Unyielding Severely Calcified Undilatable Lesion After Rotablation & Orbital Atherectomy, What Next ?

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History

- 64 YRS/M
- CVRF: DM, HTN, Dyslipidaemia
- ESRD on maintenance haemodialysis (2016) awaiting Renal transplant
- CAD-CSA, Normal LV function, DVD, S/P PCI 3xDES –mRCA (23/7/2018)
  MIBI Scan: Mild to moderate ischemia in distal to basal inferior wall
  S/P PCI 1xDES-mRCA(10/10/2018)
  NSTEMI-DVD, mild LV dysfunction, S/ P PCI 1xDES to proxRCA (23/4/19)
  FFR –mid LAD was 0.74 (23/4/19)

  Plan: Staged PCI to LAD with Rotablation

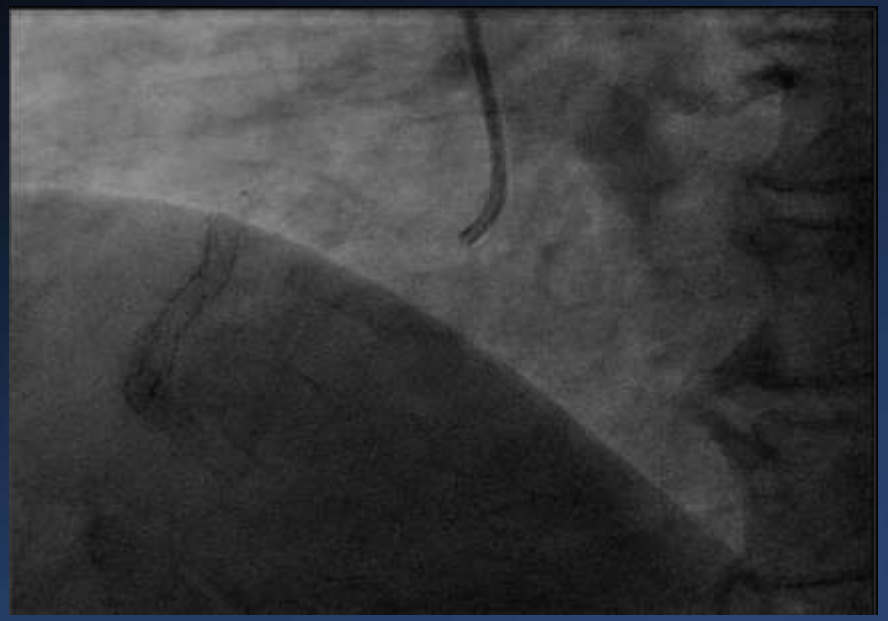
Baseline Investigations

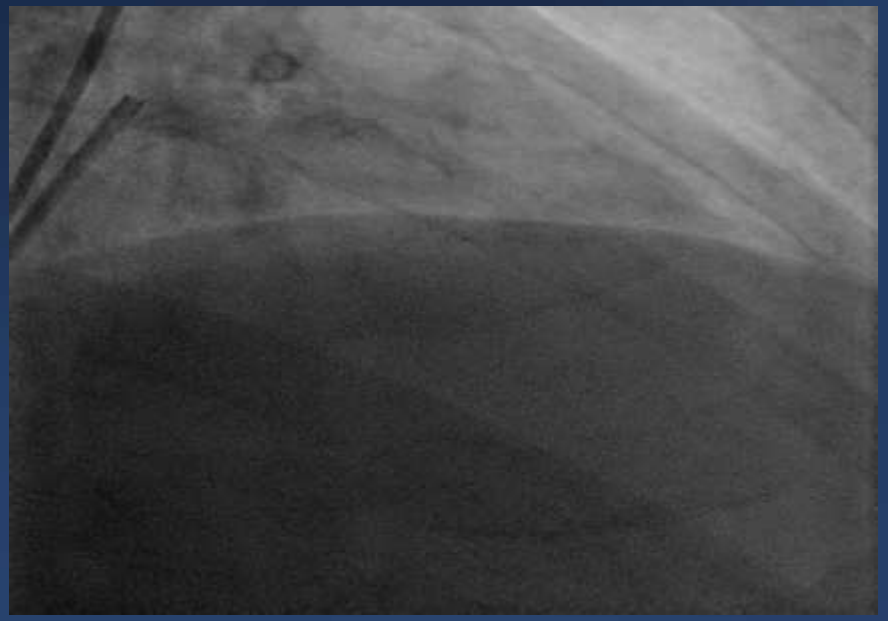
- HB-10.4 gm%
- Platelets-173000
- S. Creatinine- 524 umol/l
- Na- 138 mmol/l
- K- 4.4 mmol/l

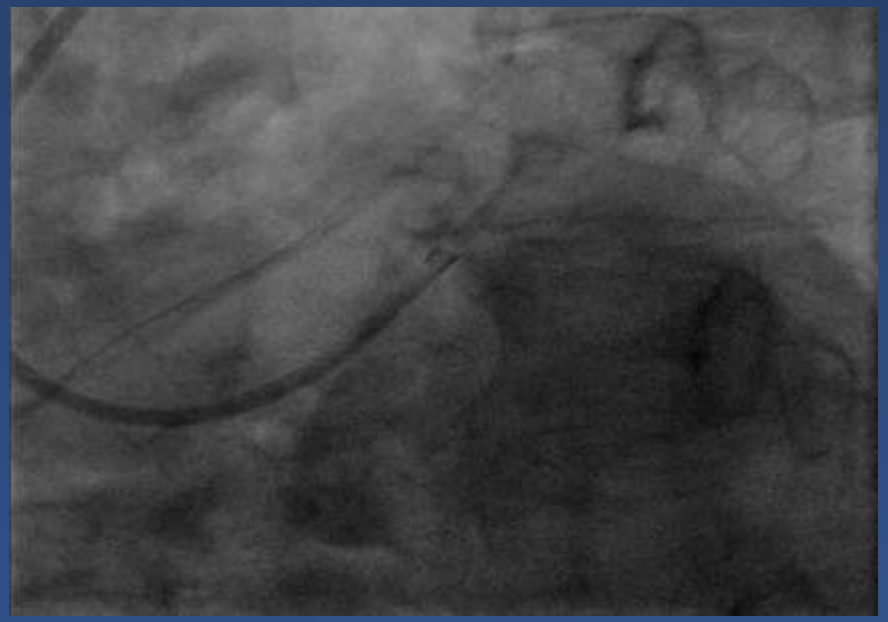
- ECG: SR, No ST-T changes

- Echo:
  LVEF-50%
  RWMA seen in Basal inferior, basal anteroseptal
  Grade 1 LVDD, Normal valves, Trivial MR & TR
  PASP-13mmhg

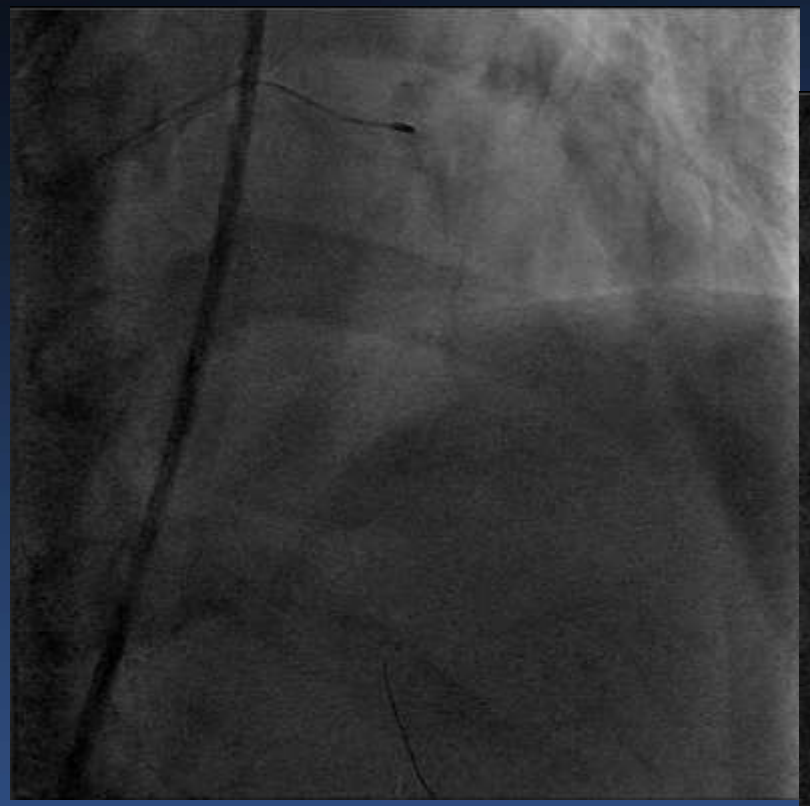
Baseline CAG



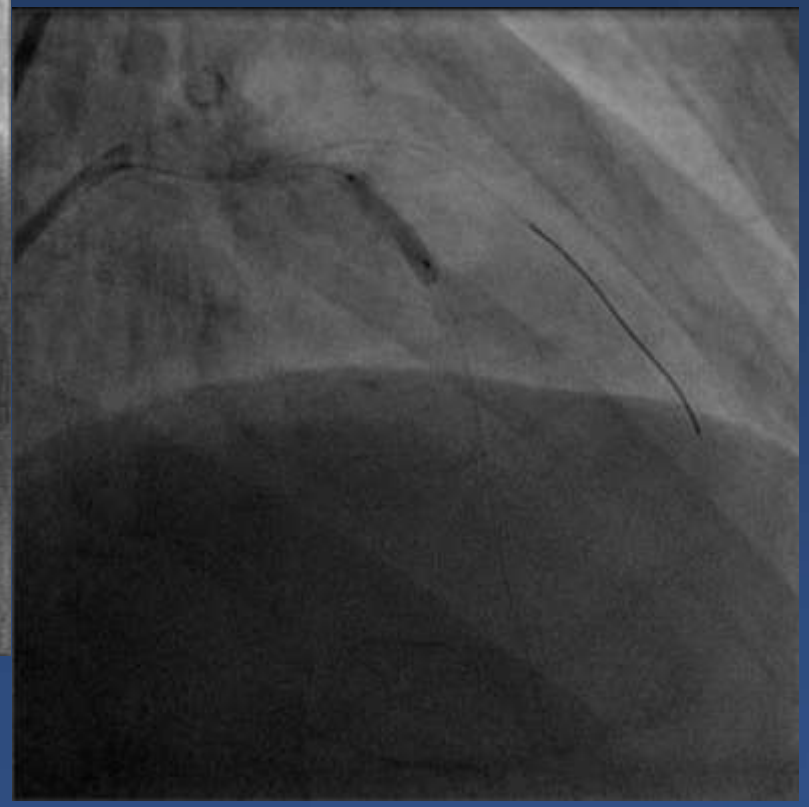




Rotablation with 1.25 mm Burr



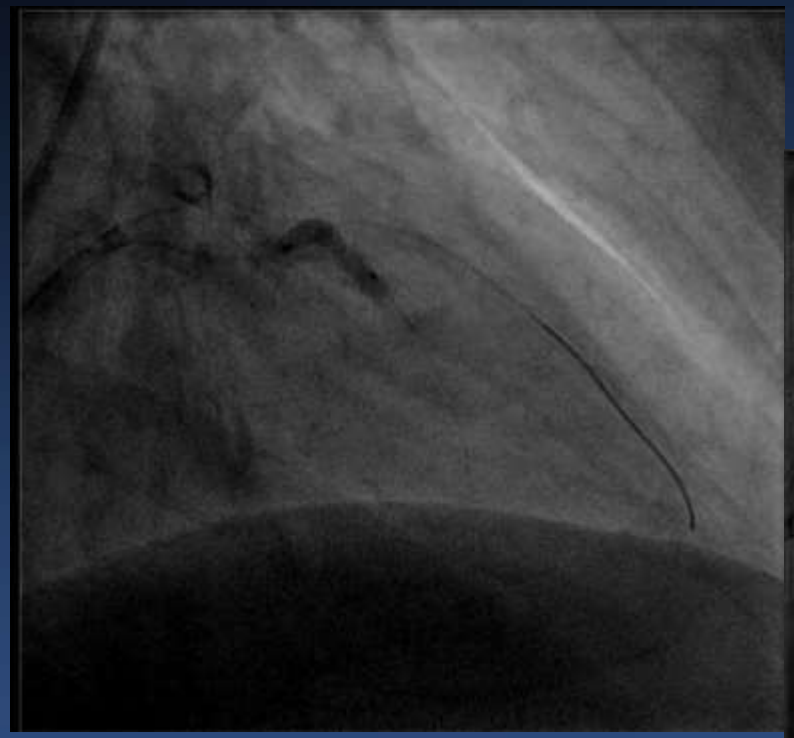
PREDILATION



Guide: XB-3.5 7 Fr
Rota wire extra support 330cm
150k RPM

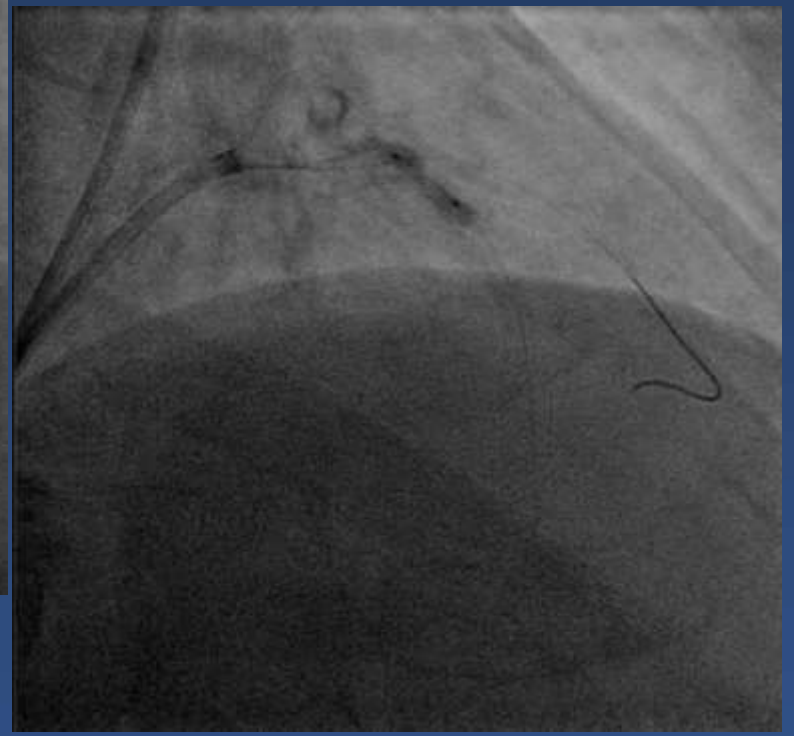
3x15mm SC Balloon@ 18 atm

Scoring Balloons



Dog bone effect

Angiosculpt 3x10mm balloon
@ 20 atm

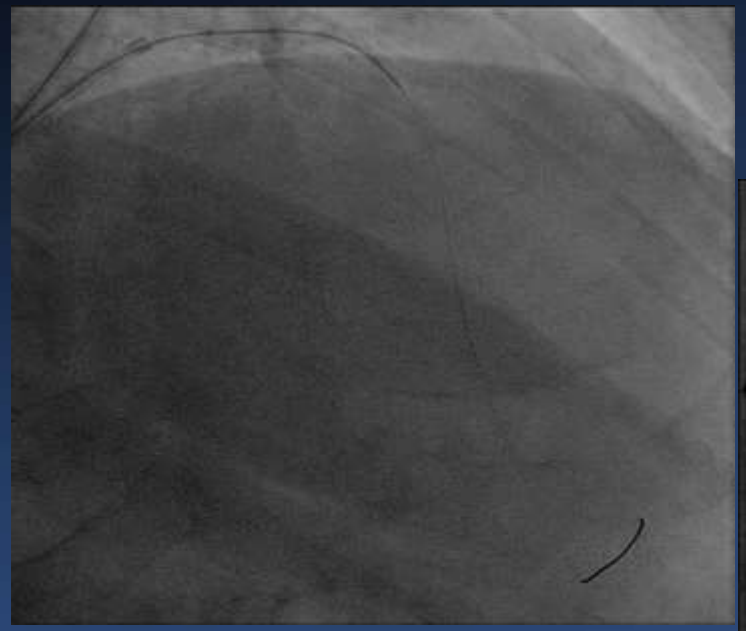


NC Scoreflex 3.0x10mm
@ 20 atm

Undilatable Calcified Lesion-Options?

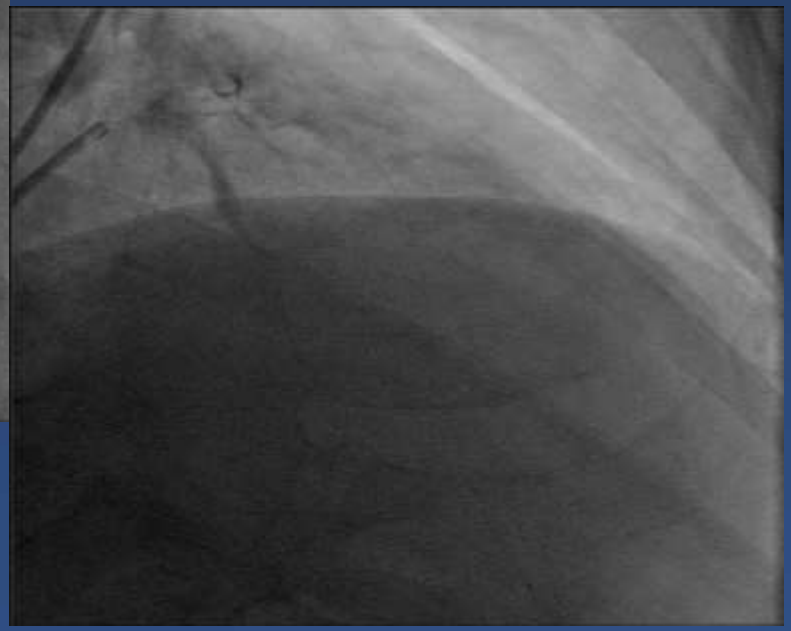
- ? Upsize Burr to 1.5mm
- ? Orbital Atherectomy System(OAS)
- ? Intravascular Lithotripsy
- ? Super high pressure balloons

OAS – Diamondback 360



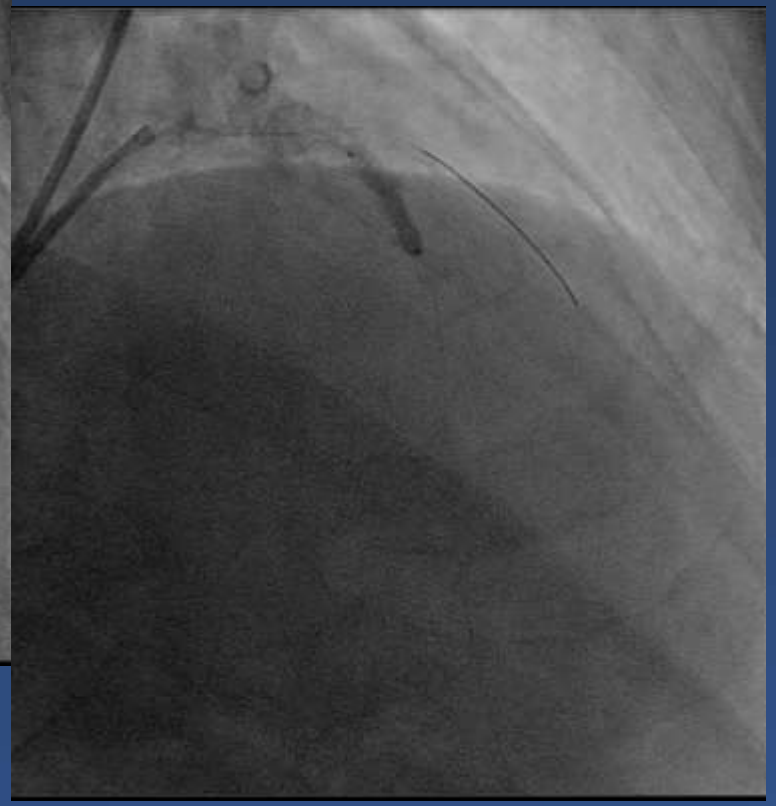
Viper wire 0.012” 325 cm

1.25 mm coronary classic crown @ 80k & 120k RPM



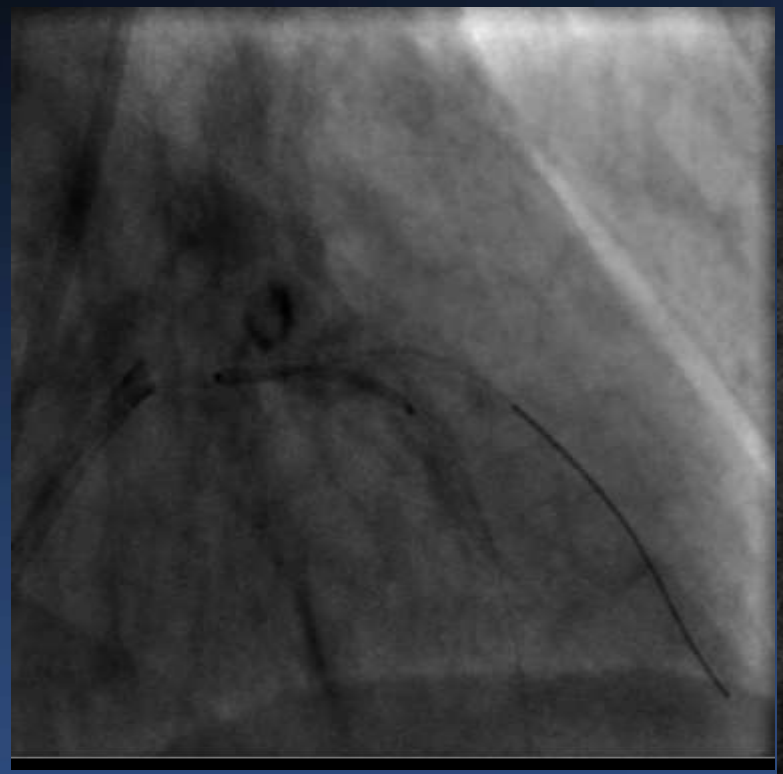
Stent Deployment

3x8 mm Lacrosse Balloon @ 20 atm

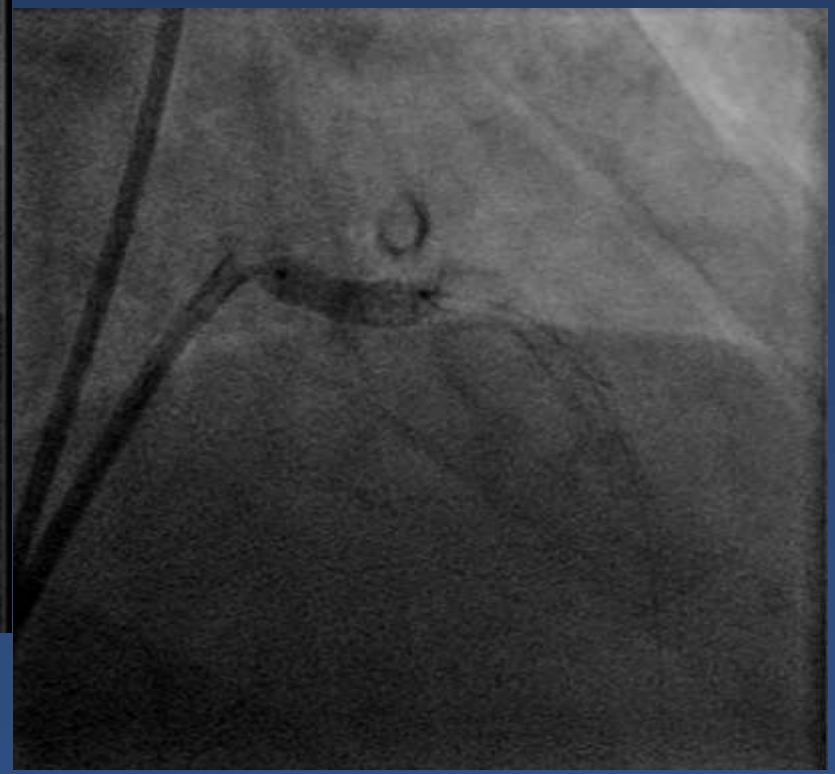


DES 3.0x16mm @ 16 atm

Stent Deployment

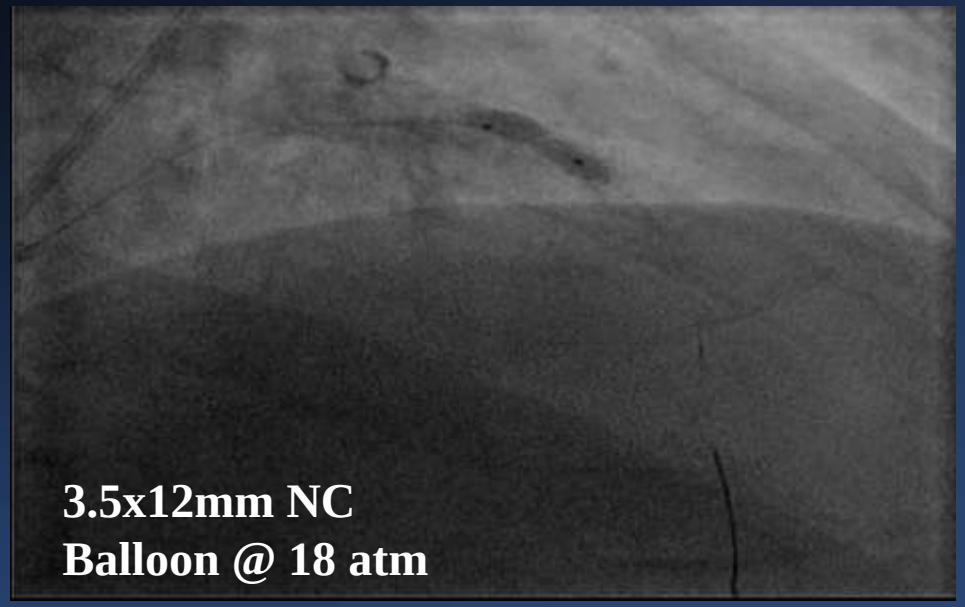


DES 3x20mm @18atm

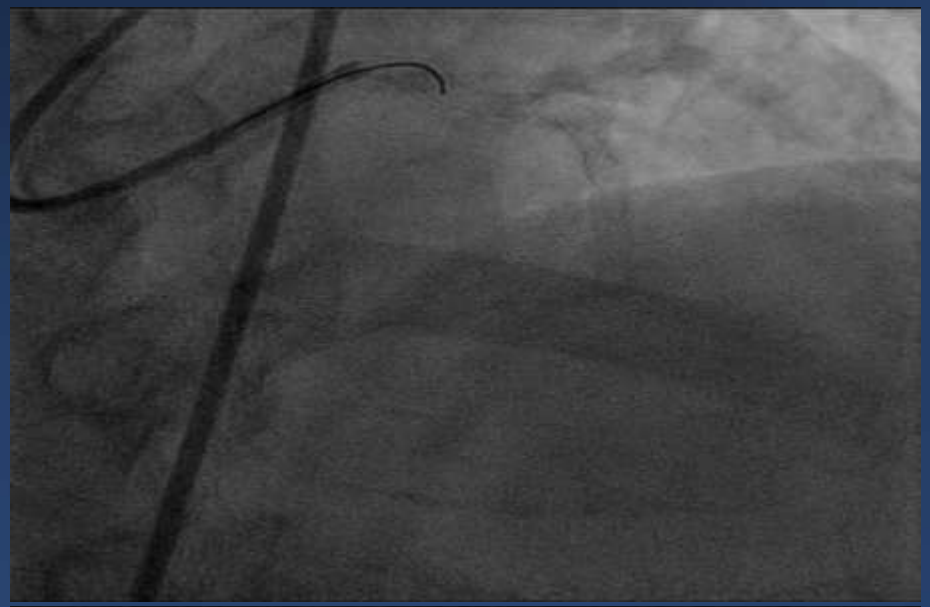


DES 3.5x12mm @ 12 atm

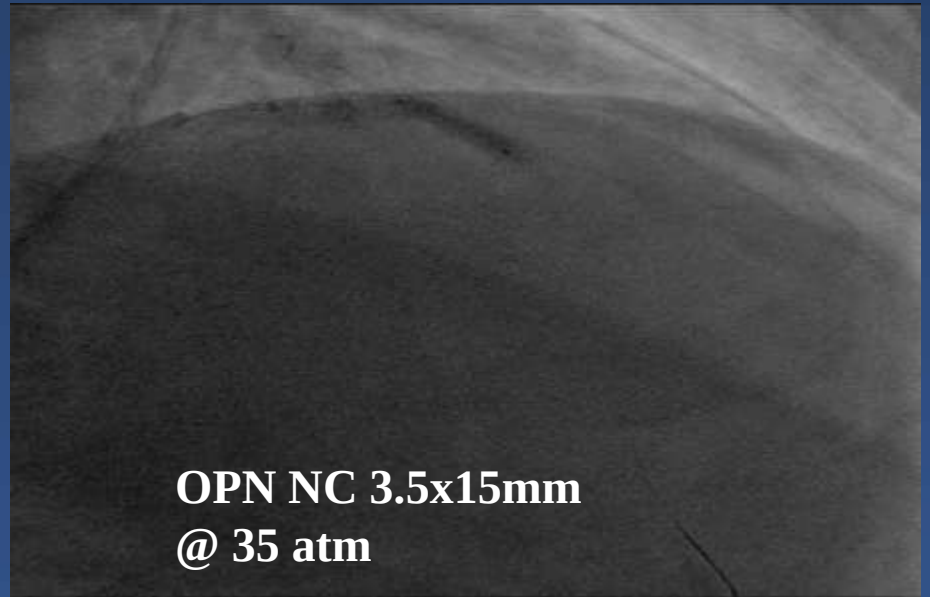
Super High Pressure Balloon Dilatation



3.5x12mm NC
Balloon @ 18 atm

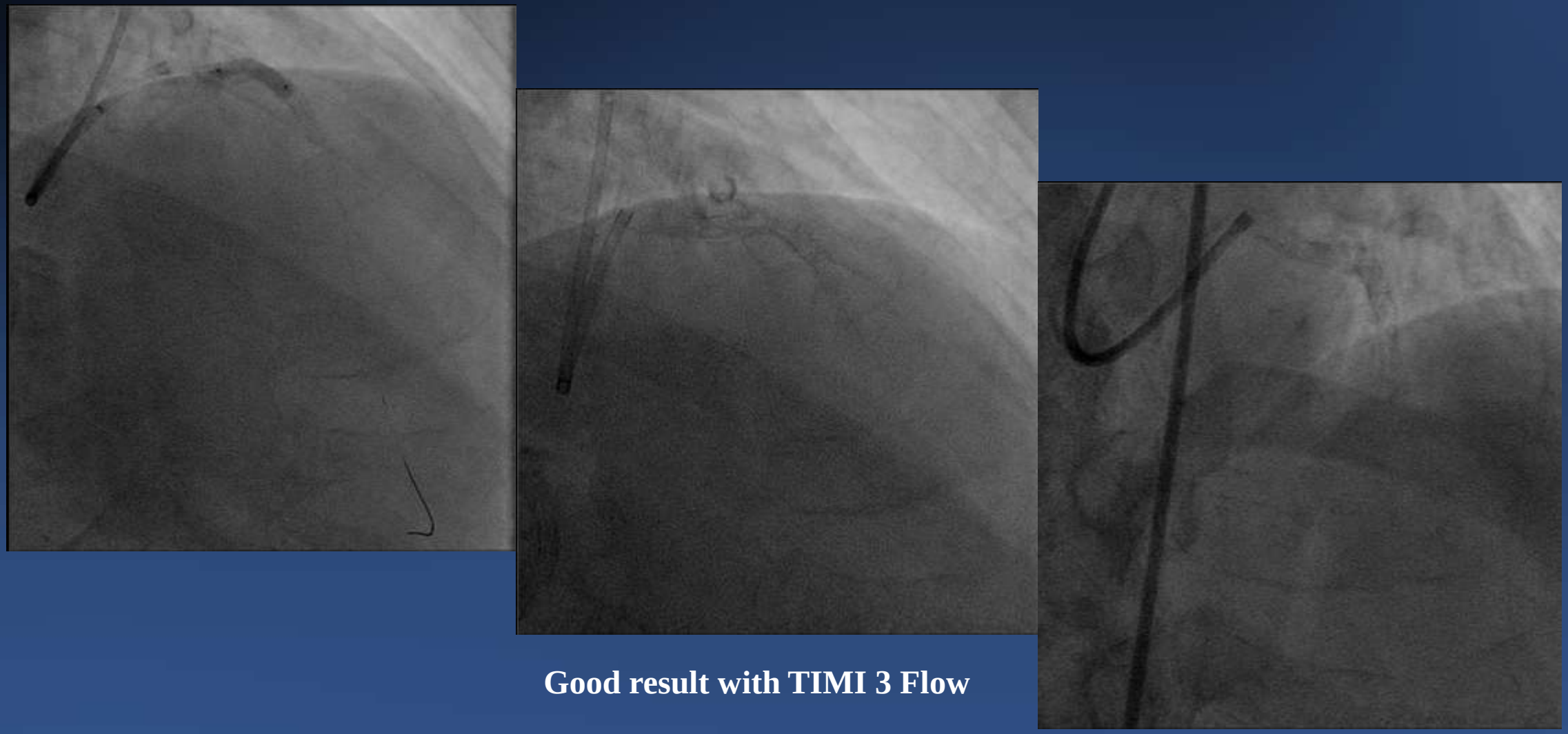


Guideliner 6Fr
3.5x10mm NC Balloon



OPN NC 3.5x15mm
@ 35 atm

Final Result

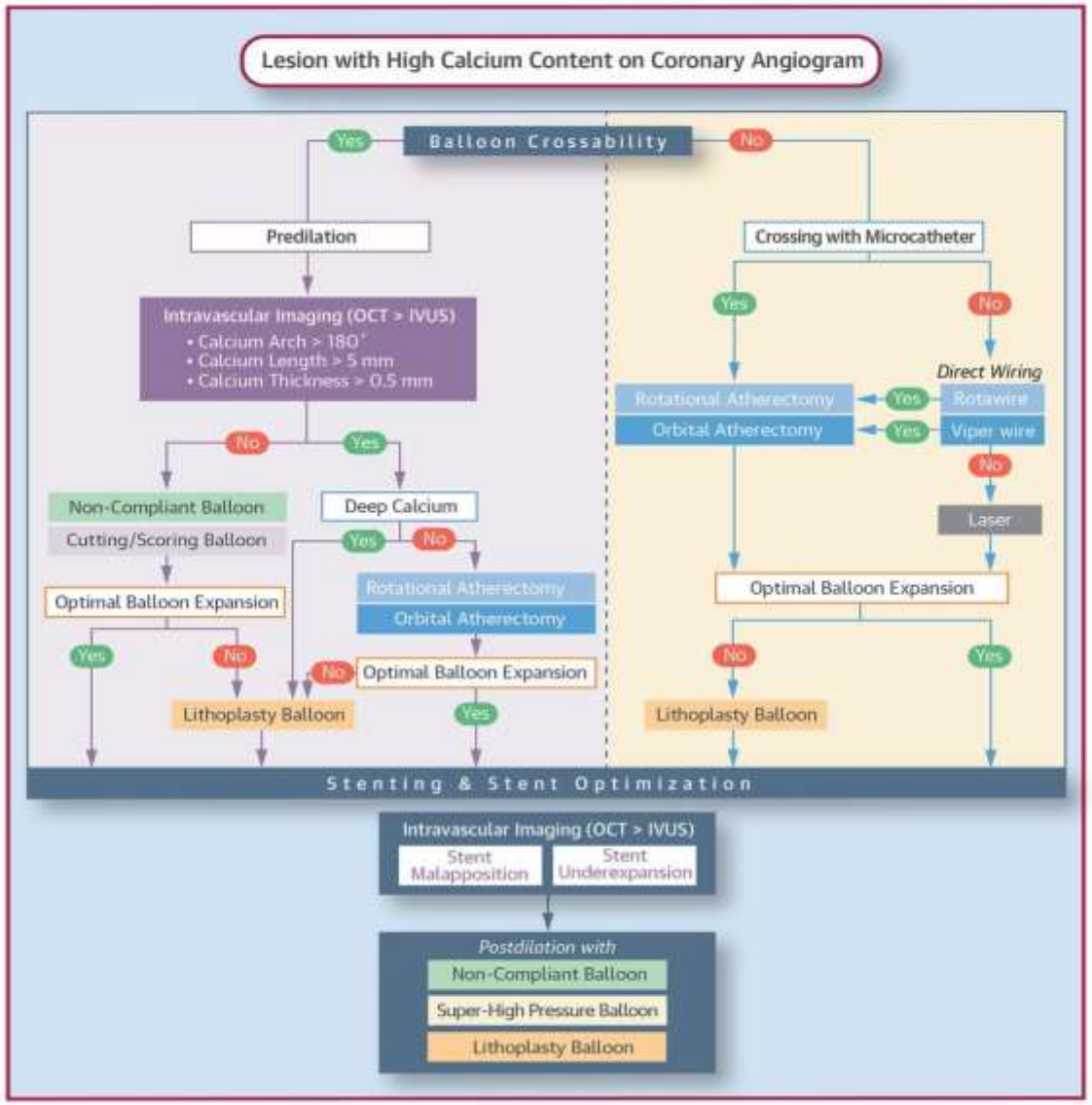


Good result with TIMI 3 Flow

Issues With Calcified Lesion

- Inadequate lesion preparation
- Difficult to deliver balloon / stent
- Damage to polymer of DES
- Stent under-expansion
  - ➢ stent thrombosis
  - ➢ in-stent restenosis , TLR, TVR
  - ➢ MACE
- ↑ Procedural complication – perforation; no reflow; dissection
- Overall ↑ clinical and procedural risks

CENTRAL ILLUSTRATION: Algorithm for Optimal Management of Coronary Calcified Lesions



De Maria, G.L. et al. J Am Coll Cardiol Intv. 2019;12(15):1465–78.

Discussion points

- Should we have used higher Burr size for Rotablation ?
- Upfront Super high pressure balloon ?
- Shock Wave balloon with imaging guidance ?

Conclusion

- Use debulking Strategy with Rotational Atherectomy, Orbital Atherectomy system & occasionally LASER for plaque modification in severely calcified stenotic lesions that are un-dilatable or non crossable
- Cutting & Scoring balloons can be used as a adjunctive therapy for plaque modification in fibrotic & mild-moderate calcific lesions
- OPN NC balloons can be used for predilating unyielding lesions, stent optimisation in unexpanded stents & ISR
- IVUS & OCT should be used to identify moderate to severe calcification to guide management
- Intravascular Lithotripsy is a newer technology in treating specific calcified lesions