

***HOW CAN OCT GUIDE PCI
PLANNING
IN
CALCIFIED LESIONS***

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WHY NEED TO DETECT CALCIUM ?

Ca associates with stent under expansion and MACE

Calcium present in 90% by age 70

Ca underdiagnosed by angio. 38% by angio but 73% by IVUS in same pts

Intra-vascular imaging sensitivity ~90-100%



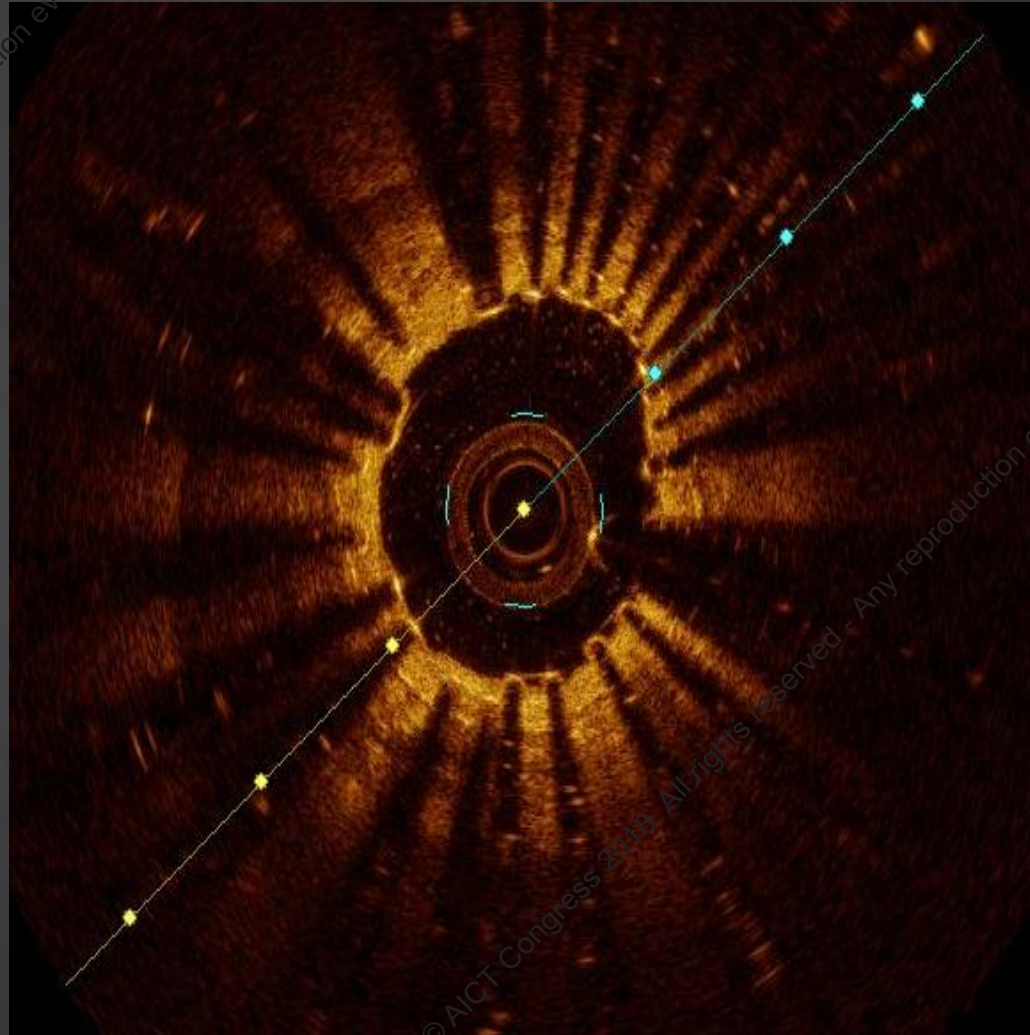
GS Mintz et al. *Circulation*. 1995

Madhavan et al. Coronary Artery Calcification. *JACC* 2014

P Genereux et al. Pooled analysis from the HORIZONS-AMI & ACUITY trials. *JACC* 2014

MSA 2.11 mm²

Final MSA will be
small
if didn't prepare
well



HOW CAN OCT HELP IN CALCIFIED LESIONS?

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WHY WE NEED OCT?

Thickness

Classification

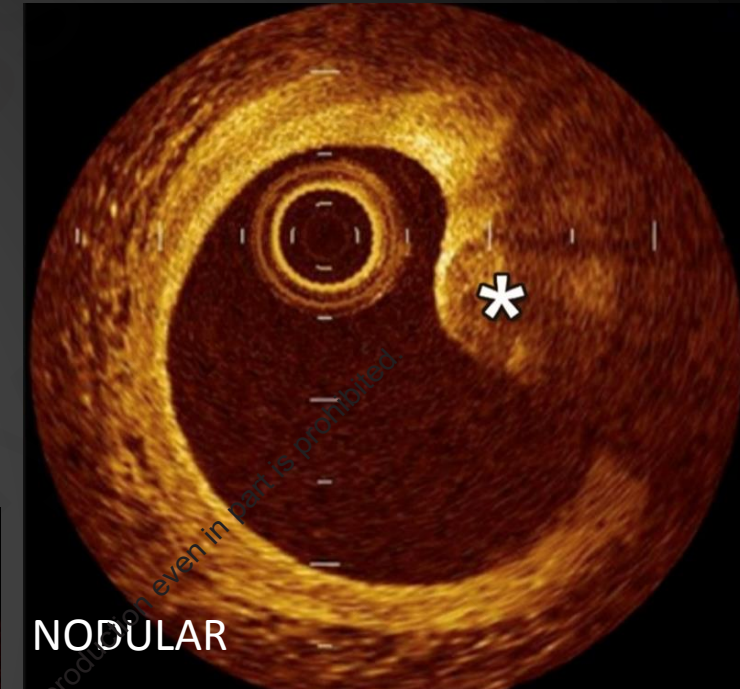
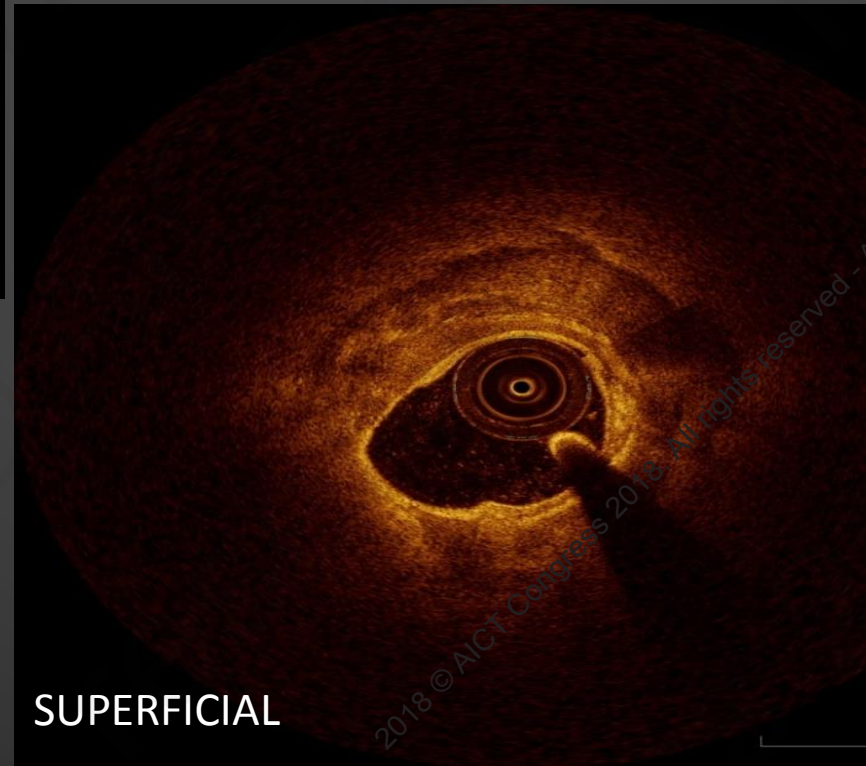
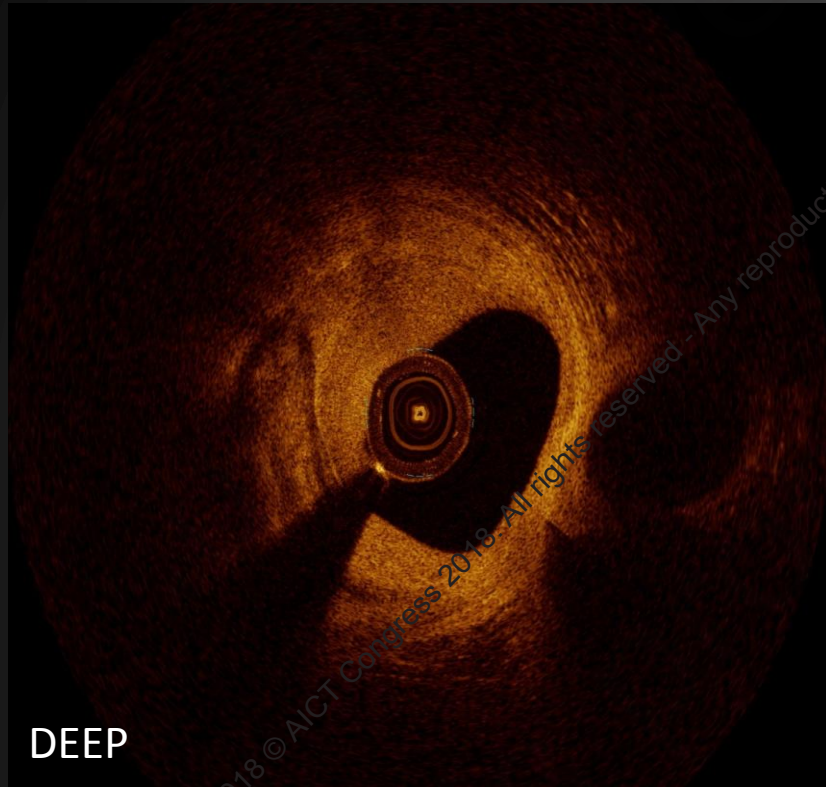
ARC

LENGTH

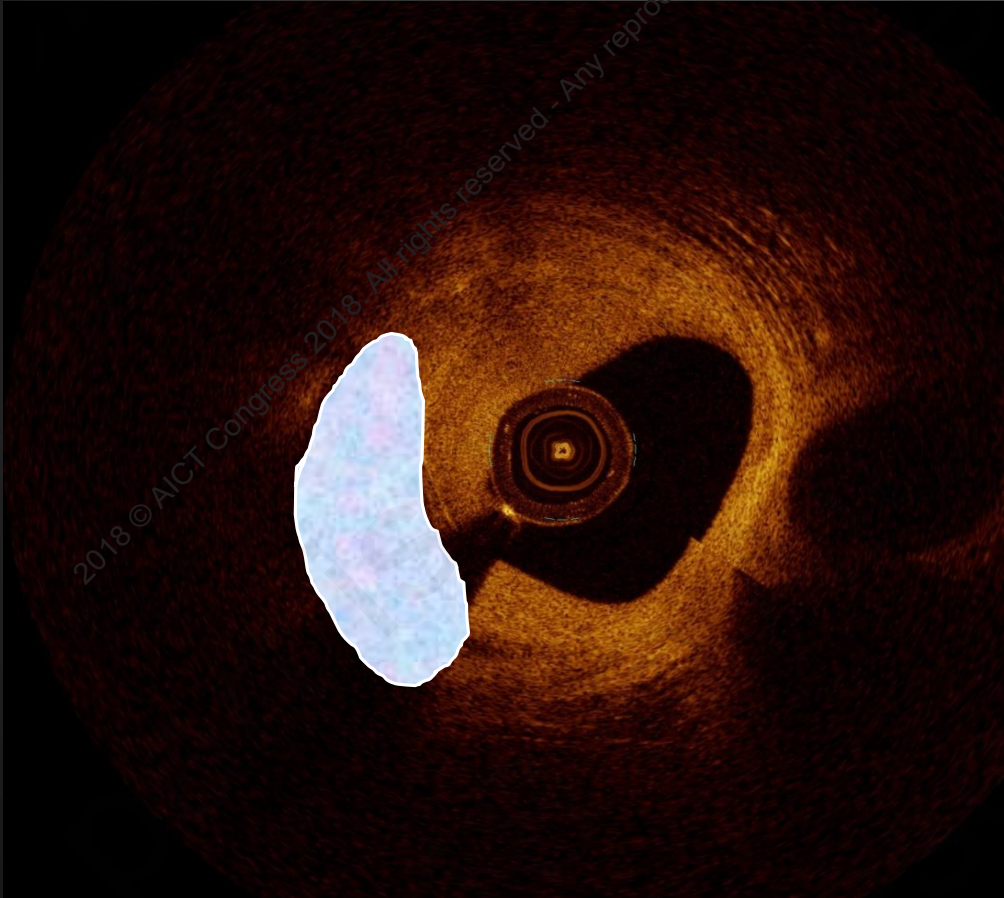
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CLASSIFICATION OF LESION TYPES



DESCRIPTION OF DEEP CALCIUM



**PRESENCE OF THICK
FIBROTIC CAP**

-

Deep calcified lesion



**TRADITIONAL
TECHNIQUES
(NC BALLOON/
SCORING/CUTTING)**

DESCRIPTION OF CALCIFIED NODULE

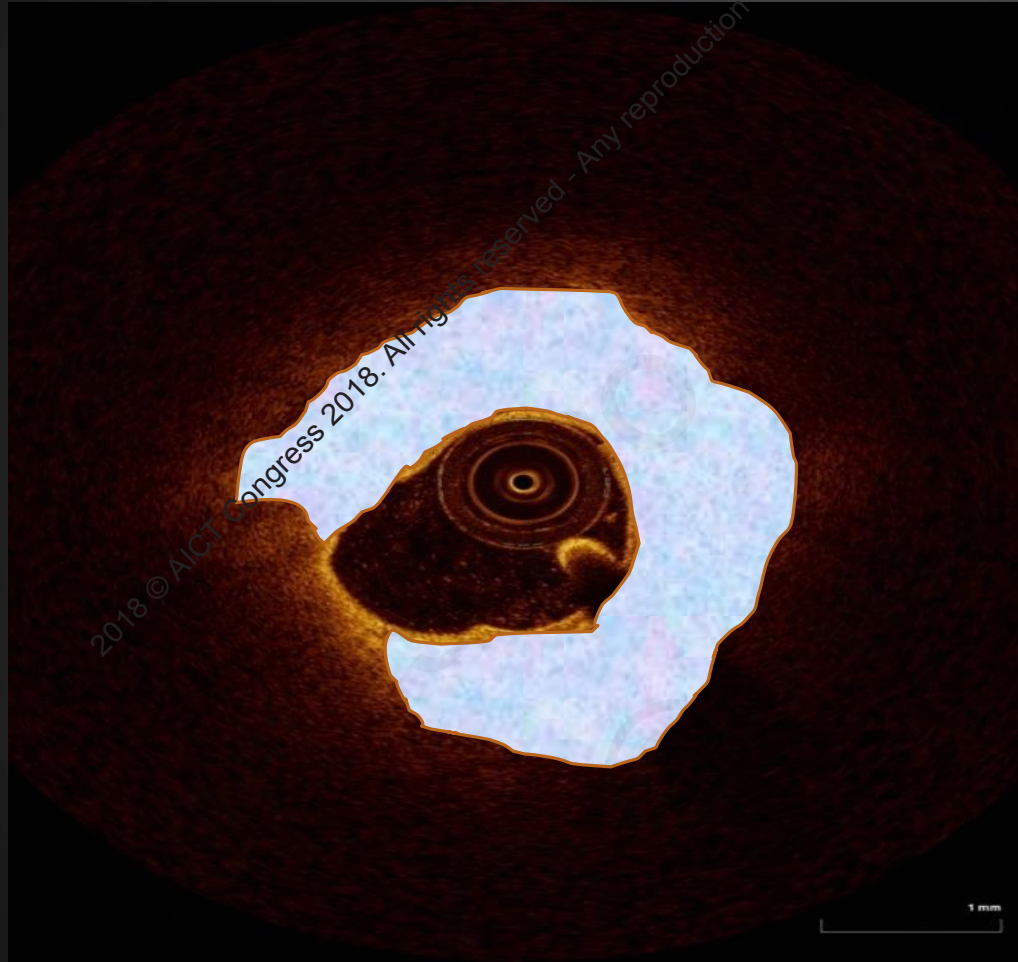


**SUPERFICIAL CALCIUM
-
ATTENUATION PRESENT**



**Directional
ATHERECTOMY**

DESCRIPTION OF SUPERFICIAL CALCIUM



**MINIMAL TO NO
FIBROTIC LAYER**

**DEPTH OF CALCIUM
LIKELY MEASURABLE**



ATHERECTOMY

**Thick and long calcified lesion is
associated with stent under expansion !!!**

0.5mm thickness

ARC > 180 degree

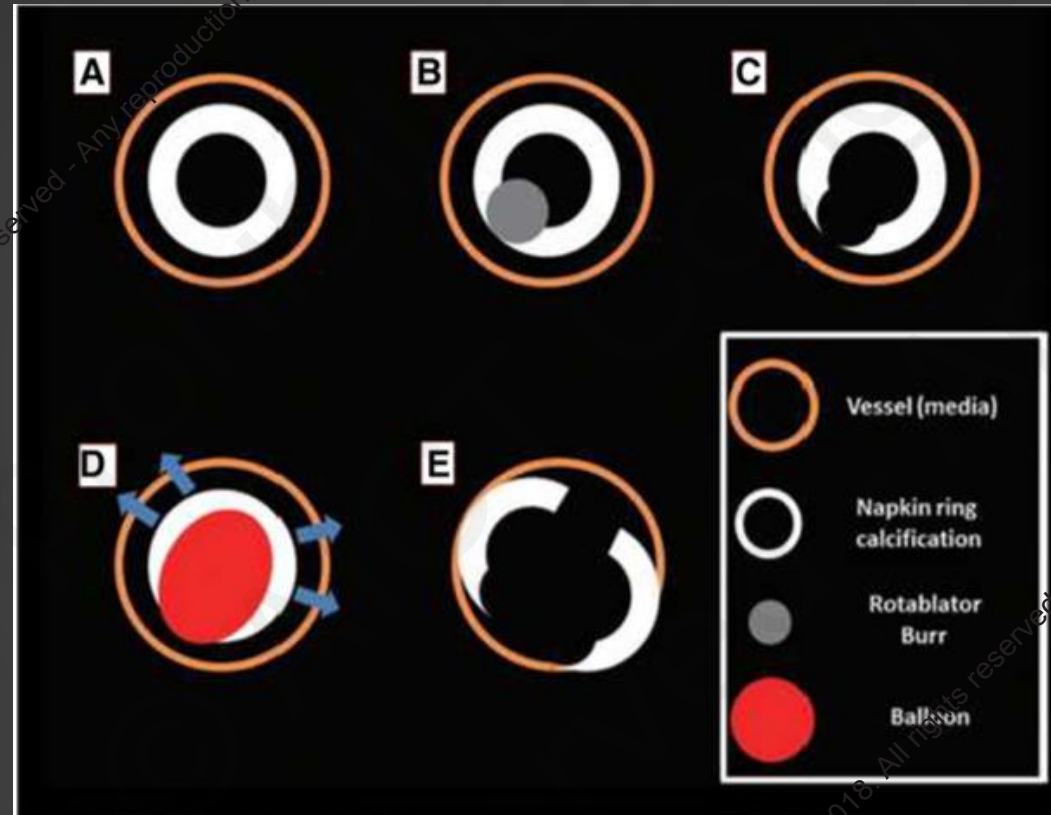
LENGTH more than 5mm

RISK STRATIFICATION FOR UNDEREXPANSION

1. Maximum Calcium Angle (°)	$\leq 90^\circ$ → 0 point
	$90^\circ < \text{Angle} \leq 180^\circ$ → 1 point
	$> 180^\circ$ → 2 points
2. Maximum Calcium Thickness (mm)	≤ 0.5 mm → 0 point
	> 0.5 mm → 1 point
3. Calcium Length (mm)	≤ 5.0 mm →
	> 5.0 mm →
Total score	0 to 4 points

**≥ 4 had =
poor stent expansion**

The creation of a calcium crack using a small rotational atherectomy burr is the principle of lesion modification.



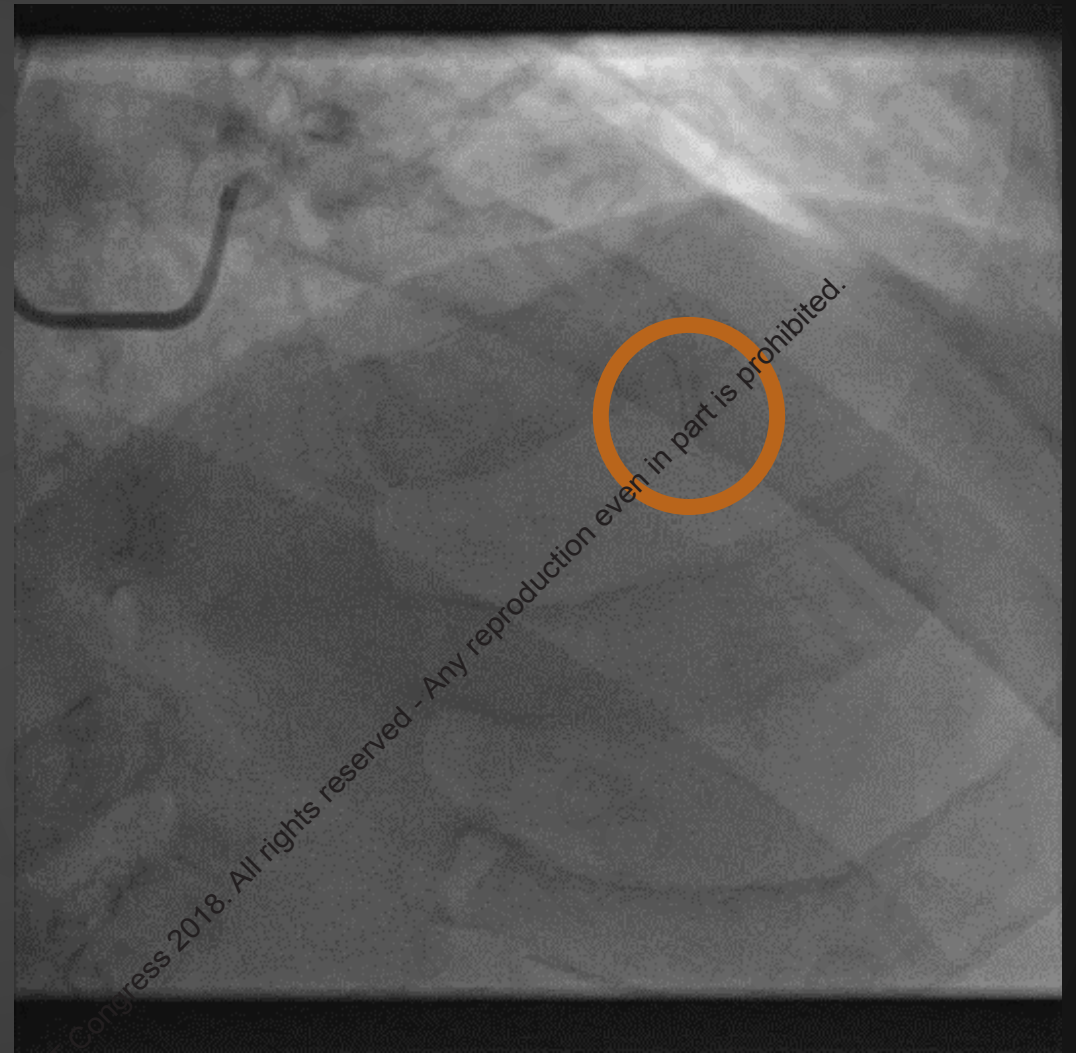
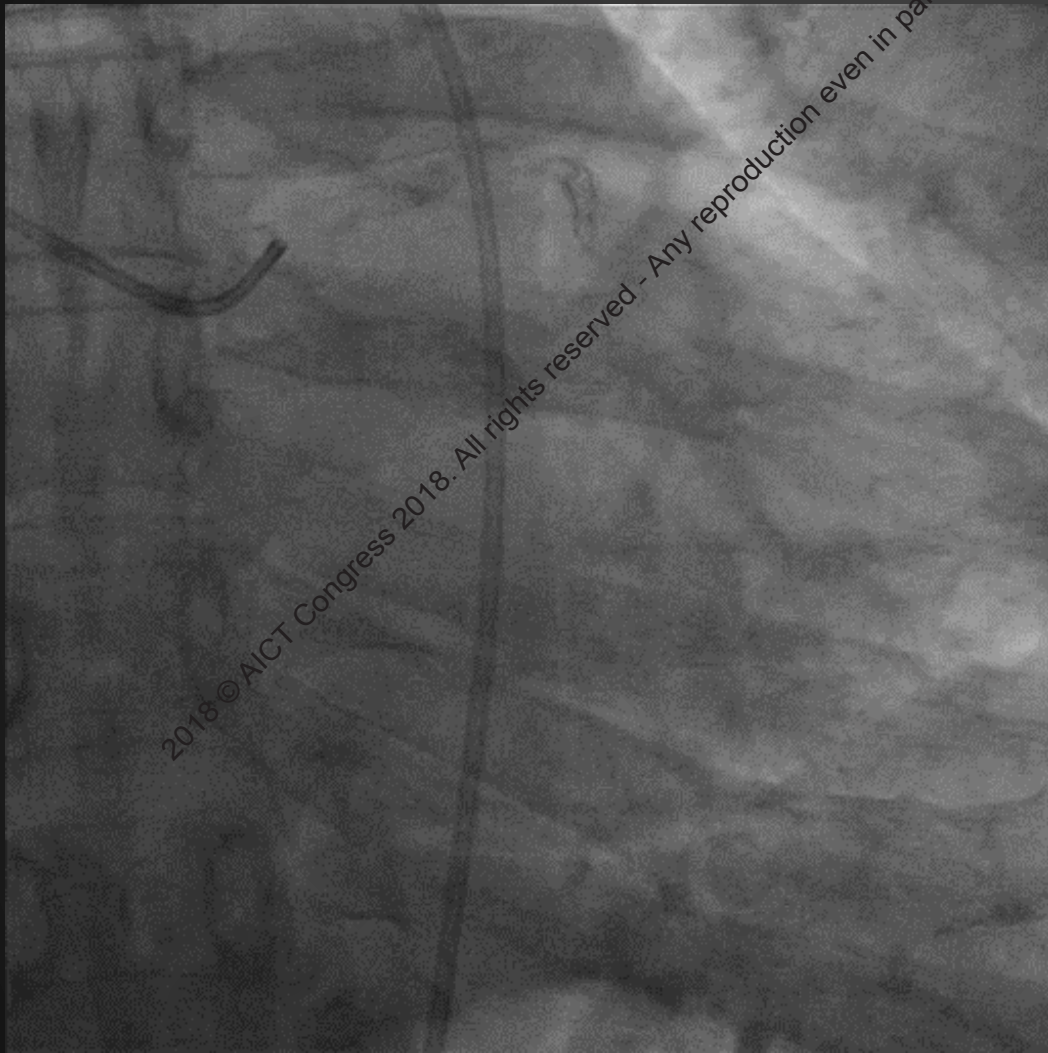
Chance of calcium cracking is low using balloon only angioplasty if...

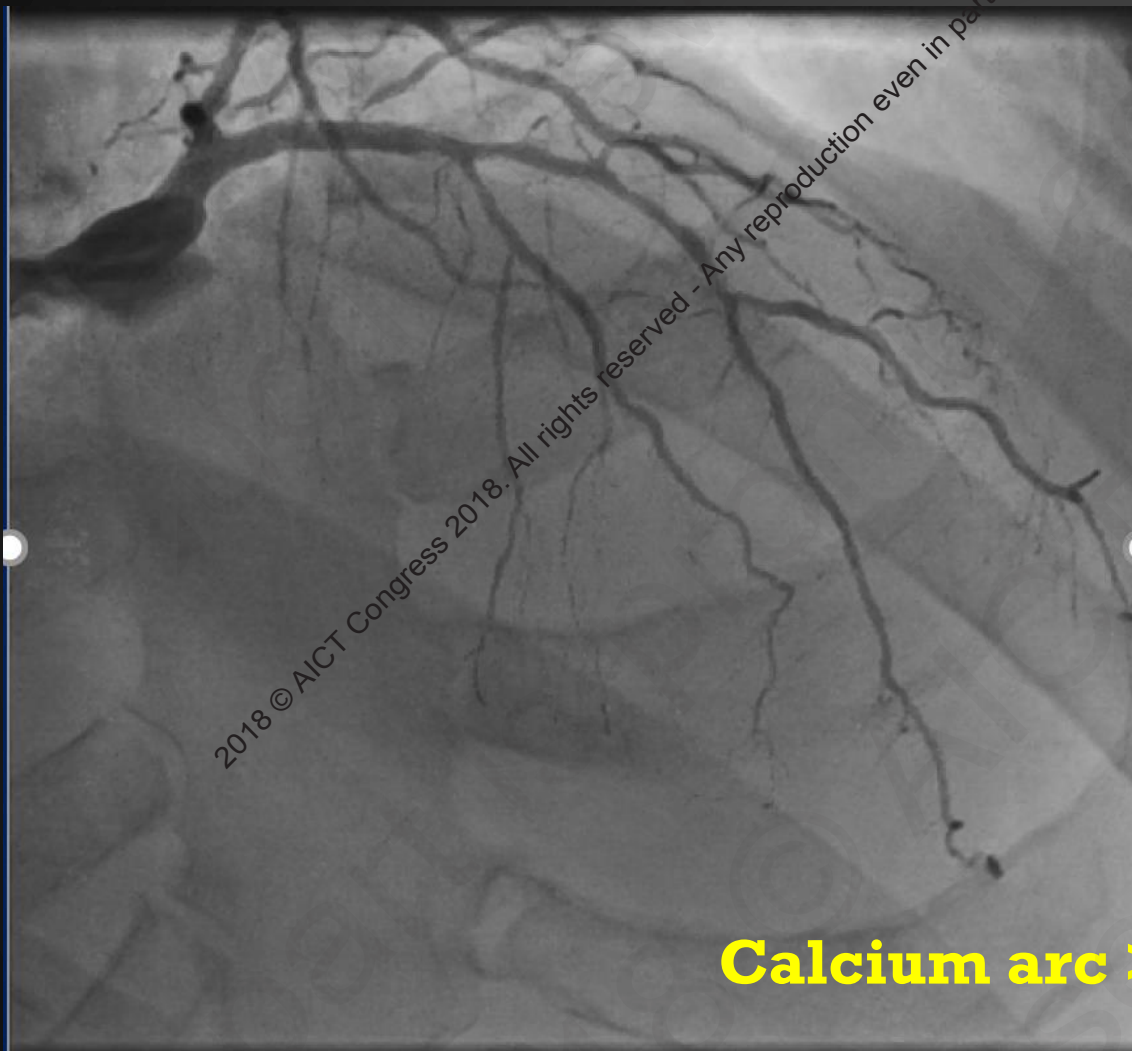
- Calcium thickness > 0.67 mm
- Arc < 227

CASE EXAMPLE

- 57/M
- DM
- History of PCI done to dLAD years ago
- Unstable angina

CASE EXAMPLE



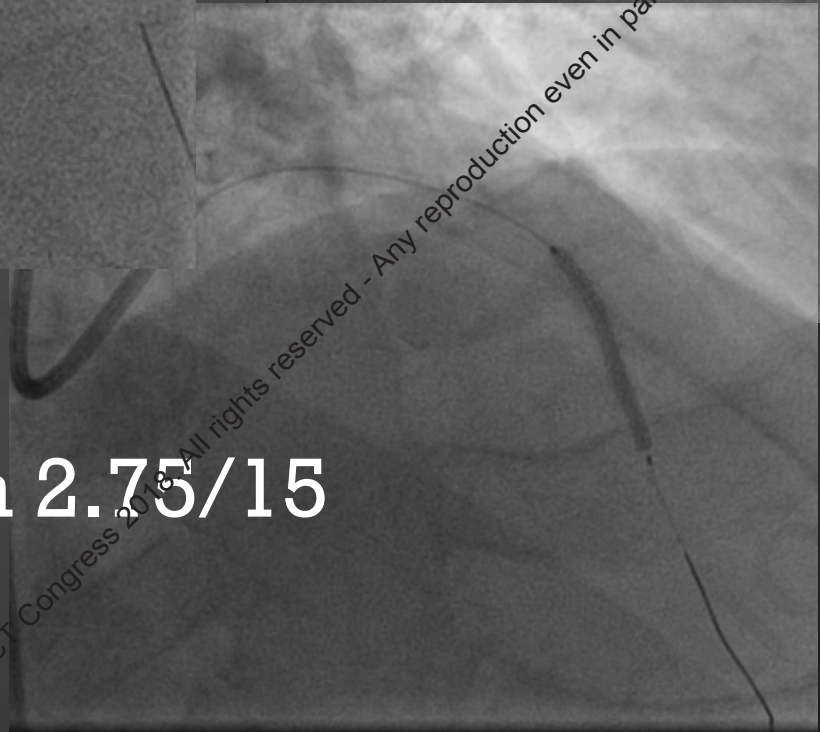
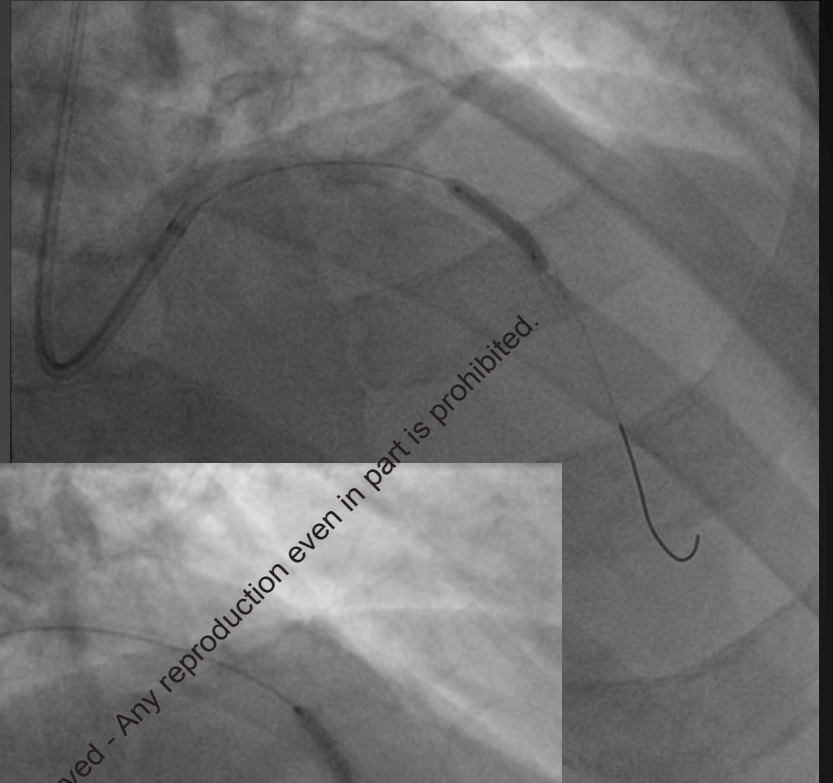


Calcium arc > 270, Thinnest thickness about 0.5 mm



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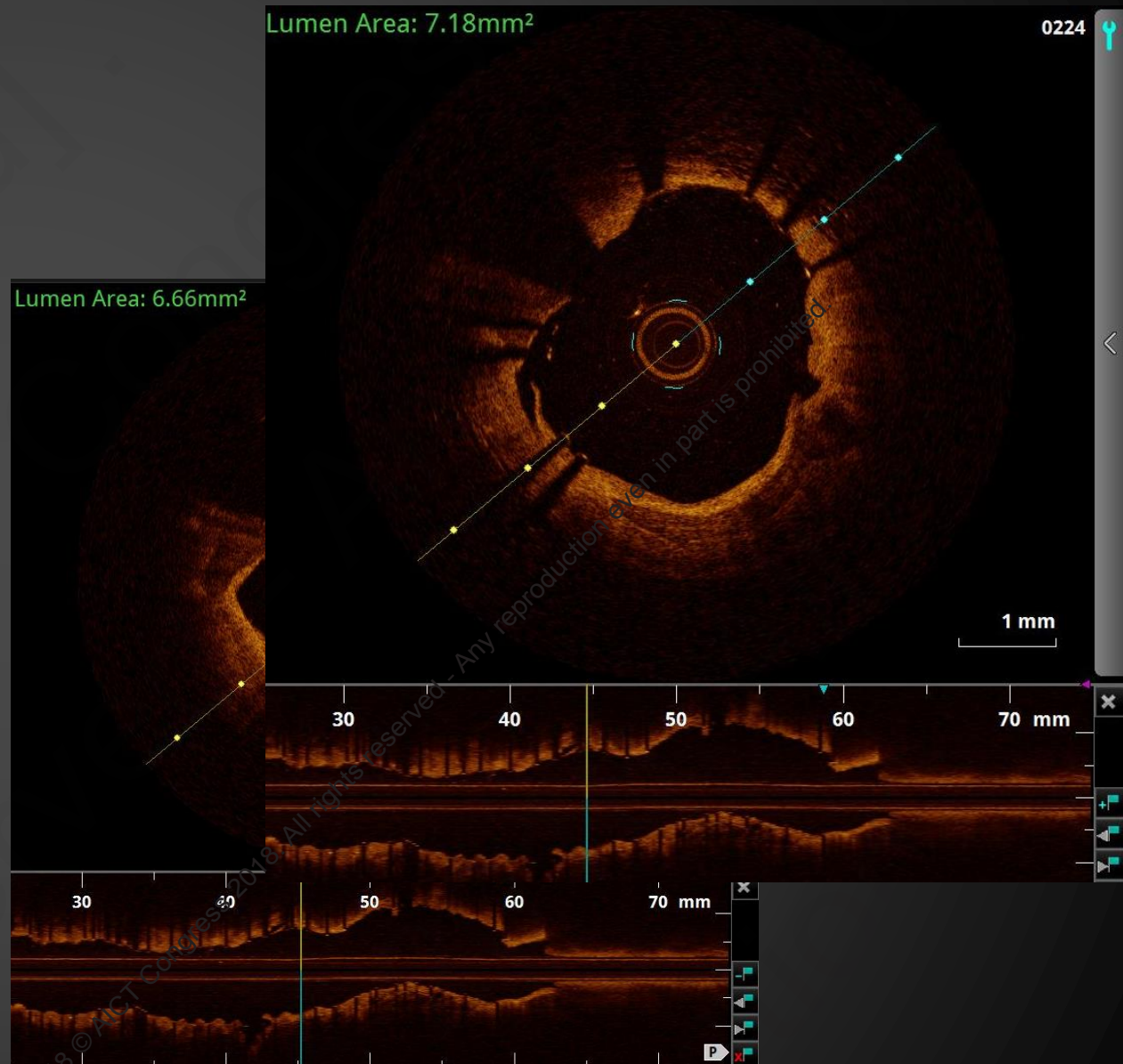


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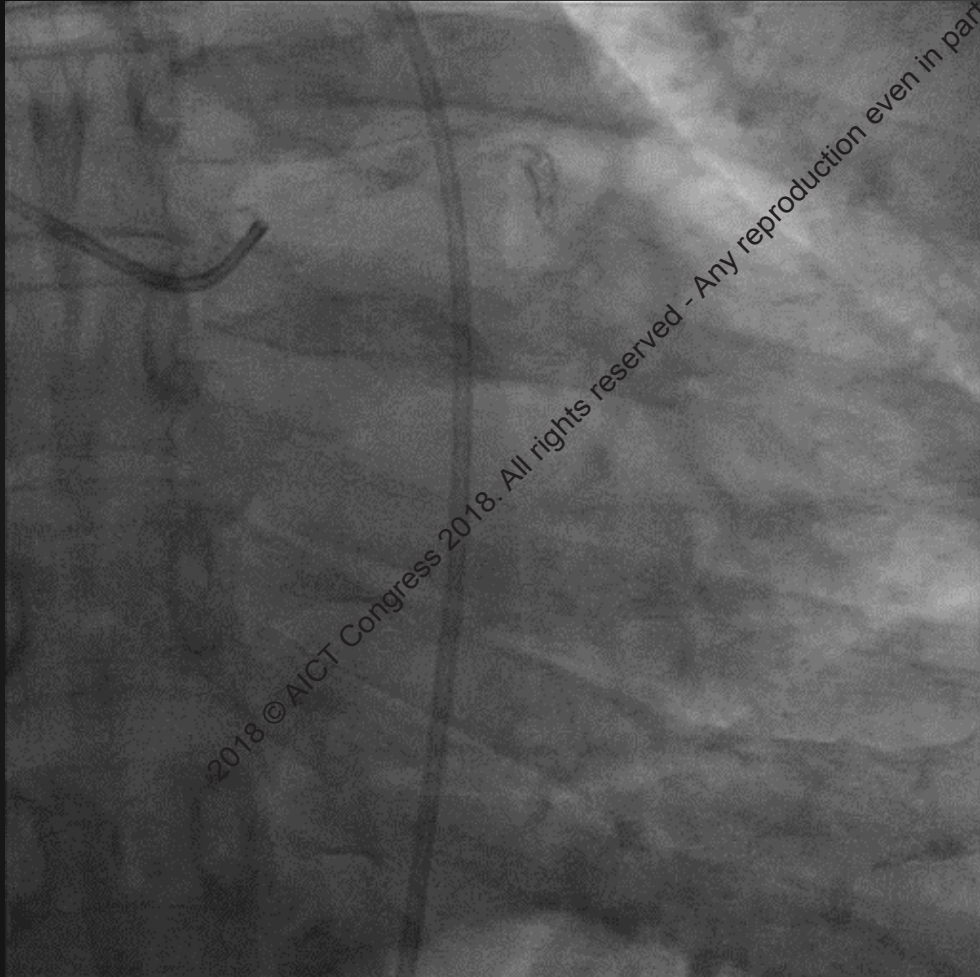
Balloon: Scoring 2.5/15, NC balloon 2.75/15
Stent: 2.25/26 and 3.0/30
Post dilated to 3.0/20

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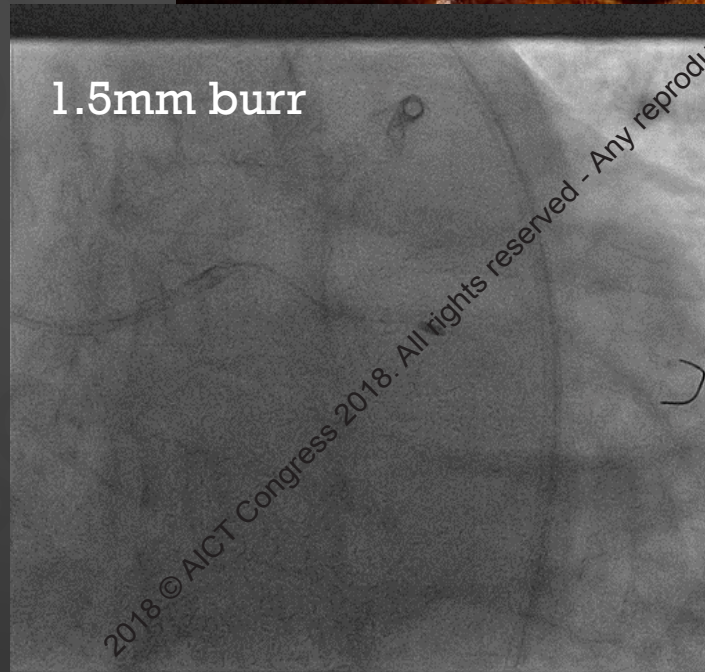
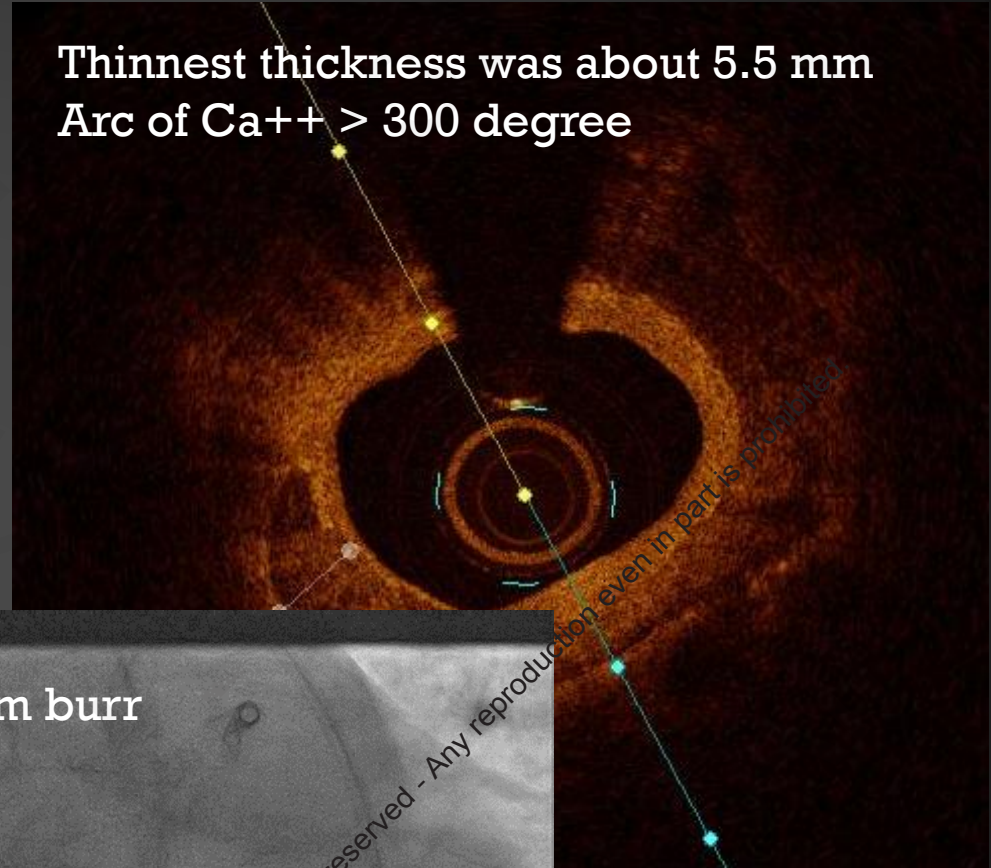
FINAL ANGIOGRAM

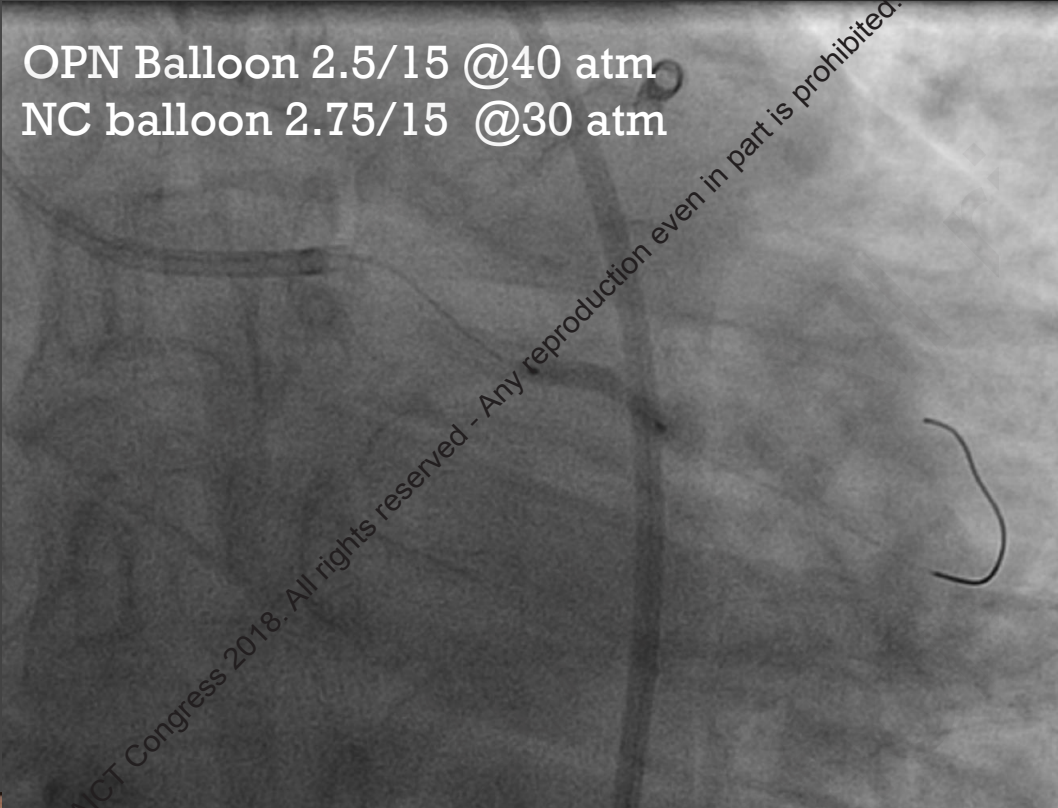
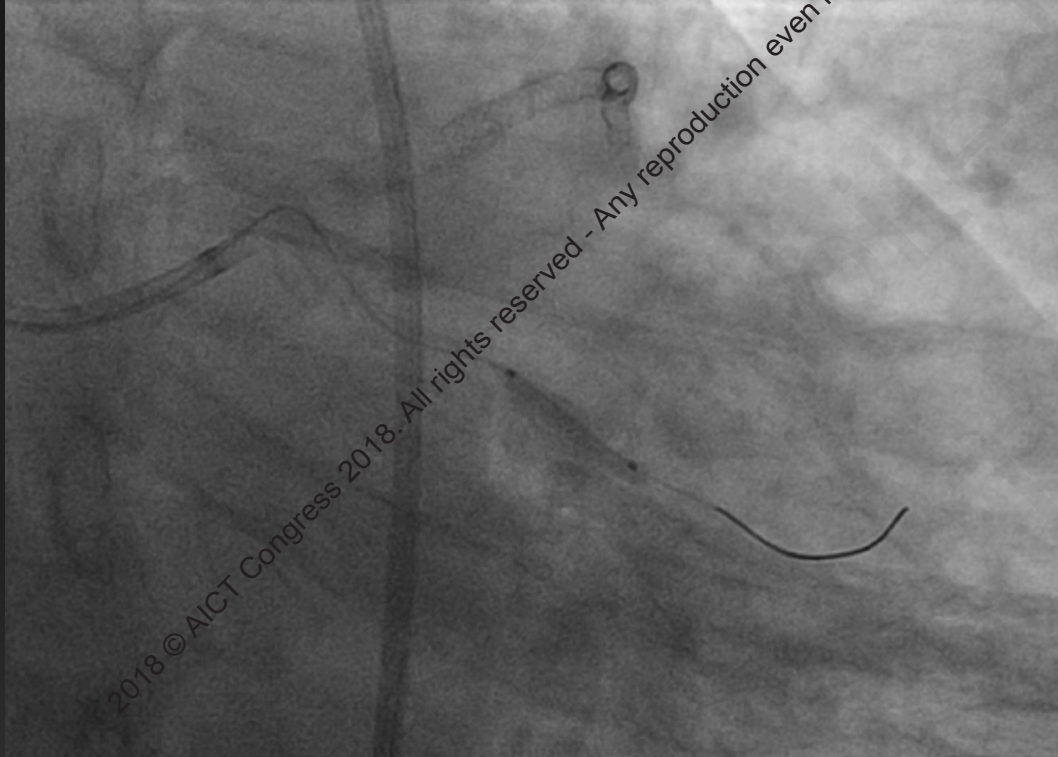


CIRCUMFLEX



Thinnest thickness was about 5.5 mm
Arc of Ca++ > 300 degree





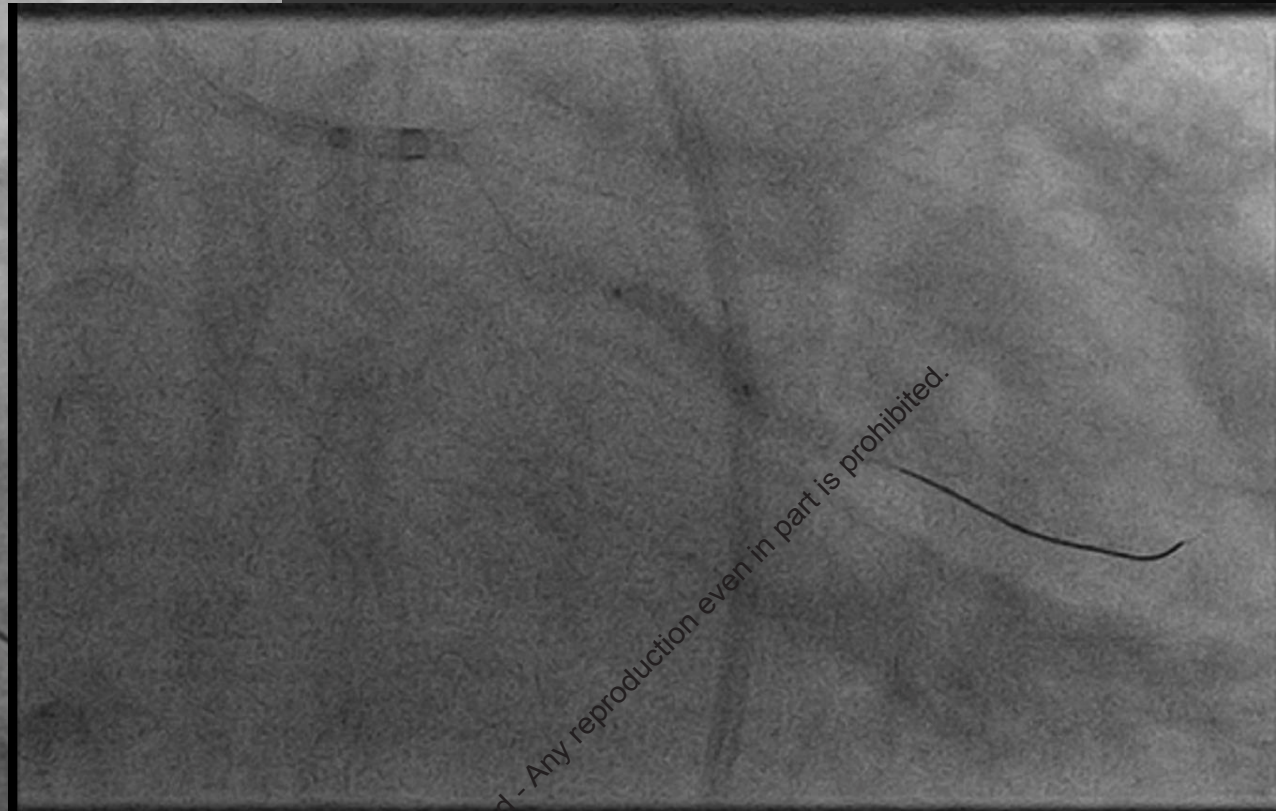
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DES 2.5/38, post dilated to
2.75/15 @20atm



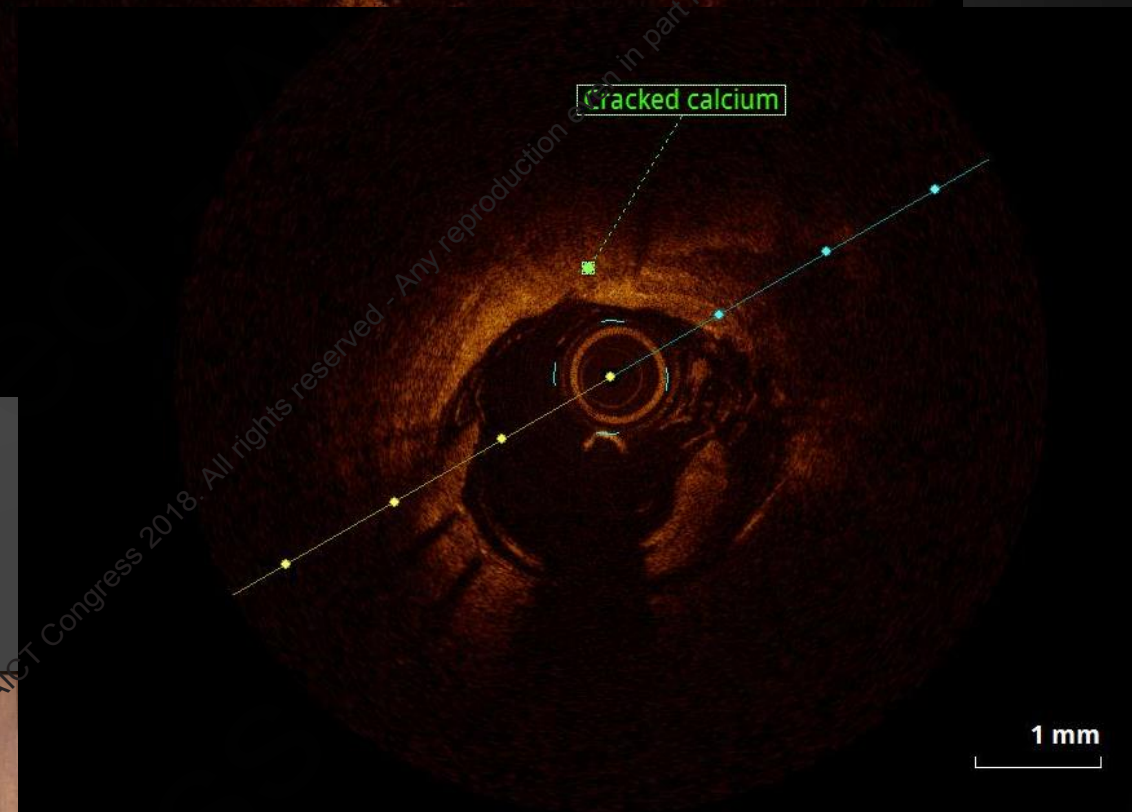
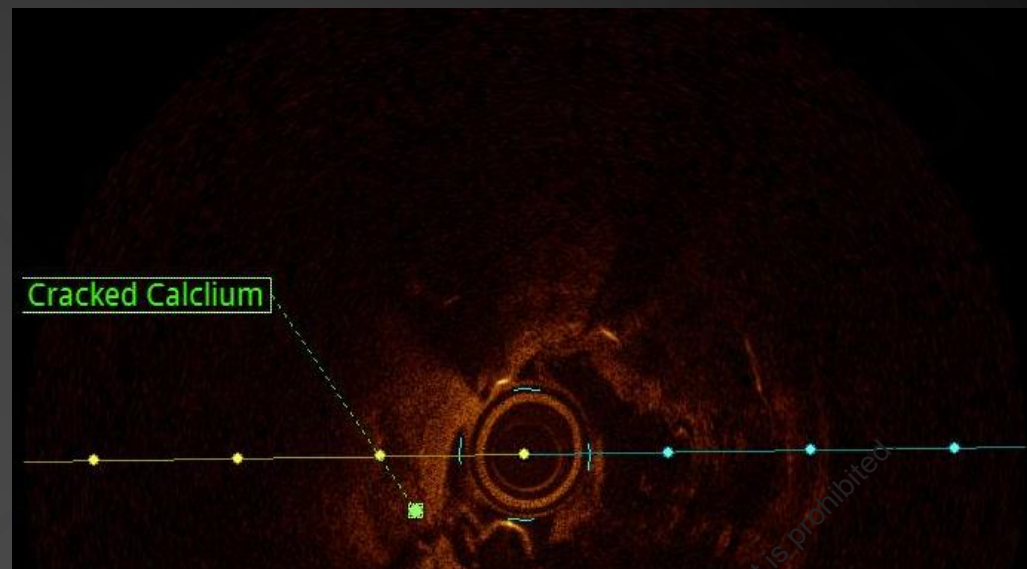
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FINAL ANGIOGRAM



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7 OCT steps to guide our PCI

STEP 1 - Classification of calcified lesions

STEP 2 - LENGTH

STEP 3 - SIZE

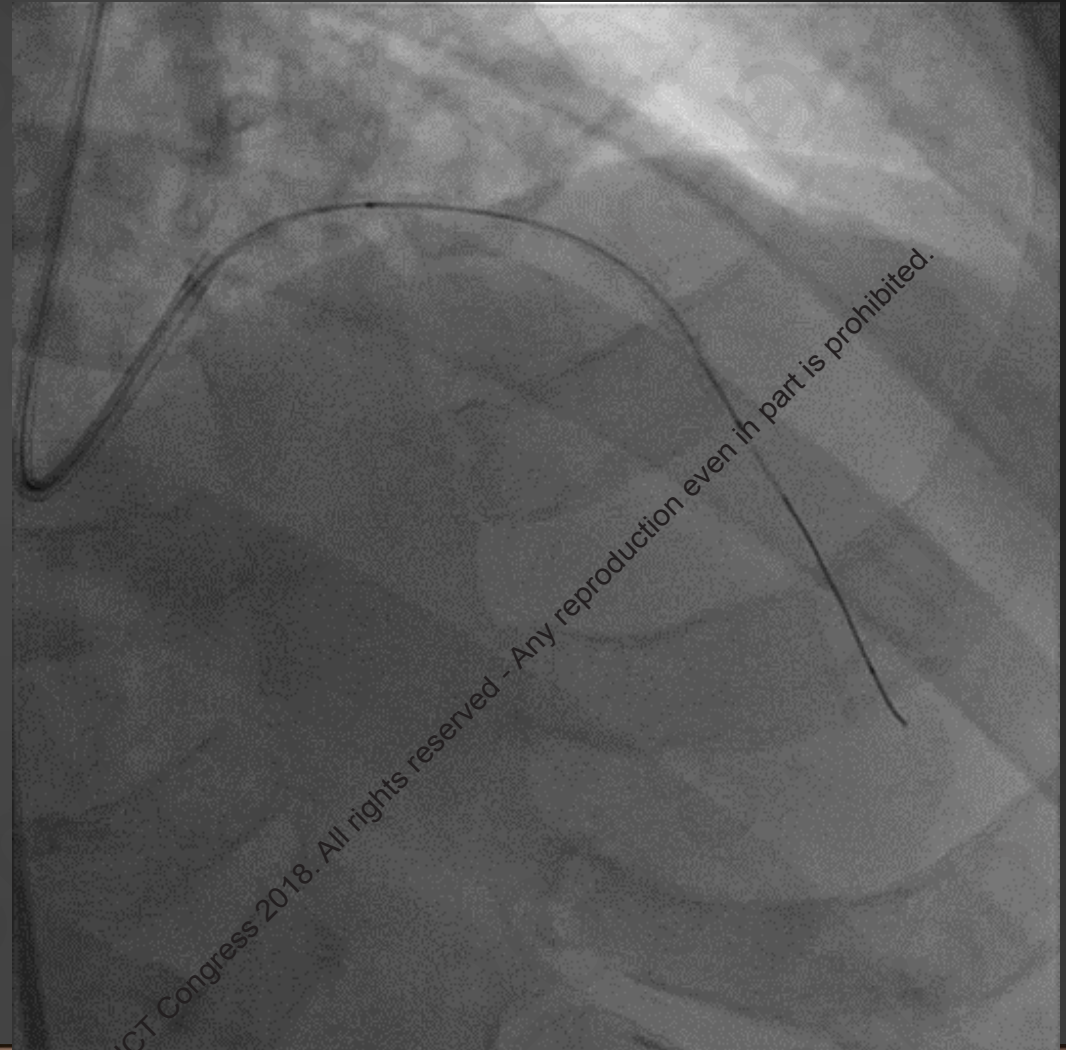
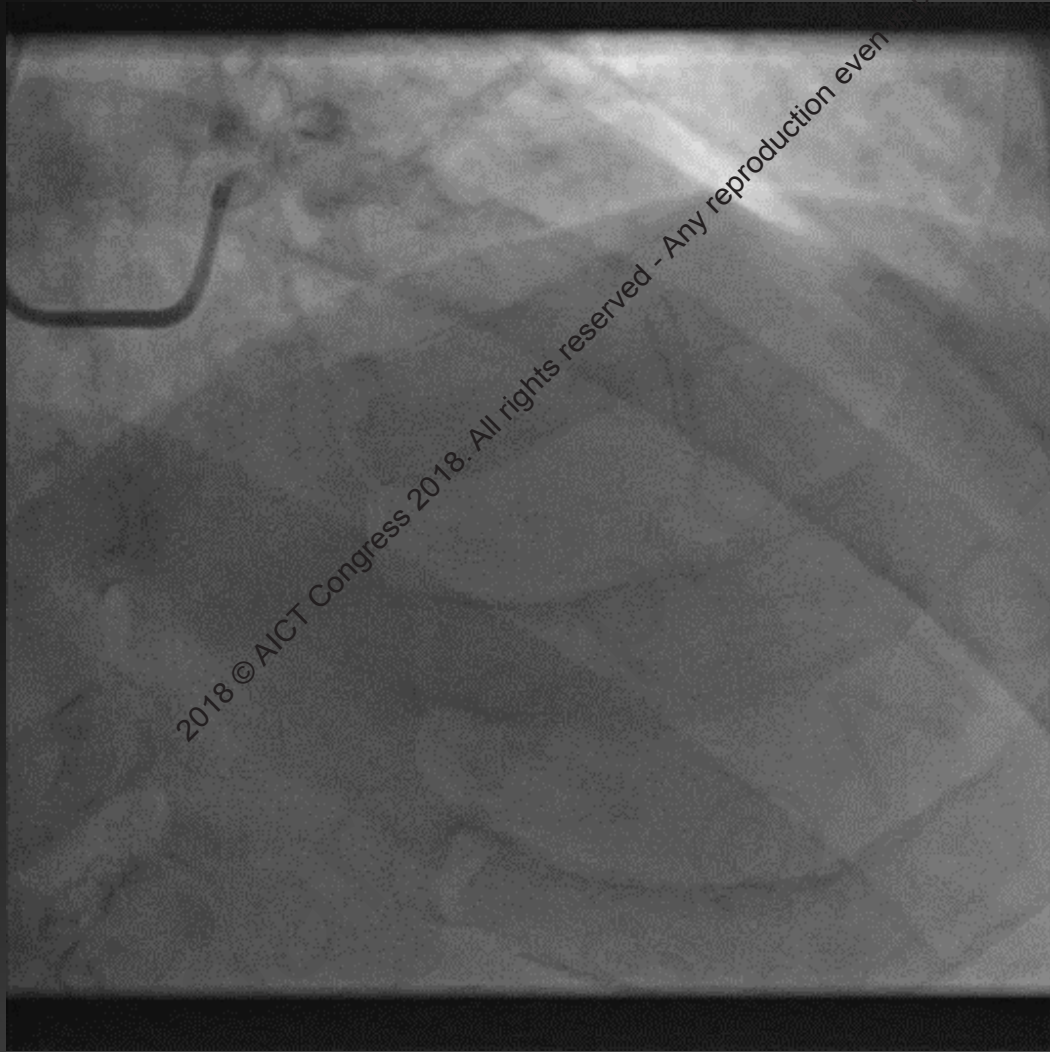
STEP 4 - COREGISTRATION

STEP 5 - EDGE DETECTION

STEP 6 - APPPOSITION

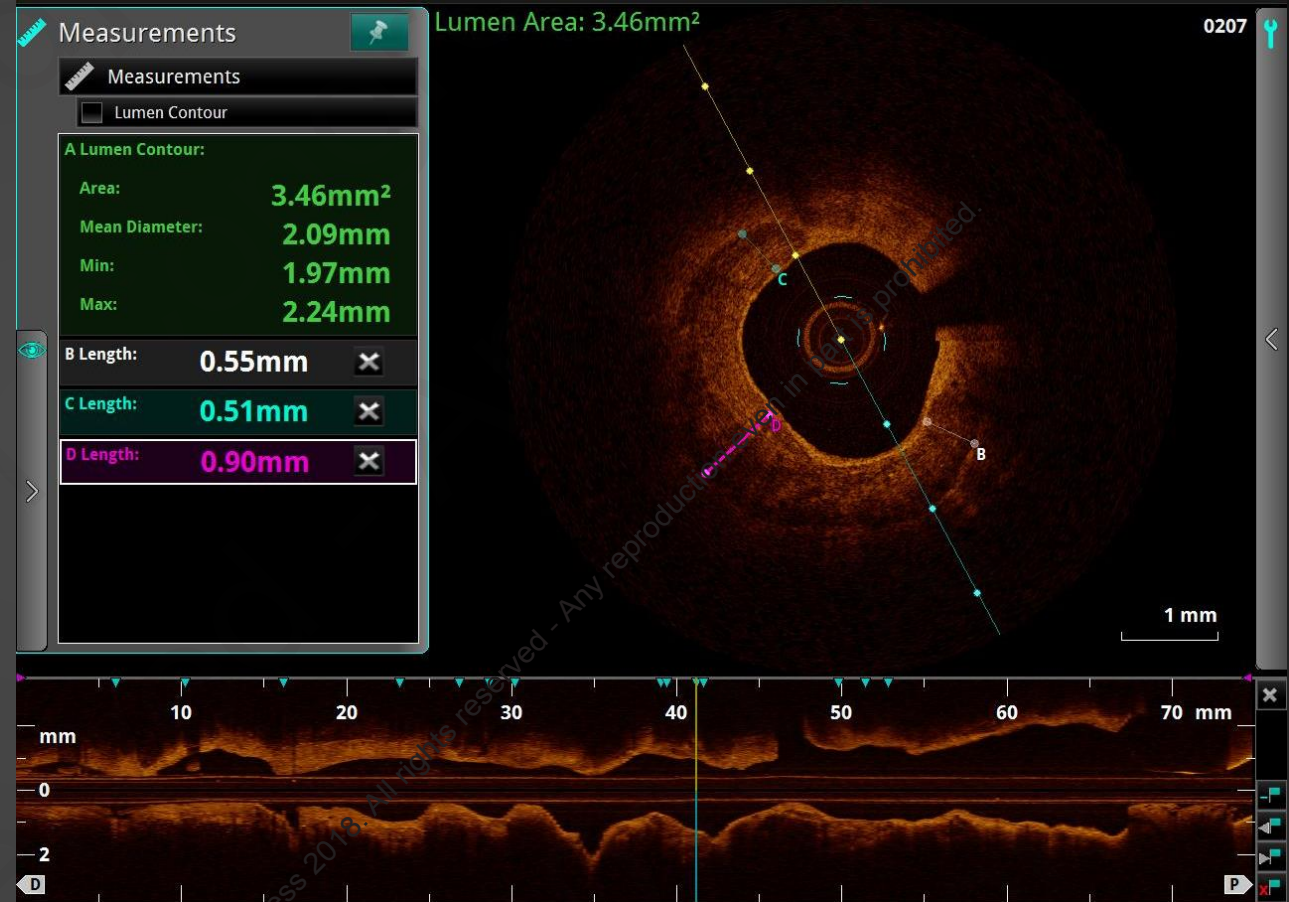
STEP 7 - LUMINAL GAIN

CASE EXAMPLE

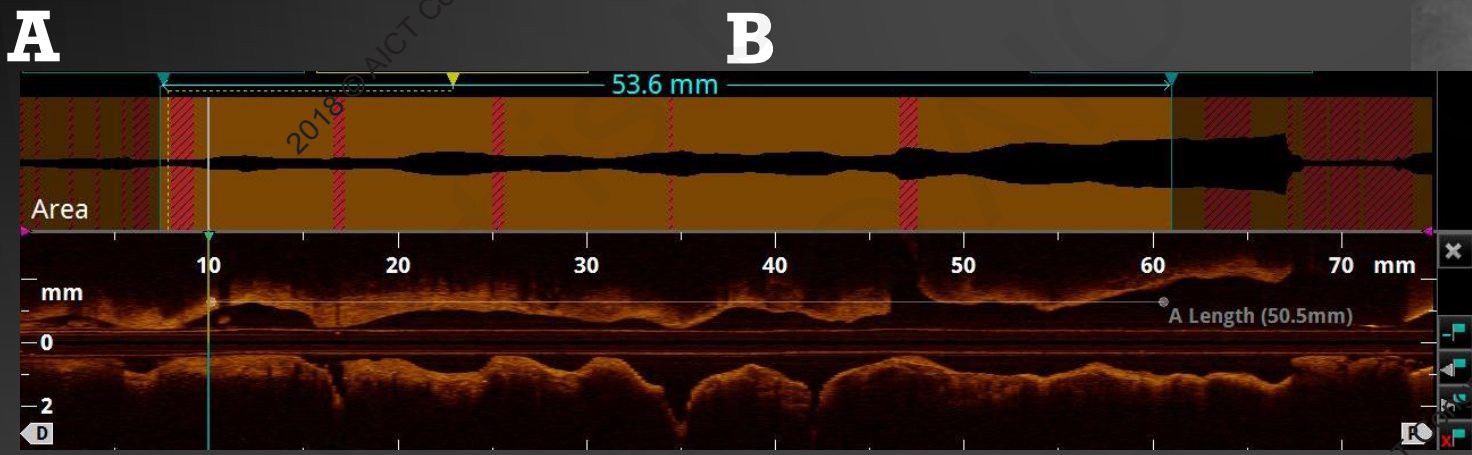
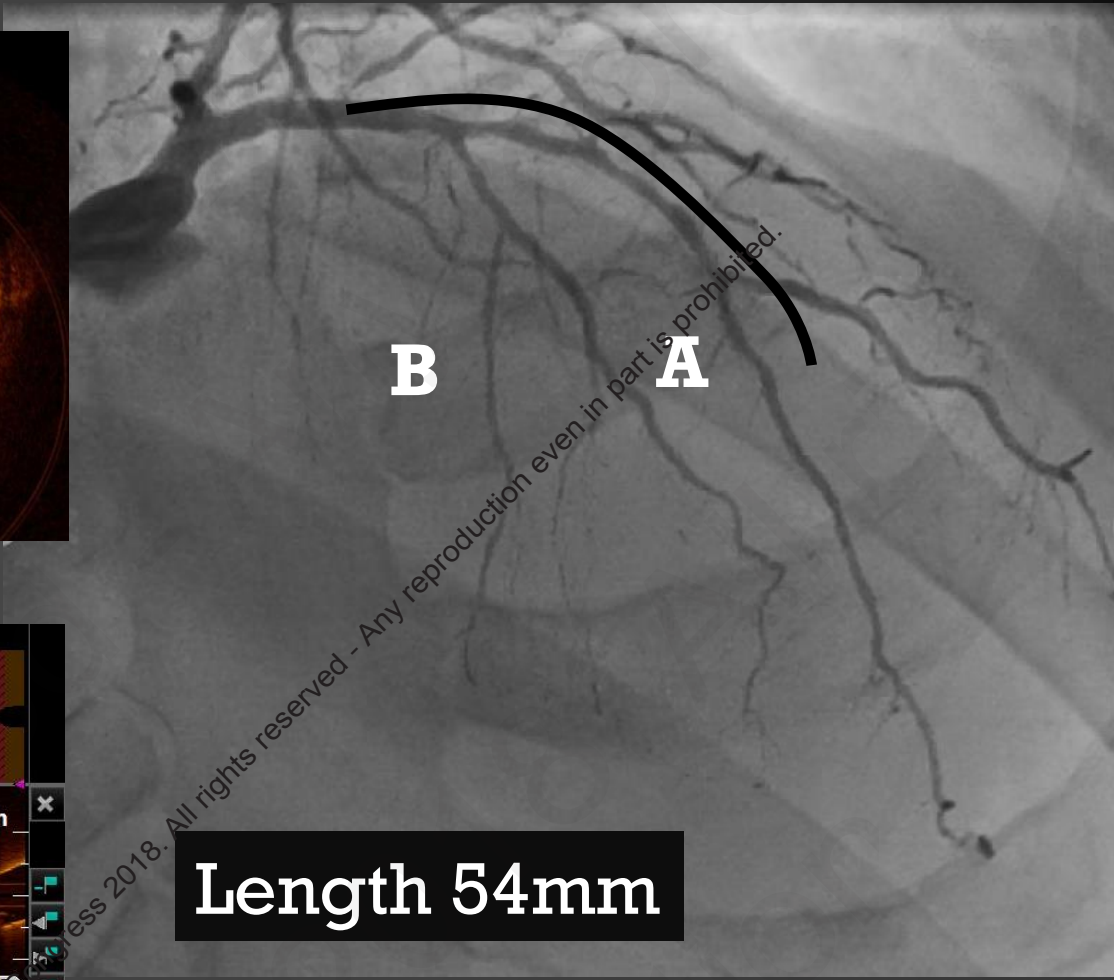
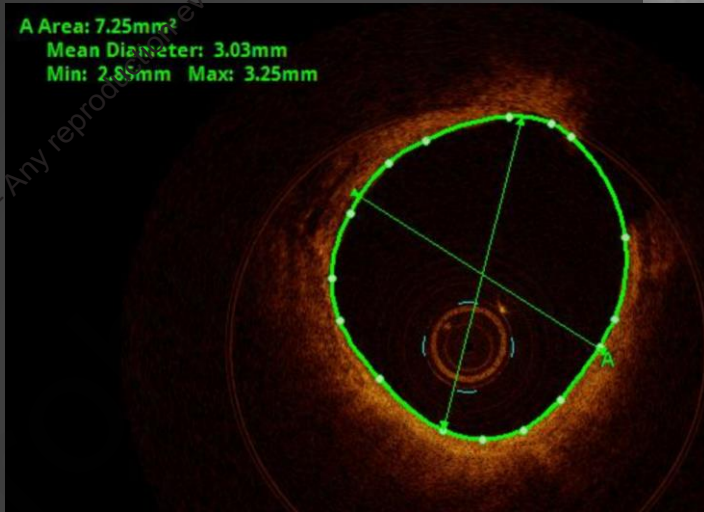
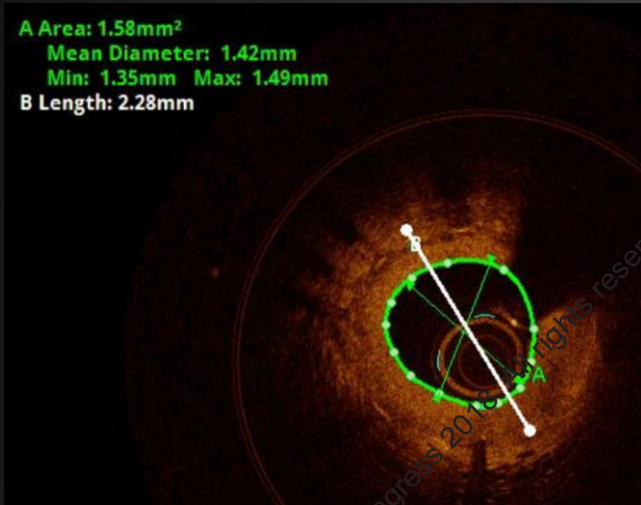


STEP 1 MORPHOLOGY → CALCIUM

- ✓ **SUPERFICIAL CALCIUM**
- ✓ **323 ° Arc**
- ✓ **LOWEST DEGREE OF THICKNESS:
0.5 mm**
- ✓ **LENGTH: 50 mm**

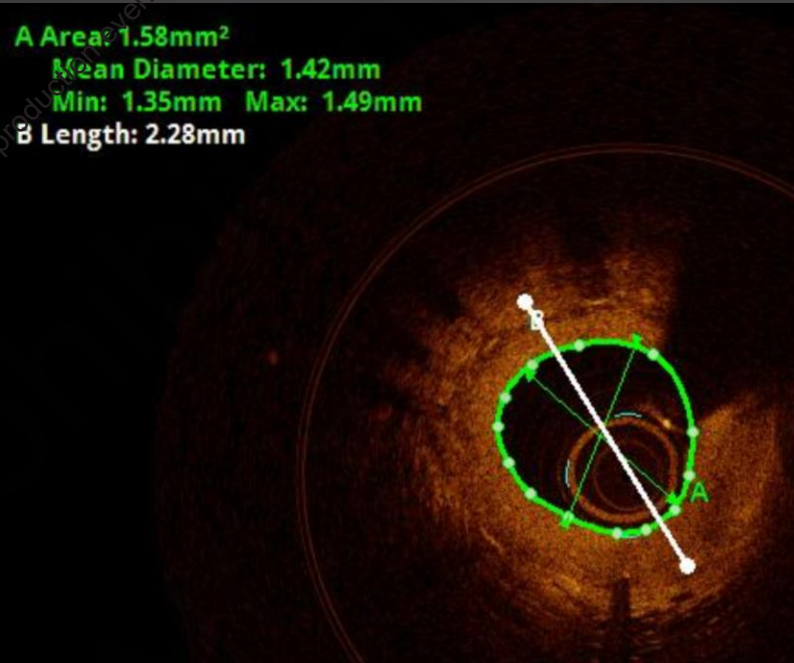
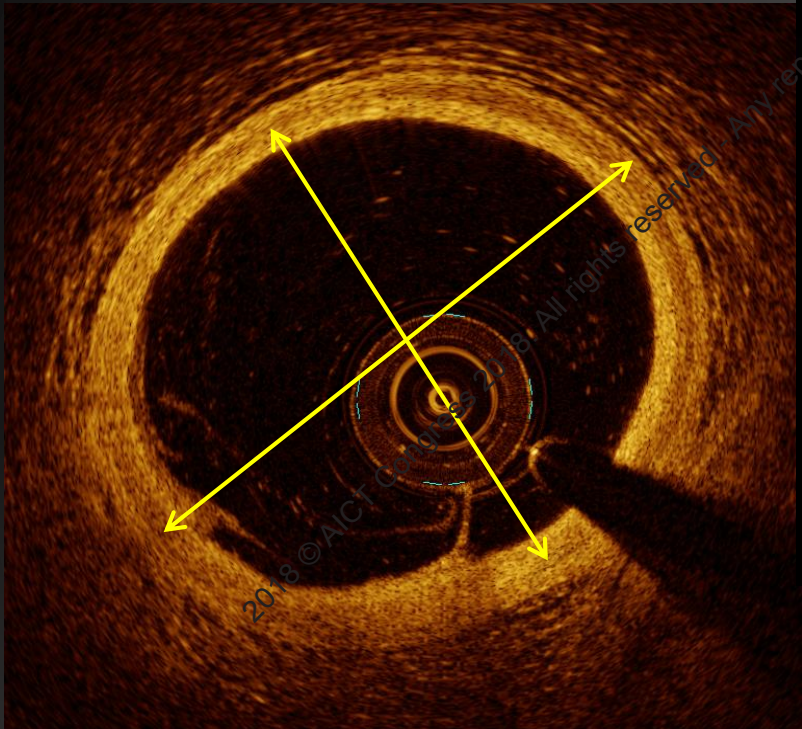


STEP 2 LENGTH OF LENGTH

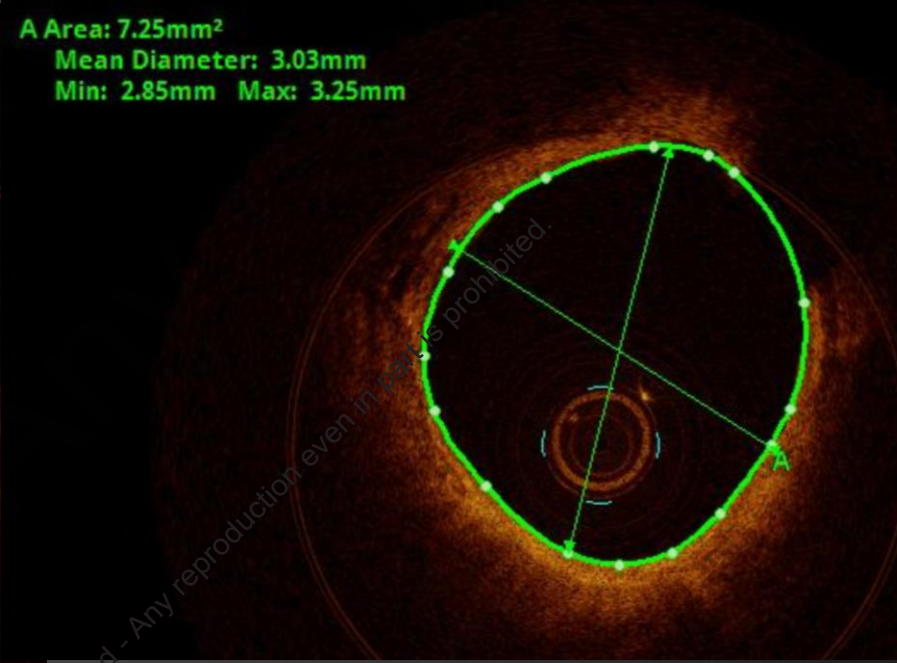


STEP 3 SIZE → 2.25MM DIAMETER

LOCATE Distal EEL



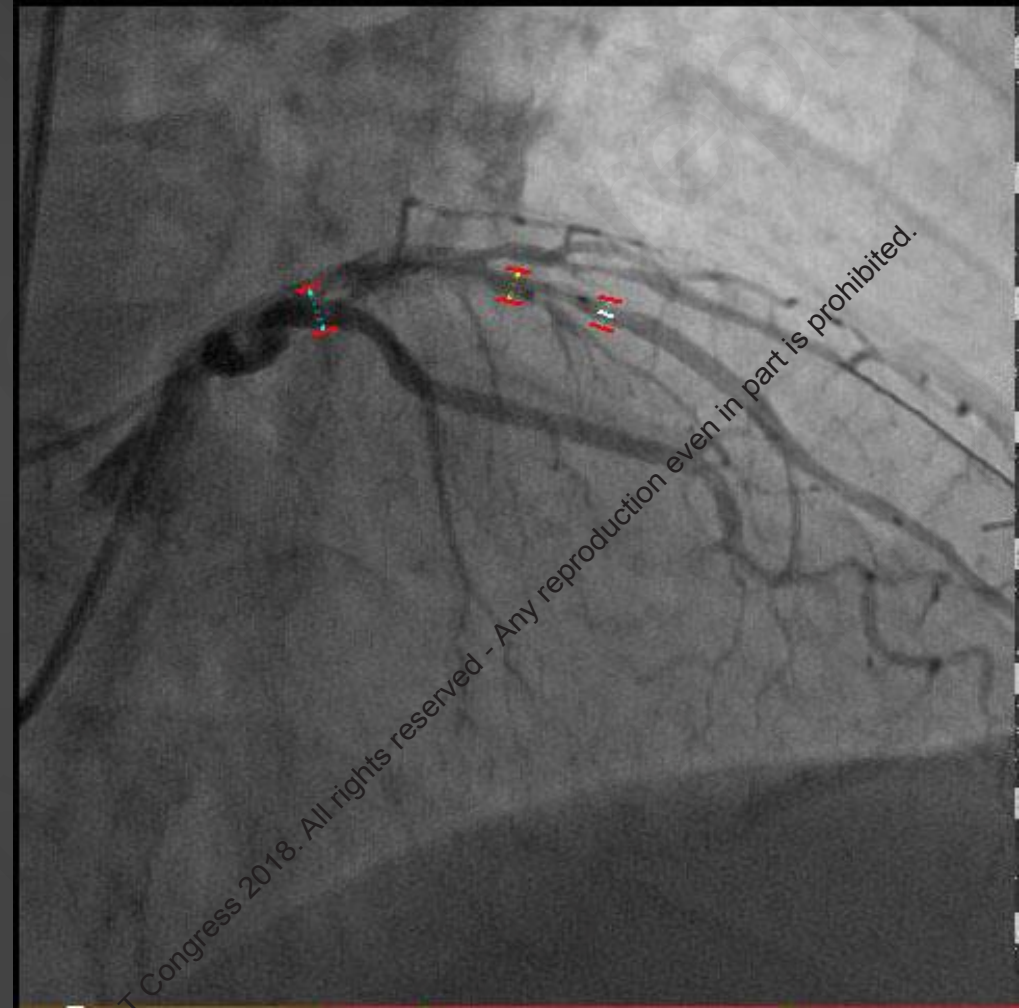
DISTAL: 2.28 mm



PROXIMAL: 3.0 mm

STEP 4 CO-REGISTRATION

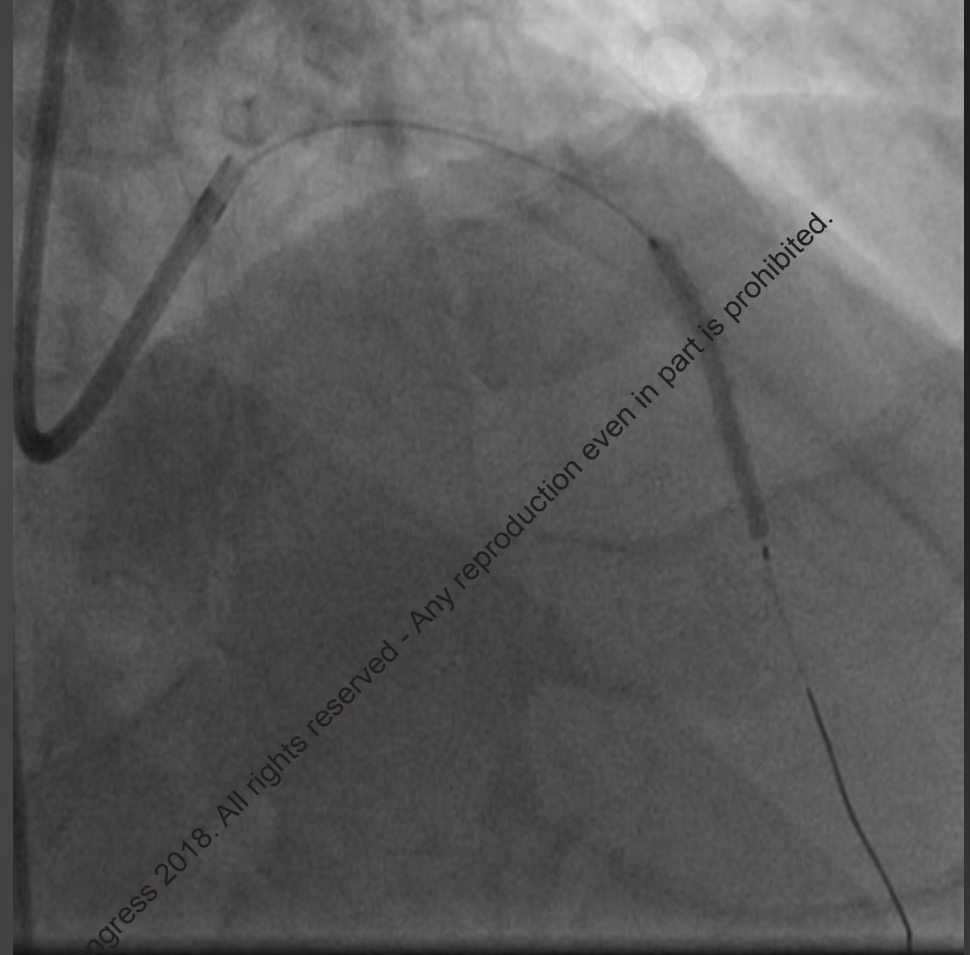
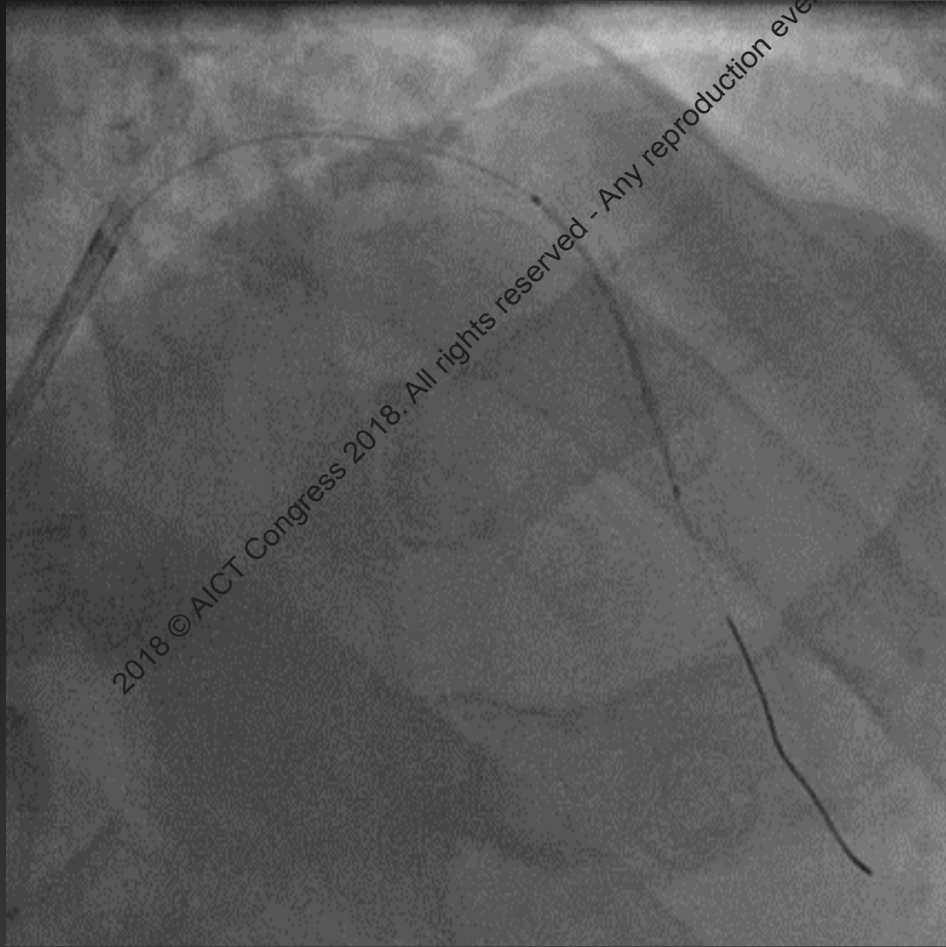
Eliminates angiographic ambiguity



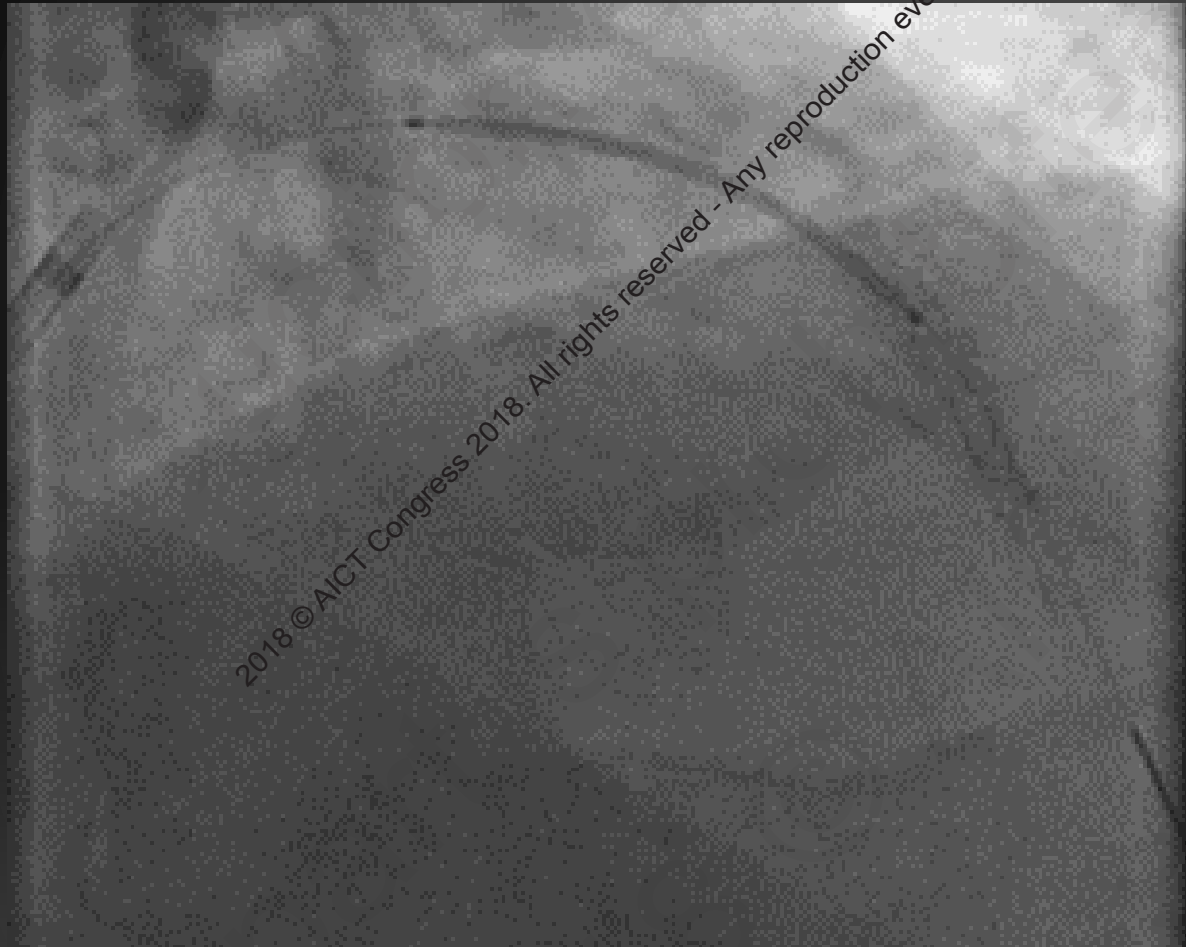
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2.25 X 26 MM DES

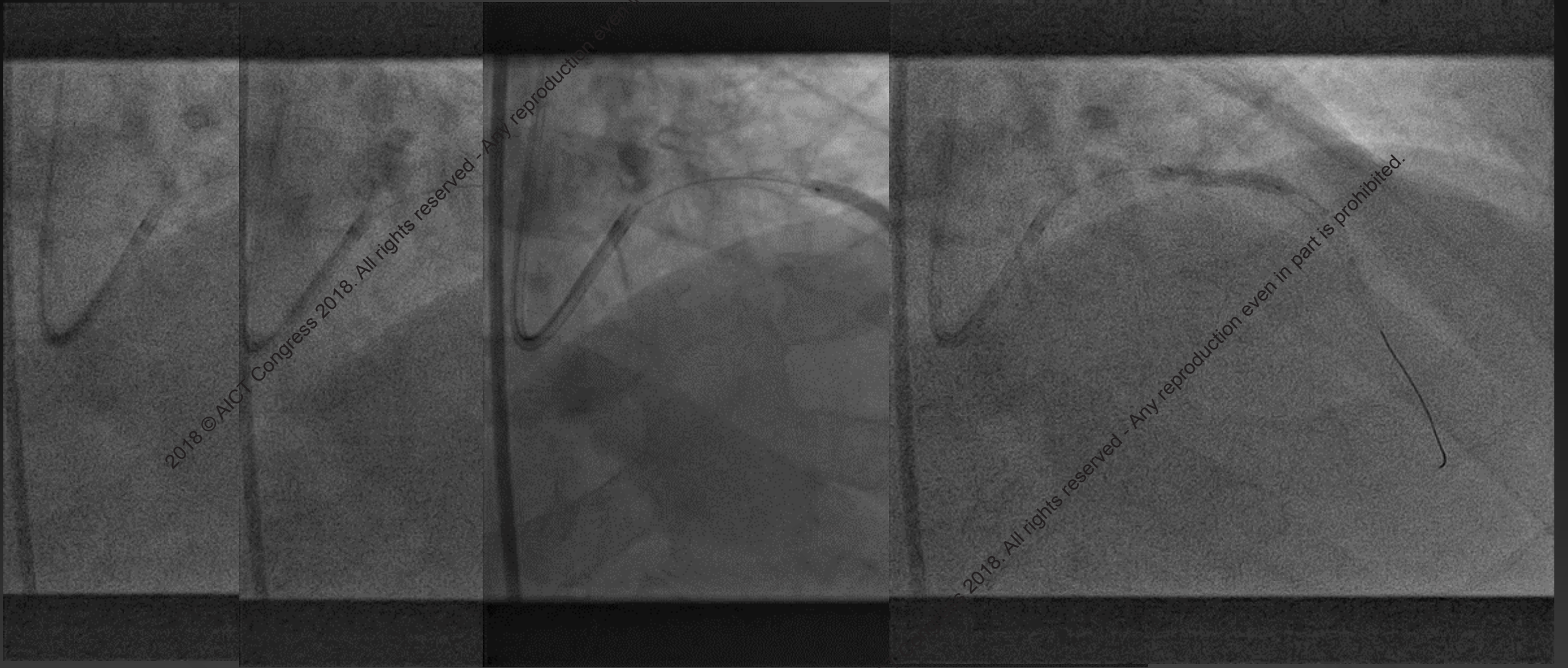


3.0 X 30mm DES to LAD



NC BALLOON

2.25/15 AND 3.0/20



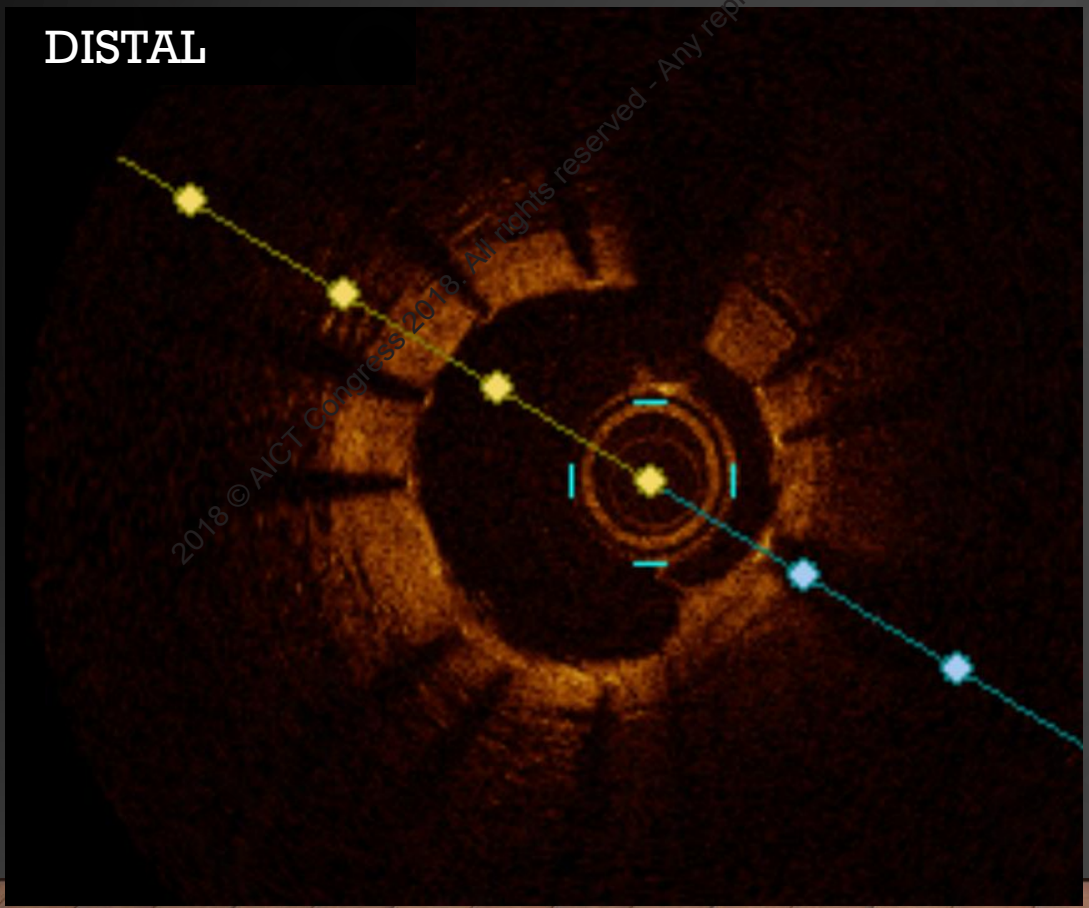
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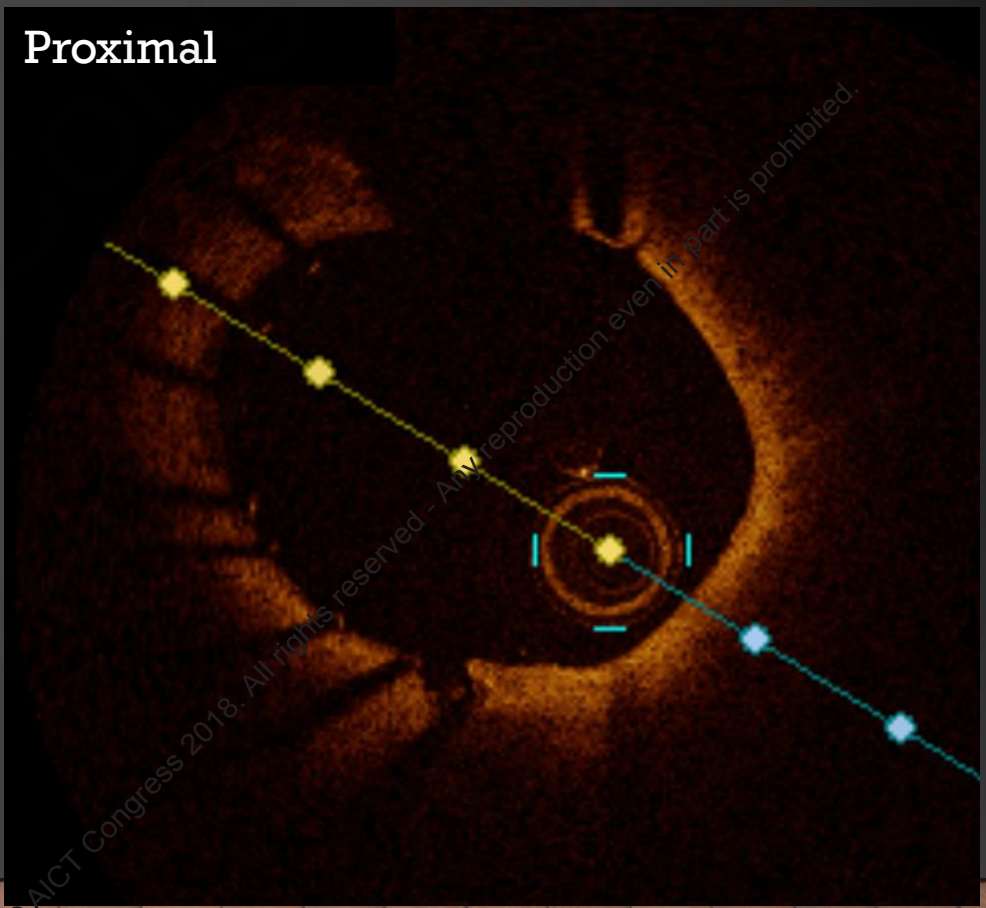
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STEP 5 EDGE DETECTION → NO DISSECTION

DISTAL



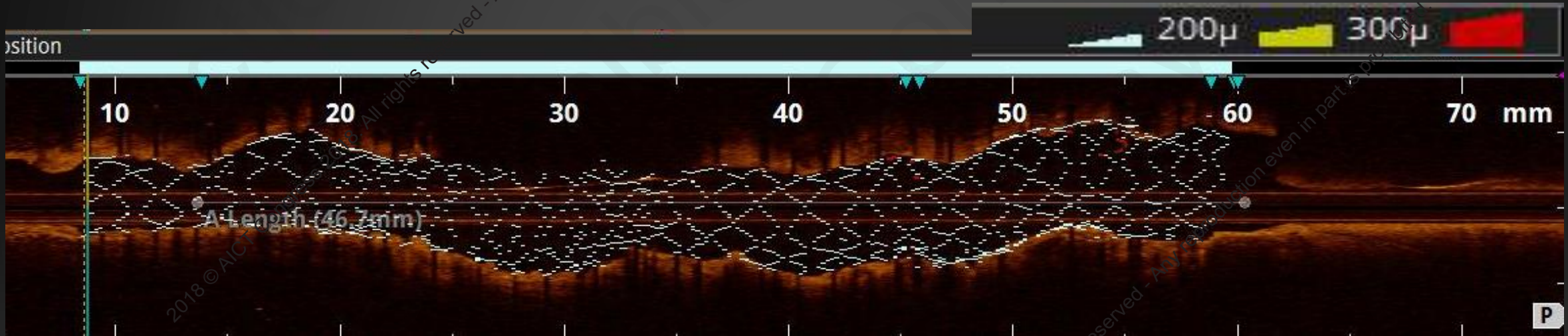
Proximal



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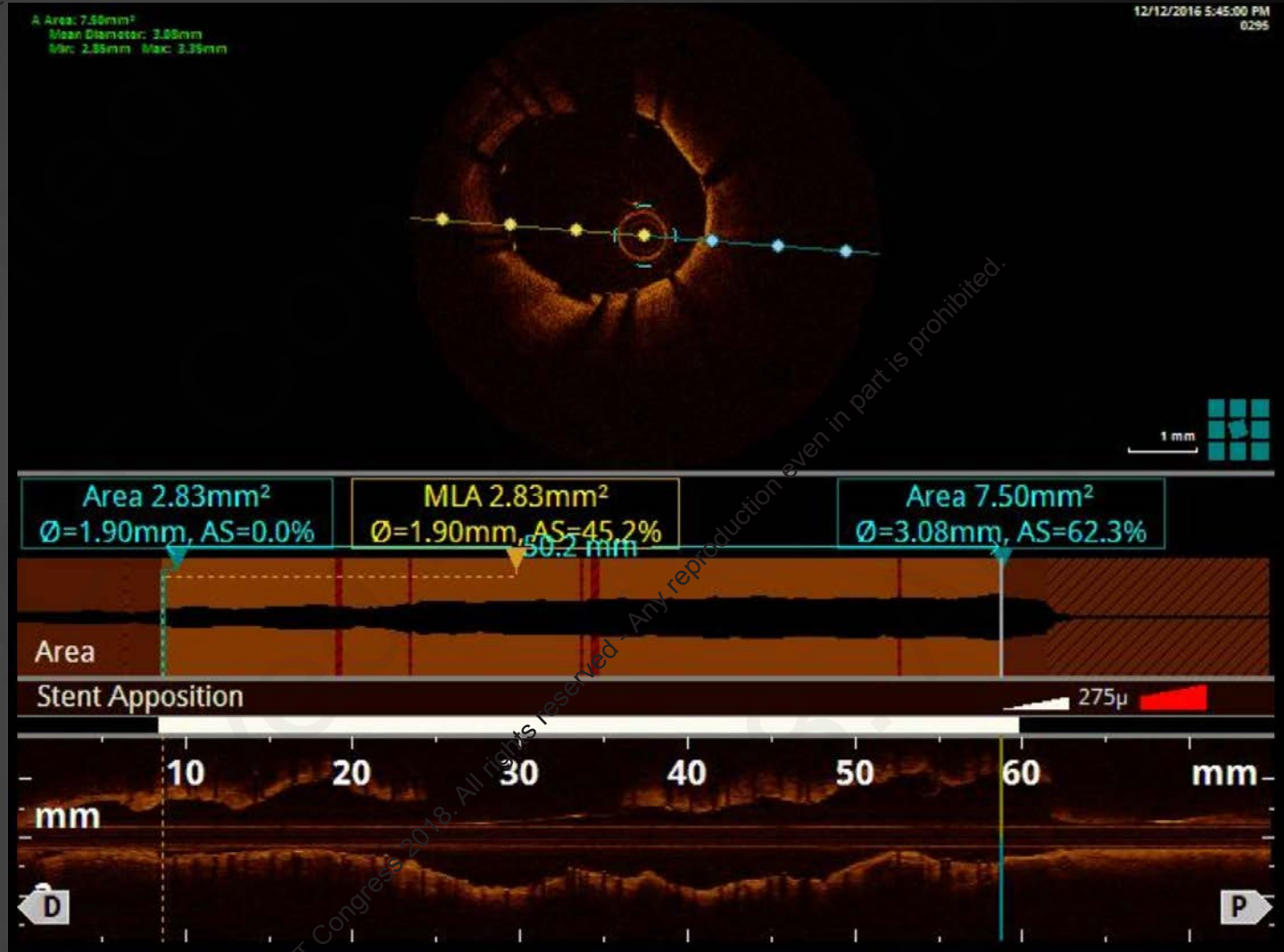
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STEP 6 APPOSITION



STEP 7 STENT EXPANSION

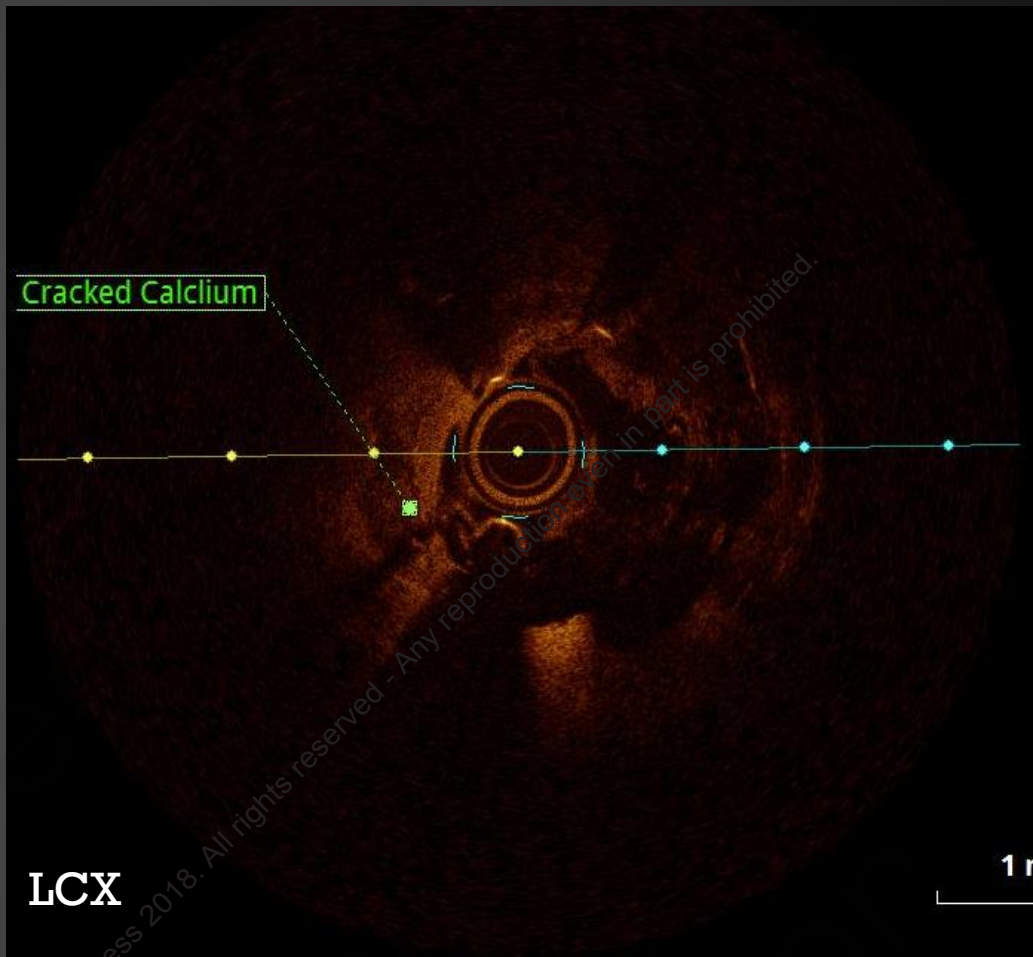
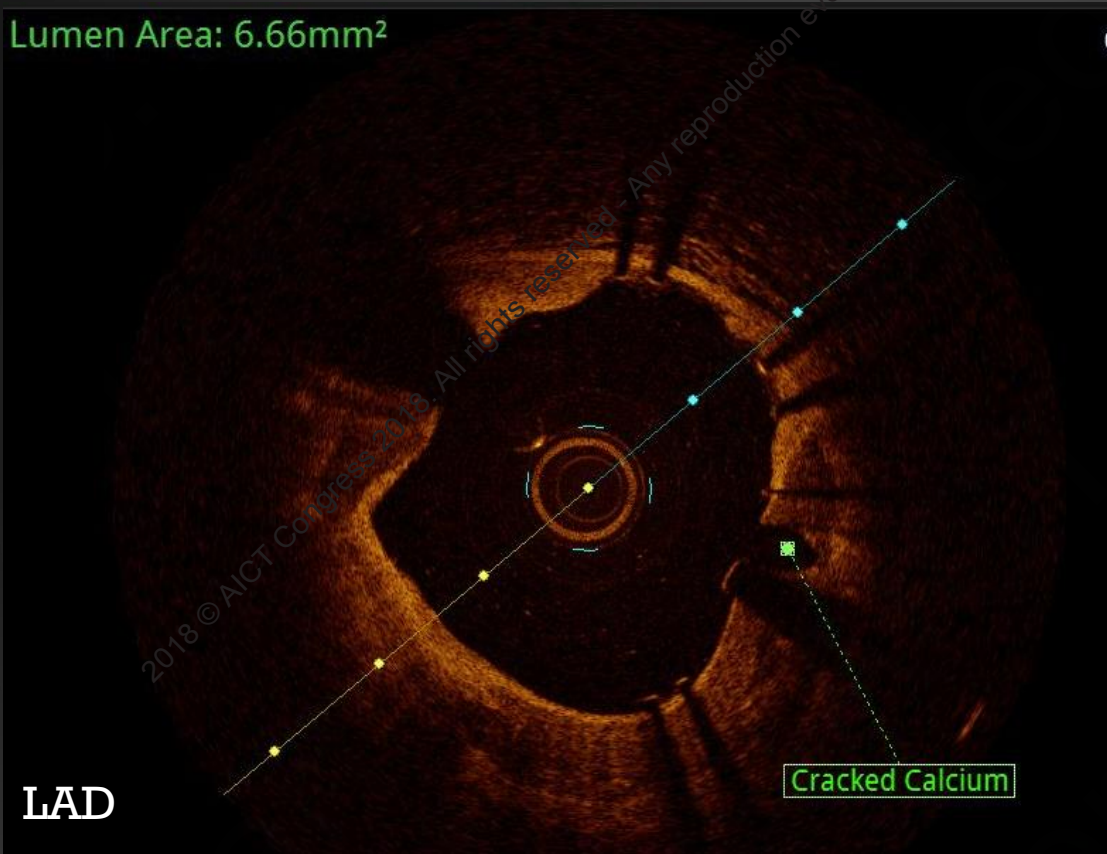
MSA: >90% ref



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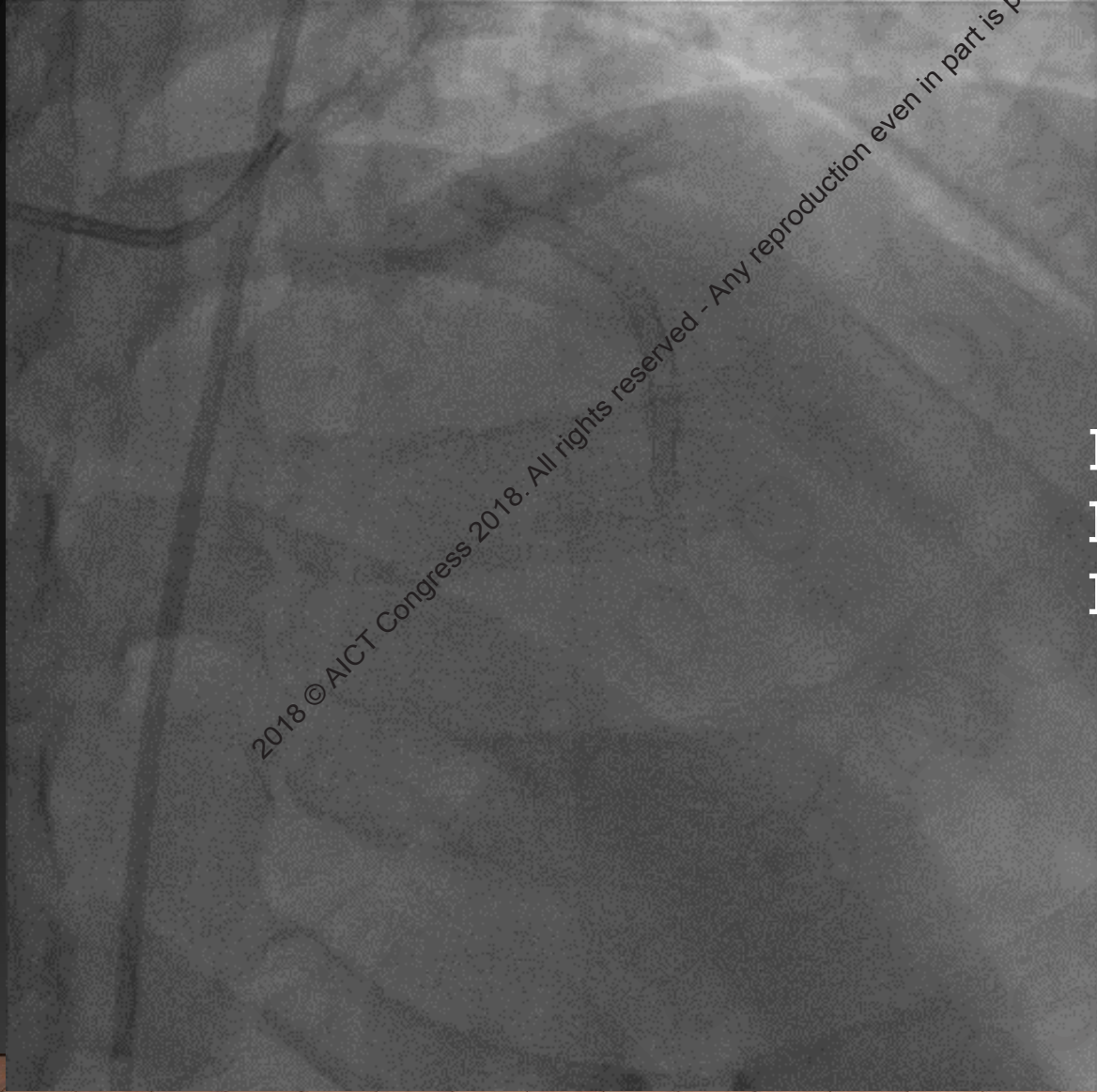
EVIDENCE OF CALCIUM FRACTURE

Lumen Area: 6.66mm²



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FINAL



Further post dilated with
NC 2.25 for distal part
NC 3.0 mm balloon for the mid – proximal part

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Long-term consequences of optical coherence tomography findings during percutaneous coronary intervention: the Centro Per La Lotta Contro L'infarto - Optimization Of Percutaneous Coronary Intervention (CLI-OPCI) LATE study.

Prati F¹, Romagnoli E, La Manna A, Burzotta F, Gatto L, Marco V, Fineschi M, Fabbiochi F, Versaci F, Trani C, Tamburino C, Alfonso F, Mintz GS.

⊕ Author information

Clinical Impact of OCT Findings During PCI



The CLI-OPCI II Study

Francesco Prati, MD, PhD,*† Enrico Romagnoli, MD, PhD,† Francesco Burzotta, MD, PhD,‡ Ugo Limbruno, MD,§
Laura Gatto, MD,*† Alessio La Manna, MD,|| Francesco Versaci, MD,¶ Valeria Marco, RN,† Luca Di Vito, MD, PhD,*
Fabrizio Imola, MD,* Giulia Paoletti, RN,† Carlo Trani, MD,‡ Corrado Tamburino, MD,|| Luigi Tavazzi, MD,#
Gary S. Mintz, MD**

Eurointervention 2018

Prati F. JACC Cardiovascular imaging 2015

Clinical Impact of Suboptimal Stenting and Residual Intrastent Plaque/Thrombus Protrusion in Patients With Acute Coronary Syndrome

The CLI-OPCI ACS Substudy (Centro per la Lotta Contro L'Infarto- Optimization of Percutaneous Coronary Intervention in Acute Coronary Syndrome)

Francesco Prati, MD; Enrico Romagnoli, MD, PhD; Laura Gatto, MD; Alessio La Manna, MD; Francesco Burzotta, MD, PhD; Ugo Limbruno, MD; Francesco Versaci, MD; Franco Fabbiochi, MD; Alessandro Di Giorgio, MD; Valeria Marco, RT; Vito Ramazzotti, MD; Luca Di Vito, MD; Carlo Trani, MD; Italo Porto, MD, PhD; Alberto Boi, MD; Luigi Tavazzi, MD; Gary S. Mintz, MD

Prati F. JACC Circ Cardiovasc Interv. 2016

CONCLUSION

- ✓ **Calcified lesion is very common.**
- ✓ **It affects luminal gain, and stent apposition**
- ✓ **It causes restenosis and poor expansion**
- ✓ **Intra vascular imaging is essential and sensitive tool to detect calcified lesions and guide our PCI strategy**

THANK YOU

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