

Complex PCI of calcified Lesion using rotablation

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Why use Rotational Atherectomy?

- The prevalence of **severe calcium**, defined as **superficial in nature with greater than 180° arc**, is estimated to present itself in 12% of cases using angiographic imaging. When IVUS guidance is used, it's seen in approximately 26% of cases.¹
- **Asymmetrical stent expansion** occurs in **up to 50% of cases** where calcium is not treated before stent deployment.²
- Lesion preparation with compliance change for a calcified lesion can substantially facilitate stent delivery and symmetrical stent expansion for **more homogeneous drug delivery**.³
- **With DES**, RA is an important tool for calcified lesions.

1. Mintz et al. Patterns of Calcification in Coronary Artery Disease. *Circulation* April 1995, Volume 91, No 7

2. Moussa, Moses, Columbo et al. Coronary Stenting After Rotational Atherectomy in Calcified and Complex Lesions. *Circulation* 1997; 96:128-136

3. Iakovou, I. et. al. *J Am Coll Cardiol* 2005;46:1446-55

Device Selection

Quick Reference Burr Guide

Burr Diameter		Recommended Guide Catheter	Minimum ID Required
mm	Inches	(French)*	(Inches)
1.25	0.049	6.0	0.060**
1.50	0.059	6.0	0.063
1.75	0.069	7.0	0.073
2.00	0.079	8.0	0.083
2.15	0.085	8.0	0.089
2.25	0.089	9.0	0.093
2.38	0.094	9.0	0.098
2.50	0.098	9.0	0.102

Physician Considerations

- Guide catheter **with side holes**
- Guide catheter that provides coaxial engagement will reduce unfavorable guidewire bias
- **Burr-to-artery ratio of 0.4~0.6**

Contraindications

- Saphenous Vein Grafts
- Last Remaining Vessel
- Thrombus
- Significant Dissection
- Non-surgical candidates

Precautions

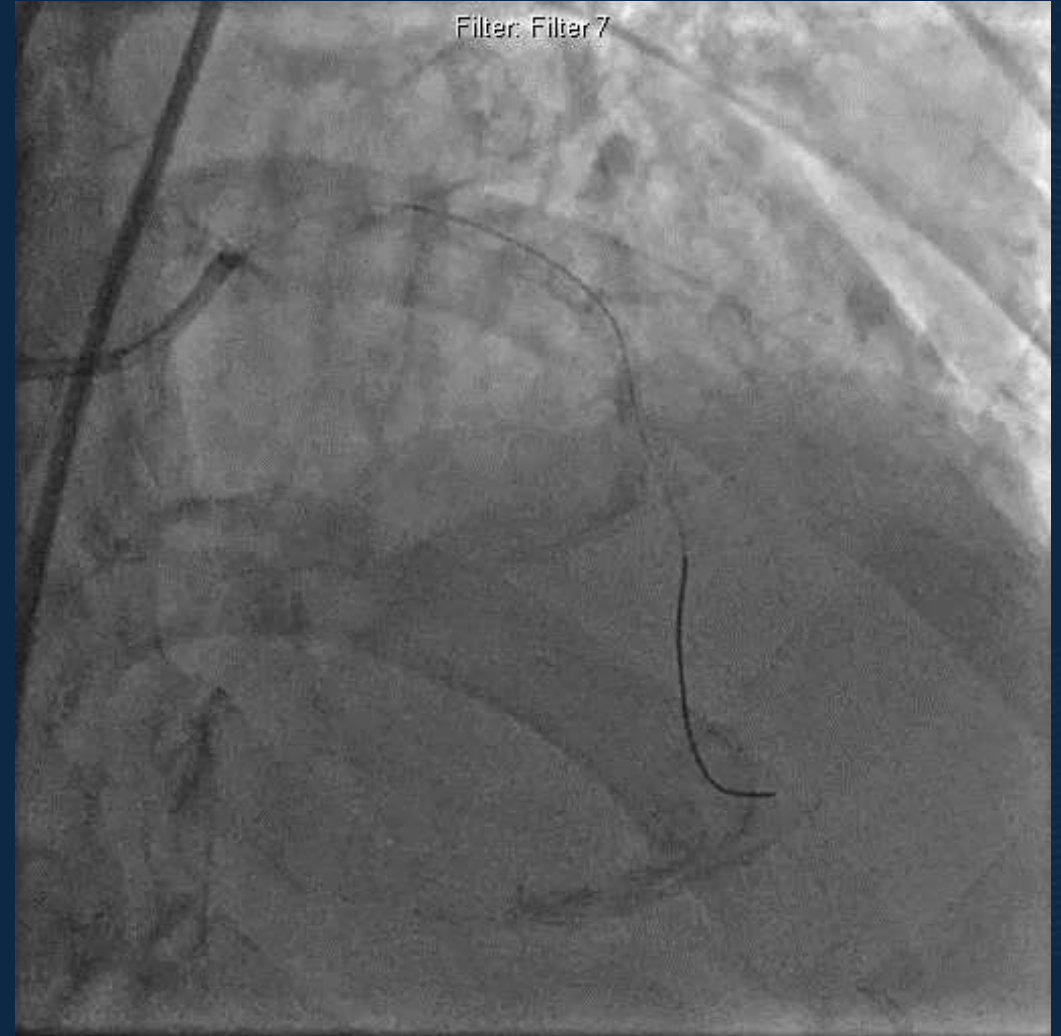
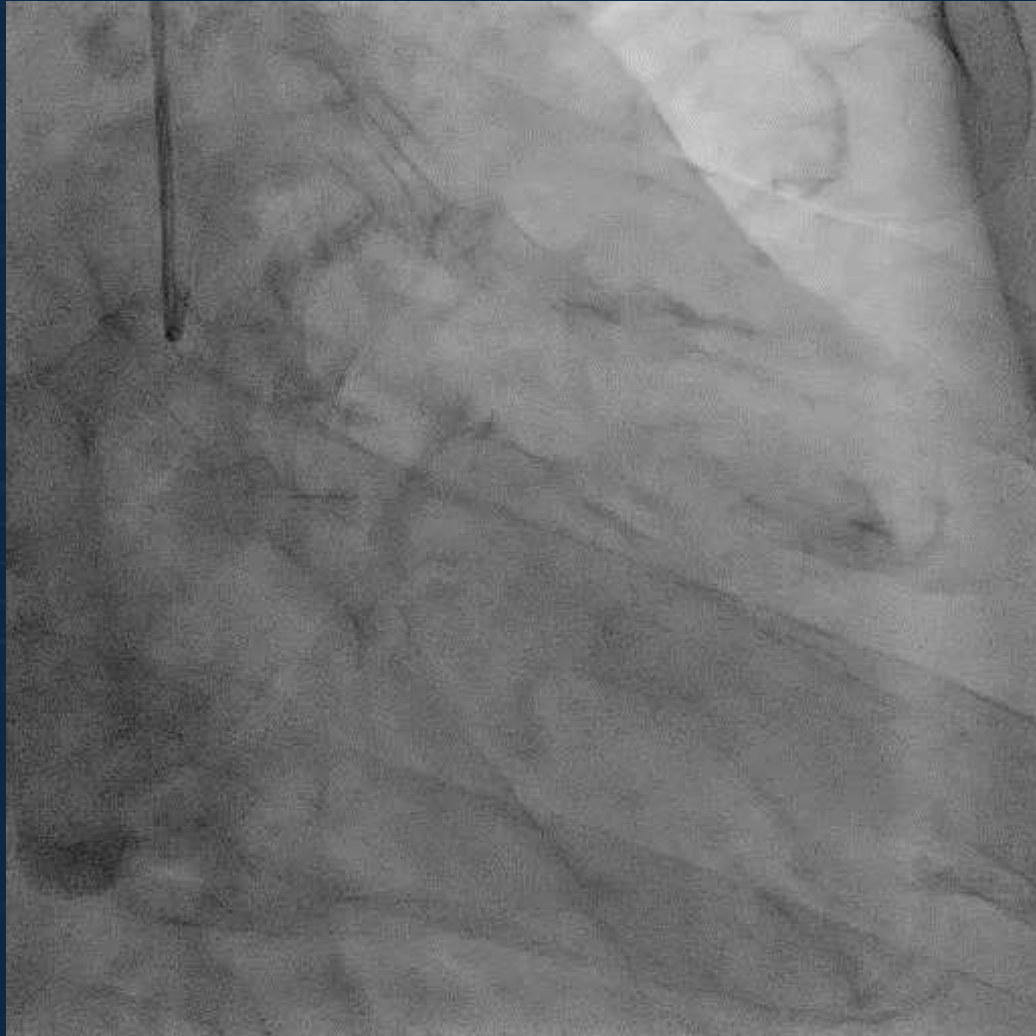
- Ejection fraction less than 30%
- Lesions longer than 25mm
- Angulated lesions

Case1

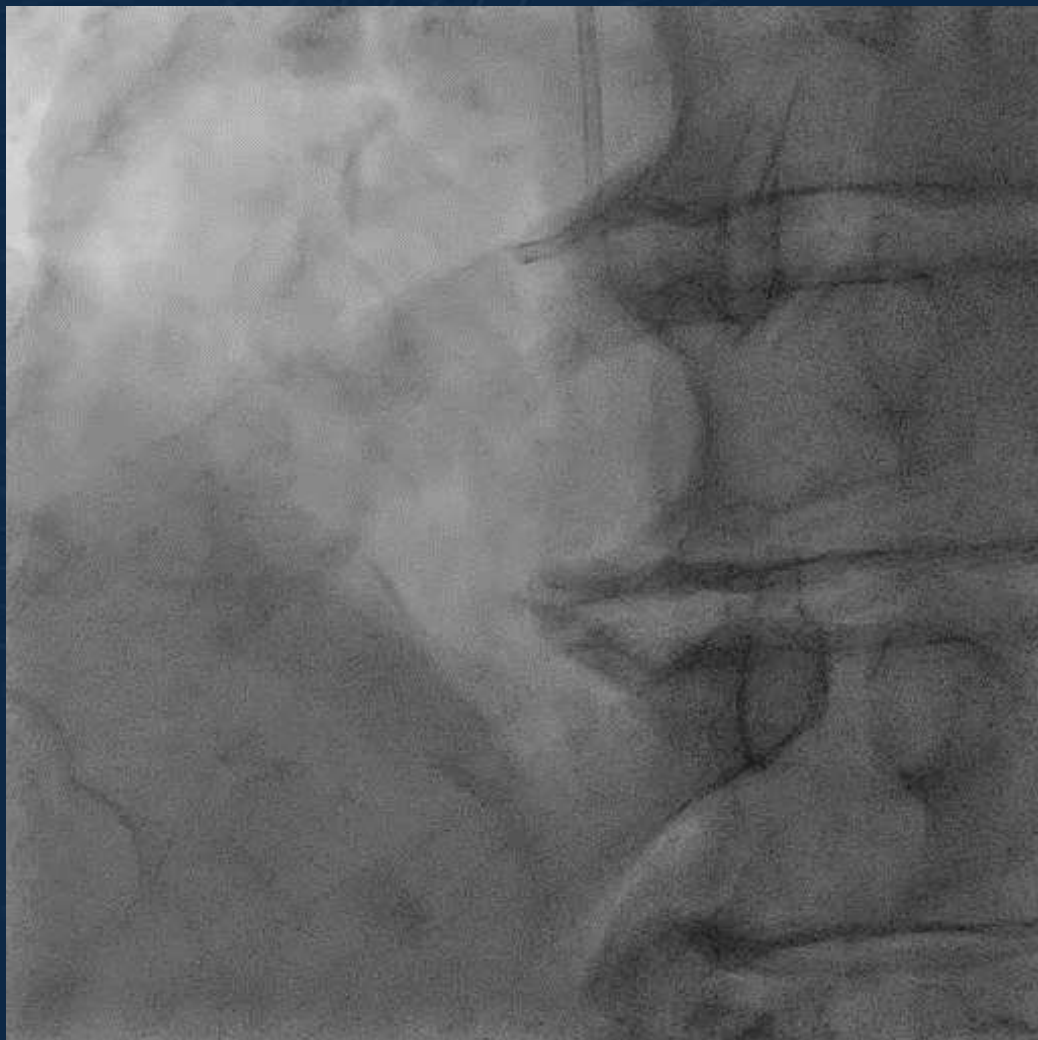
History

- 89 years old male
- DM(-), HTN(+)
- 최근 chest discomfort 지속되어, 본원에서 시행한 CAG상 IHD(LM+2VD)소견보여, PCI 위해 입원함
- Angina
- CAG(22/01/24) : LM os 50%, LAD diffuse 80%, mLAD subtotal occlusion

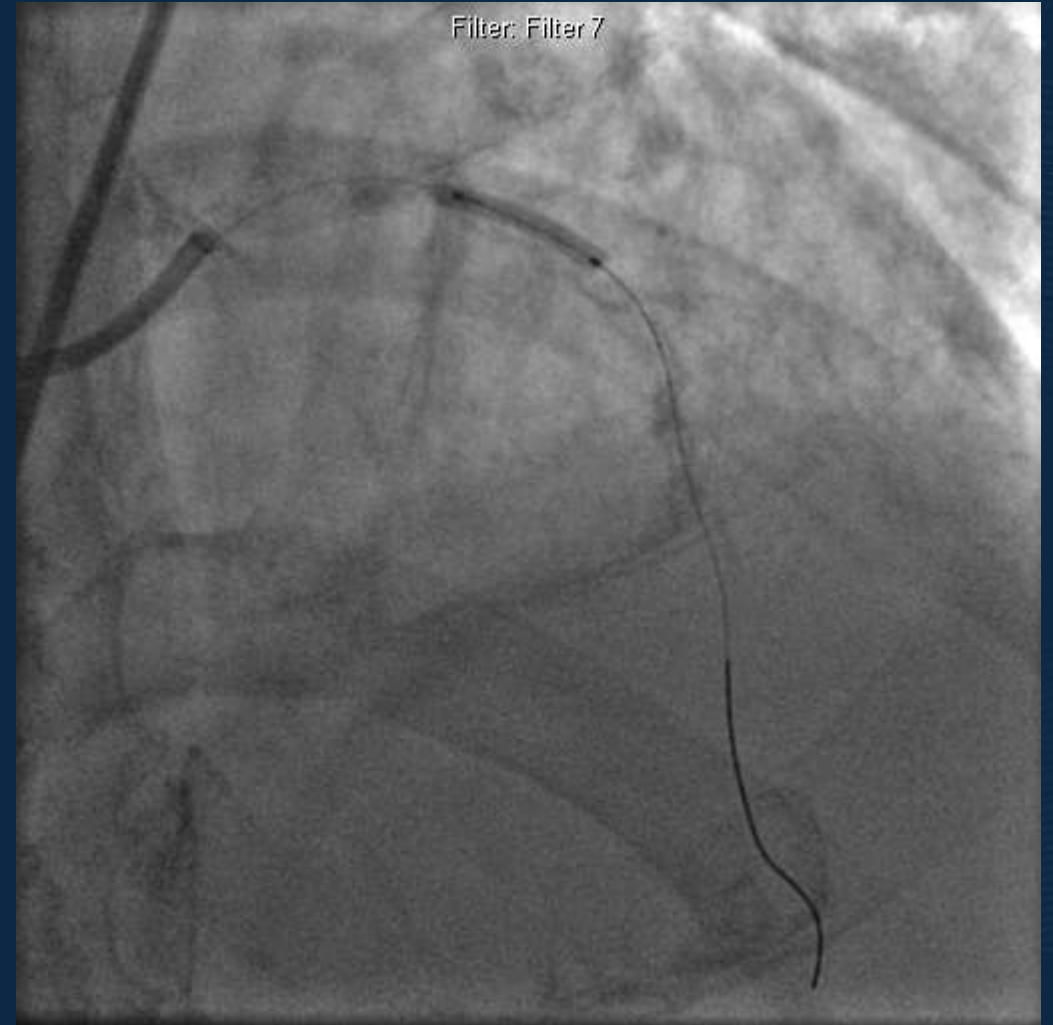
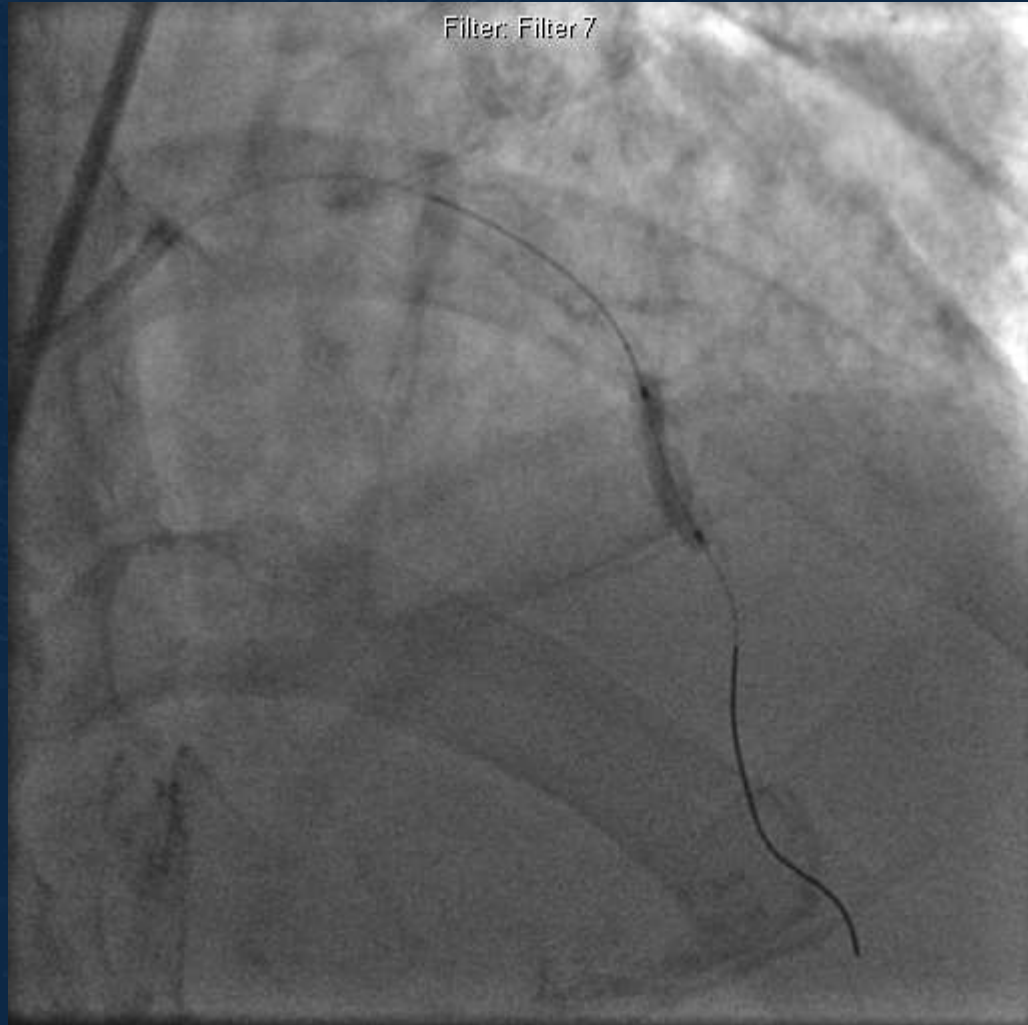
Coronary Angiography(LCA)



Coronary Angiography(RCA)

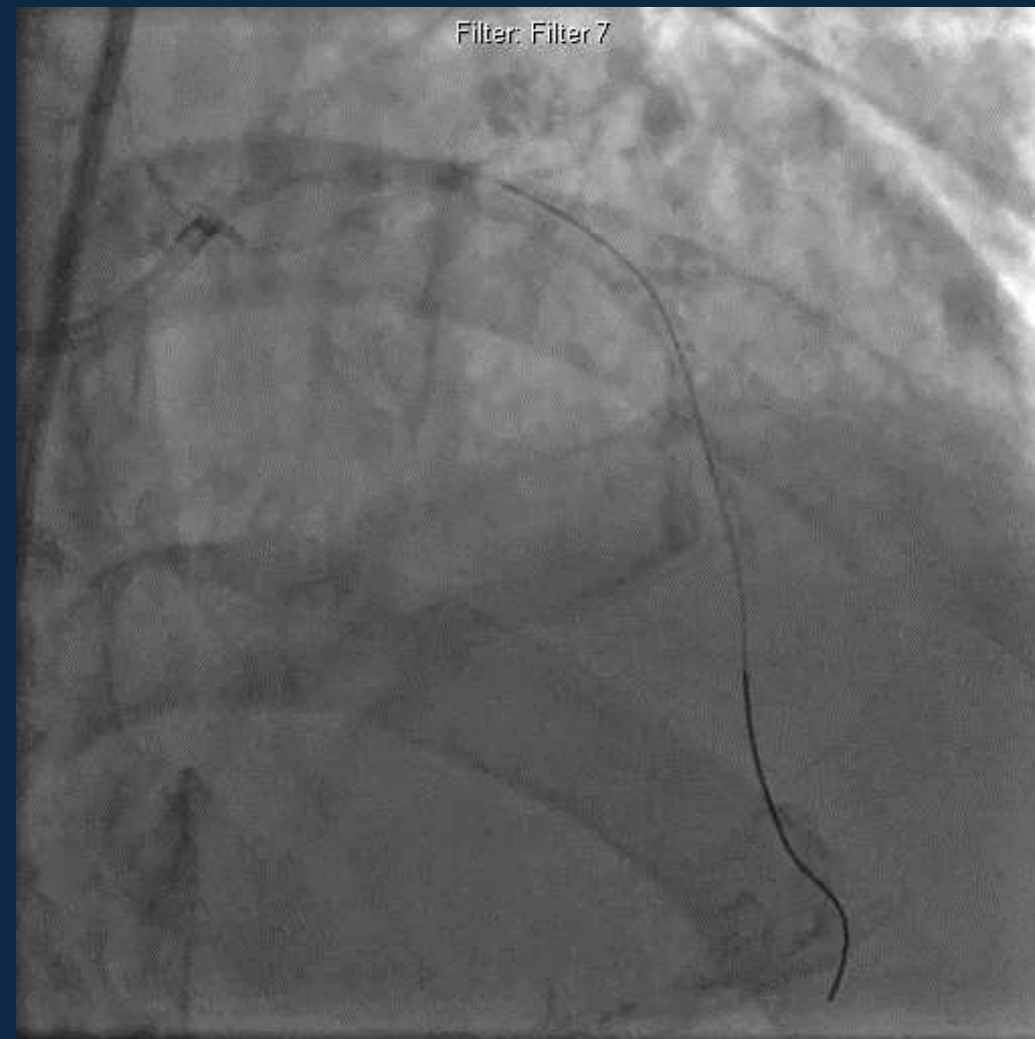
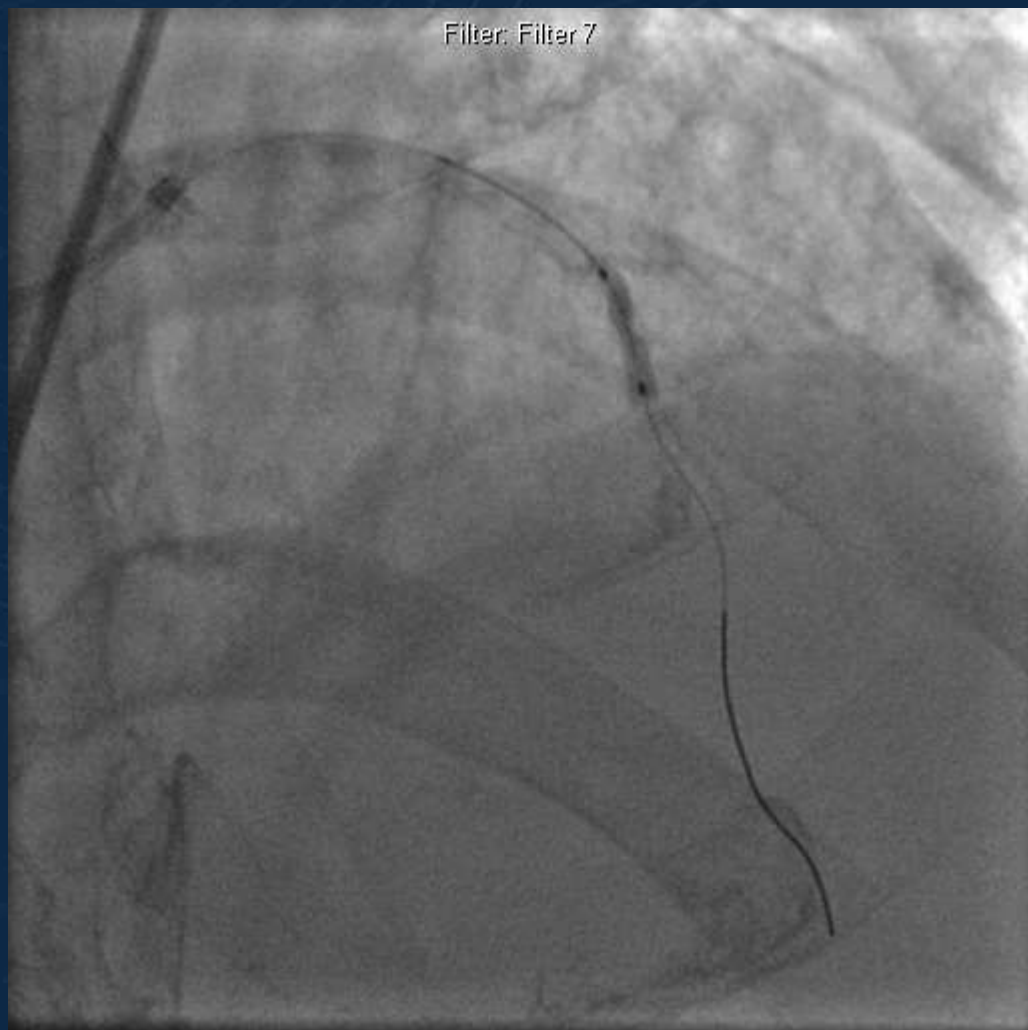


LAD balloon



Compliant balloon 2.0x15 mm

LAD balloon



Compliant balloon 2.0x15 mm

LAD balloon

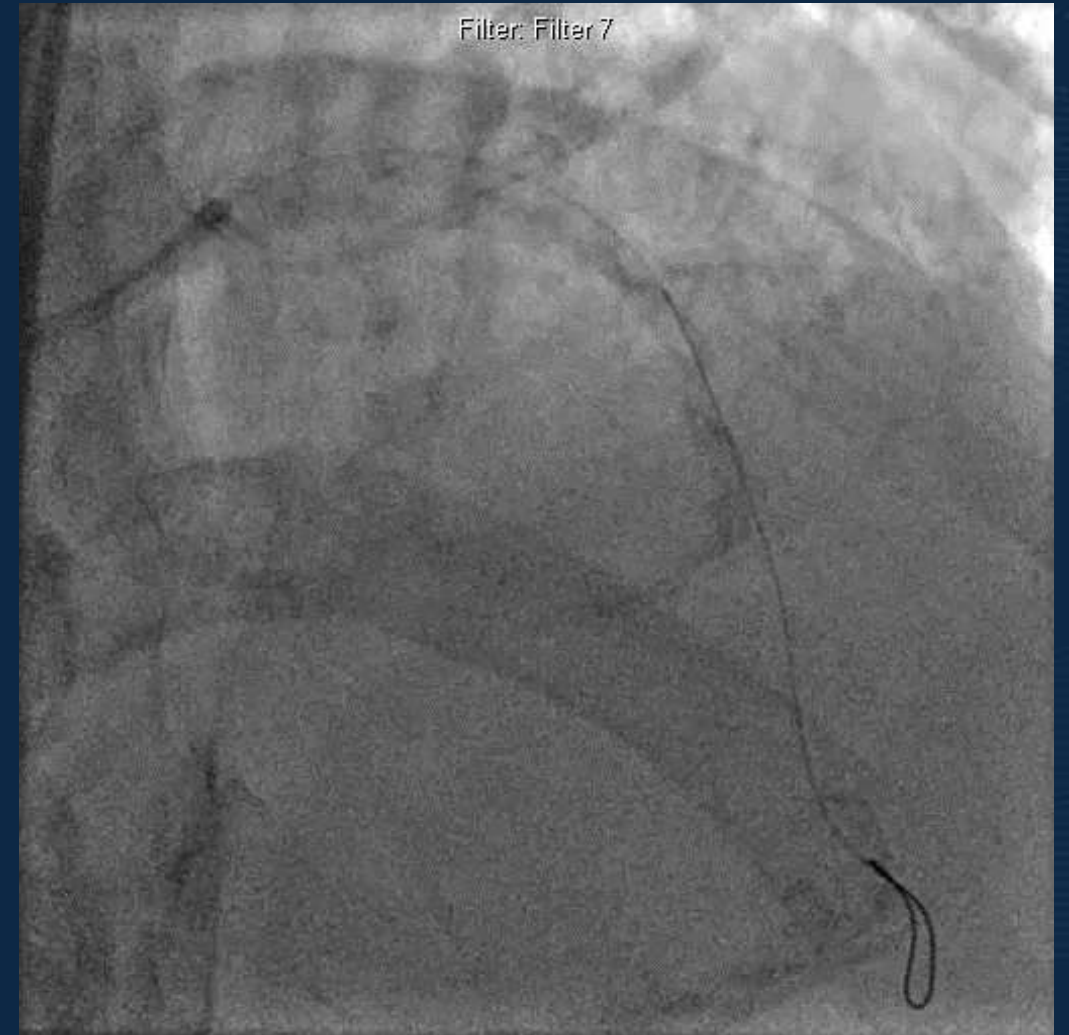
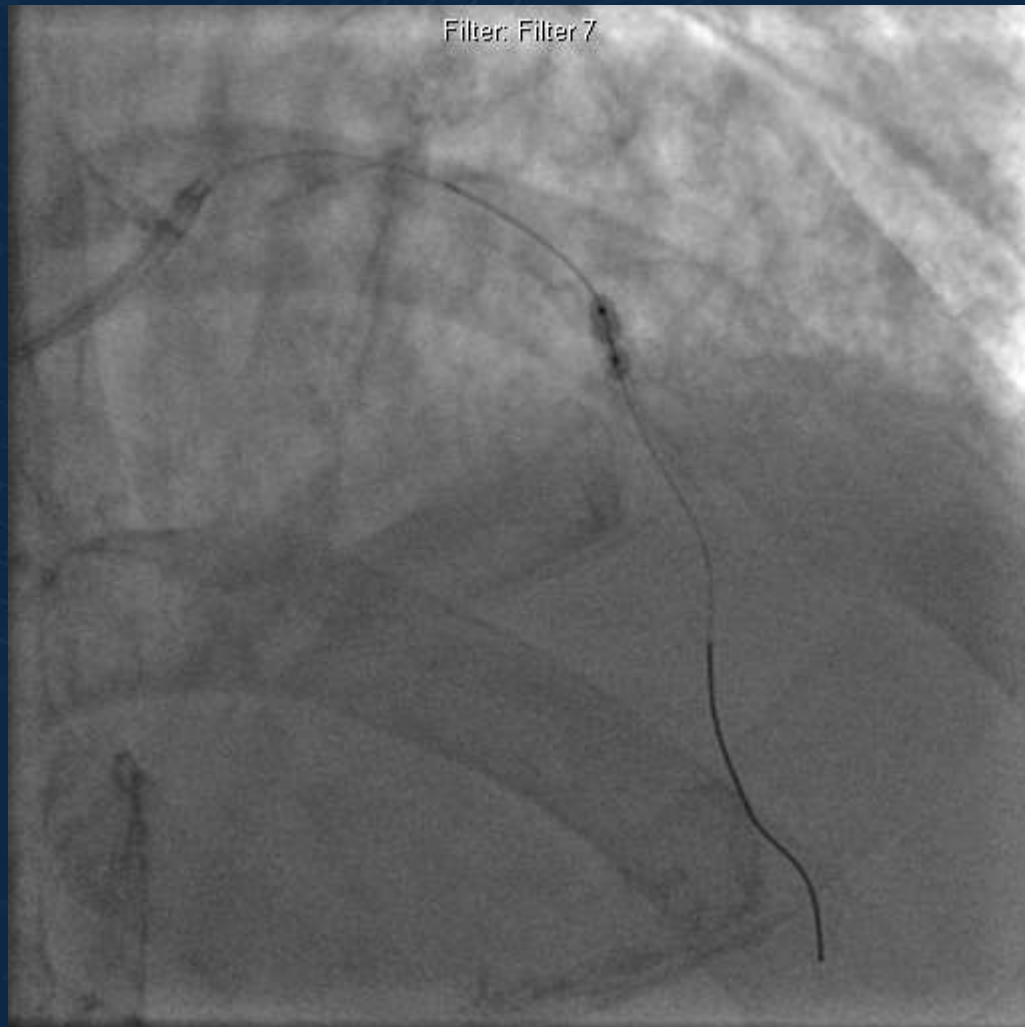


Nc balloon 2.5x12 mm



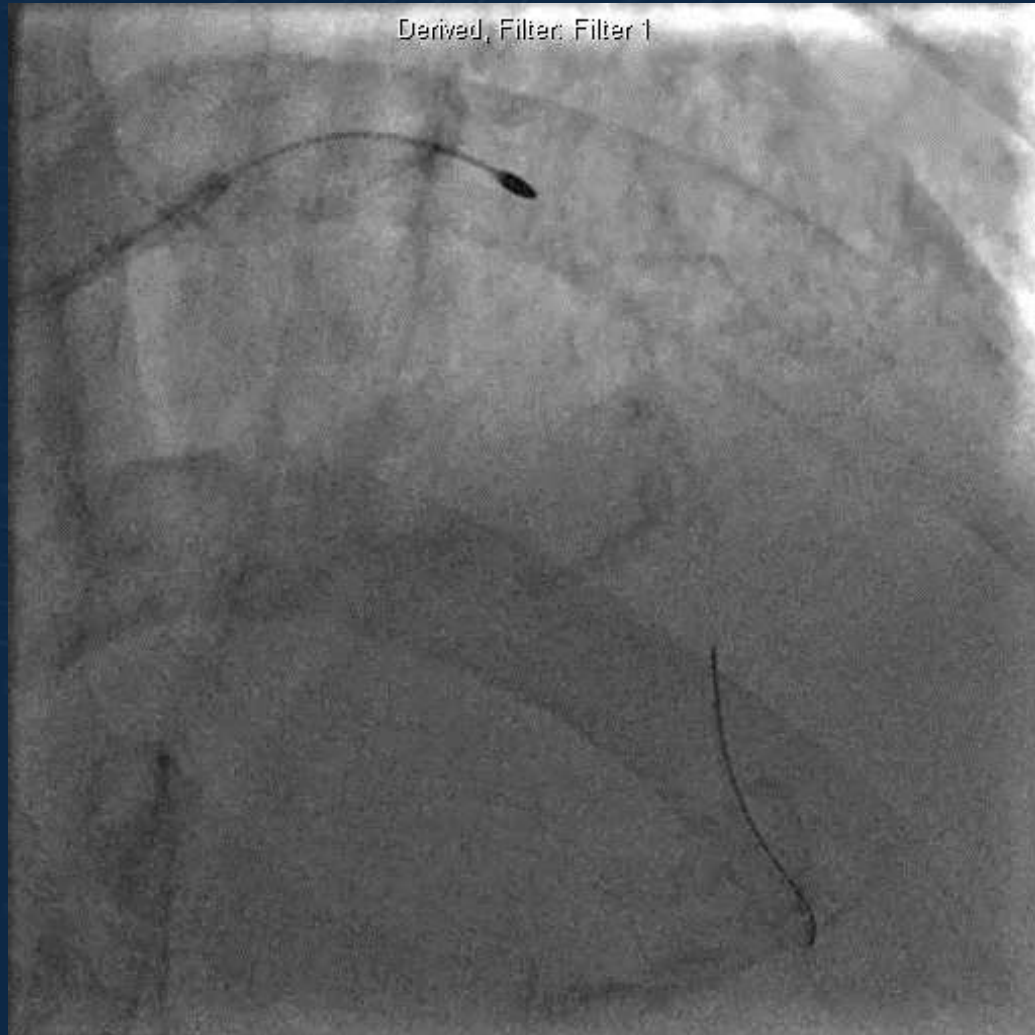
Nc balloon 2.75x12 mm

LAD balloon

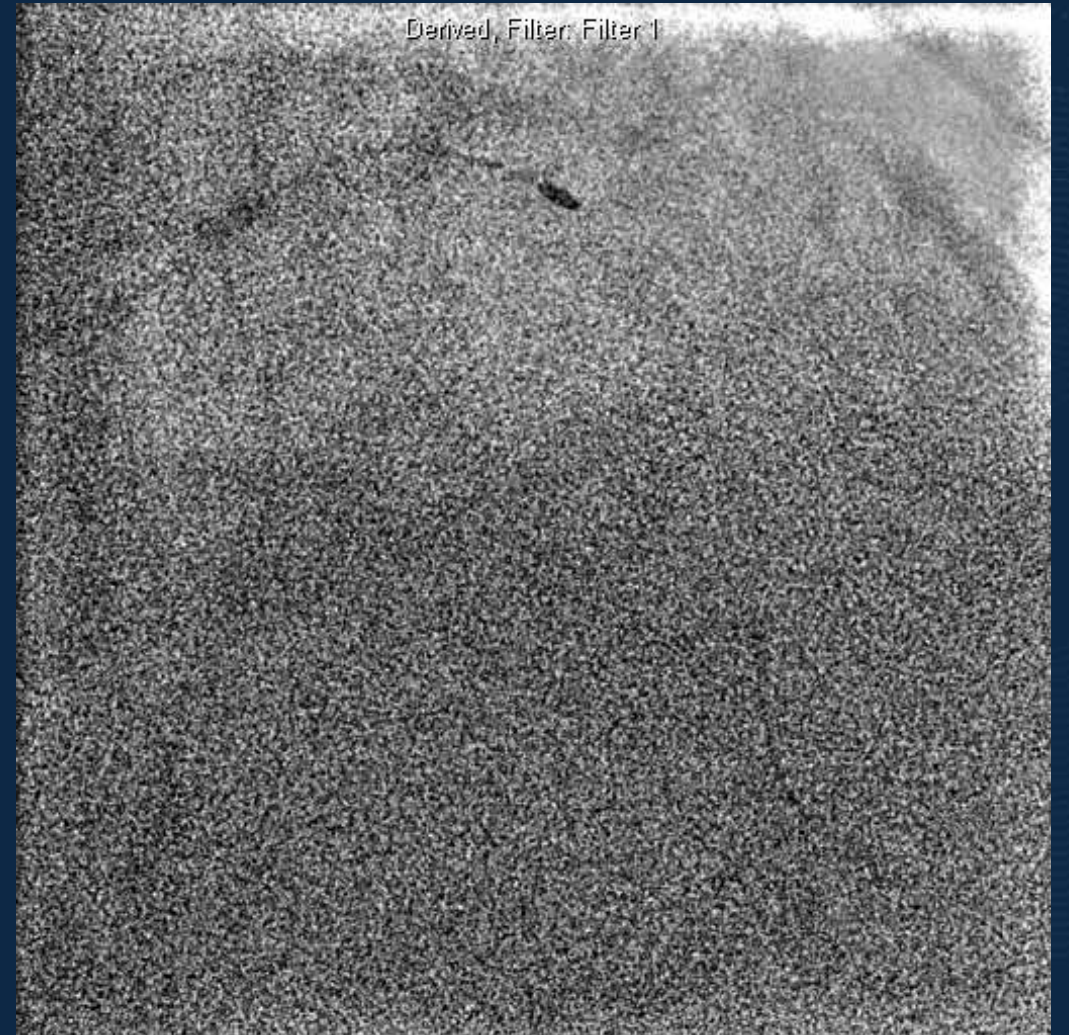


Cutting balloon 2.75x10 mm

Rota(LAD)

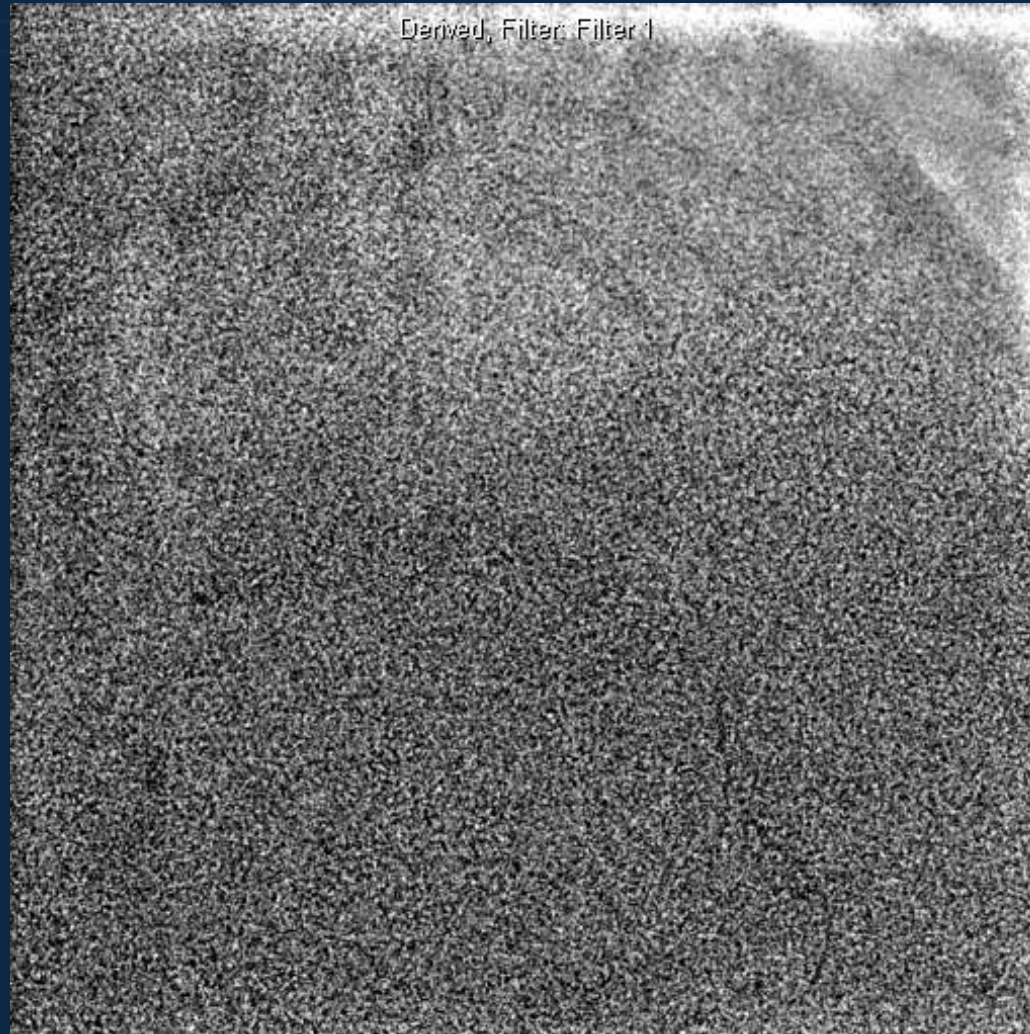


1.25 burr

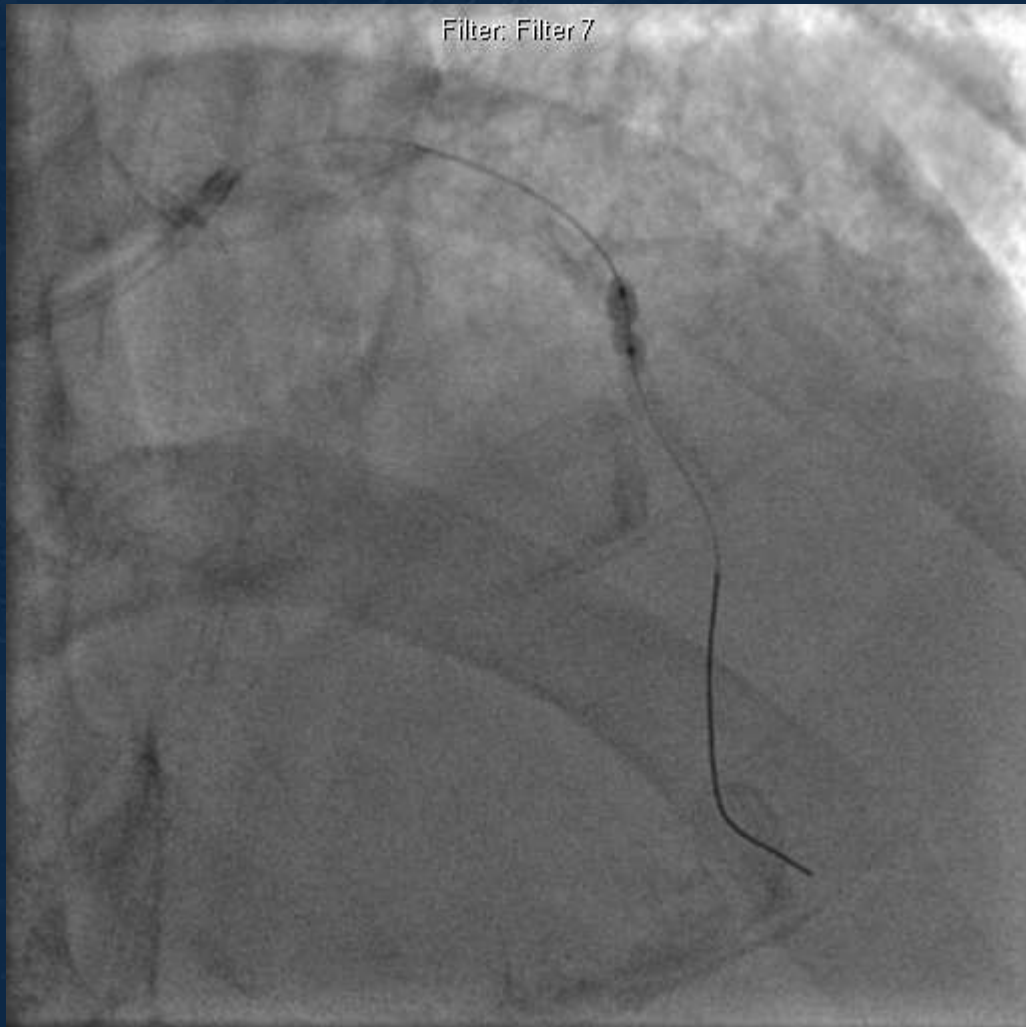


1.5 burr

Rota(LAD)



Post Rota

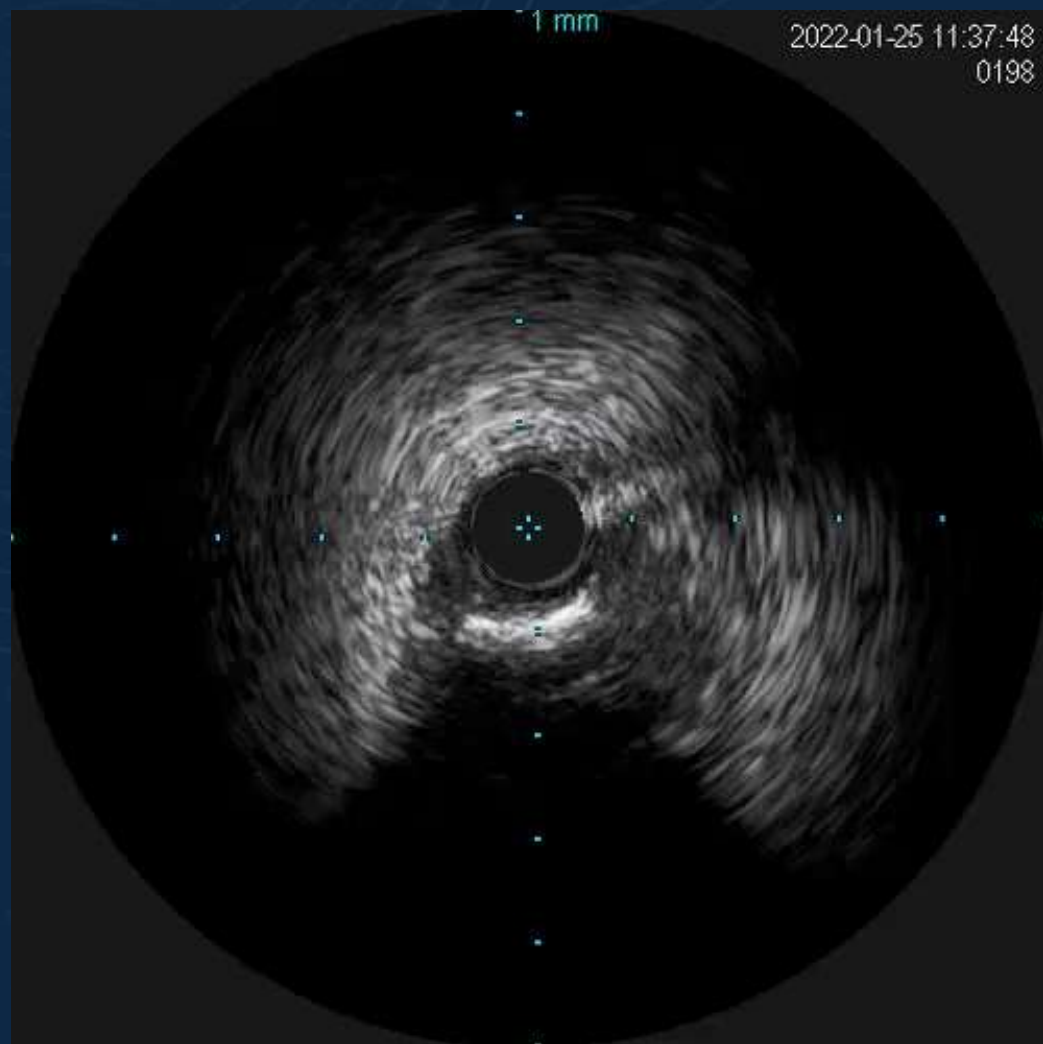


Nc balloon 2.75x8 mm

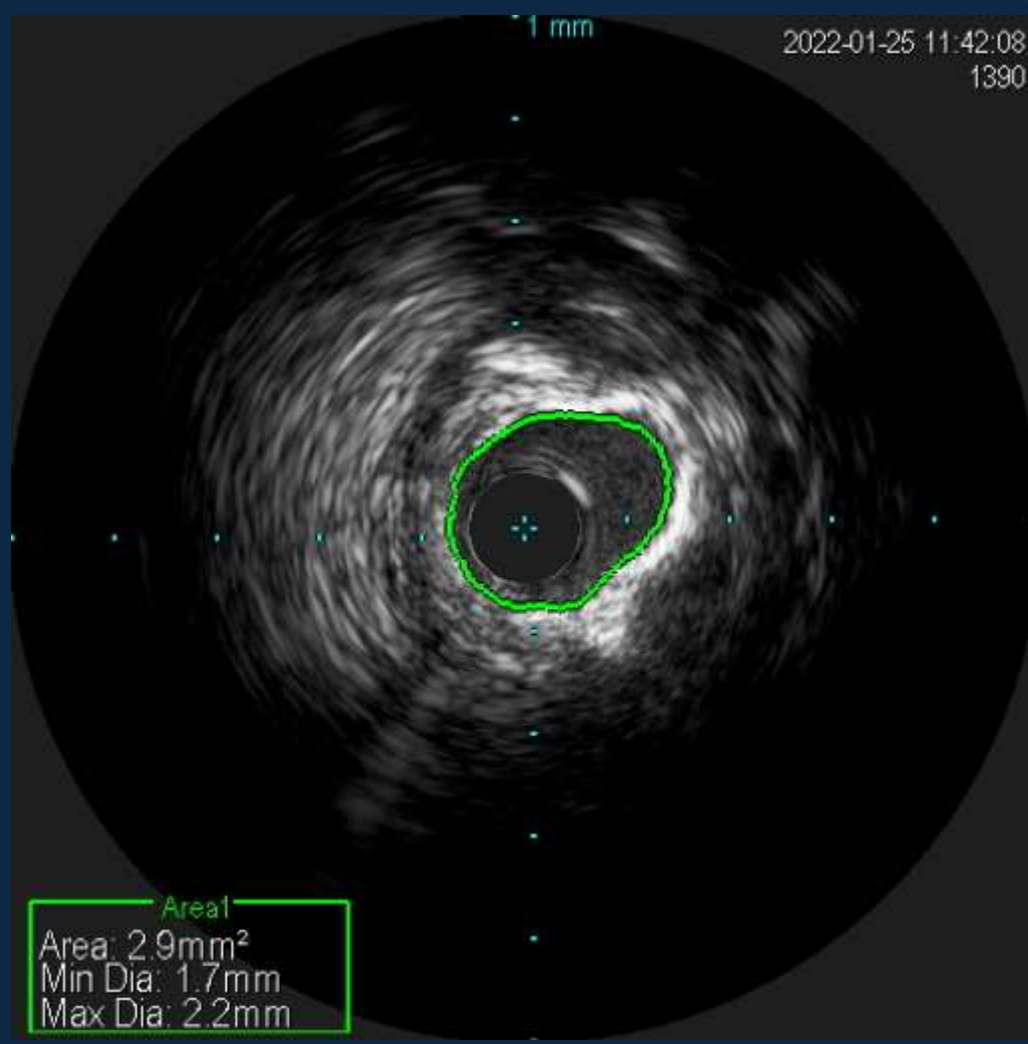


NSE balloon 3.0x13 mm

IVUS(LAD)

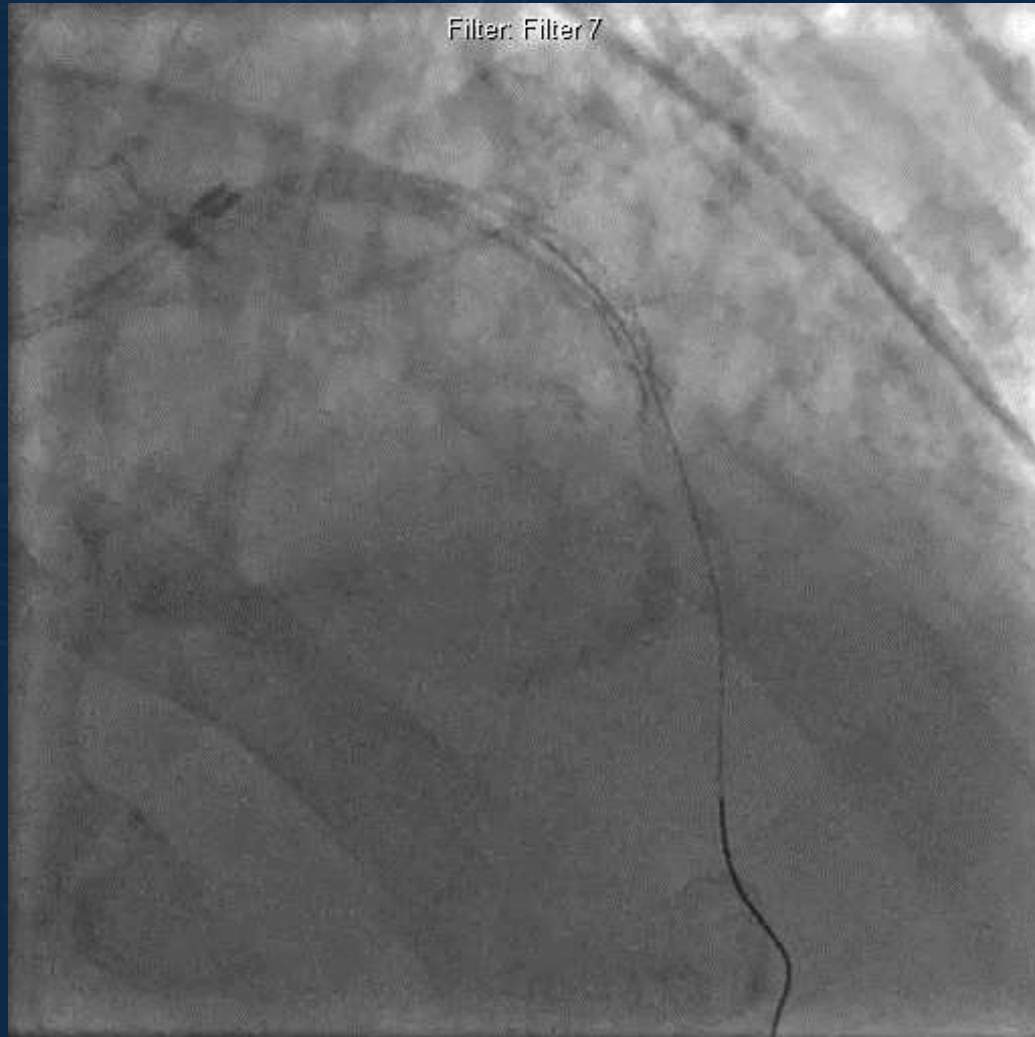


LAD

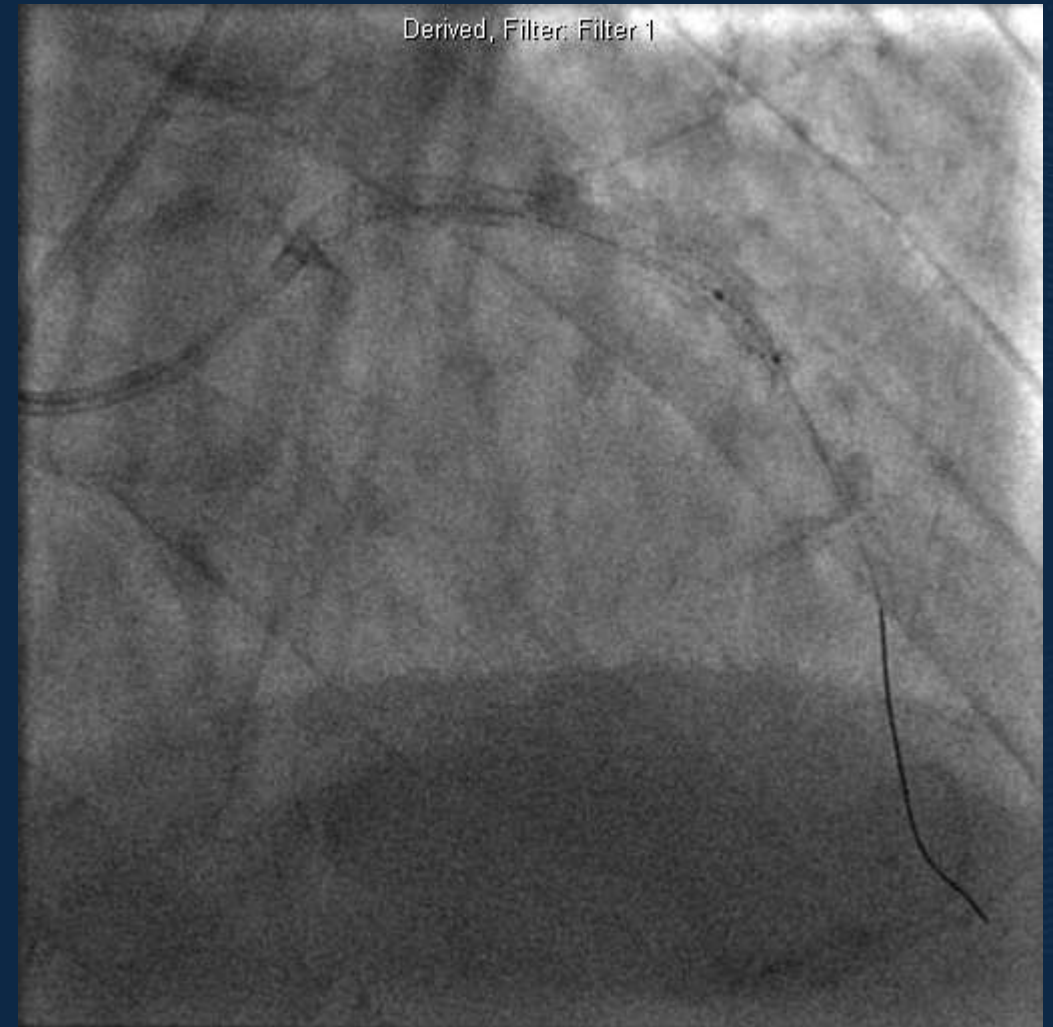


LAD mid

Stent

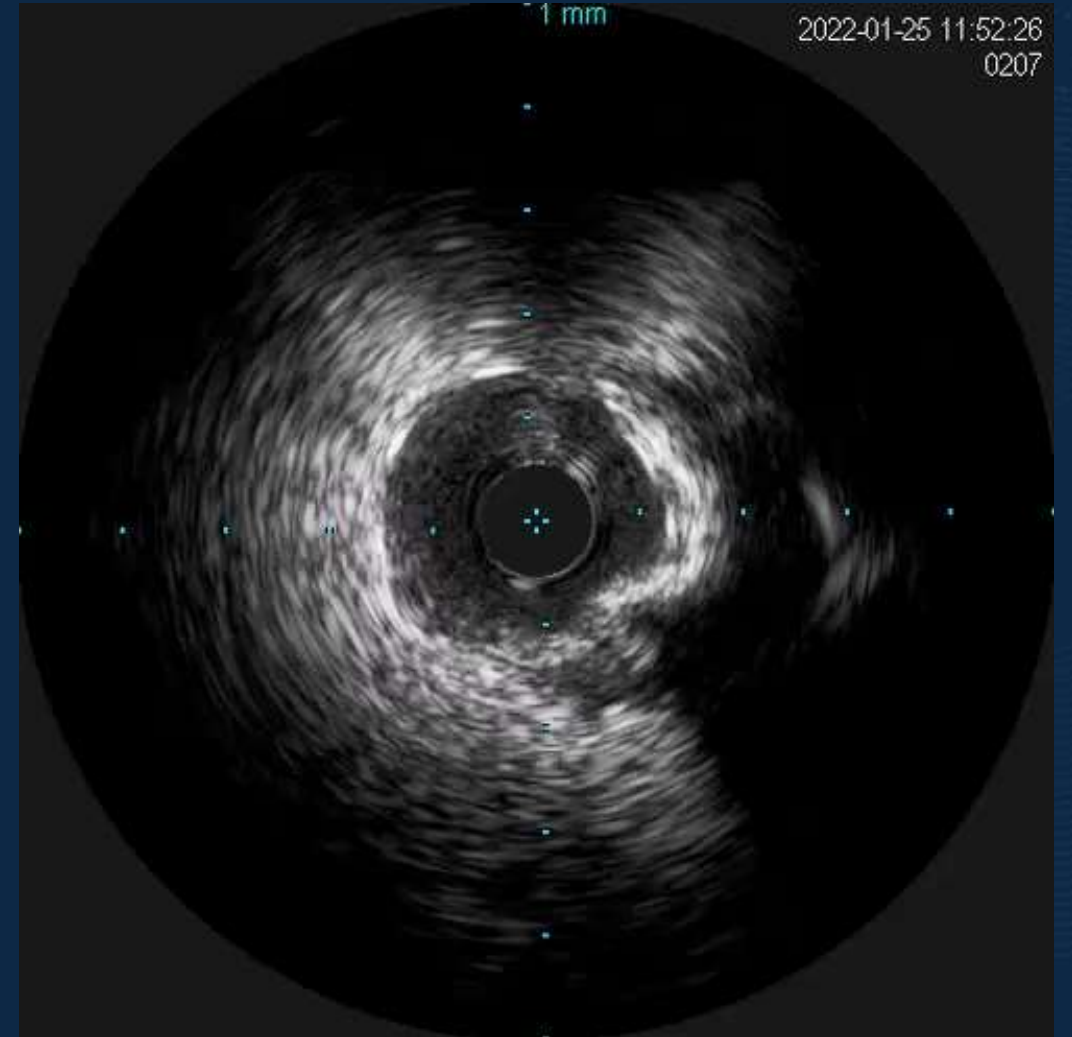


Onyx 3.0x38 mm



Onyx 3.5x22 mm

Final

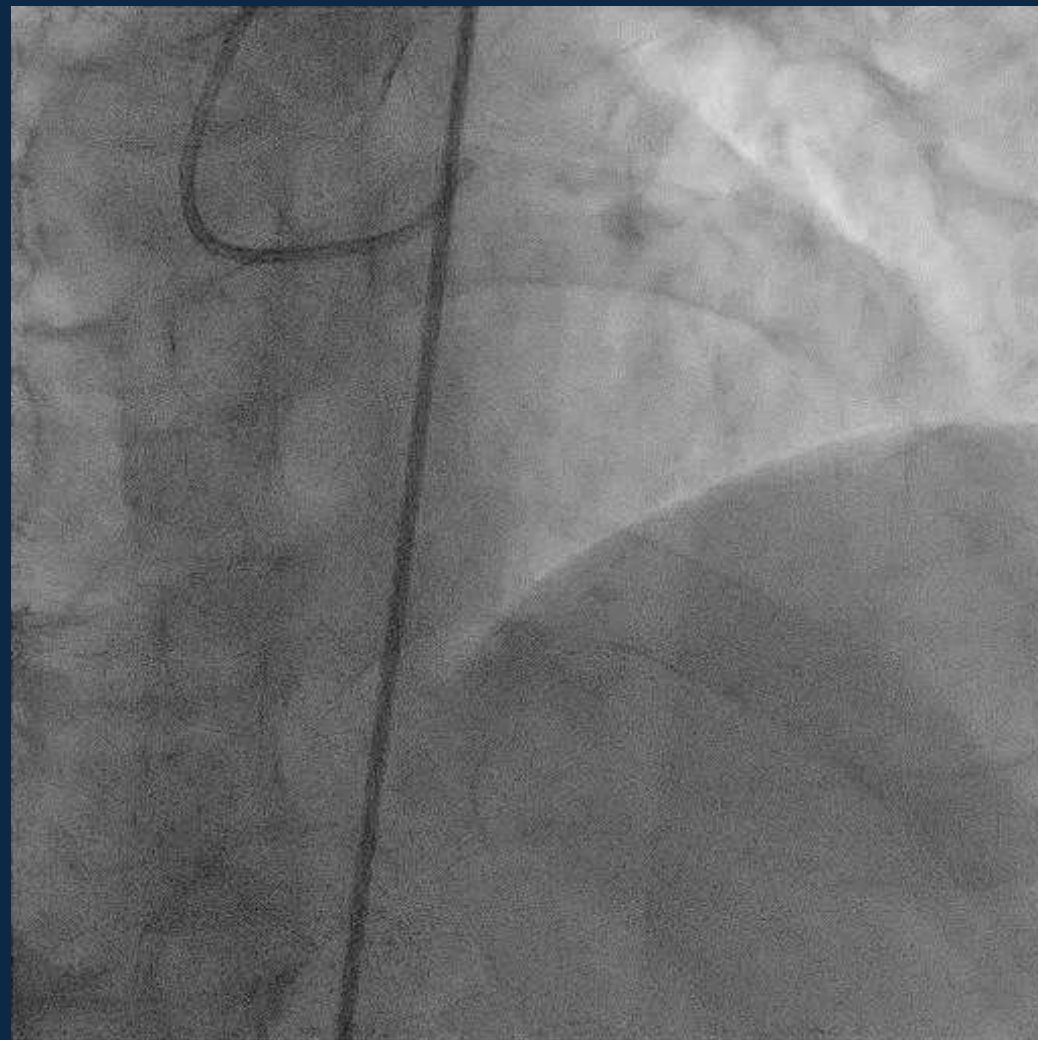
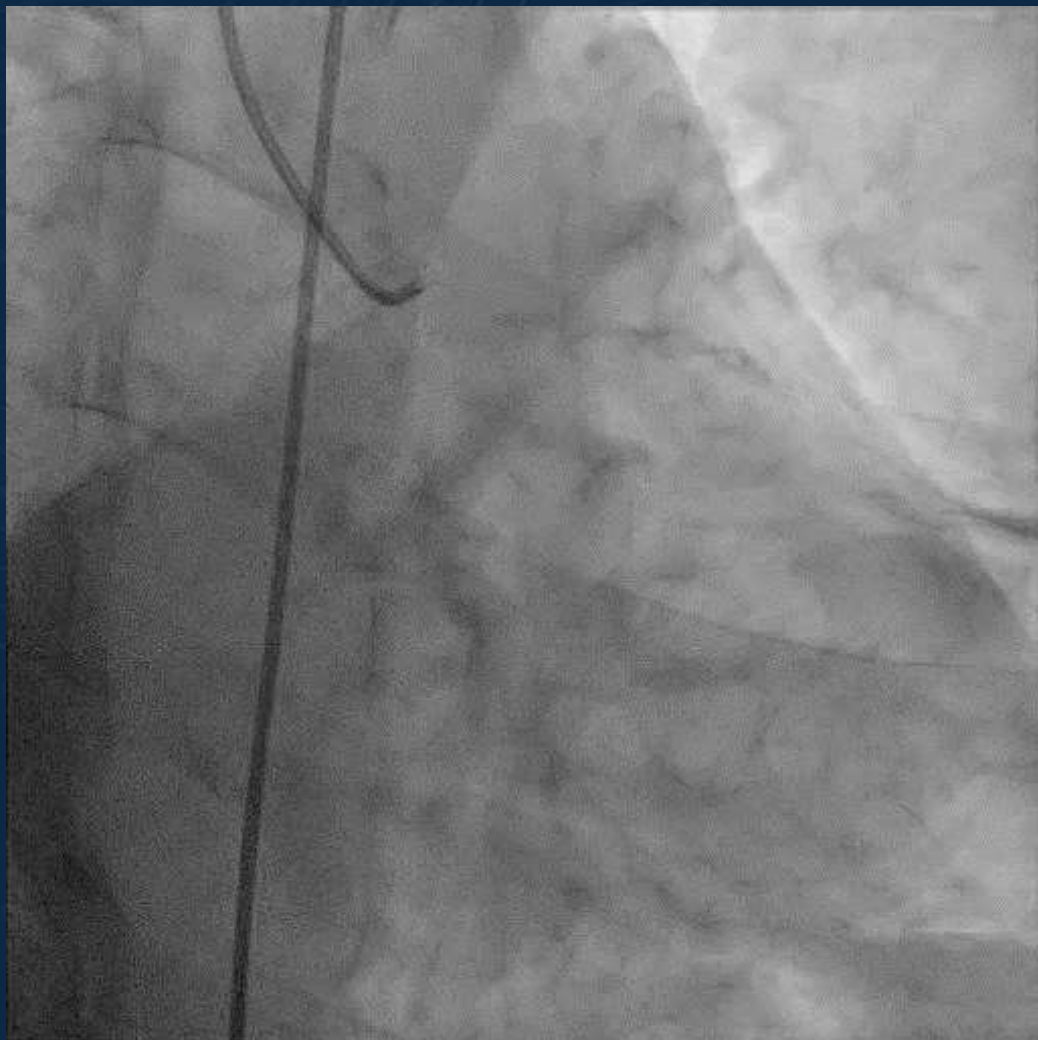


Case2

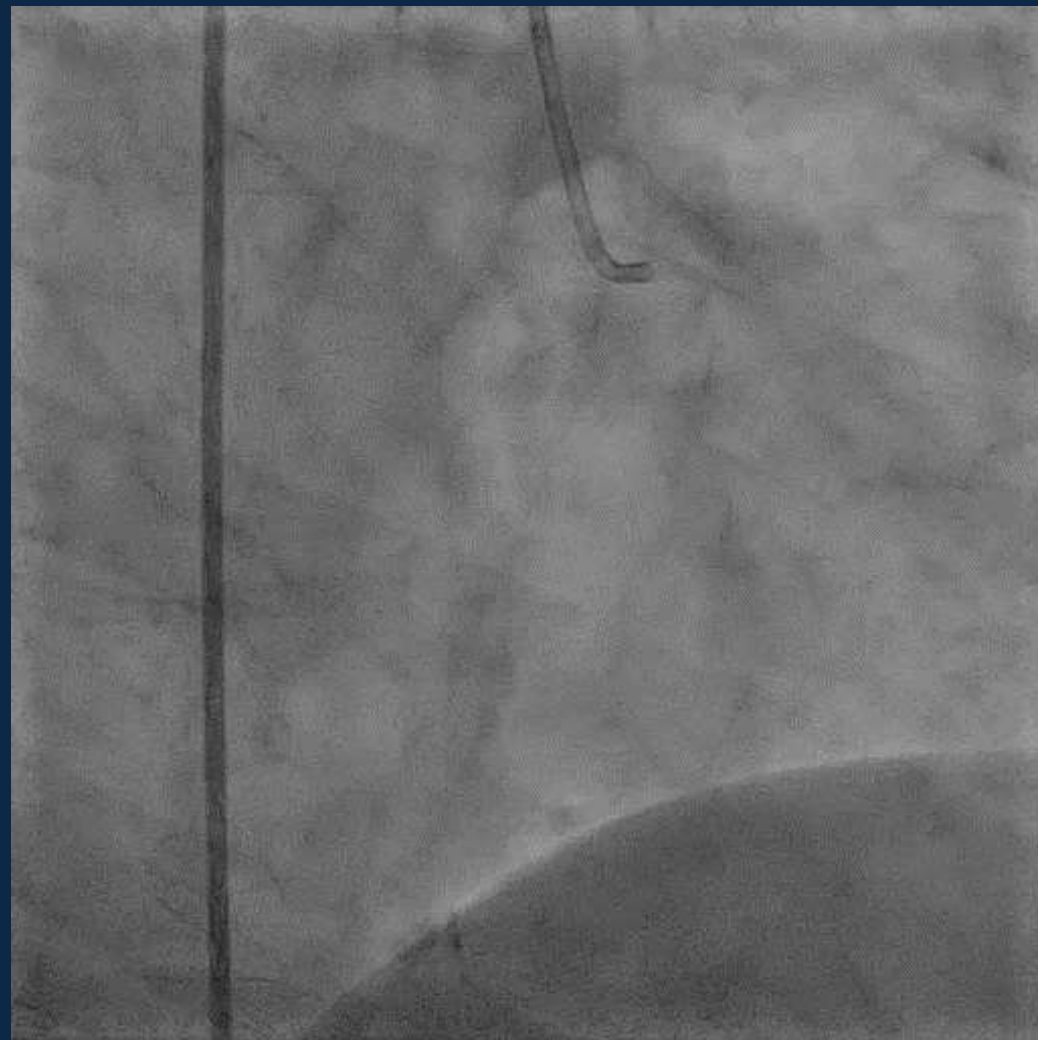
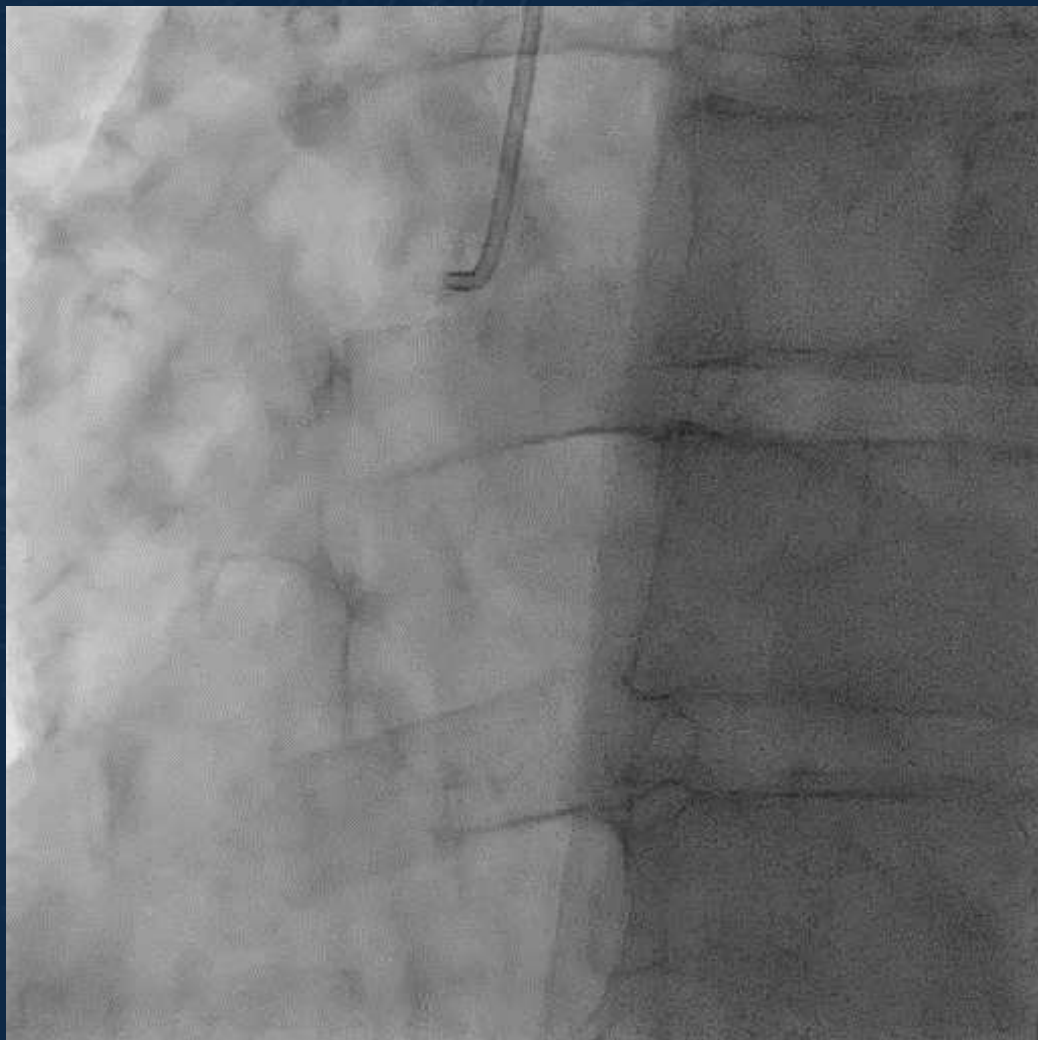
History

- 71 years old male
- DM, HTN
- Hyperlipidemia, old CVA
- 2020년 계단 오를 때 발생하는 가슴통증으로 cardiac w/u 시행하였고 mRCA CTO 소견으로 타병원에서 2020/11/19 PCI try하였으나 fail하였고 PCI retry 위해 입원함

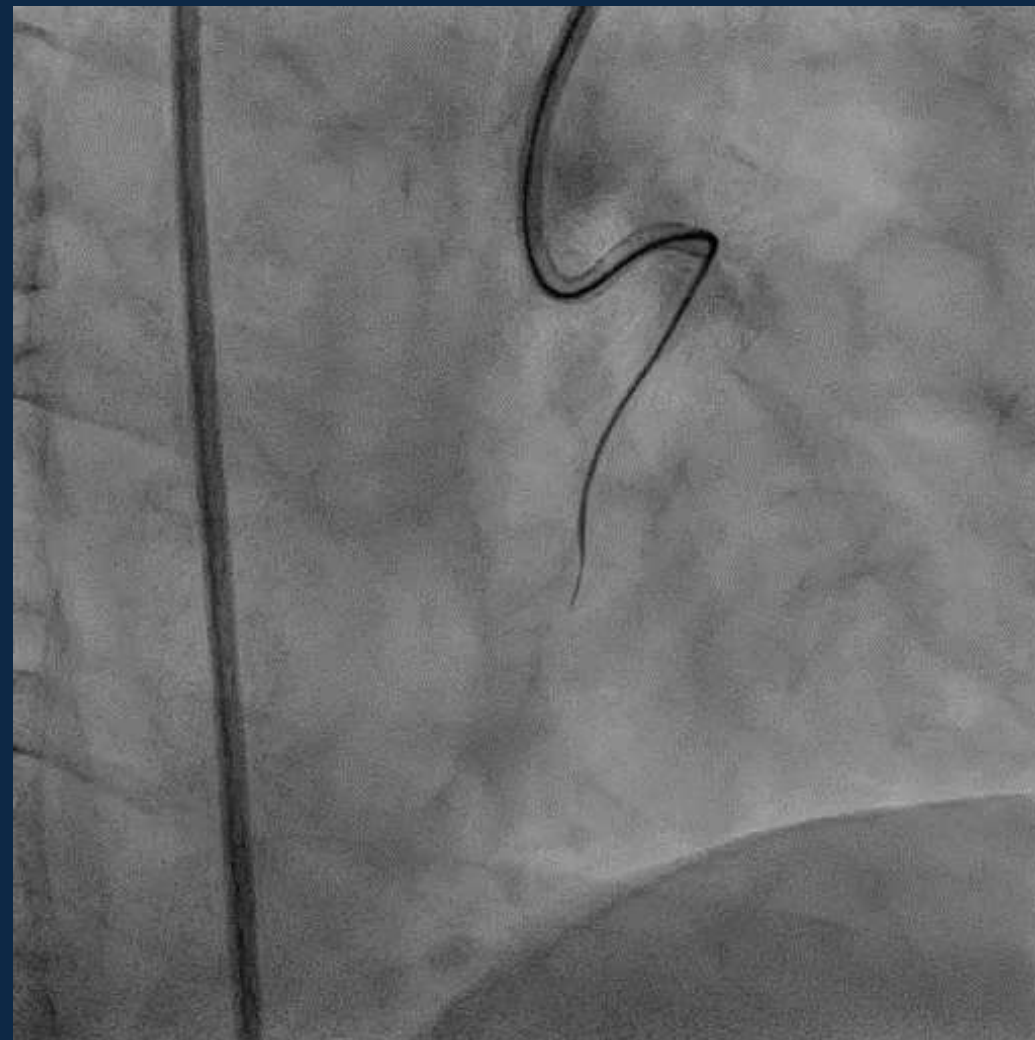
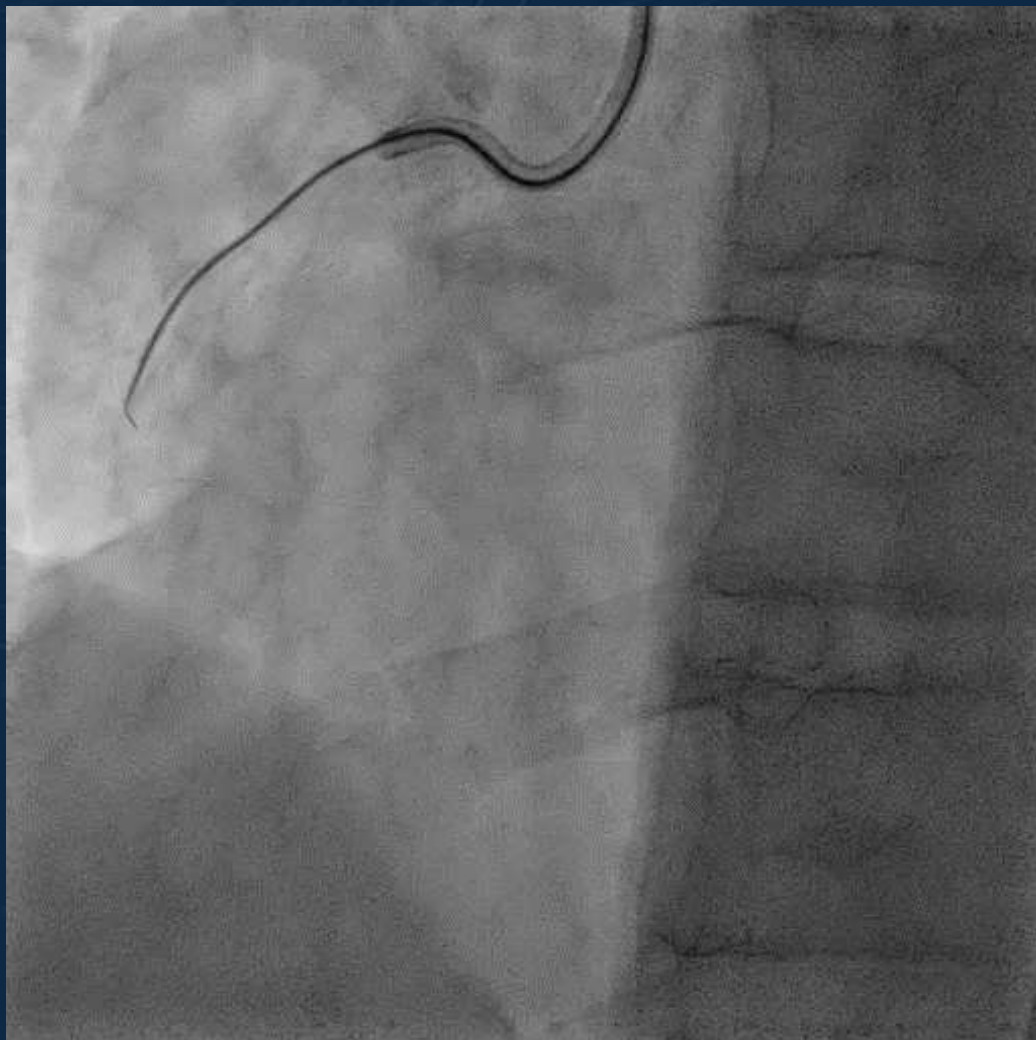
Coronary Angiography(LCA)



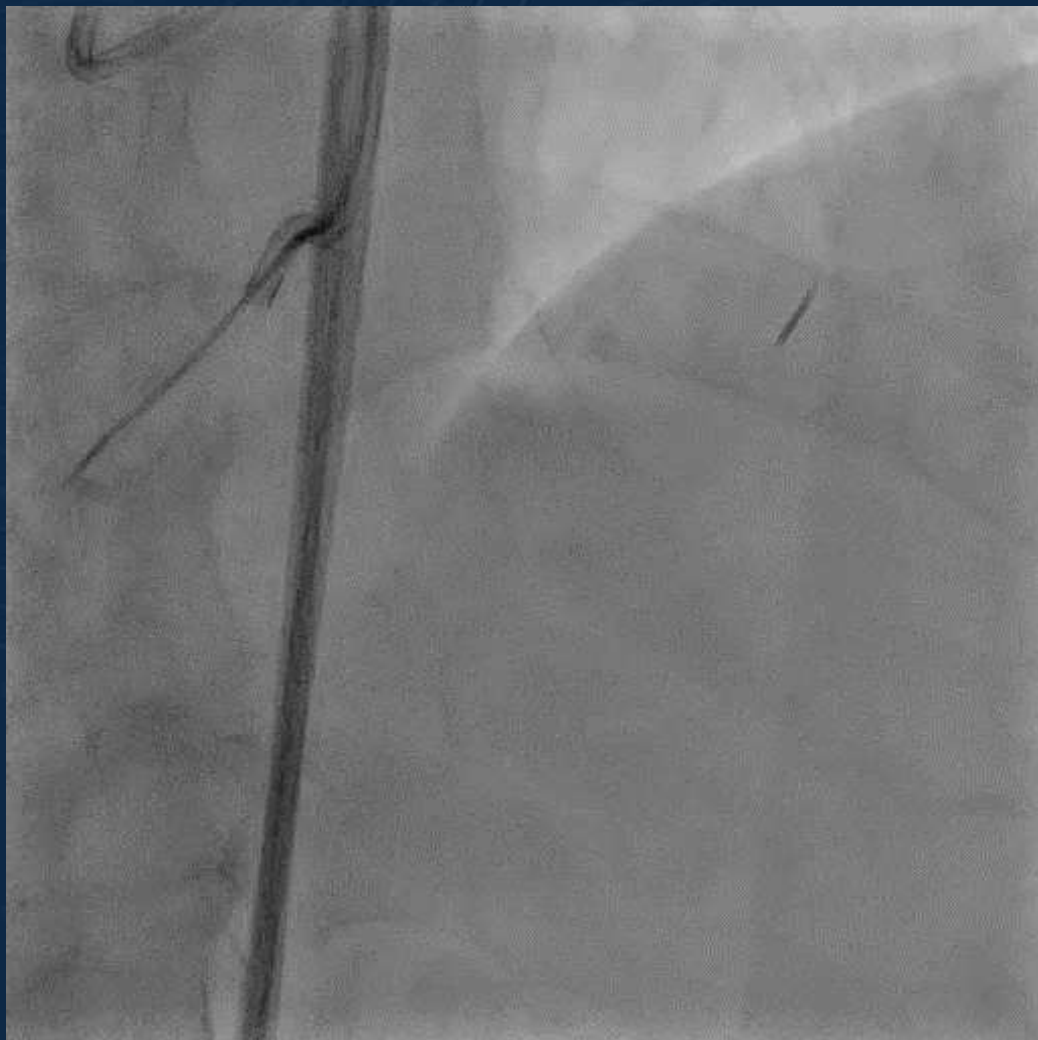
Coronary Angiography(RCA)



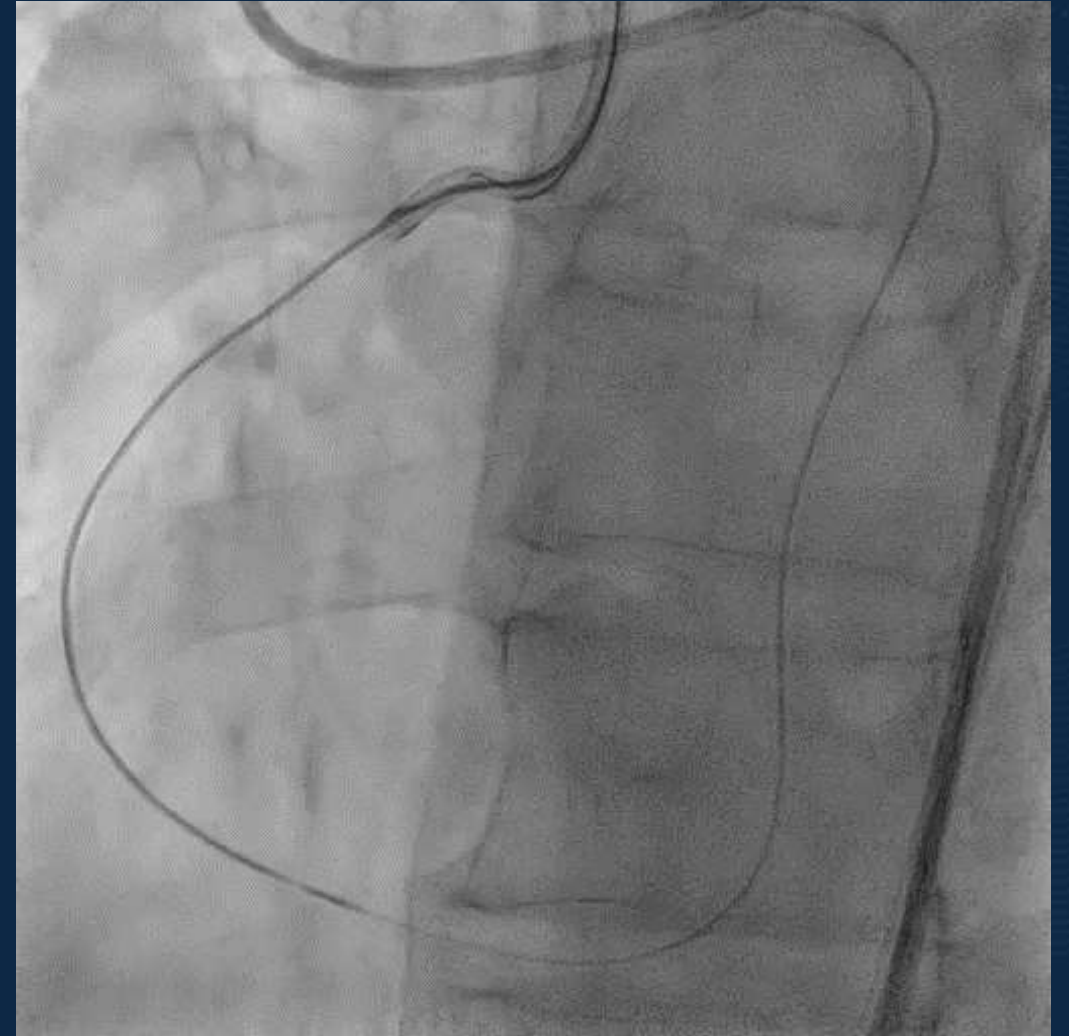
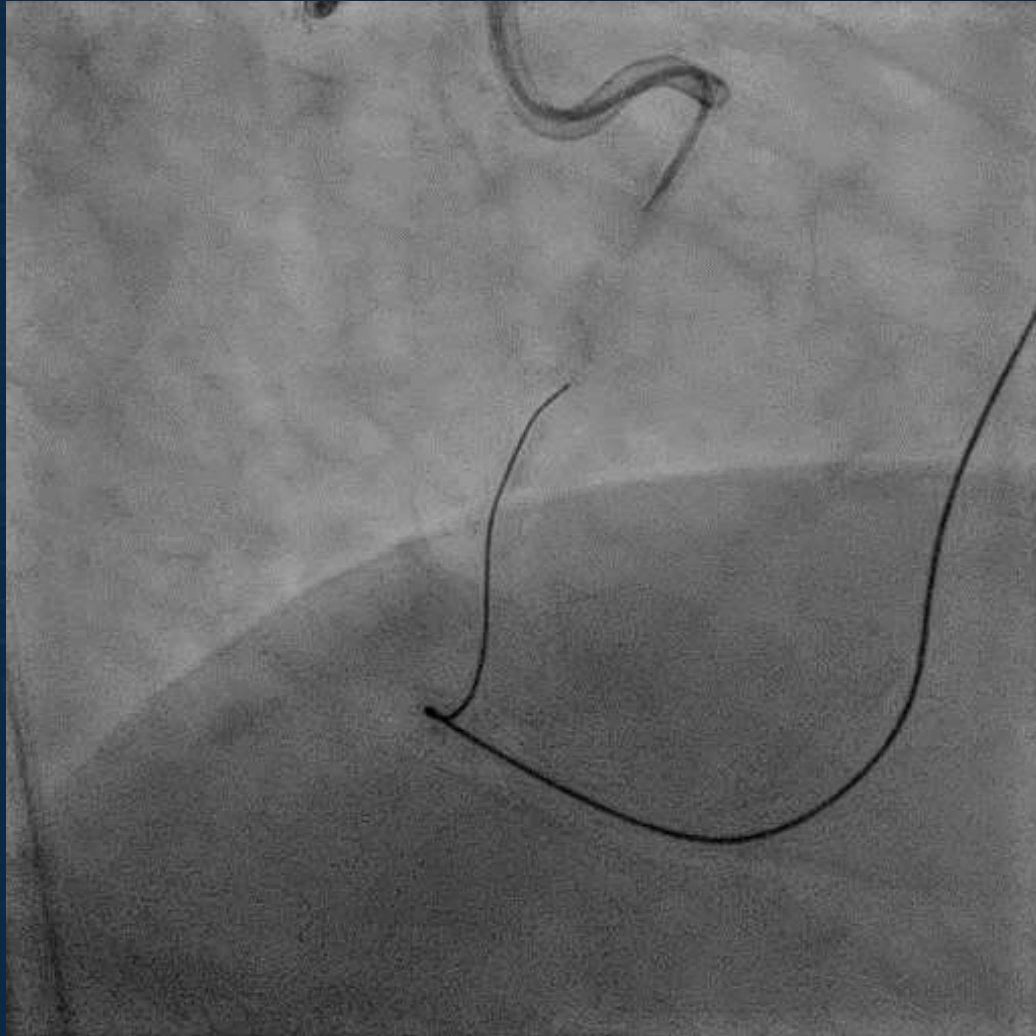
CTO(antegrade)



CTO(retrograde)



CTO(retrograde)

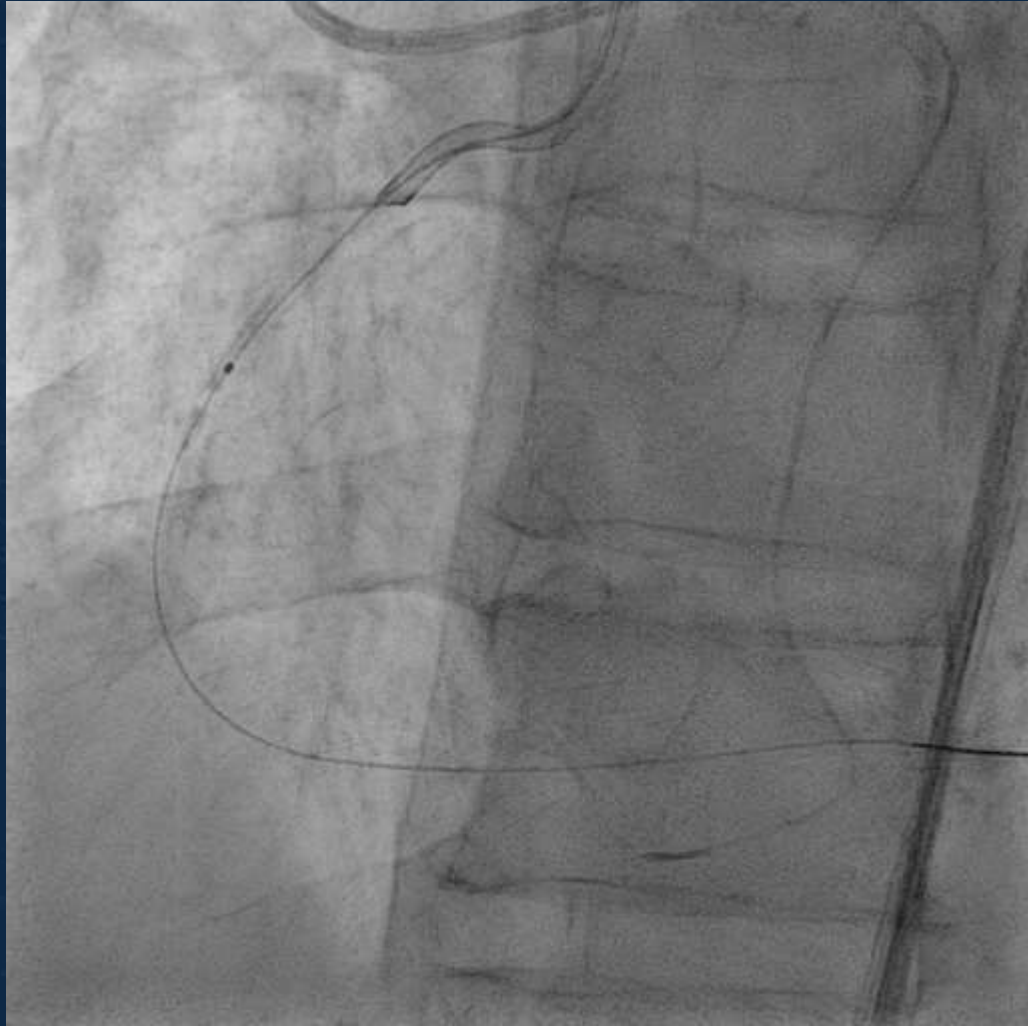


RCA balloon



Compliant balloon 1.5x15 mm

RCA balloon



Compliant balloon 1.5x15 mm

RCA balloon



Compliant balloon 2.0x15 mm

RCA balloon

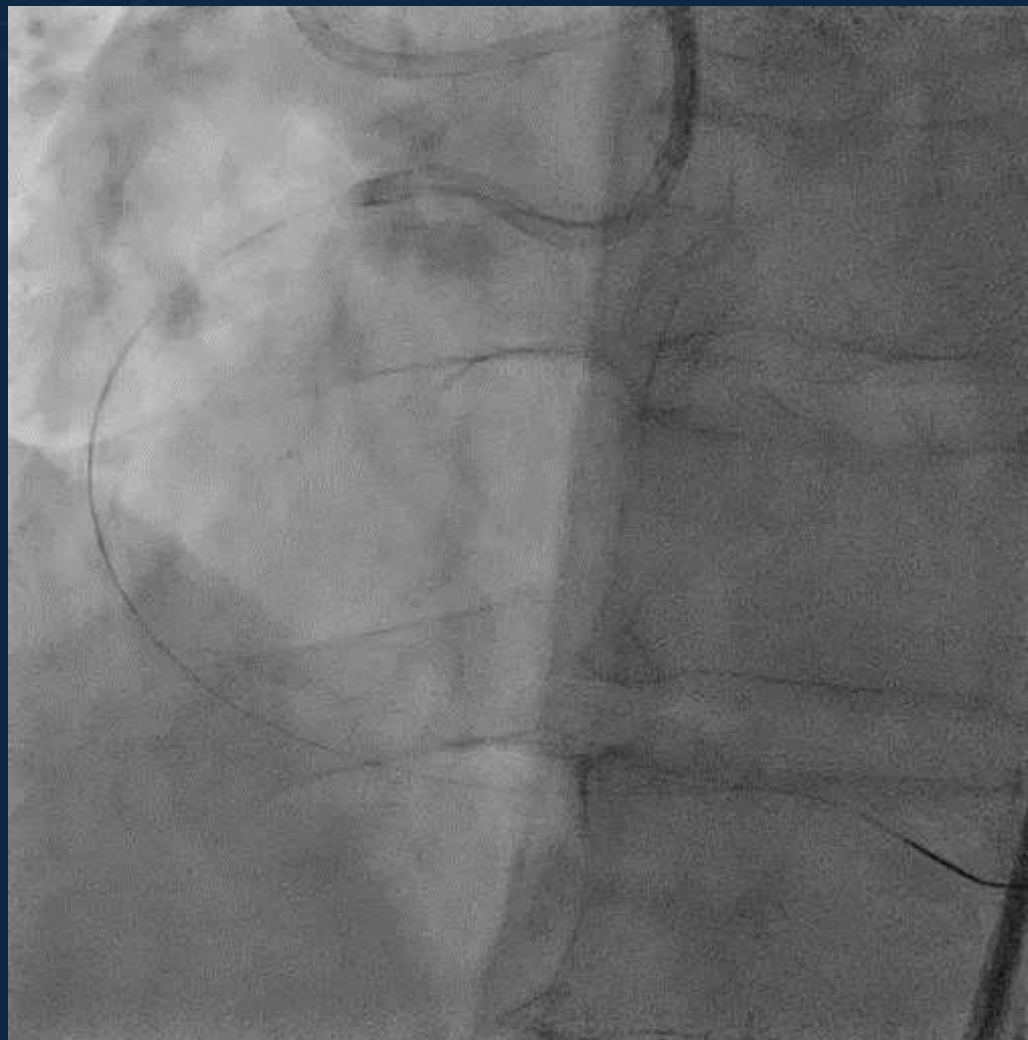


Compliant balloon 2.5x15 mm

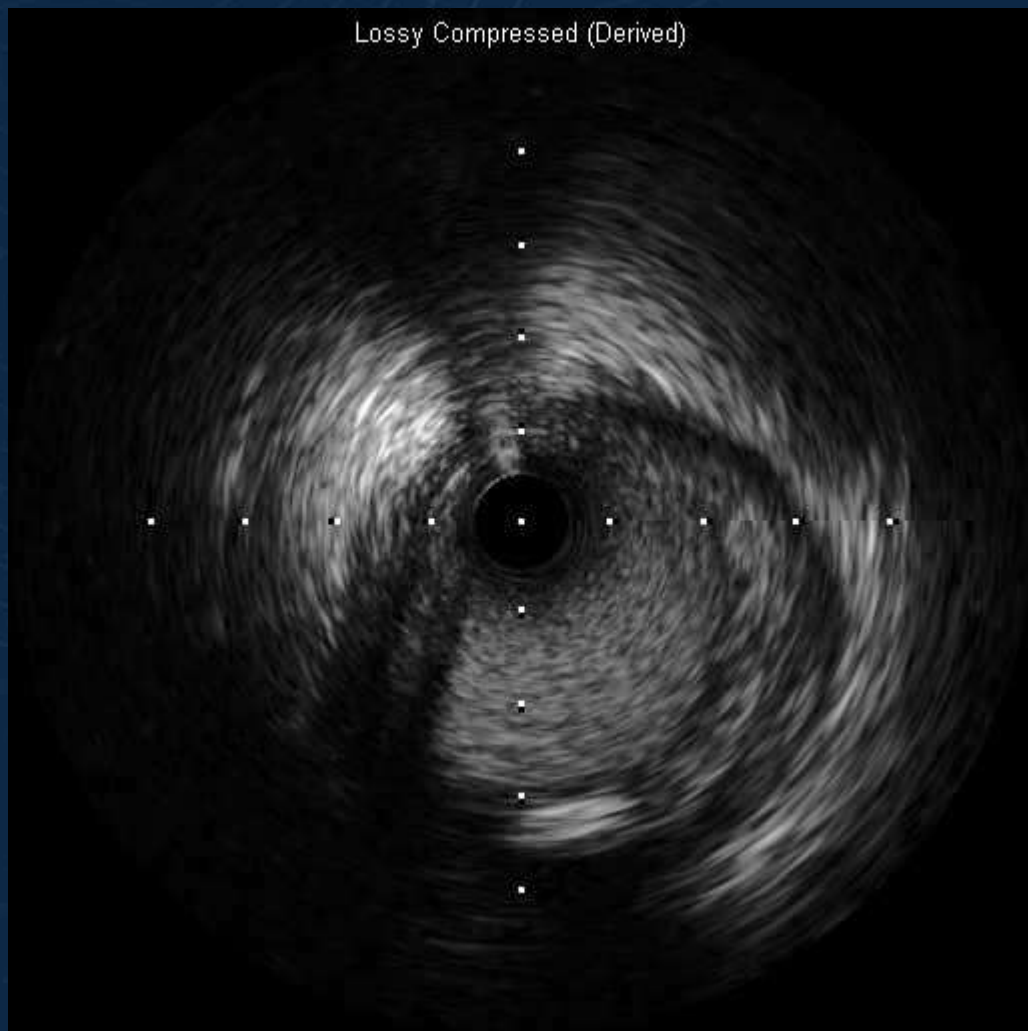


Nc balloon 3.0x15 mm

Coronary Angiography(RCA)



IVUS(RCA)



RCA os

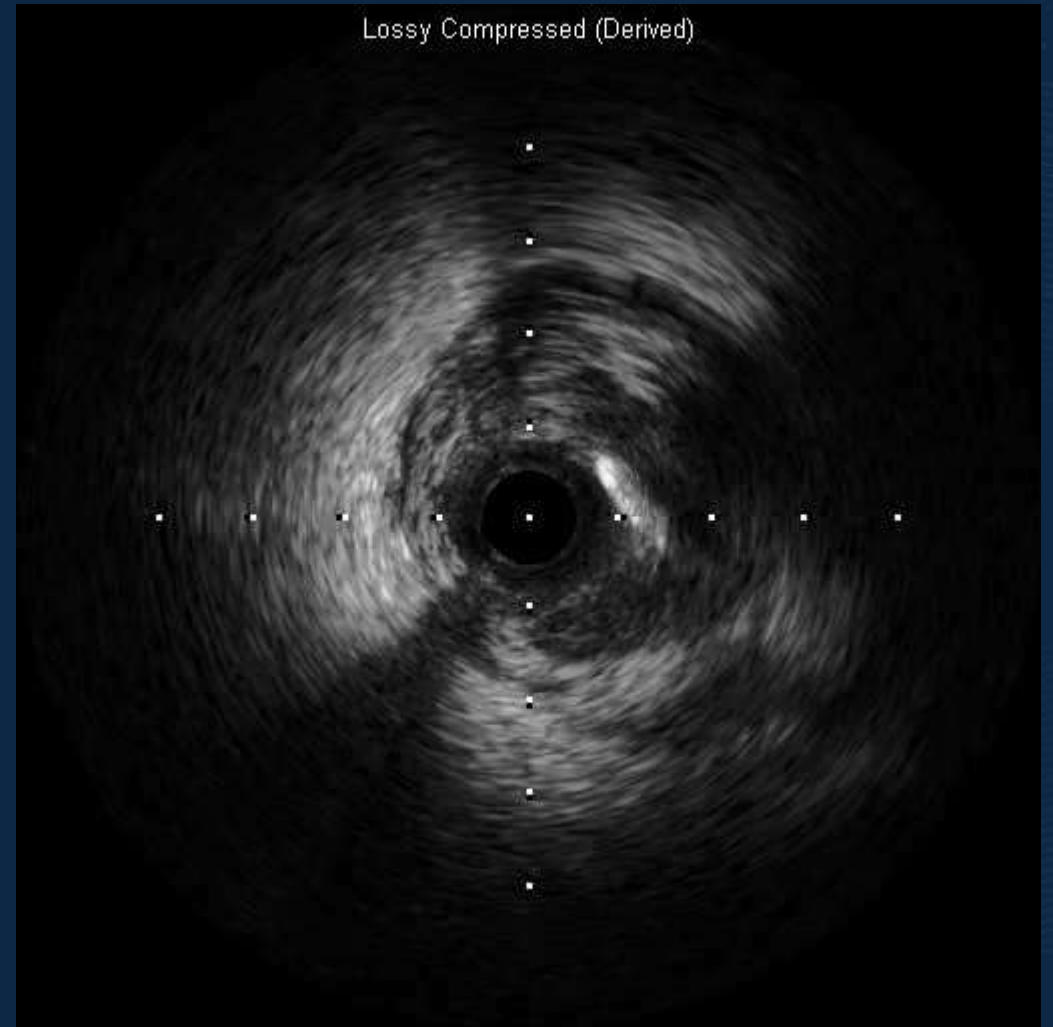


RCA proximal

IVUS(RCA)

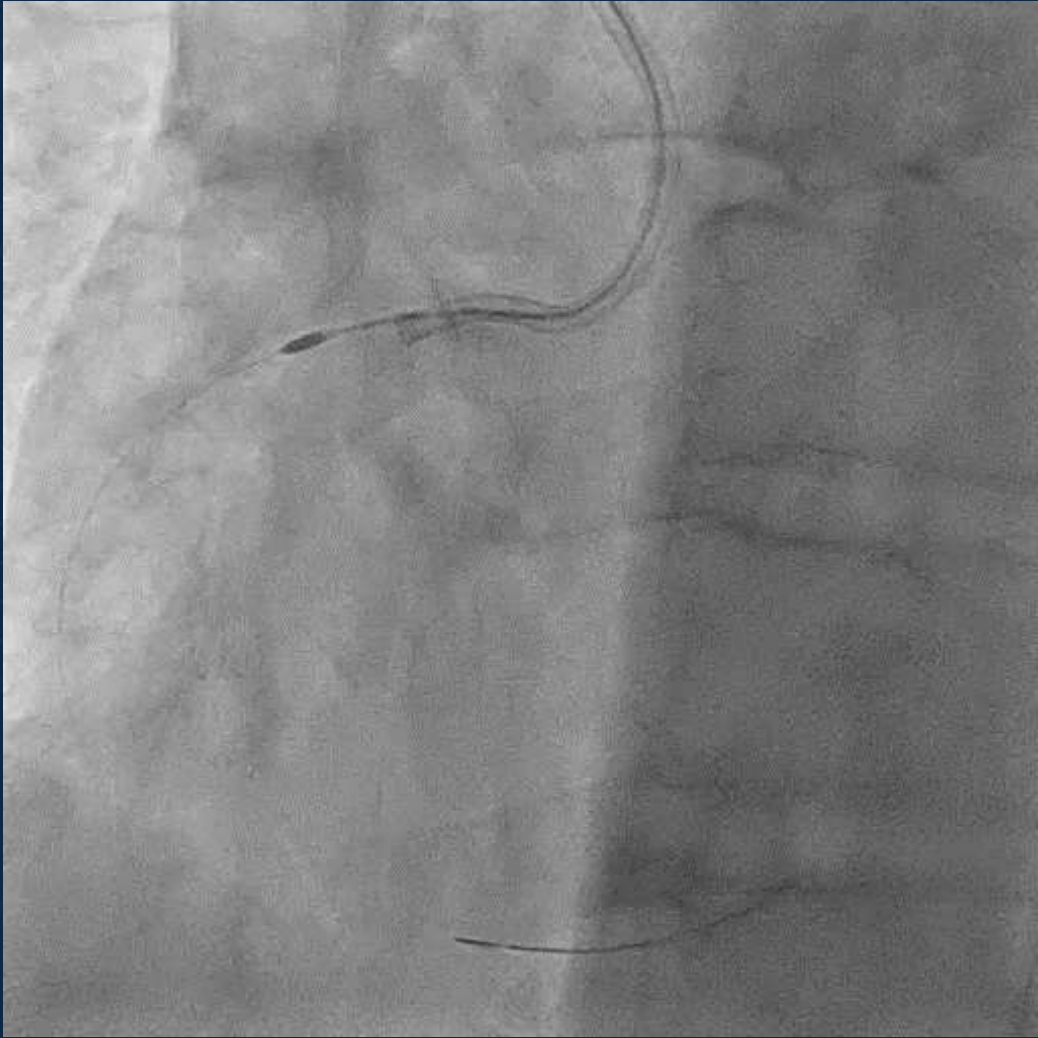


RCA mid

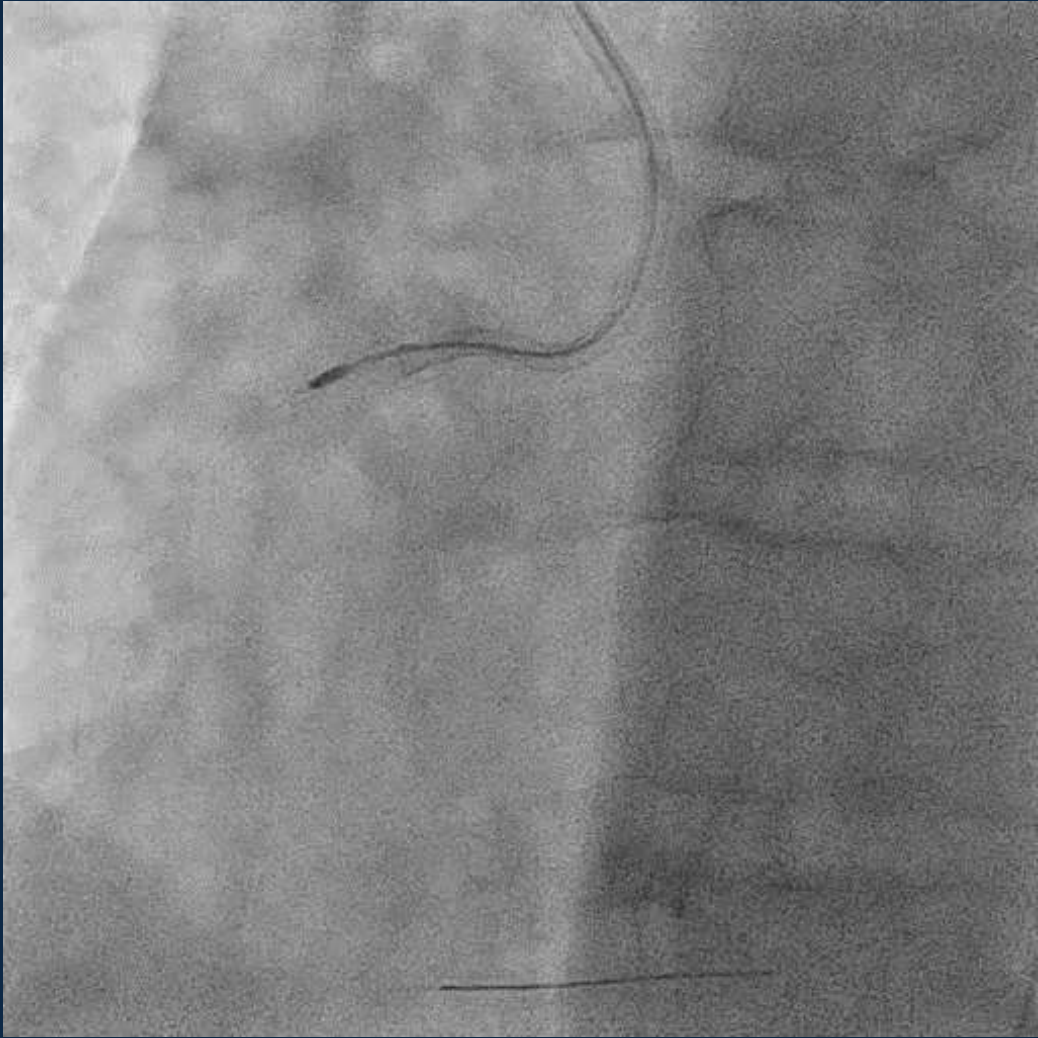


RCA distal

Rota(RCA)

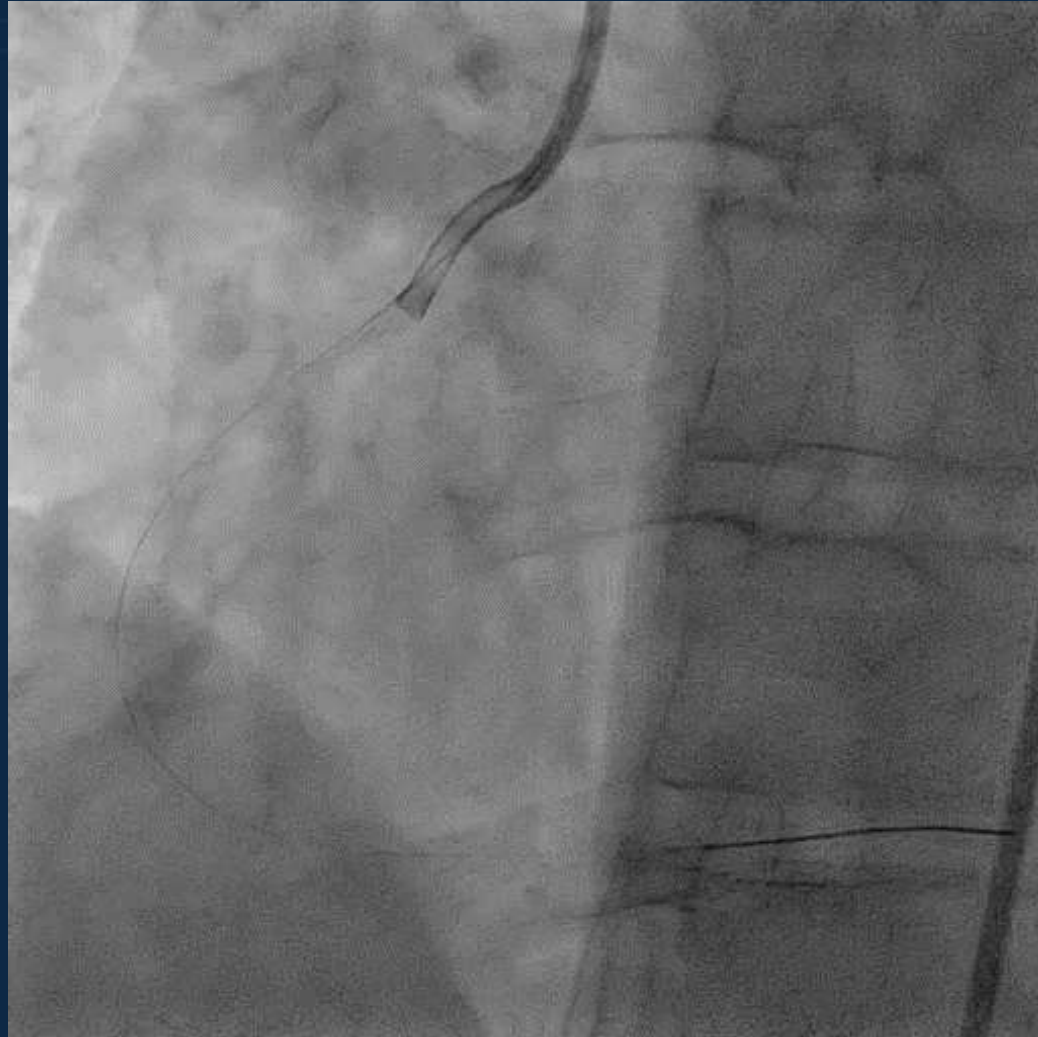


1.25 burr

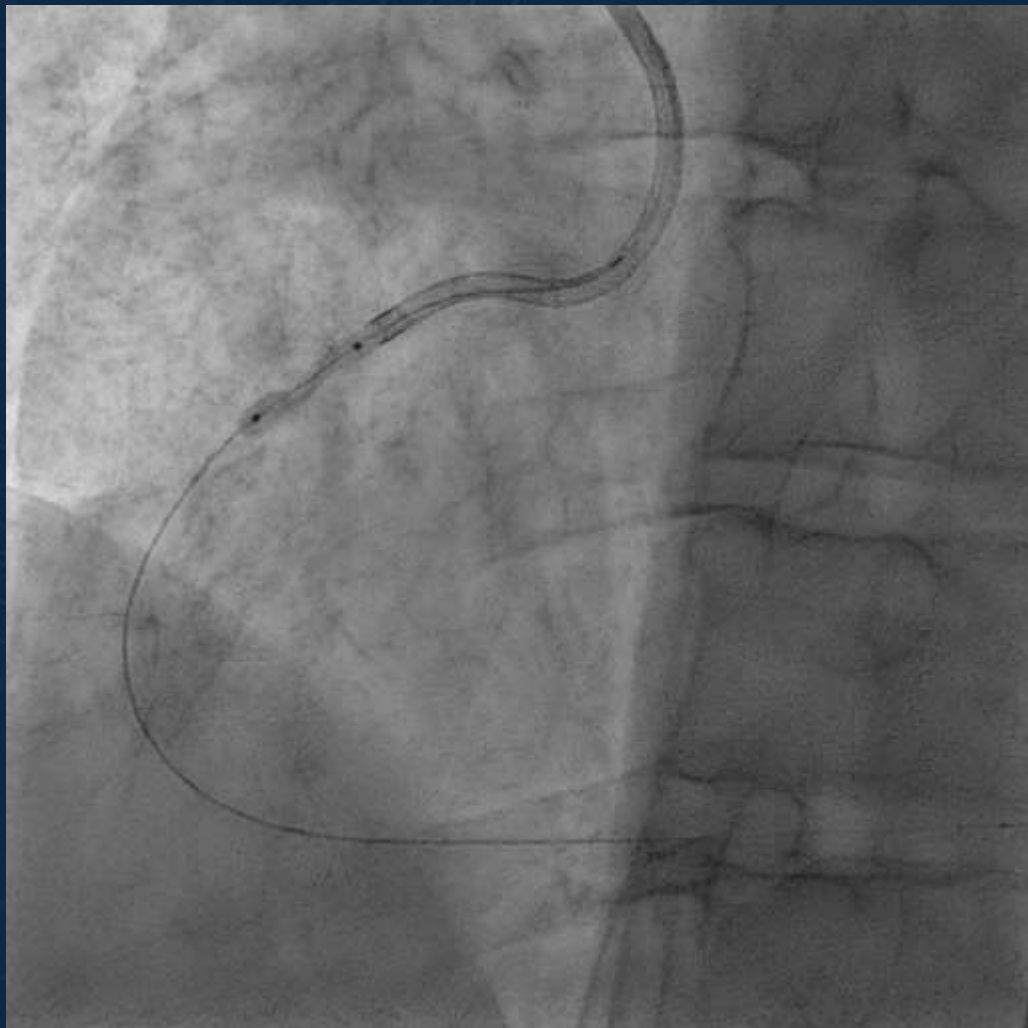


1.5 burr

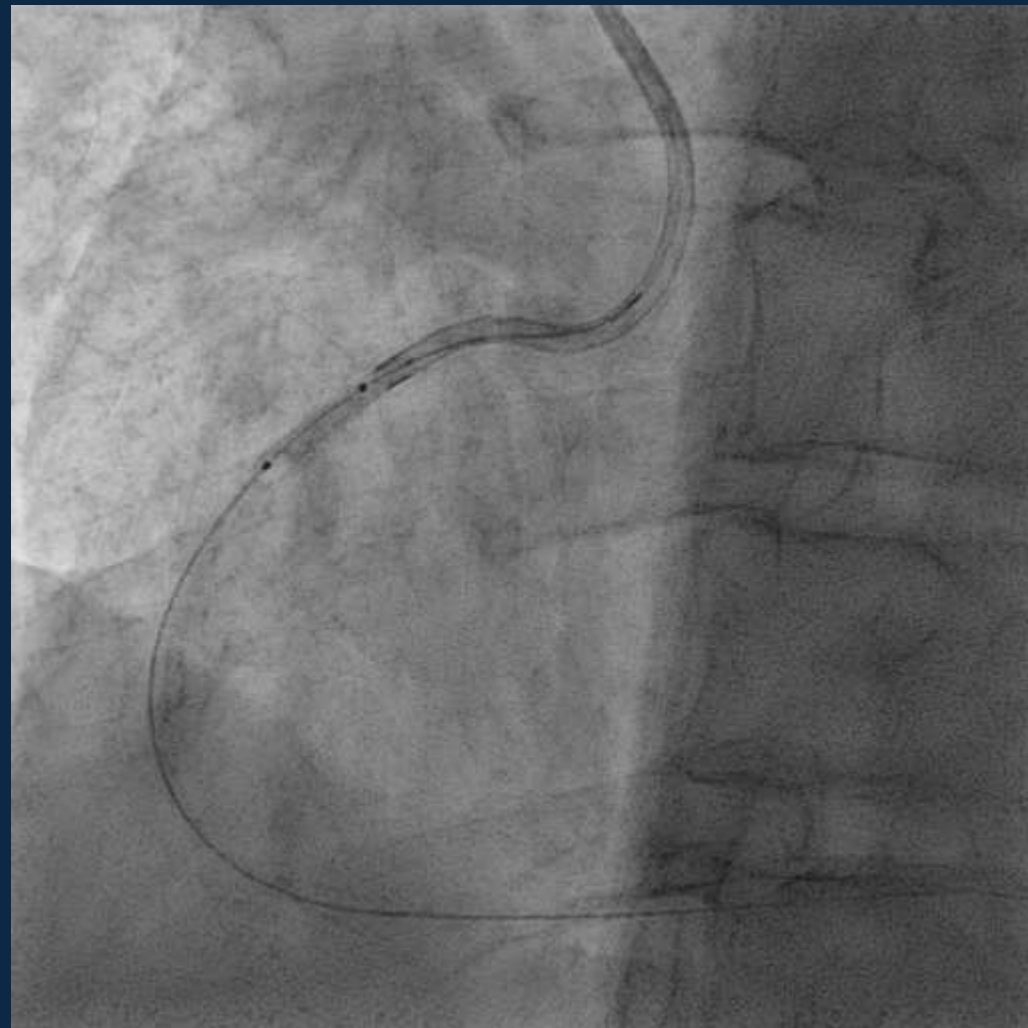
Coronary Angiography(Post Rota)



Post Rota



Cutting balloon 2.5x10 mm

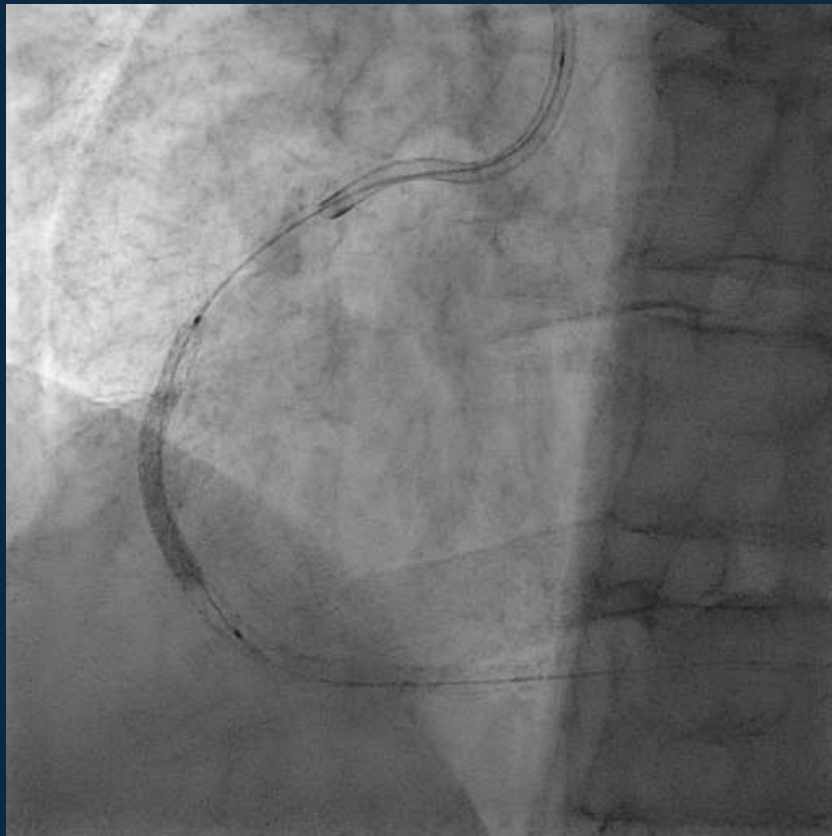


NC balloon 3.0x10 mm

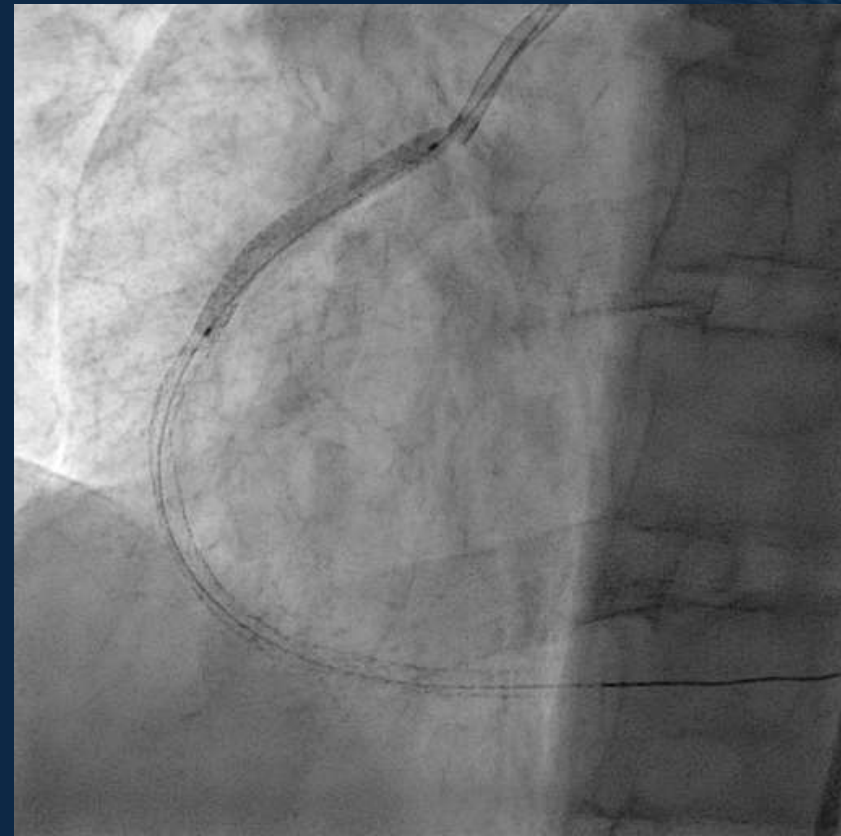
STENT



Onyx 2.5*38

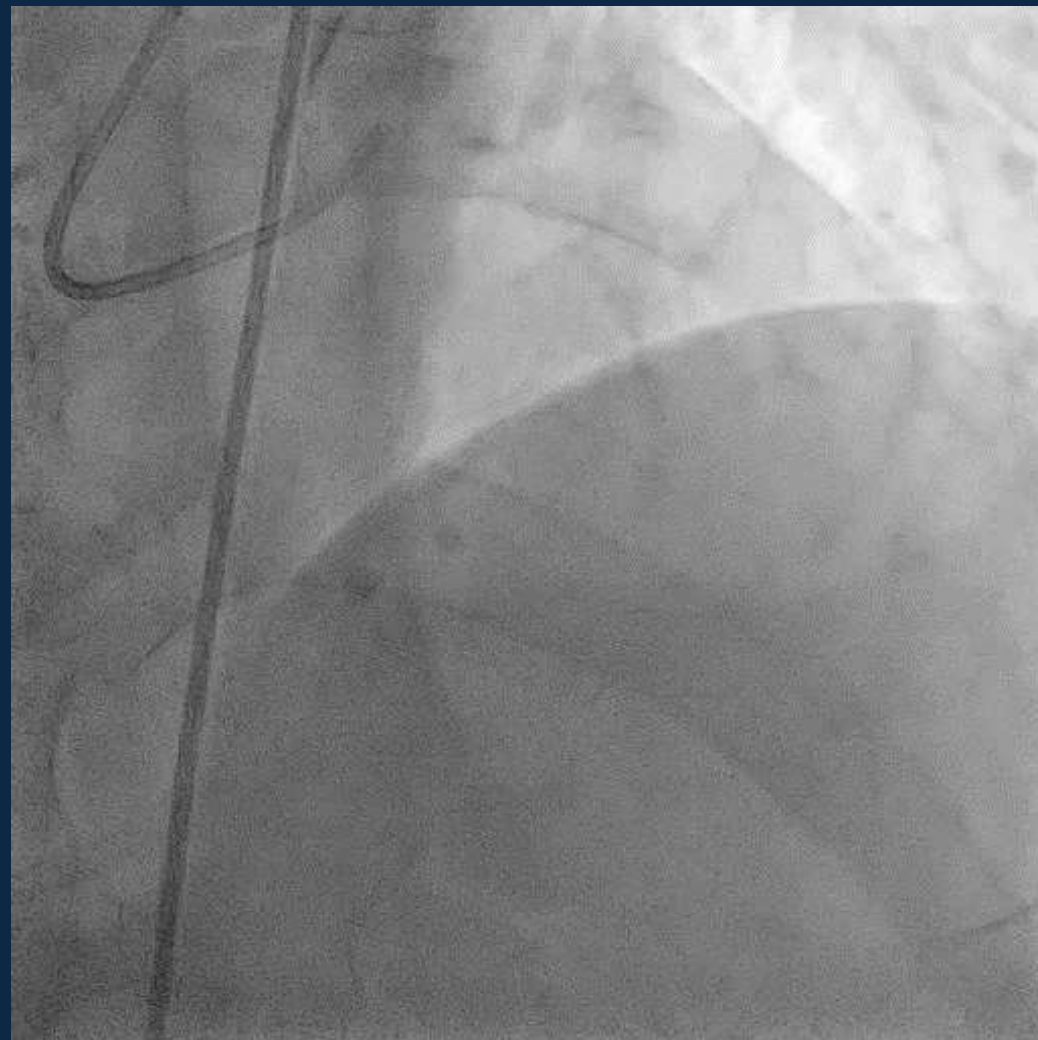
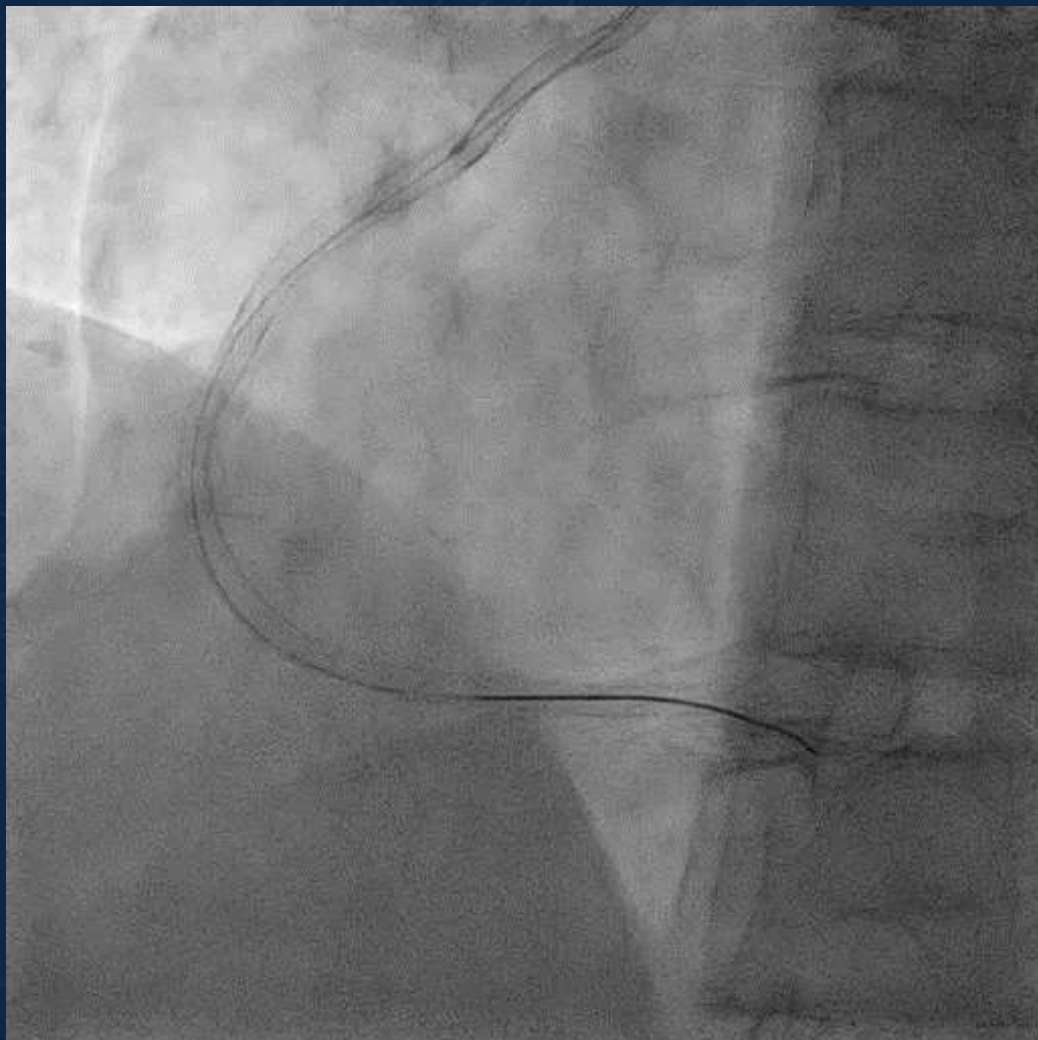


Onyx 2.75*38



Onyx 3.0*30

Final



Case3

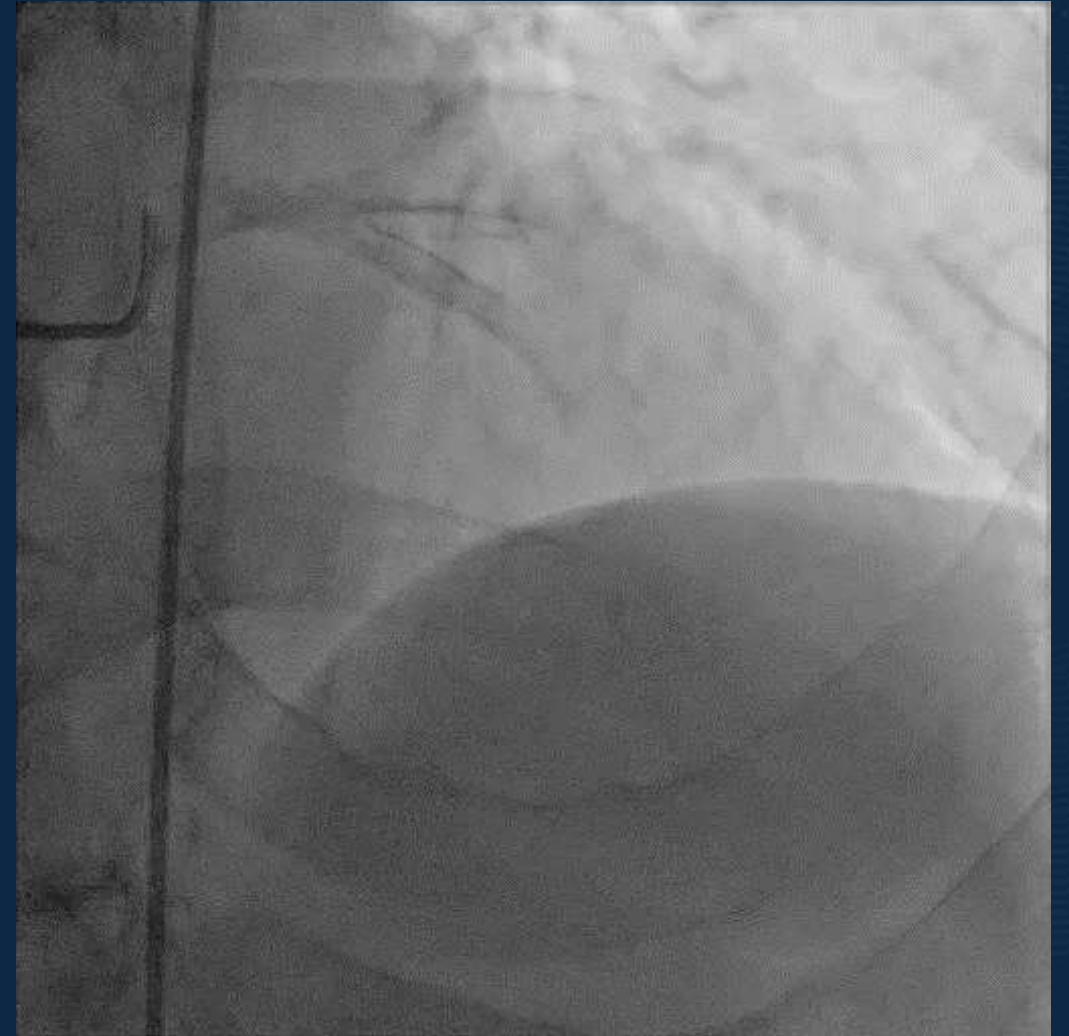
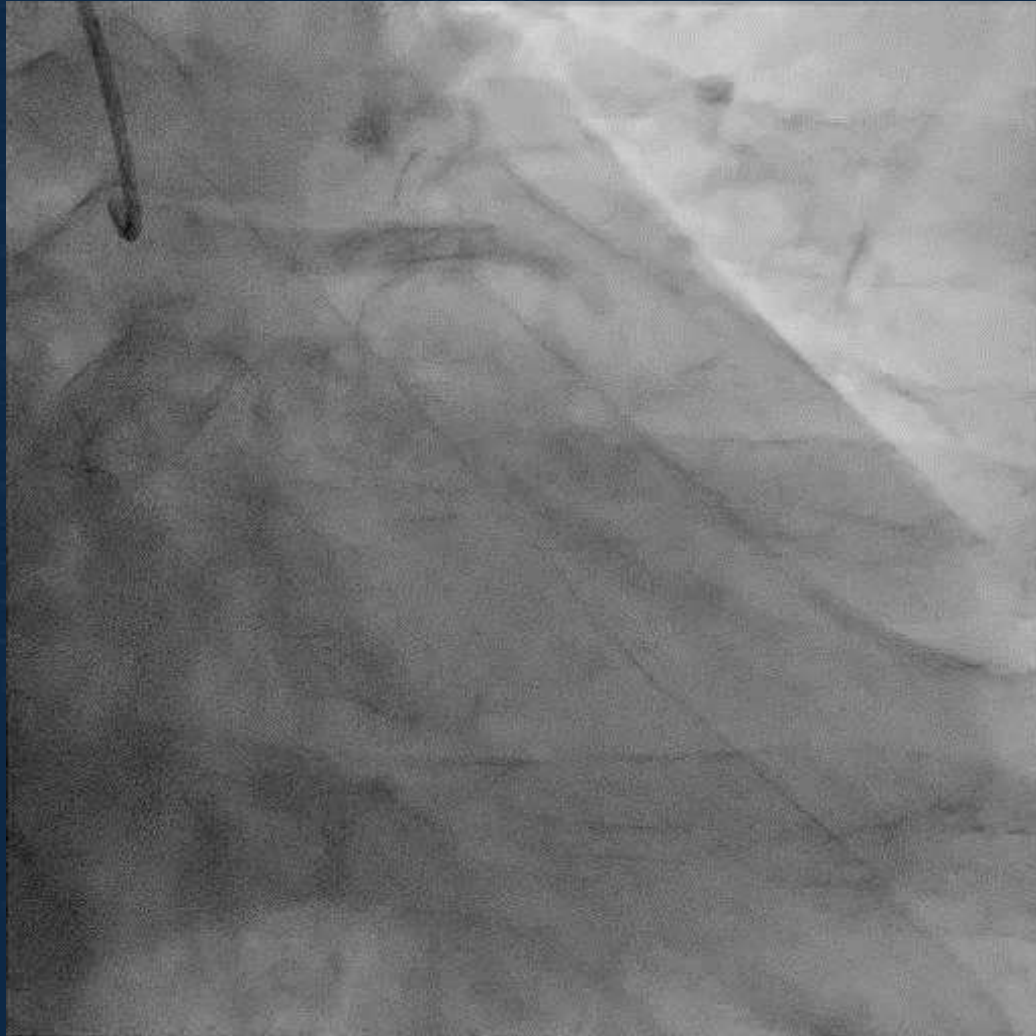
History

- 68 years old male
- DM, HTN
- Early morning chest pain – 2 month ago
- Angina
- TTE : No RWMA, EF 67%

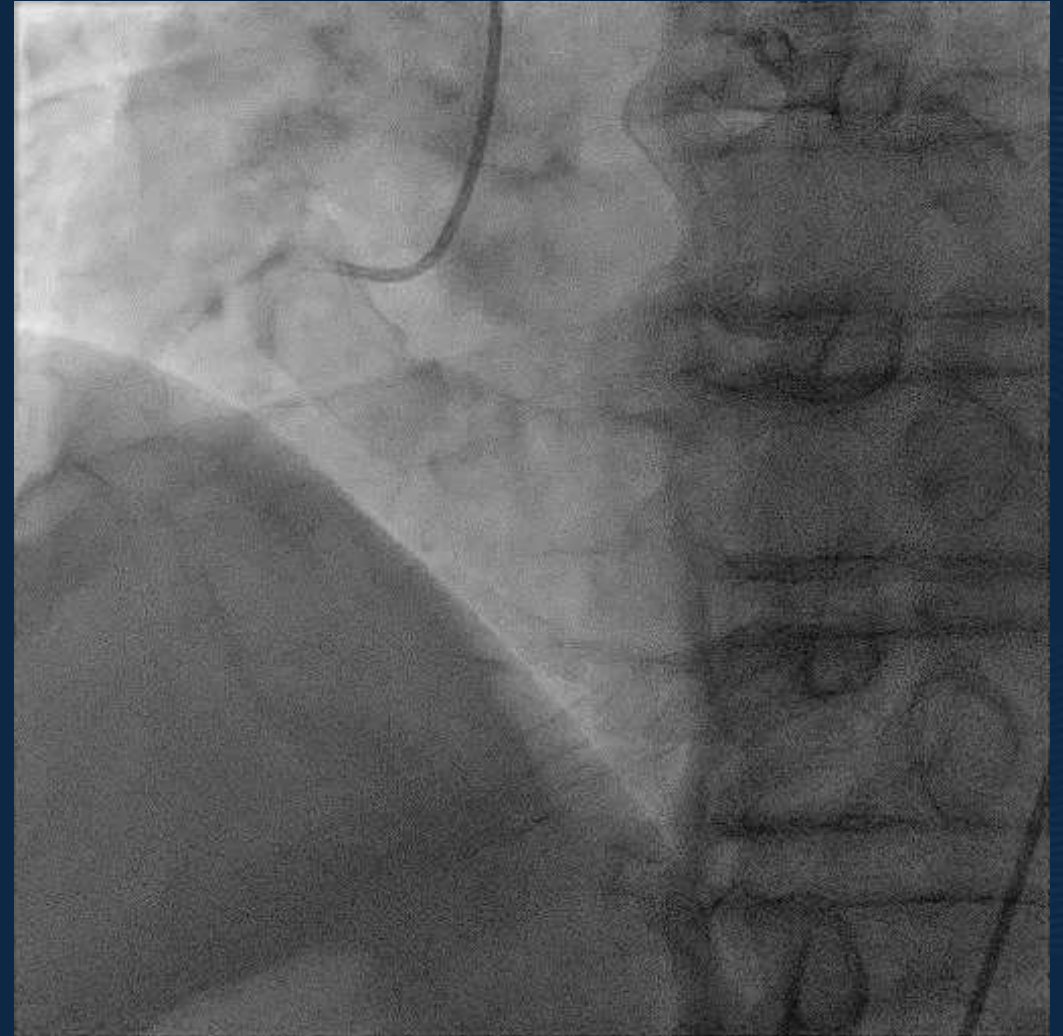
History

- PCI :
- 2010년 1월 시행 2VD- LAD, RCA
- mRCA diffuse 80%, calcification++
- S/P PCI at pmLAD(Cypher 3.0*23), D1(Cypher3.0*18)

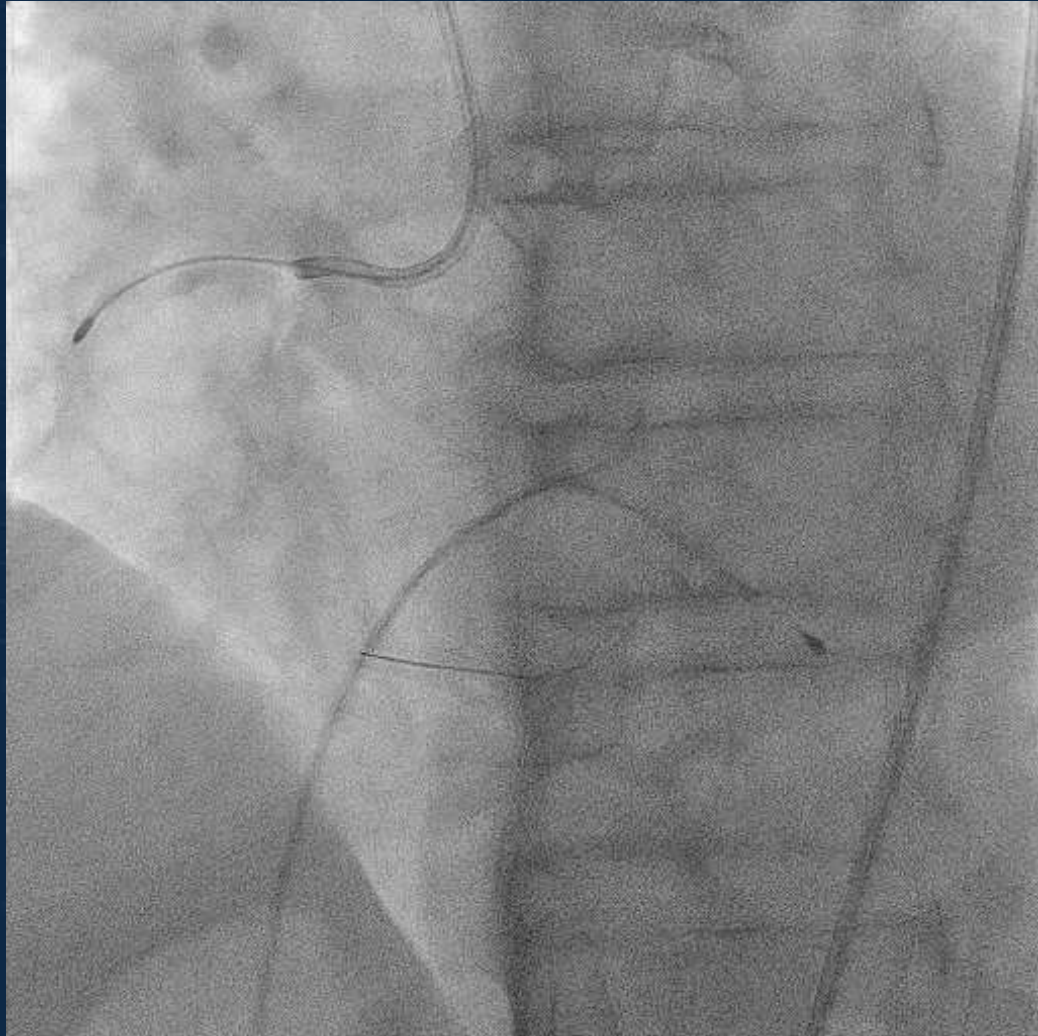
Coronary Angiography(2022 LCA)



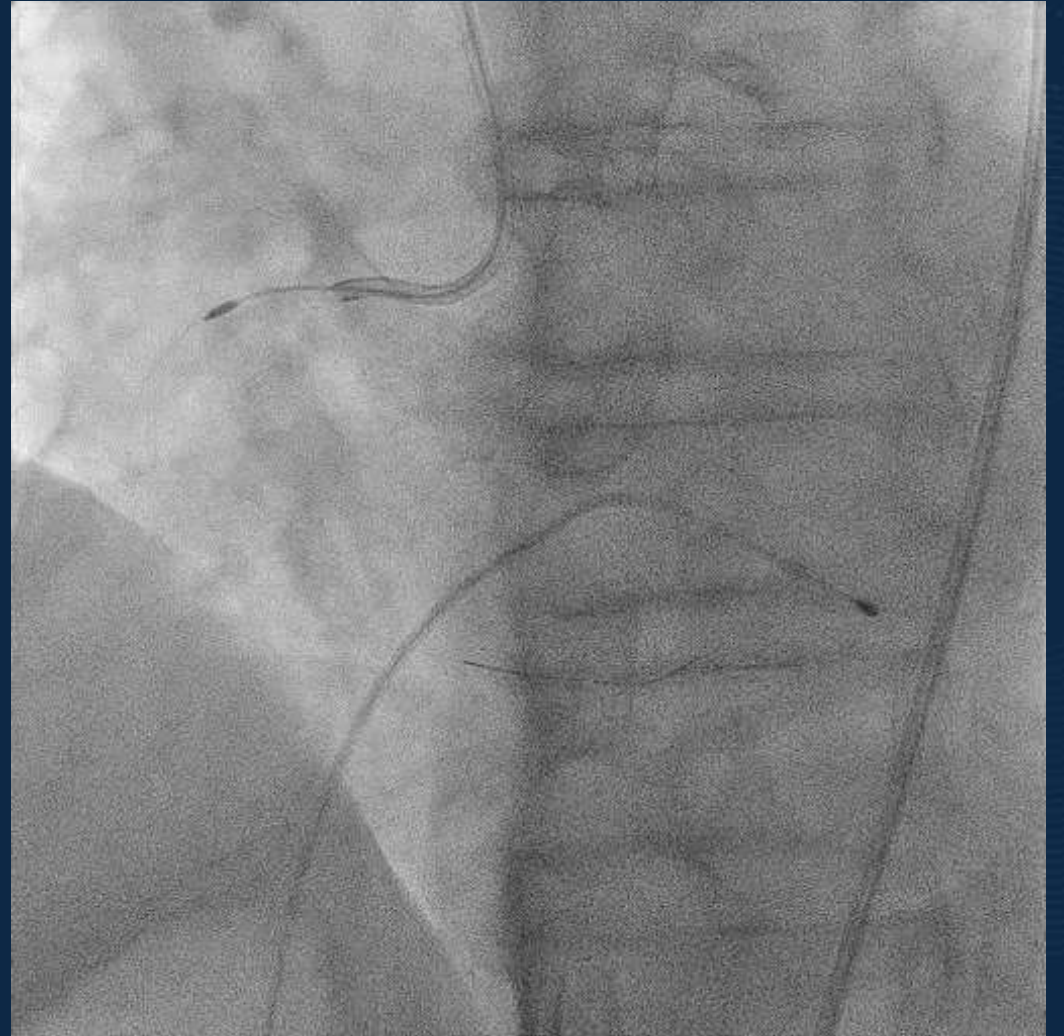
Coronary Angiography(2022 RCA)



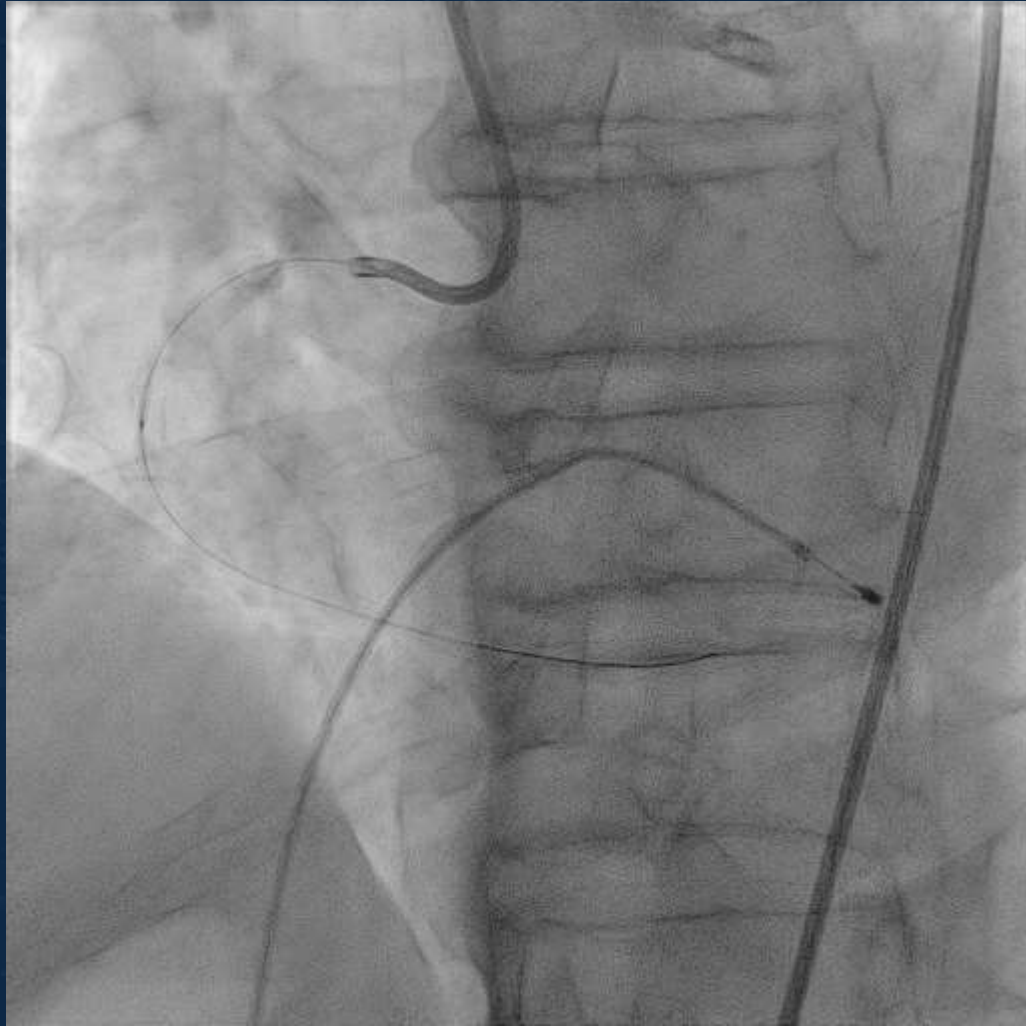
Rota(RCA)



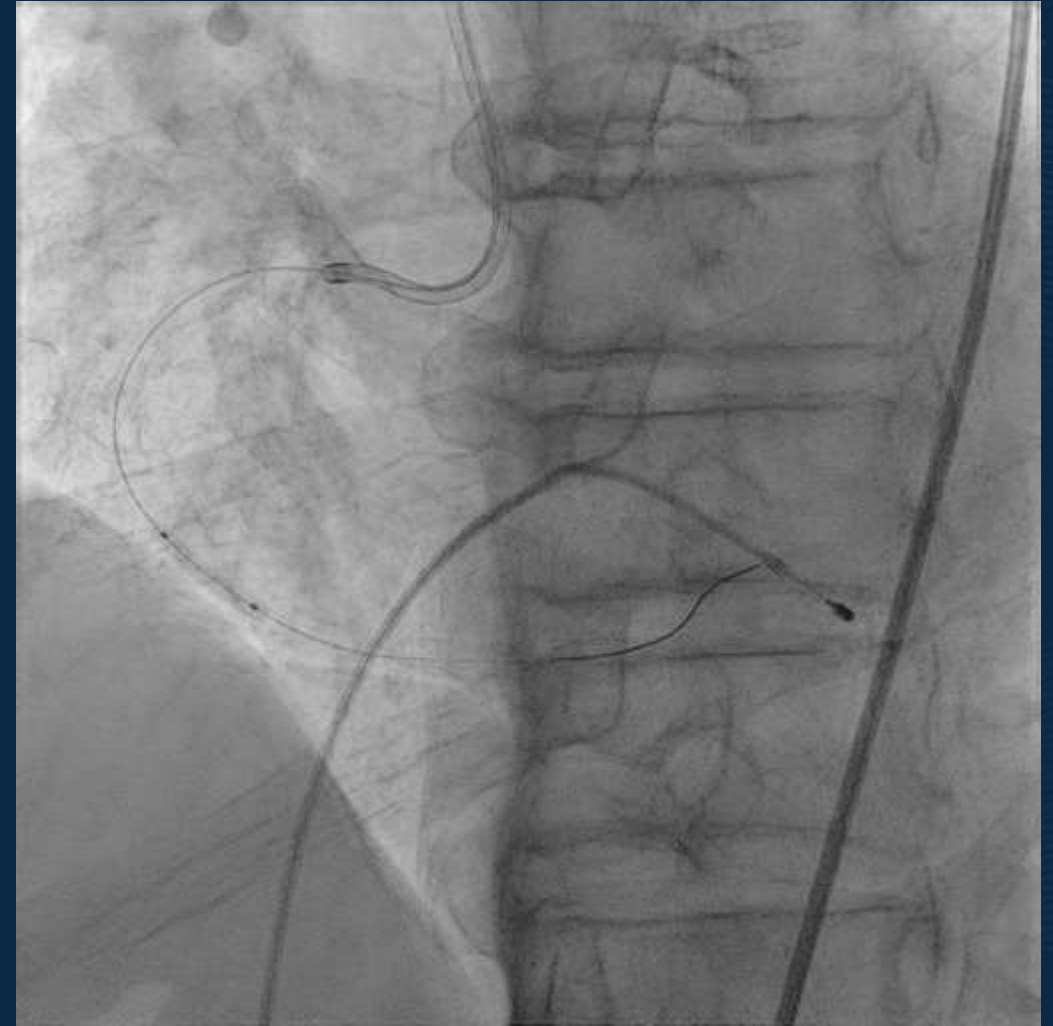
1.25 burr



RCA balloon

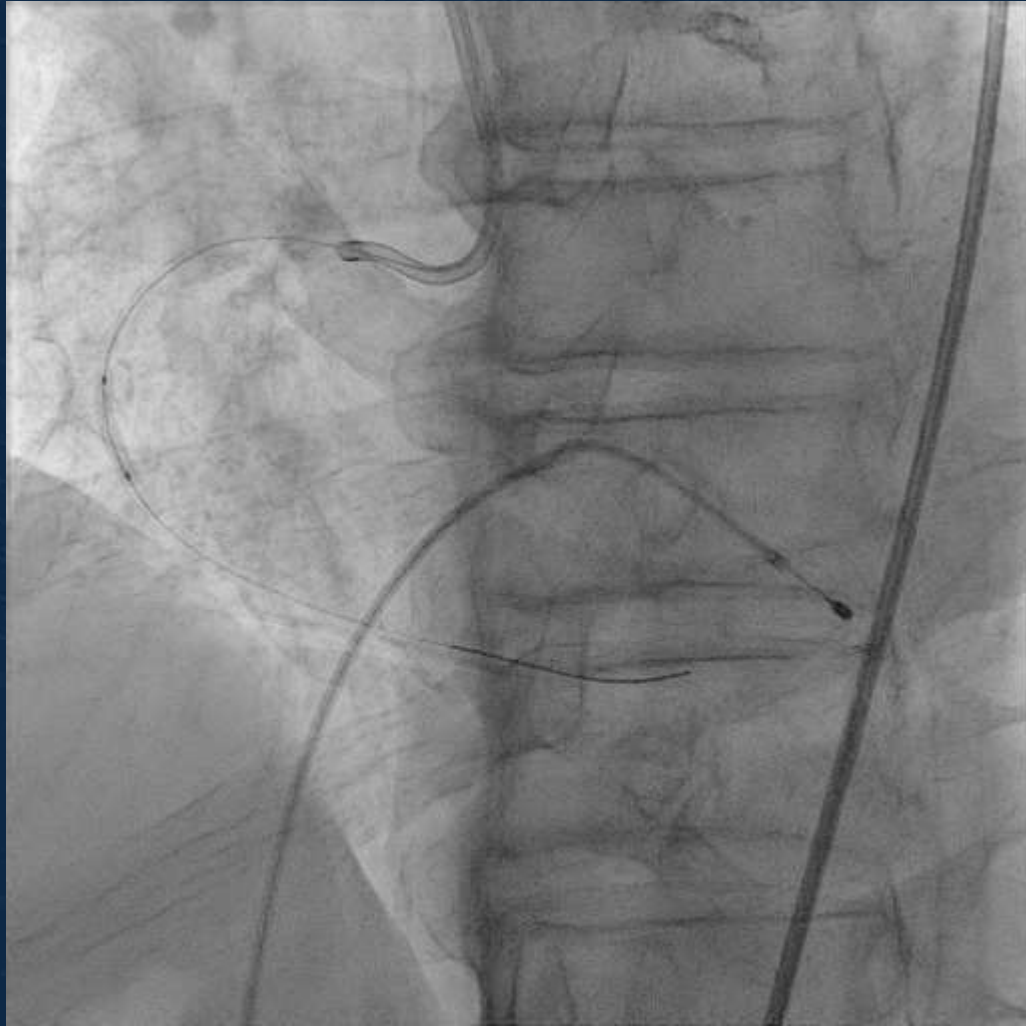


Compliant balloon 1.5x15 mm

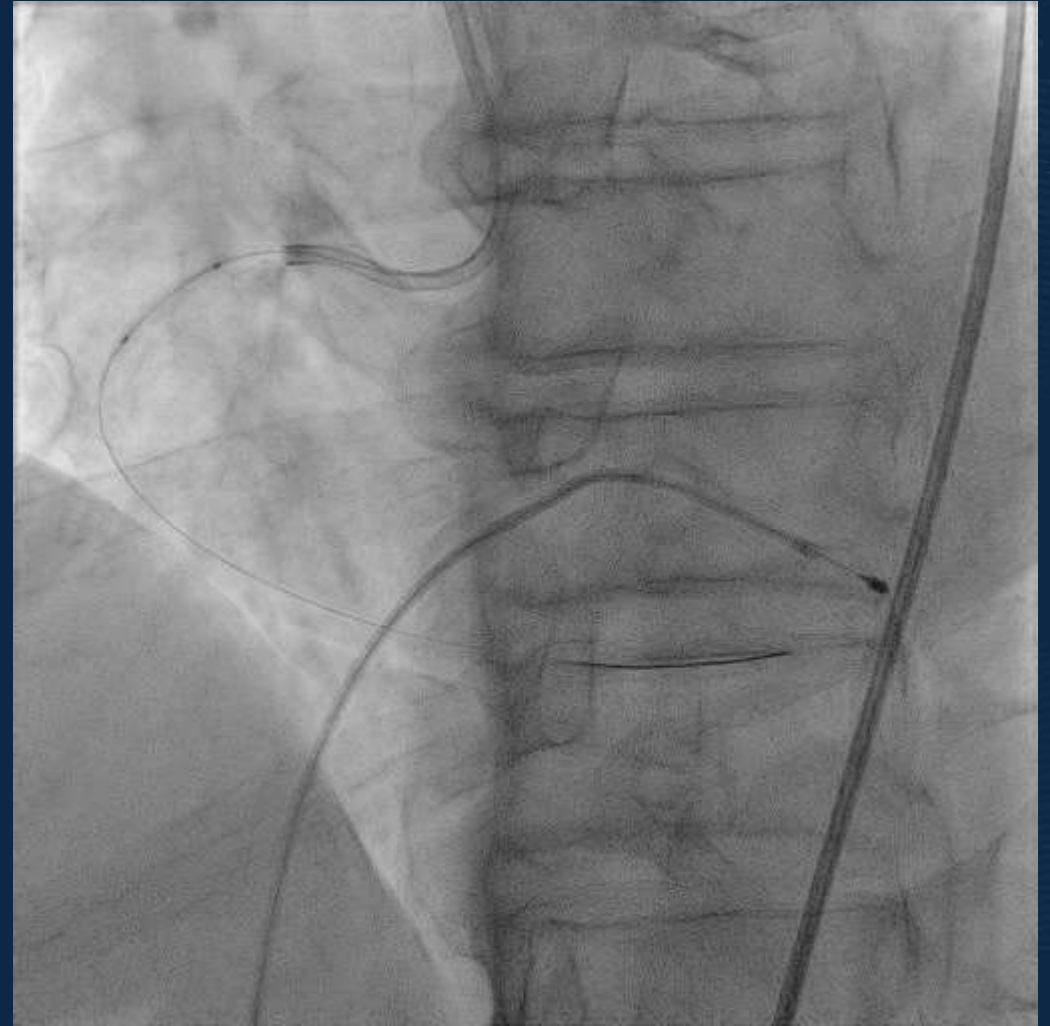


Nc balloon 2.5x15 mm

RCA balloon

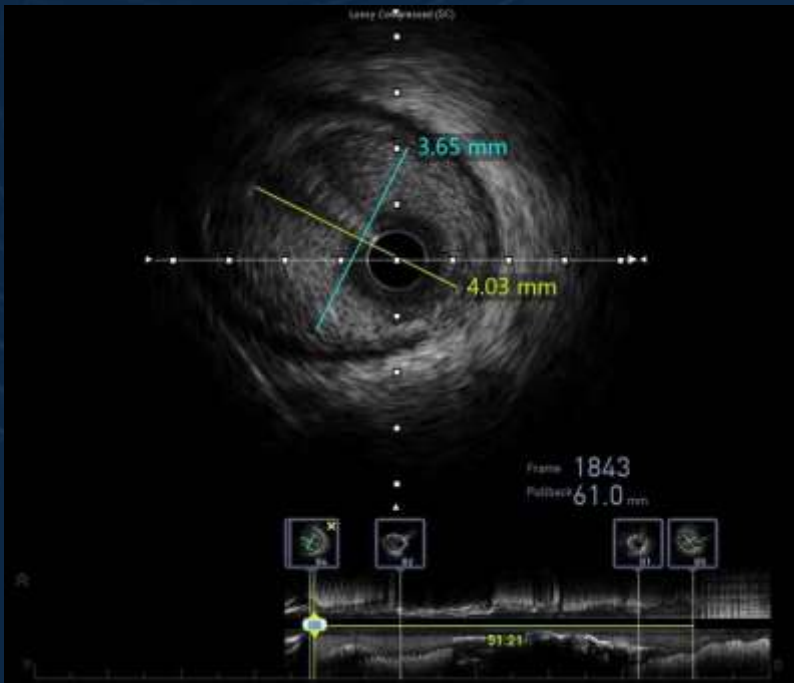


Nc balloon 2.5x15 mm

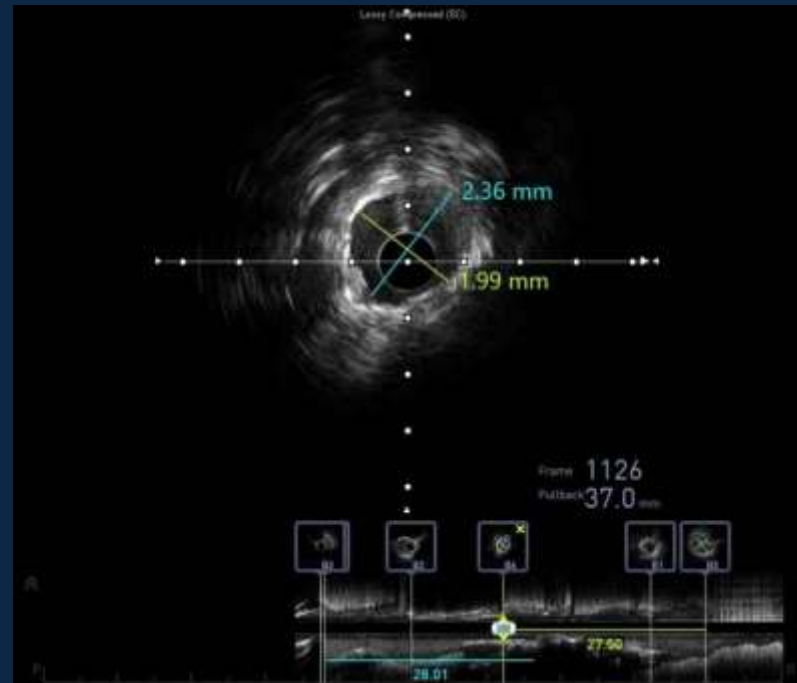


Nc balloon 2.5x15 mm

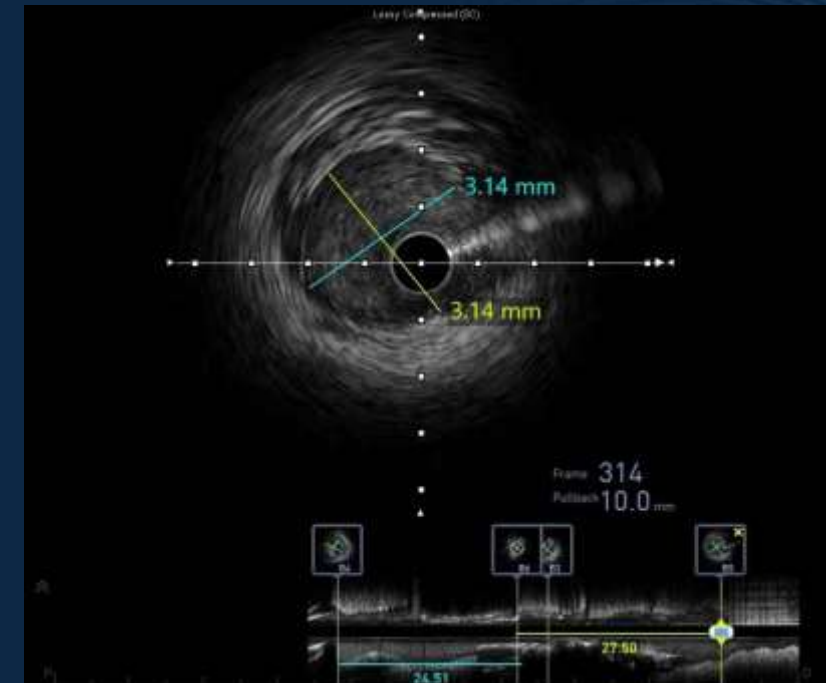
IVUS(RCA)



RCA proximal

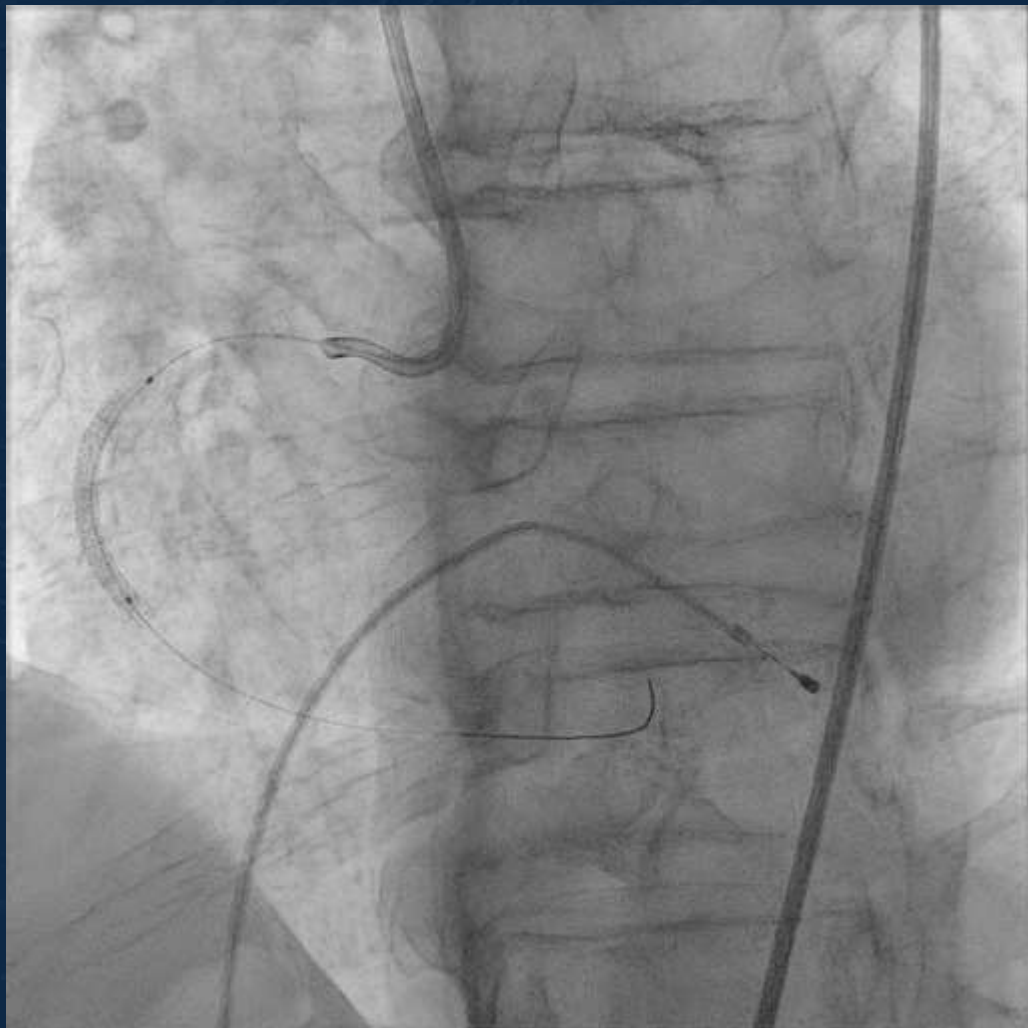


RCA mid

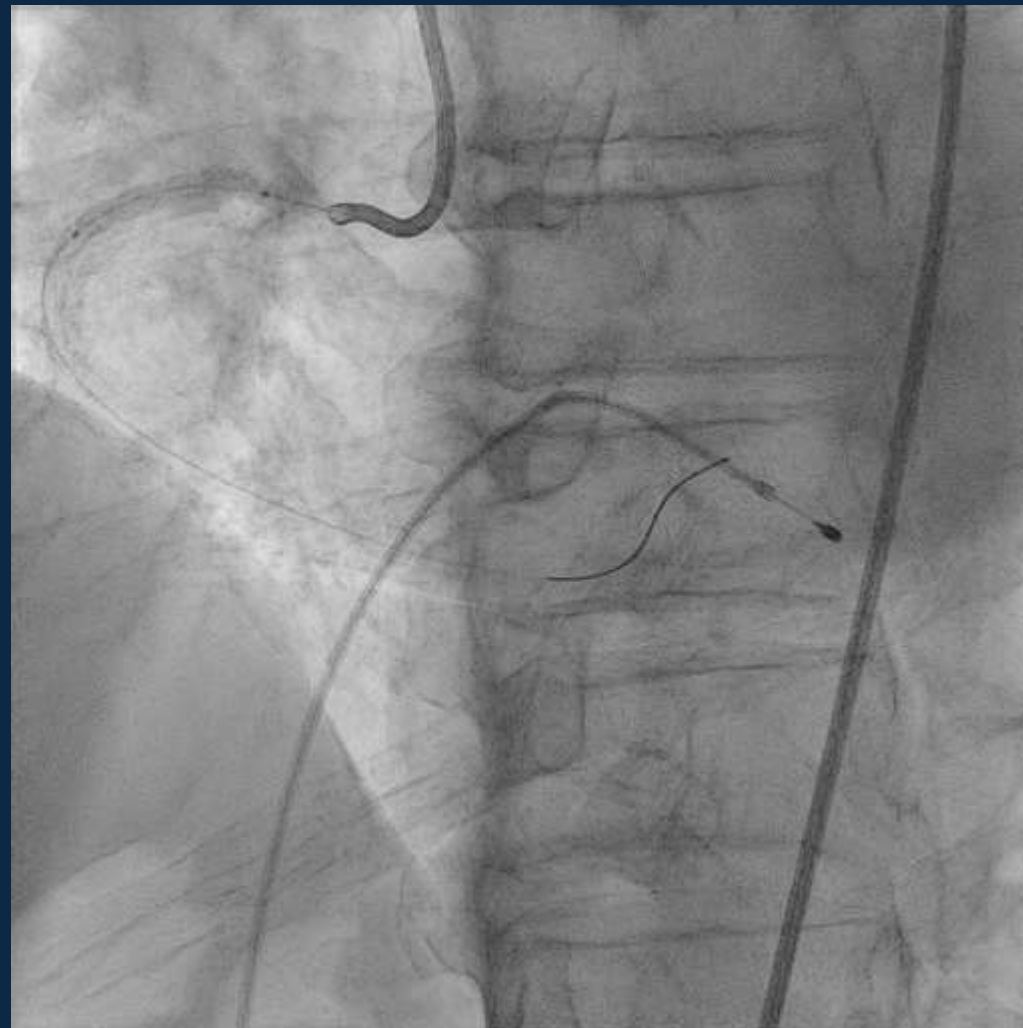


RCA distal

STENT

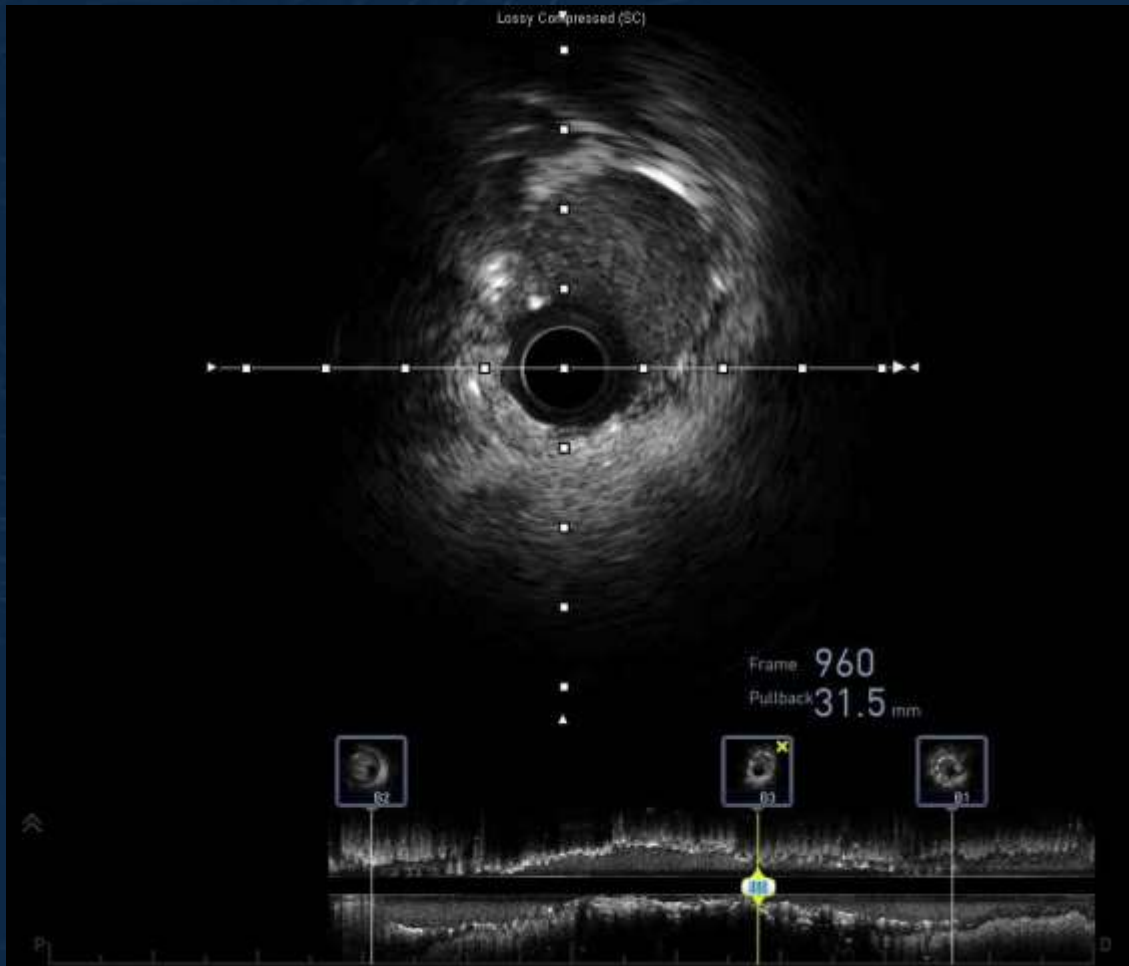


Synergy 2.75*28



Synergy 3.0*24

IVUS(RCA)

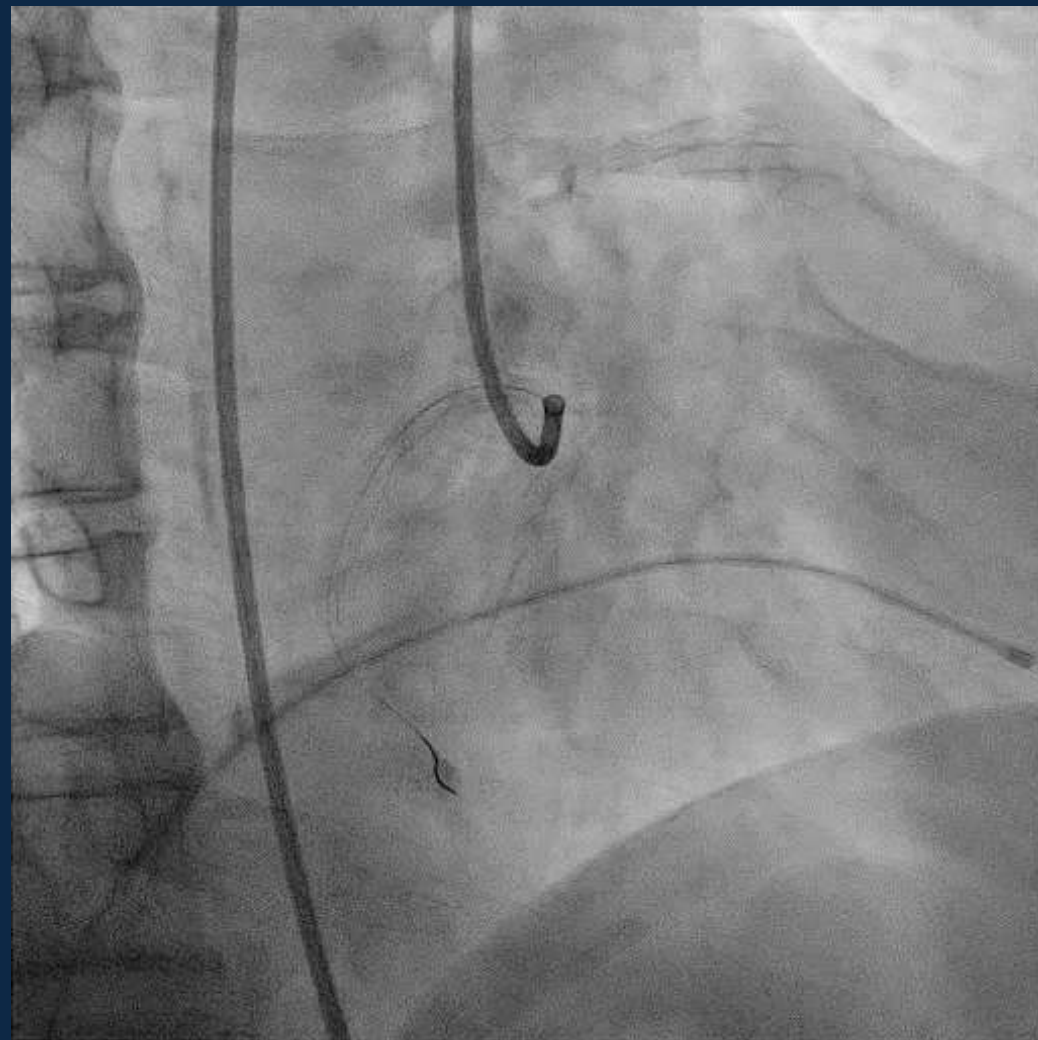
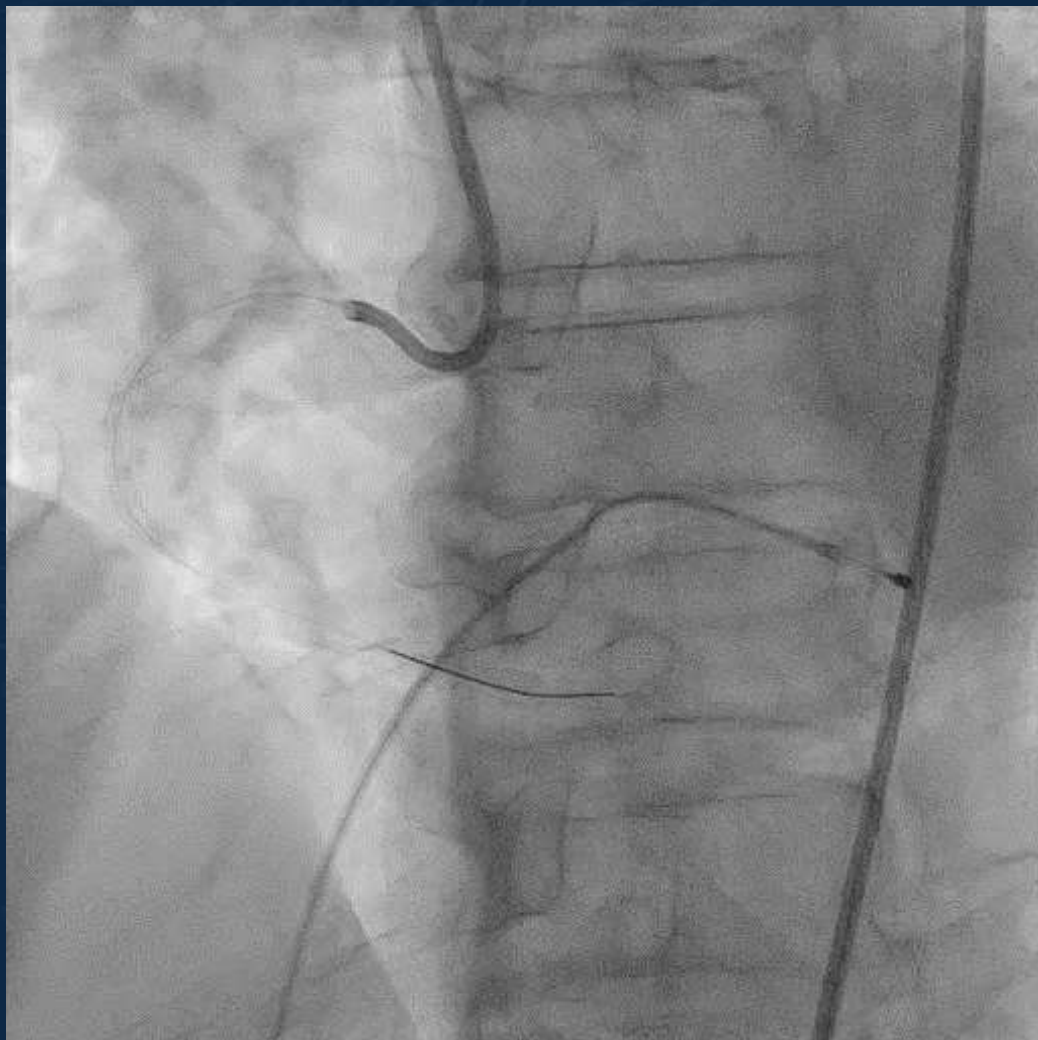


RCA mid



RCA distal

Final



Conclusion

- Severe calcium lesion

- Balloon inflation fail

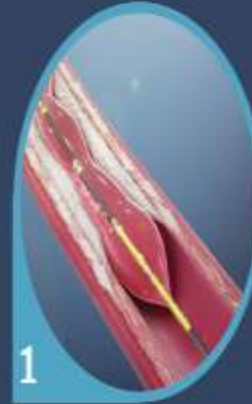


- Rotablator Acute gain good
- But not almight
- Indication 잡을 때 주의
- 되도록이면 시술 전에 rota를 계획하고 시작하자

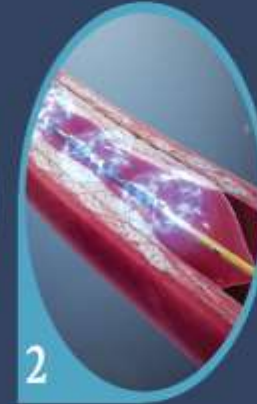
Conclusion



HOW SHOCKWAVE INTRAVASCULAR LITHOTRIPSY WORKS



1
The IVL Catheter is delivered across a calcified lesion over an 0.014" wire and the integrated balloon is expanded to 4atm to facilitate efficient energy transfer



2
An electrical discharge from the emitters vaporises the fluid within the balloon, creating a rapidly expanding and collapsing bubble that generates sonic pressure waves



3
The waves create a localised field effect that travels through soft vascular tissue, selectively cracking intimal and medial calcium within the vessel wall



4
After calcium modification, the integrated balloon may subsequently be used to dilate the lesion at low pressure in order to maximise luminal gain

Caption: Adapted with permission from Shockwave Medical Inc.