Annual Conference for Cardiovascular Nurse & Technologist Joint Program with TCTAP 2016

OCT-Guided Device Sizing and PCI Optimization

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Recommendations/Evidence

ESC Guidelines Myocardial Revascularization, 2014

Recommendations	Class[a]	Level[b]	Ref.[c]
IVUS in selected patients to optimize stent implantation.	IIa	B	702,703,706
IVUS to assess severity and optimize treatment of unprotected left main lesions.	IIa	B	705
IVUS or OCT to assess mechanisms of stent failure.	IIa	C	
OCT in selected patients to optimize stent implantation.	IIb	C	

Should be considered

Stent implant

Left main

Stent failure

Should be considered

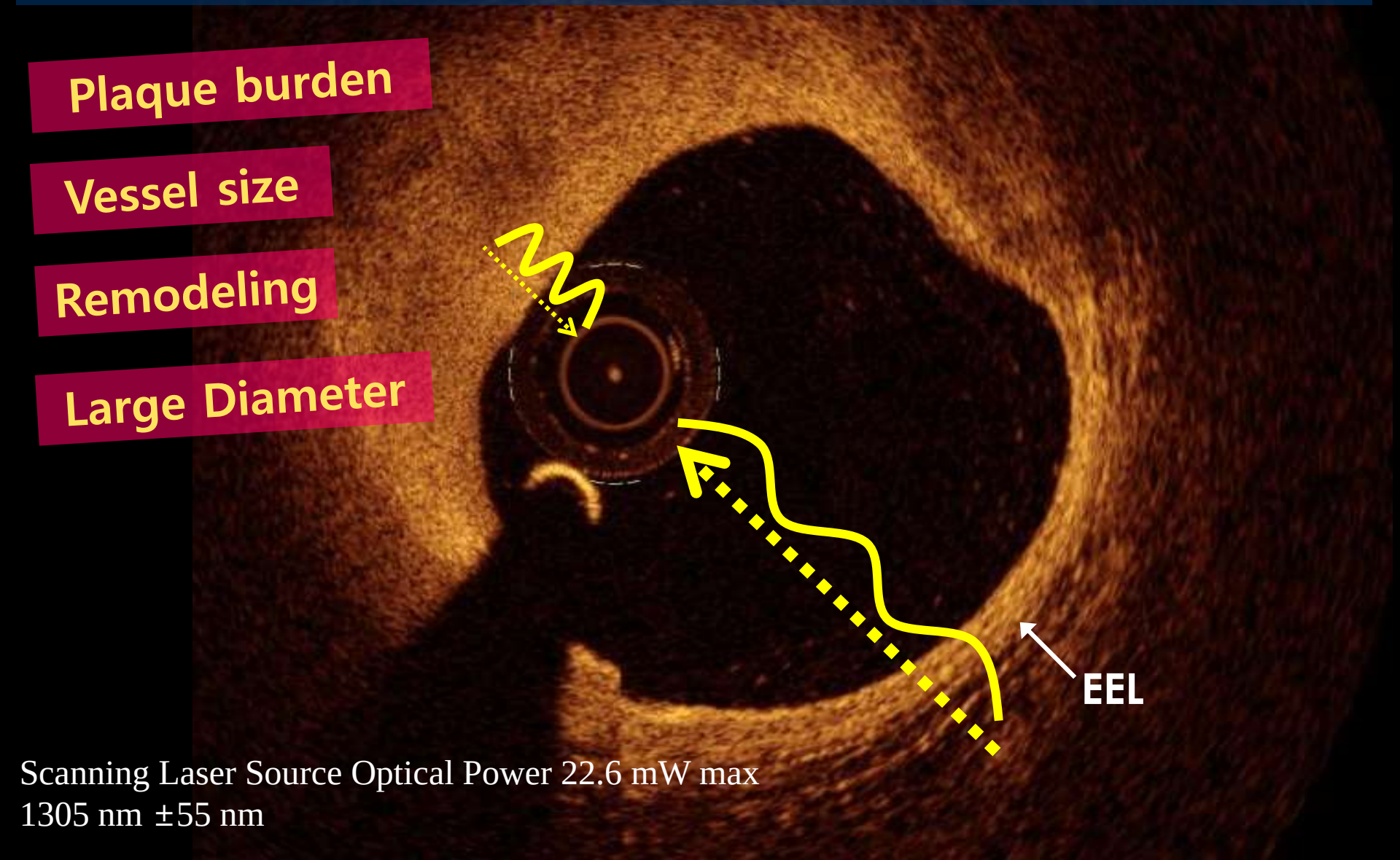
Stent failure

May be considered

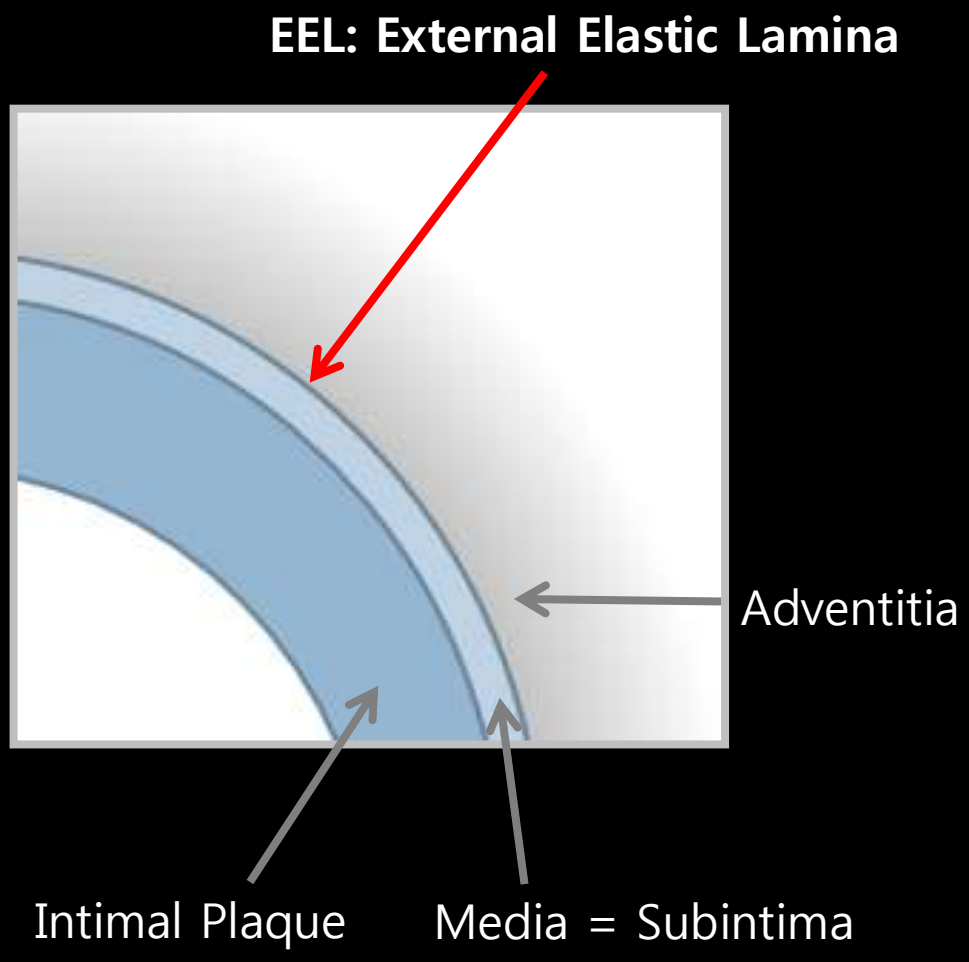
Stent implant

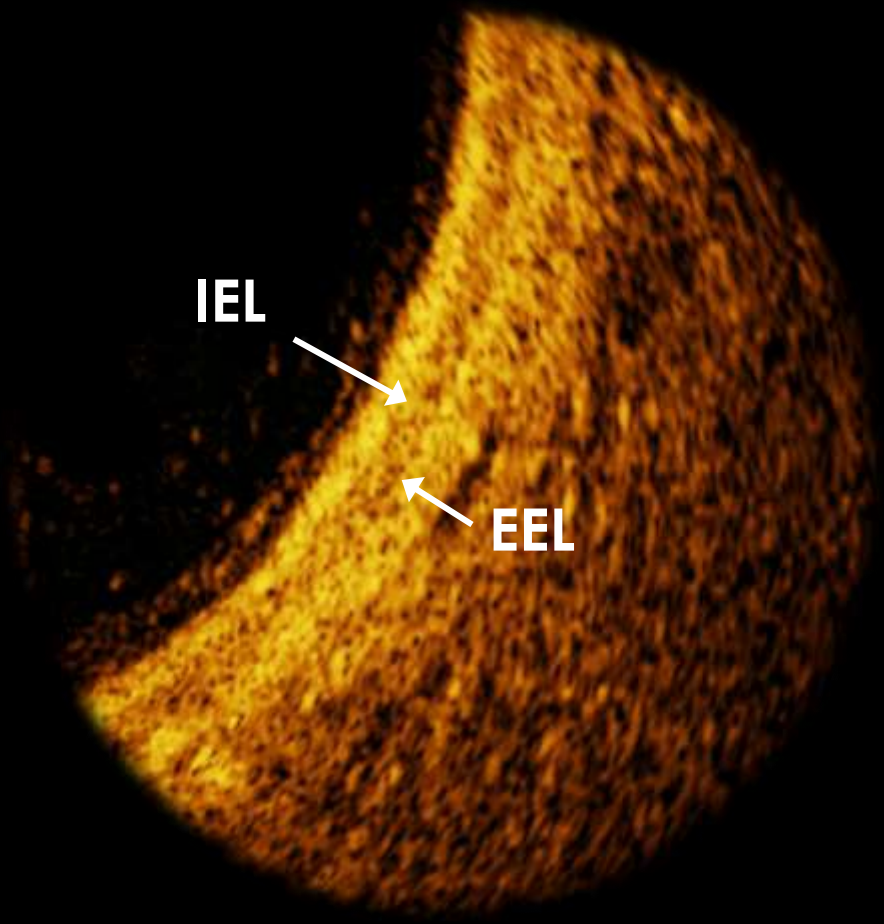
Pre-Intervention

Can you visualize the EEL?



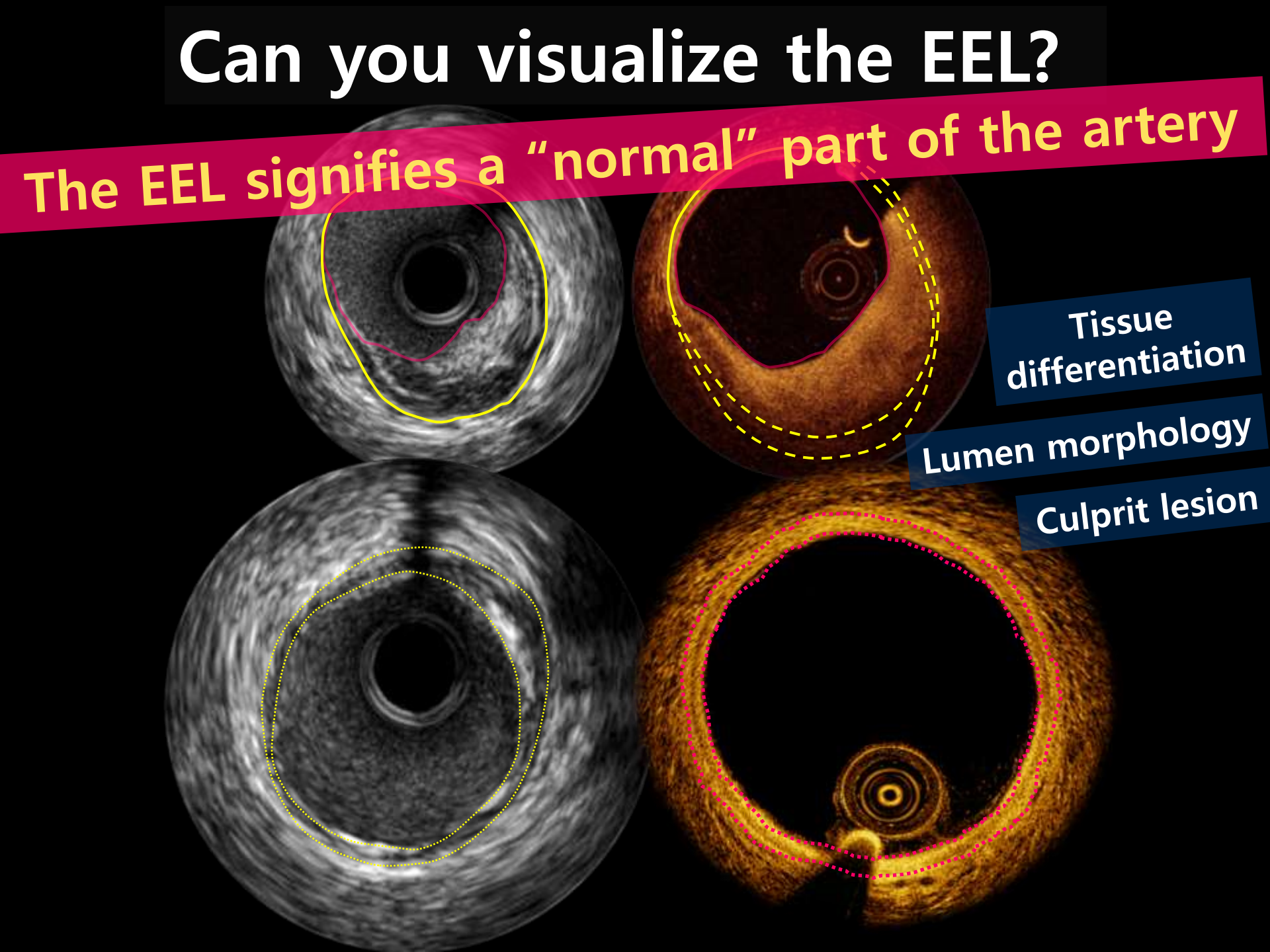
Scanning Laser Source Optical Power 22.6 mW max
1305 nm ±55 nm


EEL: External Elastic Lamina
Adventitia
Intimal Plaque
Media = Subintima


IEL
EEL

Can you visualize the EEL?

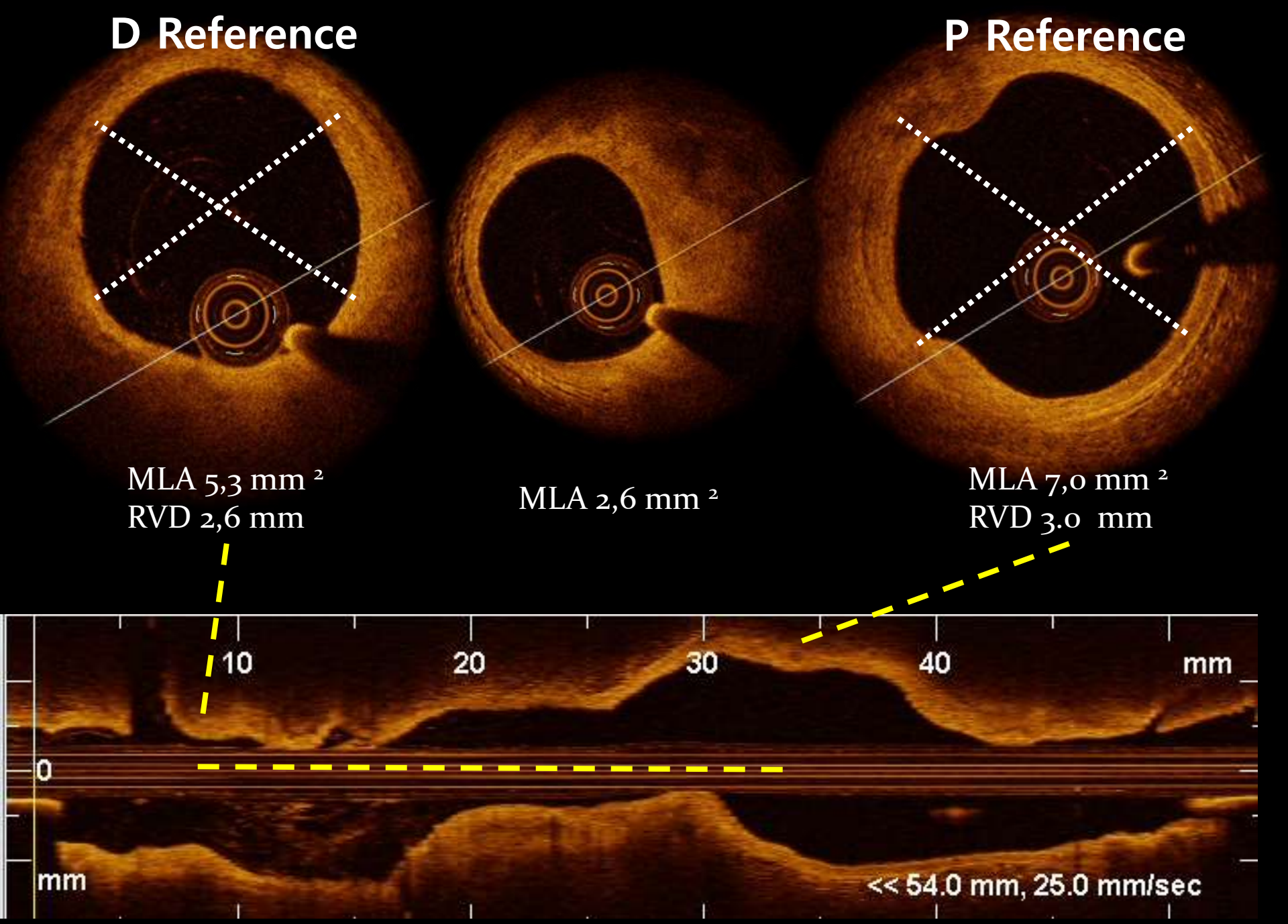
The EEL signifies a "normal" part of the artery



Tissue differentiation

Lumen morphology

Culprit lesion


D Reference
P Reference
MLA 5,3 mm ²
RVD 2,6 mm
MLA 2,6 mm ²
MLA 7,0 mm ²
RVD 3.0 mm
10
20
30
40
mm
0
mm
<< 54.0 mm, 25.0 mm/sec

How to determine the Landing Zone: OCT

Maximum diameter of the smaller reference

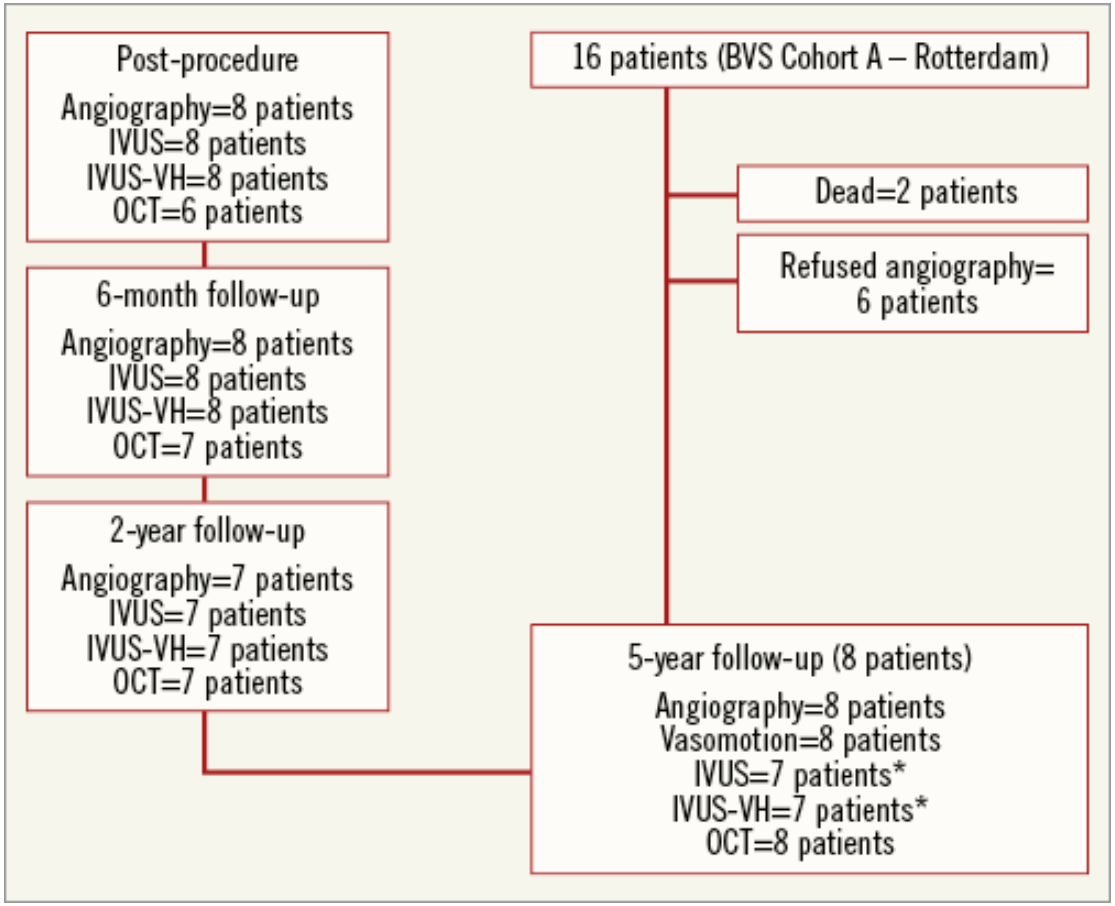
Average of the maximum diameters of the P and D references

Maximum diameter of the largest reference

Mid-wall to mid-wall diameters (between lumen and media)

Media-to-media diameter

EuroIntervention



Long-term invasive follow-up of the everolimus-eluting bioresorbable vascular scaffold: five-year results of multiple invasive imaging modalities

EuroIntervention 2016;11:996-1003

MLA : IVUS ≠ OCT

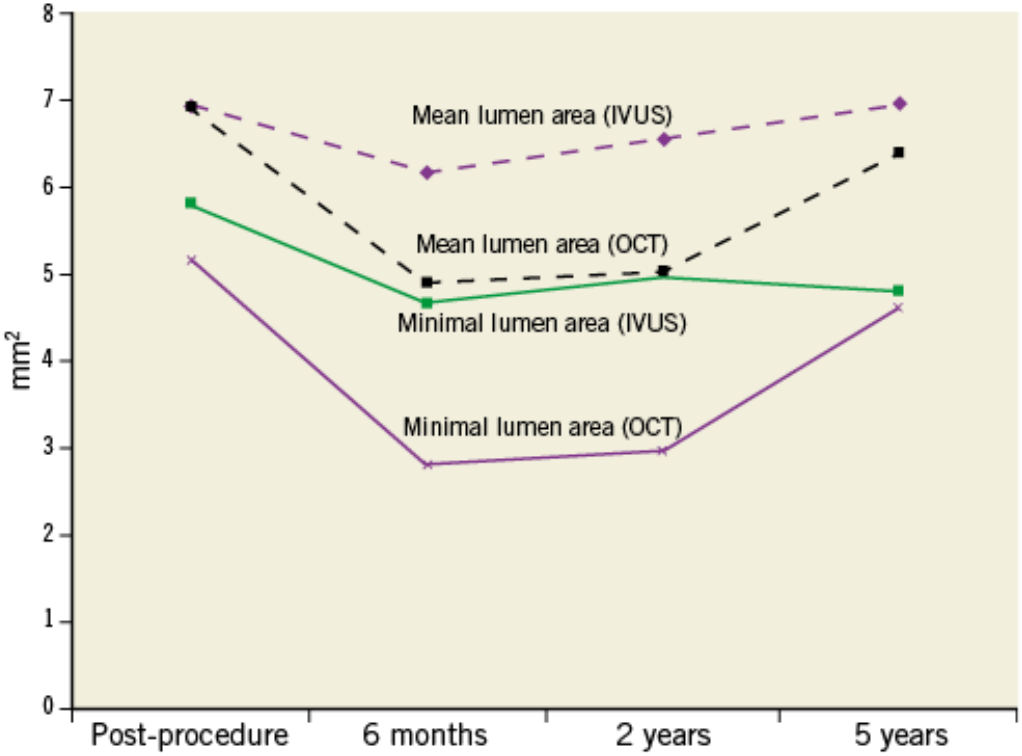


Table 2. Quantitative coronary angiography.

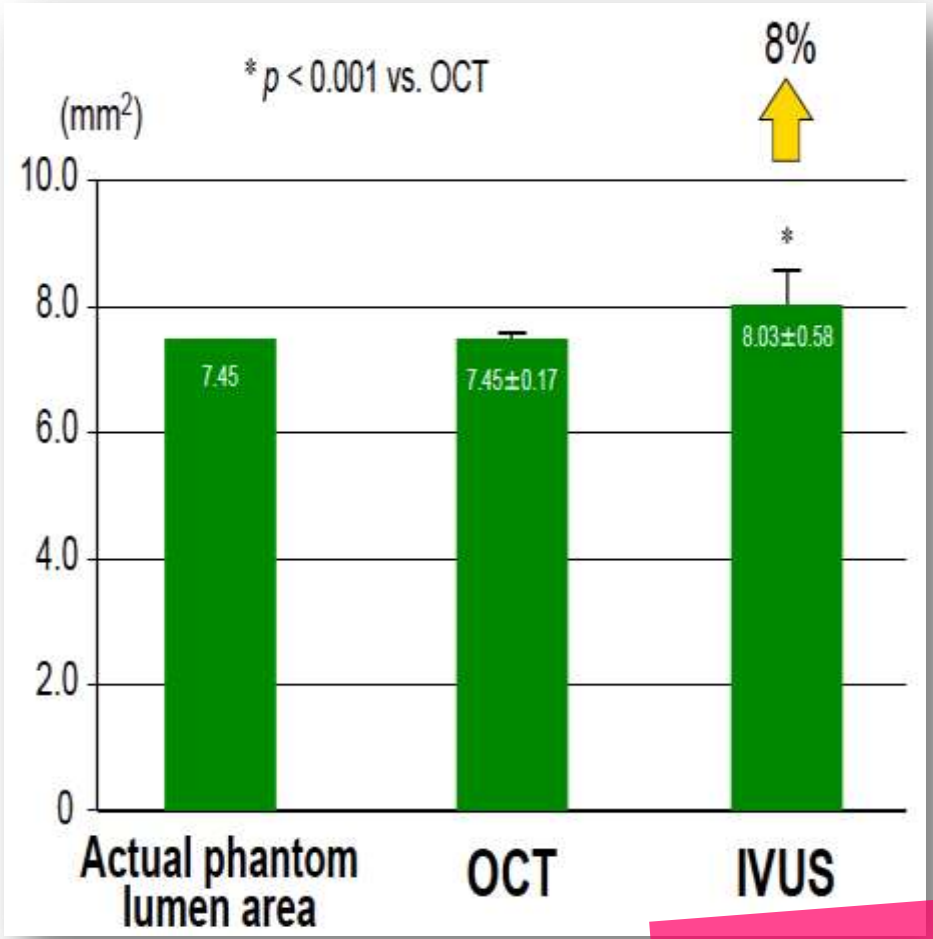
Quantitative coronary angiography	Before procedure	After procedure	6 months	2 years	5 years	*p*-value after procedure vs. 5 years	*p*-value 6 months vs. 5 years	*p*-value 2 years vs. 5 years
N	8	8	8	7	8			
Reference vessel diameter (mm)	3.02 (±0.56)	3.04 (±0.20)	2.93 (±0.21)	2.78 (±0.08)	2.83 (±0.30)	0.02	0.67	0.74
In-scaffold minimum luminal diameter (mm)	1.06 (±0.30)	2.36 (±0.30)	2.10 (±0.31)	1.95 (±0.37)	2.14 (±0.38)	0.09	0.67	0.09
In-scaffold diameter stenosis (%)	64.56 (±10.66)	22.33 (±6.68)	28.19 (±10.99)	29.93 (±13.26)	24.67 (±9.77)	0.21	0.50	0.07
In-scaffold late loss (mm)	–	–	0.26 (±0.25)	0.39 (±0.31)	0.22 (±0.34)	–	0.67	0.09

EuroIntervention 2016;11:996-1003

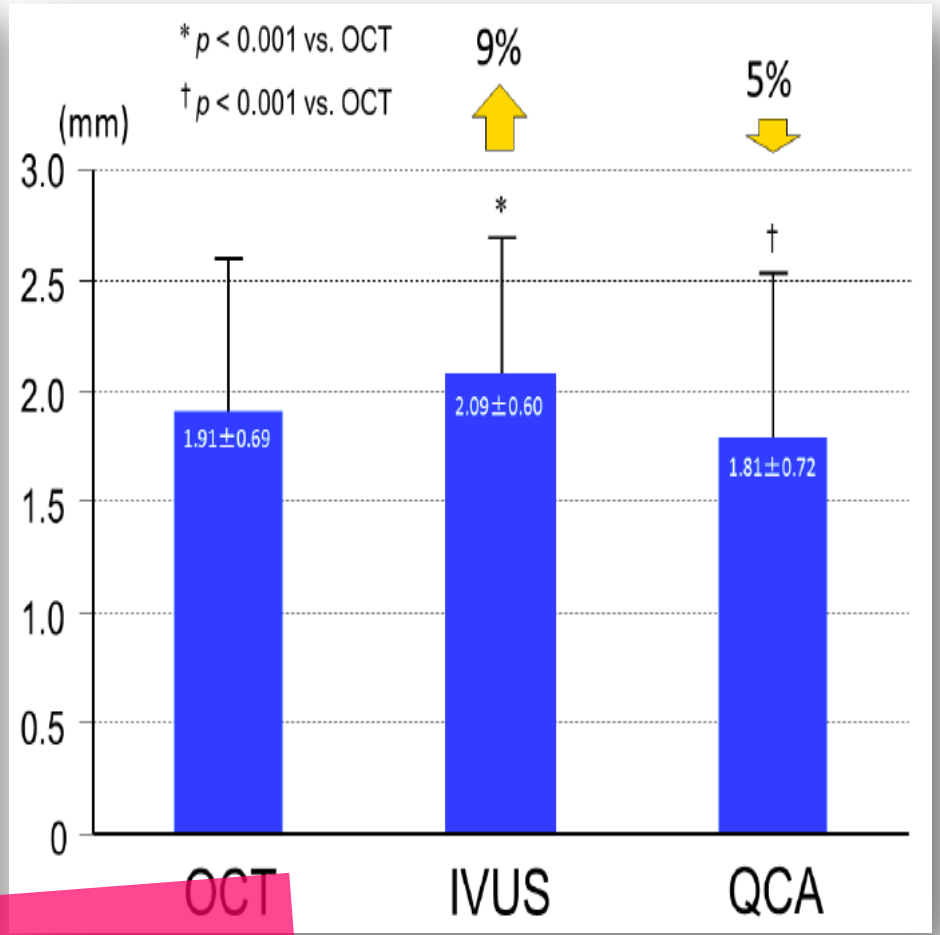
– OPUS-CLASS Study –

(Phantom vs OCT vs IVUS)

Minimum Lumen Area (mm^2)

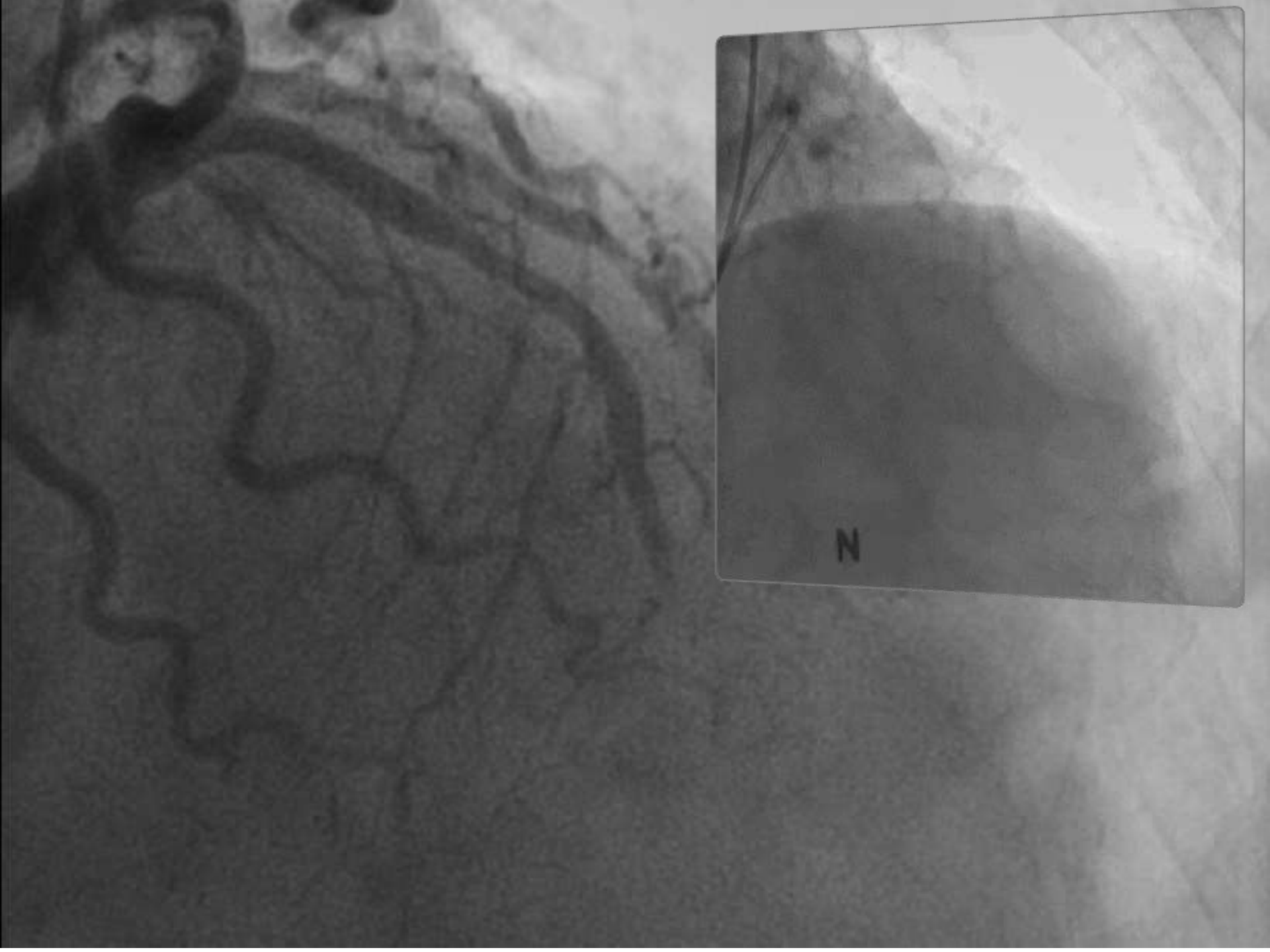


Minimum Lumen Diameter (mm)

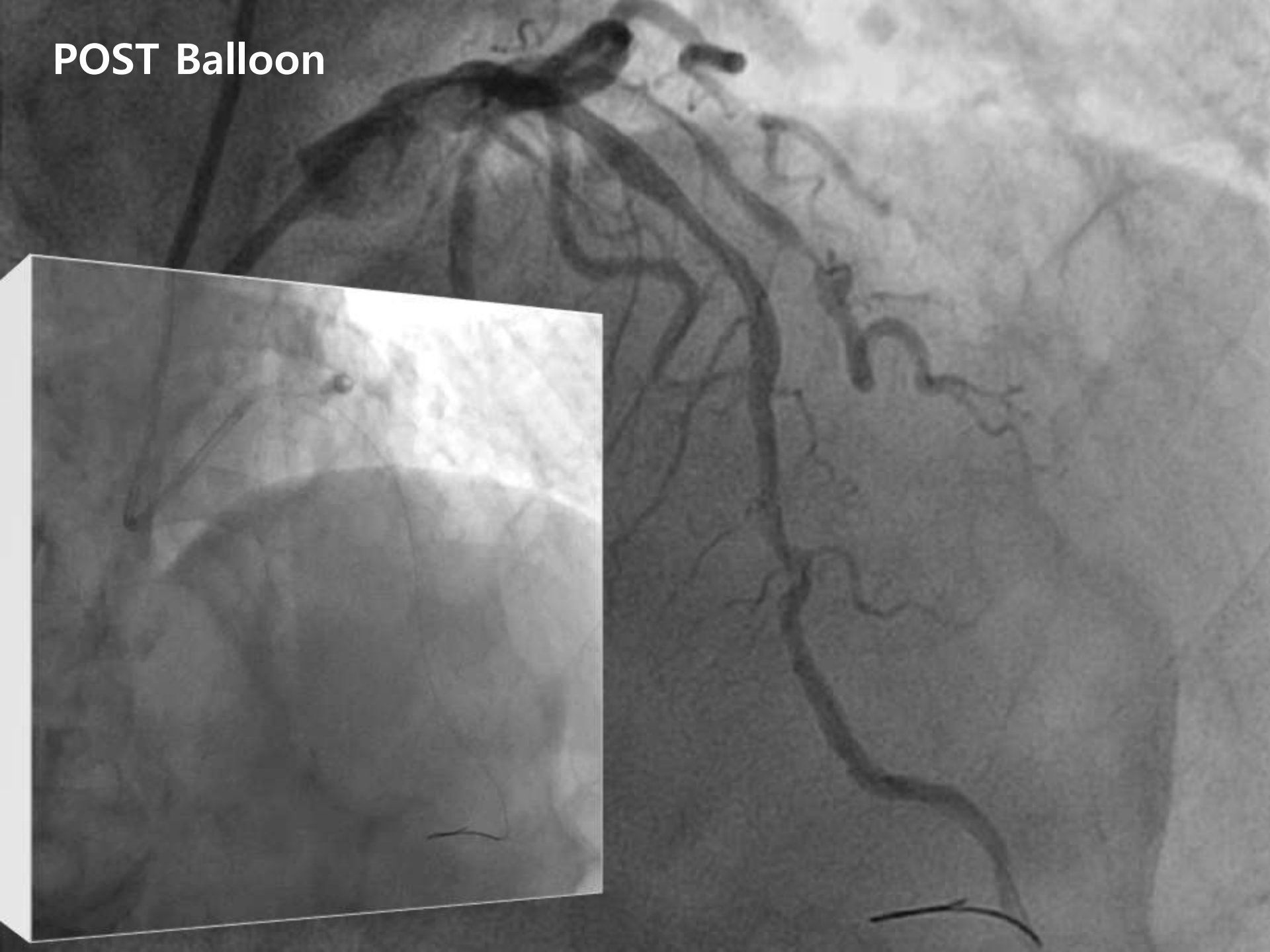


Accuracy

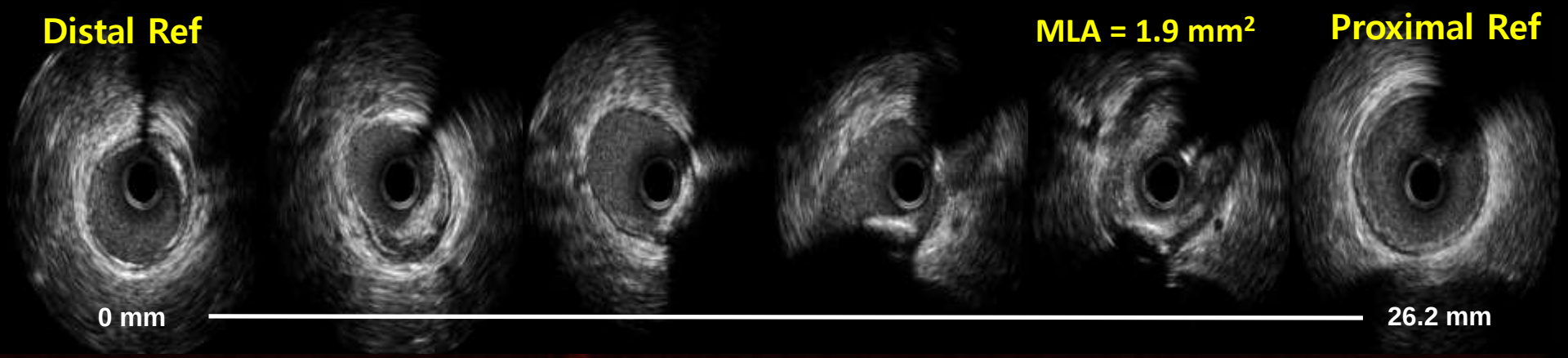
Kubo et al. iJACC 2013;6(10):1095-1104

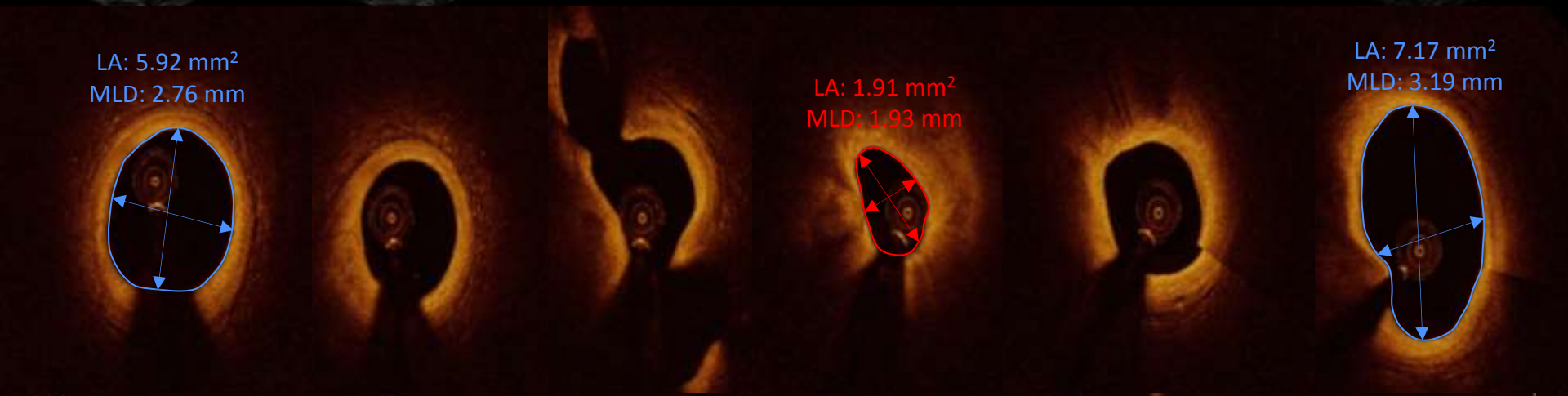

N

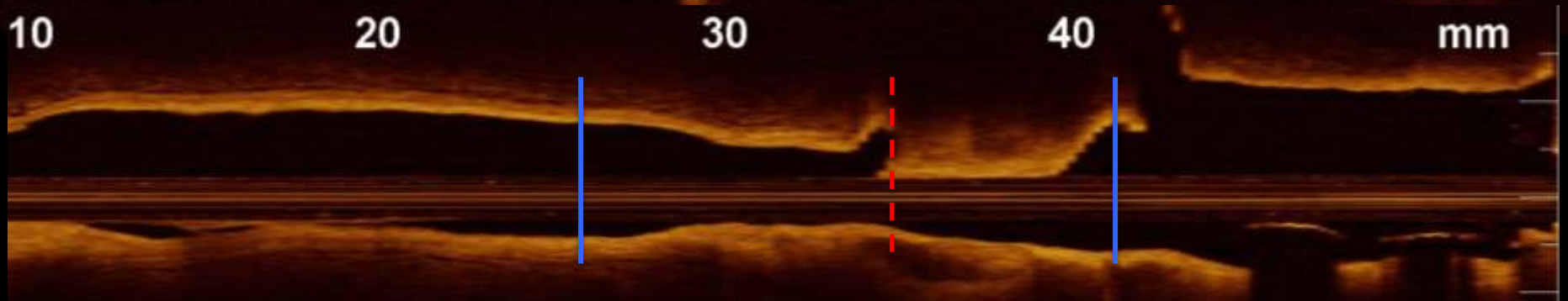
POST Balloon

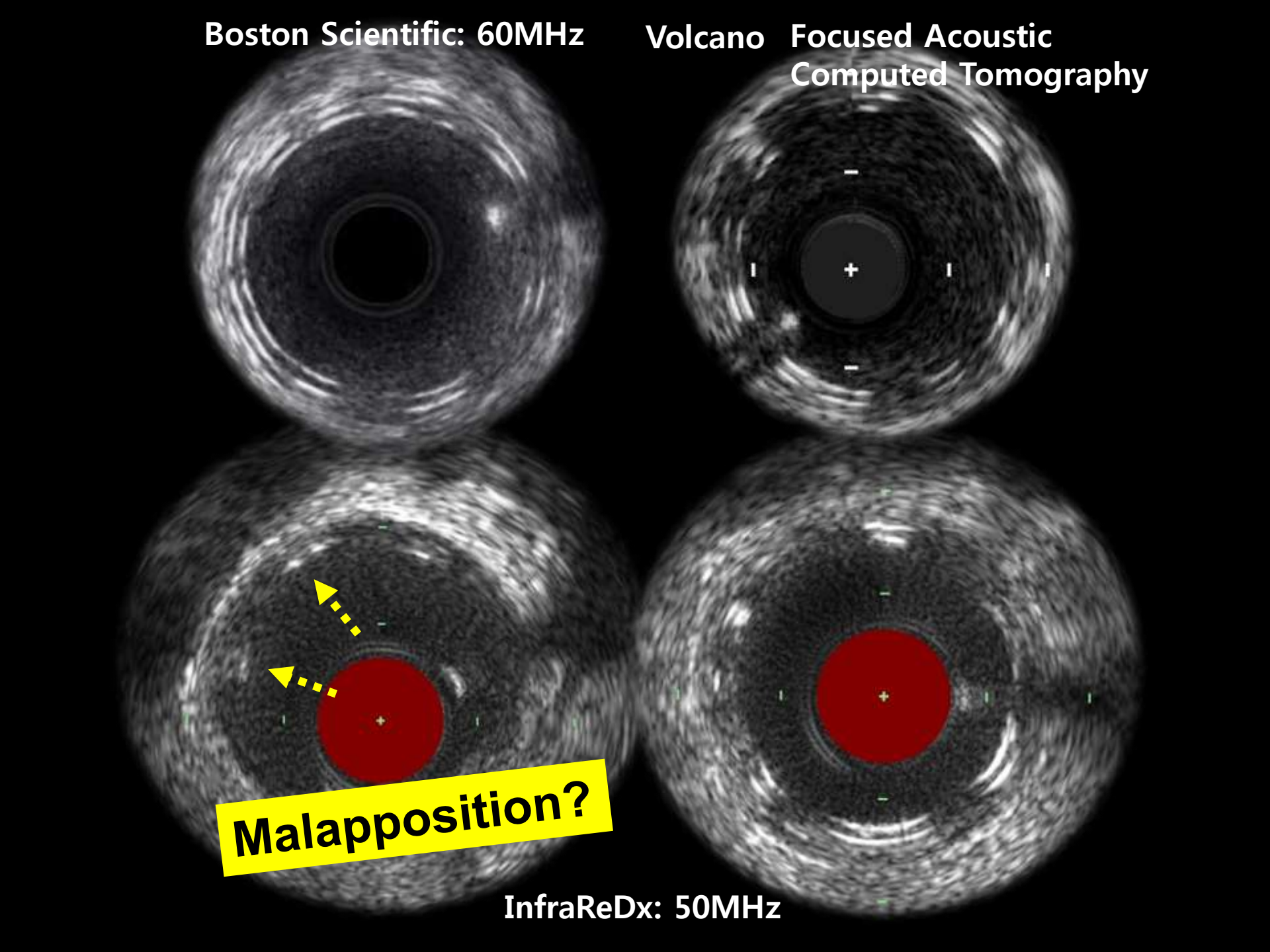


Landing Zone: IVUS OCT

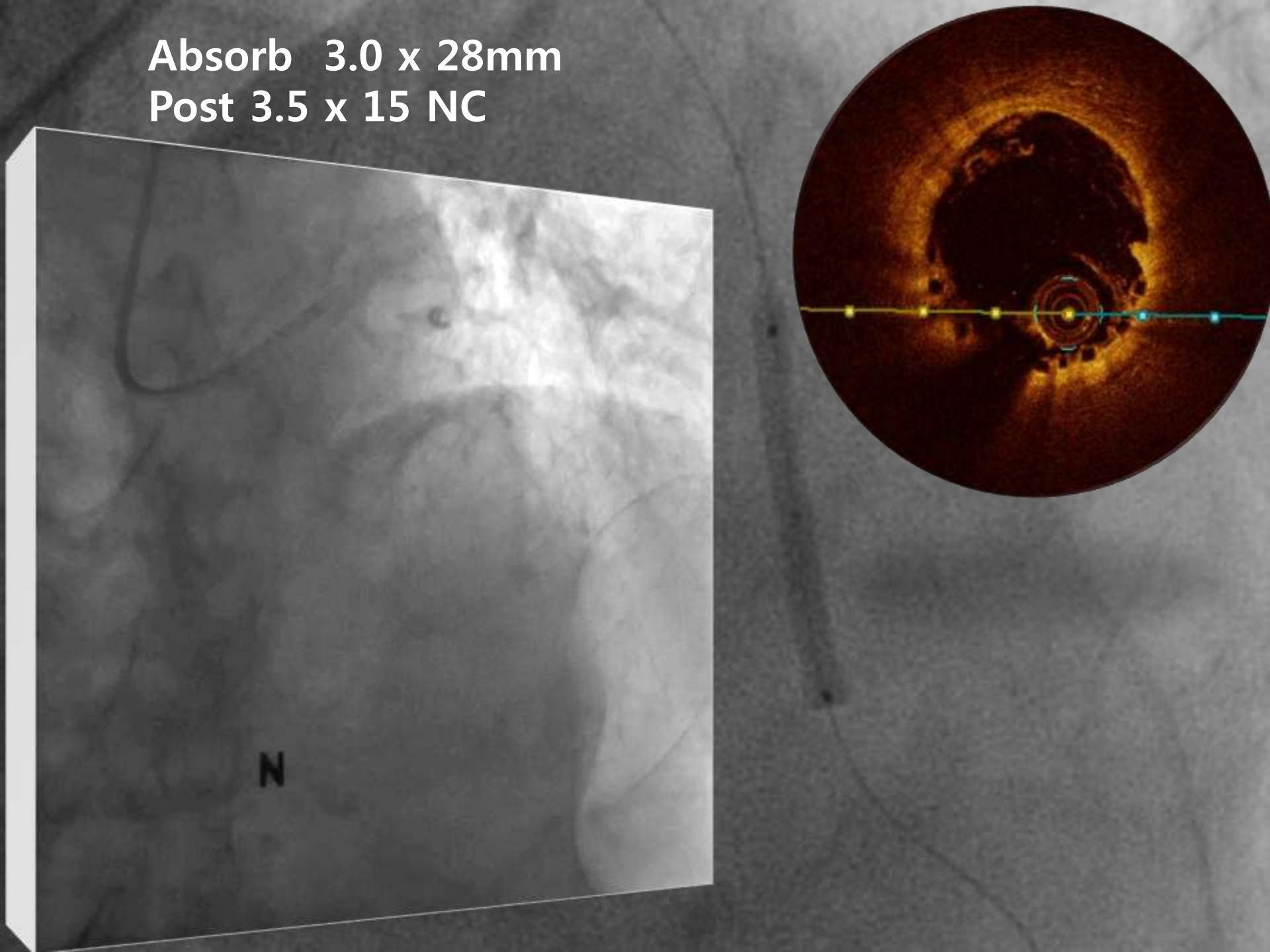






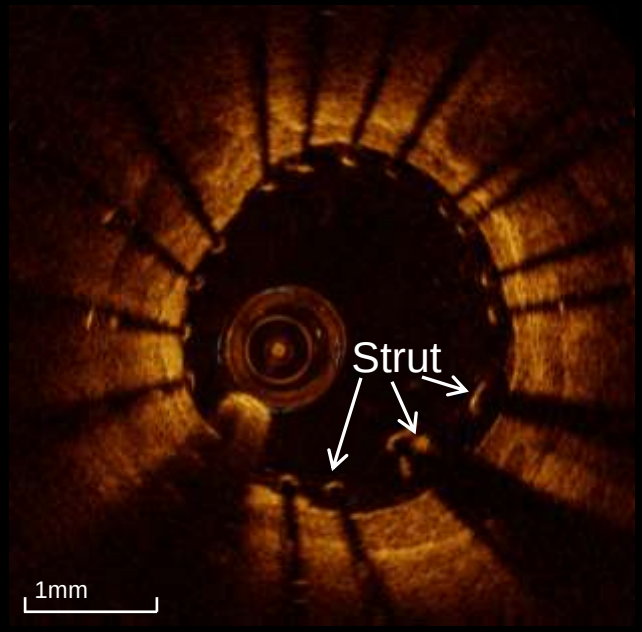

Boston Scientific: 60MHz
Volcano Focused Acoustic Computed Tomography
Malapposition?
InfraReDx: 50MHz

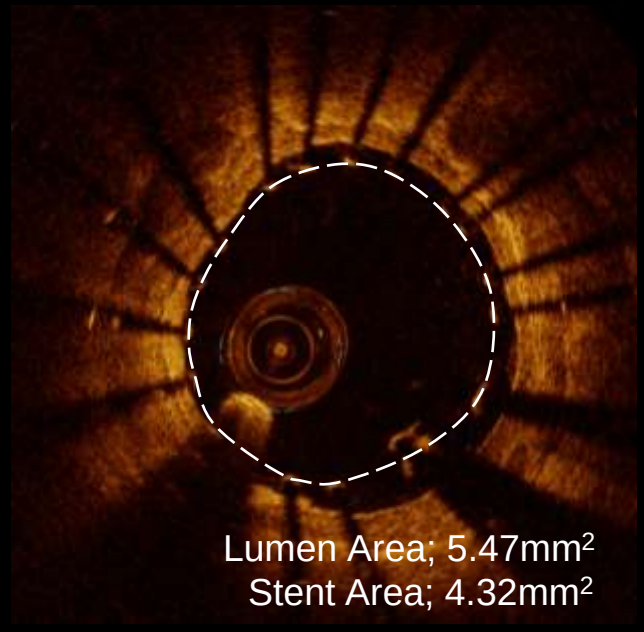
Absorb 3.0 x 28mm
Post 3.5 x 15 NC



Malapposition

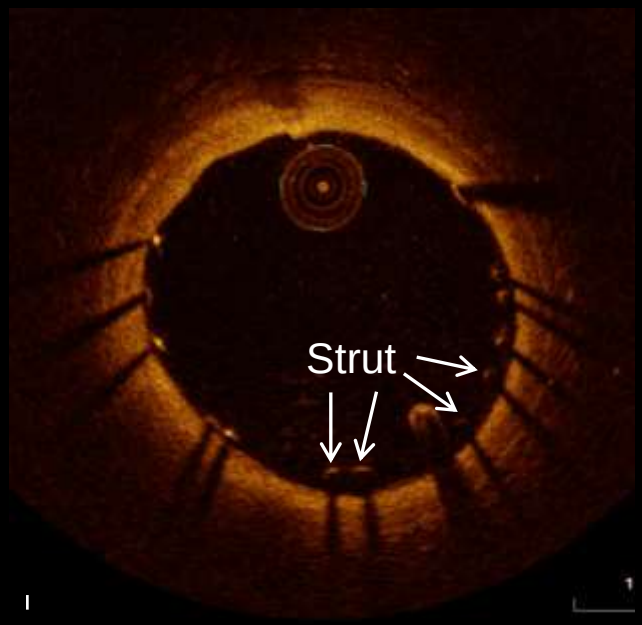
Major

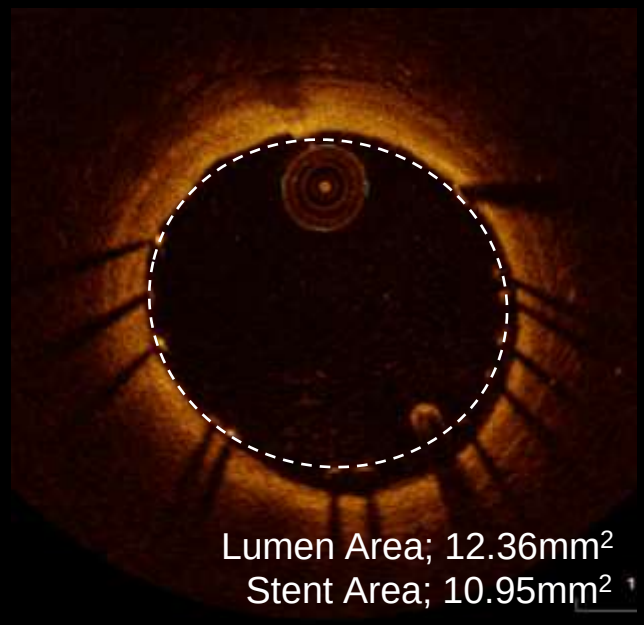




Associated
stent
underexpansion

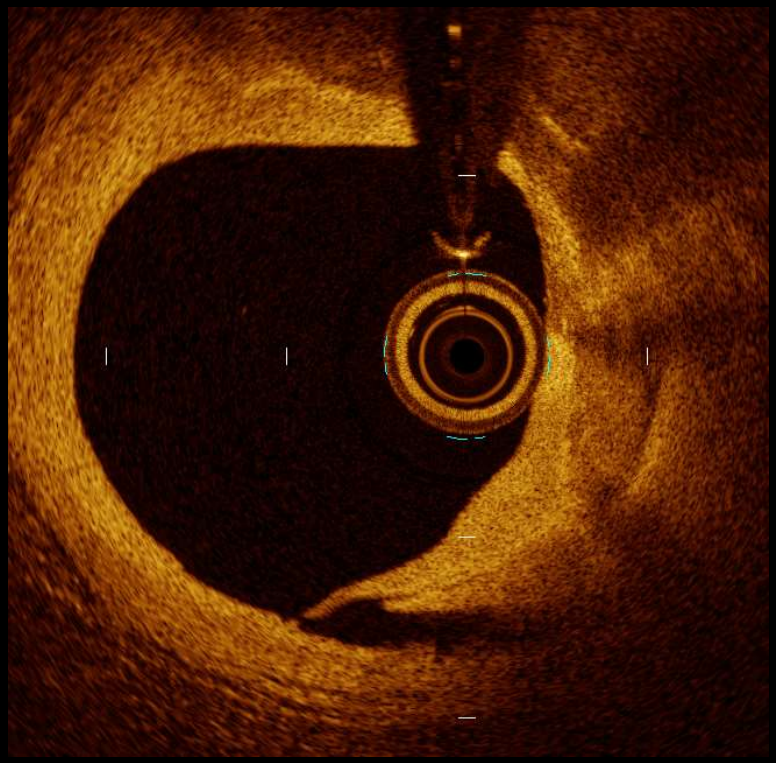
Minor

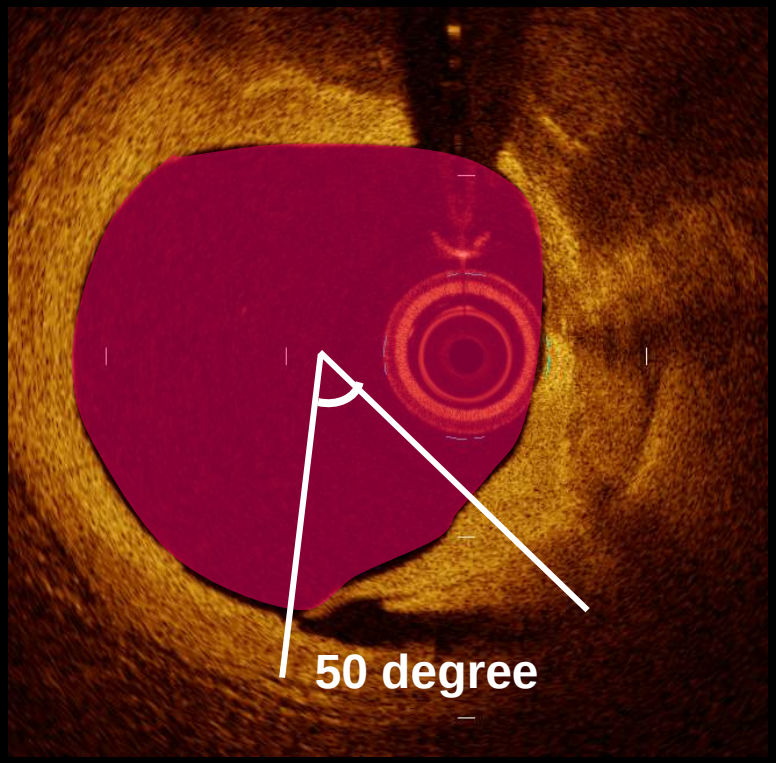




Not Associated
stent
underexpansion

Edge Dissection

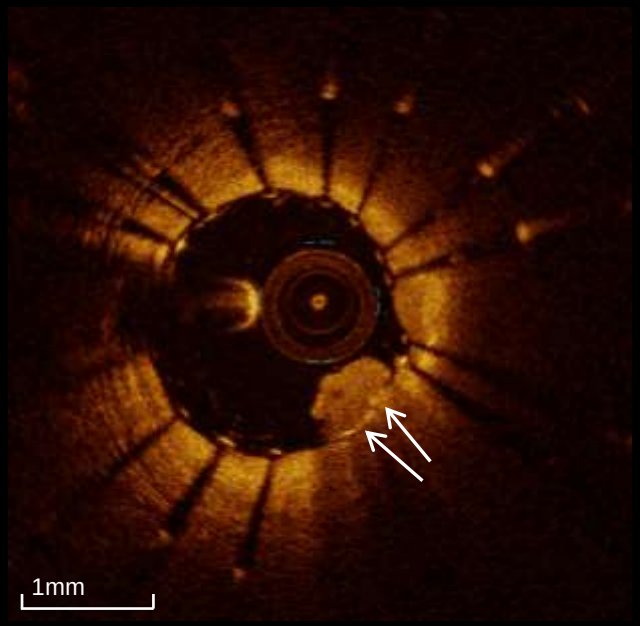


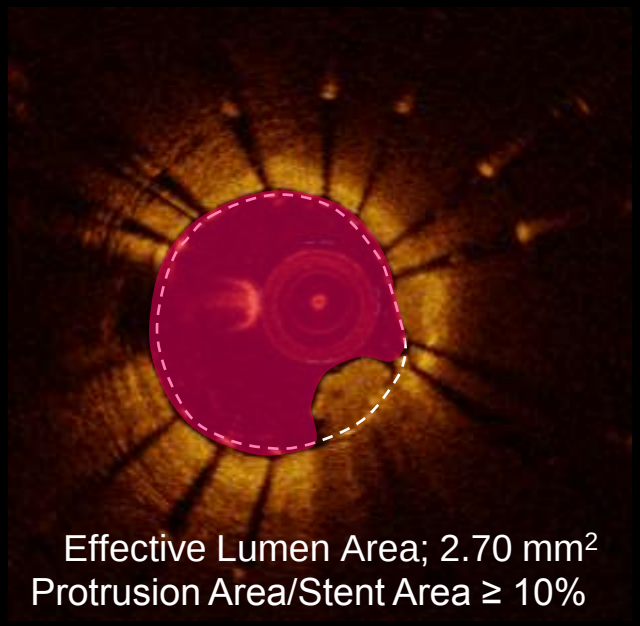


1)>50˚
2) length
3) Flow limiting (TIMI)
4) Inadequate MLA

Tissue Protusion

Major

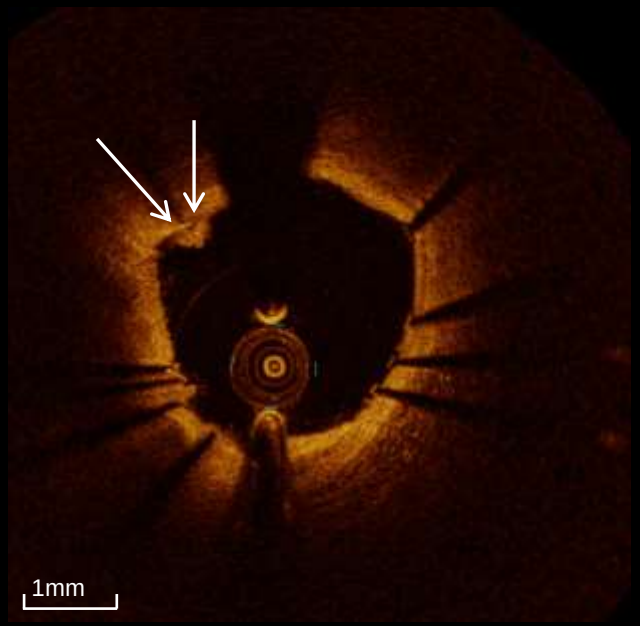


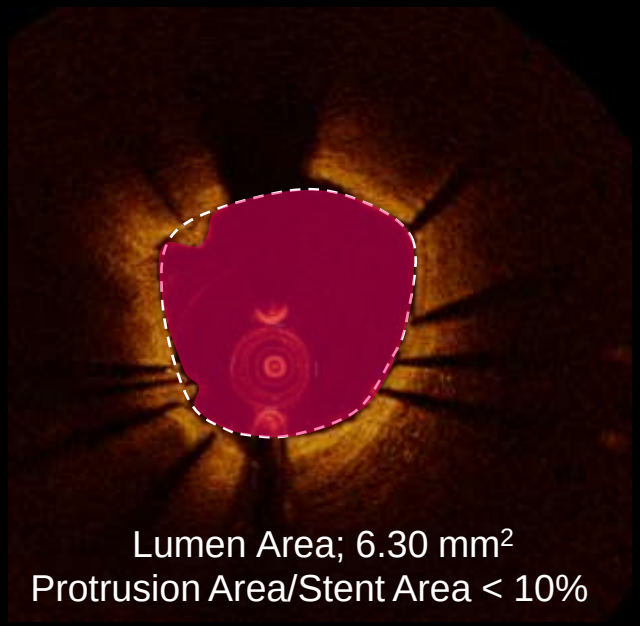


Effective Lumen Area; 2.70 mm^2
Protrusion Area/Stent Area ≥ 10%

Effective MLA
<5.5mm^2

Minor





Lumen Area; 6.30 mm^2
Protrusion Area/Stent Area < 10%

Effective
MLA >5.5mm^2

CLI-OPCI study

The Centro per la Lotta contro I'Infarto-Optimisation of Percutaneous Coronary Intervention Study)

OCT guidance vs Angio guidance

	ANGIO (N = 335)	OCT (N = 335)	P value
Events at 1-year follow-up			
Death	23 (6.9%)	11 (3.3%)	0.035
Cardiac death	15 (4.5%)	4 (1.2%)	0.010
Myocardial infarction	20 (6.7%)	18 (5.4%)	0.096
TLR	11 (3.3%)	11 (3.3%)	1.0
Definite stent thrombosis	2 (0.6%)	1 (0.3%)	0.624
Cardiac death or MI	43 (13.0%)	22 (6.6%)	0.006
Cardiac death, MI, or repeat revascularization	50 (15.1%)	32 (9.6%)	0.034

OCT-guided PCI significantly lowers the risk of Death, MI, ST, MACE

Prati F et al. EuroIntervention 2012:8(1):823-9

ILUMIEN I

Observational Study of Optical Coherence Tomography (OCT) in Patients Undergoing Fractional Flow Reserve (FFR) and Percutaneous Coronary Intervention

FFR and **OCT** pre and post PCI *prospective*

418 pts, Clinical FU at 30 days, 1 year

ADAPT-DES Study

Assessment of Dual AntiPlatelet Therapy with Drug-Eluting Stents

IVUS vs No IVUS

8,582 pts, Successful and uncomplicated 2,179 pts

Clinical FU at 30 days, 1 year, 2year

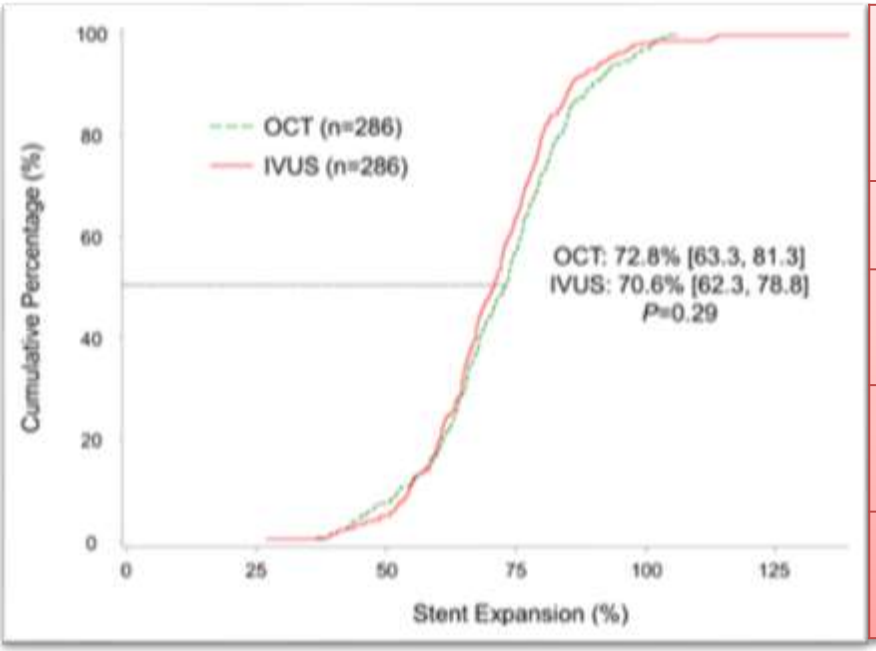
ILUMIEN II

Observational Study of Optical Coherence Tomography (OCT) in Patients Undergoing Fractional Flow Reserve (FFR) and Percutaneous Coronary Intervention

ILUMIEN I vs ADAPT-DES Retrospective

1:1 propensity matching

286 PTS **286 PTS**

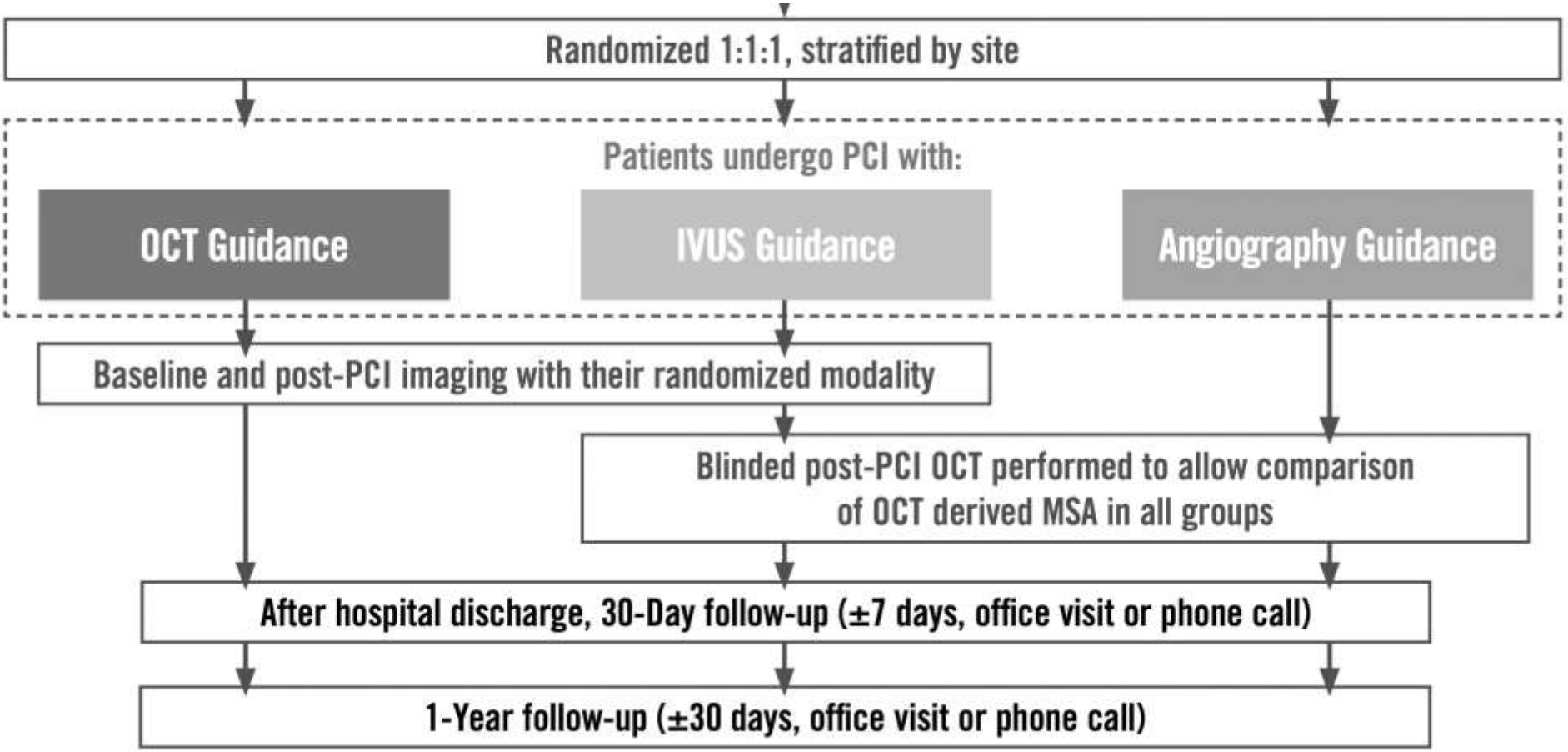


	OCT guidance (n=286)	IVUS guidance (n=286)	P value
Any finding			
Malapposition	**76 (26.6%)**	**39 (13.6%)**	0.0002
Tissue protrusion	**182 (63.6%)**	**78 (27.3%)**	<0.0001
Stent edge dissection	**66 (23.1%)**	**15 (5.2%)**	<0.0001

Maehara A at al. JACC Cardiovasc Interv 2015; (8): 1704-8

ILUMIEN III

Observational Study of Optical Coherence Tomography (OCT) in Patients Undergoing Fractional Flow Reserve (FFR) and Percutaneous Coronary Intervention



Efficacy **Safety**

OCT-Guided Device Sizing

Can the EEL be identified at both P and D reference segments

Yes

Reference stent diameter decided by OCT measurement of smallest mean **EEL to EEL diameter** at reference site

No

Reference stent diameter decided by OCT automation based on **smallest mean lumen diameter** **at reference site**

PCI Optimization

Target MSA/Pattern achieved

Post-dilation

Due to OCT high resolution, we see detail structures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Thank you for your time!