

Beyond CTO – Management of the Distal Vessel



WELLINGTON
CARDIOLOGY



Scott Harding
Department of Cardiology
Wellington Hospital

Potential Conflicts of Interest

I have the following potential conflicts of interest to report:

Grant/Research Support: Asahi Intecc

Proctoring Fees/ Speakers Honoraria: Boston Scientific, Medtronic, Abbott Vascular,
Kaneka, Bio-Excel, Teleflex Medical

Case 1: RCA-CTO

Proximal RCA CTO
immediately post stenting

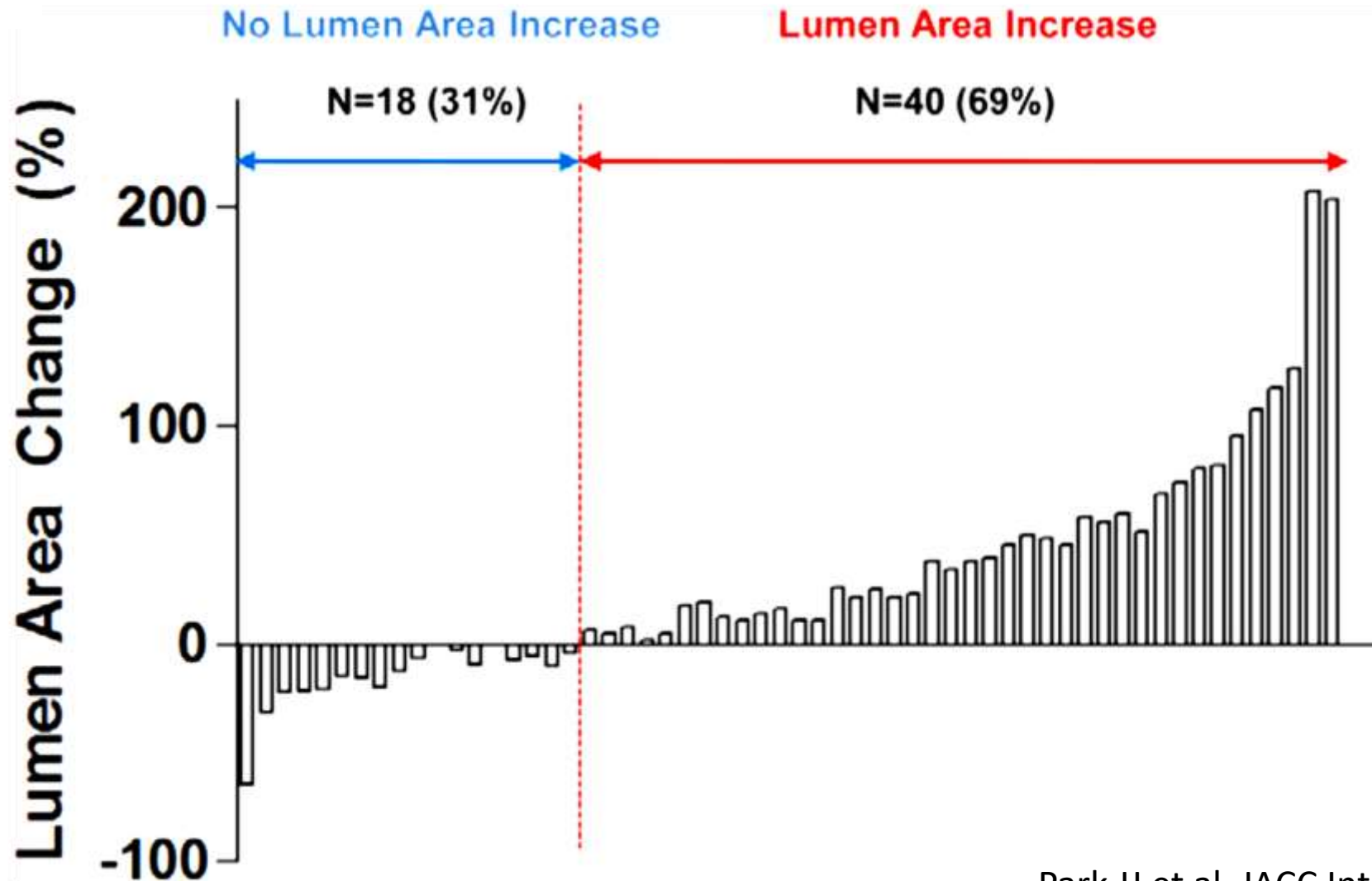


RCA-CTO

Follow-up angiogram 6 months later



Lumen increase 6 months after recanalization of CTO



Predictors of TLF post CTO PCI with DES

Full Metal Jacket With Drug-Eluting Stents for Coronary Chronic Total Occlusion

JACC interv:2017:10:1405-12

TABLE 4 Predictors of Target Lesion Failure

	Univariate	p Value	Multivariate	p Value
Diabetes mellitus	0.88 (0.53-1.47)	0.63	NA	
Left ventricular ejection fraction (per 1% increment)	0.99 (0.97-1.02)	0.66	NA	
J-CTO score (per 1-U increment)	1.00 (0.80-1.26)	0.98	NA	
Multiple CTOs	1.86 (0.95-3.64)	0.07	1.92 (0.98-3.78)	0.06
Repeat-attempt CTO PCI	1.07 (0.58-1.97)	0.83	NA	
<u>Stent number of the target vessel (per 1 increment)</u>	<u>1.52 (1.03-2.23)</u>	<u>0.03</u>	1.72 (1.16-2.54)	0.006
Average stent diameter (per 1-mm decrement)	1.20 (0.52-2.75)	0.67		
<u>Persistent distal luminal narrowing</u>	<u>2.51 (1.54-4.10)</u>	<u><0.001</u>	2.73 (1.66-4.47)	<0.001

Potential causes of a small distal vessel

- Diffuse disease
- Spasm
- Negative remodeling
- Haematoma
- Dissection
- Muscle bridge

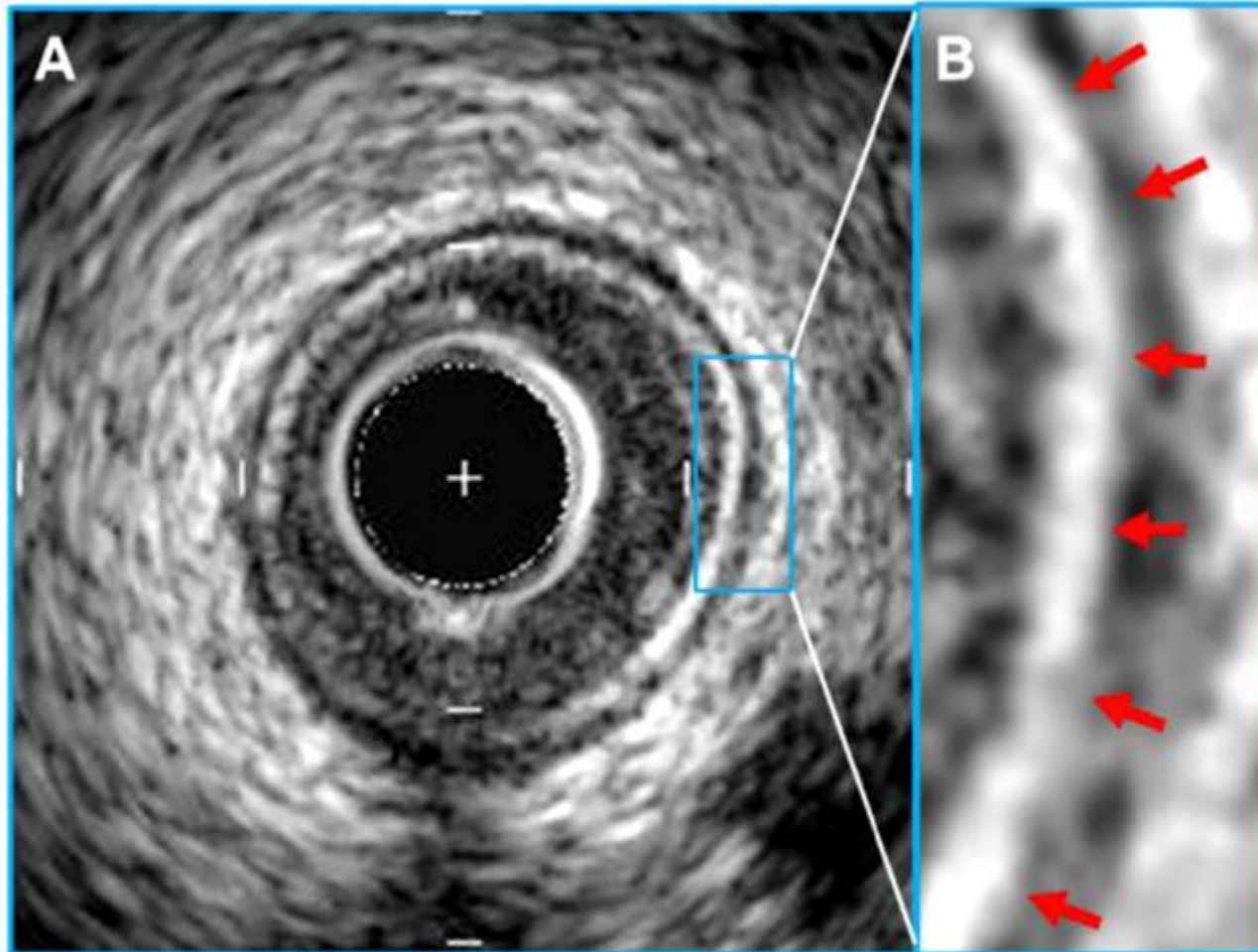
Prediction of Chronic Vessel Enlargement by a Novel Intravascular Ultrasound Finding – Peri-Medial High-Echoic Band –

Table 4. IVUS Comparison of Lesions With and Without LLG in Patients Who Underwent Successful IVUS-Guided PCI for Severe Coronary Stenosis

	LLG (+) (n=16)	LLG (-) (n=11)	P value
EEM CSA, mm ²	7.8±4.6	9.9±4.7	0.292
Lumen CSA, mm ²	4.1±1.8	6.7±3.4	0.071
P+M CSA, mm ²	3.8±3.2	3.2±1.5	0.845
Plaque burden, %	43±15	33±10	0.082
PHB, n (%)	14 (88)	2 (18)	0.007

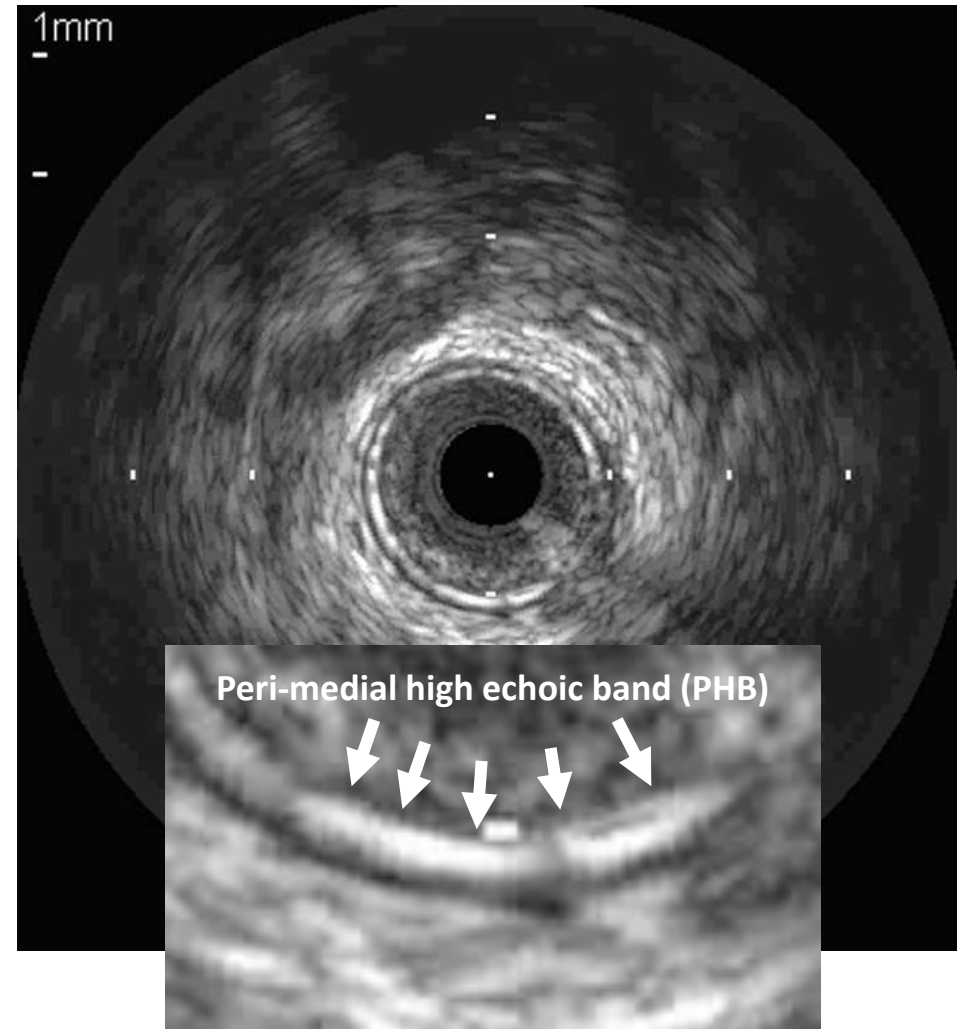
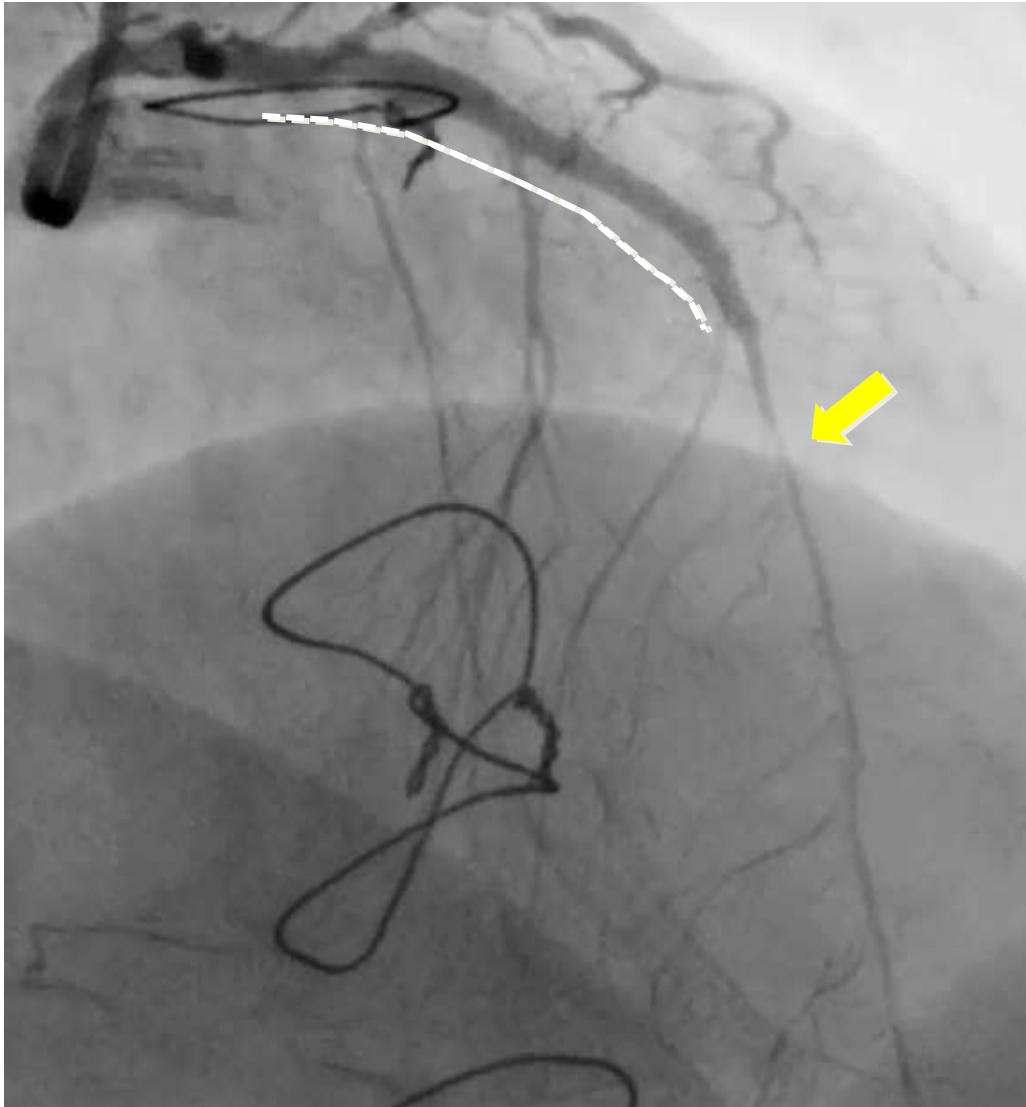
LLG, late lumen gain. Other abbreviations as in Tables 1,3.

Peri-medial high-echoic band



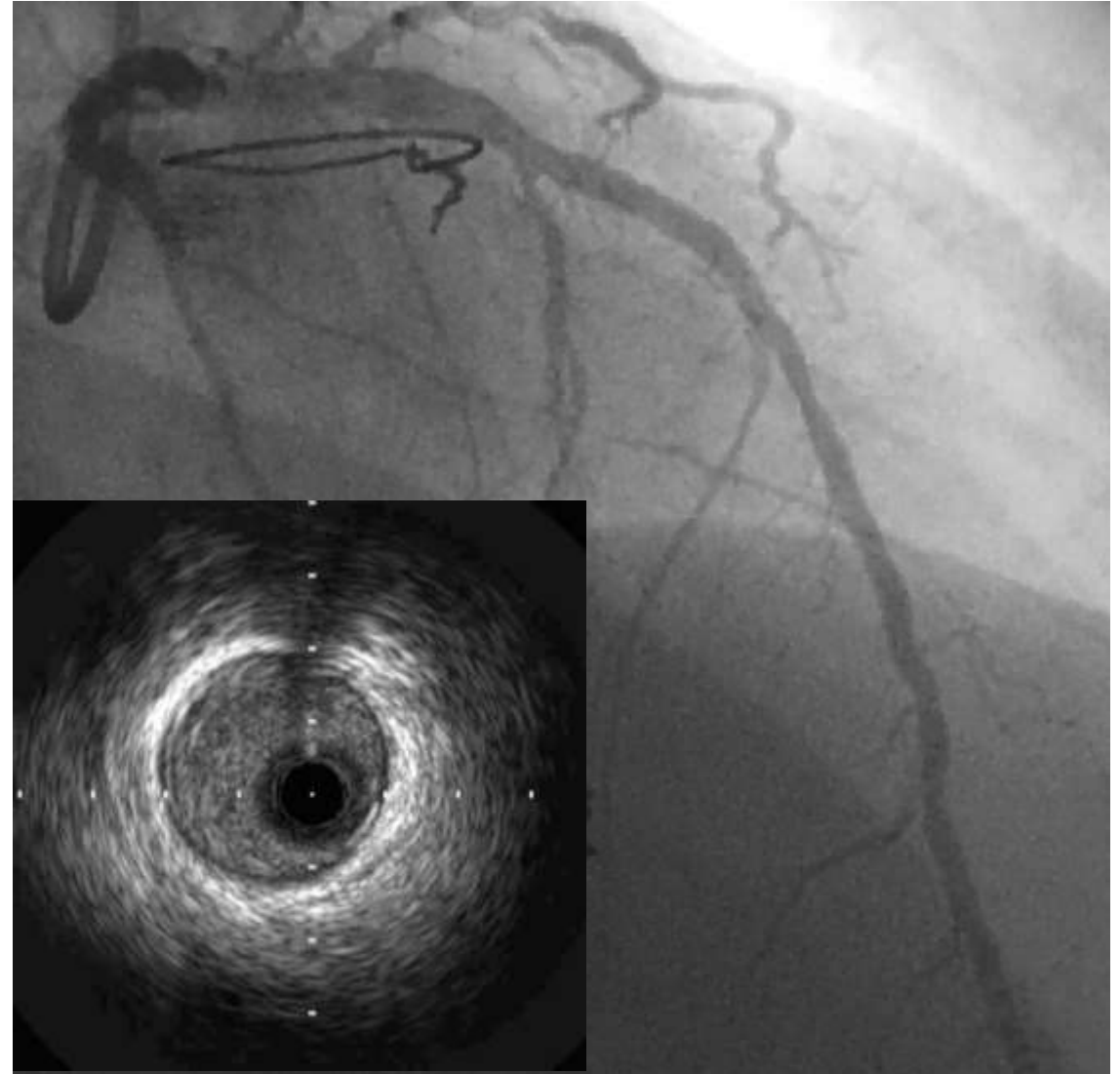
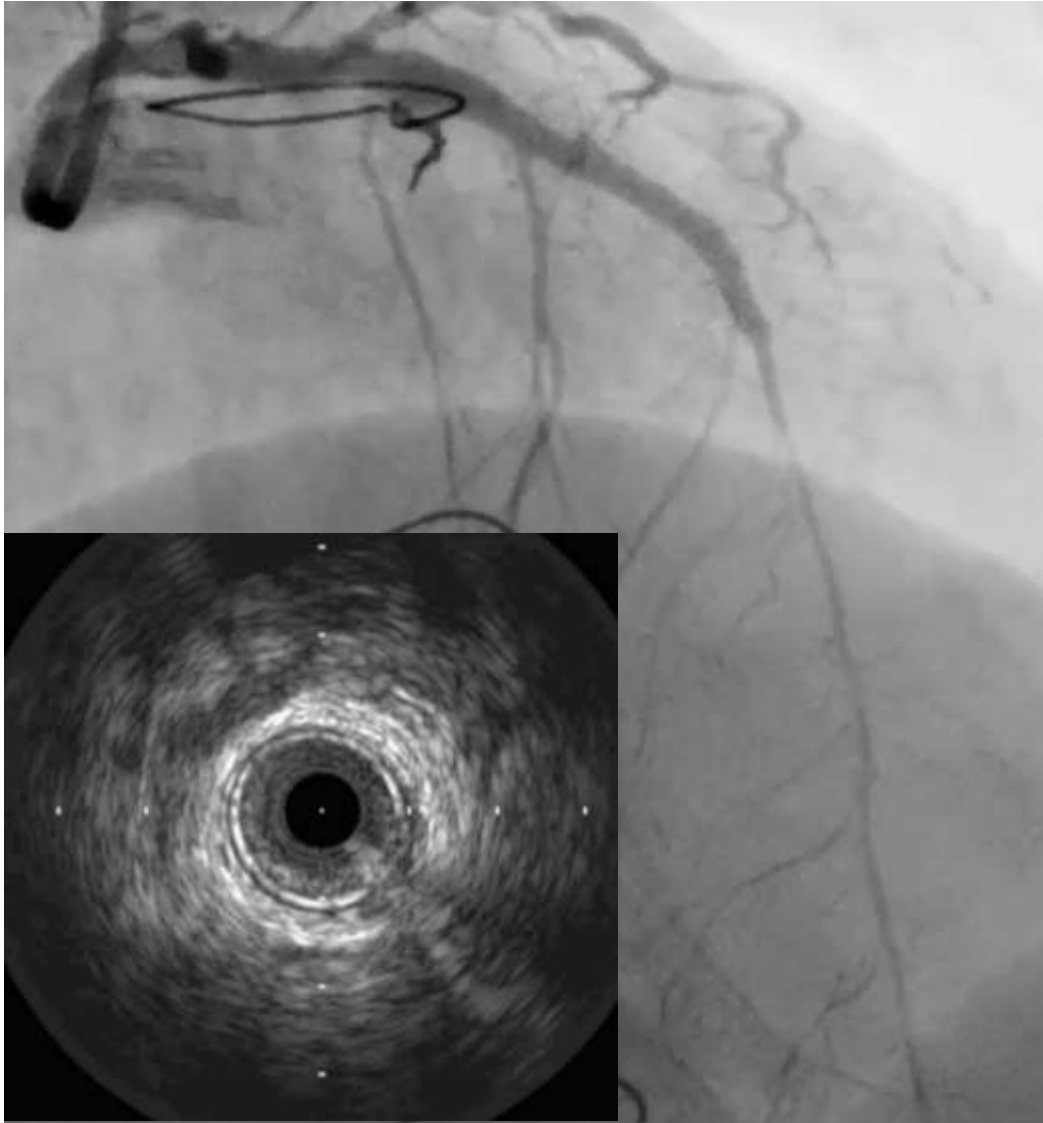
IVUS image of distal vessel following CTO intervention showing a peri-medial high-echoic band

Case 2: LAD-CTO



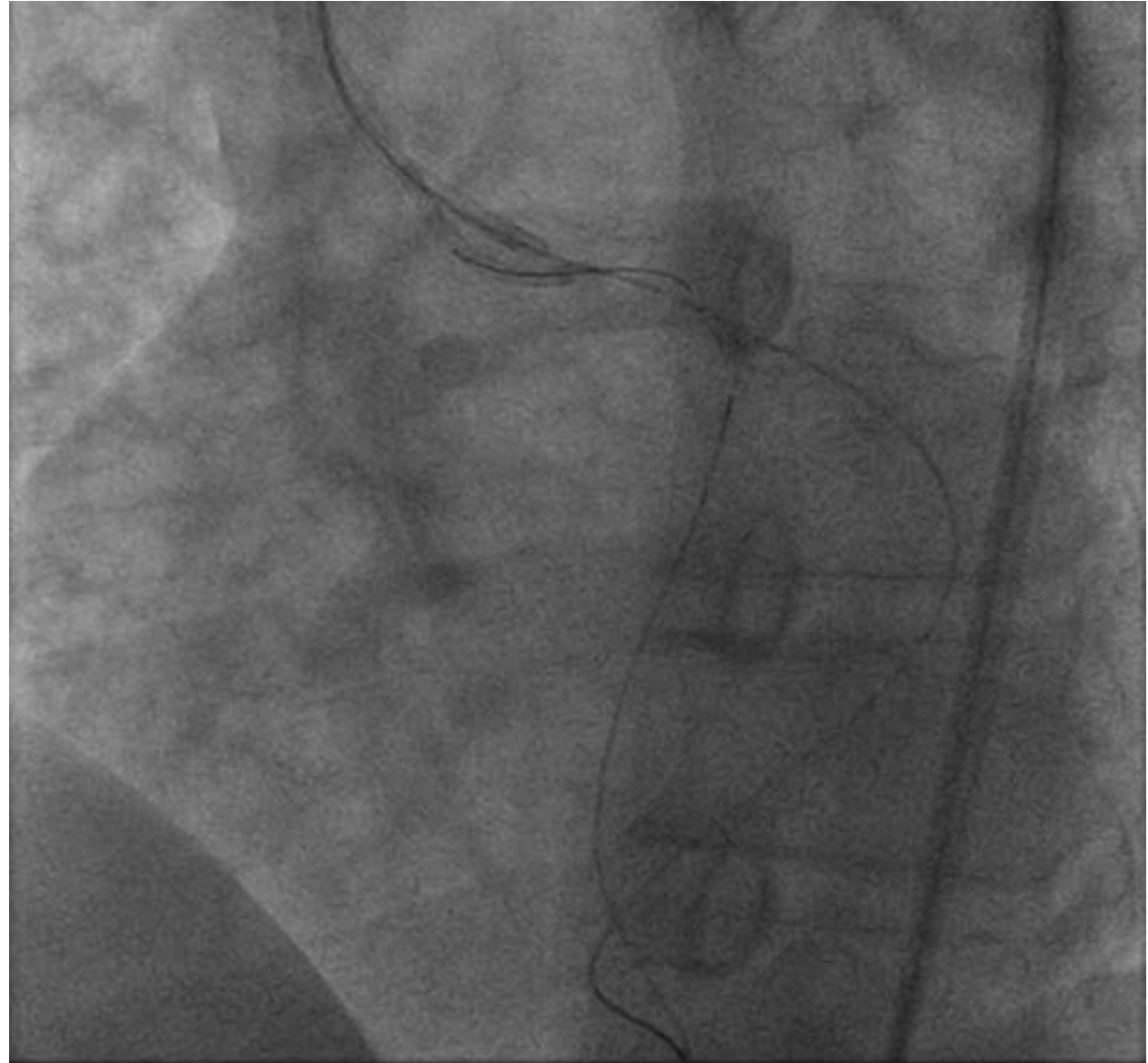
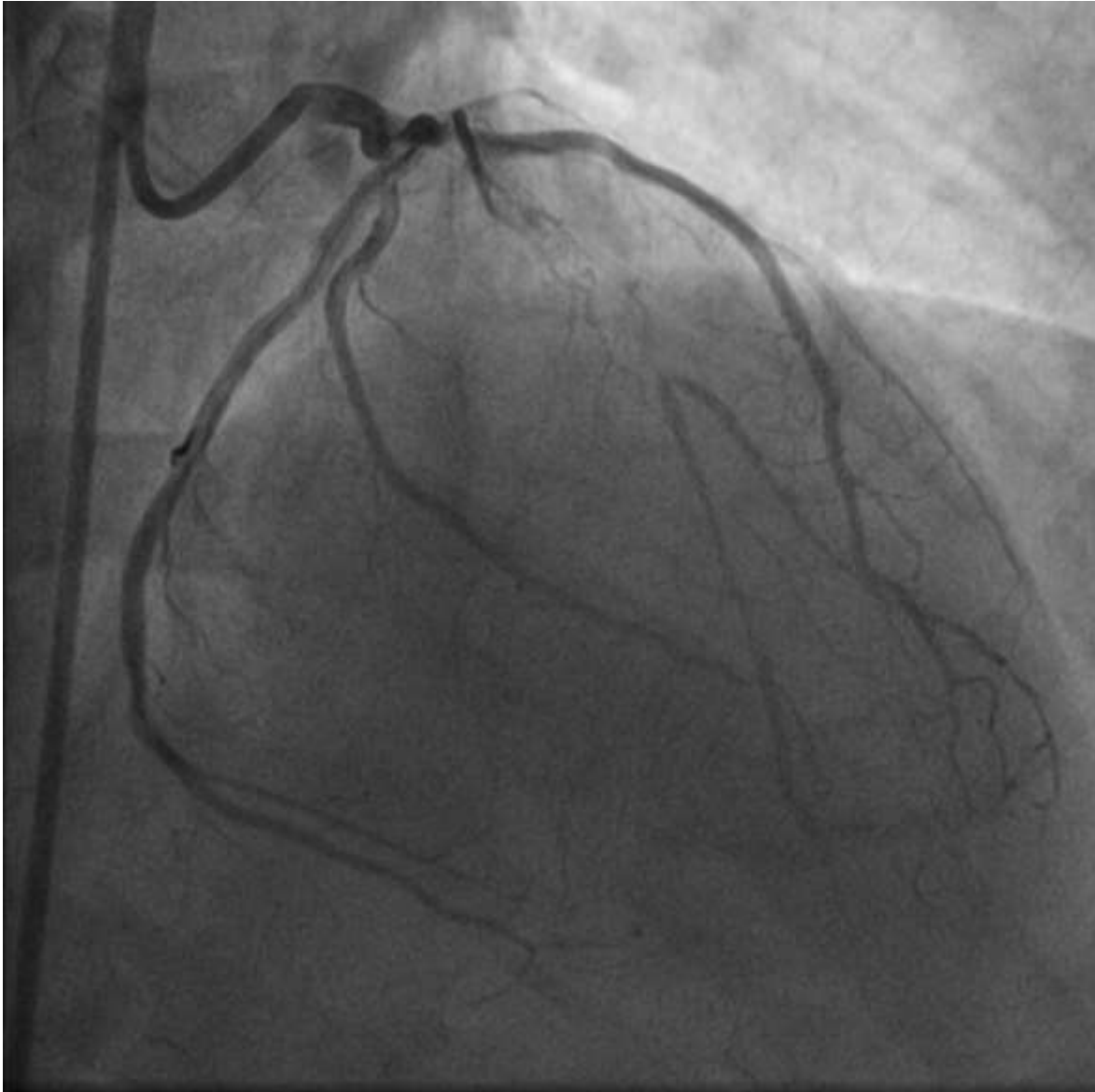
Courtesy of Dr H Okura

Case 2: LAD-CTO



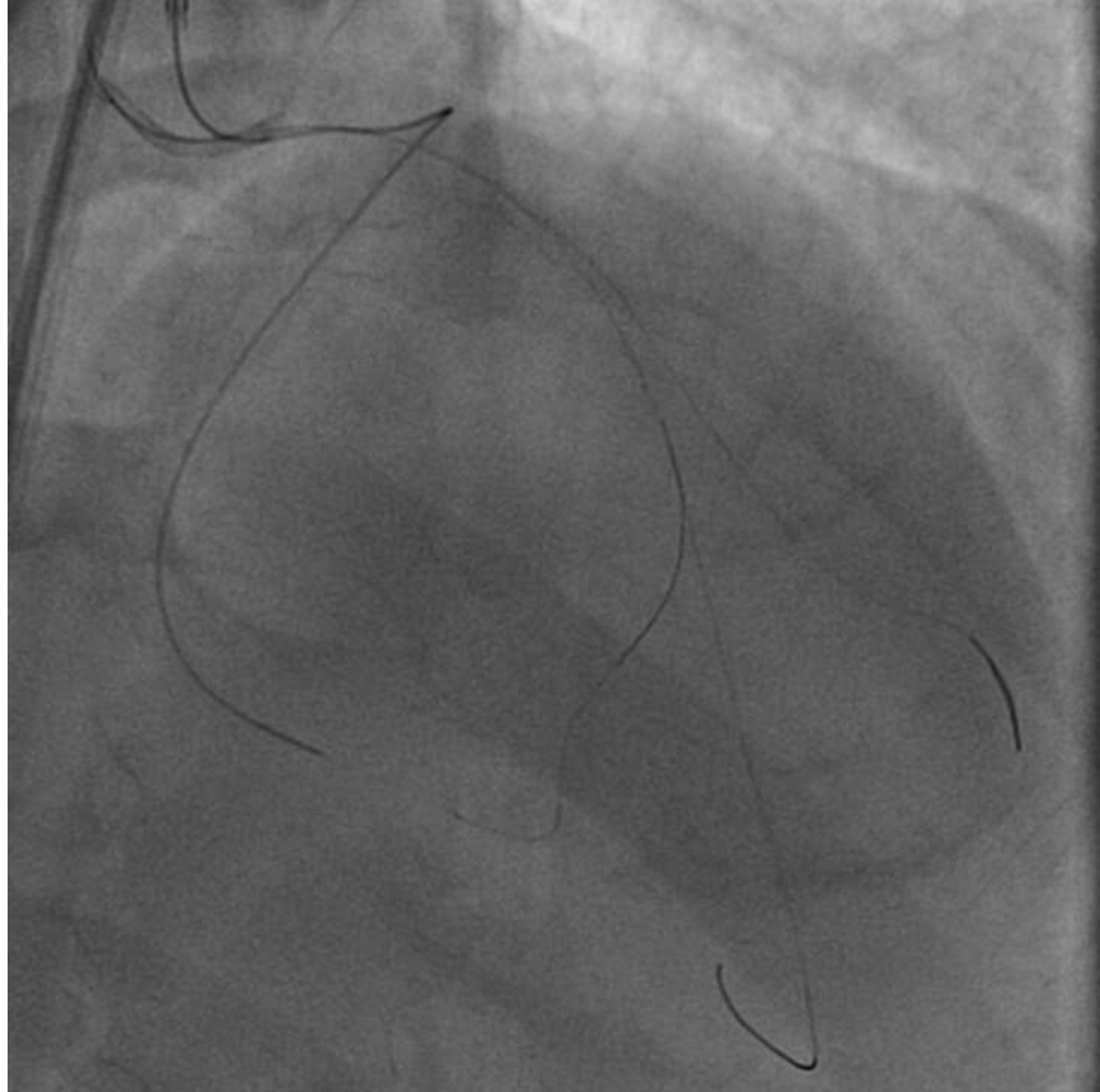
Courtesy of Dr H Okura

Case 3: LAD CTO

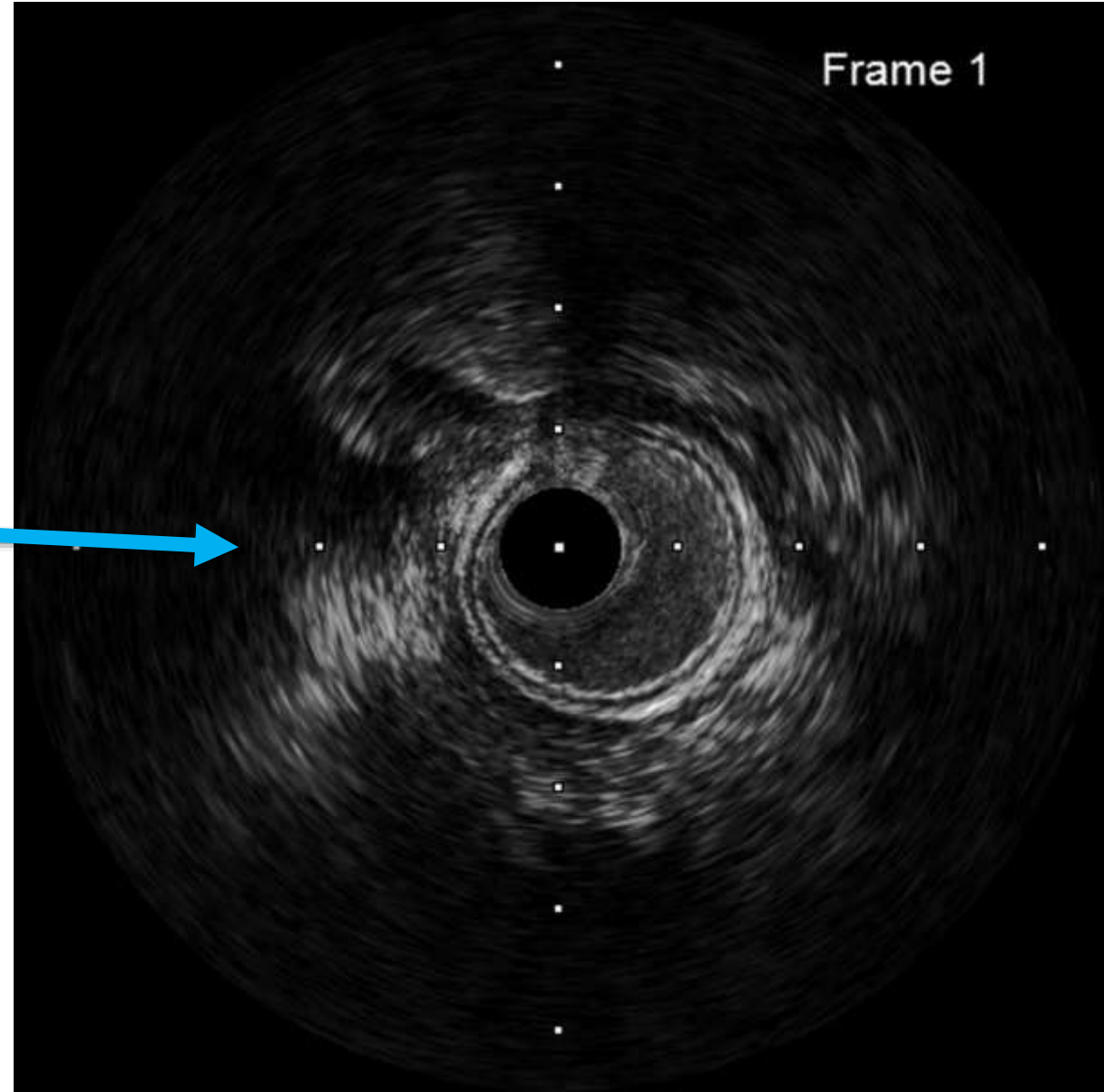
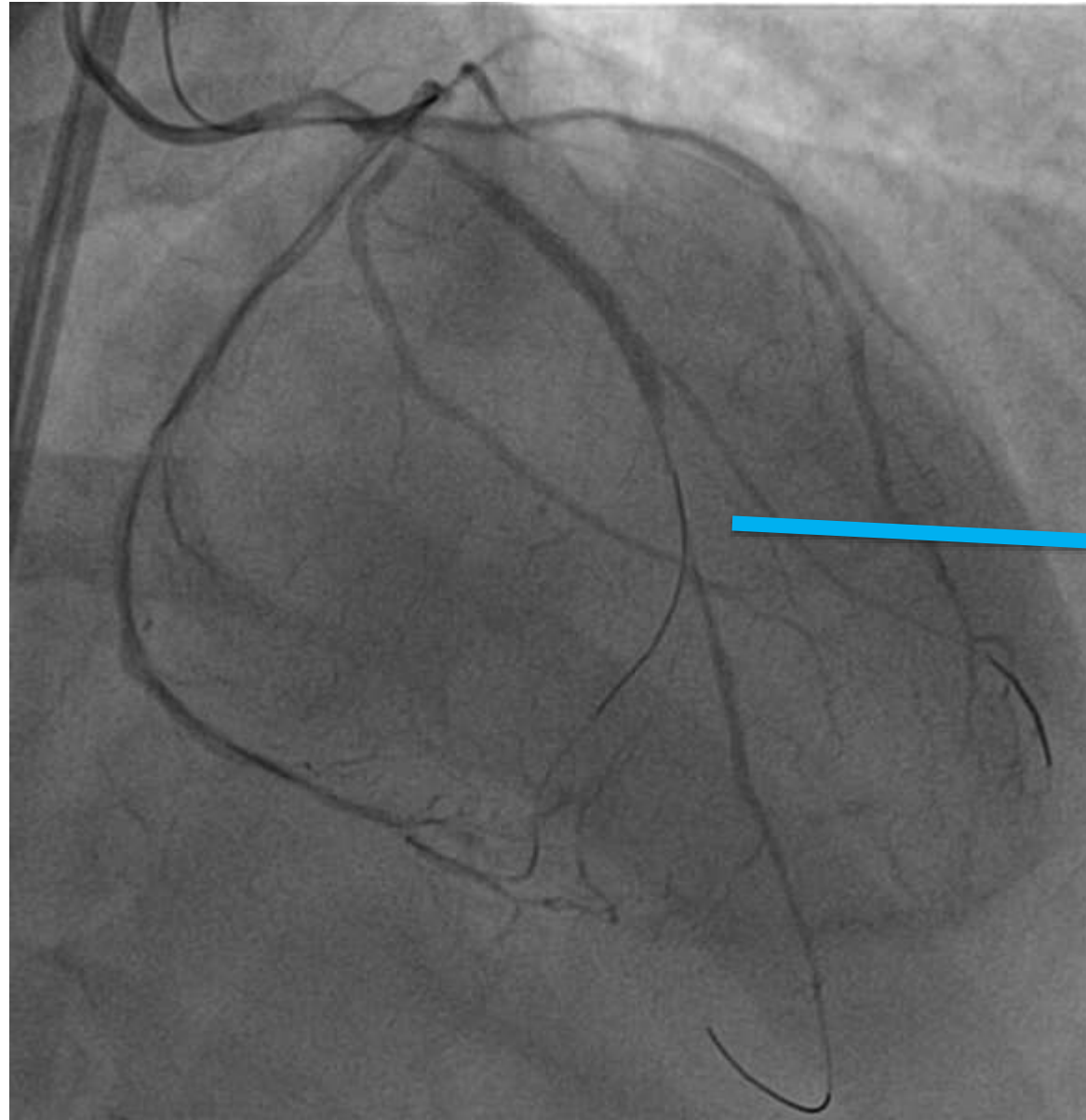


Case 3: LAD CTO

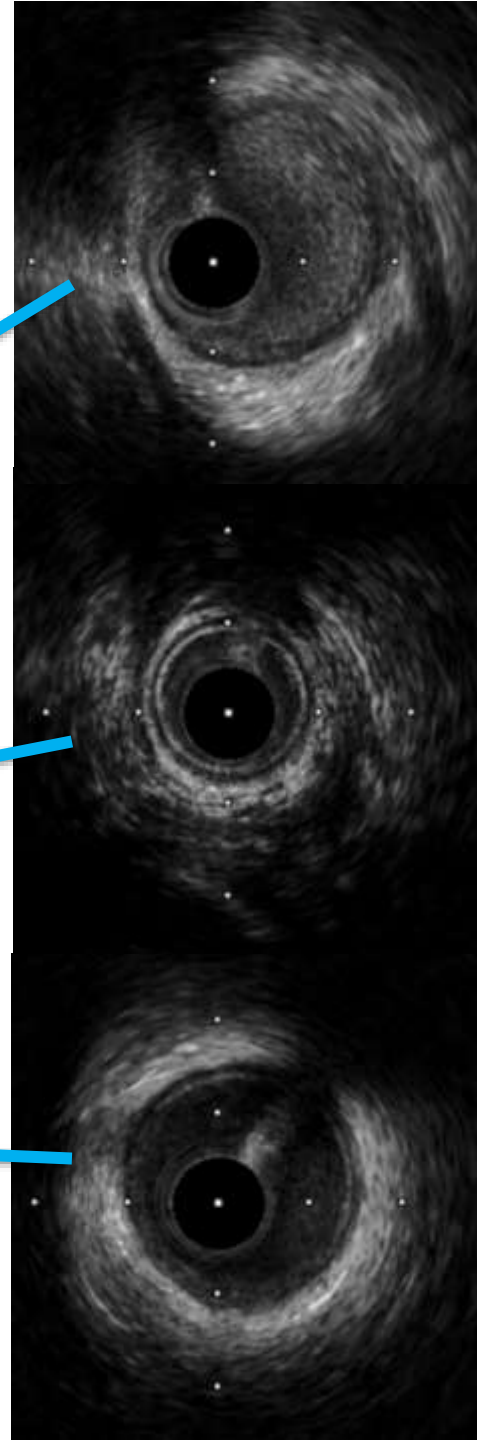
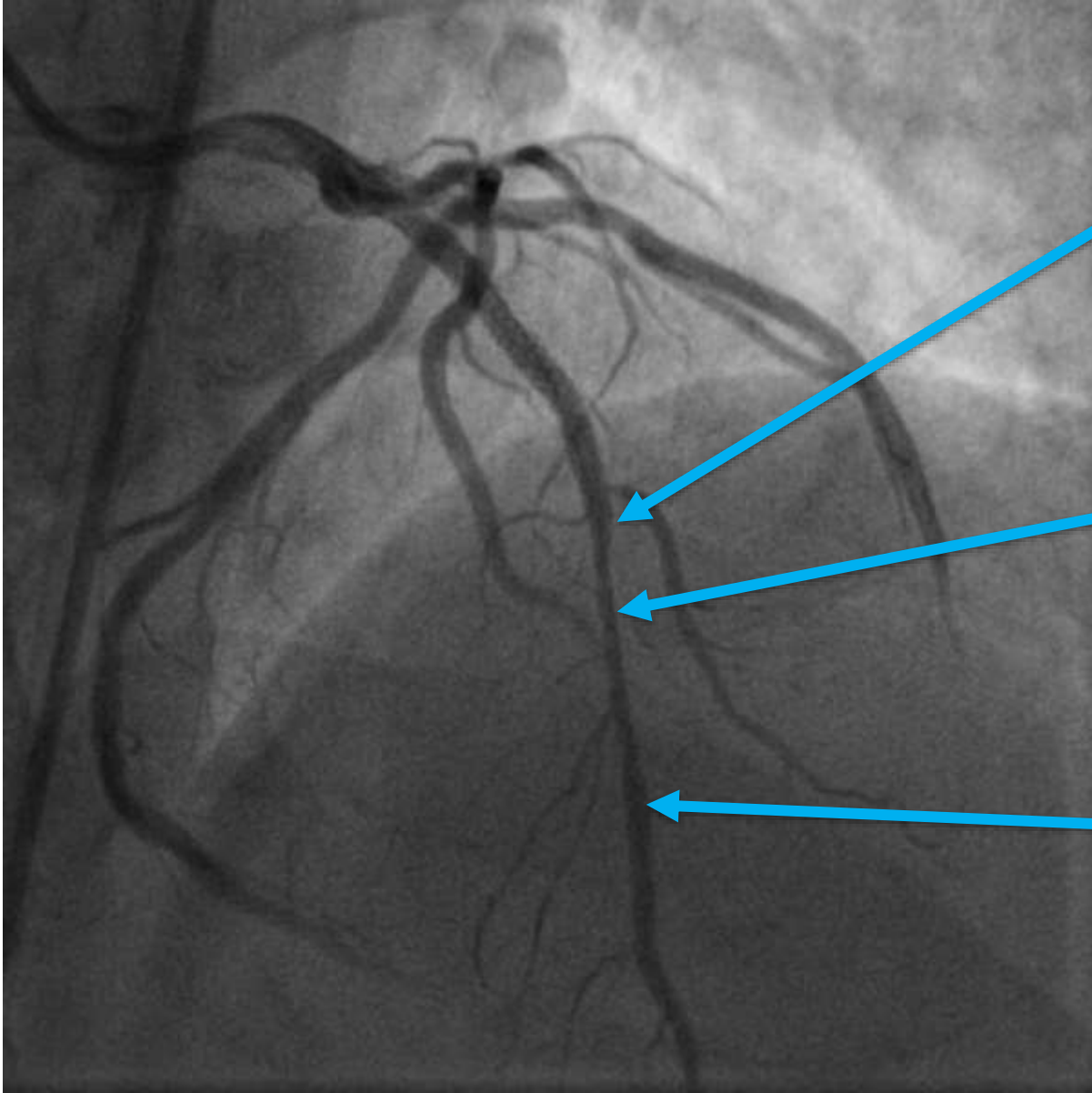
Angiography following placement of the initial stent appears to show significant distal disease



Case 3: LAD CTO

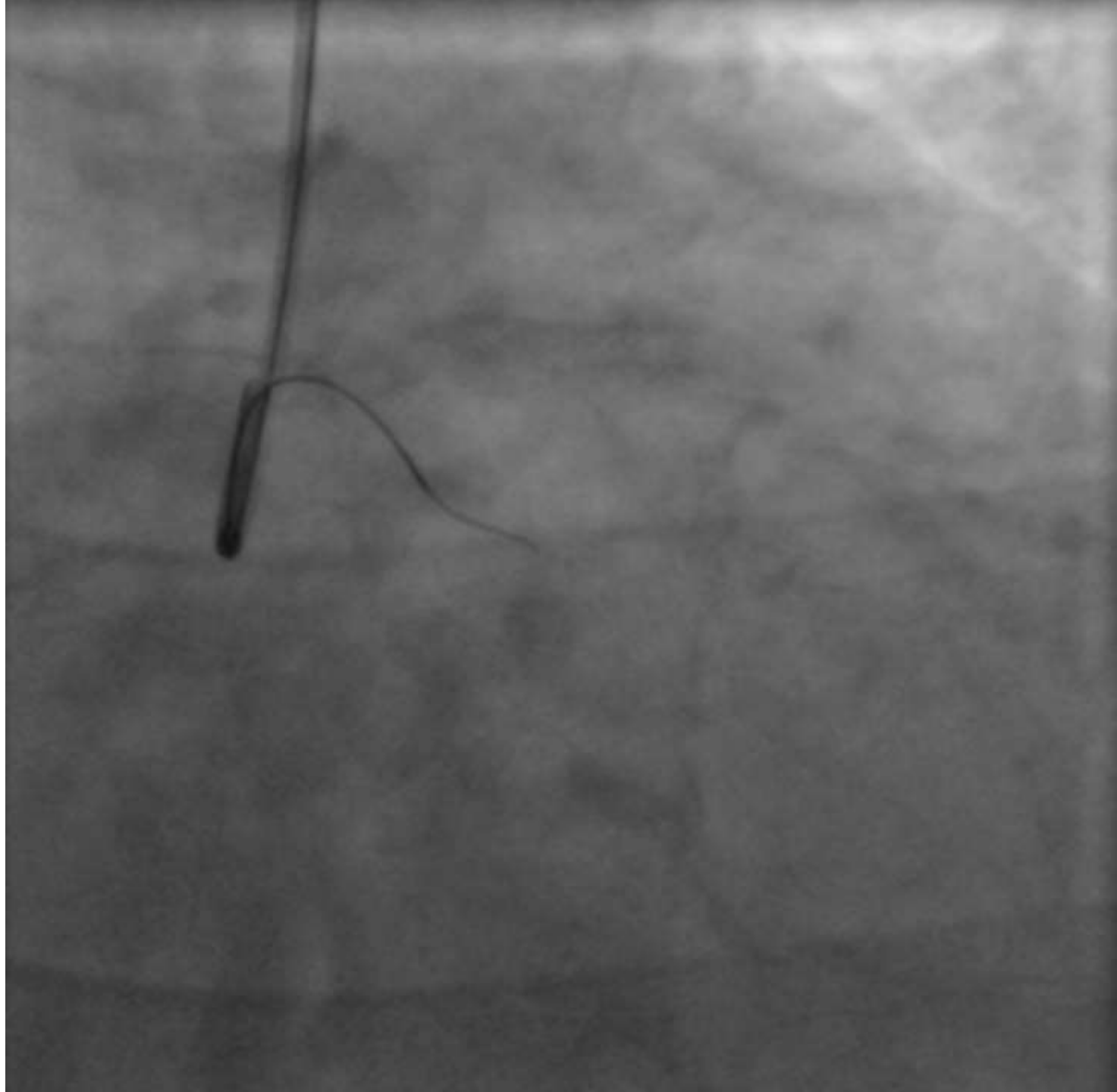


Case 3: LAD CTO



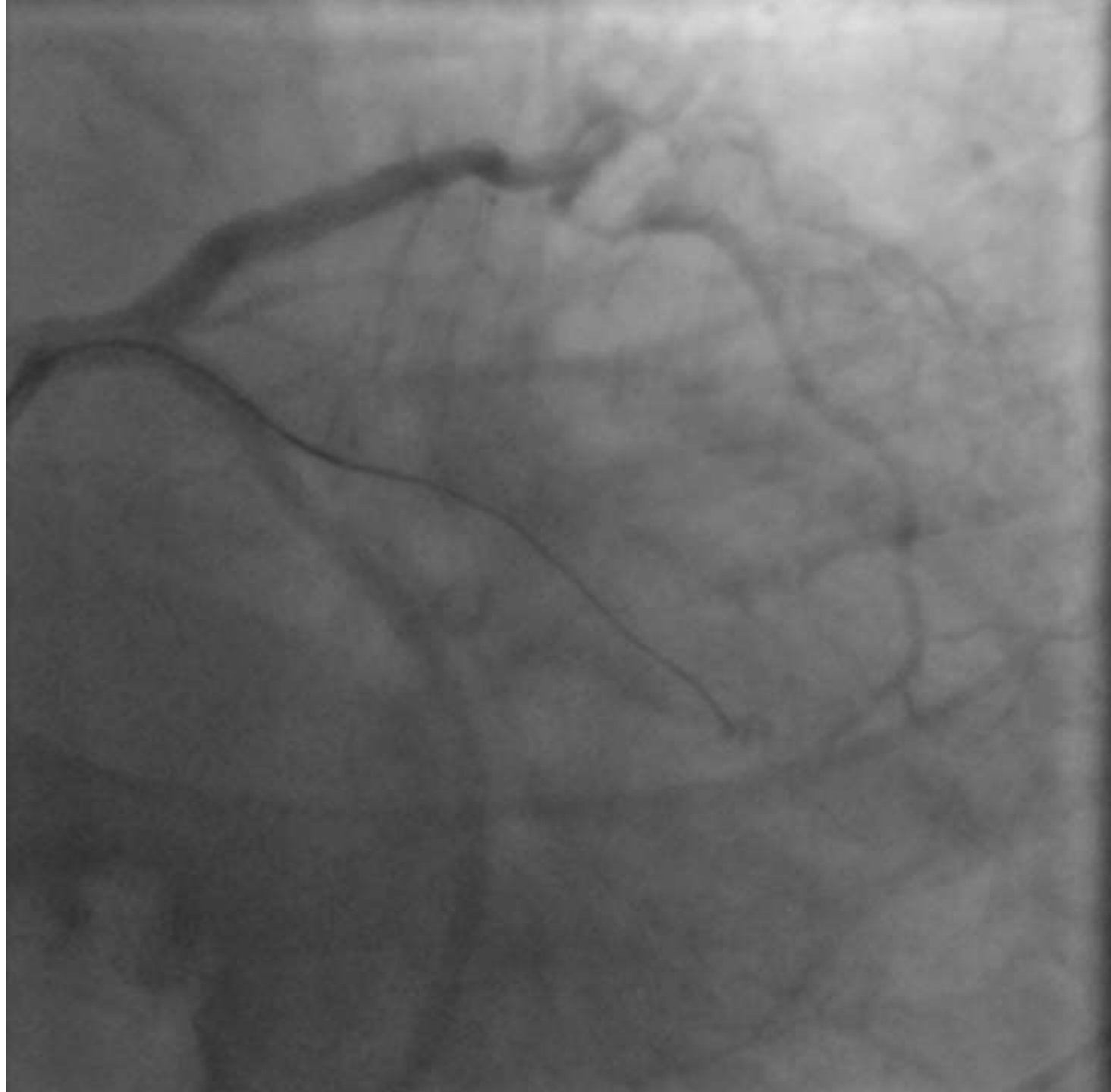
Case 4: OM-CTO

Corsair and Fielder XT-A
used to cross the lesion



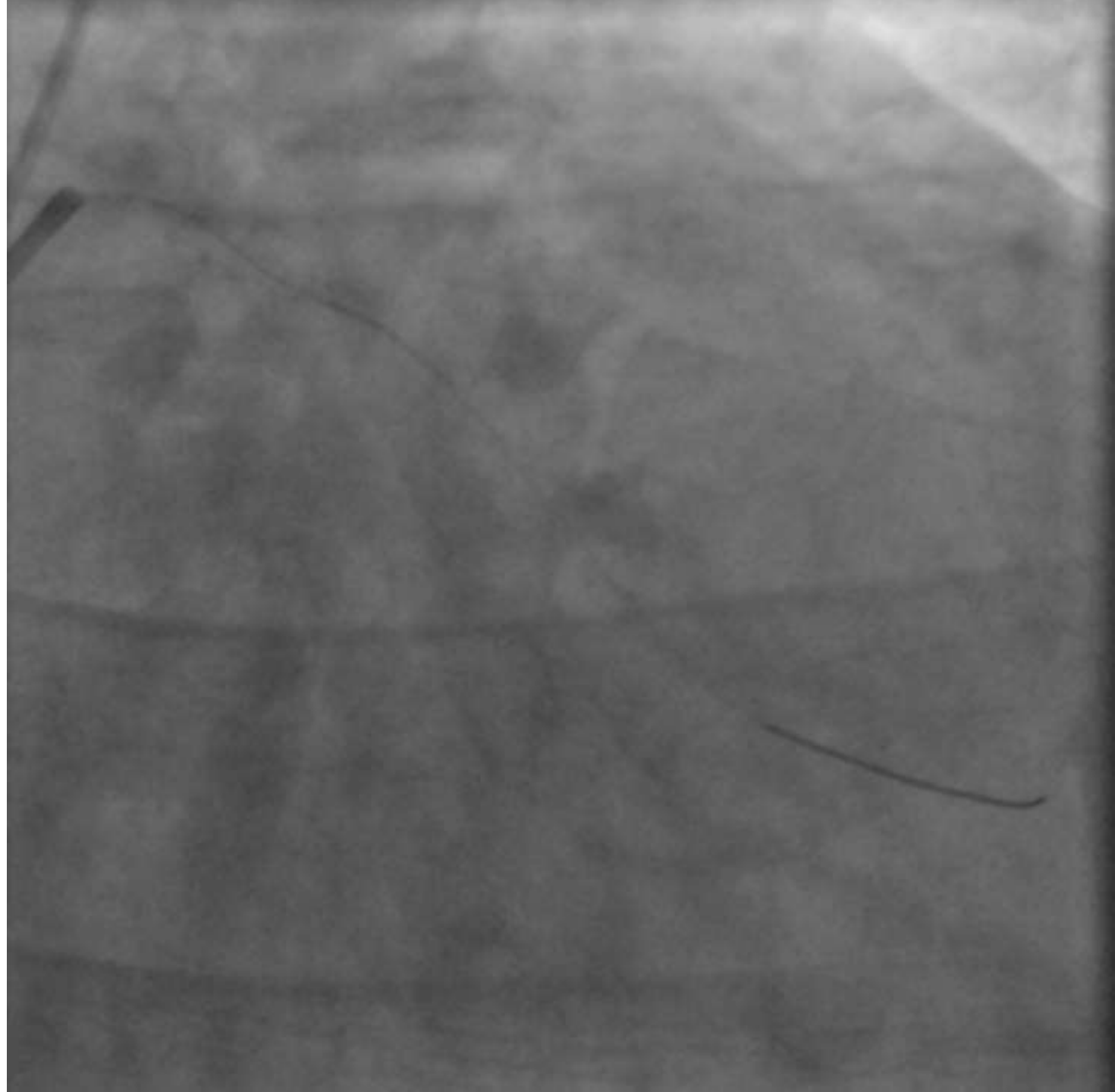
Case 4: OM-CTO

Confirmation wire in distal lumen



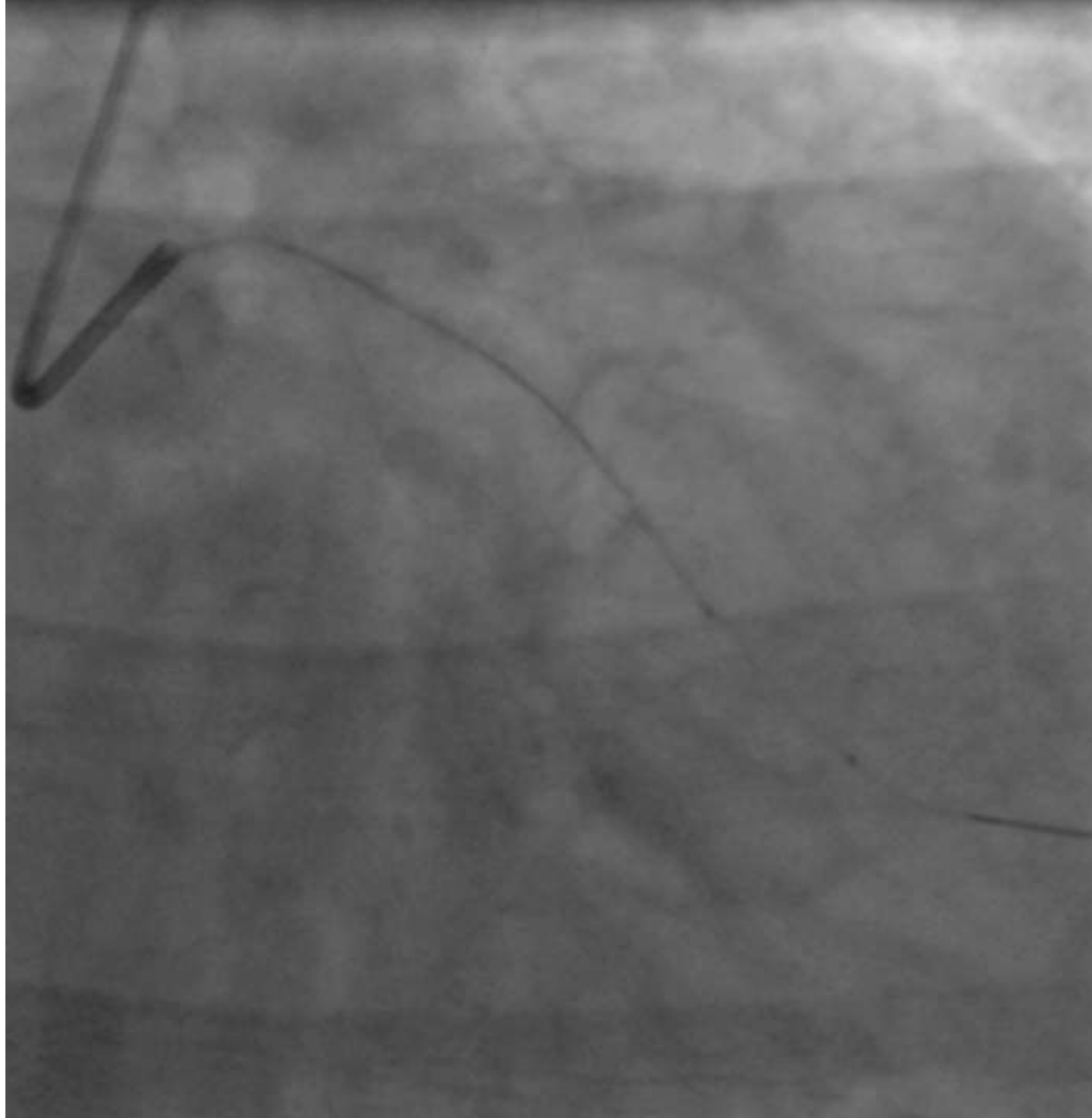
Case 4: OM-CTO

Angiogram following
placement of a 2.5 x 12 mm
Synergy stent



Case 4: OM-CTO

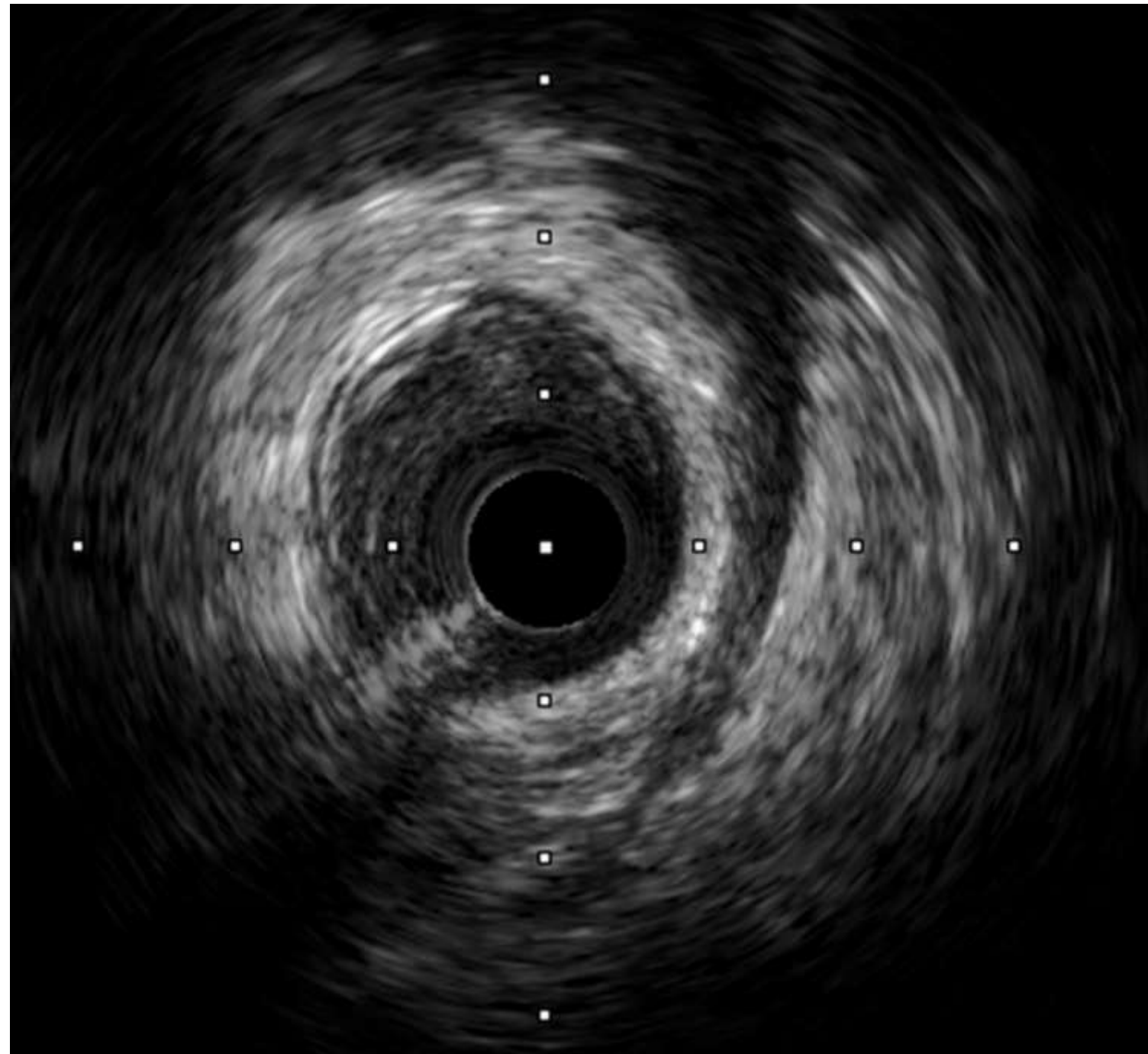
IVUS performed



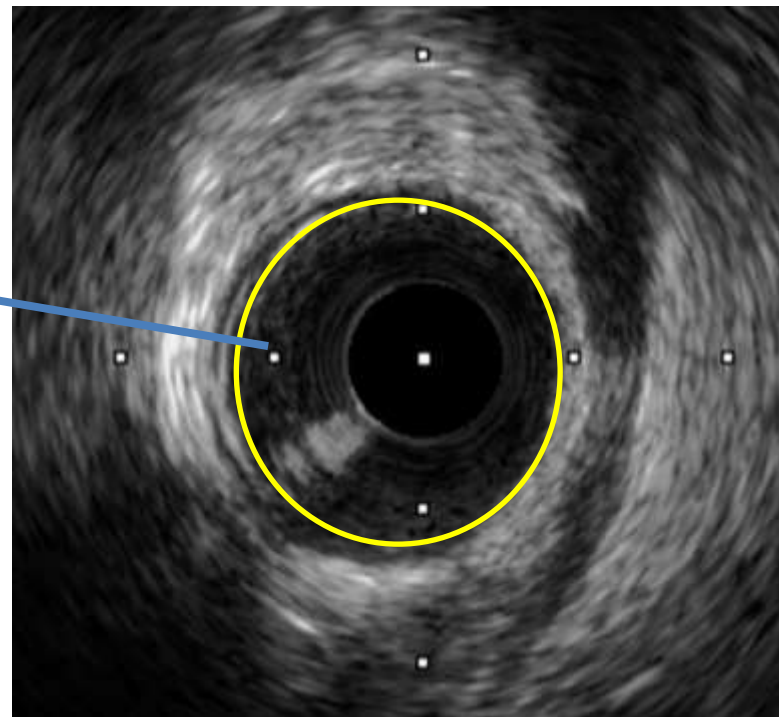
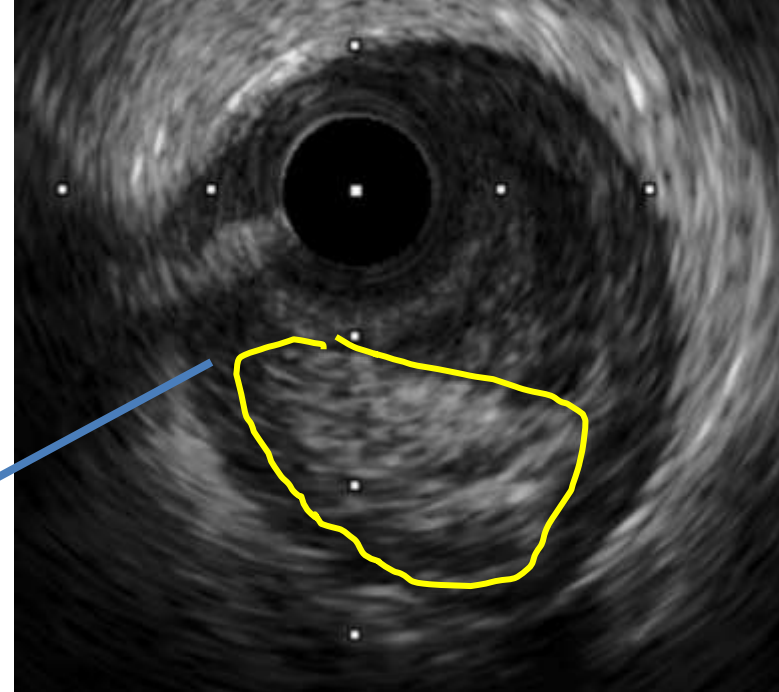
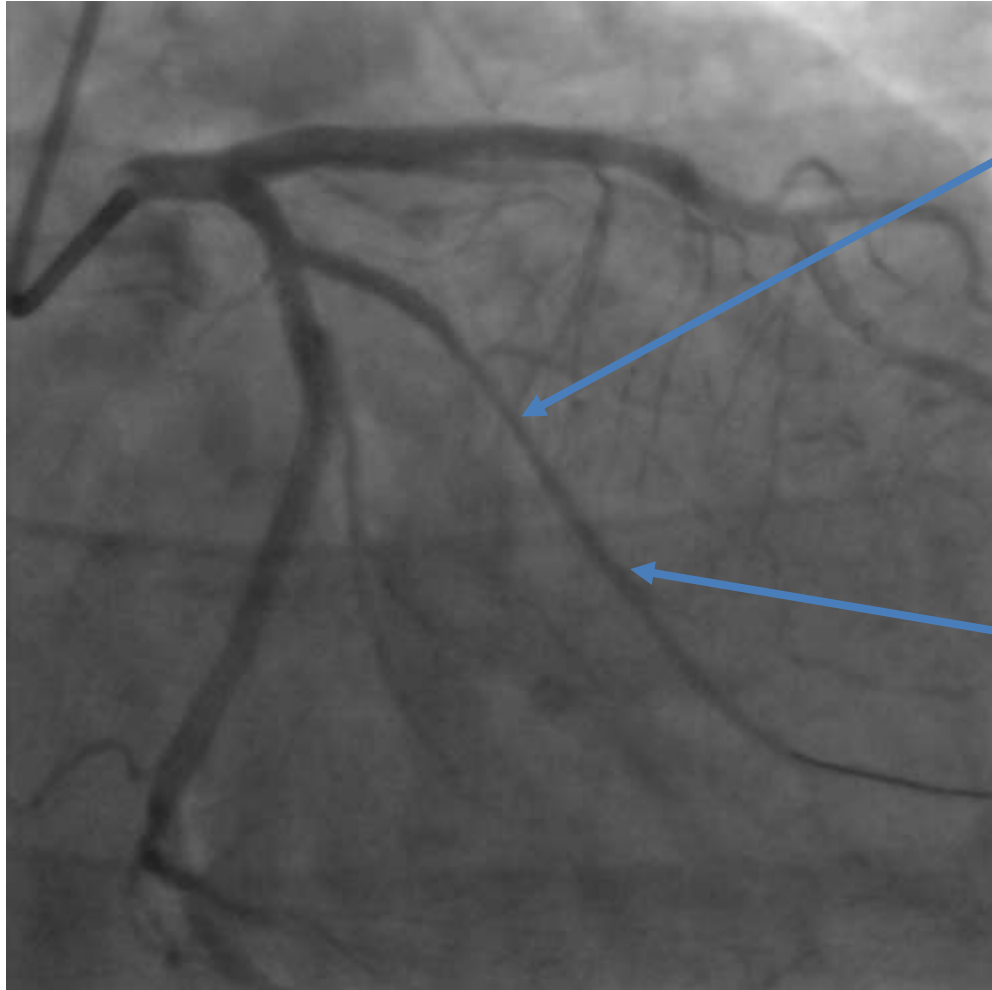
Case 4: OM-CTO

IVUS assessment of the distal vessel

What do you see?

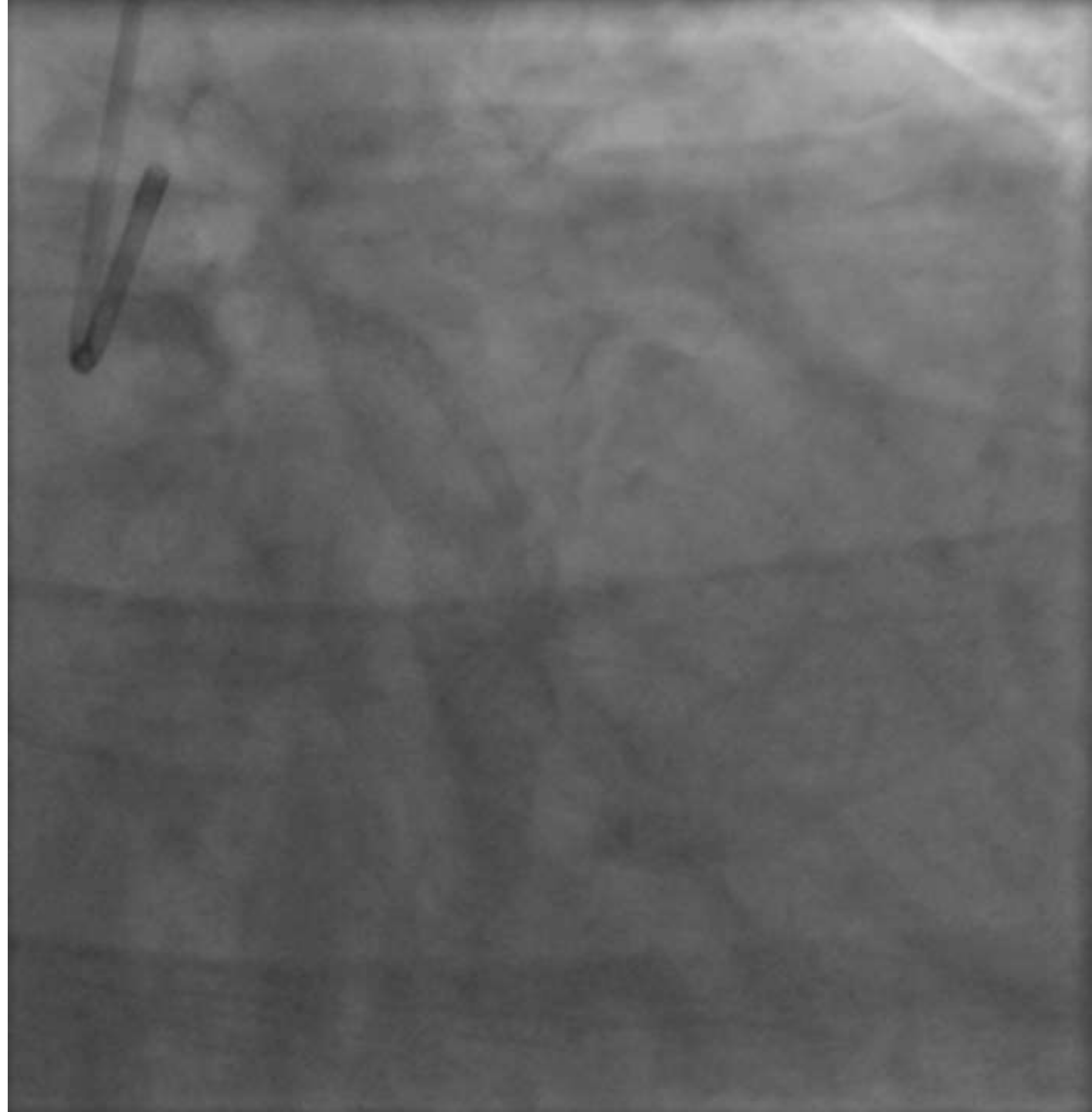


IVUS assessment of the distal vessel



Case 4: OM-CTO

Final angiogram following placement of a further overlapping 2.5 x 20 mm Synergy stent distally

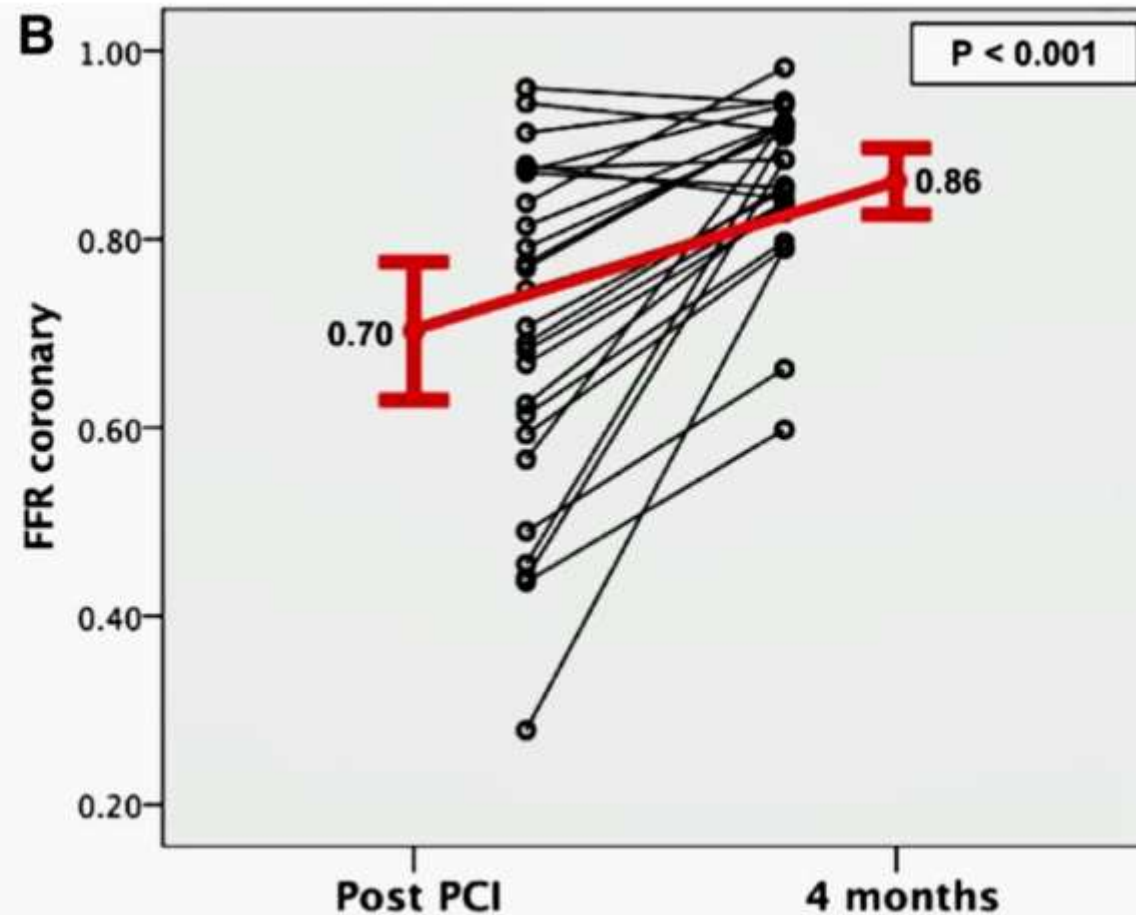
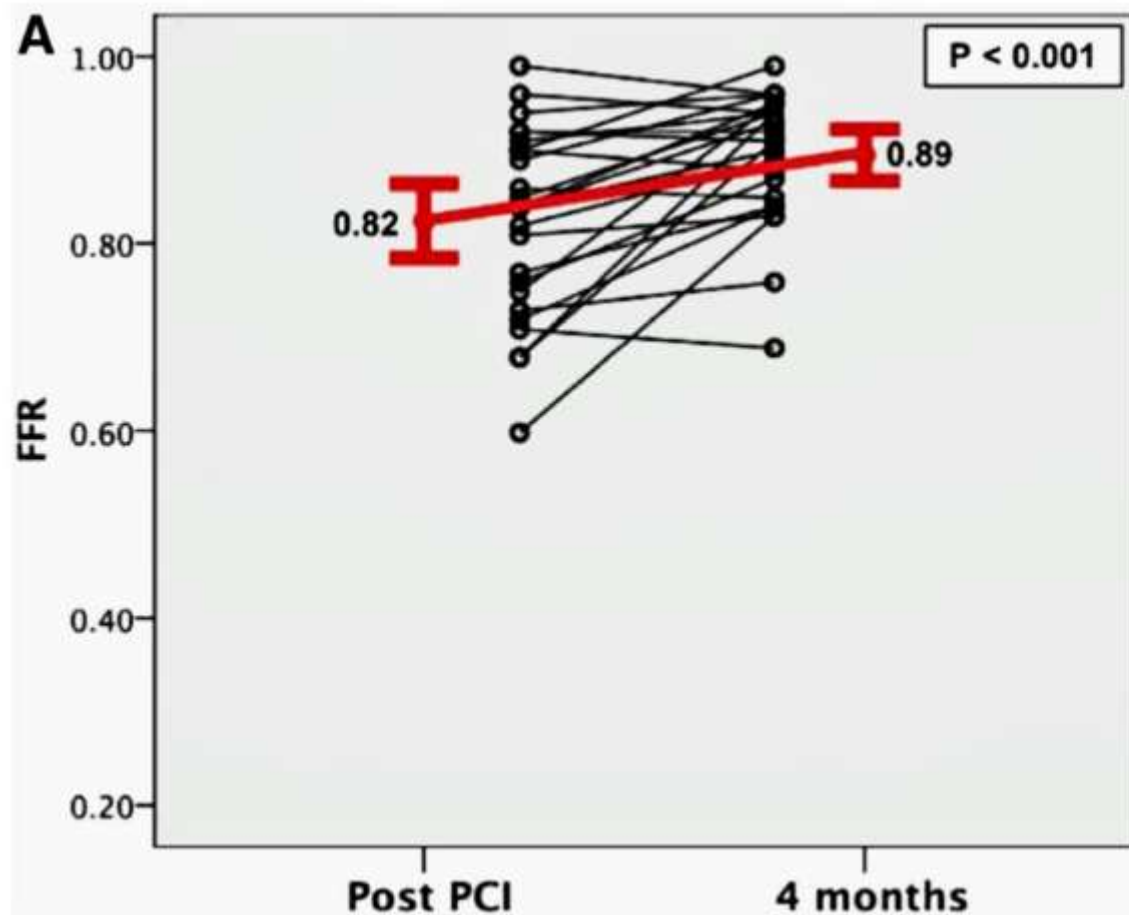


Serial Fractional Flow Reserve Measurements Post Coronary Chronic Total Occlusion Percutaneous Coronary Intervention

Circulation: Cardiovascular Interventions

Volume 11, Issue 11, November 2018

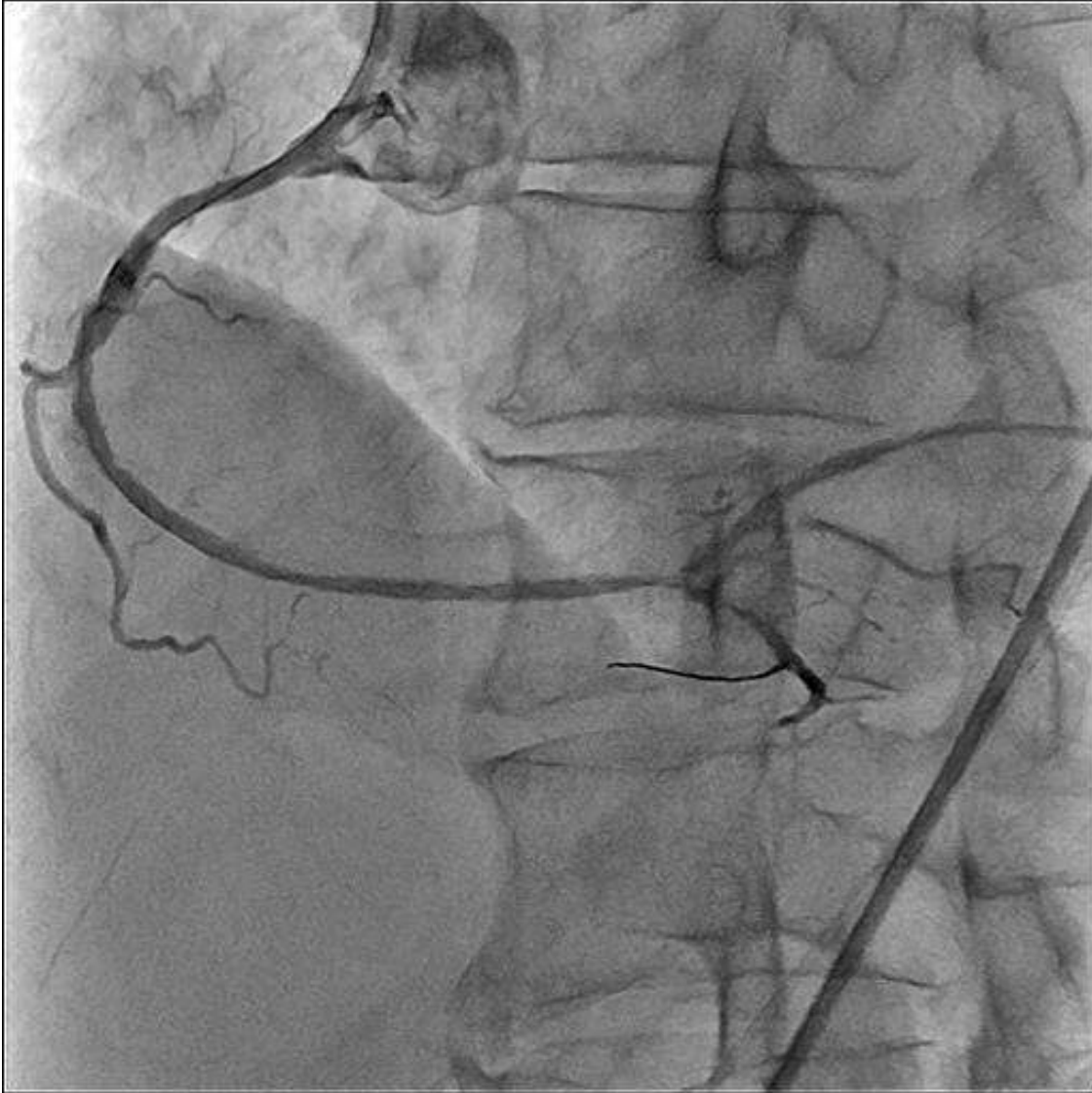
<https://doi.org/10.1161/CIRCINTERVENTIONS.118.006941>



Case 5: RCA-CTO



Case 5: RCA-CTO



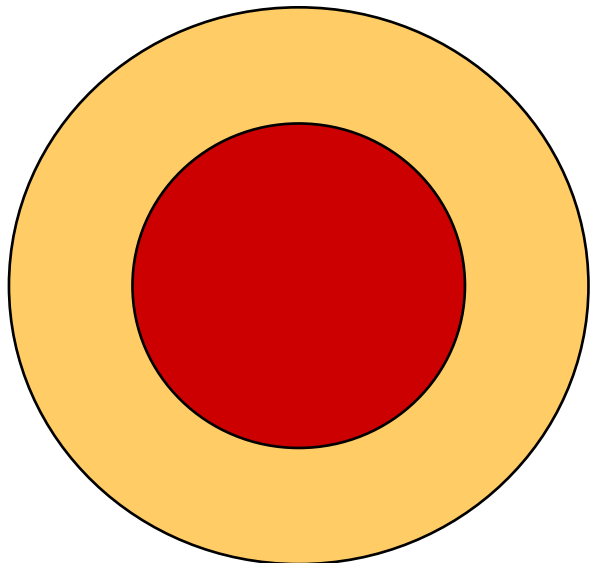
Where is the optimal stenting site ?



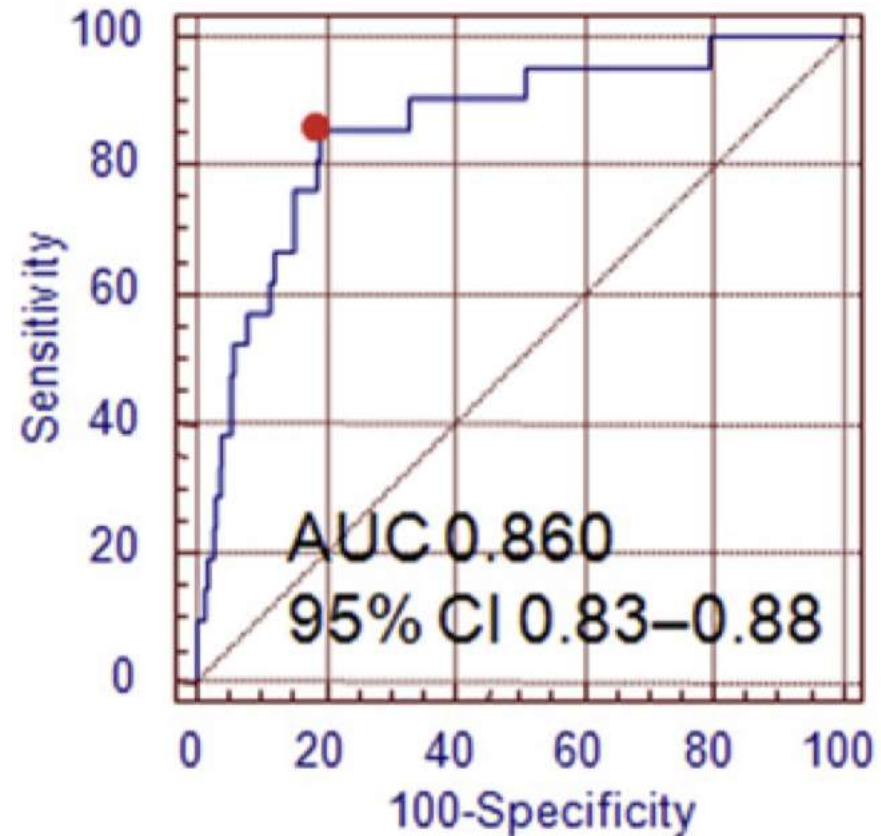
IVUS

IVUS guided Stent implantation reference site selection

Edge plaque burden < 50% low risk of edge restenosis



50%

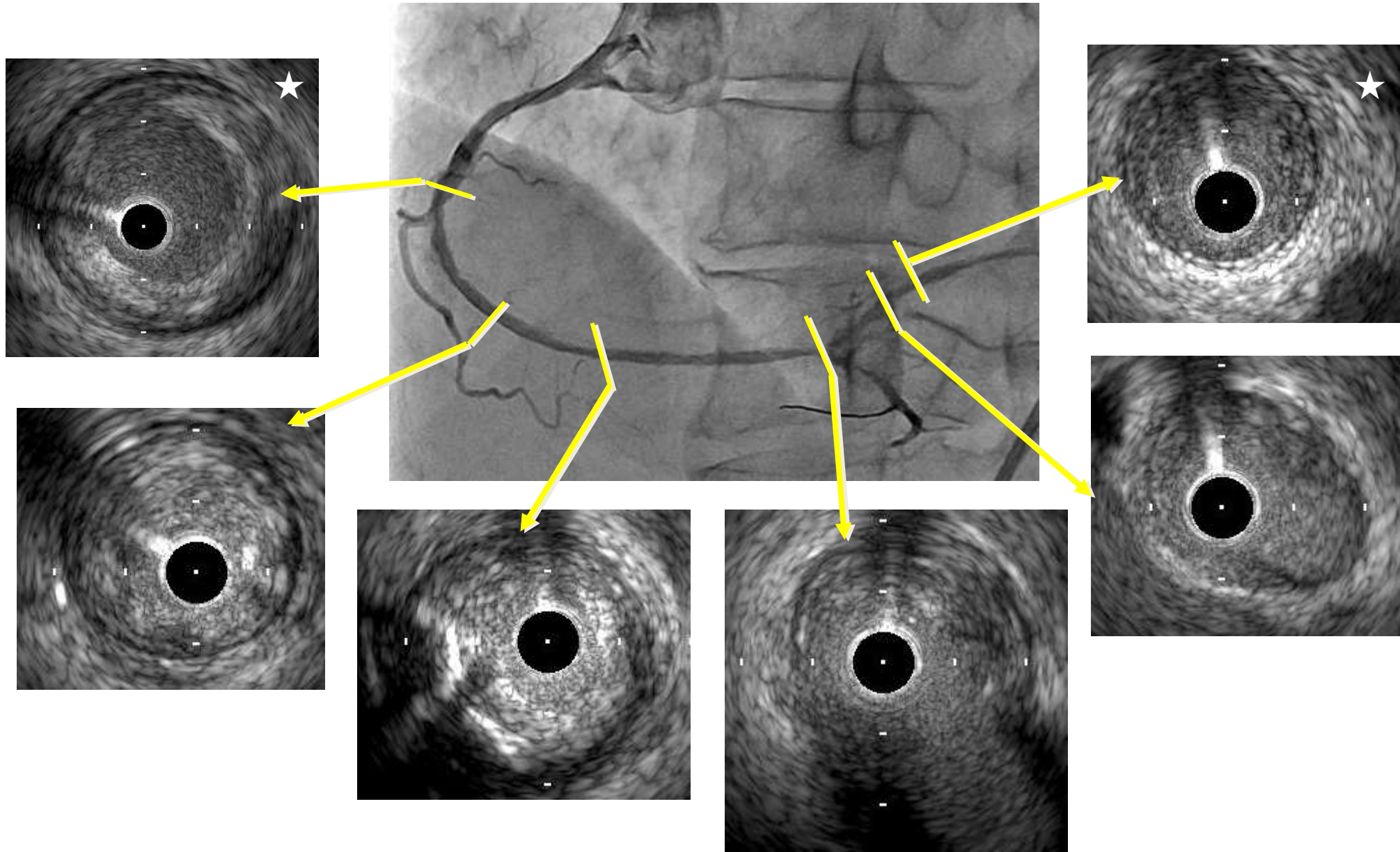


Plaque burden 51.9%

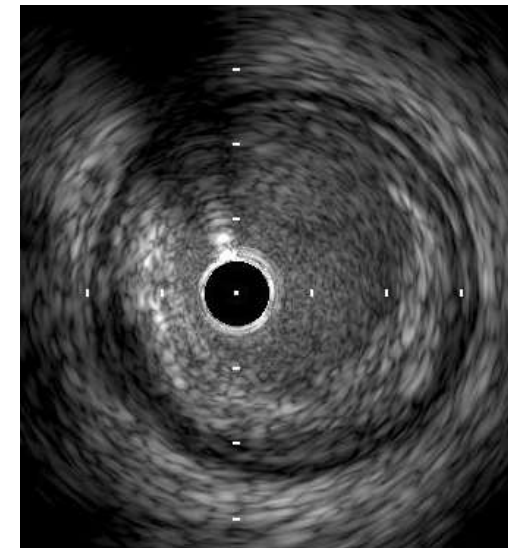
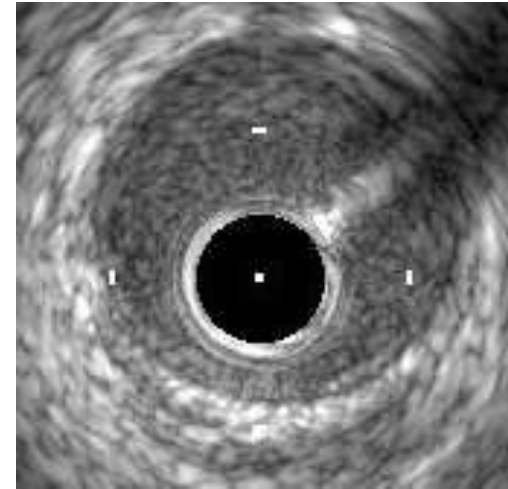
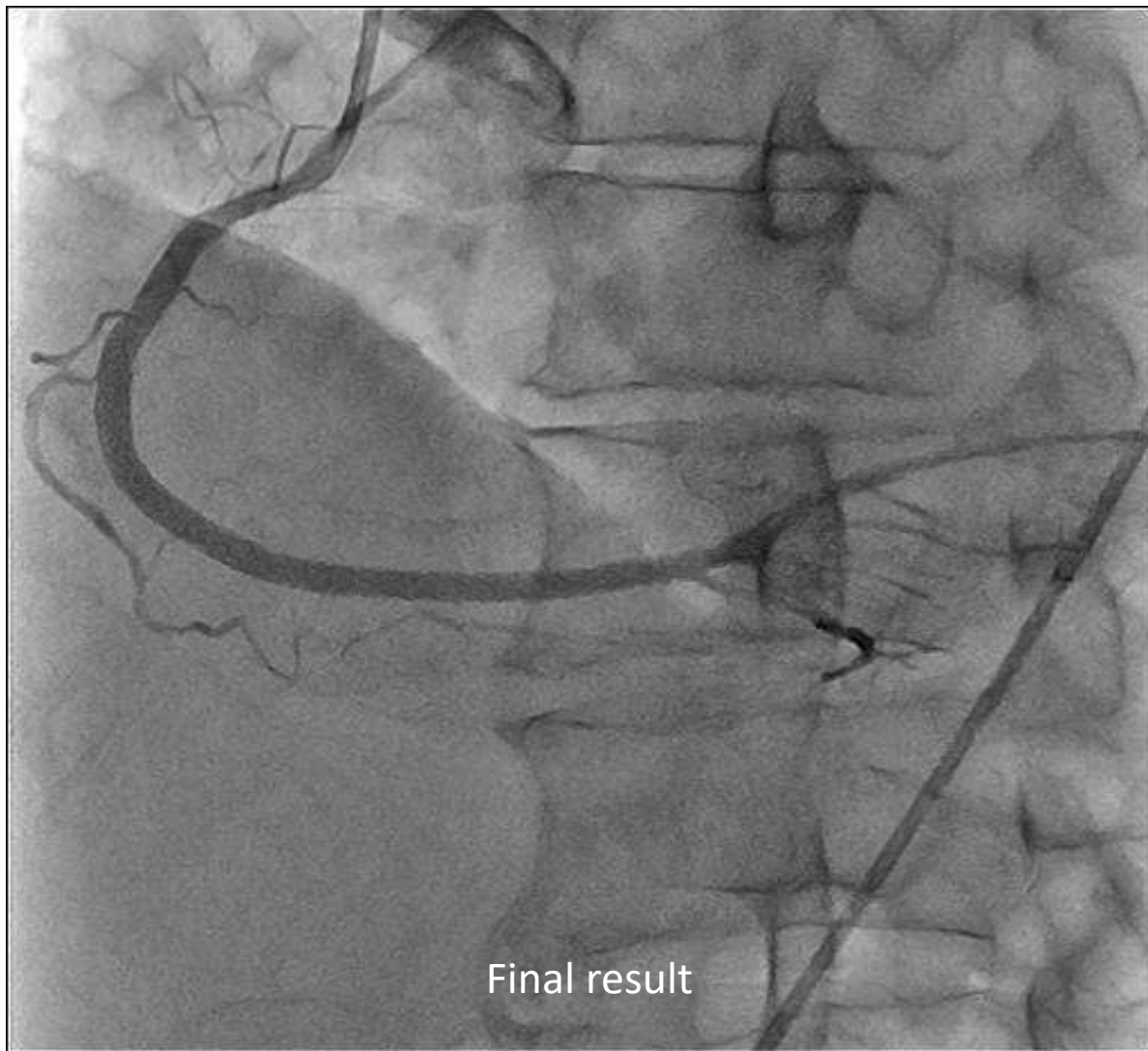
Sensitivity 86%

Specificity 81%

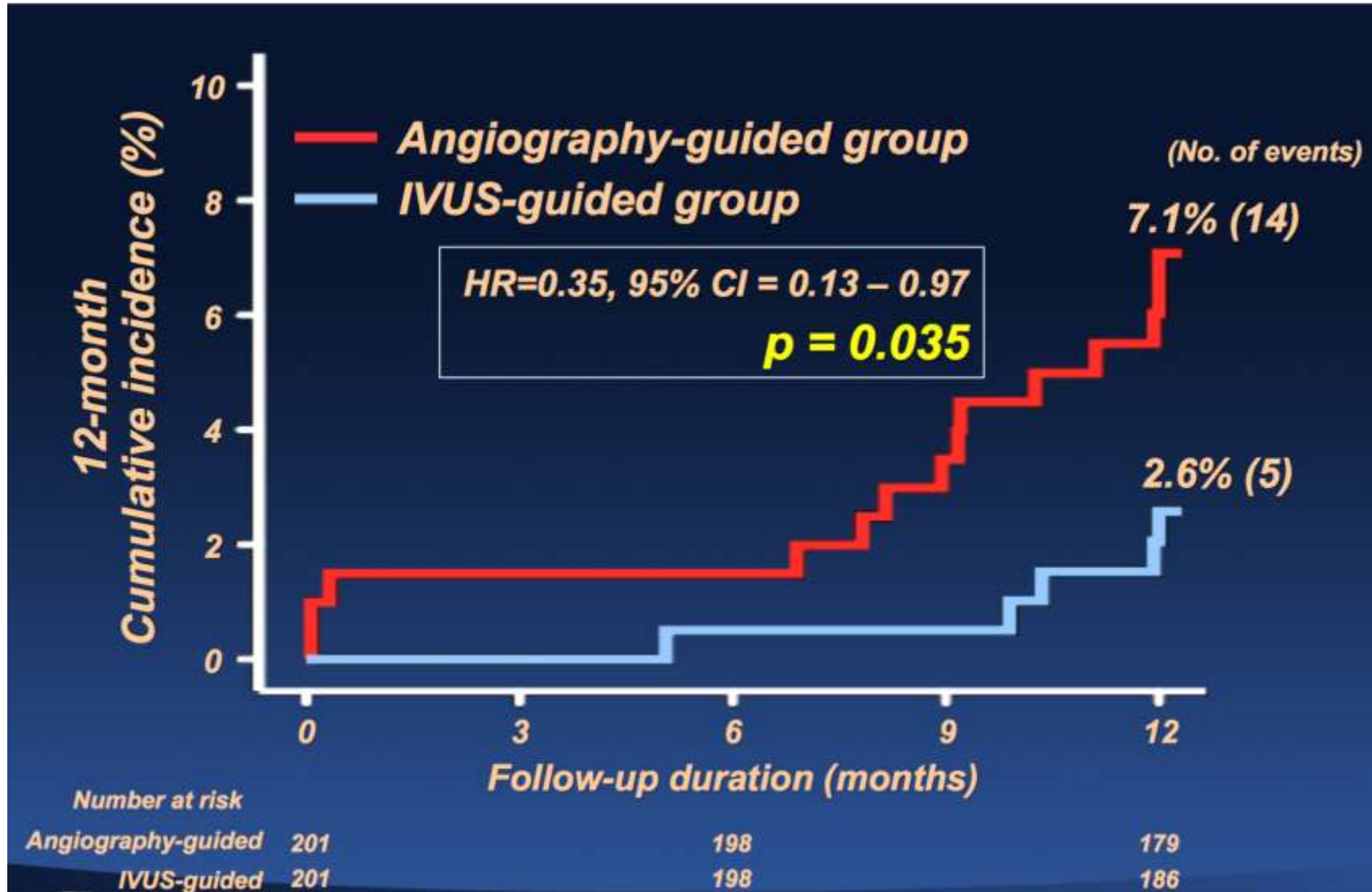
Case 5: RCA-CTO



Case 5: RCA-CTO



IVUS guided CTO PCI



Primary endpoint
death or MI

Conclusions



- Greater stent length and persistent small distal vessel size have been associated with worse outcomes
- IVUS guided CTO-PCI allows cause of the small distal vessel to be determined, can guide optimal stenting and improves outcomes
- The presence of peri-medial high-echoic band on IVUS predicts subsequent enlargement of the distal vessel
- In general if there is TIMI 3 flow, no critical focal atherosclerotic lesion and no dissection the distal vessel should be managed conservatively initially