

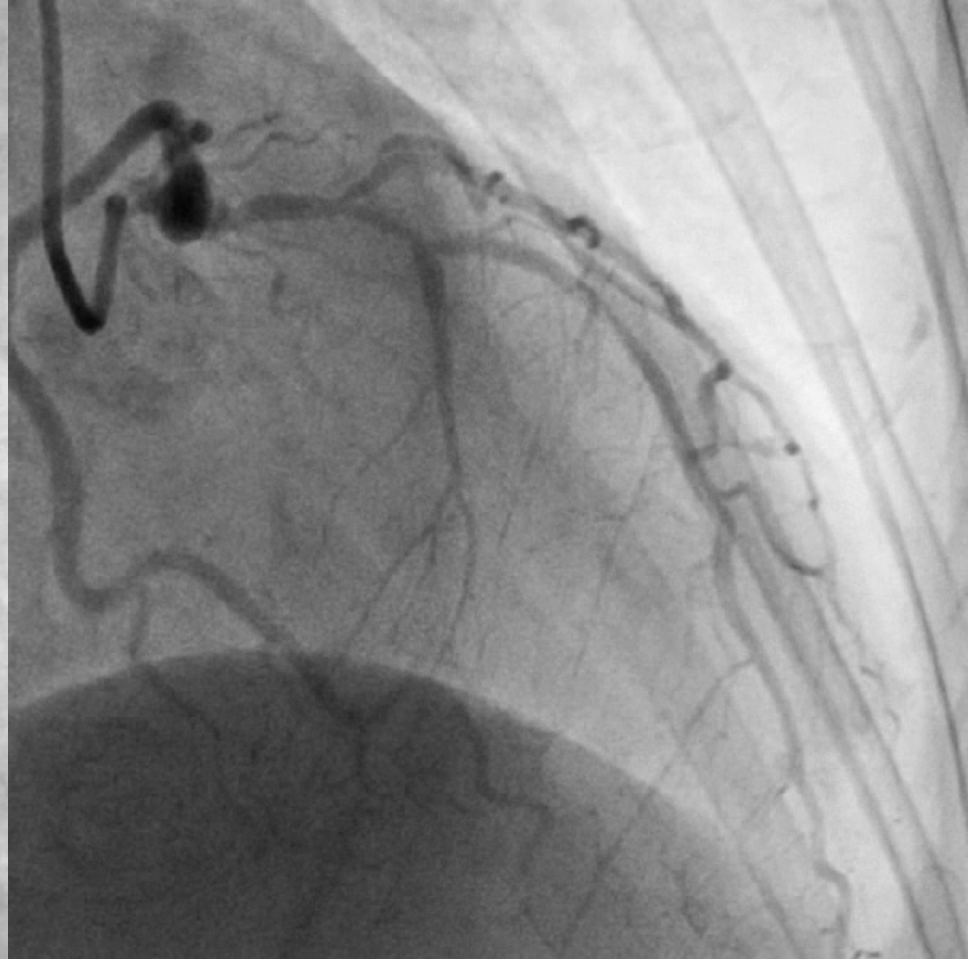
# The mission impossible 4 mm CTO

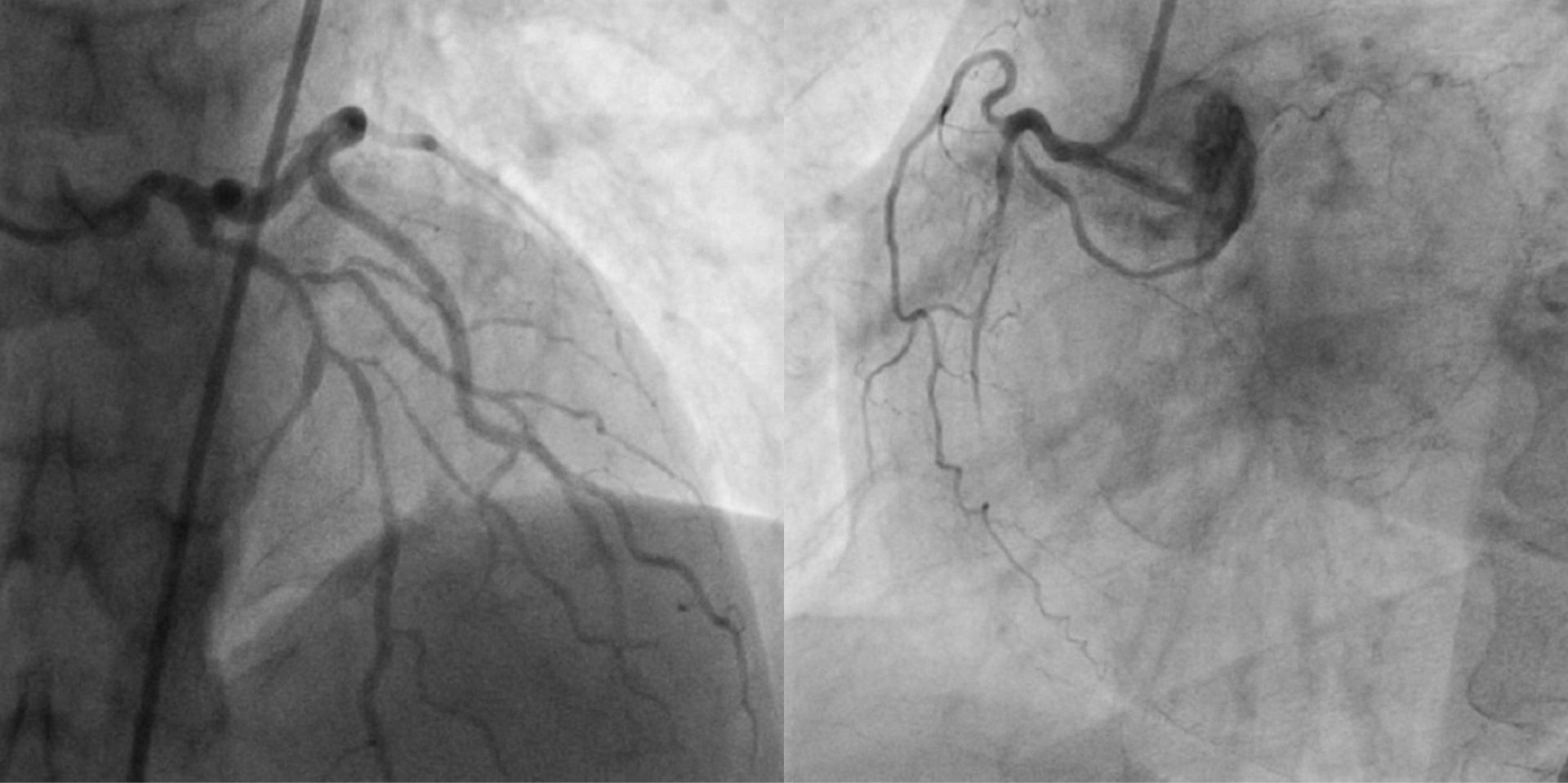


**Ahmad Samir, MD**

Cairo University  
Aswan Heart Centre  
Egypt

- **63 y old lady**
- **T2DM, HTN, Obese (BMI 36)**
- **Echo → LVEF 32% - mild MR –extensive multi-territorial RWMA**
- **Angina class III**
- **CMR → viable all myocardial territories.**
- **CAG performed in June 2021**



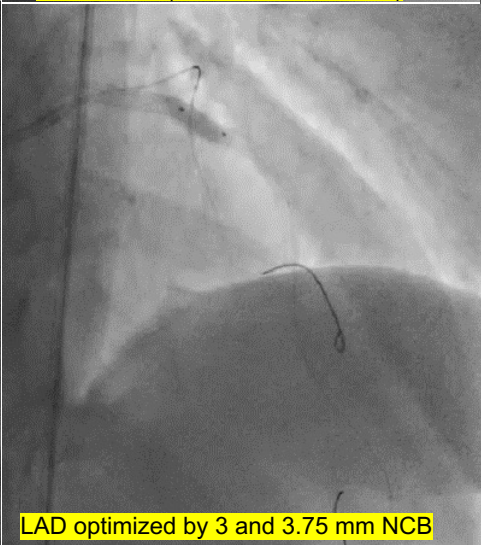
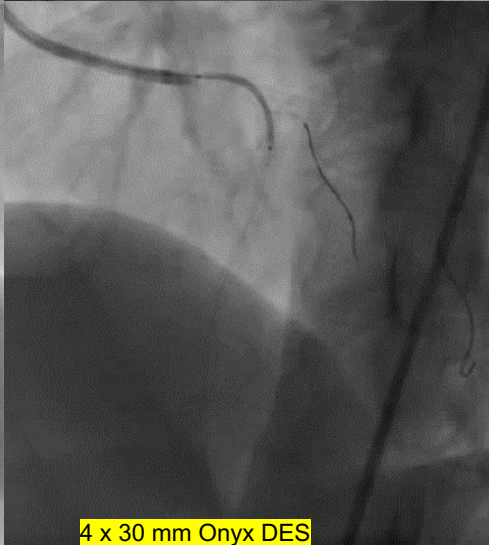
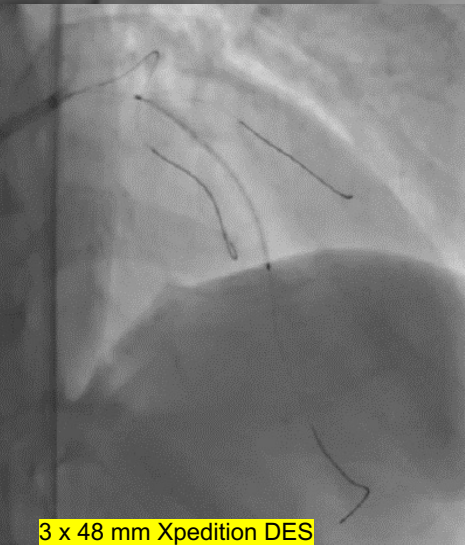
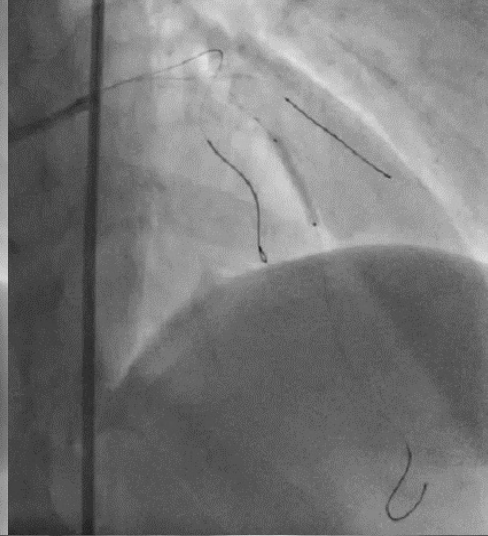
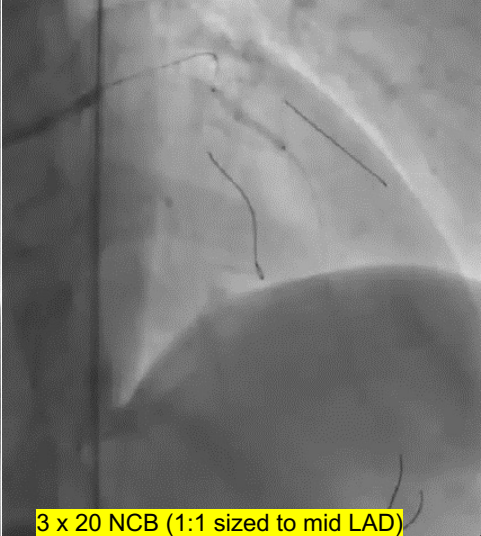
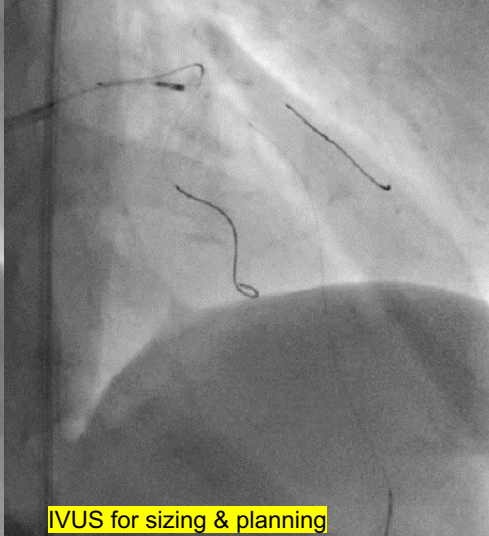


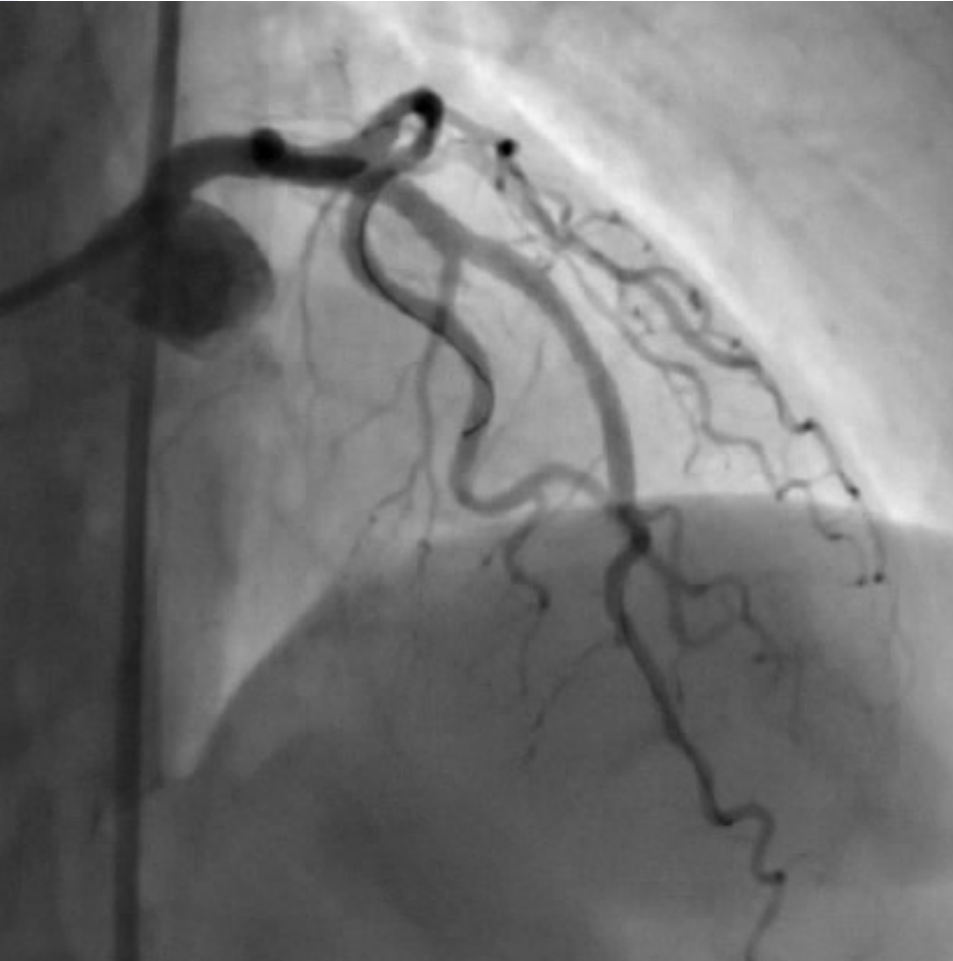
Ostial LM severe stenosis; Severe calcific proximal LAD stenosis;  
another mid LAD stenosis involving Diag origin; CTO proximal-mid RCA



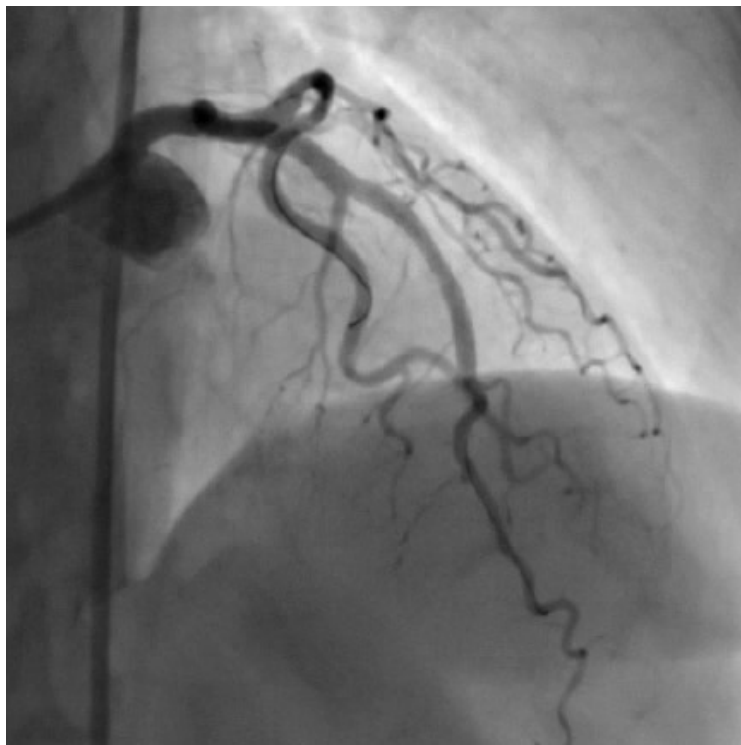
- **Upon heart team discussion, the patient was advised for CABG**
- **Unfortunately, she remained suffering for 8 months of crescendo UA, absolutely rejecting the surgical option, despite repeated counselling**
- **Thereby, we offered her the option of staged-percutaneous revascularization**

Lt system PCI-IVUS guided-PS-2 DES

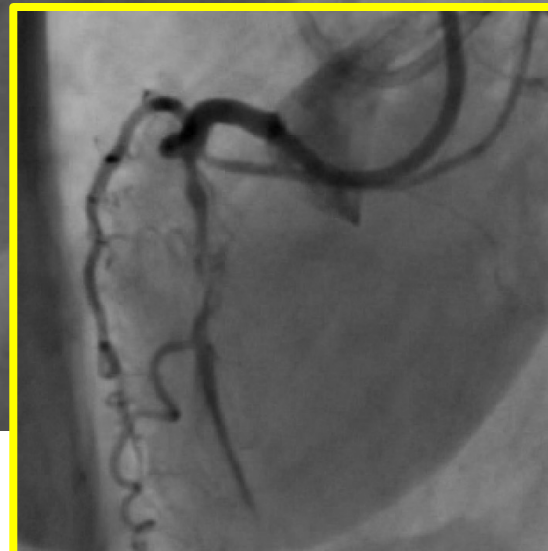
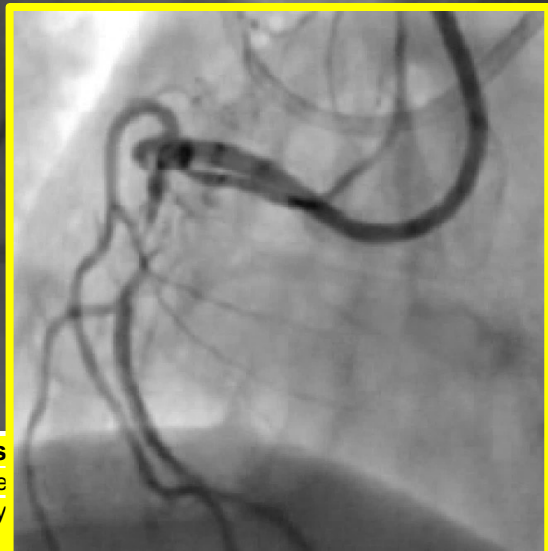
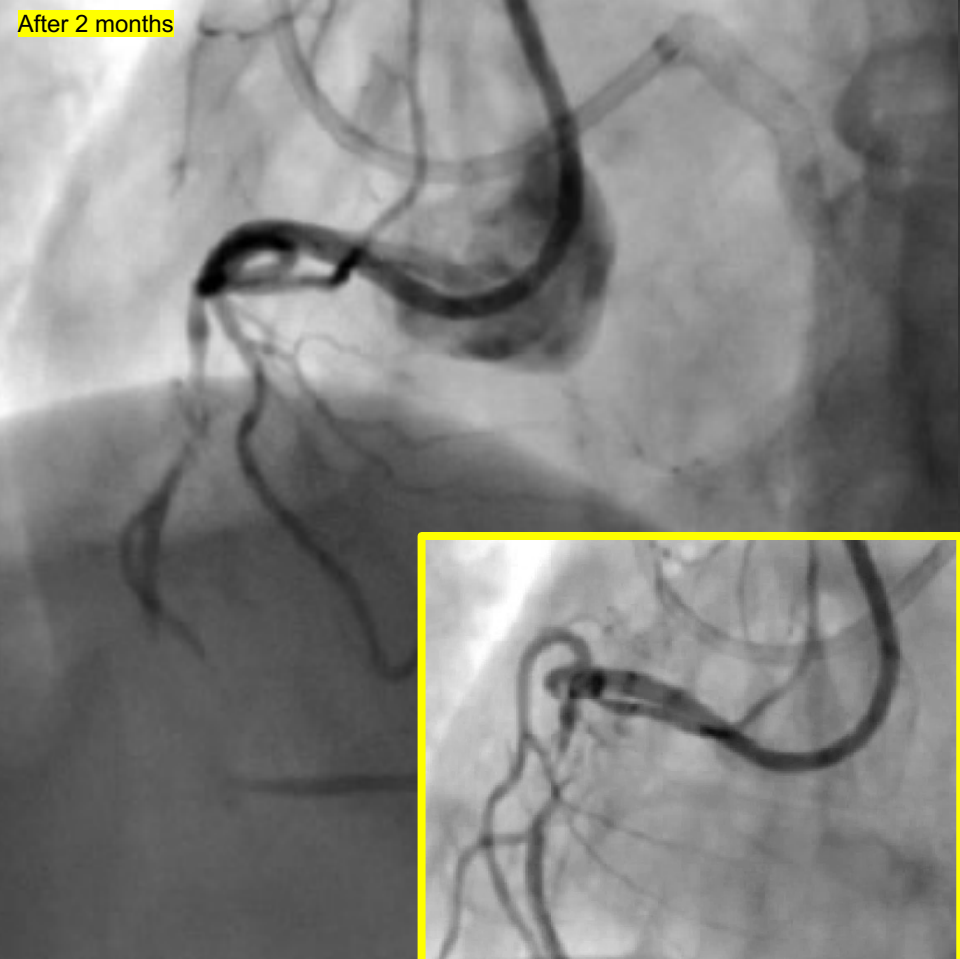




- **We were planning to bring the lady for PCI to RCA CTO in 2-3 months**
- **We had some arguments, because some of the team believed it was not a deserving vessel, with disappointing retrograde filling after PCI to LM-LAD**
- **But for the sake of complete revascularization and to give the lady the best chance to improve LV function, we brought her after 2 months**



After 2 months



**Important takes**

- RCA is really de
- Looks like a tiny
- However, there

acutely



## Our plan is

**We begin antegrade**

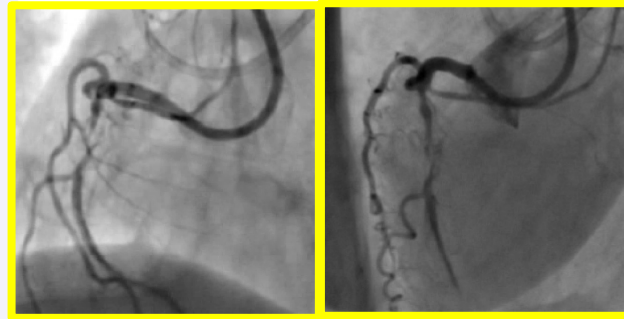
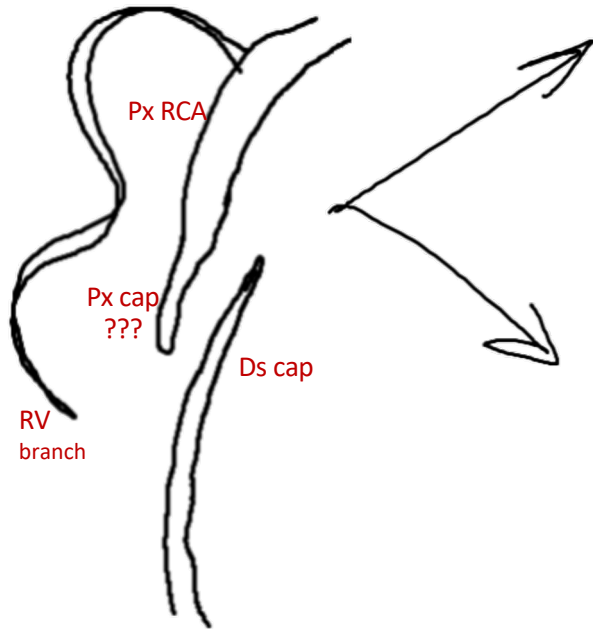
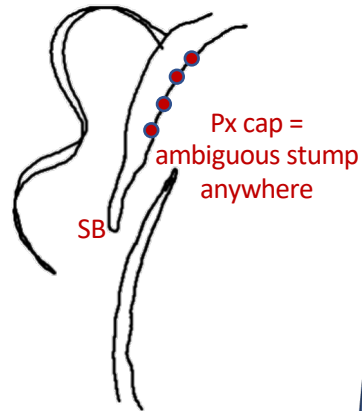
**Starting from proximal to the ??  
Px cap**

**Hoping to fish a connecting  
microchannel**

**if fortunately we tracked the px  
cap, we proceed antegrade**

**Otherwise, we switch retrograde  
to resolve the ambiguity**

auto-bridging-collaterals





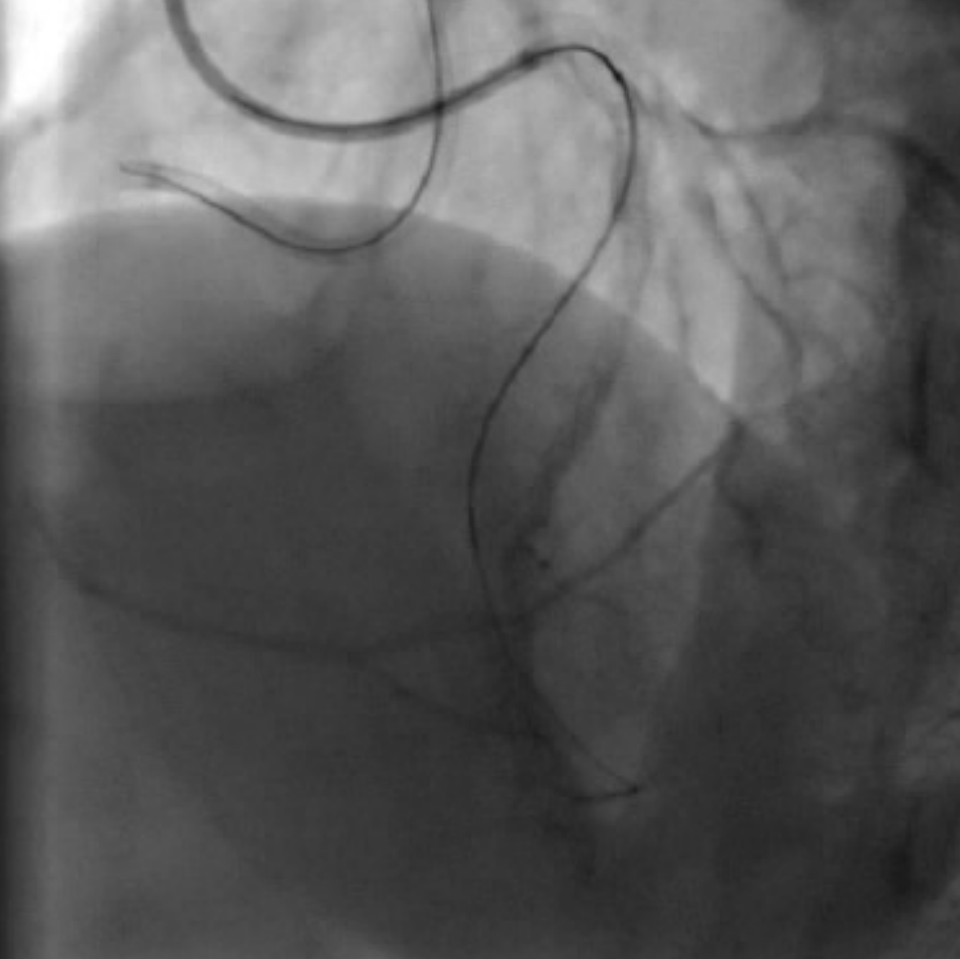
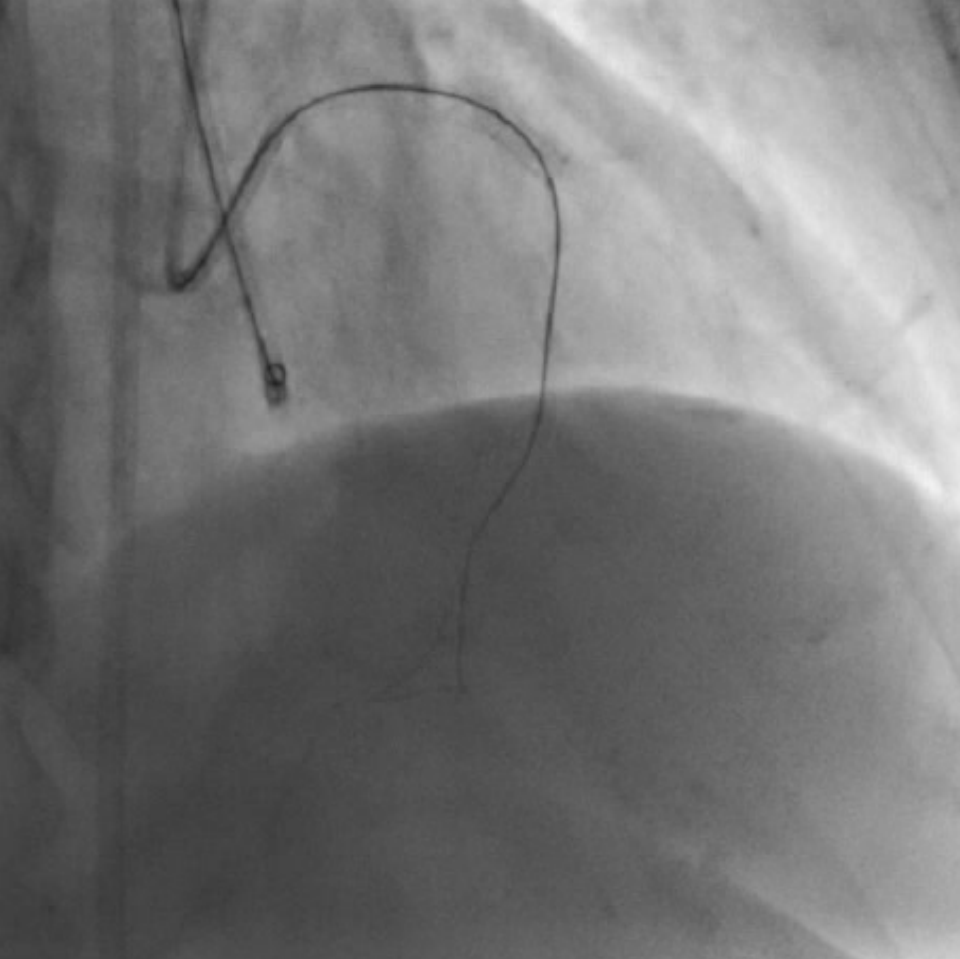
Caravel 150 parked few mm proximal to the questionable px cap  
Fielder XT-A tried to scratch any potential channel  
but consistently jumps into the tapered track down into a false lumen



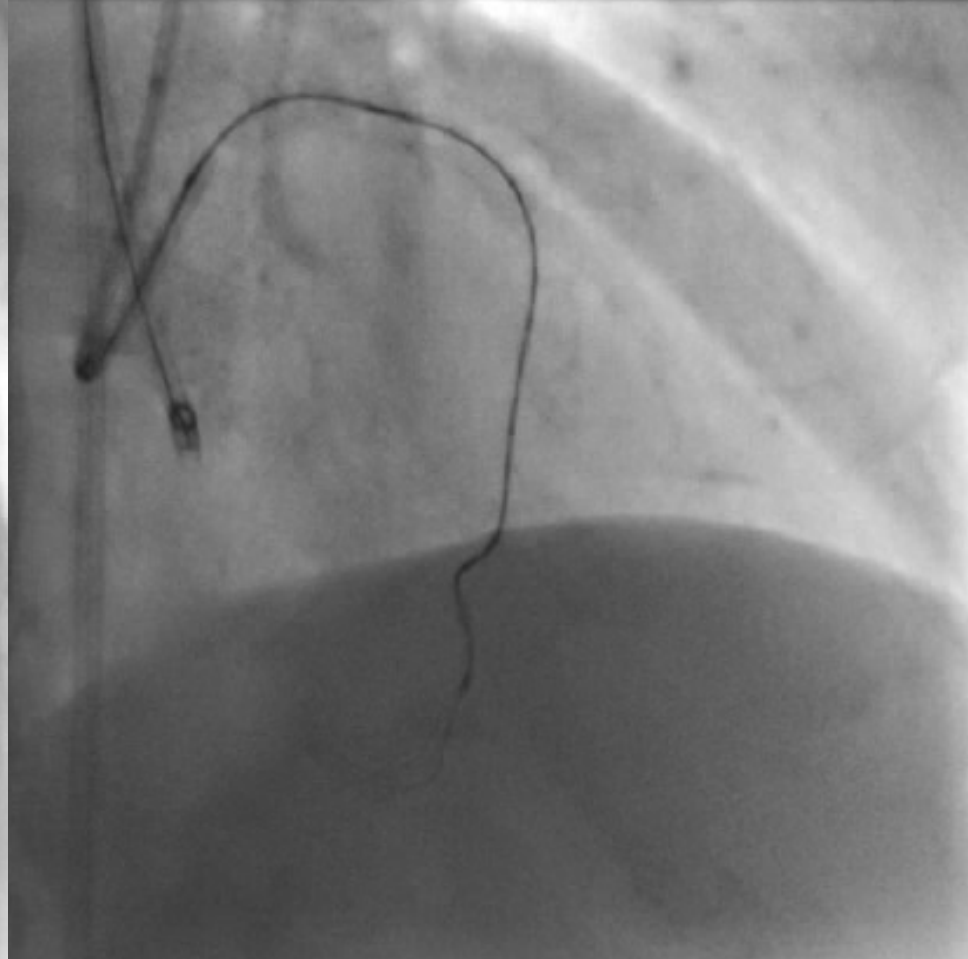
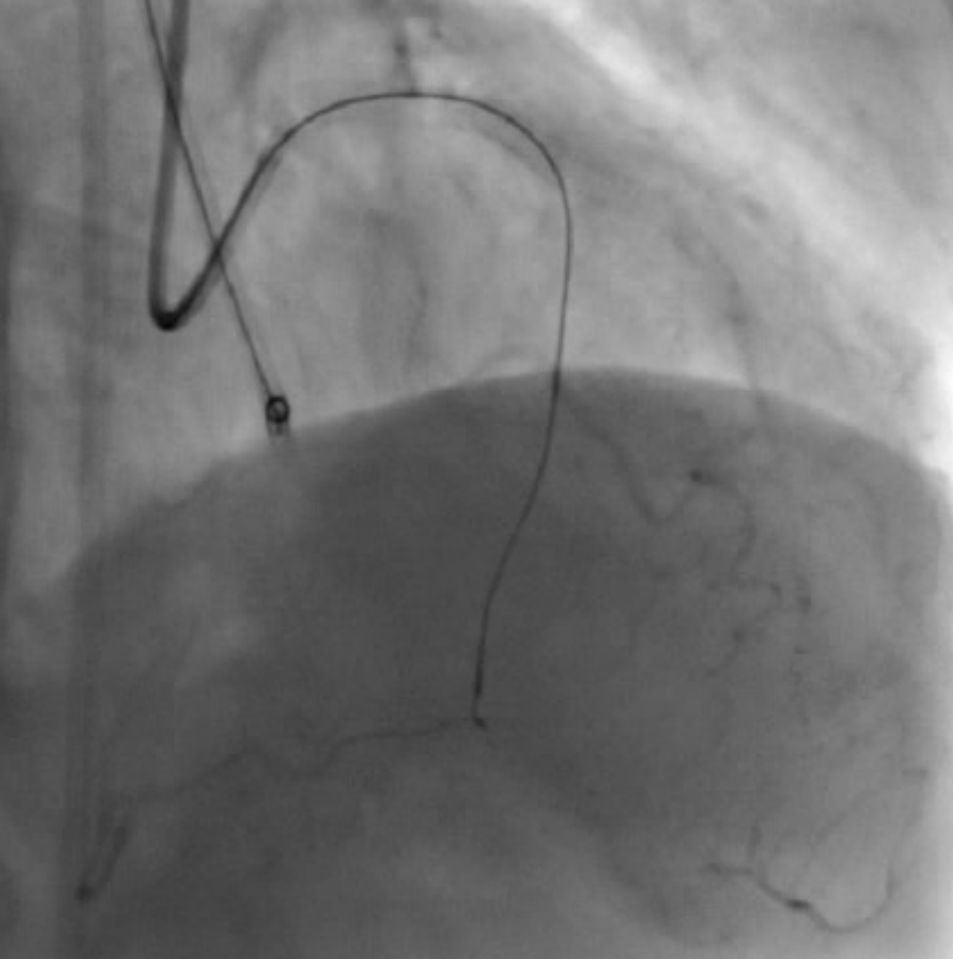
Escalated to Gaia 2nd for better tracking/control

Looked promising in AP-Cra

But was disappointing in an orthogonal view



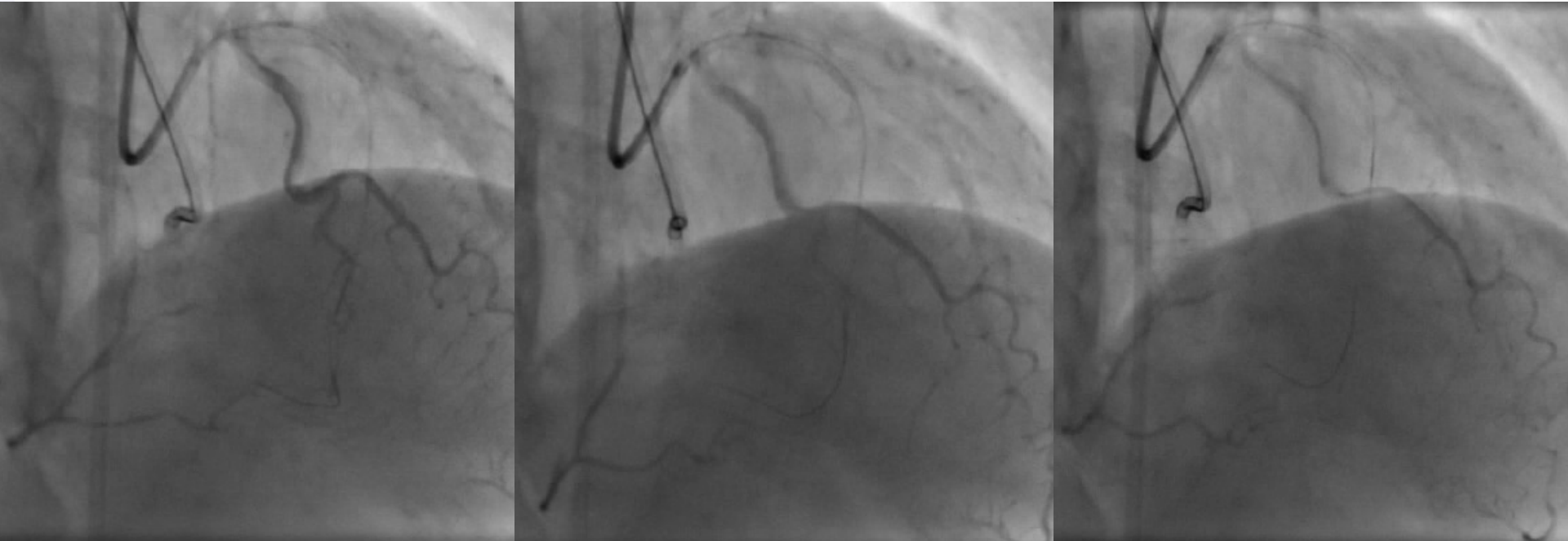
Started septal surfing with Sion black, but could not reach PDA  
Quickly switched to Fielder XT-R, which found its way to the target (the tortuous PDA)



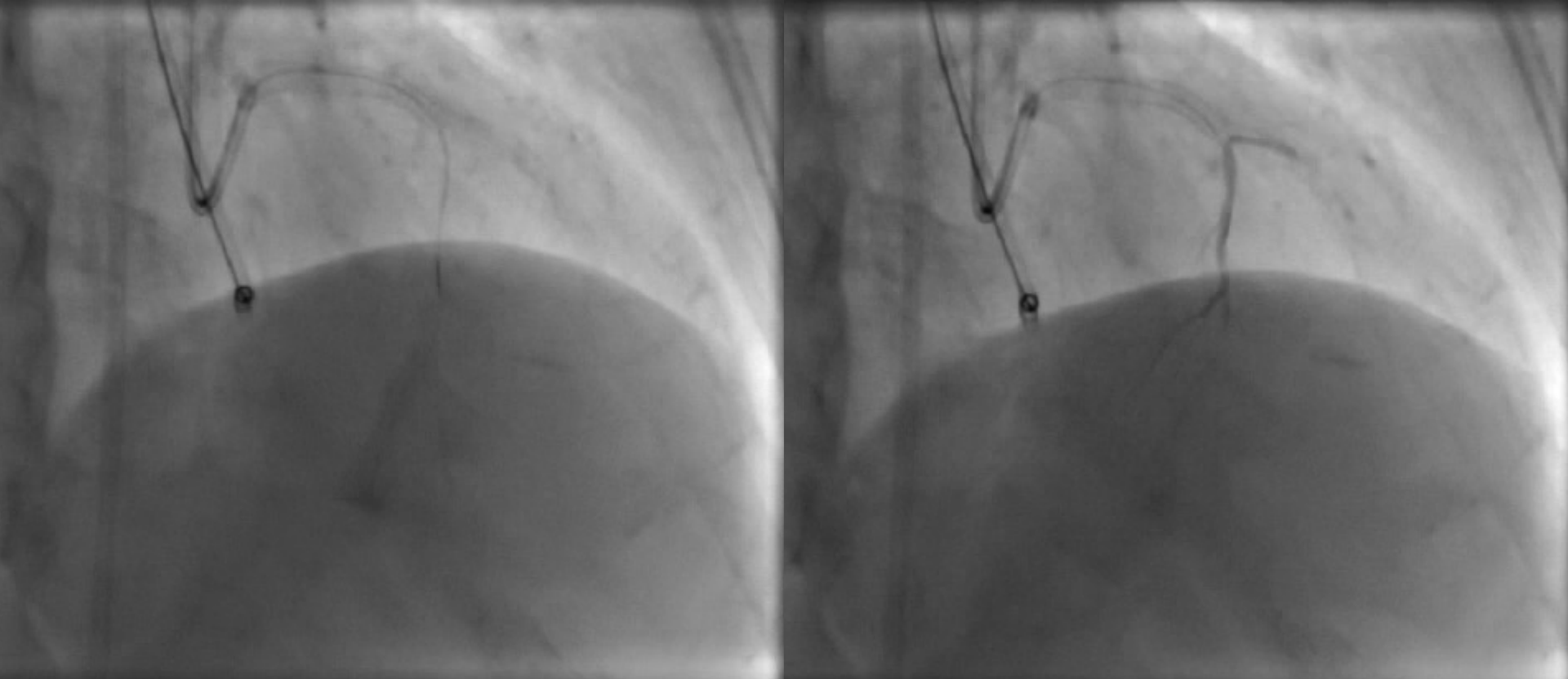
However, shortly the Fielder XT-R could not advance through the PDA tortuosity [3 X >90 bends]  
While, its weak shaft could not support advancing the Caravel



While fixing a road map with the Fielder XT-R course  
Exchanged back to the Sion black (more supportive shaft)

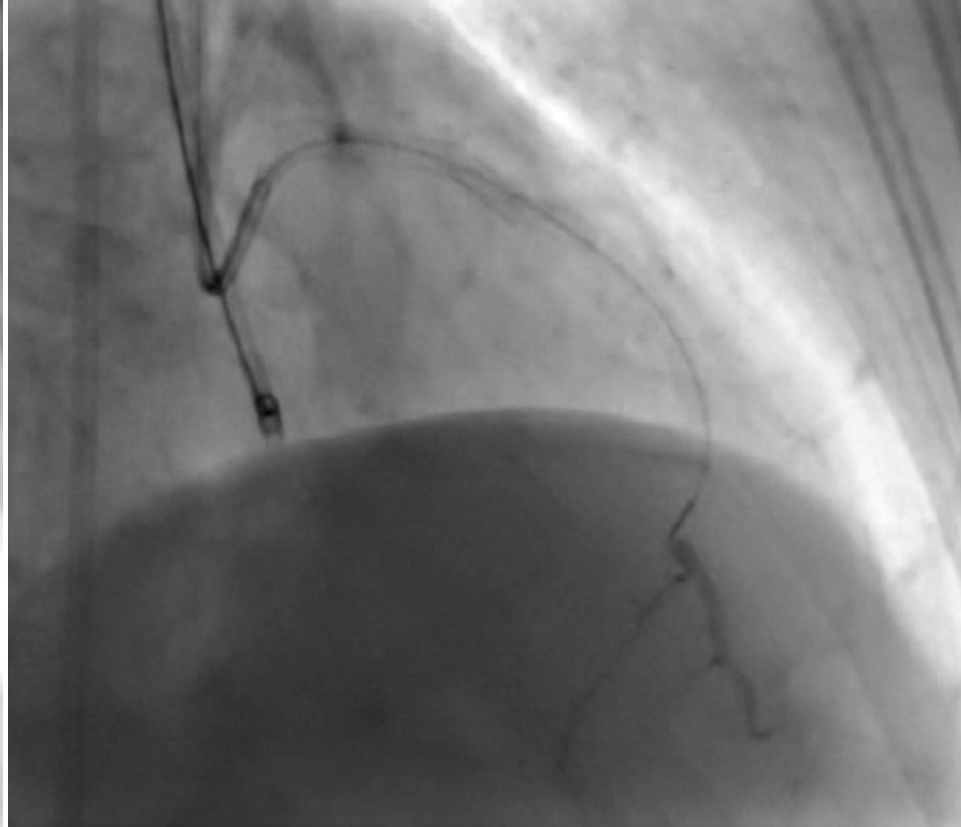


However, the Sion black was unable to track the same connection of the Fielder

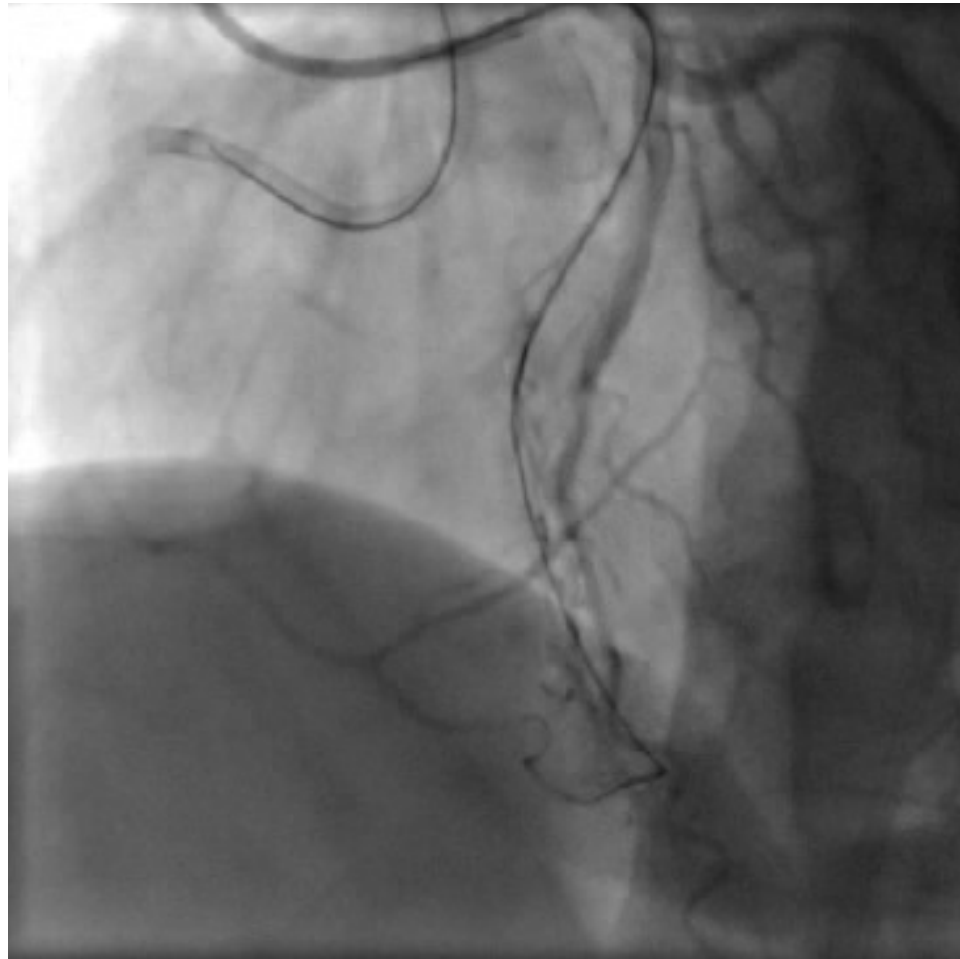
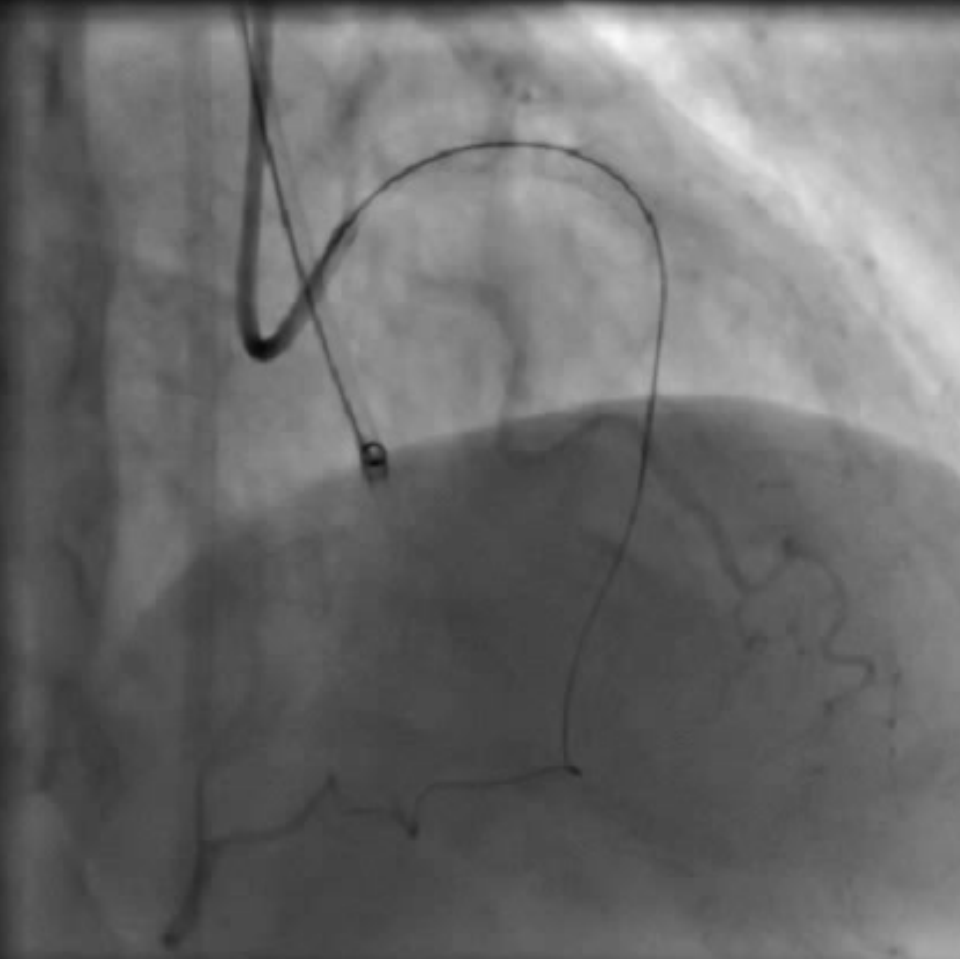


Probably,

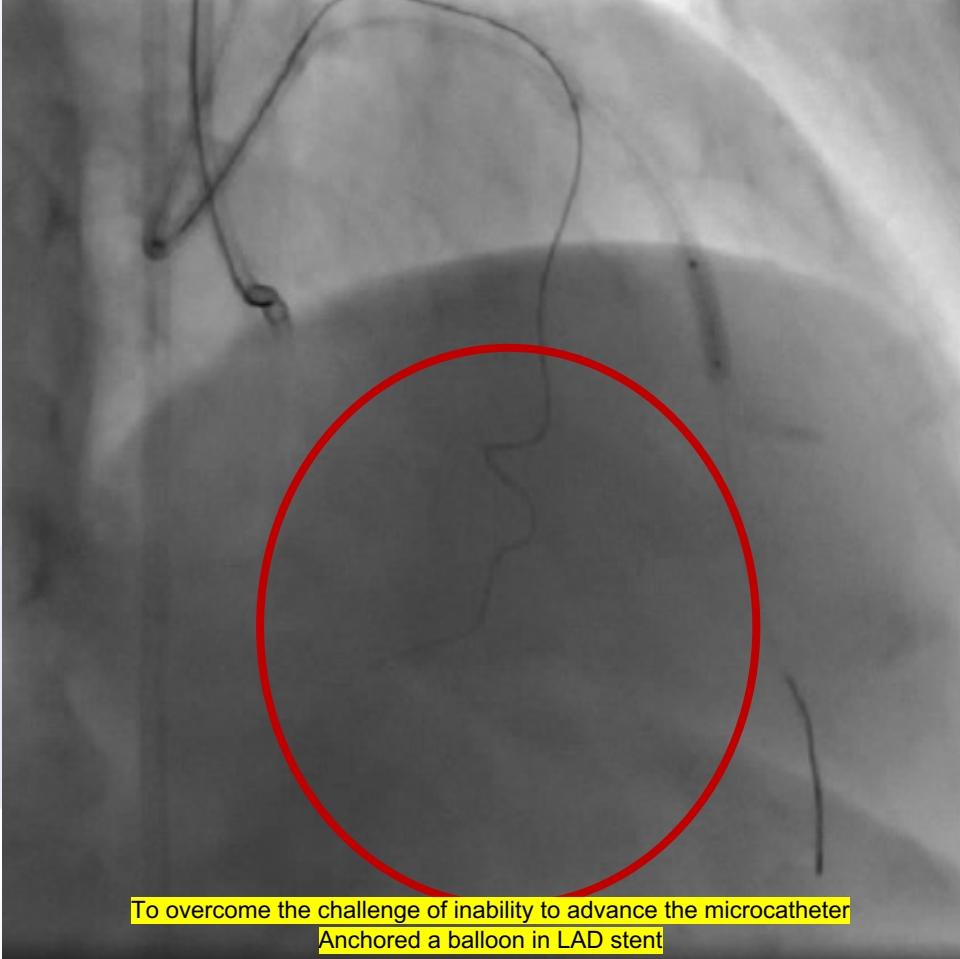
The tapered Fielder XT-R was in a CC-0 invisible connection that the Sion black could not engage  
Which is supported by tip injection



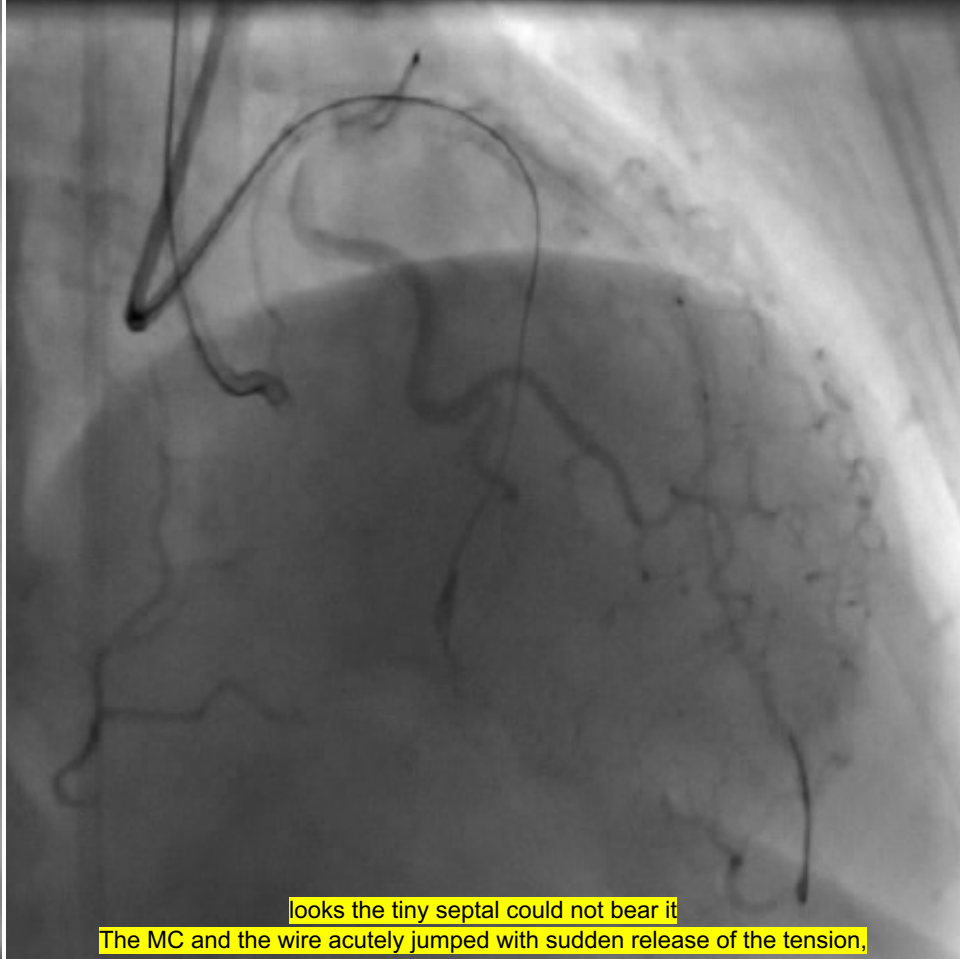
Tried other septals  
but none of them seemed promising



The devil you know,  
Back to the large septal with the Fielder XT-R



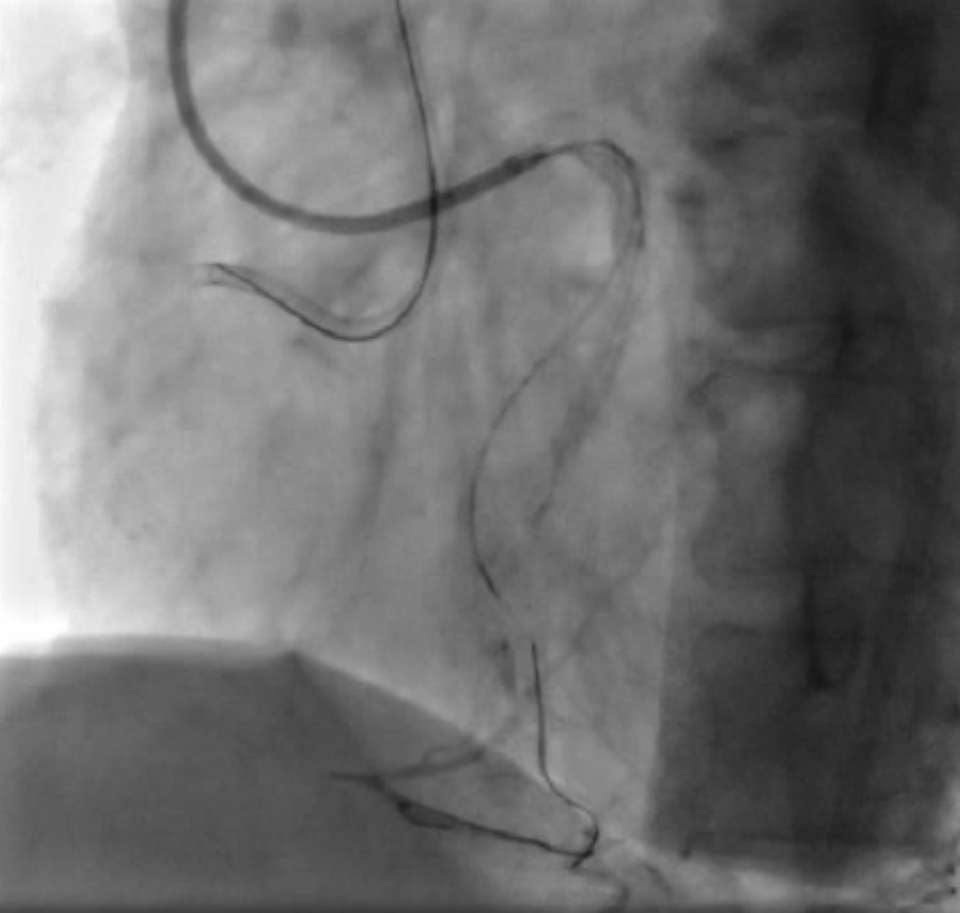
To overcome the challenge of inability to advance the microcatheter  
Anchored a balloon in LAD stent



looks the tiny septal could not bear it  
The MC and the wire acutely jumped with sudden release of the tension,

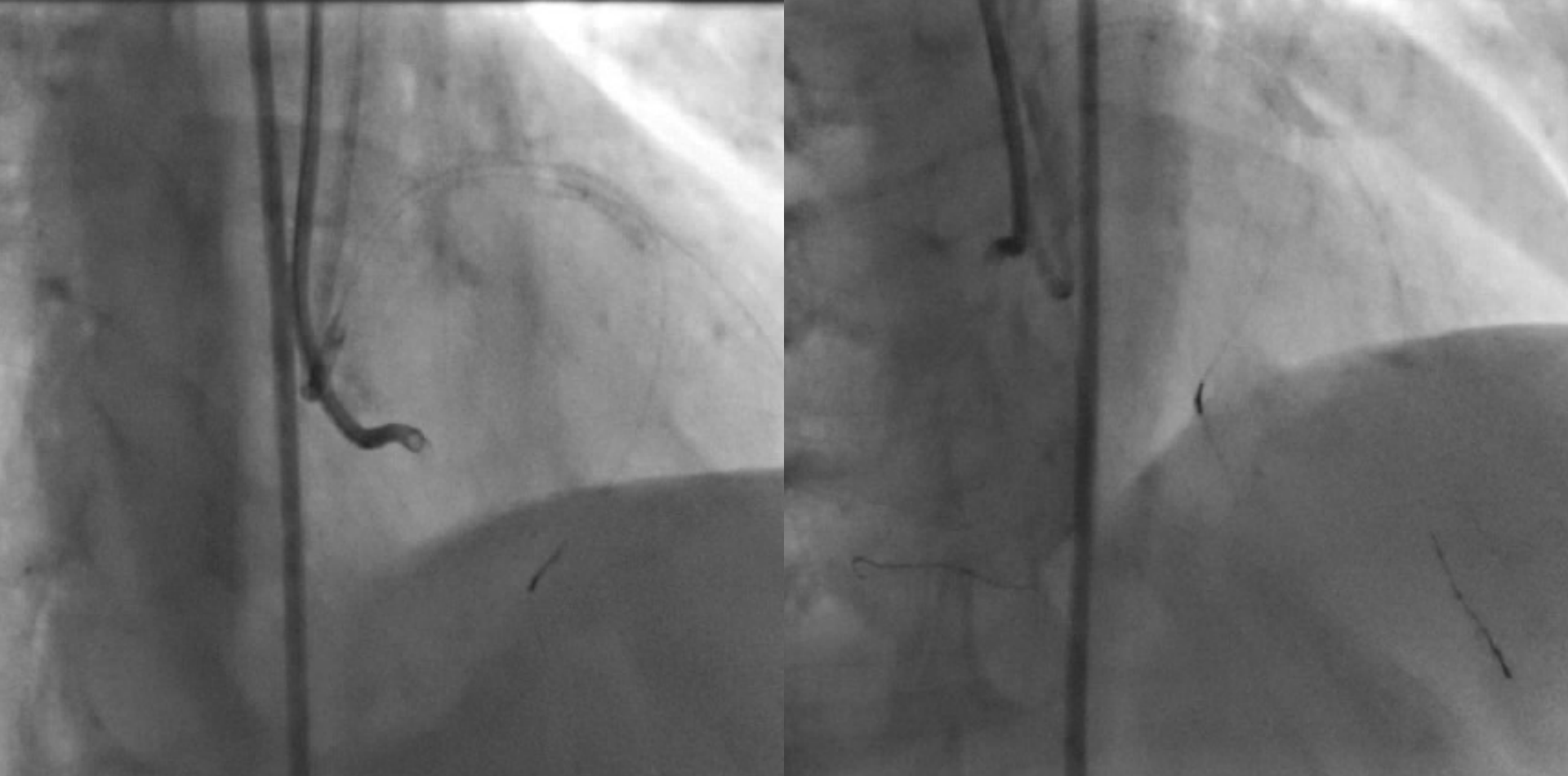
- 1) The perforator was damaged leading to a septal hematoma
- 2) Fielder XT-R is not my best option now





**Three good things**

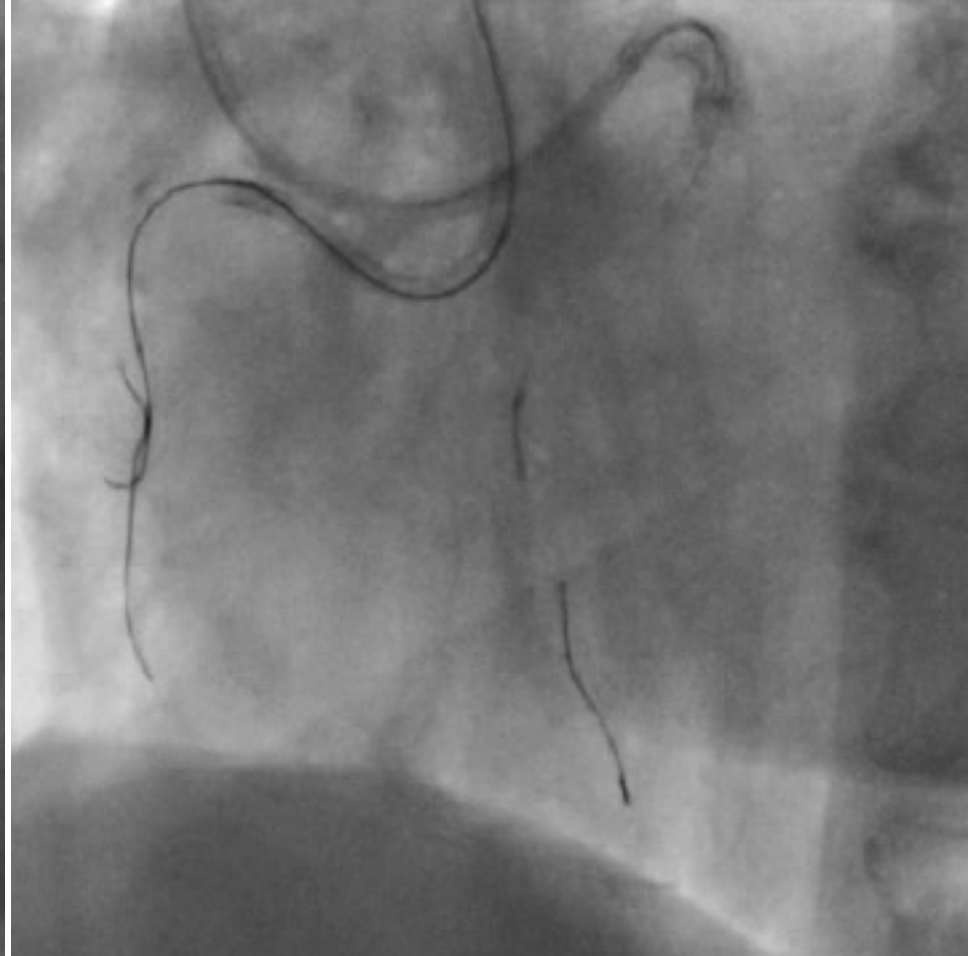
- 1) Hematoma was tiny thanks to an initially tiny septal,
- 2) The modification of the connection now permitted the sion black to cross to the PDA
- 3) With the sharp PDA bends, the Sion black made a knuckle that can safely traverse the remaining curves



Despite the better support offered by a knuckled Sion black that was advanced to mid RCA  
Neither my exhausted caravel, nor a new Turnpike LP could make its way into the PDA  
Forward torquing of the MC was expelling the EBU endangering to lose the hardly achieved progress



Because I can not straighten the knuckle,  
Wished the knuckle can be pushed into the aorta  
So I can snare it and finish the case, but it was too much wishful



Alternatively,  
kept the retrograde wire as marker,  
Tried a Gaia 3rd antegradely through the Caravel, but only advancing subintimal

## Wrapping up where I am stuck,

A ***stuck retrograde microcatheter*** in the septum

A ***knuckled Sion black wire*** at the distal cap

An antegrade ***Gaia 3rd extending subintimally***

To finish RWE with ***rendez-vous***,

➔ **need to straighten the Sion knuckle**

To finish with ***r-CART***,

➔ **need to straighten the Sion knuckle**

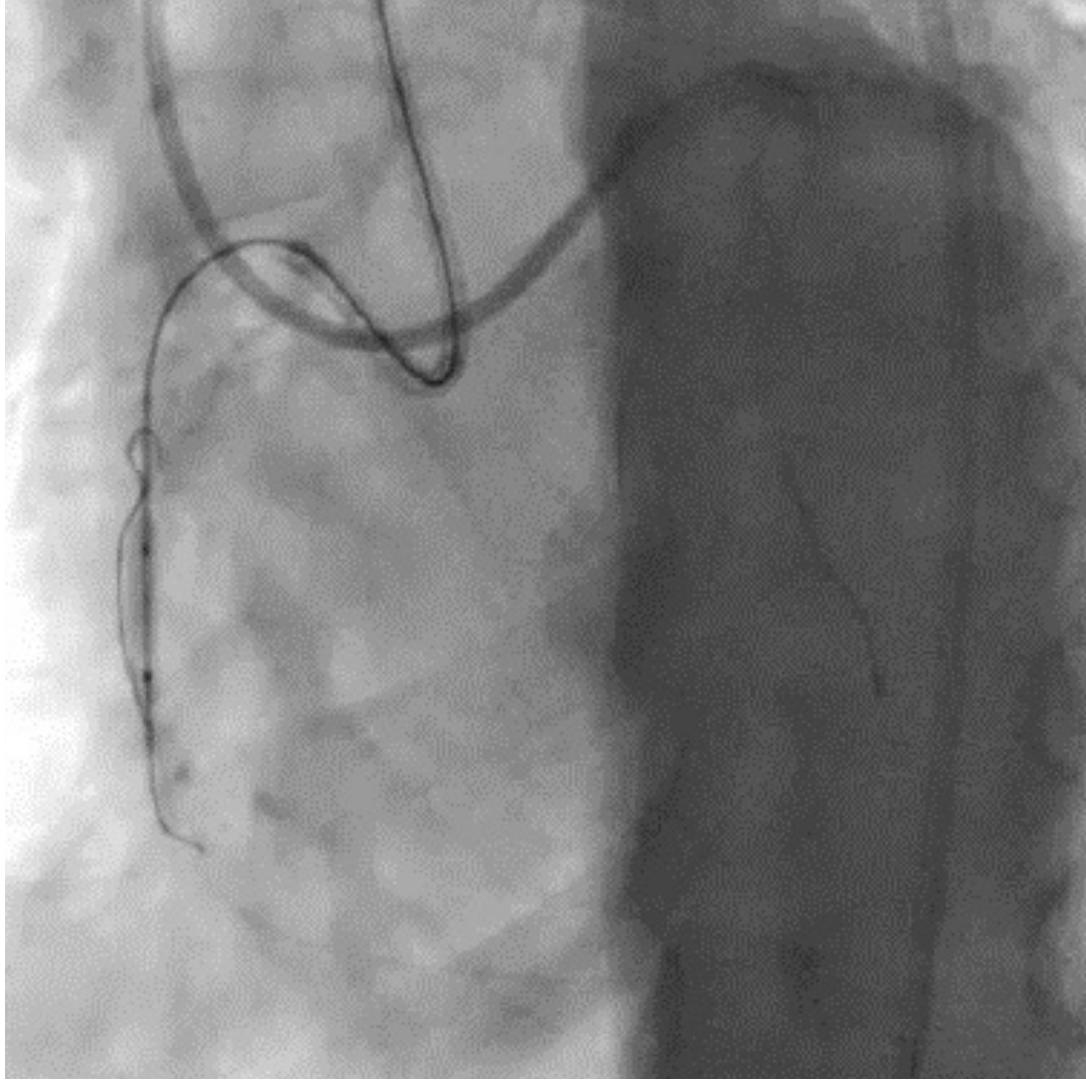
***To straighten the knuckle***,

➔ **need to advance the retrograde MC**

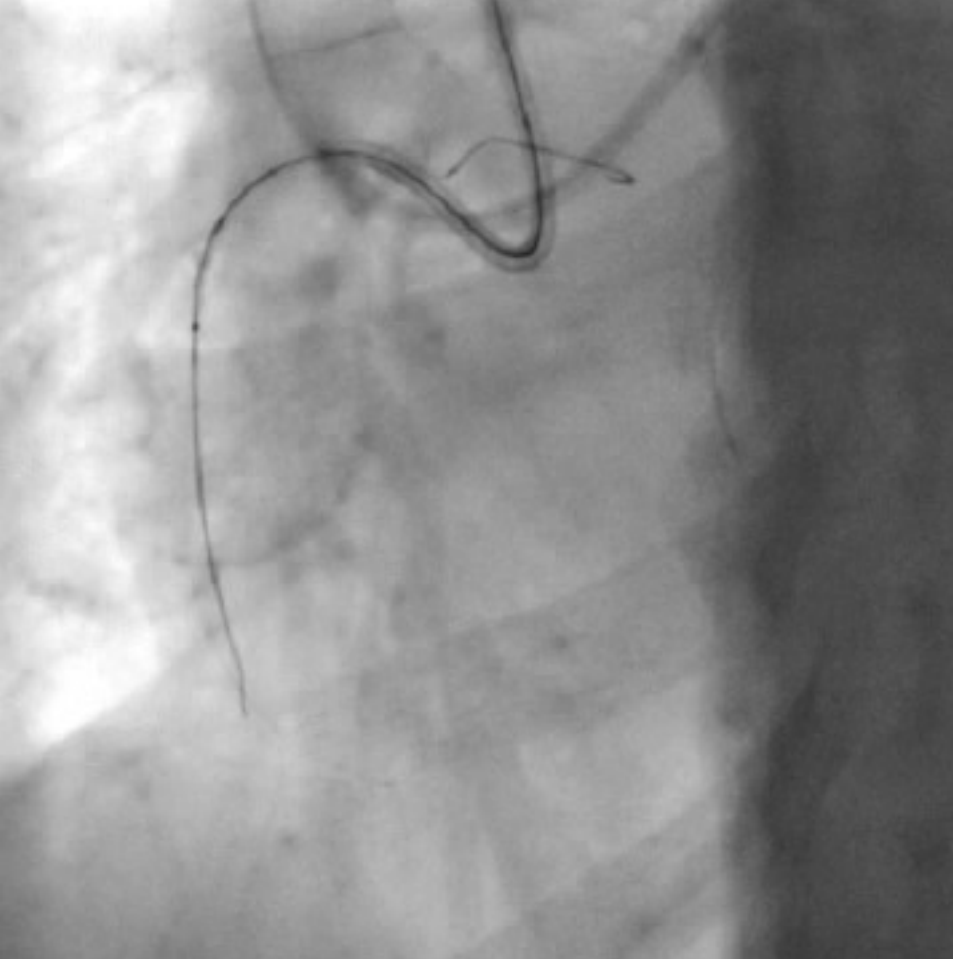
**Which I failed to do**

## Defeating the challenge Straightening the knuckle

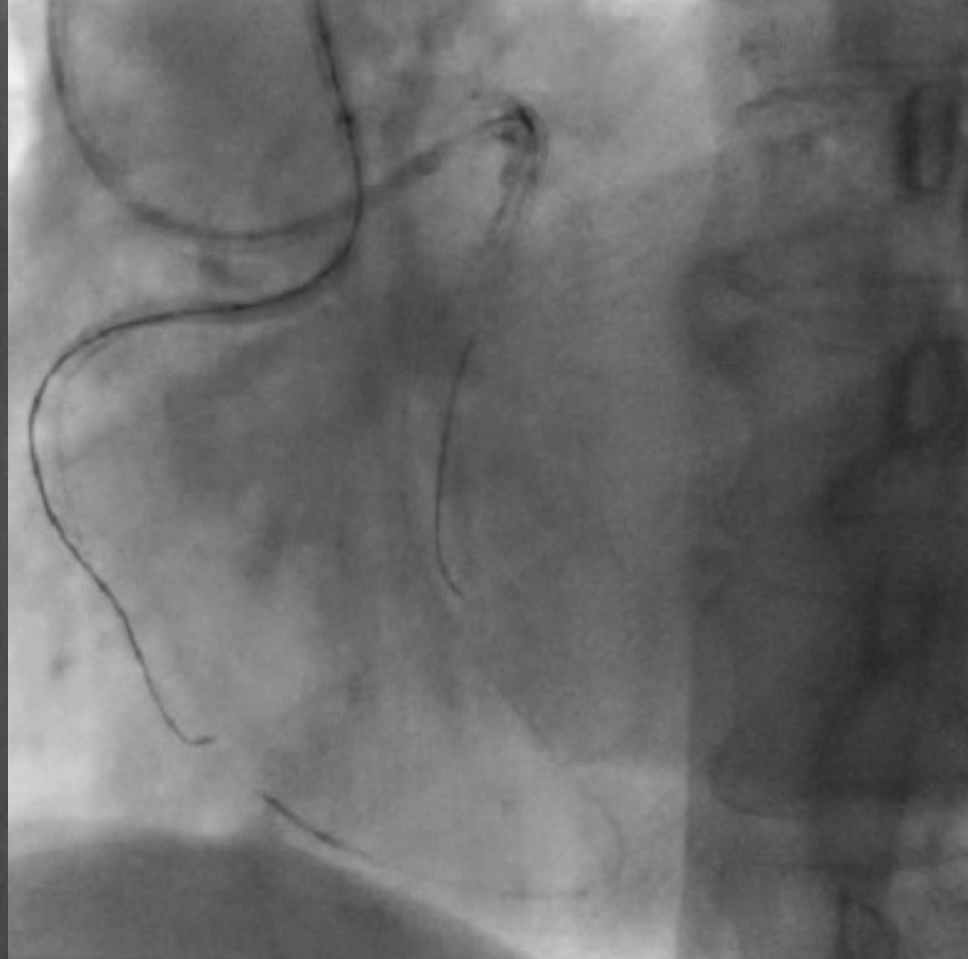
2.5 mm NCB over the antegrade Gaia





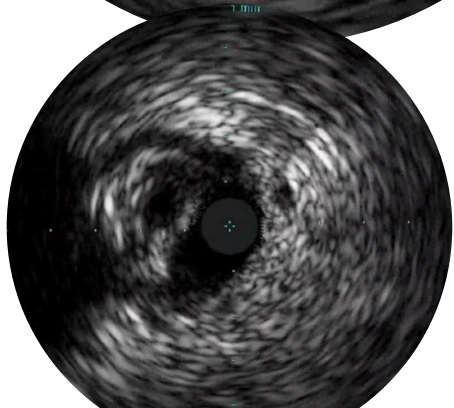
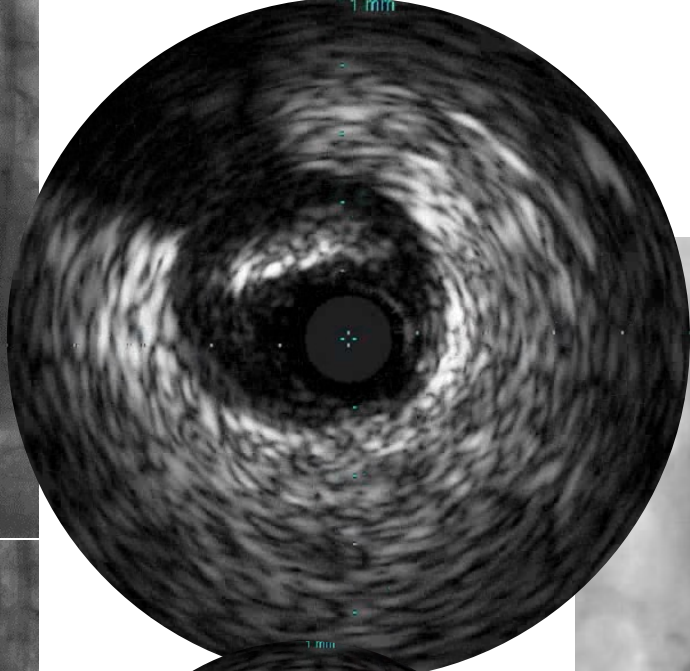
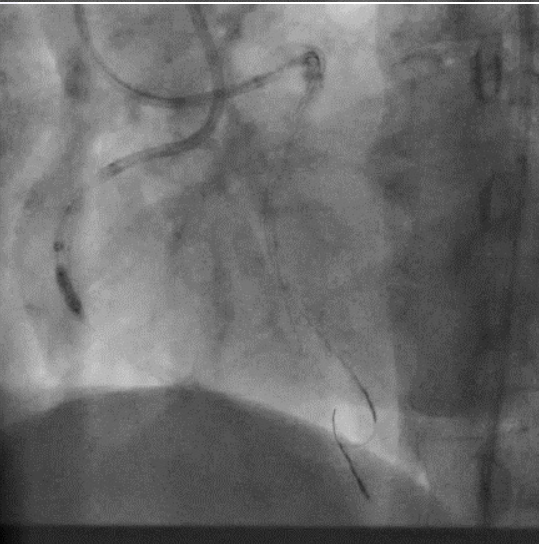
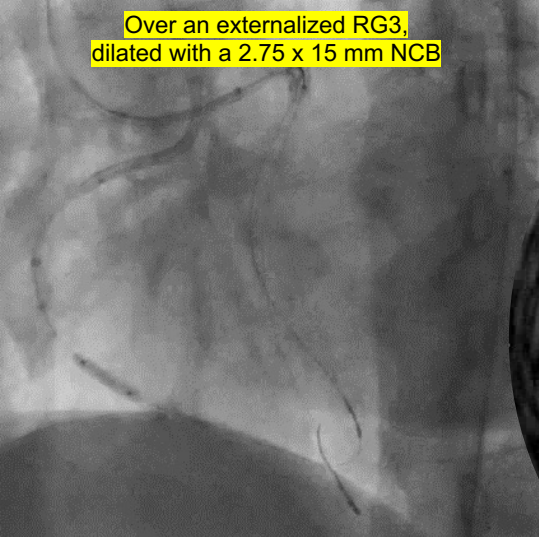


Now, with a straight retrograde wire  
Guideliner R-CART  
Sion black wire externalized into the aorta

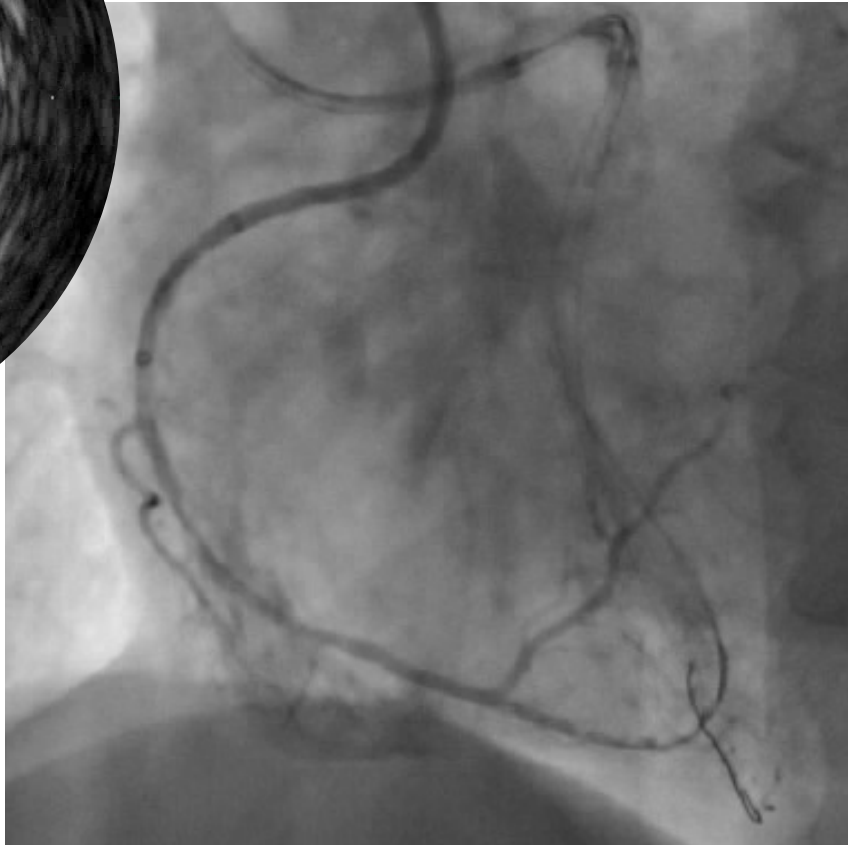


Redirected the Sion black into the antegrade guide  
Trapped with a NCB, and gave the needed support to advance the microcatheter

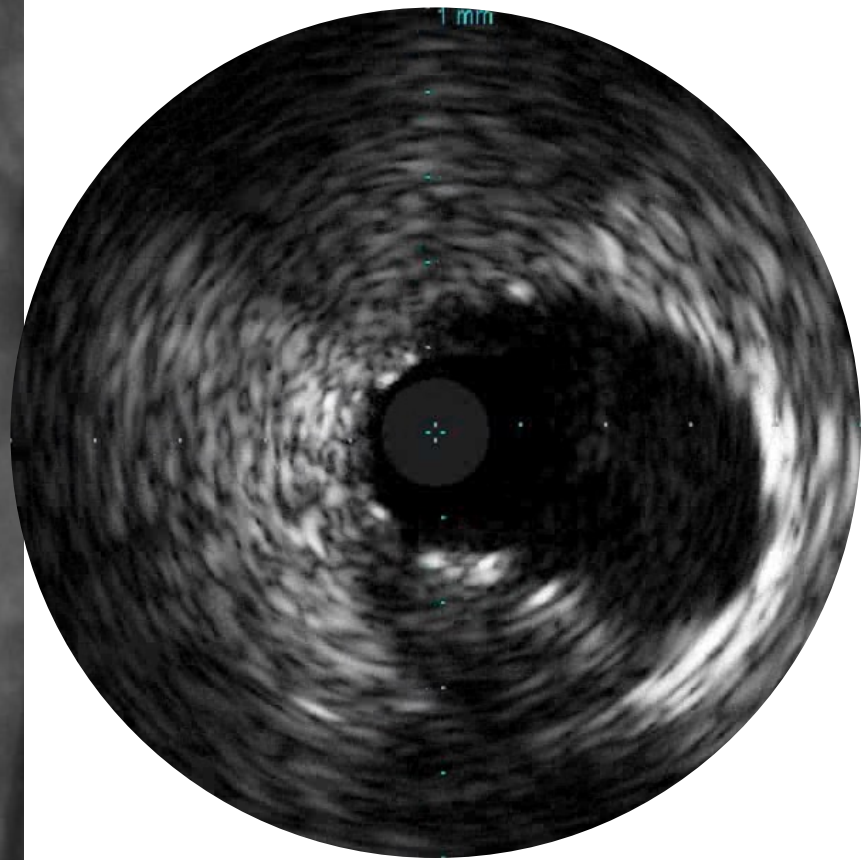
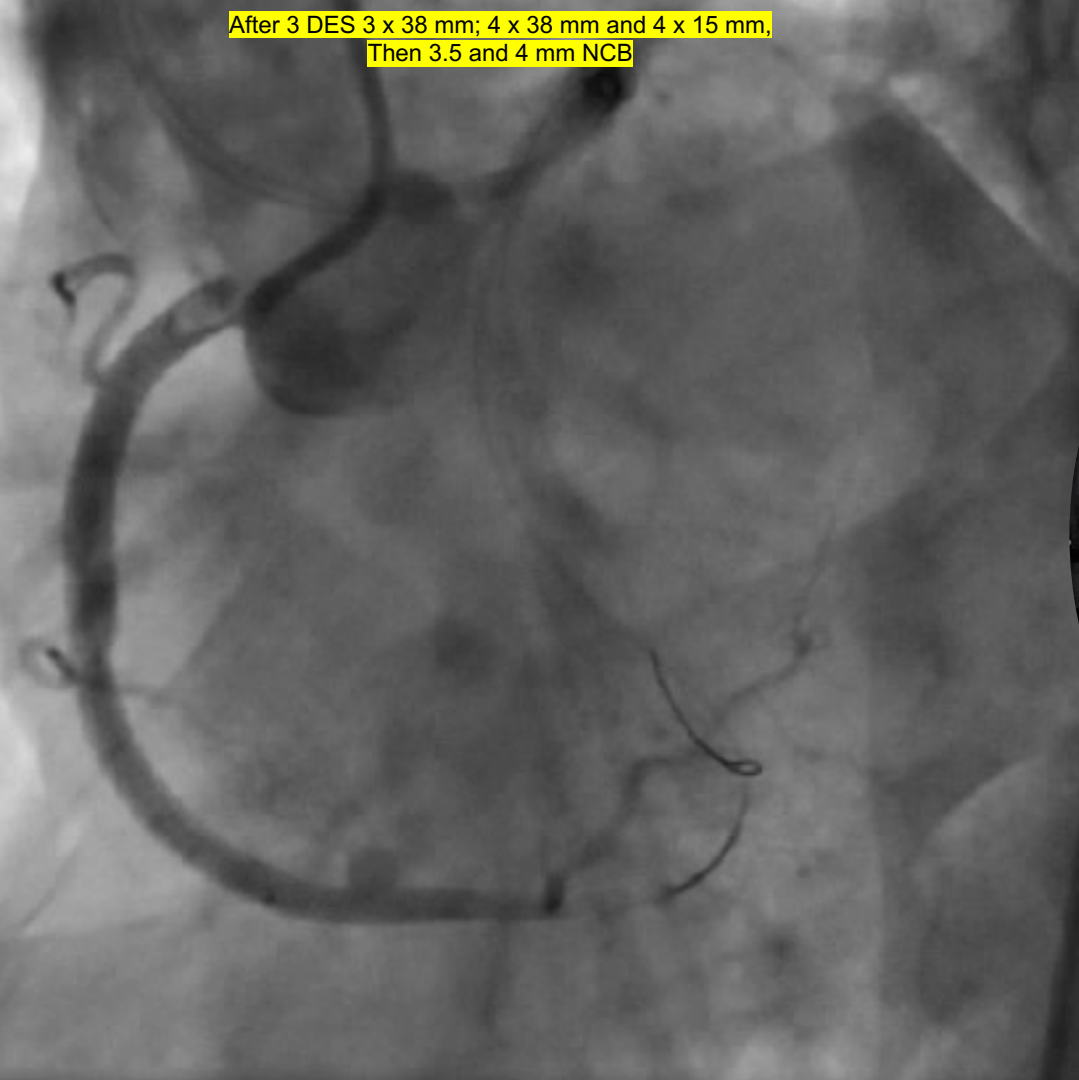
Over an externalized RG3,  
dilated with a 2.75 x 15 mm NCB



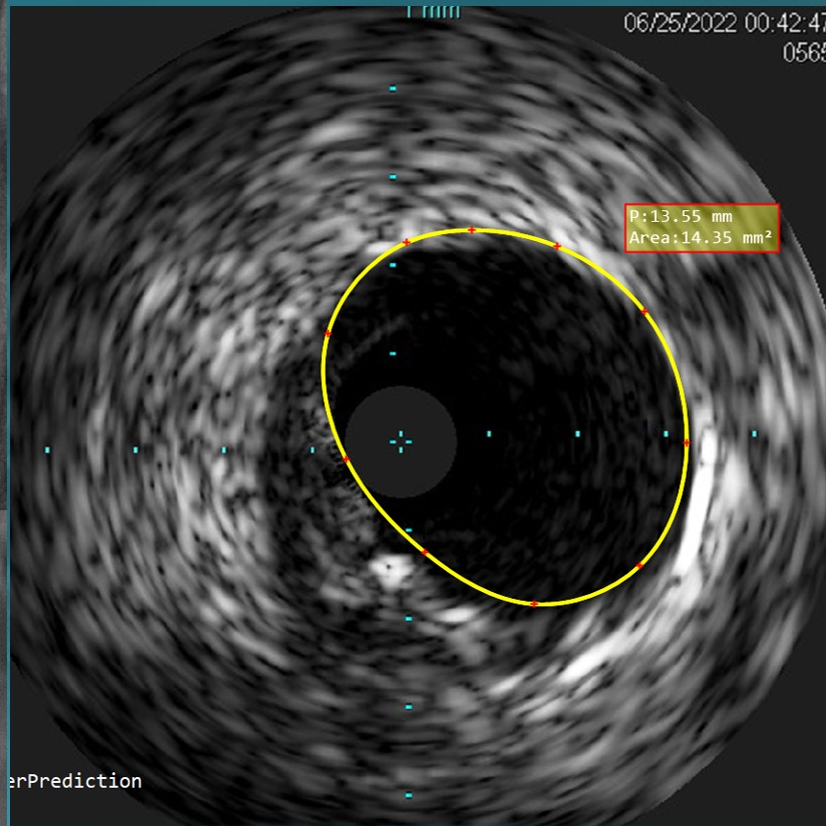
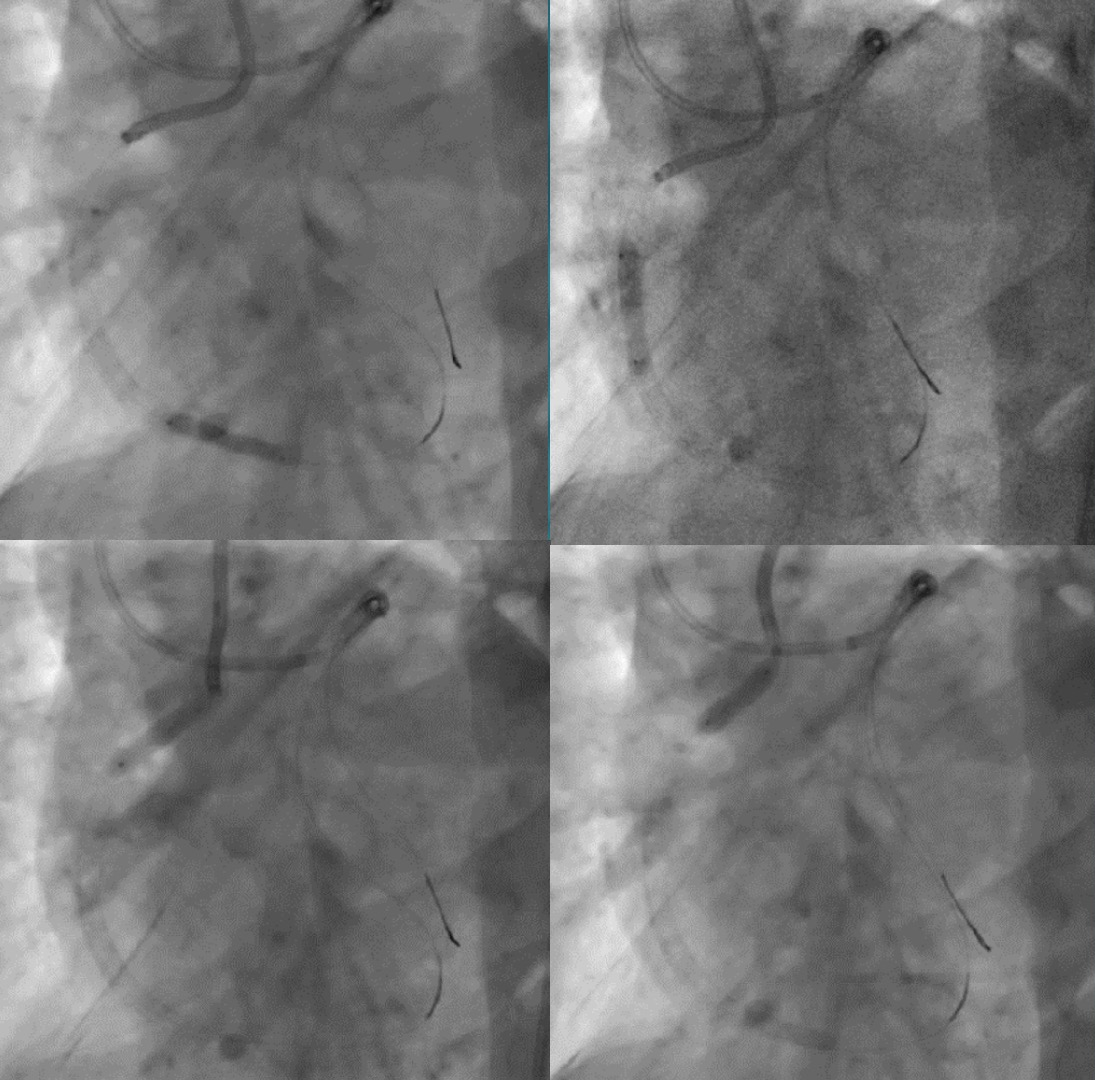
CTO segment was canalized by RDR



After 3 DES 3 x 38 mm; 4 x 38 mm and 4 x 15 mm,  
Then 3.5 and 4 mm NCB



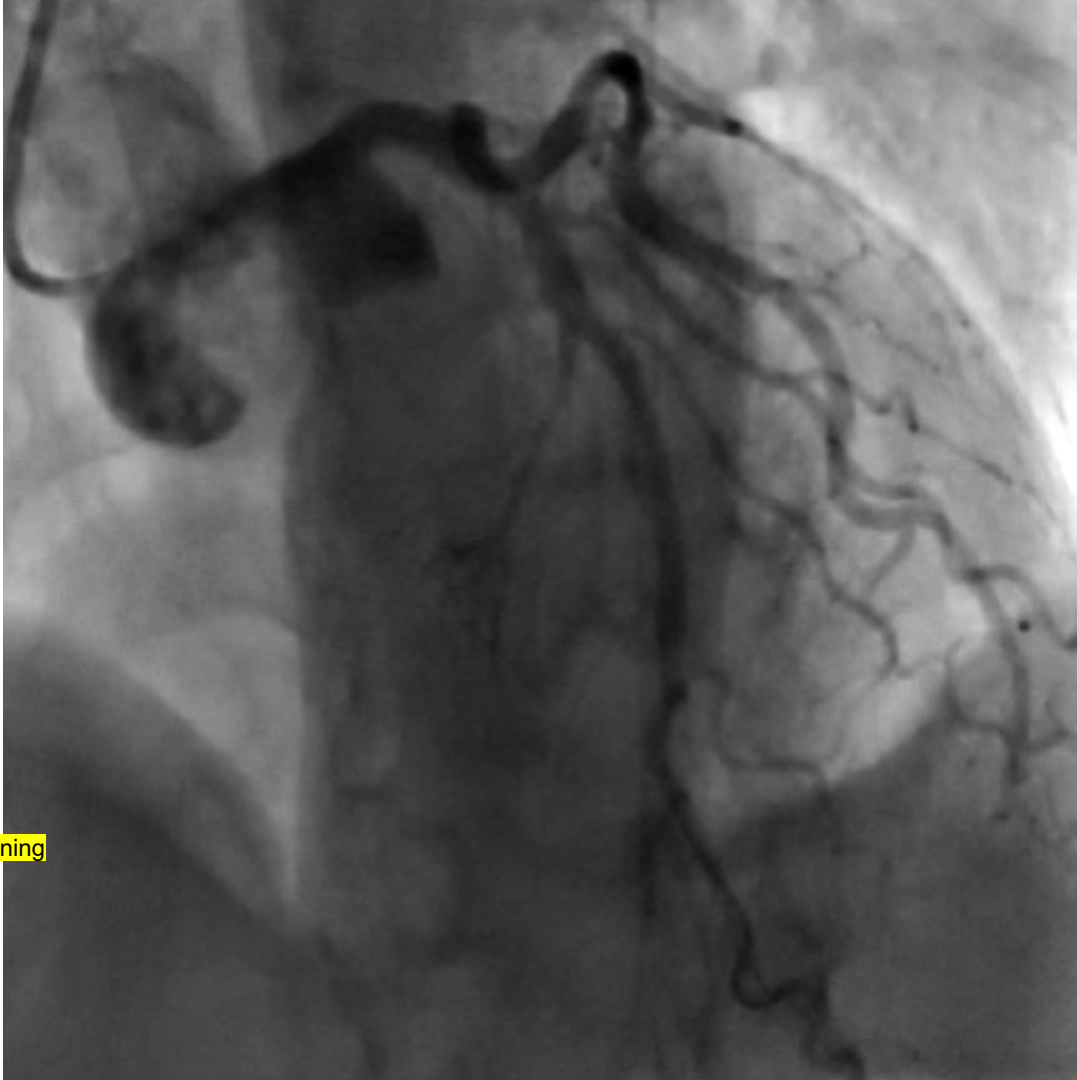




Further optimizations by 3 x 20 mm and 4.0 x 18 mm NCB, ending with MSA of >14 mm<sup>2</sup> at the calcific portion of the px RCA [px cap]



Final result



Checking the donor vessel and the septal staining



# Lessons learnt from the case

**Underestimating a CTO can be the easiest way to fail, a few mm on the screen can be miles away to success**

**Single projection can frequently be deceiving, Reconstructing orthogonal shots into 3D understanding is critical for complex coronary work**

**Structured and organized thinking are the best way to defeat challenges**



*Thank You*