Complex PCI 2022
My first OCT guided PCI for STEMI as a Junior

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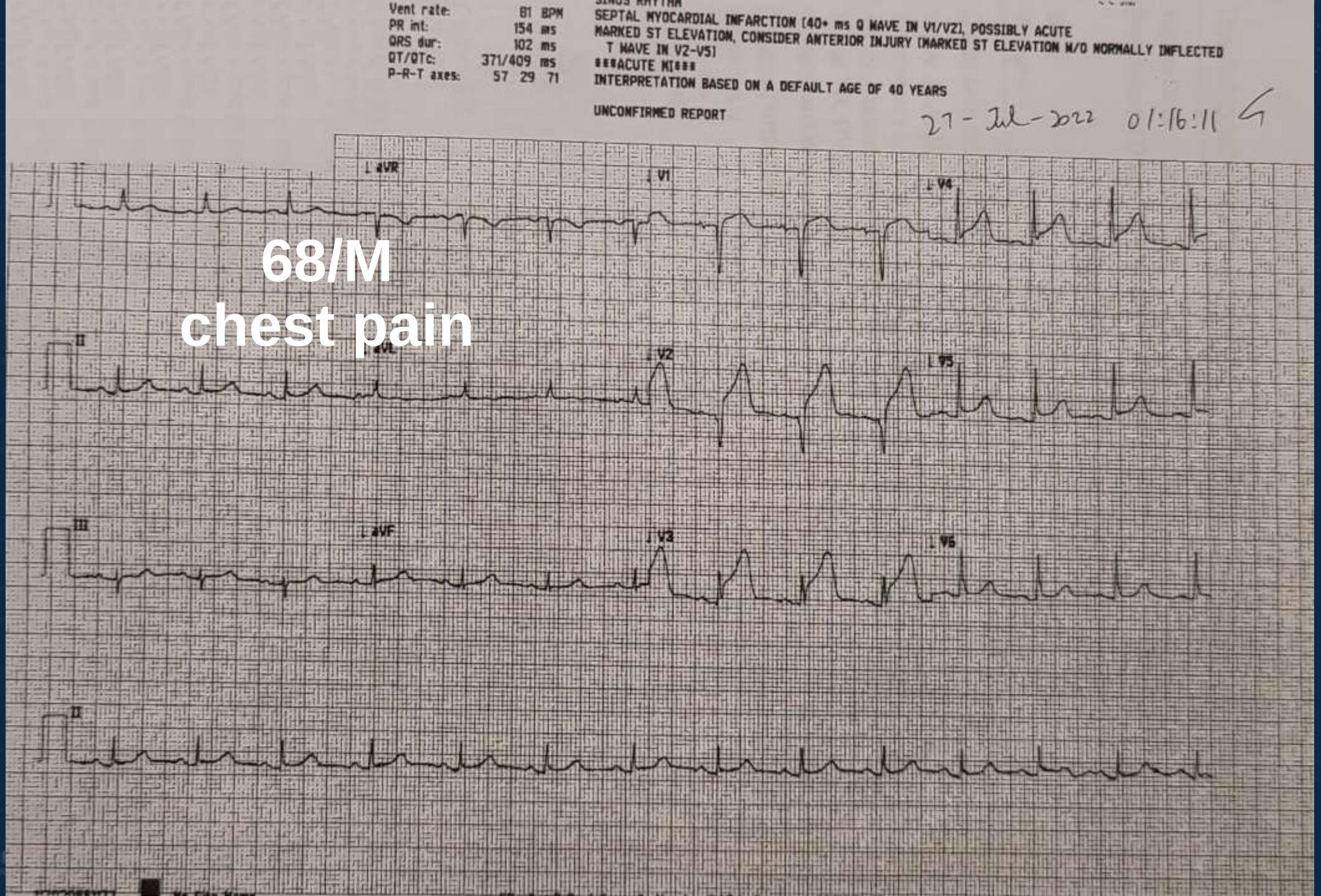
I have nothing to disclose


Vent rate: 81 BPM
PR int: 154 ms
QRS dur: 102 ms
QT/QTc: 371/409 ms
P-R-T axes: 57 29 71
SINUS RHYTHM
SEPTAL MYOCARDIAL INFARCTION (40+ ms Q WAVE IN V1/V2), POSSIBLY ACUTE
MARKED ST ELEVATION, CONSIDER ANTERIOR INJURY (MARKED ST ELEVATION W/O NORMALLY INFLECTED
T WAVE IN V2-V5)
ACUTE MI
INTERPRETATION BASED ON A DEFAULT AGE OF 40 YEARS
UNCONFIRMED REPORT
27-Jul-2022 01:16:11
I aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
68/M
chest pain

Diagnostic Coro

AO
155/71/102
00:05:52
200
180
160
140
120
100
80
60
40
20
0

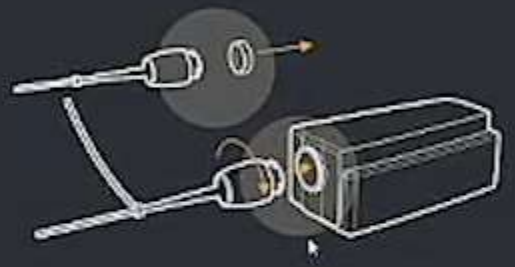
Pre-PCI OCT

Setup — Pullback — Image quality — Co-registration

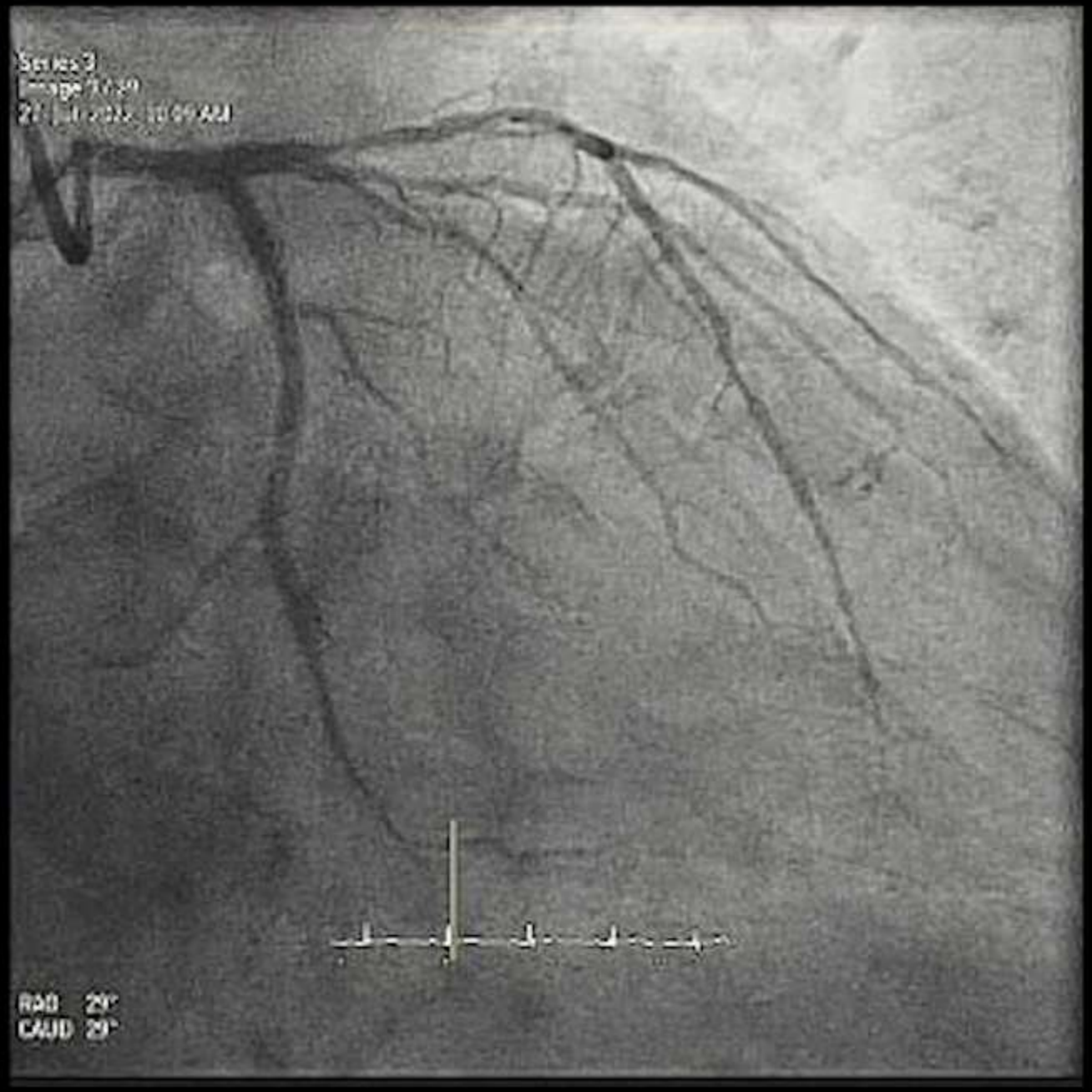
Purge Catheter and Connect

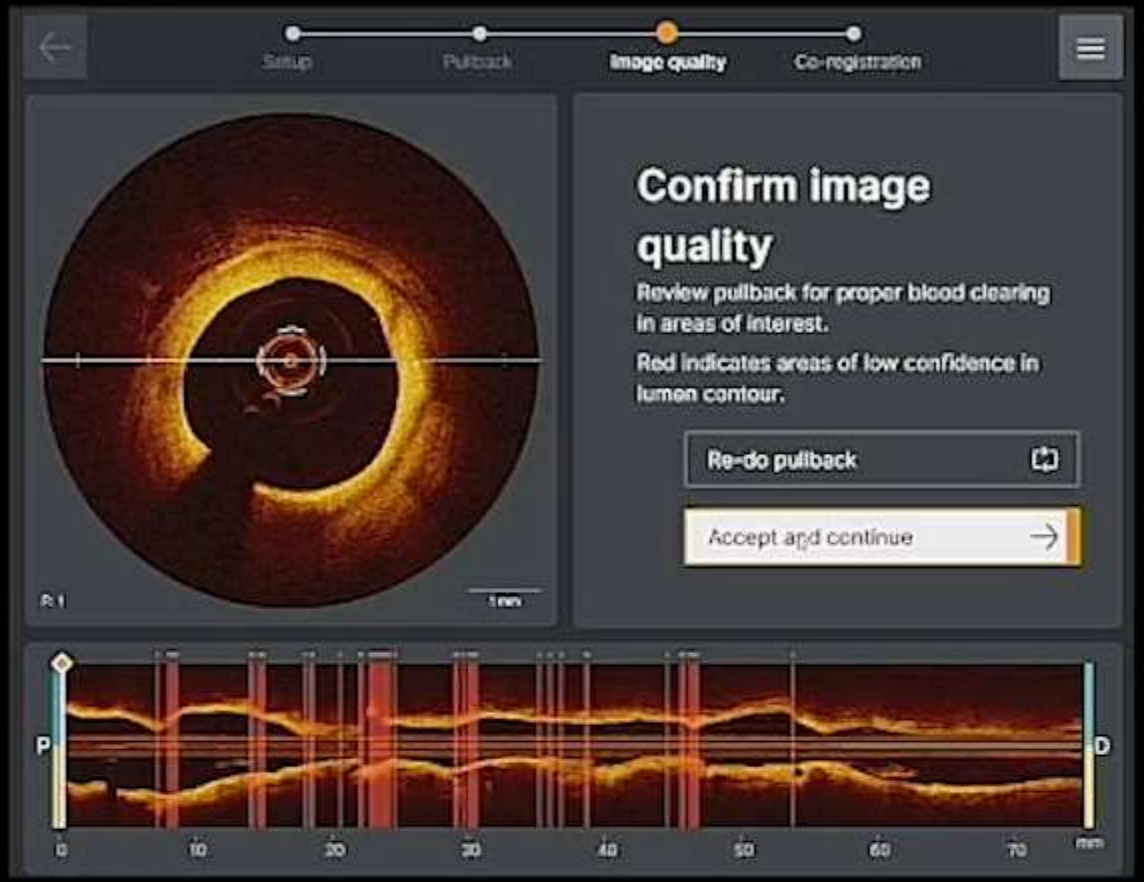
System will continue once imaging catheter is connected

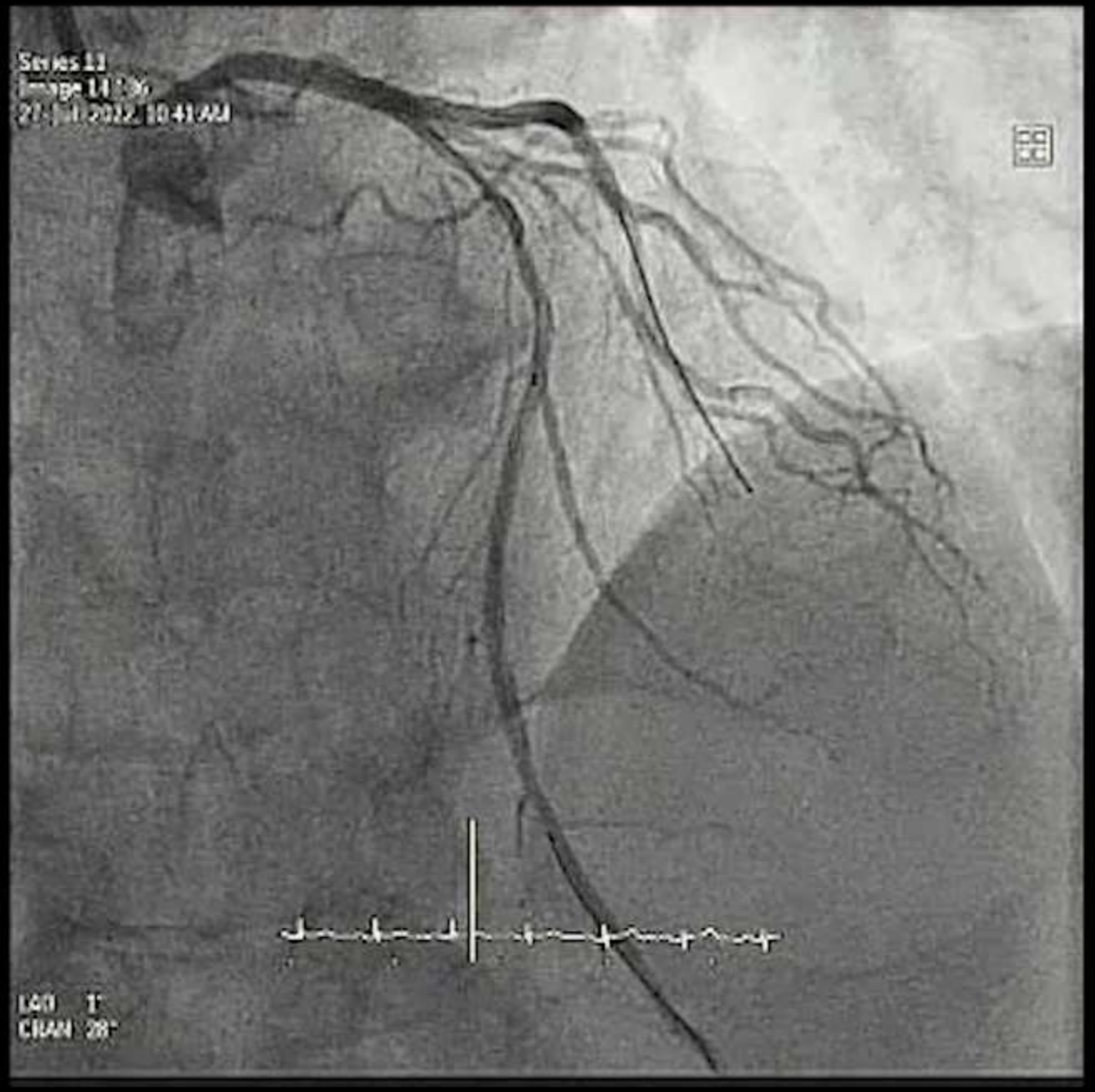
Purge imaging catheter side arm with contrast

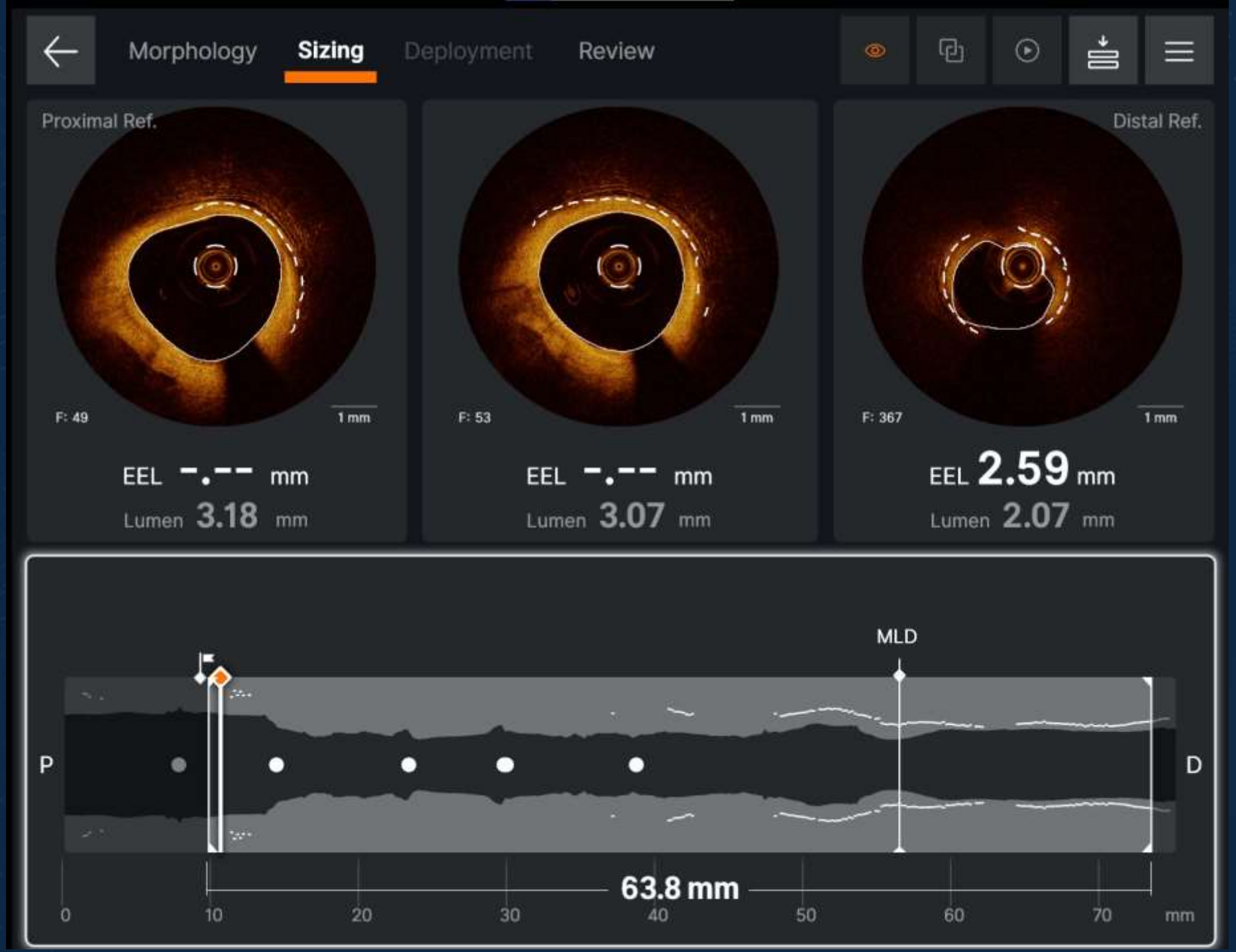


Remove catheter cap, insert into DOC and rotate 1/4 turn to engage



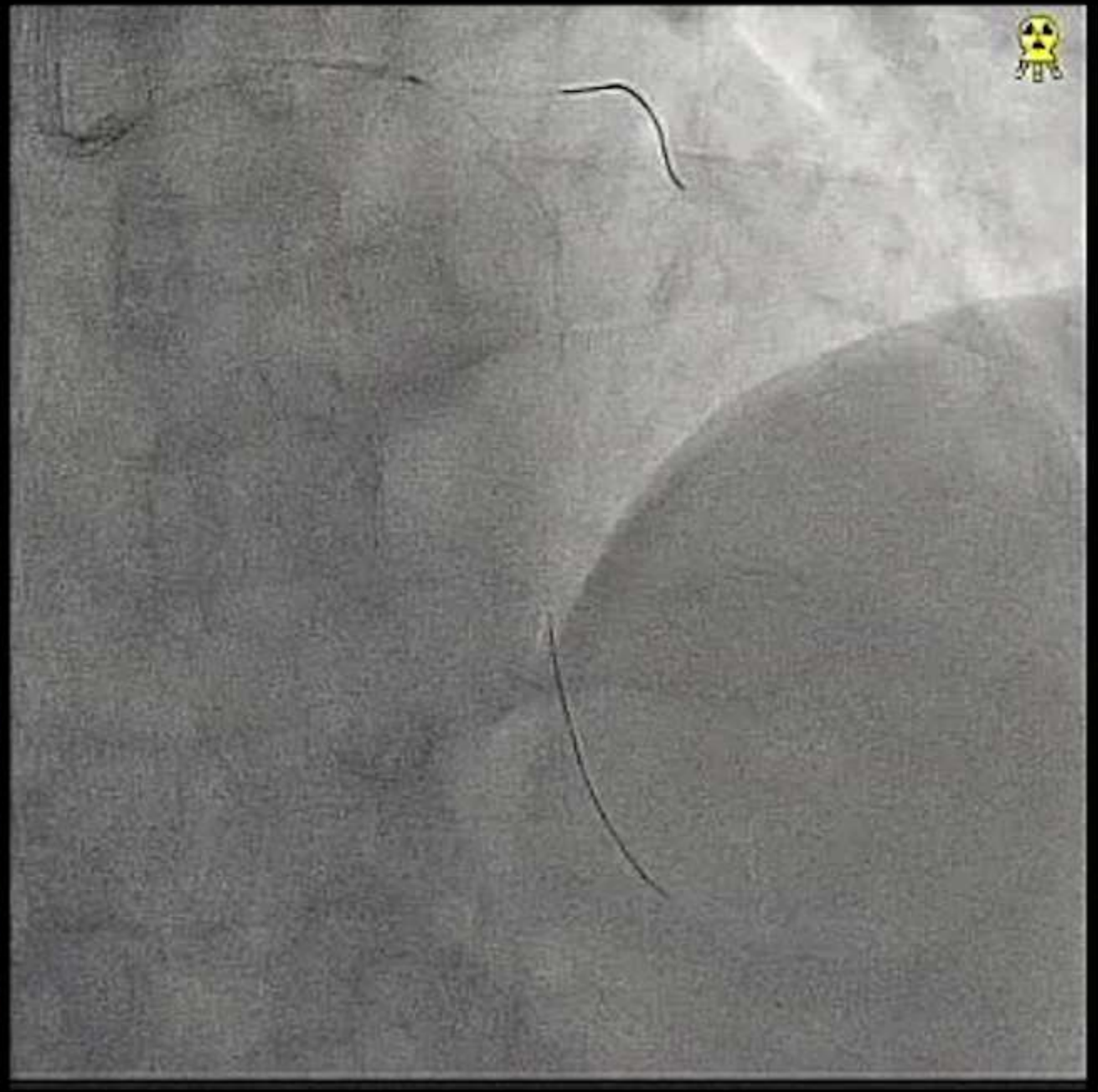

Setup
Pulback
Image quality
Co-registration
Confirm image quality
Review pullback for proper blood clearing in areas of interest.
Red indicates areas of low confidence in lumen contour.
Re-do pullback
Accept and continue
P
D
0
10
20
30
40
50
60
70
mm


LAO 1°
CRAN 28°

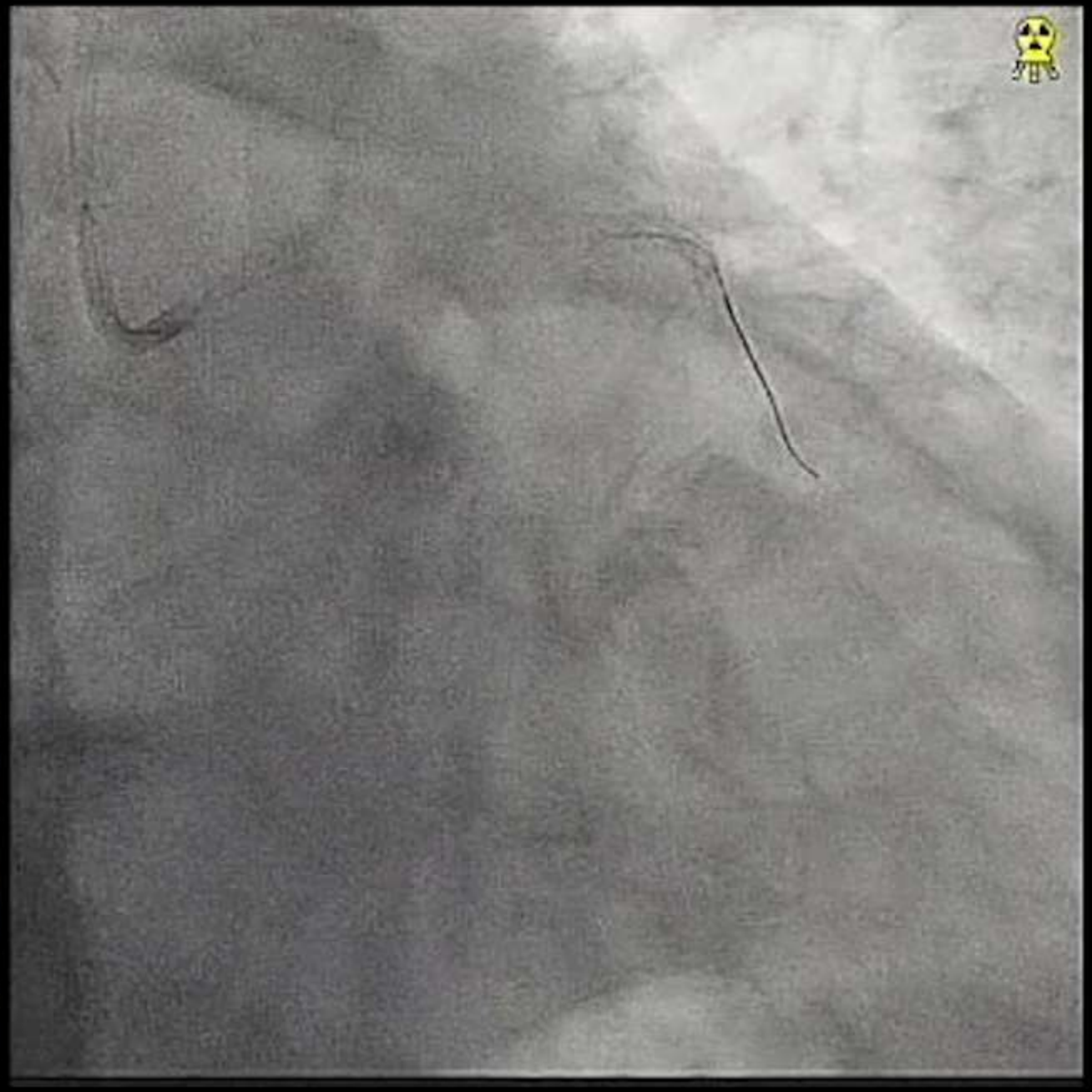

Morphology
Sizing
Deployment
Review
Proximal Ref.
F: 49
1 mm
EEL -.-- mm
Lumen 3.18 mm
F: 53
1 mm
EEL -.-- mm
Lumen 3.07 mm
Distal Ref.
F: 367
1 mm
EEL 2.59 mm
Lumen 2.07 mm
MLD
P
D
63.8 mm
0
10
20
30
40
50
60
70
mm

Stent Delivery

AO
139/44/93
00:42:20

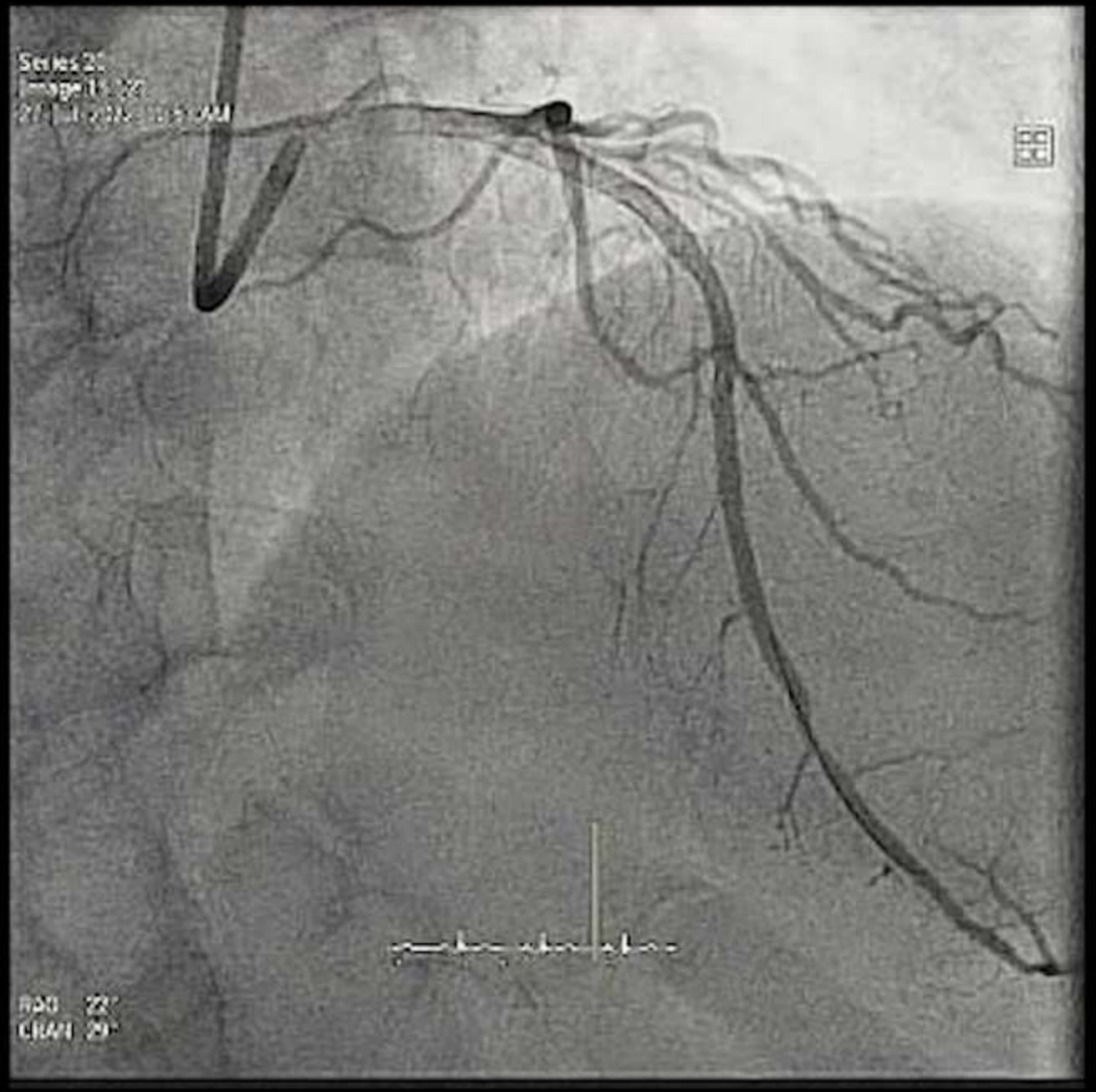


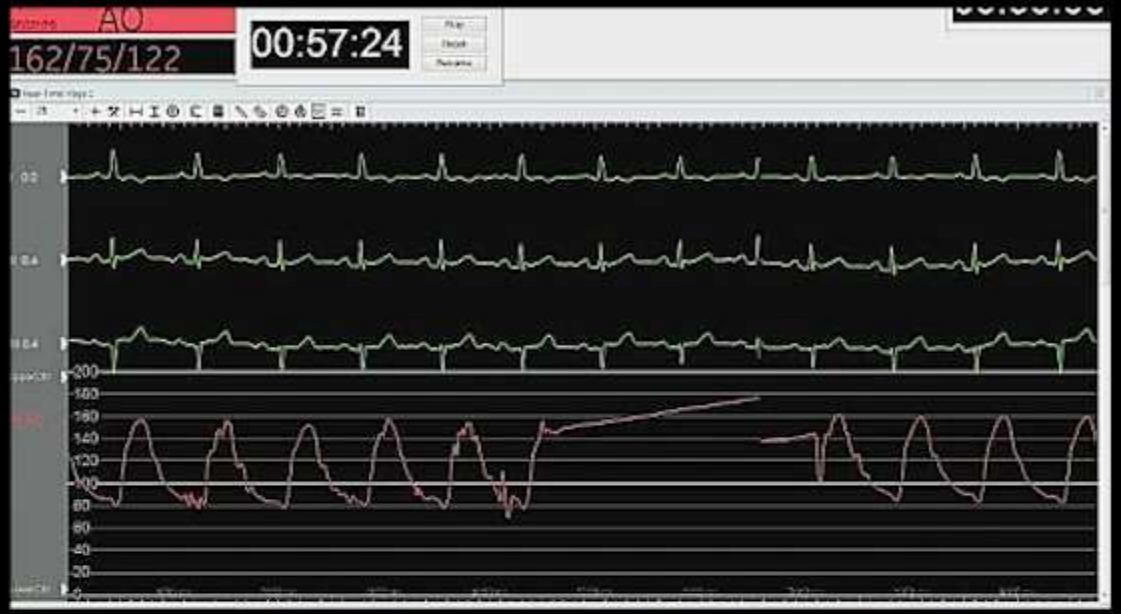
AO
148/-36/85
00:47:21

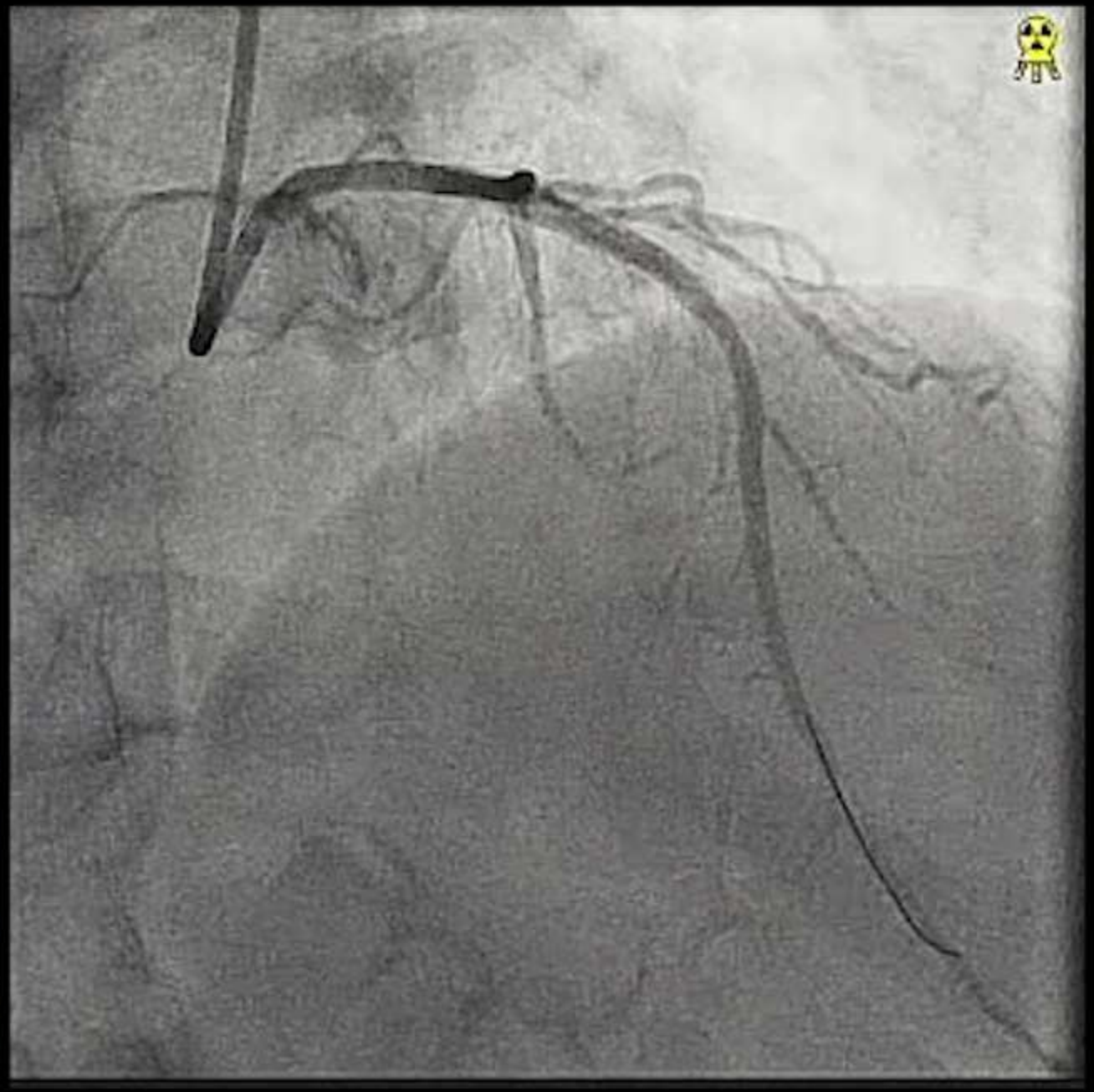


Post Stent Dilatation

AO
172/82/137
00:51:41



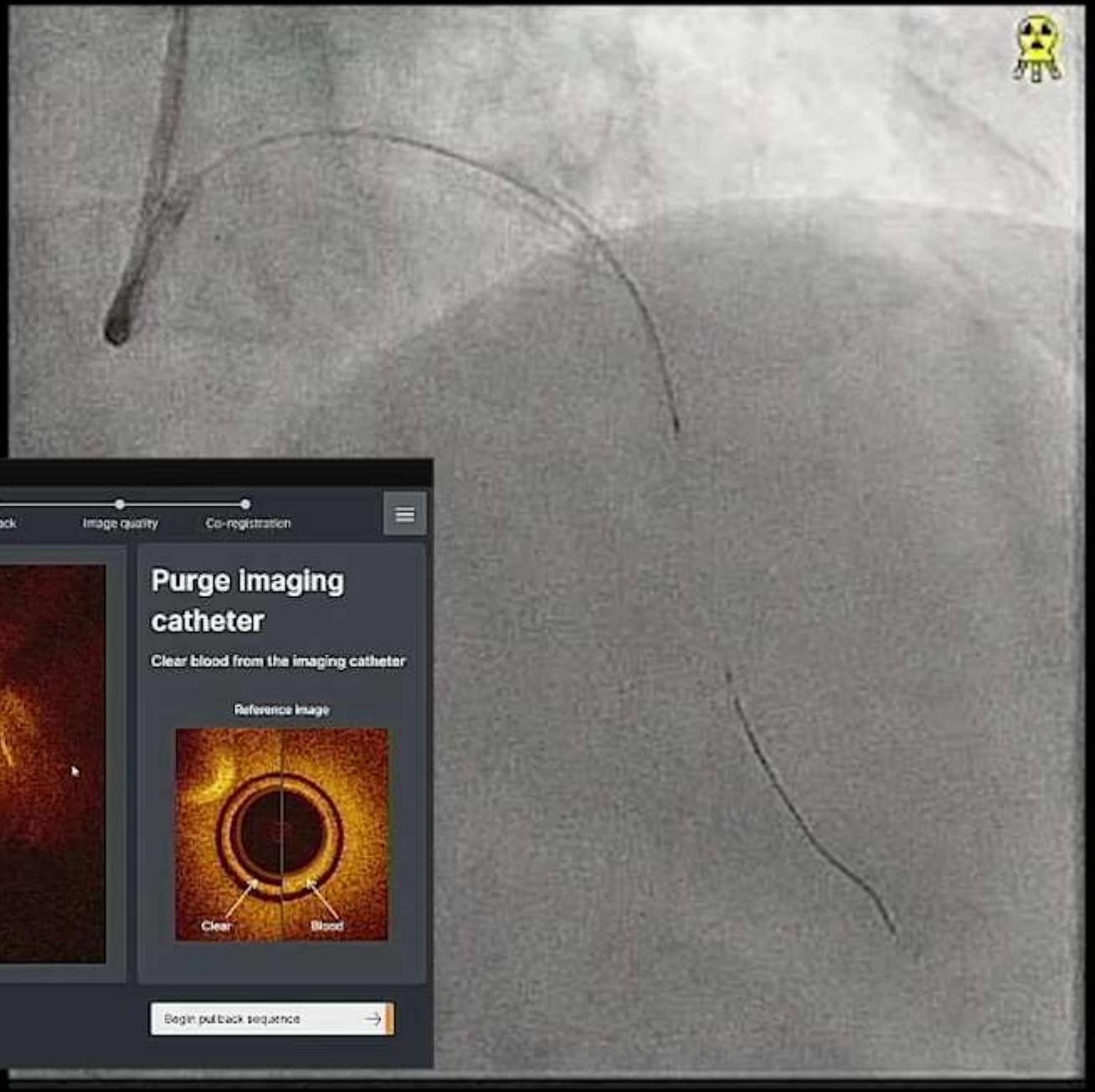

AO
162/75/122
00:57:24



Post – PCI OCT

AO
125/28/86
01:00:27

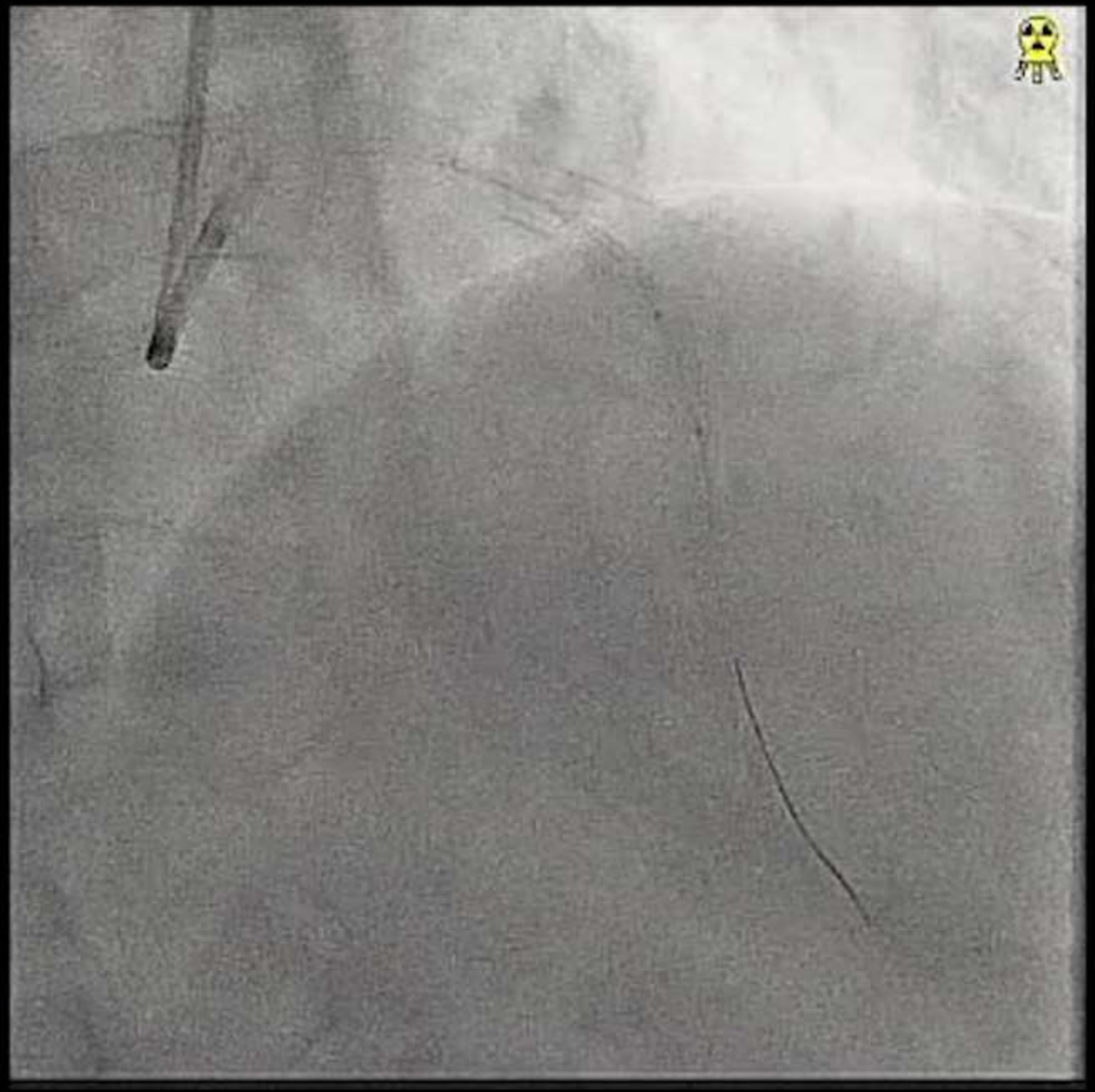
Setup
Pullback
Image quality
Co-registration
LIVE
Purge imaging catheter
Clear blood from the imaging catheter
Reference image
Clear
Blood
Begin pullback sequence



Morphology
Sizing
Deployment
Review
F: 198
1 mm
Expansion
74 %
Ref. lumen diameter
2.64 mm
Lumen diameter
2.25 mm
Min Exp. 74%
MSA 3.92mm²
P
D
0
10
20
30
40
50
60
70
mm

OCT guided dilatation

AO
ZERO
01:05:05



ZERO
01:10:24
200
180
160
140
120
100
80
60
40
20

Progress

- The patient was discharged 3 days later with no chest pain.

Discussion – OCT

- OCT was used as intravascular imaging for sizing and landing of lesion in this case
- It uses near-infrared light to provide high-definition, cross sectional & 3D images of the artery with high precision allowing to assess lesion characteristics and plaque morphology for coronary artery disease.
- Superior over IVUS in its image clarify, faster pullback, assessment of calcium, and its semi automated interpretation function
- Limitations: blood clearance, thus making it less versatile than IVUS for certain lesion subset

Pre-PCI OCT | Strategize

M — Morphology

Search for High Calcium[1]

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

L — Length

Select Landing Zones Based on Healthy Tissue/ EEL Visualization[2]

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 areas[3]

D — Diameter

Measure Vessel, Stent, Balloon Diameters[4]

Use distal reference measurements to select stent diameter

Use distal reference measurement for distal balloons or proximal reference measurements for proximal balloons

Post-PCI OCT | Optimize

M — Medial Dissection

Address Significant Dissection[3]

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

A — Apposition

Address Gross Malapposition

Criteria:
Malapposition indicator shows longer than 3 mm[4] of significant (≥0.3 mm from wall[5]) apposition

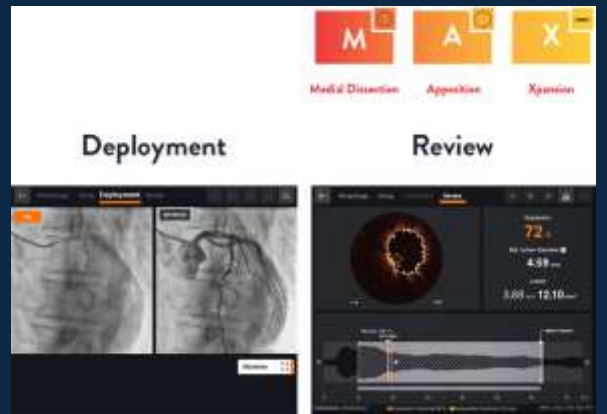
X — Xpansion

Confirm Expansion[3,6]

Criteria:
≥80% acceptable, ≥90% expansion is optimal

Discussion – Ultreon Software

- Morphology
  - automatically detect degree and thickness of calcification.
- Sizing
  - AI assisted detection of EEL and lumen to identify landing zones
- Deployment
  - side-by-side viewing of live and co-registered angio to help physicians guide precise stent deployment
- Review
  - ensure optimal stent expansion and apposition



Conclusion

- This case may represent one of the day in day out cases commonly encountered in cath lab, but it was the first STEMI case that I was allowed to be the chief operator as a cardiology trainee.
- Live procedure video was recorded with simultaneous fluoroscopic images and pressure tracings.
- This case showed that AI function of OCT can help improve expansion result after stent deployment