CTO revascularization with multiple adjunctive plaque modification devices

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Case presentation

Patient History

- 61-year-old male
- Former smoker

Co-morbidities

- Hypertension
- Hyperlipidaemia
- Type 2 Diabetes Mellitus
- Chronic renal disease on haemodialysis (Stage 5)
- Obesity

Ischaemic heart disease

- 2015: Severe 3 vessel disease; CABG (*left internal mammary artery to mid left anterior descending artery and saphenous vein graft to posterior descending artery).*

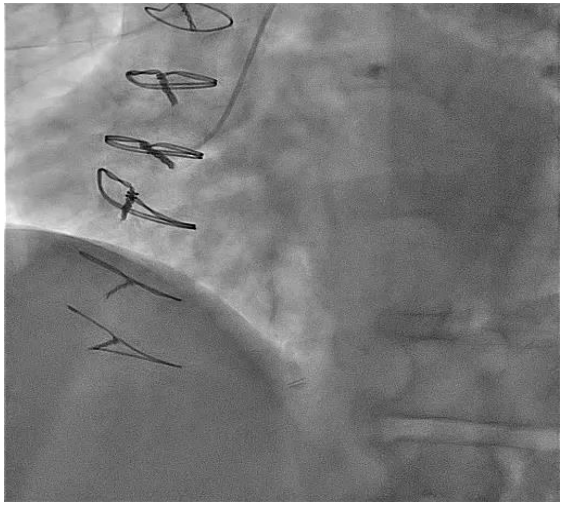
Clinical presentation

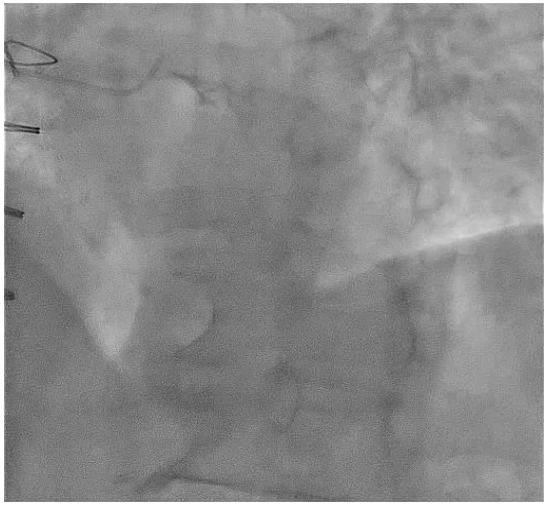
- Mild effort and progressive angina (1 year).
- ECG: Sinus rhythm with left bundle branch block.

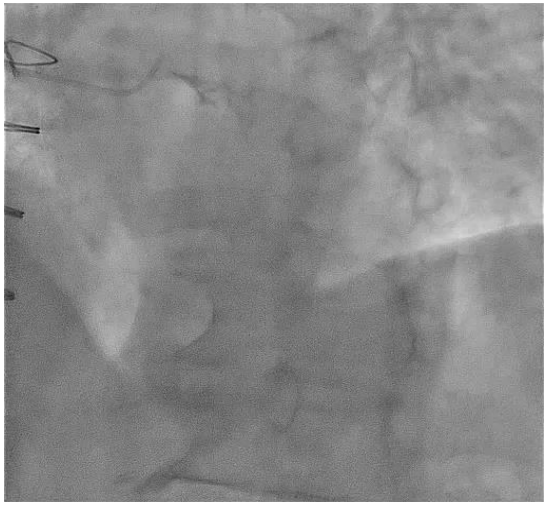
Cardiac non-invasive studies

- Nuclear myocardial perfusion stress test: 25% anterior defect with viability.
- TTE: mild left ventricle dilation with preserved ejection fraction and type II diastolic dysfunction.

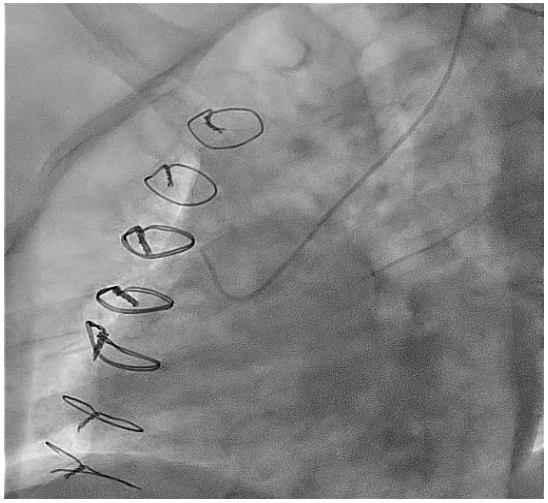
Coronary angiogram

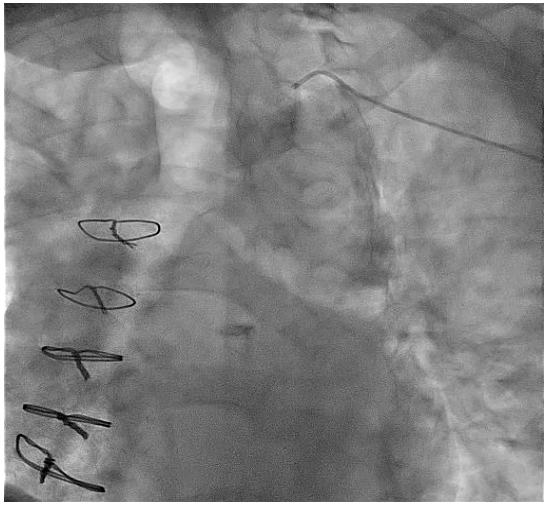






1. **CTO of proximal right coronary artery**
2. **Long and severely calcified mid left anterior descending artery CTO (Collateral Rentrop grade 3 flow)**
3. **CTO of proximal circumflex artery**
4. **Saphenous graft to posterior descendant artery occluded**
5. **Left internal mammary artery graft dysfunction**

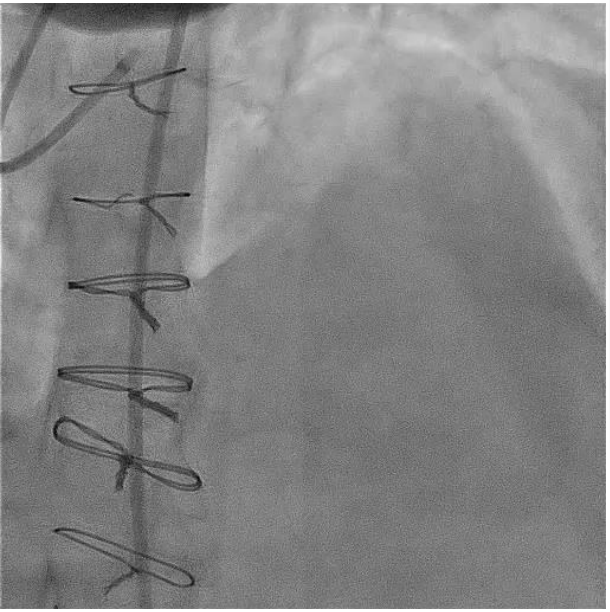


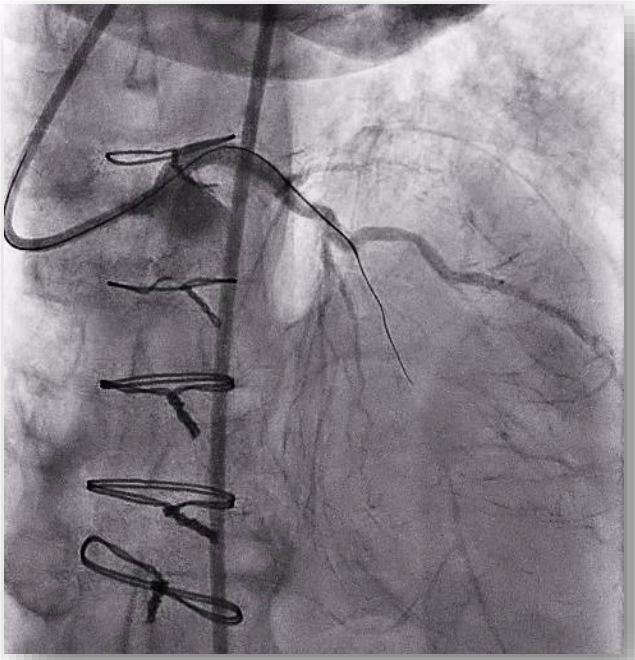


Procedure - antegrade approach

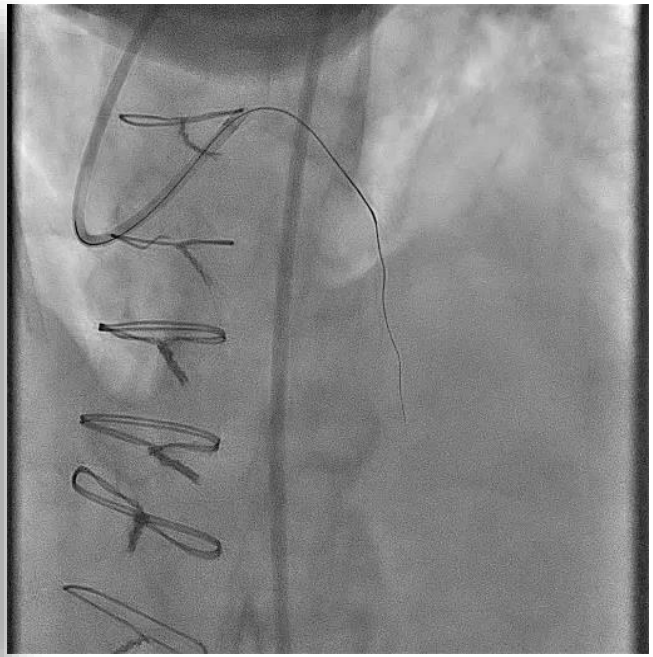
J-CTO Score = 3 (Very difficult)

1. Transfemoral approach
2. 8 Fr. XB 4.0 guiding catheter





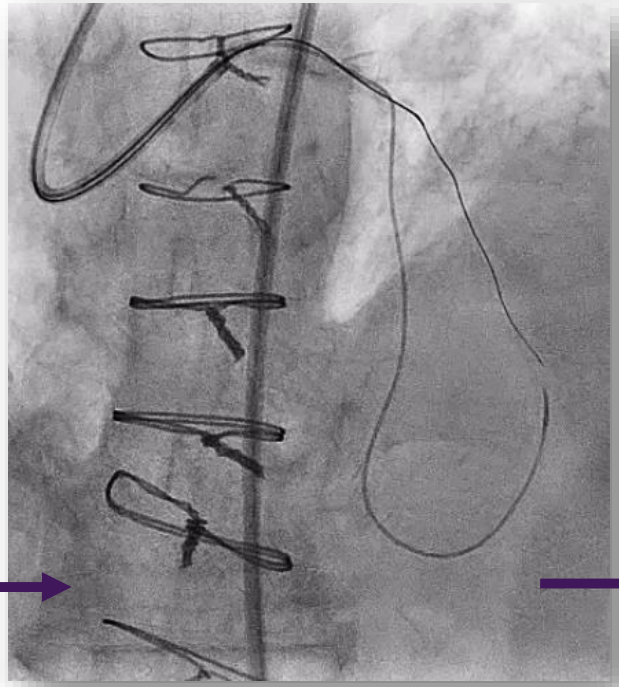
Caravel **microcatheter**
Fielder XTA **wire crossing to mid segment**



Wire interchange to *Gaia Third*
Unsuccessful distal recanalization

Switch to retrograde approach

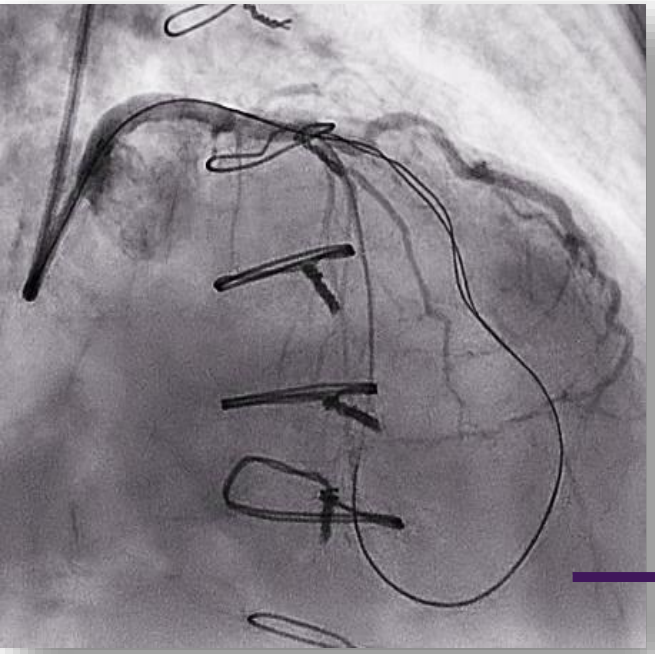
- ***SUOH 3*** **wiring of septal branch for collateral retrograde approach of distal cap**



- ***Corsair Pro*** **microcatheter progression to left anterior descending artery**

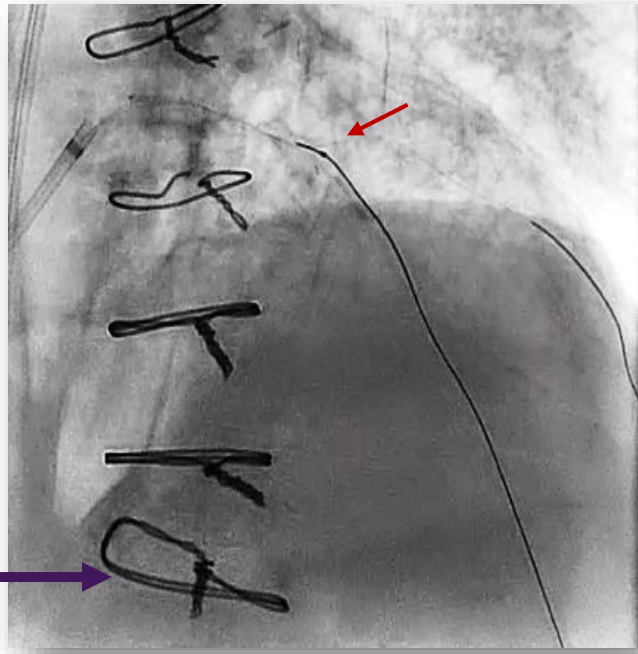
- ***Gaia Second*** **wire interchange**
- **Direct retrograde distal true lumen puncture**

Distal cap crossing



- Retrograde crossing of ***Gaia Second wire***

- Finally, antegrade distal cap crossing with ***Sion 3*** wire

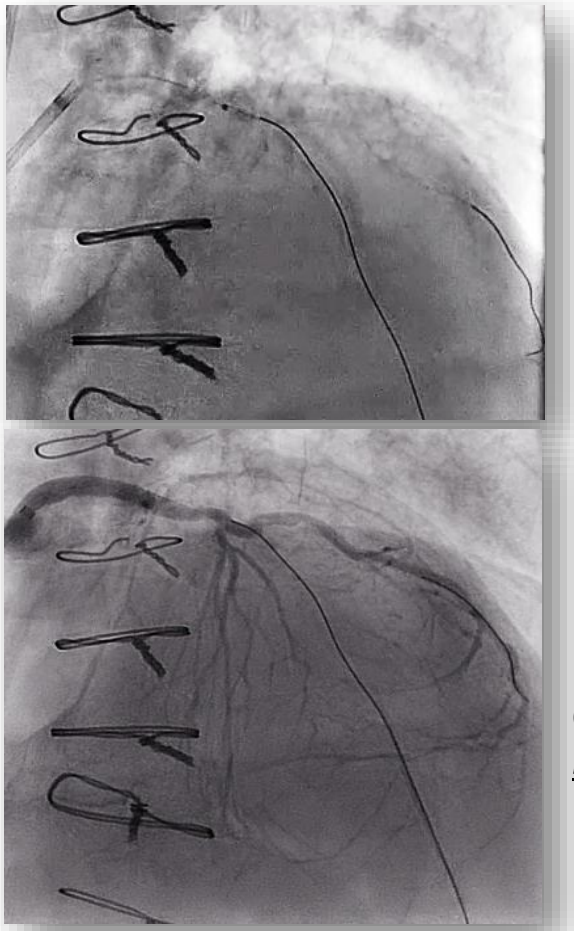


- Unsuccessful crossing of proximal severely calcified lesion with low profile balloon 1.0 X 10 mm nor microcatheter

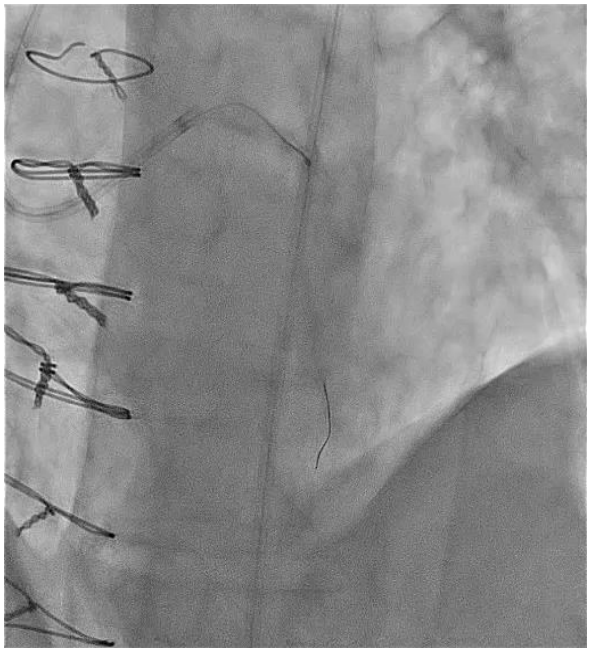
Plaque modification technique for severely calcified lesion

Excimer laser atherectomy
- 0.9 mm catheter
(80 mJ/mm² and 80 Hz)

Unsuccessful crossing of low profile balloon or microcatheter, in spite of *GuideLiner catheter*



Switch to rotational atherectomy technique

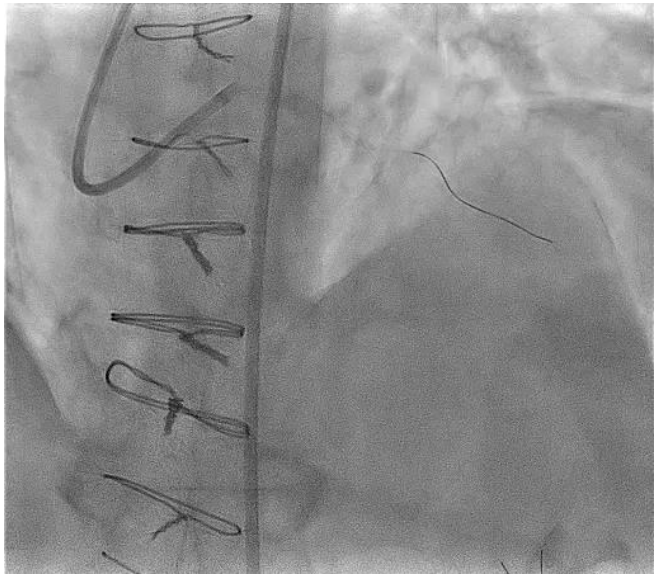


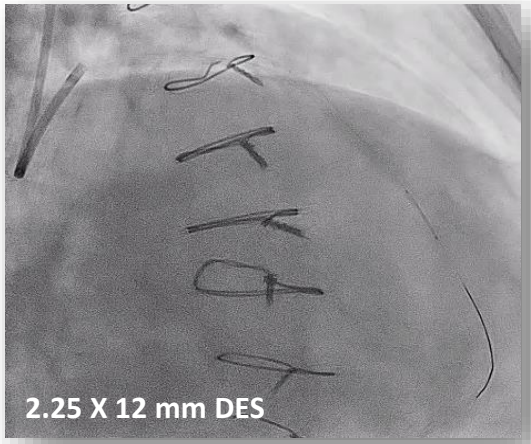
Caravel microcatheter placement in the proximal cap and *RotaWire* was placed distally with great difficulty

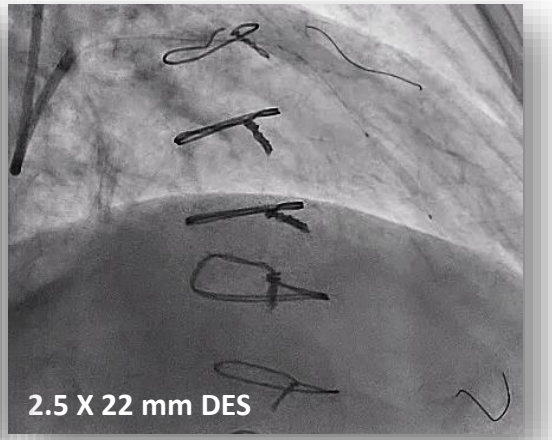
Rotational coronary atherectomy with 1.25 mm burr – *RotaPro System*

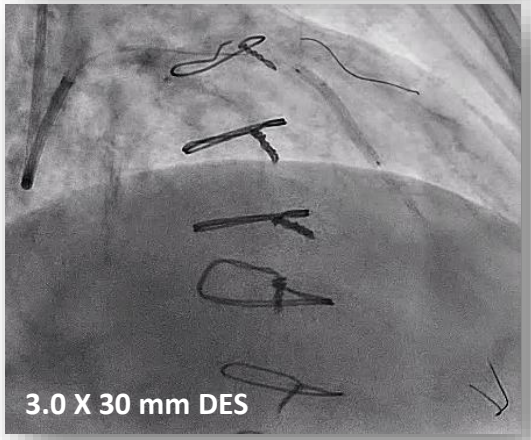
Left anterior descending artery PCI and stenting

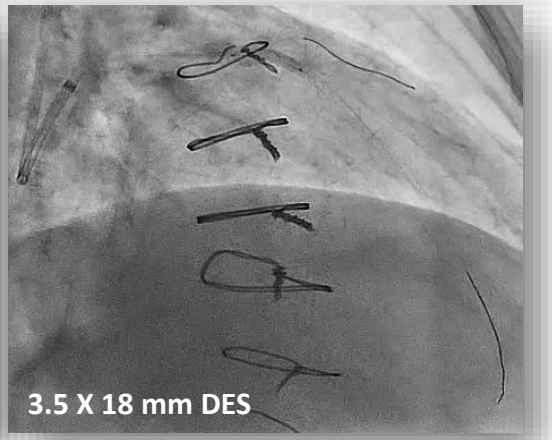
Lesion predilation with:
- **2.0 X 10 mm non-compliant balloon**
- **2.5 X 10 mm non-compliant balloon**
- **Angiosculpt 2.5 X 15 mm (proximal segment)**





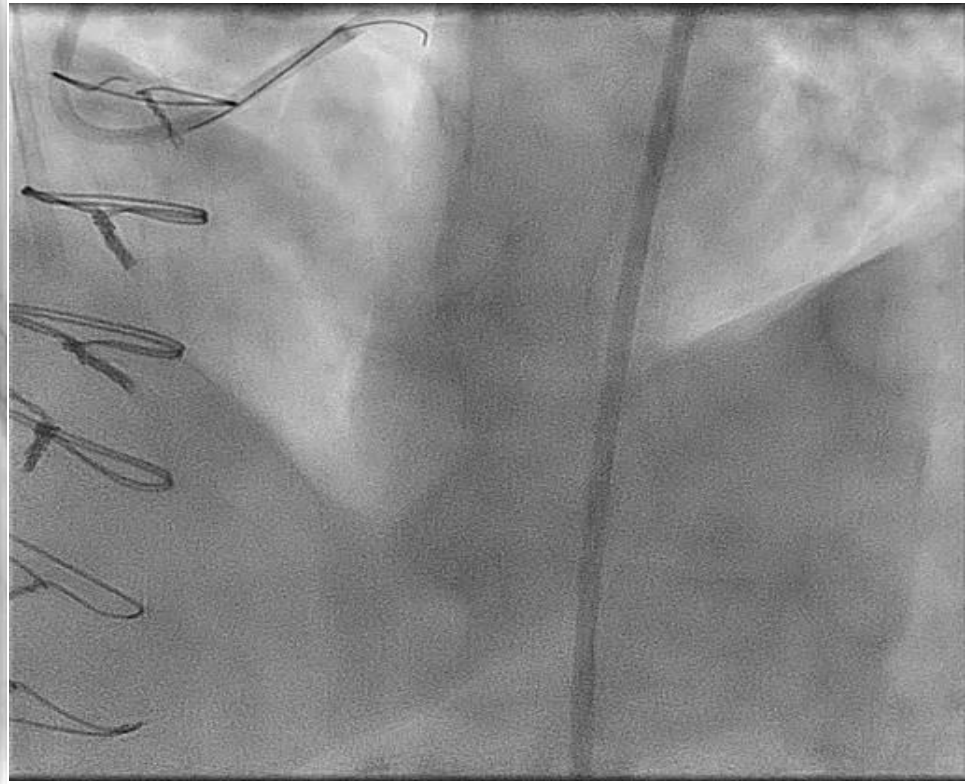






Final result

No complications



TIMI 3 flow restoration

Take home message

- ***In CTO revascularization of long and calcified lesions, both antegrade and retrograde approach are sometimes needed.***

- ***Excimer laser coronary atherectomy may be useful in balloon-uncrossable lesions, with important limitations in long and calcified CTO.***

- ***Rotational atherectomy with a small burr may be the only solution for a complex CTO PCI in the setting of balloon-uncrossable lesions if the RotaWire is successfully placed distally, assuming the increased risk of subintimal tracking atherectomy.***