

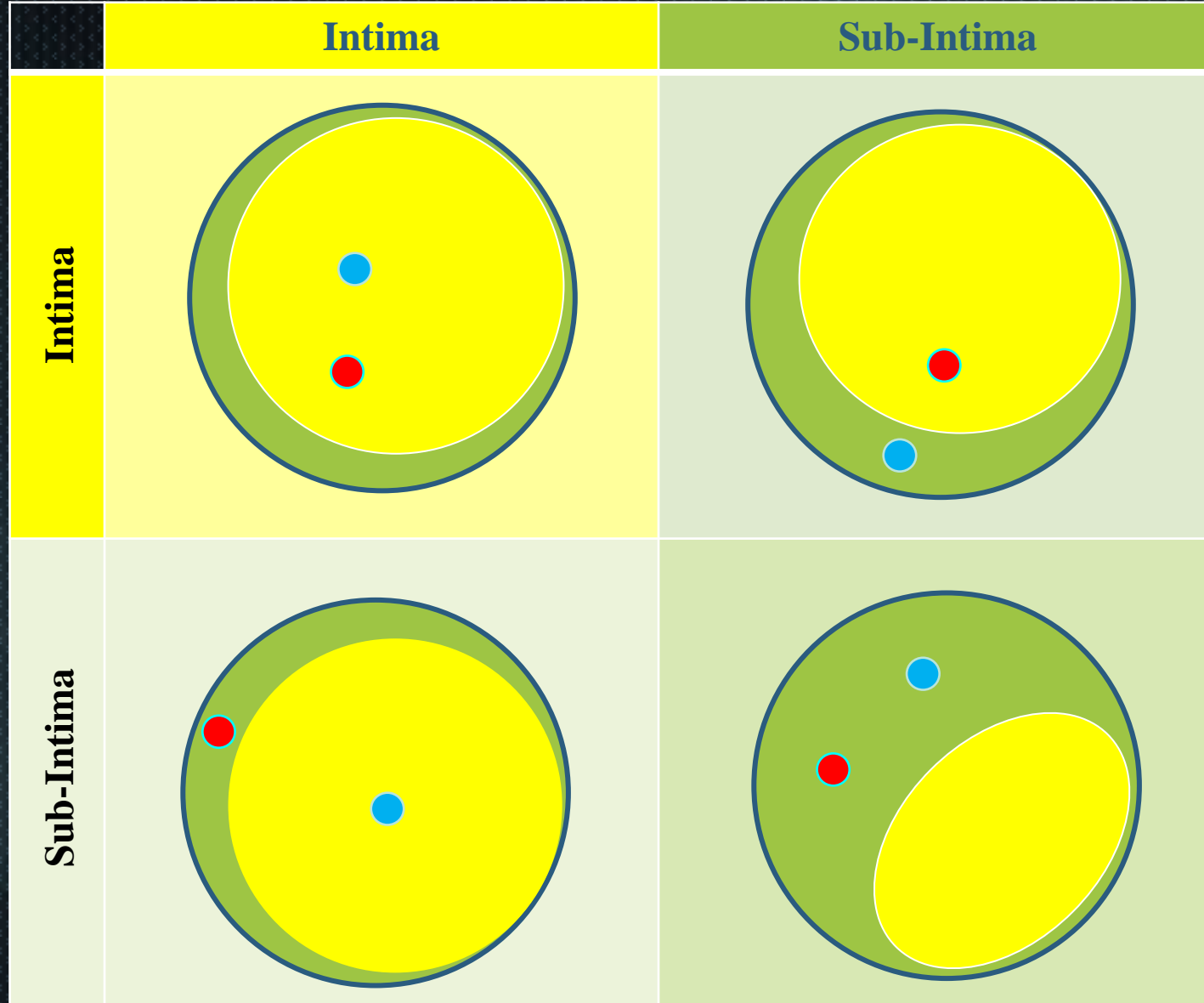
Smart use of Reverse CART technique in difficult situation

Kenya Nasu, MD, FACC

Toyohashi Heart Center, Japan

● Retrograde wire position

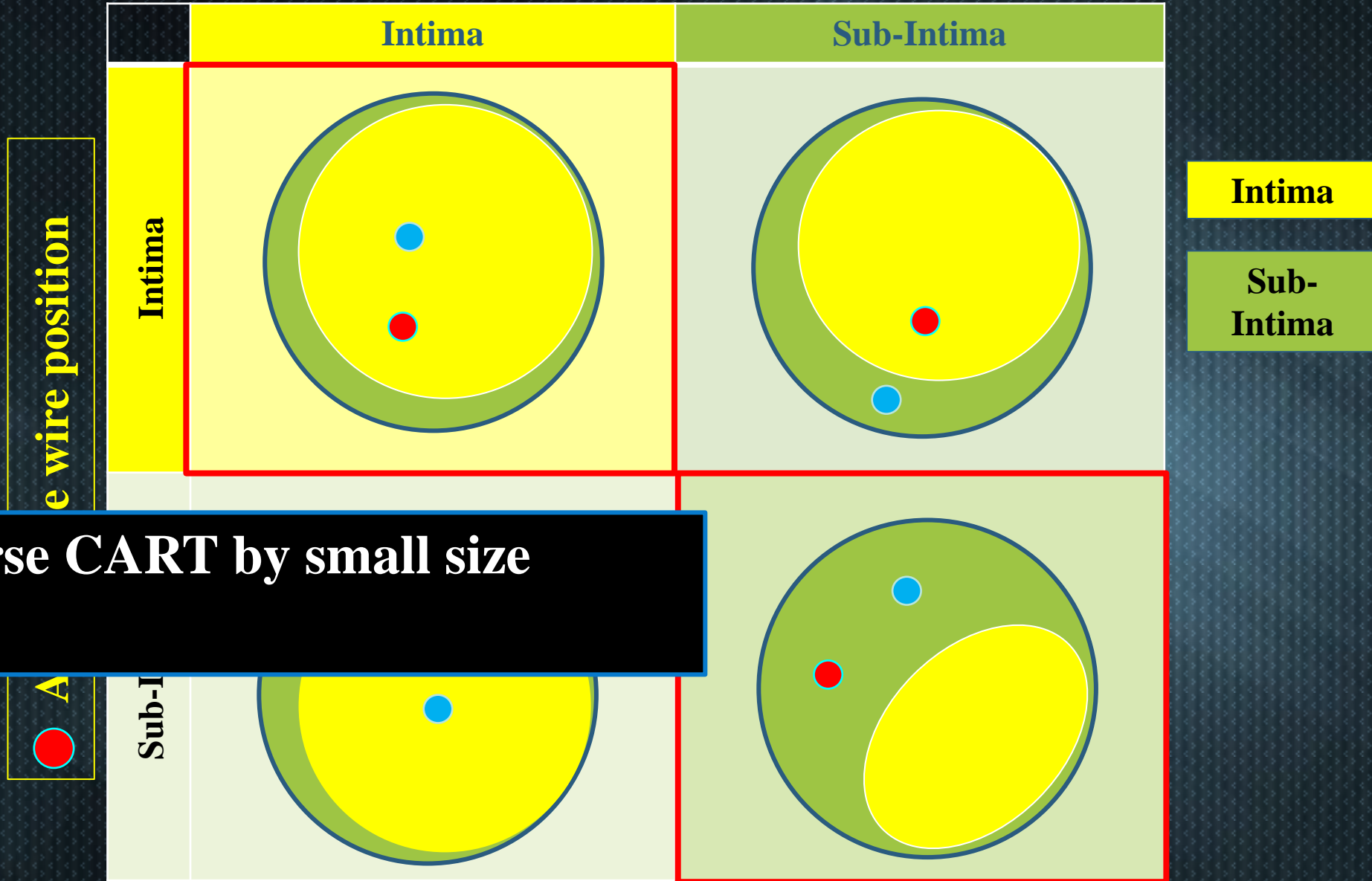
● Antegrade wire position



Intima

Sub-Intima

● Retrograde wire position

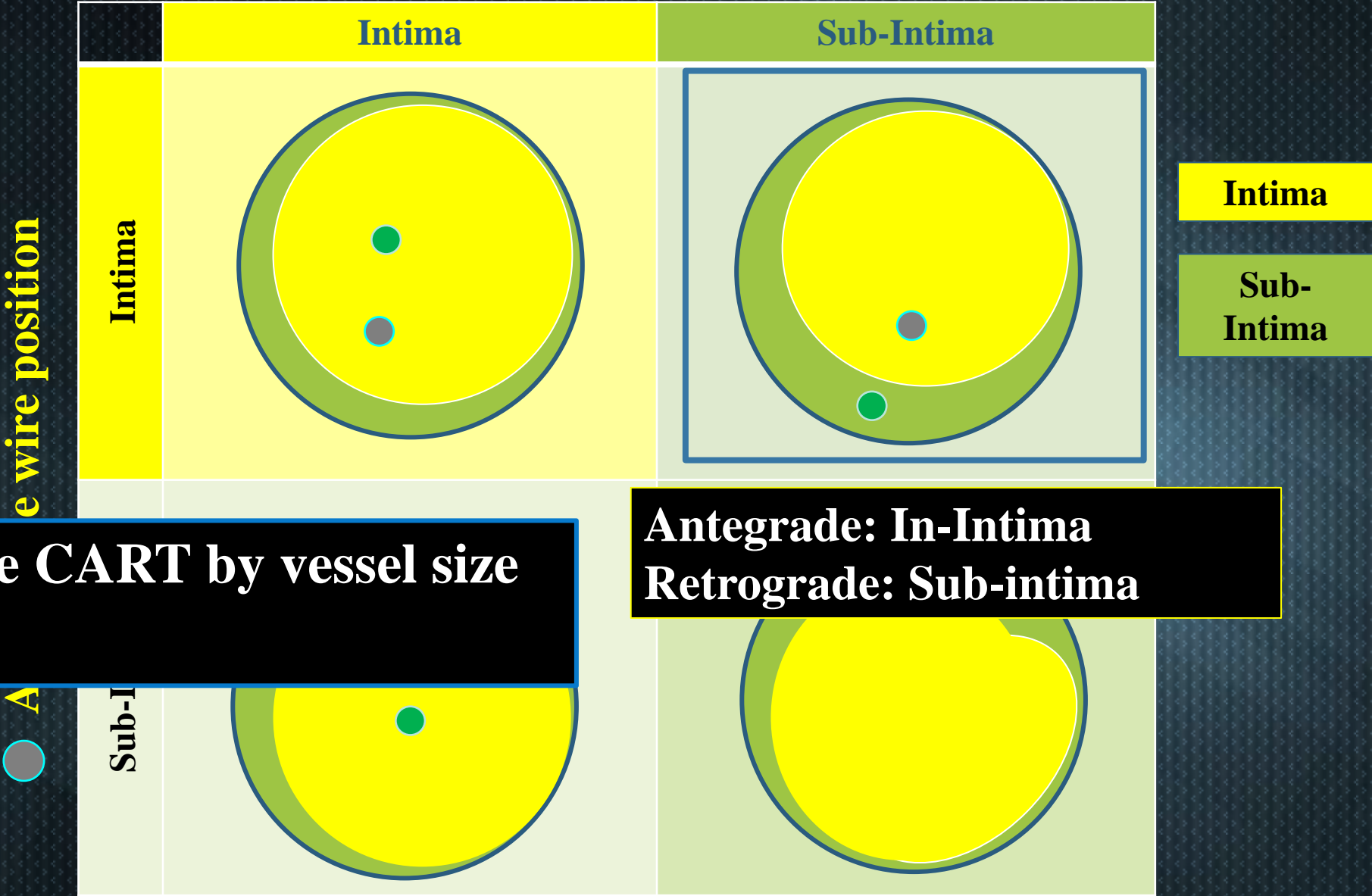


1. Reverse CART by small size balloon

When both wires are in same space (In-intima or sub-intima)

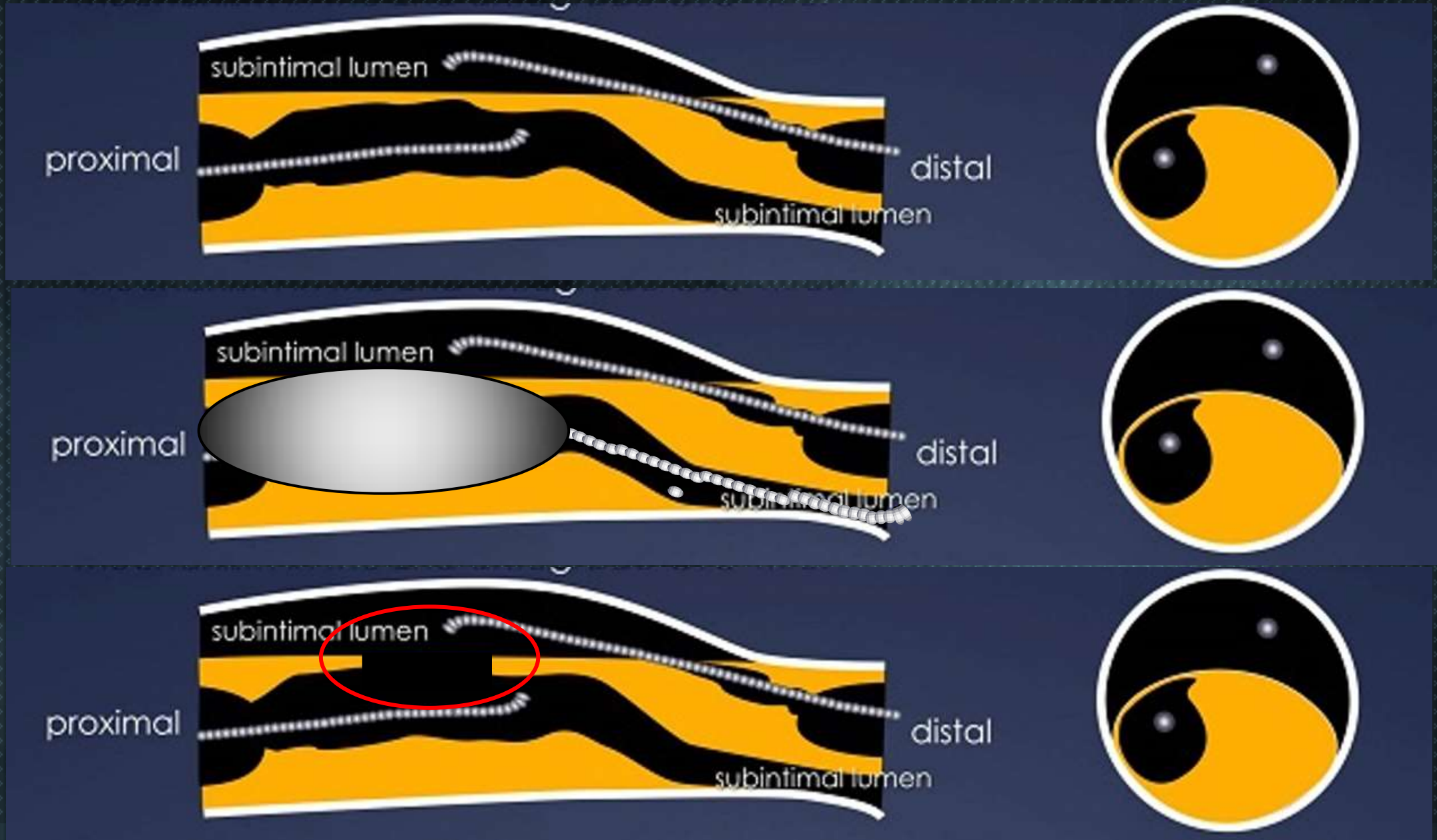
- **Closer distance between antegrade and retrograde wires before antegrade ballooning is better to complete reverse CART more easily.**
- **IVUS is useful to not only detect wire position but also decide balloon size for reverse CART.**
- **Making connection between both wires is relatively easy by small balloon dilatation.**

● Retrograde wire position



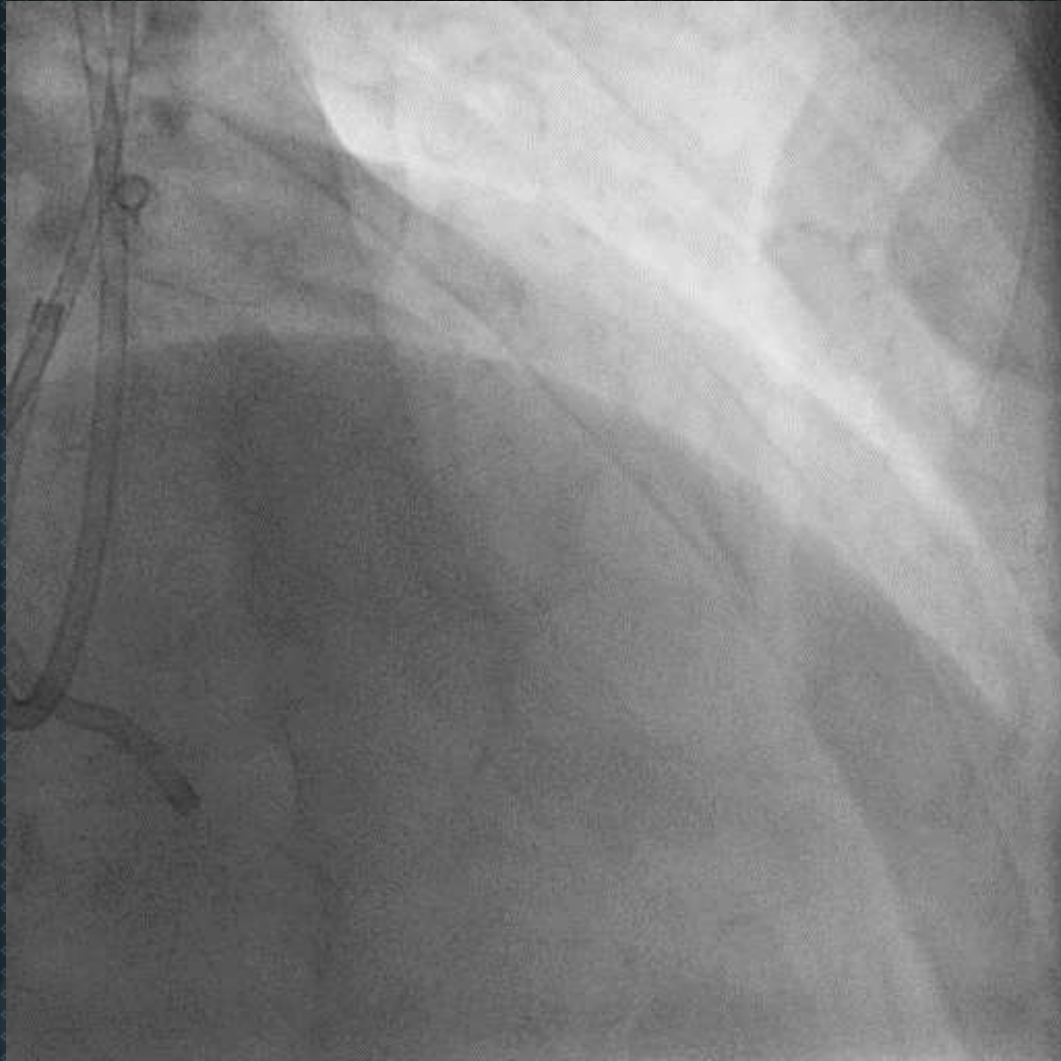
1. Reverse CART by vessel size balloon

Basic concept of reverse CART



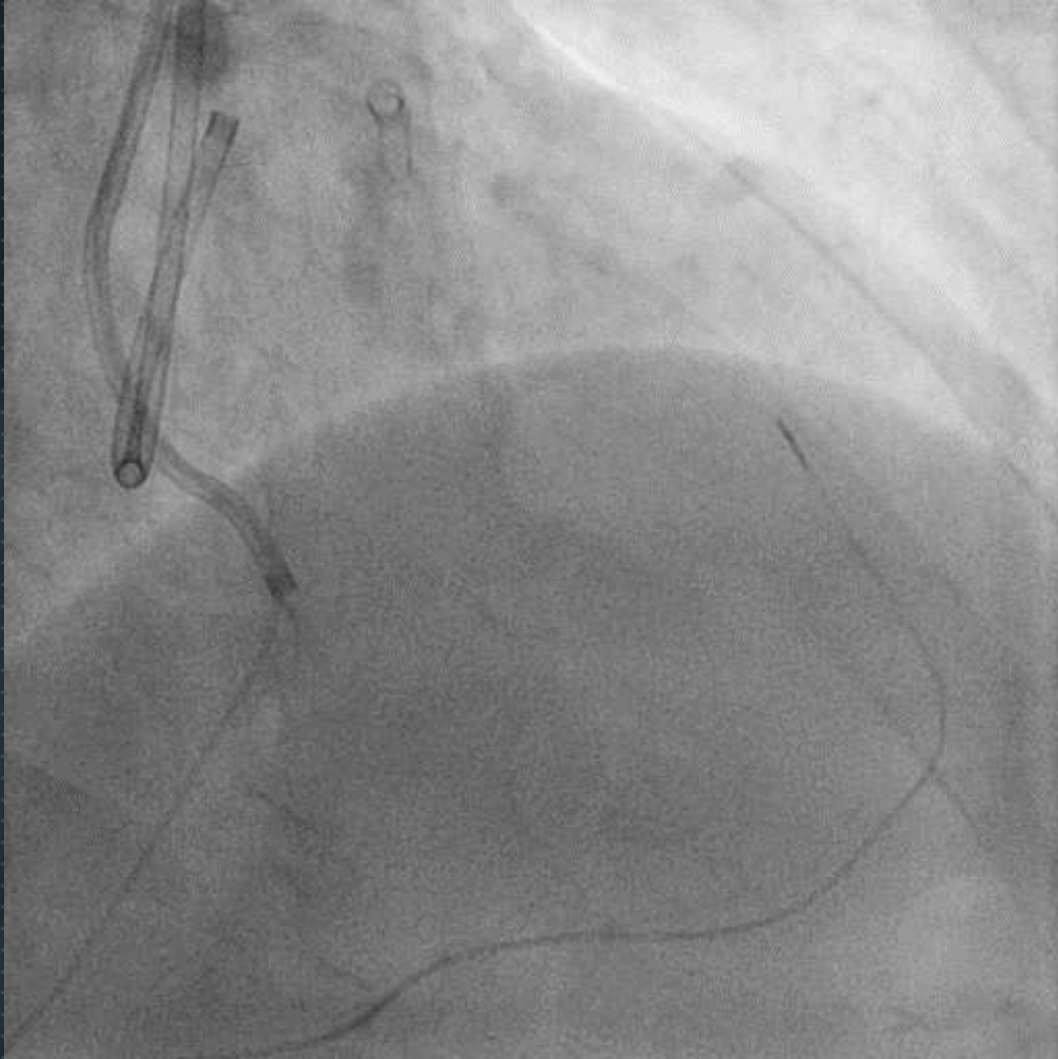
Case: LAD CTO

✓ Long LAD CTO



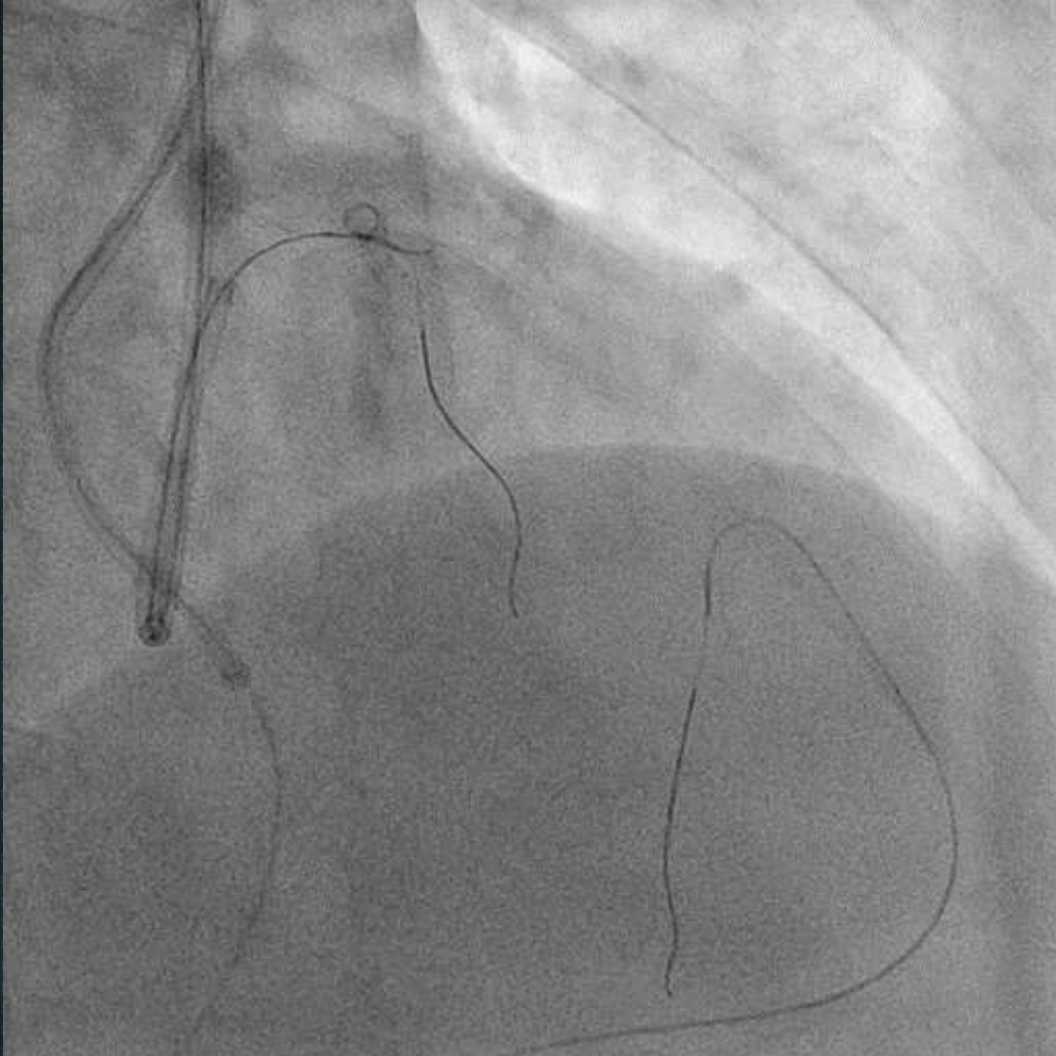
Case: LAD CTO

- ✓ Long LAD CTO
- ✓ Blunt type of distal cap

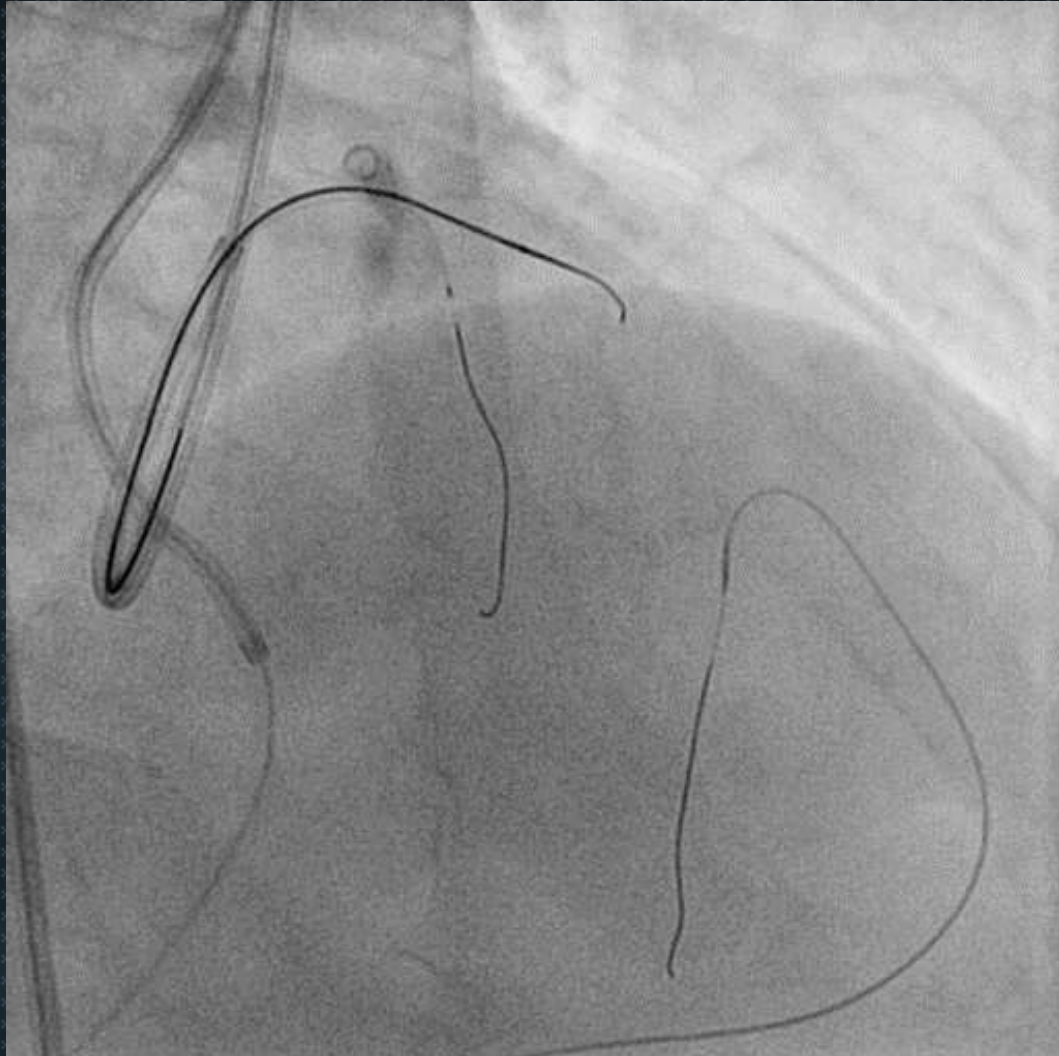


Case: LAD CTO

- ✓ Long LAD CTO
- ✓ Blunt type of distal cap
- ✓ Occlusion length >5cm

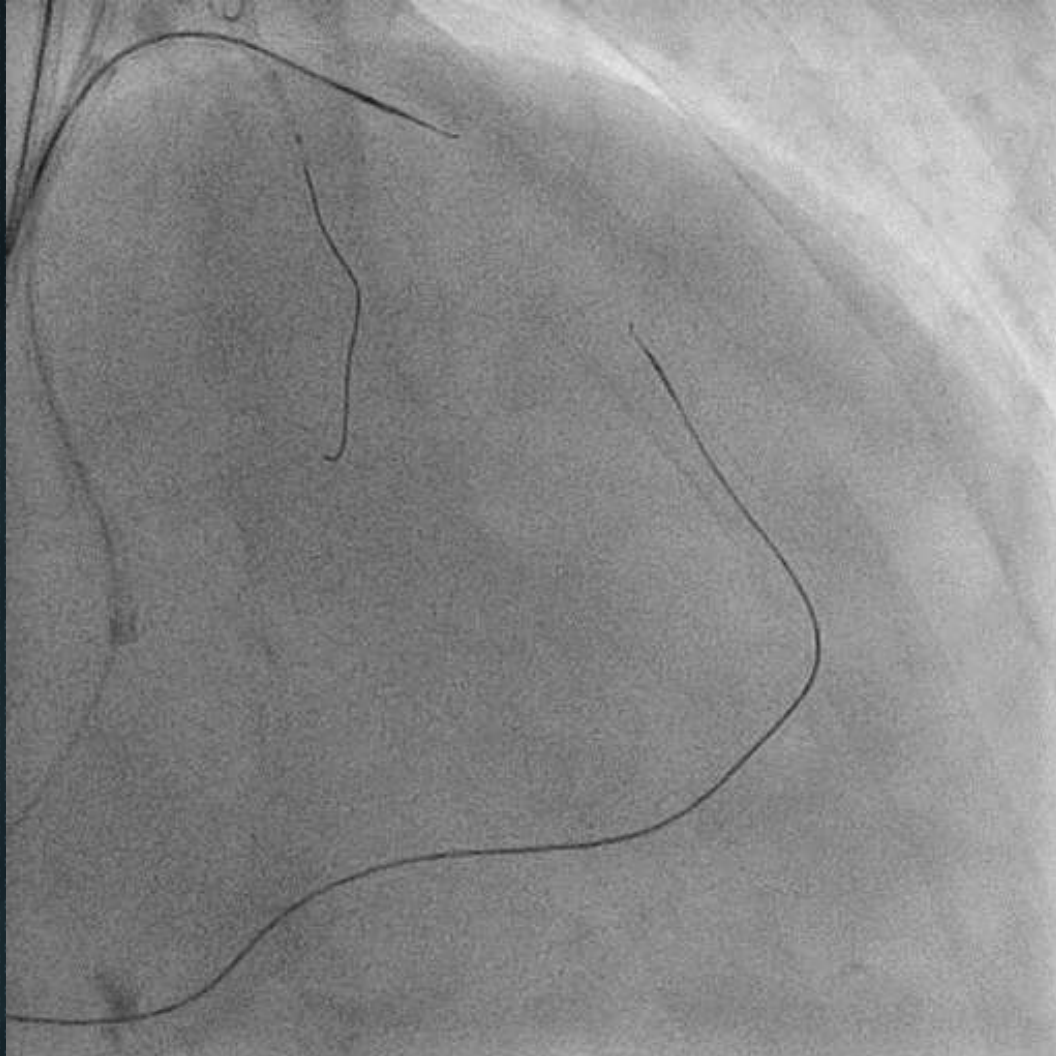


Case: LAD CTO



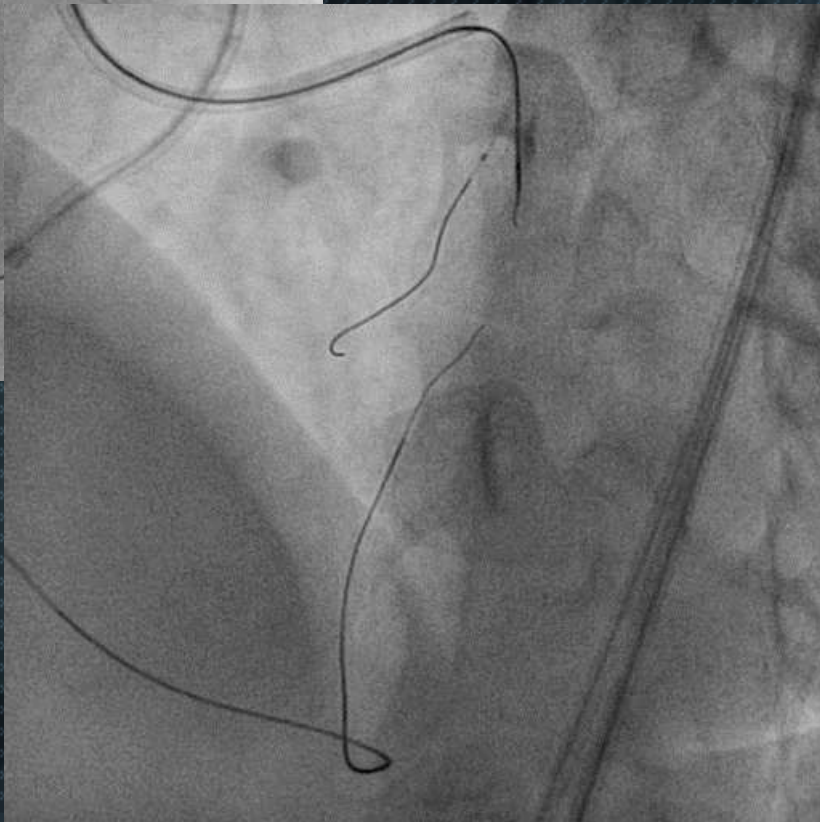
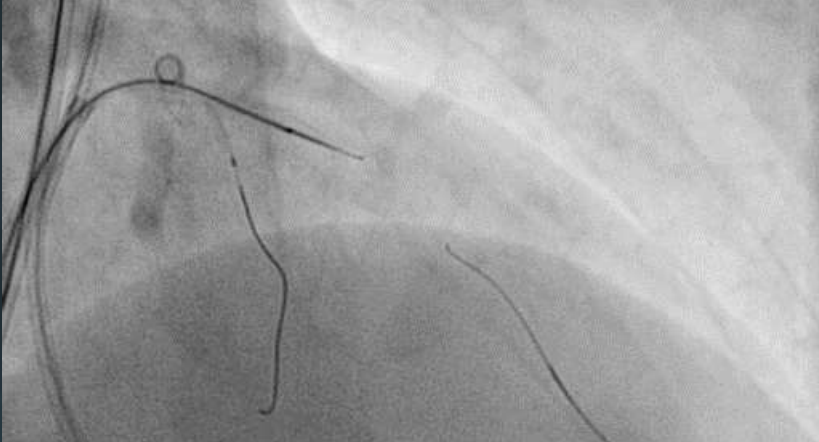
- ✓ Long LAD CTO
- ✓ Blunt type of distal cap
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- ✓ Antegrade preparation
GAIA Next 2 with CARAVEL→UB3

Case: LAD CTO



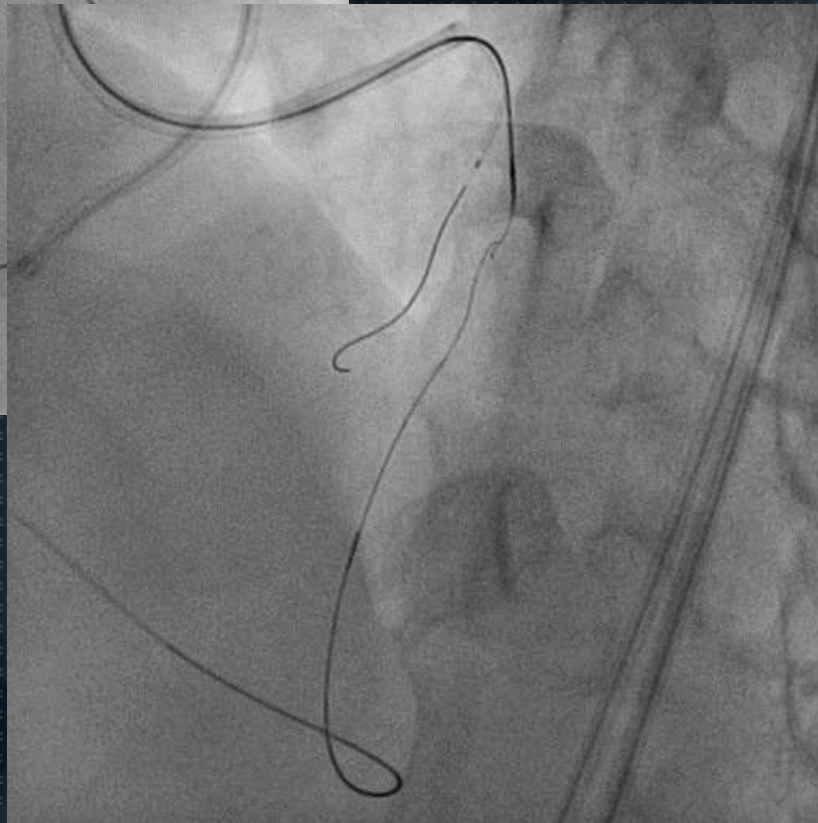
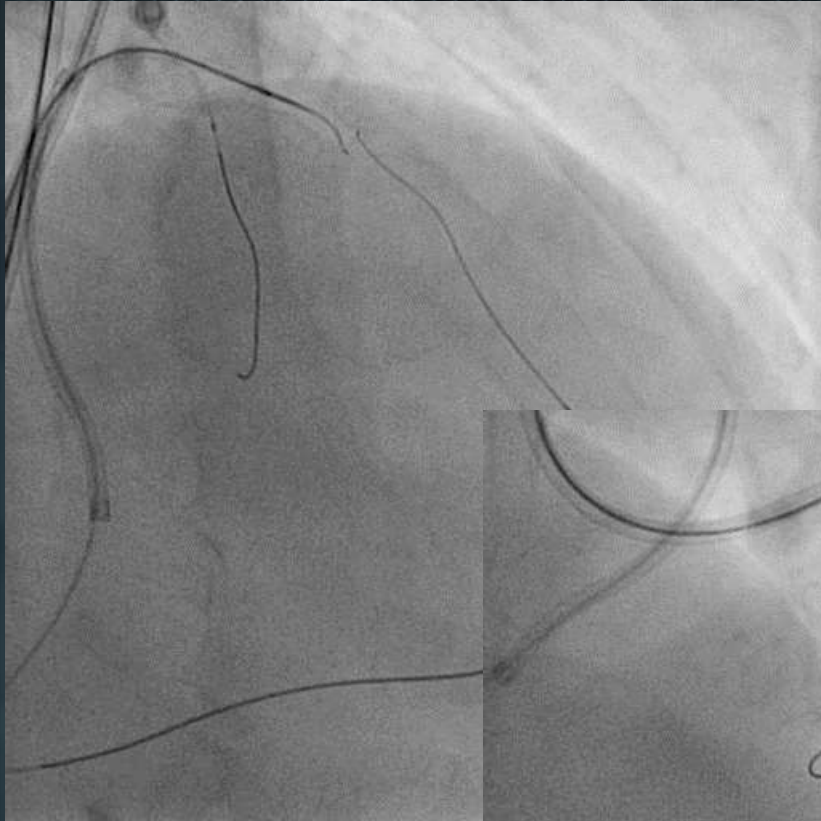
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GAIA Next 2 with CARAVEL→UB3
- ✓ Retrograde approach
- ✓ GAIA Next 1 with CARAVEL→Next2 for puncture

Case: LAD CTO



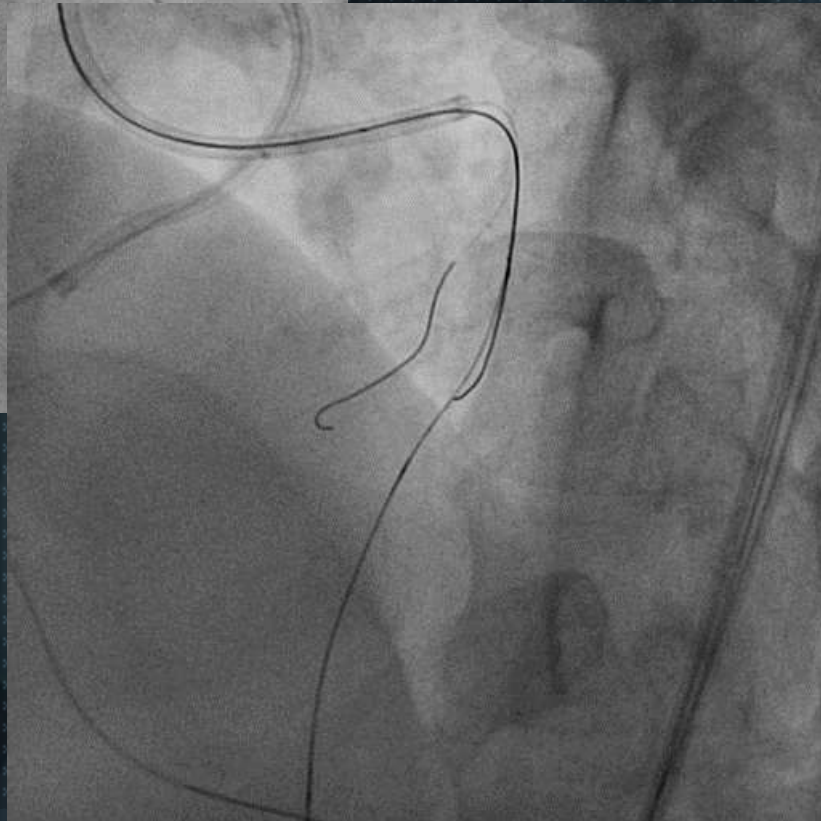
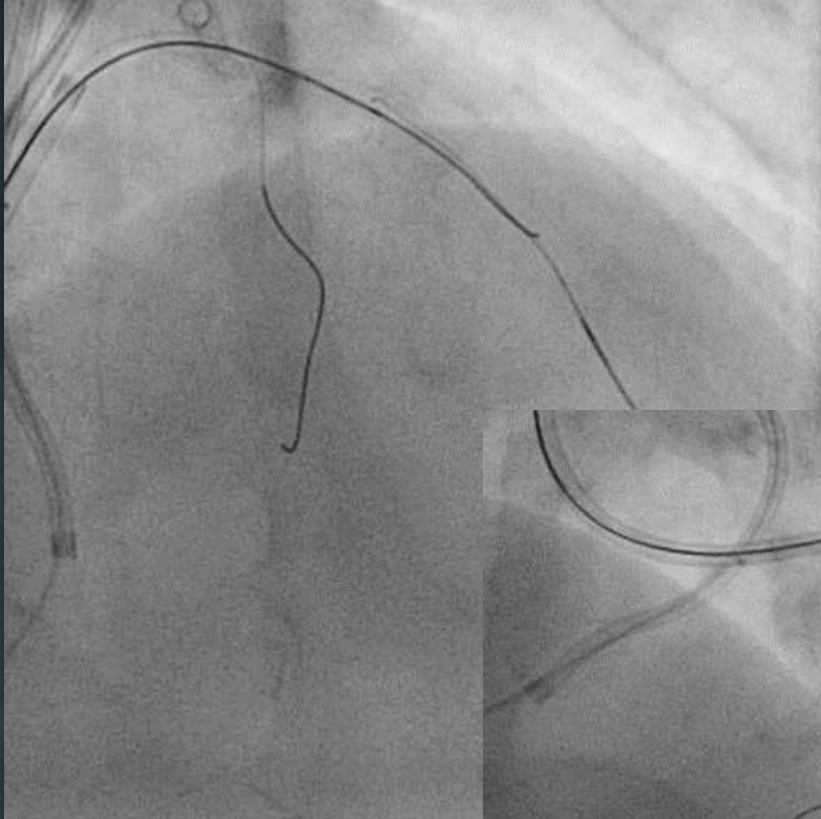
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GAIA Next 2 with CARAVEL→UB3
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- ✓ Step down to UB3

Case: LAD CTO



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Case: LAD CTO



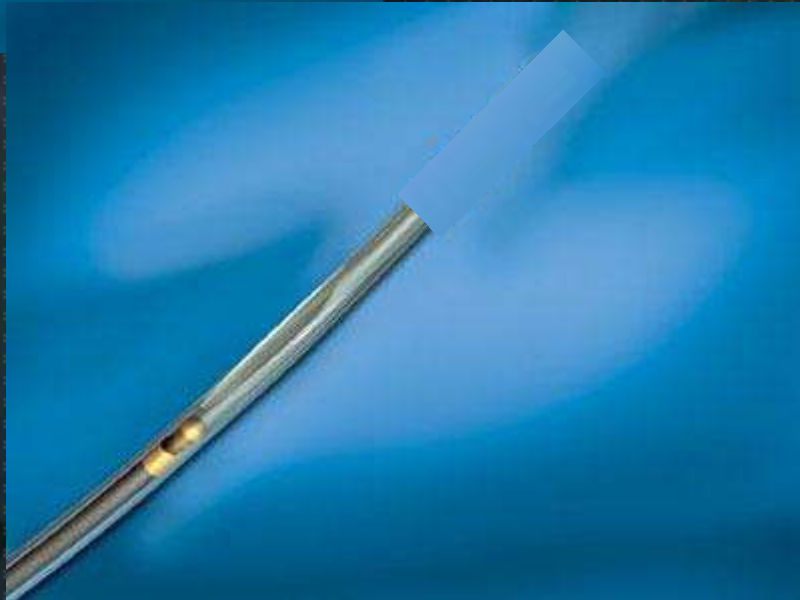
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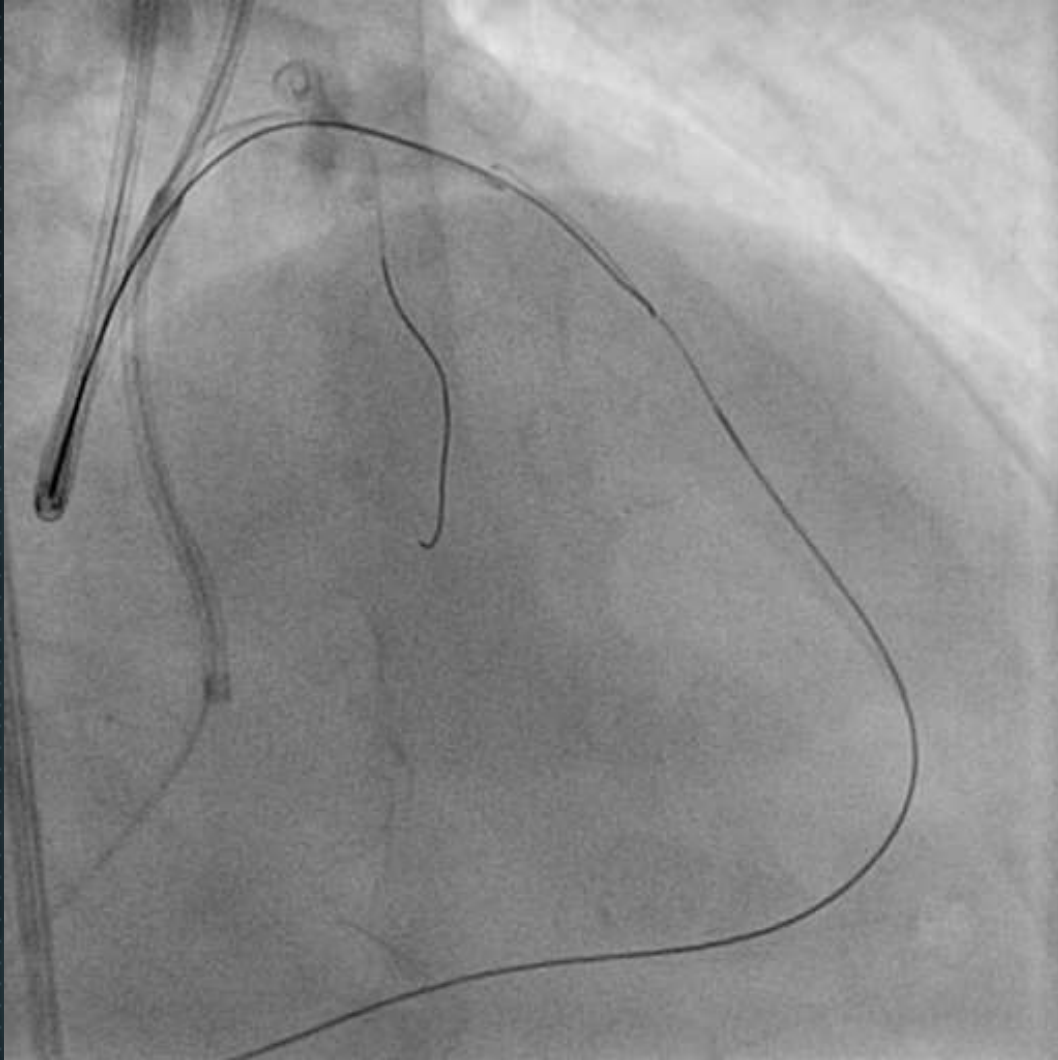
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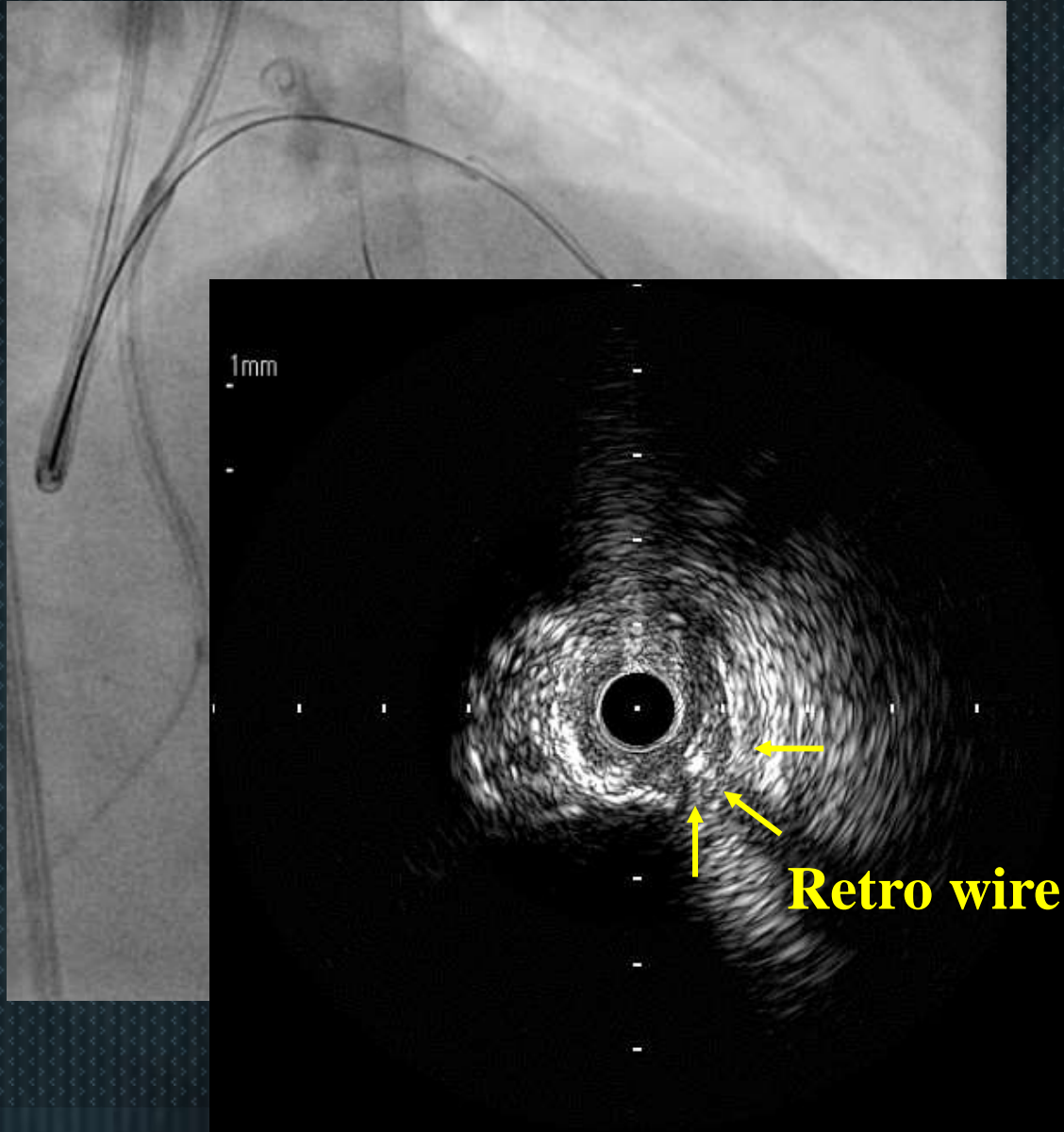
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GAIA Next 2 with CARAVEL→UB3
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- ✓ Step down to UB3
- ✓ Step up to Next1
- ✓ Cut the tip of Opticross

Case: LAD CTO



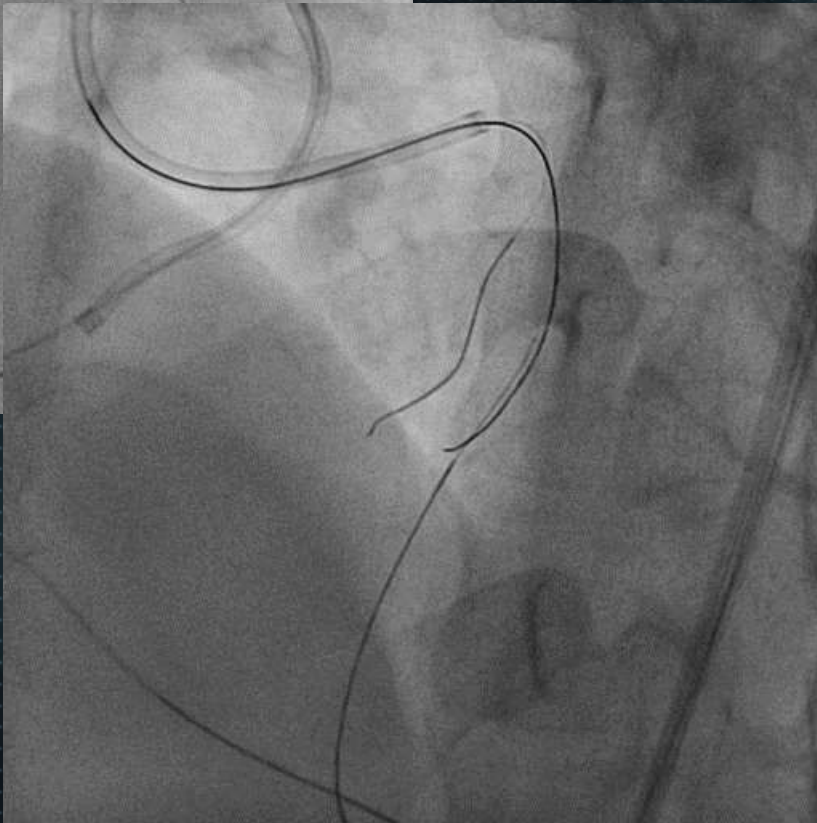
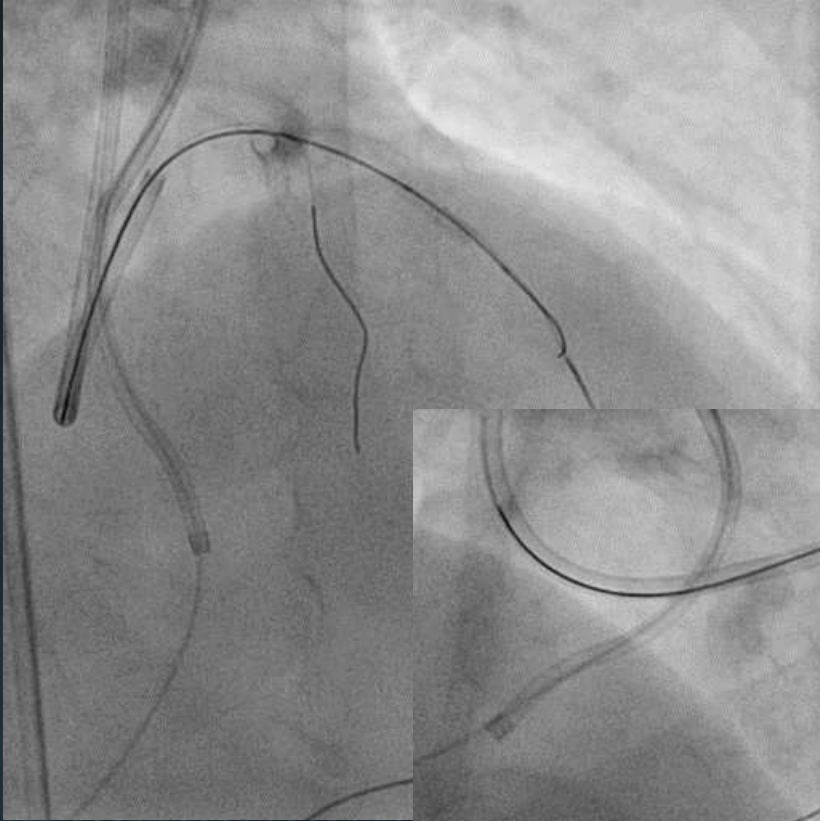
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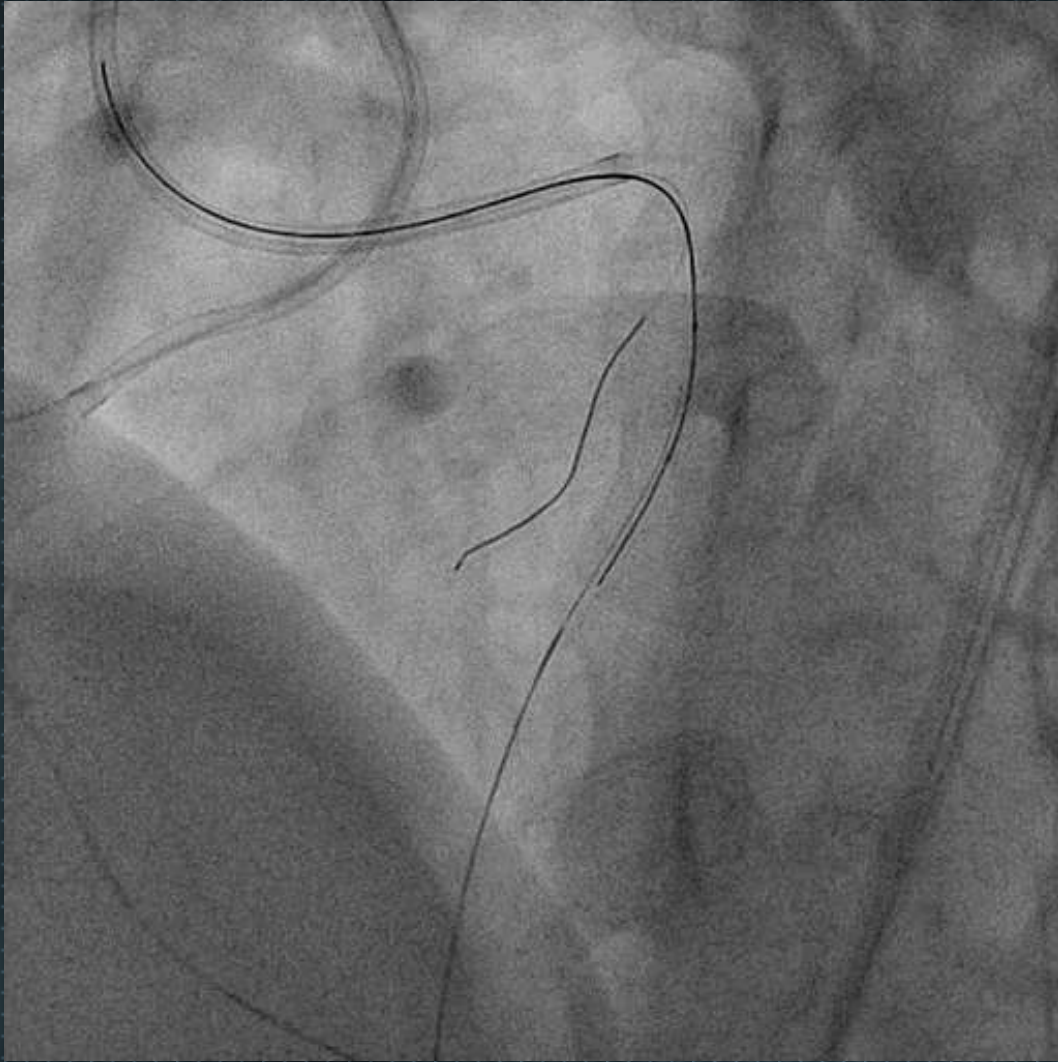
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- ✓ Cut the tip of Opticross
- ✓ IVUS examination

Case: LAD CTO



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GAIA Next 2 with CARAVEL→UB3
- ✓ Retrograde approach
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- ✓ Cut the tip of Opticross
- ✓ IVUS examination
- ✓ 2.75mm POBA for reverse CART

Case: LAD CTO



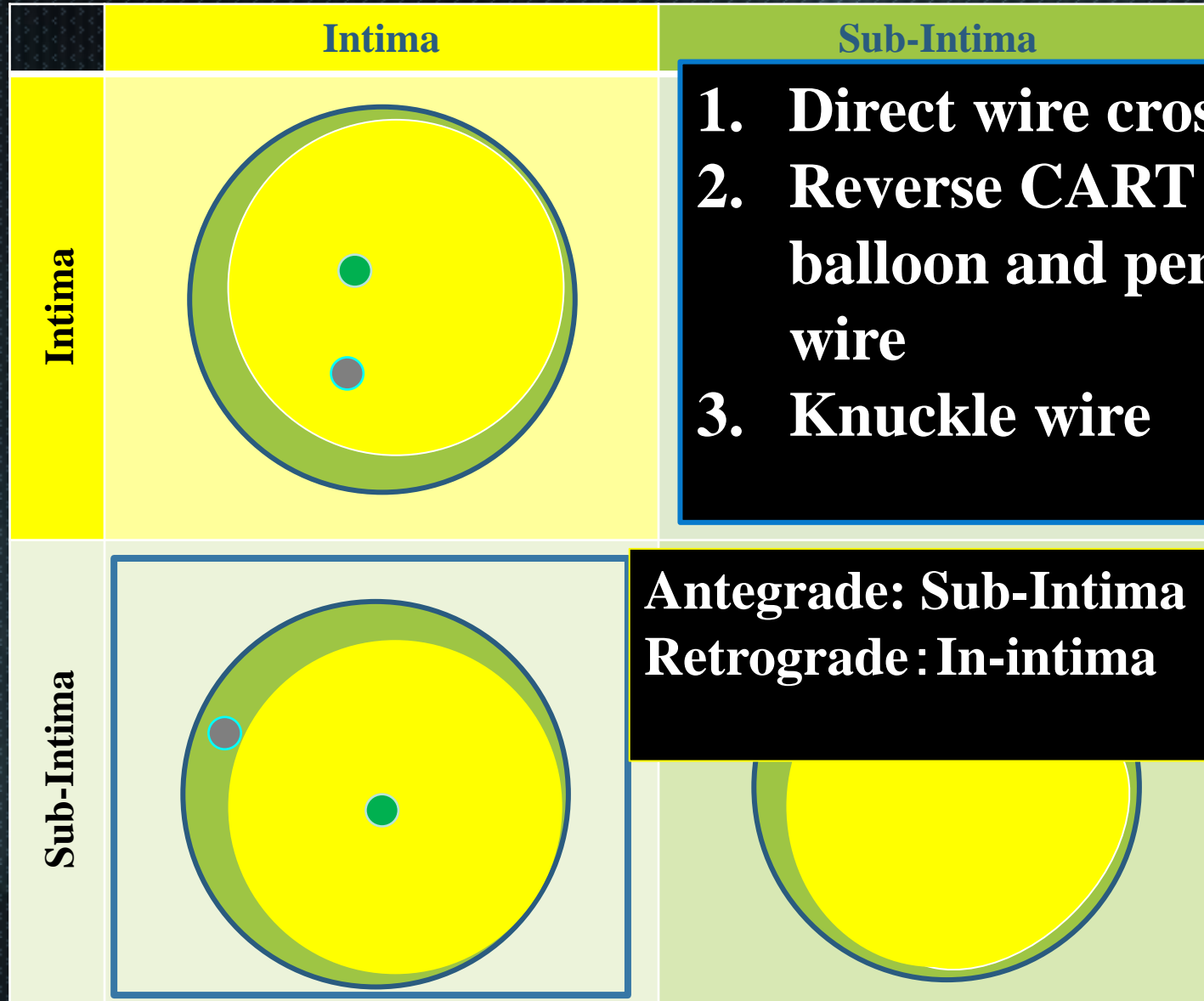
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- ✓ Cut the tip of Opticross
- ✓ IVUS examination
- ✓ 2.75mm POBA for reverse CART

When antegrade wire is in-intima and retrograde wire is sub-intima...

- **IVUS information is important.**
- **Bigger balloon same as vessel size should be needed to make dissection from antegrade = classic reverse CART concept.**
- **After making dissection, controllable soft wire (SION, SION Black, or GAIA 1 etc) in retrograde is better to get proximal true lumen.**

● Retrograde wire position

● Antegrade wire position

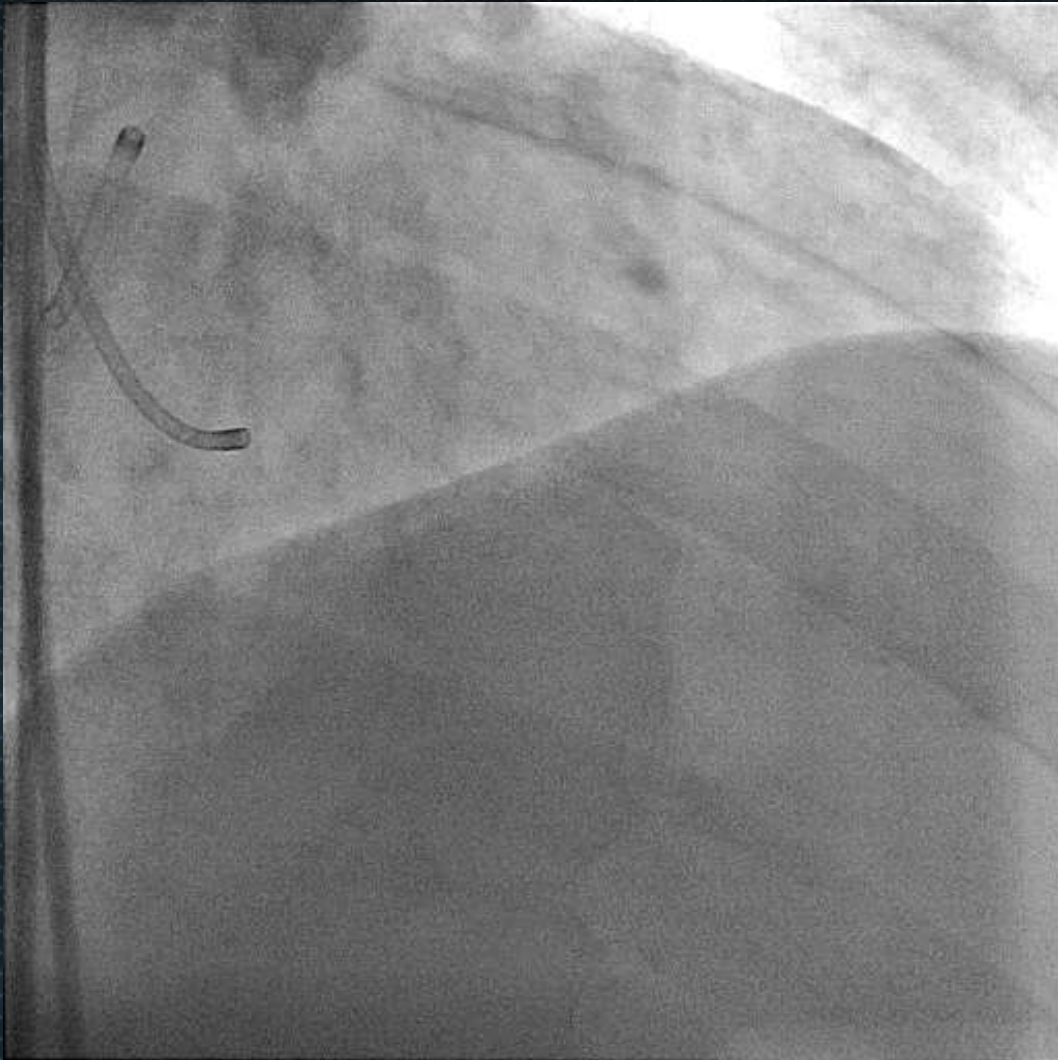


1. Direct wire crossing
2. Reverse CART by vessel size balloon and penetration by hard wire
3. Knuckle wire

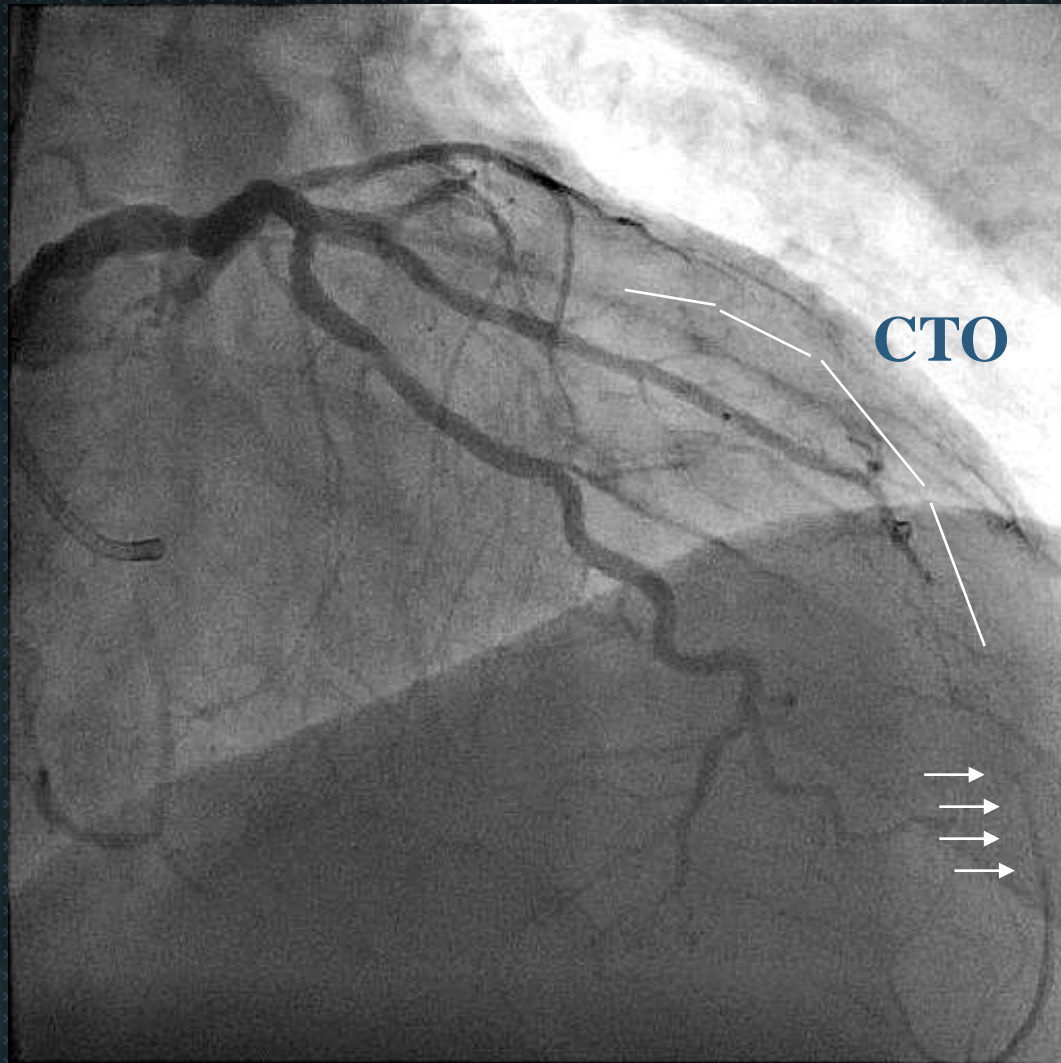
Antegrade: Sub-Intima
Retrograde: In-intima

Case1: LAD CTO

✓ Long LAD CTO

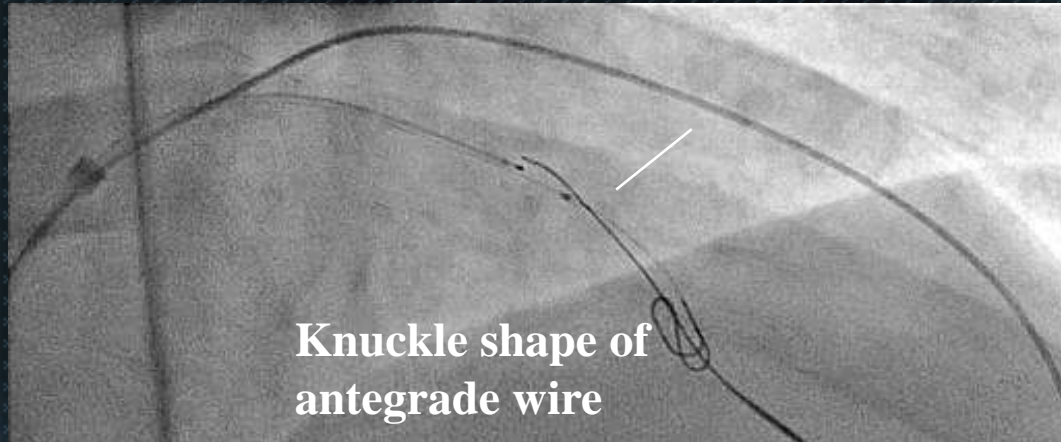


Case1: LAD CTO

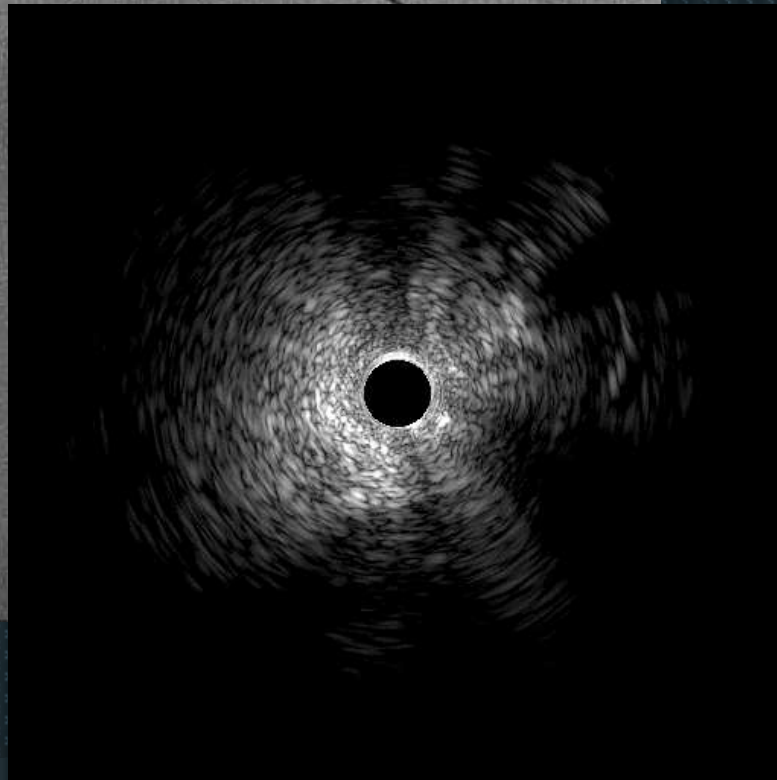


✓ Long LAD CTO

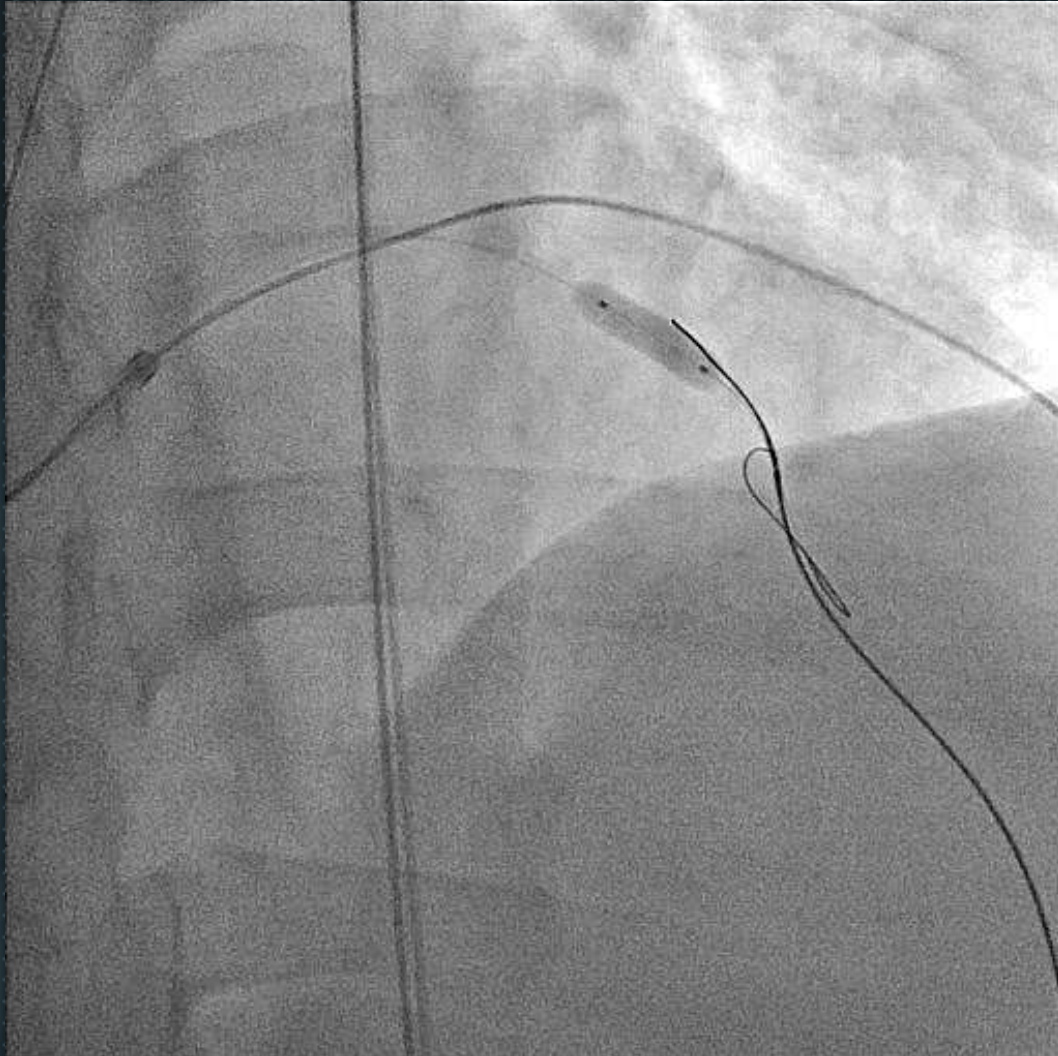
Case1: LAD CTO



- ✓ Long LAD CTO
- ✓ Antegrade wire in true lumen
- ✓ Retrograde wire in sub-intimal space
- ✓ Failure of retrograde direct wire crossing

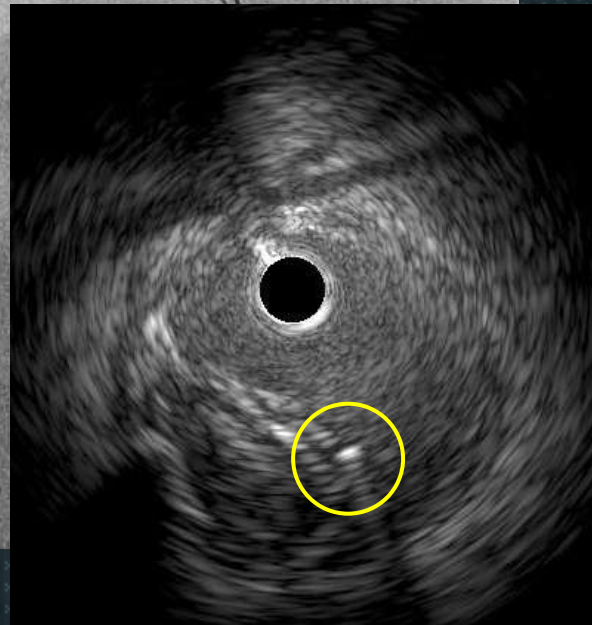
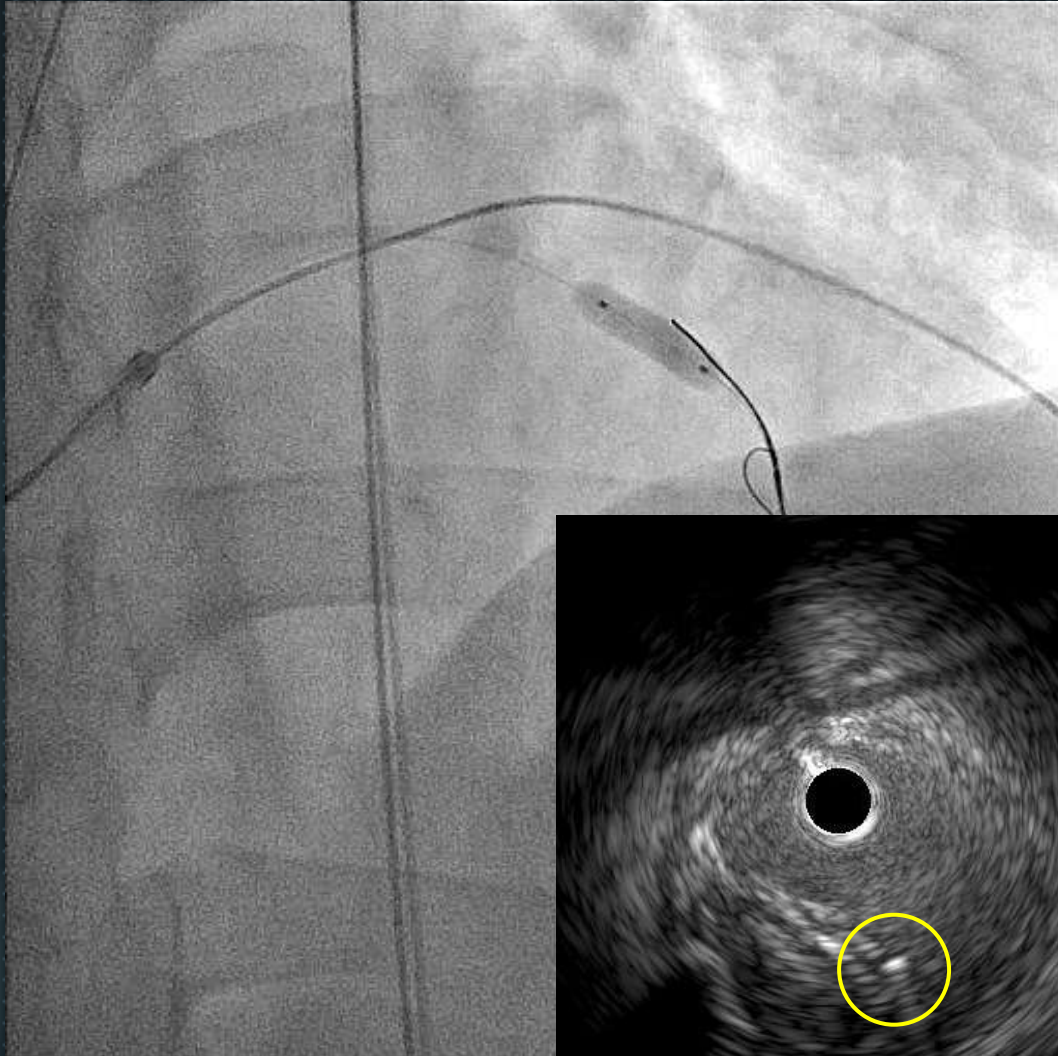


Case1: LAD CTO



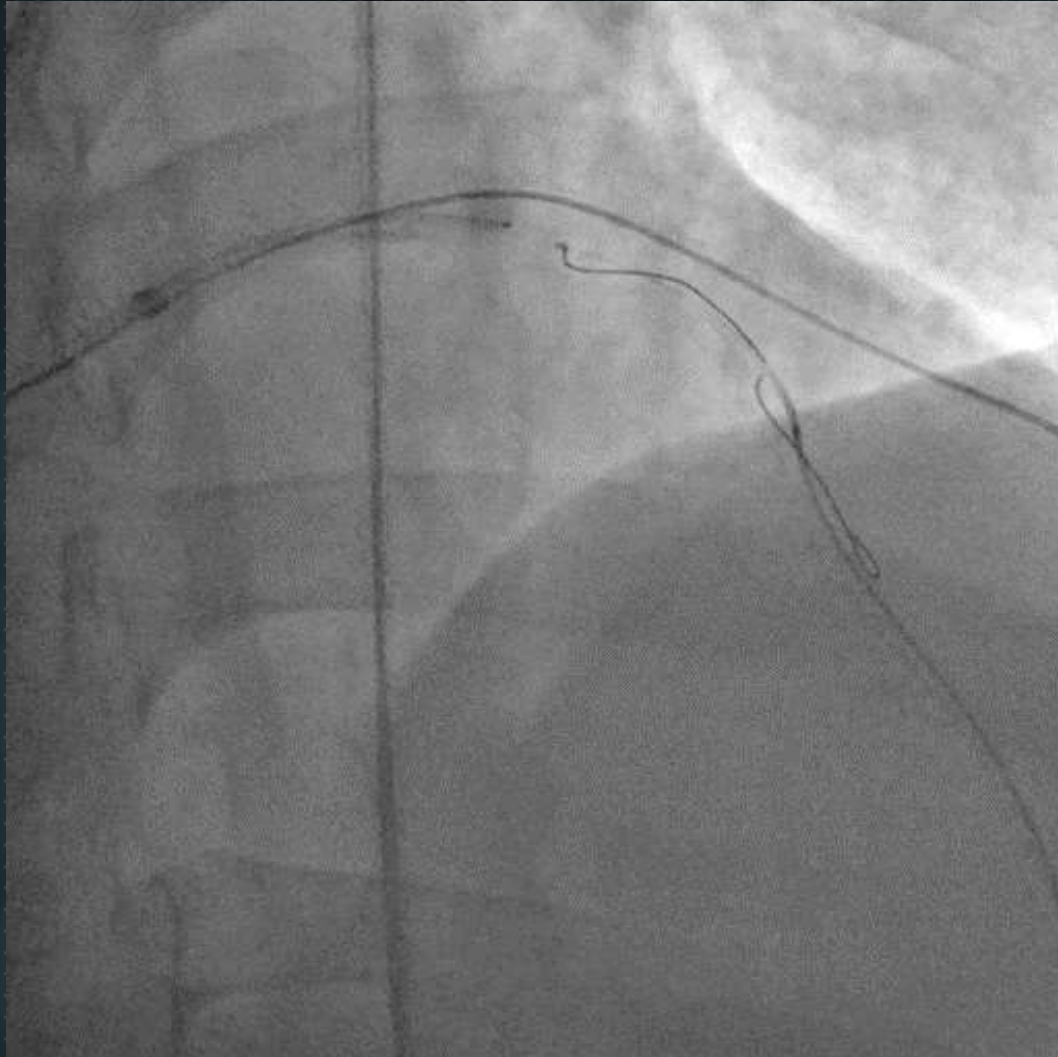
- ✓ Long LAD CTO
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- ✓ Failure of retrograde direct wire crossing
- ✓ 4.0mm POBA fore Reverse CART

Case1: LAD CTO



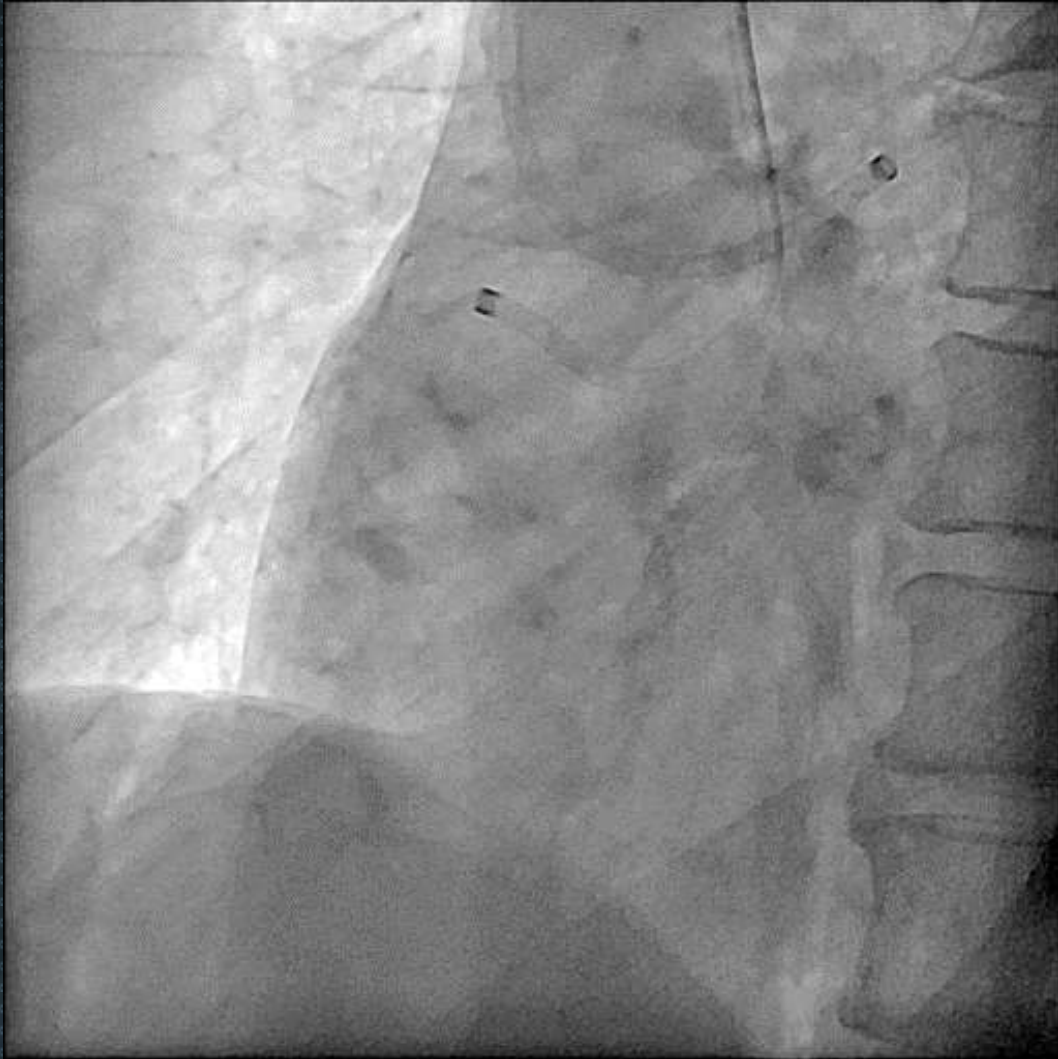
- ✓ Long LAD CTO
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- ✓ 4.0mm POBA fore Reverse CART
- ✓ Miracle 12g was located at the edge of plaque

Case1: LAD CTO



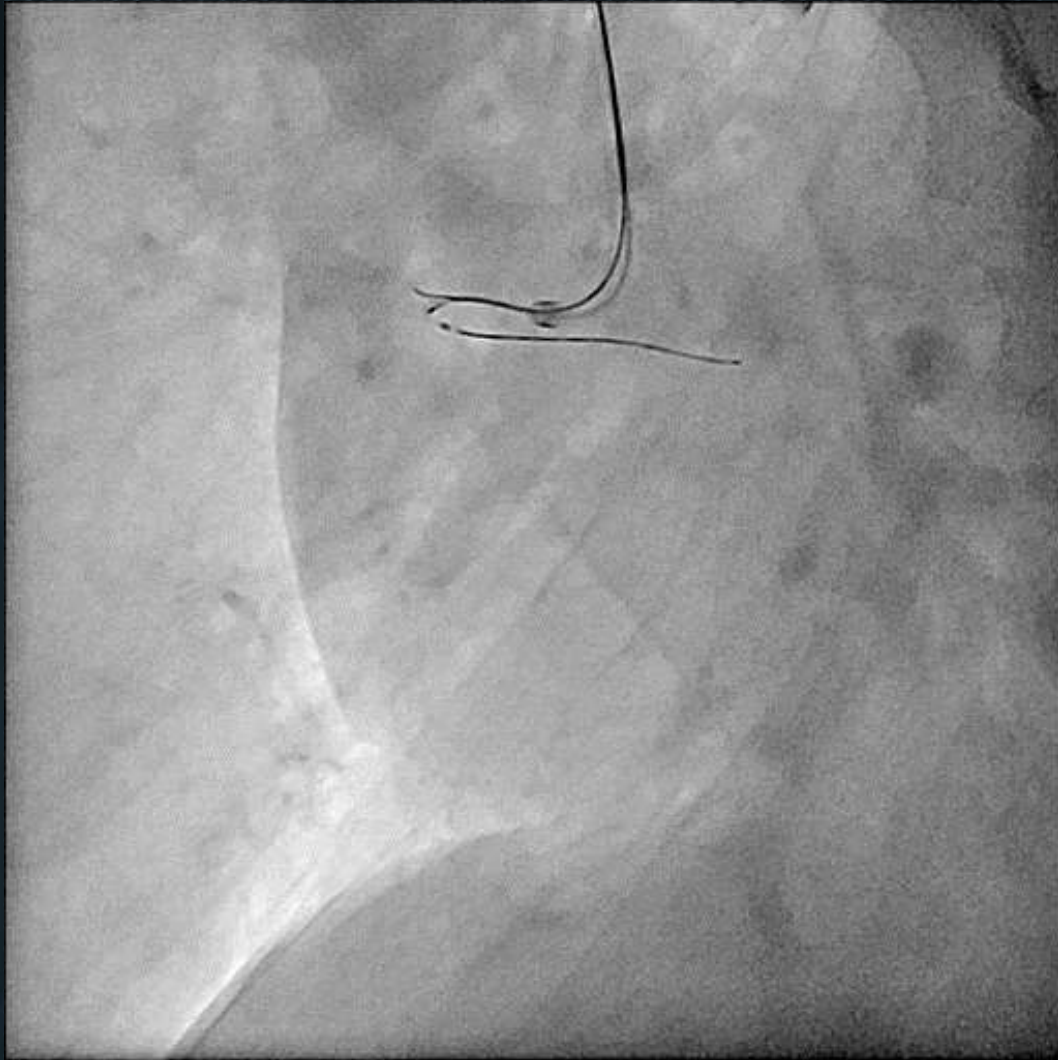
- ✓ Long LAD CTO
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- ✓ Failure of retrograde direct wire crossing
- ✓ 4.0mm POBA fore Reverse CART
- ✓ Miracle 12g was located at the edge of plaque
- ✓ Miracle 12g has been passed.

Case2: RCA CTO



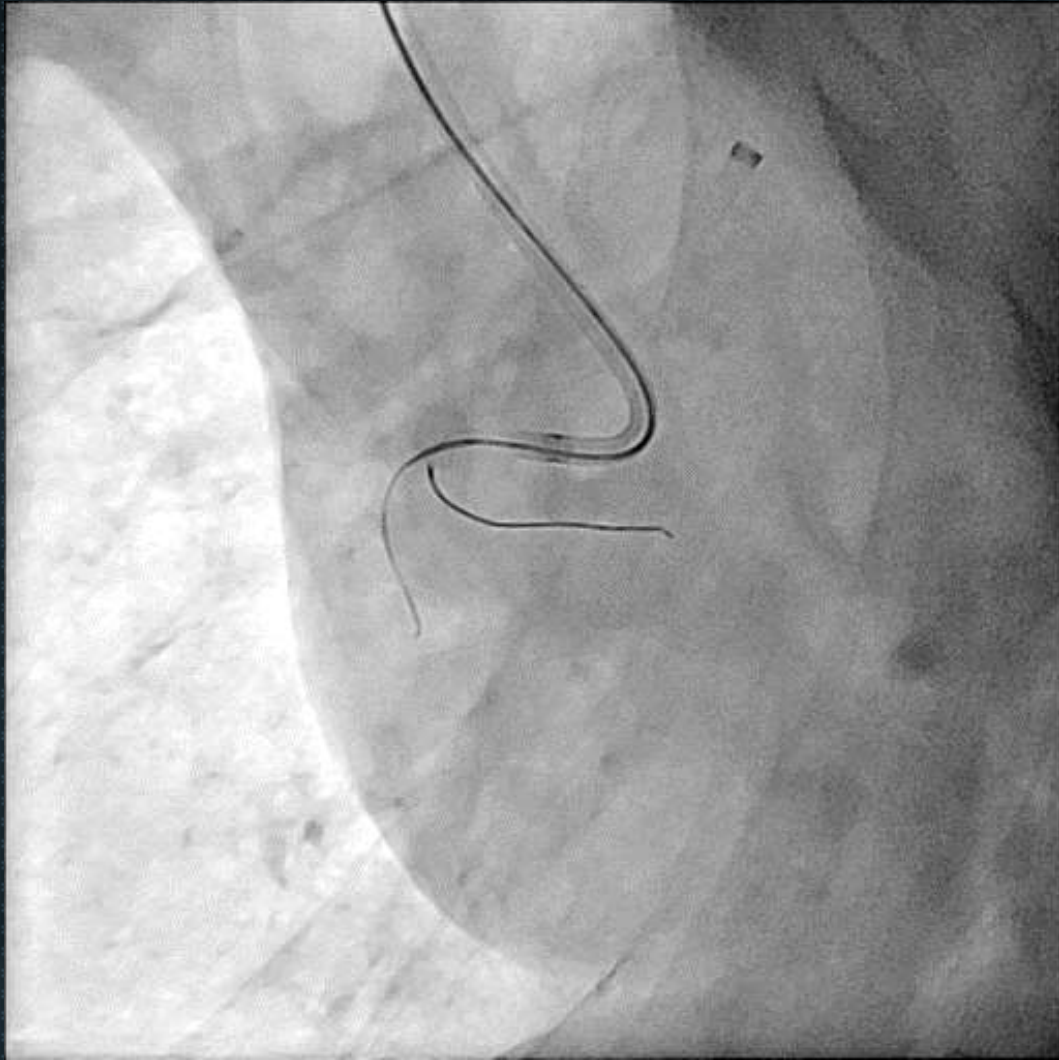
✓ RCA CTO with bridging collateral

Case2: RCA CTO



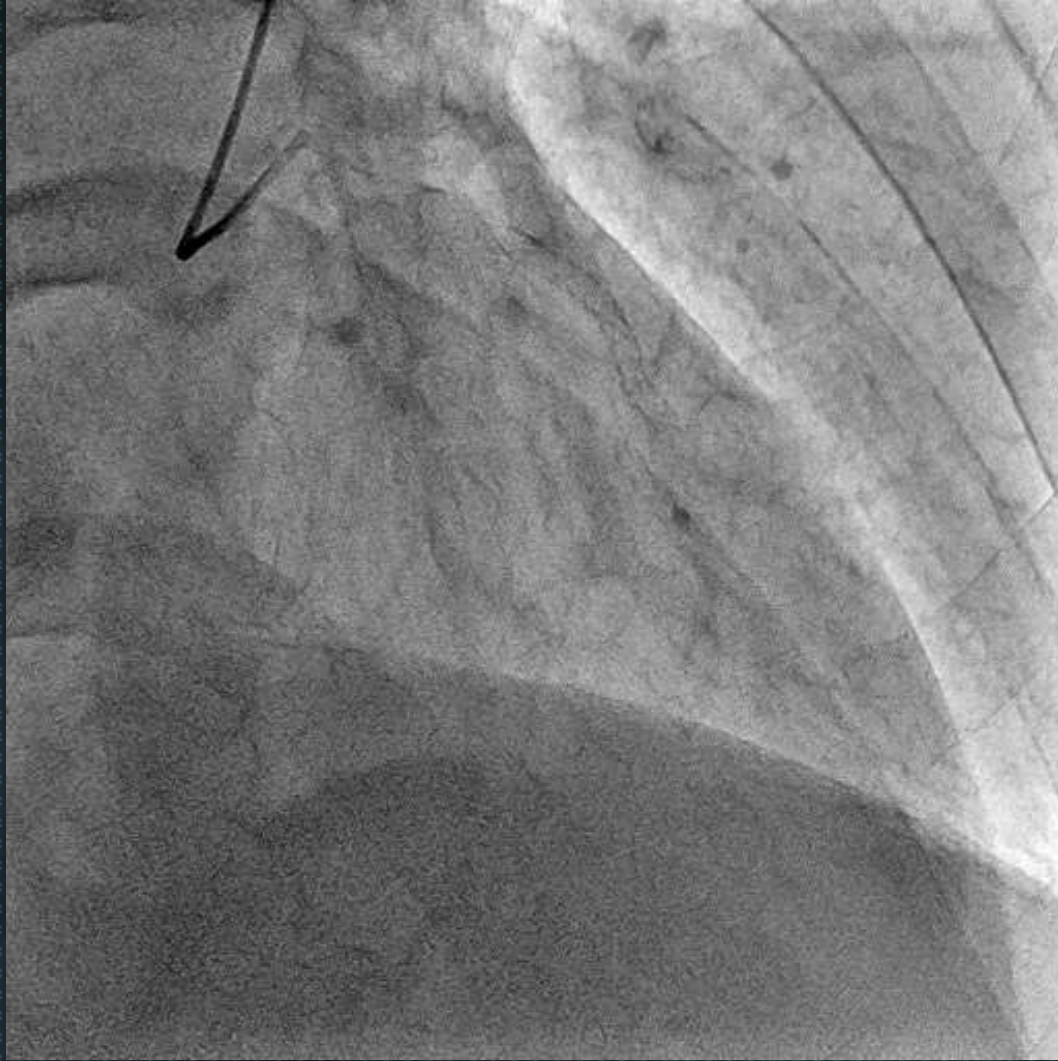
- ✓ RCA CTO with bridging collateral
- ✓ Antegrade puncture with IVUS guidance

Case2: RCA CTO



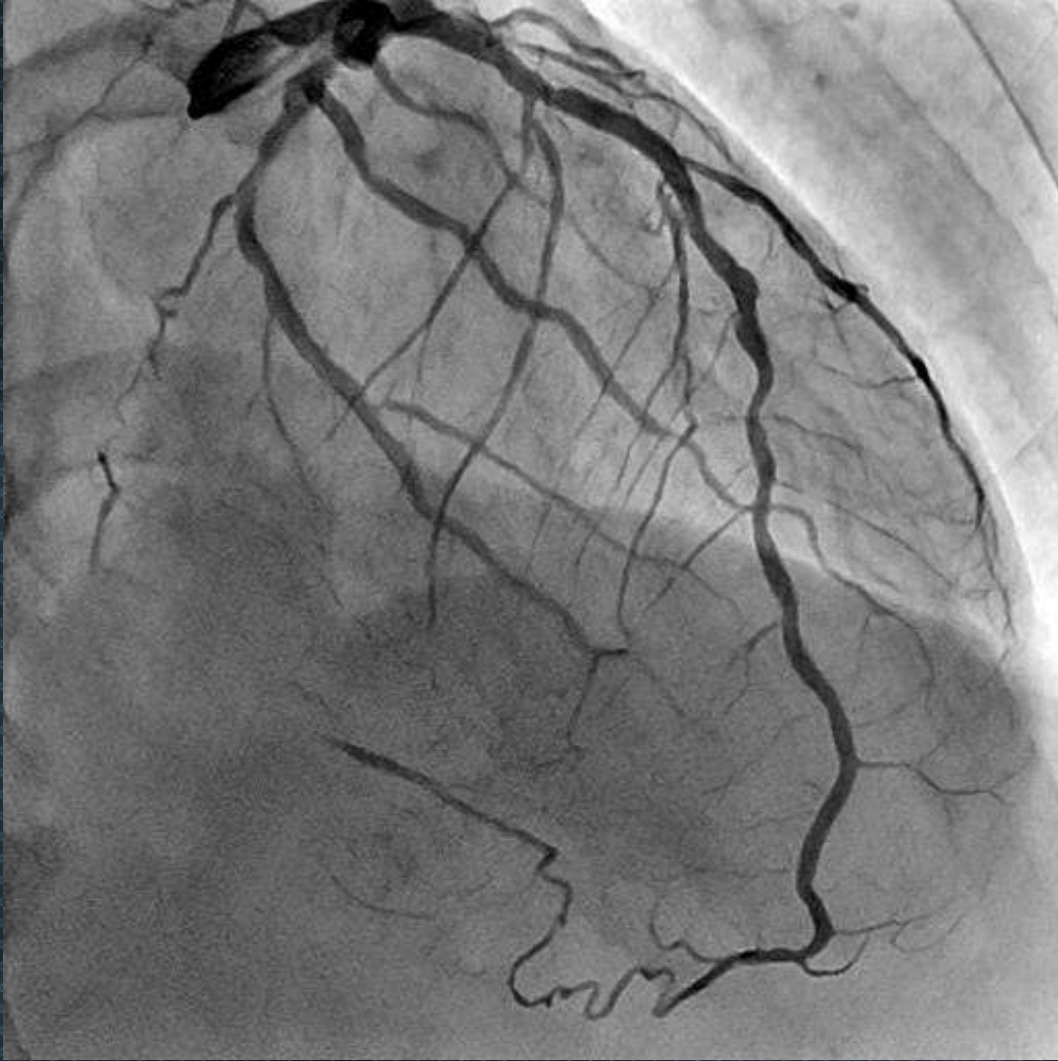
- ✓ RCA CTO with bridging collateral
- ✓ Antegrade puncture with IVUS guidance
- ✓ Gaia Next1→Next2

Case2: RCA CTO



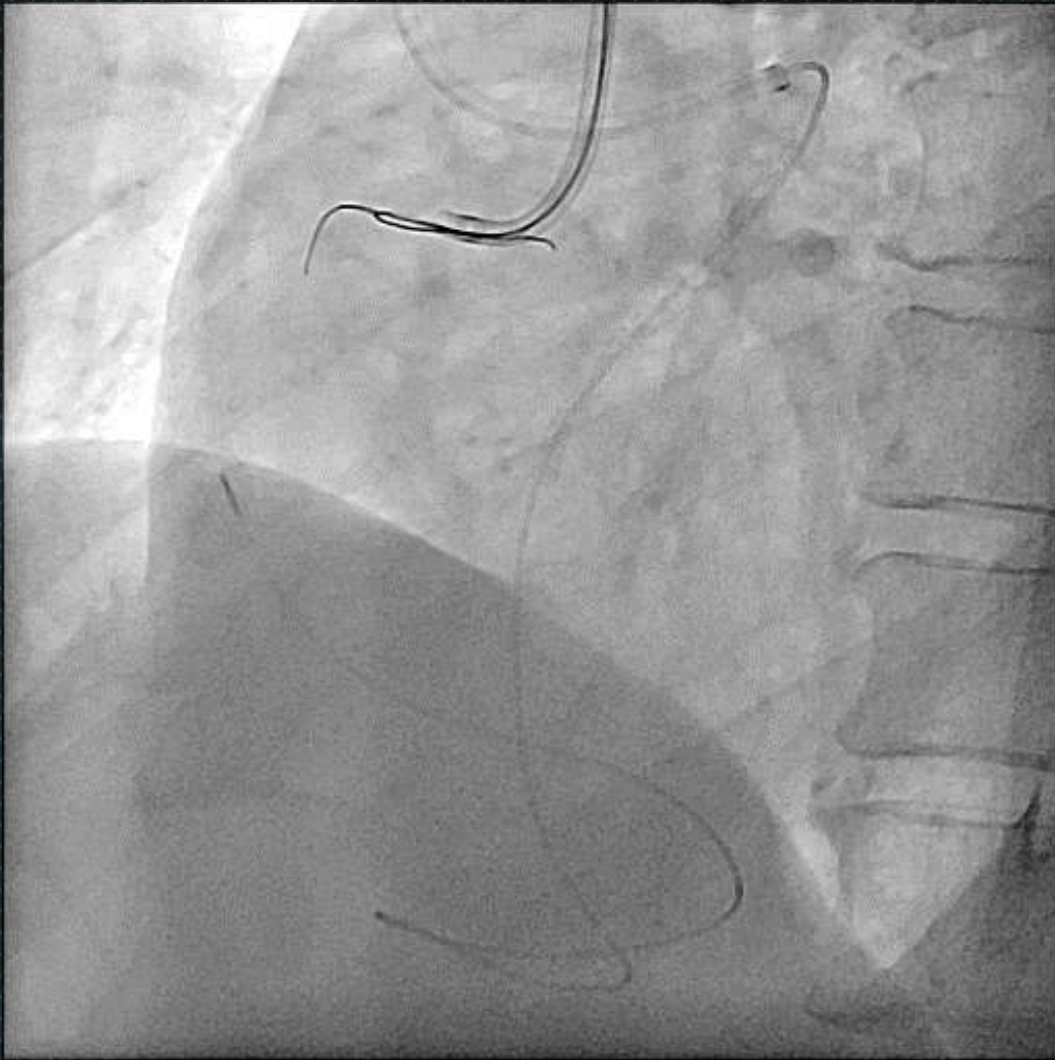
- ✓ RCA CTO with bridging collateral
- ✓ Antegrade puncture with IVUS guidance
- ✓ Gaia Next1→Next2
- ✓ Retrograde injection

Case2: RCA CTO



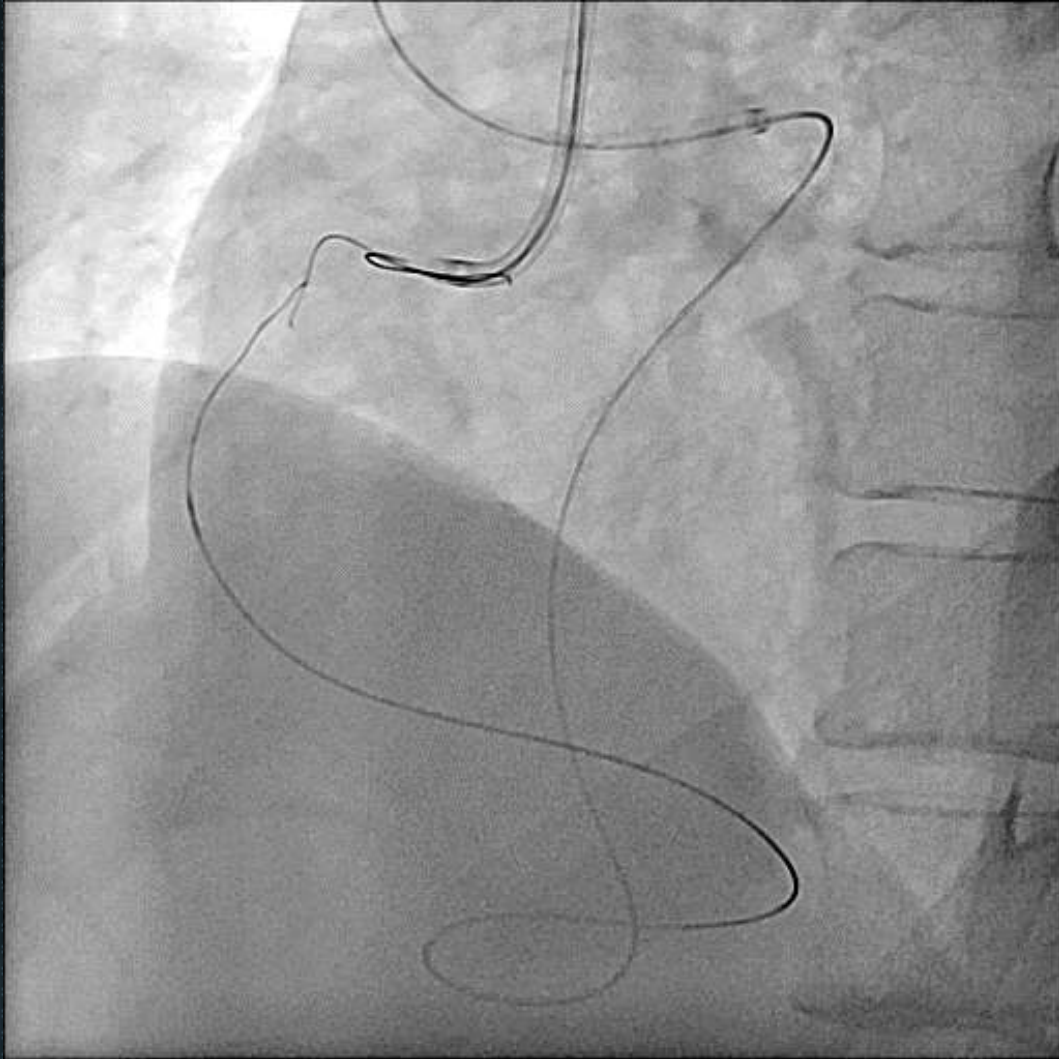
- ✓ RCA CTO with bridging collateral
- ✓ Antegrade puncture with IVUS guidance
- ✓ Gaia Next1→Next2
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Case2: RCA CTO



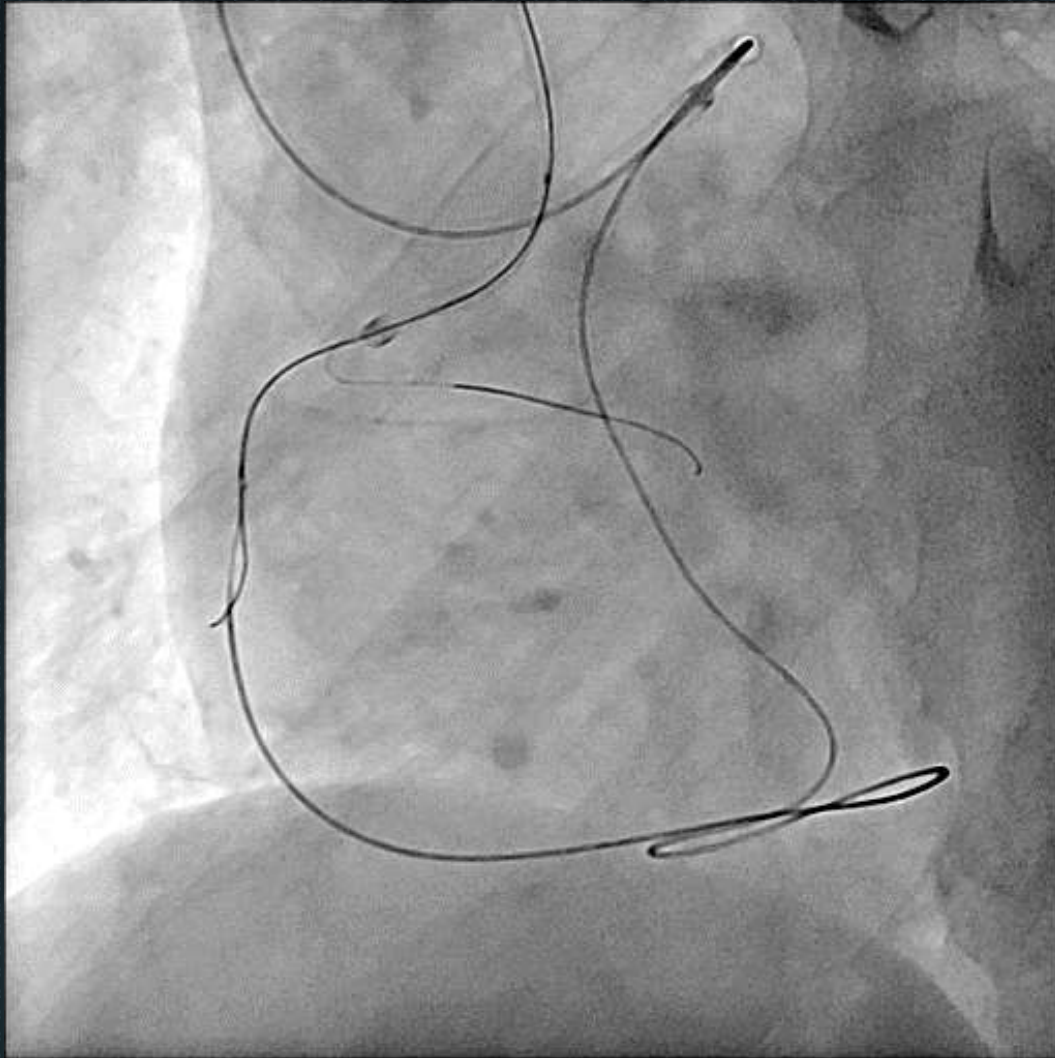
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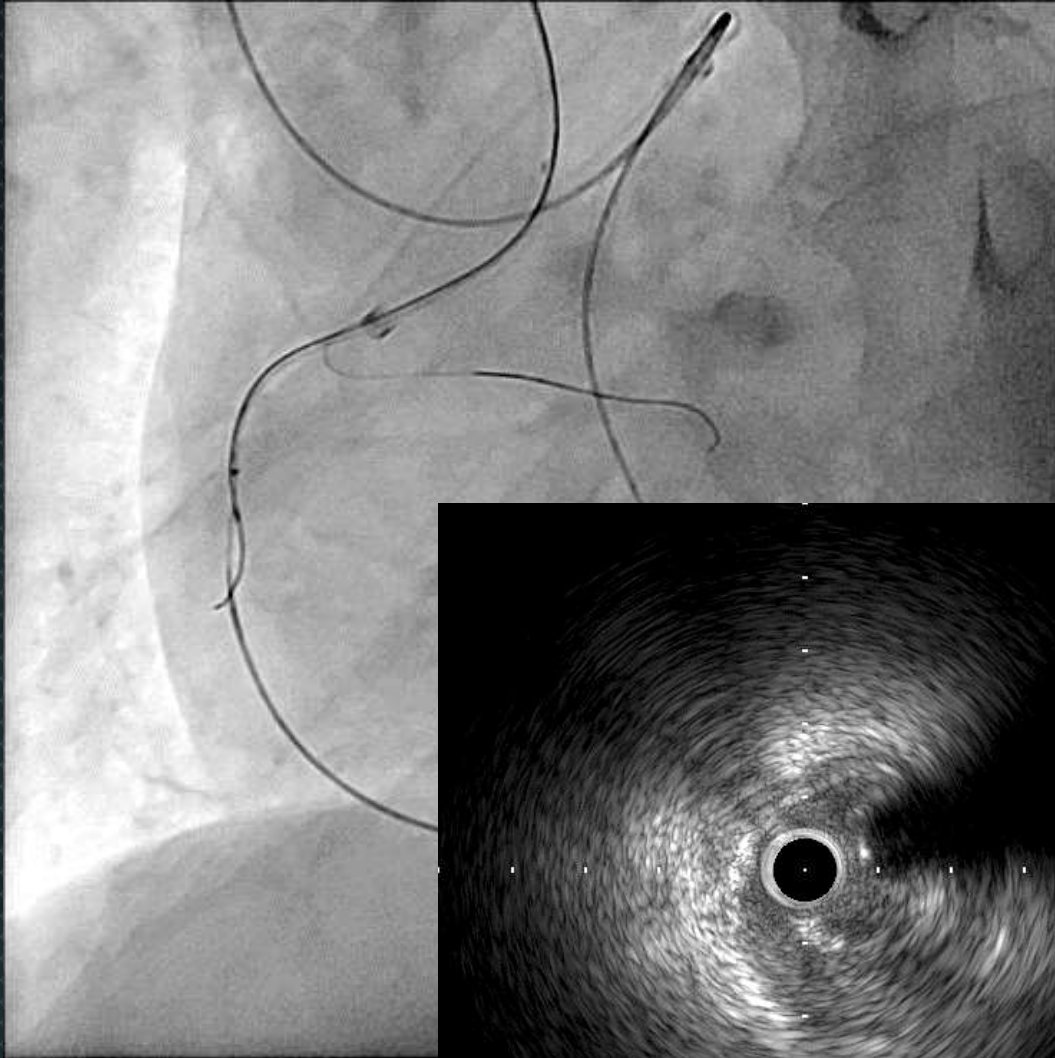
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Case2: RCA CTO



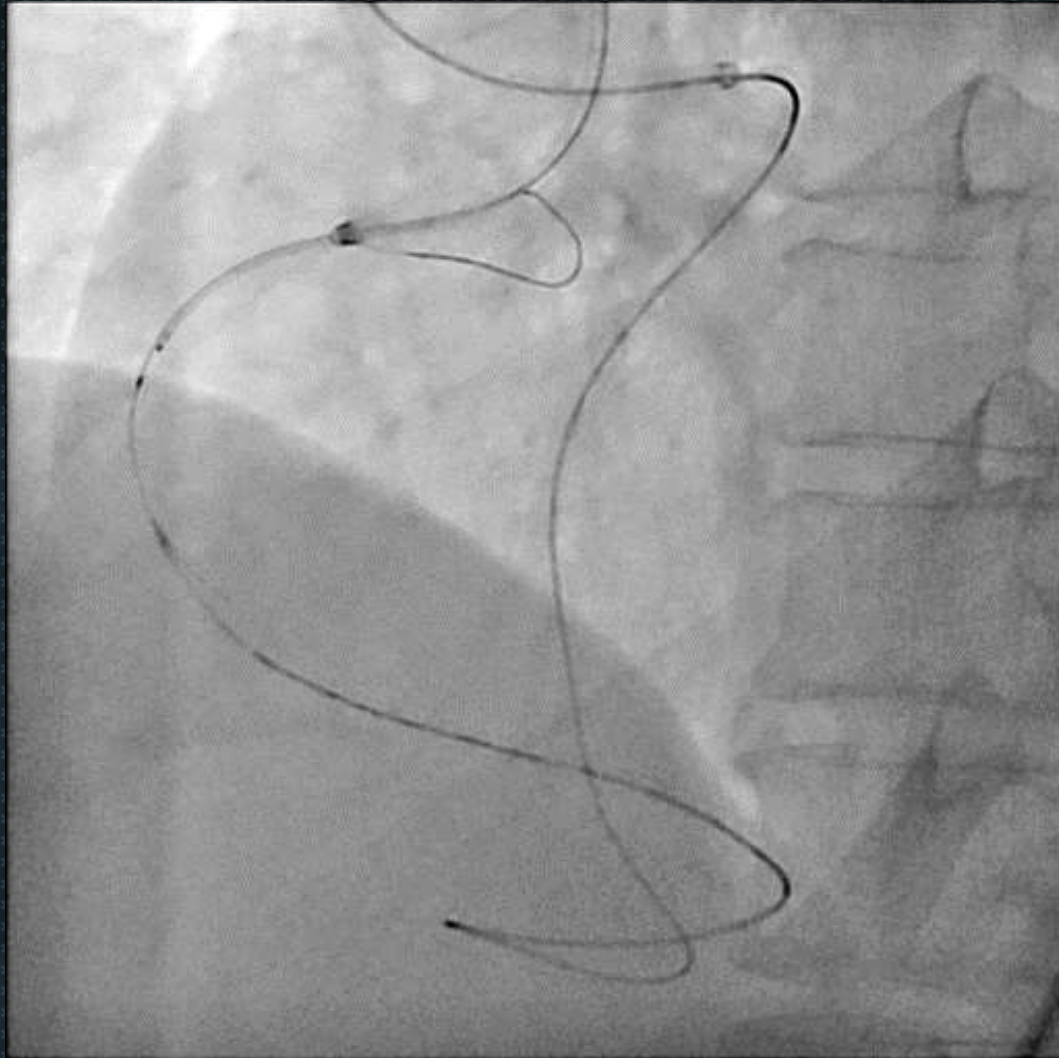
- ✓ RCA CTO with bridging collateral
- ✓ Antegrade puncture with IVUS guidance
- ✓ Gaia Next1→Next2
- ✓ Retrograde injection
- ✓ Retrograde wiring
Gaia Next1

Case2: RCA CTO



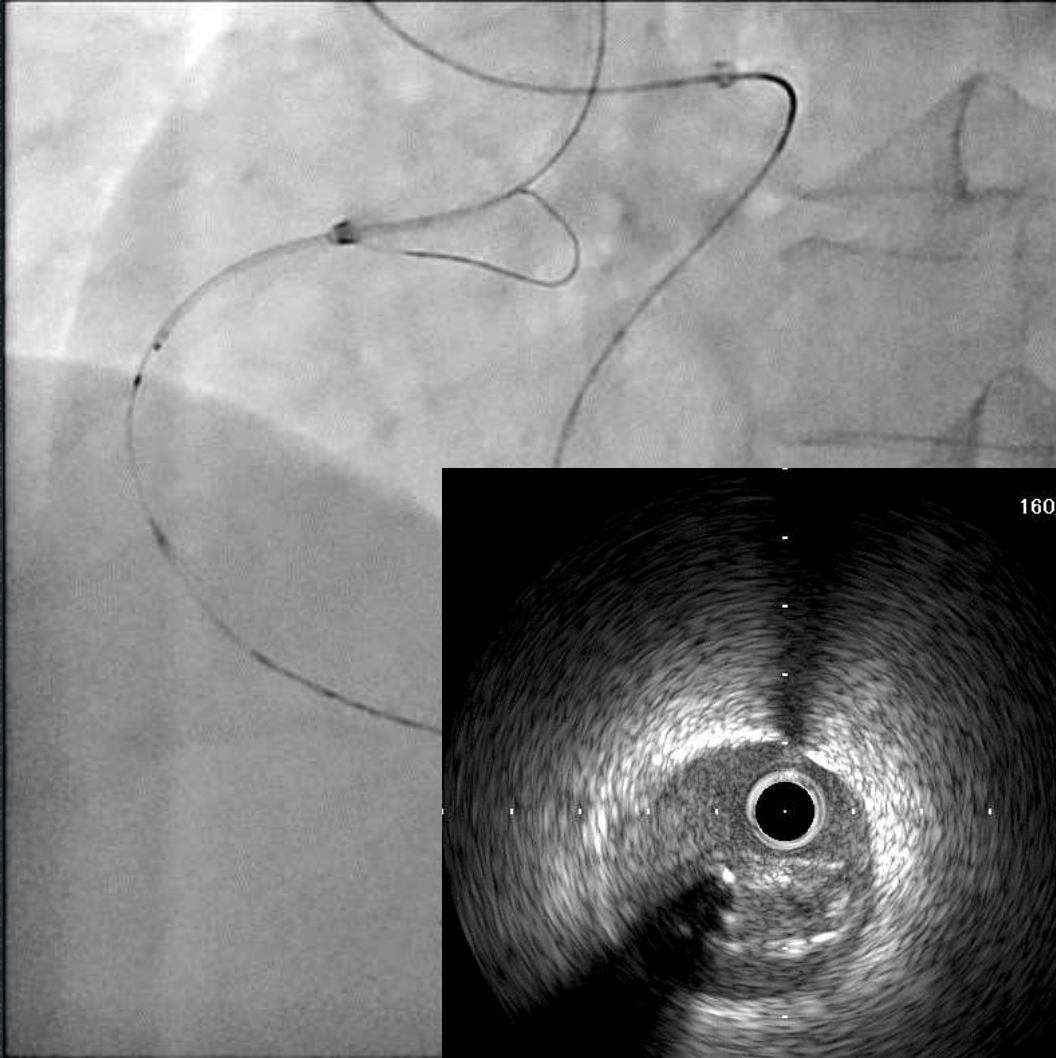
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- ✓ Retrograde wiring
- ✓ Gaia Next1
- ✓ Retrograde direct crossing
- ✓ Gaia Next1→Next2→Next3→Conq12g
- ✓ Failure because of poor back-up force

Case2: RCA CTO

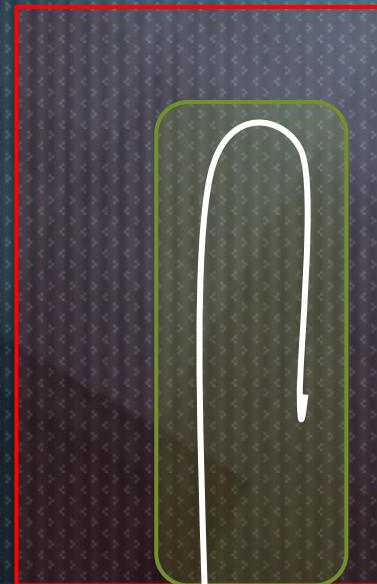
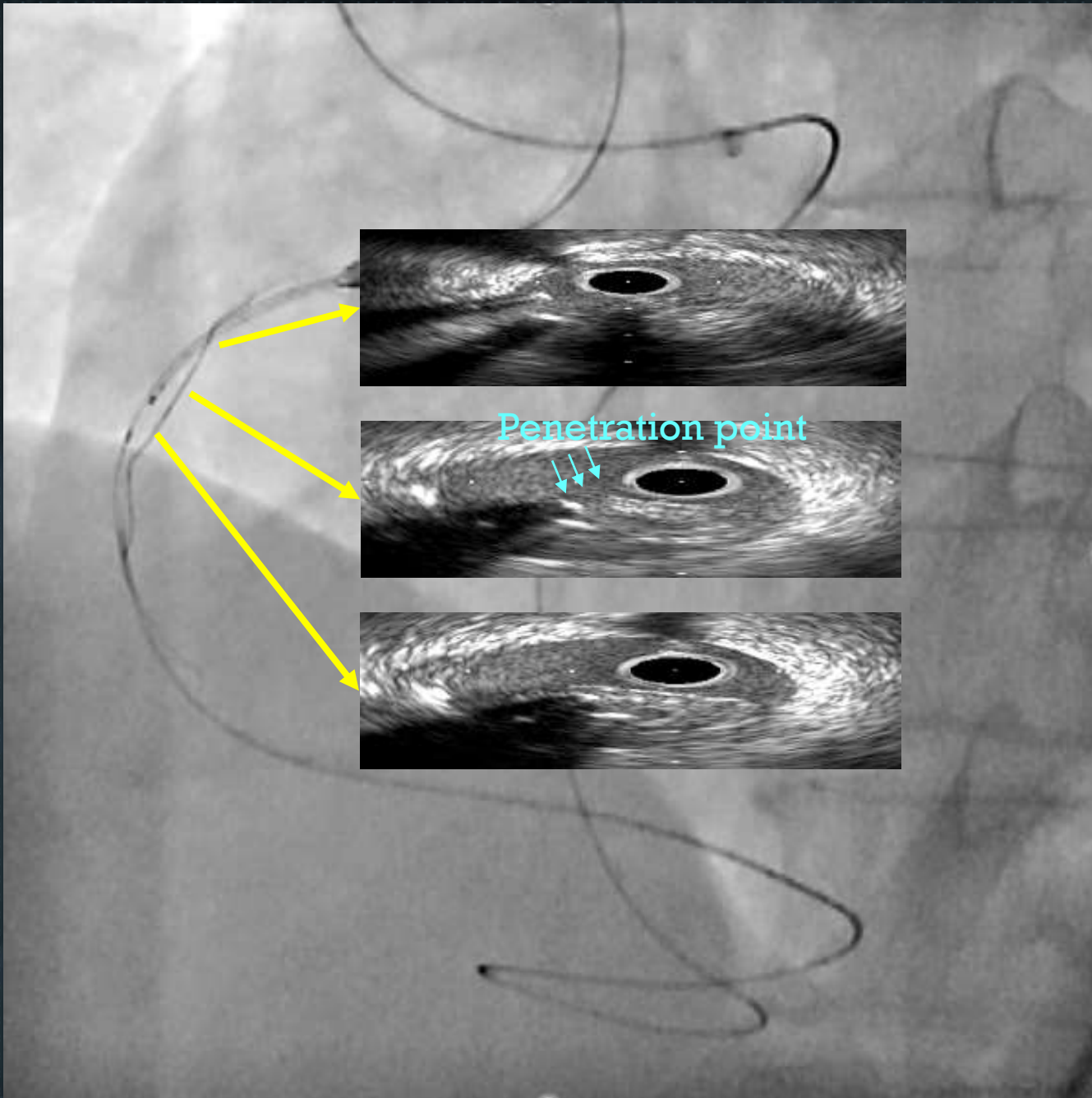


- ✓ RCA CTO with bridging collateral
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- ✓ Retrograde direct crossing
- ✓ Gaia Next1→Next2→Next3→Conq12g
- ✓ Failure because of poor back-up force
- ✓ Knuckle wire

Case2: RCA CTO



- ✓ RCA CTO with bridging collateral
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Case2: RCA CTO



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- ✓ Reverse CART

Case2: RCA CTO



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- ✓ Retrograde direct crossing
- ✓ Gaia Next1→Next2→Next3→Conq12g
- ✓ Failure because of poor back-up force
- ✓ Knuckle wire
- ✓ Reverse CART
- ✓ Guide extension

When antegrade wire is sub-intima and retrograde wire is in-intima...

- **The most difficult situation.**
- **Direct wire crossing by hard tip wires (Miracle 12g or Conquest family) should be considered as a 1st step.**
- **After failure of direct wire crossing, balloon dilatation from antegrade sub-intima is needed to change lesion morphology and retrograde wire bias. → taking long time...**
- **Knuckle wiring with medium weight wires (Pilot 200) can be useful.**

CTO Club

The 19th Seminar of Angioplasty of Chronic Total Occlusions

Dates June 15 Fri. – 16 Sat., 2018

Venue WINC AICHI, Nagoya, Japan