

Image-guided PCI for Bifurcation Lesions

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Why intracoronary imaging for bifurcations

- For further 3D evaluation in detail
- To simplify strategy
- To avoid side-branch occlusion
- For better outcome

EBC consensus

- **IVUS and OCT may be of particular value in guiding bifurcation treatment** and are recommended for left main bifurcation treatment.
- Segment overlapping on angiography (often the SB osmium) can be evaluated by intracoronary imaging. **OCT may be superior to IVUS in evaluation of the SB osmium by MB pullback.**
- Evaluation of wire positions may be of importance whenever crossing stents in single and double stenting.
- Intracoronary evaluation of optimal vessel and stent expansion is superior to angiographic assessment.
- Pullback in both and MB are recommended in evaluation of two-stent techniques if intracoronary imaging is used.

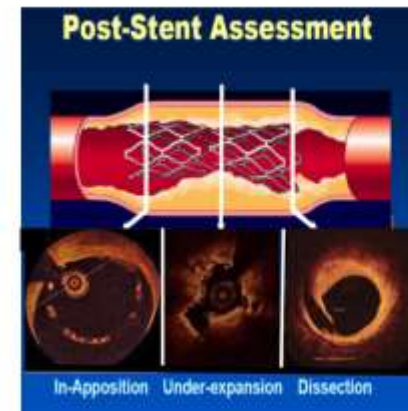
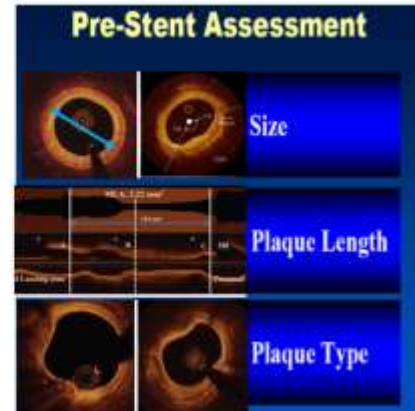
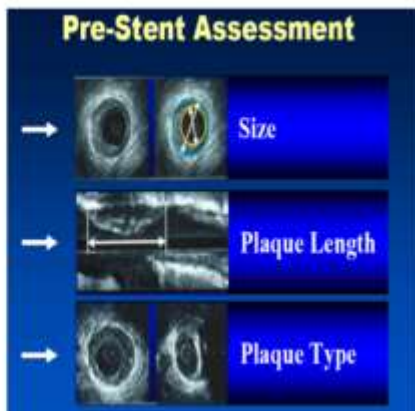
Key Roles of IVUS Guidance in PCI

- Pre-procedure Assessment
 - Sizing, plaque morphology and calcification
 - Device selection
- Intra-procedure strategy guidance
- Post-intervention Assessment
 - Post-stenting optimization
 - Complication management

Expansion
Apposition
SYmmetry

Key Roles of OCT Guidance in PCI

- Pre-procedure Assessment
 - Sizing, plaque morphology and calcification
 - Device selection
- Intra-procedure strategy guidance
- Post-intervention Assessment
 - Post-stenting optimization
 - Complication management



Medina Type 1-1-1 by Angiography

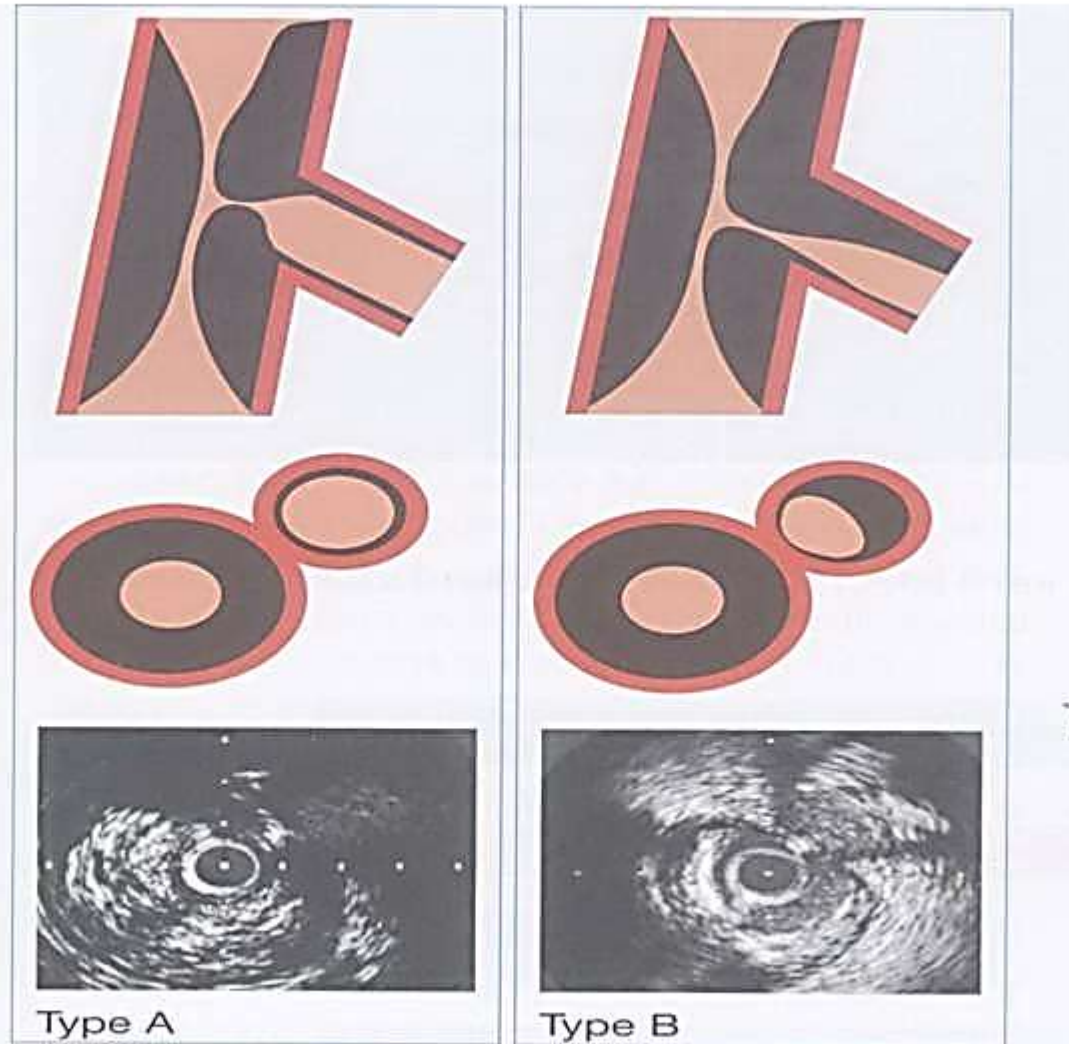


図1 分岐部プラーク局在による分類¹⁾

Type A: プラークがおもに main branch のみに存在。

Type B: プラークが main branch に加え、side branch 入口部にも存在。

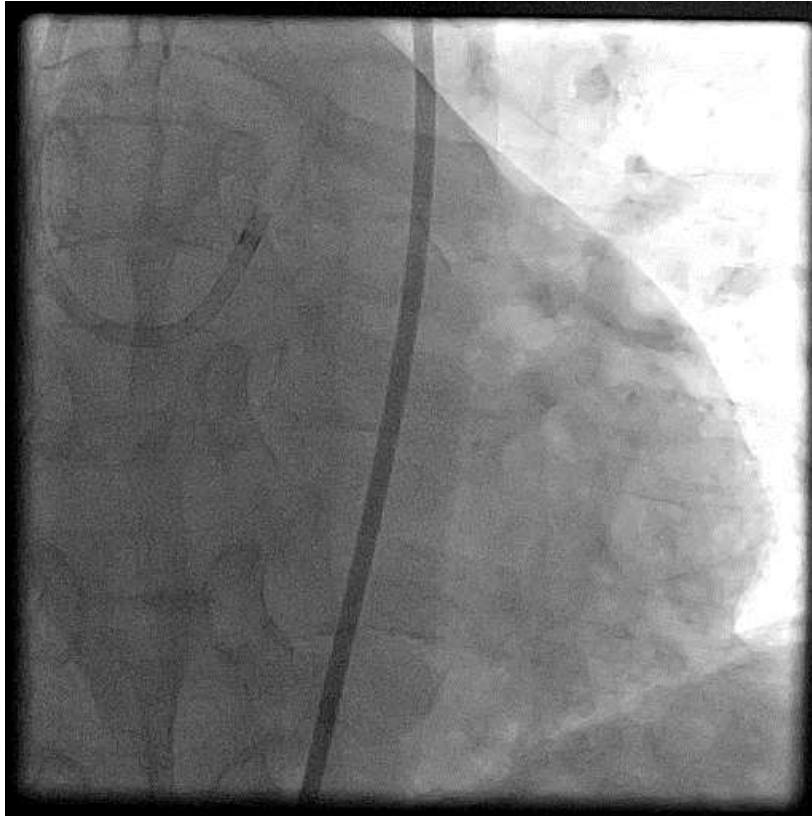
側枝閉塞率は Type A が 8.2%、Type B が 35.0%と、有意に後者で高い。

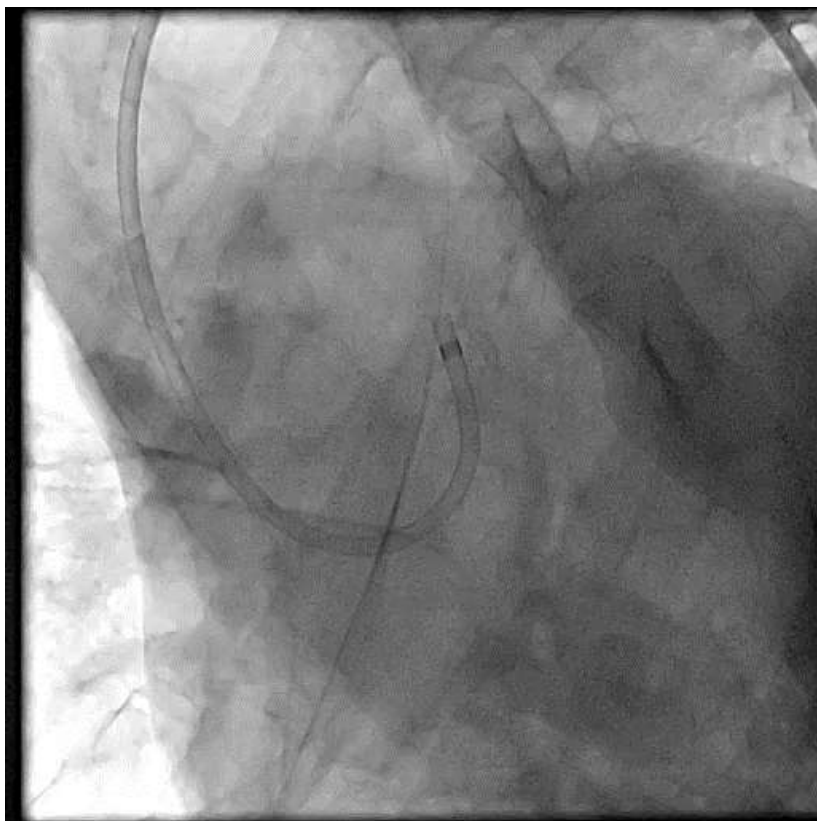
Case 1

64M, angina on exertion for 8 months, CCS 2,
HCVD, LDL 186, DM on OHA for 20+ yrs

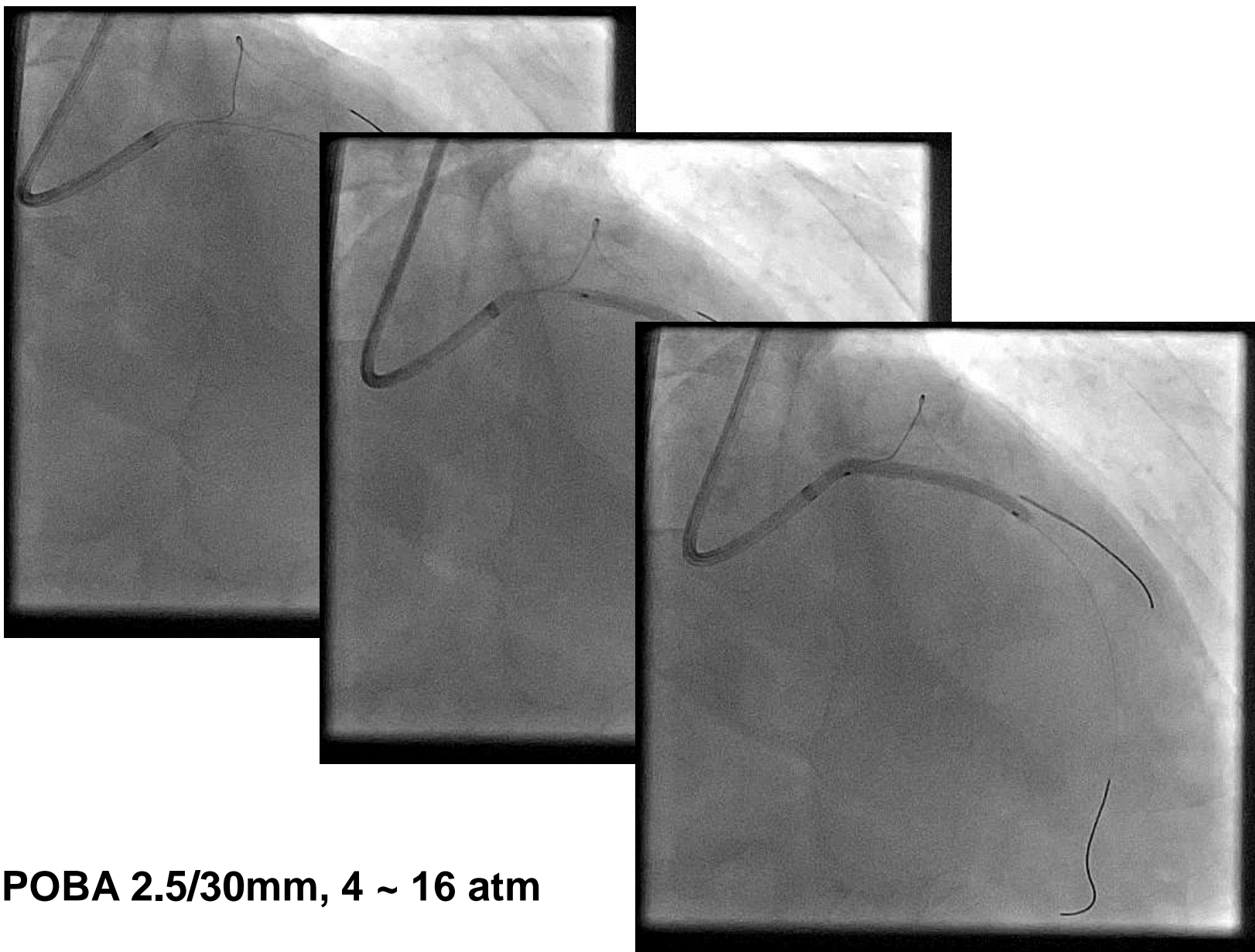
CAD, LM + 3-V-D, p't refused CABG & referral for PCI

LVEF = 62%, eGFR = 60, Syntax Score = 35, Euroscore II = 0.84%



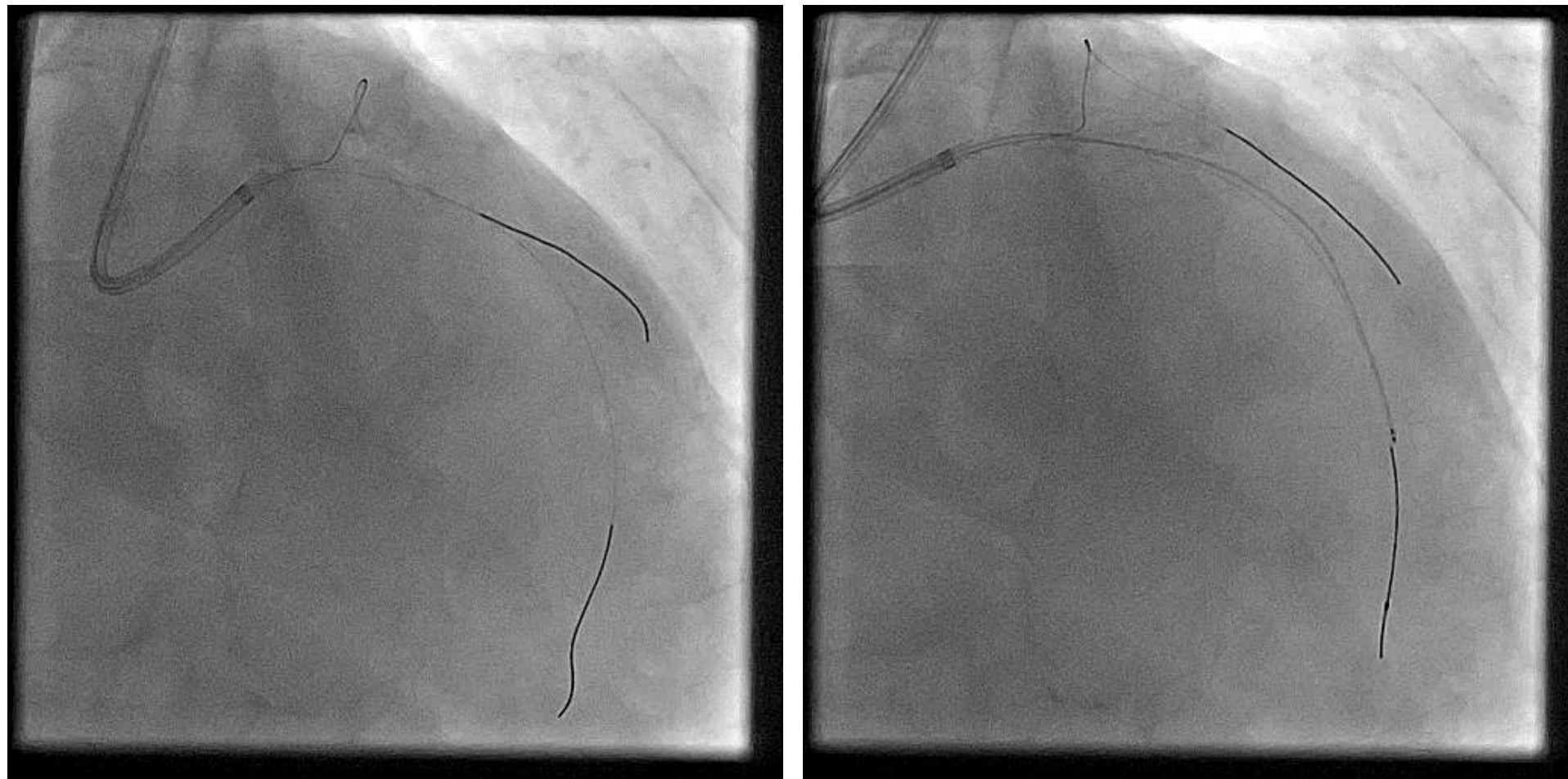


Tainan, Taiwan. 2015



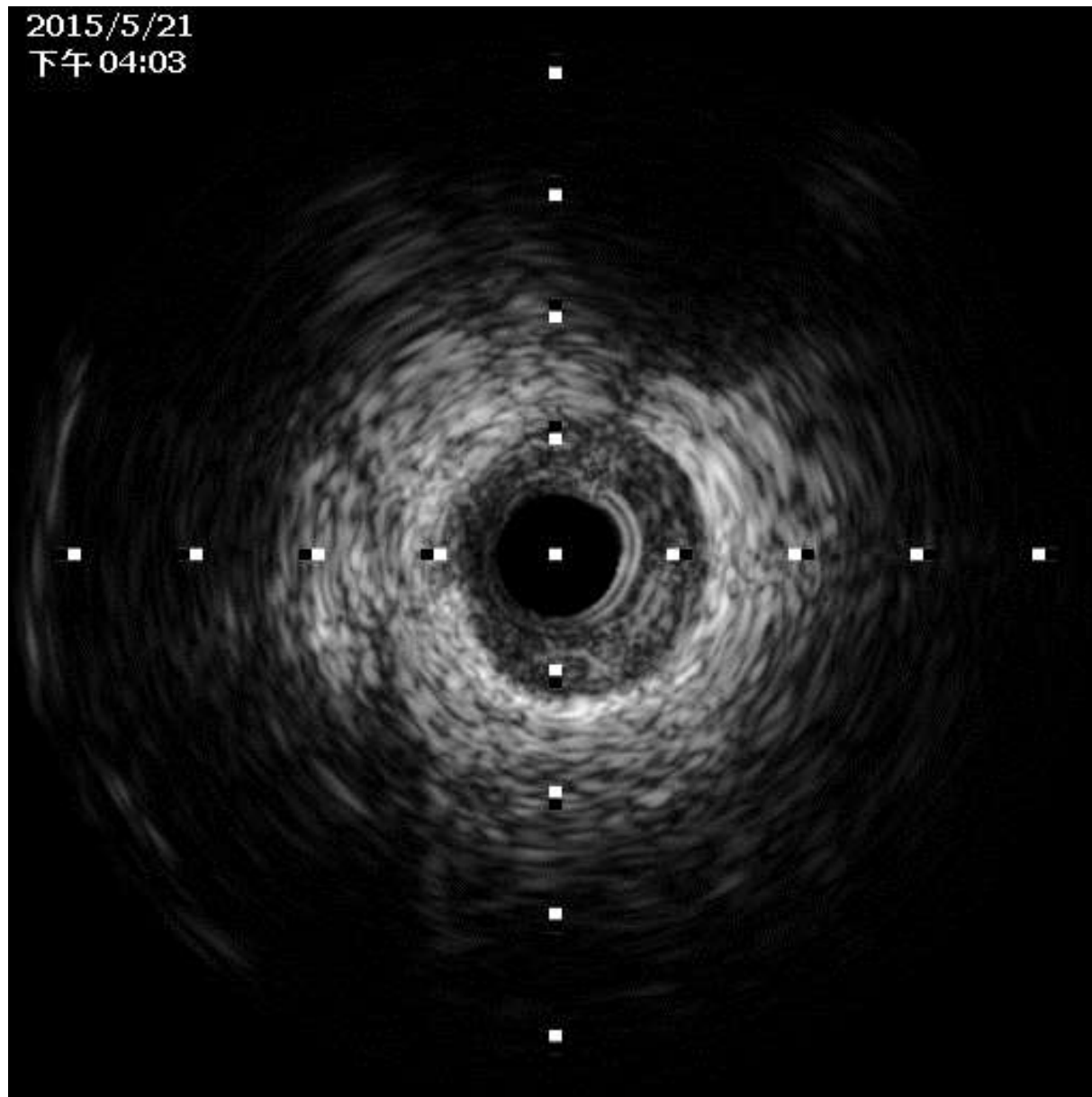
POBA 2.5/30mm, 4 ~ 16 atm

Post-POBA & IVUS

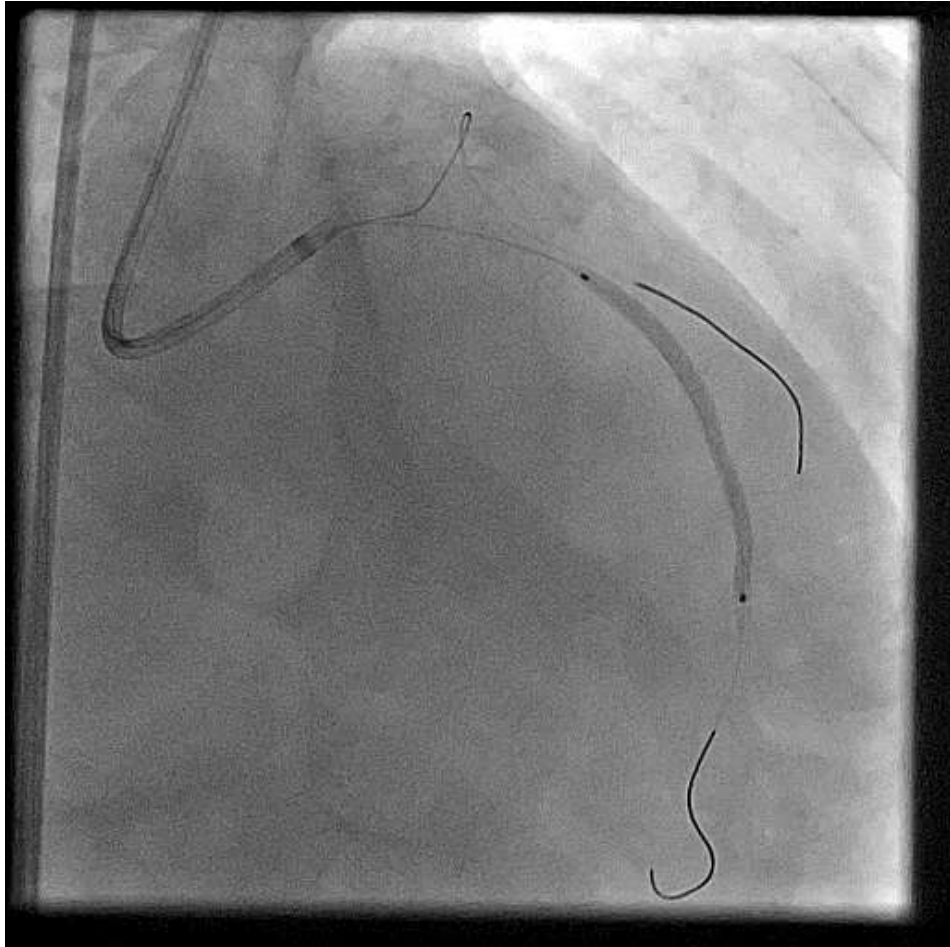


Tainan, Taiwan. 2015

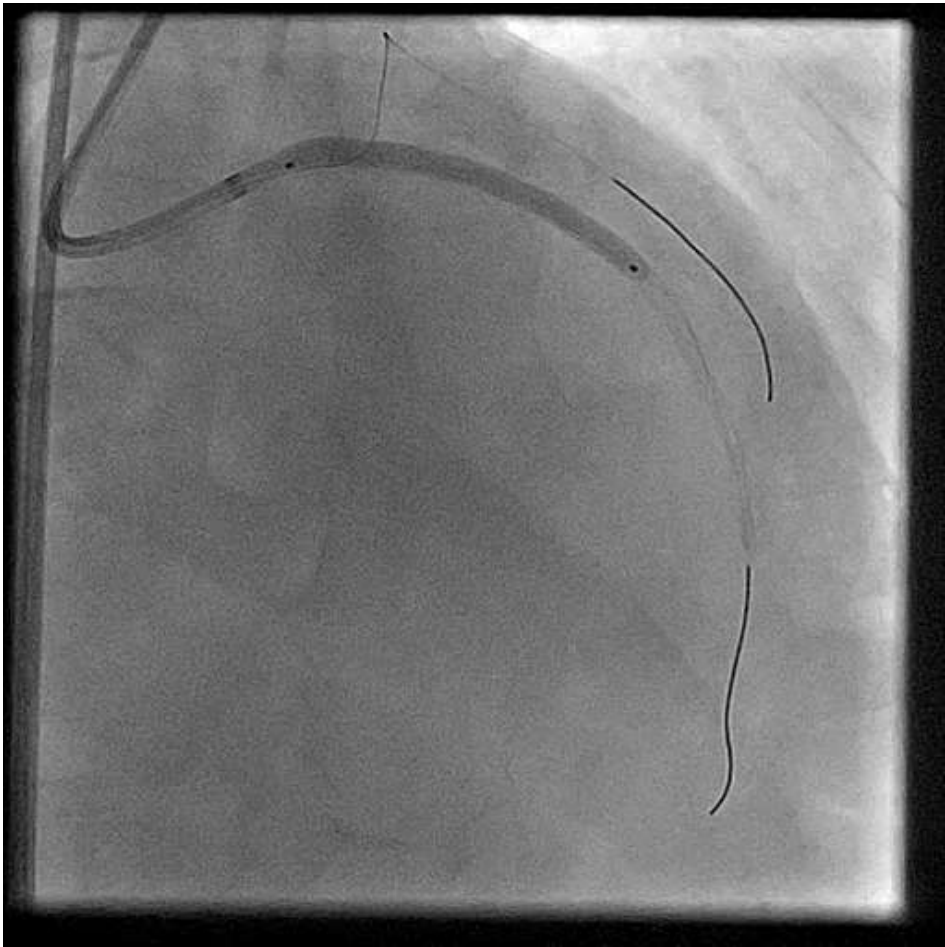
IVUS from LAD to LM



DES 2.25/40mm, 6 ~ 12 atm



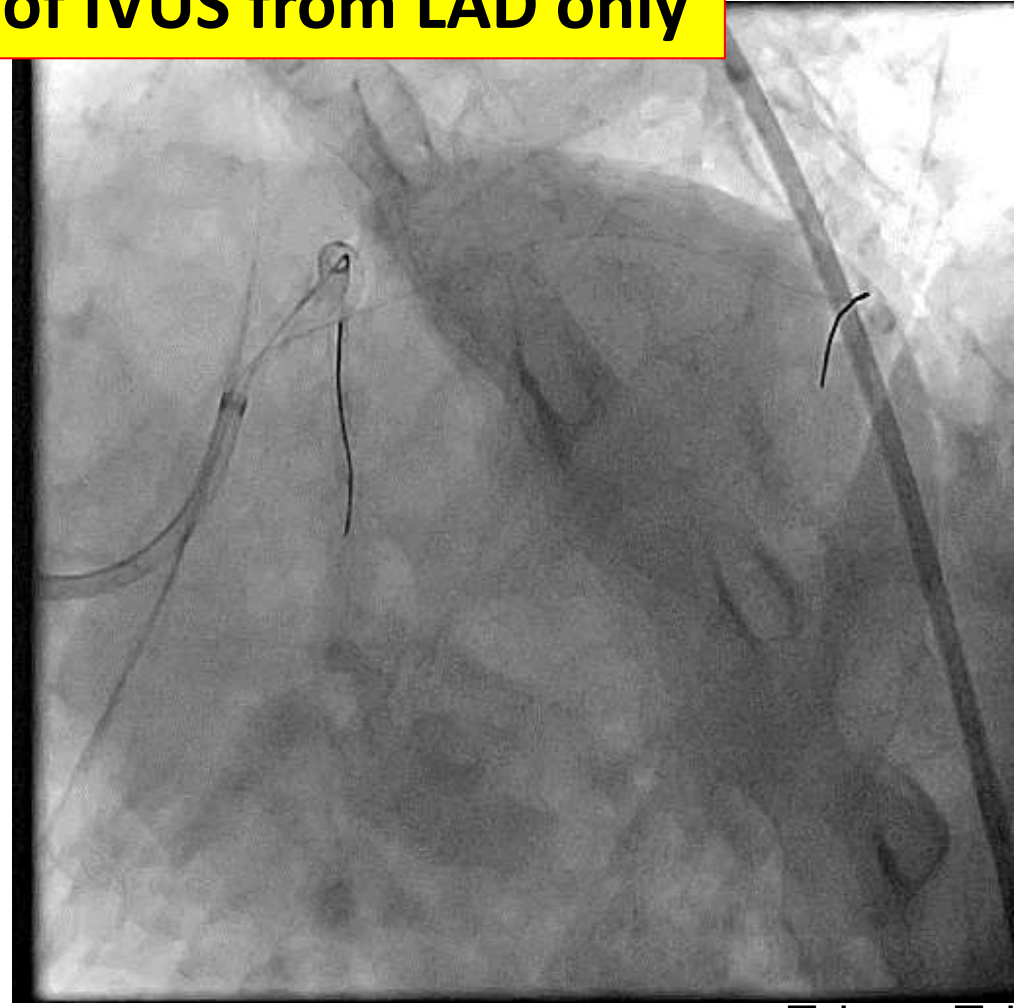
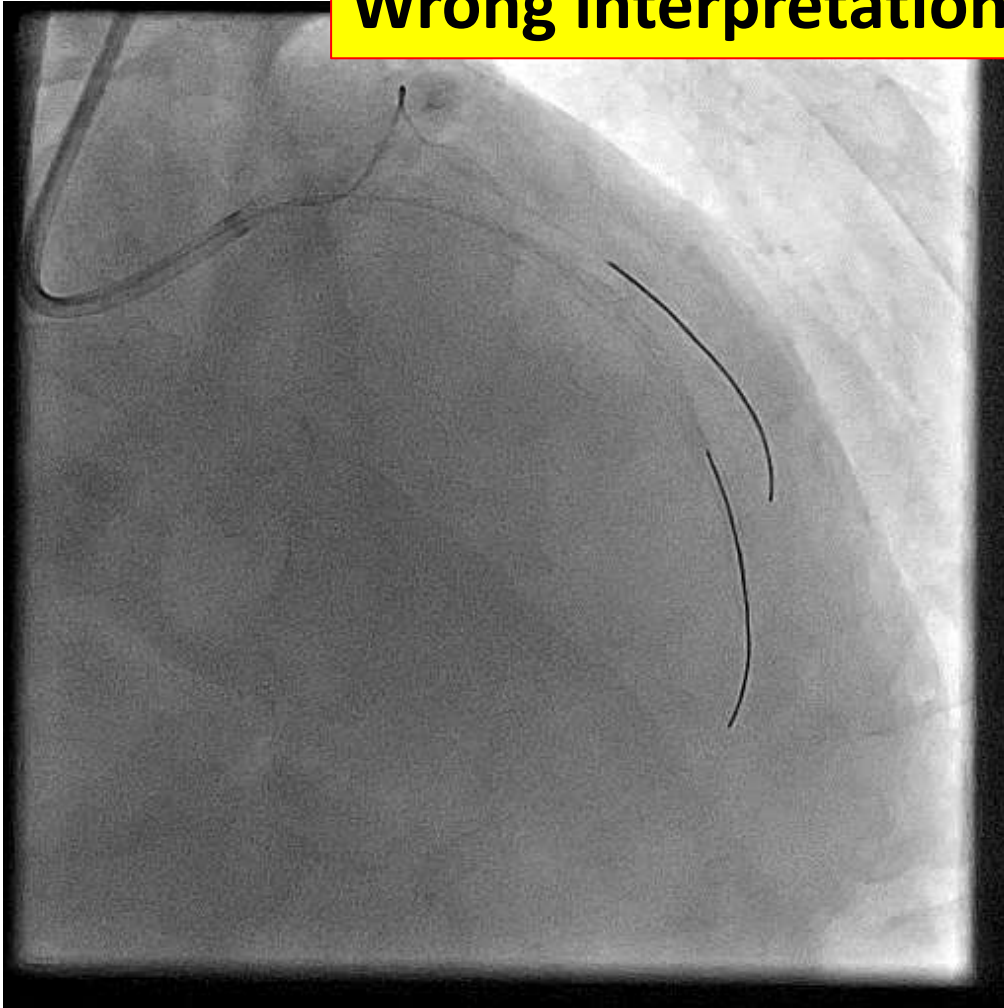
DES, 3.0/40mm, 12 atm



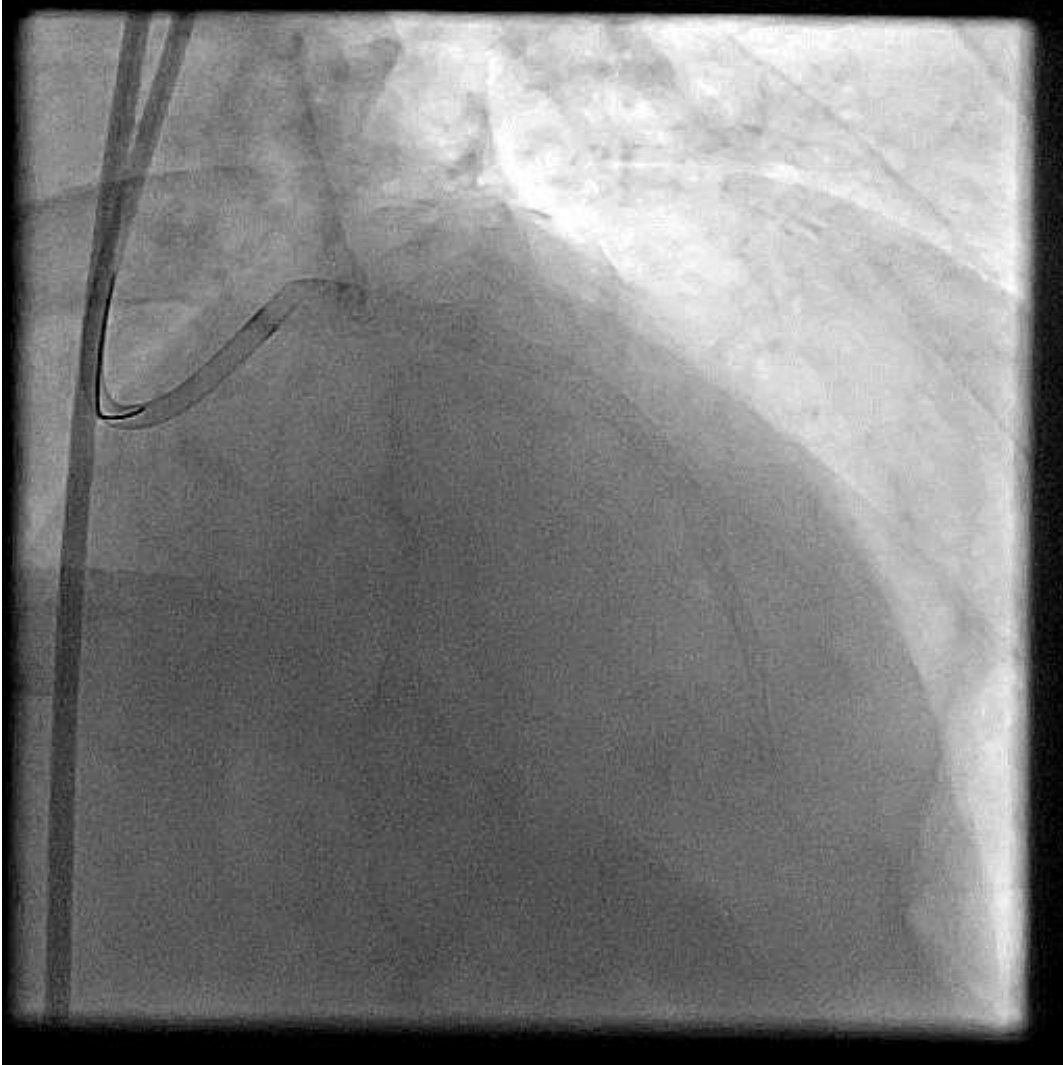
TIMI 0-1 flow in LCX

(angina, STE on lead aVL, V/S: stable)

Wrong interpretation of IVUS from LAD only



Rescue by reverse-crush



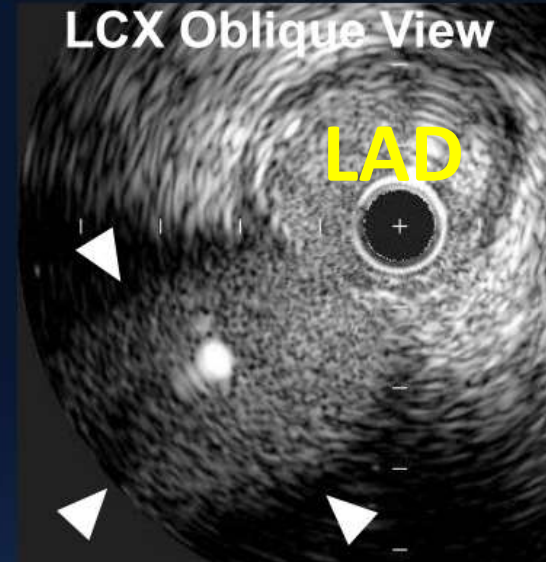
initial



Tainan, Taiwan. 2015

IVUS pitfall

- Though you don't see anything, this is not true.
- If you see something, this may be true.



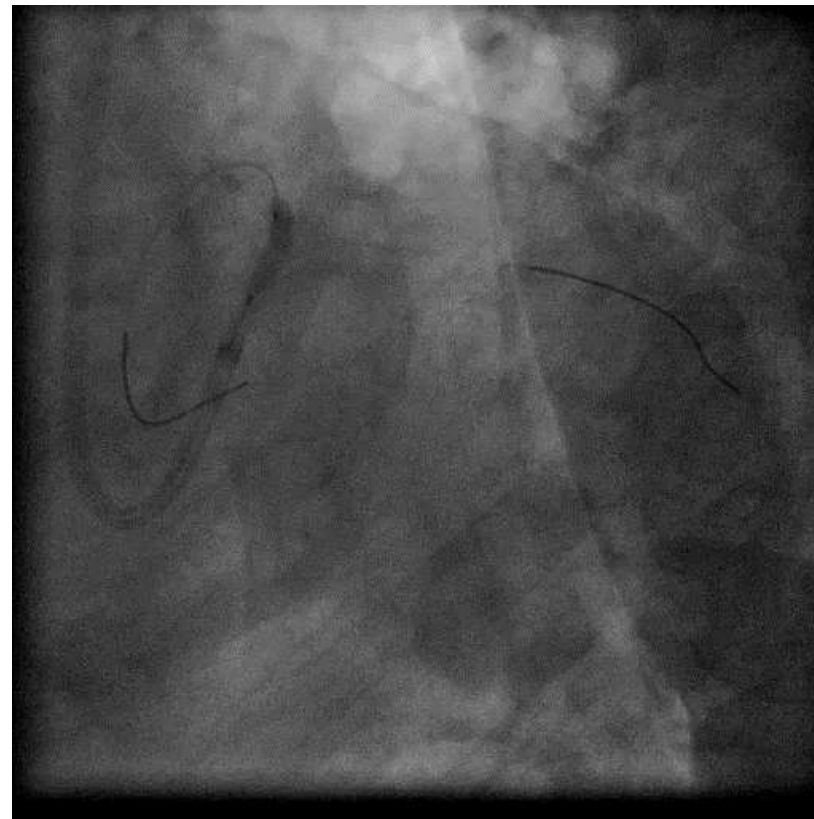
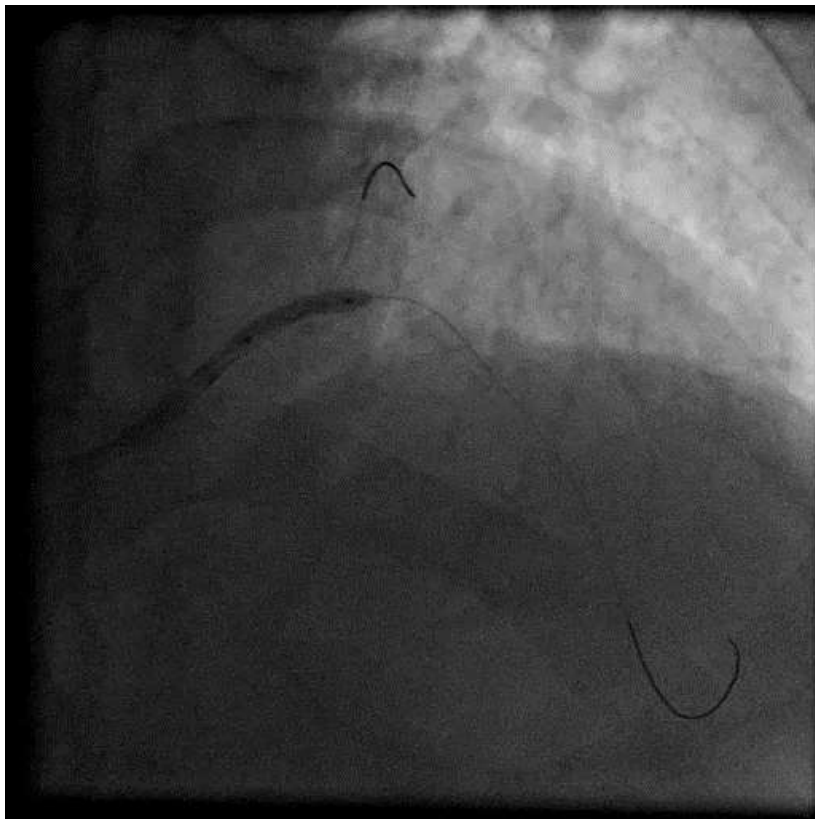
62M, typical angina, CCS Fc 3

((Angiographic Medina 1 1 1 or 1 0 0 ?))

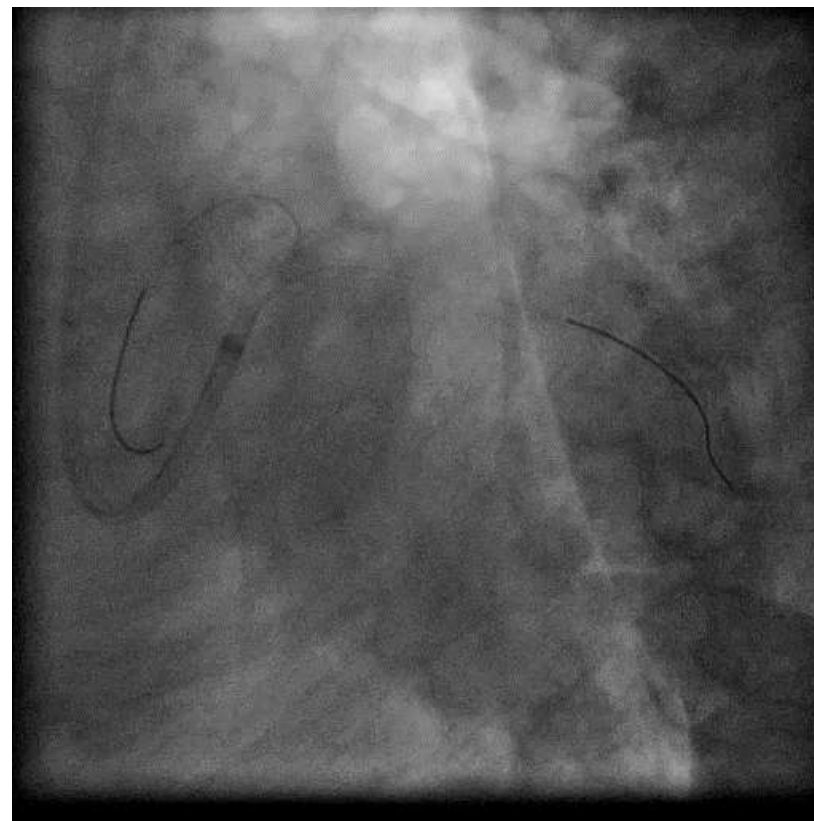
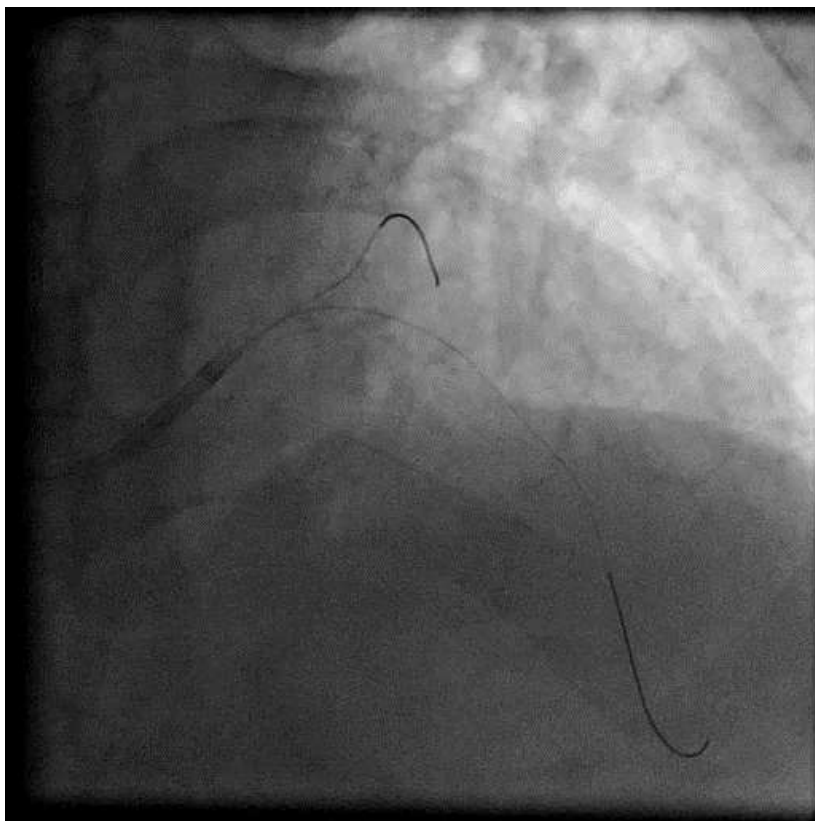
What is your strategy? Double stenting?



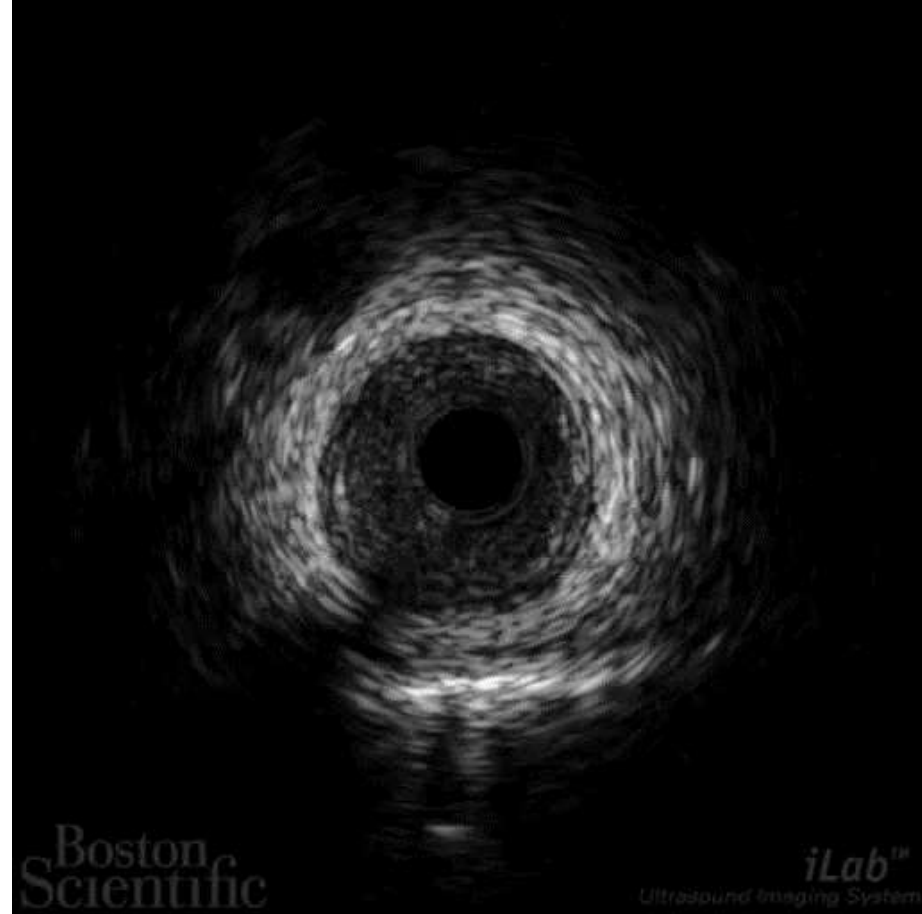
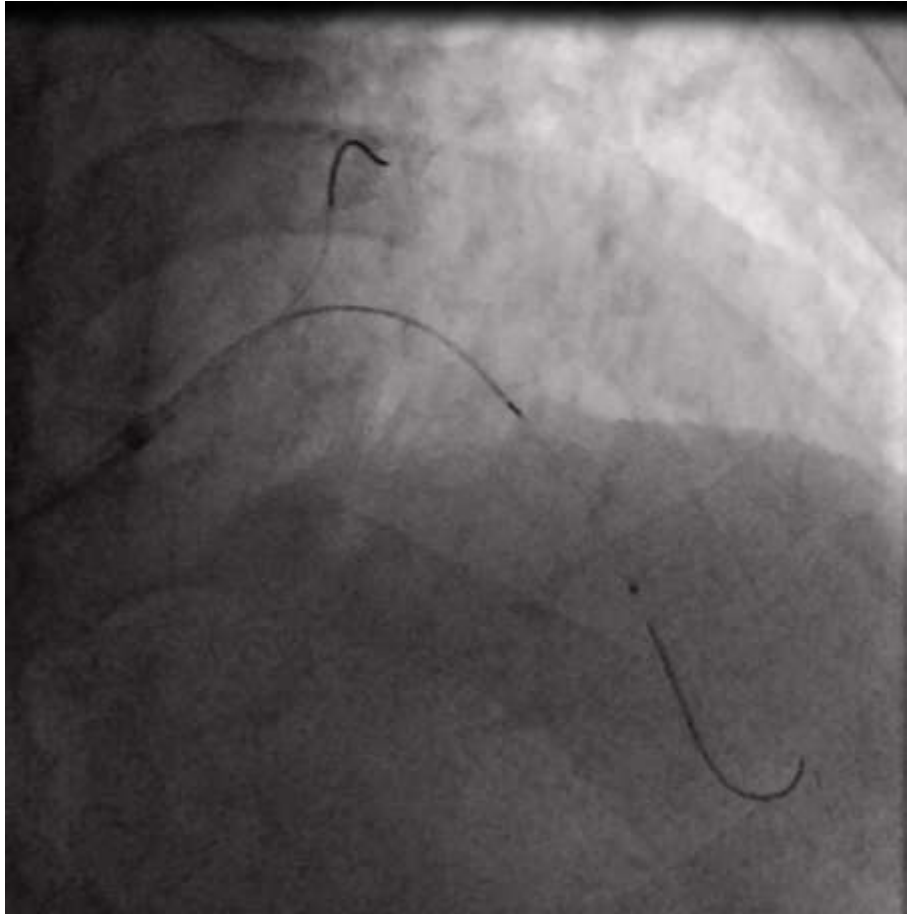
3.0mm POBA



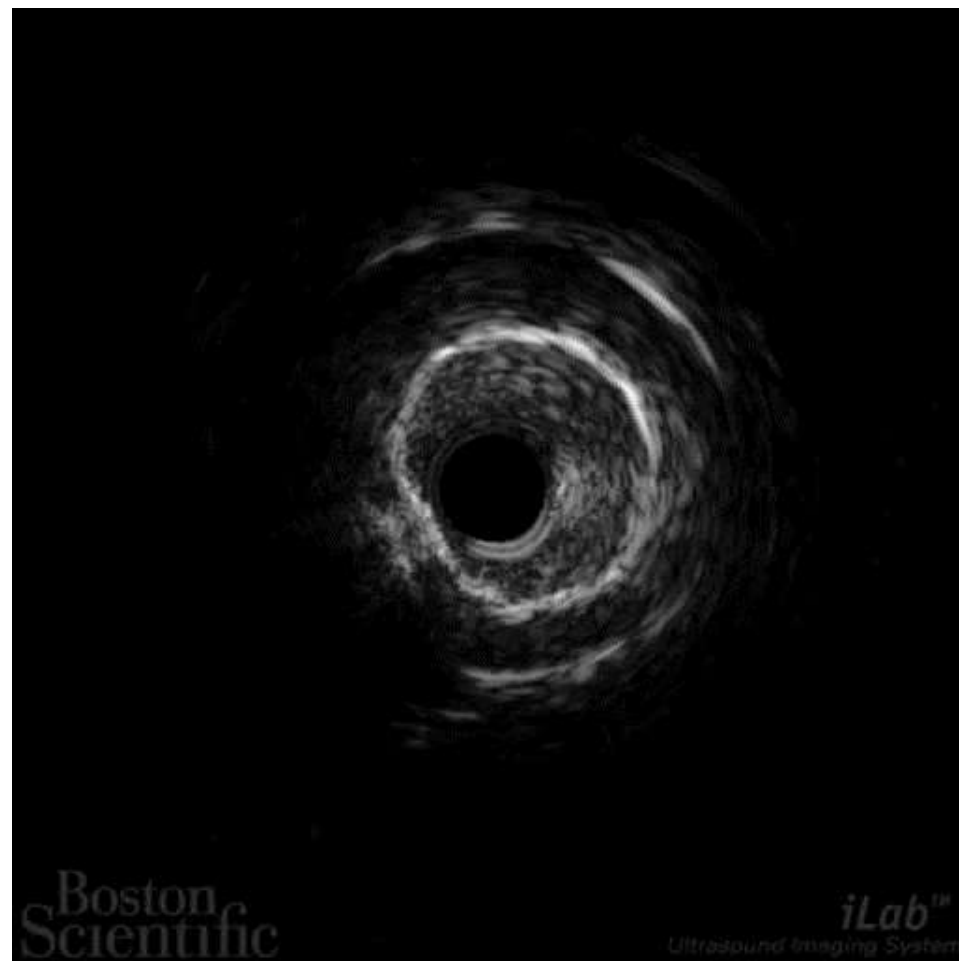
After 3.0mm POBA



IVUS from LAD to LM



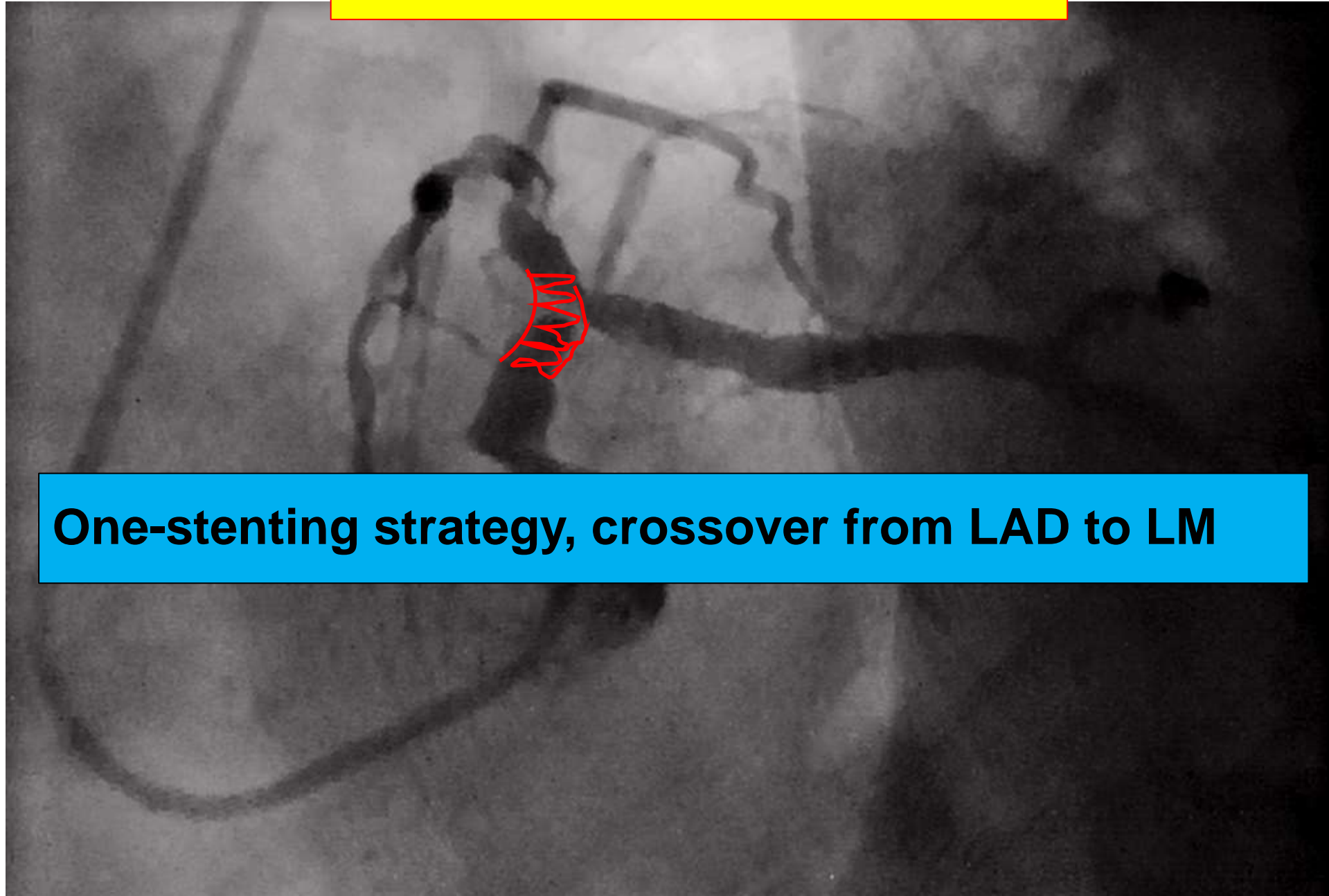
IVUS from LCX to LM



IVUS picture on the carina

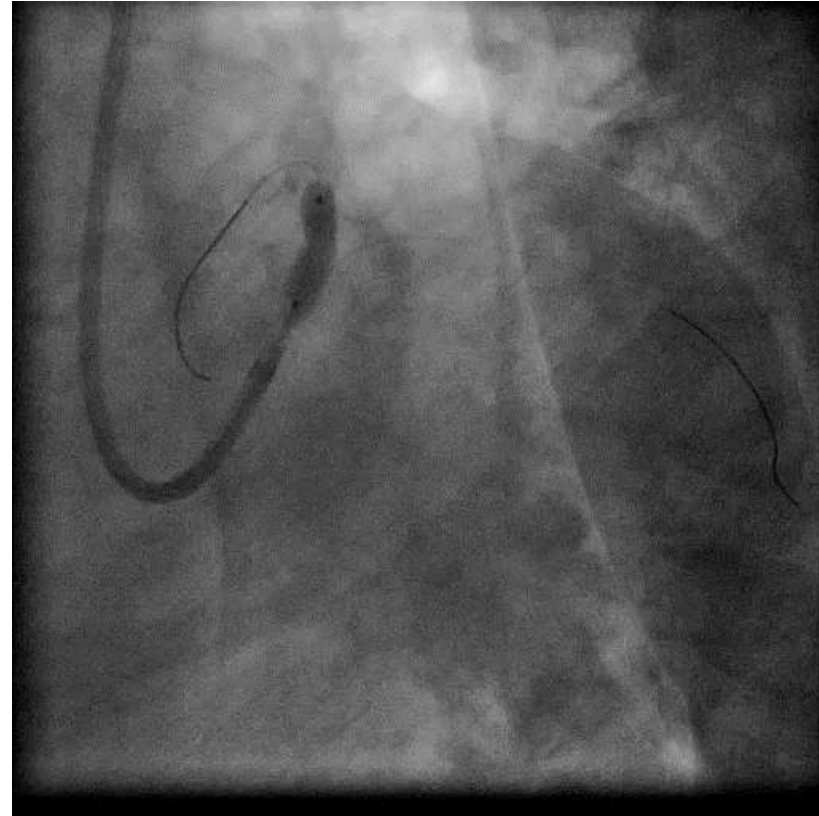
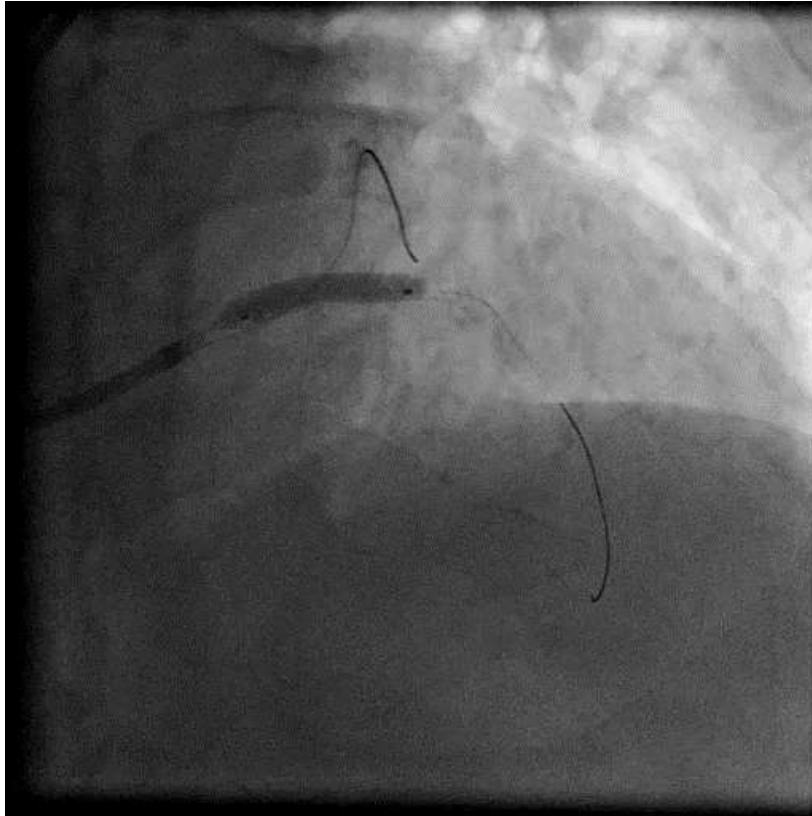


After IVUS evaluation

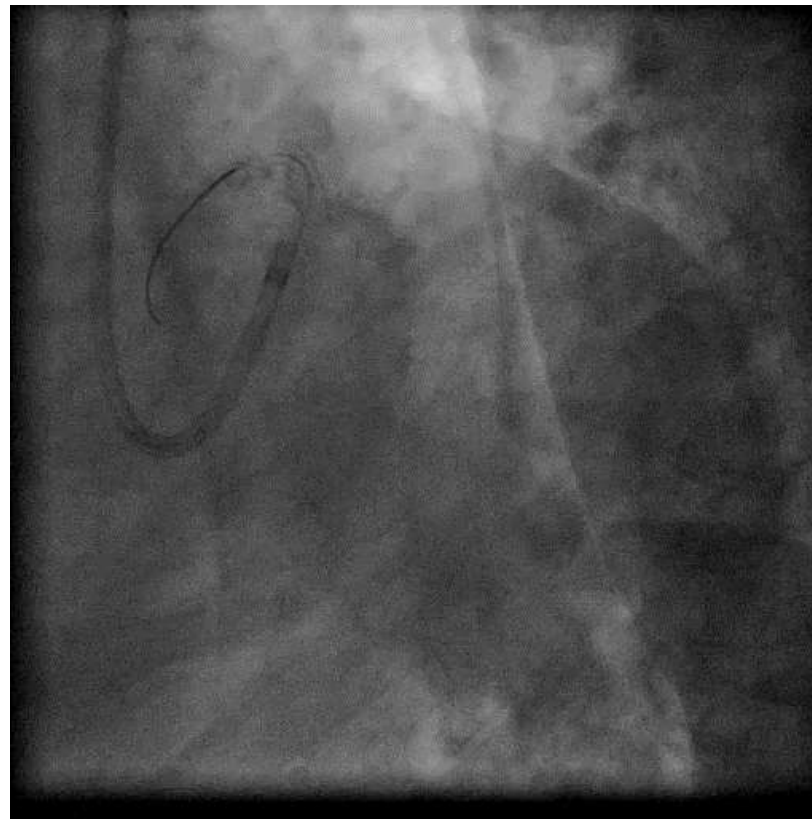
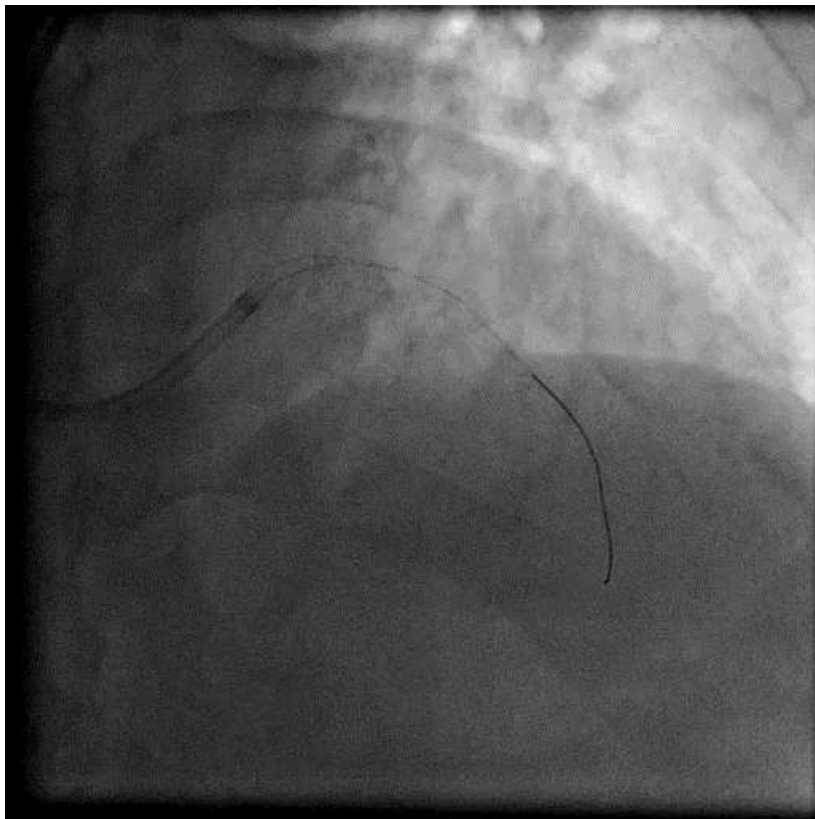


One-stenting strategy, crossover from LAD to LM

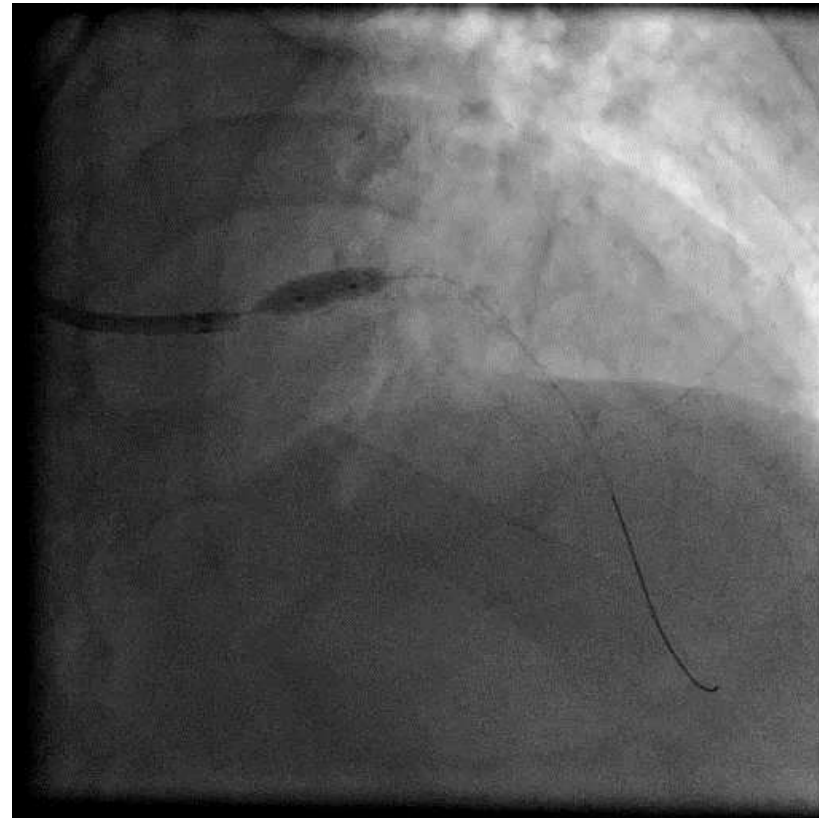
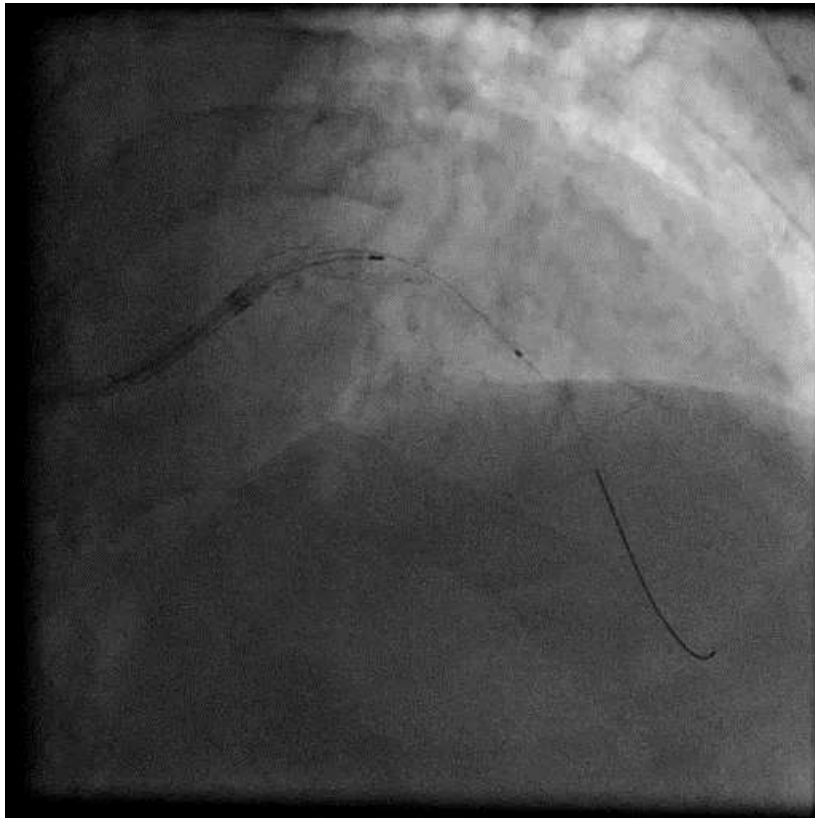
4.0mm DES from LAD-P to LM-body, **16 atm**



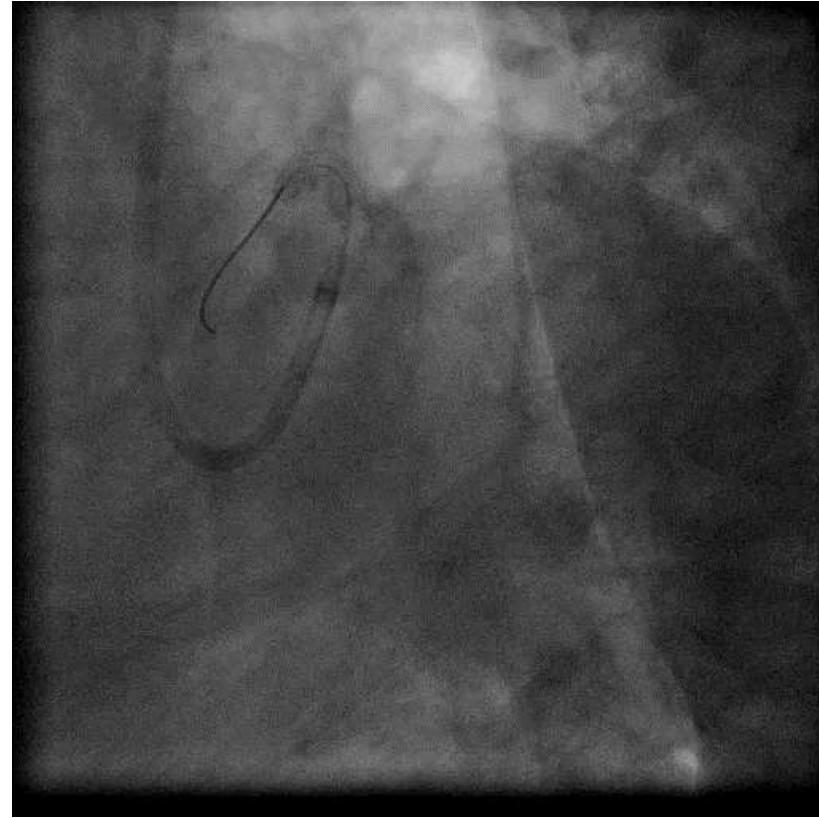
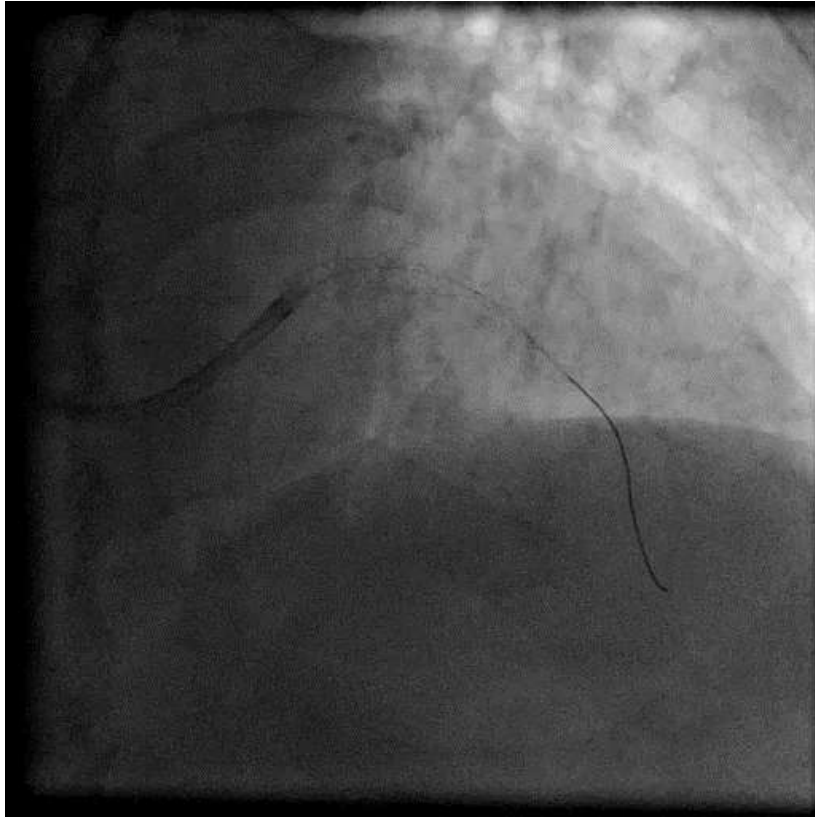
After 4.0mm DES



After KBT & IVUS,
POT: Quantum NC 5.0/15mm balloon, 12 atm



final

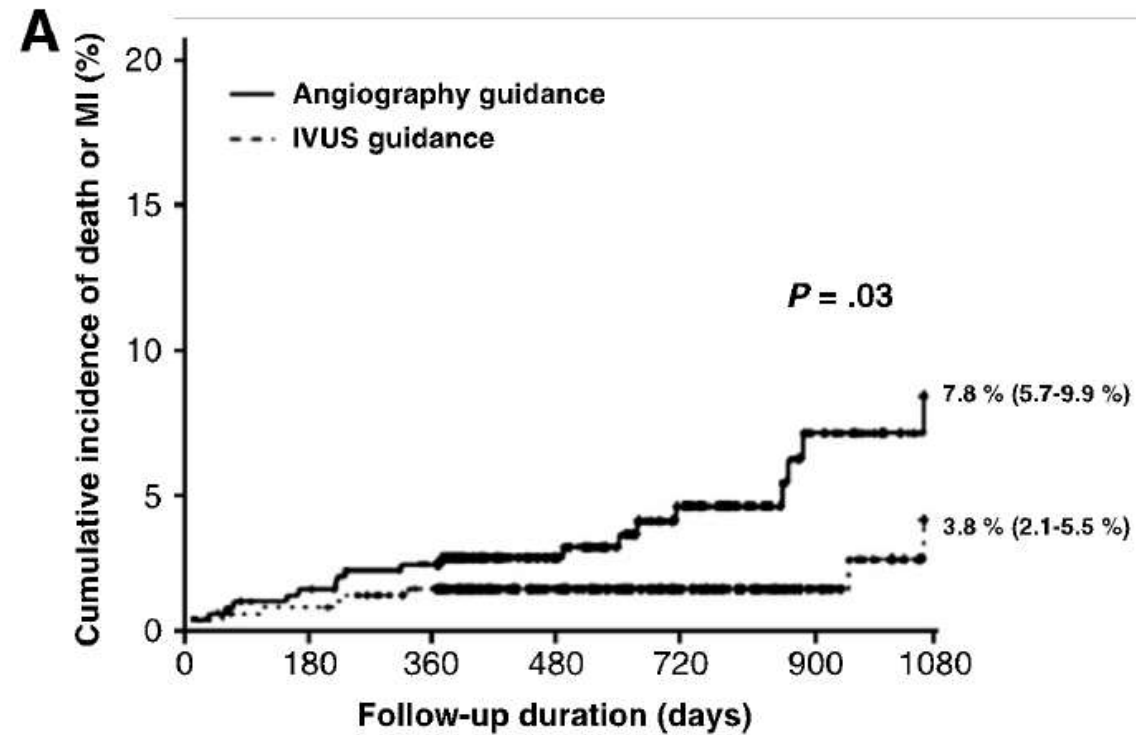


IVUS Guidance in Bifurcation

The Korean COBIS registry

Reduction in *death or MI* by IVUS use

HR 0.44 [0.12,0.96], p=0.04



Patients at risk

IVUS guidance	487	467	281	118
Angiography guidance	487	469	346	124

IVUS-guided PCI for Bifurcation treated with **2-Stent Technique**; n=628

<i>12 months</i>	IVUS N=324	No IVUS N=304	P-Value
Stent thrombosis	1.2%	6.9%	<0.001
Definite	0.6%	5.3%	<0.001
Probable	0%	1.6%	0.026
Possible	0.6%	0%	0.50
Death	2.2%	3.9%	0.54
Cardiac death	0.9%	3.3%	0.049
MI	4.6%	8.9%	0.038
TLR	8.6%	13.5%	0.056
TVR	10.2%	15.5%	0.055
MACE	15.7%	19.7%	0.21

Clinical Impact of Intravascular Ultrasound Guidance in Drug-Eluting Stent Implantation for Unprotected Left Main Coronary Disease

Pooled Analysis at the Patient-Level of 4 Registries

1,670 patients DES-PCI; Propensity Matched

505 patients with IVUS guidance

vs.

505 patients without IVUS guidance

Independent Predictors for Major Adverse Events DES LM-PCI

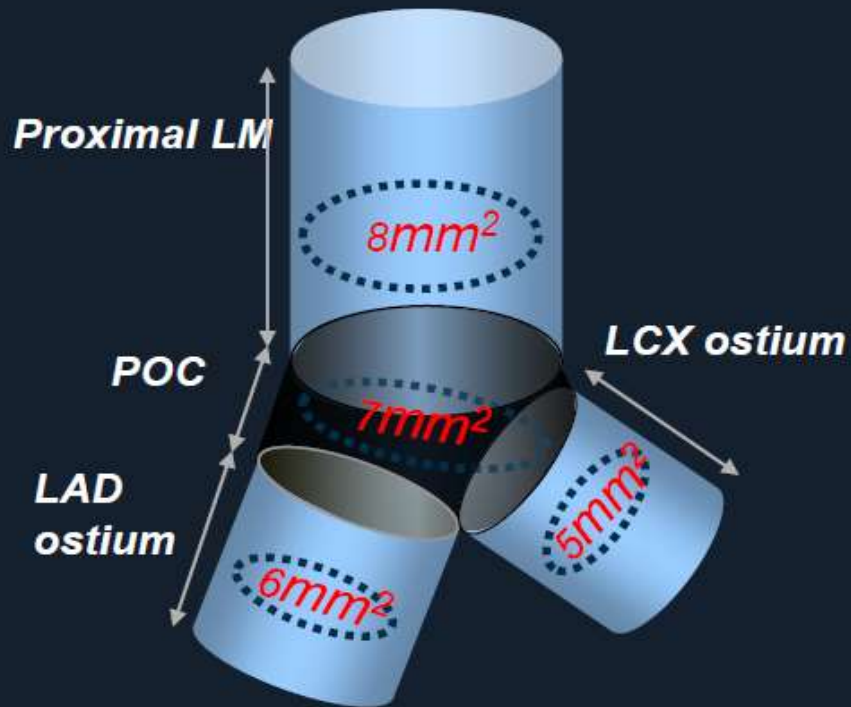
	HR [95%CI]	P-Value
All population		
IVUS use	0.70 [0.52,0.99]	0.04
Age	1.03 [1.01,1.05]	0.0001
LVEF	0.98 [0.97,0.99]	0.01
Diabetes	1.81 [1.32,2.47]	0.0002
Distal LM 2 stents	2.23 [1.44,3.48]	0.0004
ACS	1.84 [1.30,2.60]	0.0006

Distal LM disease / LM Bifurcation

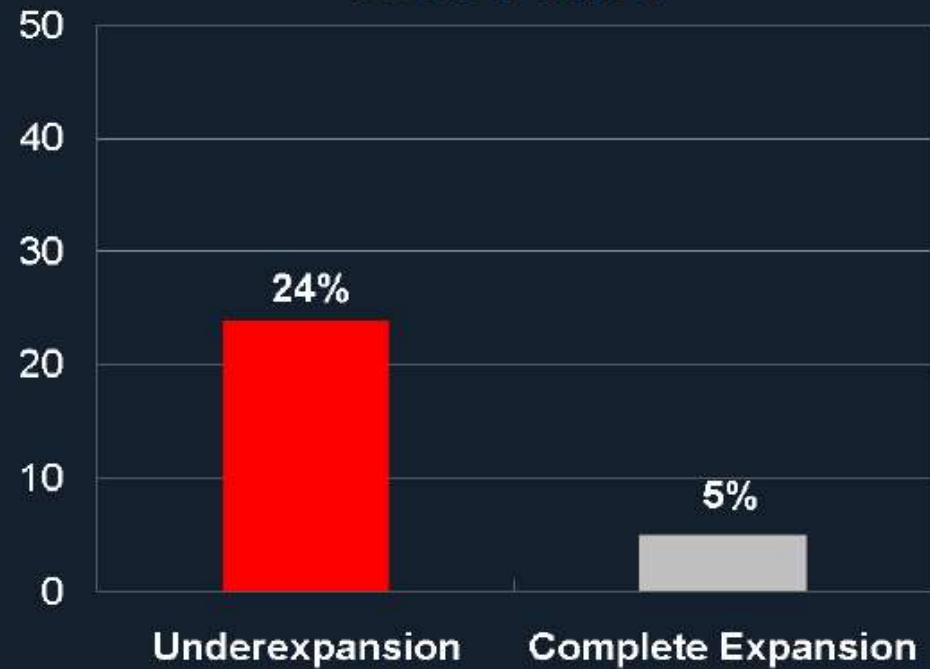
IVUS use	0.54 [0.34,0.90]	0.02
Age	1.02 [1.00,1.05]	0.02
Diabetes	1.62 [1.02,2.59]	0.04
Distal LM 2 stents	2.86 [1.71,4.77]	0.0001
ACS	1.95 [1.14,3.31]	0.01

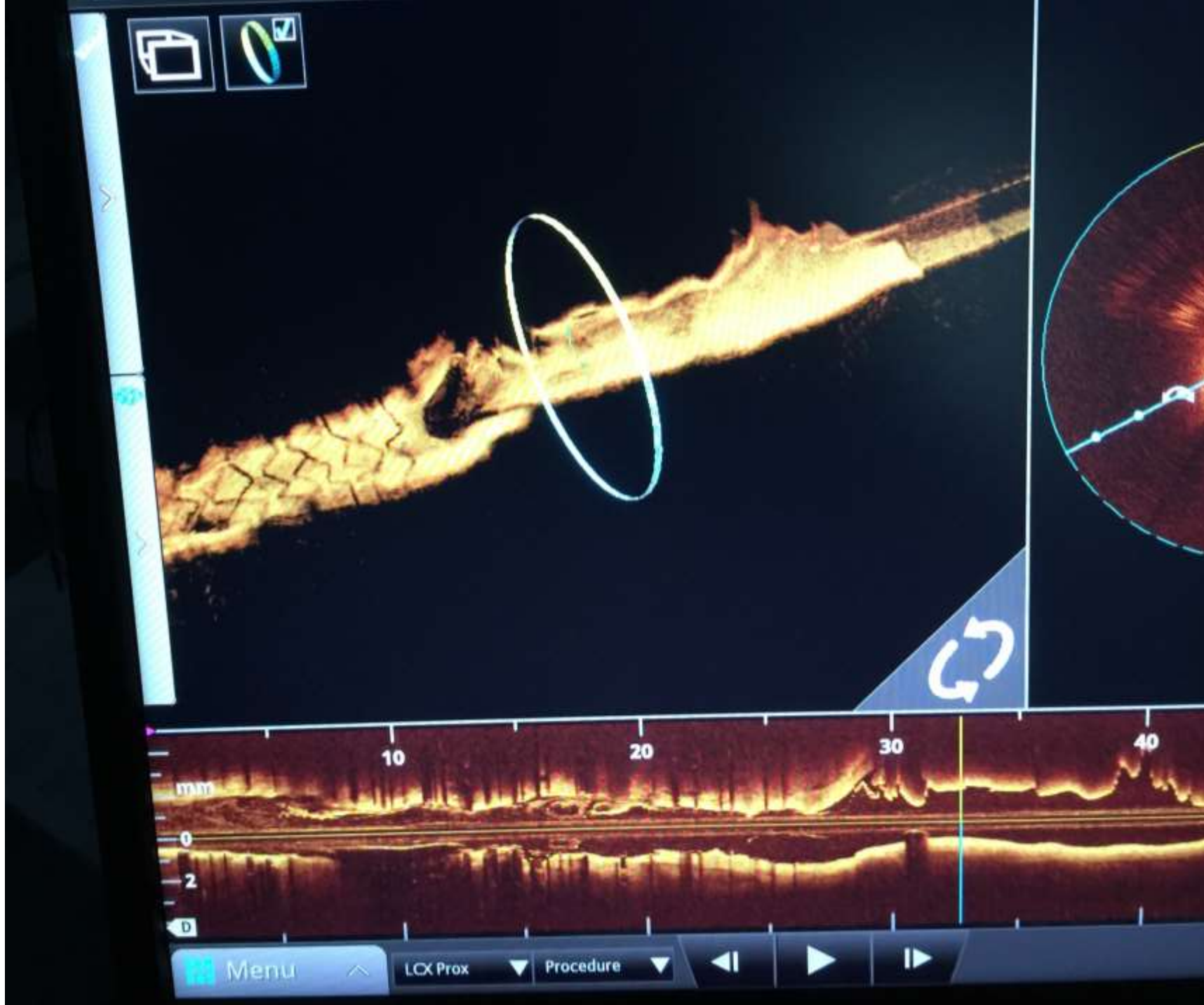
Optimal Stent Cross Sectional Area

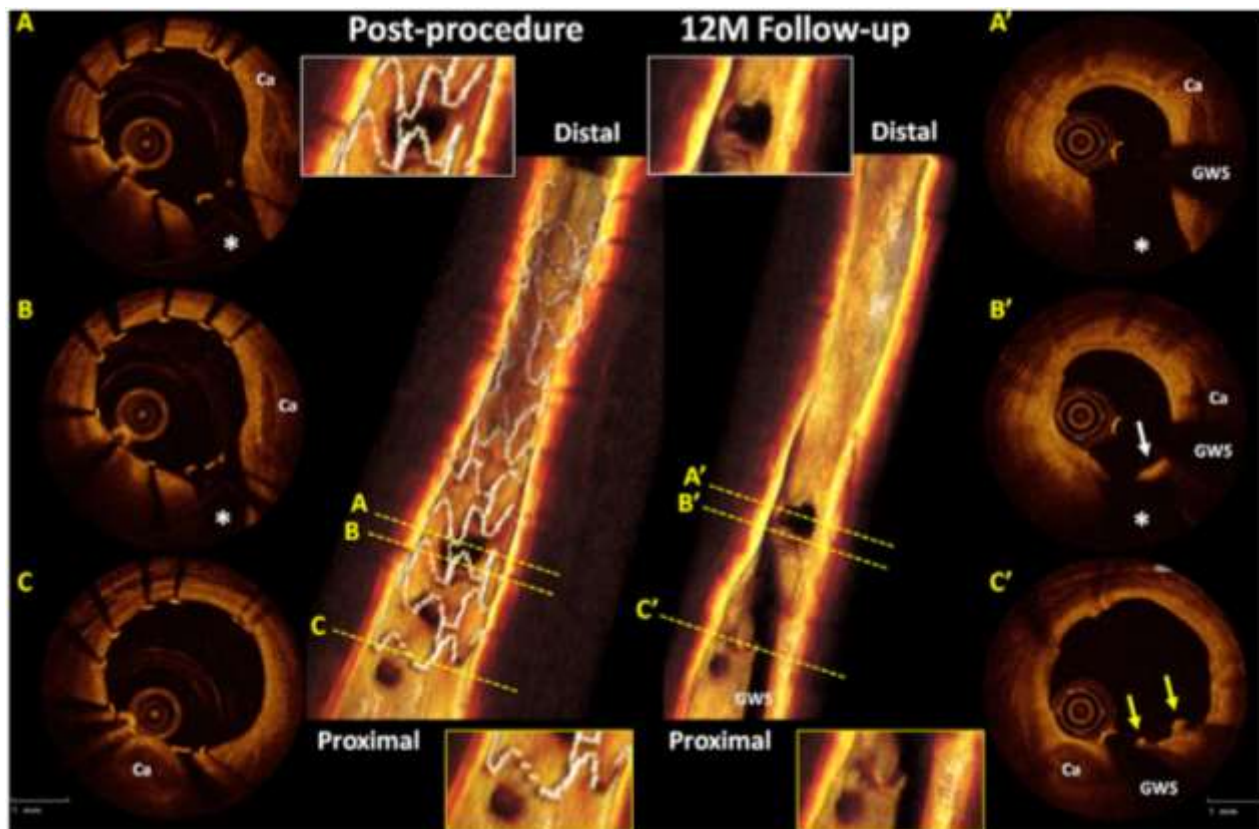
IVUS-guided



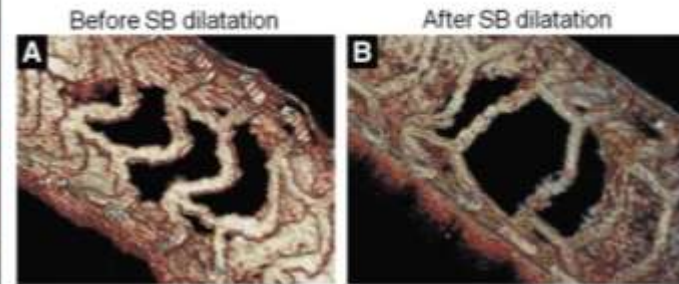
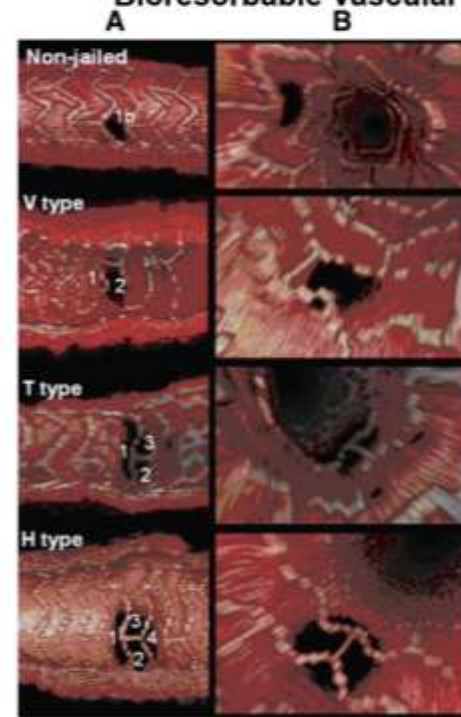
ISR Rate







3-Dimensional Assessment of Jailed Side Branches by Bioresorbable Vascular Scaffolds: A Proposal for Classification



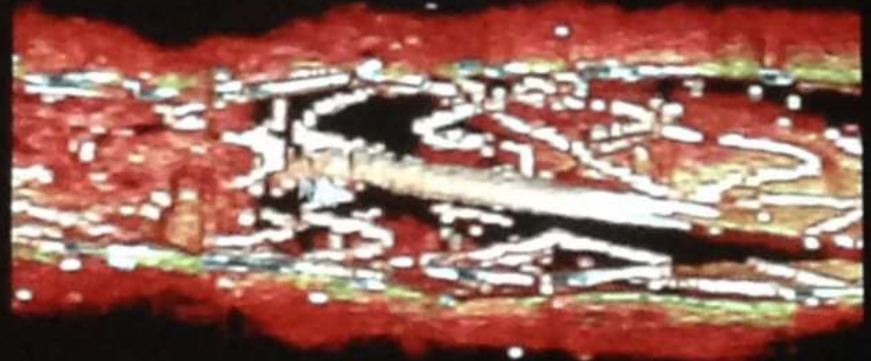
JACC: Cardiovascular interventions 3, issue 8, Aug 2010, 836-44



2nd rewiring

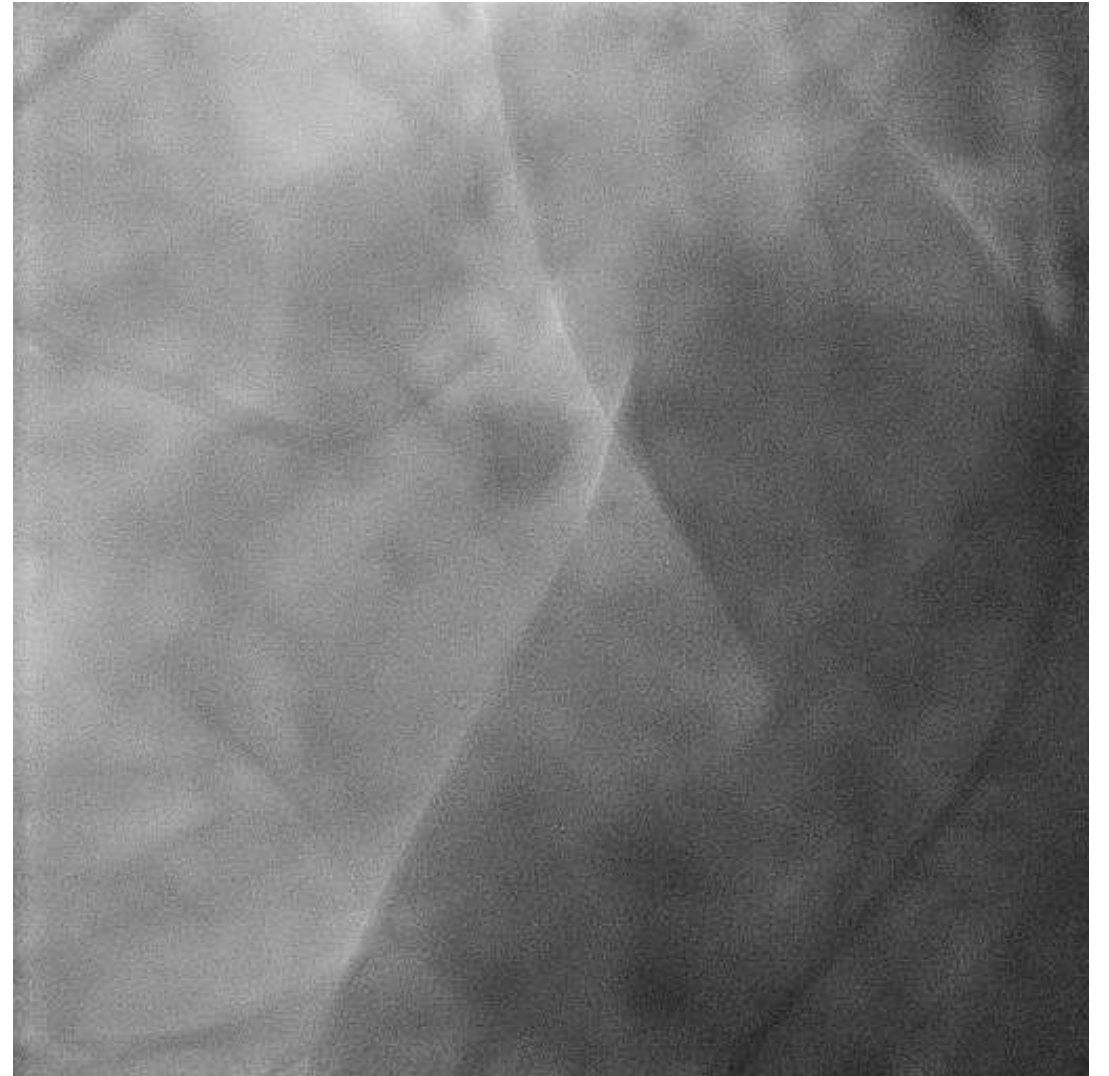
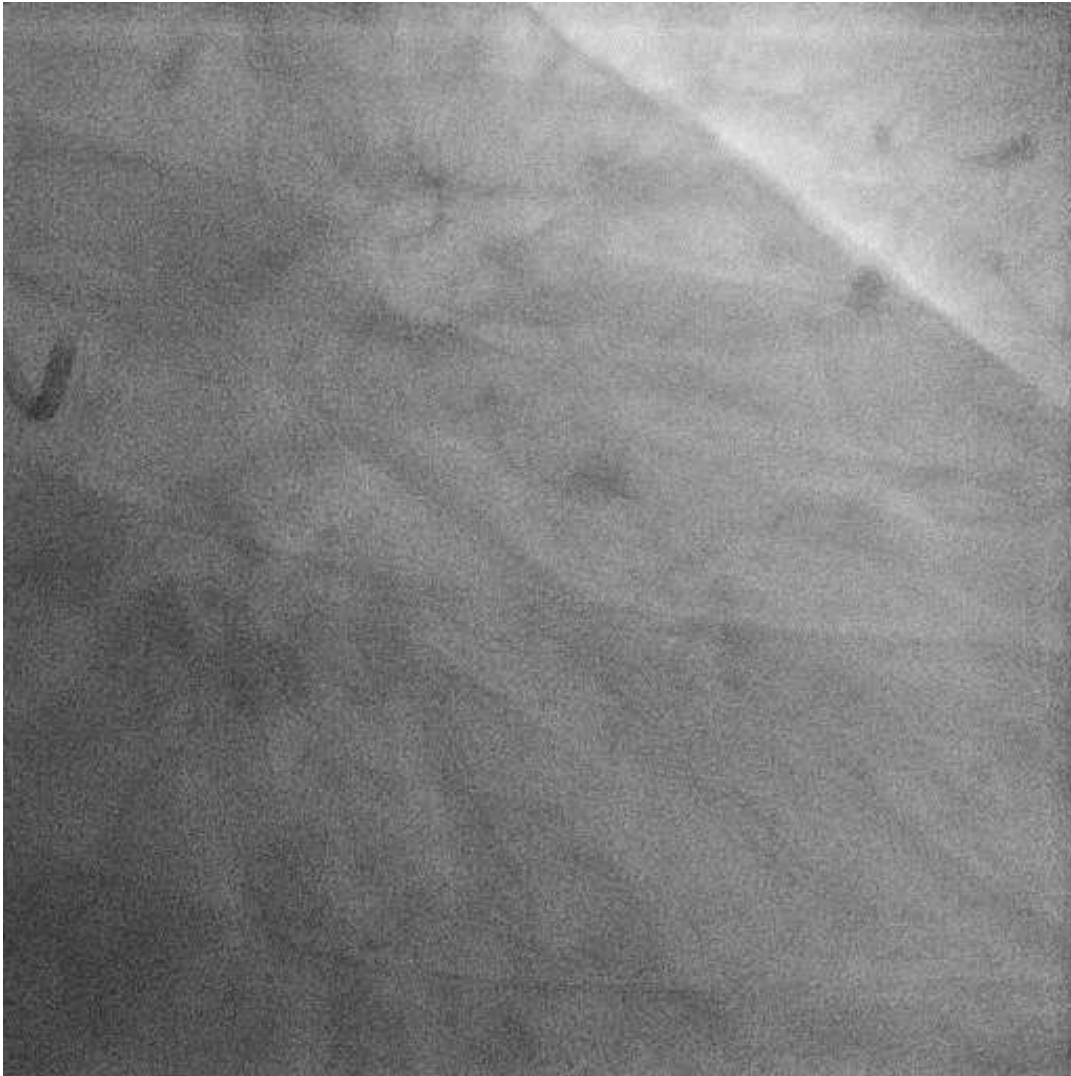


3rd rewiring



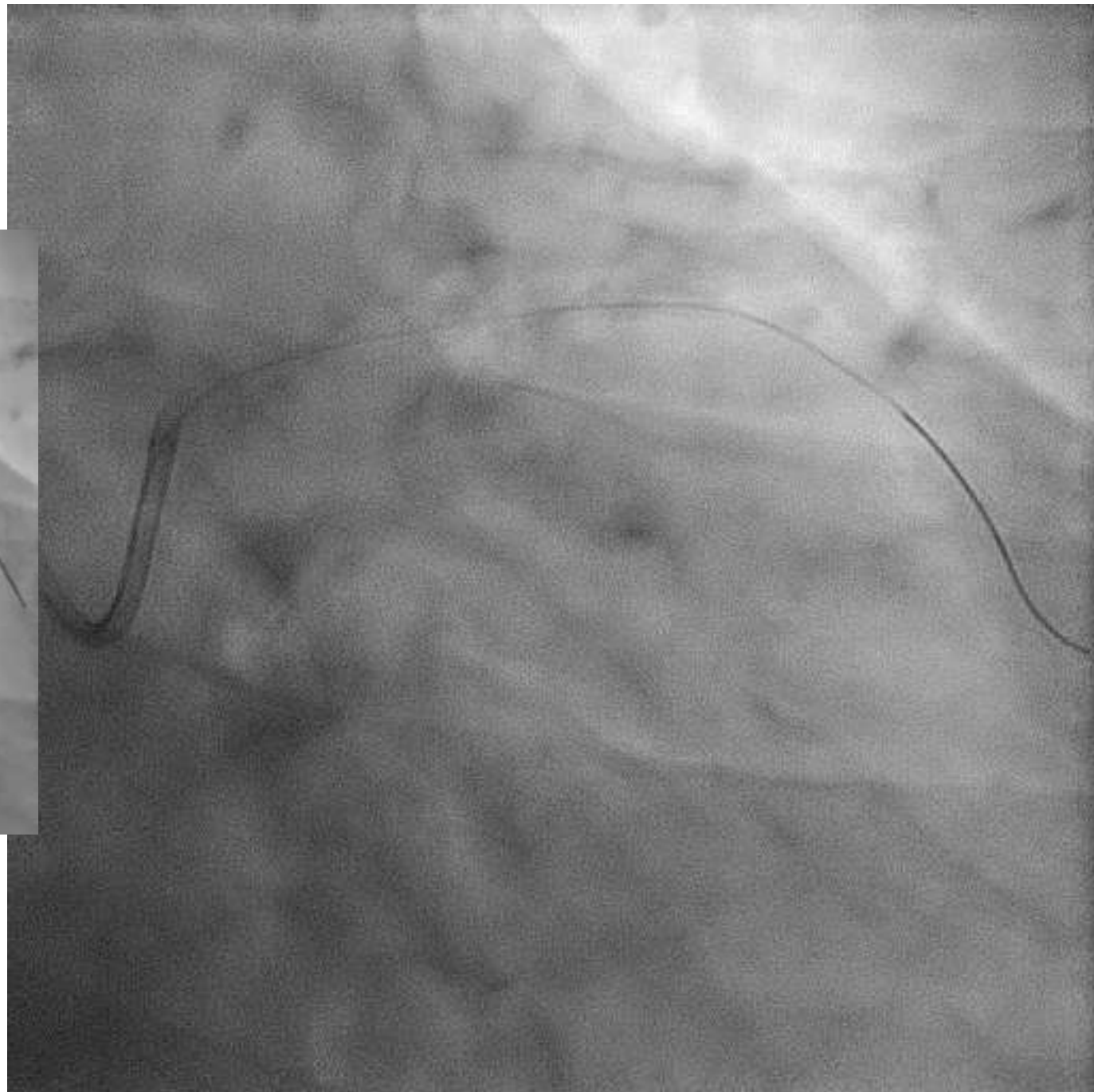
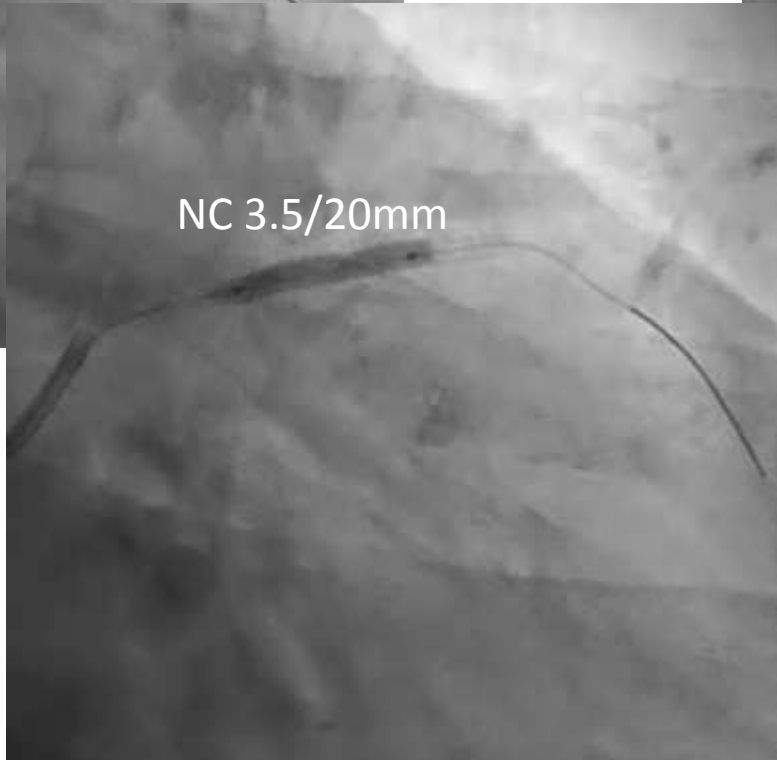
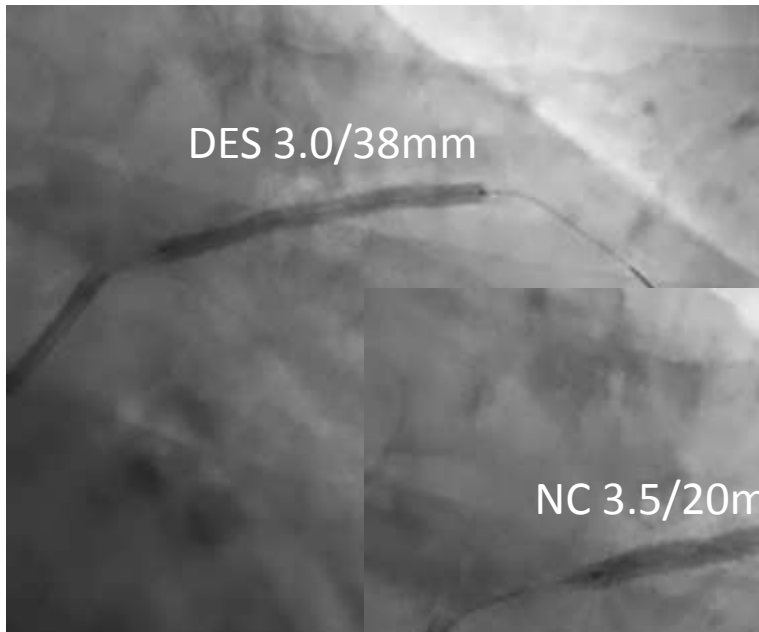
Shite, J @ CCT 2014

68M, typical angina, CCS_{FC} 2-3

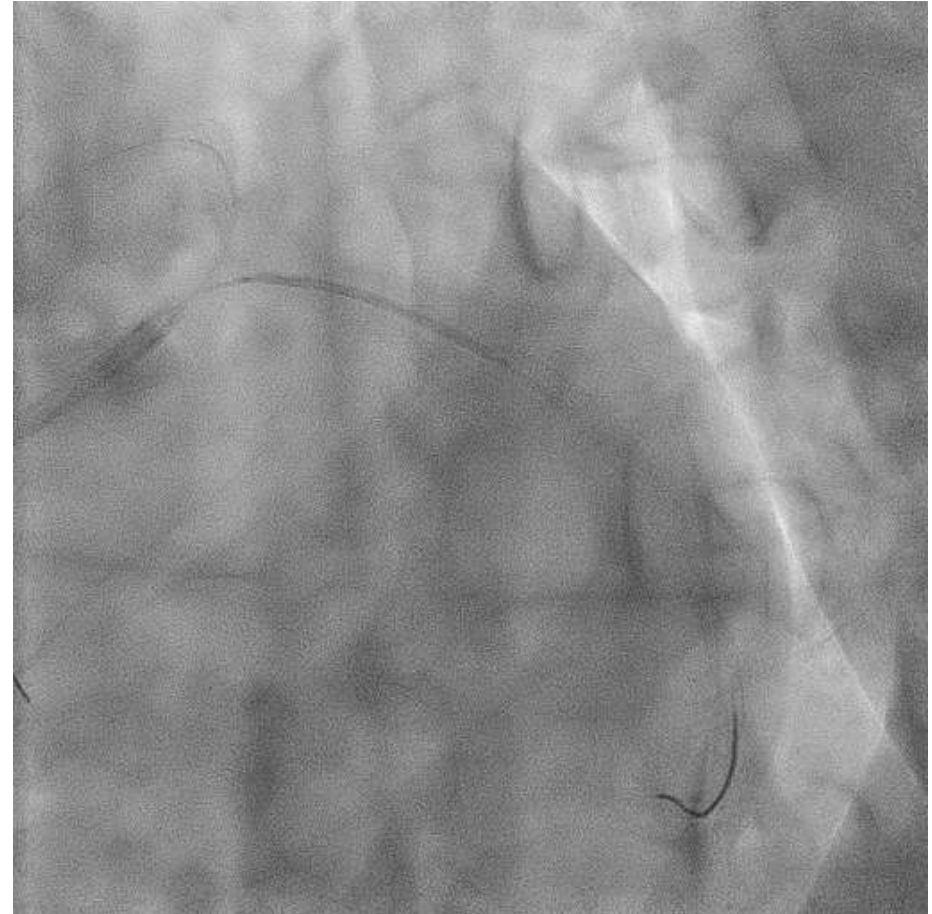
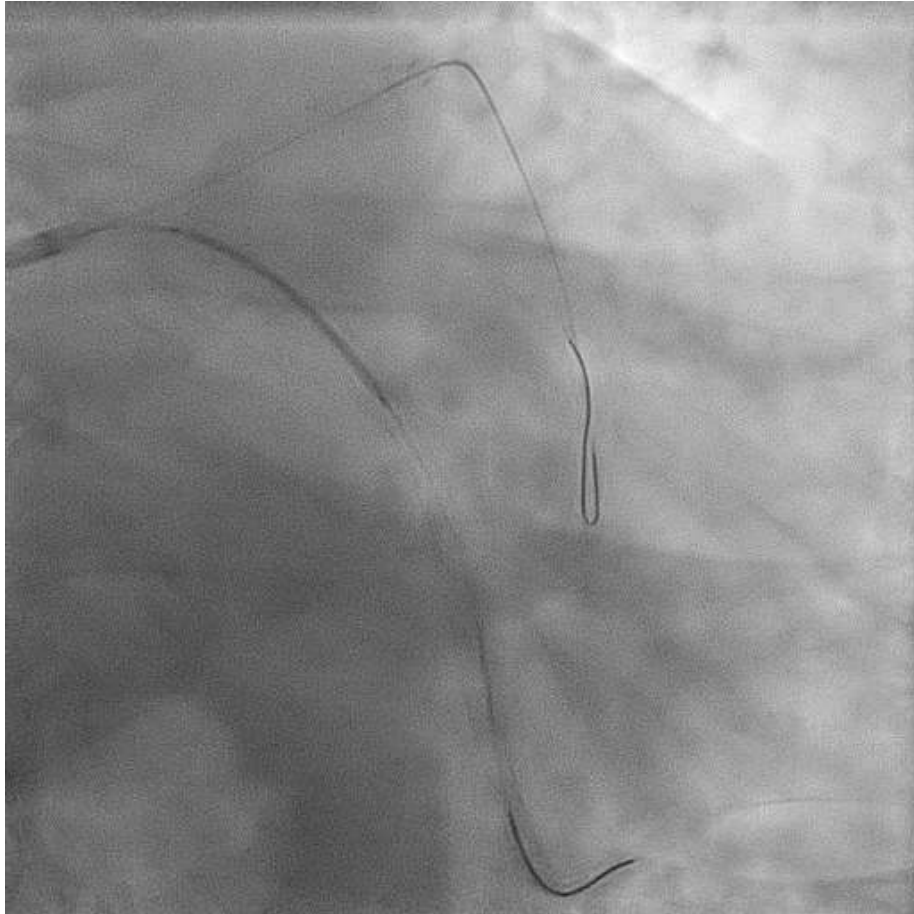


DES 3.0/38mm

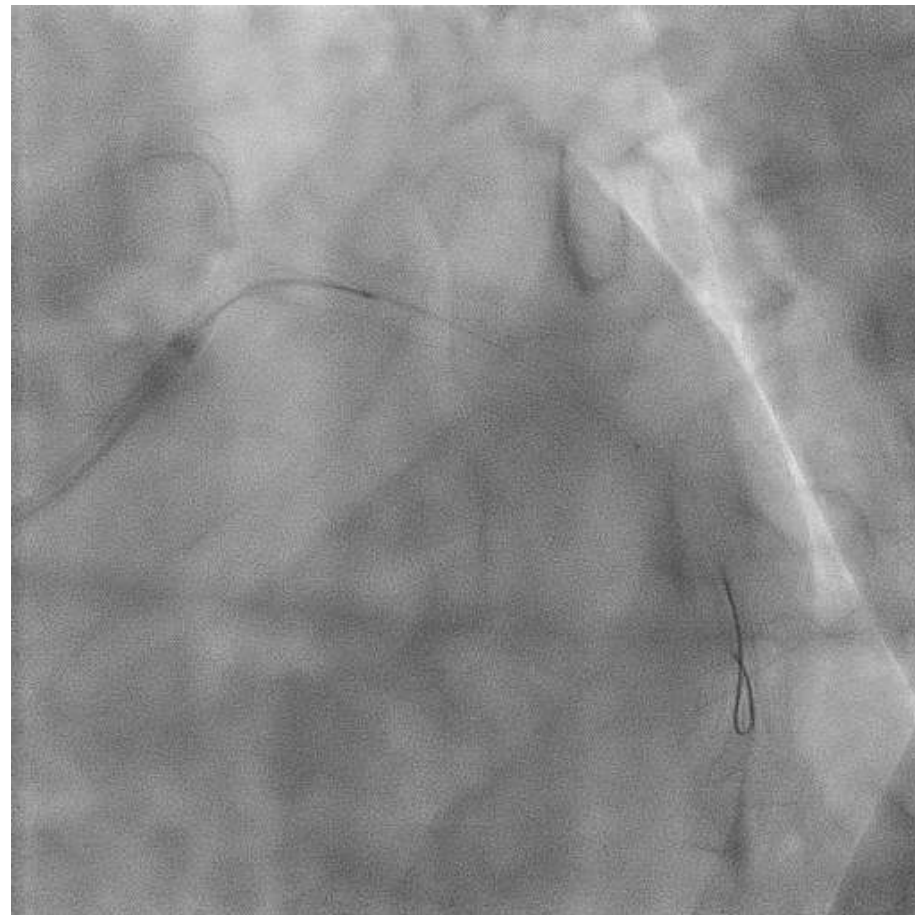
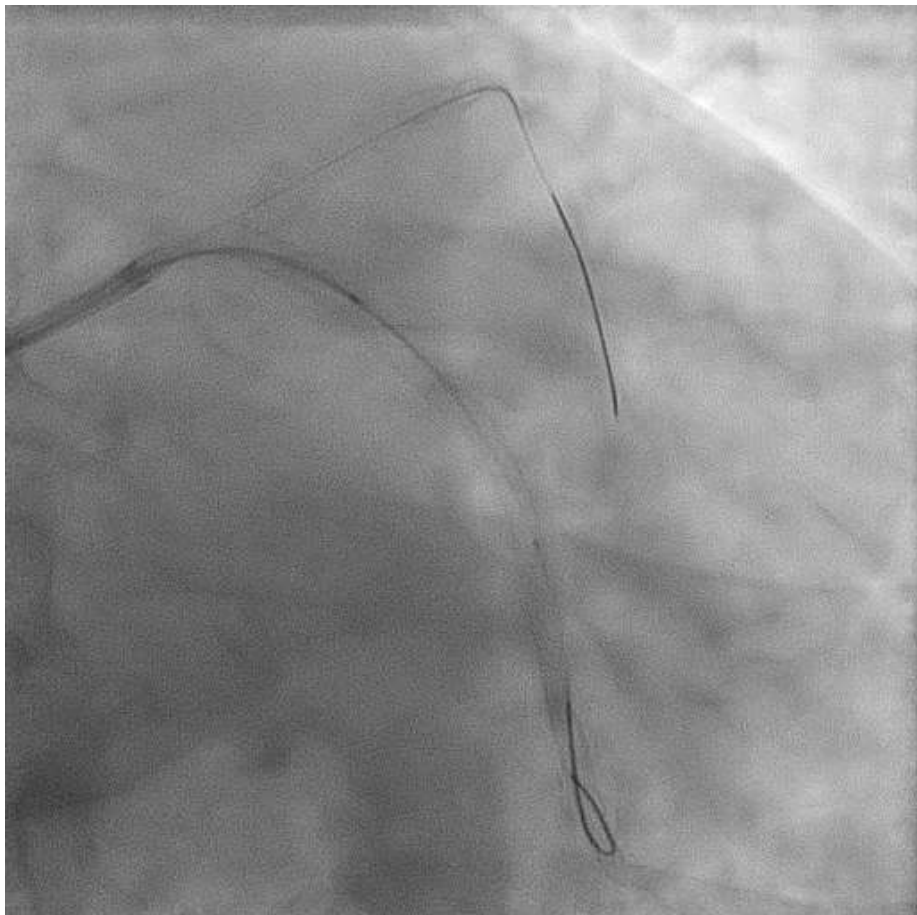
NC 3.5/20mm

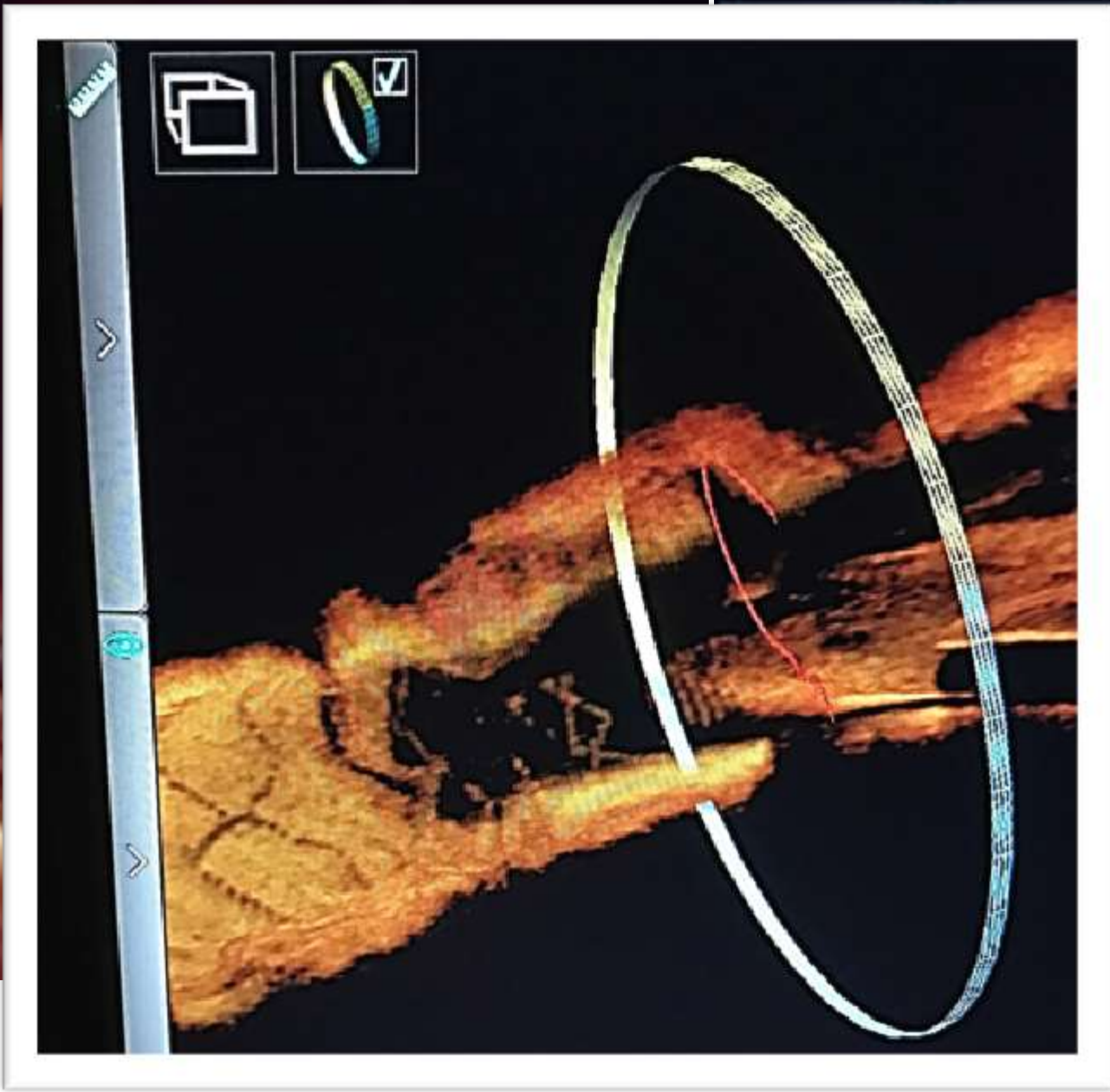


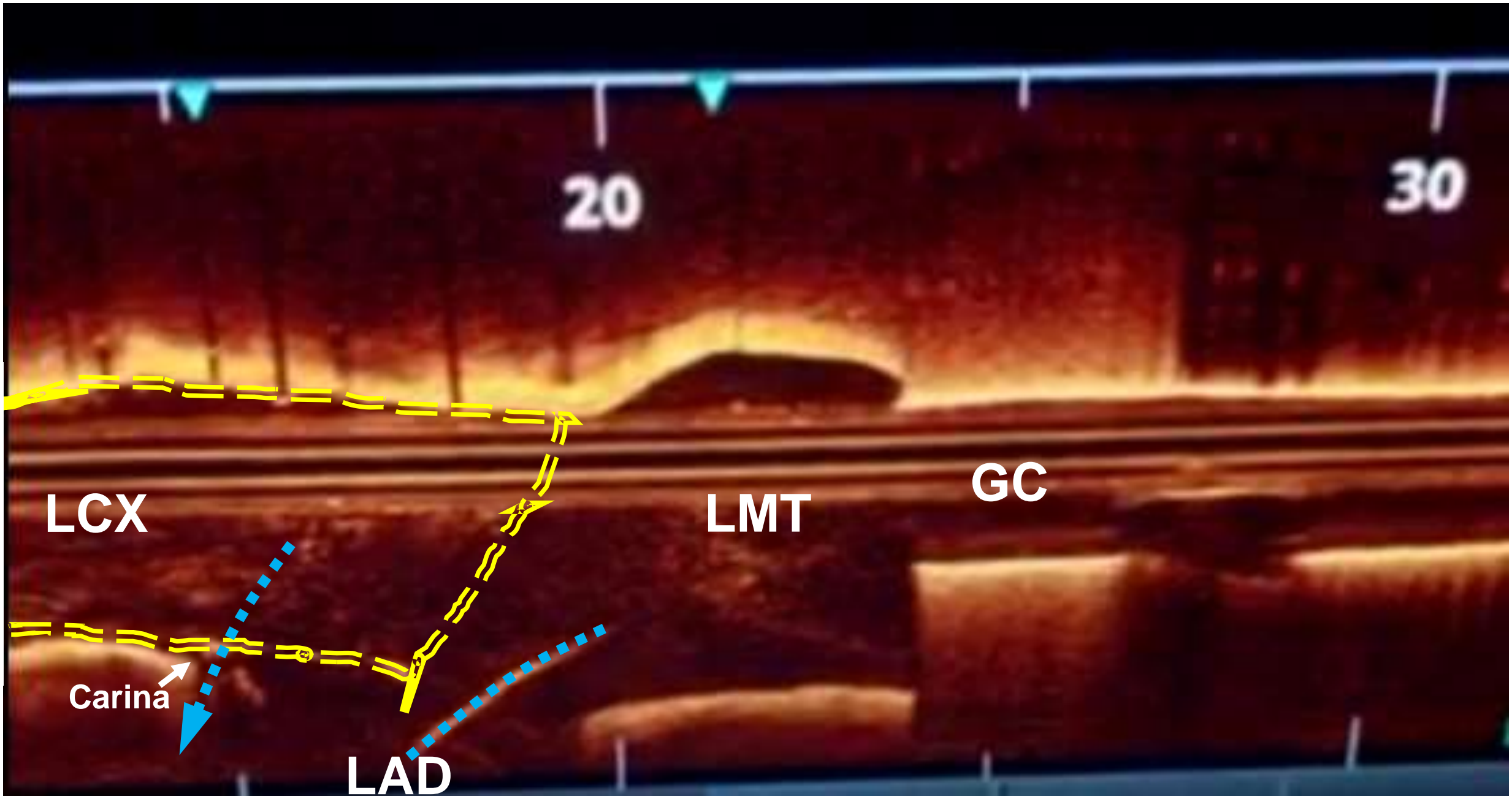
LCX stenting position



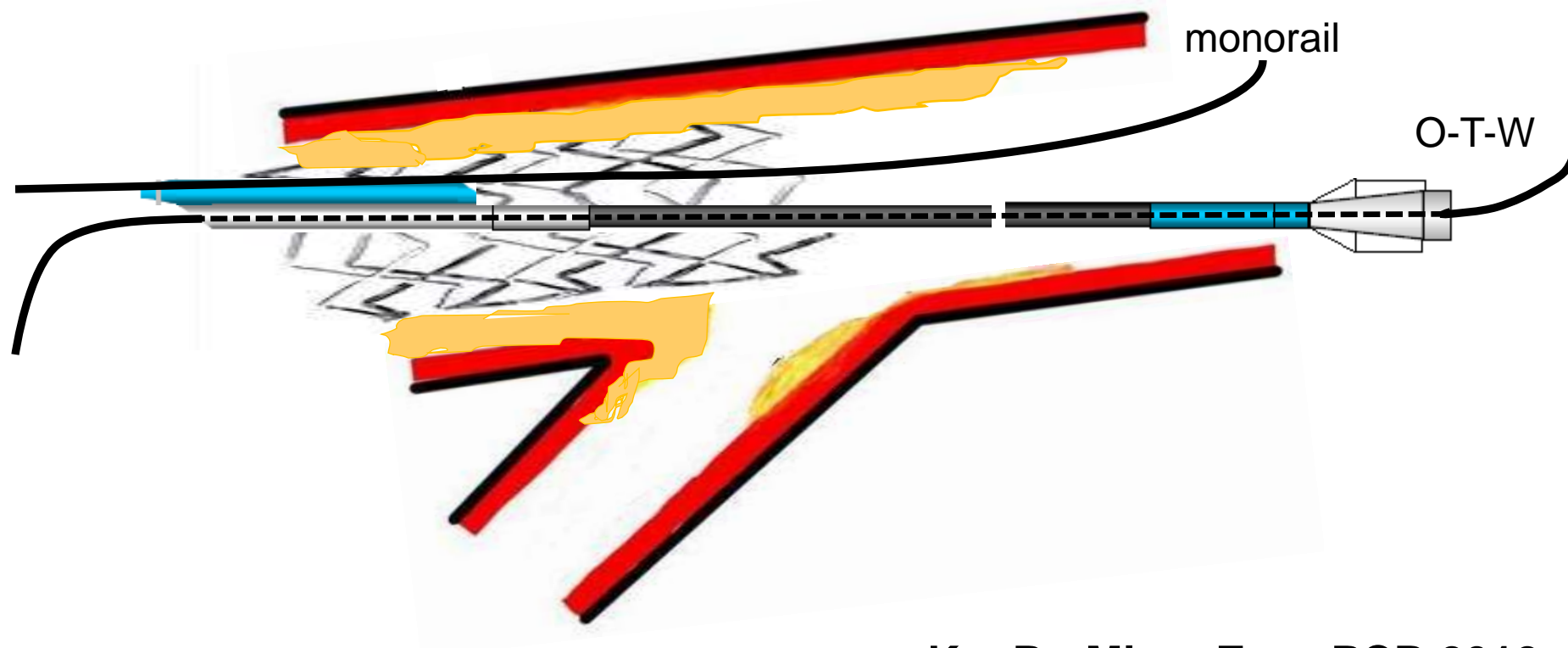
Angio & OCT from LCX to LMT



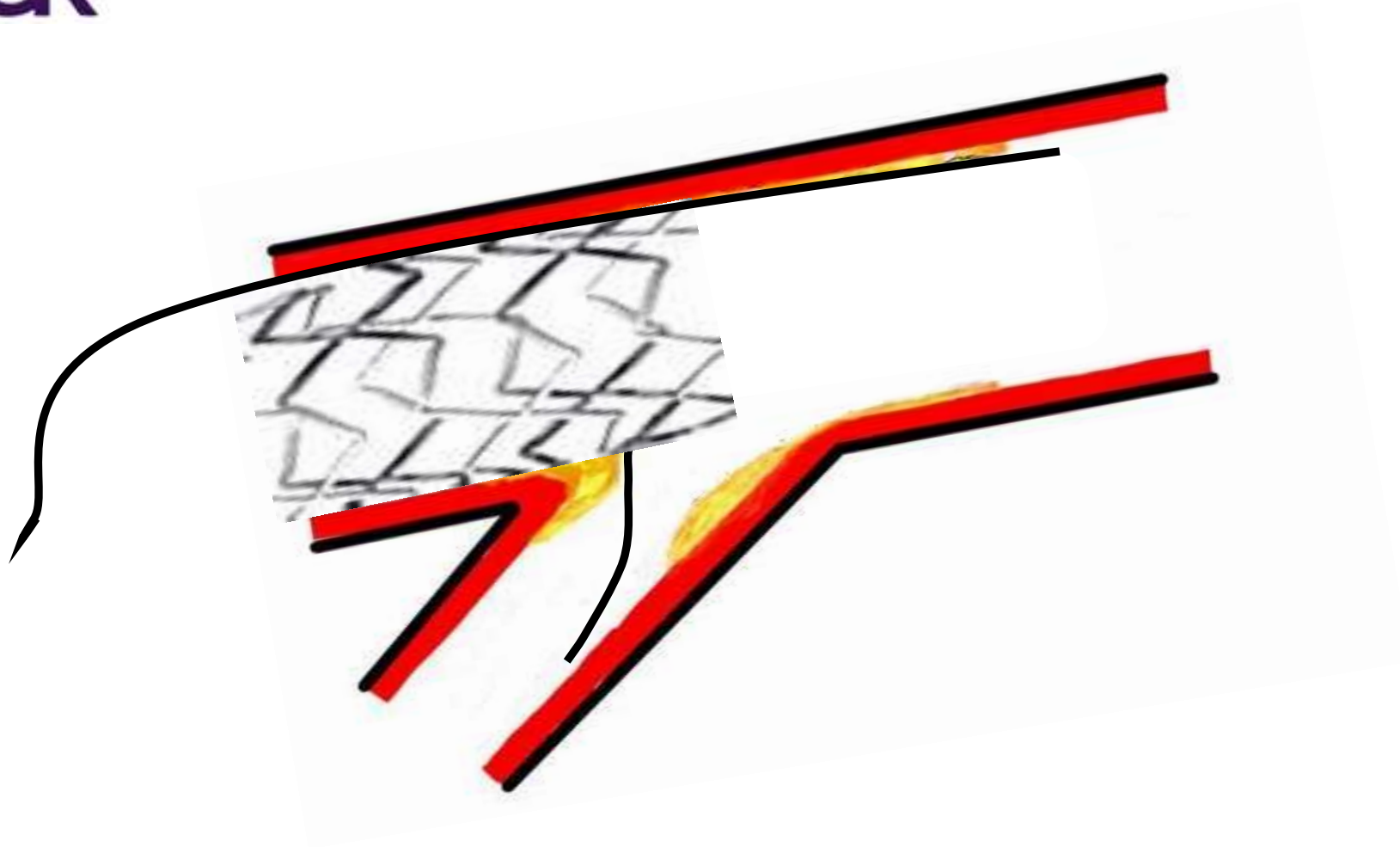




2nd GW through the side-hole of Crusade double-lumen microcatheter

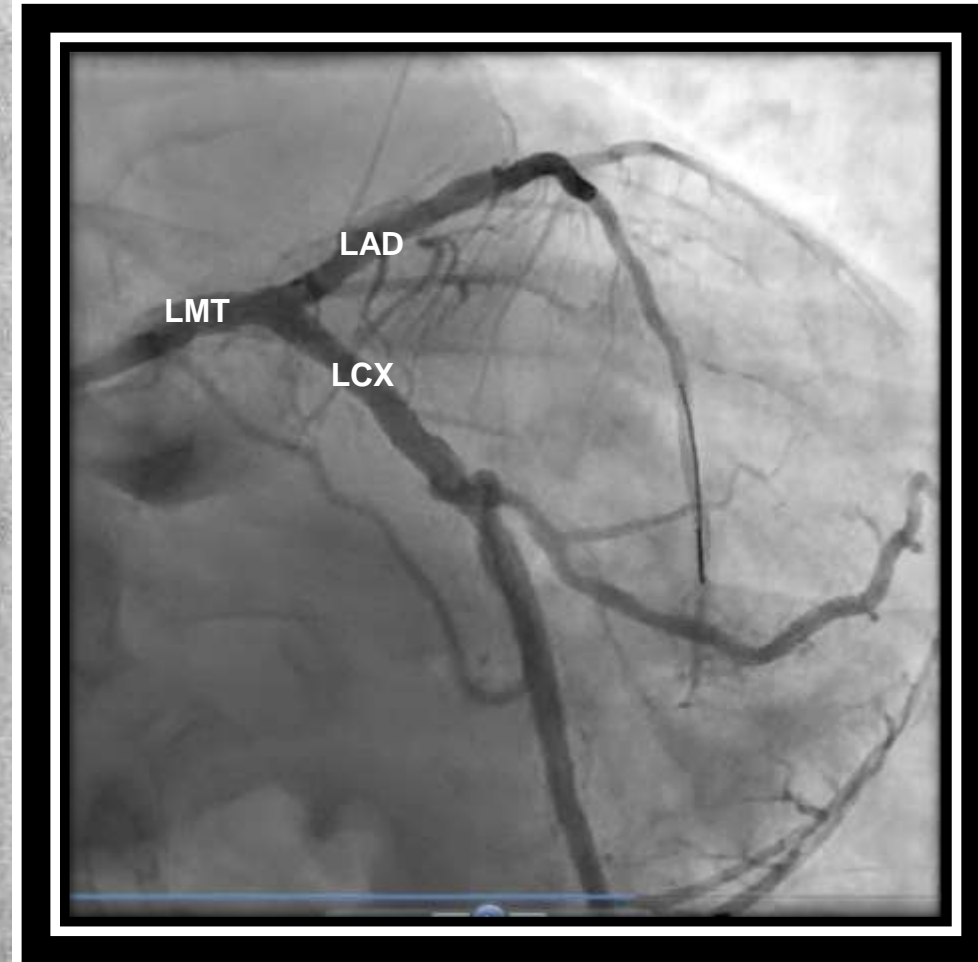


Ku, Po-Ming. Euro PCR 2012

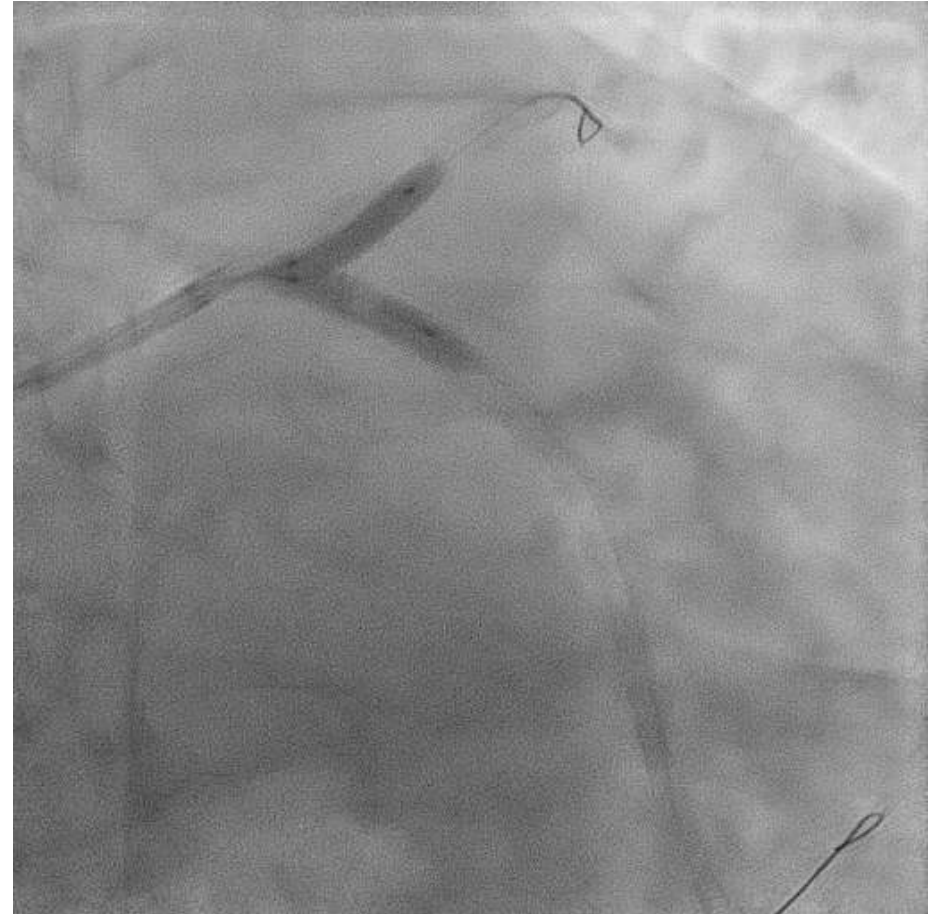


Ku, Po-Ming. Euro PCR 2012

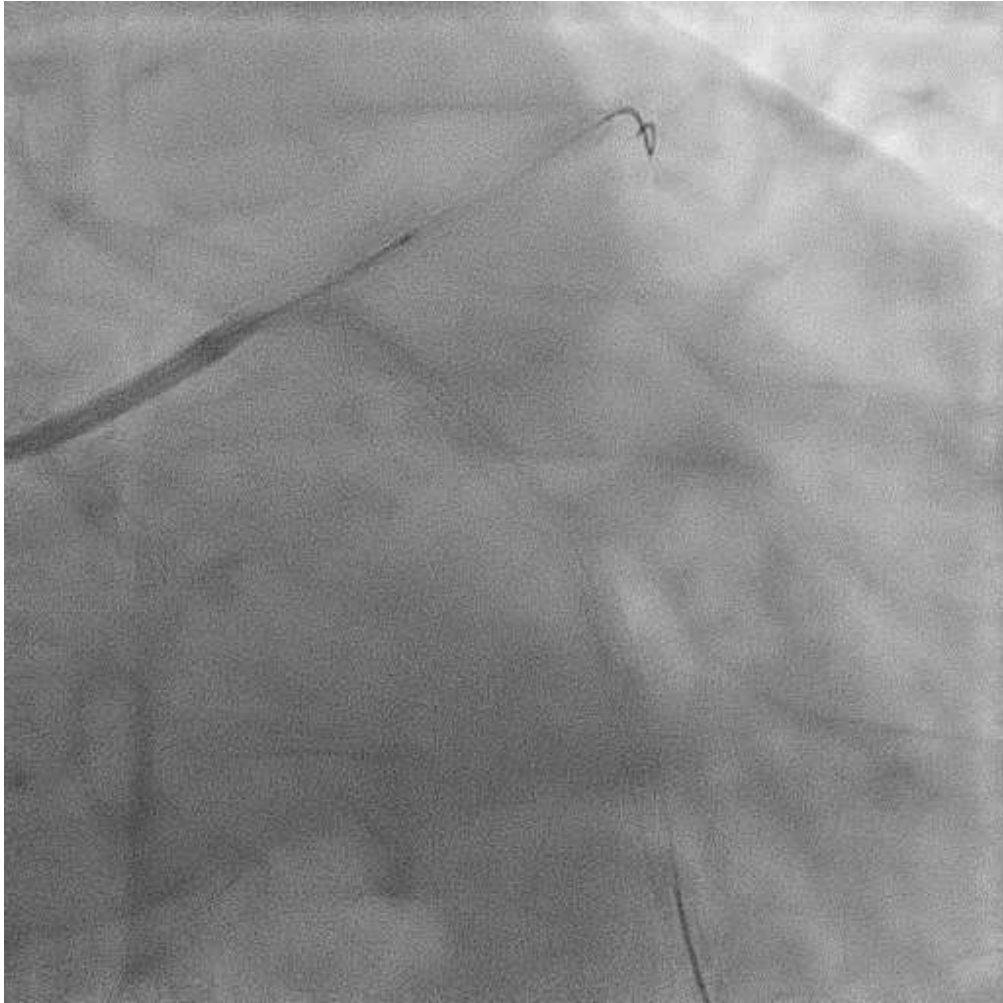
2nd GW recross the stent strut through
Crusade double-lumen microcatheter

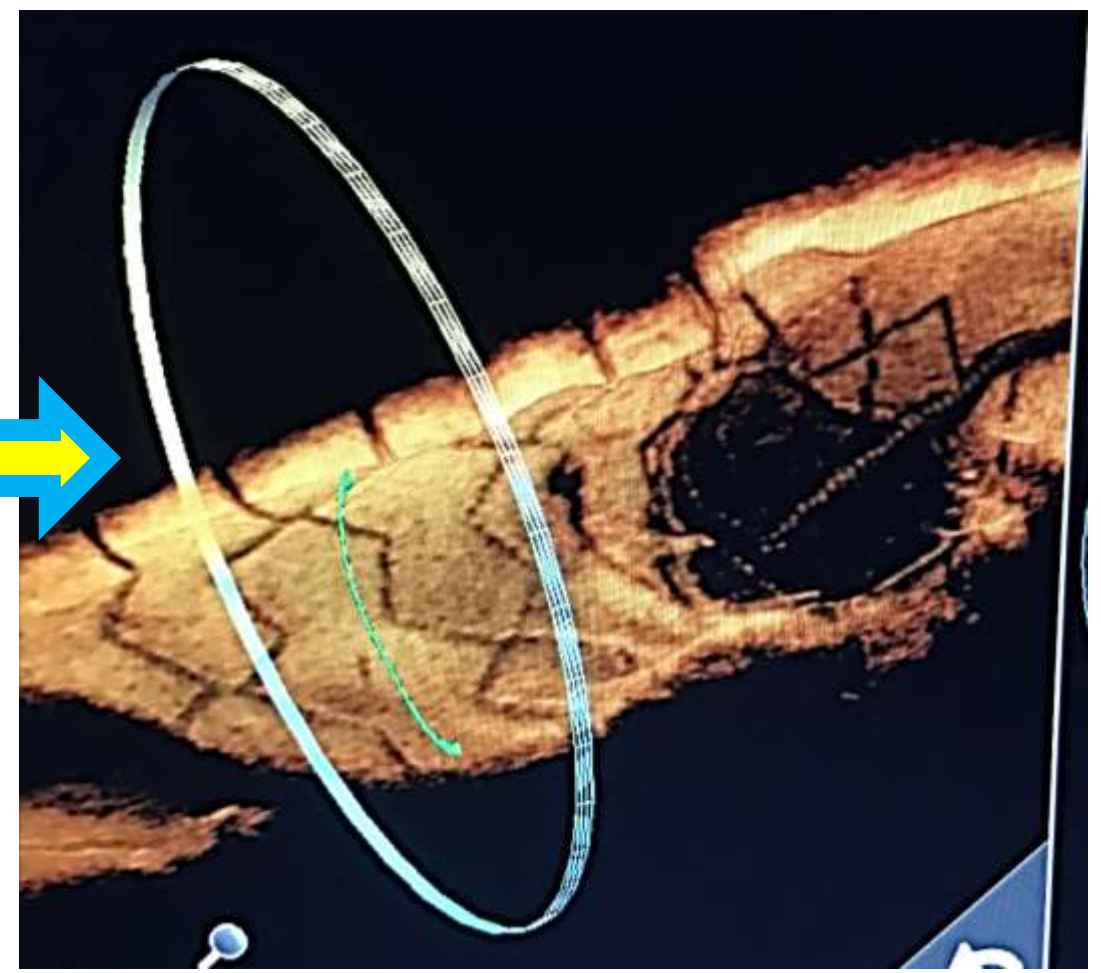
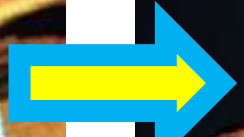
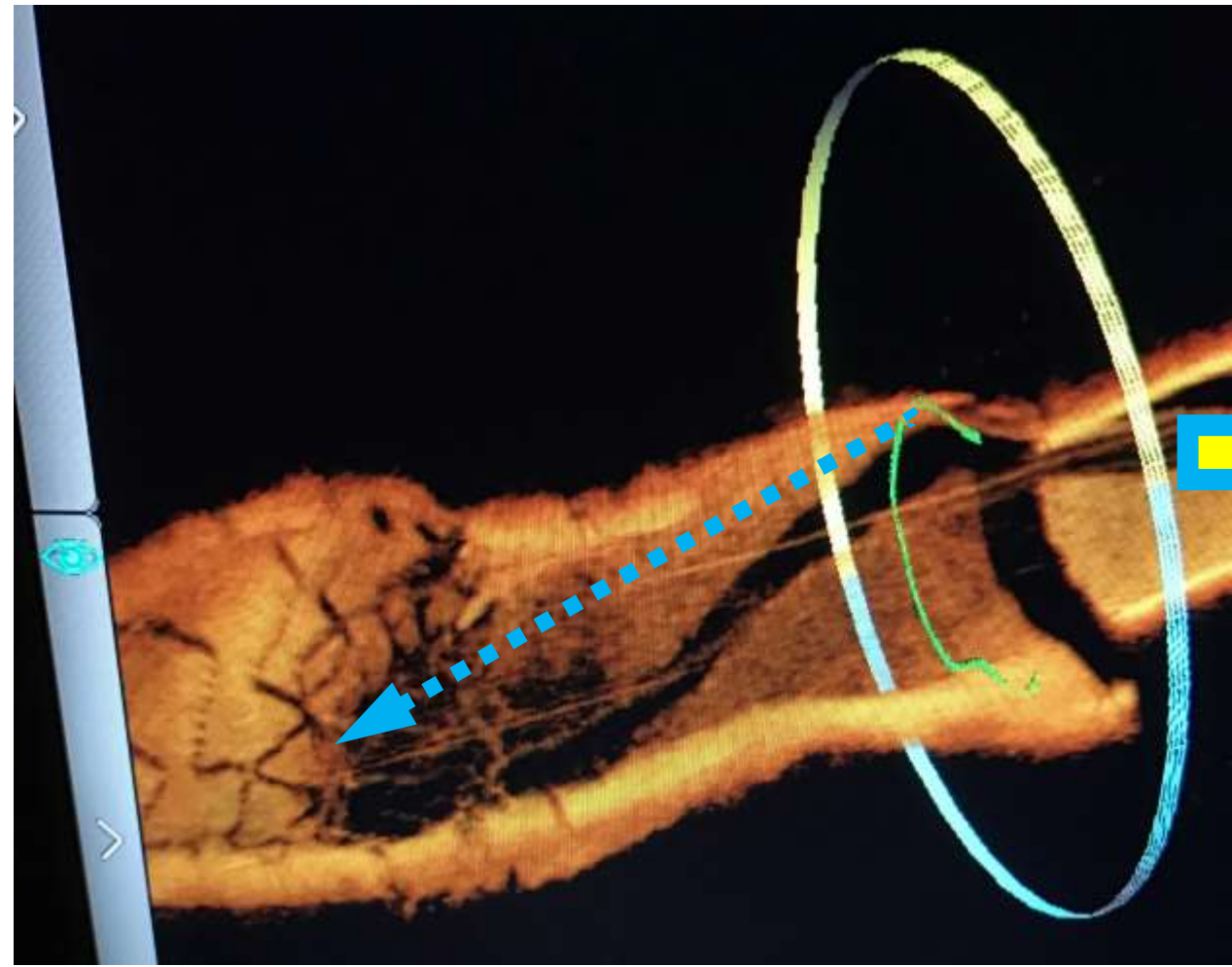


Snuggling kiss, 4.0/15mm & 3.5/15mm, 12 atm



Final angio + OCT





Take Home Messages

- **OCT/IVUS: further 3D evaluation in detail**
- **OCT/IVUS simplify strategy (& avoid side-branch occlusion)**
- **OCT/IVUS for better outcome**



Thank you