

How to overcome calcified lesions

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Calcification Problem

- **Lower Stent Delivery**
- **Malapposition**
- **Stent Under Expansion**
- **Increase ISR**
- **Edge Dissection & Perforation**

Calcification Problem

Observational Study > Catheter Cardiovasc Interv. 2018 Apr 1;91(5):859-866.

doi: 10.1002/ccd.27204. Epub 2017 Jul 19.

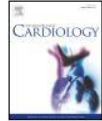
Prevalence, correlates, and impact of coronary calcification on adverse events following PCI with newer-generation DES: Findings from a large multiethnic registry



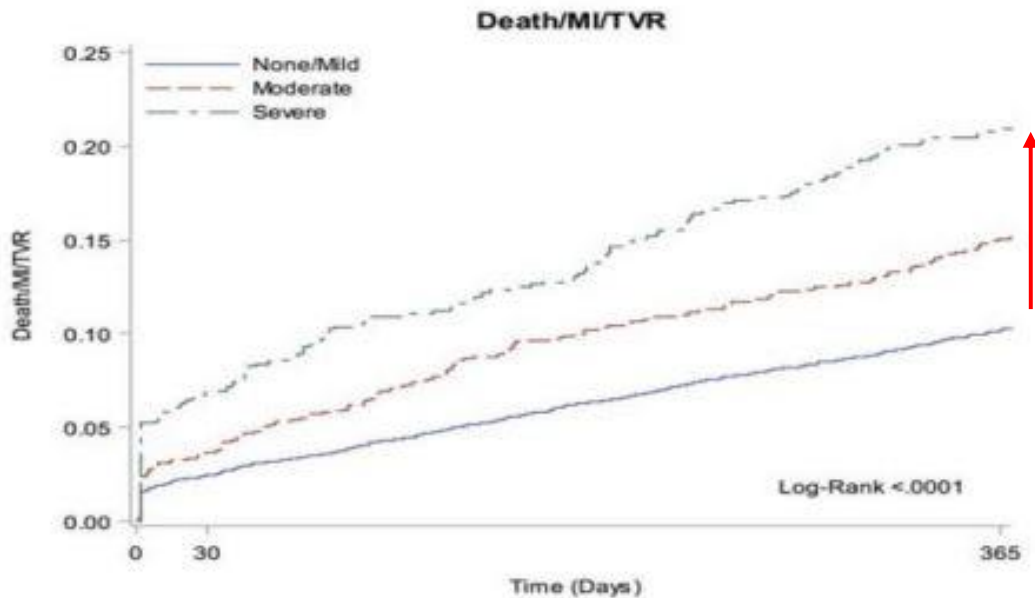
Contents lists available at ScienceDirect

International Journal of Cardiology

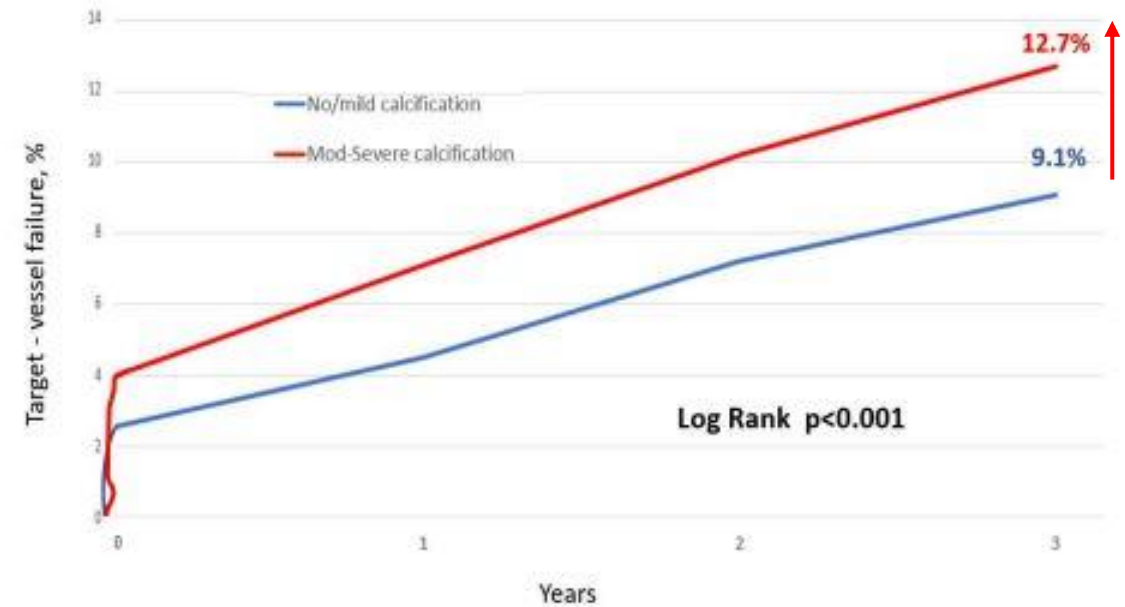
journal homepage: www.elsevier.com/locate/ijcard



Differential cutoff points and clinical impact of stent parameters of various drug-eluting stents for predicting major adverse clinical events: An individual patient data pooled analysis of seven stent-specific registries and 17,068 patients



Copeland-Halperin R.S. et al., Catheter Cardiovasc Interv., 91 (2018), pp. 859-866.



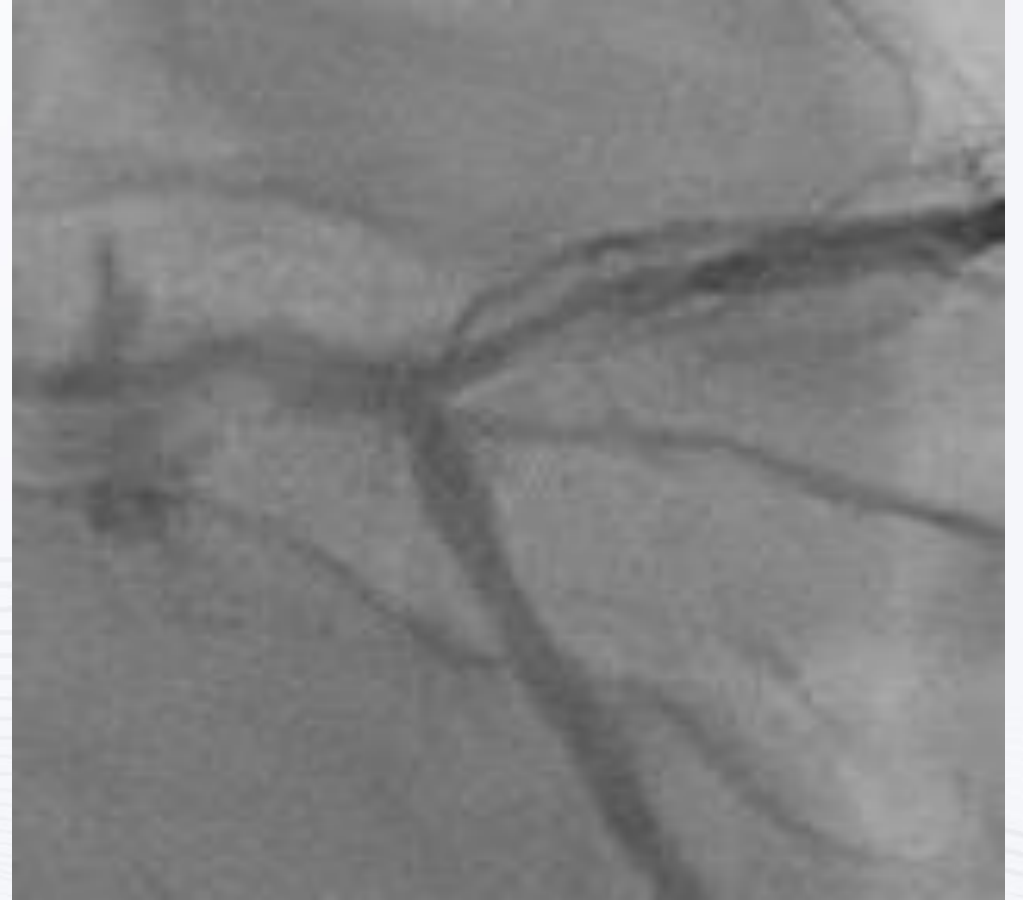
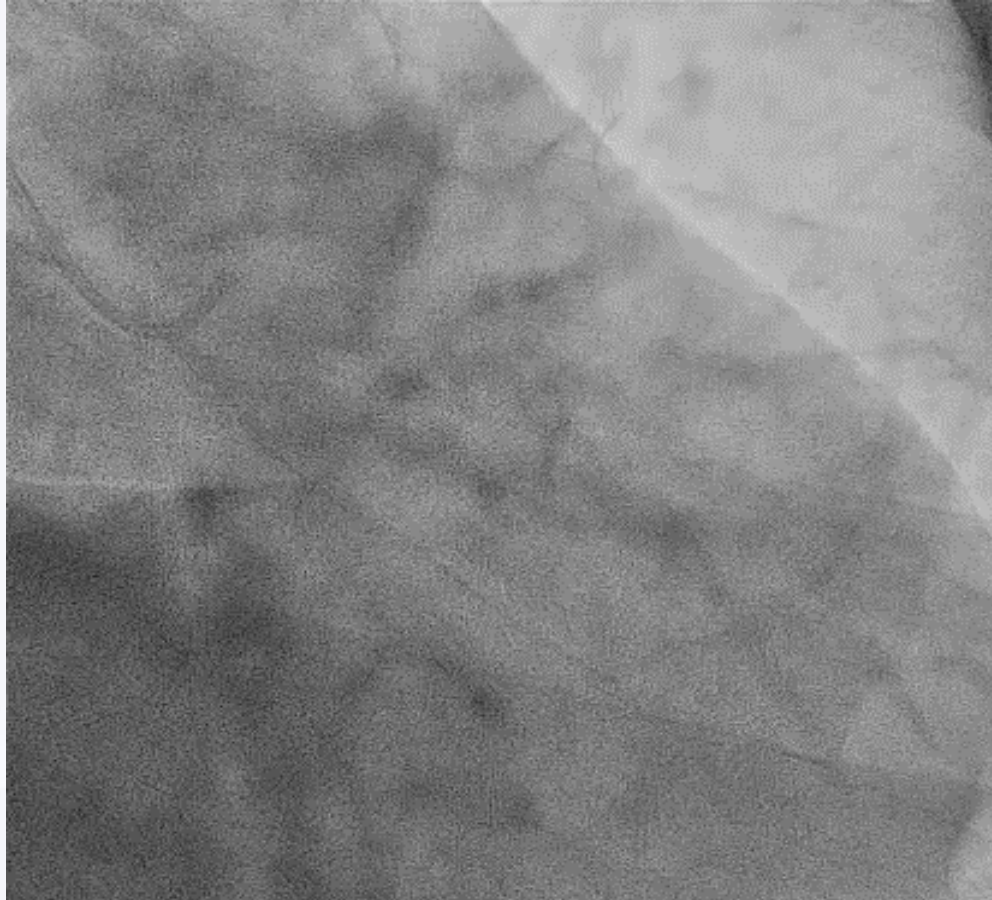
Lee CH, et IRIS-DES Registry Investigators. Coron Artery Dis. 2021 Jan;32(1):42-50.

Case 1

Brief History (SSS, M/65)

- **PHx**
 - **Coronary artery disease**
 - **Dyslipidemia**
- **Present Illness**
 - **TMT : 13.3 STD Positive without Angina**
 - **Heart MDCT Ca Score : 639.7**
 - **CAG (12.01.10)**
 - **→ diffuse 40% of RCA-D**

Diagnostic



Diagnostic

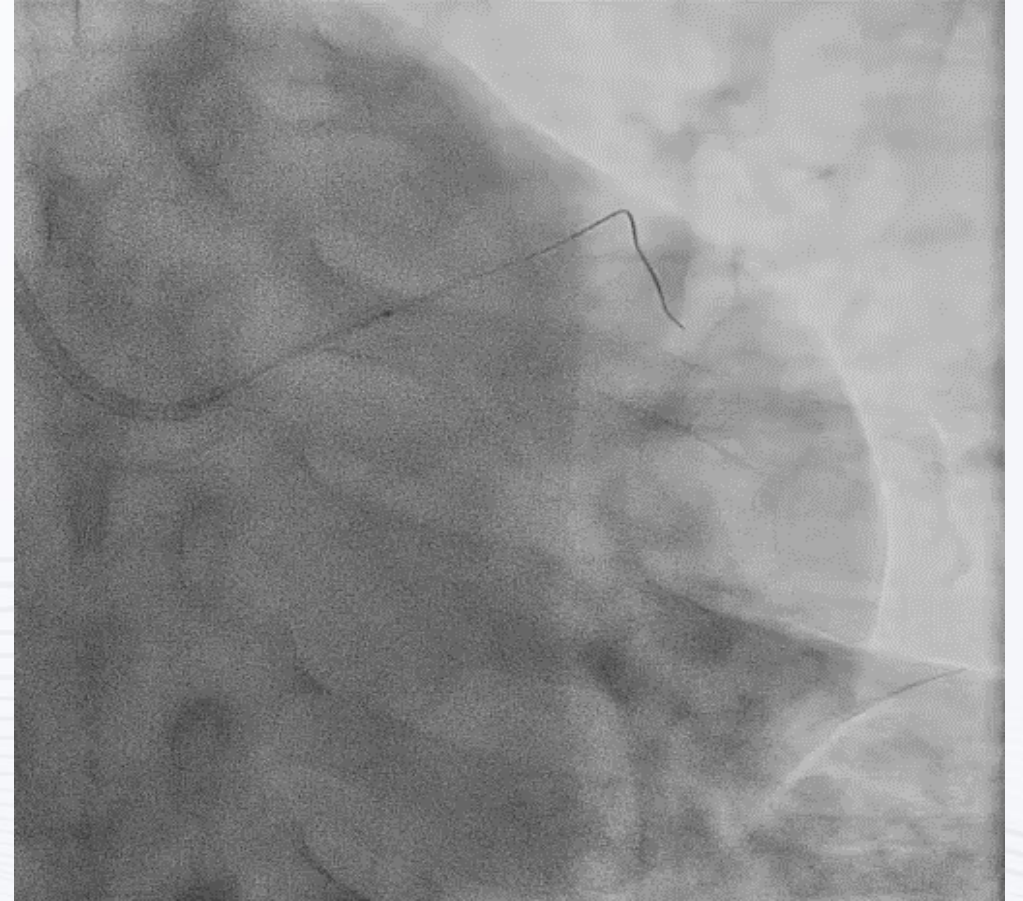
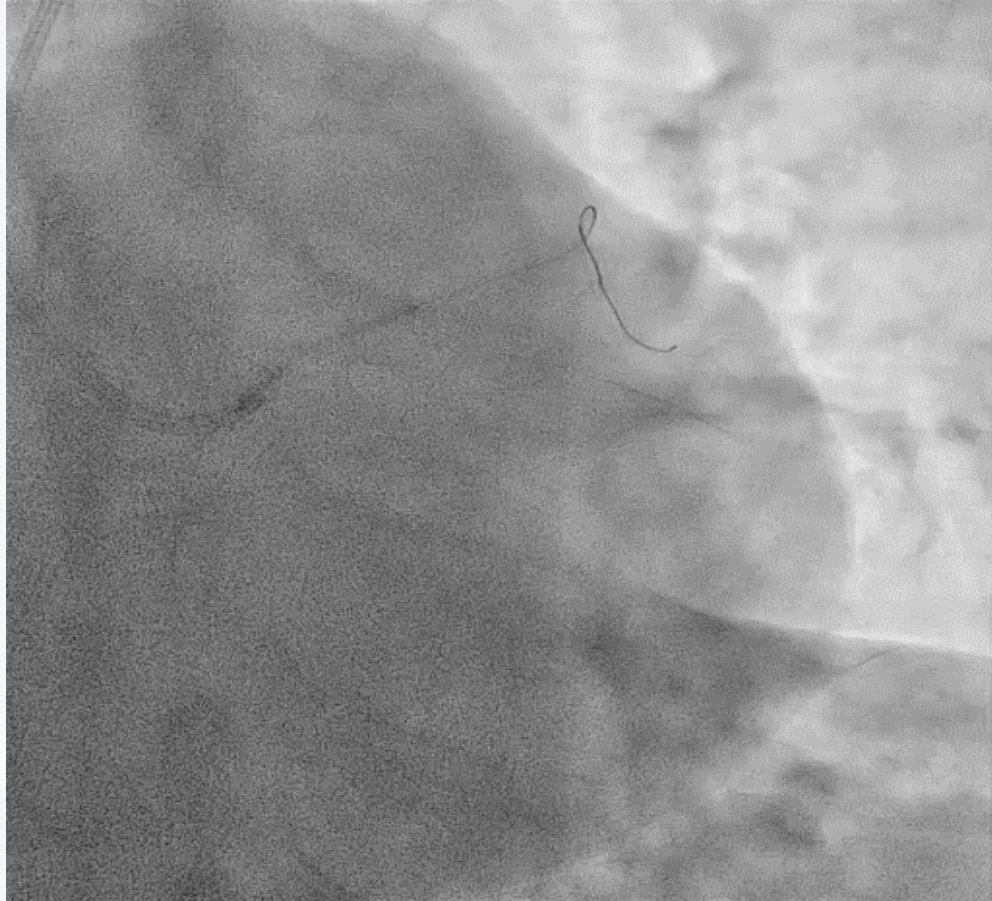


PCI Pre-Dilation



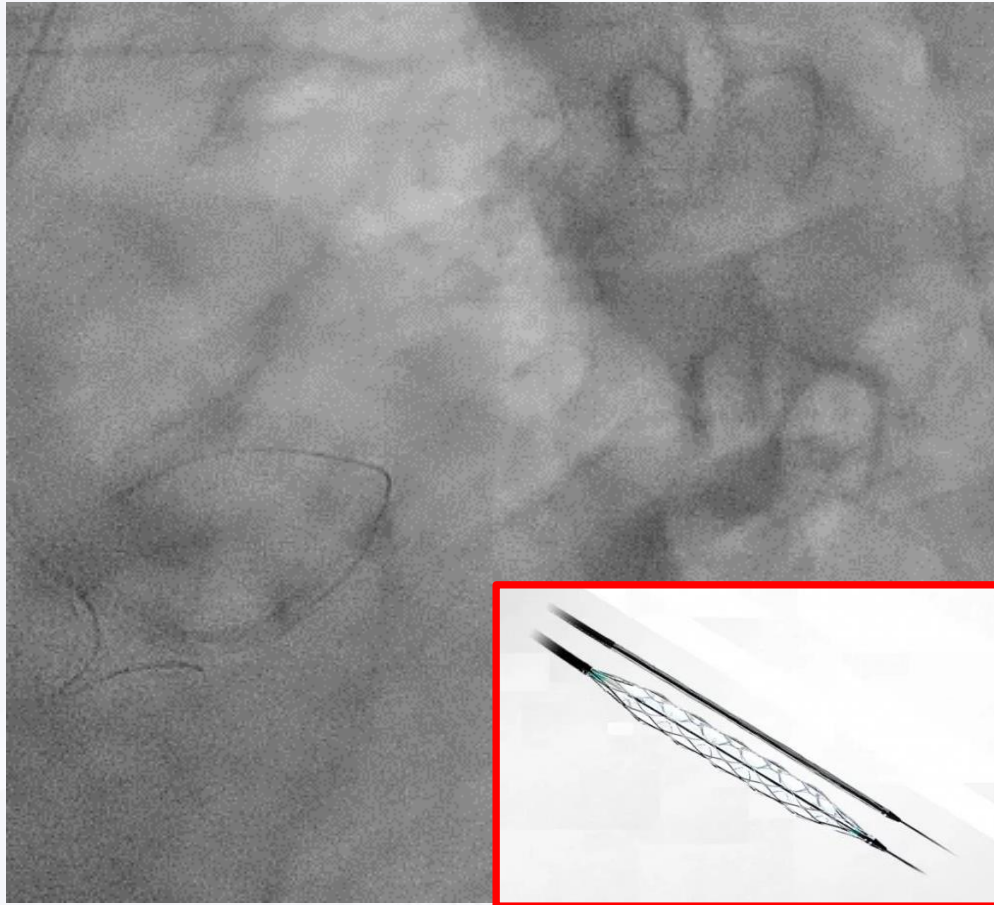
Semicompliant 2.5*15

PCI Stent

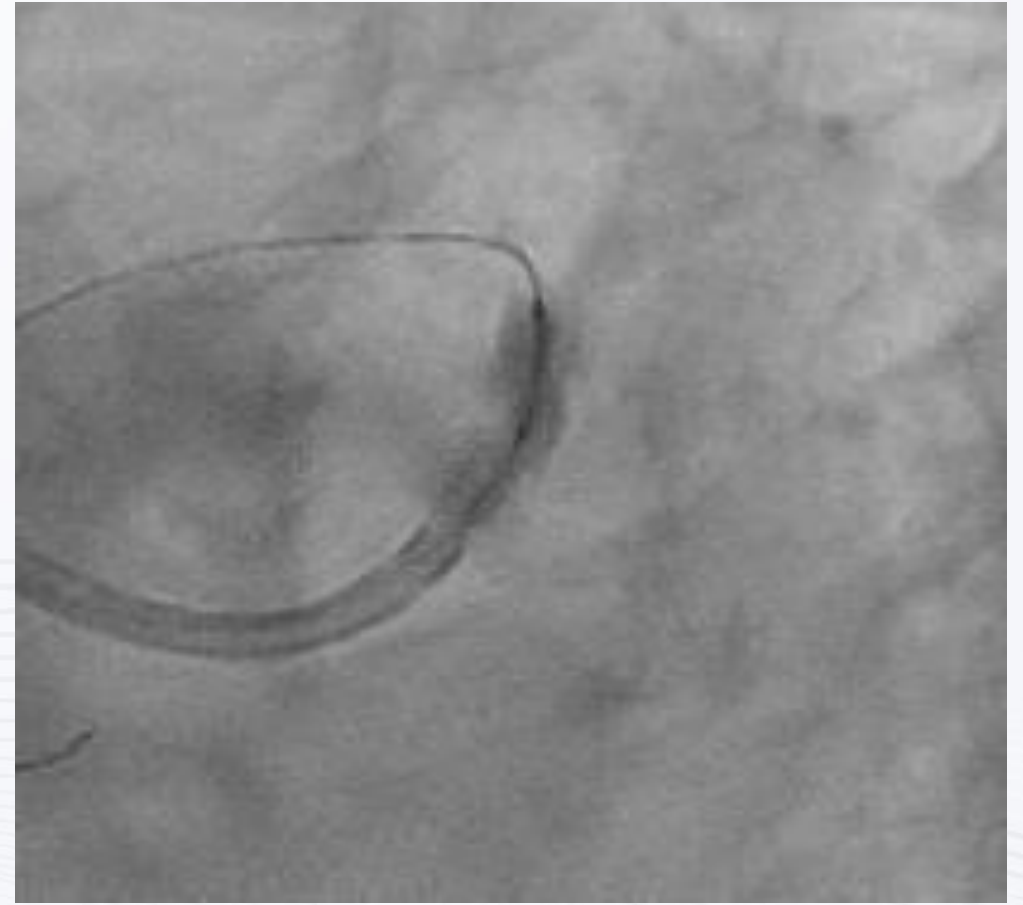


Xience Skypoint 2.75*23

PCI Scoring Balloon

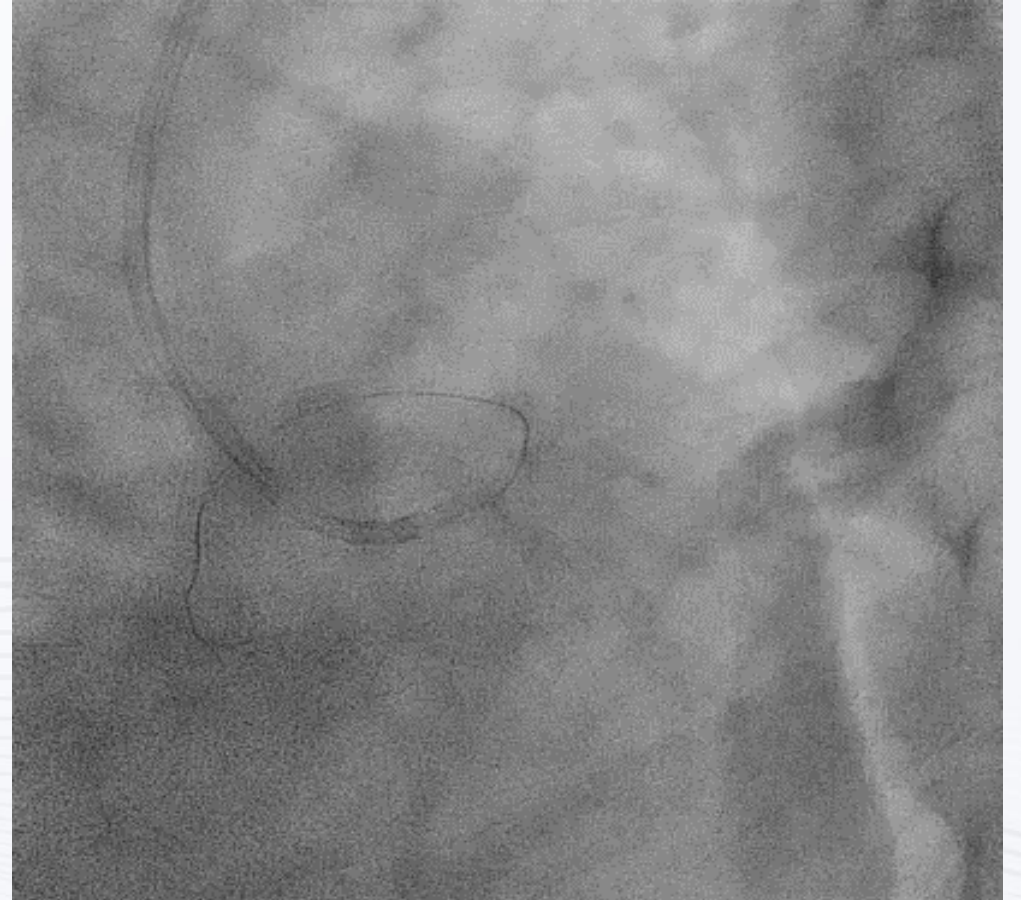


Scoring Balloon 2.5*13

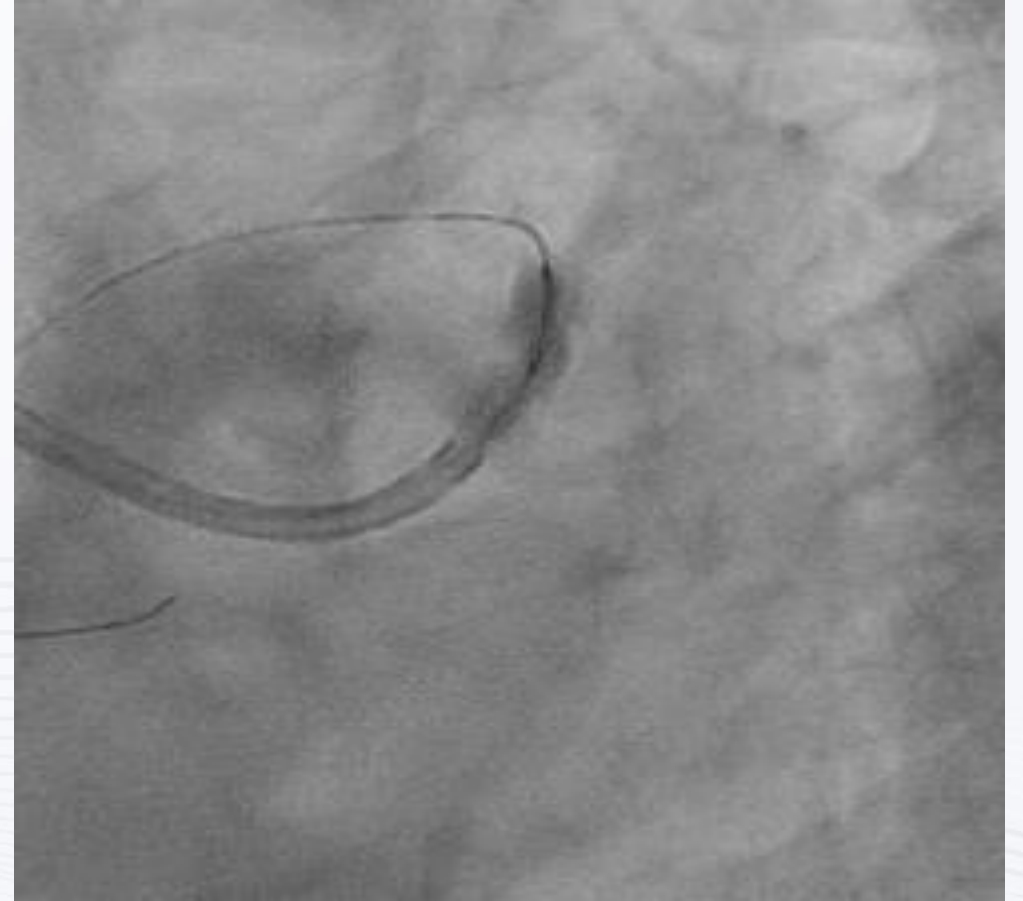
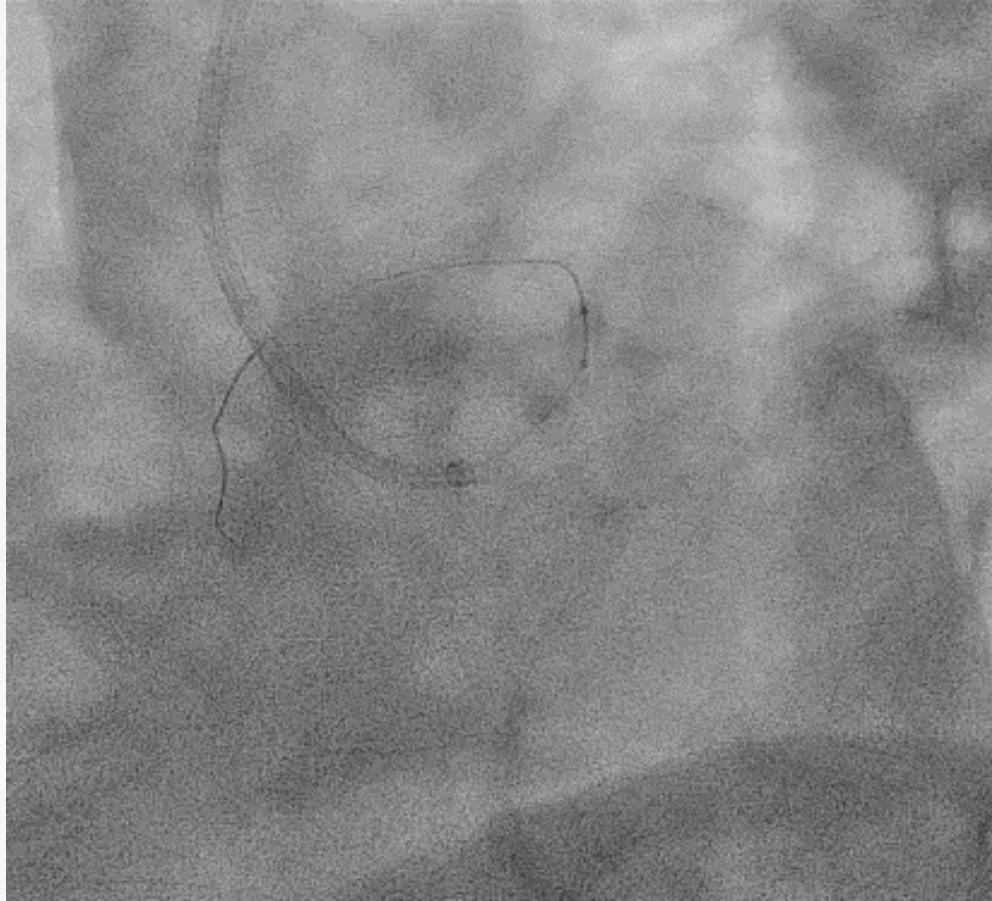


Dog Bone Effect

PCI POST Scoring Balloon

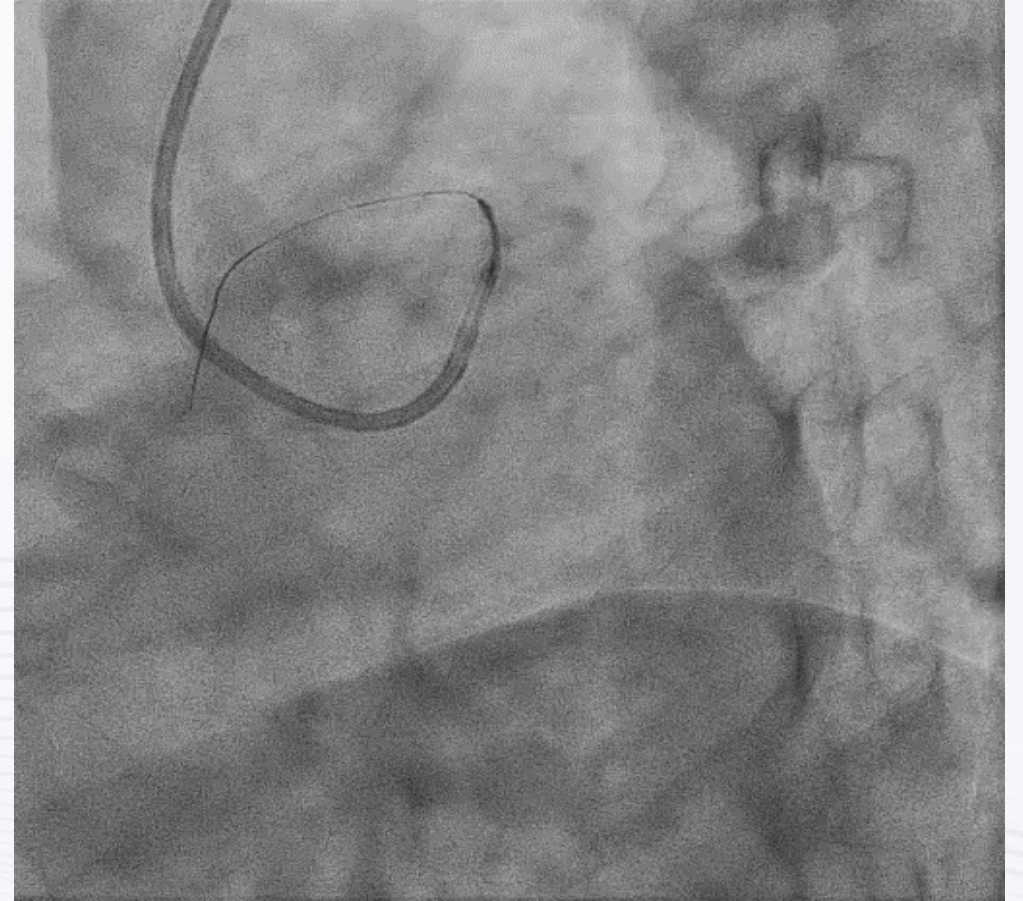


PCI NC Balloon



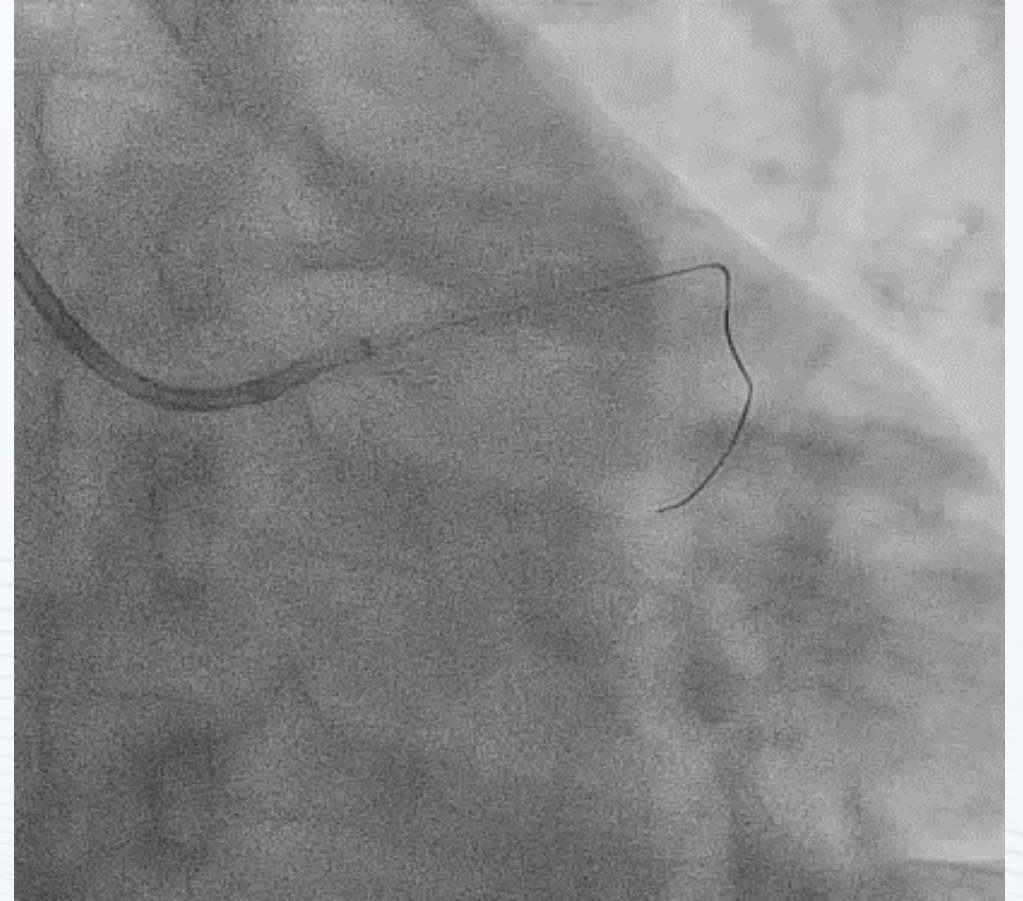
Non compliant 2.75*10

PCI POST NC Balloon



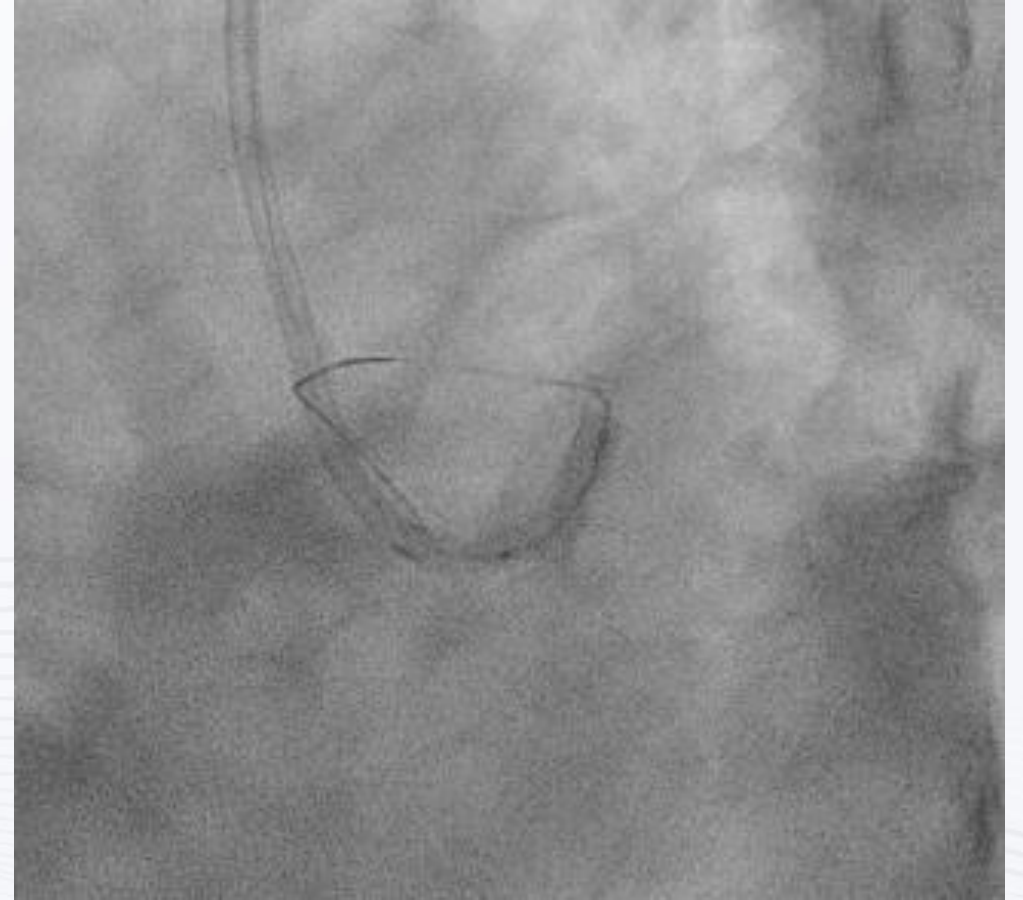
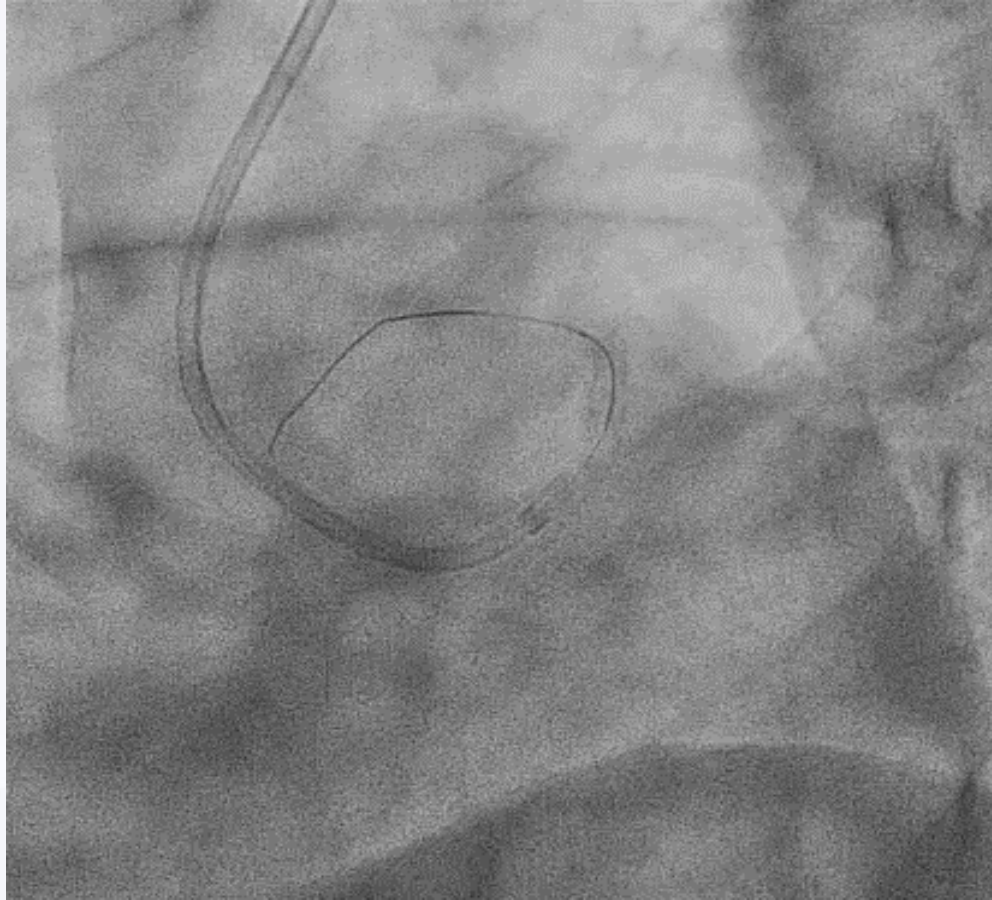
Inner Guiding Catheter

PCI Stent



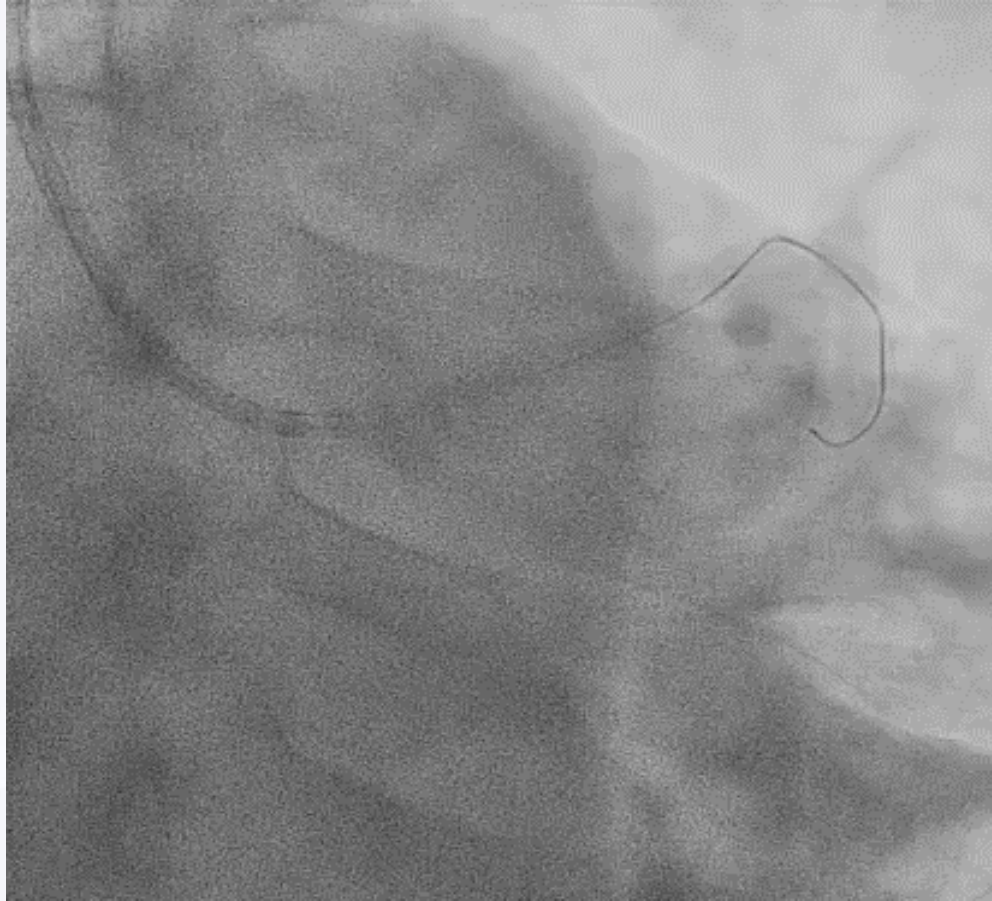
Xience Skypoint 2.75*23

PCI POST NC



Non Compliant 2.75*10

FINAL

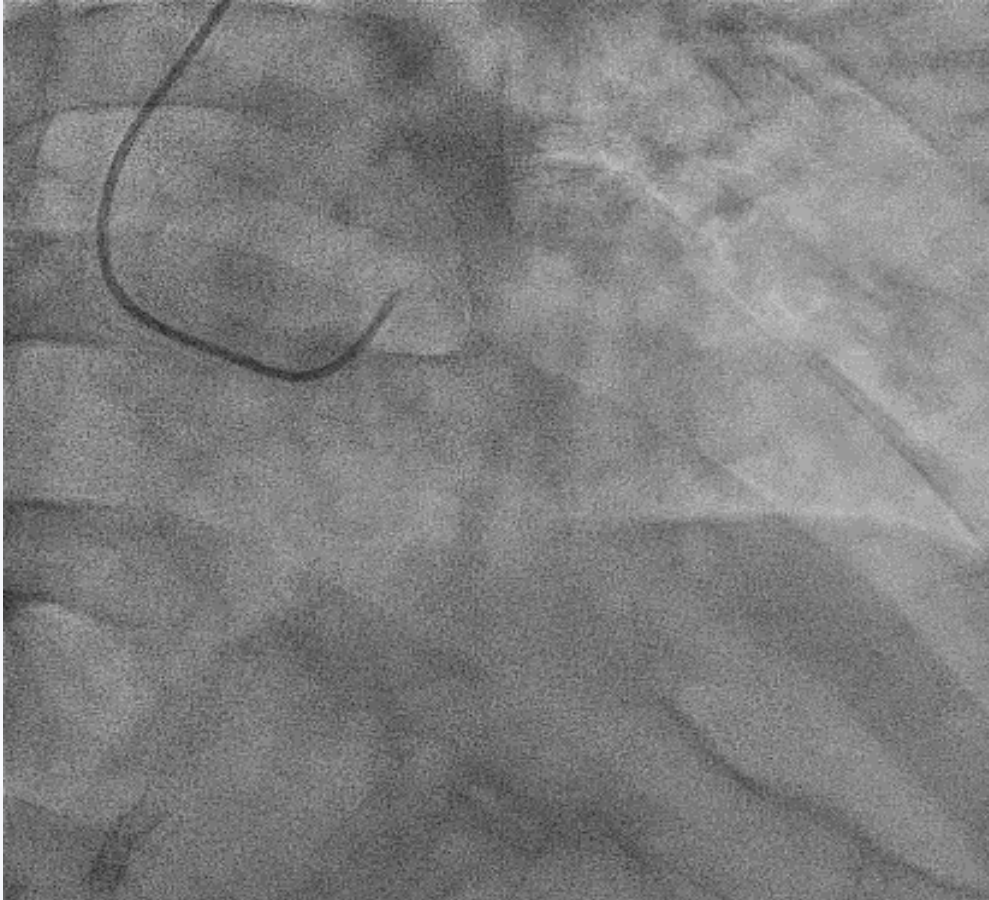


Case 2

Brief History (KSK , M/69)

- **PHx**
 - **18' PCI Stent at RCA-P~M**
 - **20.12 STEMI PCI at RCA-D (Sierra 3.0*28)**
 - **22.03 f/u angio ISR 40% at RCA-M~D**
- **Present Illness**
 - **RWMA compatible with RCA territory**
 - **EKG : NSR**
 - **Troponin I <0.012**
 - **Chest Pain**

Diagnostic

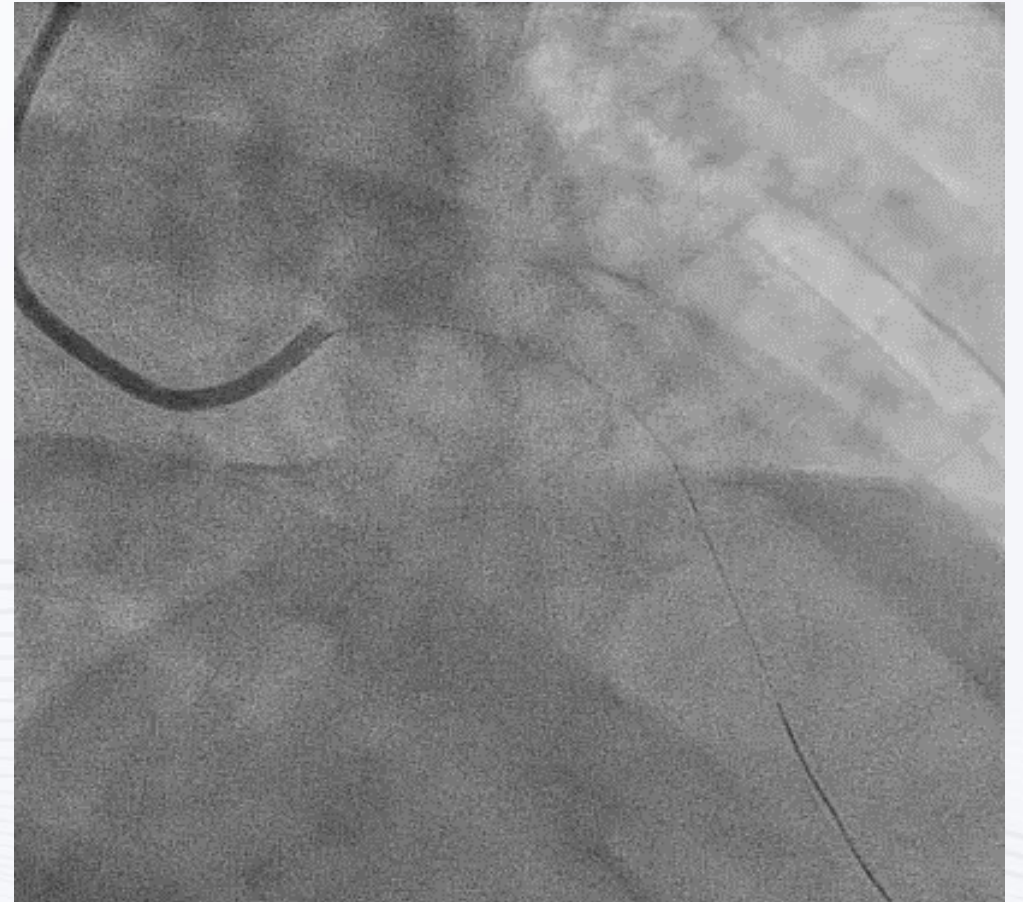


PCI Pre-Dilation



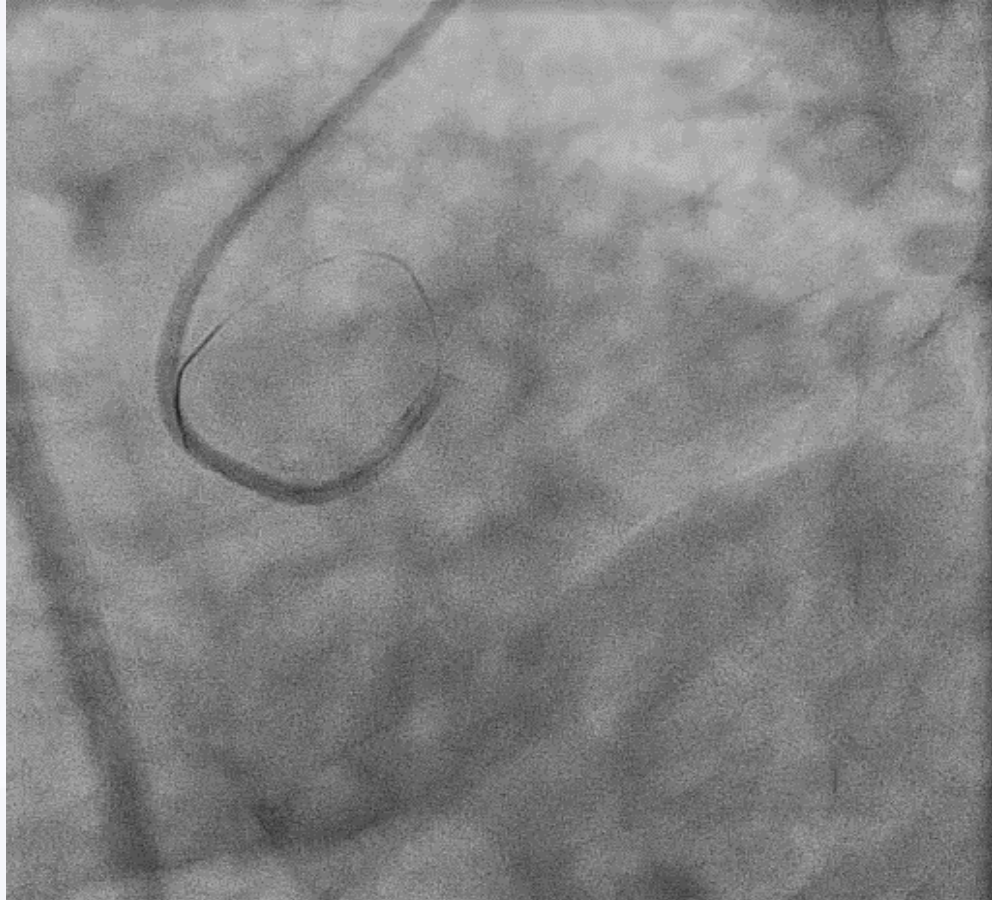
Semi Compliant 2.5*15 5회

PCI Scoring Balloon



Scoring Balloon 2.5*13 3회

PCI Scoring Balloon



How can we overcome calcified lesions?

Rotablator

1) Guiding Selection : **Must Side Hole**

2) Burr Size : Lumen * 1/2 (**Step-up Burr**)

3) 0.09 G/W : Floppy Rota Wire

- Exchange G/W using M/C
- Provide Sufficient Axis
- **Be careful to make loop in Aorta**

4) **Contradiction**

- **Tortuous Vessel , Ostium**
- **Milking**
- **Unstable G/C Engagement**

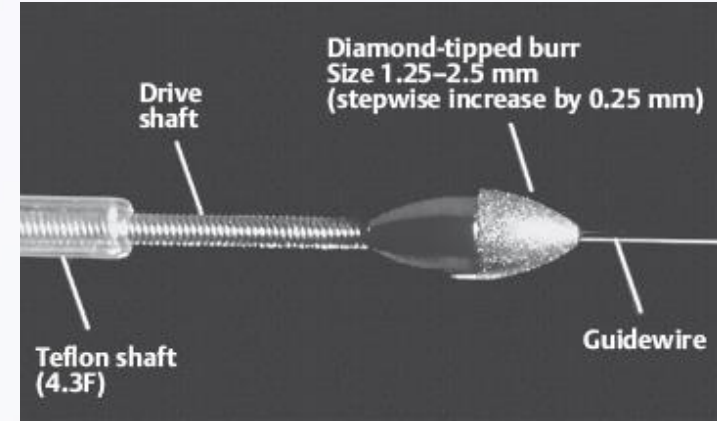
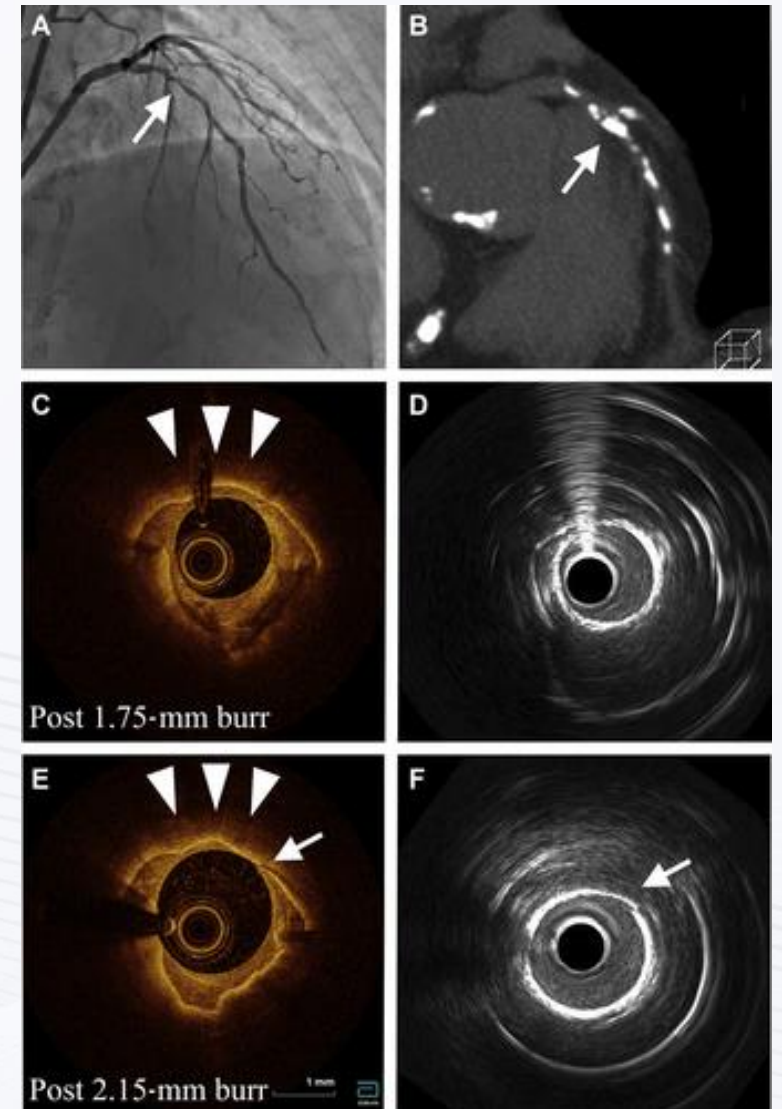


Table 25.1 Size of guiding catheter for rotational atherectomy

Burr diameter		Minimal internal diameter of the guiding catheter	Catheter size (minimum size)
mm	Inch	Inch	French
1.25	0.049	0.053	6.0
1.50	0.059	0.063	6.0
1.75	0.069	0.073	7.0
2.00	0.079	0.083	8.0
2.15	0.085	0.089	9.0
2.25	0.089	0.093	9.0
2.38	0.094	0.098	10.0
2.50	0.098	1.102	10.0

Rotablator

- Modification of plaque -> **CRACK**
- Improving the plaque and **vessel compliance**
- **Avoid Complication**
 - Under Expansion, Perforation, Dissection



Rotablator

Circulation: Cardiovascular Interventions

Volume 11, Issue 10, October 2018

<https://doi.org/10.1161/CIRCINTERVENTIONS.118.007415>



CORONARY INTERVENTIONS

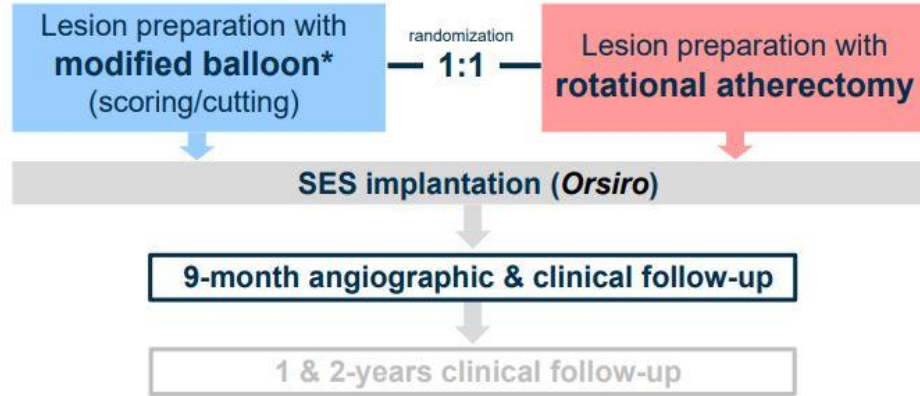
High-Speed Rotational Atherectomy Versus Modified Balloons Prior to Drug-Eluting Stent Implantation in Severely Calcified Coronary Lesions

The Randomized PREPARE-CALC Trial

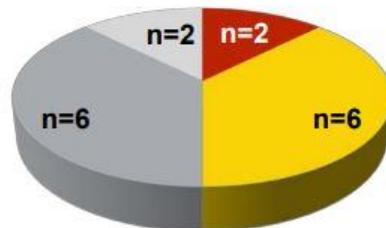
Rotablator

PCI in 200 patients with severely calcified lesions

* Predilatation with standard balloons was allowed to facilitate delivery of modified balloons

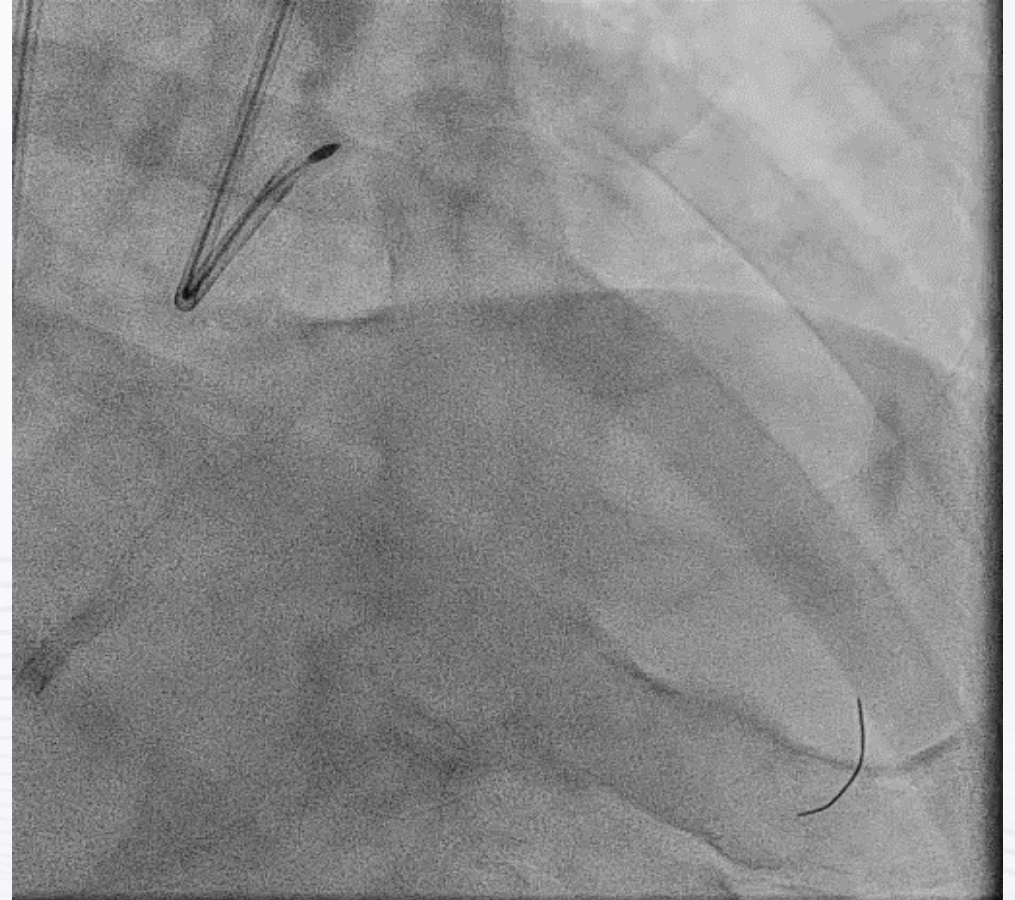
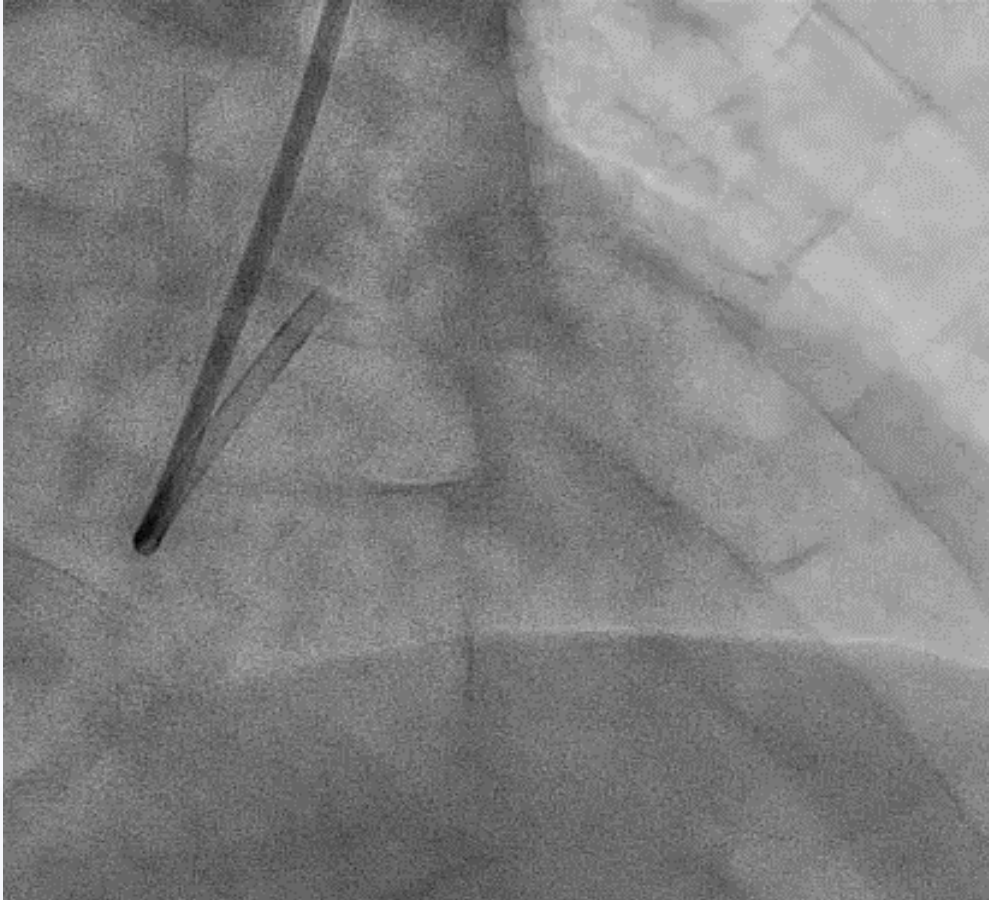


	Modified balloon (n = 100 pts.)	Rotational atherectomy (n = 100 pts.)	p-value
Strategy success	81 (81%)	98 (98%)	0.0001
Final TIMI flow < III	0 (0%)	1 (1%)	0.99
Residual stenosis >20%	2 (2%)	0 (0%)	0.49
Stent failure	4 (4%)	1 (1%)	0.36
Crossover	16 (16%)	0 (0%)	<0.0001



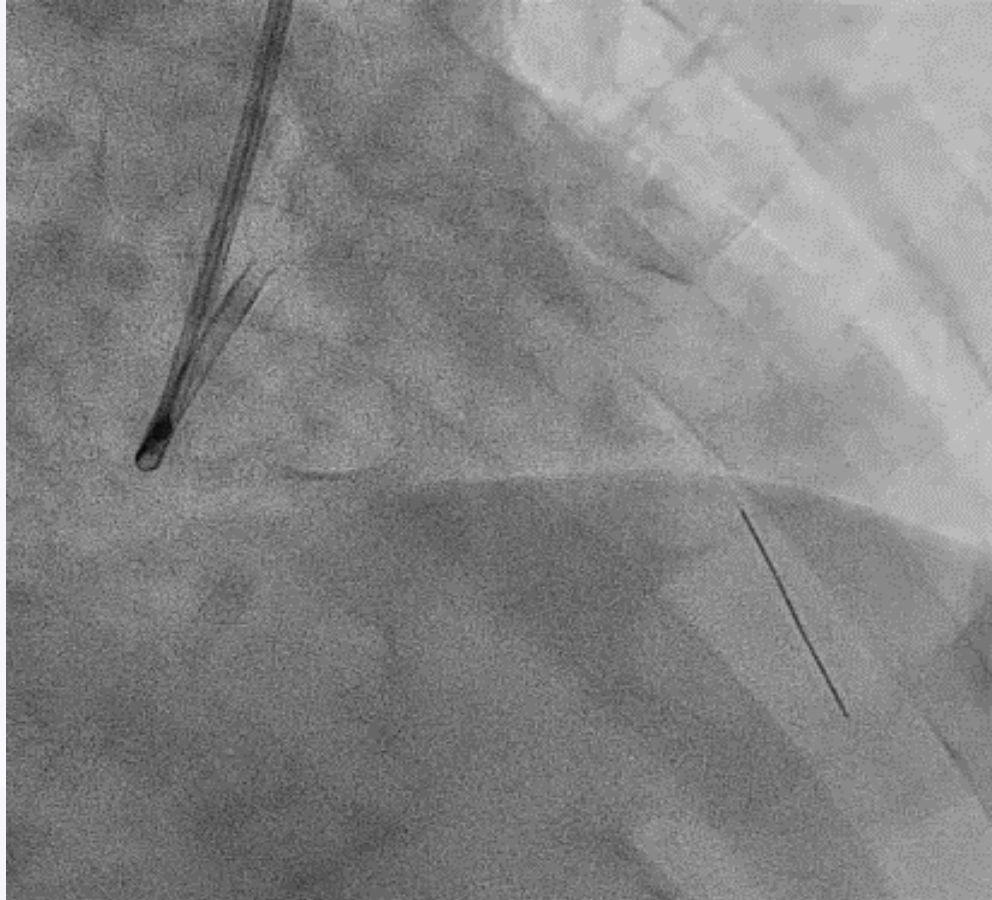
- not crossable by any balloon
- not crossable by modified balloon
- not adequately dilatatable
- stent not deliverable

PCI Rotablator



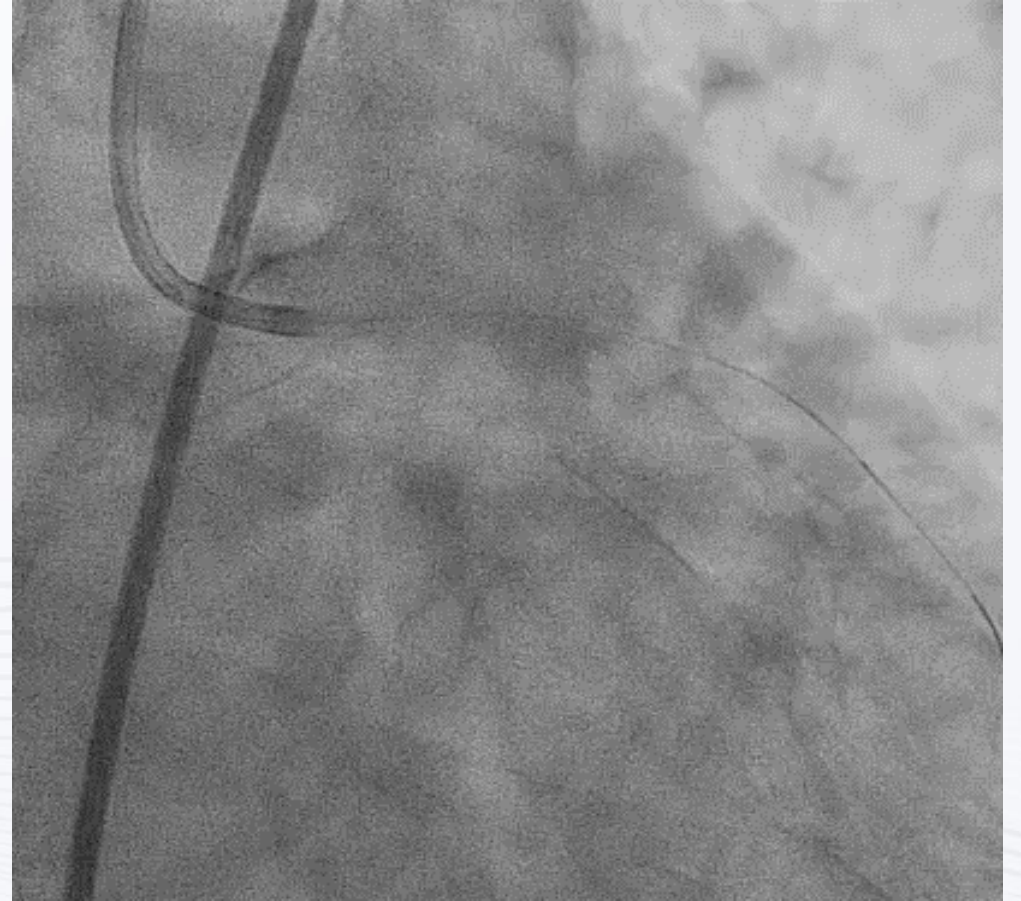
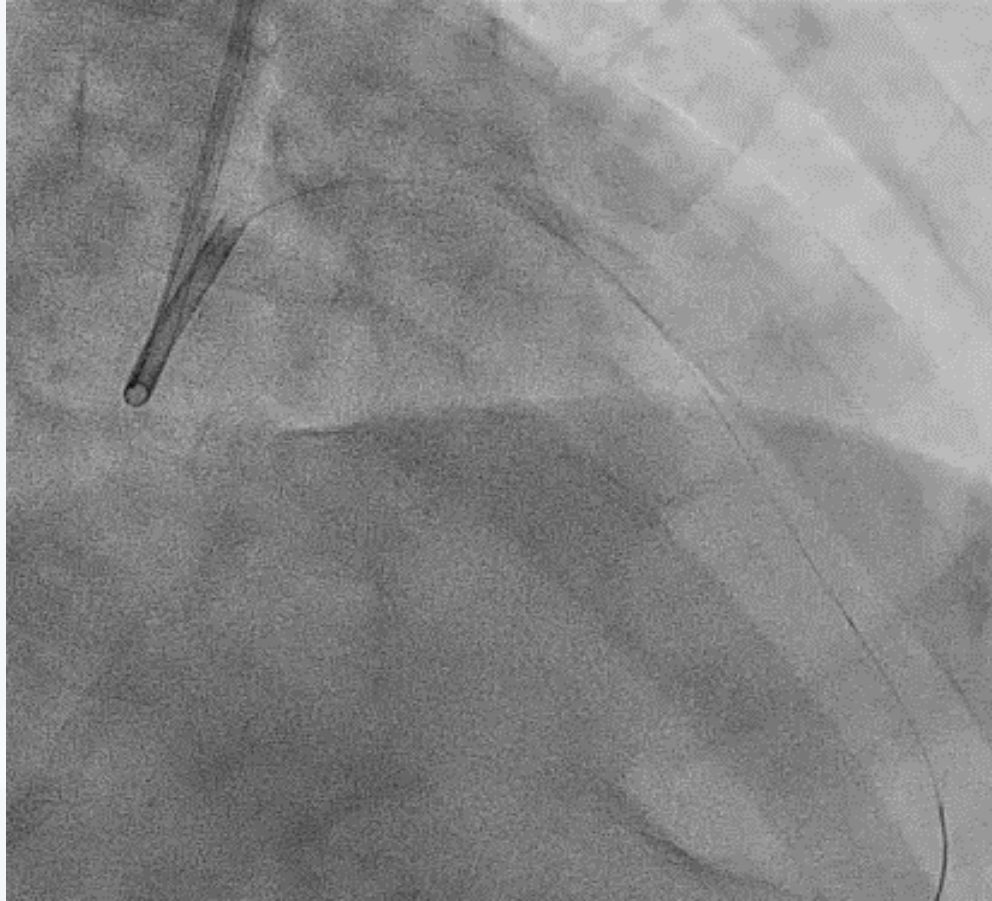
Rotablator Burr : 1.5 / 1.75

PCI Pre-Dilation

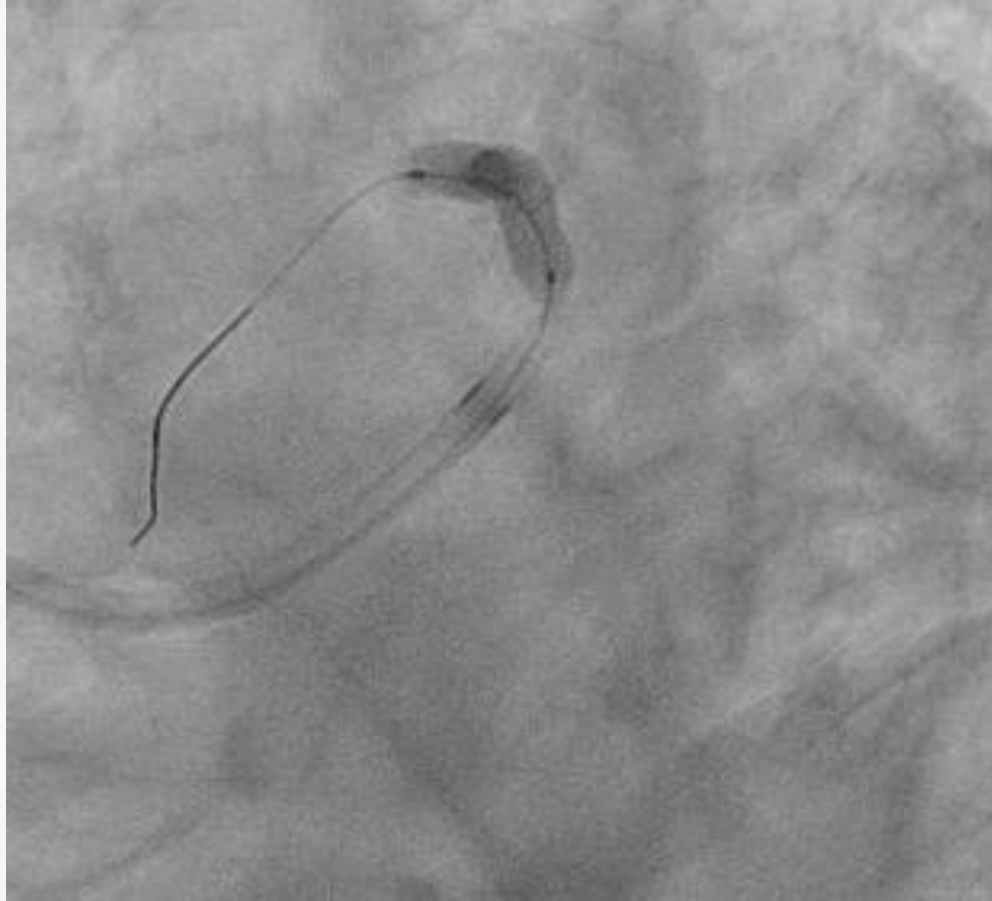


Semi Compliant 2.5*15 3회

PCI



FINAL



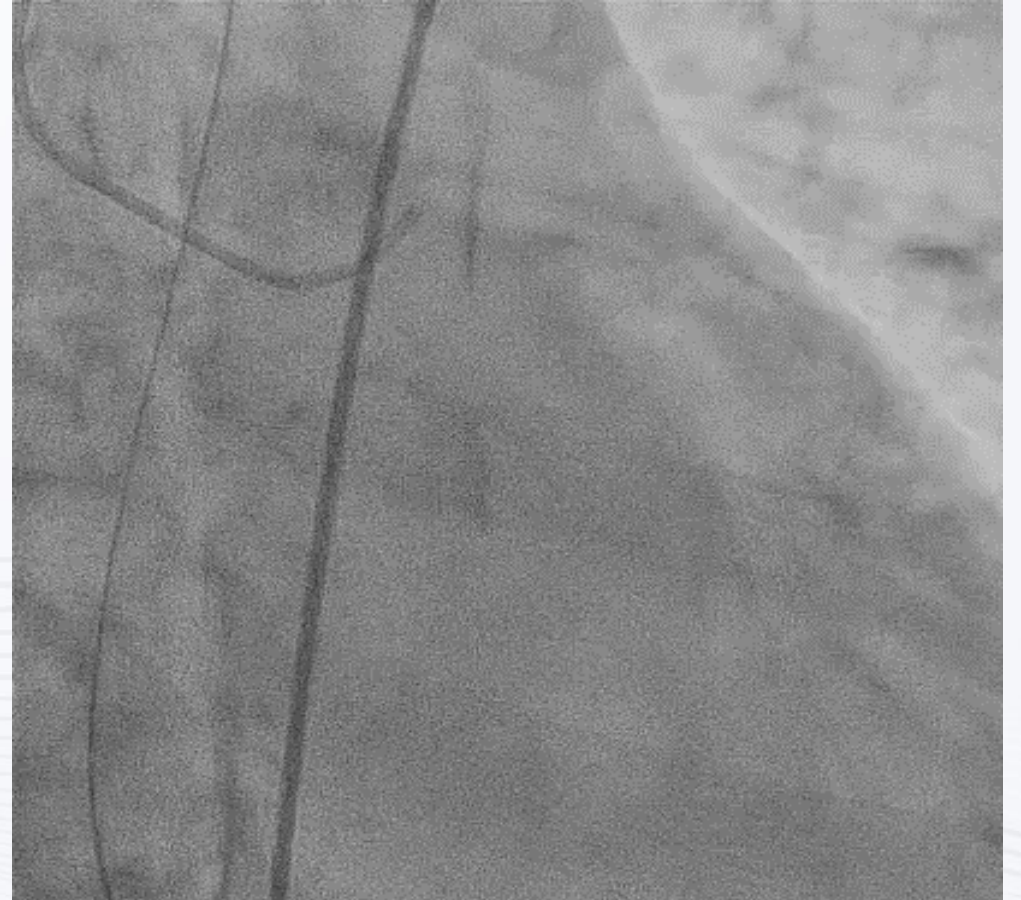
Resolute Onyx 3.5*30

Case 3

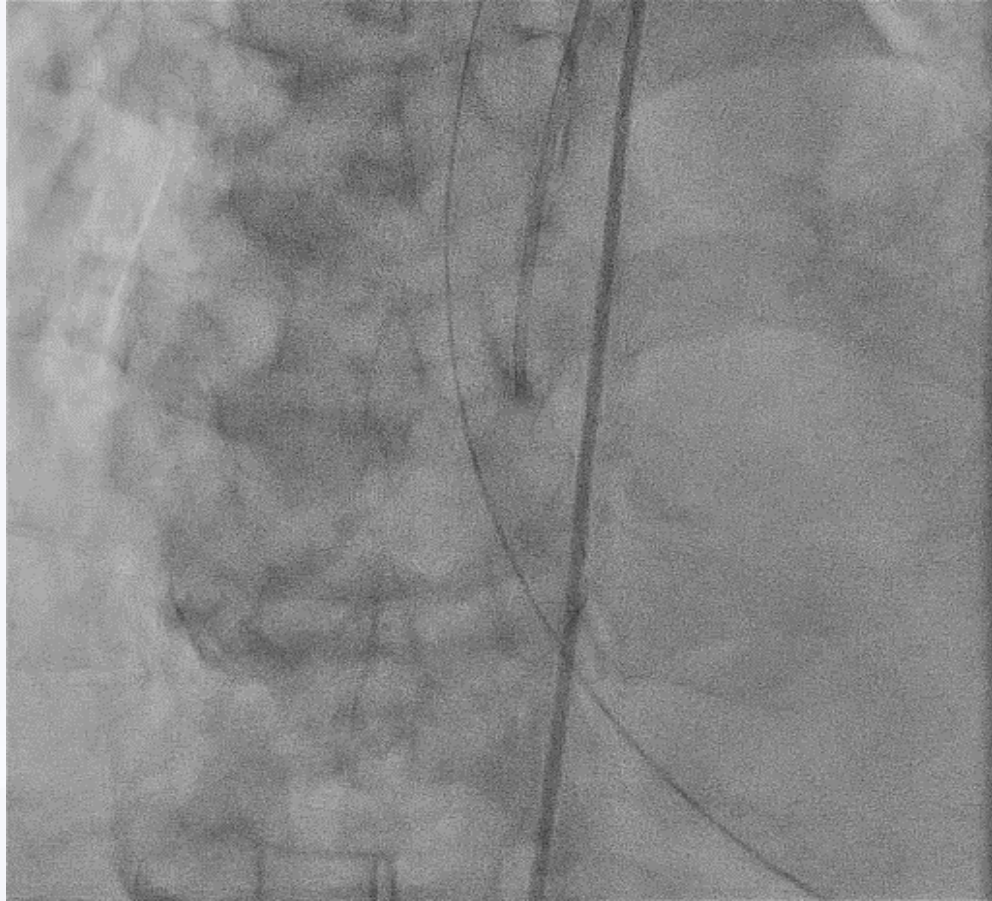
Brief History (YSS, M/71)

- **PHx**
 - **HTN(+), DM(+), ESRD**
 - **FHx : None**
- **Present Illness**
 - **Dyspnea(+), DOE(+), EF : 50%**
 - **Chest discomfort**
- **Cardiac Enzyme**
 - **Troponin I : 0.56**
 - **NT-proBNP : > 35000**
 - **CK-MB : 0.44**
 - **CK : 133**

Diagnostic



Diagnostic



Diagnostic

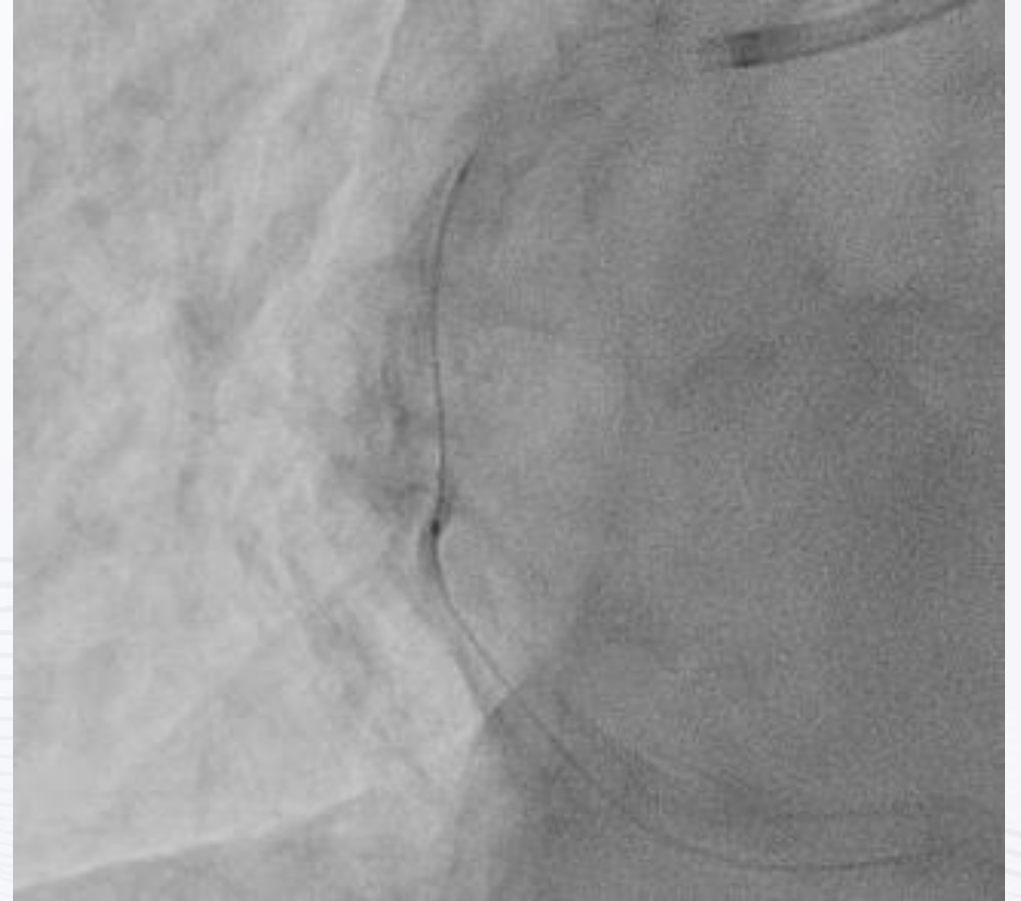
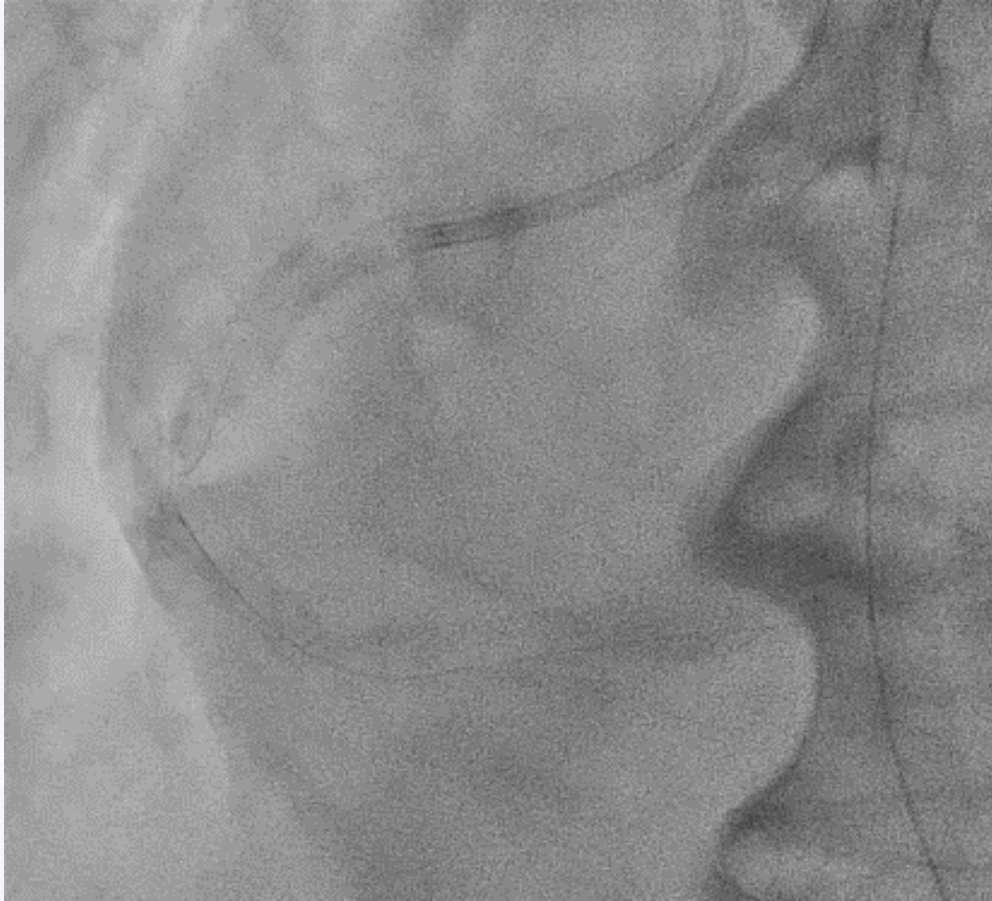


Strategy

- Rotablator ?
 - Tortuous Vessel
 - Unstable G/C Engagement
 - Distal Lesion
- NC Balloon
 - + CHAMP 2.0 G/C



PCI Pre Dilation



Semi Compliant 1.0*6 5회

PCI NC Balloon



Semi Compliant 2.5*15 4회



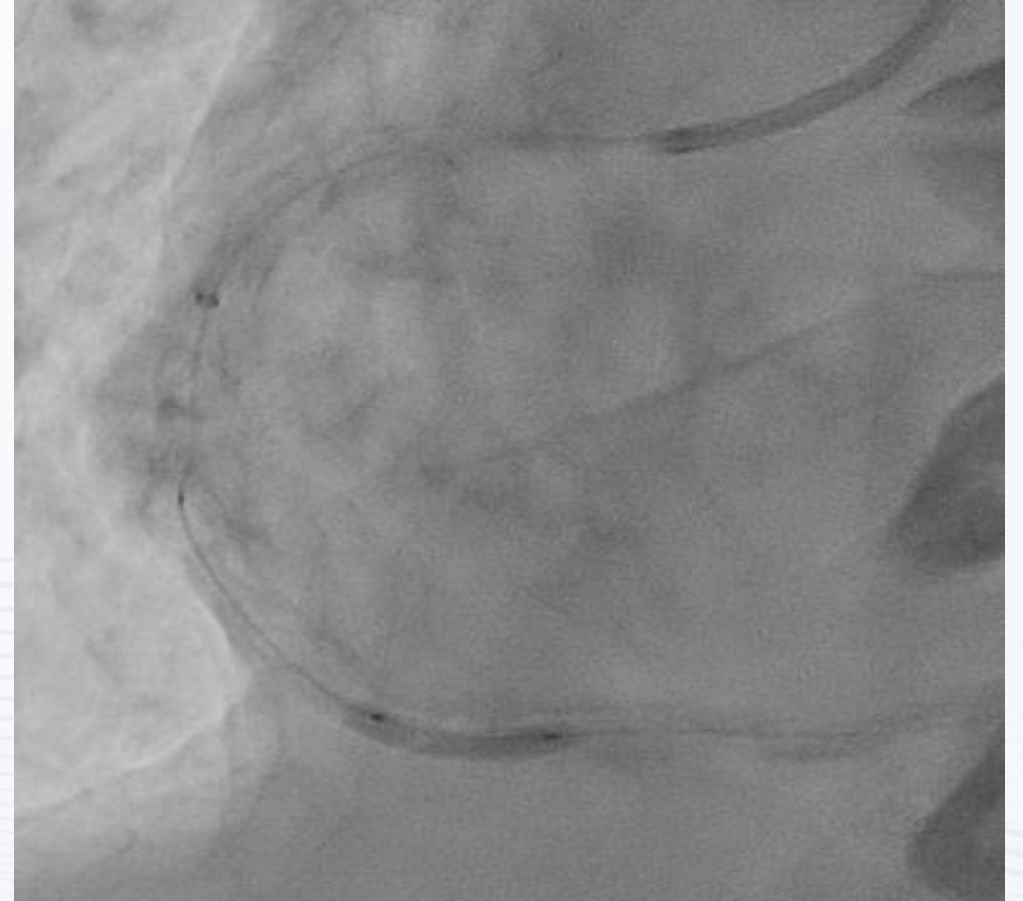
Non Compliant 3.5*12

PCI NC Balloon



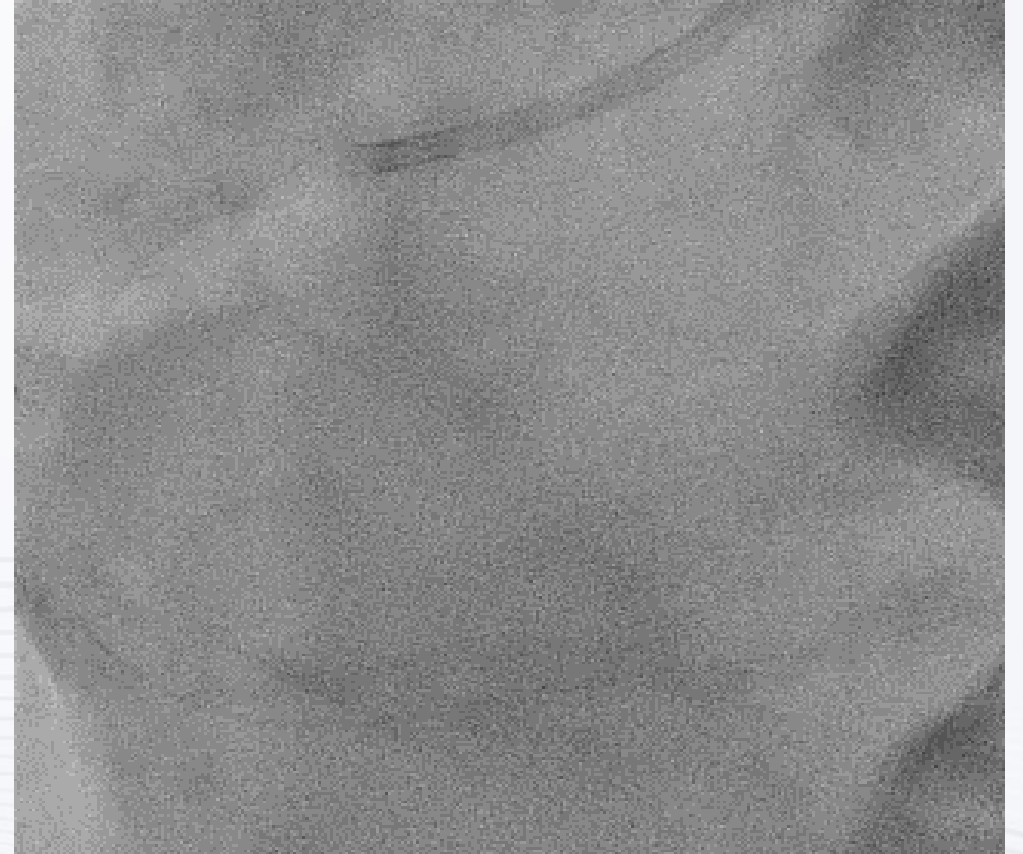
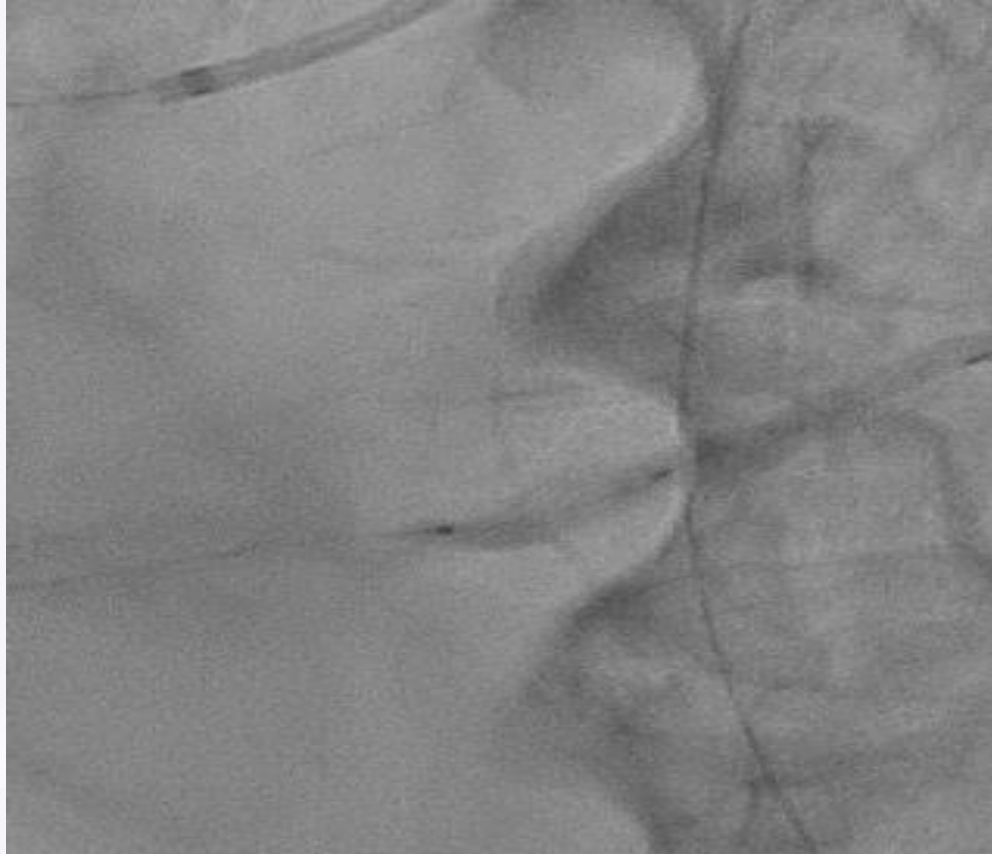
**How can we overcome
calcified lesions?**

PCI Scoring Balloon



Scoring Balloon 2.5*13 3회

PCI Scoring Balloon

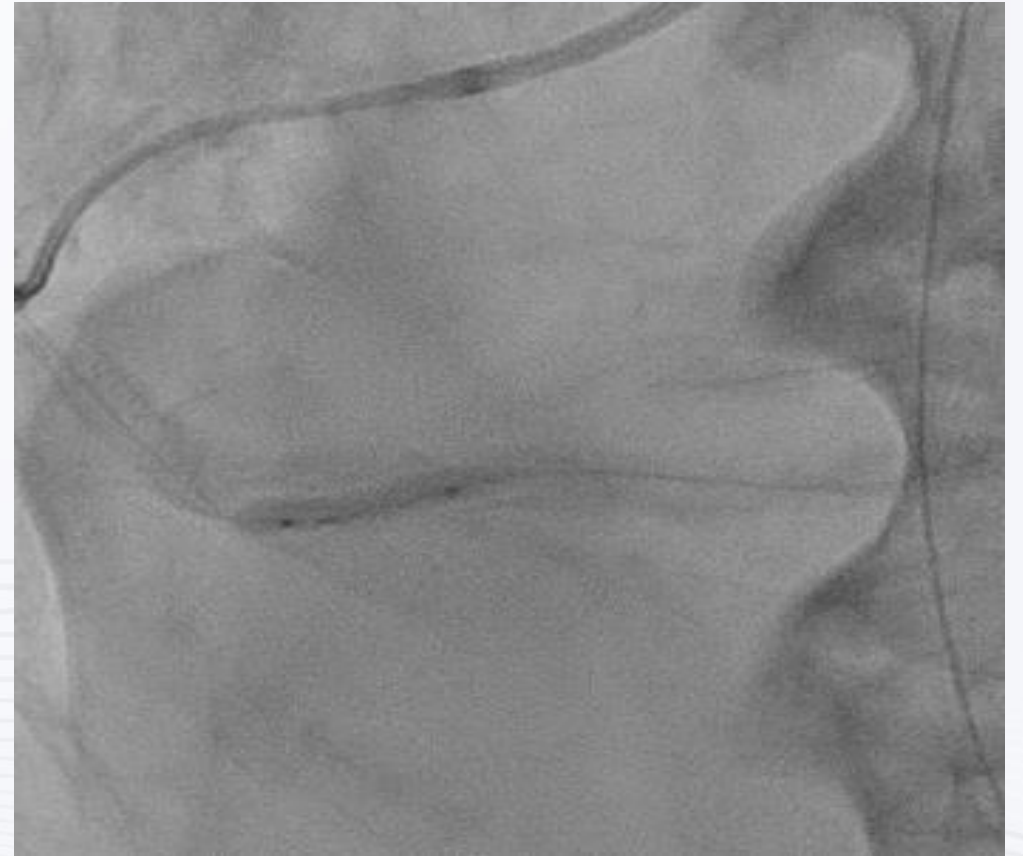


Scoring Balloon 2.5*13 4회

PCI Scoring Balloon

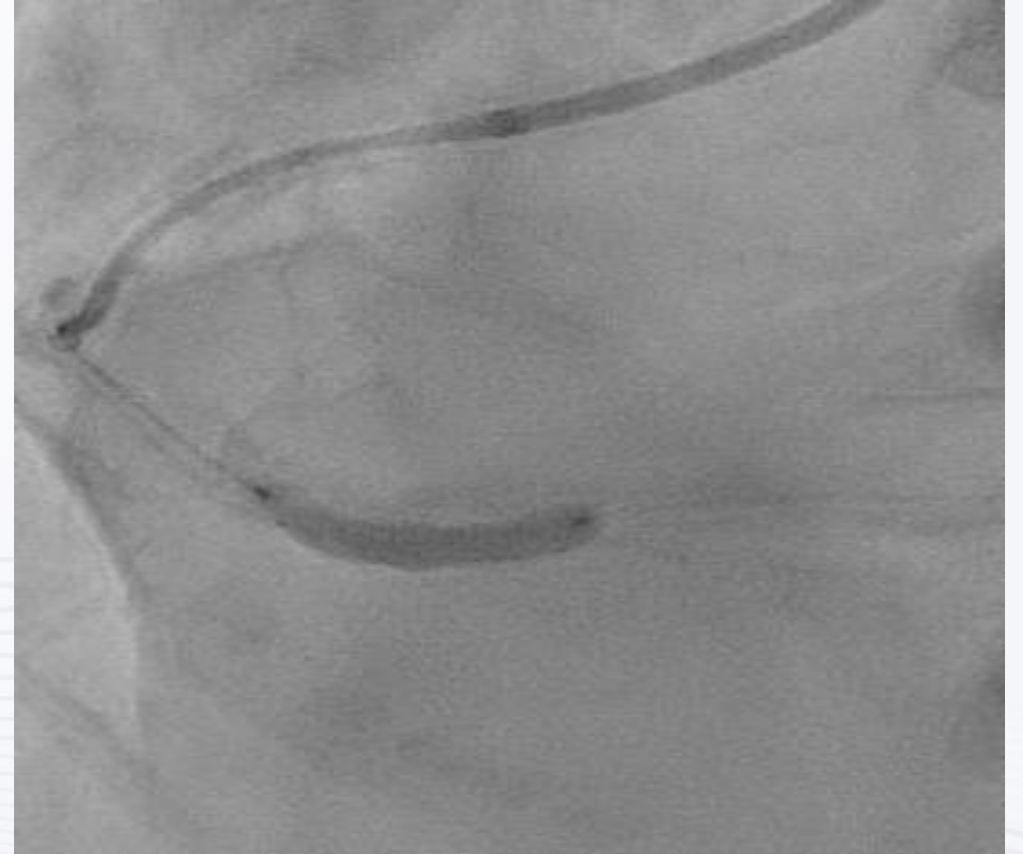


Scoring Balloon 2.5*13 4회



Scoring Balloon 2.5*13 3회

PCI STENT



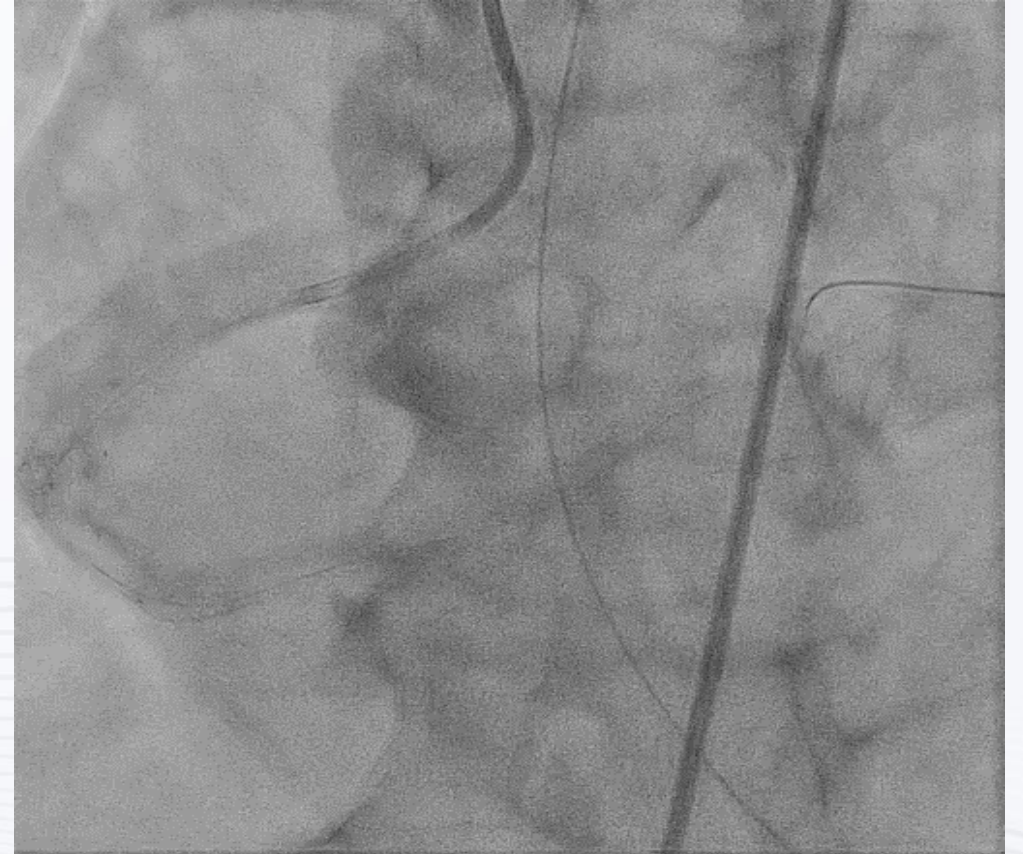
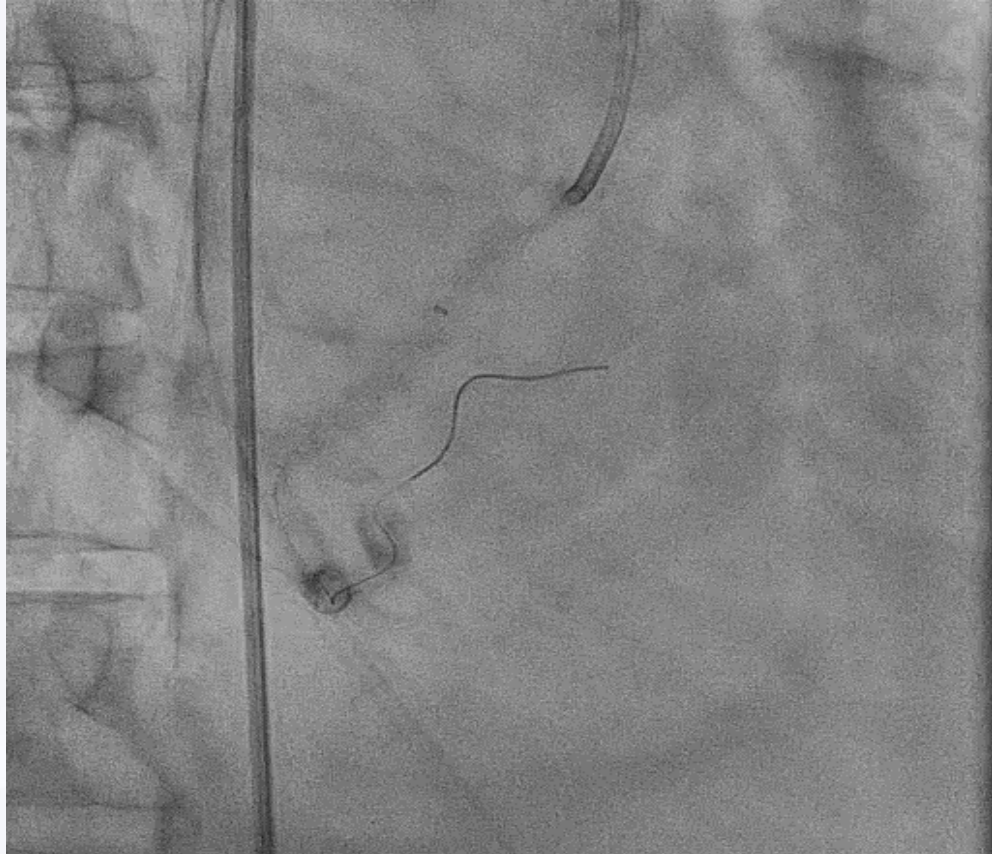
CRE 8 EVO 3.5*16

PCI STENT



CRE 8 EVO 3.5*16

FINAL



Conclusion

1) Widen Lumen

- Balloon : Non Complaint > Scoring Balloon
(Several Times & High Pressure)
- Rotablator

2) Increase Stent Delivery

- Change Approach : Radial to Femoral
- Guiding Catheter : Bigger French , Inner Guiding Catheter
Deep Engagement , Amplatz / CHAMP
- Supportable 0.14 Wire : GRANDSLAM , Buddy Wire Technique

Discussion Points

- How we overcome this **Far distal calcified lesion**?
- Should we use **IVUS or OCT** during the procedure on severe calcified lesions?
- Is there any Idea to overcome severe calcification in any other hospital?