IVUS with OCT

Case Studies

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ARCH ELITE Fellows Course
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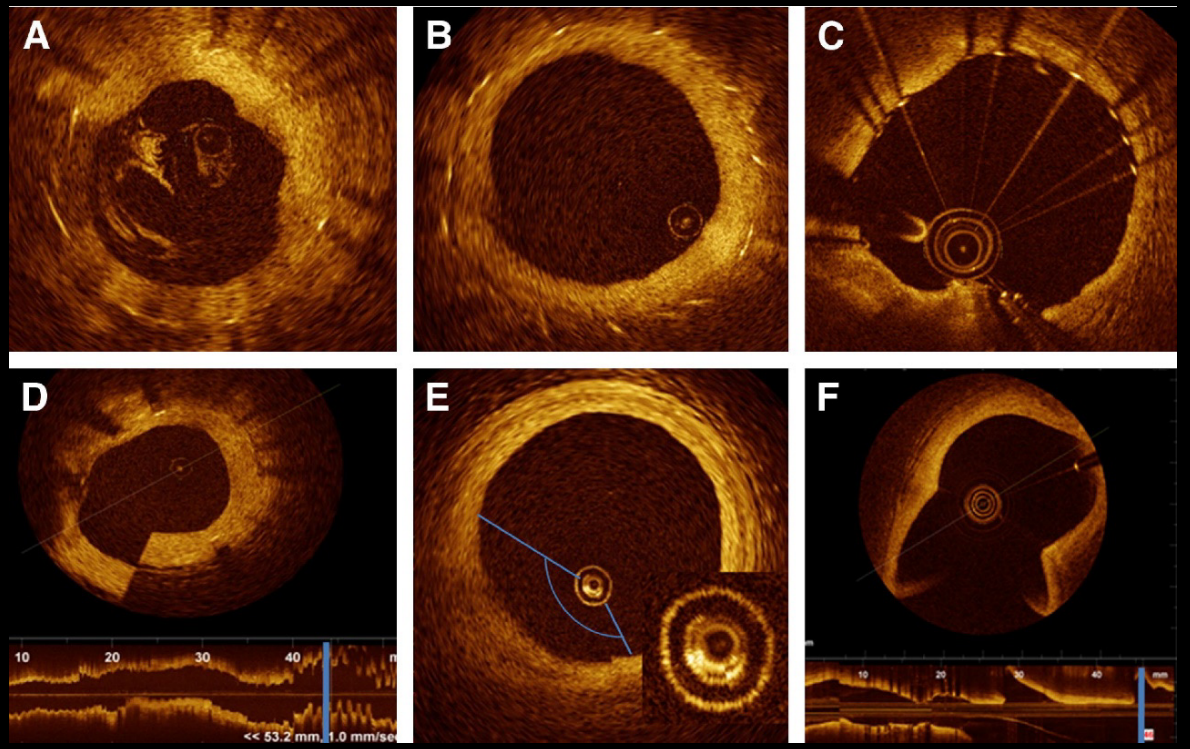
OCT Basics and Artifacts

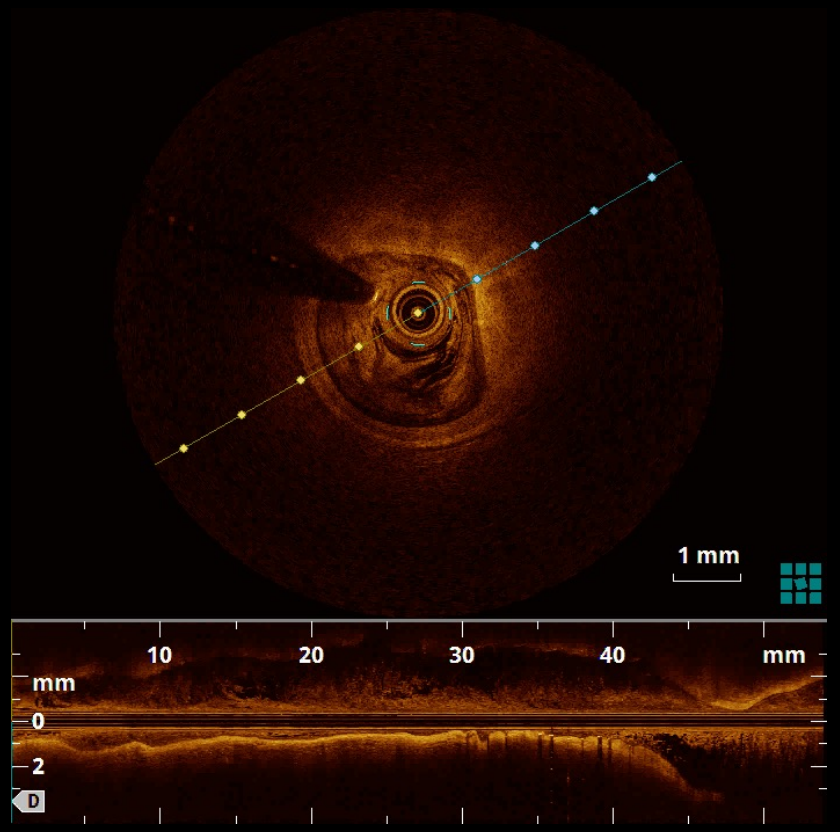
- Requires blood free environment so must flush with contrast during imaging run.
- Automated pull back run
- Catheter is easily delivered
- Not good for aorto ostial lesions
- Less tissue penetration



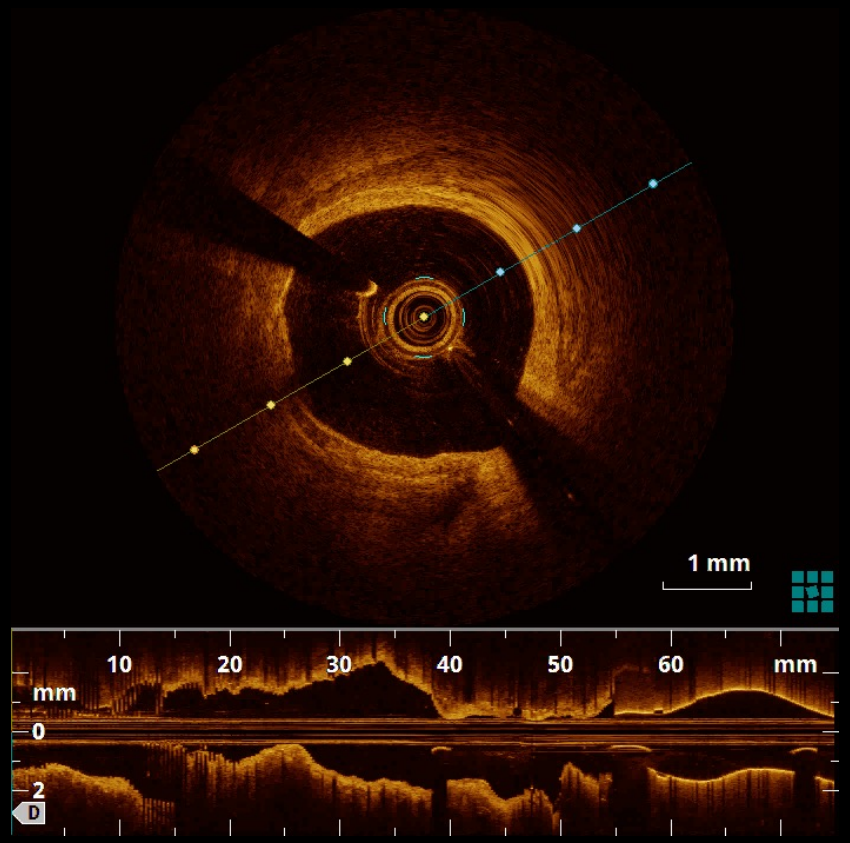
A; blood artifact
B; wire movement
C; oversaturation artifact (over reflection from stents)
D; Sew up artifact (vessel motion)
E; Air bubble
F; Fold over artifact (signal processing error)

JACC 2009, 11: 1035-1046.

OCT not always pretty



Poor Contrast



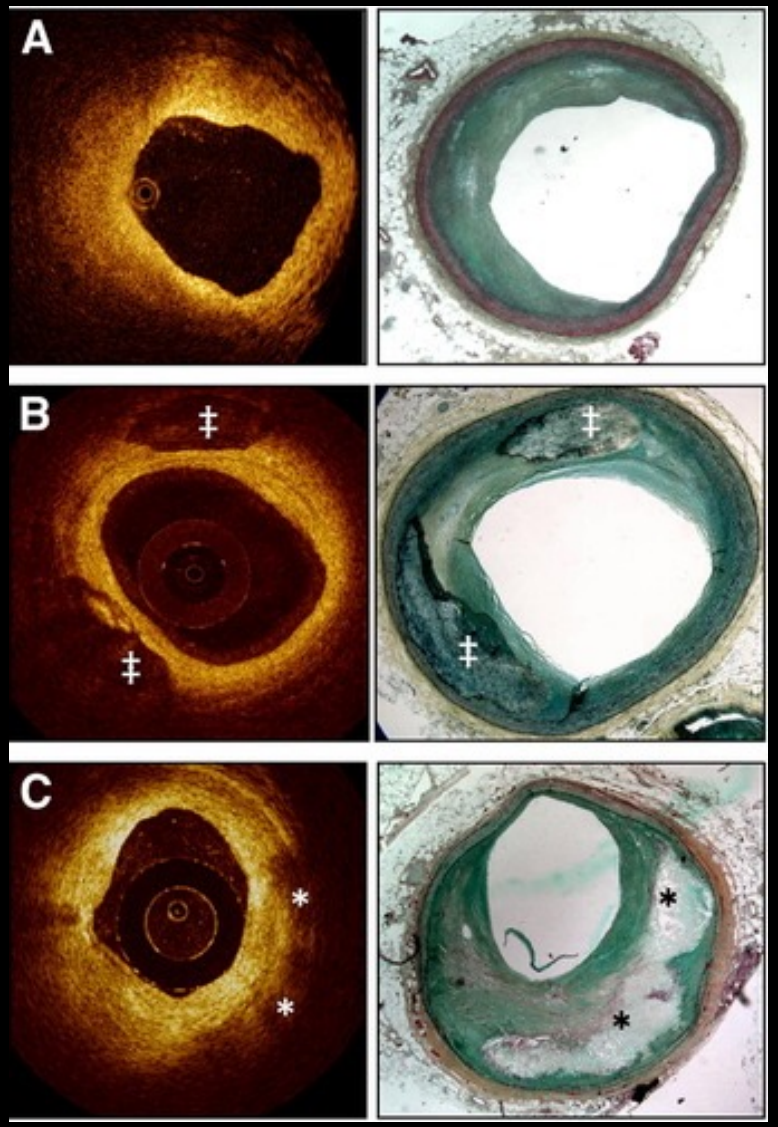
“Sew Up Artifact”

OCT Interpretation

General Characteristics of the Different Tissues by OCT

Tissue	Backscattering	Attenuation	General Aspects
Calcium	+	+	Sharp borders, low signal with heterogeneous regions
Lipid	++	+++	Irregular borders, superficial high signal followed by very low signal
Fibrotic	++	+	Homogeneous bright tissue
Red thrombus	+++	+++	Superficial signal rich, low penetration, signal-free shadowing
White thrombus	+++	+	Signal rich, more penetration than for red thrombus
Media layer	+	+	Low signal region, limited by 2 signal-rich band (IEL/EEL)
IEL/EEL	+++	+	High signal band (~20 μm)

IEL/EEL = internal elastic lamina/external elastic lamina; OCT = optical coherence tomography; + = low; ++ = moderate; +++ = high



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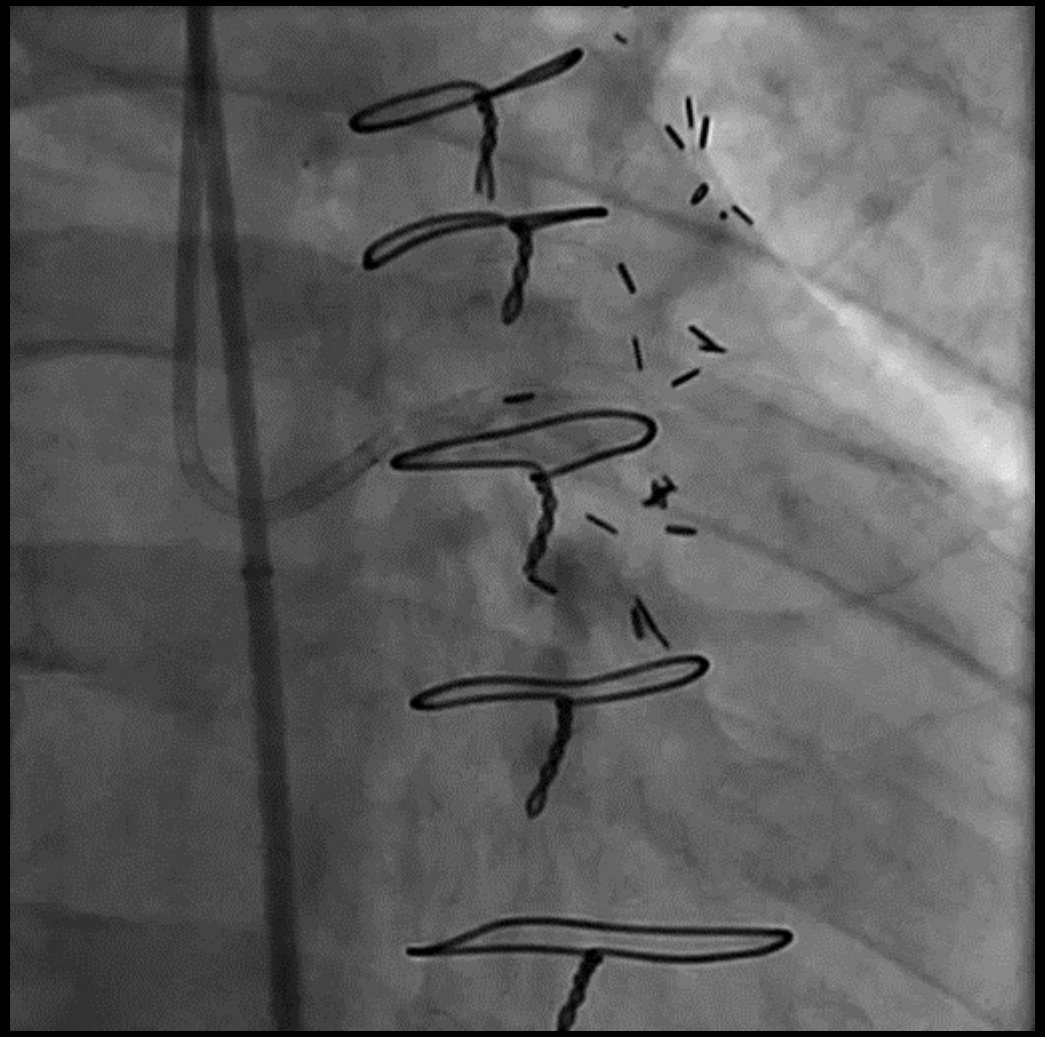
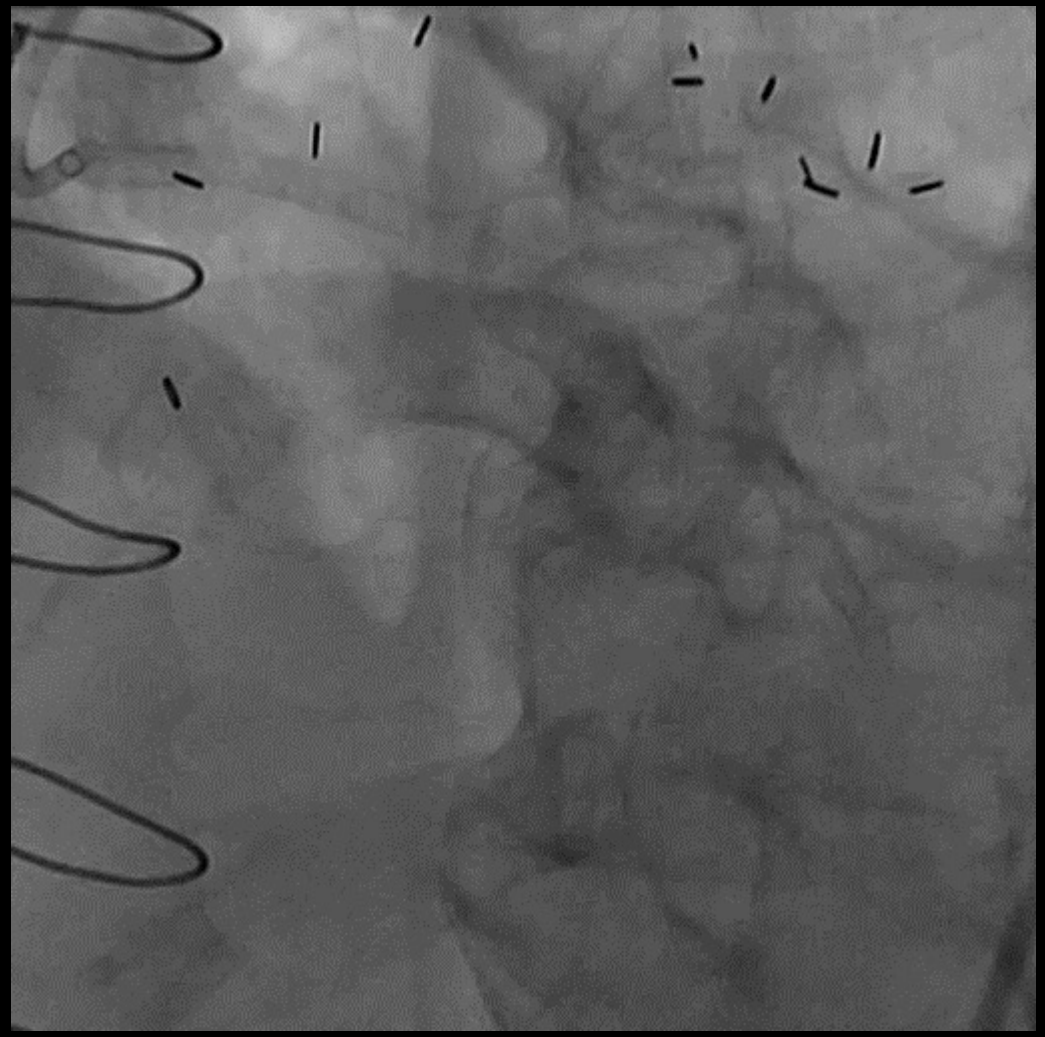
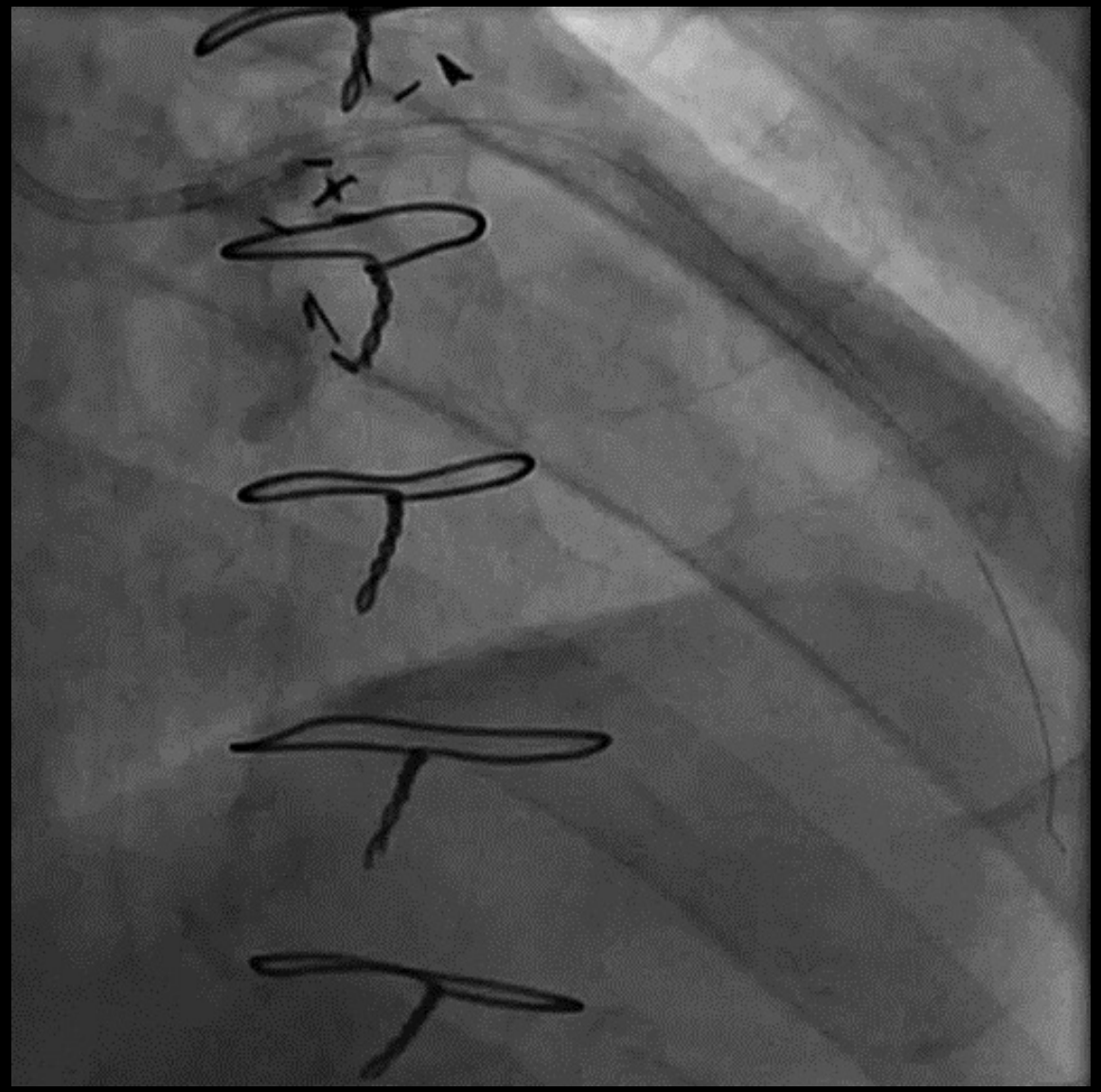
Case ISR

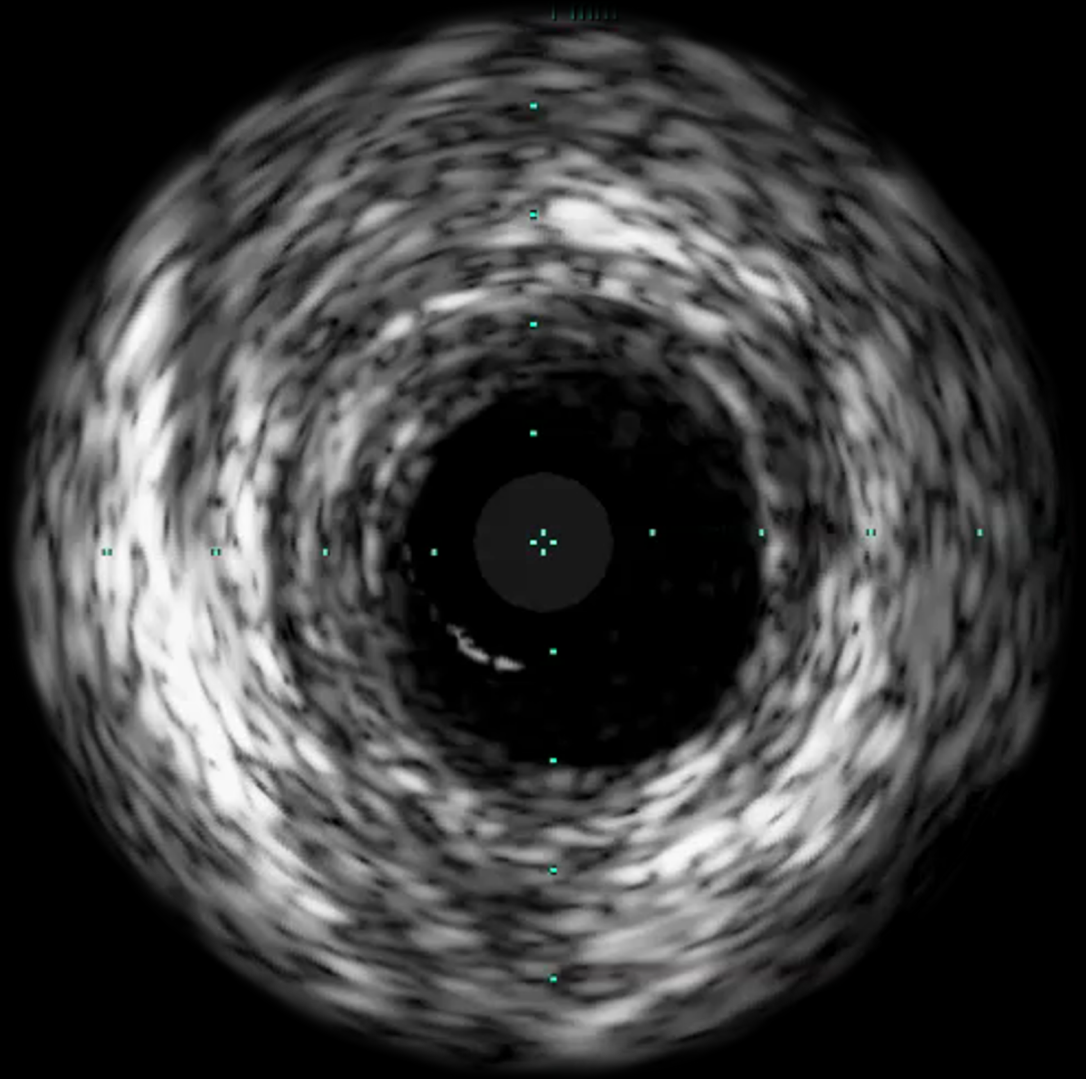




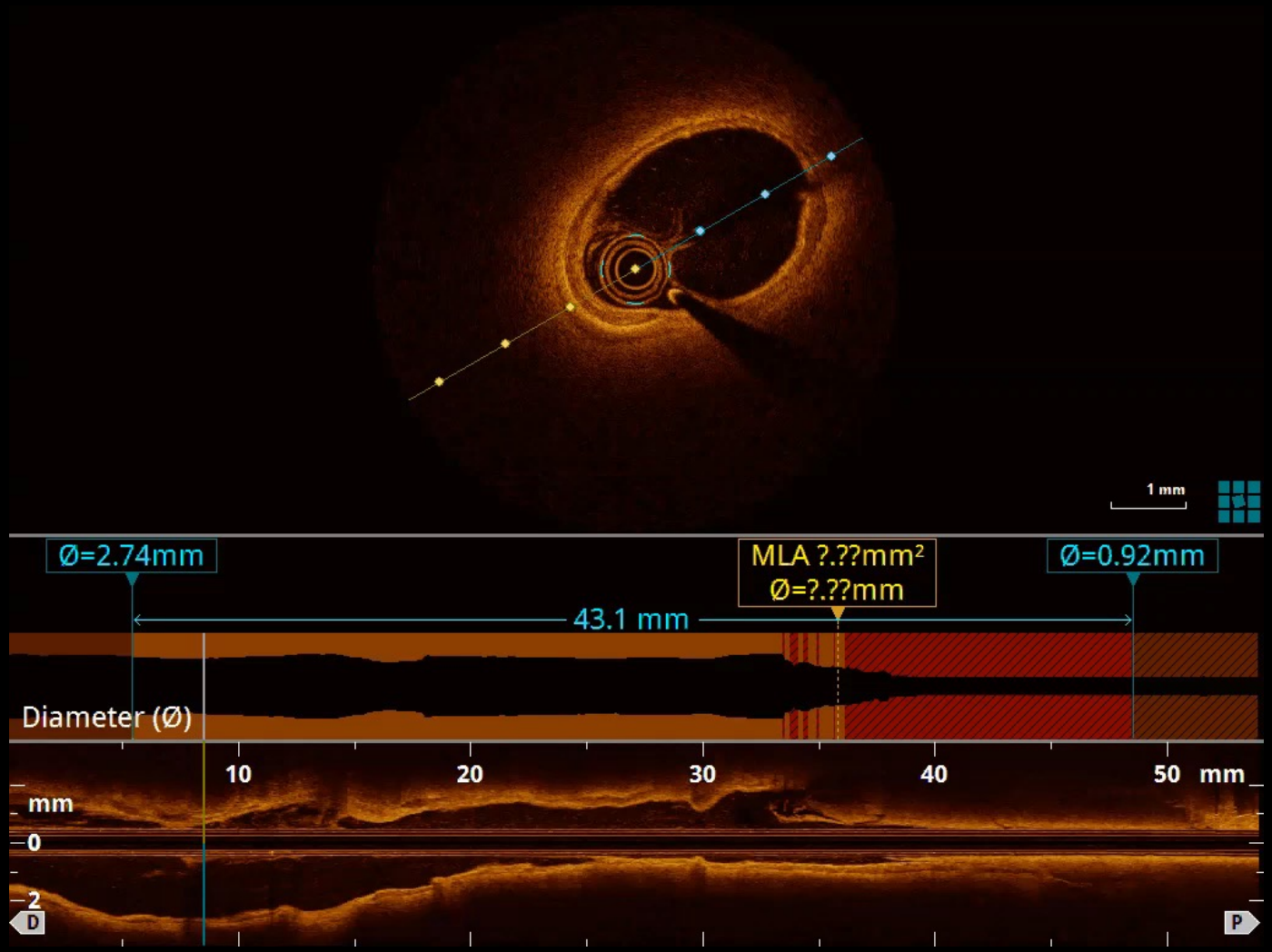
84 y/o male with pmh of CABG and PCI presents for increasing angina.

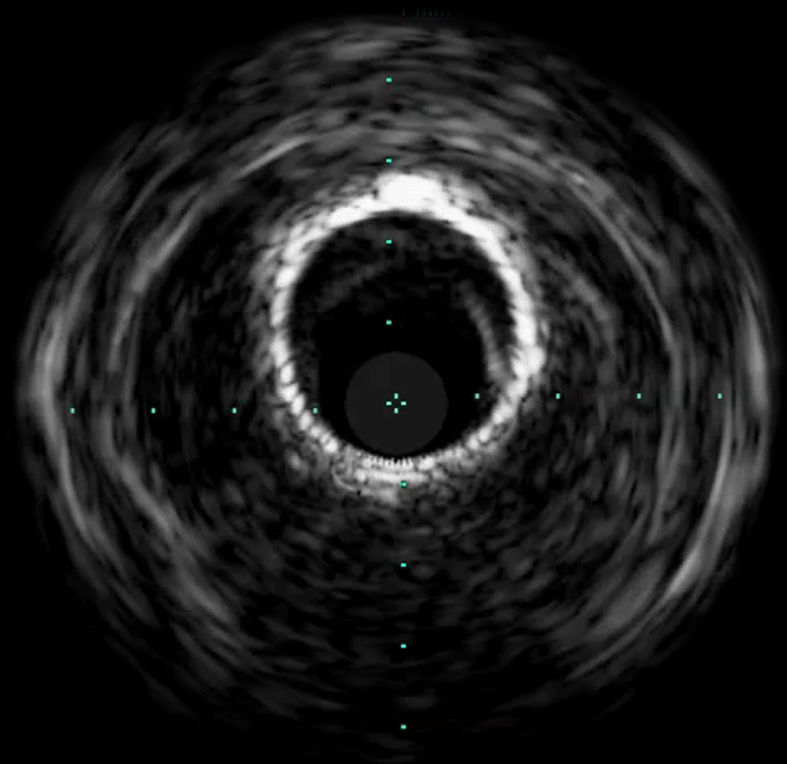
0.9mm Laser Catheter

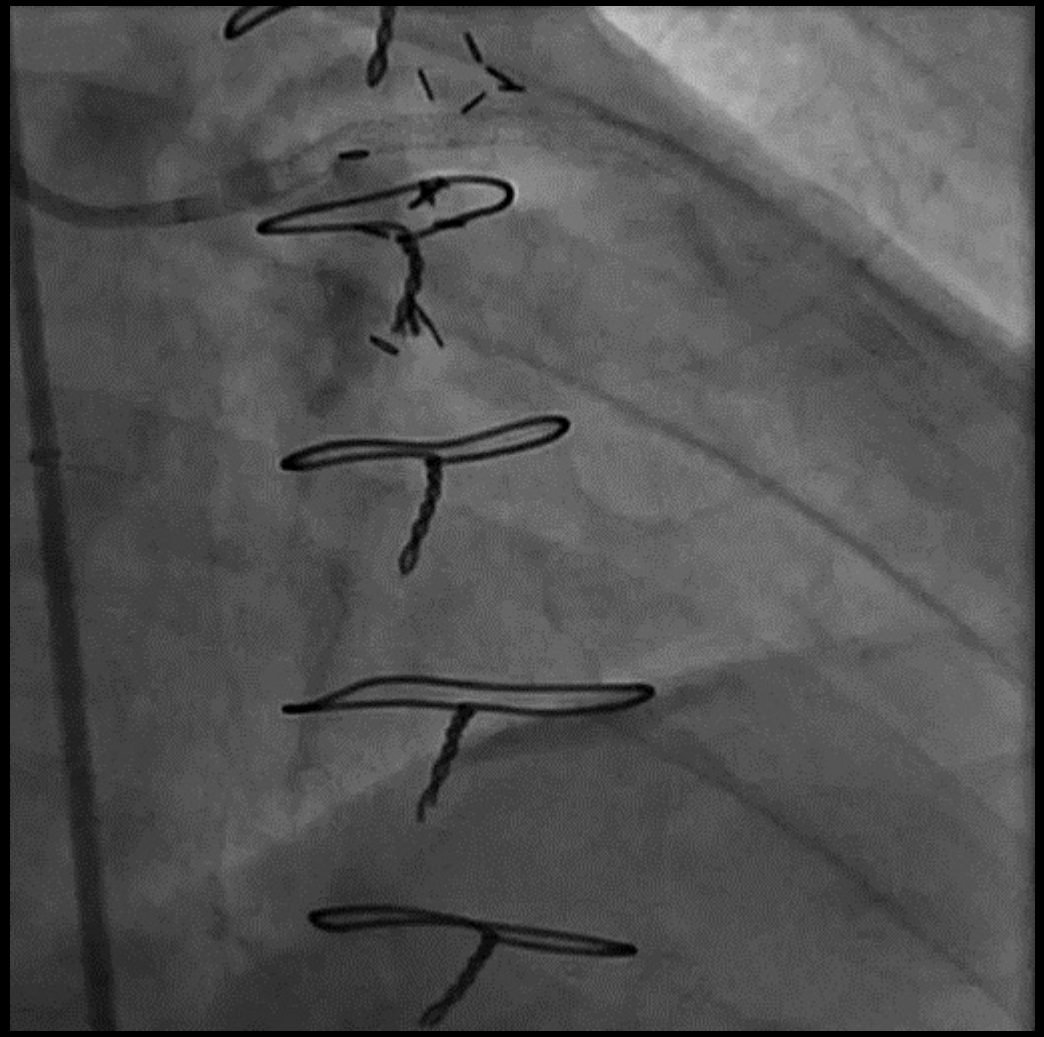




OCT vs. IVUS

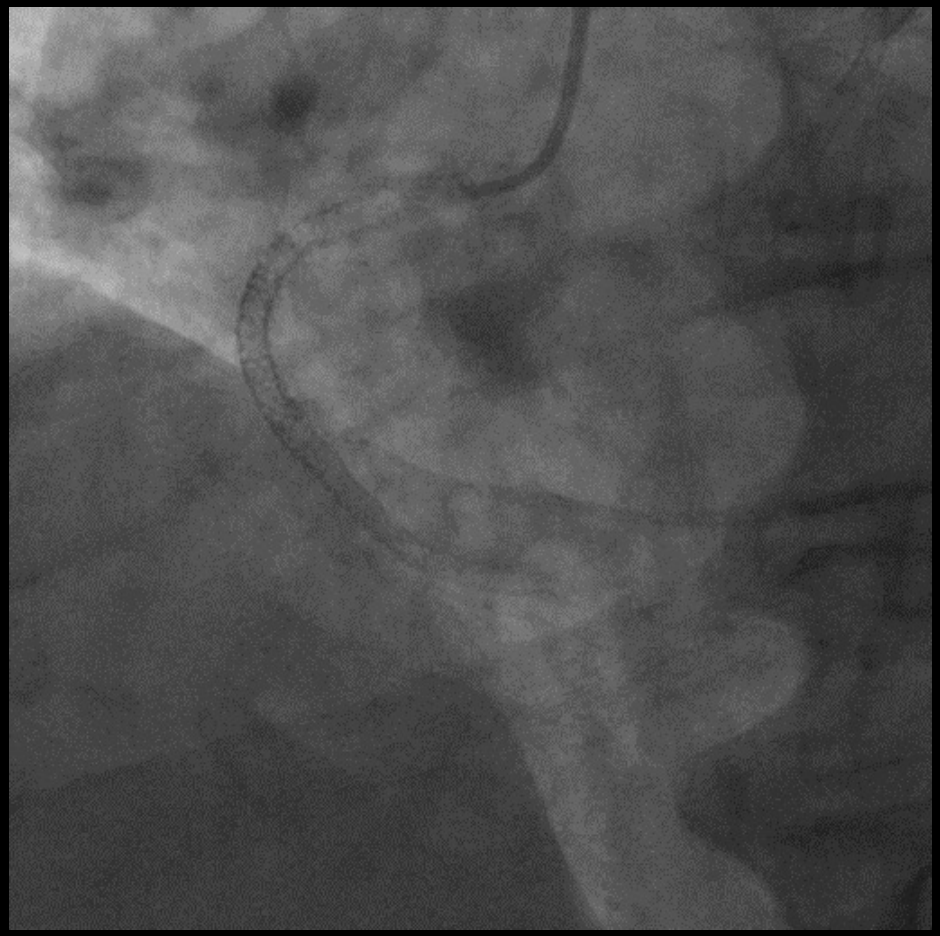

1 mm
Ø=2.74mm
MLA ?.??mm²
Ø=?.??mm
Ø=0.92mm
43.1 mm
Diameter (Ø)
10
20
30
40
50 mm
mm
0
2
D
P





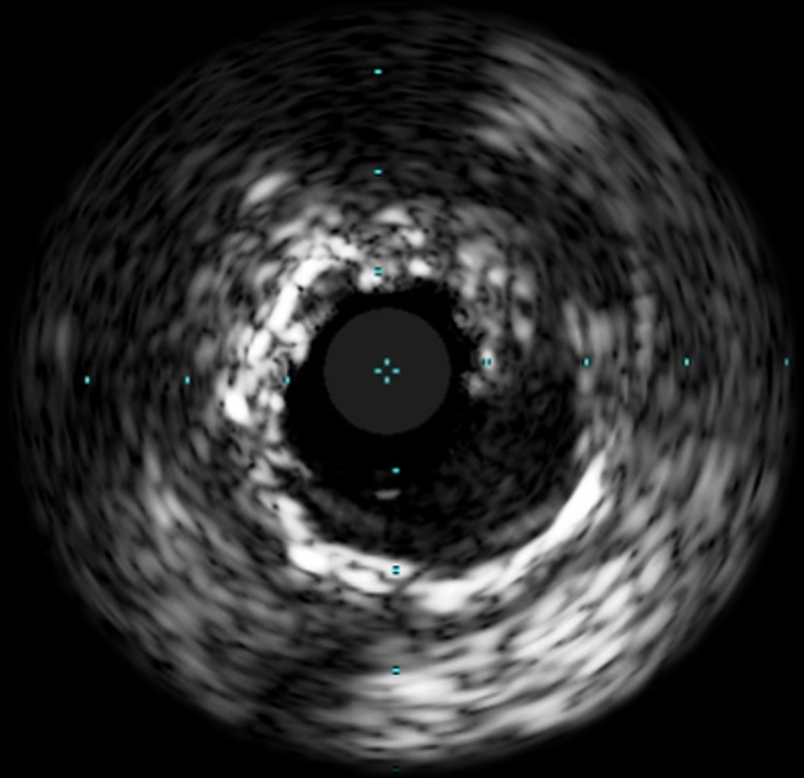
Final Result

Case Repeat Thrombosis

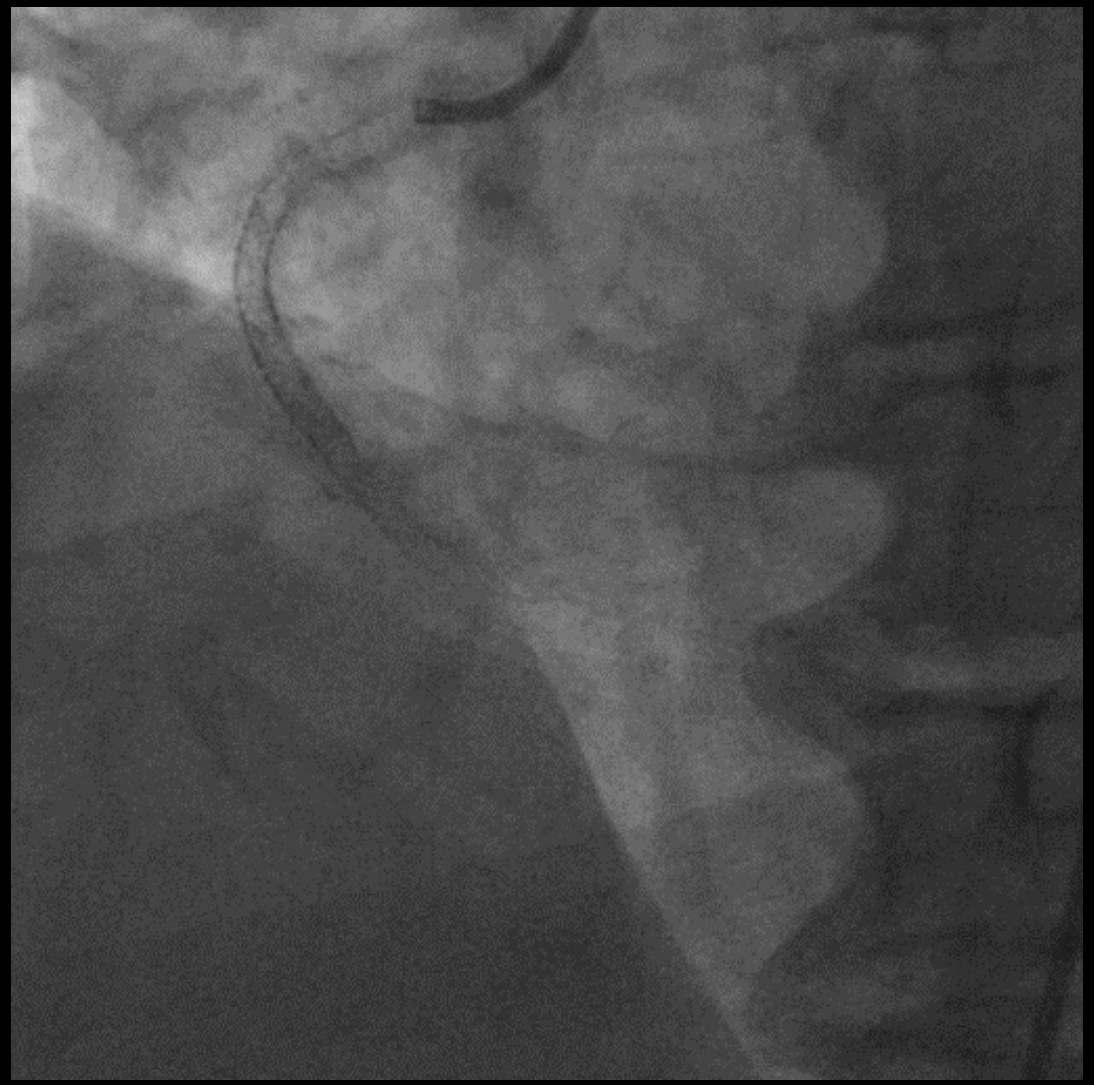


70 y/o with many previous PCI comes in for unstable angina after recent DES placement.
1 month prior to that PCI he had another episode with thrombosis noted in same area.

OCT vs. IVUS

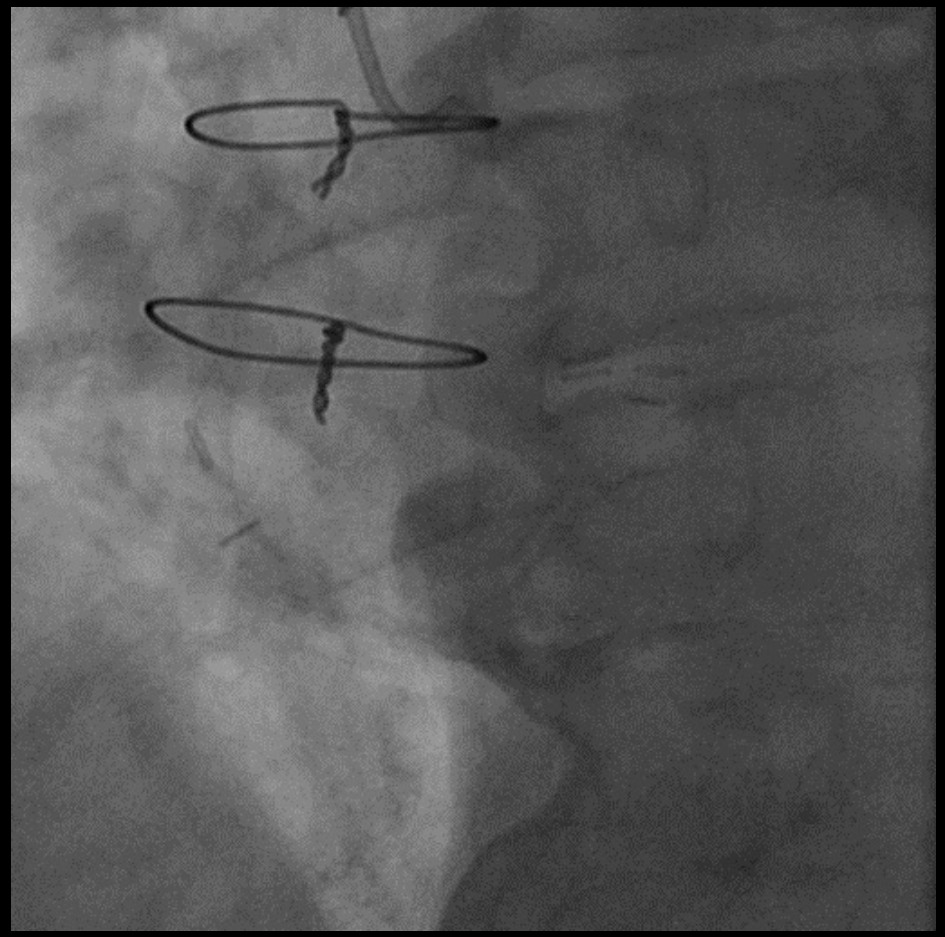


Mostly “red clot” or thrombin rich clot as opposed to platelet rich clot. So many layers of stent were present it was proposed that it was a nidus for thrombosis despite aggressive DAPT.

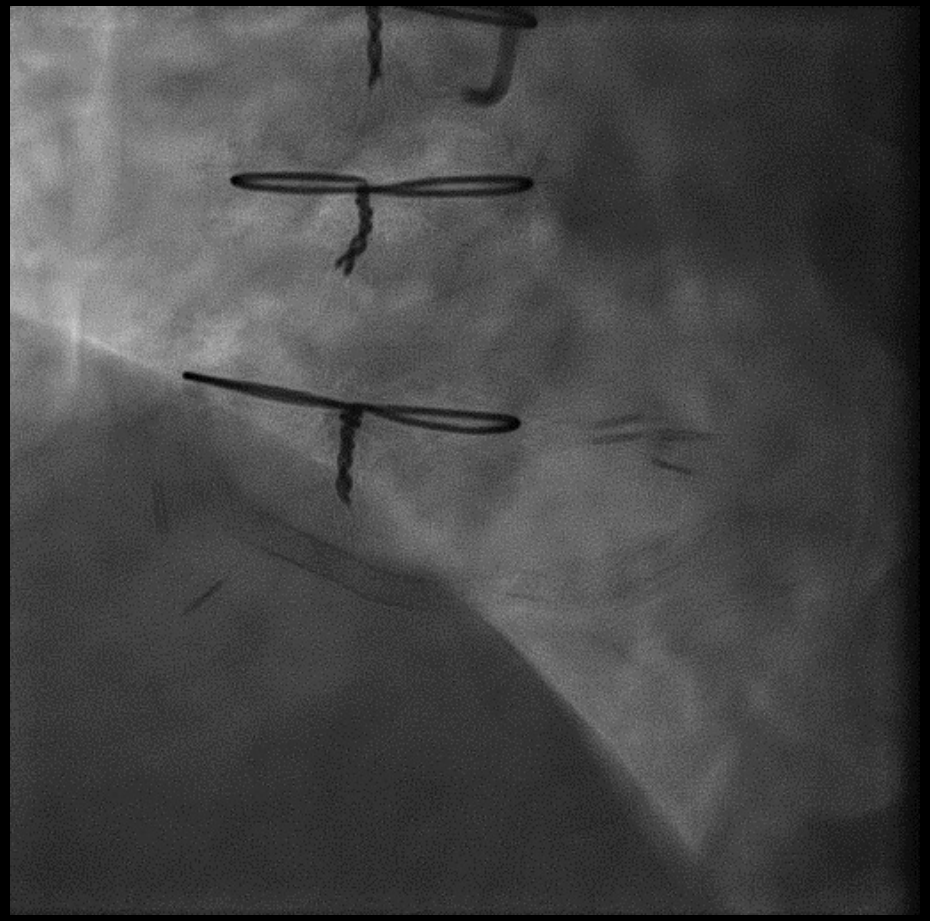


ECLA and resented the segment. Placed on Coumadin and has not had symptoms since.

Case ISR #2



PCI in last 5months



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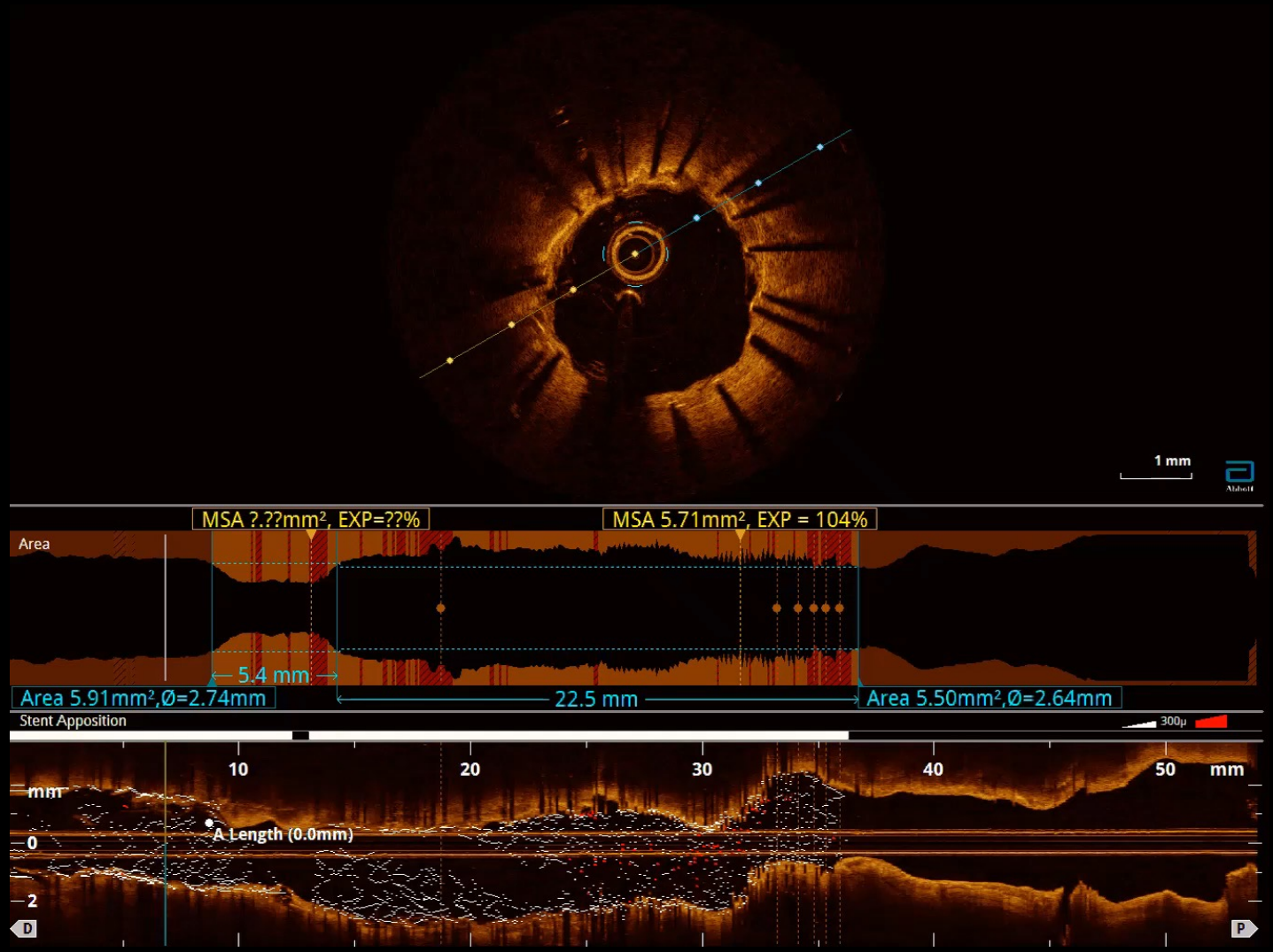
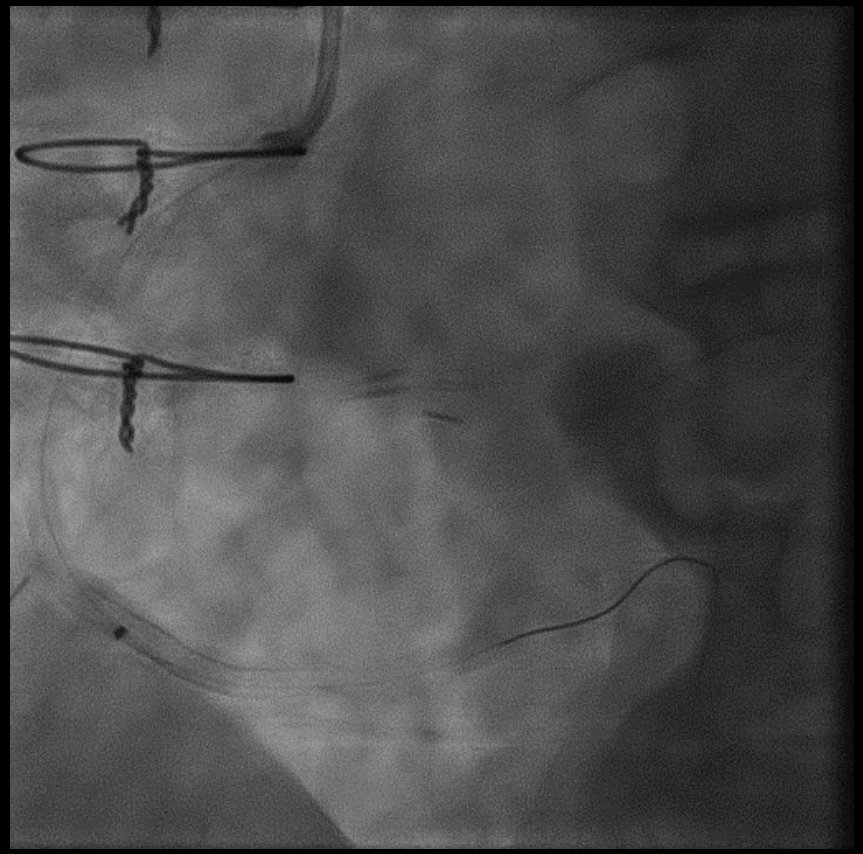
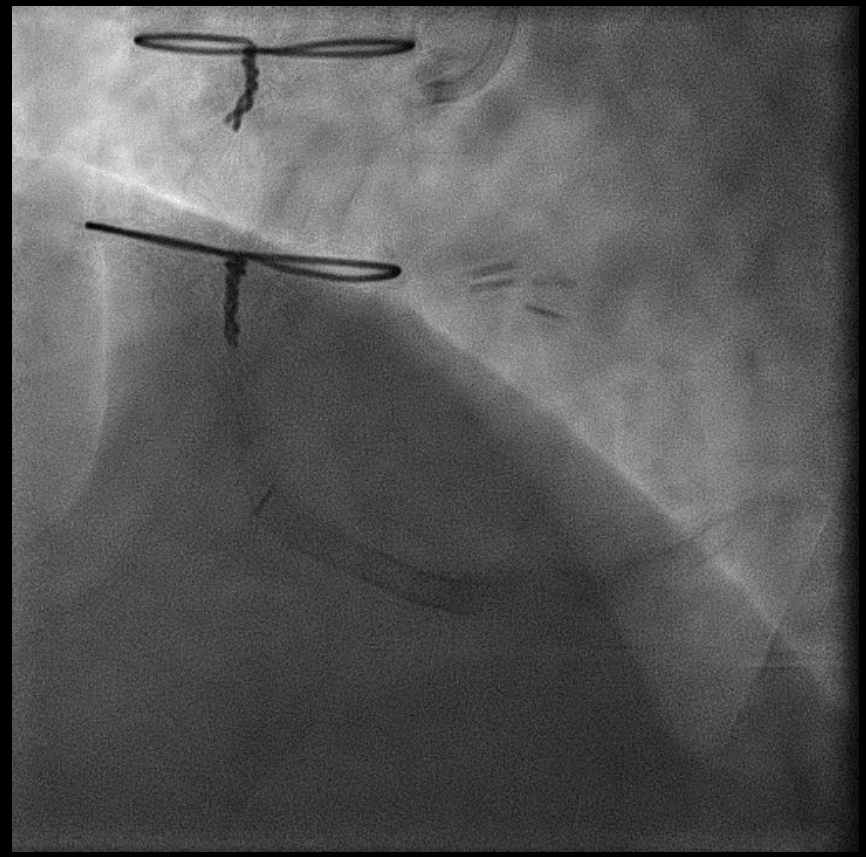

1 mm
MSA ?.??mm², EXP=??%
MSA 5.71mm², EXP = 104%
Area
5.4 mm
Area 5.91mm²,Ø=2.74mm
22.5 mm
Area 5.50mm²,Ø=2.64mm
Stent Apposition
300µ
10
20
30
40
50
mm
mm
A Length (0.0mm)
0
2
D
P

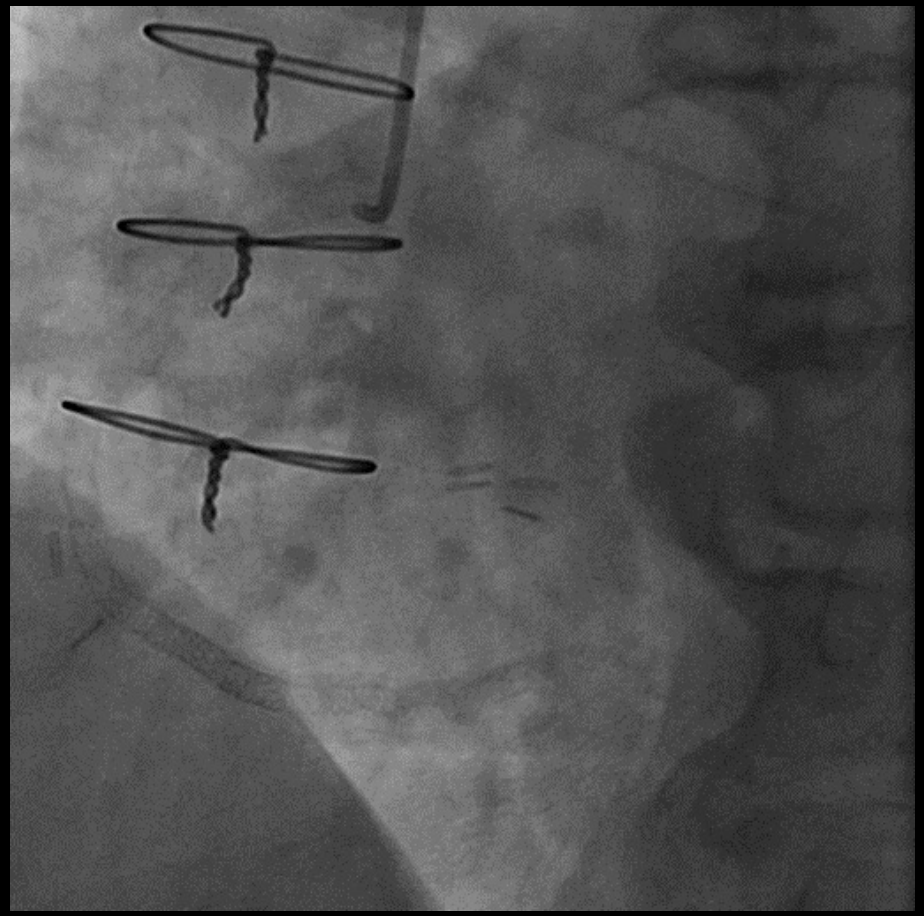
Case ISR #2



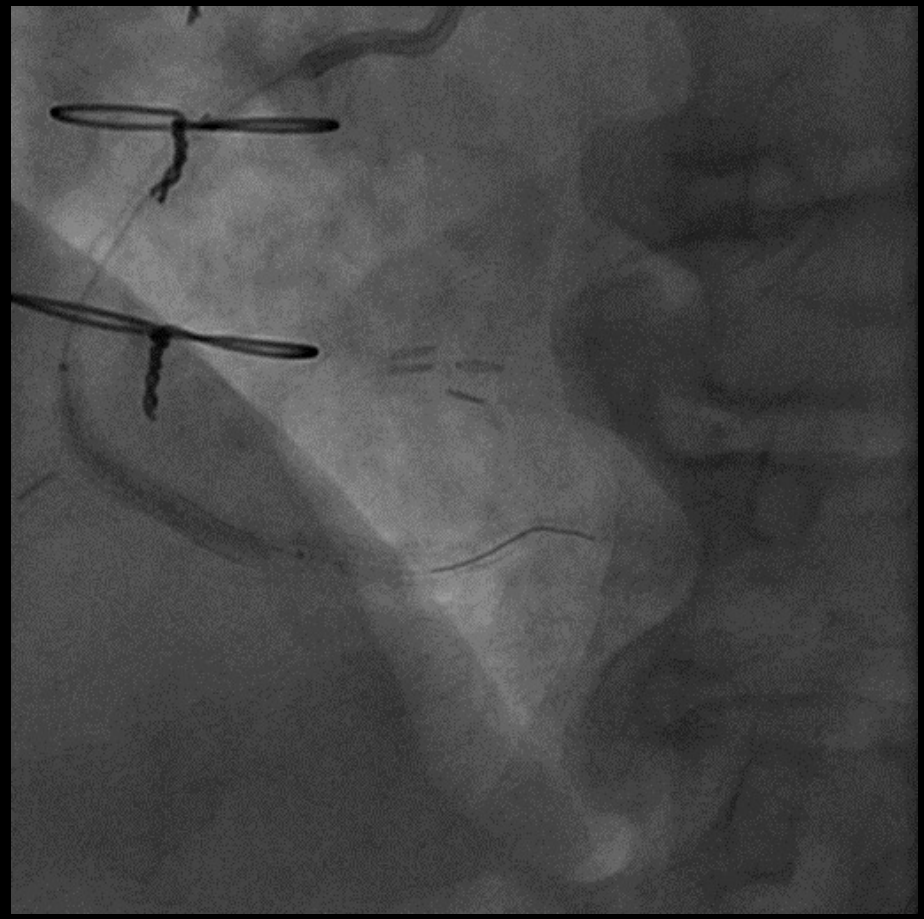


1.2mm ECLA Catheter and repeat PCI

Case ISR #2

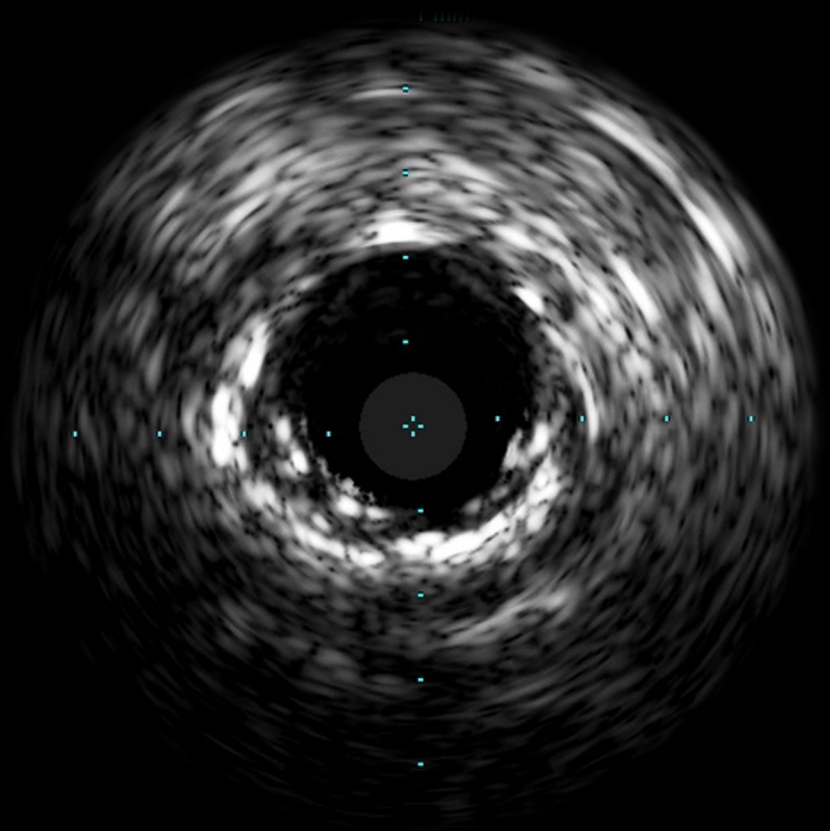


2 months later.

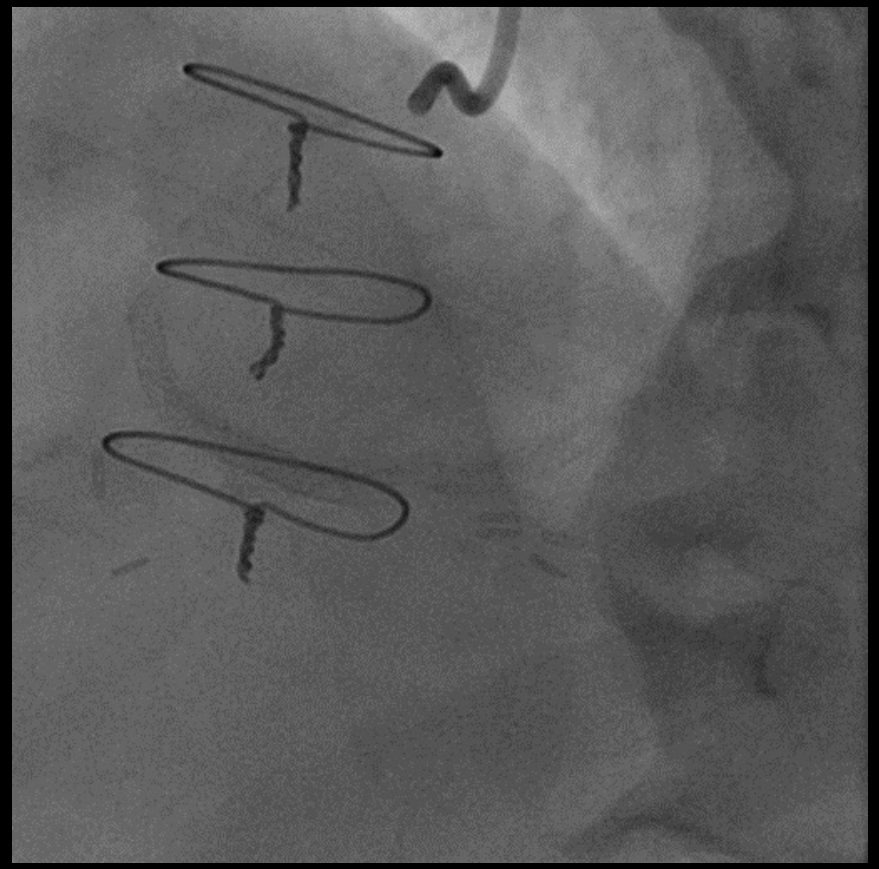


2.5 mm Shock Wave

Case ISR #2

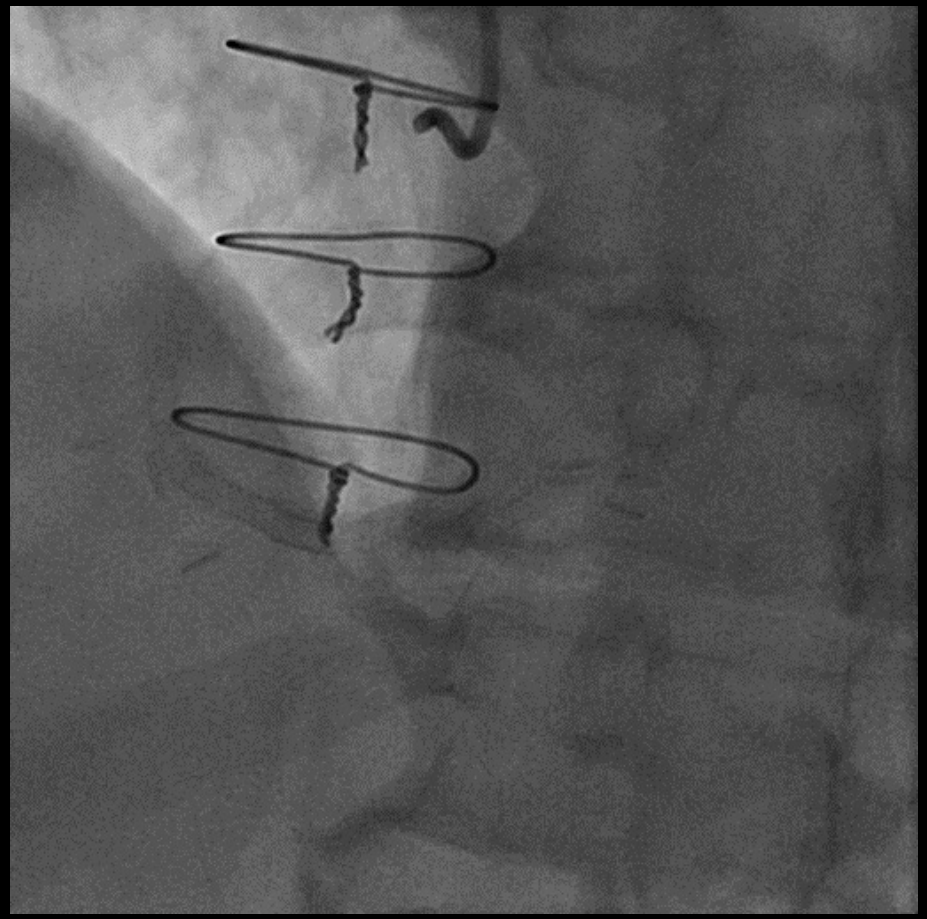


IVUS post POBA



Final Angiogram

Case ISR #2

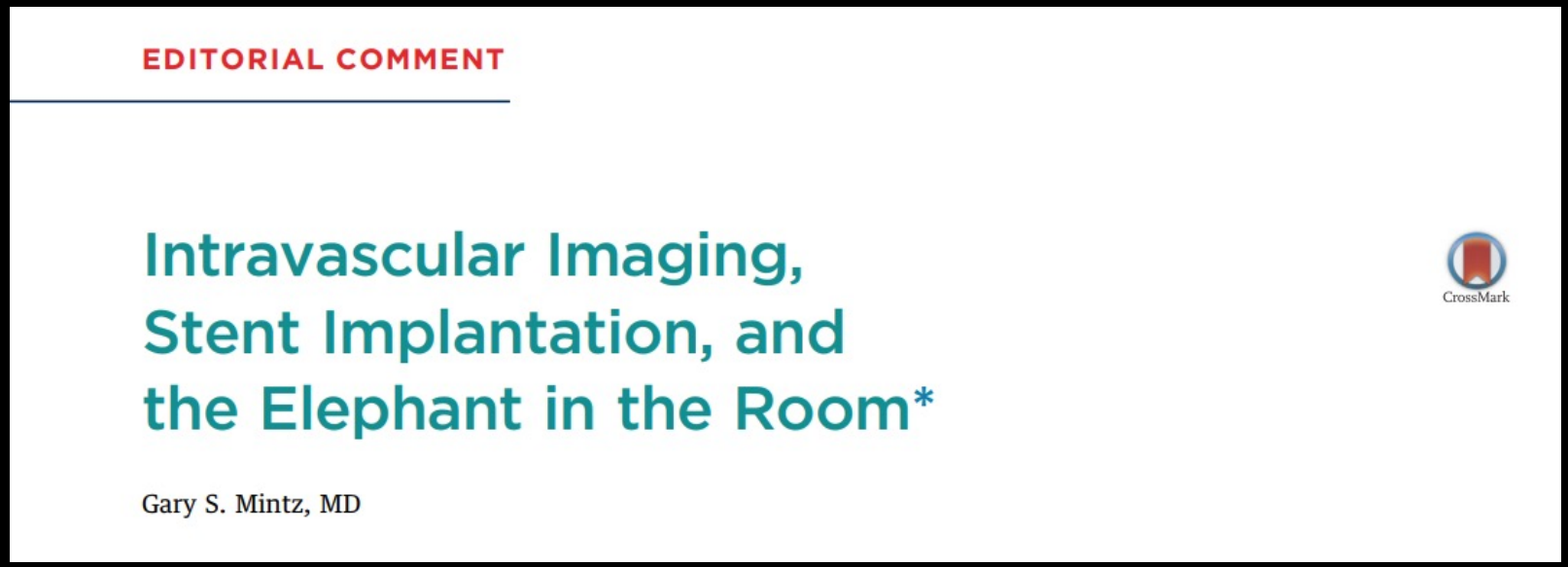


3 months later

iFR evaluation.

Conclusions

2017 marked the 40th anniversary for PCI, 30th anniversary for IVUS and 20th anniversary for OCT.


EDITORIAL COMMENT

Intravascular Imaging, Stent Implantation, and the Elephant in the Room*

Gary S. Mintz, MD

CrossMark

JACC Intvent 2017; 10: 2499-2501.

Conclusions

What are the main excuses or explanations [for lack of use]?

1) no data [debunked]
2) No RCT data [again debunked, IVUS XPL]
3) Cost… IVUS is dominant and cost effective
4) Safety…IVUS complications rare
5)Angiography is sufficient…angiography has known limitations [FFR anyone?]
6) Lack of guidelines…hopefully current data will convince guideline authors

7) Education…52% of surveyed Interventional fellows reported no or rudimentary IVUS education and 68% reported no or rudimentary OCT education.

JACC Intvent 2017; 10: 2499-2501.

Conclusions

“ A modern Interventionalist should be able (or be trained) to properly preform, interpret, and use at least 1 of these 2 technologies.”

-Gary Mintz, MD

OCT versus IVUS