

Indication and Effectiveness of Intravascular Lithotripsy in Calcified Lesions

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Disclosure

- I have no conflicts of interest about this presentation

Back ground

- Recently, almost there is no contraindication for PCI because of so many devices developed.
- However, calcified lesion is still one of the challenging intervention because of higher event rate.
- We have three devices for calcification, which are Rotational atherectomy, Orbital atherectomy and intravascular lithotripsy who is the newest.

Rotational atherectomy

- The Rotablator is a 30 year proven device.
- This is very powerful for severe calcification.
- However, you won't know if slow flow will occur until you try it.
- Select appropriate burr size depend on anatomy and clinical settings.



Rota Case Example

64y old male

CC : Chest pain during Hemodialysis (2018.4)

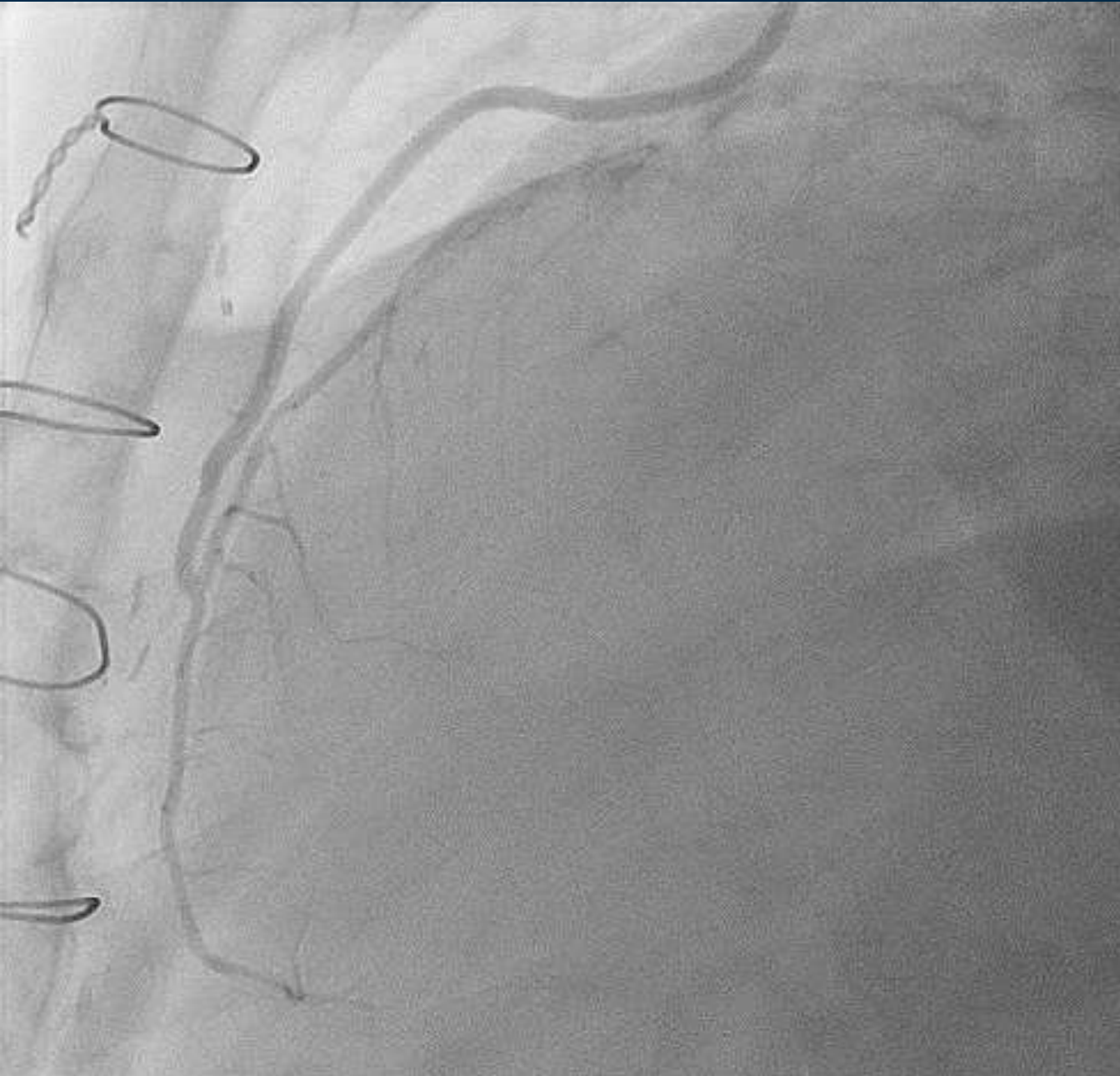
PH: DM (Insulin user)

2007 prox. RCA TAXUS 2.75x16 mm 2.5x16mm at other hospital

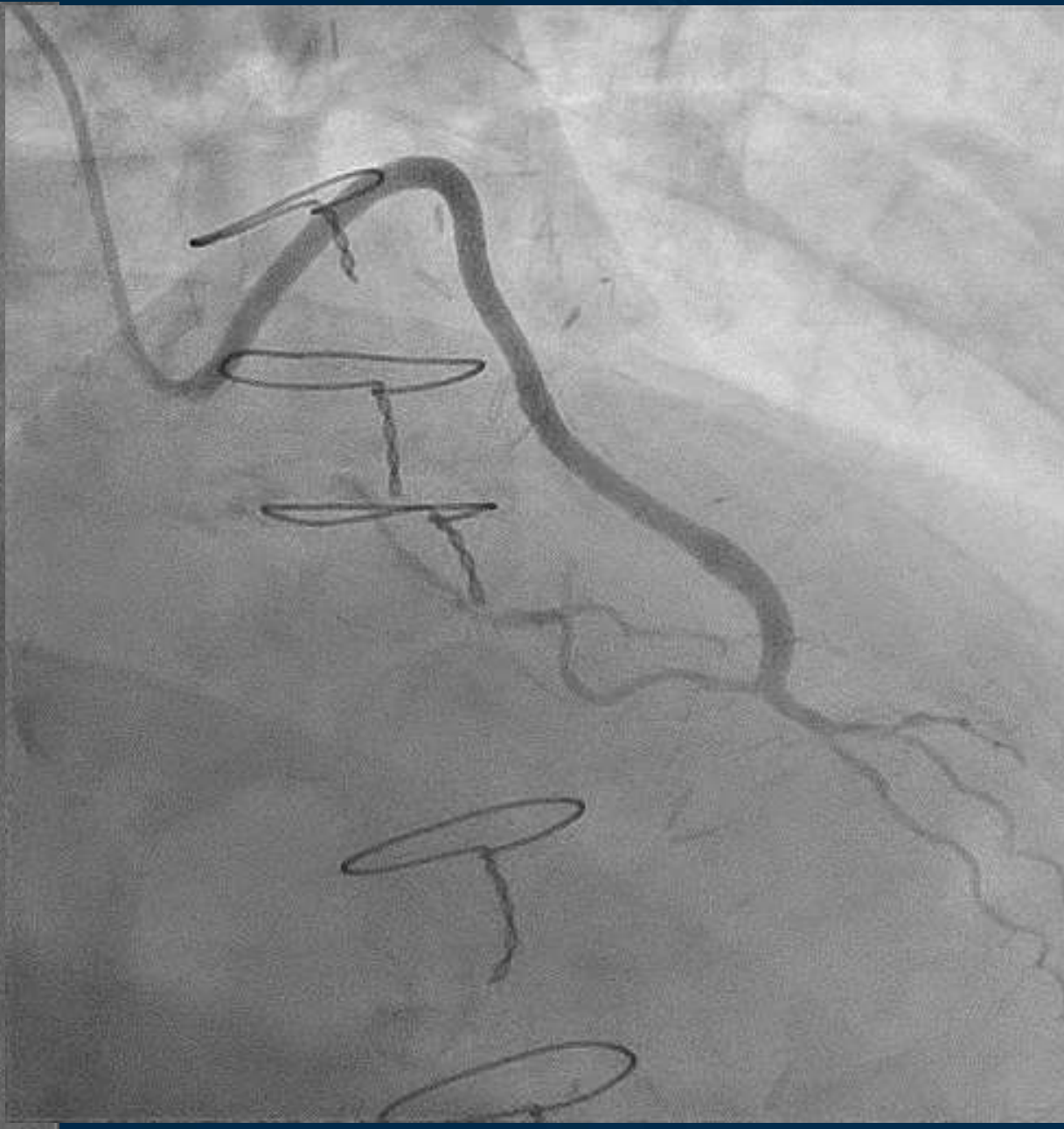
2010 CABG (LITA-LAD #8, SVG-OM, SVG-#4PD-#14)

2011 EVT for for L-SFA (Bare Nitinol stent 6.0x40mm),
for R-SFA (Bare Nitinol stent 7.0x80mm)

LITA-LAD (patent)



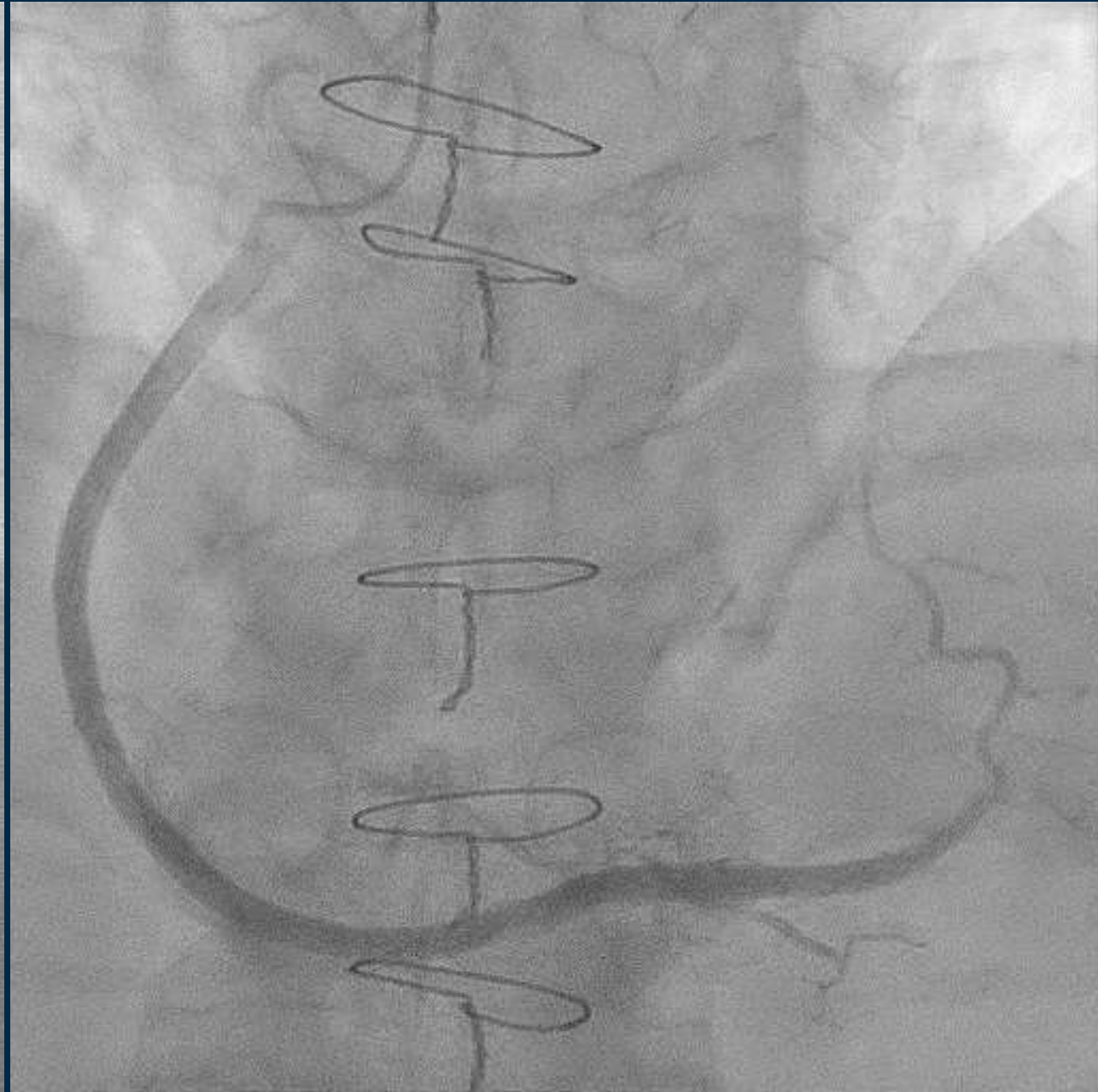
SVG-OM (patent)



2 TAXUS stents in prox. RCA

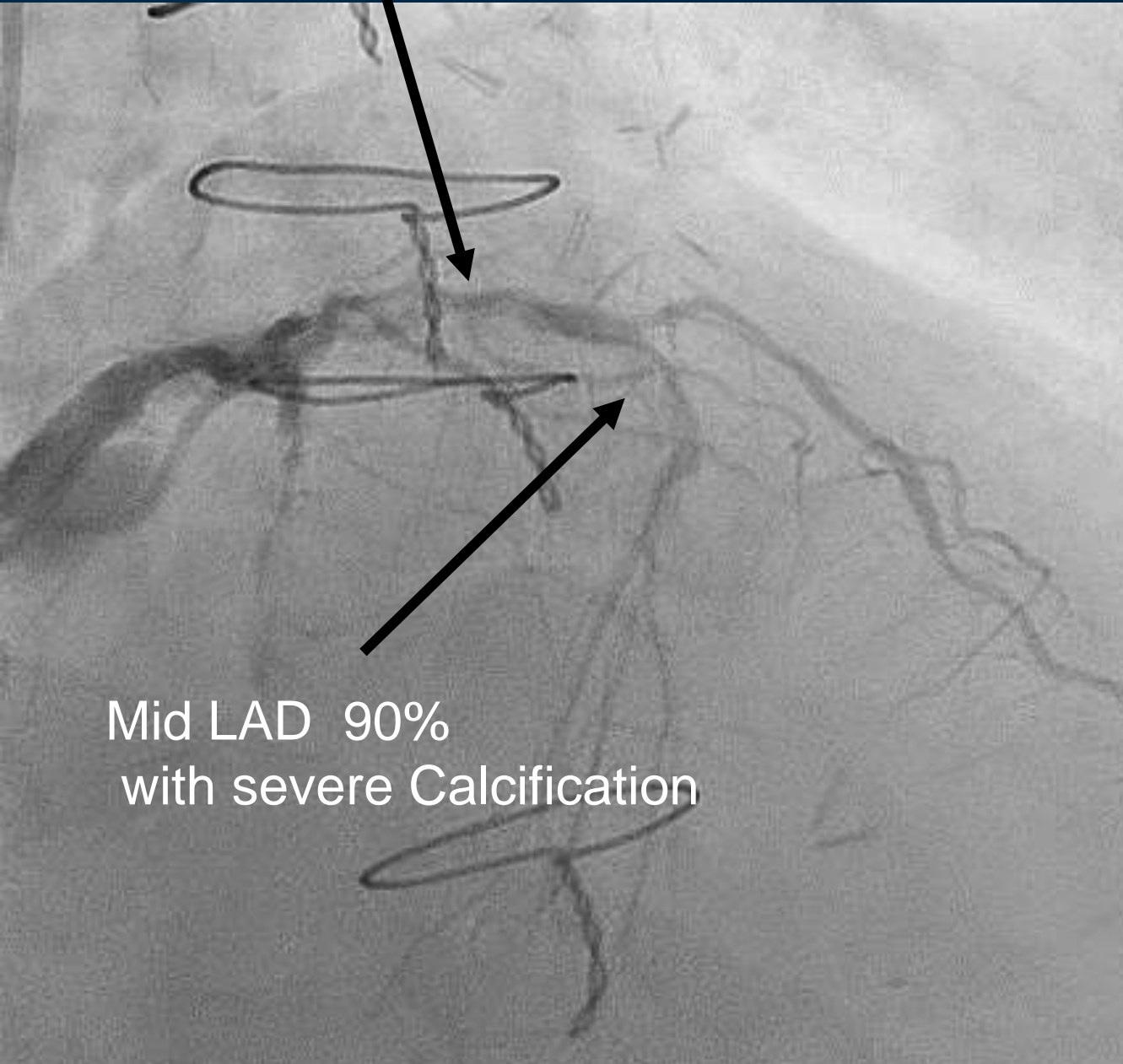


SVG-4PD-PL (patent)

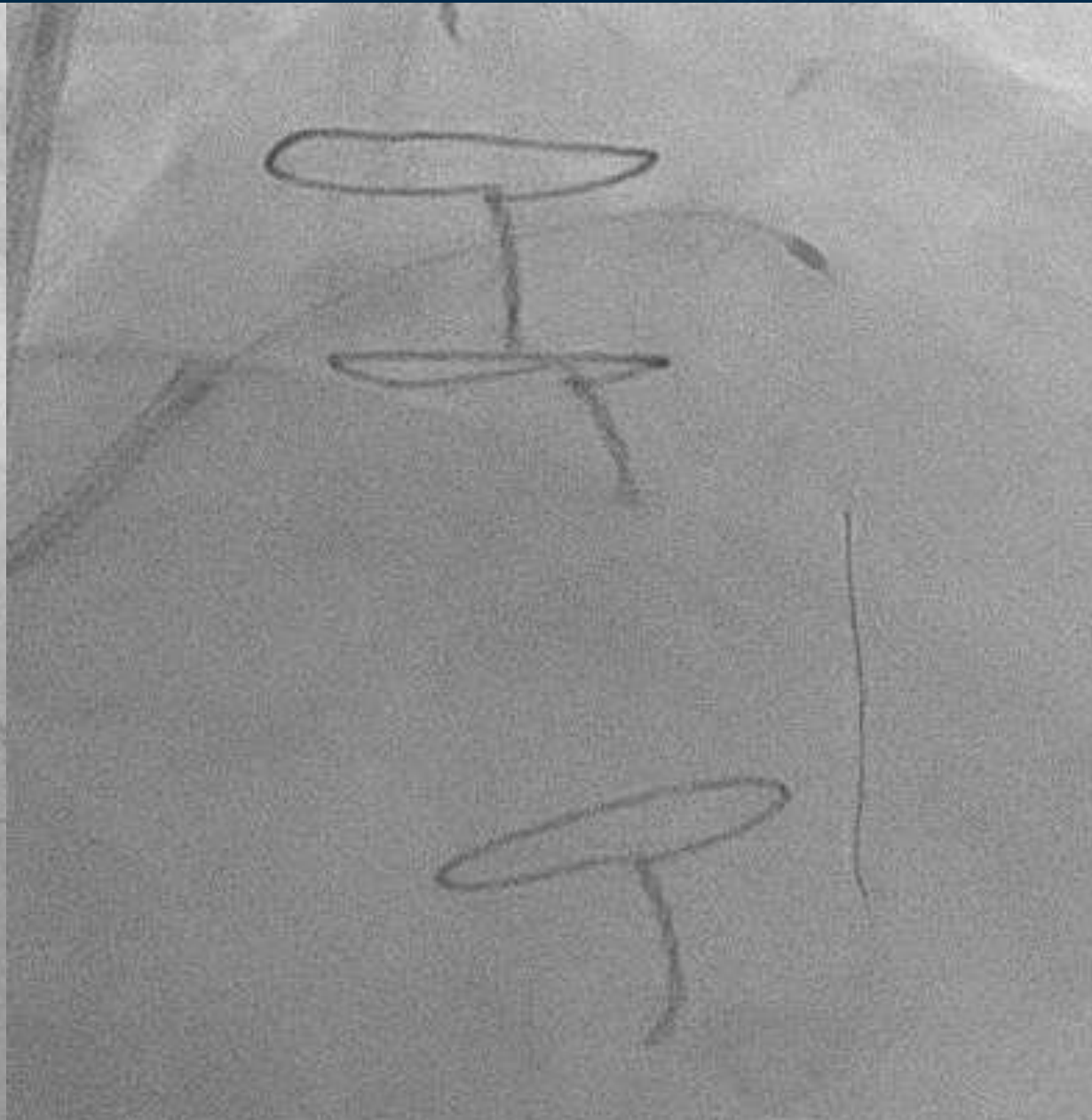


Proximal LAD 90% with severe Calcification

Rotablator 1.5mm Burr

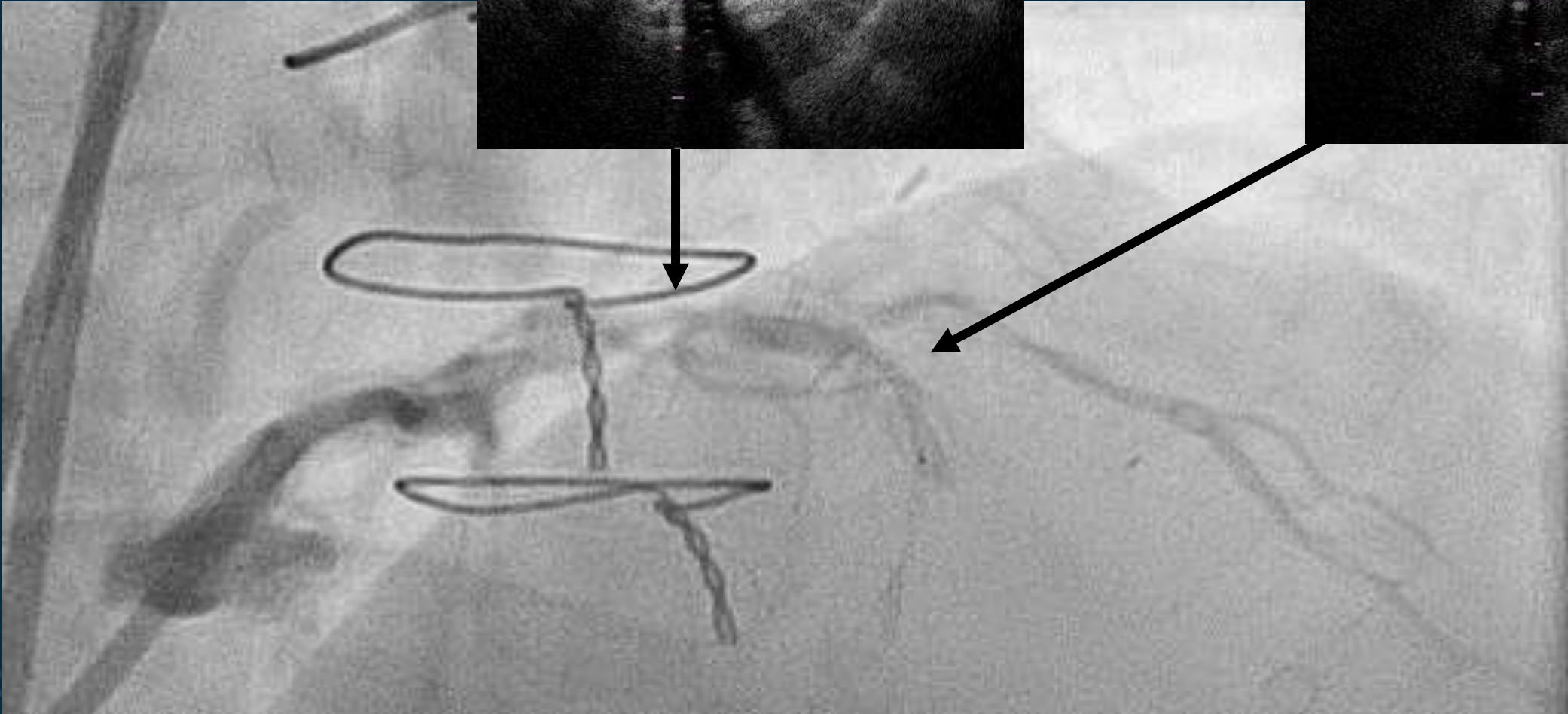
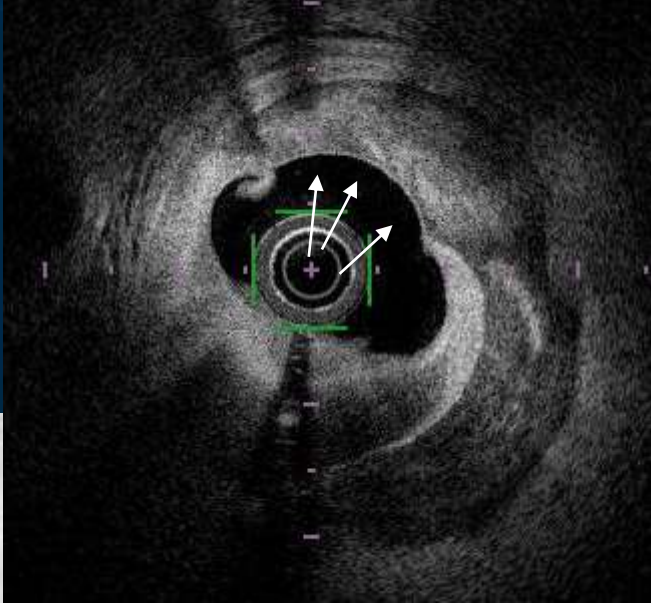
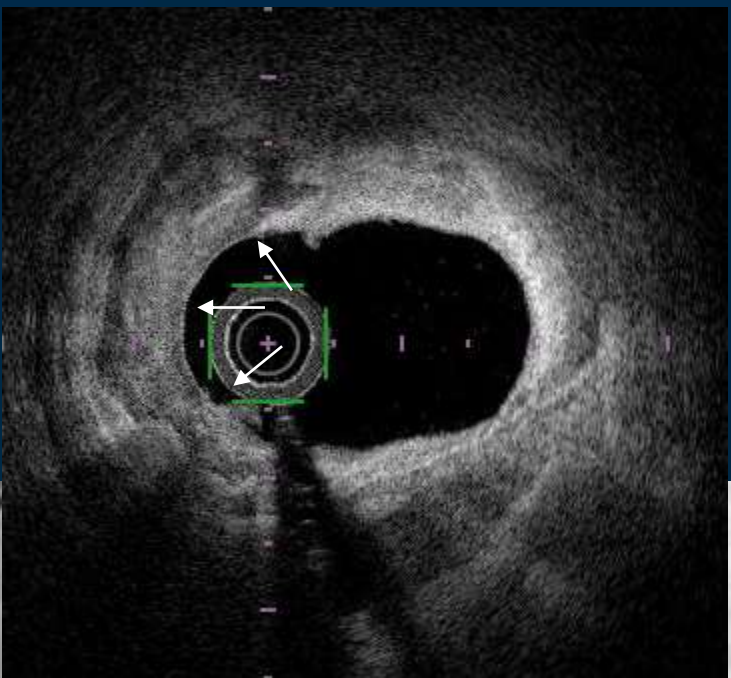


Mid LAD 90%
with severe Calcification

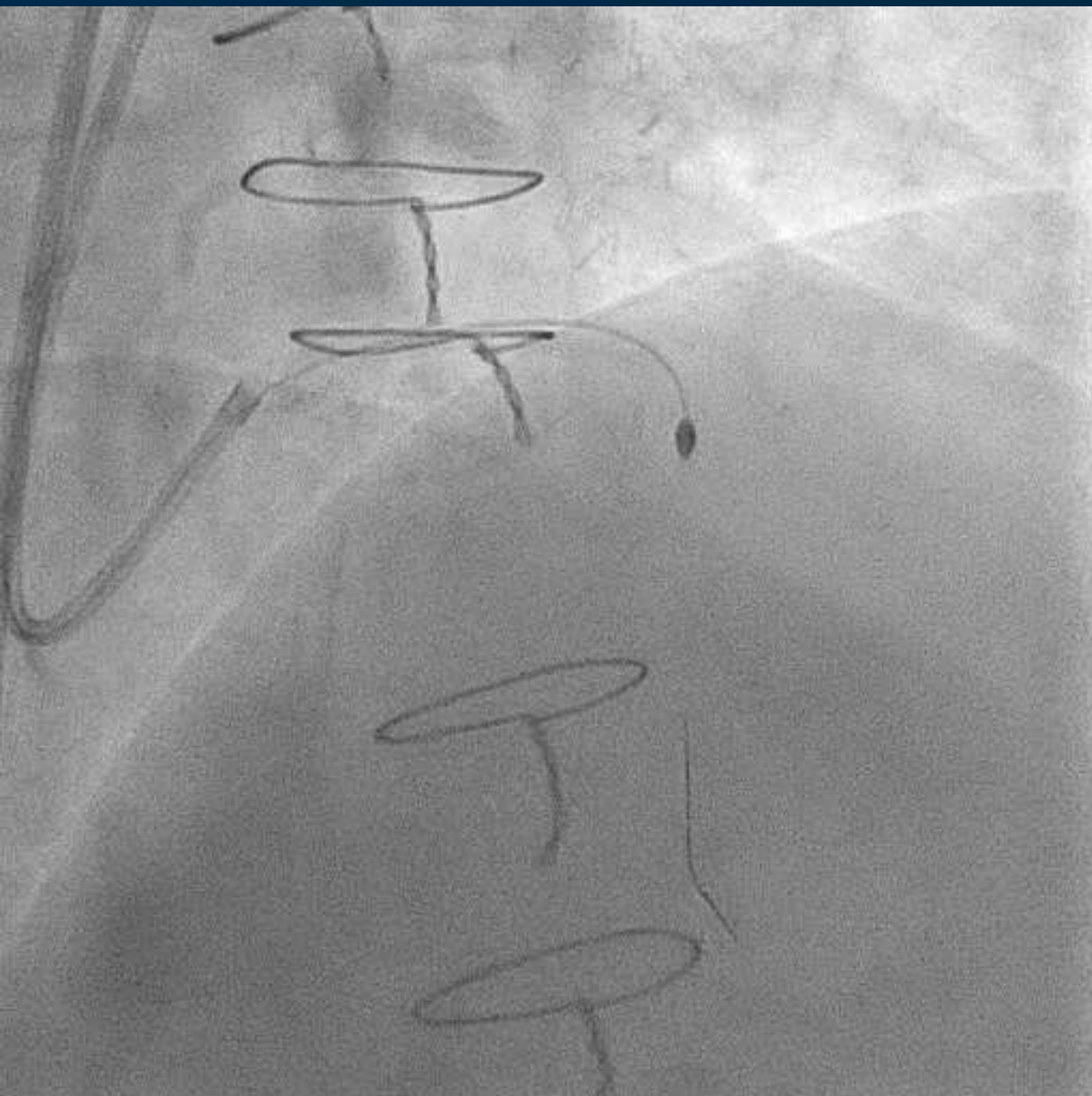


Post 1.5 Burr

OFID (Terumo)



Rota 2.0mm Burr 149K 6 Runs

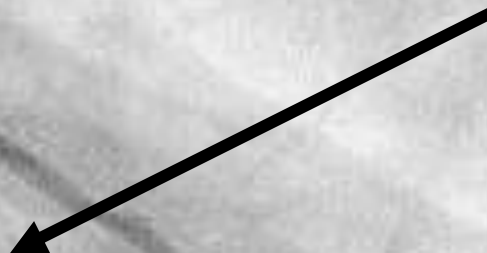
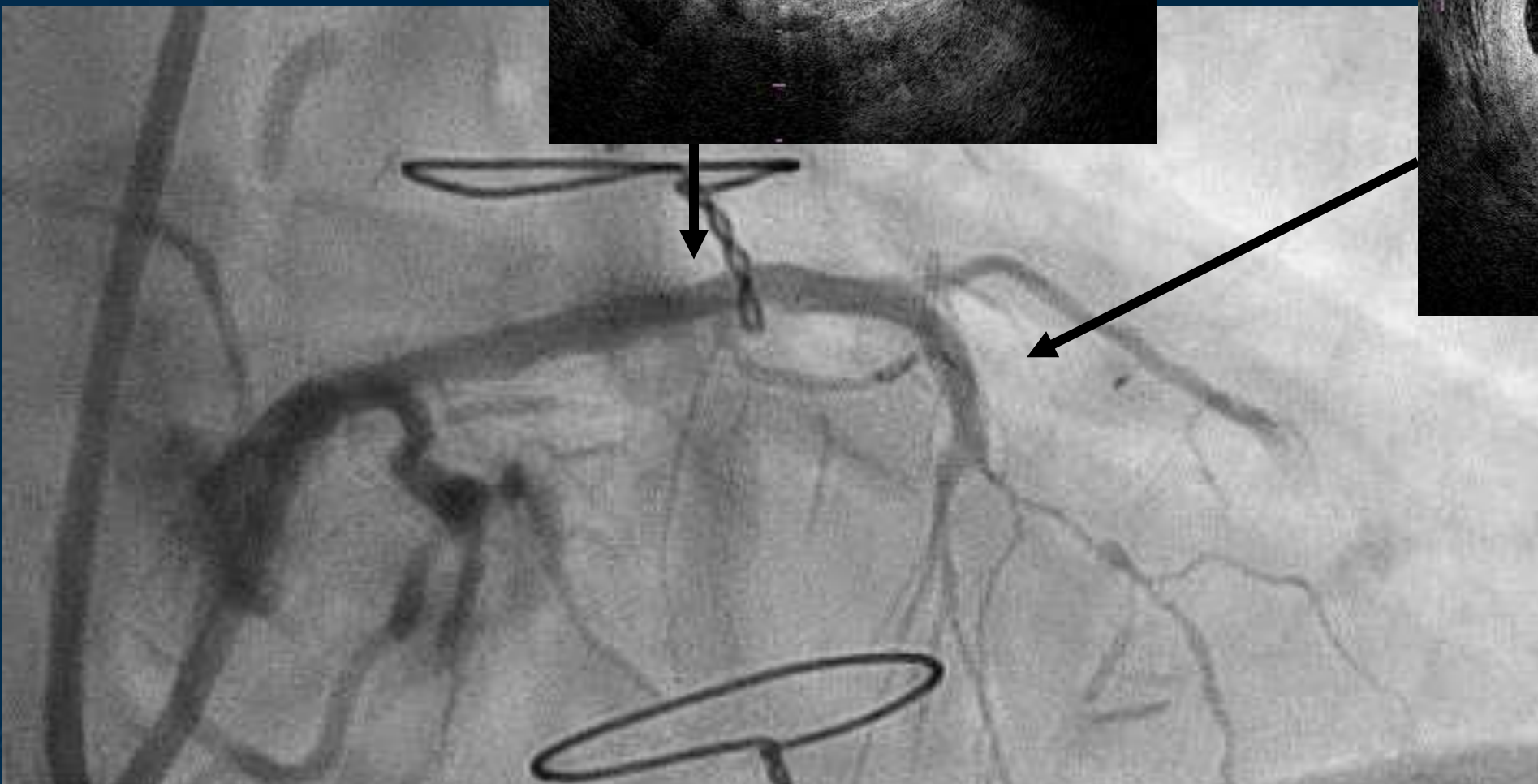
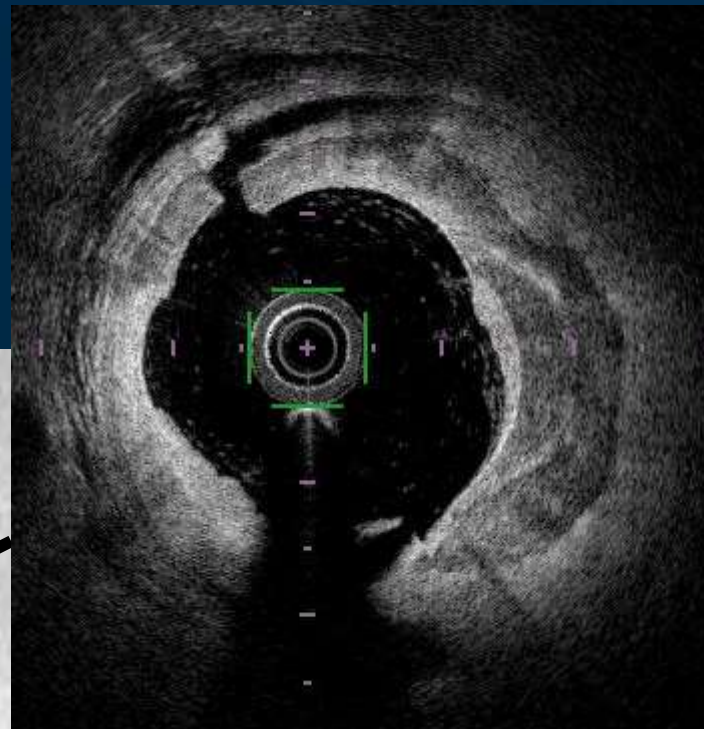
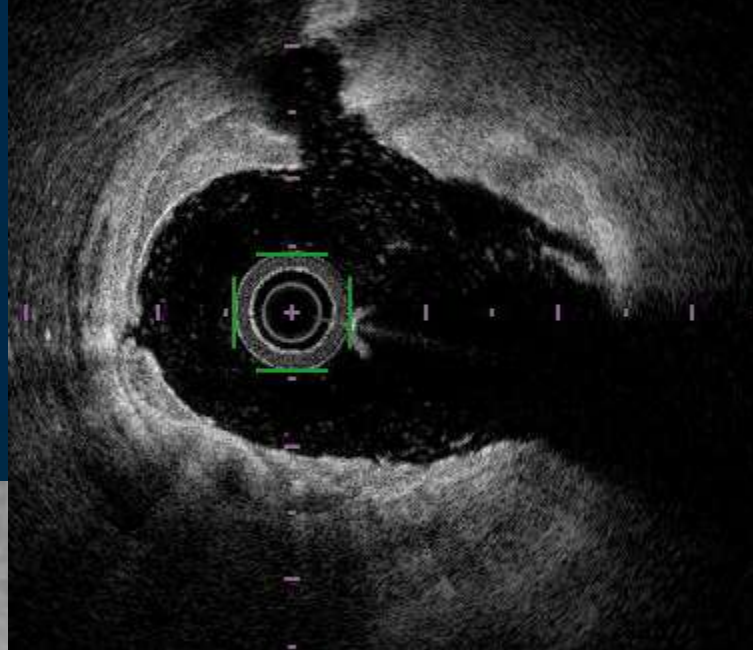


Cutting balloon 2.75mm 14atm
SeQuent Please 3.0x30mm at 10 atm



Final

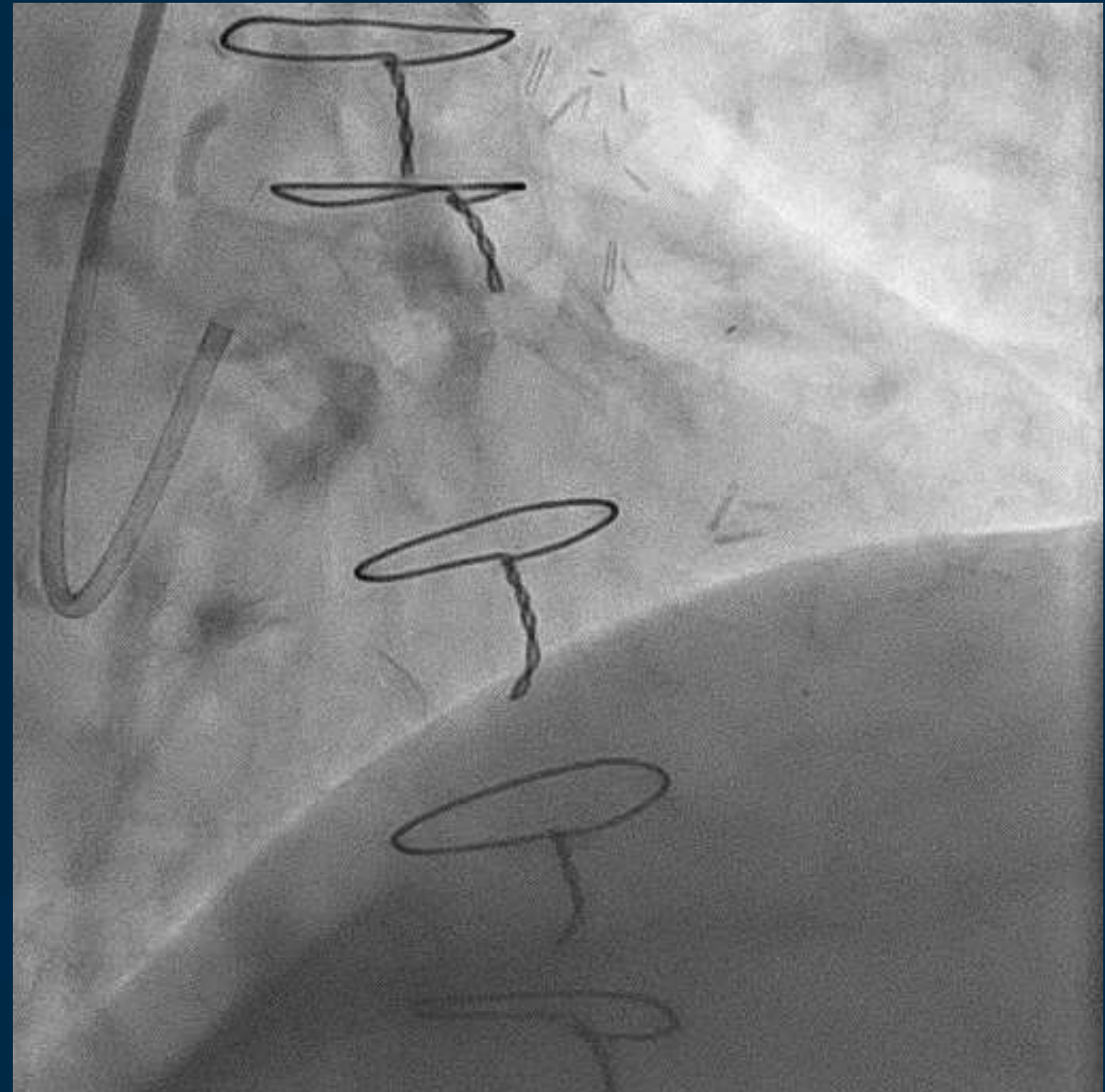
Rota 2.0
Cutting 2.75
DCB 3.0mm



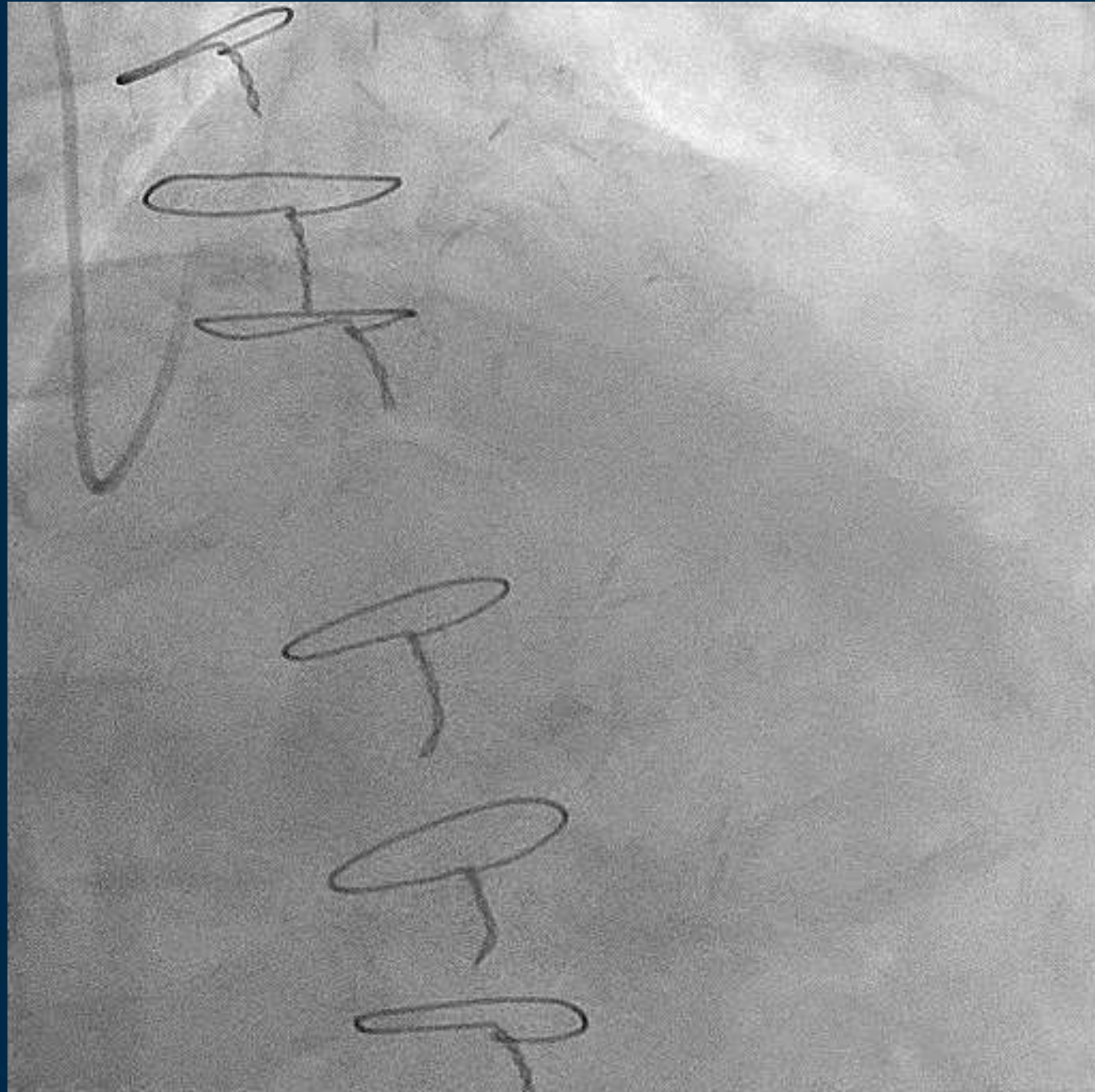
Pre PCI



Post Rota 2.0mm+cutting+3.0mm DCB



4m FU



Conclusion of the case

Rotablator is powerful device to **reduce calcium volume**.

An operator must be nervous when using Rotablator in very complex situation.

Orbital atherectomy

Classic Crown

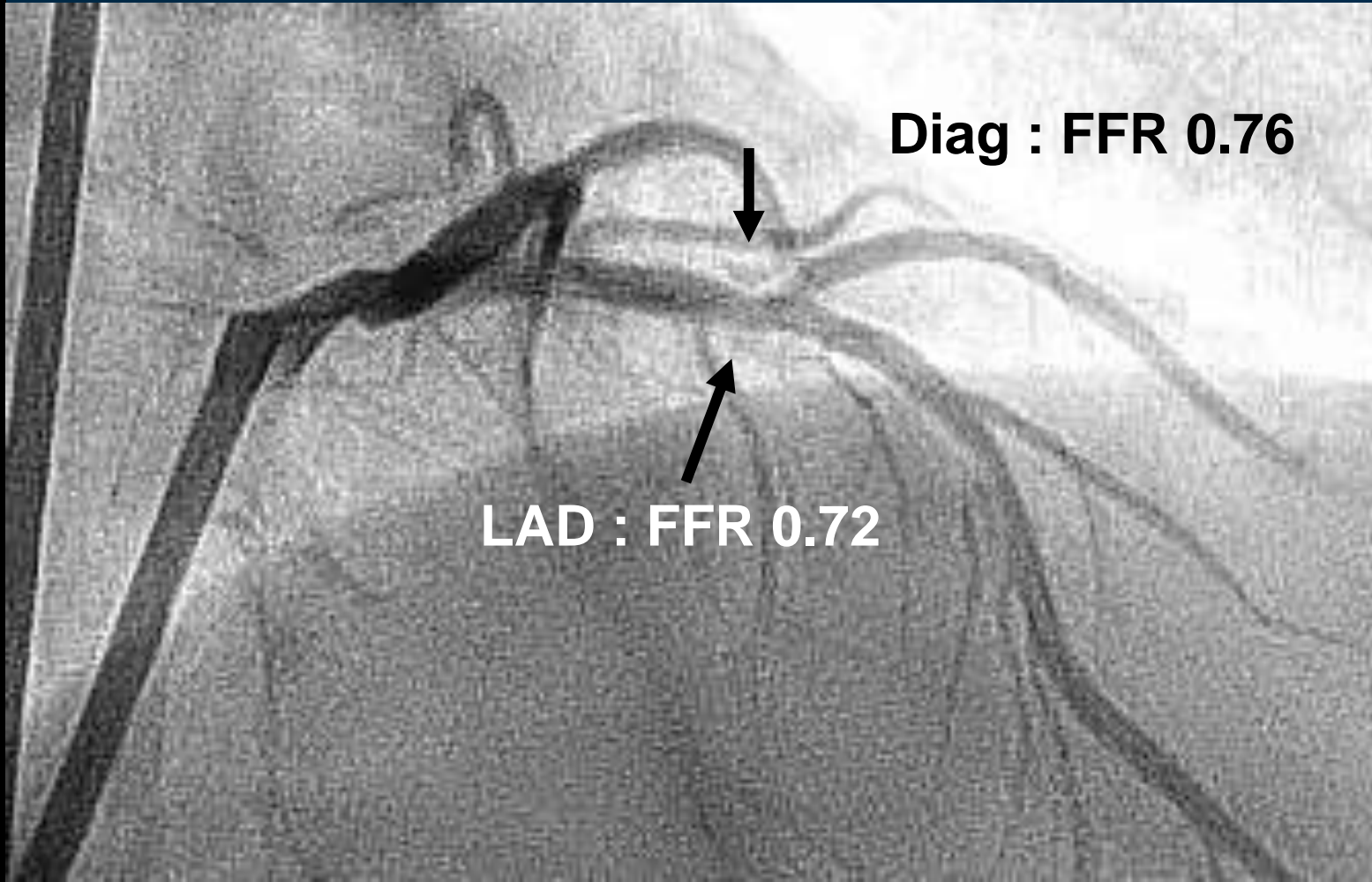
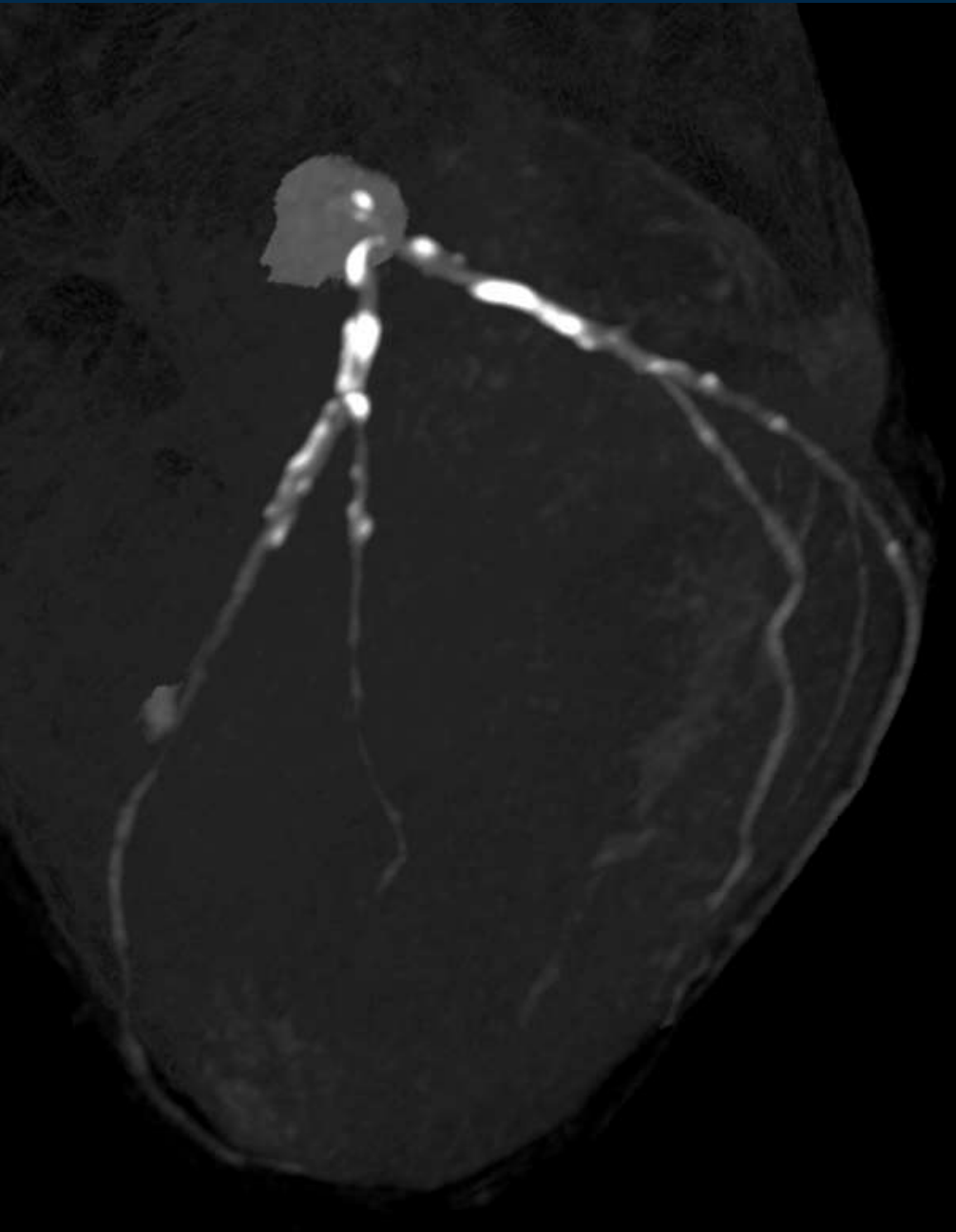
2019.2-



- Newly introduced device for calcium debulking.
- One size (1.25mm) crown has two rotational speed changes the working range.
- The device is flexible that is an advantage to make small curve.

Case example : LAD proximal lesion

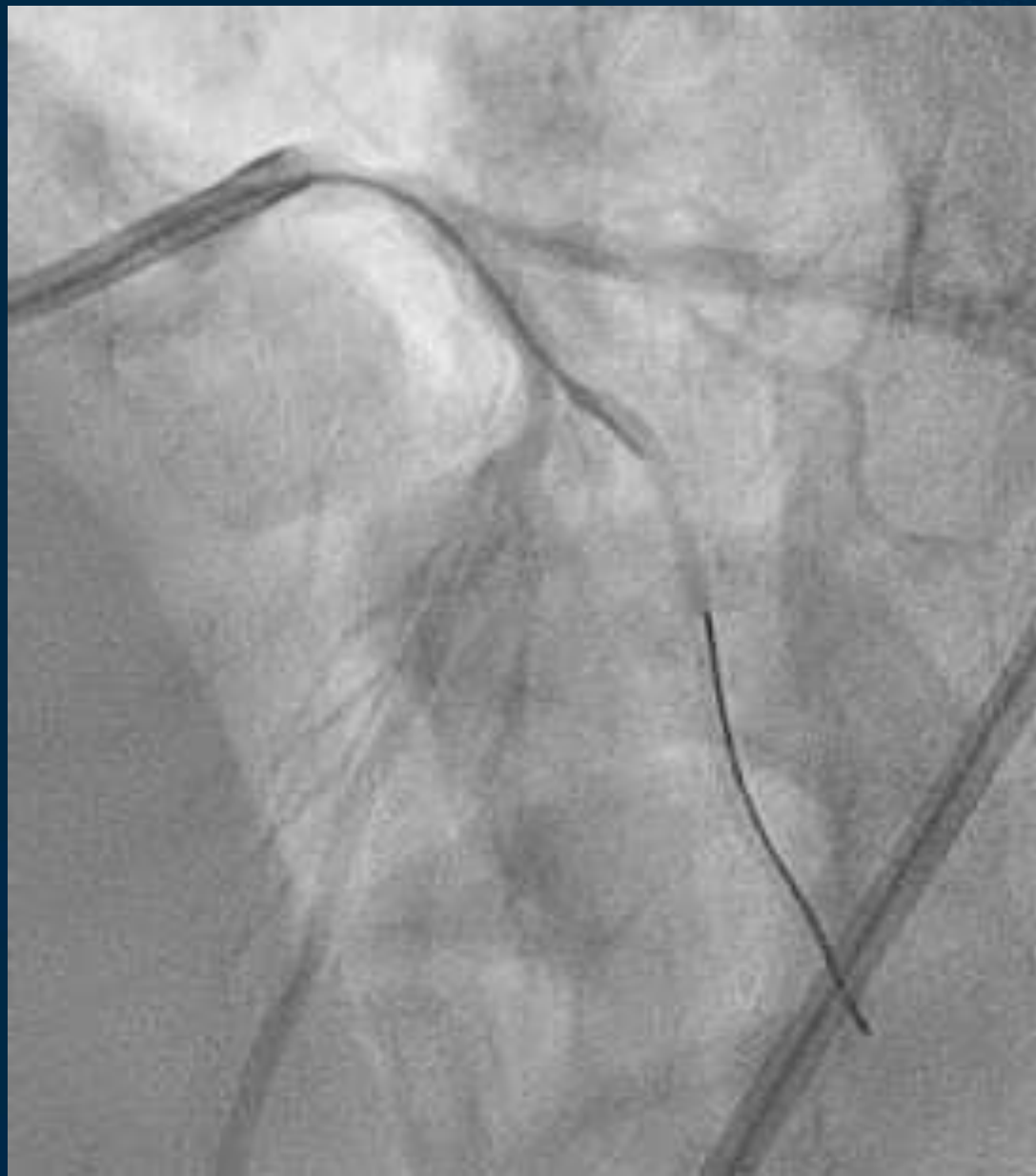
78y male



LAO cranial view



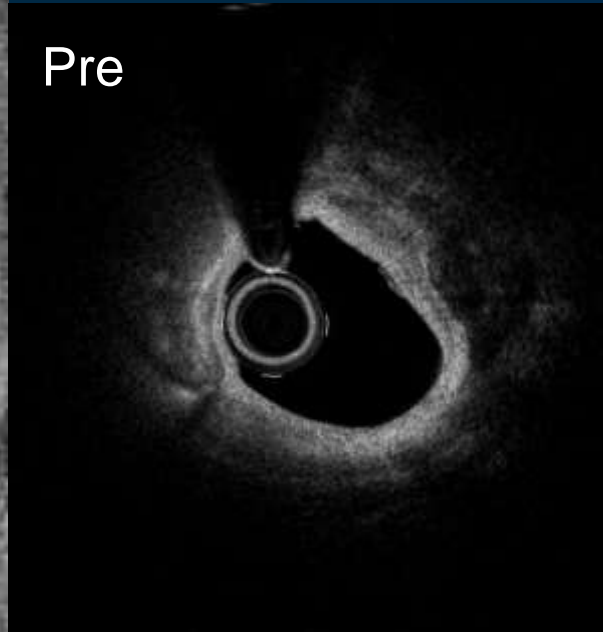
Pull back OAS



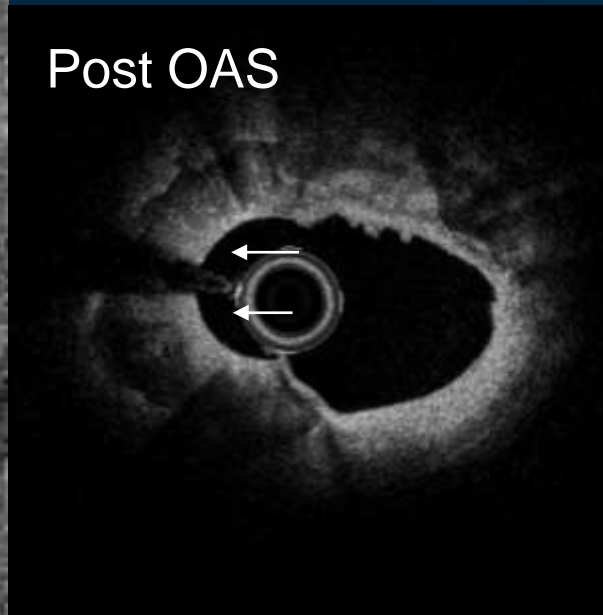
Post OAS low speed 8 times



Pre



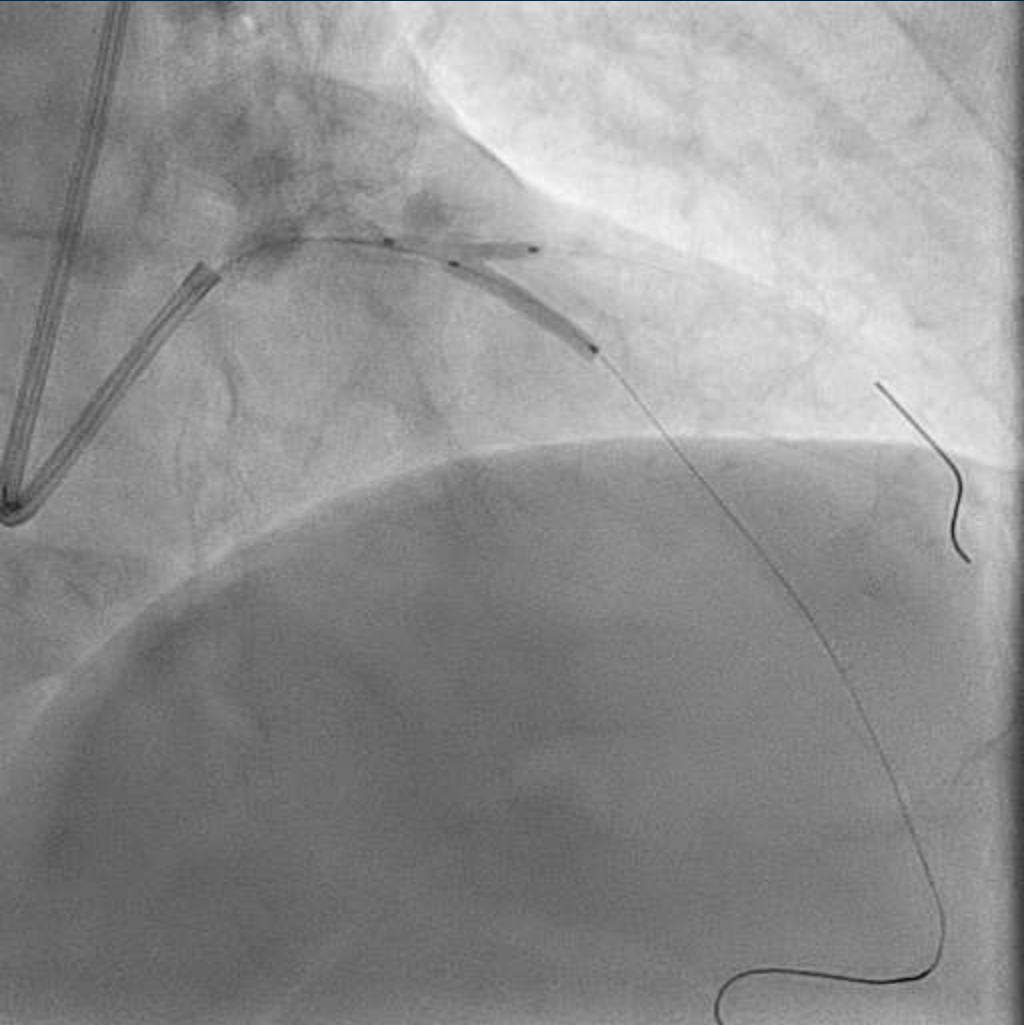
Post OAS



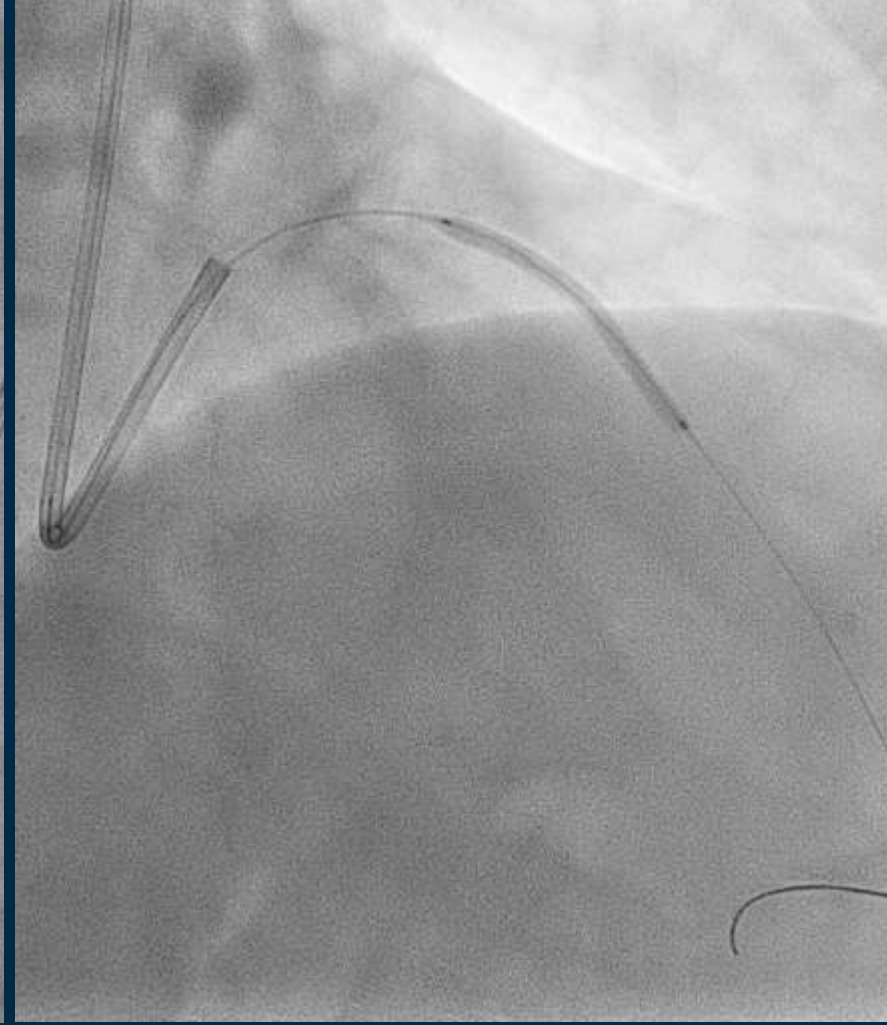
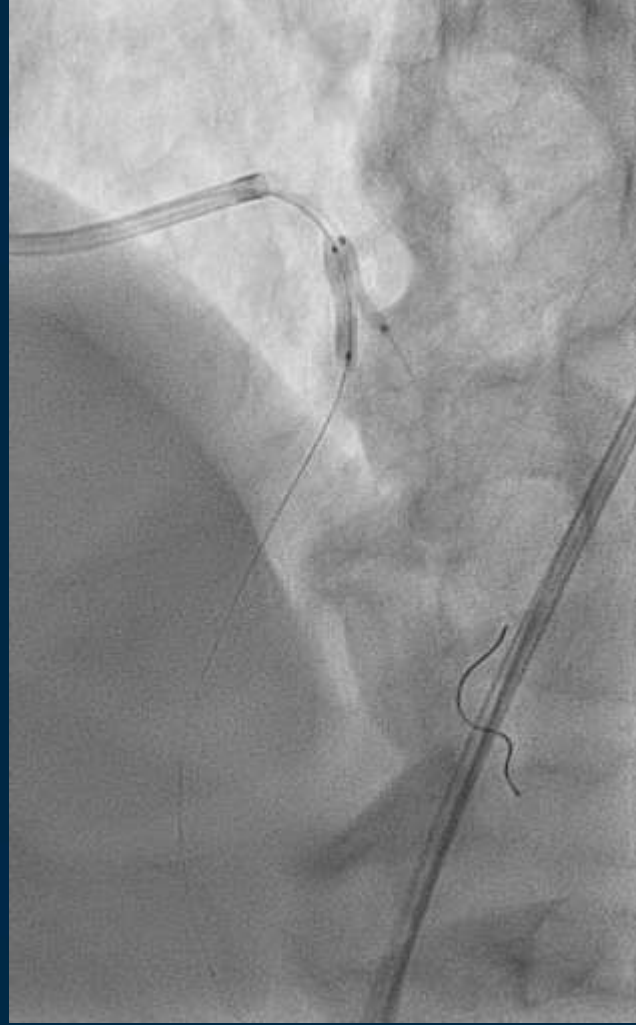
OAS does not make an orbital shaving, because coronary artery has several bends.

Basically, **the device runs on the wire** like Rotablator.

LAD Cutting 2.5x15mm
Diagonal 2.0 x 15 mm 6 atm



Alternative DCB LAD 2.5x 30 mm 6atm
Diagonal 2.5 x 20 6atm



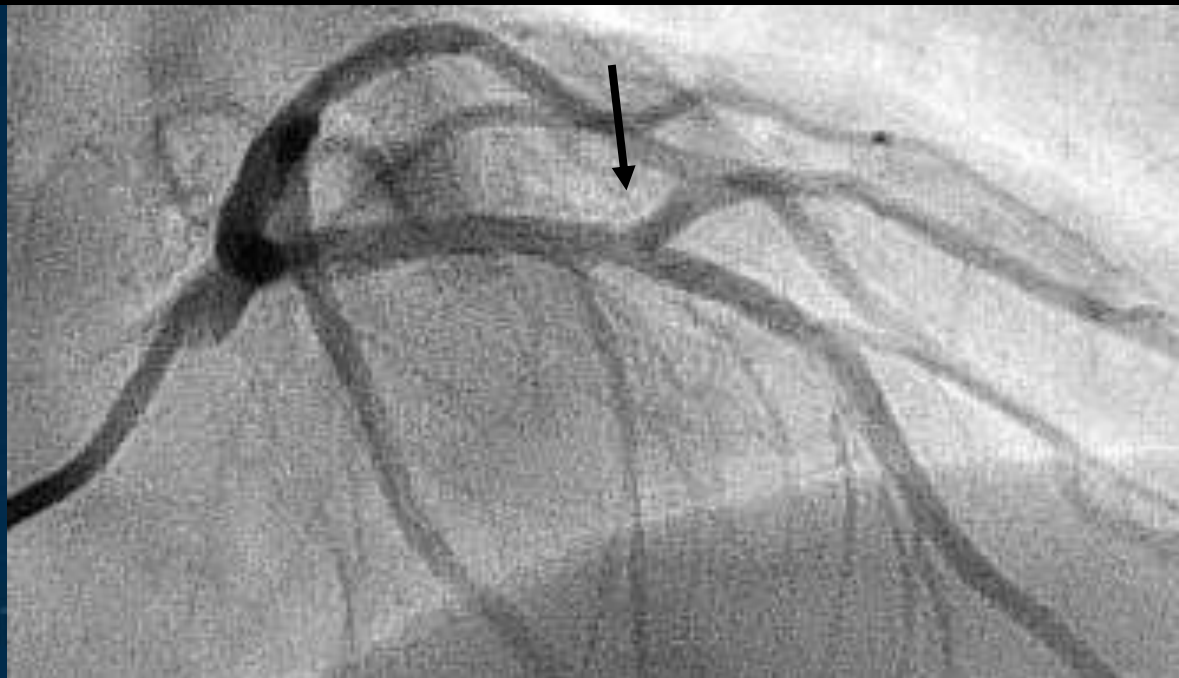
Final angiogram after OAS + DCB



Pre PCI for calcified LAD and Diagonal lesion



6 Months follow up after OAS + DCB



Features of OAS

- Diamondback is effective at the **small bend lesion** because of flexibility.

Summary of these two debulking devices

- The guide wire must contact on the calcified plaque (**Needs good wire bias**).
- Still there are risks of slow flow and perforation.
- Reading of intravascular imaging is required to master these tools.

Shock wave

- Shock wave is unique device that cracking calcium by sonic pressure wave.
- Advantage of this device **does not require a wire bias.**
- It is safe **without coronary rupture or slow flow.**



Case example : ACS of RCA

68y Male

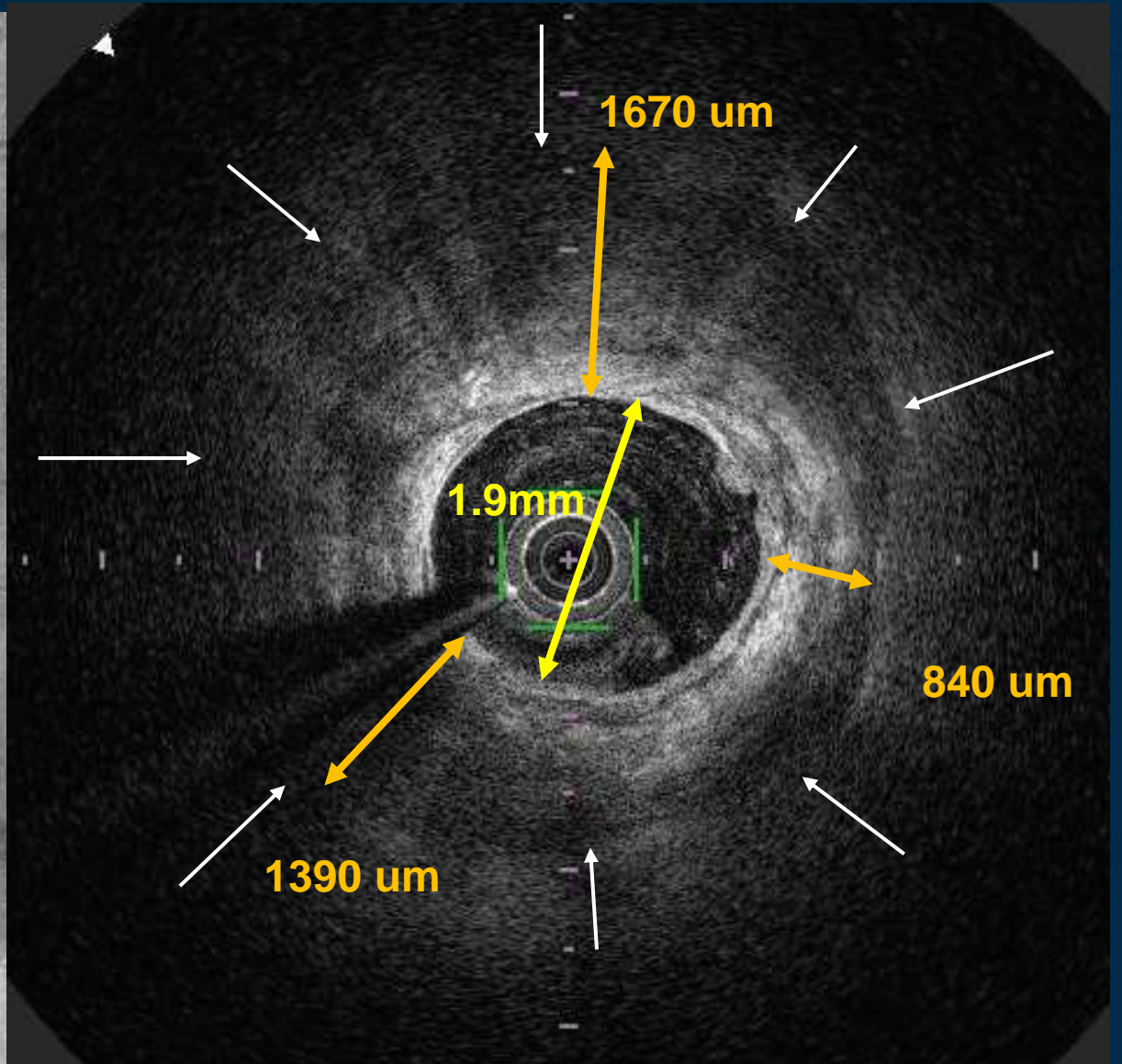
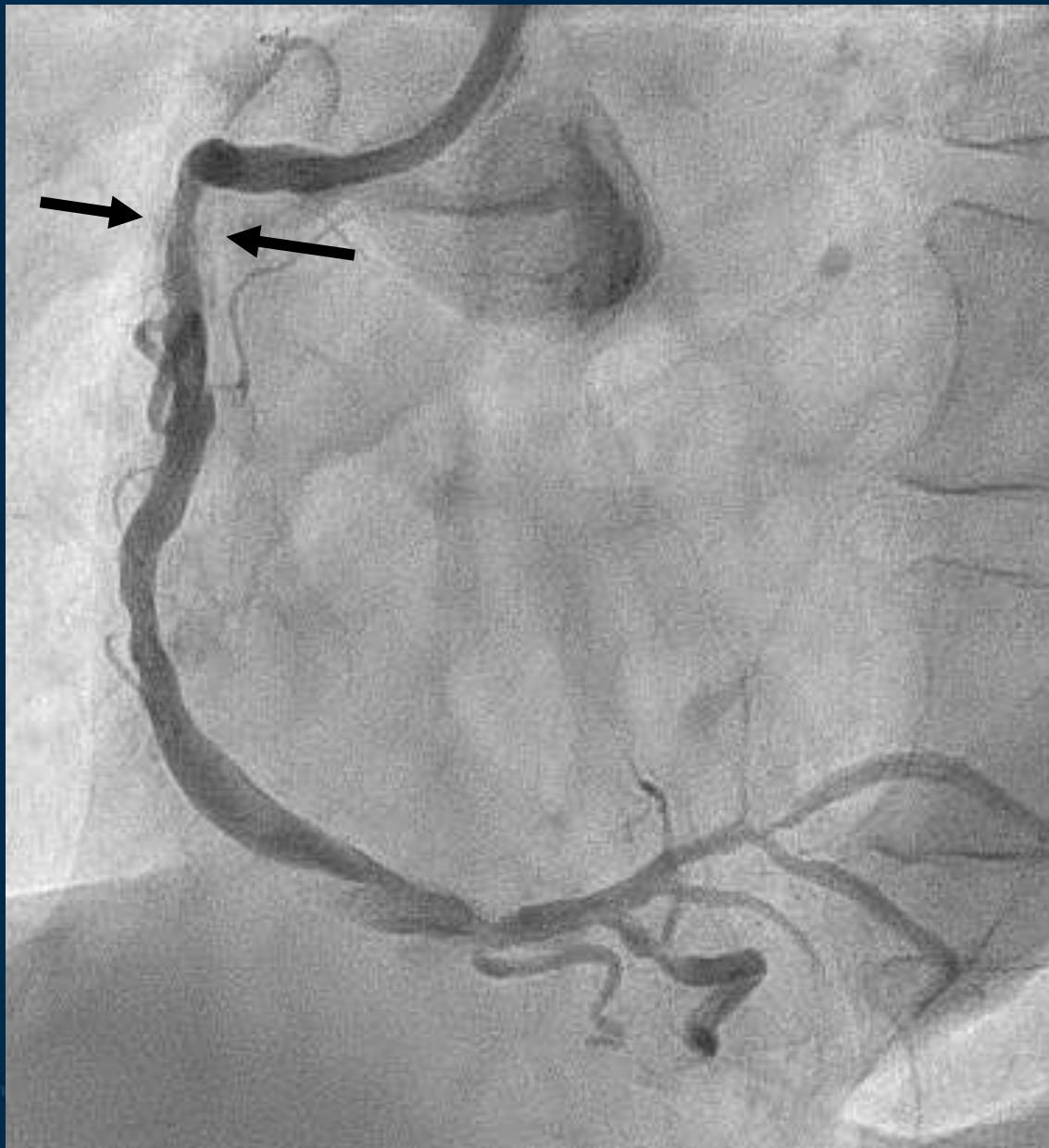


Wolverine 2.75mm
14 atm



Scoreflex NC 2.75mm
20 atm

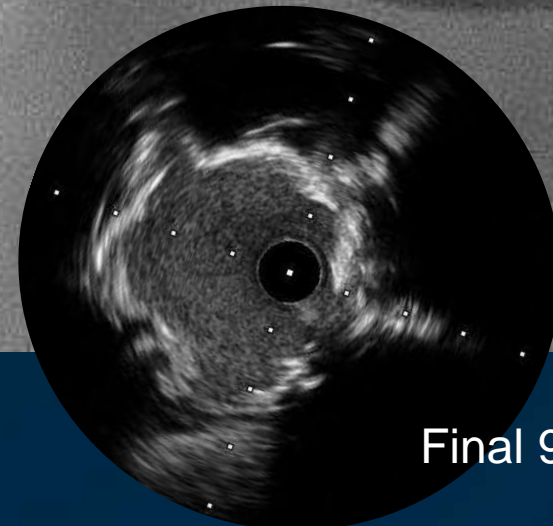
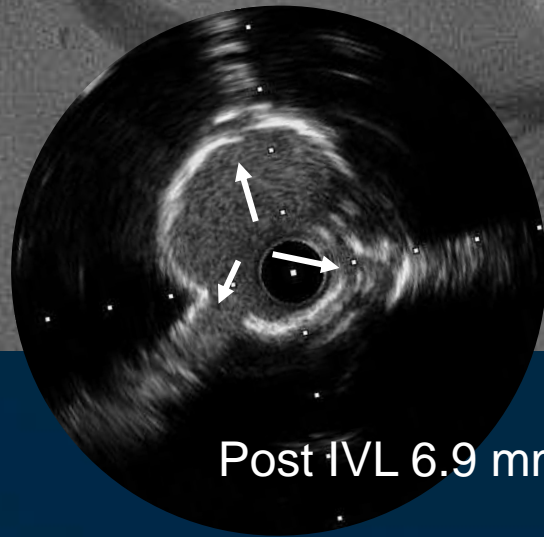
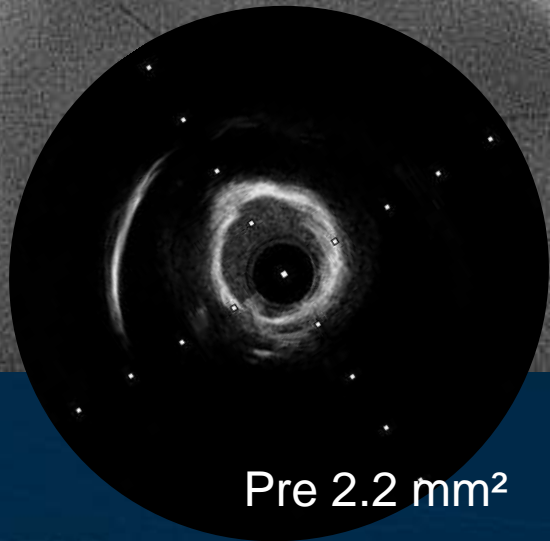
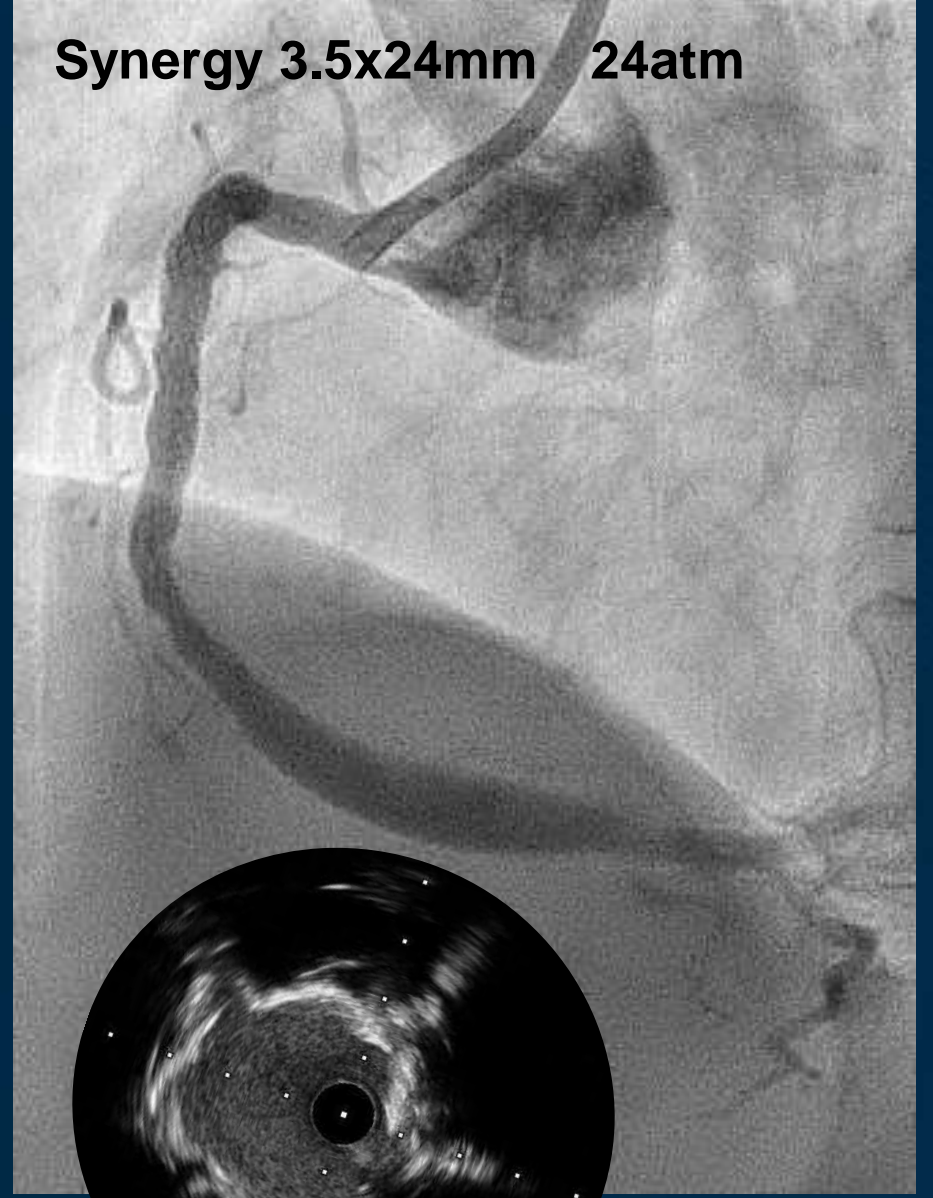
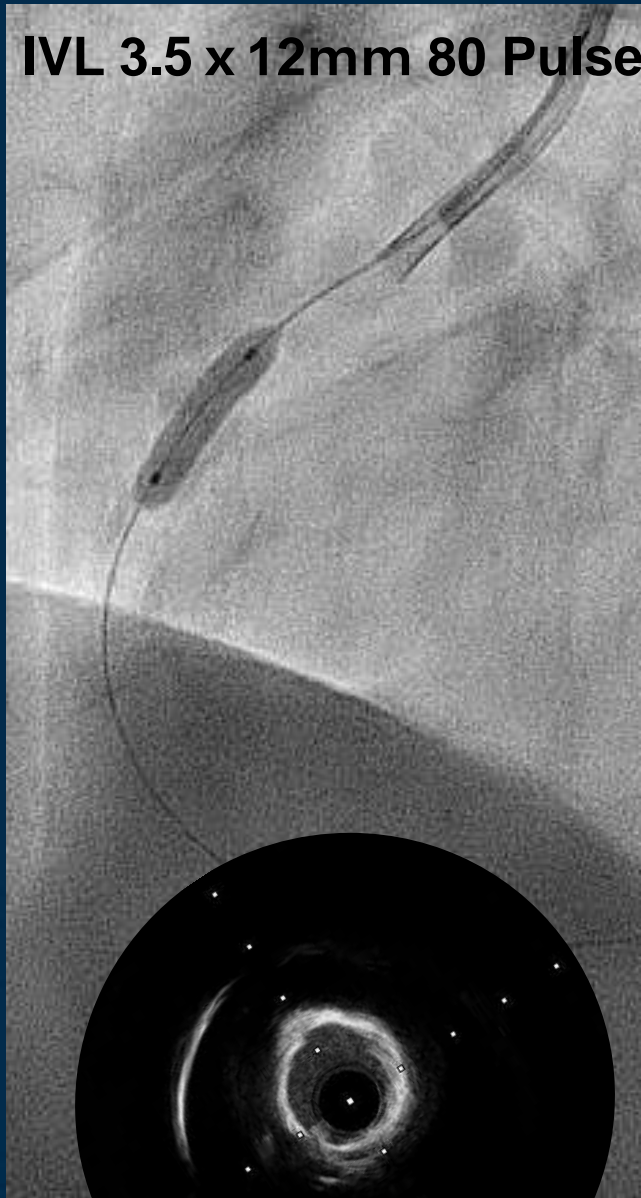
A week later



IVL 3.5 x 12mm 80 Pulses

Post IVL

Synergy 3.5x24mm 24atm



Pre 2.2 mm²

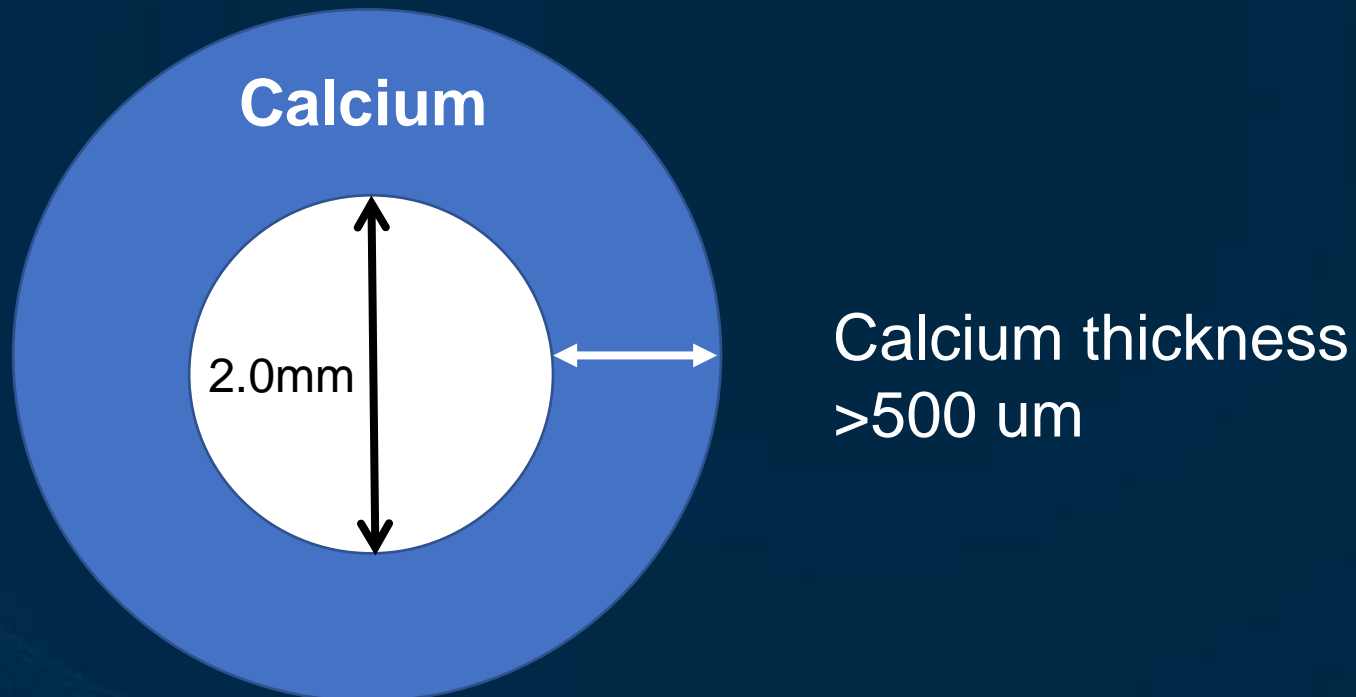
Post IVL 6.9 mm²

Final 9.5 mm²

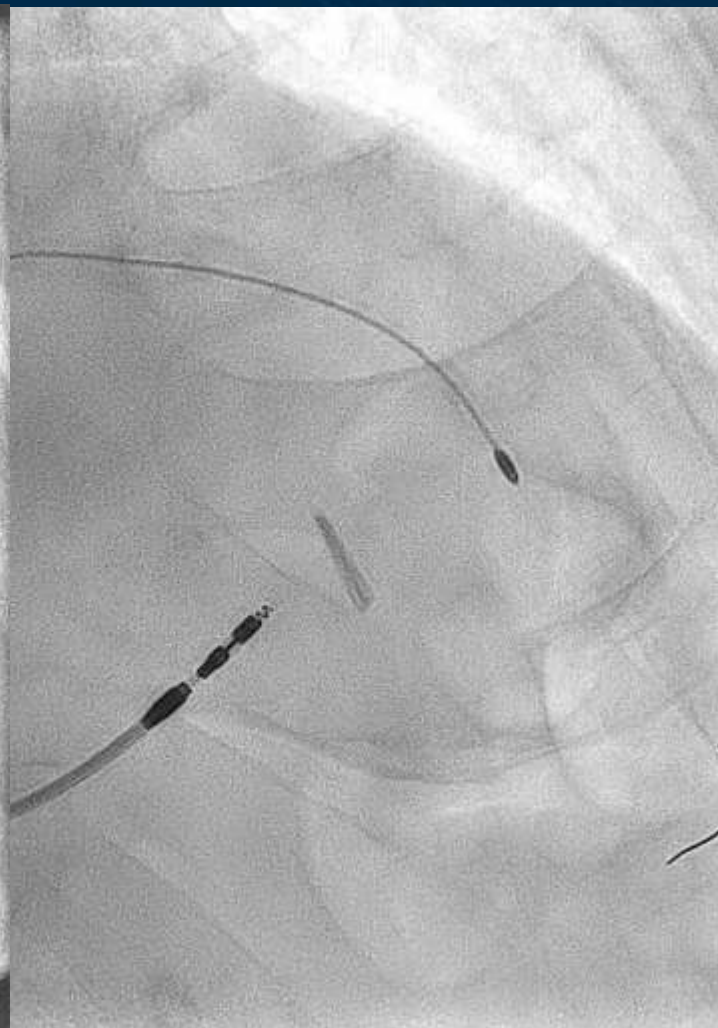
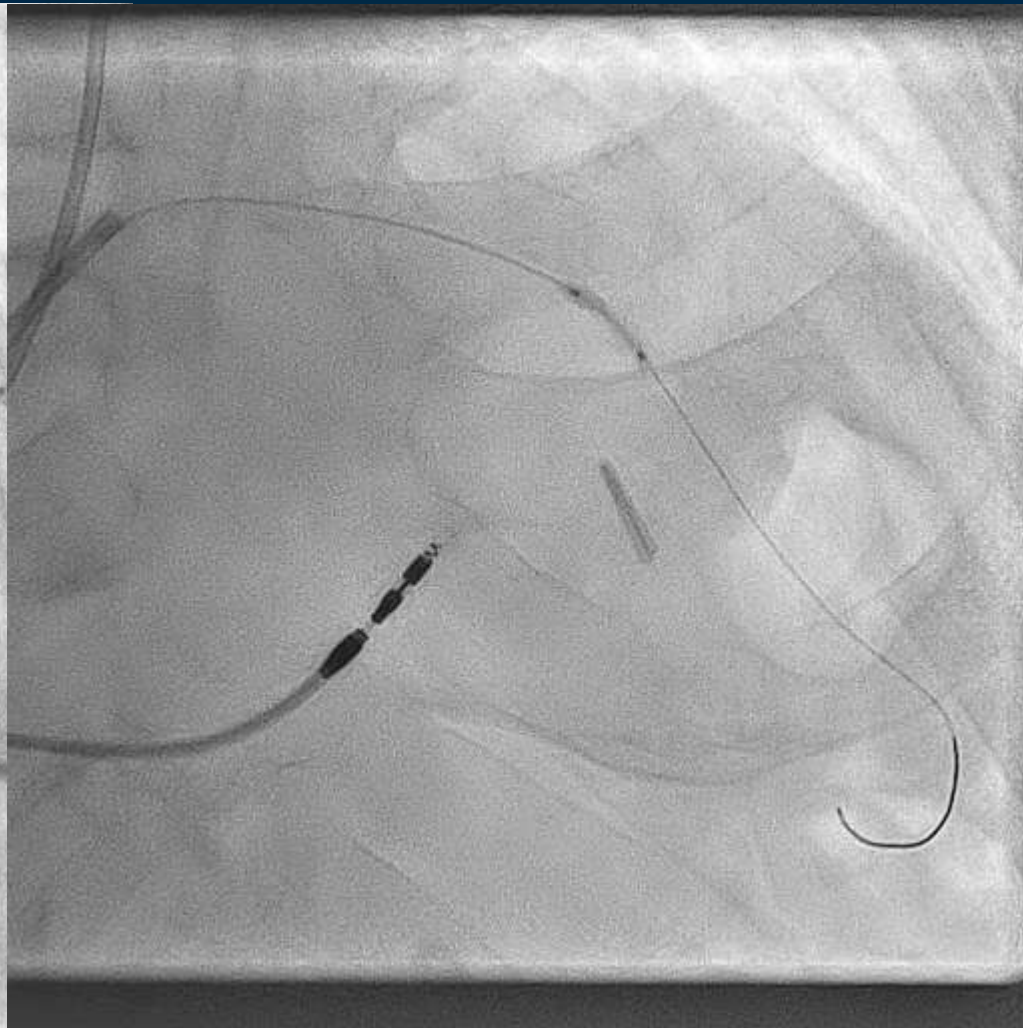
Best indication of IVL

Donut-shaped calcification and inner lumen diameter more than 2.0mm.

Because Rotablator (2.0mm Burr) may not work.



Case example : LAD mid calcified lesion 84y Male

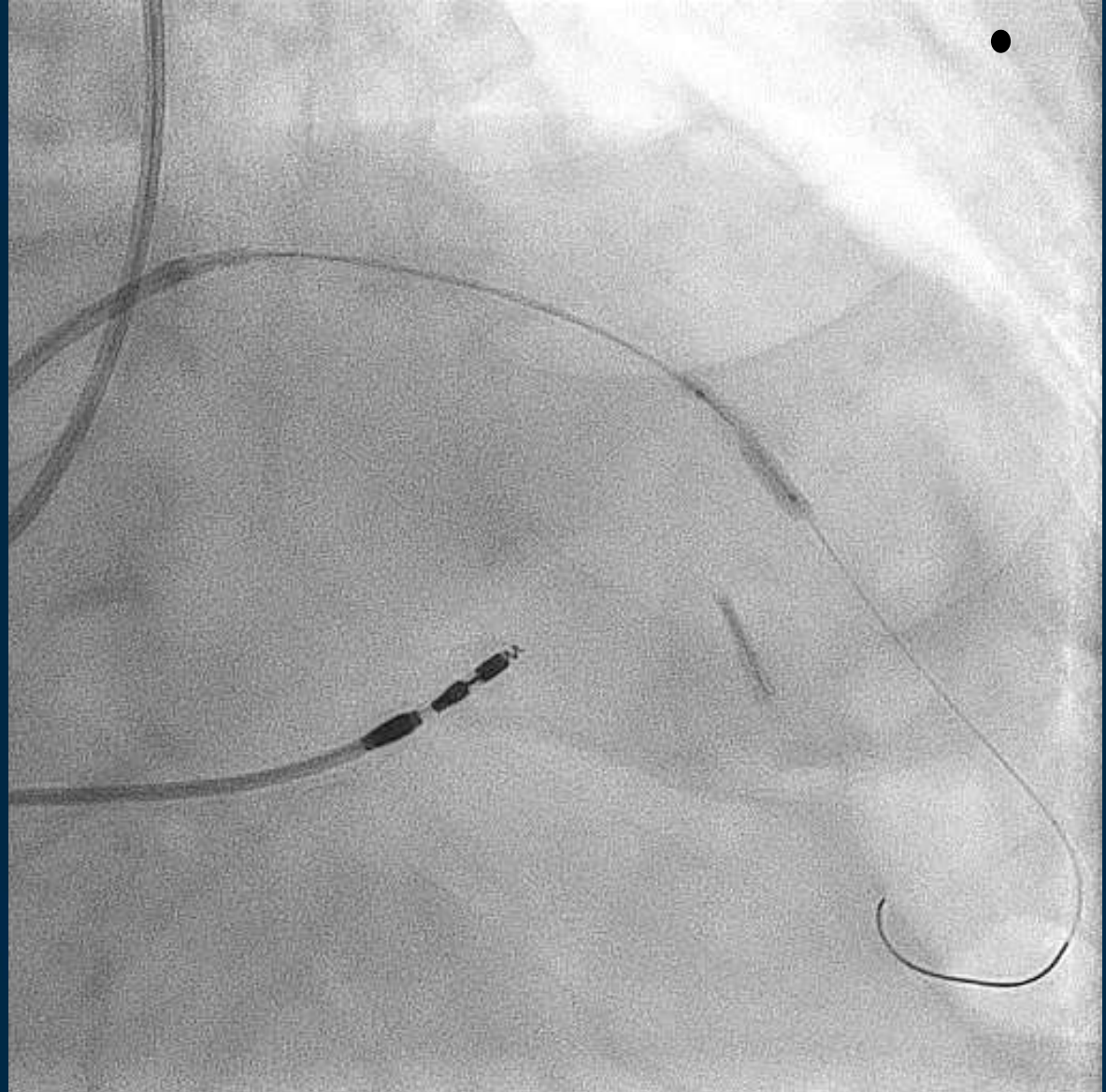


Calcium shadow is detected both side

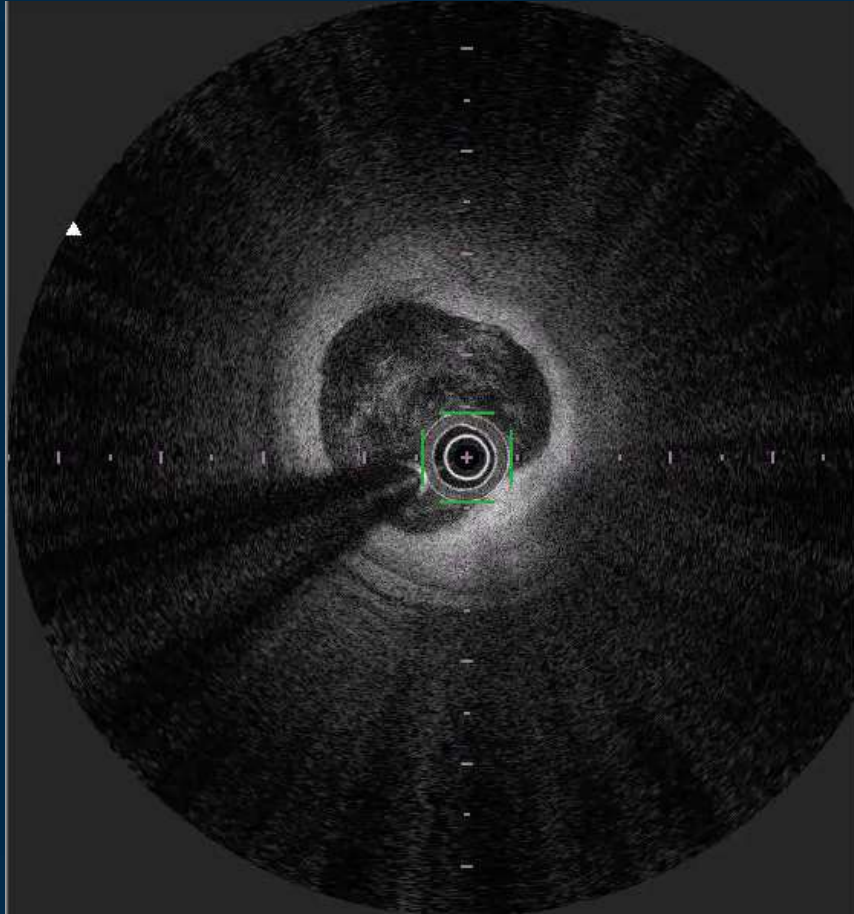
OFDI did not cross
2.0mm balloon 16atm did not expand

Rota 1.5mm Burr 170K

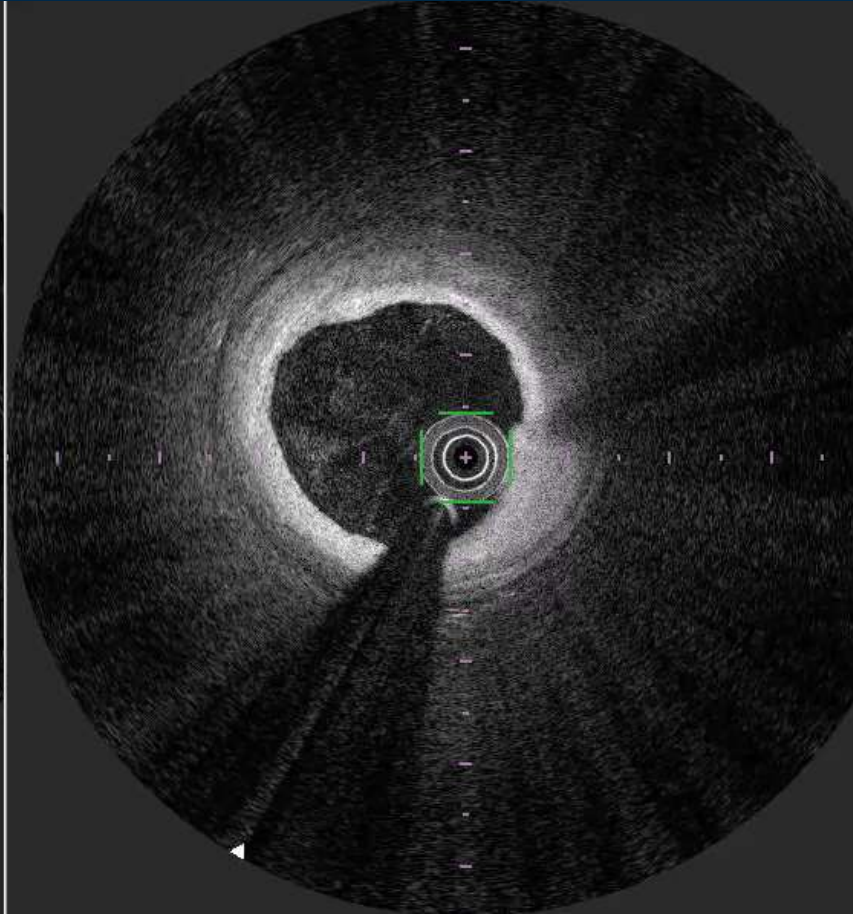
IVL 3.0x12mm was set in the lesion with 4 atm.



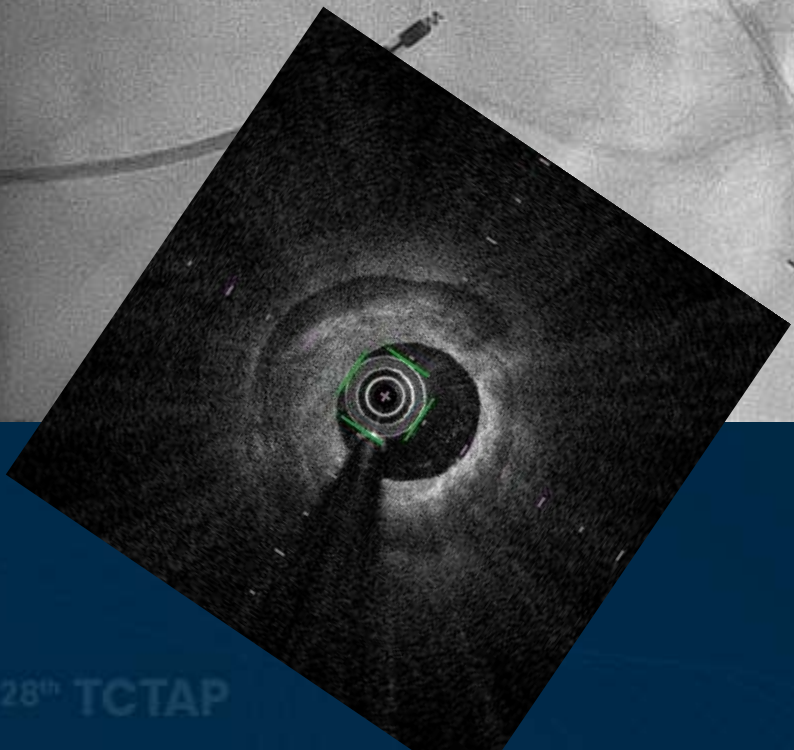
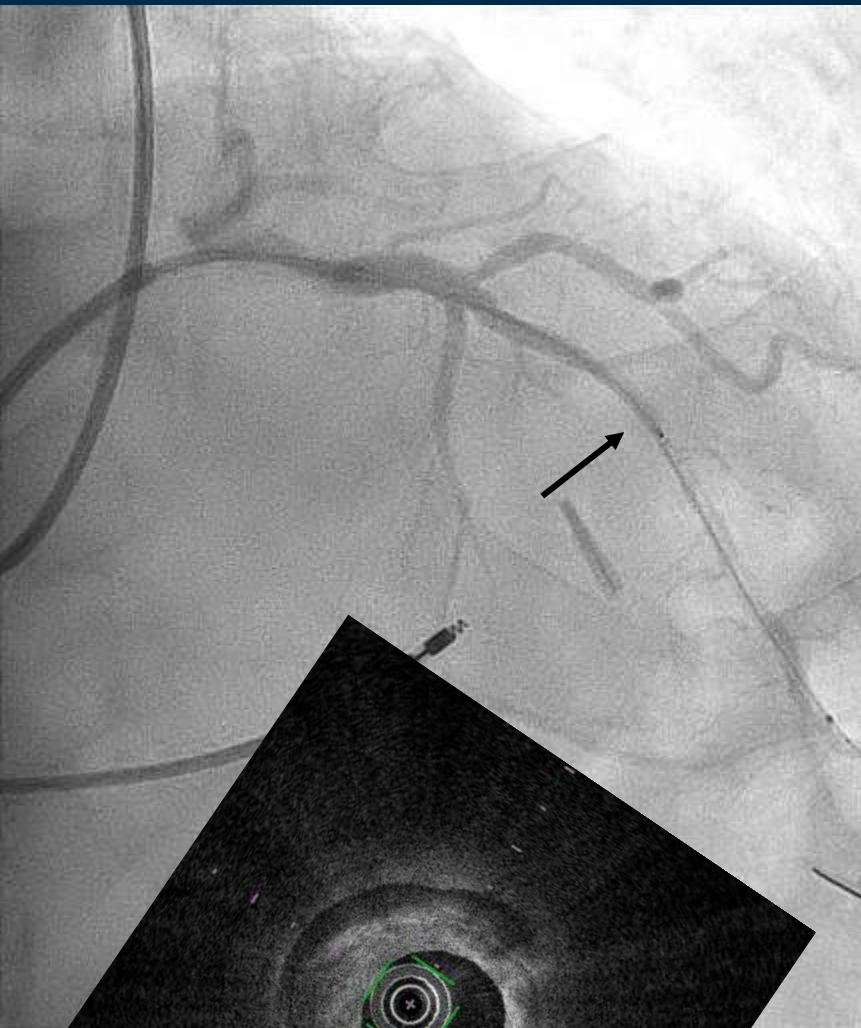
Post Rotablator 1.5mm



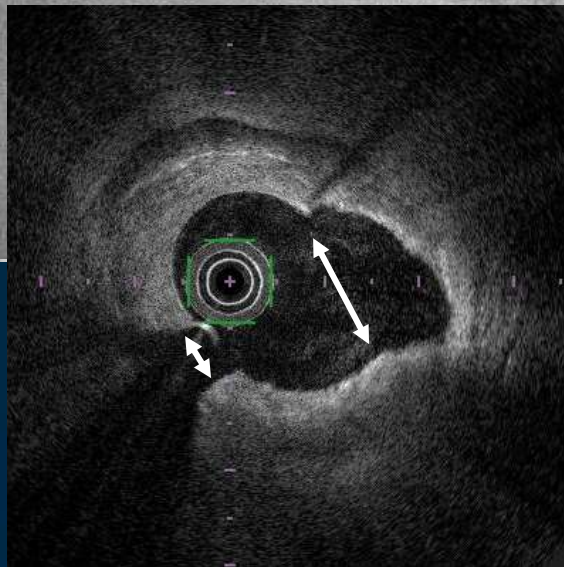
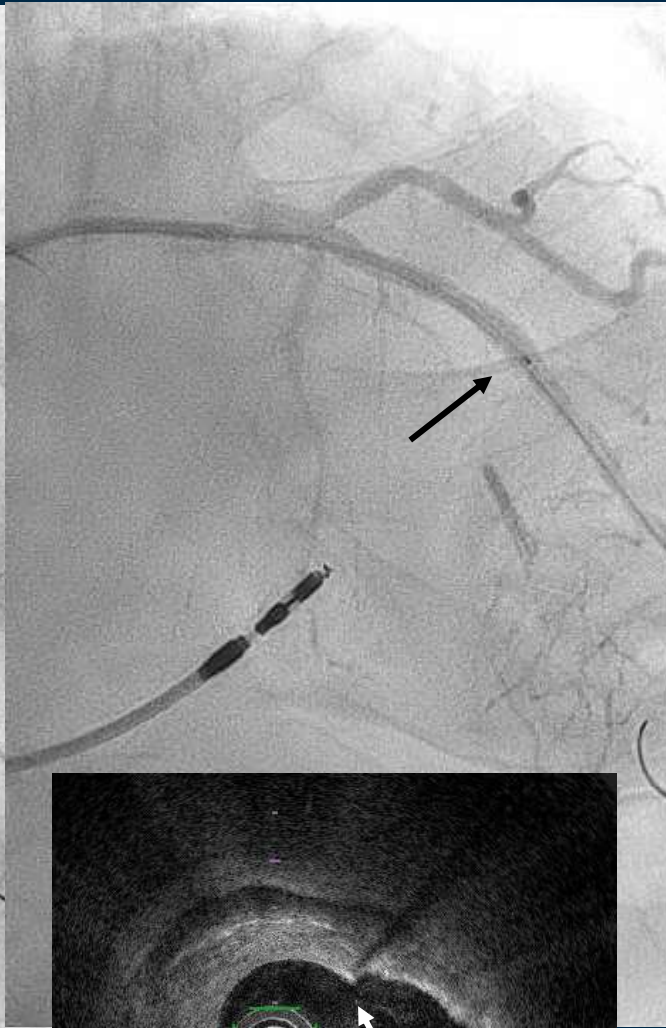
Post 3.0mm IVL 80 pulses



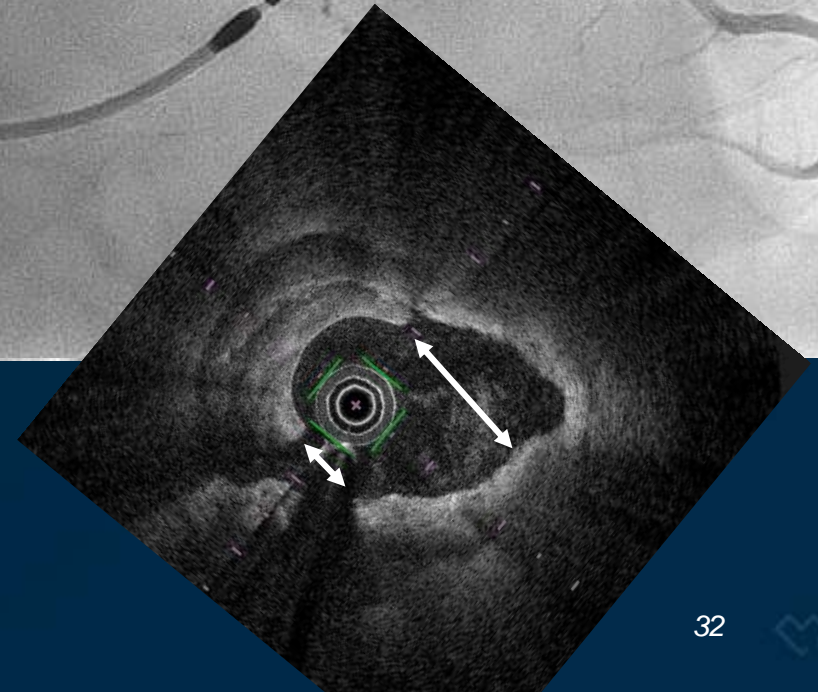
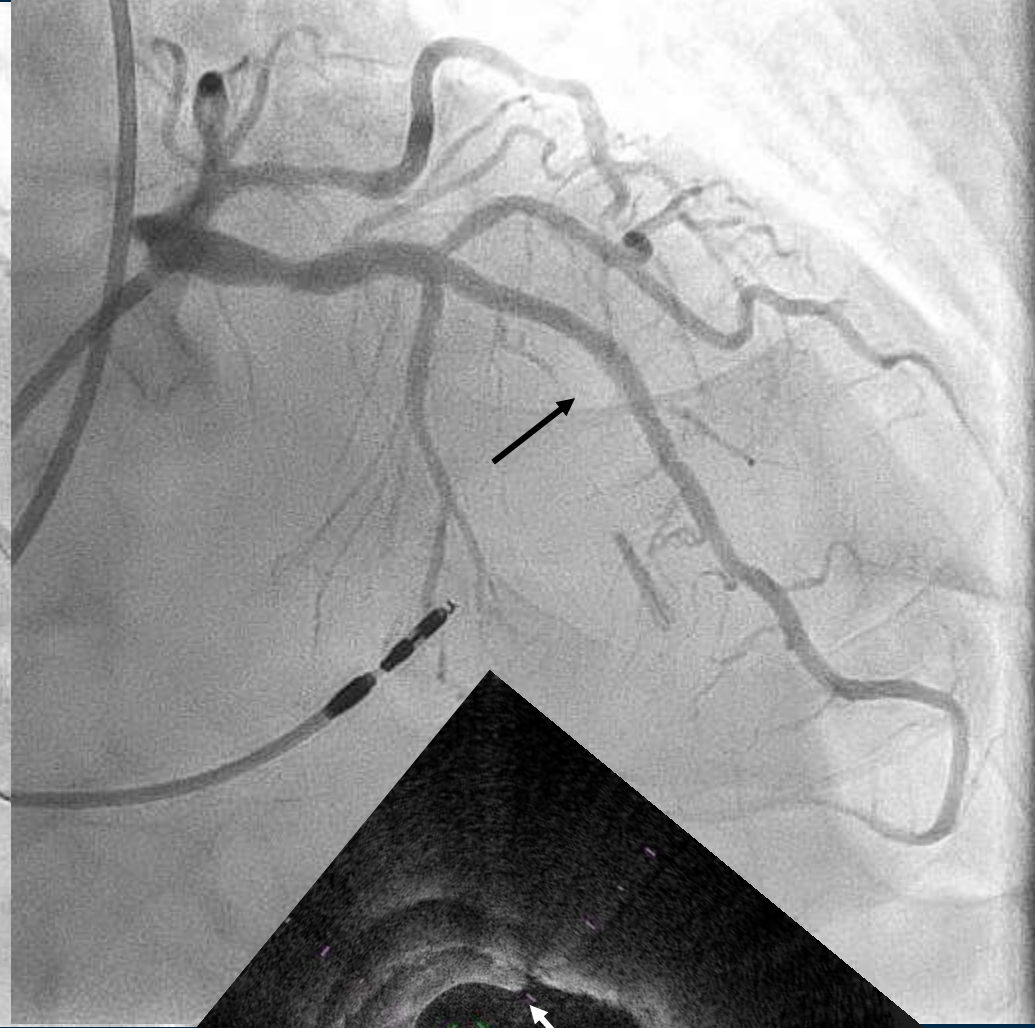
Post 1.5mm Rota



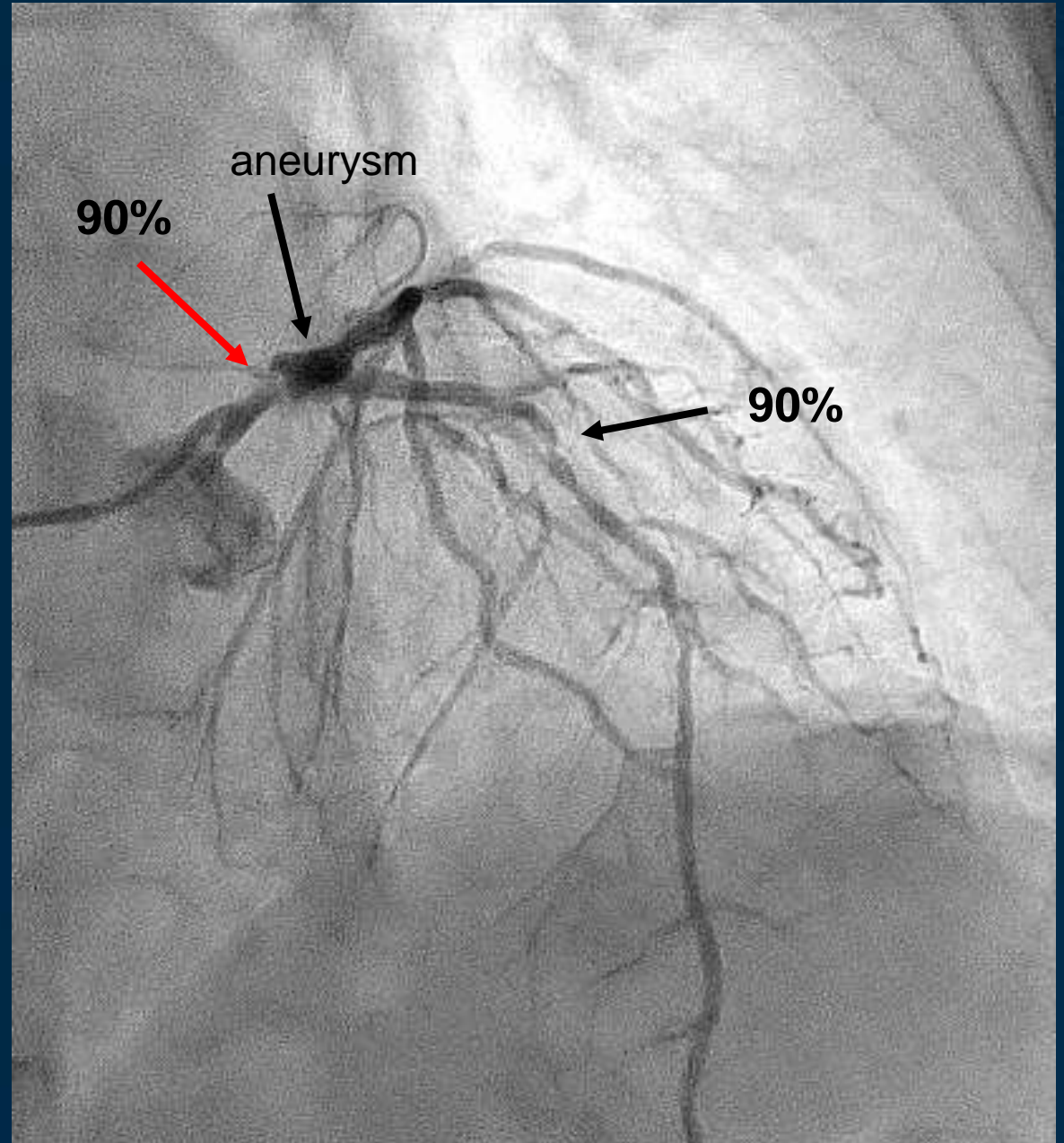
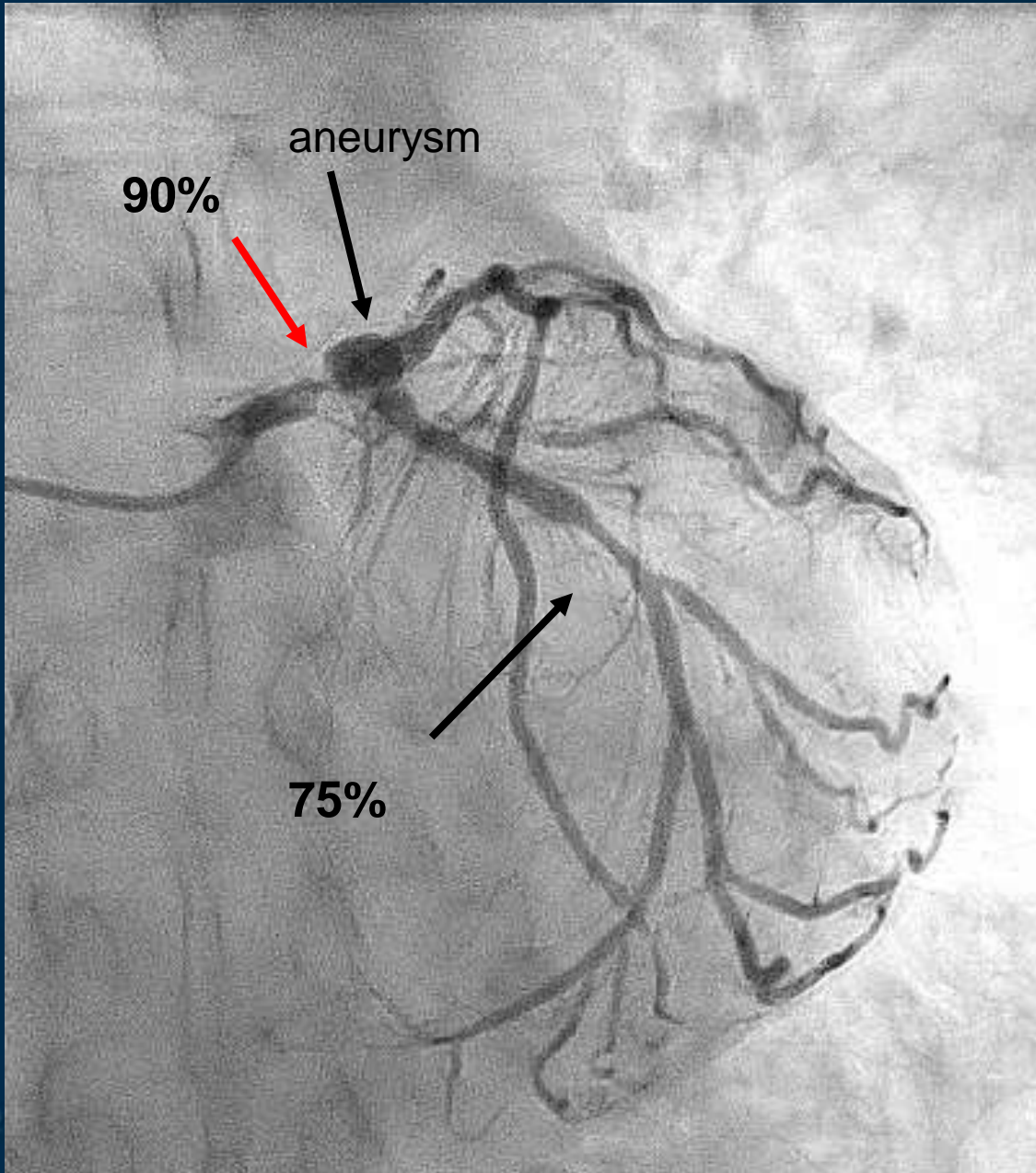
IVL 3.0x12mm 80 pulses



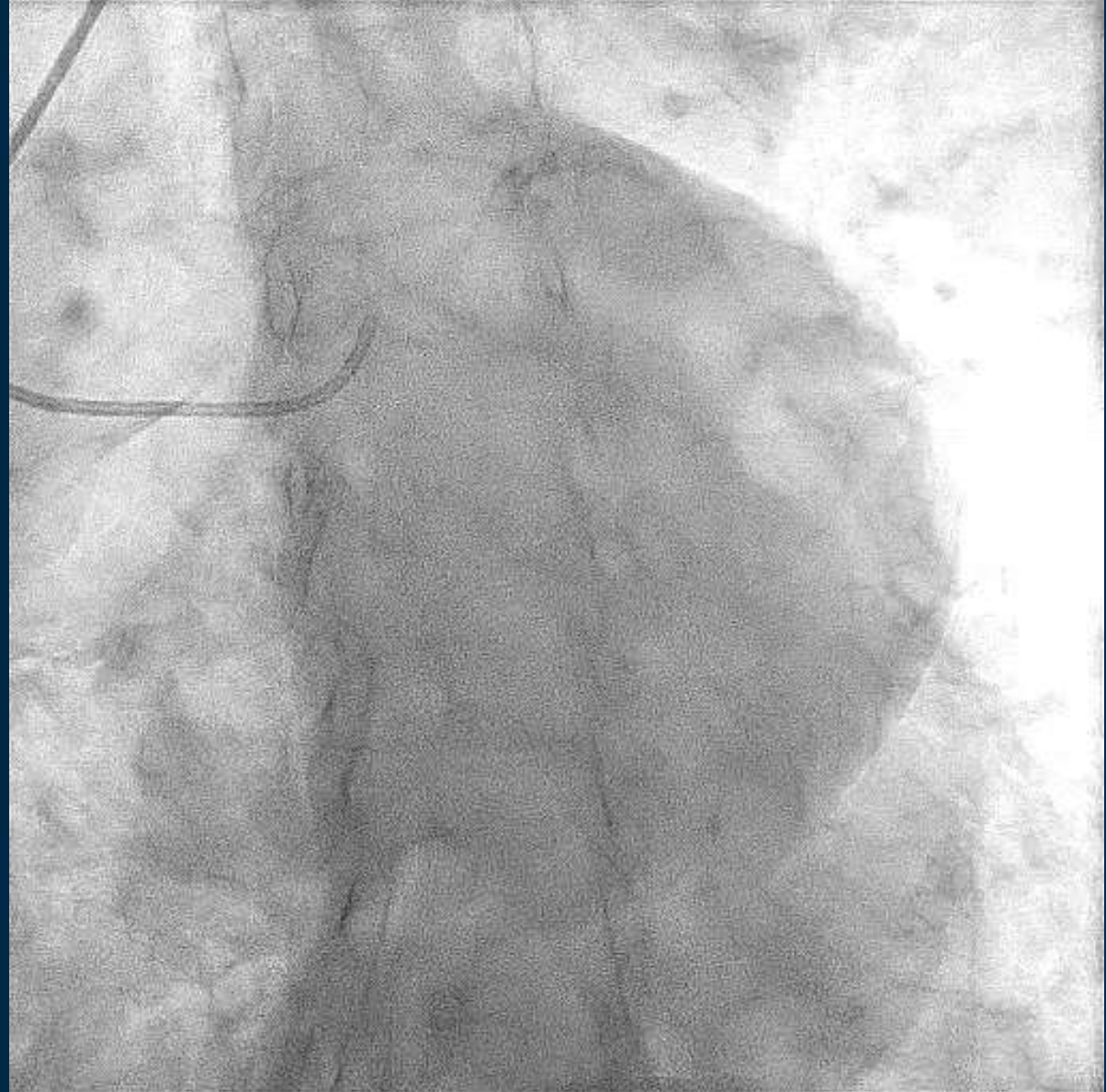
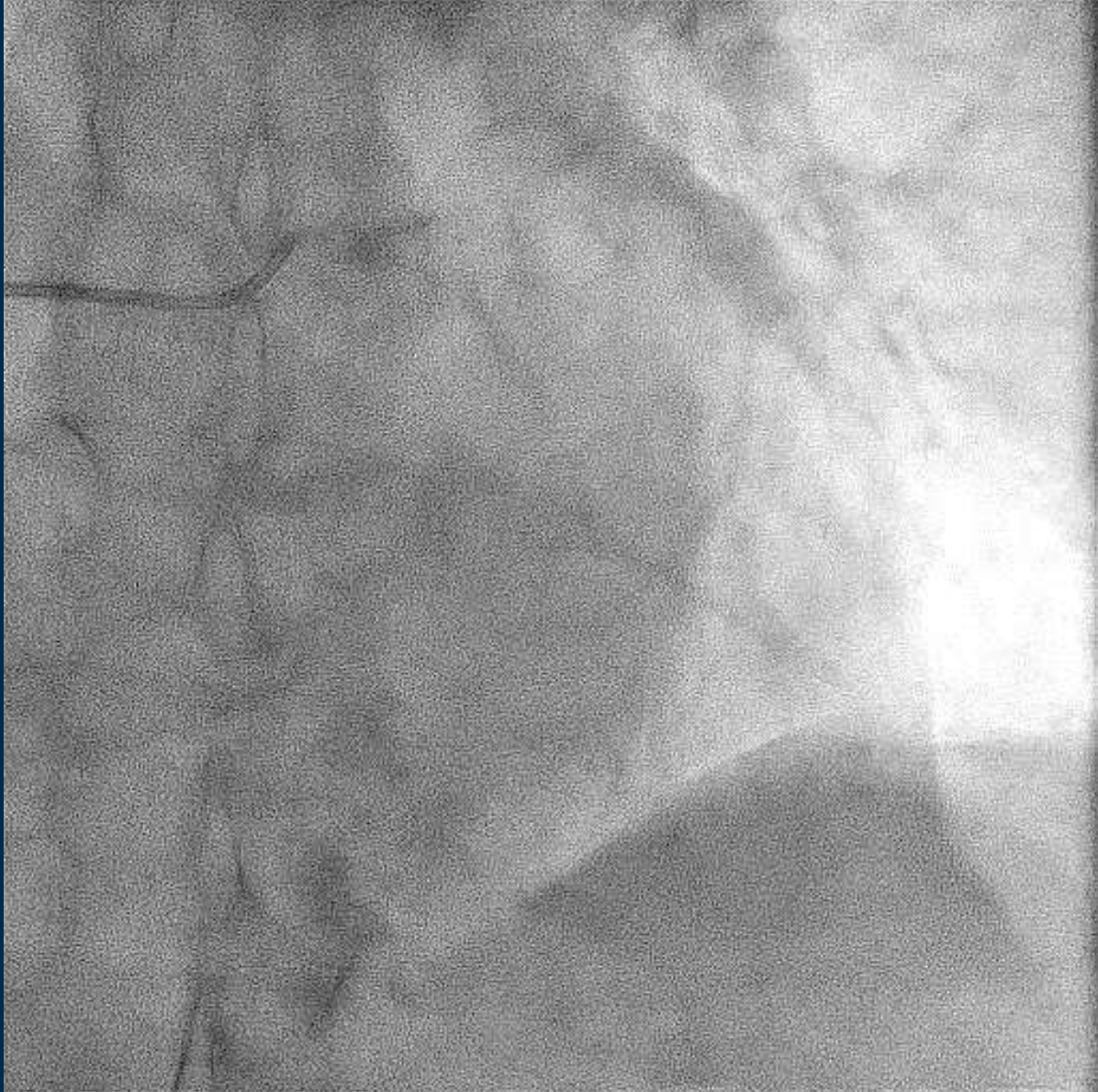
DCB 3.0x30mm 6atm 90sec,



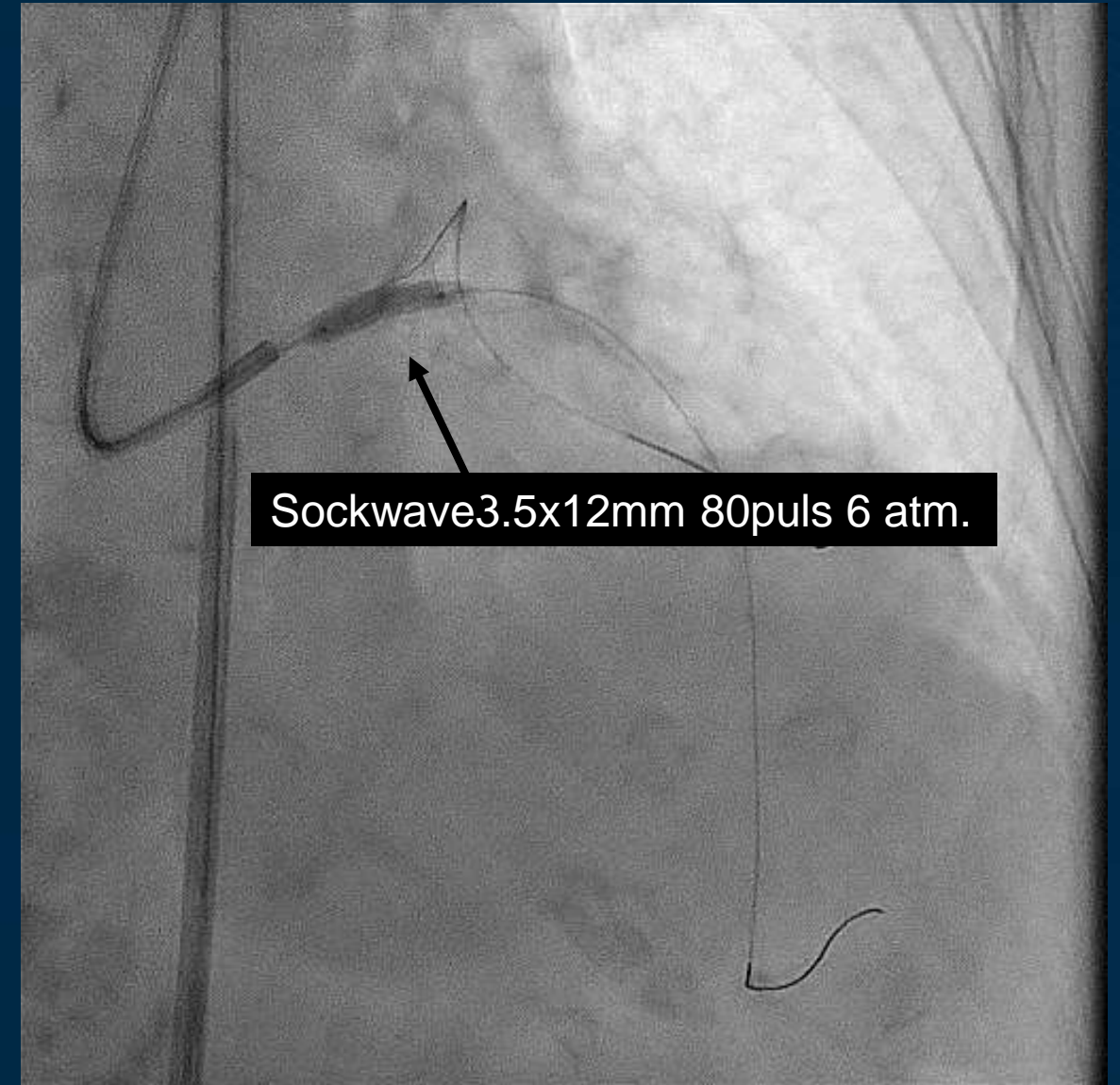
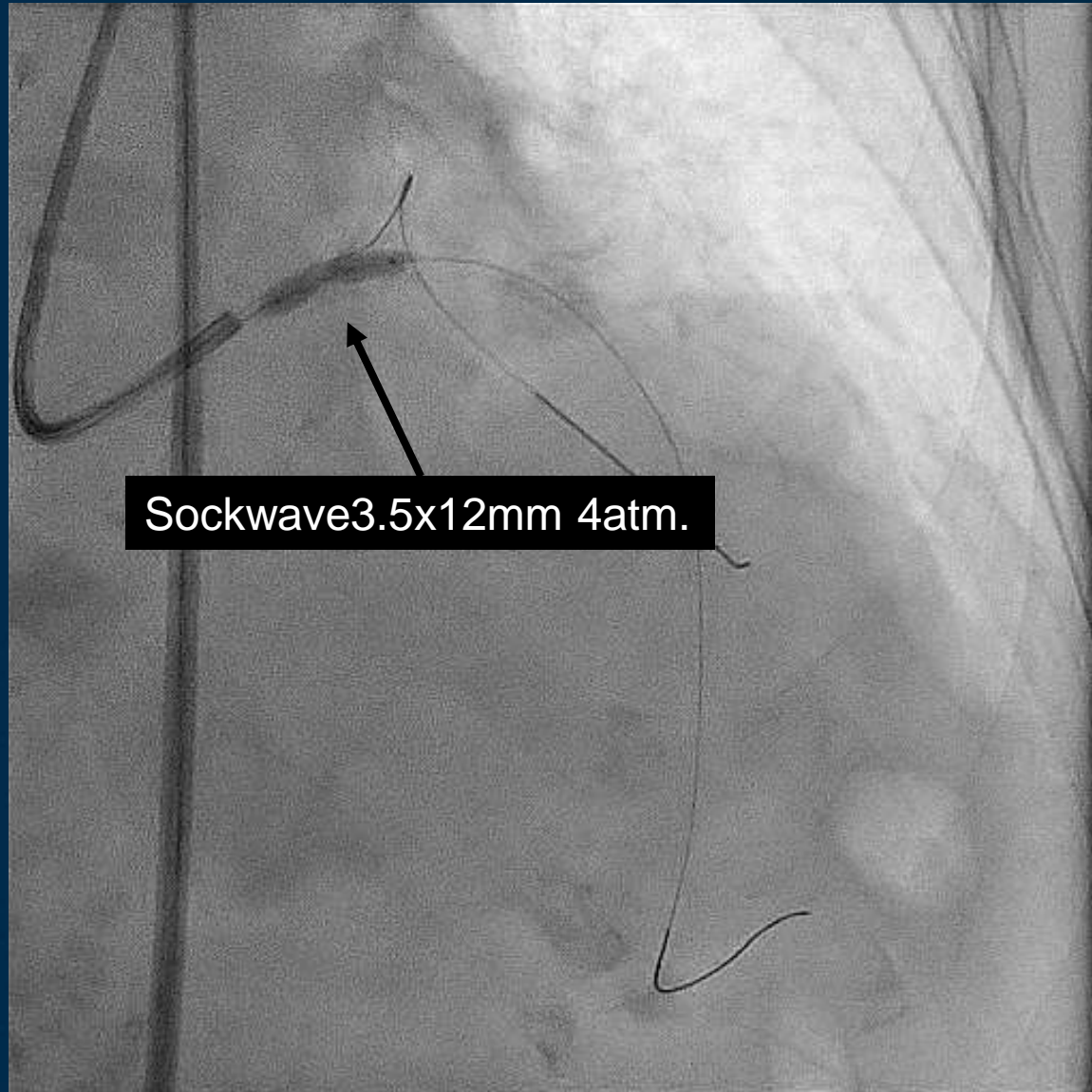
Case example : 91y female UAP



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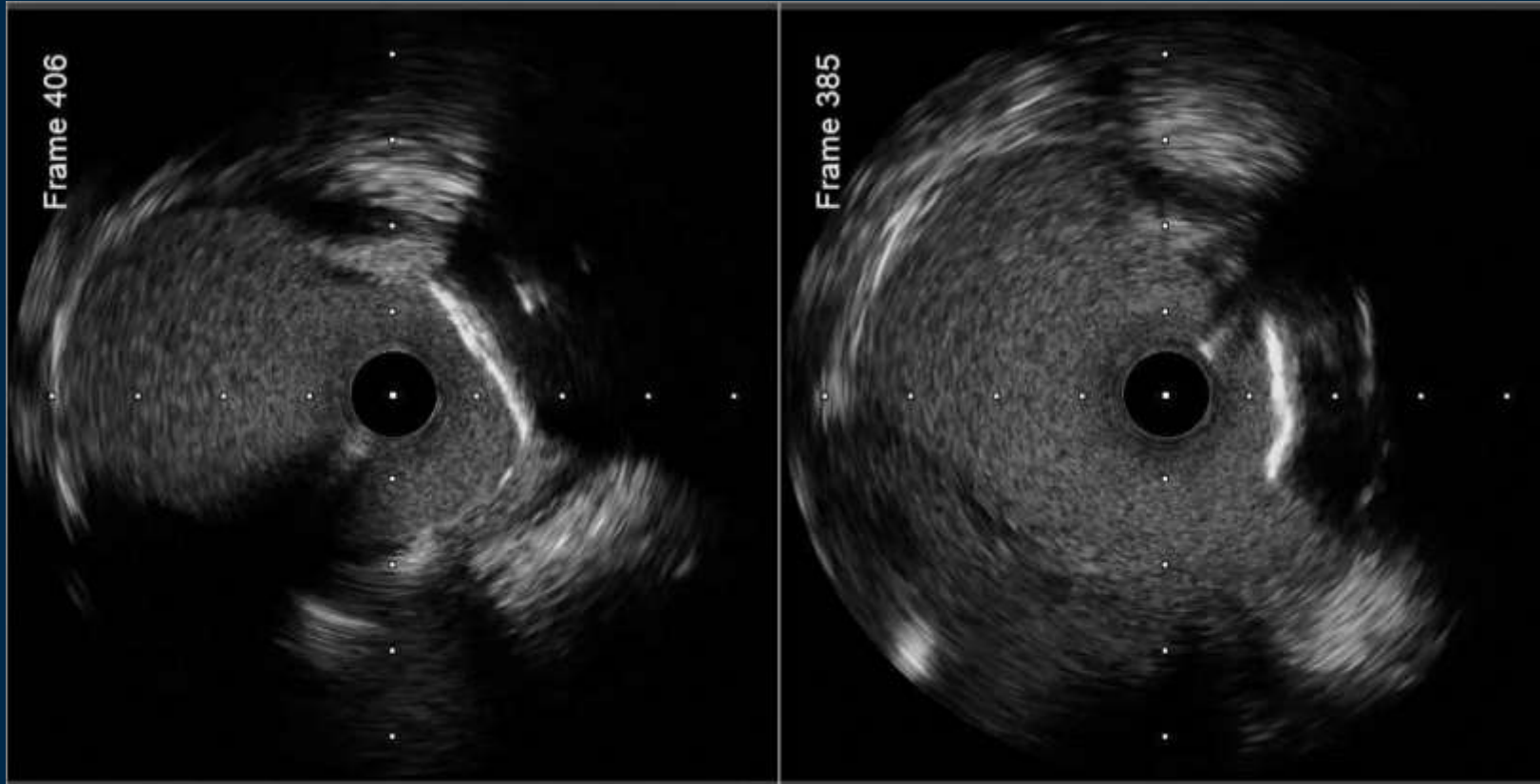


Case example : 91y female UAP

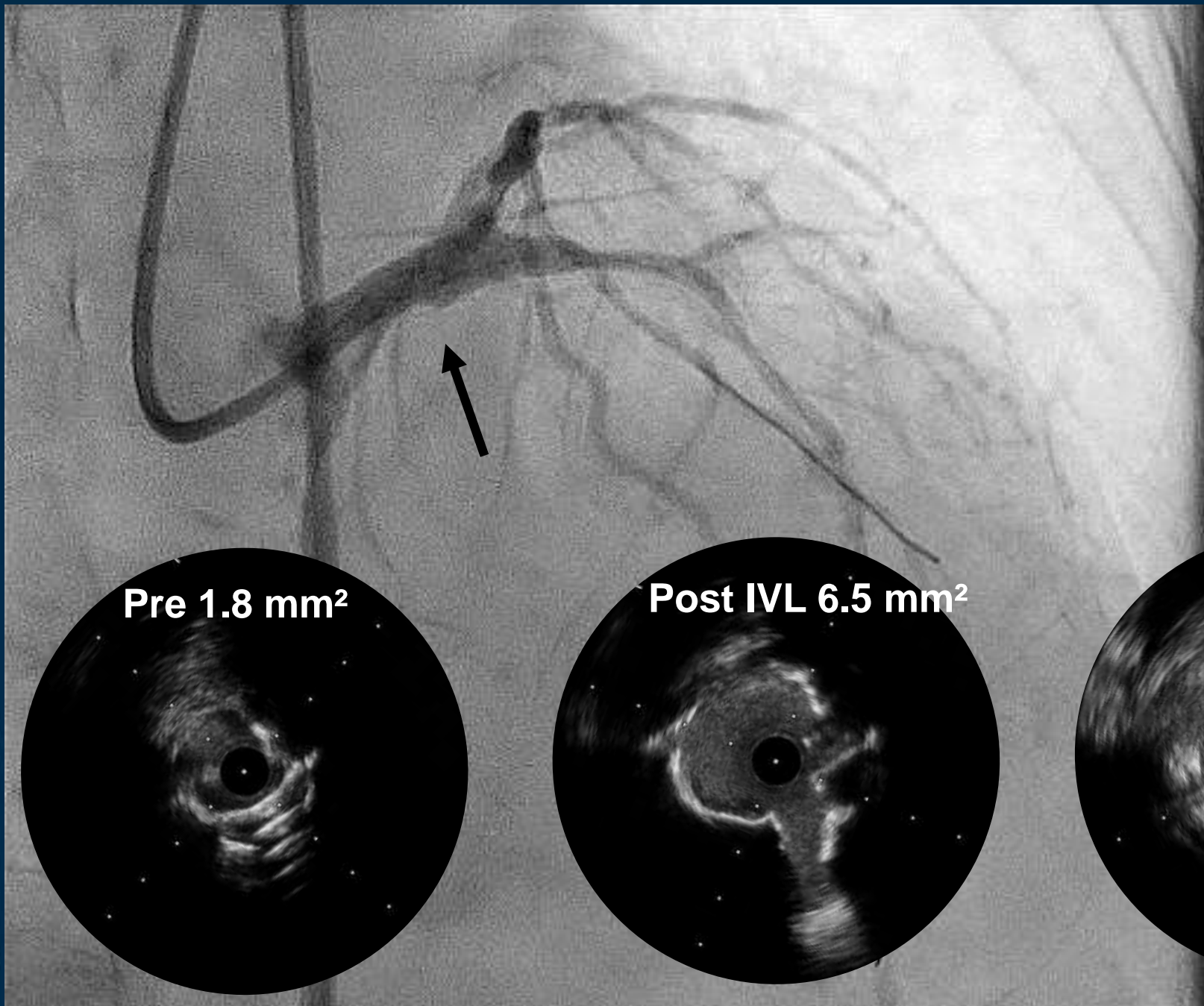


Pre IVL

Post IVL 3.5x12mm 80pulses



Final



BioFreedom
3.5x19mm
Optimized with
5.0x10mm balloon
18atm

Pre 1.8 mm²

Post IVL 6.5 mm²

Final 24.3 mm²

Conclusions

- Shockwave is safe and effective clacking calcium without slow flow and perforation.
- No need for good wire bias.
- No need for special skill.
- Best indication is donuts like thick ring calcium lesion where other debulking devices may not work.