Friend or Faux ?

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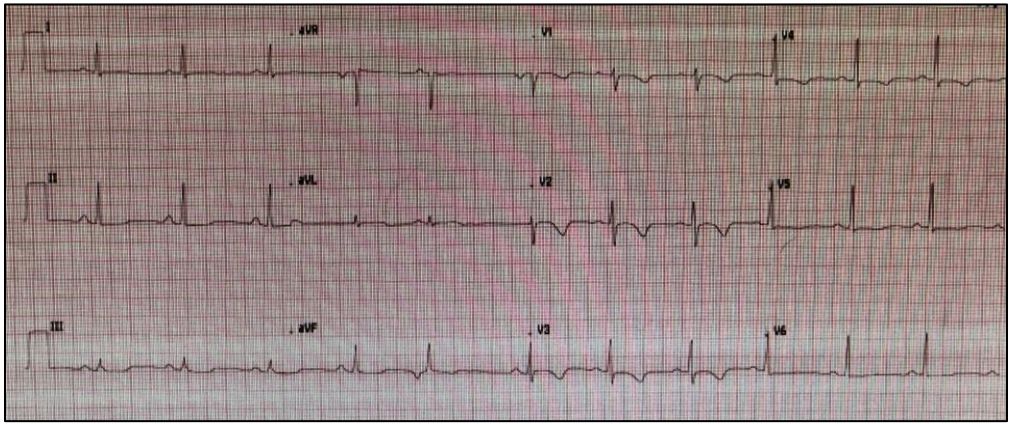
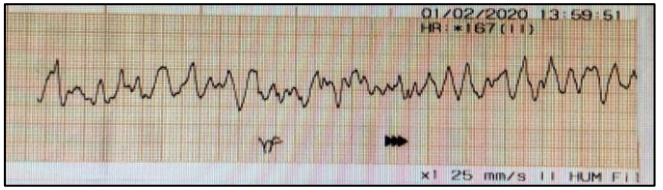
Brief history

- 40 year-old-woman with dyslipidemia (untreated)
- 2 months ago: Presented to a private hospital with angina at rest off and on for 1 week
- ECG: Wellens' T wave inversion (TWI V1-V4)

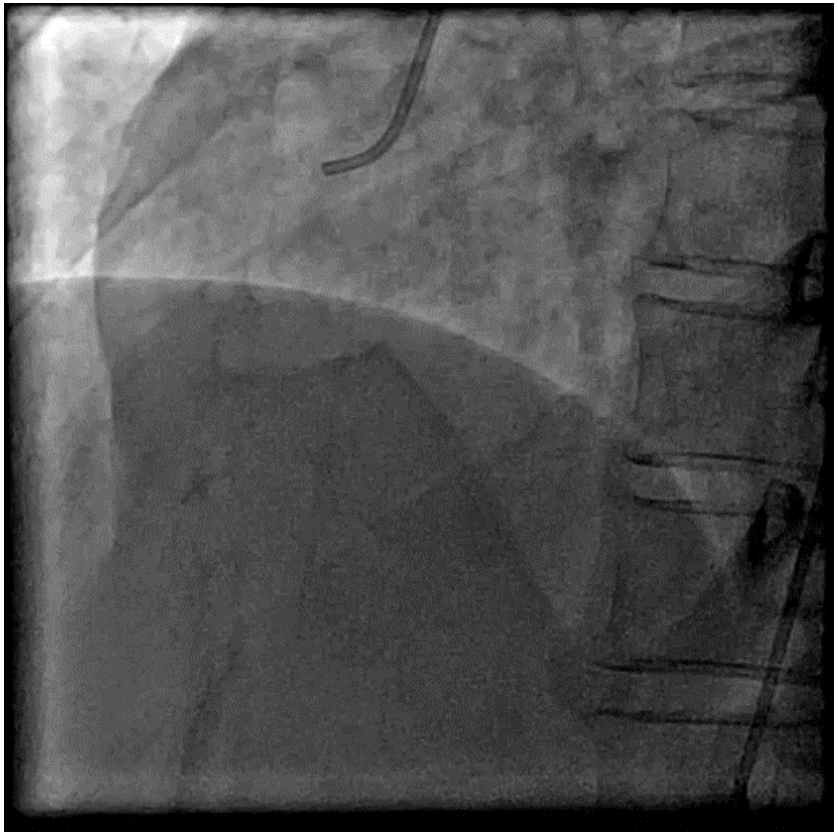


- Echo: EF 50%, hypokinesia of anterior wall mid to apical level
- Cardiac arrest (VF) during echo

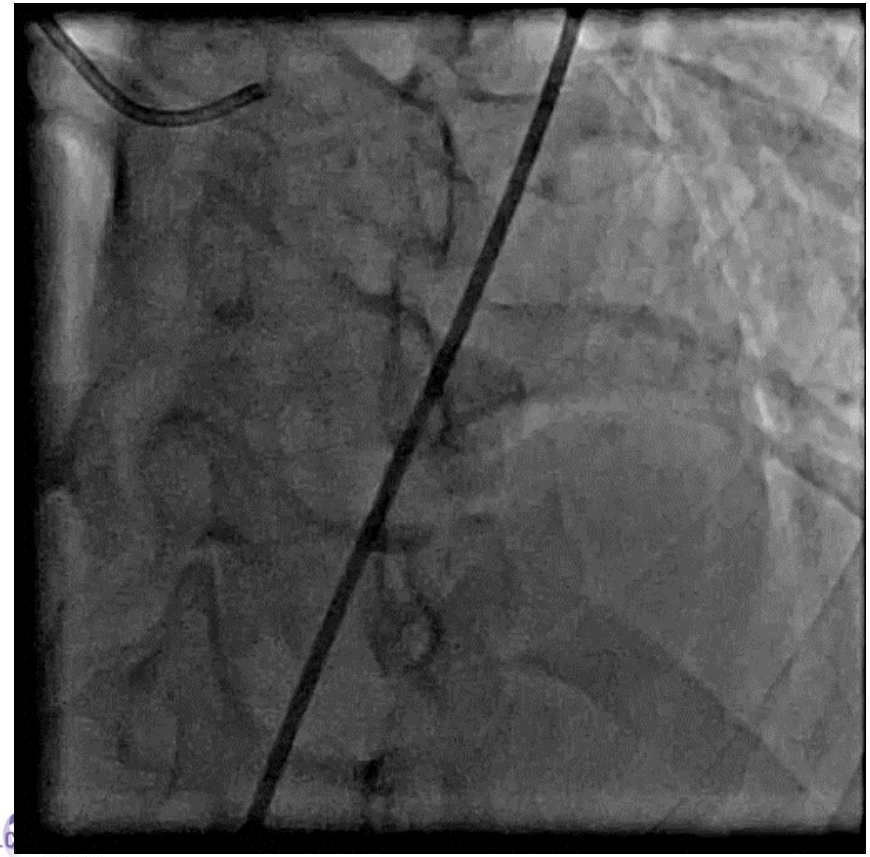


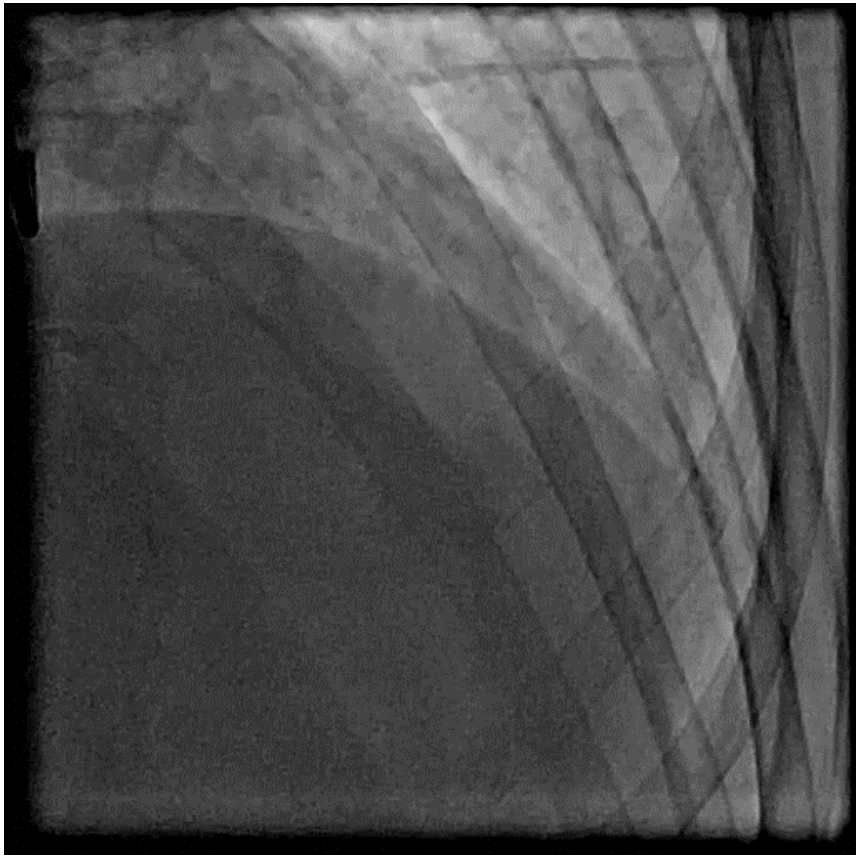
- CPR 3 min, Defibrillation x 1

Emergency angiography in another hospital

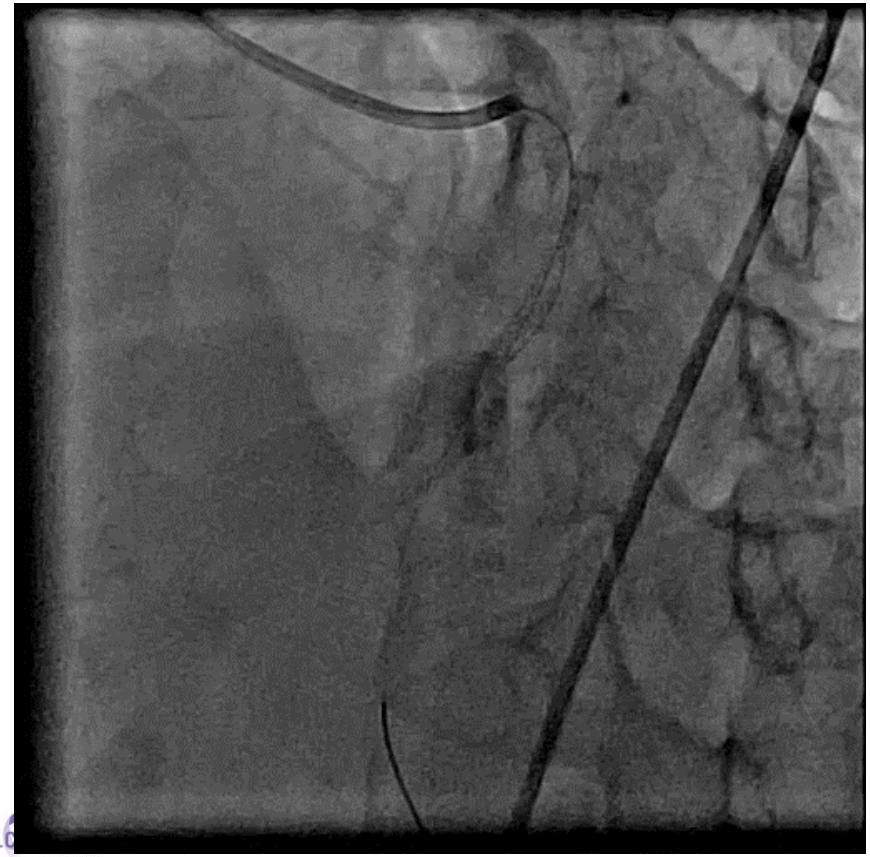


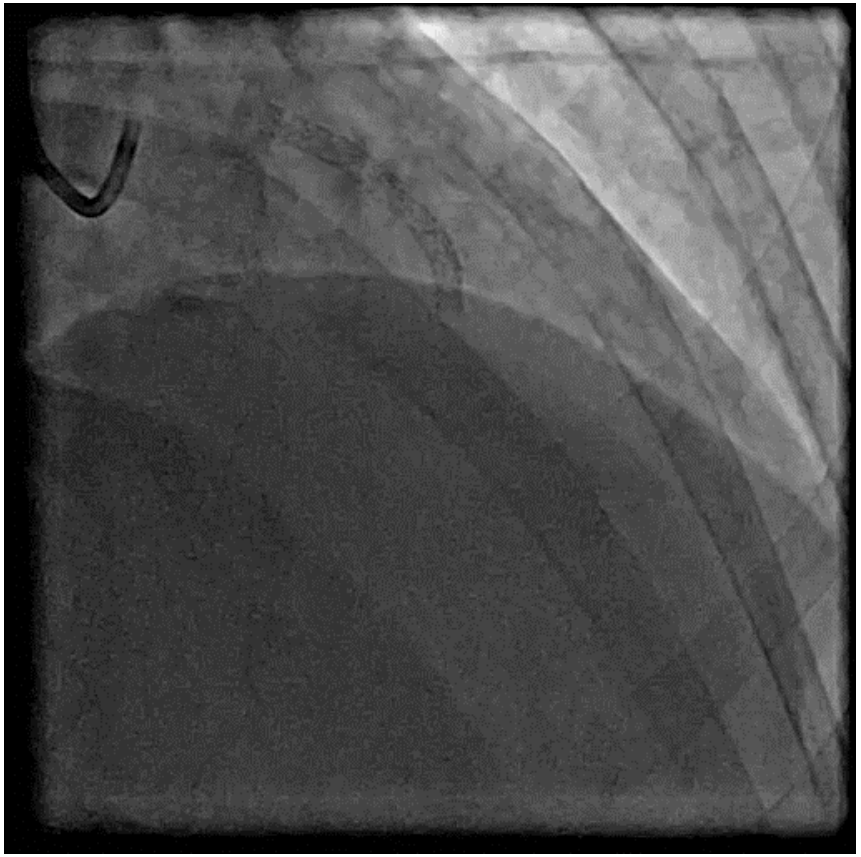
Emergency angiography





3.5x33 mm DES at mid LAD



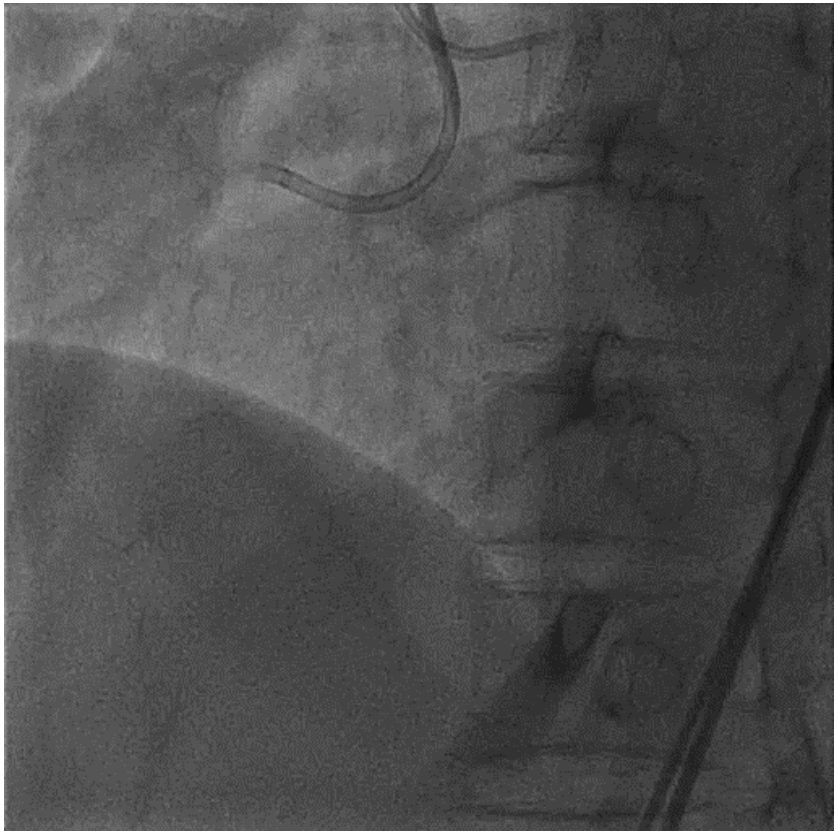


Post PCI

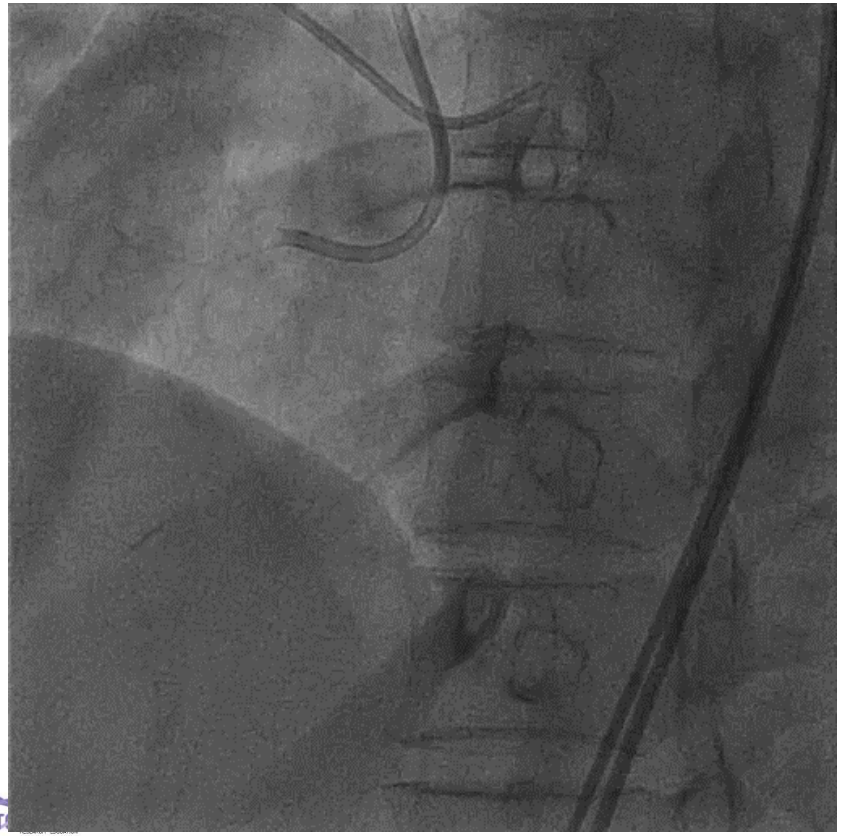
- No chest pain (still limited activity)
- Echo: LVEF 60%, trivial MR, RVSP 35 mmHg
- Total CHOL 481, LDL 363
- Medication: ASA (81) 1x1, Ticagrelor (90) 1x2, Metoprolol (100) 0.5x2, Atorvastatin (40) 1x1, Folic 1x1

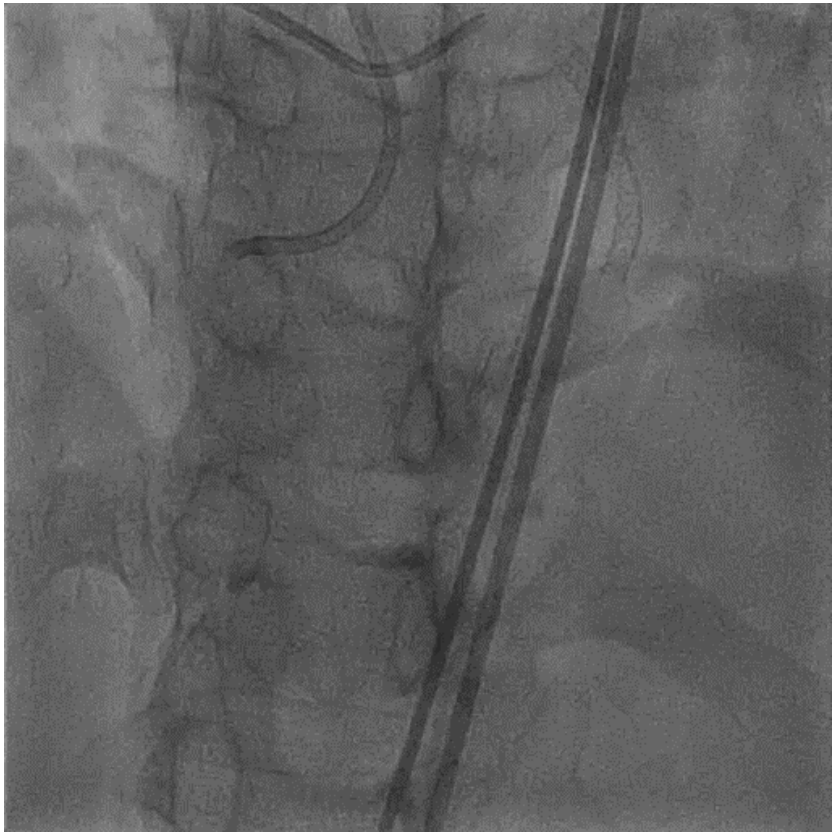
- Refer to my center for PCI to CTO mid RCA

Bilateral femoral access
6F SAL1 SH, 6F EBU 3.5

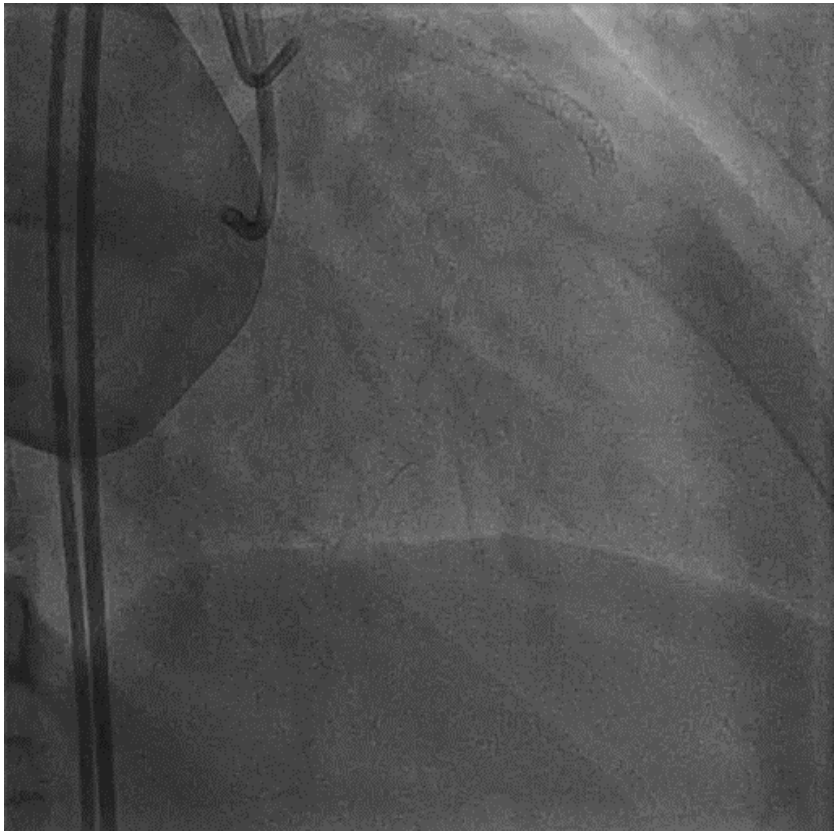


Dual injection

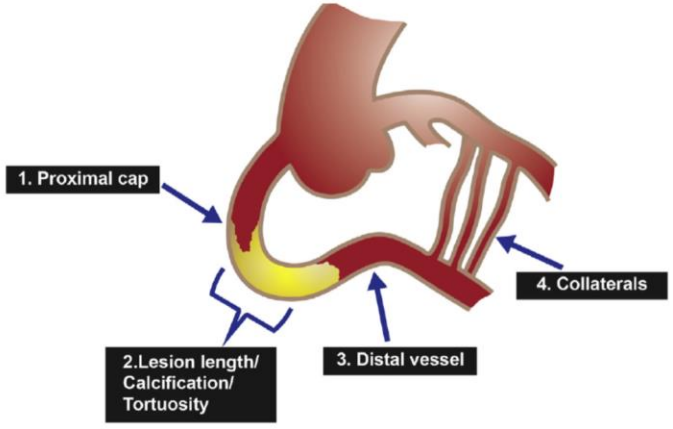


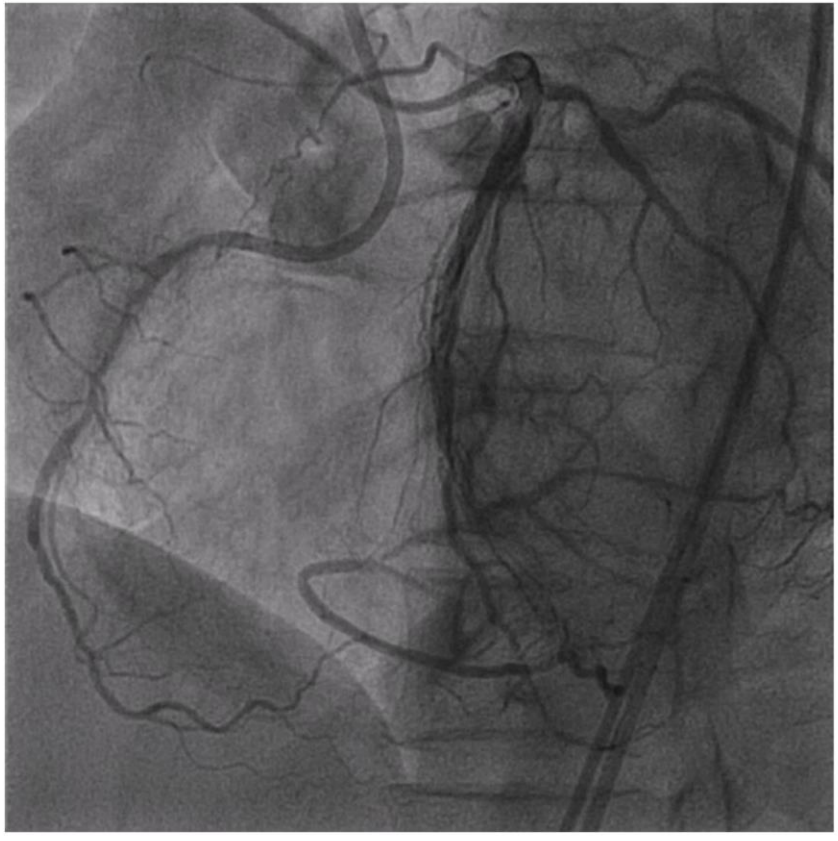


Dual injection



Four Key Angiographic Parameters to Guide CTO PCI





Assessment

Mid RCA CTO

Proximal cap	?
CTO segment	?, but > 20 mm
Distal vessel	Bifurcation at distal cap
Collateral	Septal branch to PD Atrial branch to PL

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Proximal cap	?
CTO segment	?, but > 20 mm
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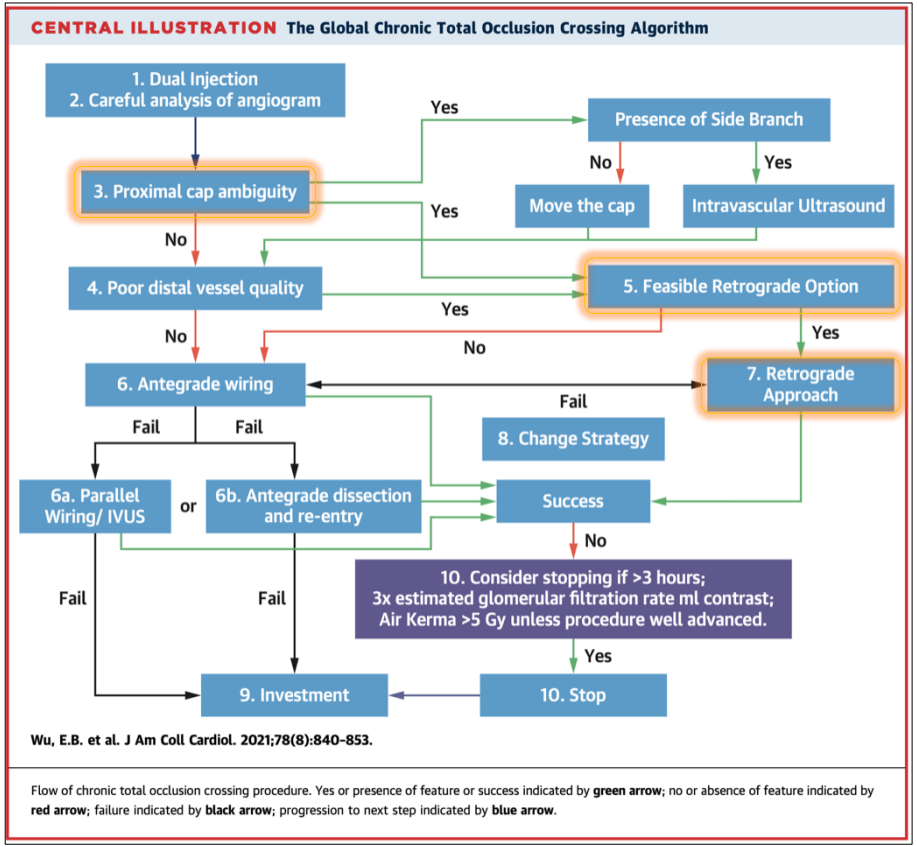
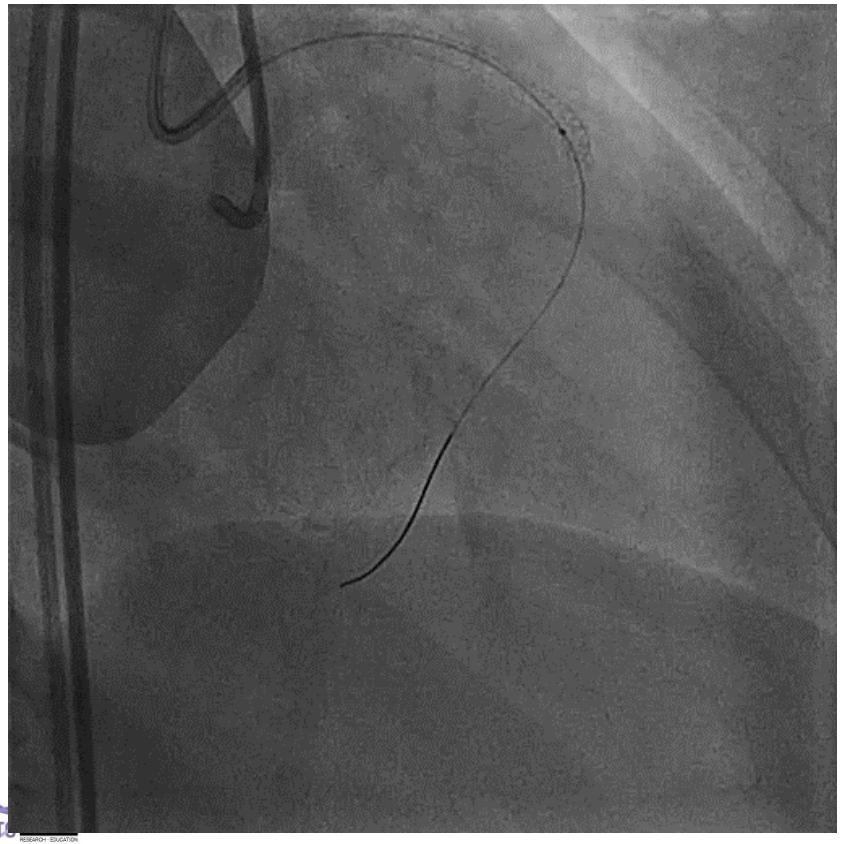
Collateral	Septal branch to PD Atrial branch to PL

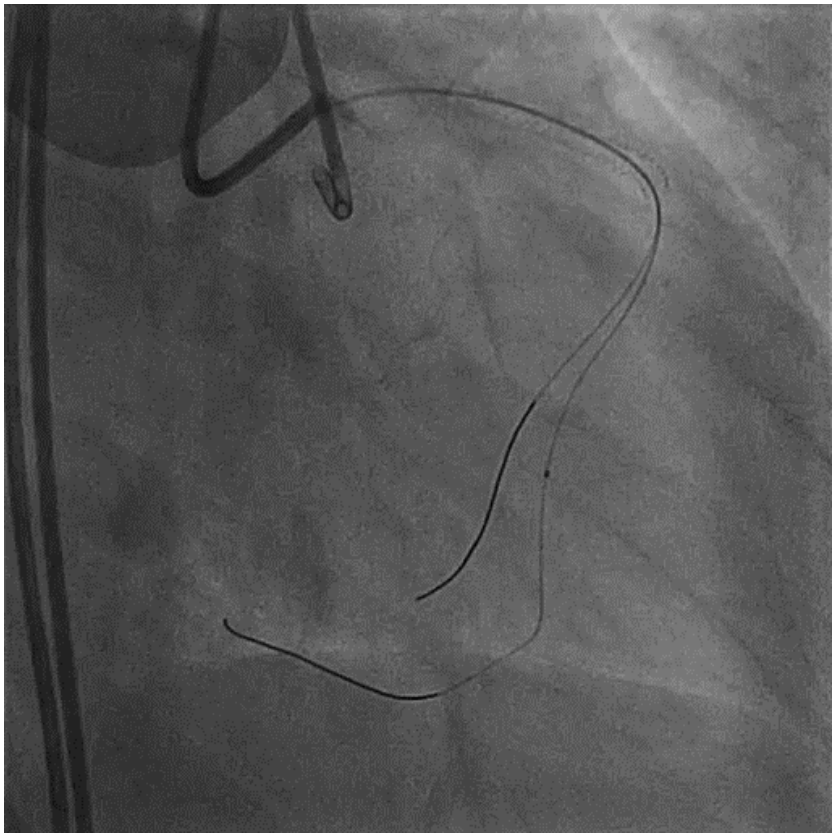
Plan

Primary retrograde via septal channel

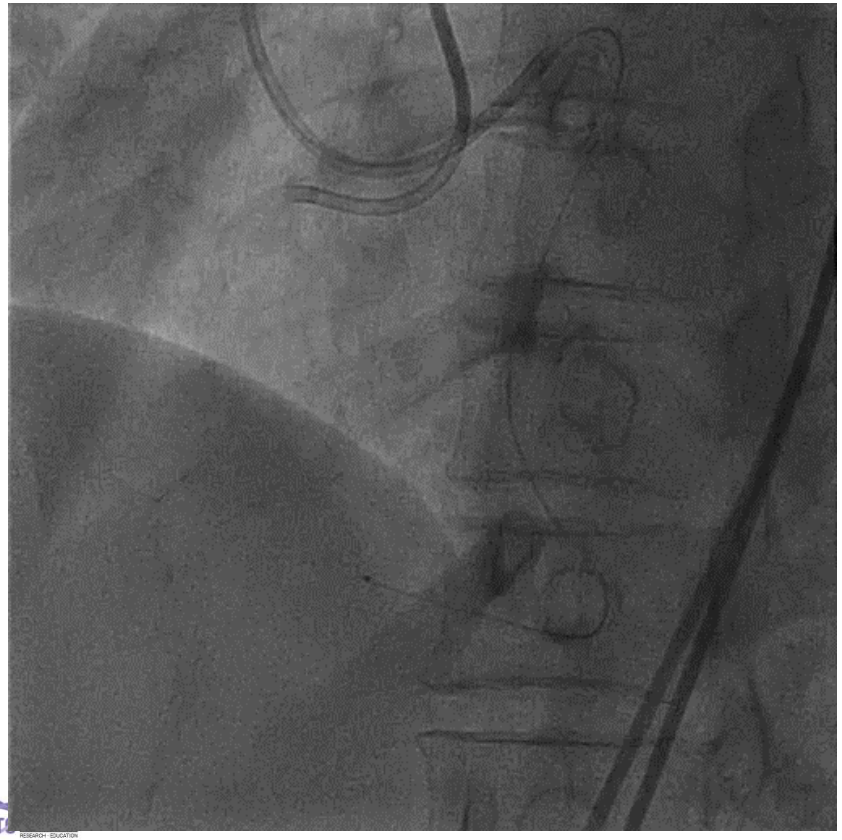


Retrograde via septal collateral
Sion + Finecross

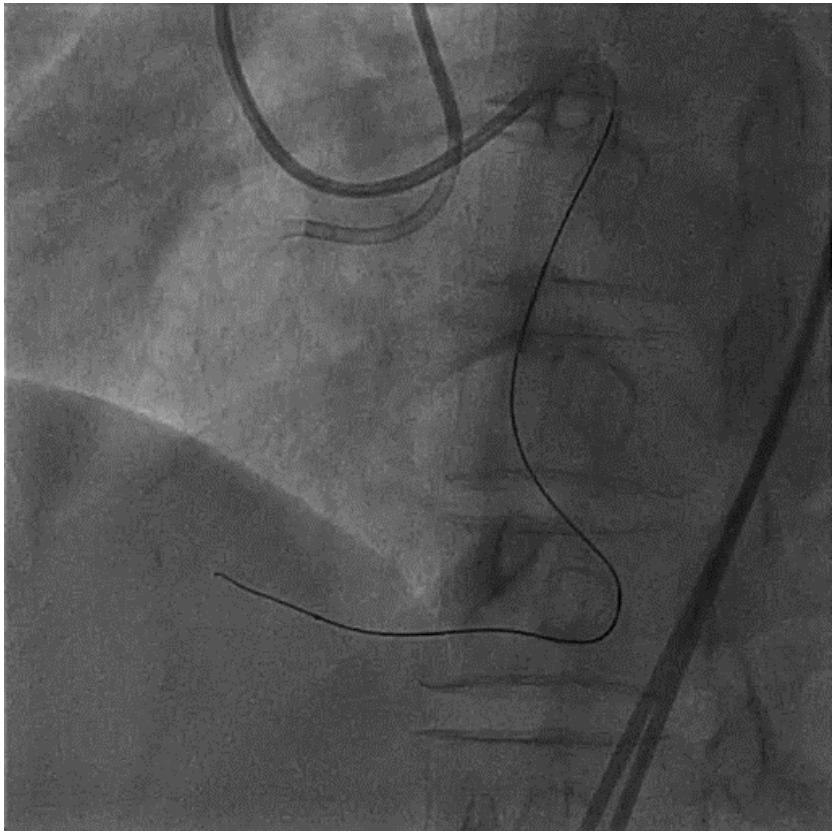




Tip injection revealed distal cap at bifurcation

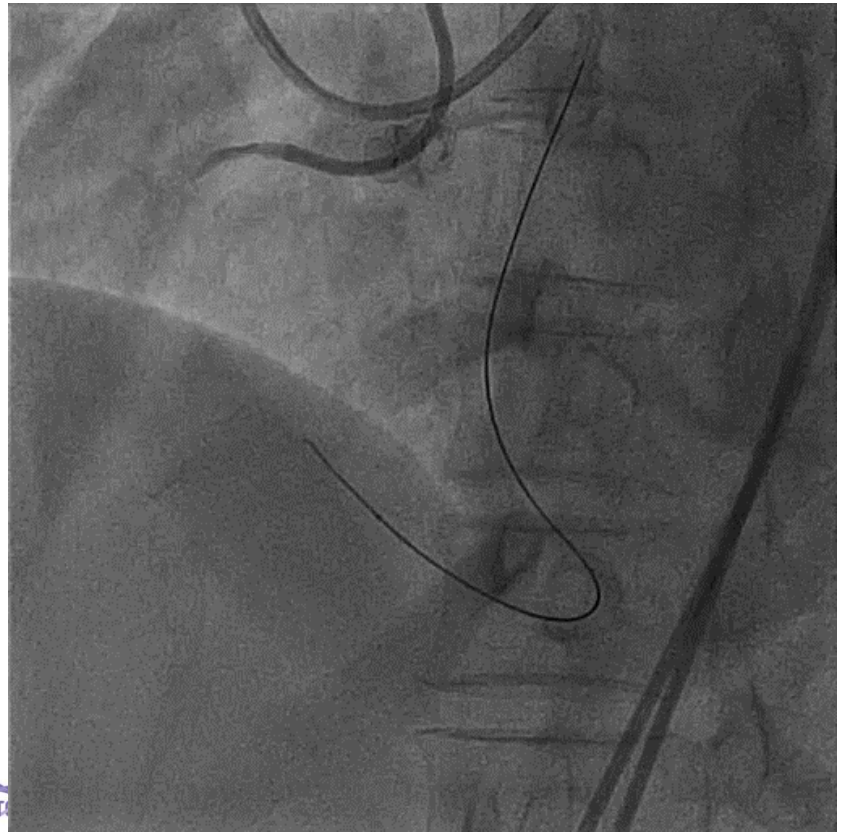


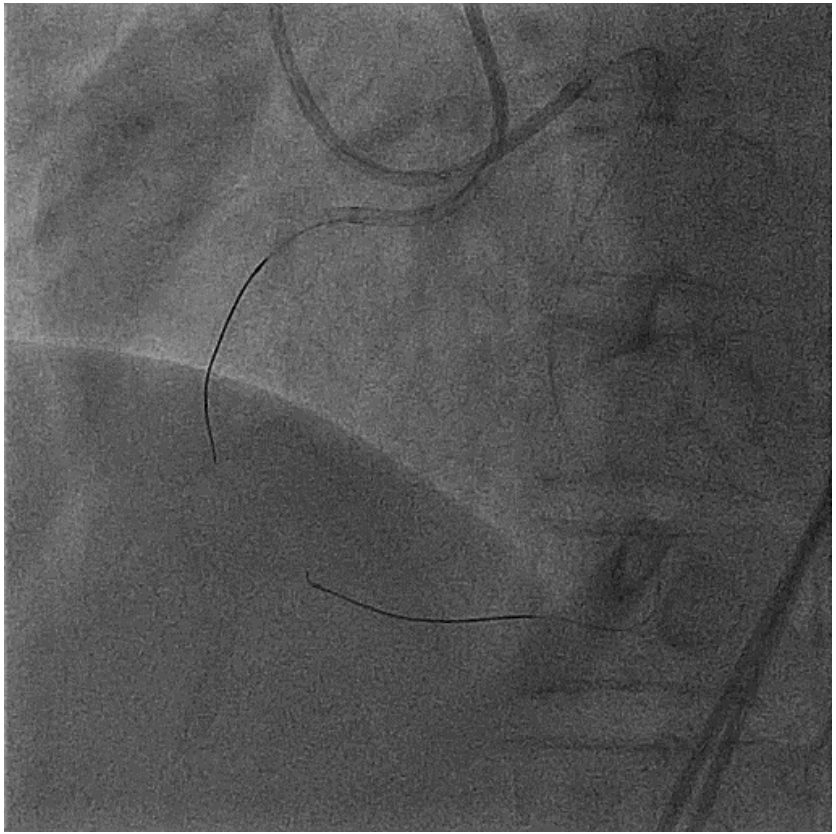
Retrograde puncture with Gaia-2



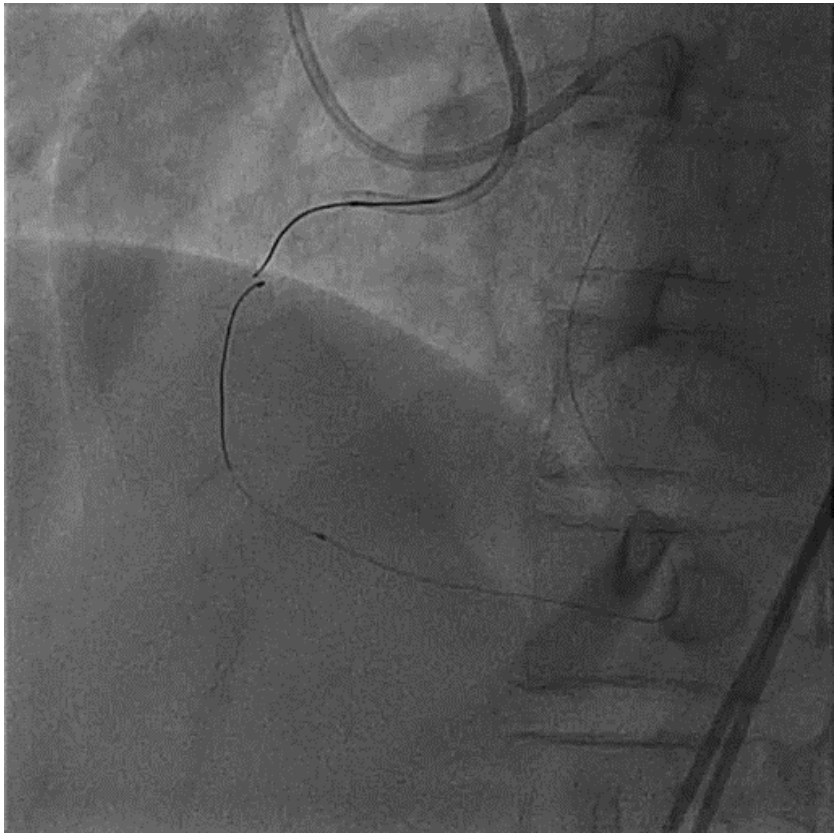
Switch between retrograde Gaia-2, UB3, Gaia-3, Pilot 50

The “RV branch-like” channel dances in sync with retrograde wire---Can it be a channel in CTO body?
Tried wiring with soft wire but failed to cross.

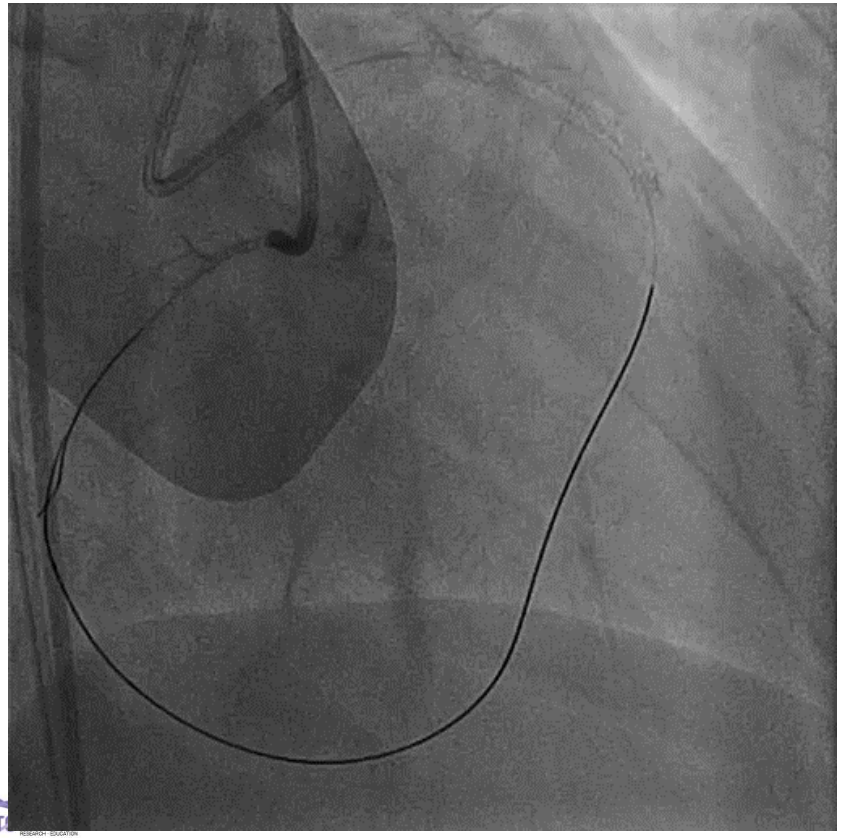


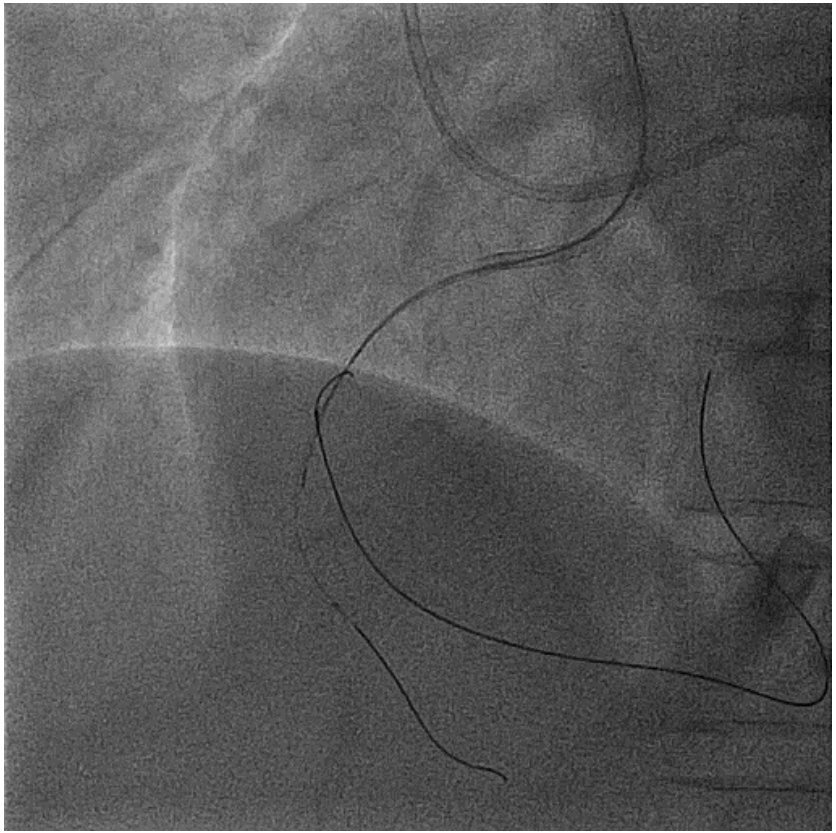


Retrograde wire crossing

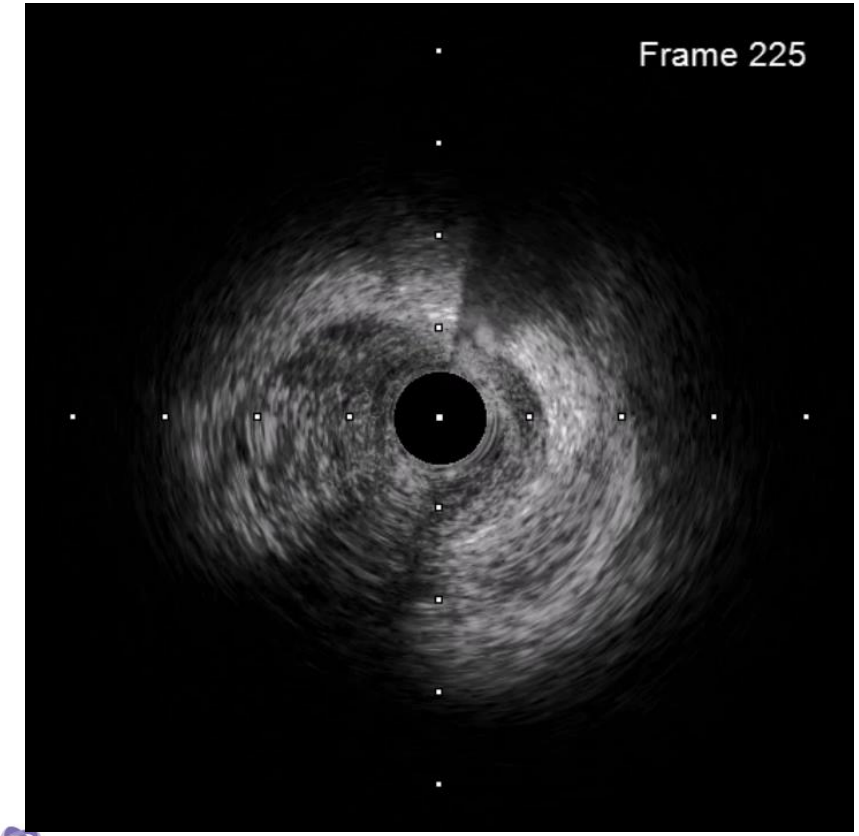


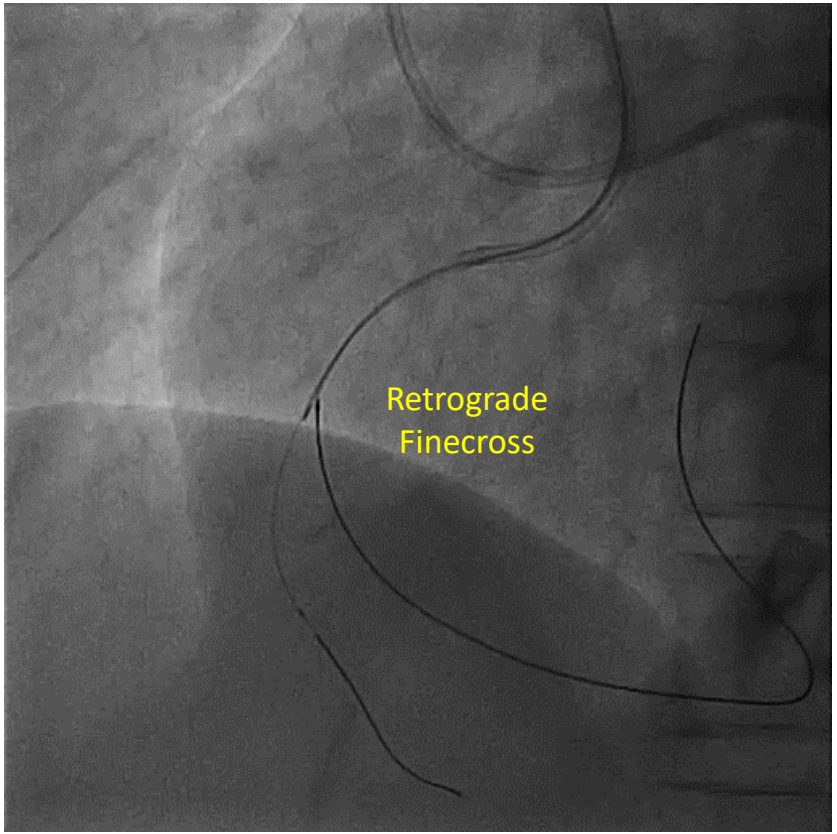
IVUS to identify wire position



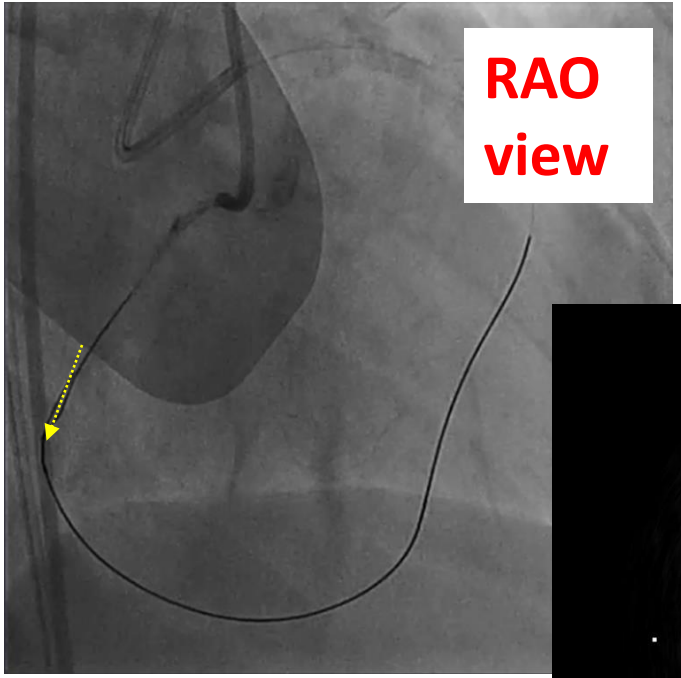


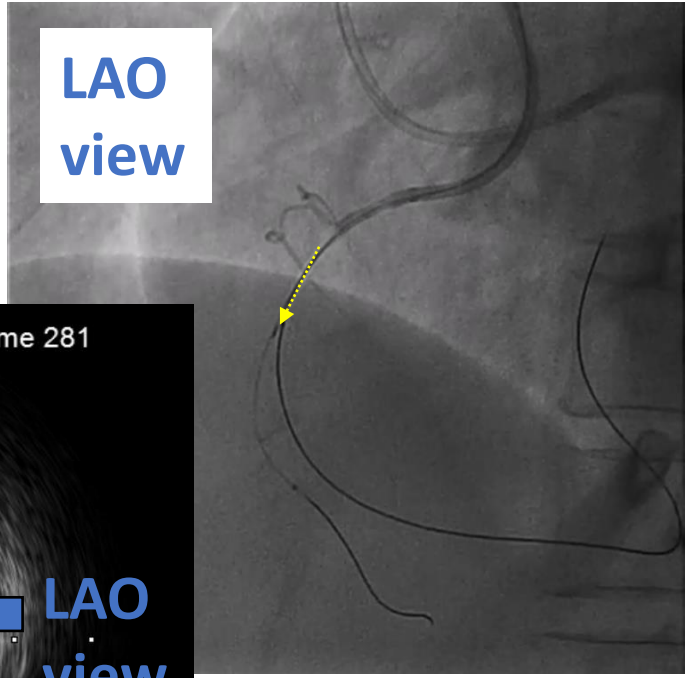
IVUS-guided re-entry

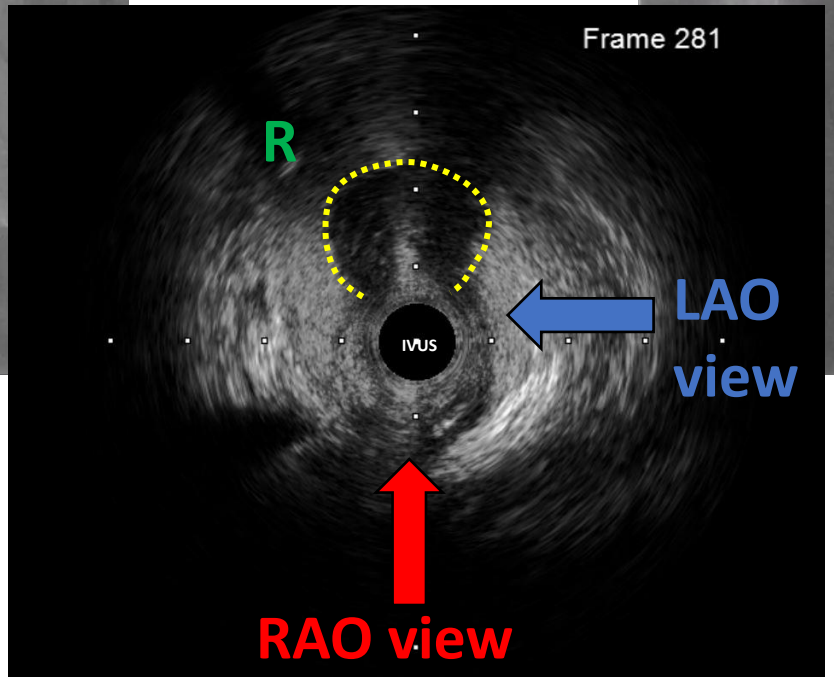




IVUS-guided re-entry



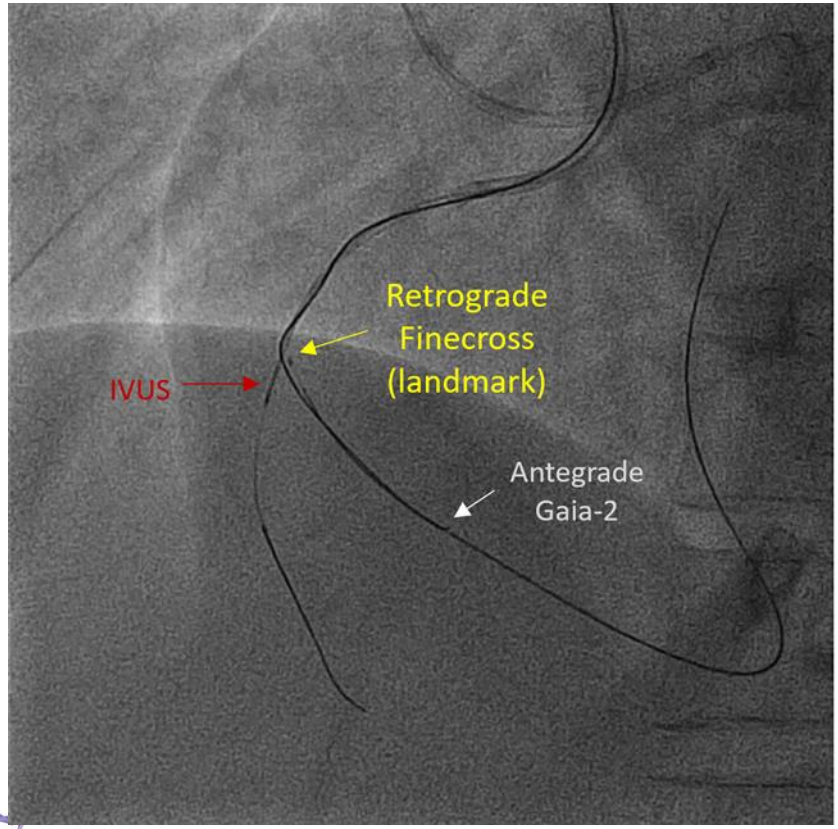


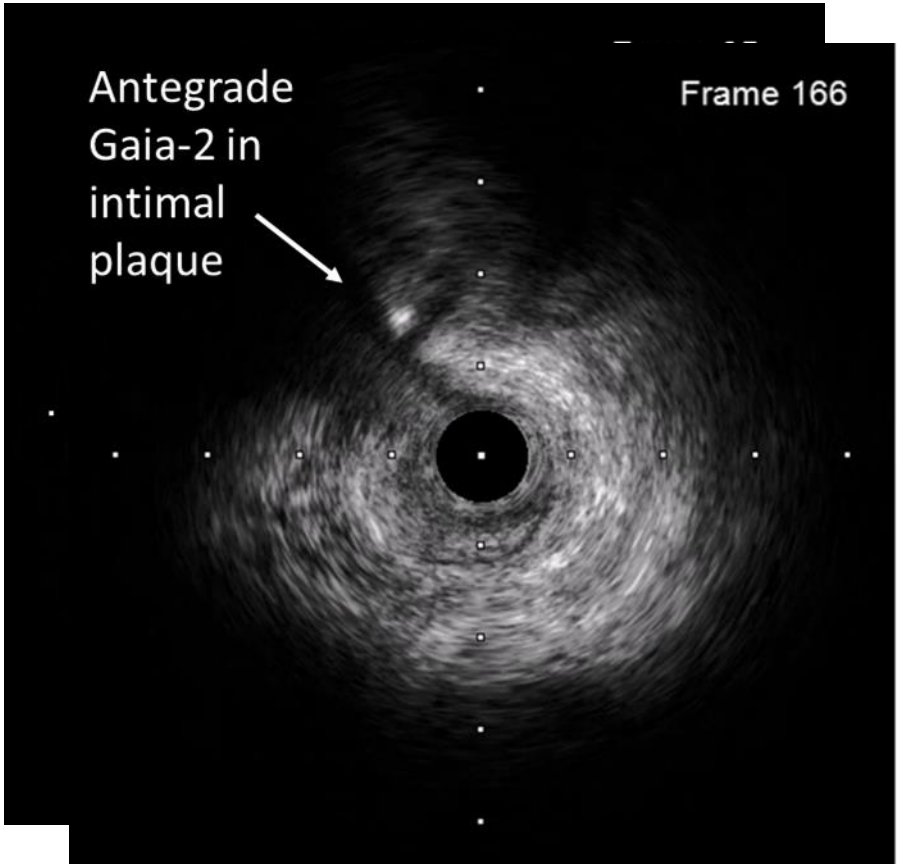


Therefore, intimal plaque should be overlapping with IVUS in RAO view

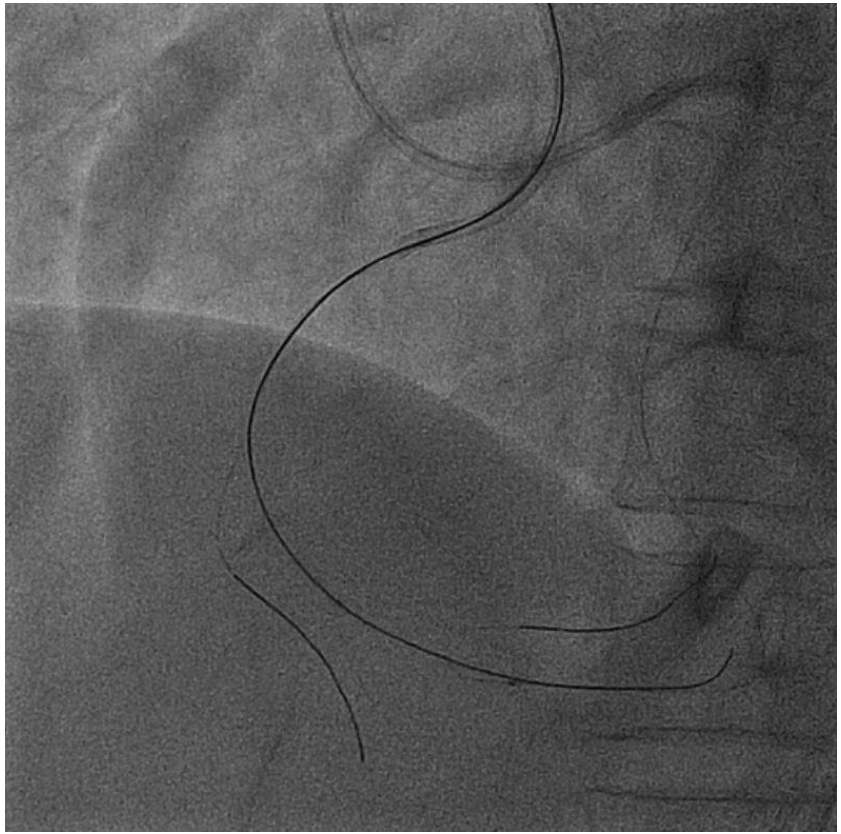
Therefore, intimal plaque should be located between IVUS and Retrograde wire in LAO view

IVUS-guided re-entry
Puncture with antegrade Gaia-2



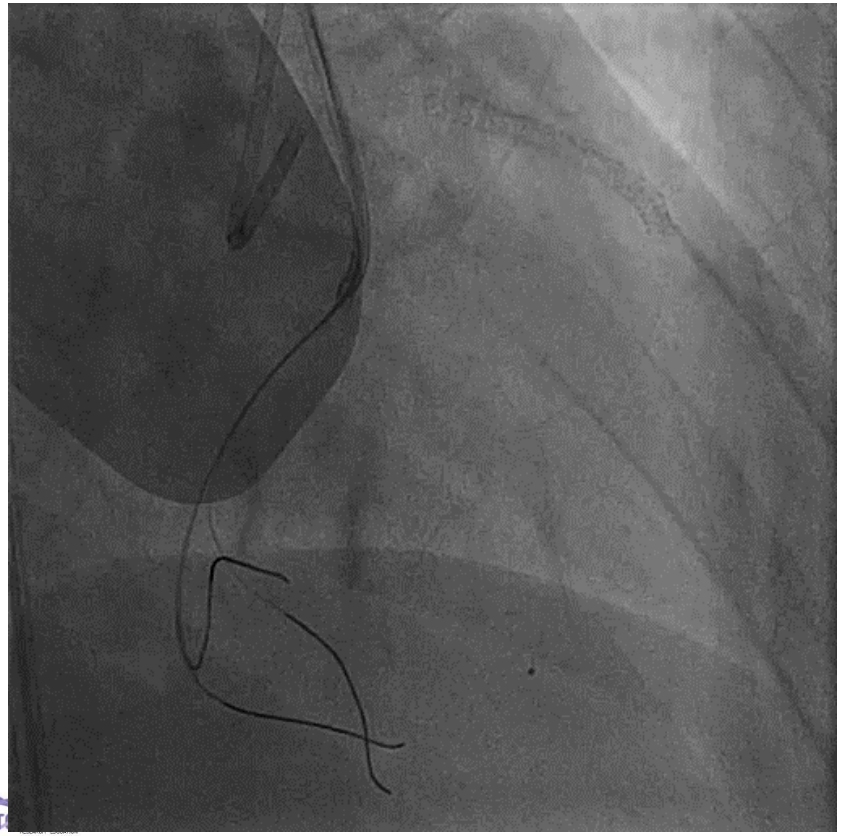


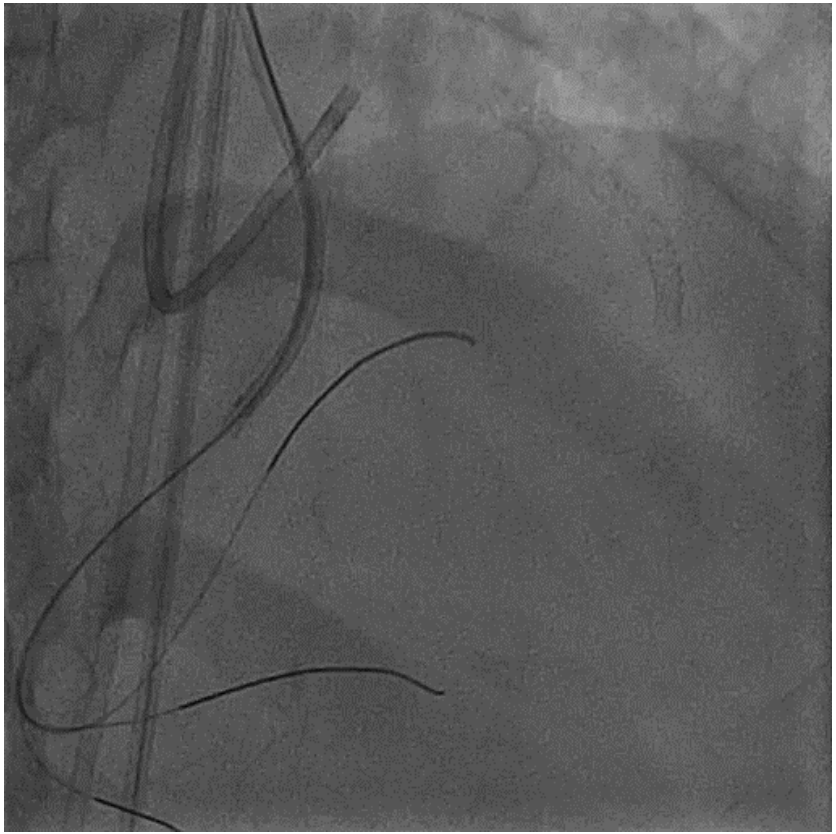
Successful antegrade crossing to PD



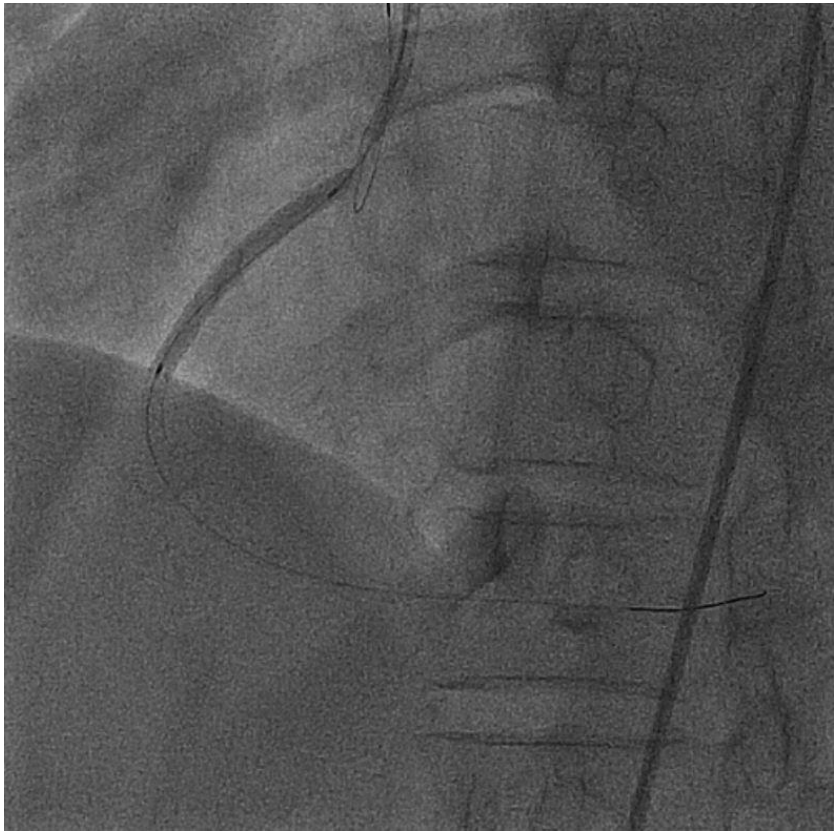
Placed retrograde wire in PL as a marker for the second antegrade wire

Check septal collateral and donor vessel

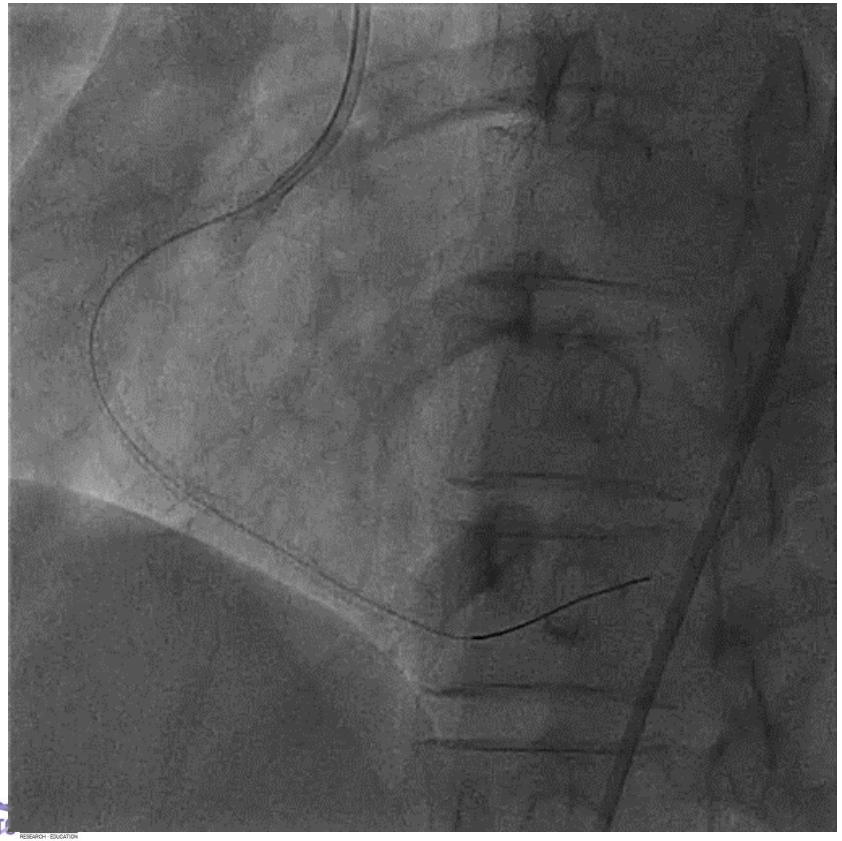


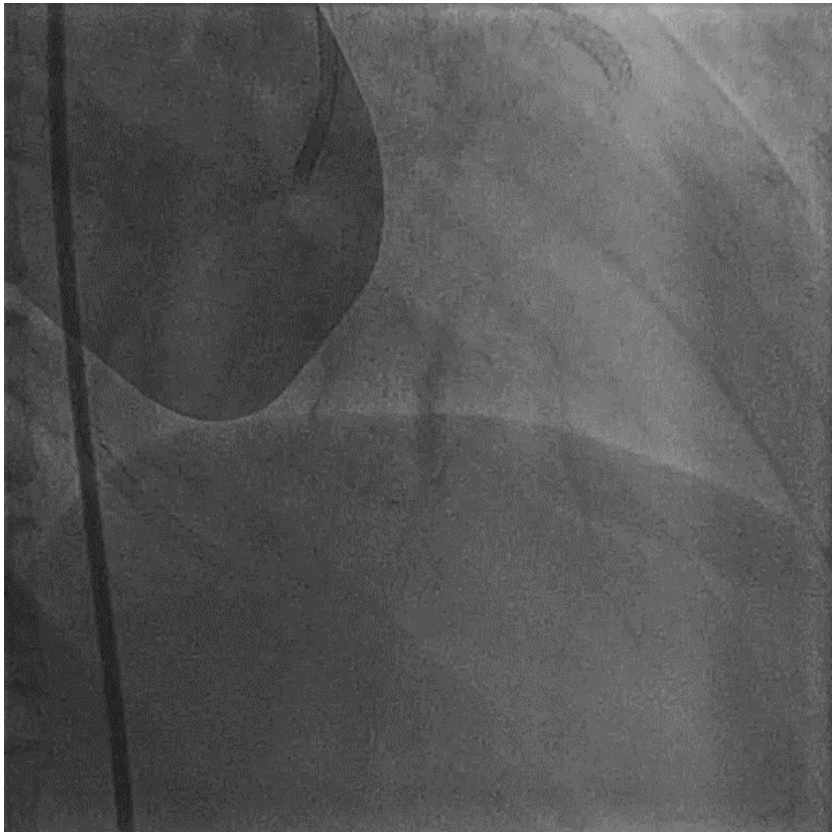


2.25x28 mm + 2.5x33 + 3.0x33 mm EES from PD to ostial RCA



Final angiogram

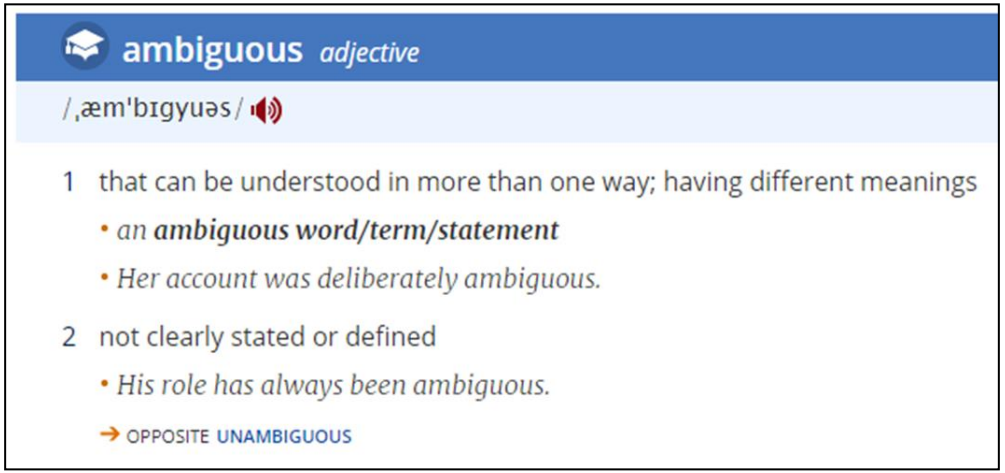




Learning Points

- **How could I improve my procedure?**
  1. **Issue of ambiguity**
  2. **Issue of retrograde technique**

Ambiguous cap



ambiguous *adjective*

/ˌæm'bɪgyuəs/

1 that can be understood in more than one way; having different meanings
- *an* ***ambiguous word/term/statement***
- *Her account was deliberately ambiguous.*

2 not clearly stated or defined
- *His role has always been ambiguous.*

→ OPPOSITE UNAMBIGUOUS

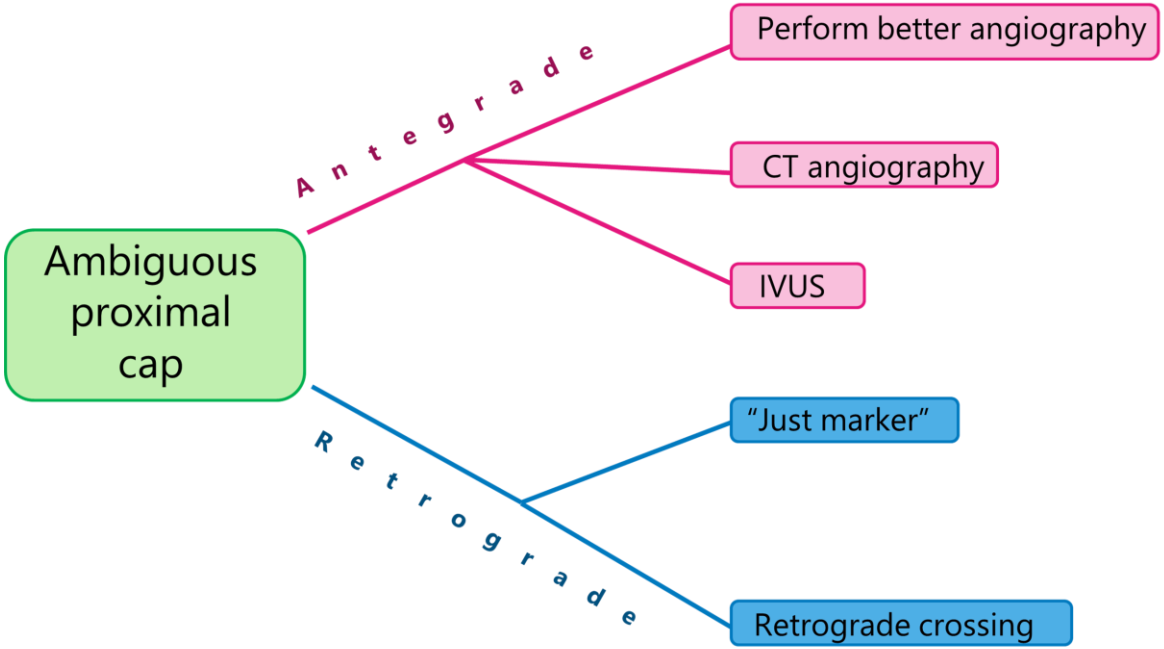
- In CTO:
- A cap is ambiguous when the operator does not feel comfortable advancing a penetration wire because of lack of anatomical clarity at the cap

- *In this case, I didn't have a confidence to puncture that RV branch-like channel.*

Oxford Learner's Dictionaries

Ashish Pershad, TCT

Approach to CTO with ambiguous proximal cap + vessel course



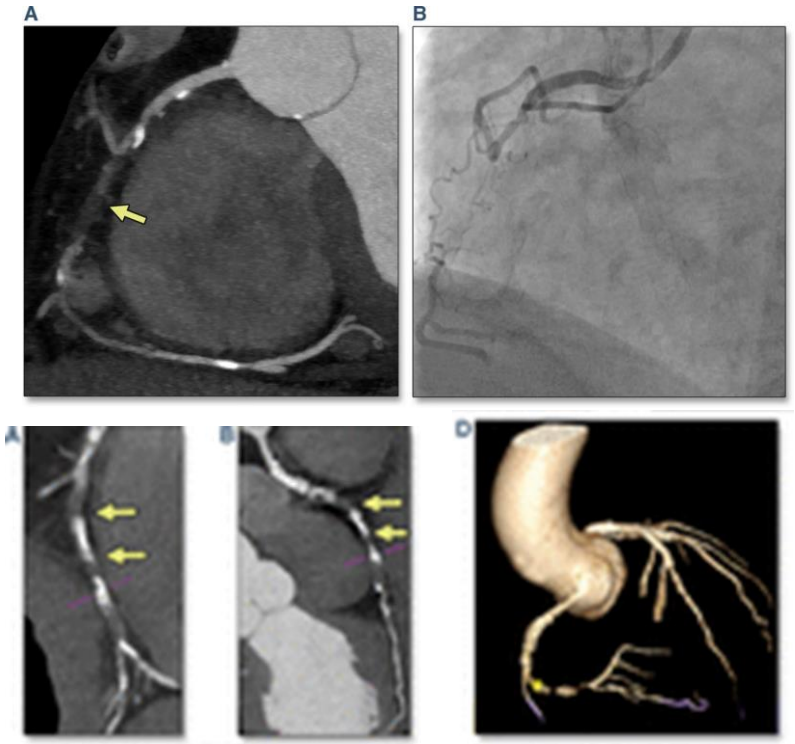
Modified from Brilakis E, Manual of Chronic Total Occlusion Interventions 2nd edition

Can CT help overcome the limitation of angiography?

- ✓ Proximal cap ambiguity
- ✓ Difficult to know the course of the vessel

↕

Using stiff wire will end up with perforation

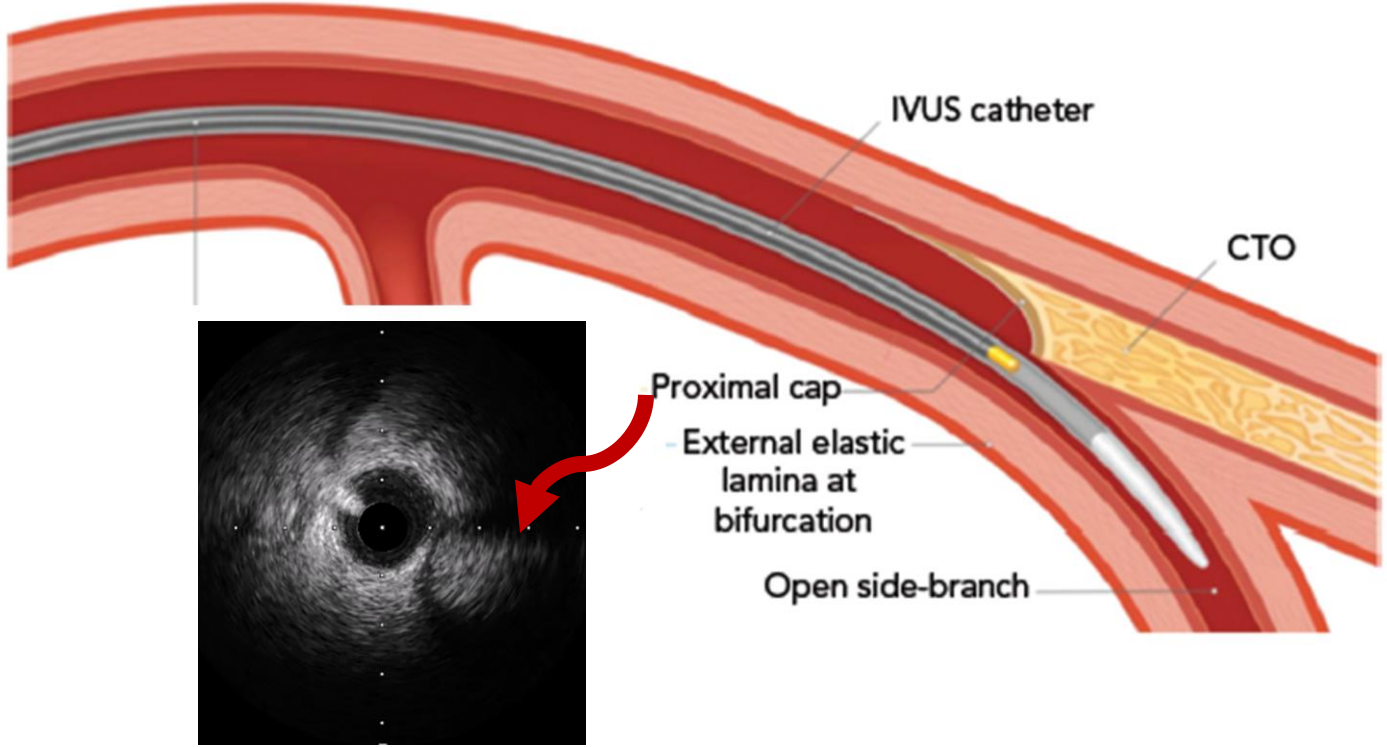


CT also help in:

- ✓ Selection of fluoroscopic projection angle
- ✓ Identify calcification

J Am Coll Cardiol Img. 2015 Jul, 8 (7) 846-858.

Can IVUS help resolve proximal cap ambiguity?



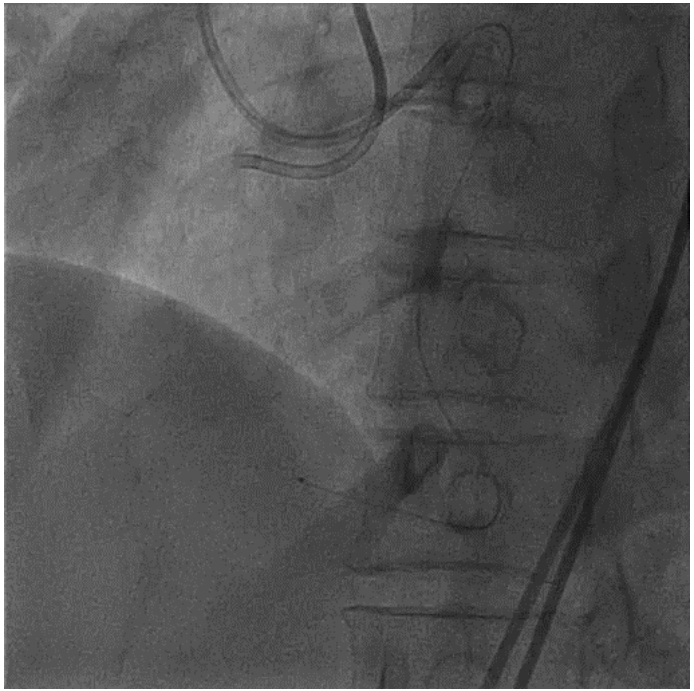
Modified from Interventional Cardiology Review 2020;15:e08.

Learning Points

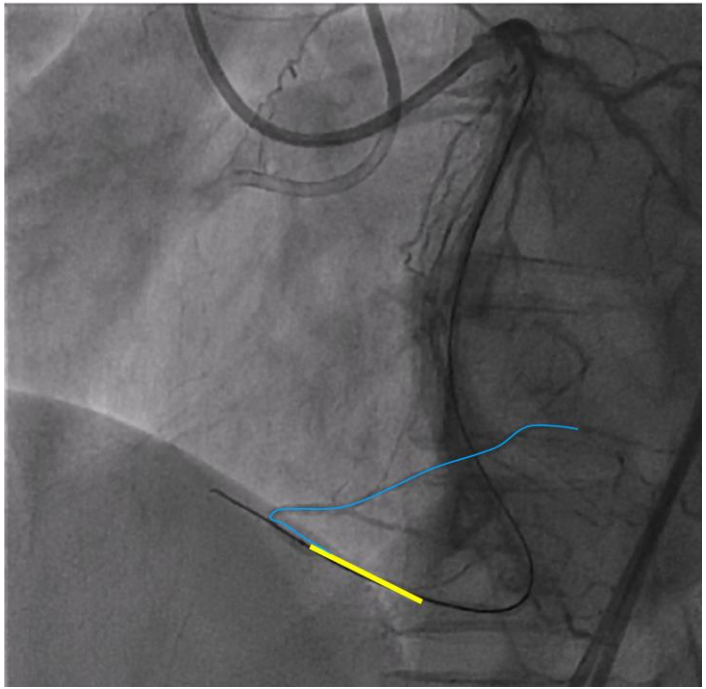
- **How could I improve my procedure?**
  1. Issue of ambiguity
  2. **Issue of retrograde technique**

How to reduce the risk of perforation at CTO exit by retrograde puncture

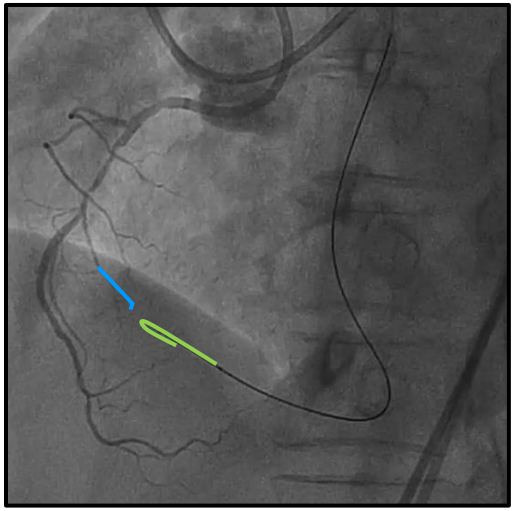
Problem: A lot of wire motion due to heart beating



Retrograde dual lumen microcatheter can provide better stability for puncture



How to reduce the risk of perforation at CTO body



Options

- Retrograde knuckle wire technique — **Risk of side branch occlusion**
- retrograde crossing
  - r-CART — **Risk of perforation & side branch occlusion**
  - IVUS-guided antegrade entry — **Risk of perforation**

(as in this case)

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RESEARCH · EDUCATION

Thank You