Techniques for optimal lesion preparation

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No conflicts to disclose

Approach to calcified lesions

High pressure balloon

Rotablator/Orbital Atherectomy

Angiosculpt/Cutting balloon

Shockwave balloon

Laser

Post-NC3.0mm20atm

Post-OPN
3.5mm40atm

OPN NC® Super High Pressure PTCA Balloons

Highest rated burst pressure of 35 bar

5.0mm² with
360° calc

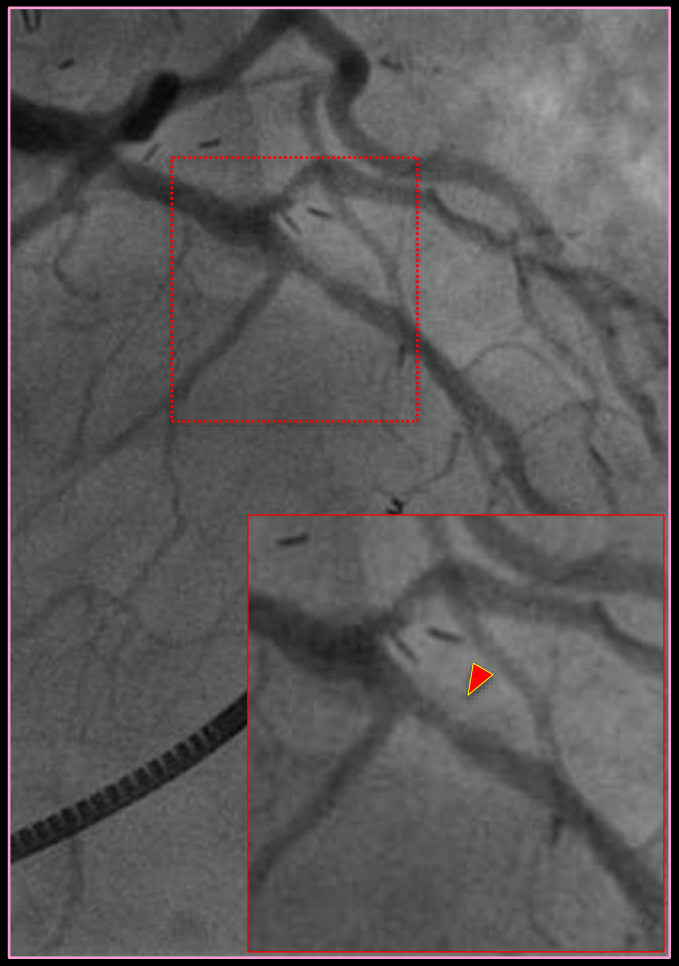
3.63mm²
(2.0 × 2.2mm)

7.70mm²
(3.6 × 3.8mm)

Underexpanded stent

Previous stent
(10years before)

Rotablation and Cutting Balloon



Rotablator: 1.75 mm
180,000 rpm

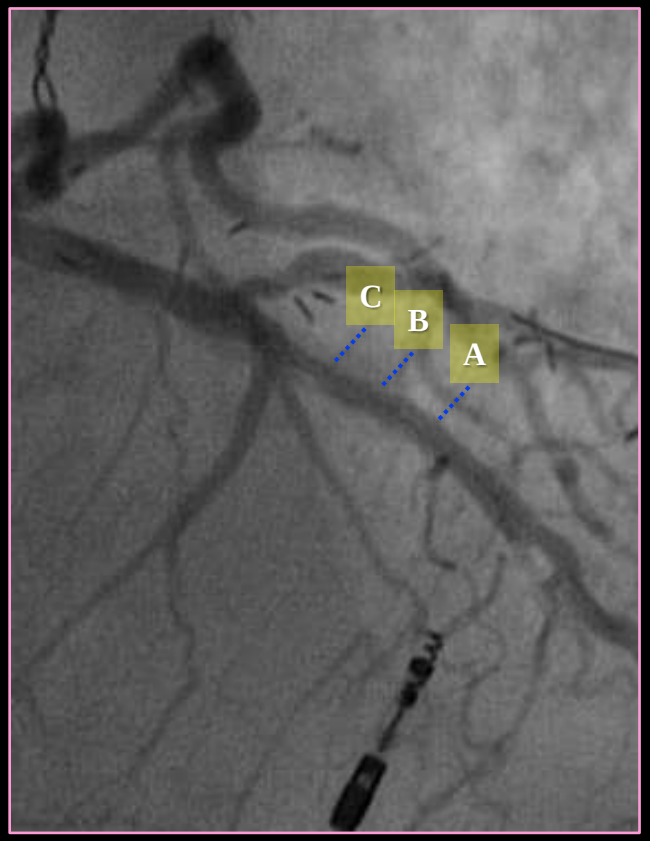
Pre-dilatation:
3.0 mm (NC), 24atm

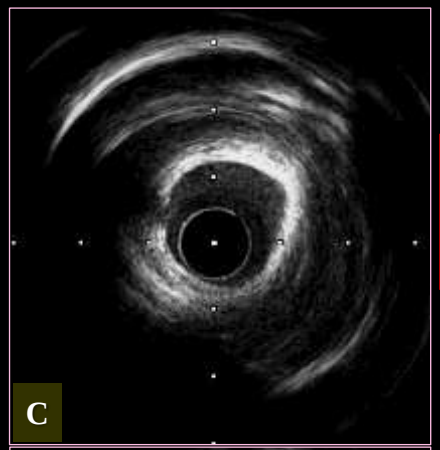
Rota burr (1.75 mm) successfully crossed the lesion.

Subsequent pre-dilatation with 3.0 mm NC balloon at high pressure (24atm)

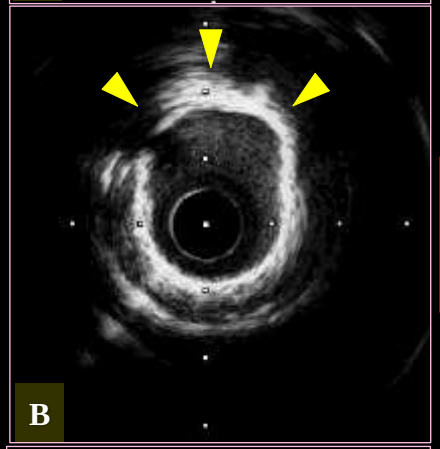
➡ The lesion could not be expanded sufficiently.

IVUS findings after rotational atherectomy

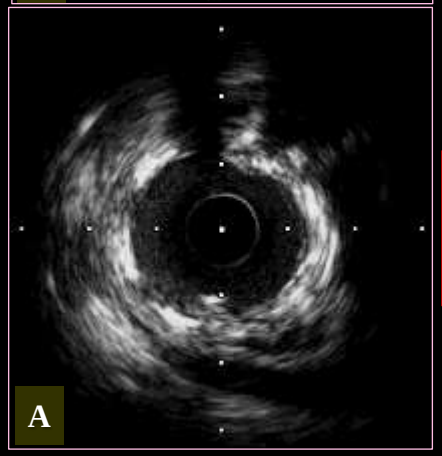




- ✓ Circumferential calcification
- ✓ MLA
  2.51 mm^2 (1.71/1.88 mm)

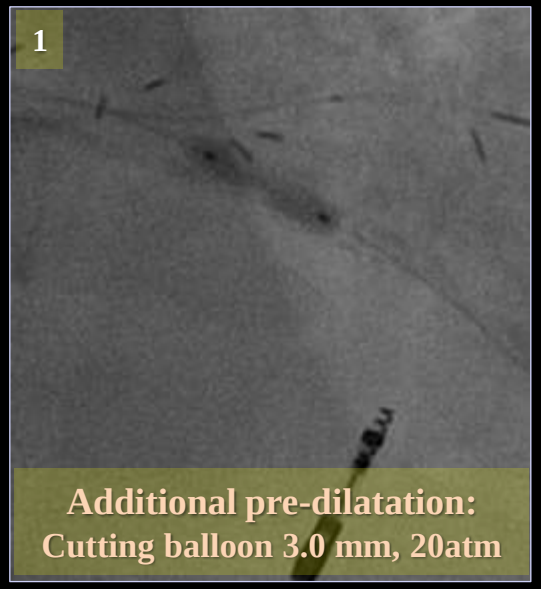


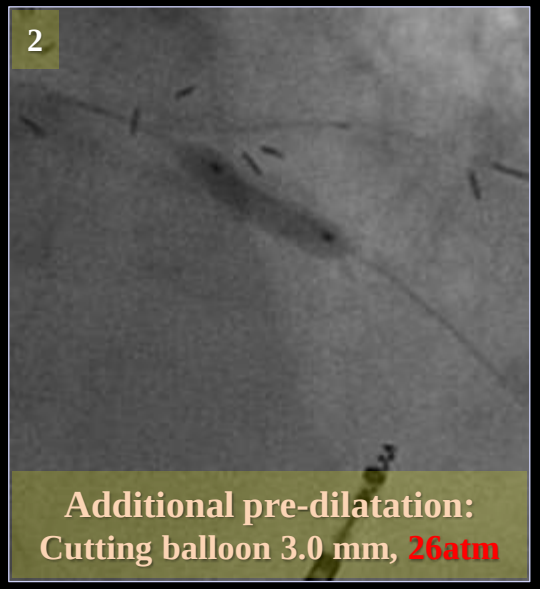
- ✓ Circumferential calcification
- ✓ Evidence of debulking by rotational atherectomy



- ✓ Previous stent
- ✓ Lumen area
  4.64 mm^2 (2.43/2.58 mm)

Additional lesion preparation: cutting balloon

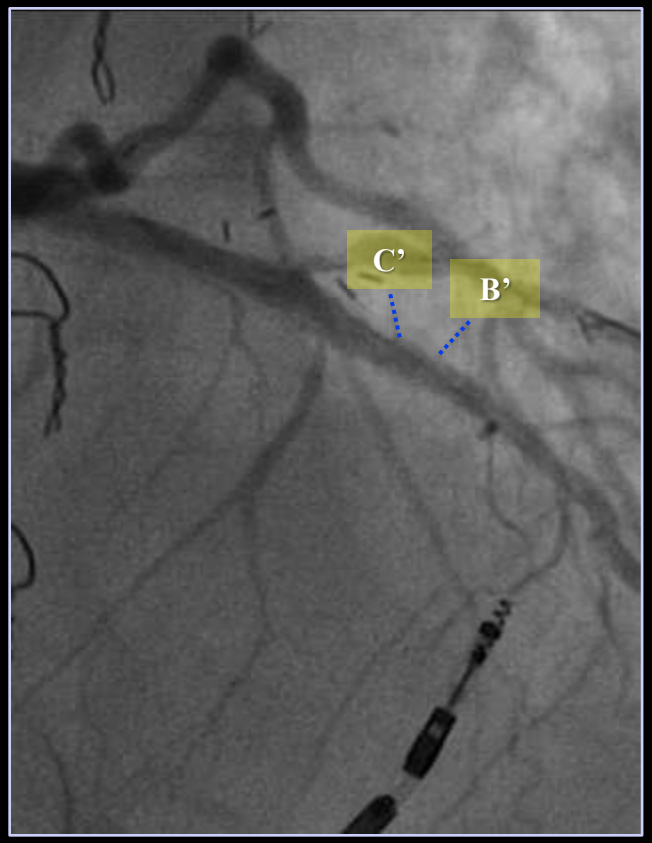


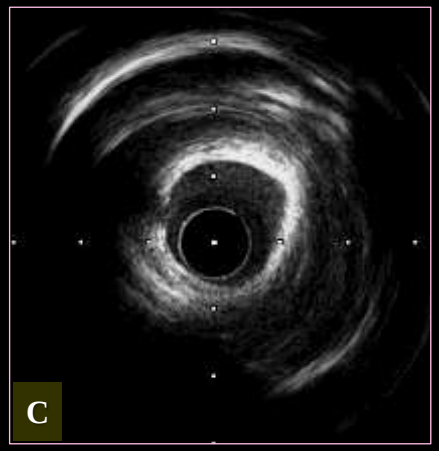


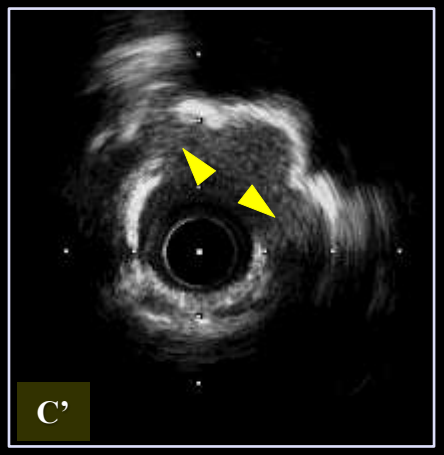
Considering severely calcified lesions, pre-dilatation with cutting balloon at high pressure was additionally attempted.

➡ The lesion could be expanded.

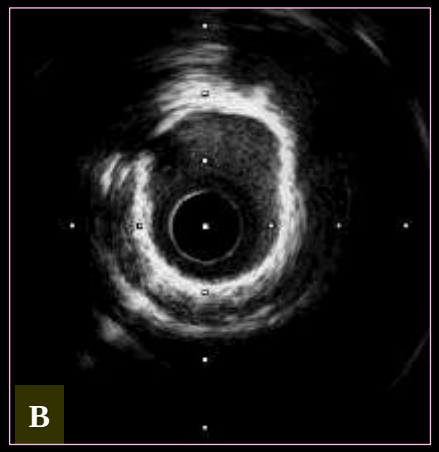
IVUS findings after cutting and NC balloons

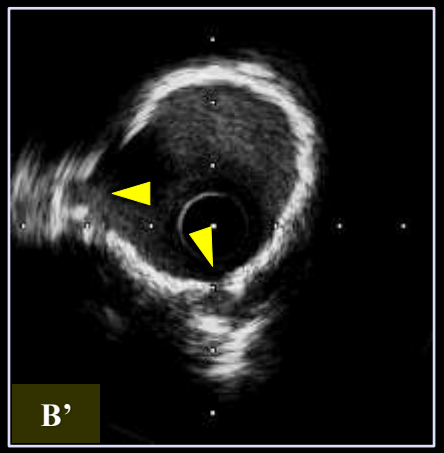






Cracks on the calcification



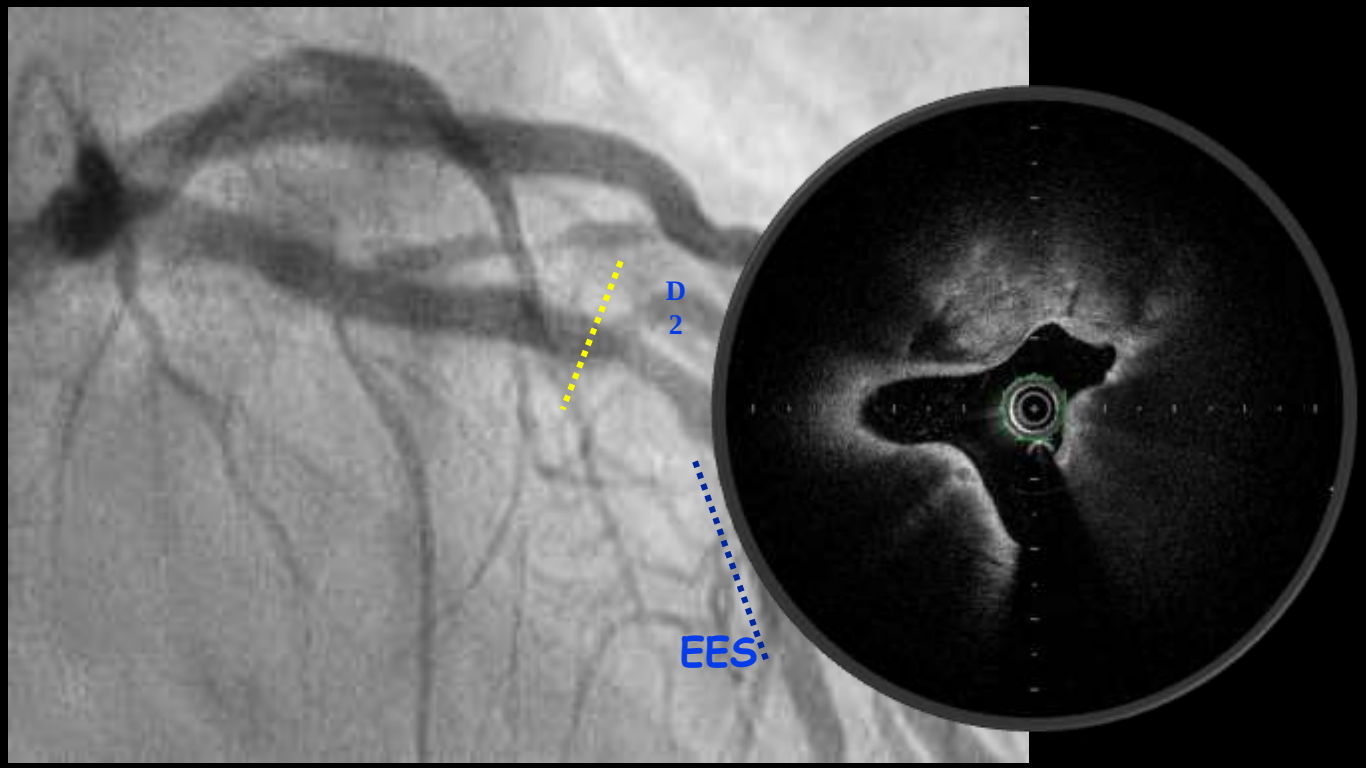


Before cutting balloon

After cutting balloon
(+ 3.0 mm NC balloon)

Final angiography: Excellent angiographic results

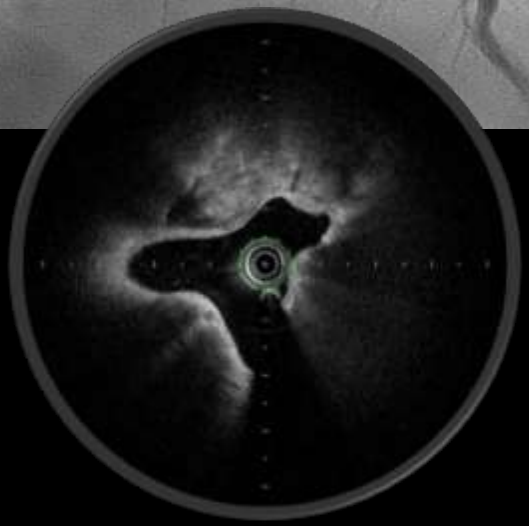
2019.6 OFDI and Angioscope



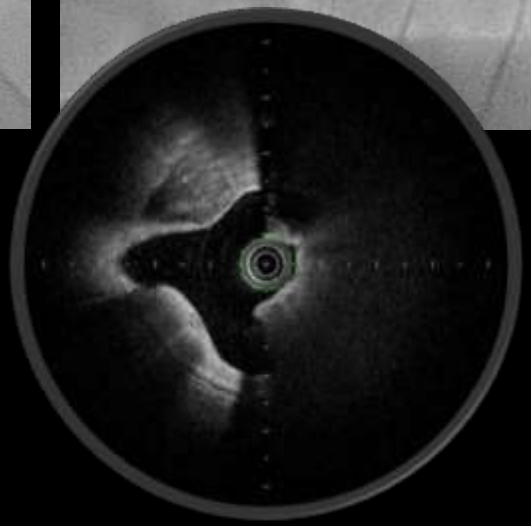
FFR 0.75

Angiogram and OFDI

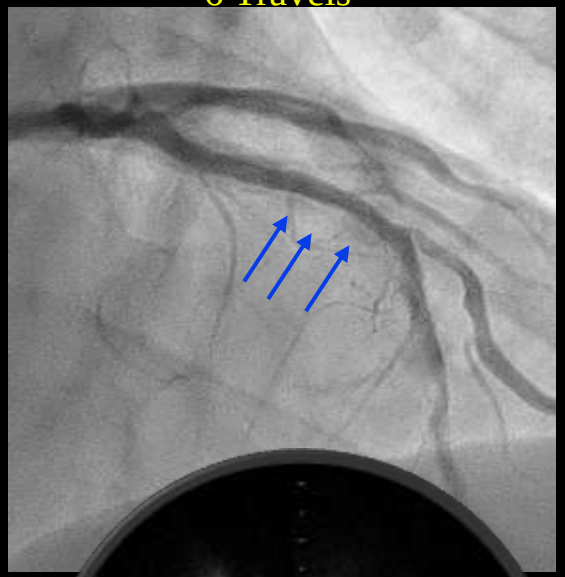
pre

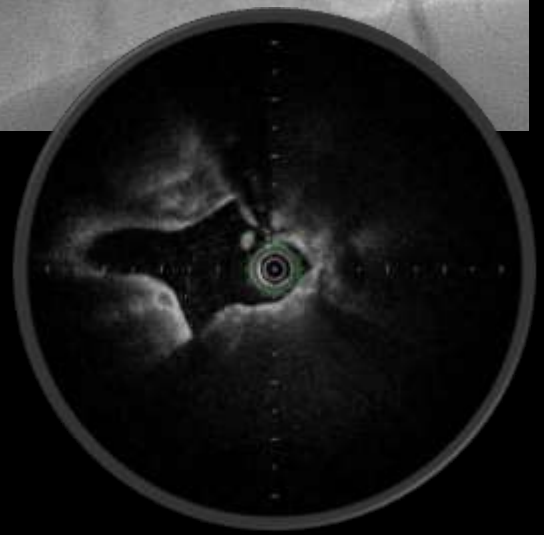


Post Diamondback Low
4 Travels

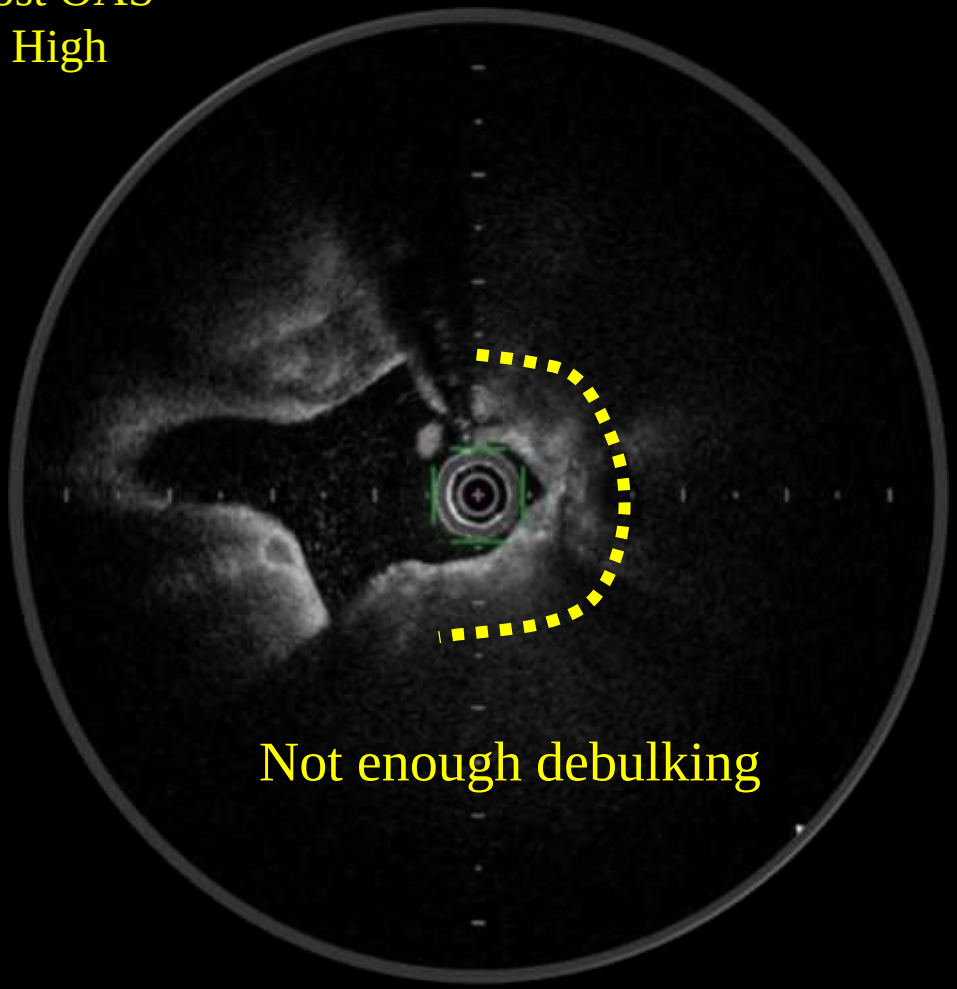


Post Diamodback High
6 Travels





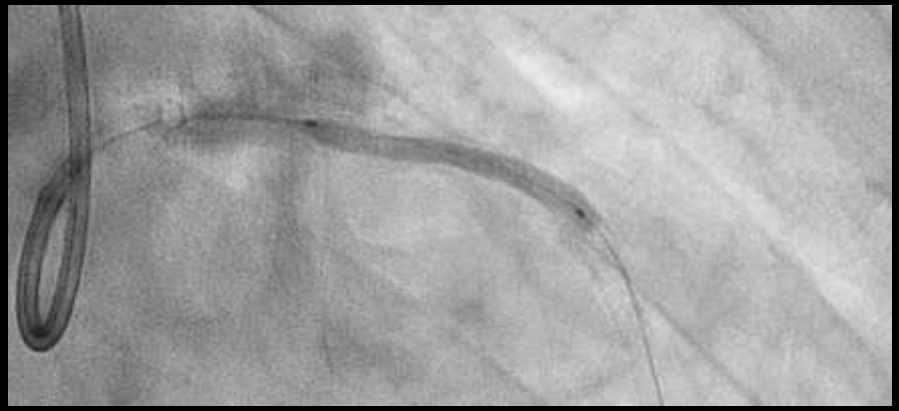
Post OAS
High



Not enough debulking

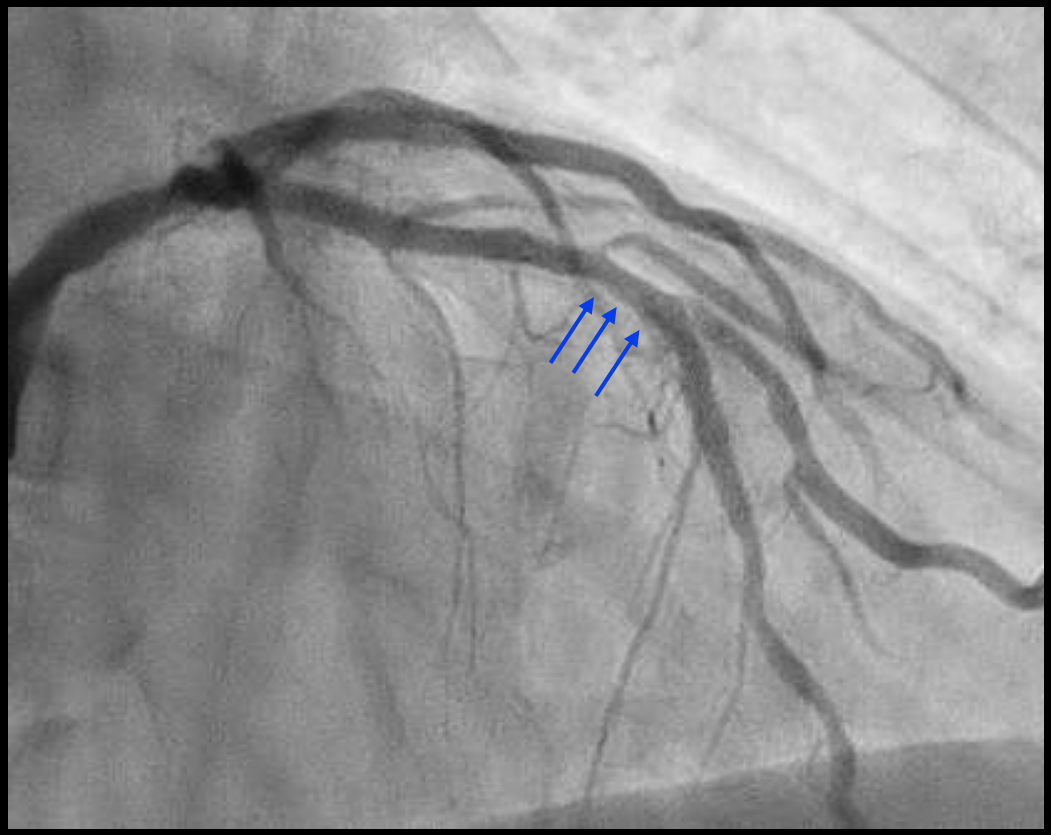
Cutting balloon 3.25 × 10mm 9 atm 5times

Drug Coated Balloon 3.0 × 26mm 7 atm



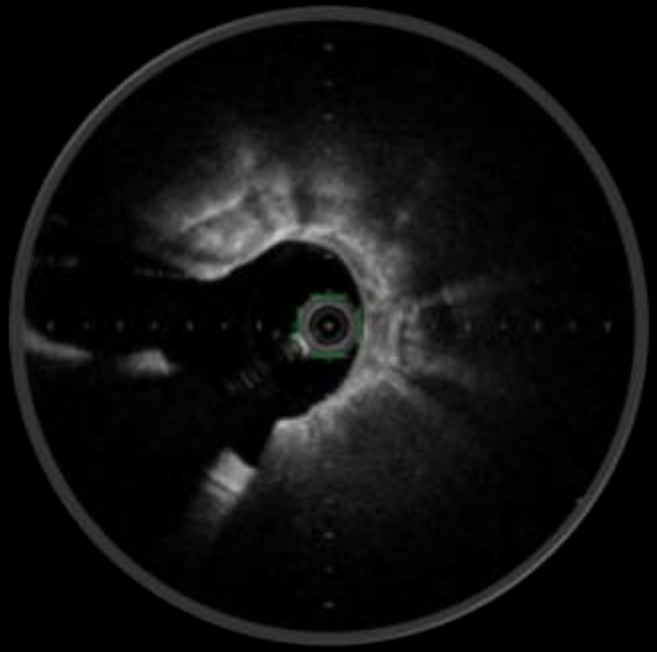
Final

Follow up Angiography at 8month



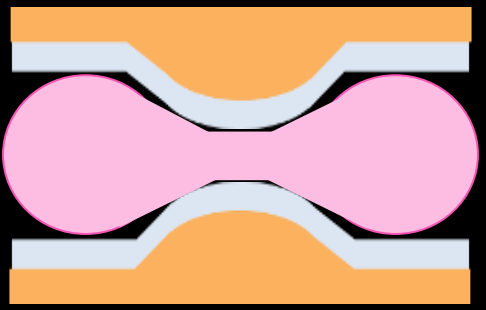
Post

8 M Follow up



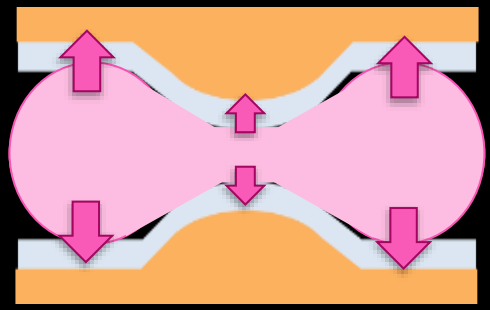
Expansion force: NC balloon vs. Cutting balloon

NC balloon



High pressure

Non-uninform expansion

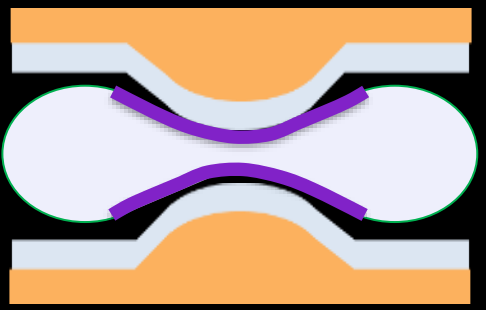


Suboptimal expansion
at the severely calcified stenosis

Expanding force tends to be distributed more to the segments with less resistance.

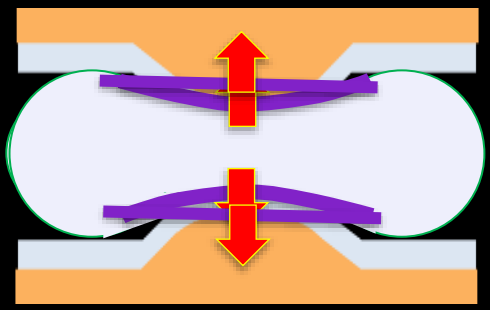
➡ Insufficient expansion at the tight lesion.

Cutting balloon



High pressure

Uninform expansion



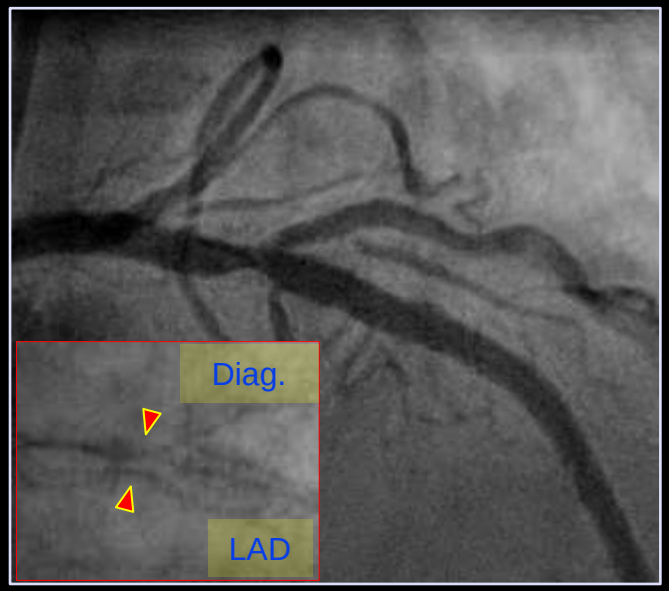
Suboptimal expansion
at the severely calcified stenosis

By the blade of cutting balloon, expanding force can be uniformly transmitted to the lesion.

➡ Sufficient expansion at the tight lesion.

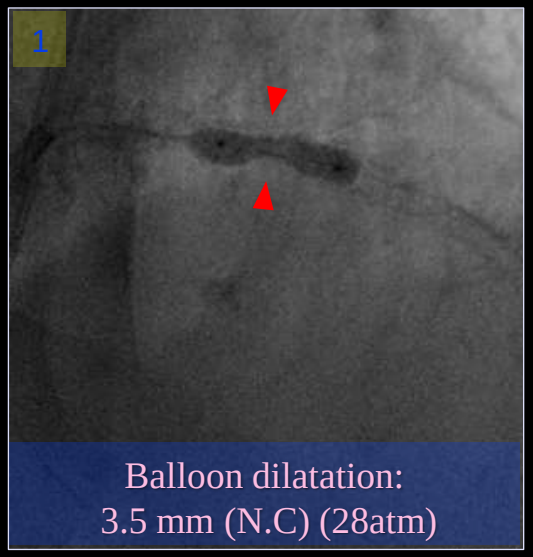
Use of Laser (ELCA)

Excimer Laser with contrast



Preprocedural IVUS

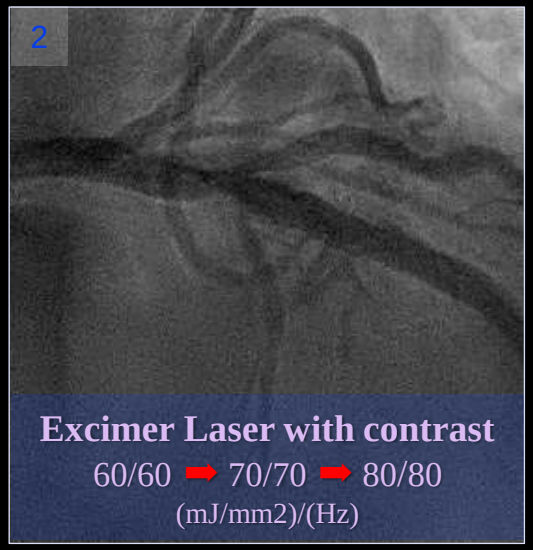
Significant stent underexpansion
in severely calcified lesion

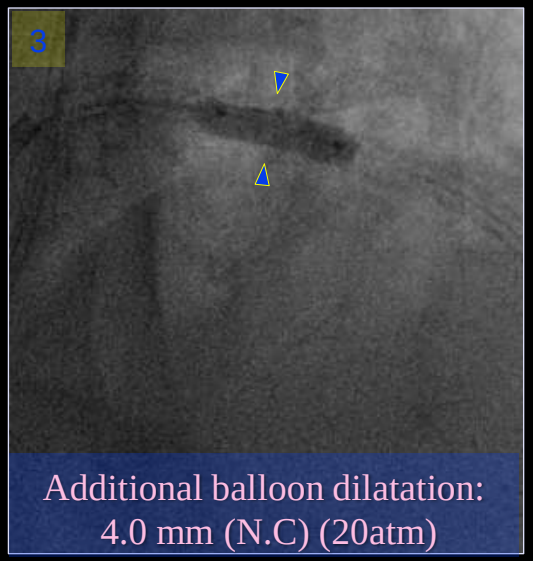


➡ **Undilated**

PCI for ISR in proximal LAD

Index PCI
- ✓ Lesion preparation:
  Rotablator: 1.5 mm burr
- ✓ DK crush technique
  (Ultimaster: 2.5/18, 3.5/38 mm)

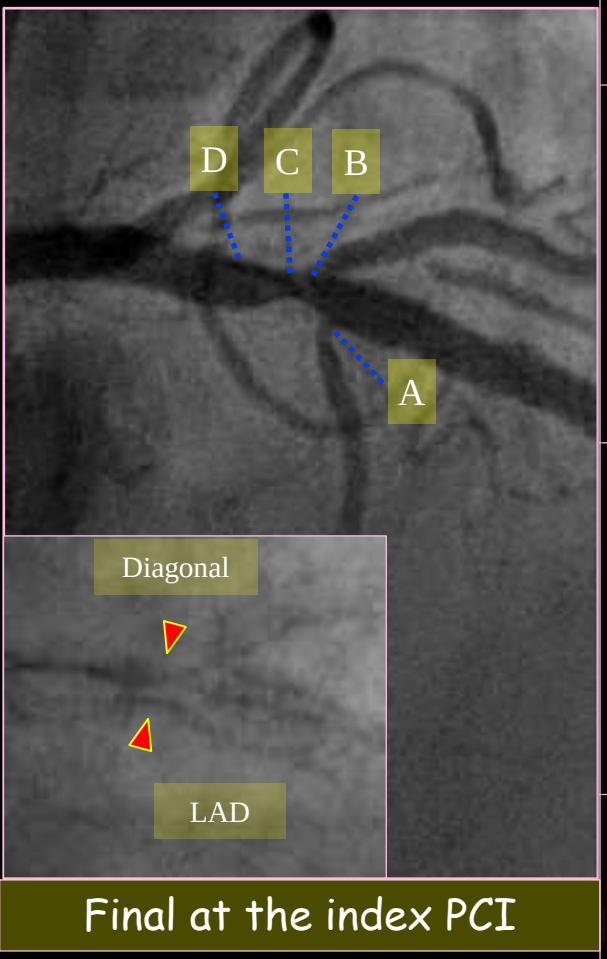




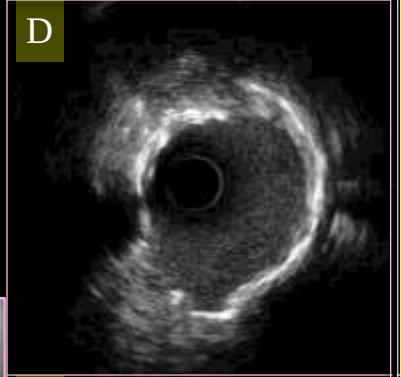
➡ **Optimally dilated**

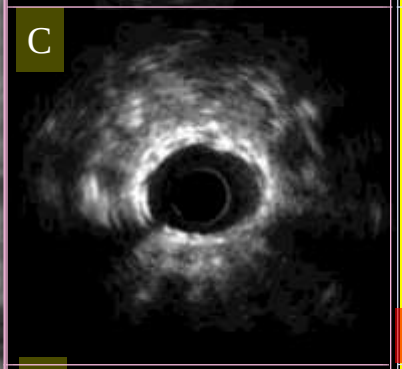
Excimer Laser with contrast

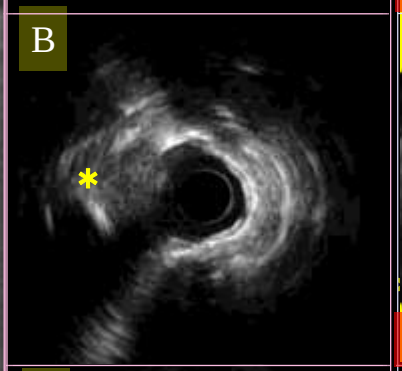
After DCB and additional KBI: Excellent results

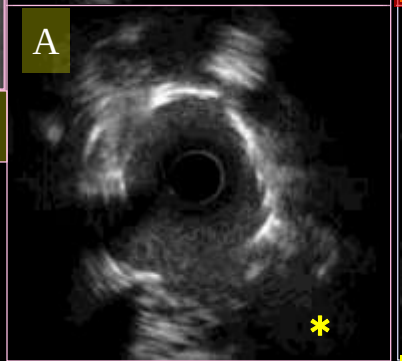


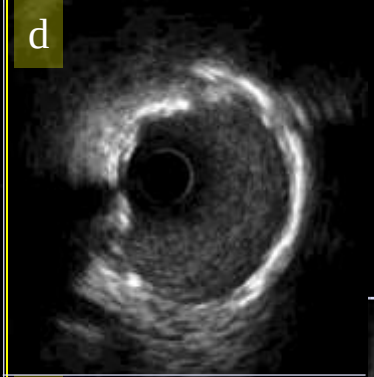
Final at the index PCI

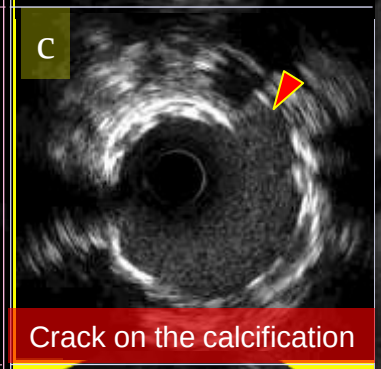


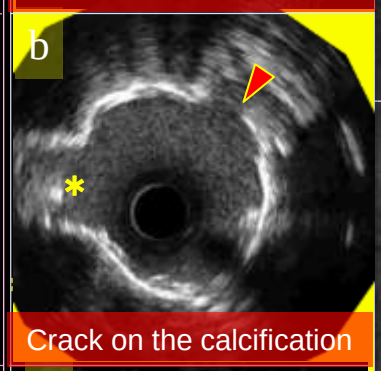


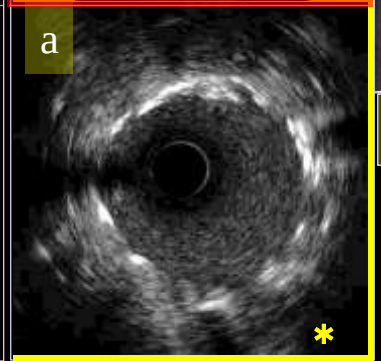


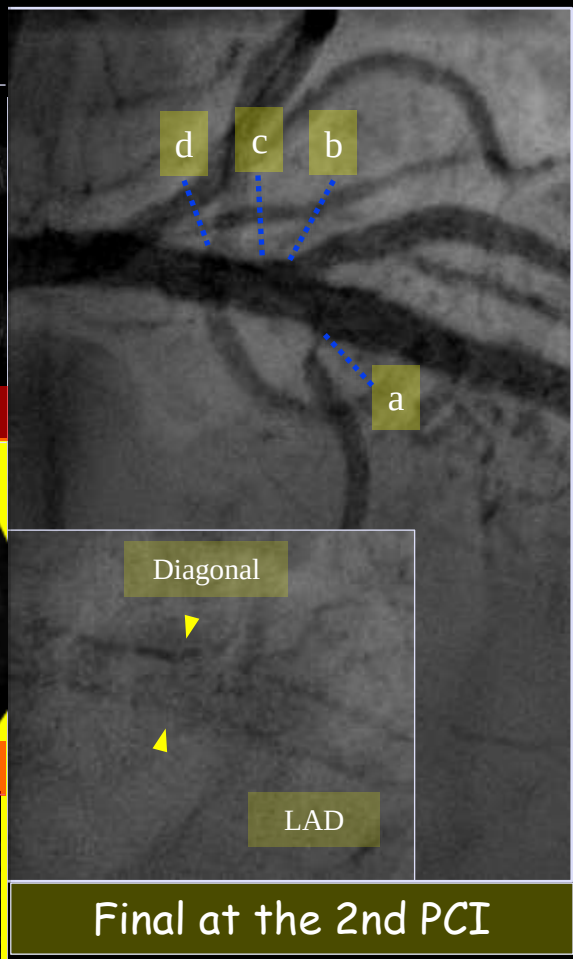










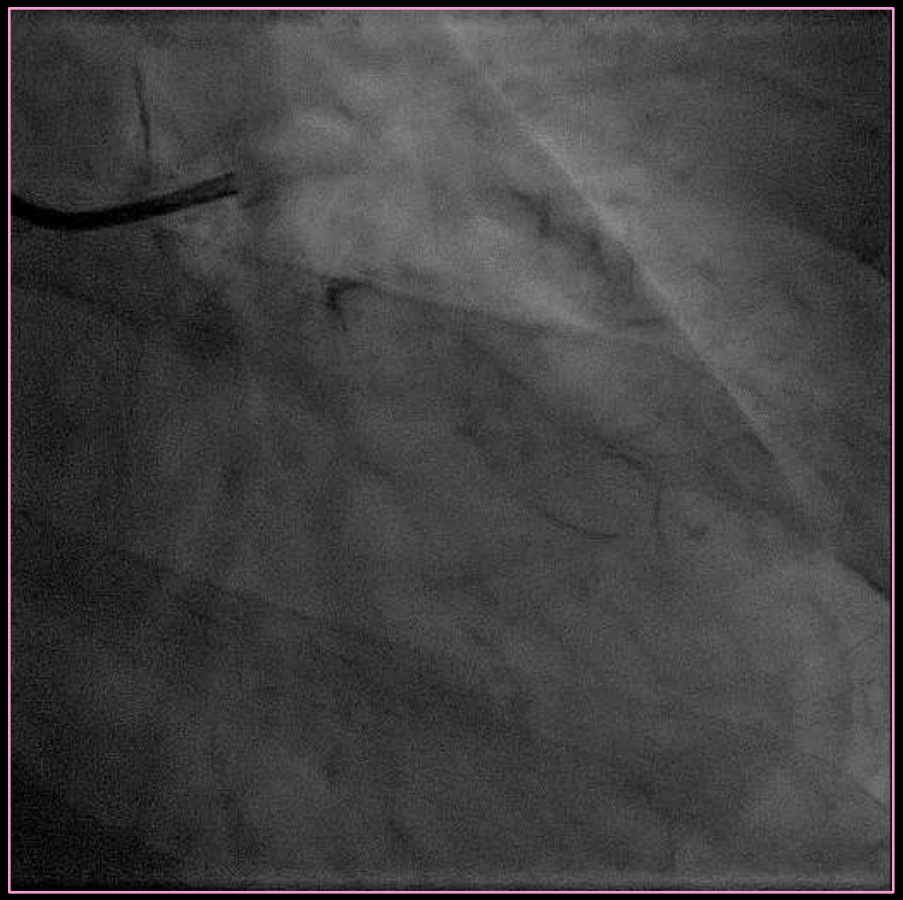


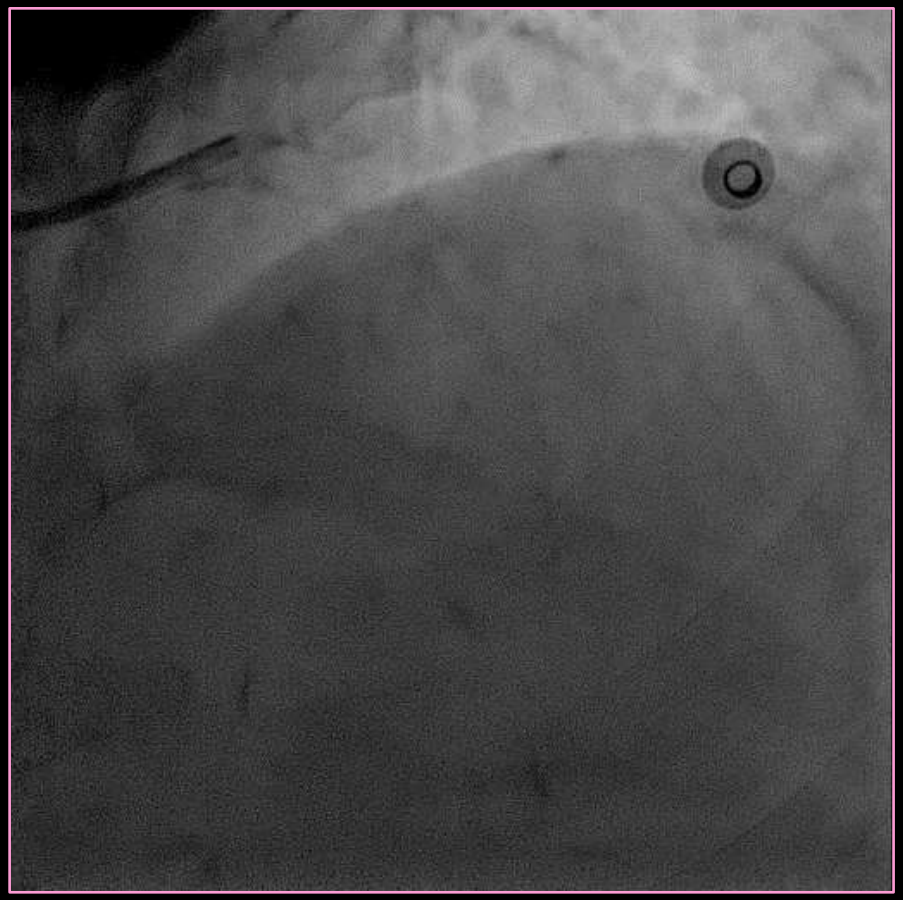
Final at the 2nd PCI

Shockwave Balloon

Case 1. diffuse mid LAD lesion

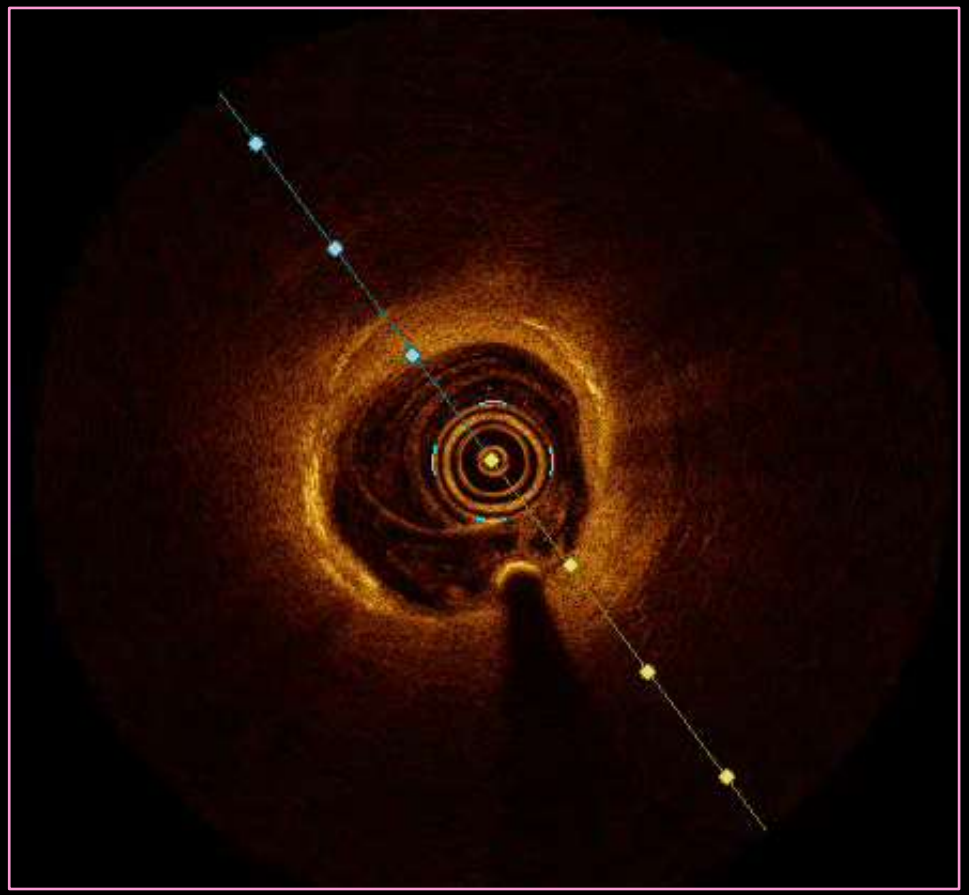
72 year-old, female
Coronary risk factors: hypertension, dyslipidemia
Stable angina





Mid LAD: diffusely and

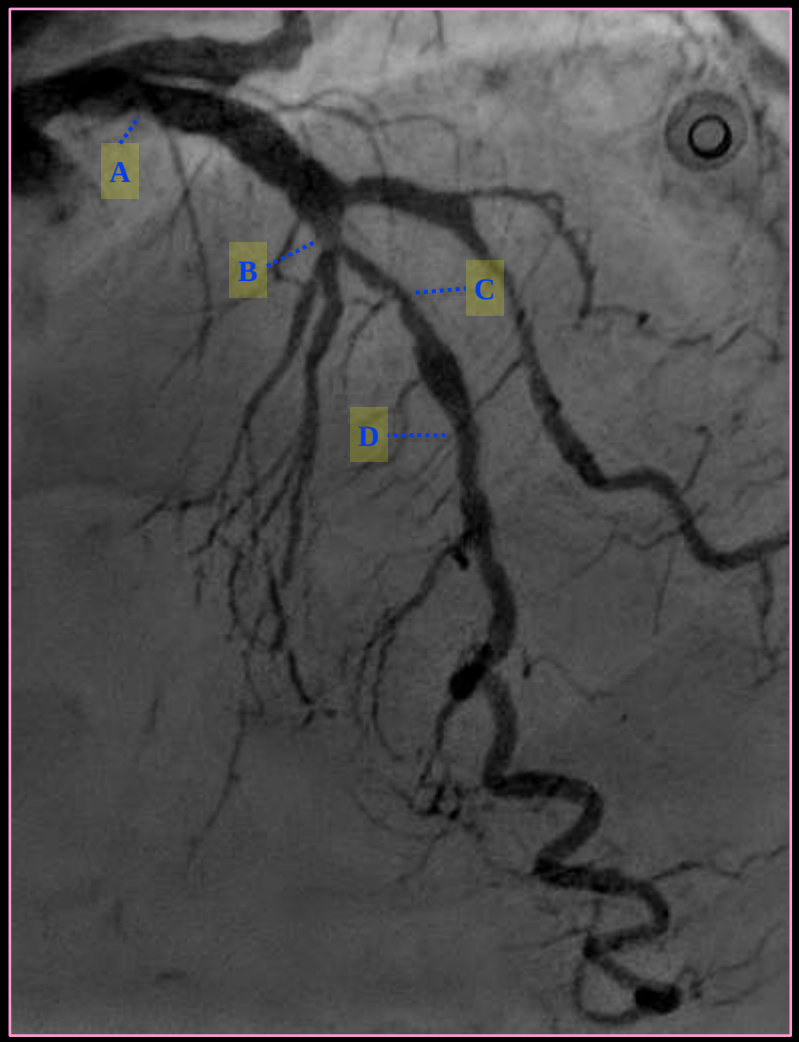
Case 1. diffuse mid LAD lesion

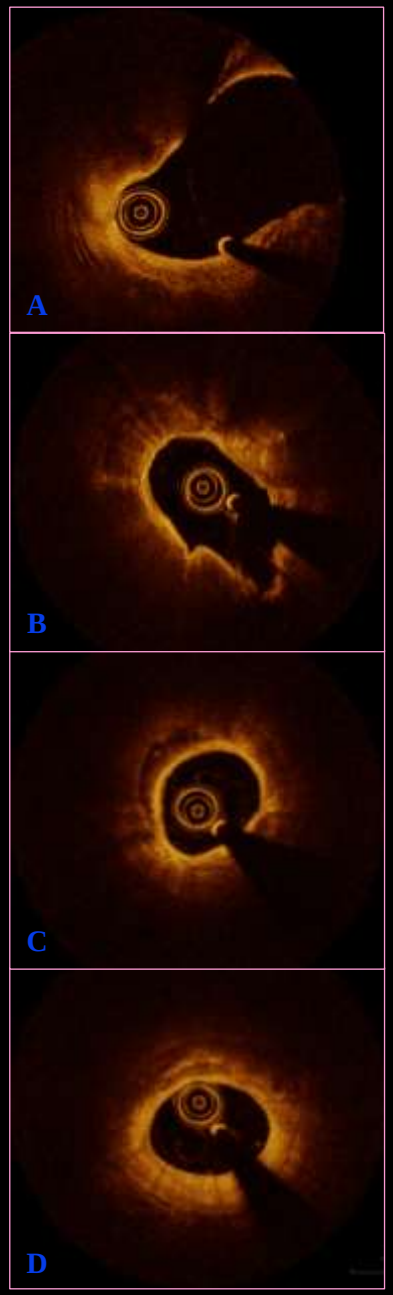


Baseline OCT pullback:

➡ Diffusely and severely calcified lesion

Case 1. diffuse mid LAD lesion

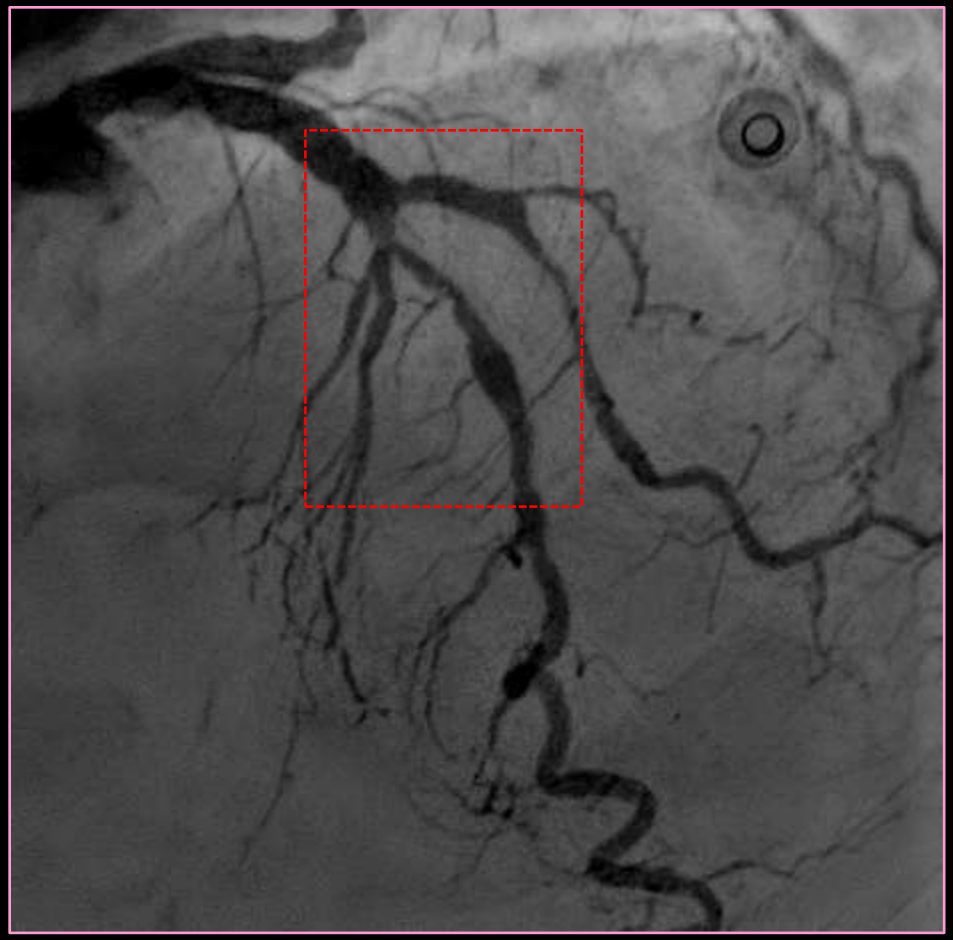




Diffusely and severely calcified LAD

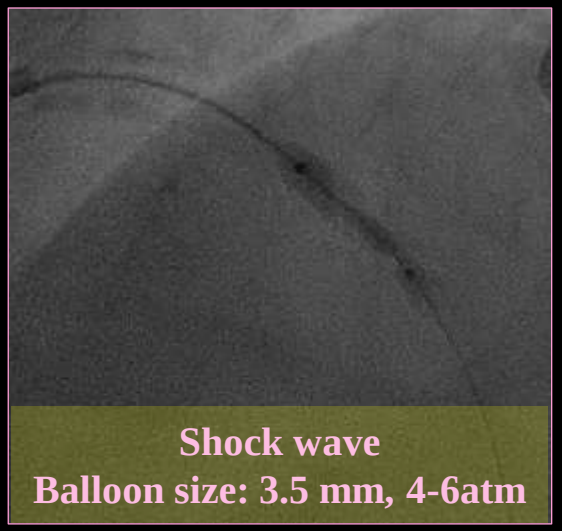
- ✓ Large arc (>180 degrees)
- ✓ Thick calcification

Lesion preparation with shock wave

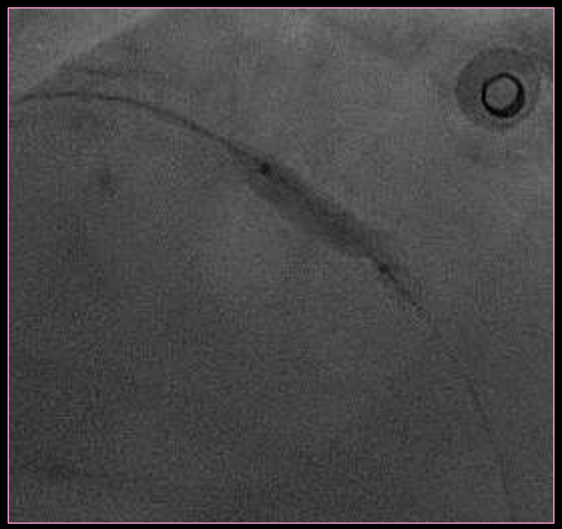


Lesion preparation with shock wave

Balloon inflation: 4atm (10 sec shock wave)
➡ 6atm ➡ deflation
(Maximum: 8 sessions/ catheter)



1st -3rd session: the lesion was undilated

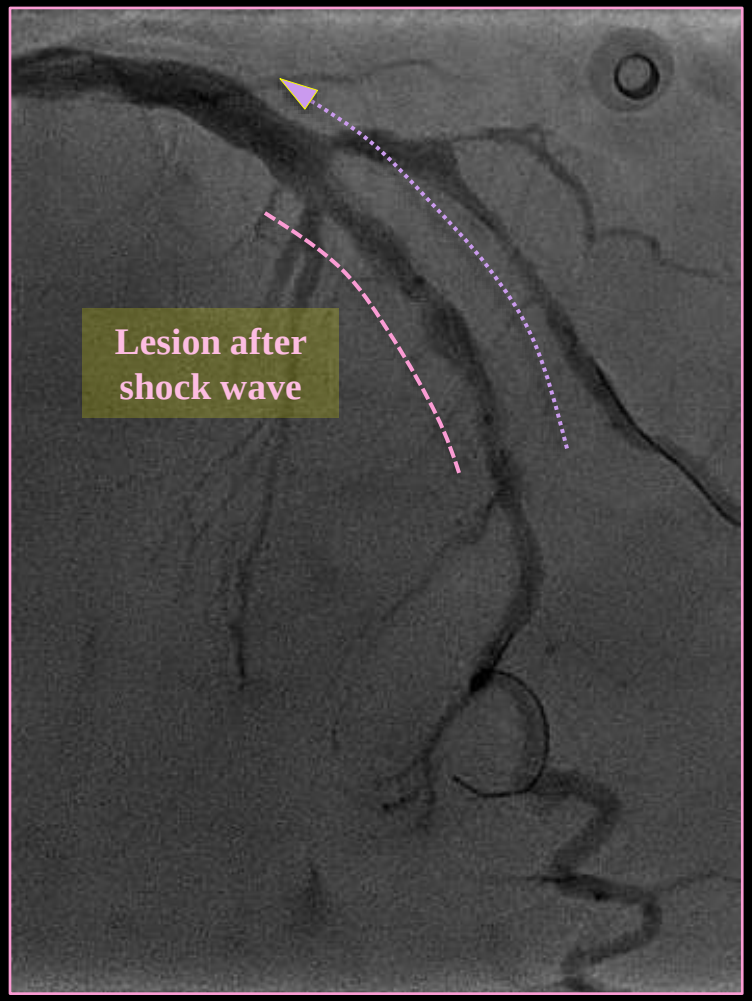


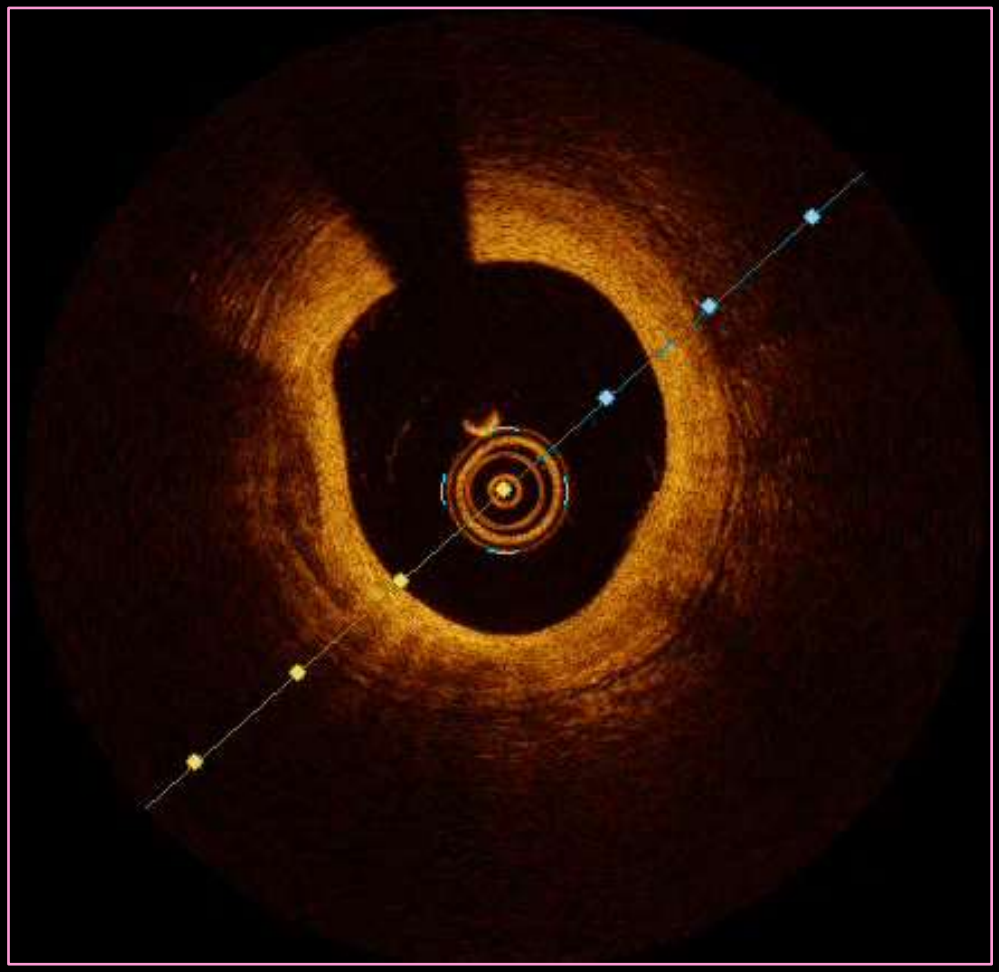
4th session: the lesion was dilated

Lesion preparation with shock wave

After shock wave (8 sessions)

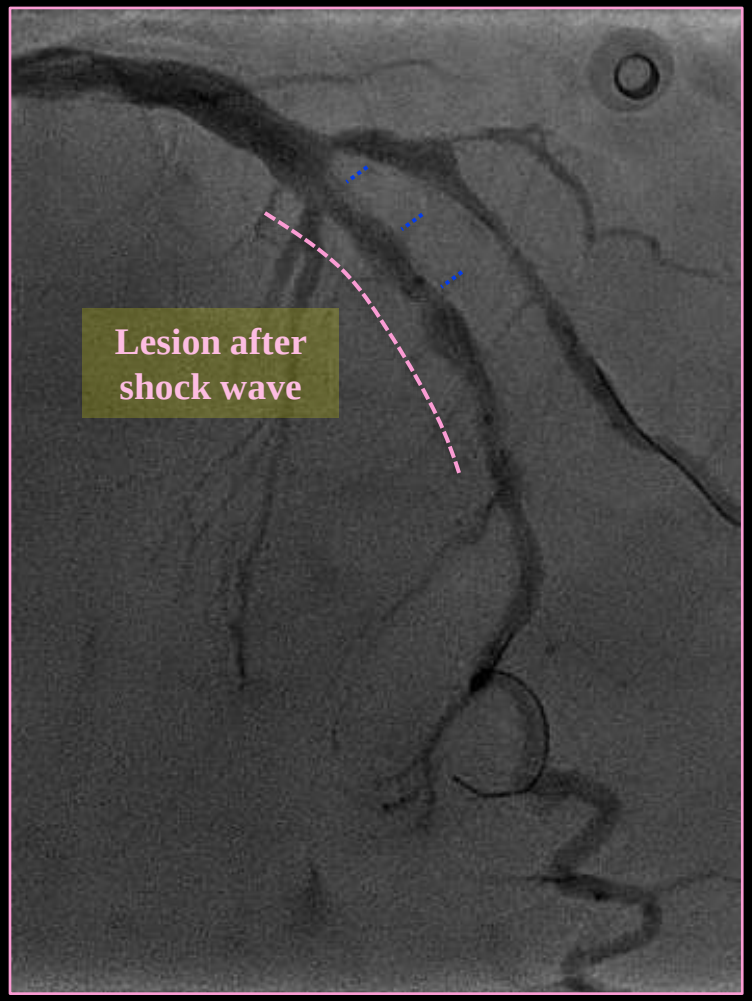
OCT pullback after shock wave

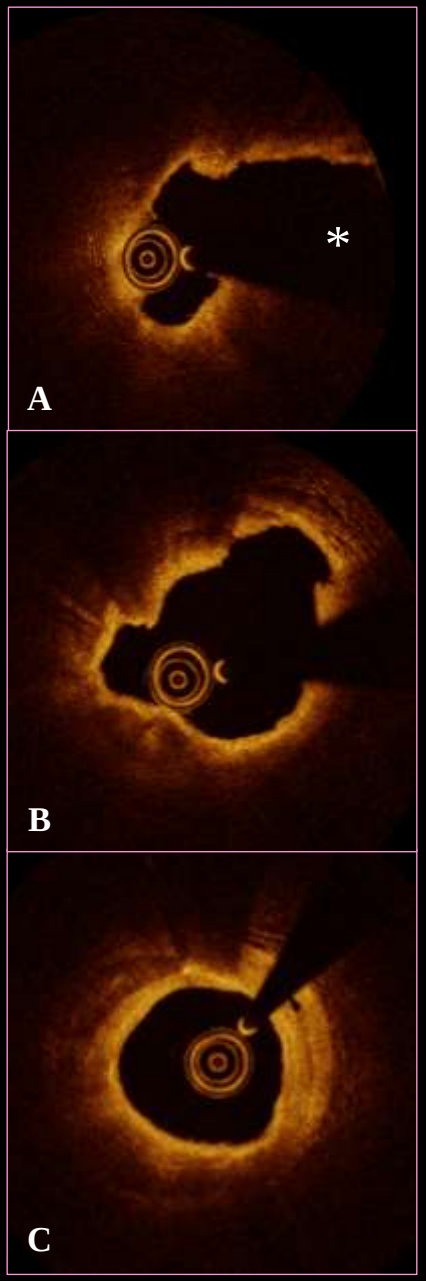




➡ Expanded lesions with dissections

OCT findings after shock wave



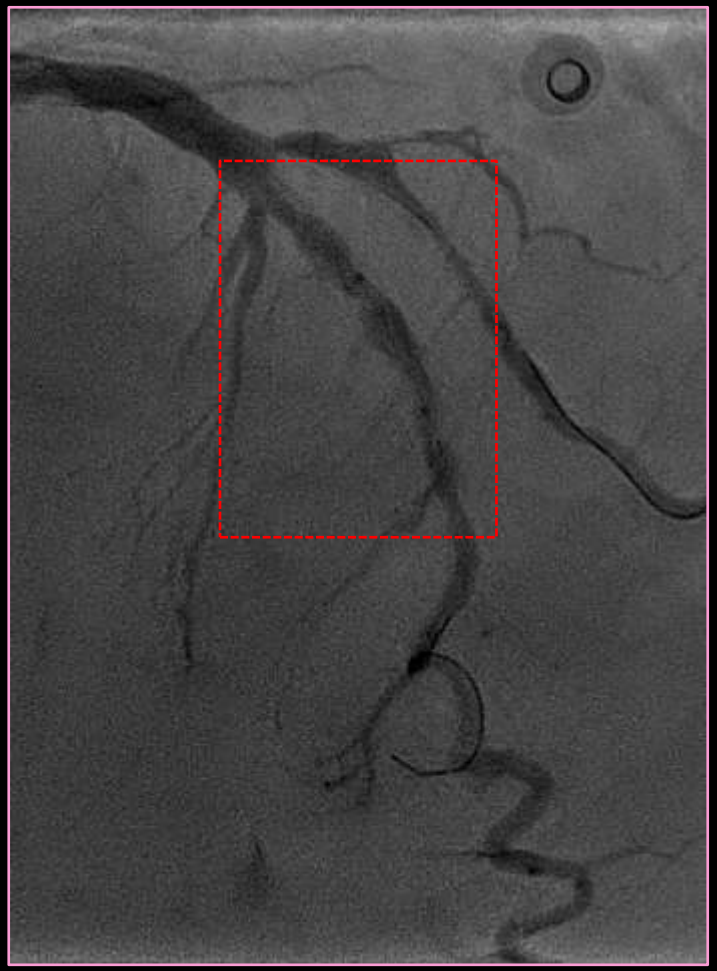


Lesions were expanded;

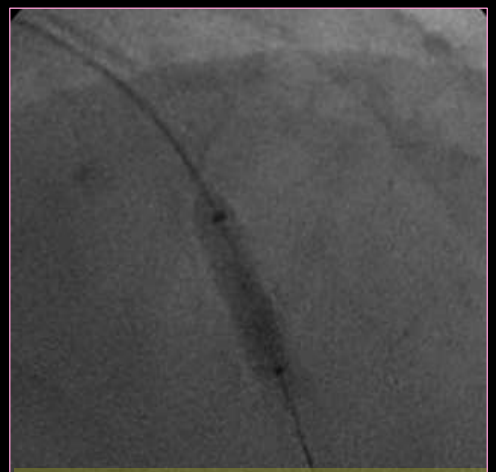
- ✓ No obvious cracks of calcification
- ✓ Dissection around calcifications

A: * Septal branch

Additional predilatations after shock wave



After shock wave
➡ Additional predilatations



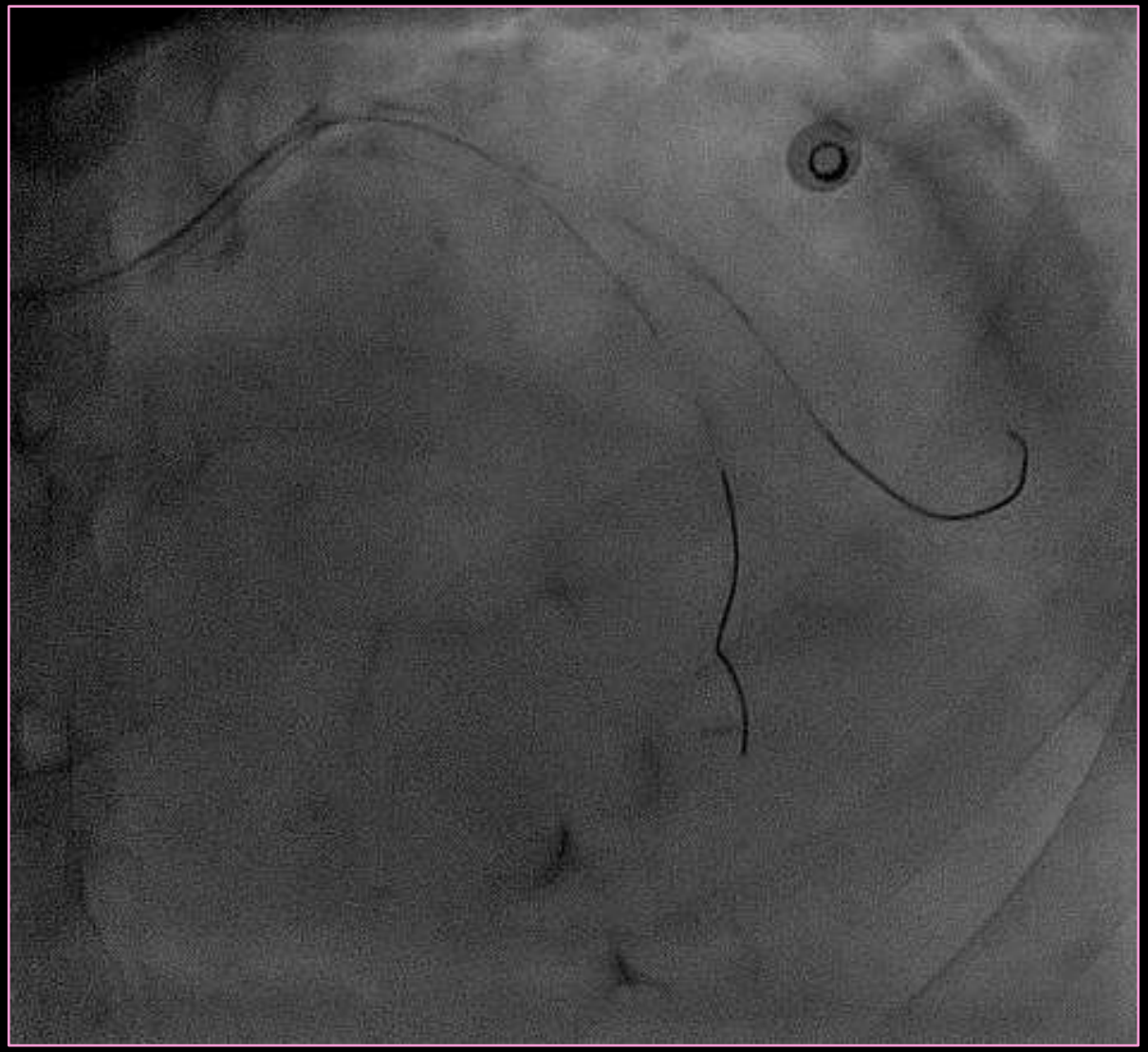
Additional predilatation
3.5 mm (NC): 18atm

Additional predilatation
3.5 mm (NC): 24atm

Multiple additional predilatations
for the lesions underwent shock wave

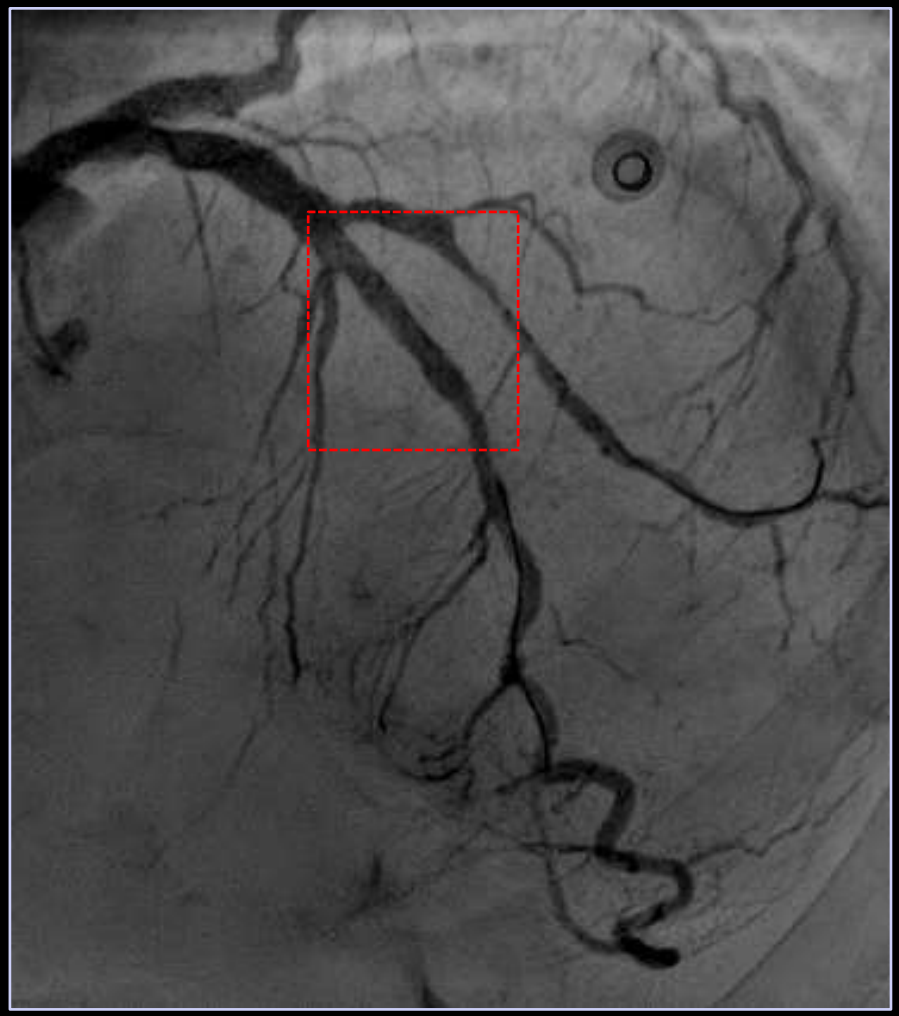
➡ Appropriate lesion expansion

Additional predilatations after shock wave

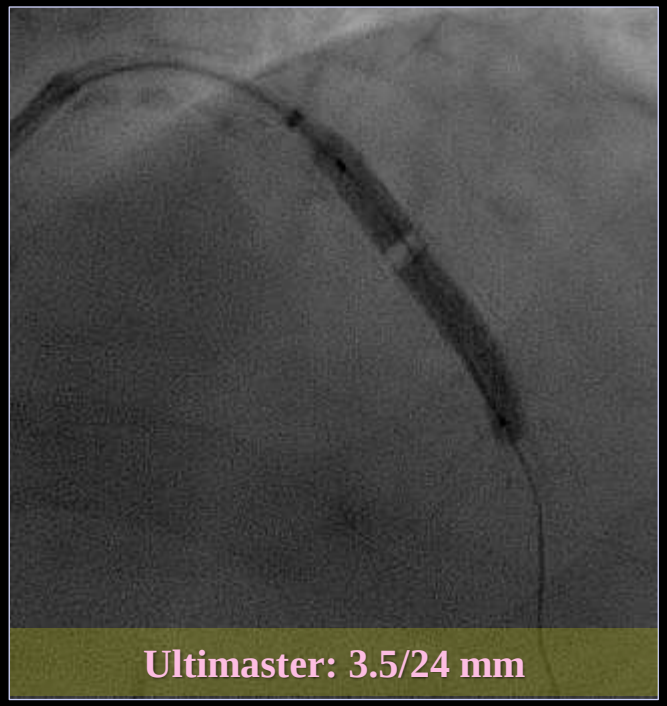


➡ Appropriate lesion expansion: “stent-like” results

DES implantation after appropriate lesion preparation



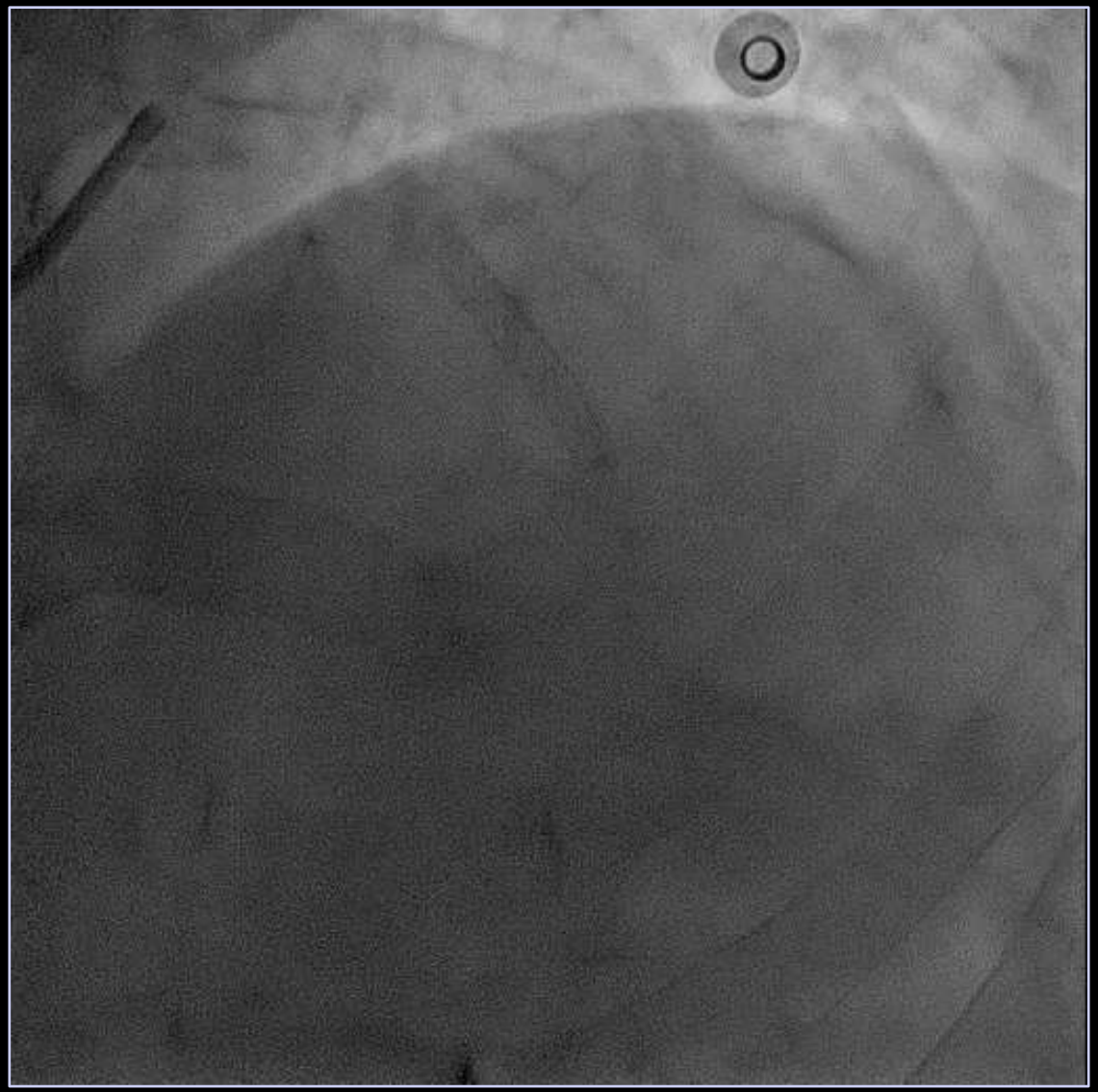
DES implantation
after appropriate lesion preparation



Because of the difficulty to deliver relatively long stent, GuideLiner support was required.

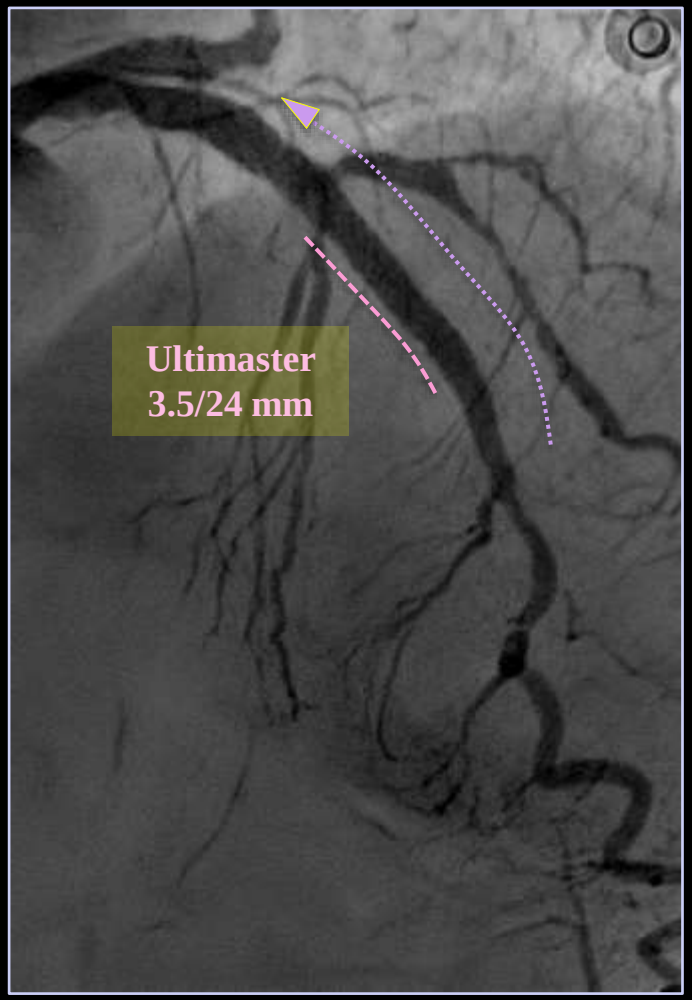
➡ **Post-dilatation: 3.5 mm (NC): 18-24atm**

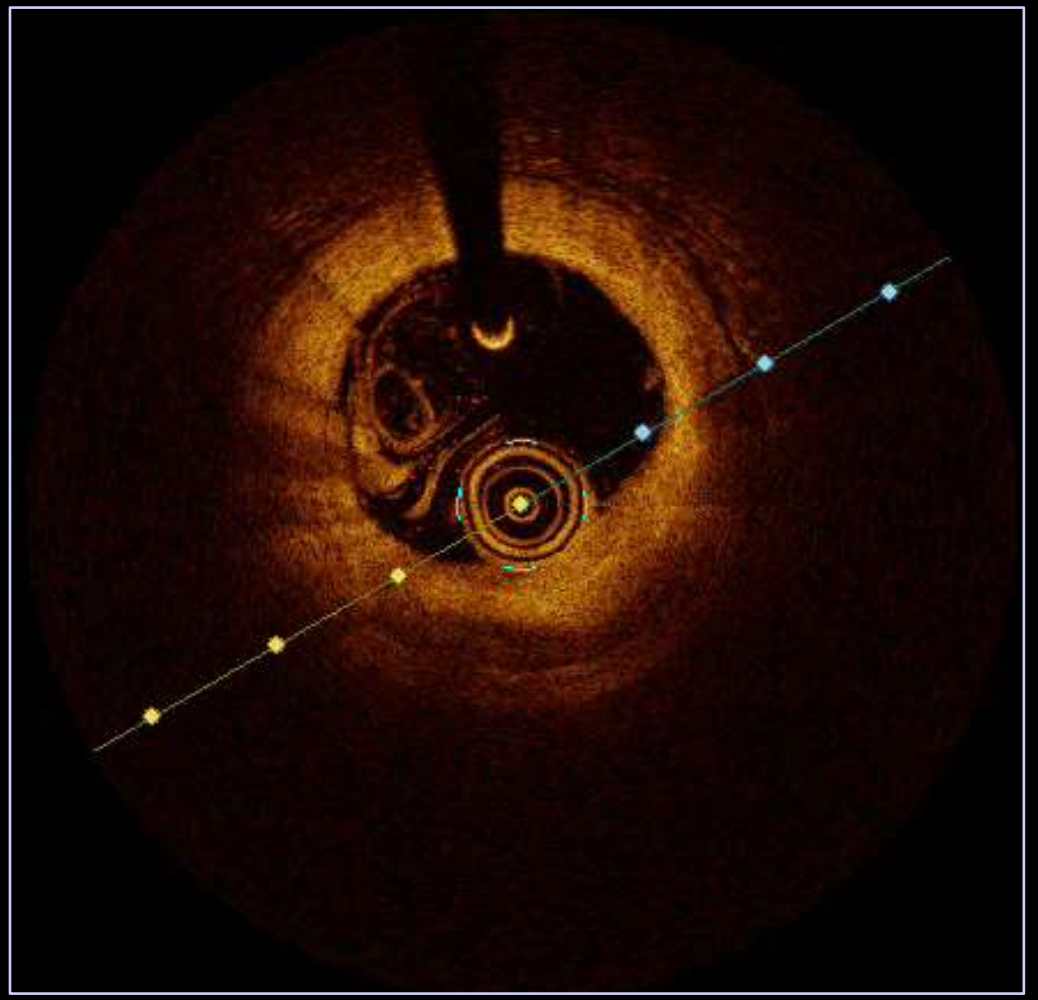
DES implantation after appropriate lesion preparation



➡ Excellent angiographic results

OCT pullback after DES implantation





➡ Optimal stent expansion: “Round shape”
Optimal stent apposition

EMO GVM CENTRO CUORE COLUMBUS s.r.l.

GVM CARE & RESEARCH

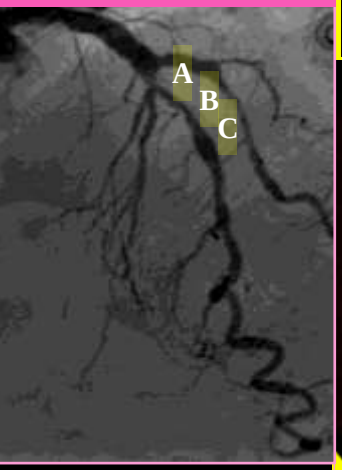
Baseline

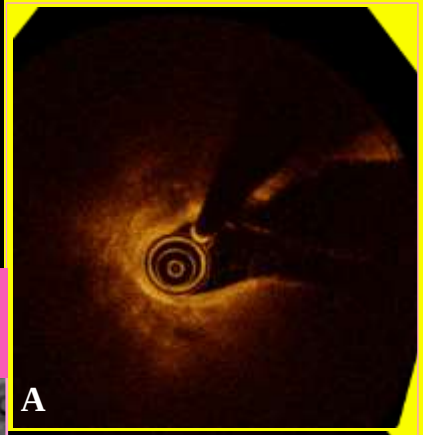
After shock wave

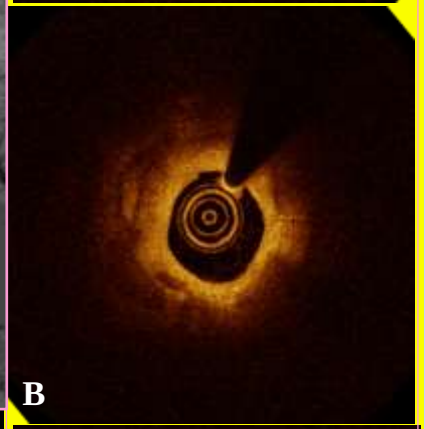
Final

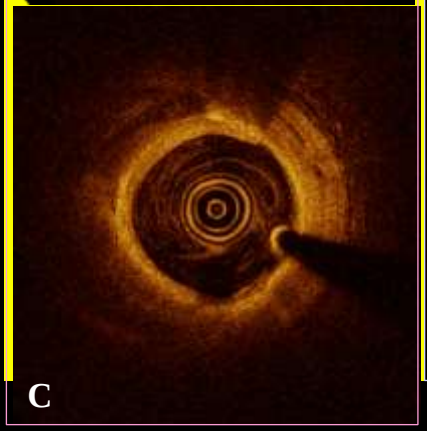
Baseline

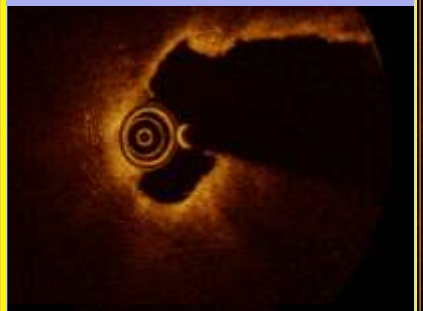
Final

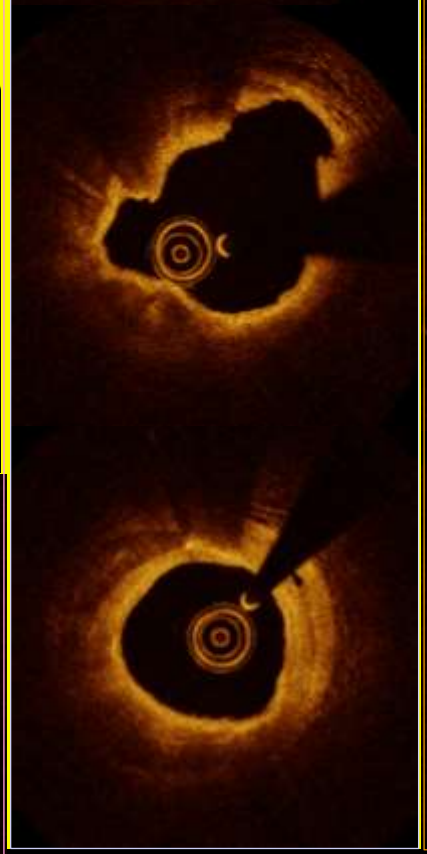


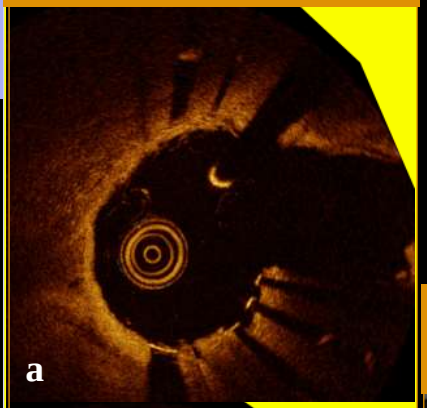


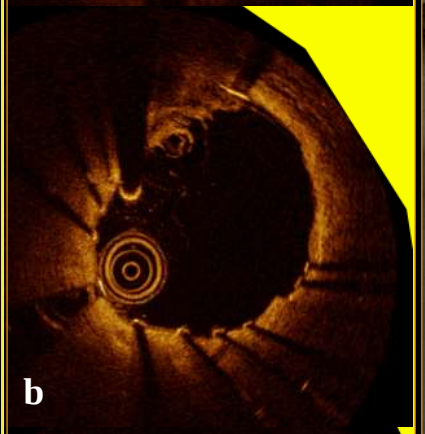


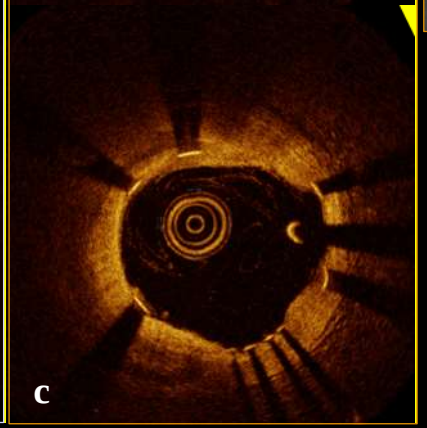


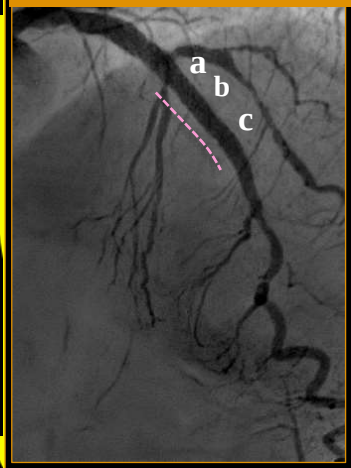


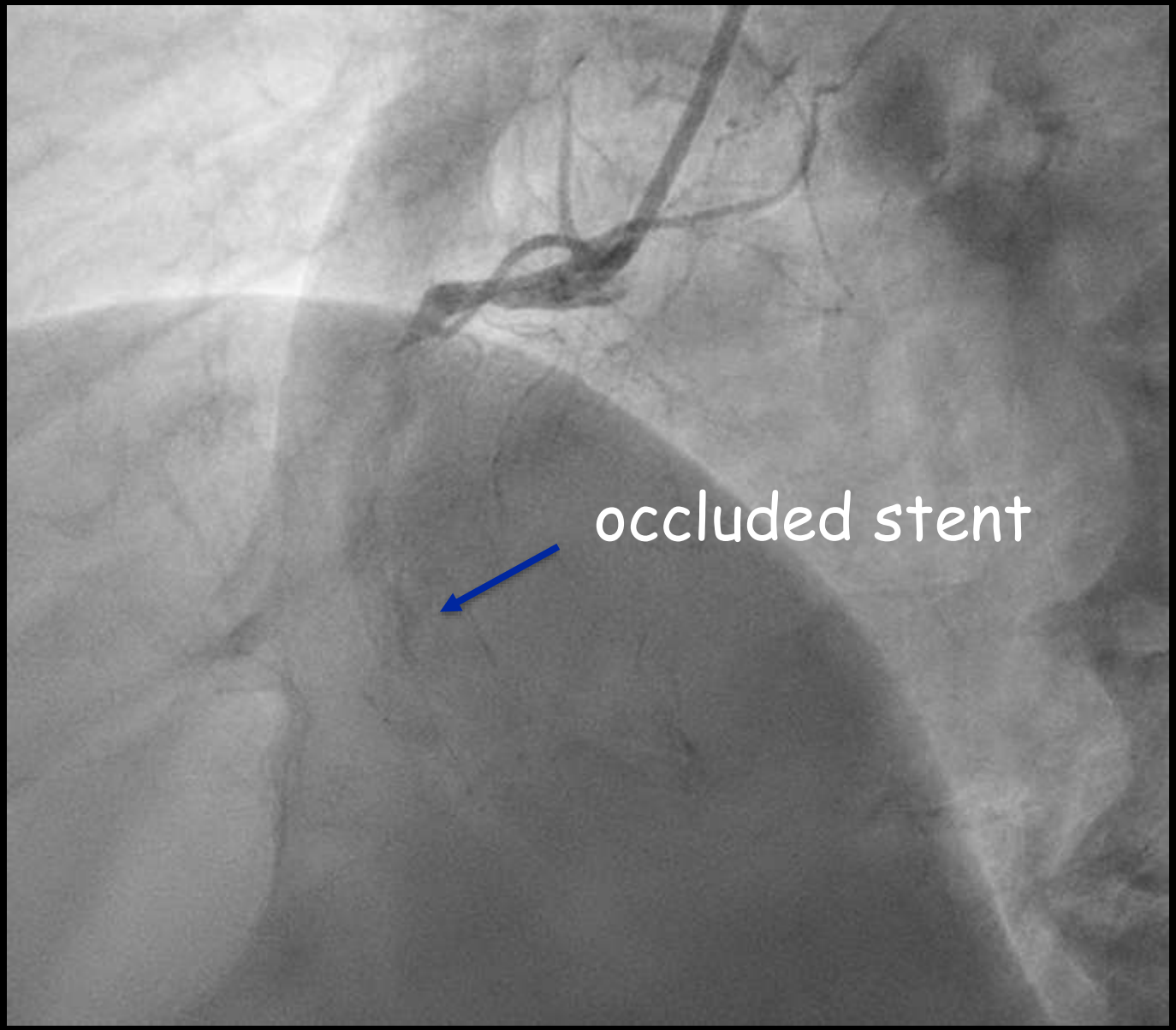


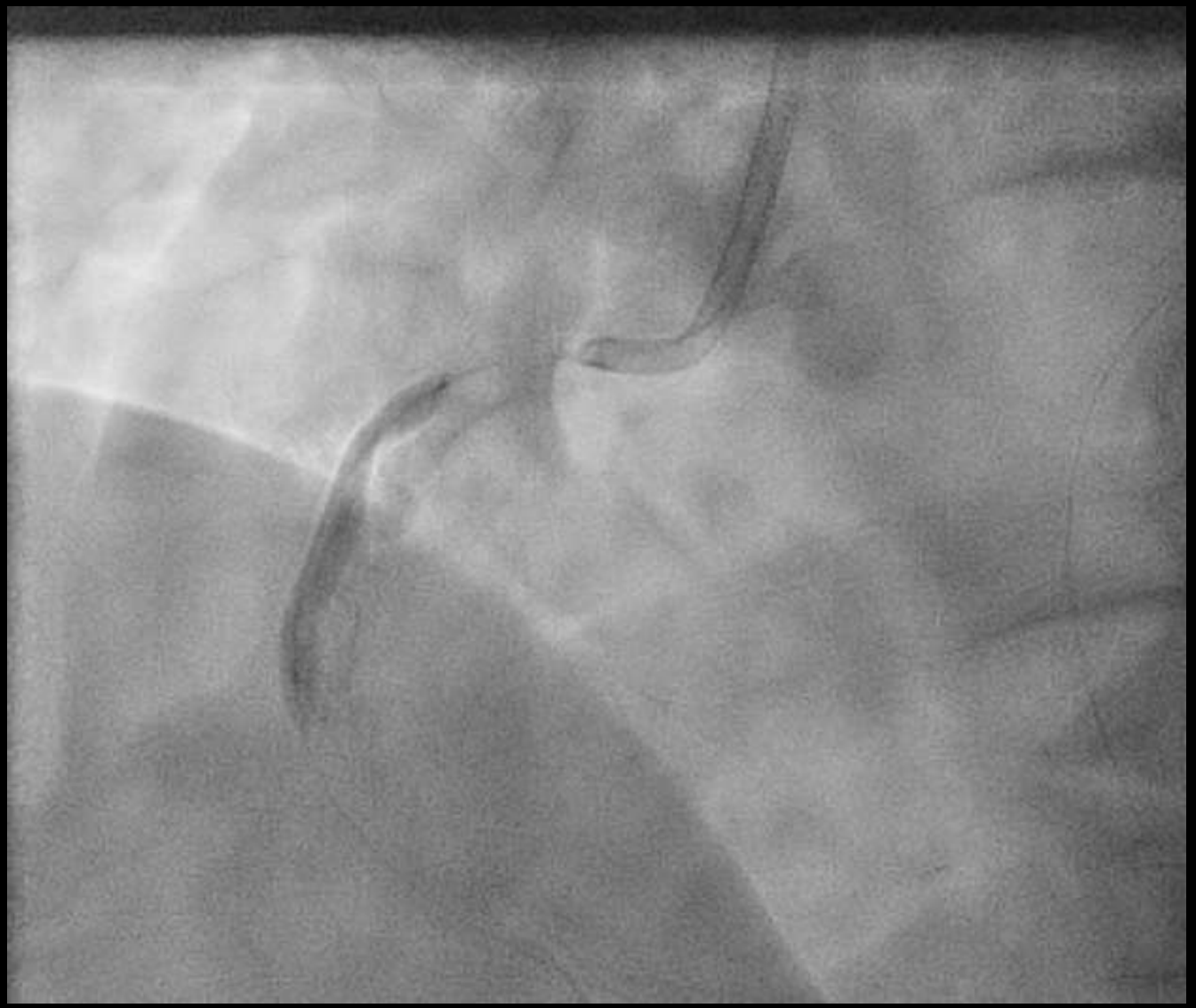






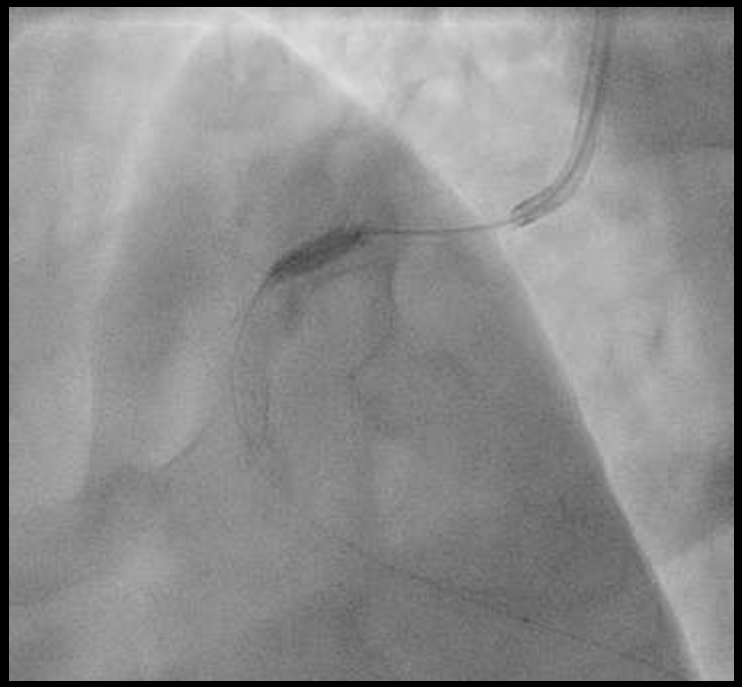



occluded stent

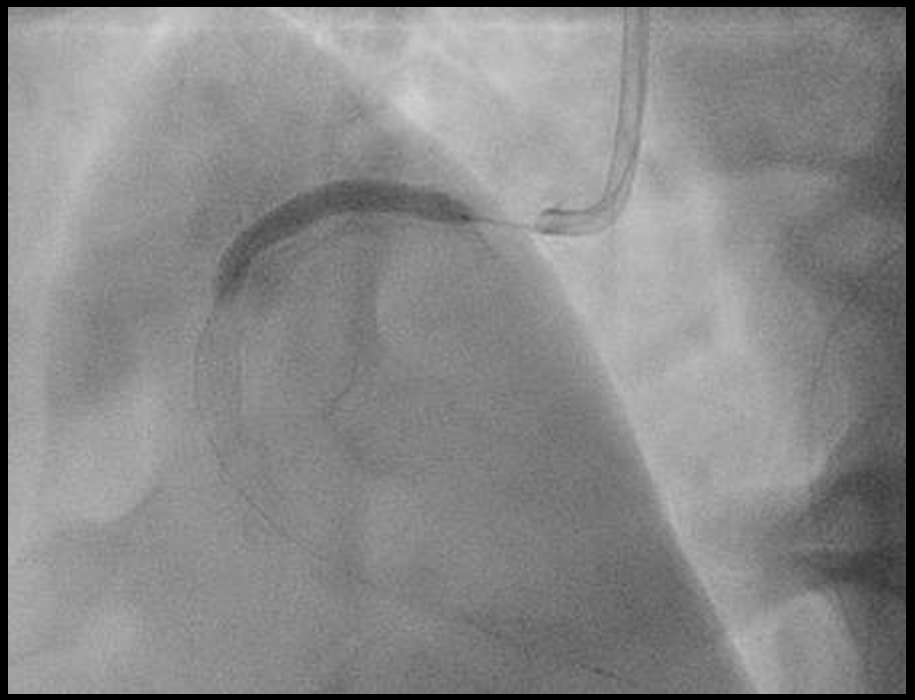


The passage has been subintimal all the way

Shockwave balloon

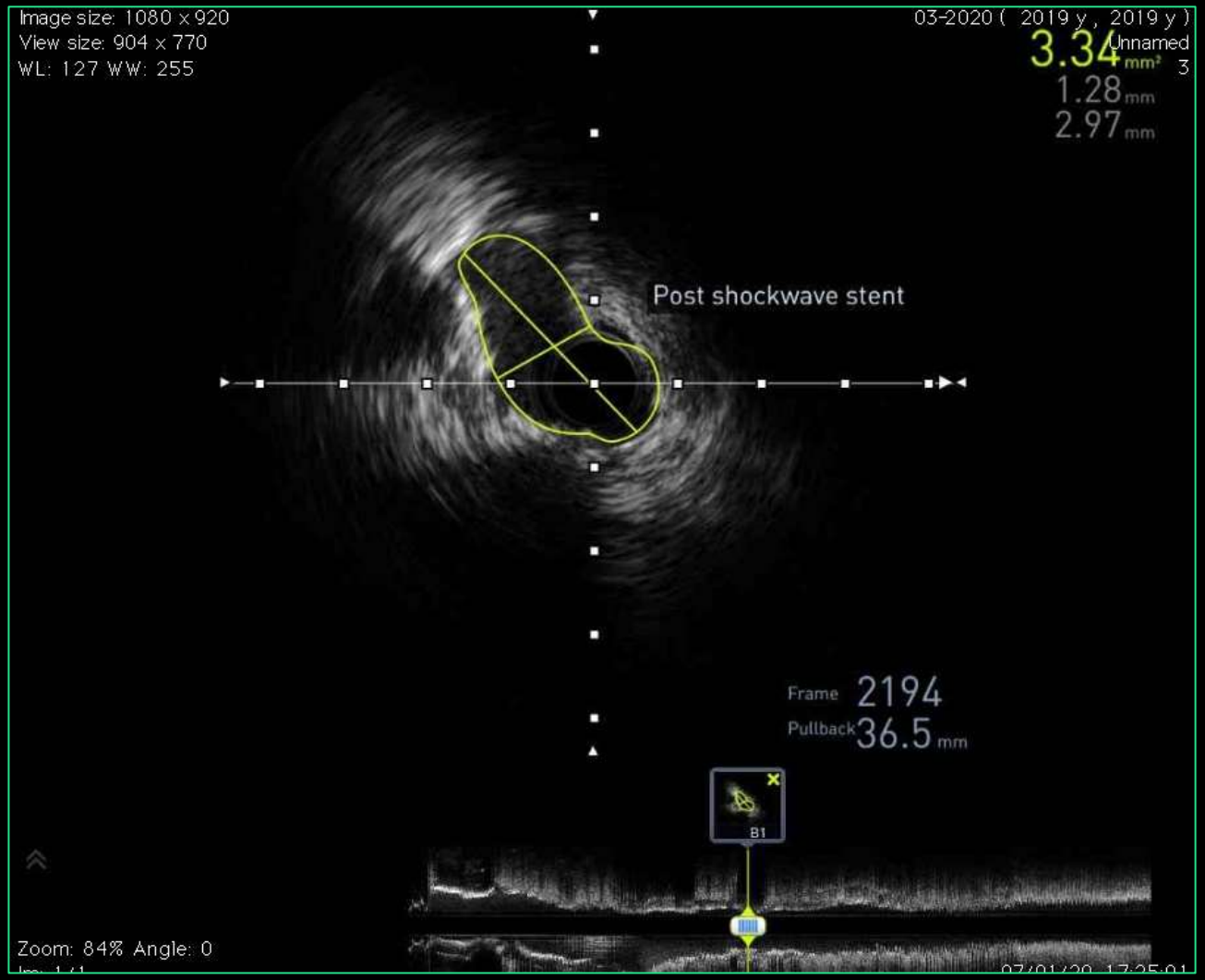


Full inflation of NC balloon



Final

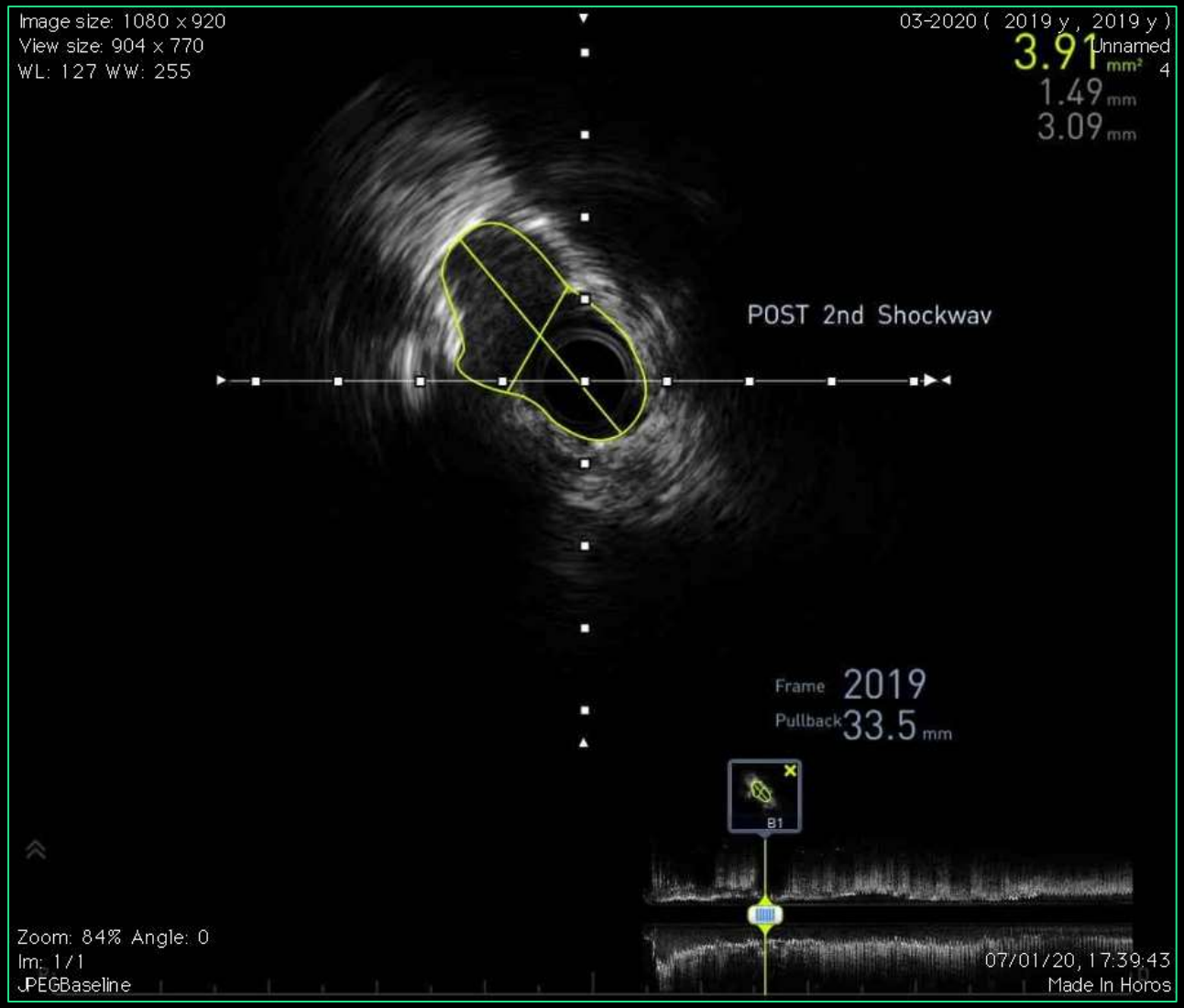
IVUS



Post Shockwave 3.0, 22 atm predilatation and DES 3.0x38

1/2020

IVUS



Post 2° Shockwave 3.0 and 3.0 24 atm NC

1/2020

IVUS

Post OPN Balloon 3.0x20mm 37 atm

1/2020

Optimal lesion preparation

Rotablator

Laser-ELCA; contrast injection only for underexpanded stent

Cutting or Angiosculpt at very high pressure

OPN very high pressure dedicated balloon

Shockwave balloon, lithoplasty

Orbital Atherectomy (CSI)