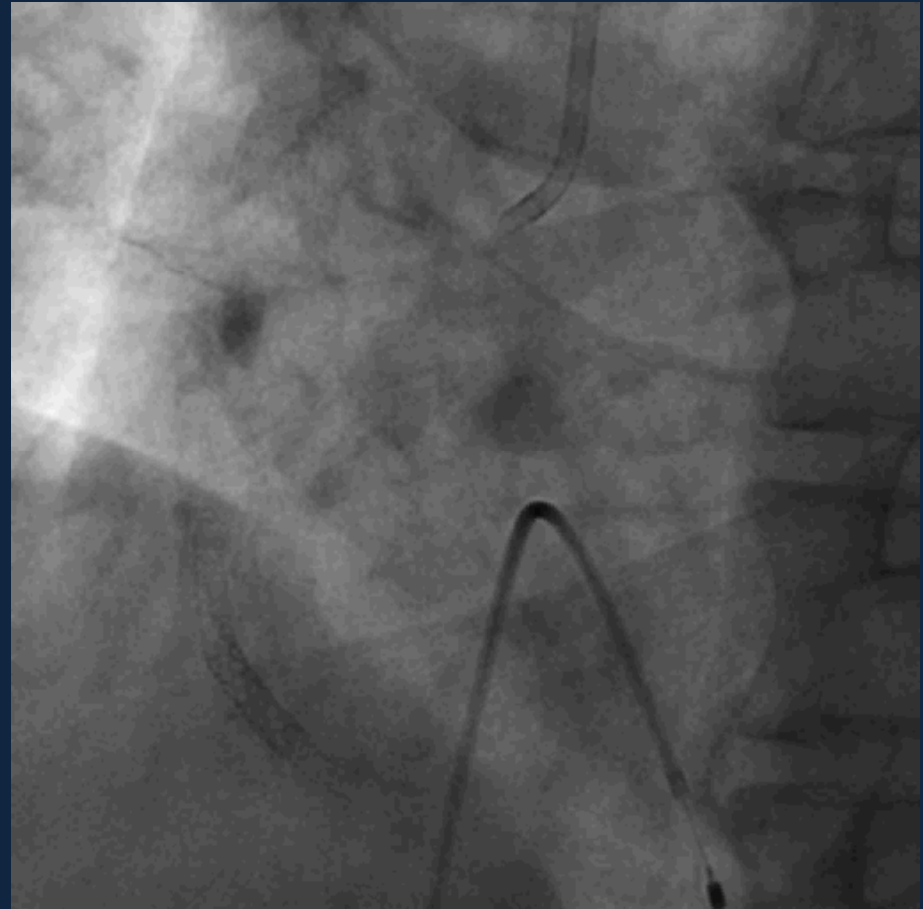




PTCA c stent at previous stent site



**Xience prime
(3.5 x 38 mm)**



Final Angiogram

- **VLST is an infrequent, but catastrophic event.**

Average 0.2 %/ year (Randomized study) - 0.6 %/year (Registry Data)

- **The pathophysiology of VLST may be different from early and late stent thrombosis.**

- **However, underlying mechanism is unclear !!**

Faxon DP. Circulation 2011

Ikenaga H, et al. J Am Coll Cardiol 2011

Nakazawa G, et al. J Am Coll Cardiol 2011

Kang SJ, et al. Circulation 2011

- Suggested mechanism

1. Incomplete endothelialization and neointimal coverage over stent strut – DESs

2. Late acquired stent malapposition – DESs

3. Neointimal rupture – Neoatherosclerosis

– both DESs (2 years) and BMSs (> 5 years)

4. Delayed arterial healing following DESs over necrotic core -DESs

Advantage and Pitfalls of OCT

- OCT can visualize the uncovered stent strut and malapposition with high resolution, but cannot detect endothelial cell and differentiate healthy neointima.
- OCT clearly demonstrate the neointimal rupture, lipid rich plaque and TCFA like neointima, but there have been discrepancies among several studies. Although this is possibly related with time period, we have to consider the artifact because of limited penetration of light source and injury during procedure, especially ISR with large burden of neointma.

Take Home Messages

from Case presentation

- 1. Incomplete neointimal coverage could be a possible cause of VLST.**
- 2. Consider an extended dual anti-platelet Tx over 1 year in case with high (?) proportion of uncovered struts.**
- 3. Neointimal plaque rupture (neoatherosclerosis) could be another possible cause of VLST in case that was implanted with DESs over 2 years and BMSs over 5 years.**

Thanks For Your Attention

