

"HANGING BY A THREAD" A Challenging Case of Acute Coronary Syndrome Caused by Critically Stenosed Distal Left Main and Critically Stenosis Right Coronary Artery Due to Eruptive Calcified Nodules in an Octogenerian Patient

**Dr Lee Tjen Jhung, MD, MRCP (UK), EAPCI(EU), SCCT (US),
BSCCT (UK), CCDS (IBHRE)**

National Heart Institute, Malaysia

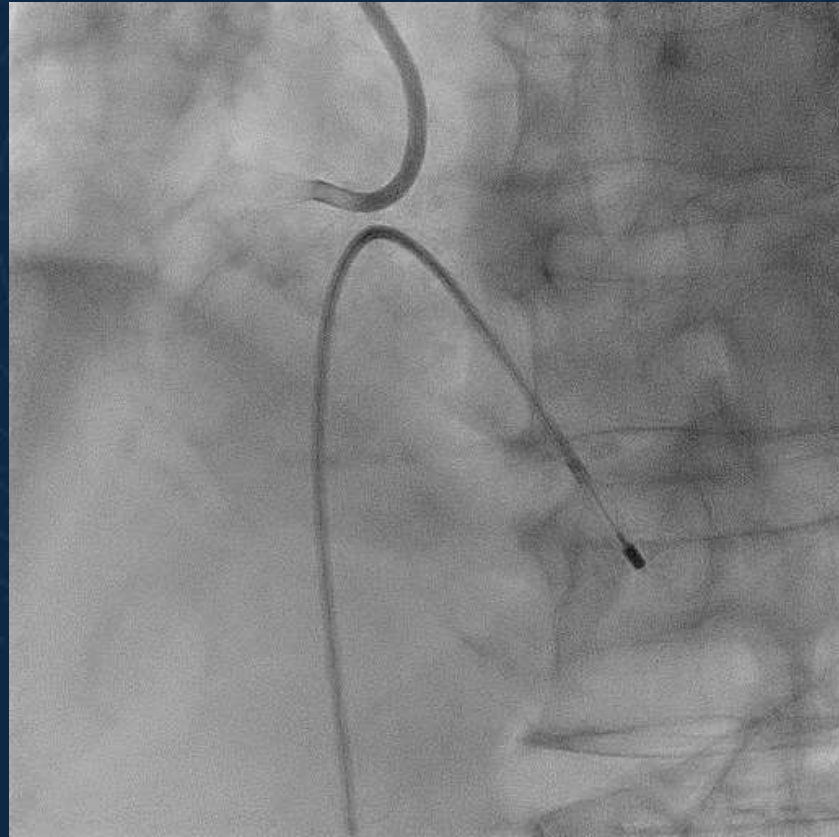
Disclosure

- Travel grant from Abbott

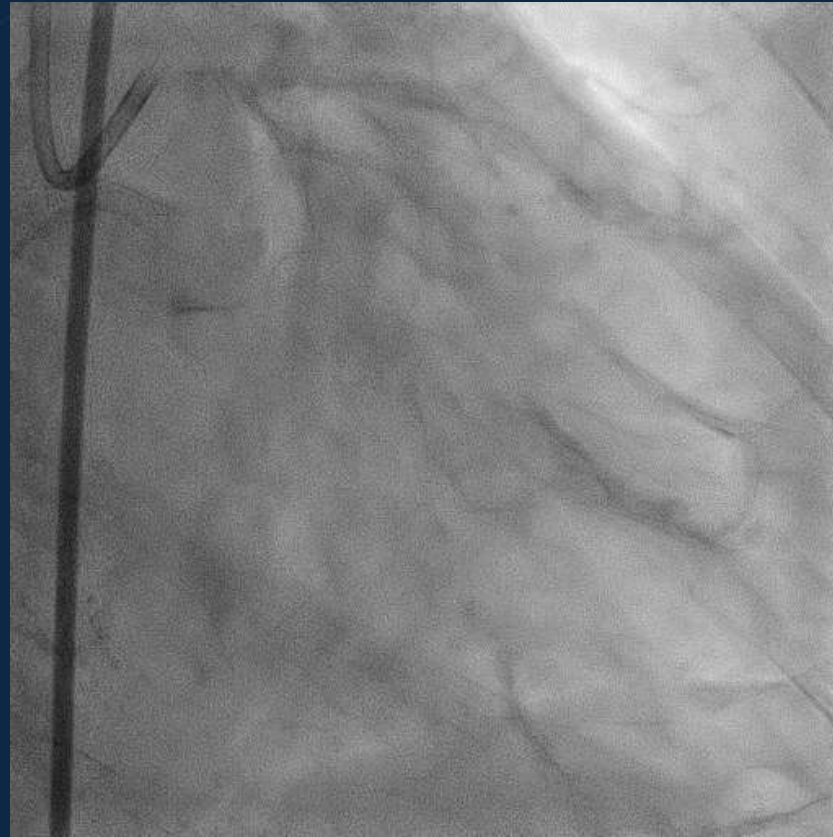
Case background

- 88 year old fit man
- HTN
- Presents with typical crushing chest pain with radiation to the jaw
- ECG shows minimal ST segment depressions in the inferior leads
- ECHO (EF60%)

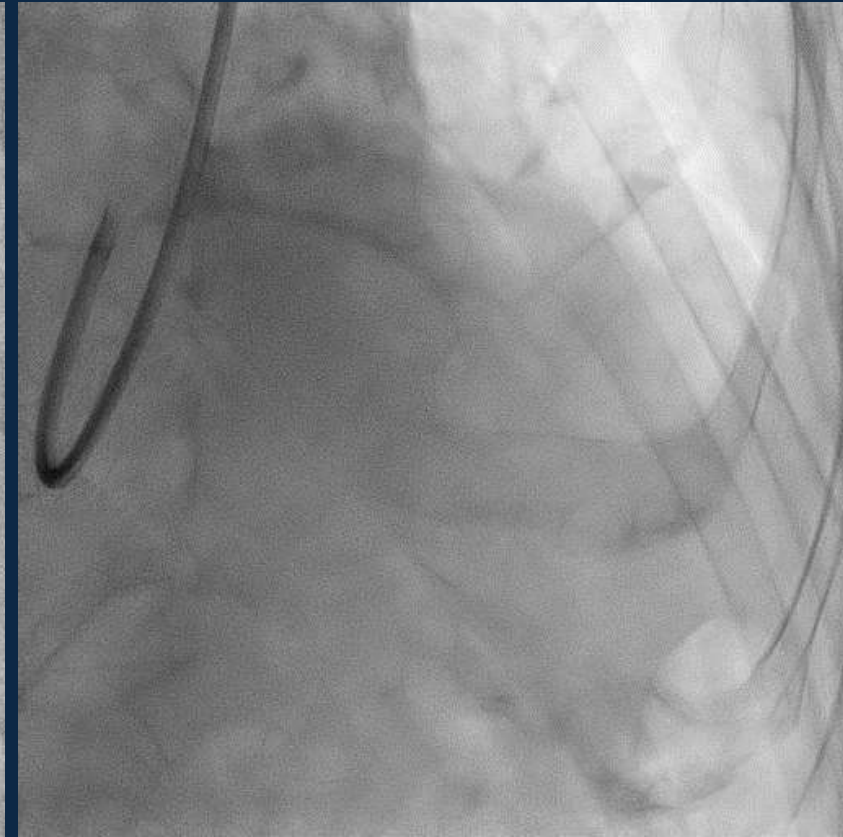
Angiogram



RCA – heavily calcified with nodule at the centre causing severe stenosis



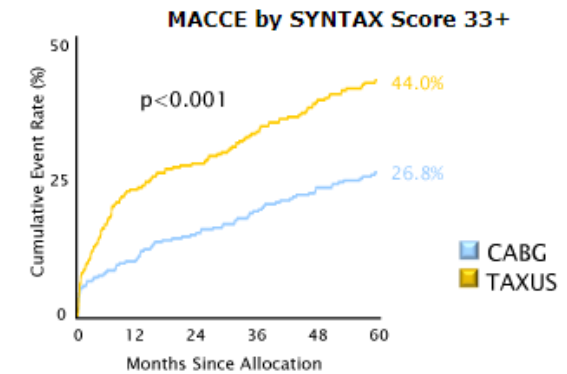
dLMS – critical stenosis caused by calcified stenosis? Calcific nodule



LAD severe stenosis mid LAD calcified, with aneurysmal sac!

Strategy??

- CABG – patient refused
- PCI: ?
- Syntax score : 50
- Right or left system first?
- Strategy : All guns blazing!
- High risk consent



The cumulative MACCE rate is displayed for the SYNTAX Trial group this score corresponds to.

SYNTAX Score I

Lesion 1

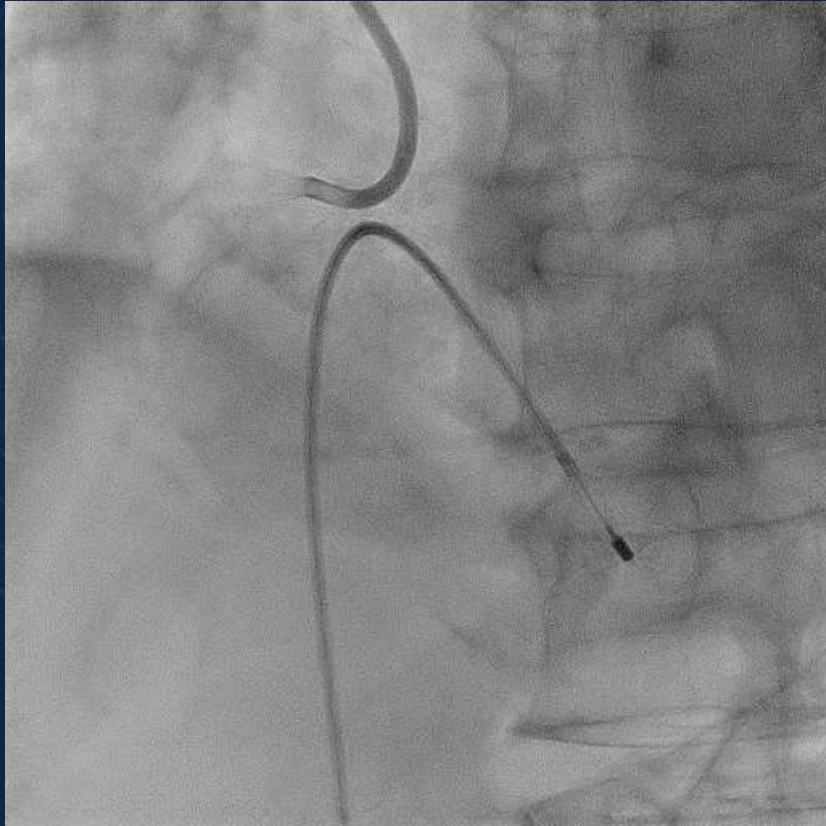
(segment 1): 1x2=	2
(segment 2): 1x2=	2
(segment 3): 1x2=	2
(segment 5): 5x2=	10
(segment 6): 3.5x2=	7
(segment 7): 2.5x2=	5
(segment 9): 1x2=	2
(segment 10): 0.5x2=	1
(segment 11): 1.5x2=	3
(segment 12a): 1x2=	2
(segment 13): 0.5x2=	1
(segment 14): 0.5x2=	1
Trifurcation 3 diseased segment(s) involved	5
Length >20 mm	1
Heavy calcification	2
<i>Sub total lesion 1</i>	46

Diffuse disease/Small vessels

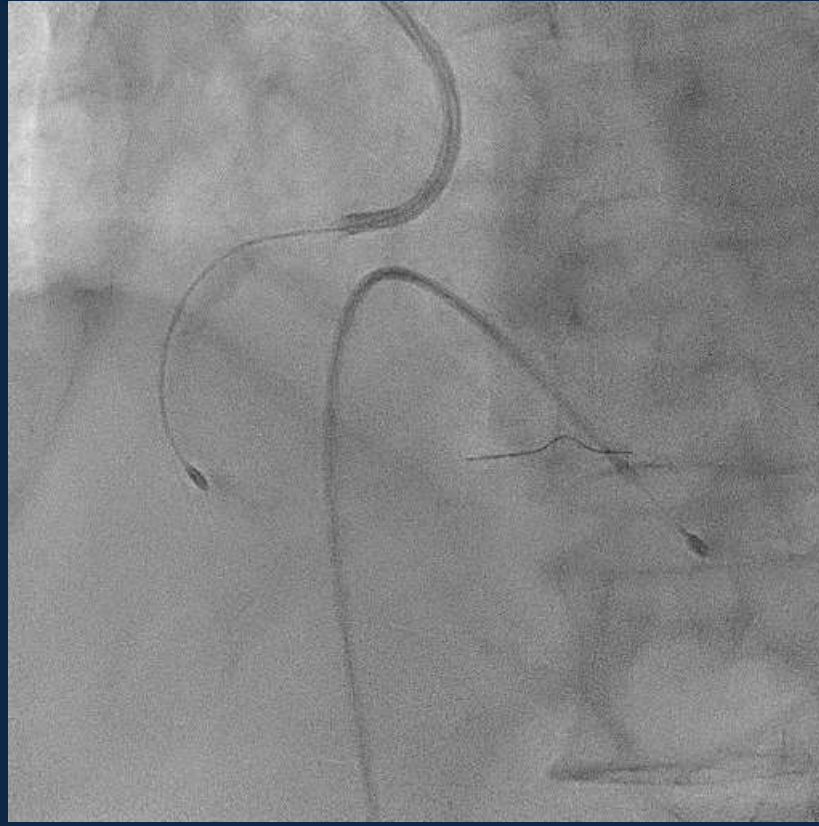
Segment 2	1
Segment 7	1
Segment 11	1
Segment 12a	1
<i>Sub total diffuse disease/small vessels</i>	4

TOTAL: **50**

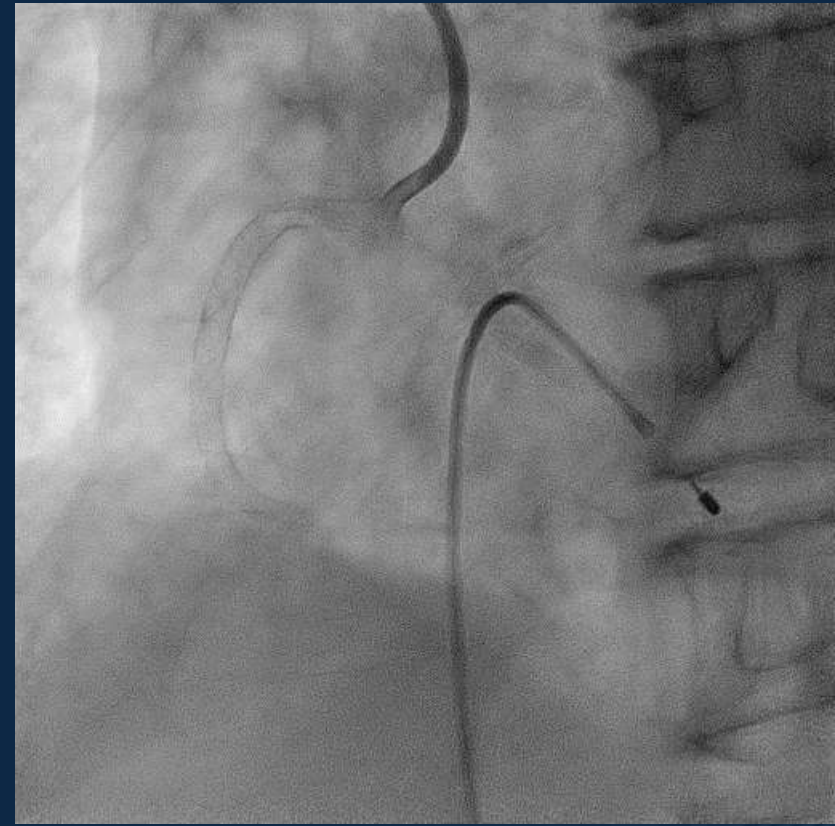
PCI to RCA



RCA – heavily calcified with nodule at the centre causing severe stenosis



Rotablation 1.5mm burr, 7 runs

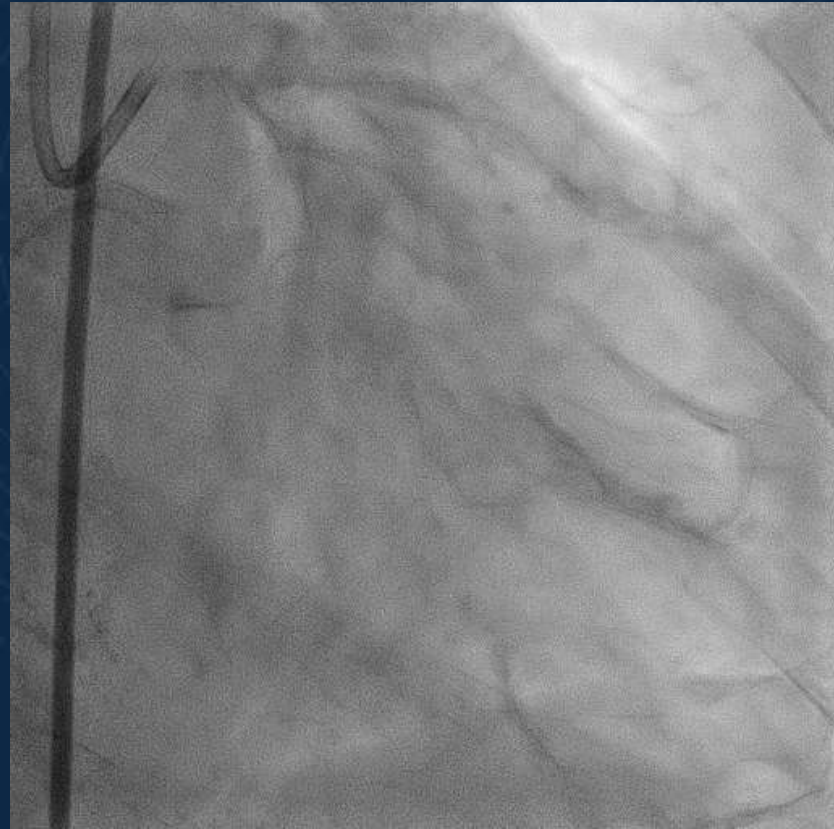


Final results (x2 DES)

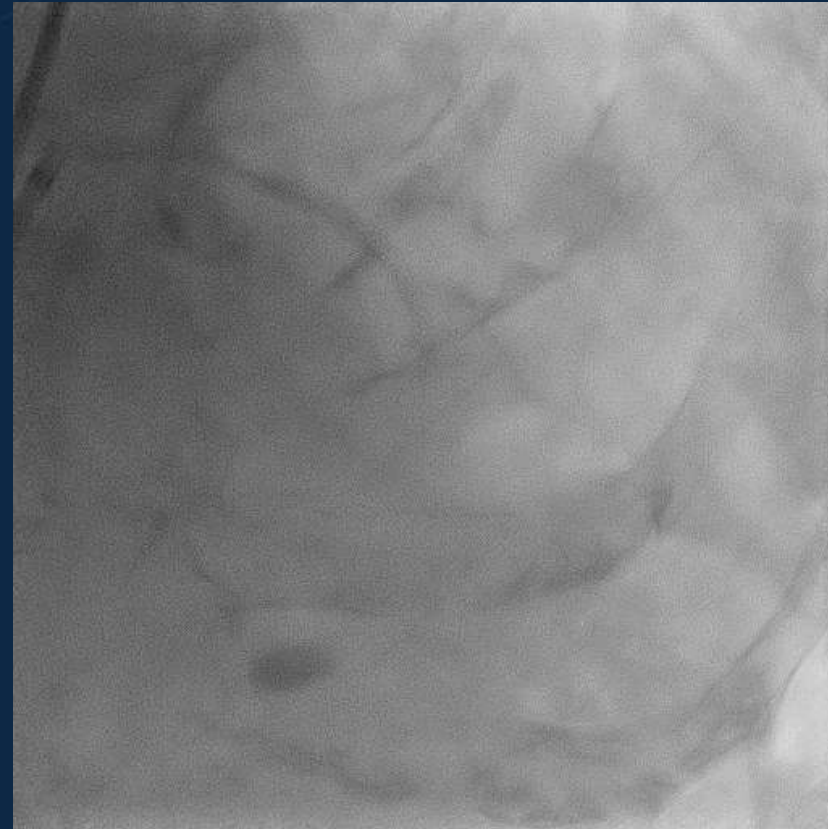
PCI to LMS (with rotablation and OCT)

- Strategy:
 - 7Fr EBU guide
 - Artherectomy is quite likely mandatory
 - OCT as mode of intracoronary imaging
 - Can the OCT catheter pass? Get stuck? Flow obstruction during OCT can be catastrophic
 - Balloon first: 2.0NC to create a channel, and “**palpate**” the vessel

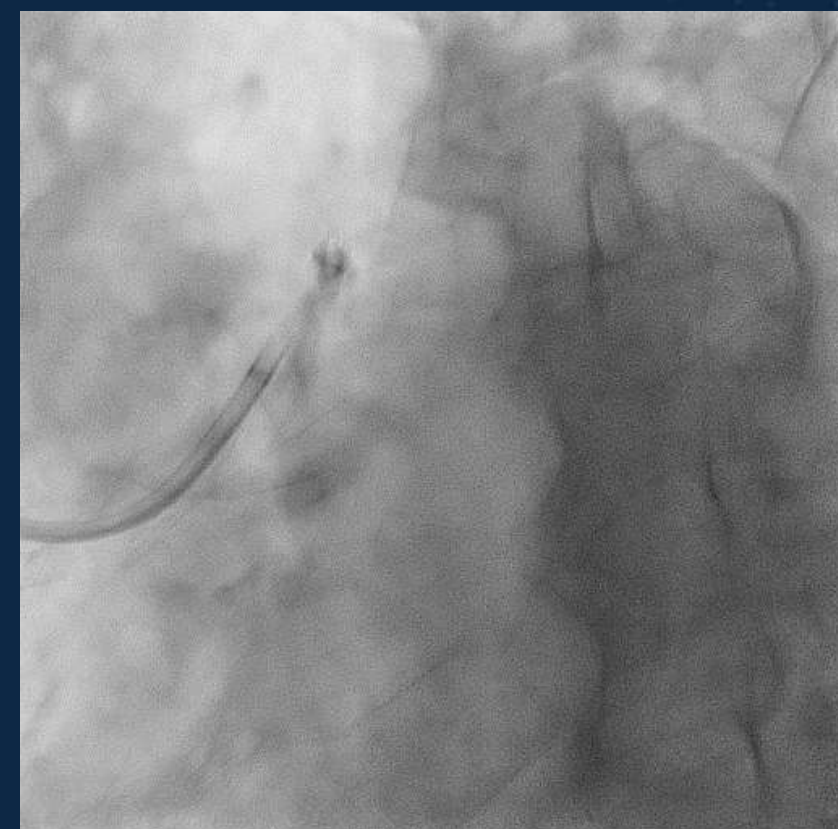
PCI to LMS



LMS – severe distal LM calcification

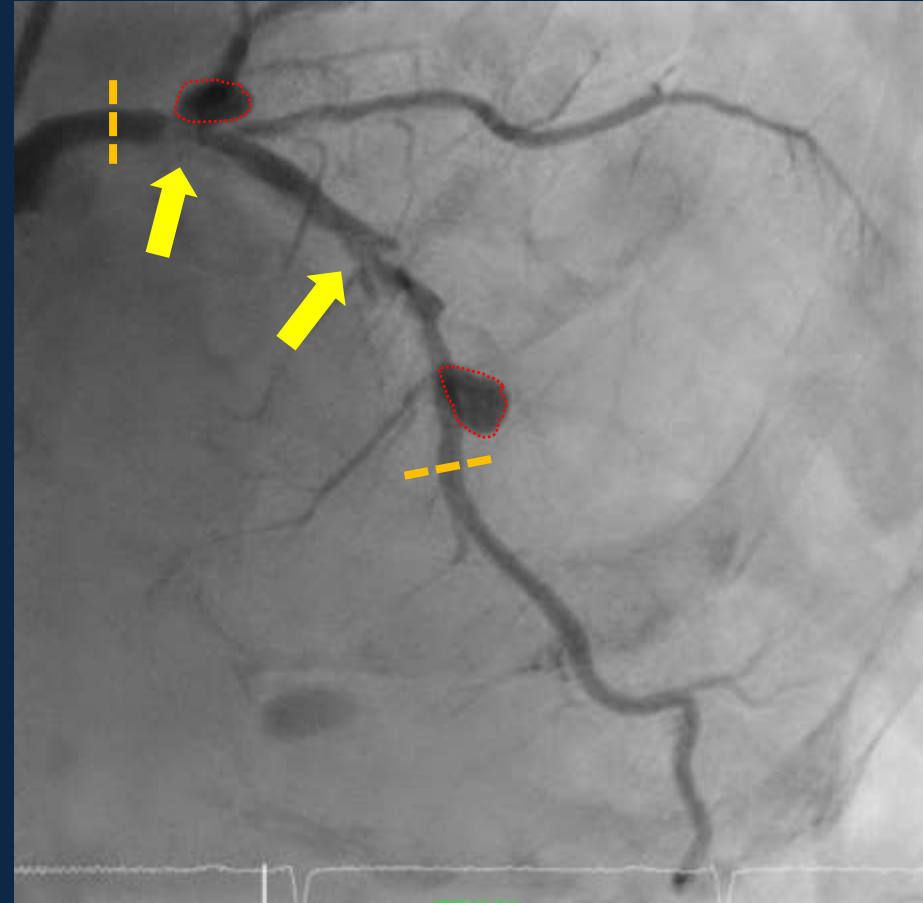
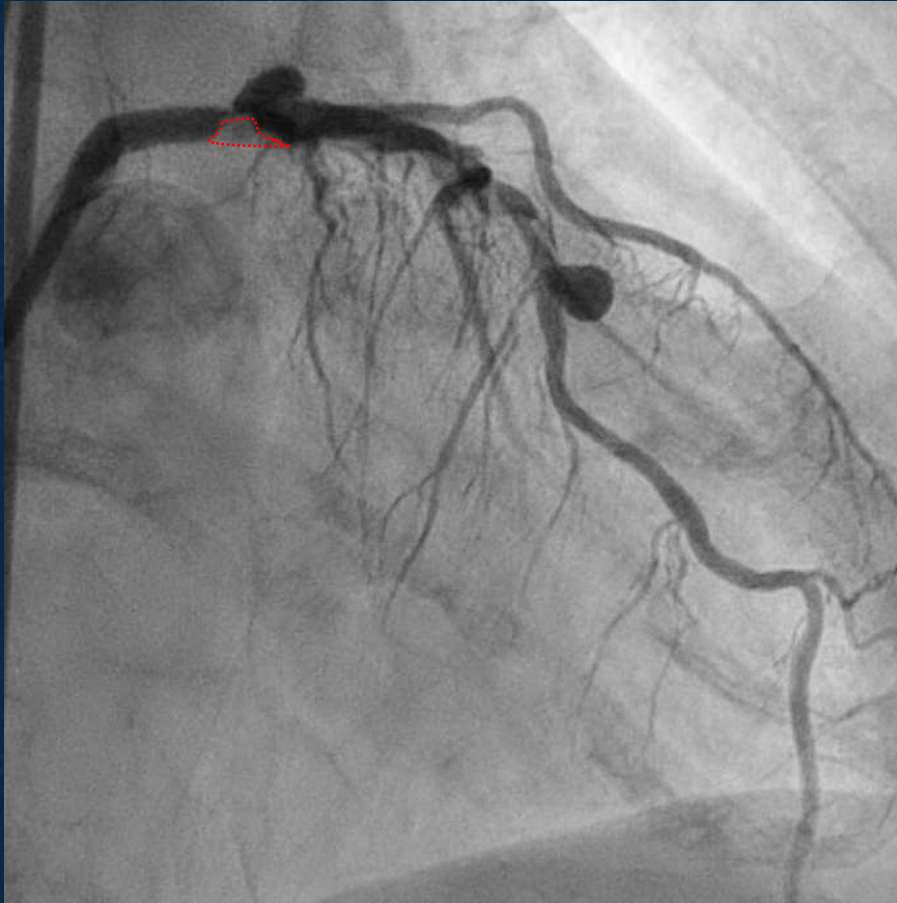


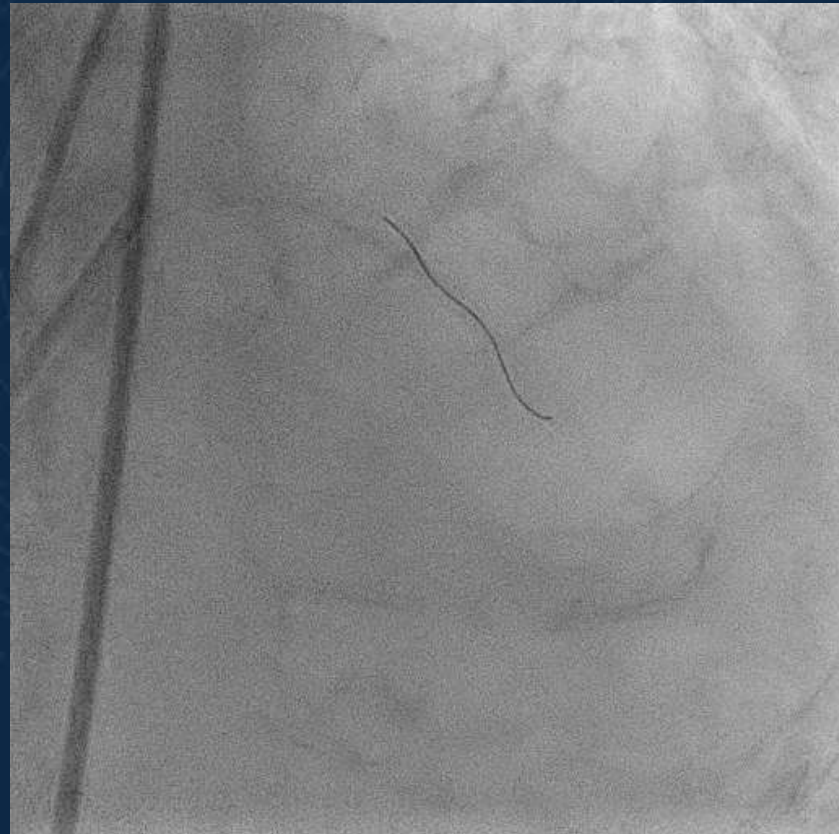
LAD – severe mid LAD stenosis with two Diagonal CTOs, and aneurysmal segment distal LAD



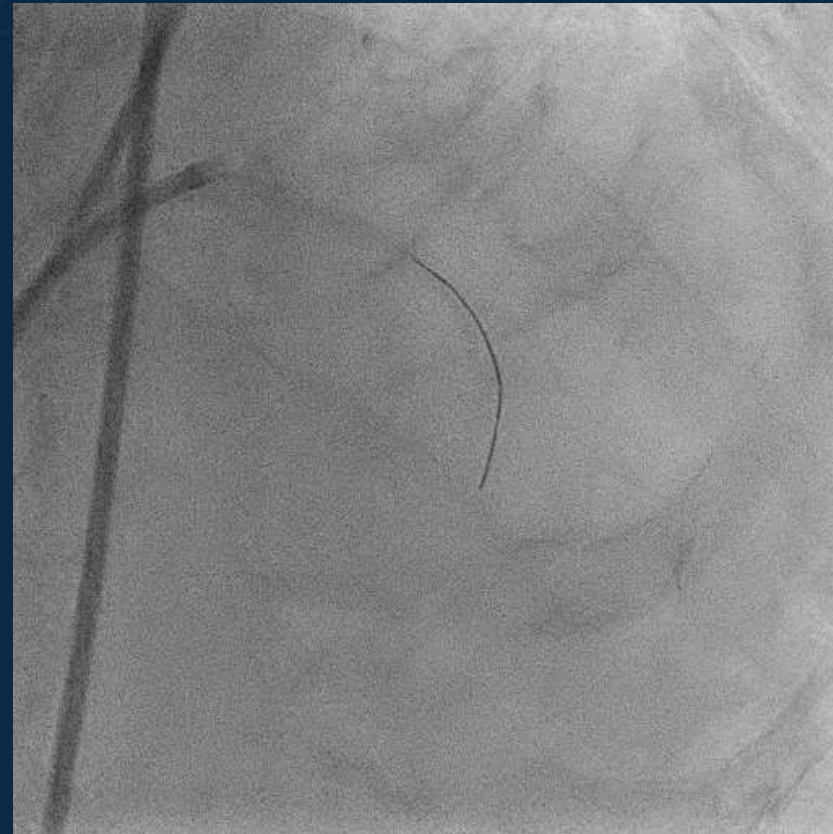
Spider view - overlap

Analysis of angiogram

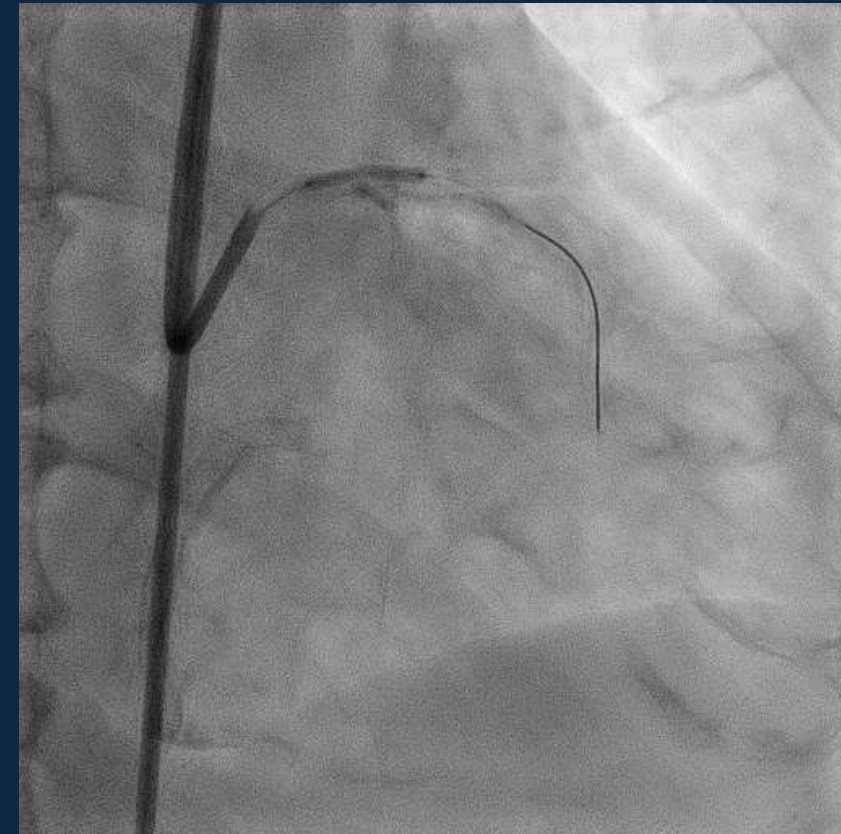




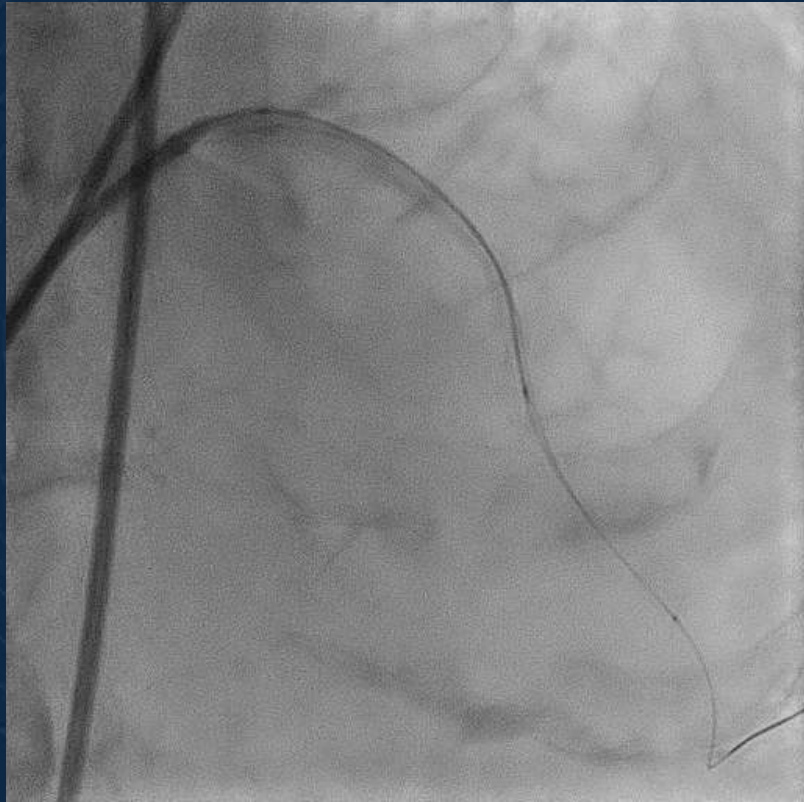
Wired with RTF



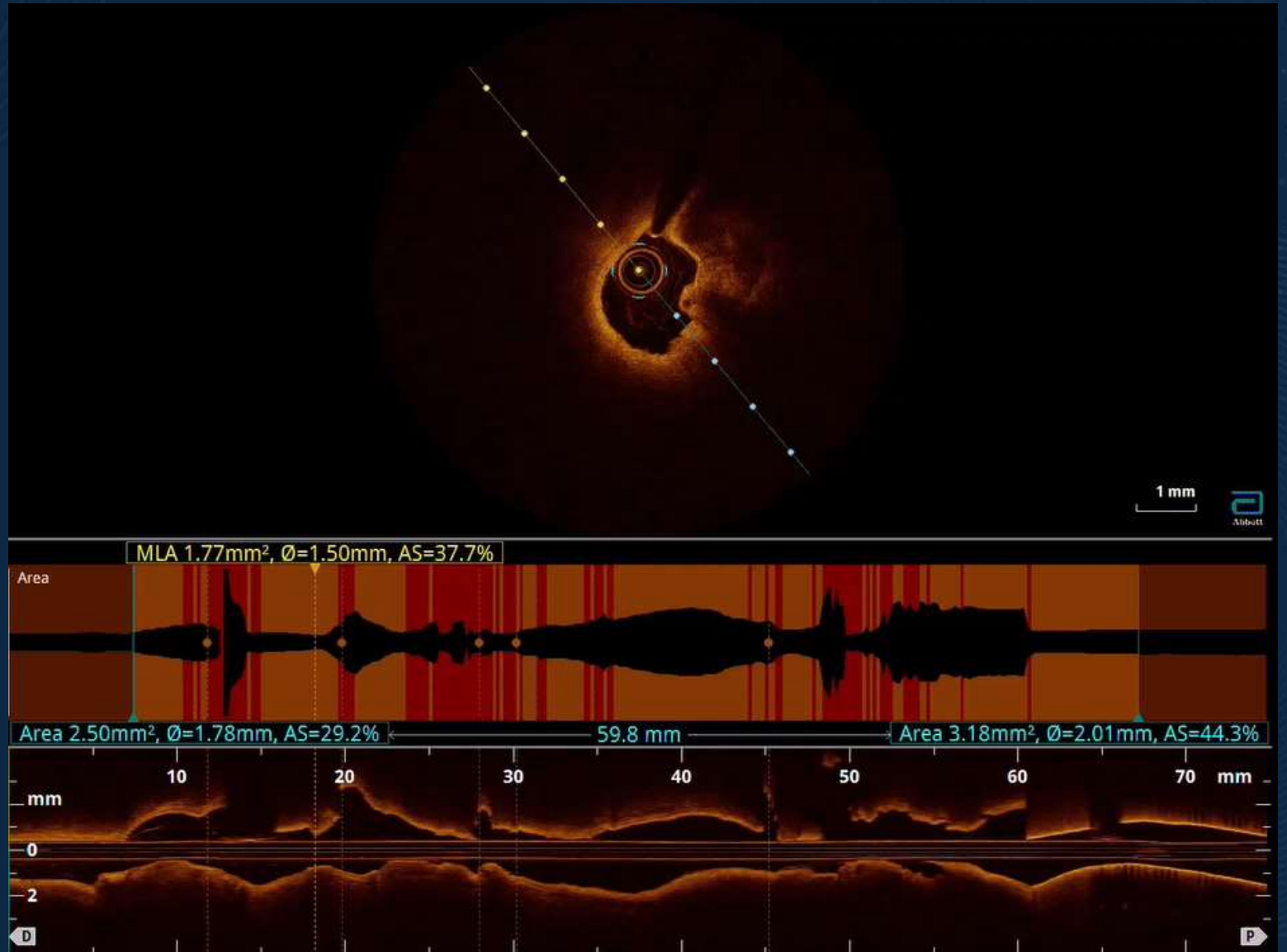
RTF got stuck/lodged in calcium crevice? See how the guide dives in when I retract the wire



Ballooned proximal LMS calcium lesion 2.0NC



OCT to LAD



Analysis of the OCT run



Pre-PCI OCT | Strategize

MORPHOLOGY

If High Calcium¹

>180 degrees, and
>0.5 mm thickness, and
>5 mm in length

Common Practice:²

NC Balloon, IVL,
Cutting/Scoring Balloon, or
Atherectomy

LENGTH

Select Landing Zones³

Visually scan for largest luminal
area

Place landing zones in healthy
tissue (i.e. EEL visualization)

*Note: In the absence of EEL to represent
healthy tissue find the largest lumen to avoid
areas of TCFA or lipid pools so as to not land
your stent edge in these high risk areas⁴*

Adjust to stent length

DIAMETER

Measure Vessel Diameter⁵

Take EEL measurements at each reference (lumen if EEL not
visible)

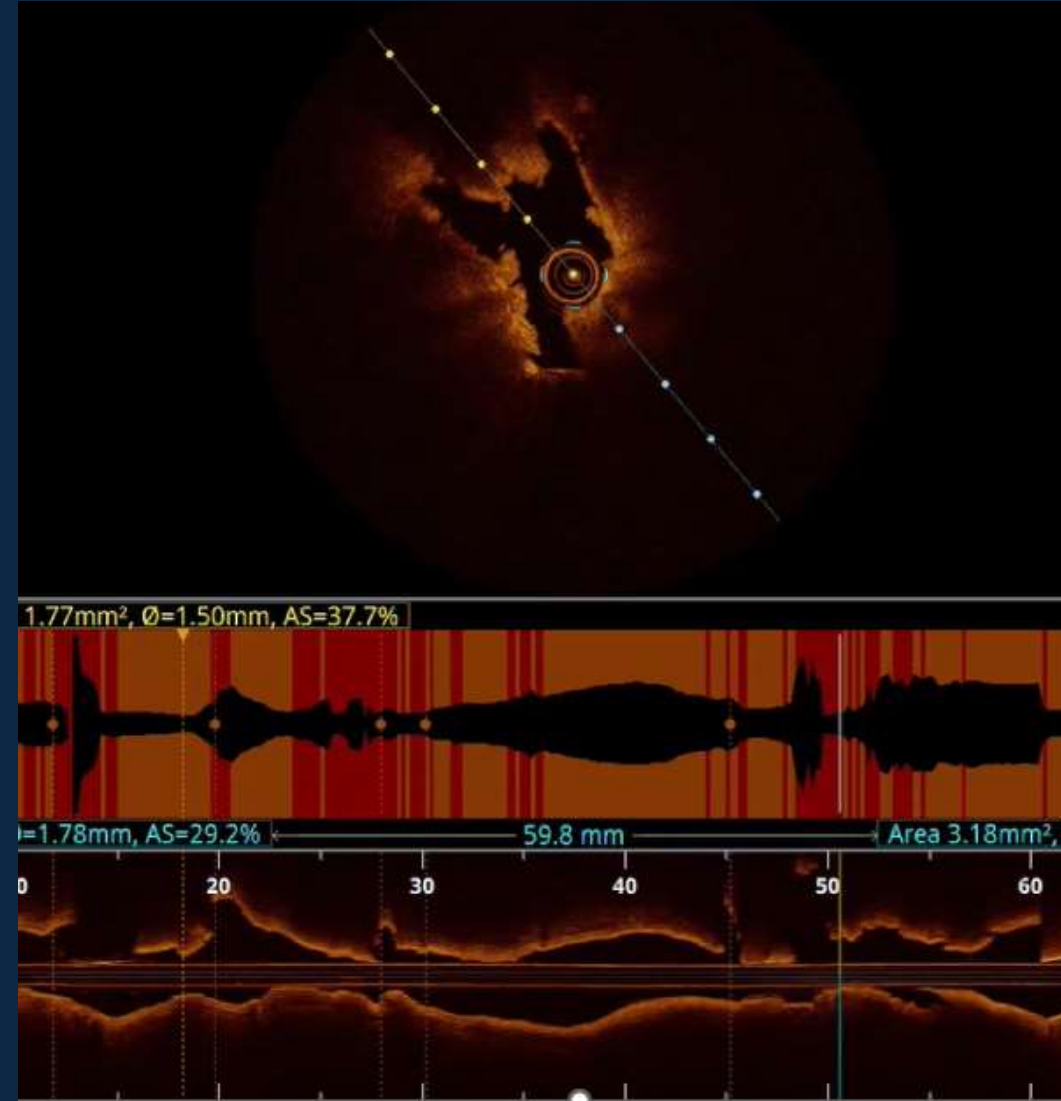
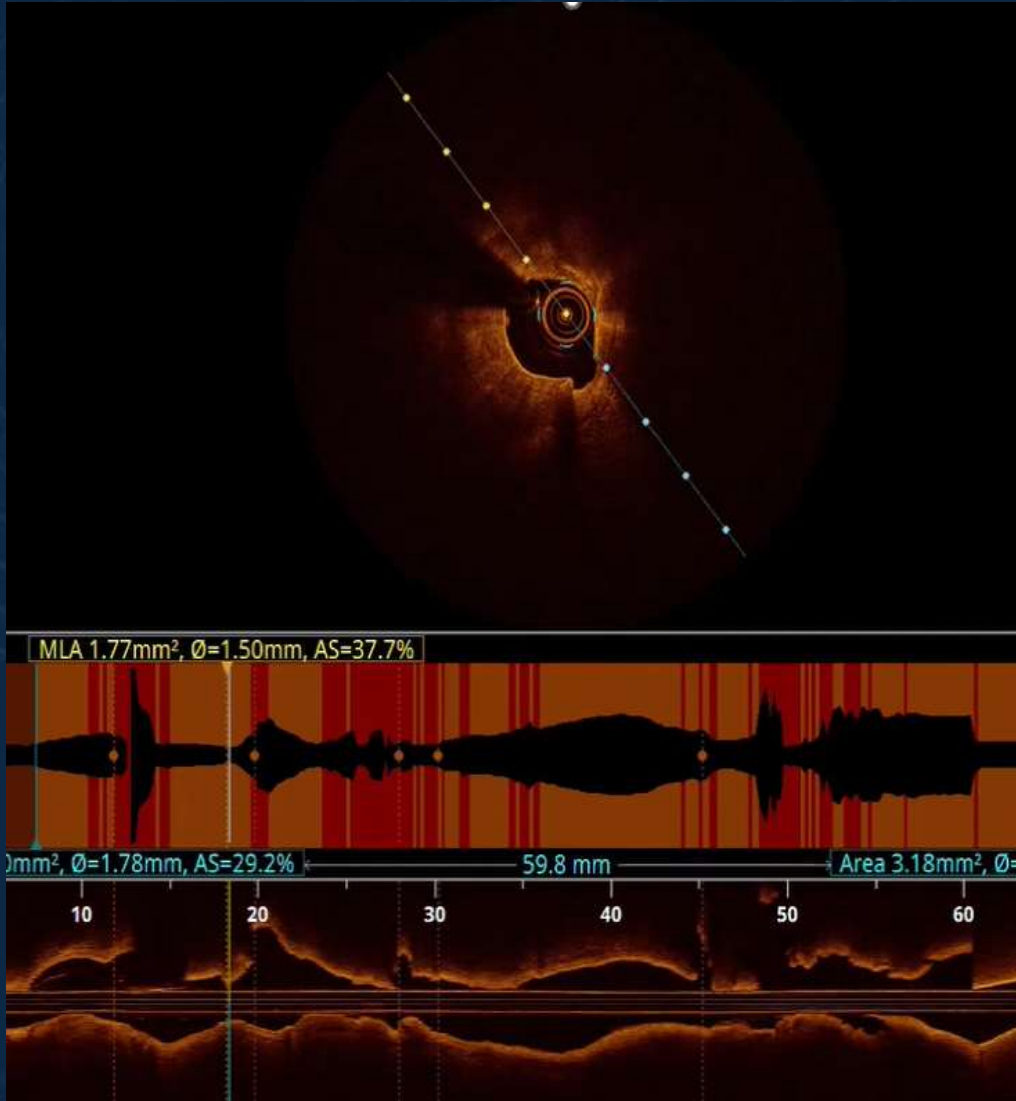
Choose Stent Diameter⁵

Use the distal reference measurement to select stent diameter
EEL: round down to nearest stent size. Lumen: round up

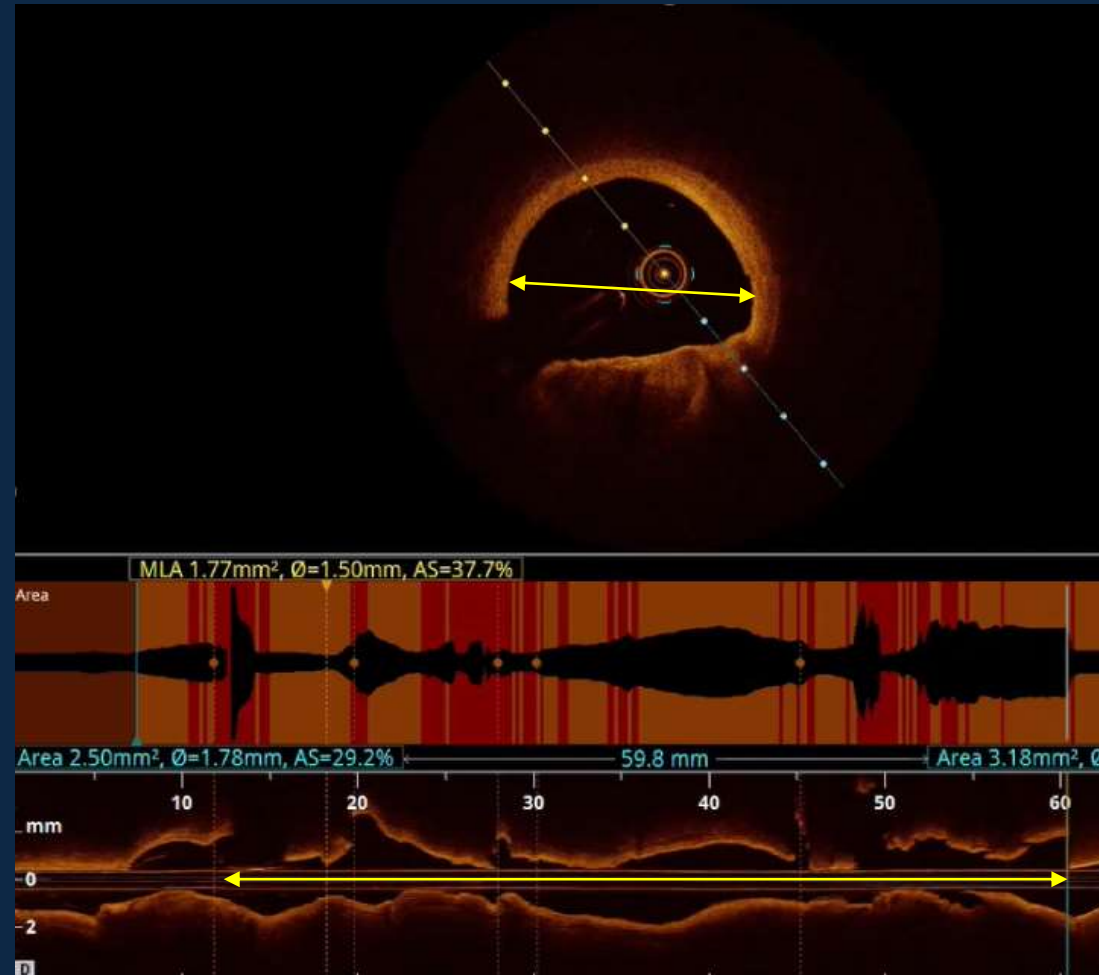
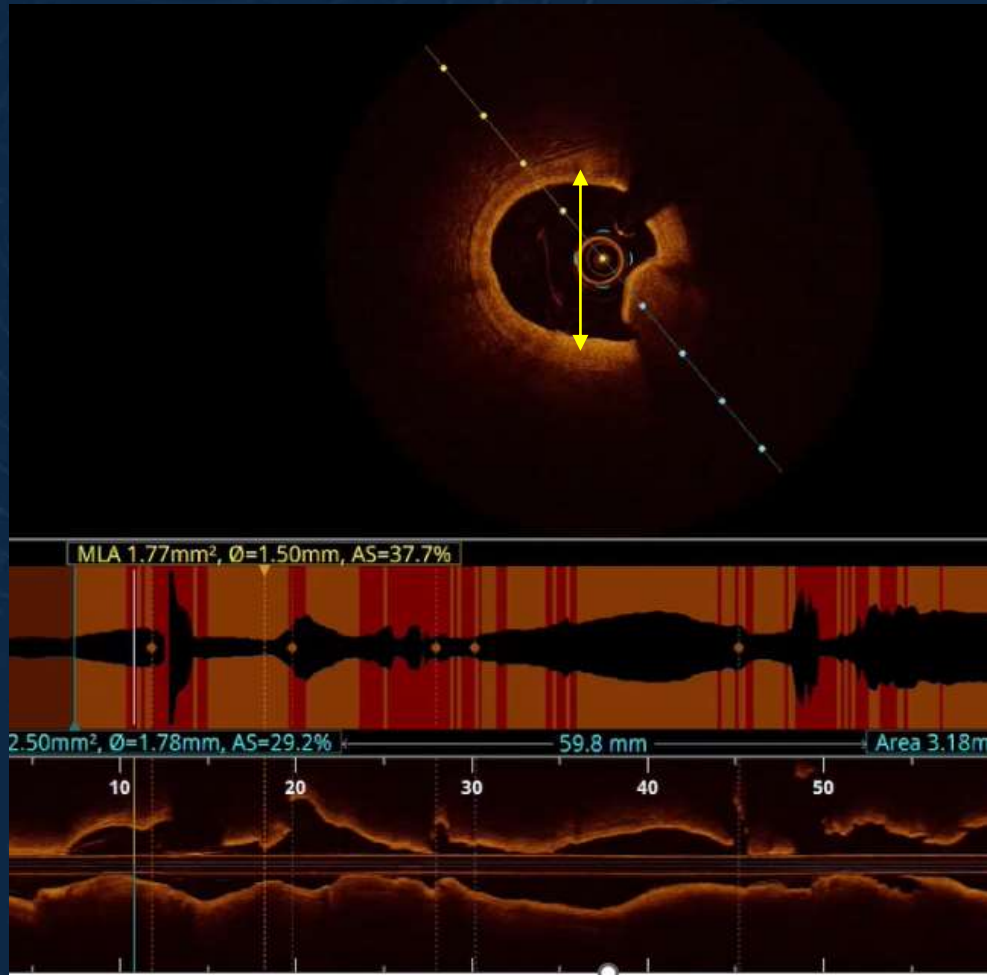
Choose Post Dilatation Balloon Diameter⁵

Distal Balloon: Use distal reference measurement
Proximal Balloon: Use proximal reference measurement

Analysis of the OCT run : M



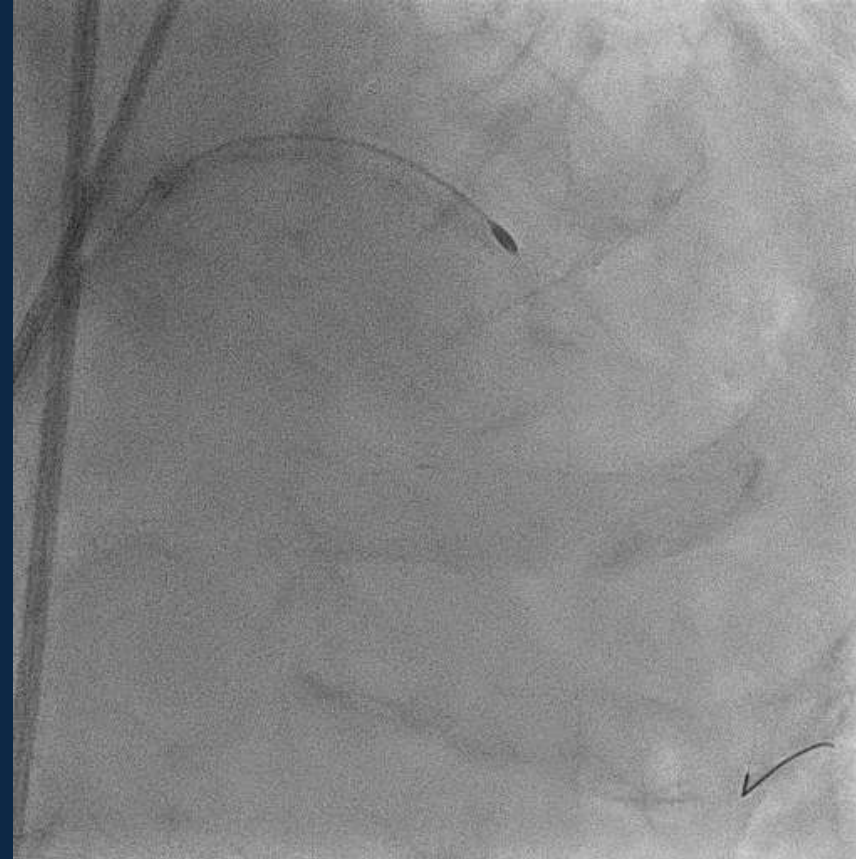
Analysis of the OCT run : L , D



Proceed with rotational arterectomy

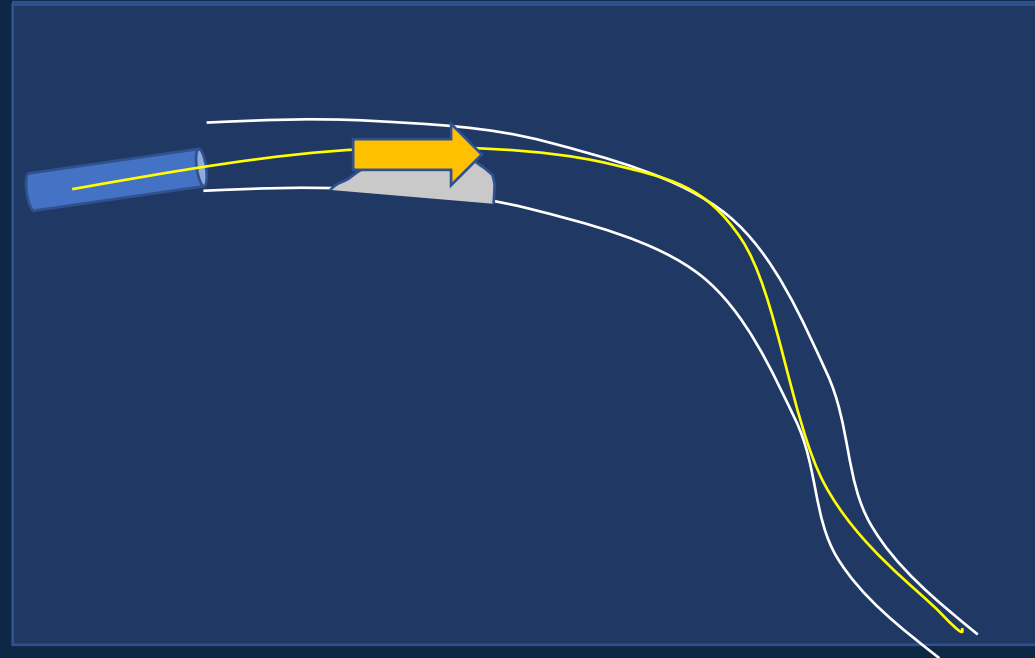
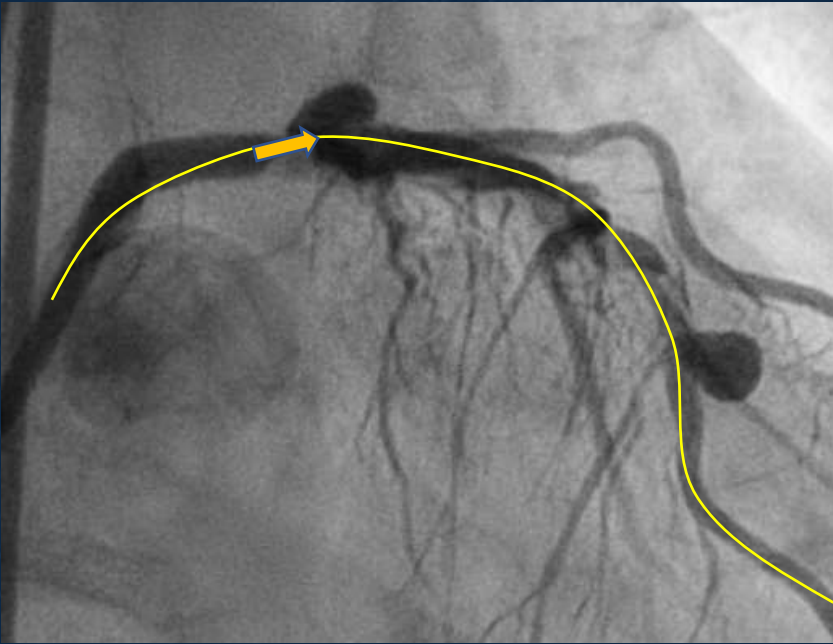


Rotablation 1.5 burr 18000rpm



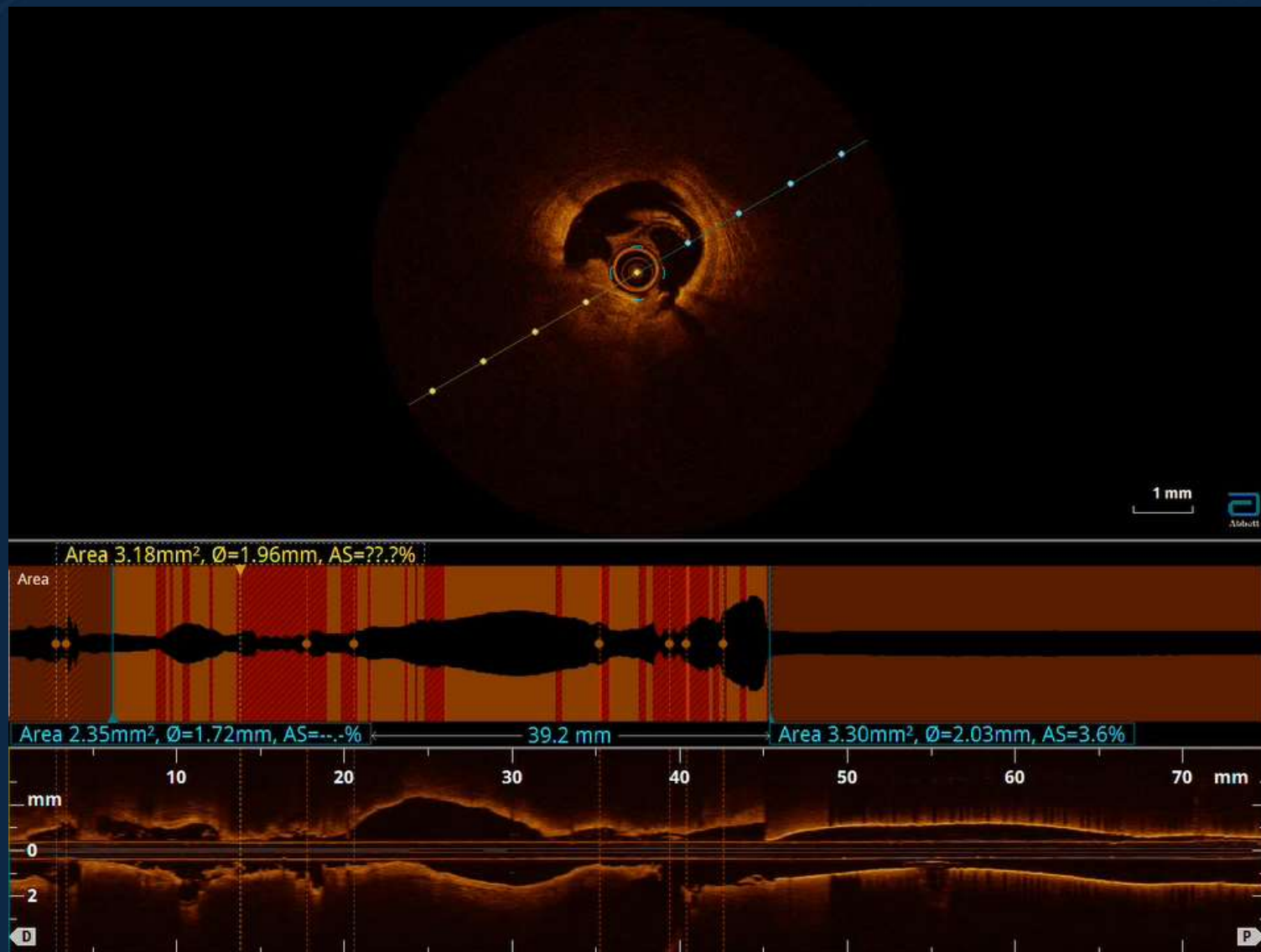
Rotablation 1.5 burr 18000rpm
Deceleration to 16000rpm!

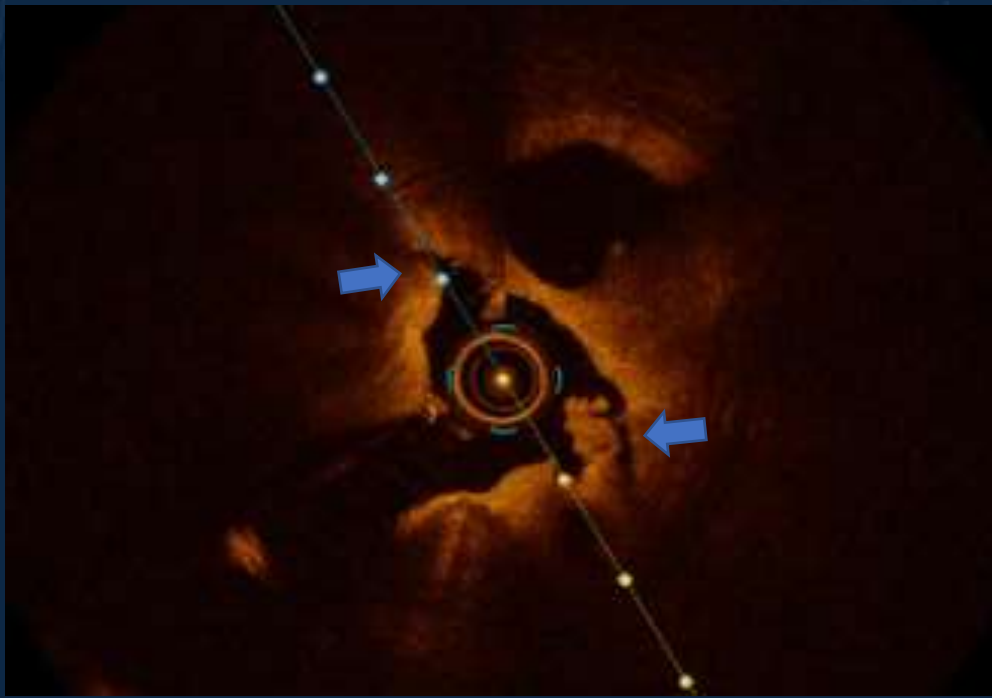
Modification of wire bias to achieve better rotablation by guide manipulation



We also reduced the burr speed to 160000rpm to increase circumferential burr movement slightly

Repeat OCT after artherectomy



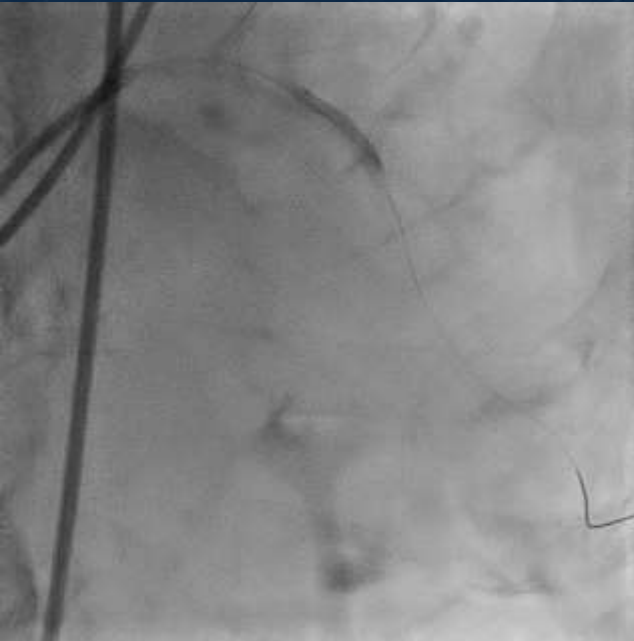


Distal calcium modification



Proximal LAD ostium and LMS calcium modification

Proceed with scoring balloon angioplasty



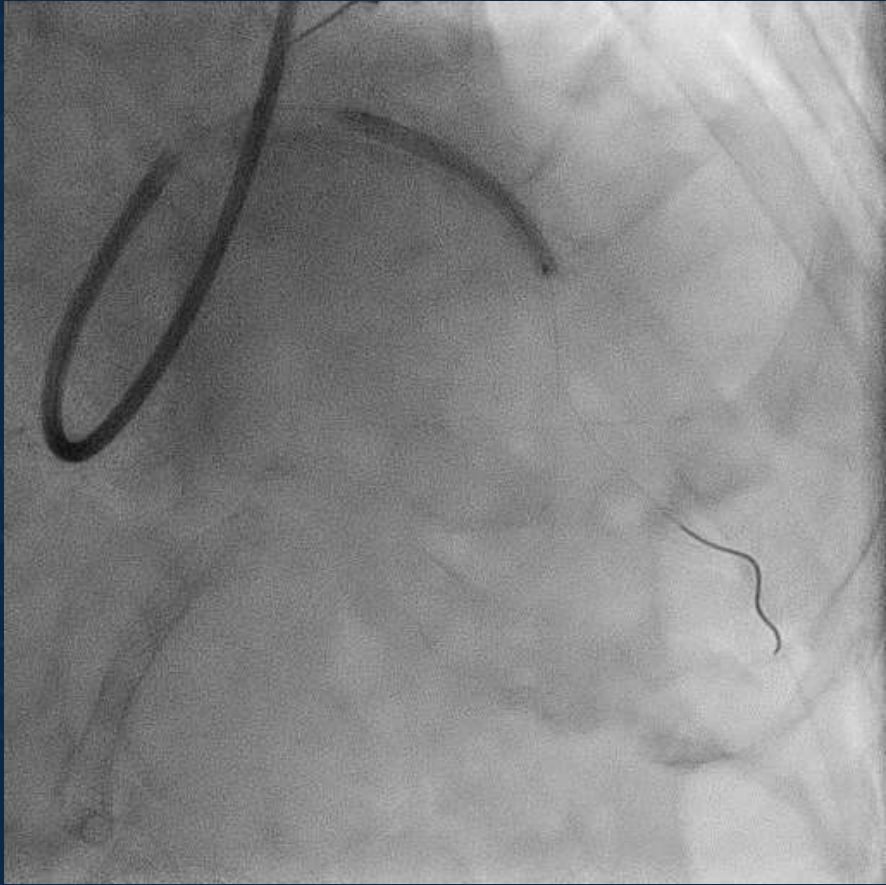
2.5x15 scoring balloon at 20atm



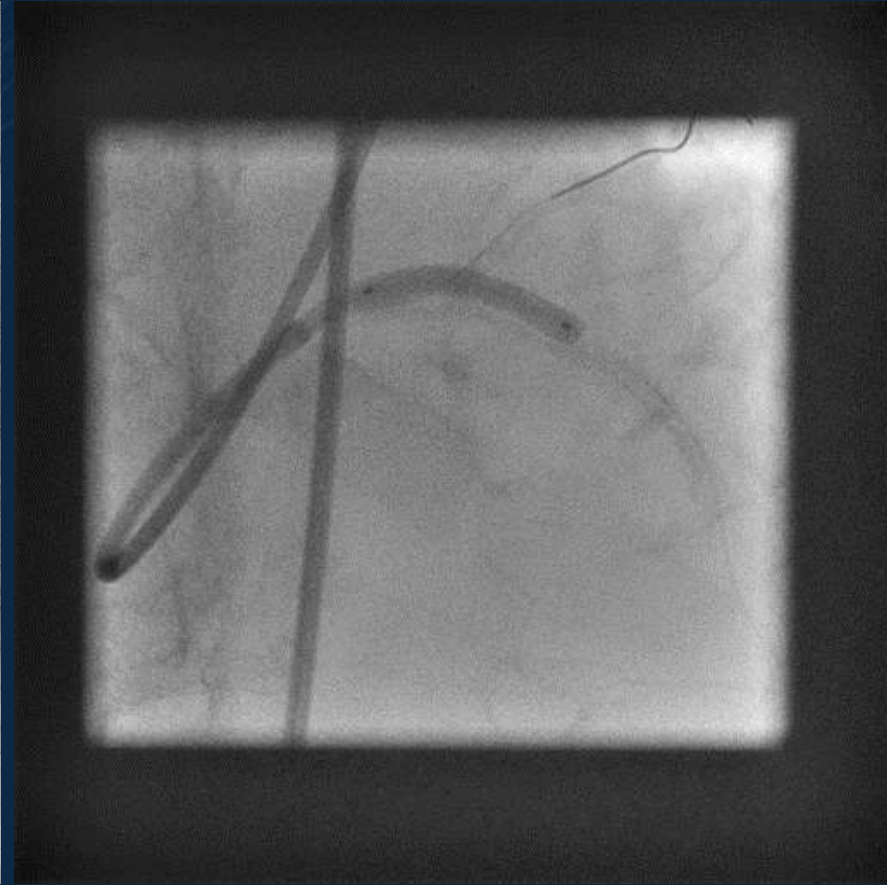
3.0x15 scoring balloon at 20atm



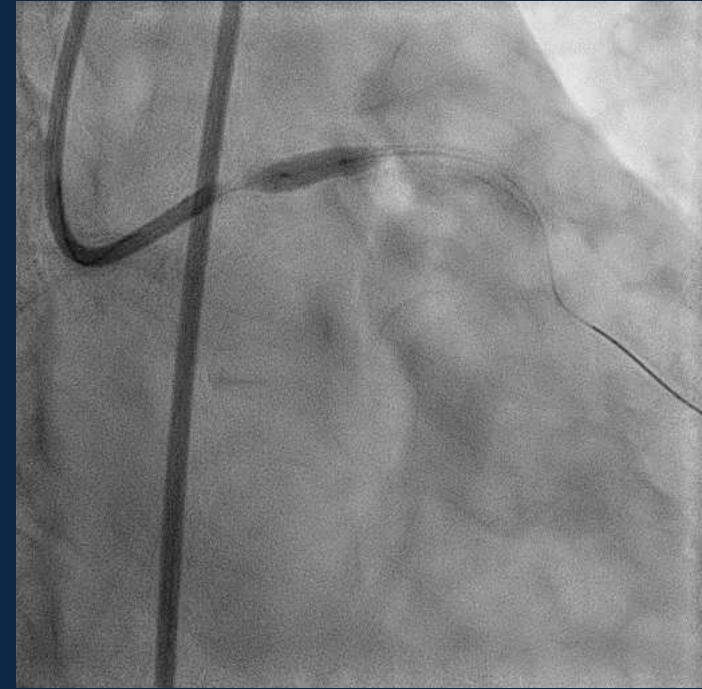
DES implantation



2.5x 28mm

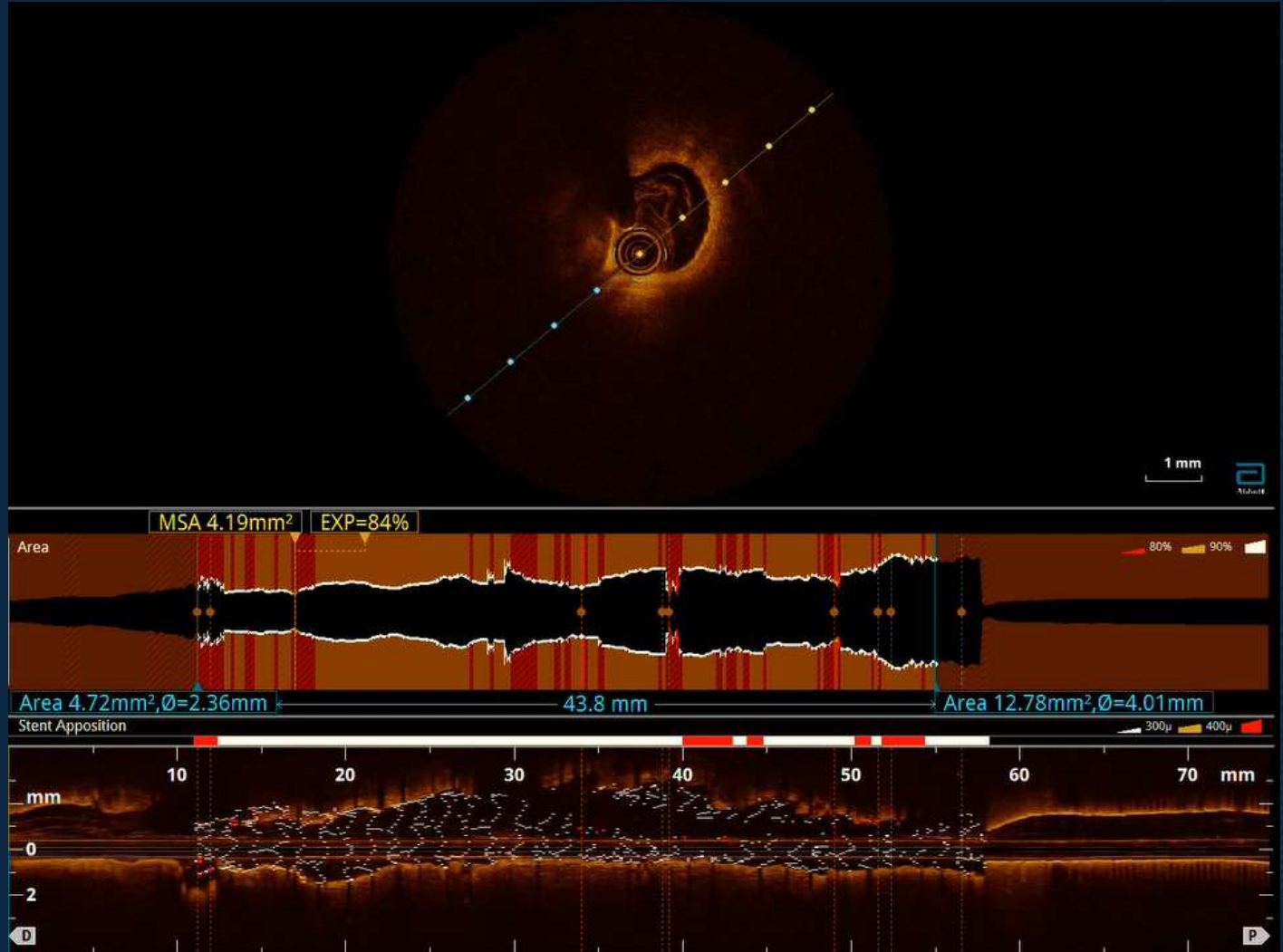
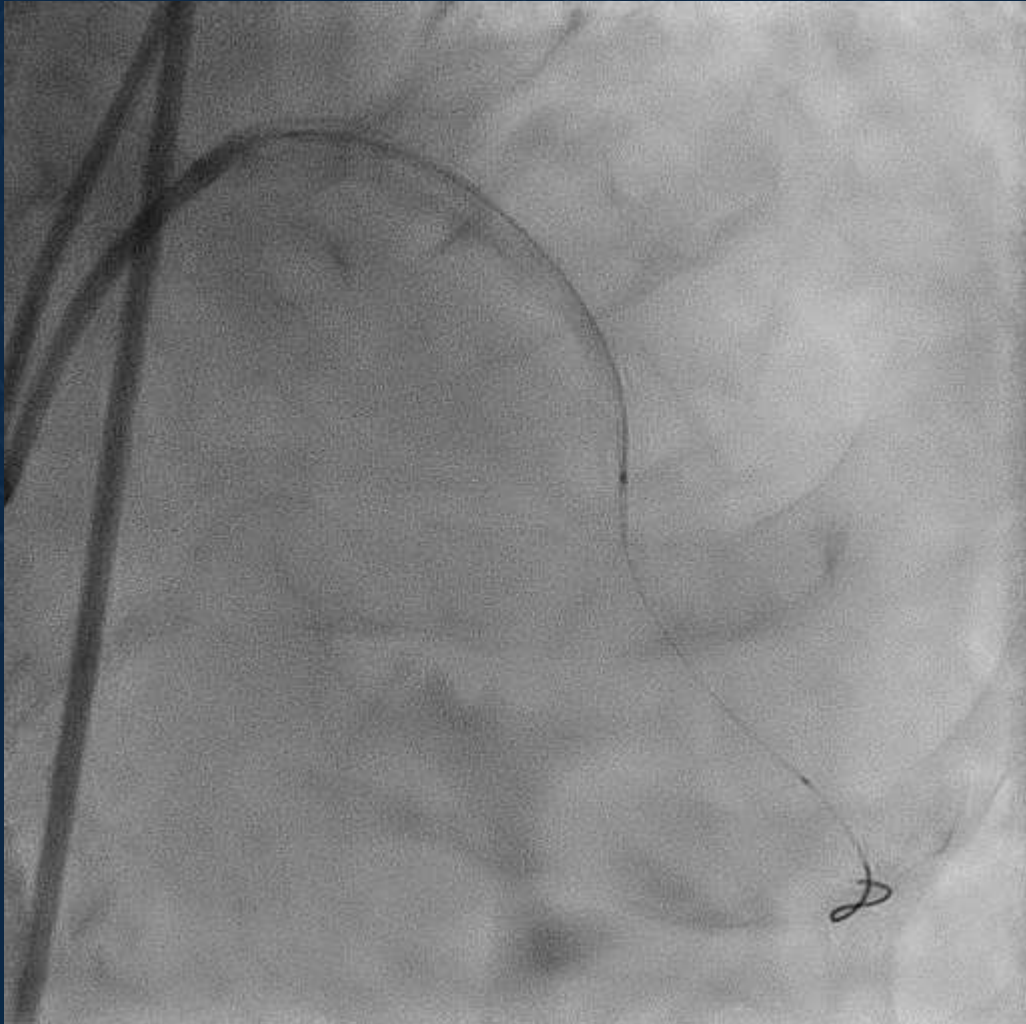


3.5x 28mm



4.0x8mm POT

Repeat OCT after Stenting and optimization



Post PCI assessment by OCT



Post-PCI OCT | Optimize

MEDIAL DISSECTION

Address Significant Dissection⁴

Dissection penetrates medial layer, and is greater than 1 quadrant arc

Common Practice:^{4,5}

Place additional stent (particularly for distal dissections)

APPOSITION

Address Gross Malapposition

Longer than 3 mm,⁵ and ≥ 0.3 mm from wall⁶

Common Practice:⁴

Dilate with semi-compliant balloon at low pressure

XPANSION

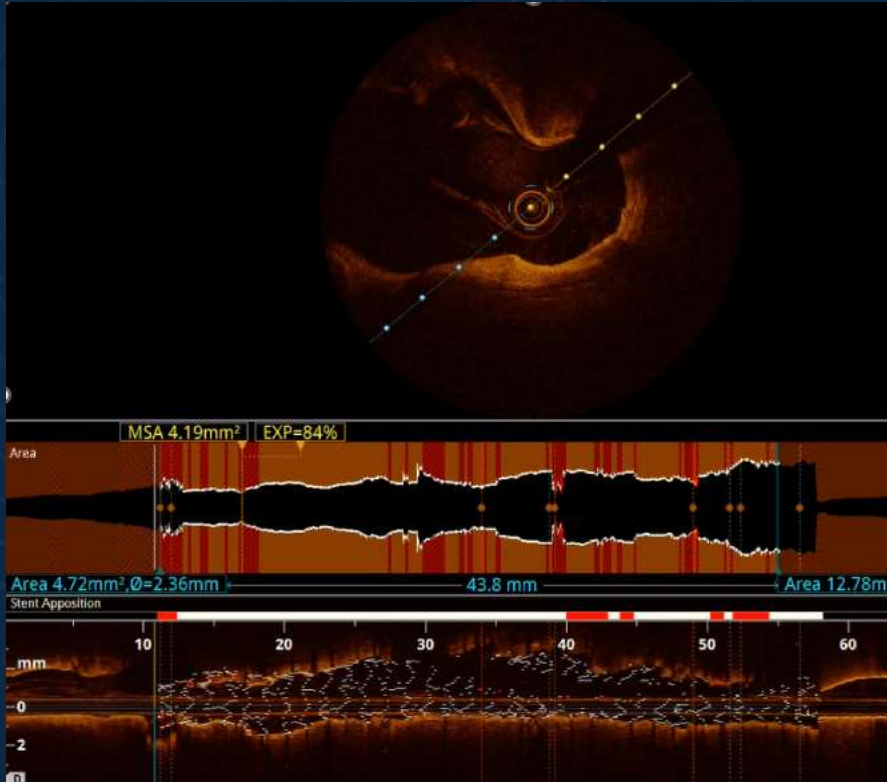
Confirm Expansion^{4,7}

$\geq 80\%$ acceptable ($\geq 90\%$ optimal)

Common Practice:⁸

If not achieved, post-dilate with non-compliant balloon

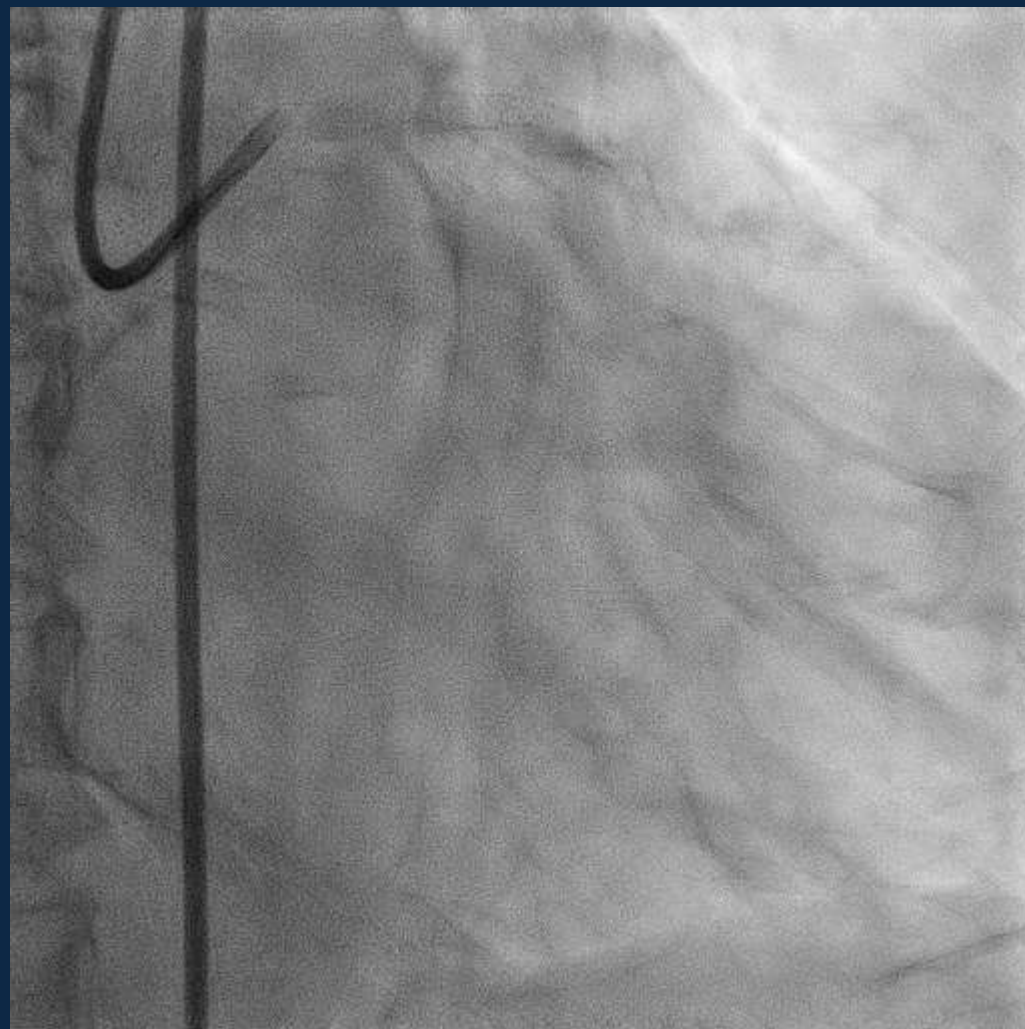
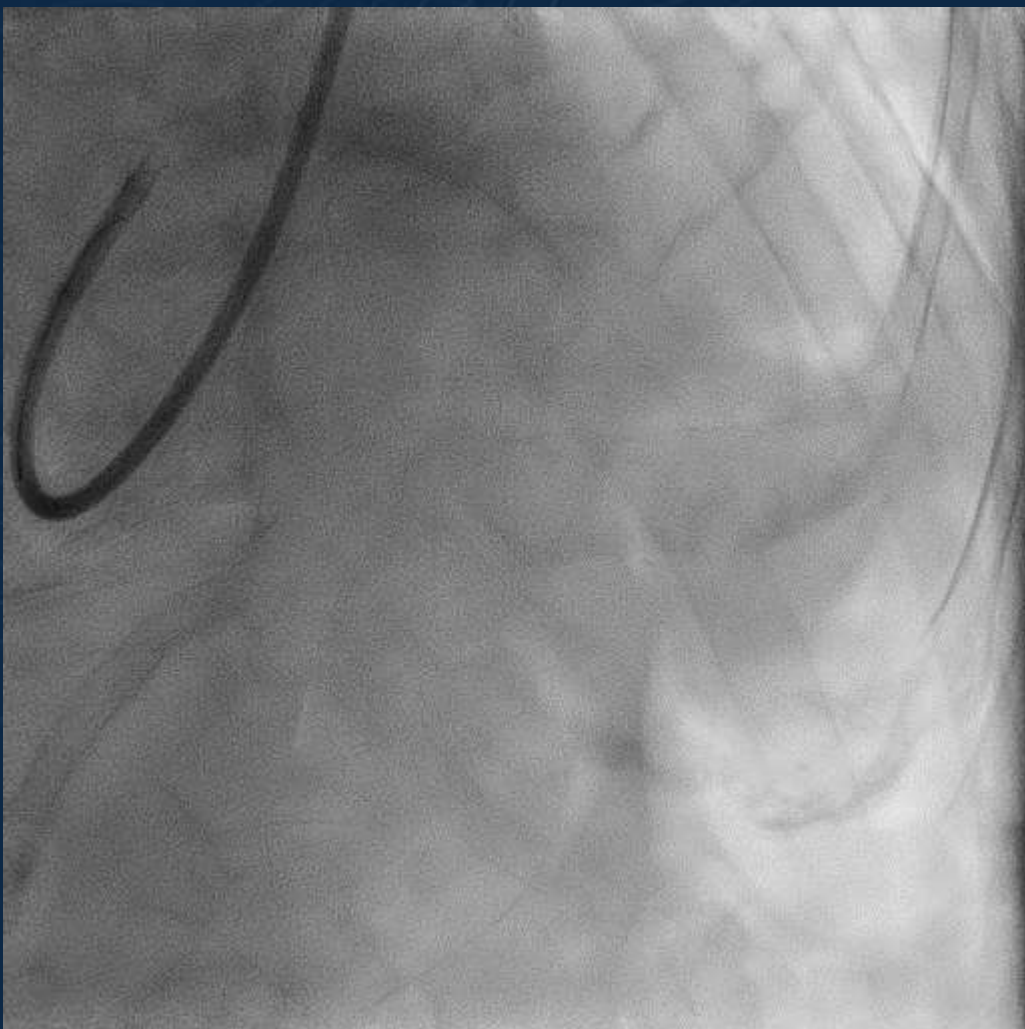
M : Medial dissection



Distal stent edge, no dissection

Proximal stent edge, cannot assess as too proximal (left main ostium) and unable to engage guide properly but at the same time visualize the proximal stent edge

Final results



Discussion Points

- Would the cardiothoracic surgeon and anaesthetist take this 88 year old fit patient for urgent **CABG** in your centre?
- Would anyone have performed PCI to **left system first** rather than the RCA
- Do you routinely use **backup transvenous pacing** when performing artherectomy to RCA?
- For the LMS-LAD lesion, would you have considered other modalities of calcium modification eg **OAS/ Laser/ IVL**?
- Would anyone have **upsized the Rota** burr to 1.75 or even 2.0mm?
- Any other tips and tricks to optimize rotablation efficacy in calcified nodules/ eccentrically calcified lesion
- Would anyone have used **IABP** for this case prophylactically despite a good LVEF 60%

Conclusion

- Patient recovered well post angioplasty and was discharged home the next day. He is well at 1 months clinic follow up with NYHA class 1 and no chest pain, and has returned to his usual routine of cycling.
- In conclusion, high-risk complex angioplasty can be successfully performed with low rates of complications when done with proper planning and in stages. This case illustrates how different intracoronary imaging modalities (OCT) have been instrumental in choosing the right calcium debulking methods, ensuring good stent expansion and reducing the risk of stent failure. In summary, intracoronary imaging should be mandated in cases with heavily calcified plaque.