

How to achieve Reverse CART in the long CTO

Yasumi Igarashi, M.D. Ph.D.

Cardiovascular Center

Tokeidai Memorial Hospital

J-CTO SCORE SHEET

Version 1.0



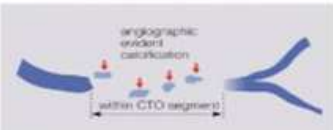


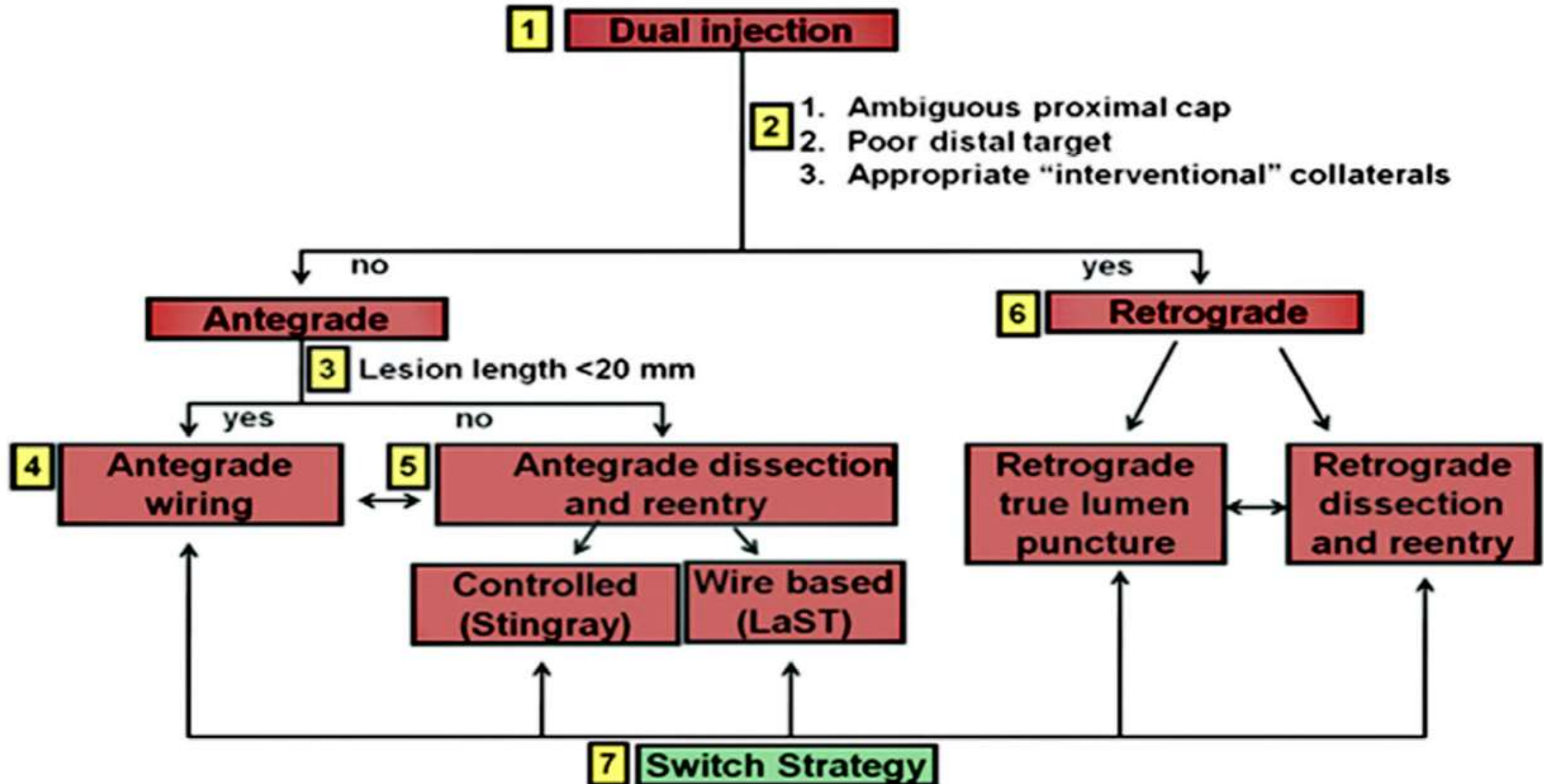
Variables and definitions		
<p>Tapered</p> 	<p>Blunt</p> 	<p>Entry with any tapered tip or dimple indicating direction of true lumen is categorized as "tapered".</p>
<p>Entry shape</p> <p><input type="checkbox"/> Tapered (0)</p> <p><input type="checkbox"/> Blunt (1)</p>		<p>point</p>
<p>Calcification</p> 		<p>Regardless of severity, 1 point is assigned if any evident calcification is detected within the CTO segment.</p>
<p>Calcification</p> <p><input type="checkbox"/> Absence (0)</p> <p><input type="checkbox"/> Presence (1)</p>		<p>point</p>
<p>Bending >45degrees</p> 		<p>One point is assigned if bending > 45 degrees is detected within the CTO segment. Any tortuosity separated from the CTO segment is excluded from this assessment.</p>
<p>Bending > 45°</p> <p><input type="checkbox"/> Absence (0)</p> <p><input type="checkbox"/> Presence (1)</p>		<p>point</p>
<p>Occlusion length</p> 		<p>Using good collateral images, try to measure "true" distance of occlusion, which tends to be shorter than the first impression.</p>
<p>Occl.Length</p> <p><input type="checkbox"/> <20mm (0)</p> <p><input type="checkbox"/> ≥20mm (1)</p>		<p>point</p>
<p>Re-try lesion</p> <p>Is this Re-try (2nd attempt) lesion ? (previously attempted but failed)</p>		<p>Re-try lesion</p> <p><input type="checkbox"/> No (0)</p> <p><input type="checkbox"/> Yes (1)</p>
<p>point</p>		<p>point</p>
<p>Category of difficulty (total point)</p> <p><input type="checkbox"/> easy (0) <input type="checkbox"/> Intermediate (1)</p> <p><input type="checkbox"/> difficult (2) <input type="checkbox"/> very difficult (≥3)</p>		<p>Total</p> <p><input type="text" value=""/> points</p>

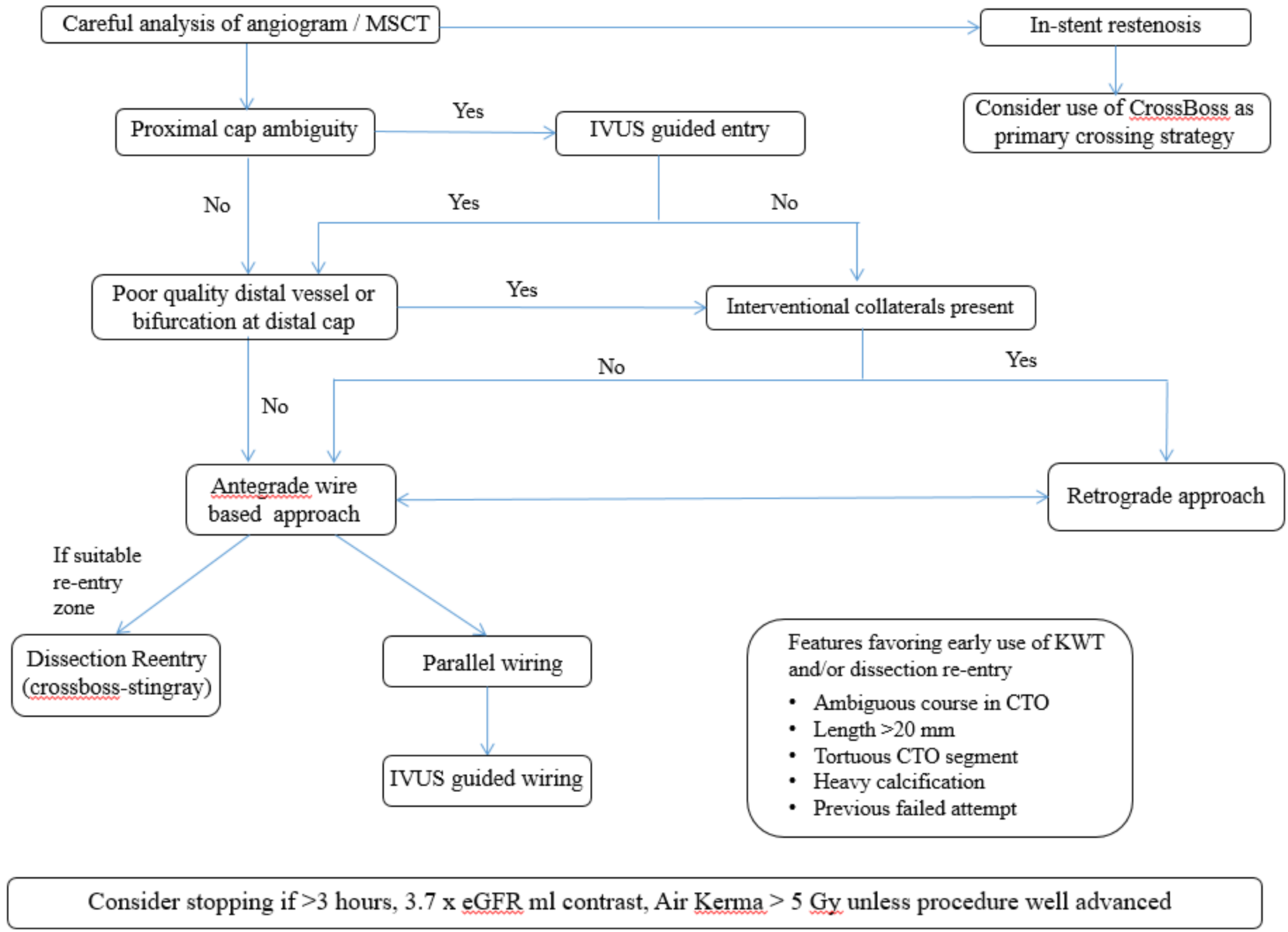
Figure 5. J-CTO Score SheetA calculation sheet for J-CTO (Multicenter CTO Registry of Japan) scoring. A definitions of each variable are summarized and illustrated. The total score is identified as the "J-CTO score".

Source courtesy : JACC: Cardiovascular Interventions Volume 4, Issue 2, February 2011

Reference

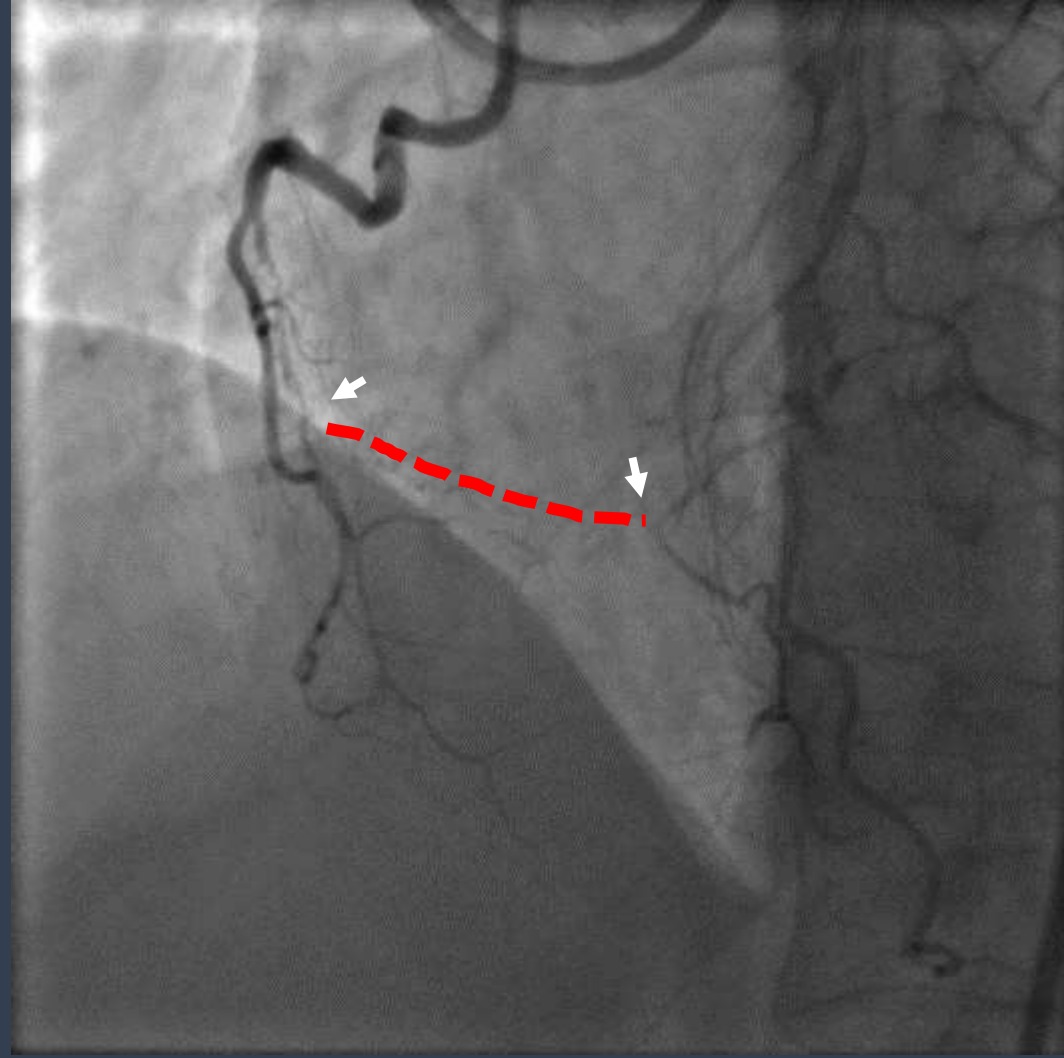
Hybrid Strategy





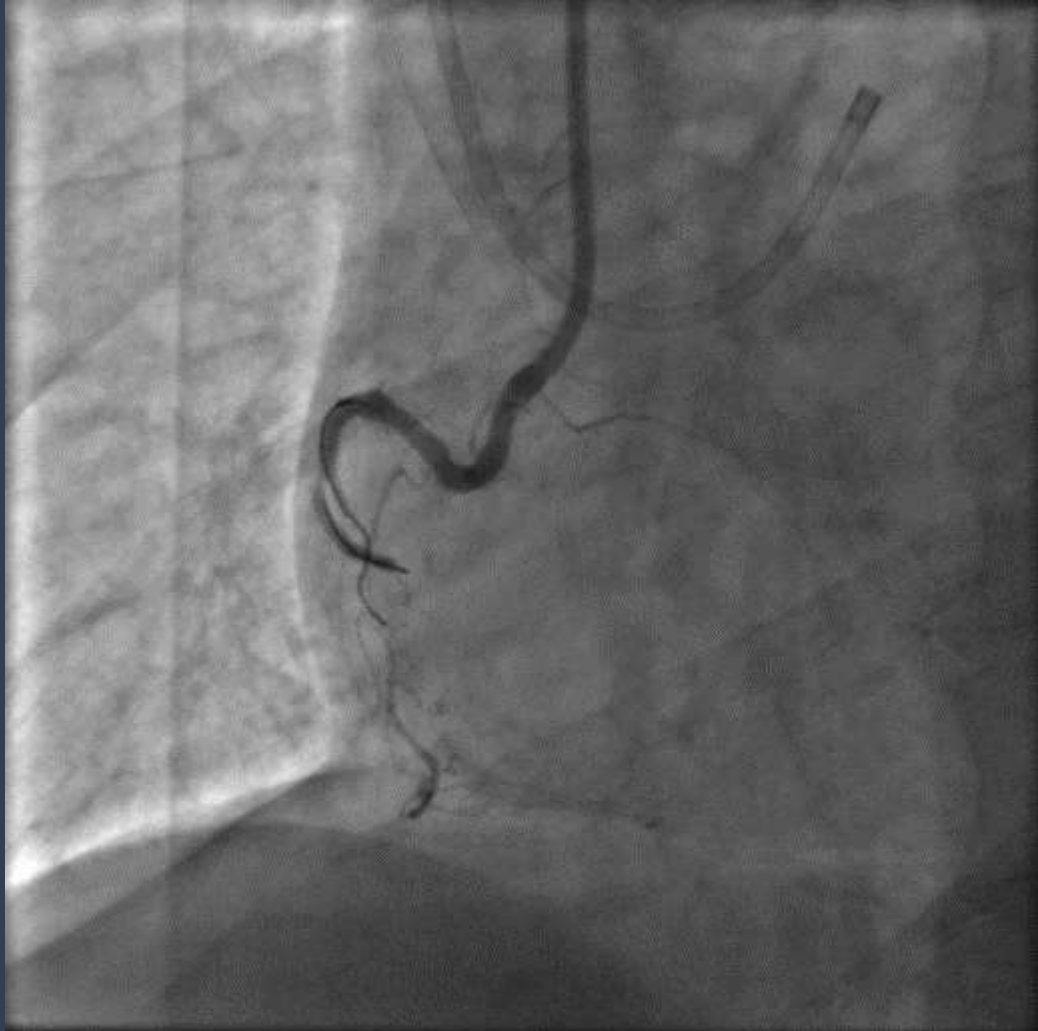
Consider stopping if >3 hours, 3.7 x eGFR ml contrast, Air Kerma > 5 Gy unless procedure well advanced

RCA mid-distal CTO with proximal strong tortuosity

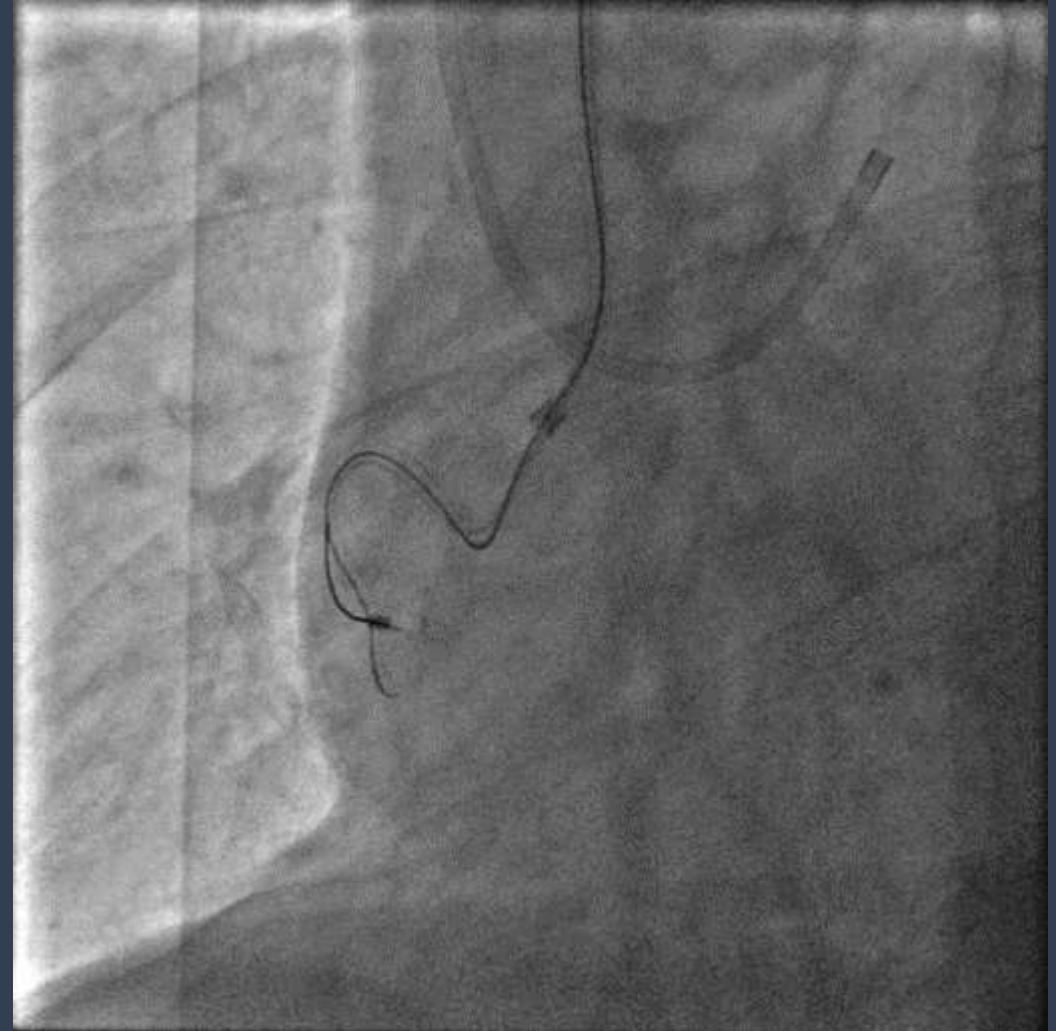


LAO CRA

Antegrade wiring

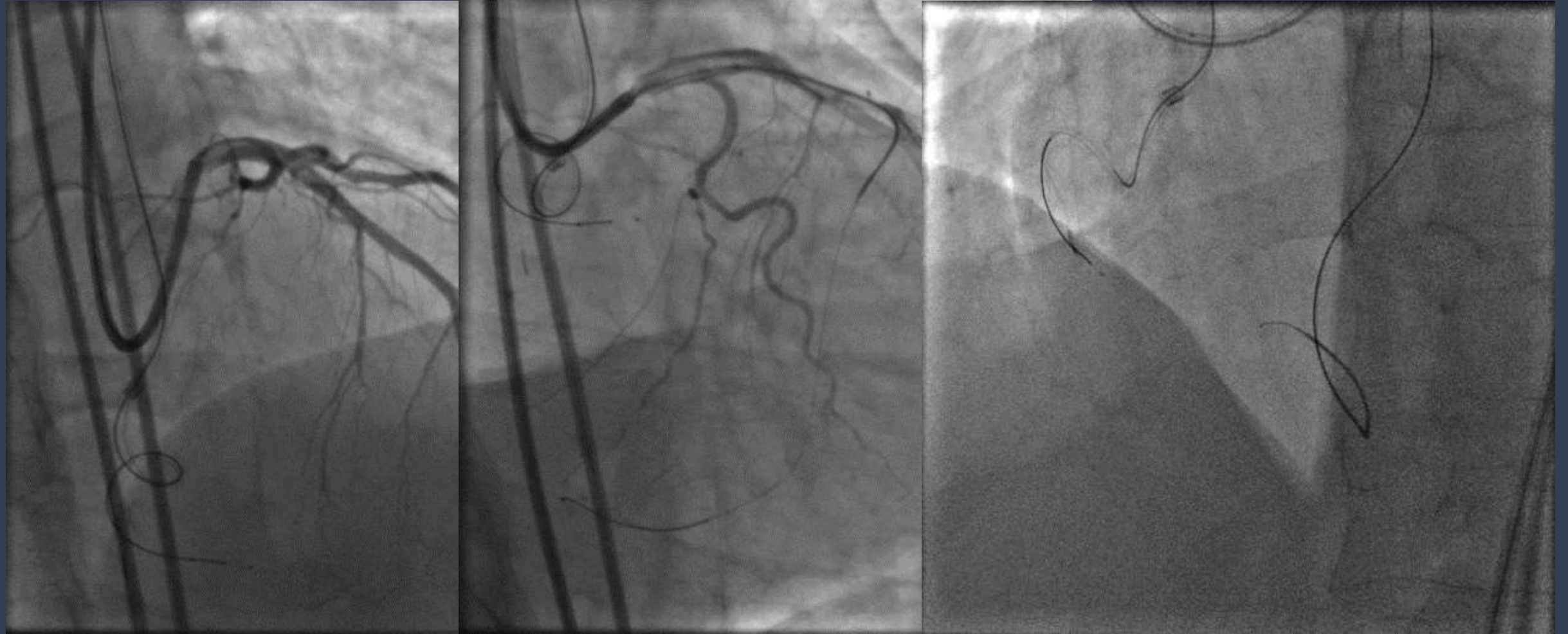


Caravel+floppy wire+side branch anchor

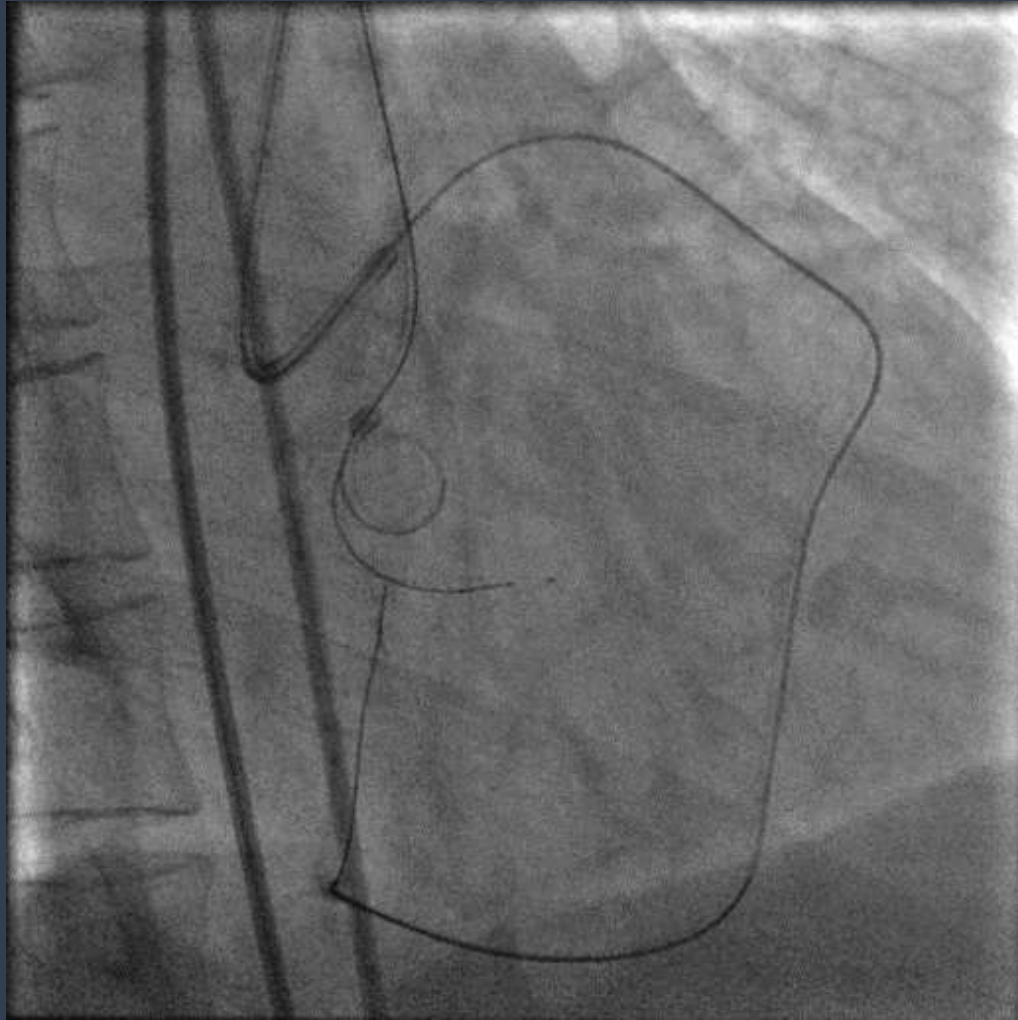


Fielder XT-A → Gaia 2nd

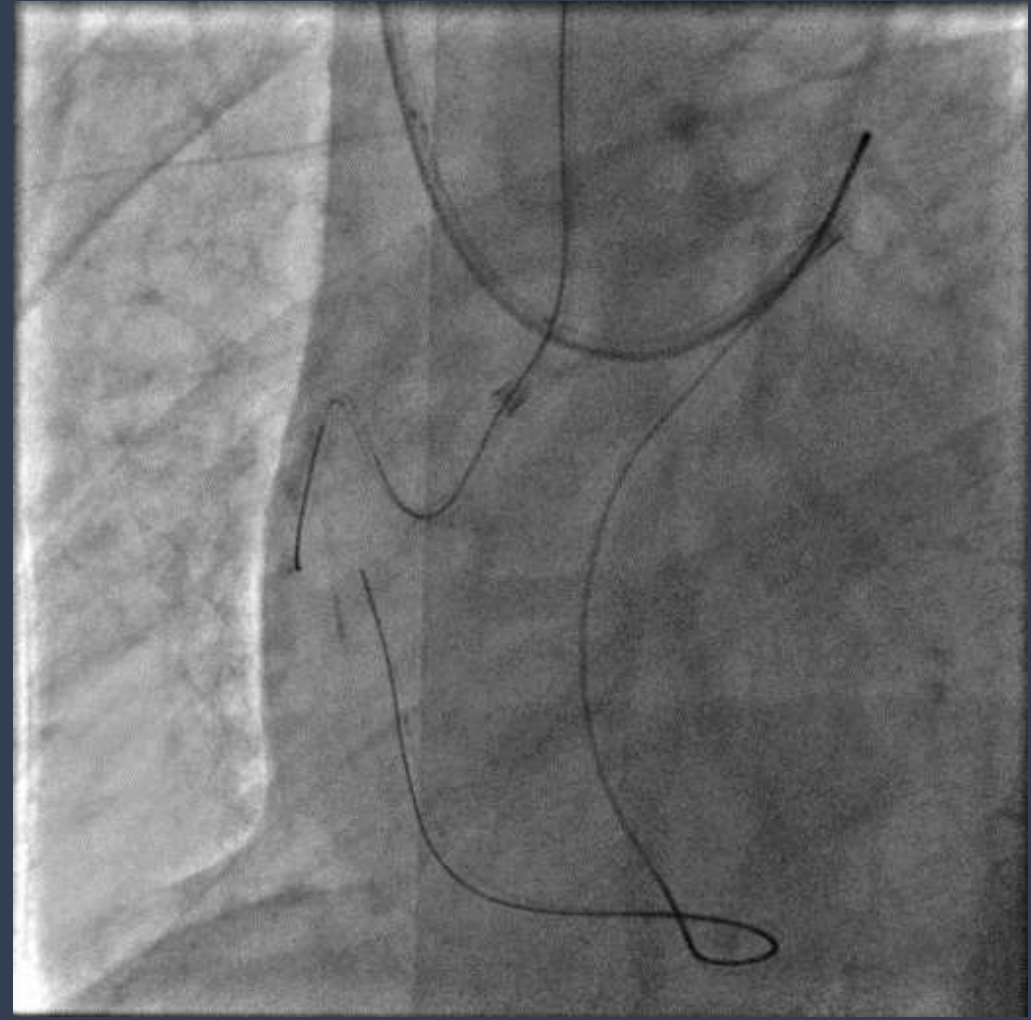
Retrograde wiring



Retrograde wiring by Ultimate bros 3G



RAO



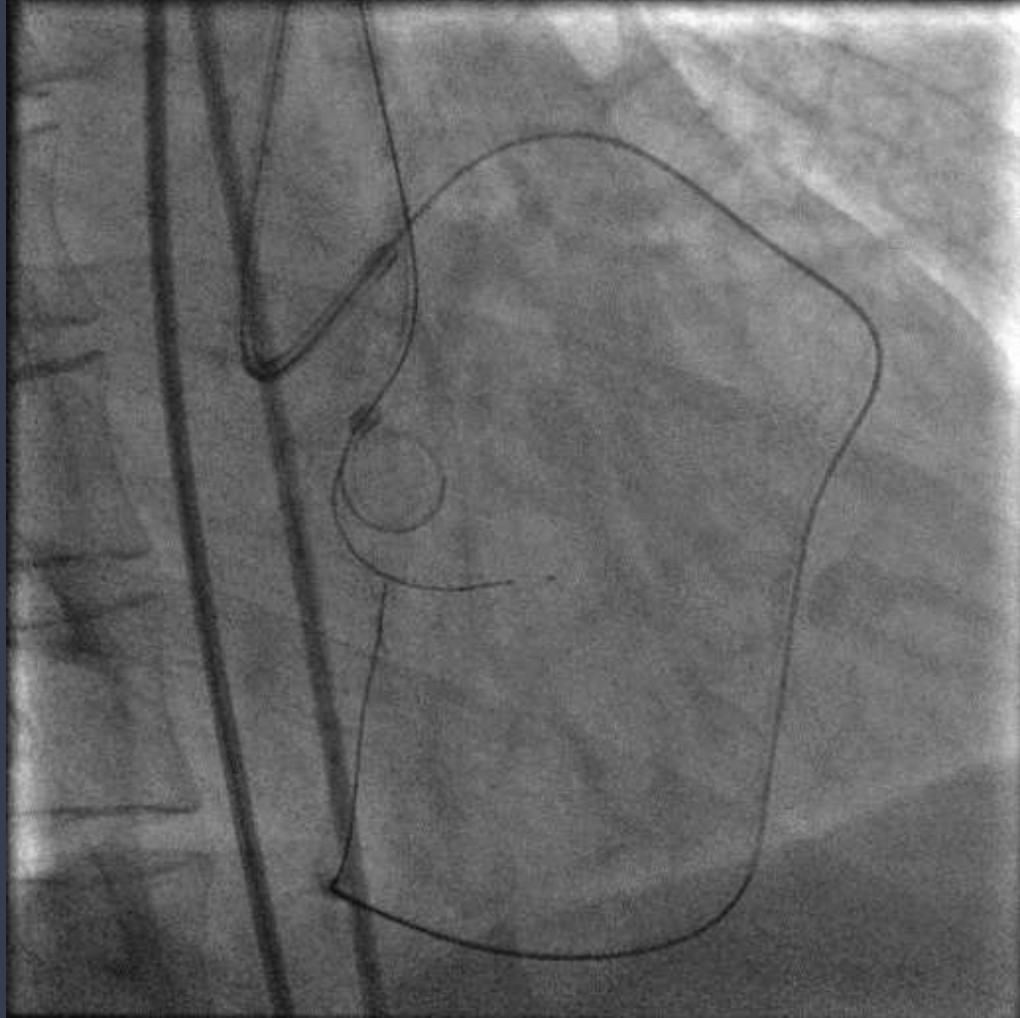
LAO CRA

ASAHI
ULTIMATEbros 3
PTCA GUIDE WIRE

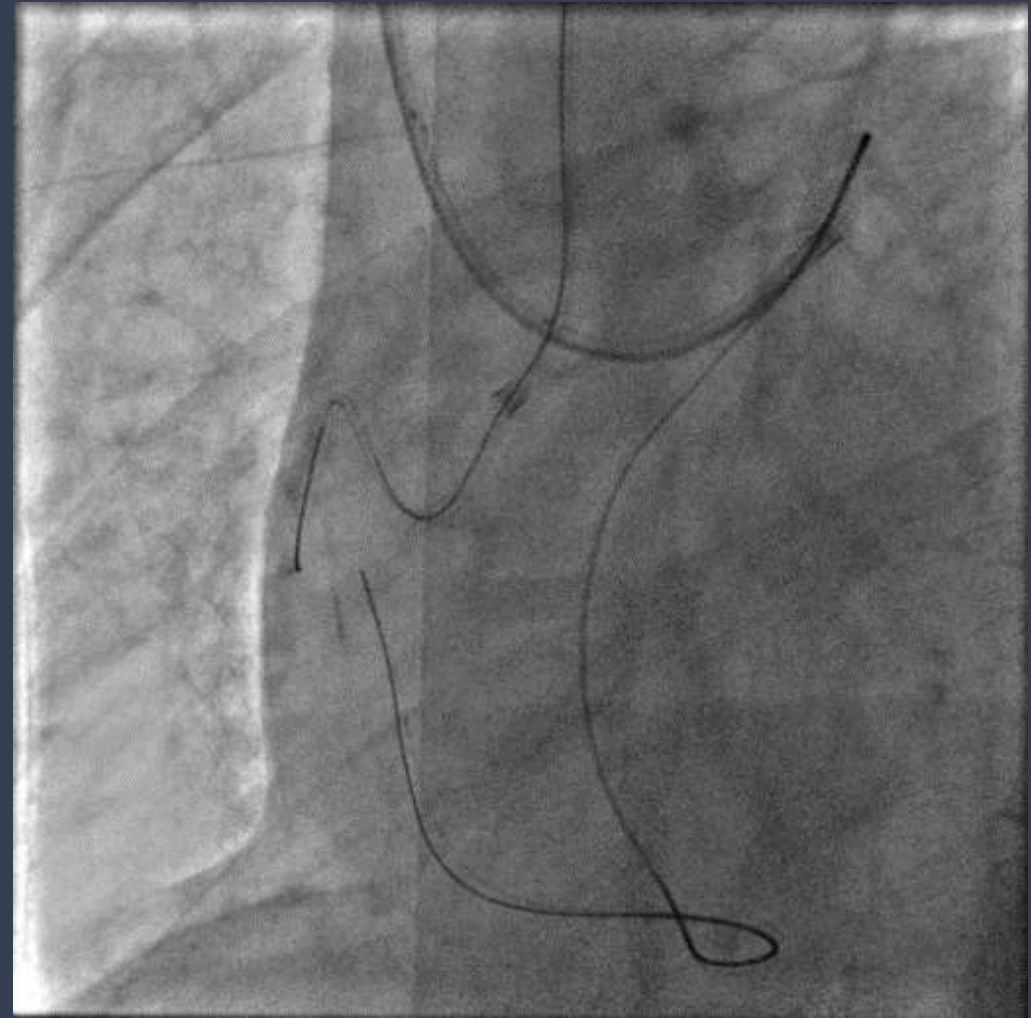


- Tip Load 3g
- Radiopacity 11cm
- Coil 11cm
- Diameter 0.014inch
- Length 175cm

Retrograde wiring by Ultimate bros 3G

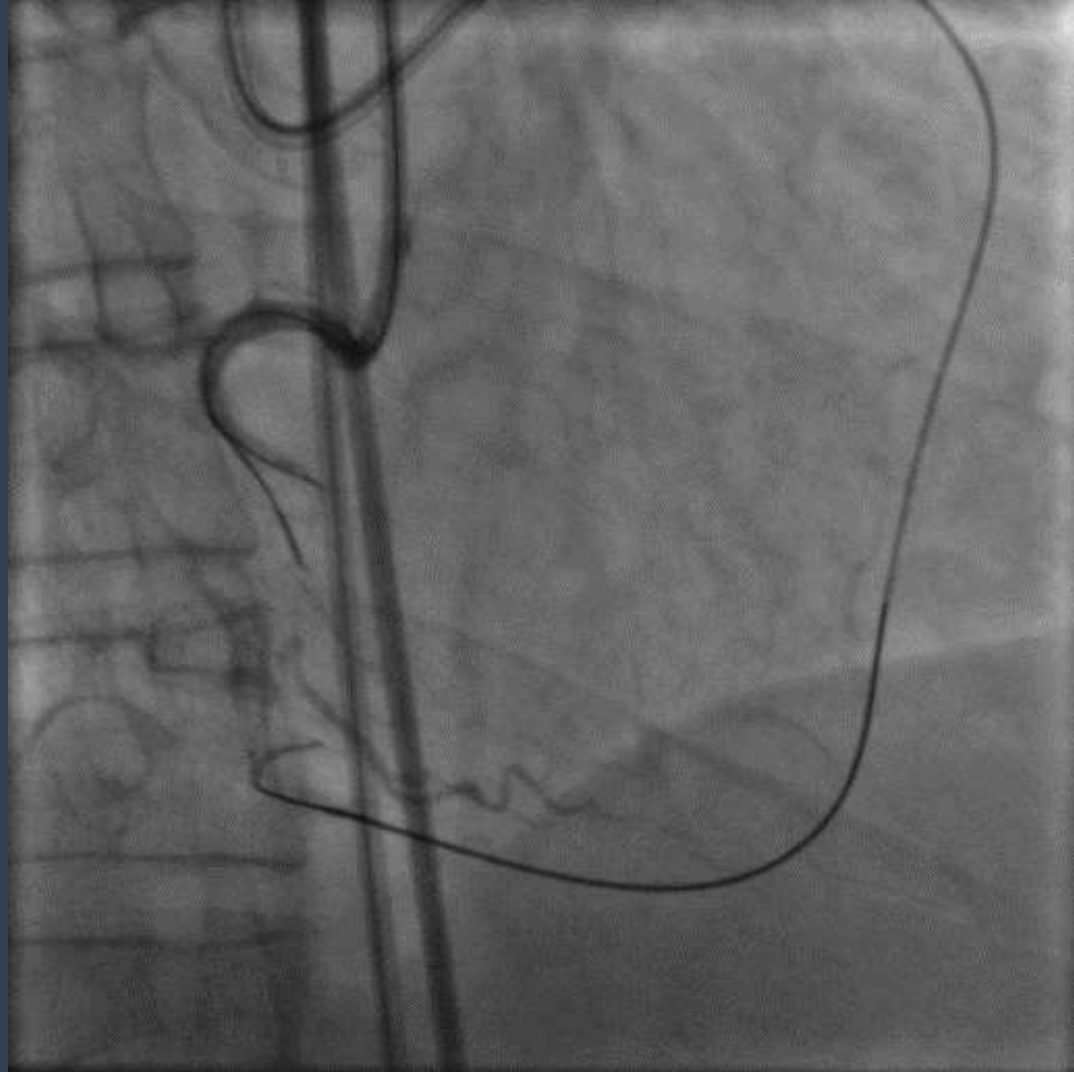


RAO

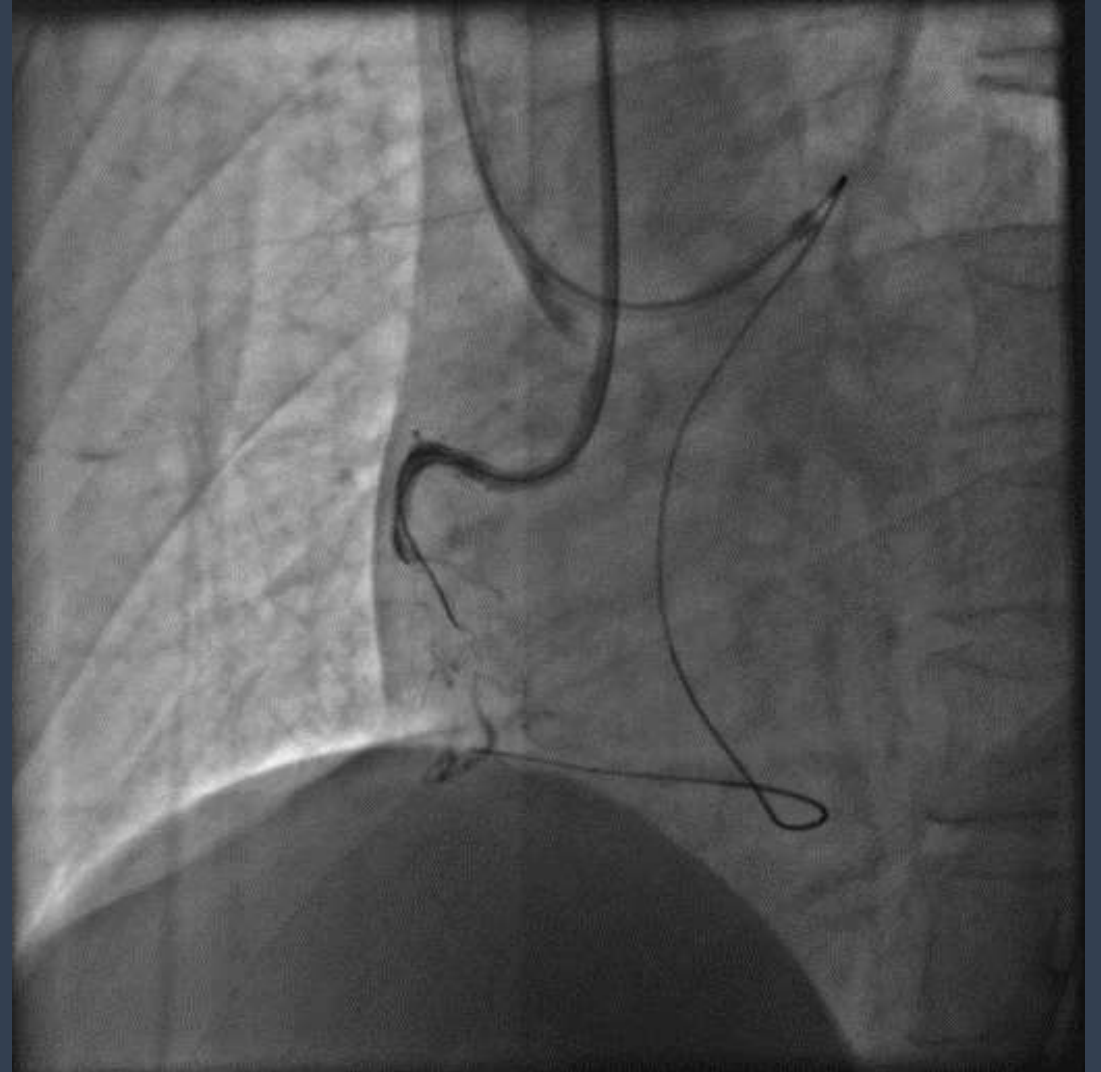


LAO CRA

Retrograde wiring by Ultimate bros 3G



RAO

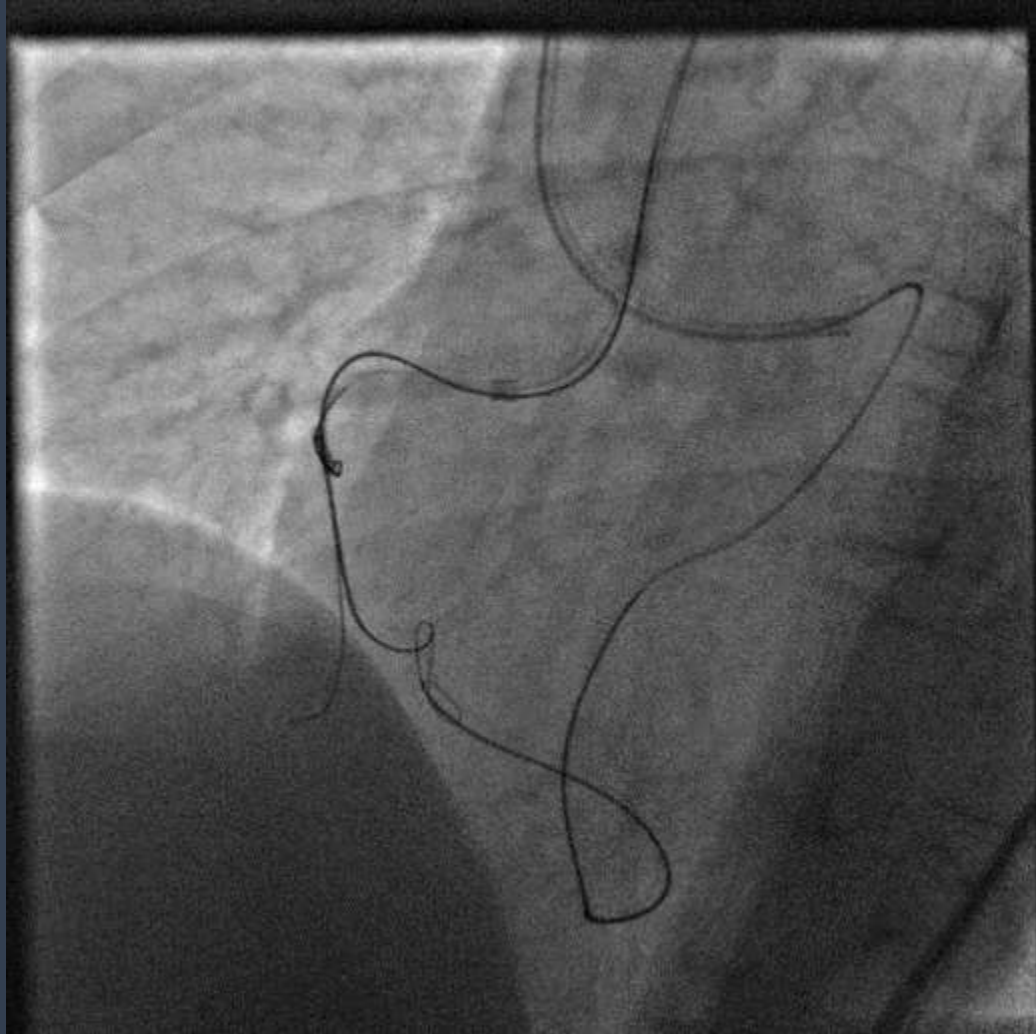


LAO CRA

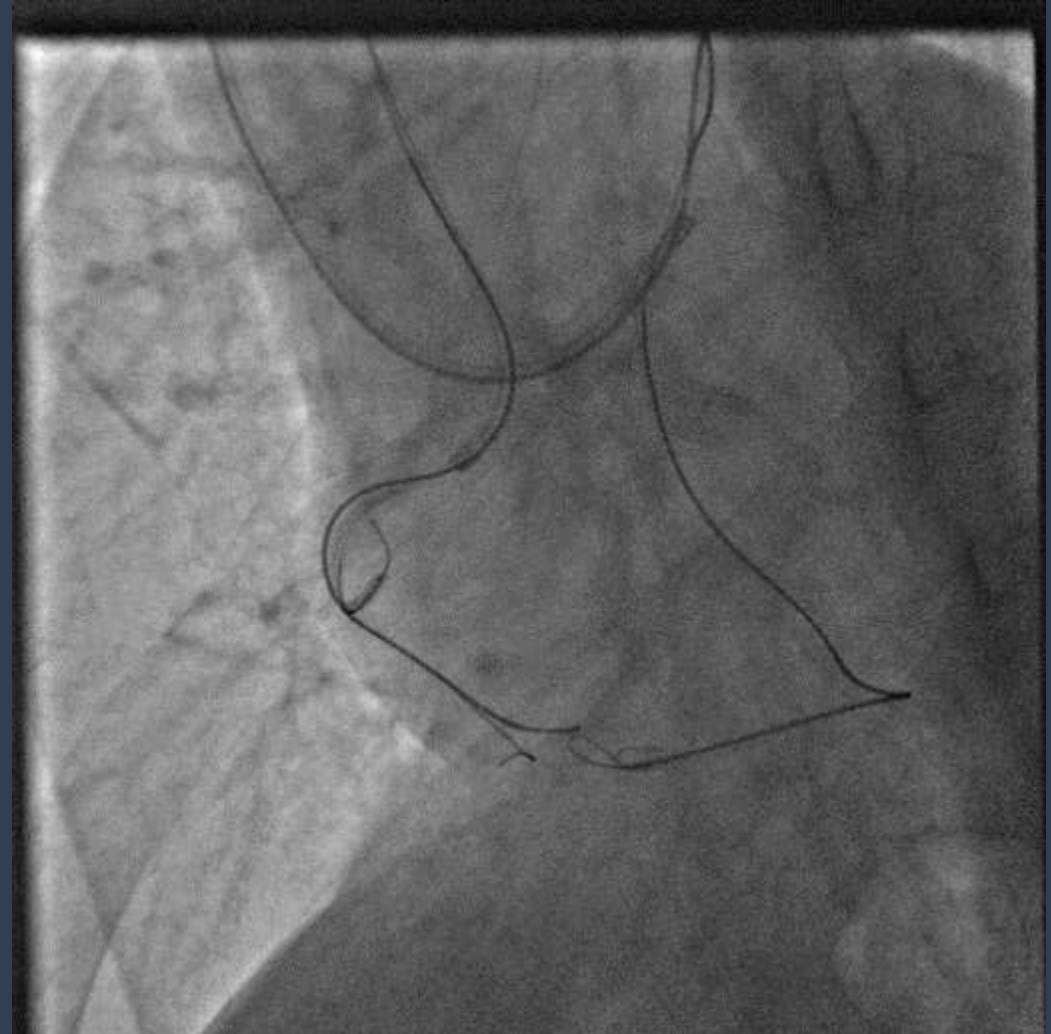
Bilateral knuckle wire technique



Bilateral wiring by knuckle wire technique

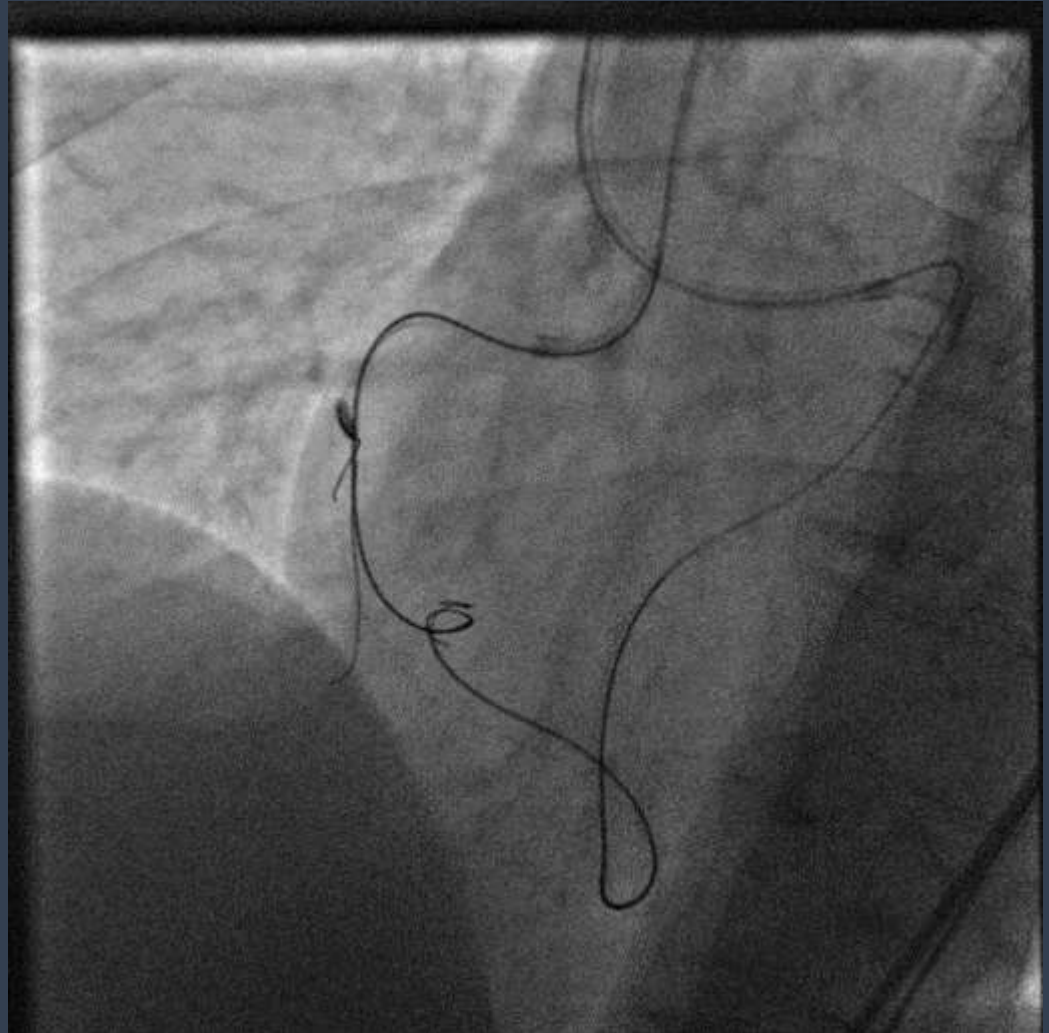
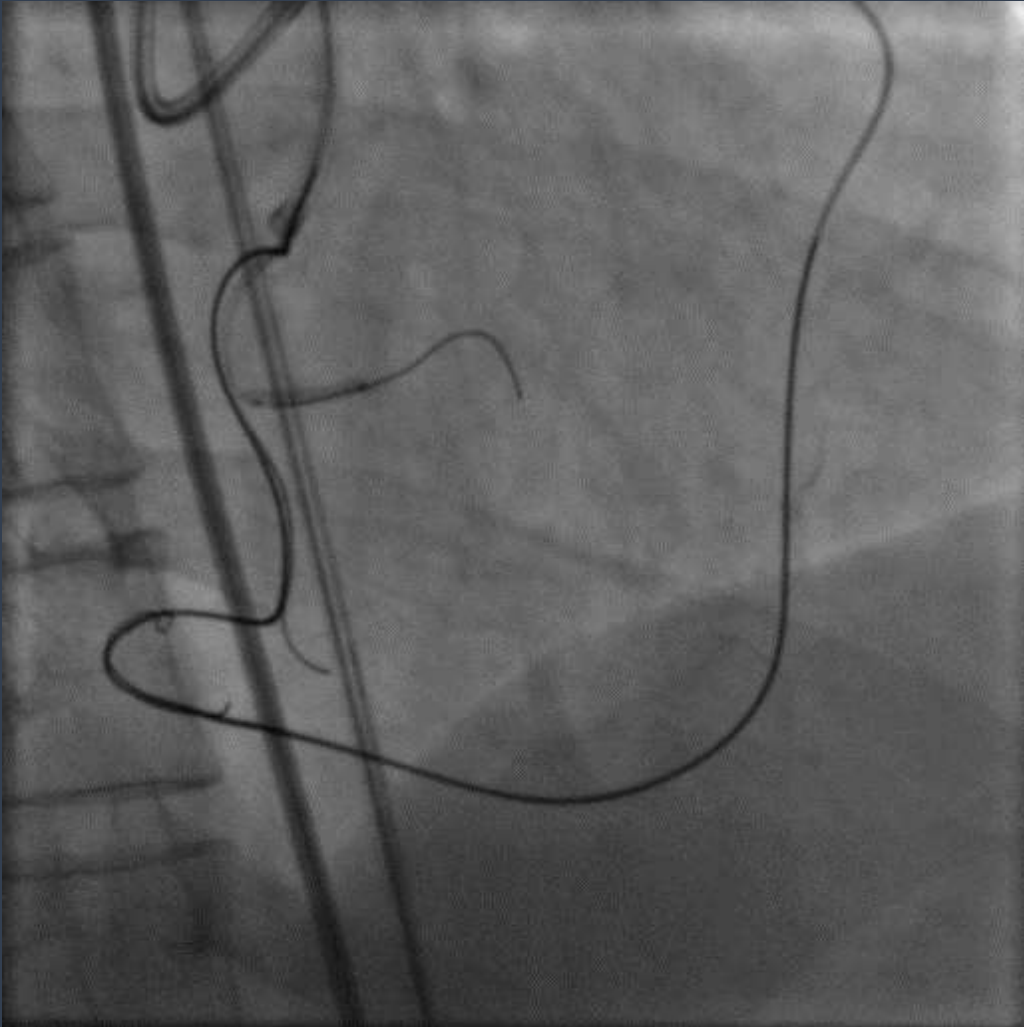


LAO CRA

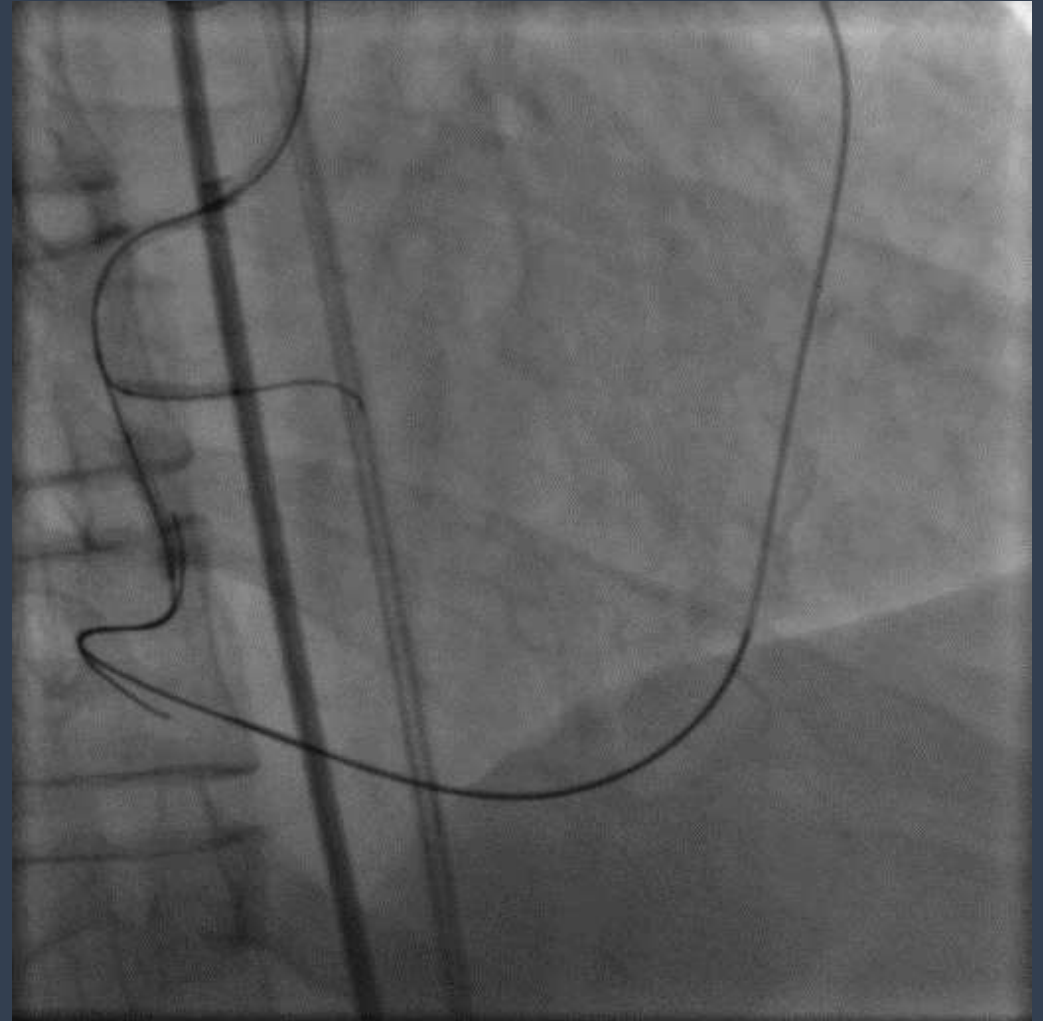
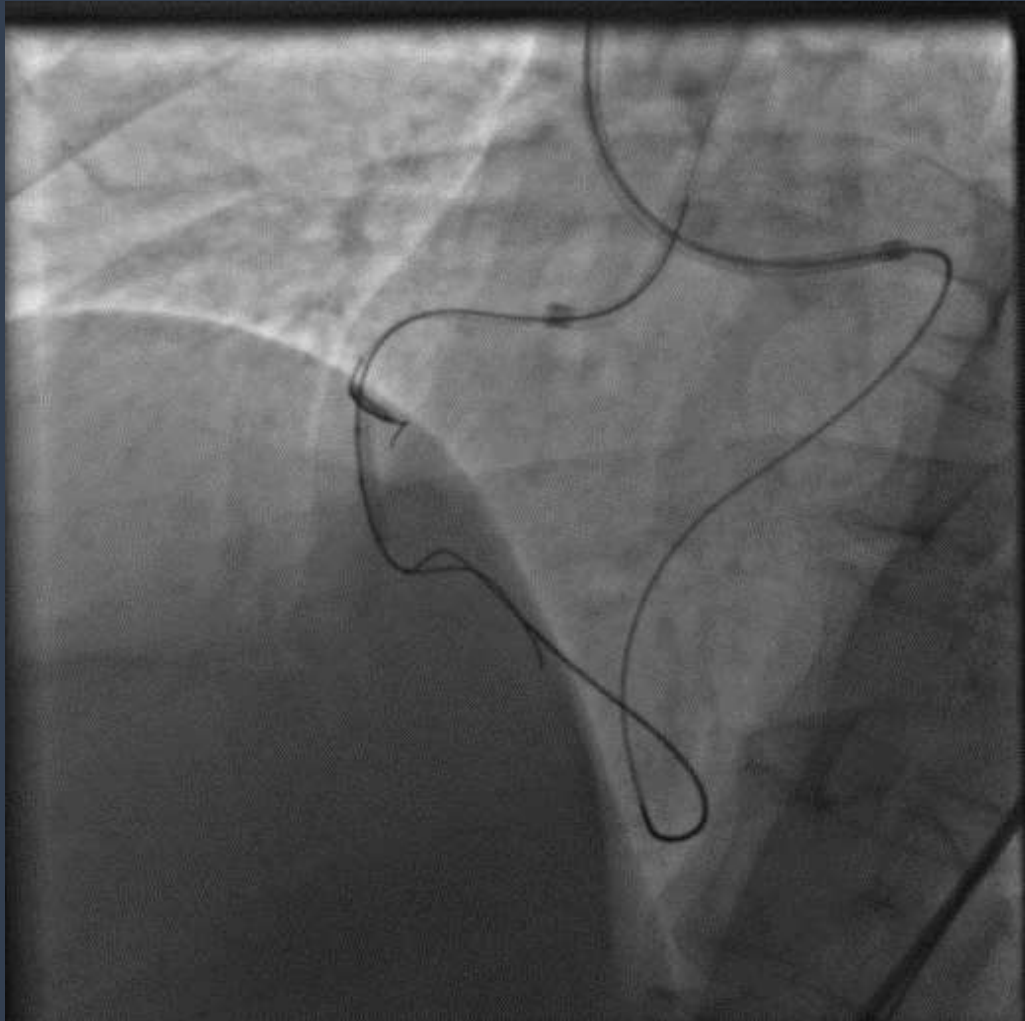


LO CAU

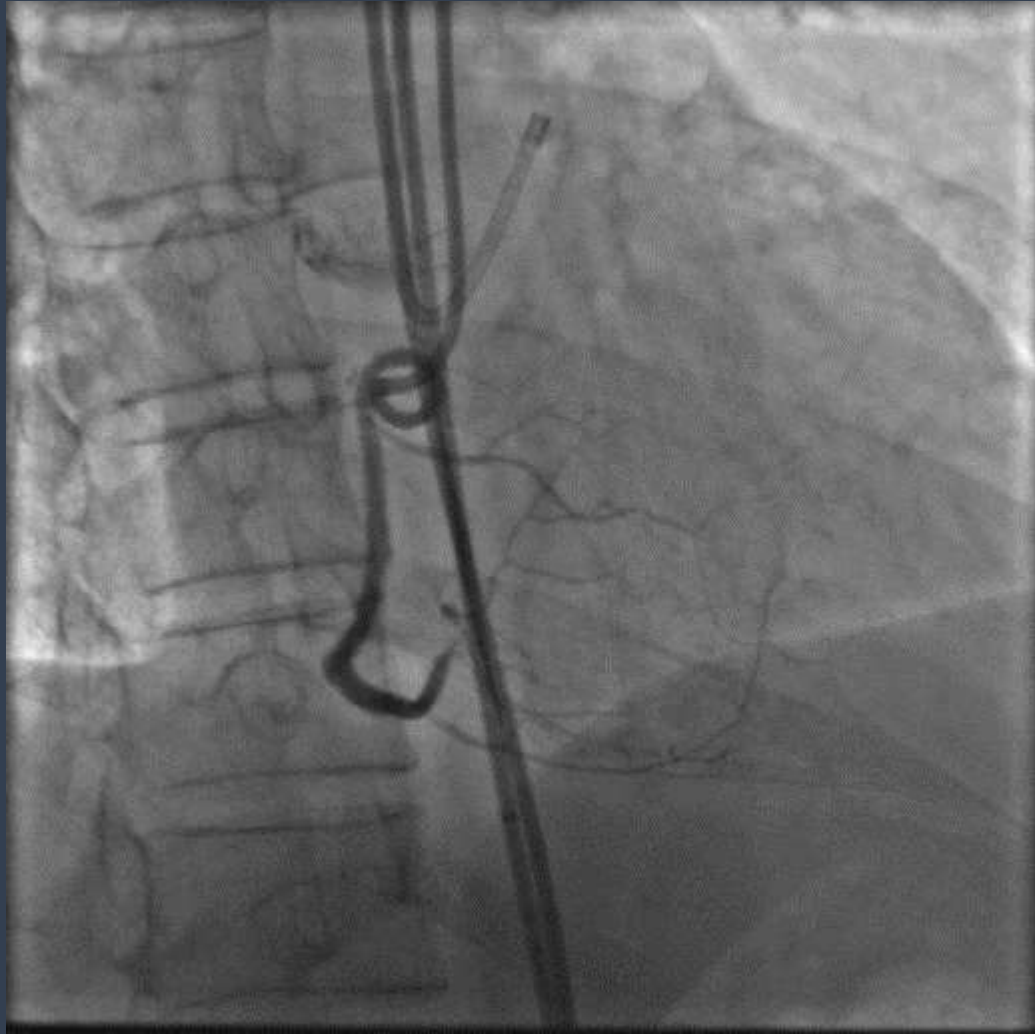
Bilateral wiring by knuckle wire technique



Reverse CART technique



Final angiogram



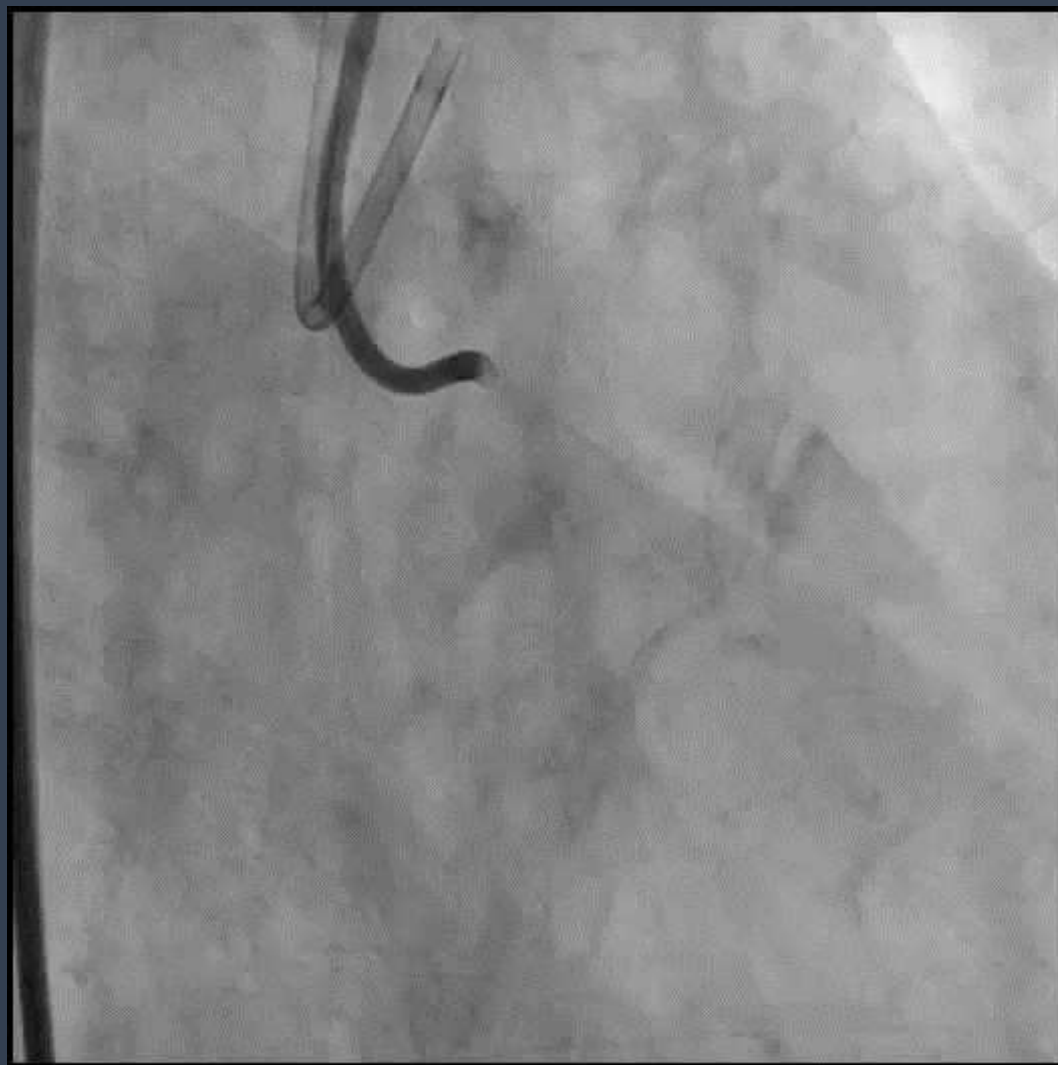
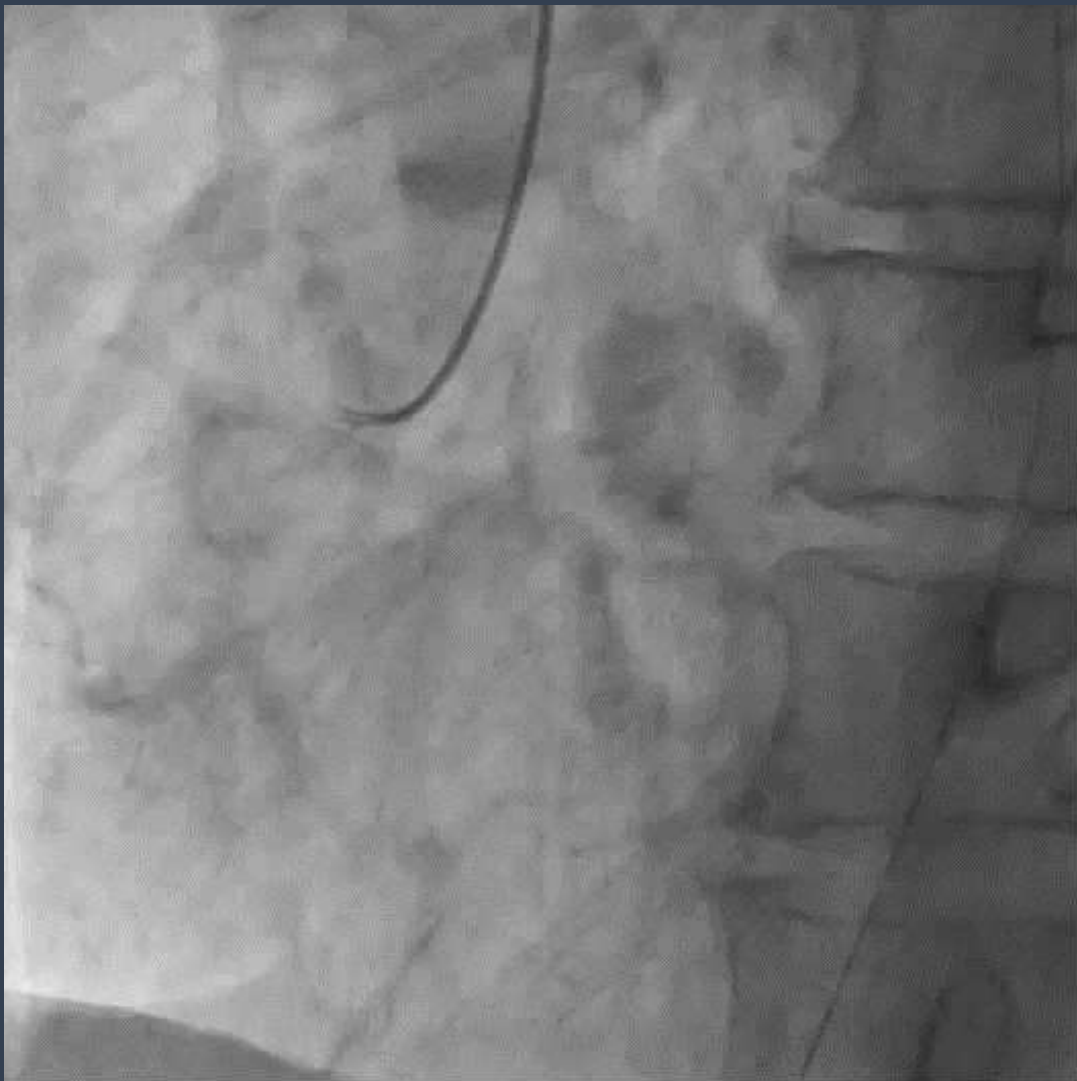
Case Summary

Ultimate Bros 3 guide wire is an widely used safe CTO wire with intermediate stiffness and excellent torque control. However, Even UB3 wire is not always stay inside of CTO lesion.

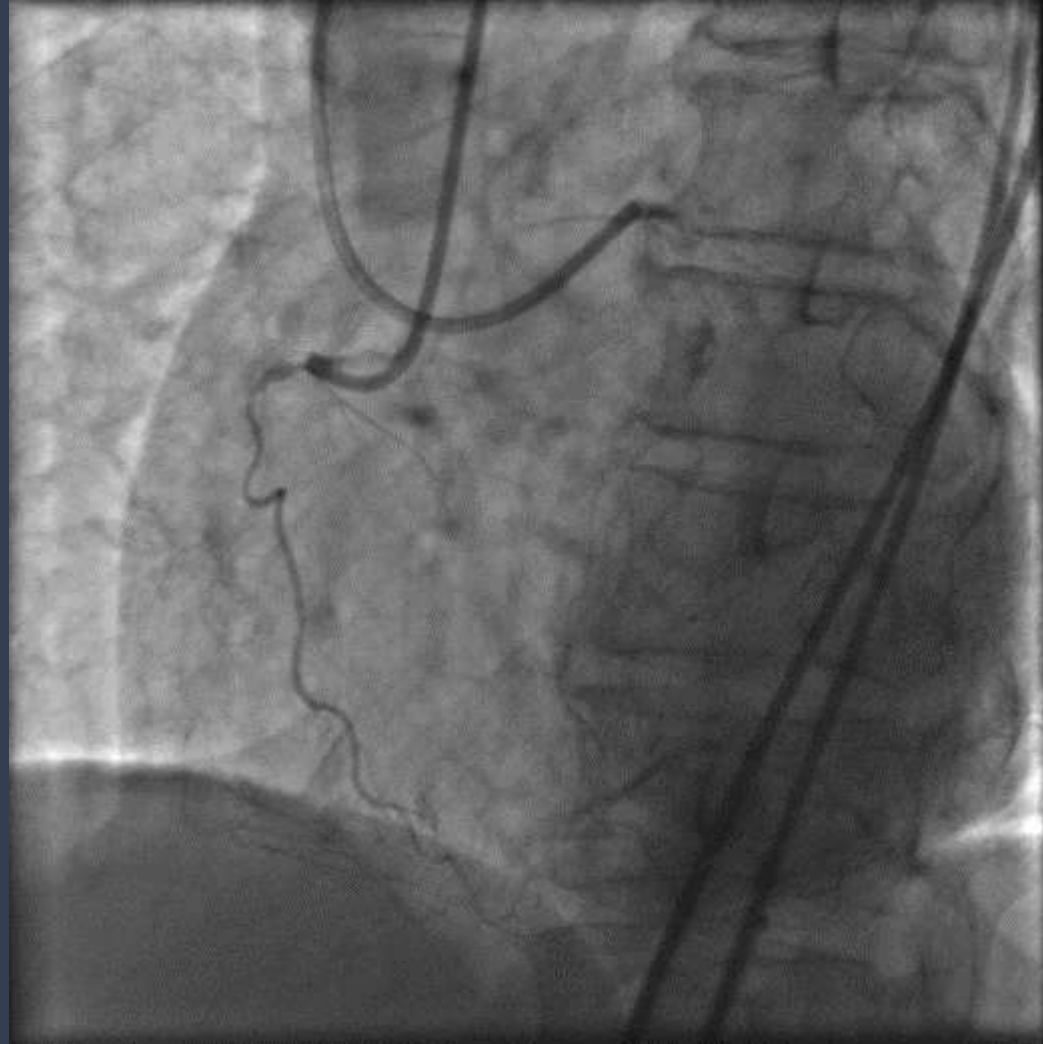
Knuckle wiring technique is not standard wiring technique for CTO PCI.

However, in some special condition like this case: a very long RCA CTO with angiographically undetectable vessel course, this technique is a useful option in CTO PCI practice.

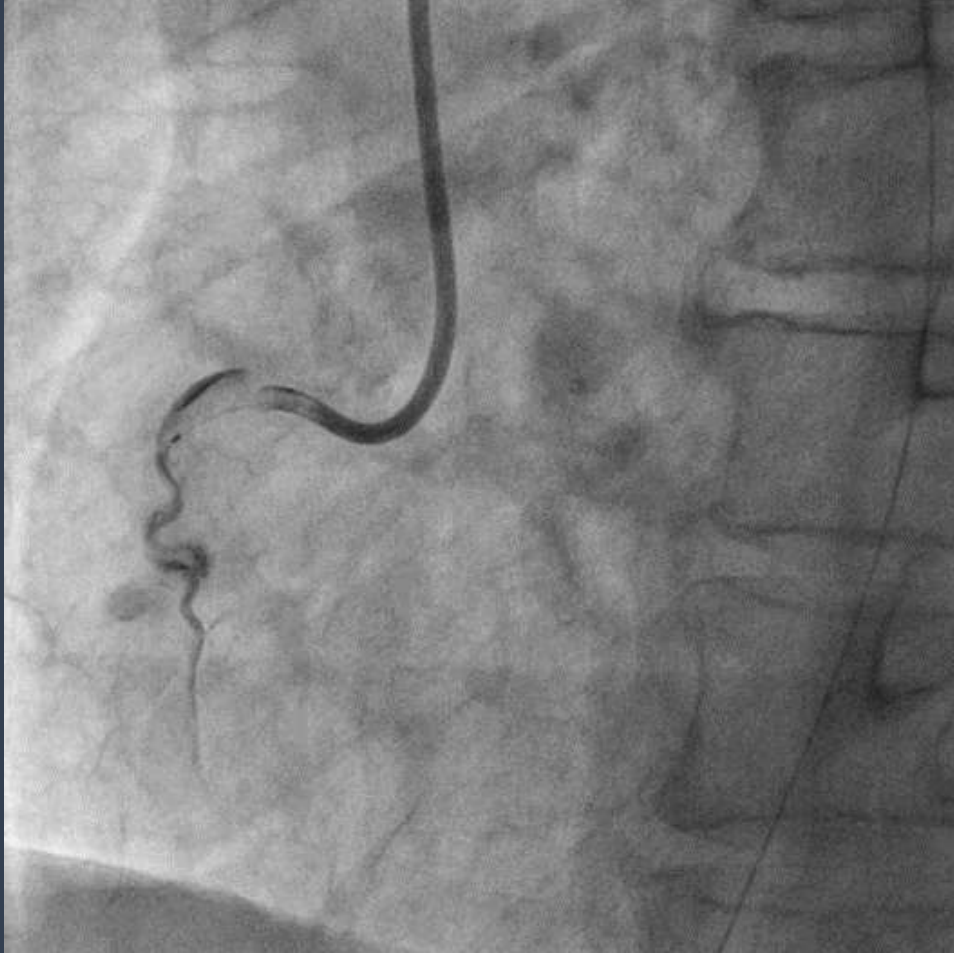
Case 2 RCA long CTO



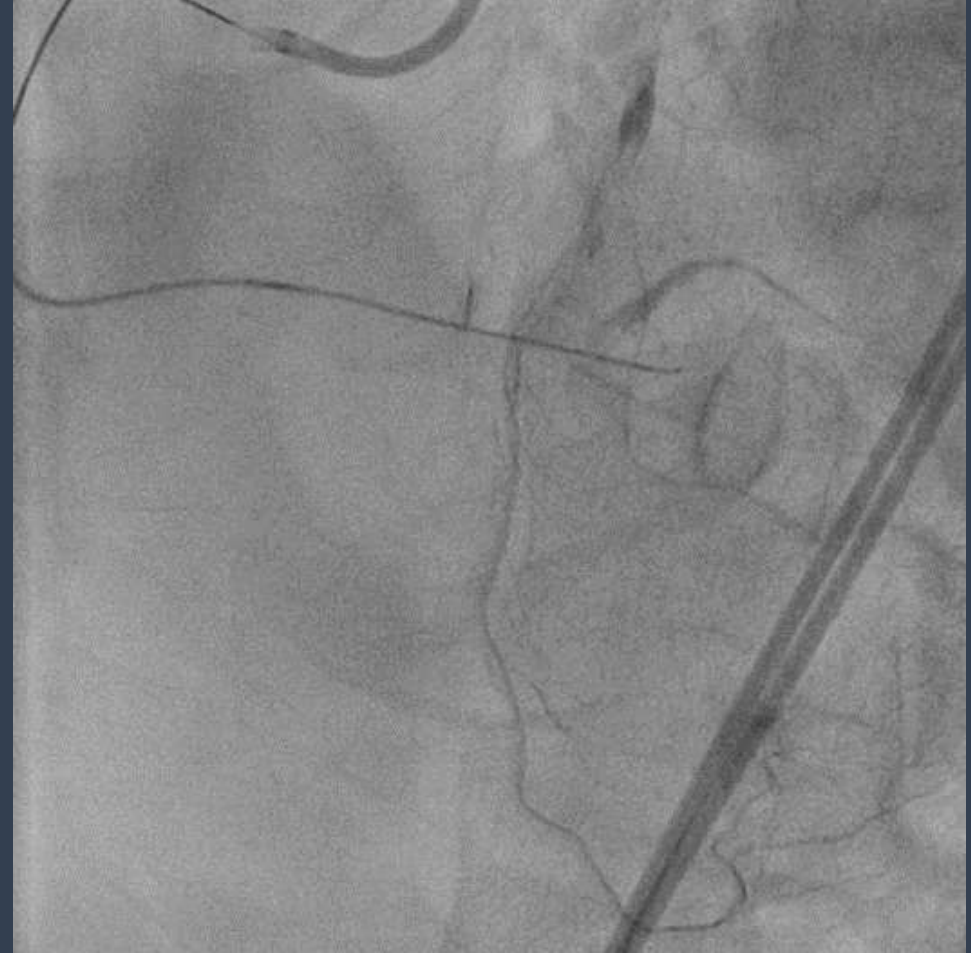
RCA long CTO (>100mm)



Previous PCIs



1st attempt



2nd attempt (procedure time 4hour)

3rd attempt retrograde approach



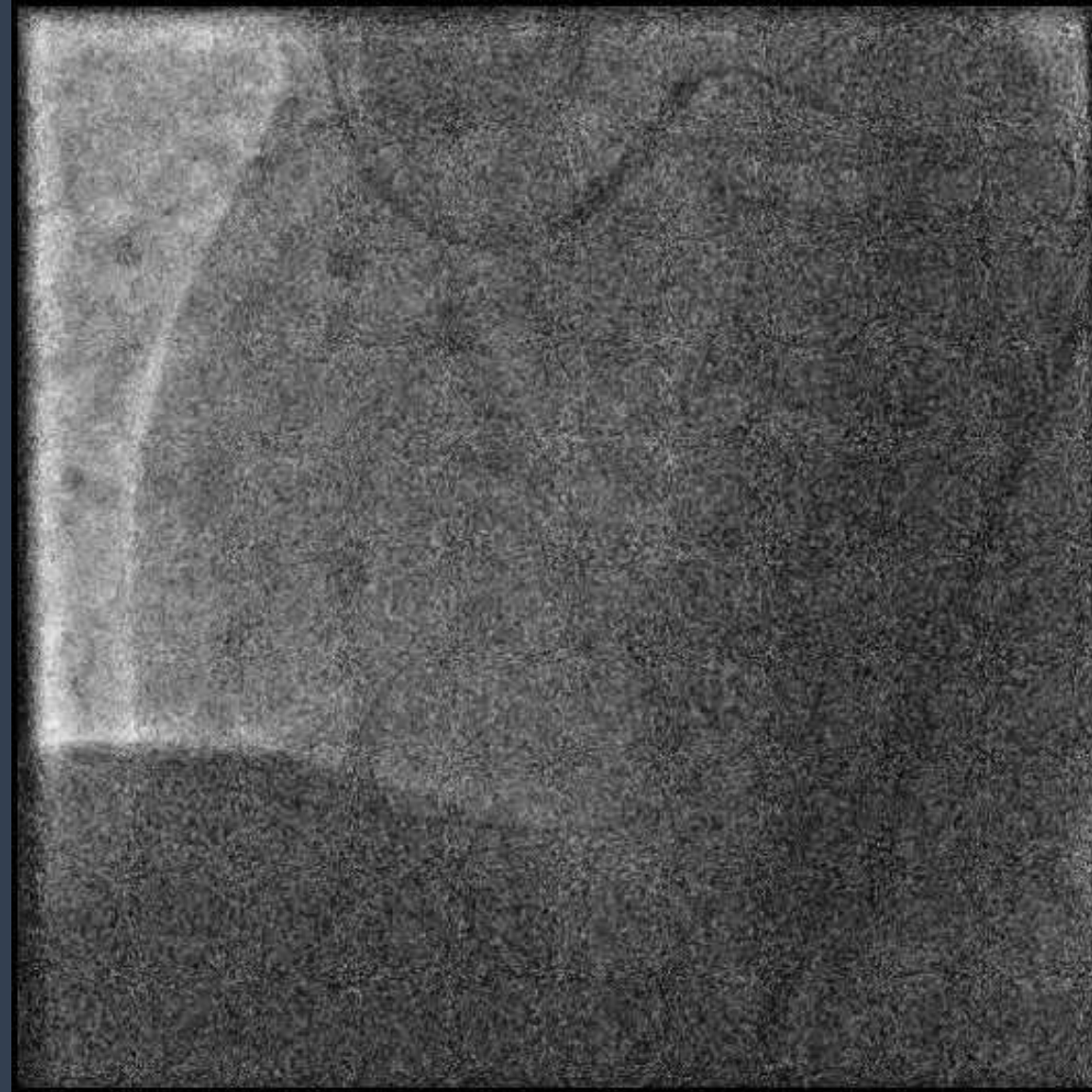
Knuckle wire technique

- Polymer jacket wire (fielder XT or pilot-200) manipulated
- To create wire loop – advanced subintimally across
CTO
- OTW system advanced to this area- reentry to true lumen with a stiffer wire or pilot 200

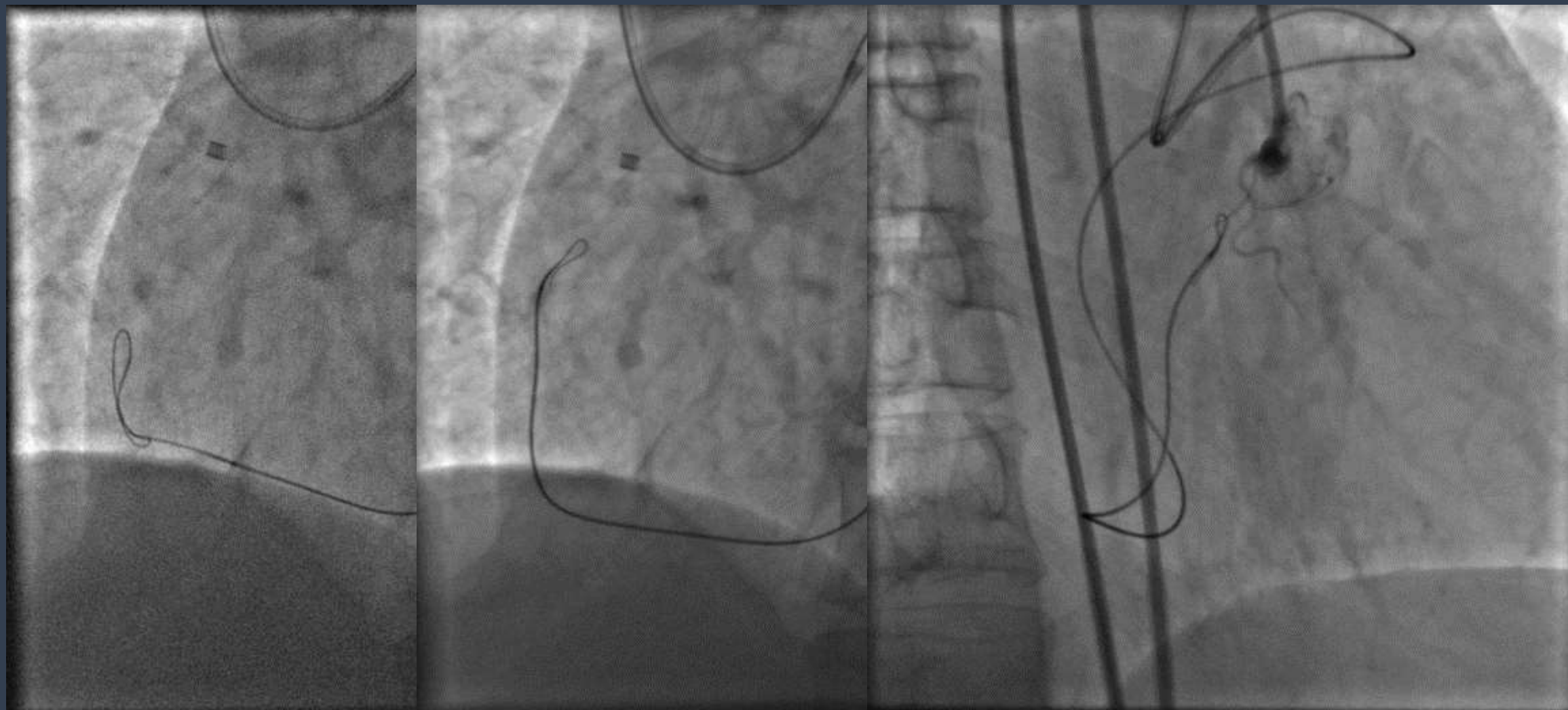
Knuckle wire technique by Fielder XT-R



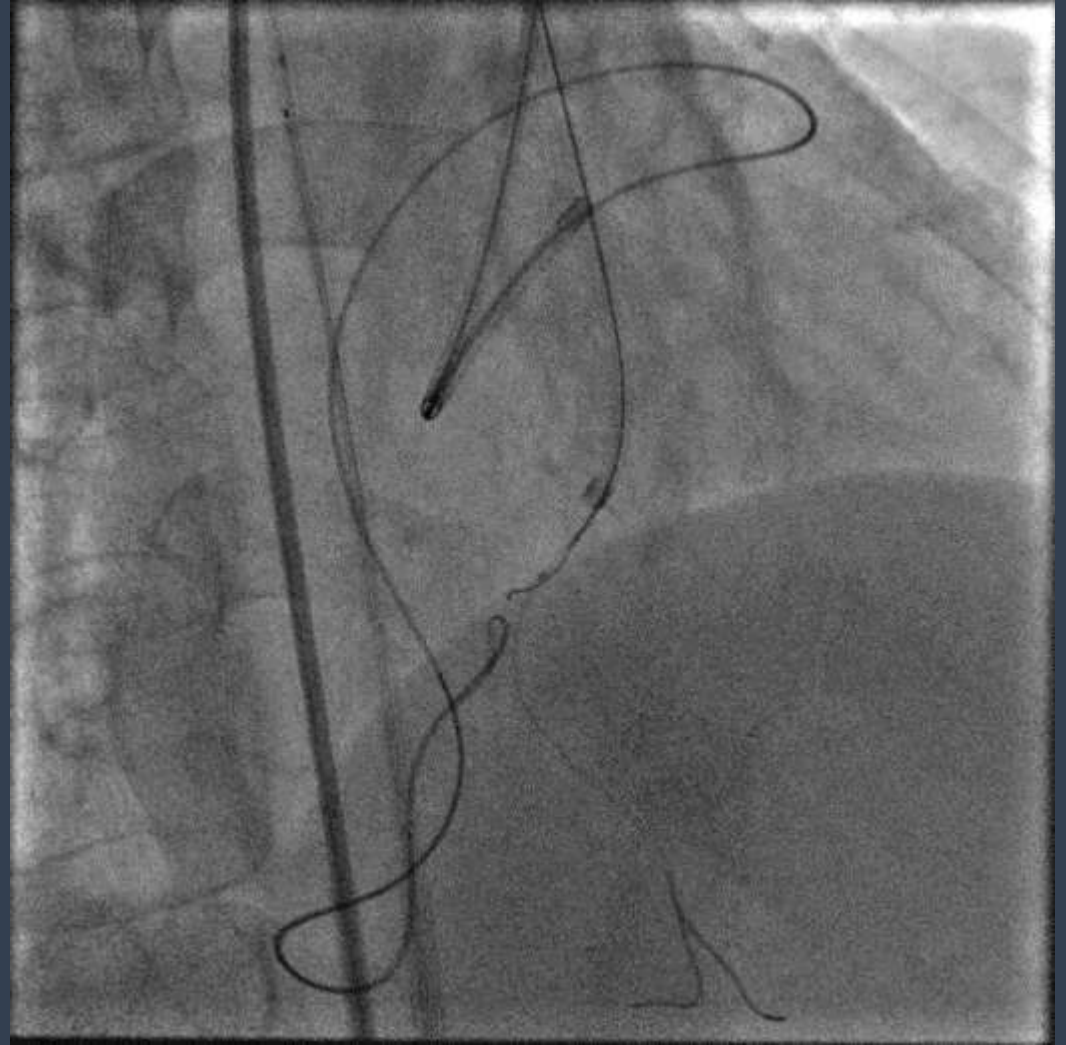
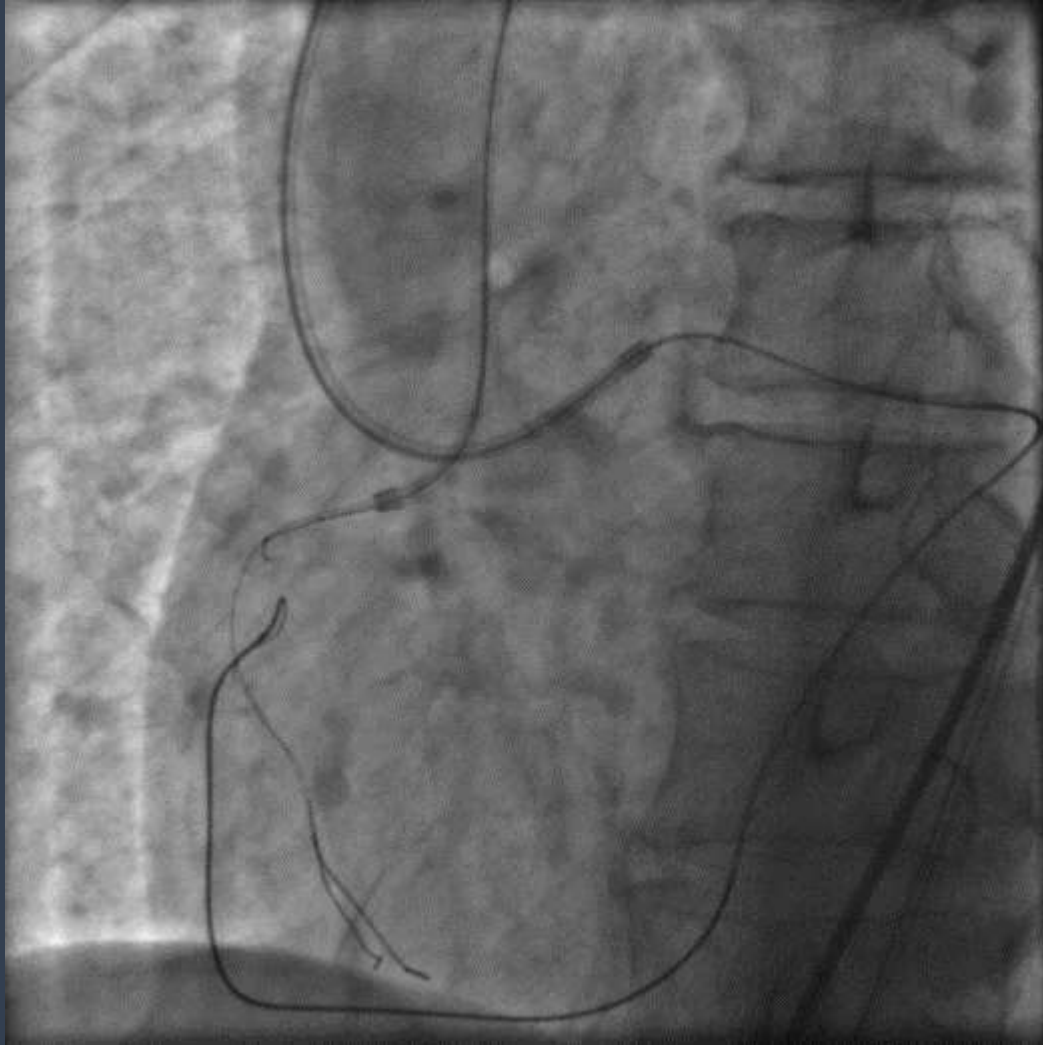
Knuckle wire technique by Pilot 200



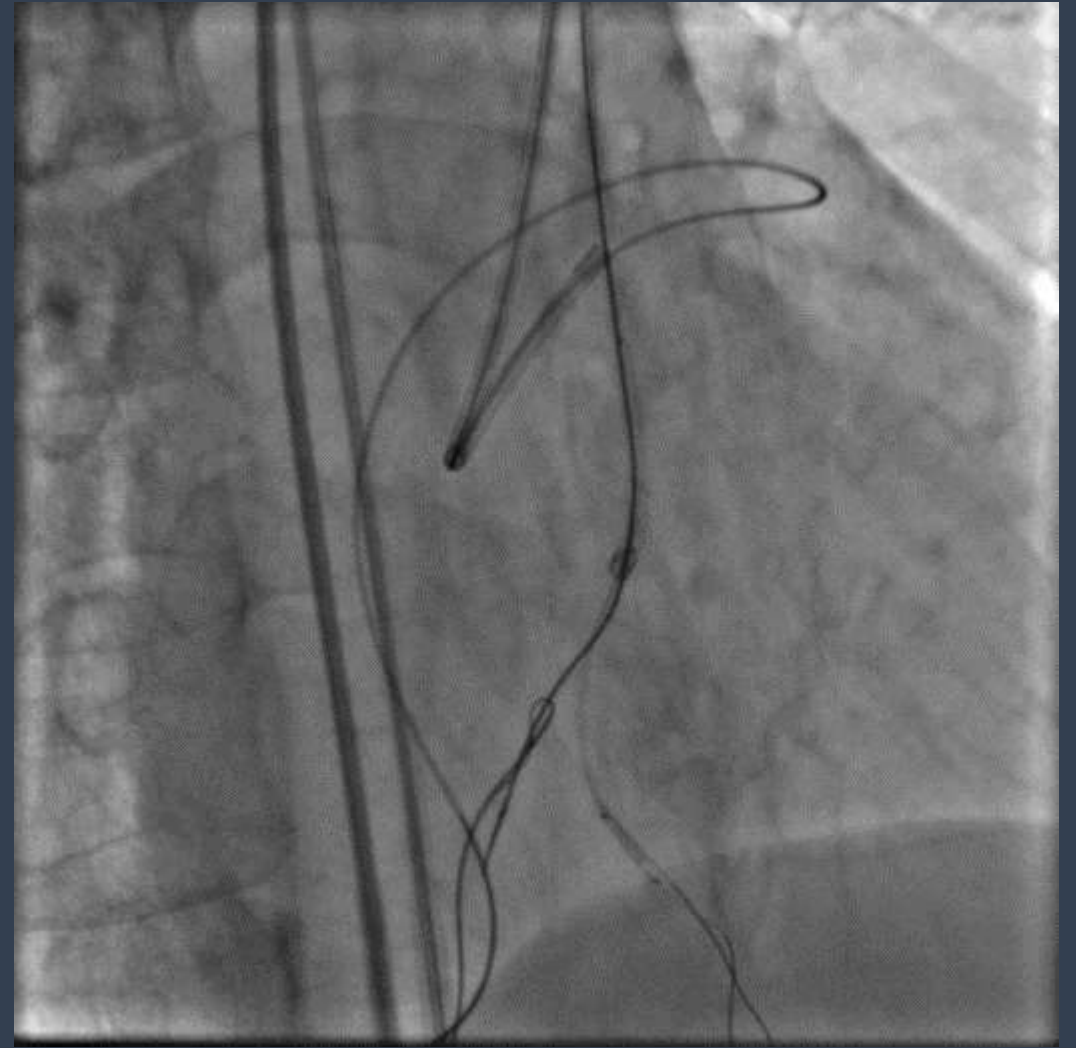
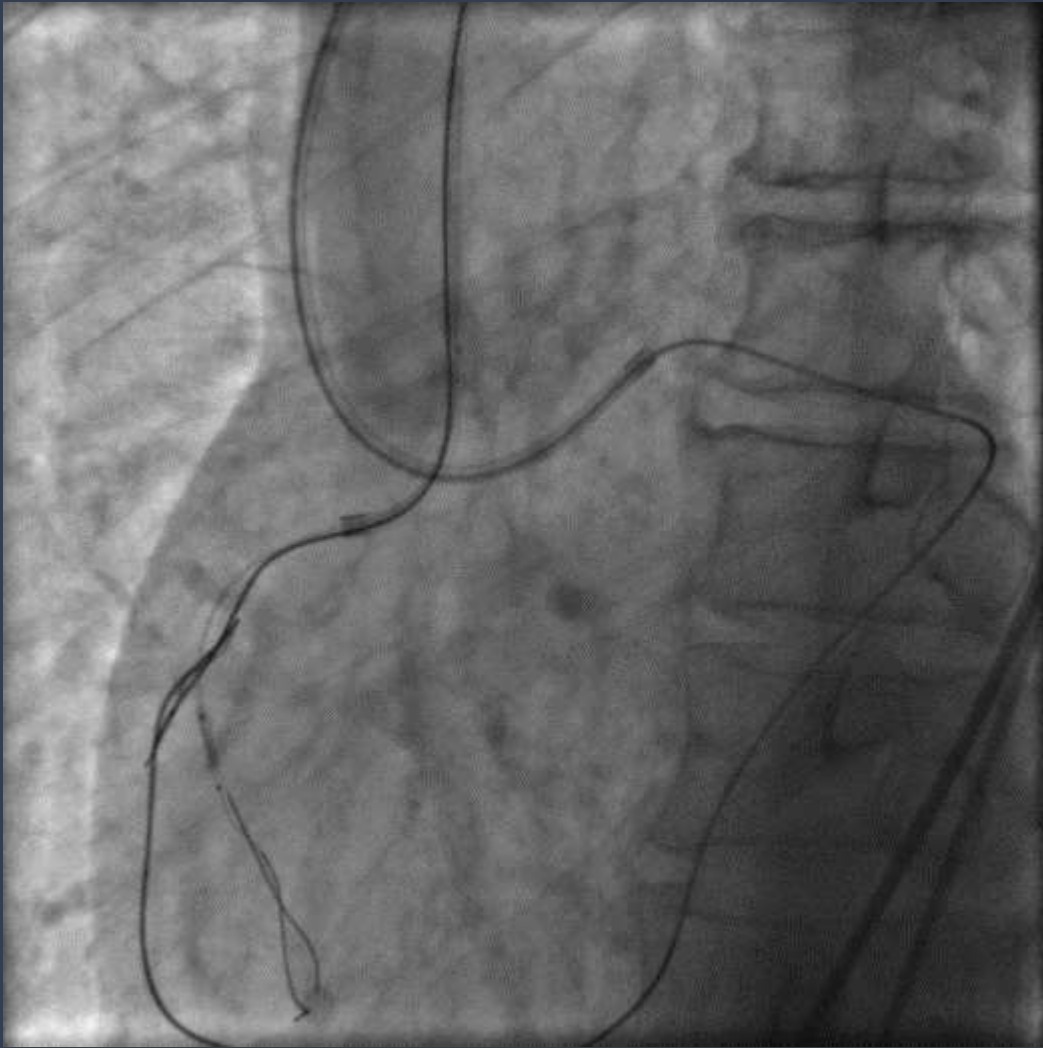
Knuckle wire technique by Pilot 200



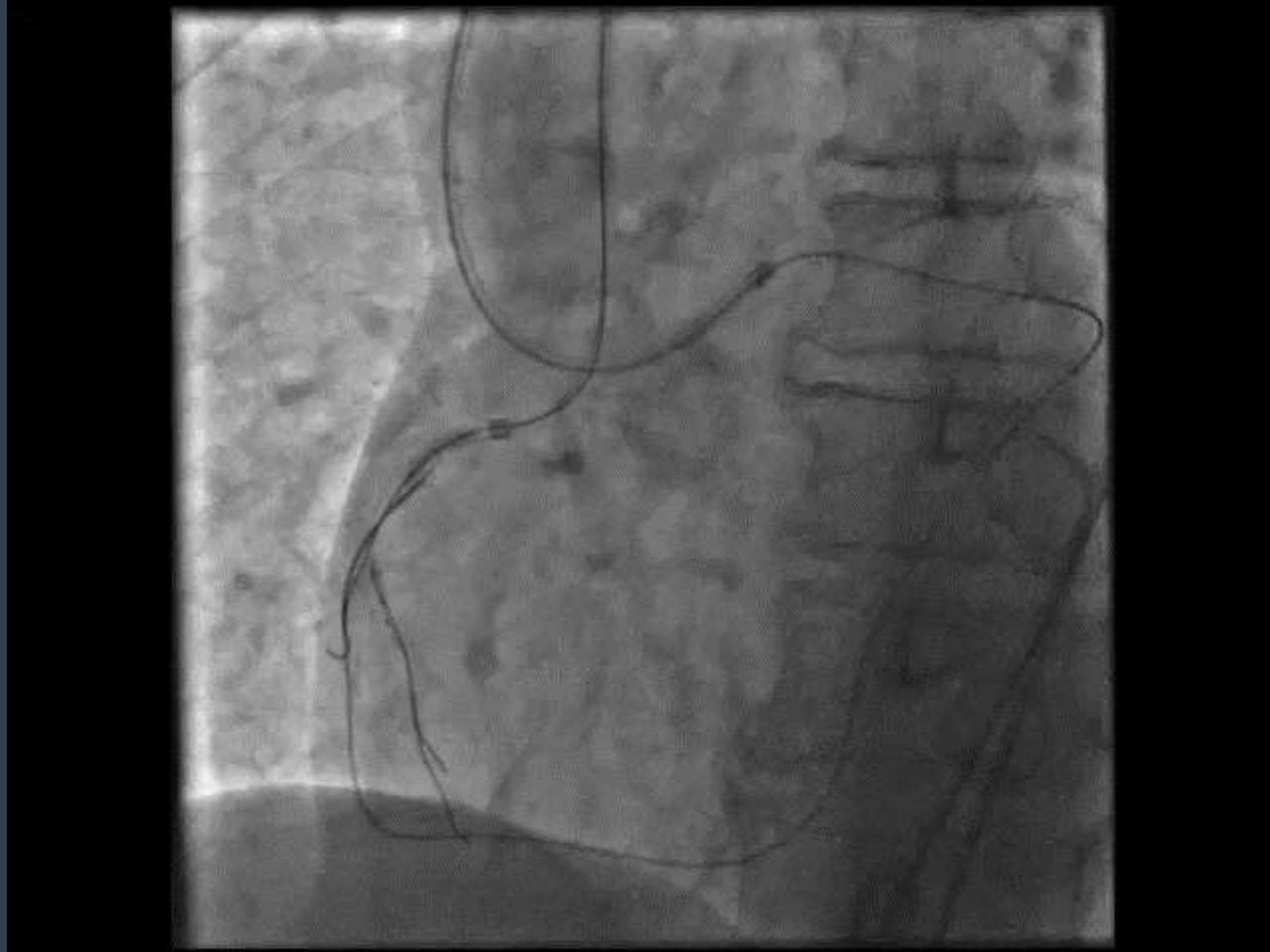
Antegrade wiring by U.B. after IVUS examination



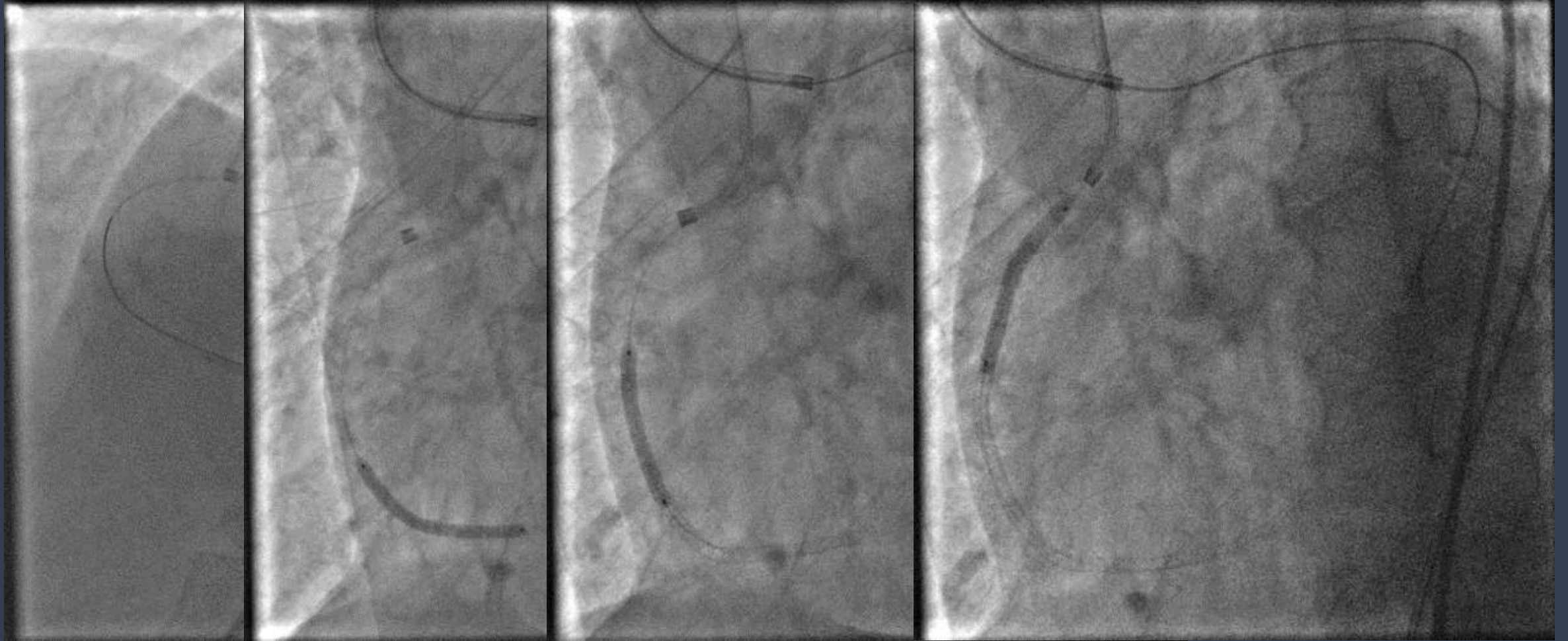
Antegrade wiring by U.B. after IVUS examination



Reverse CART with 2.5mm balloon and retrograde Gaia 1st



4 EESs was implanted



Final angiogram



Procedure time 65min

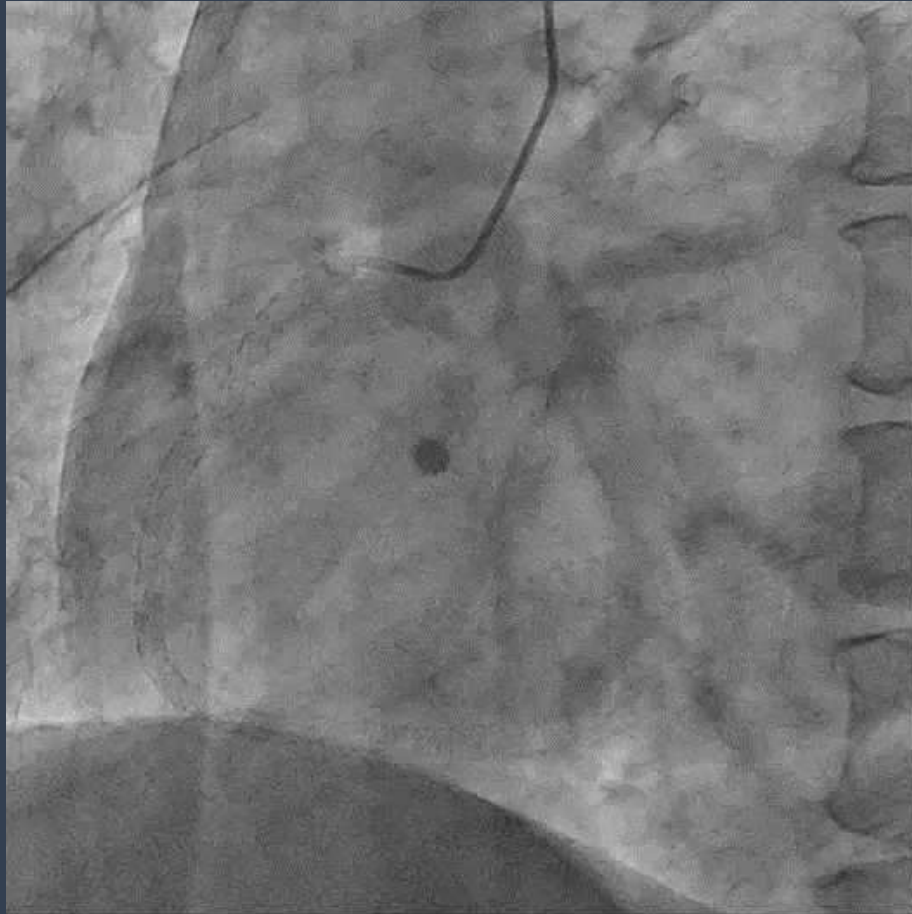
Case Summary

Extraordinary long RCA CTO case was treated by knuckle wire technique.

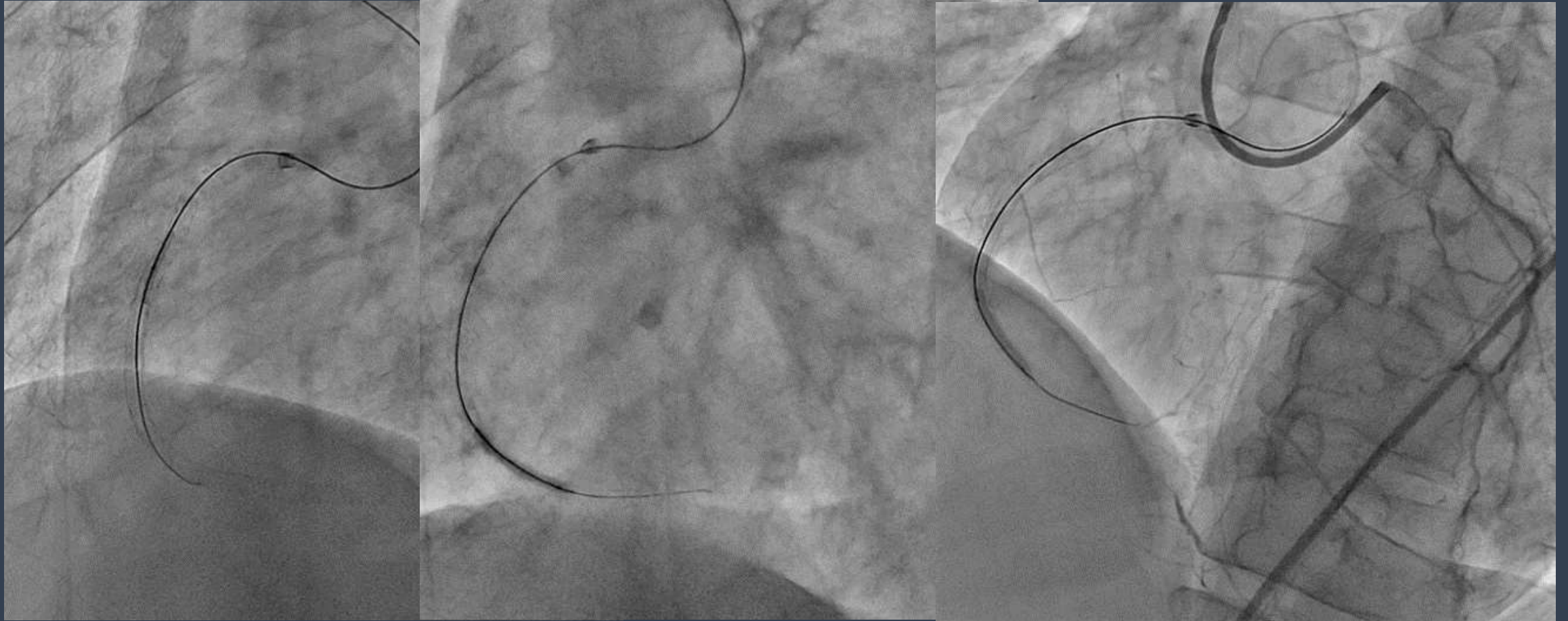
XT-R(SION Black) and Pilot 200 wire are generally used in KWT practice. Because slippery polymer coating specification is suitable for KWT.

KWT is often effective to save CTO procedure time in tough long CTO like this case.

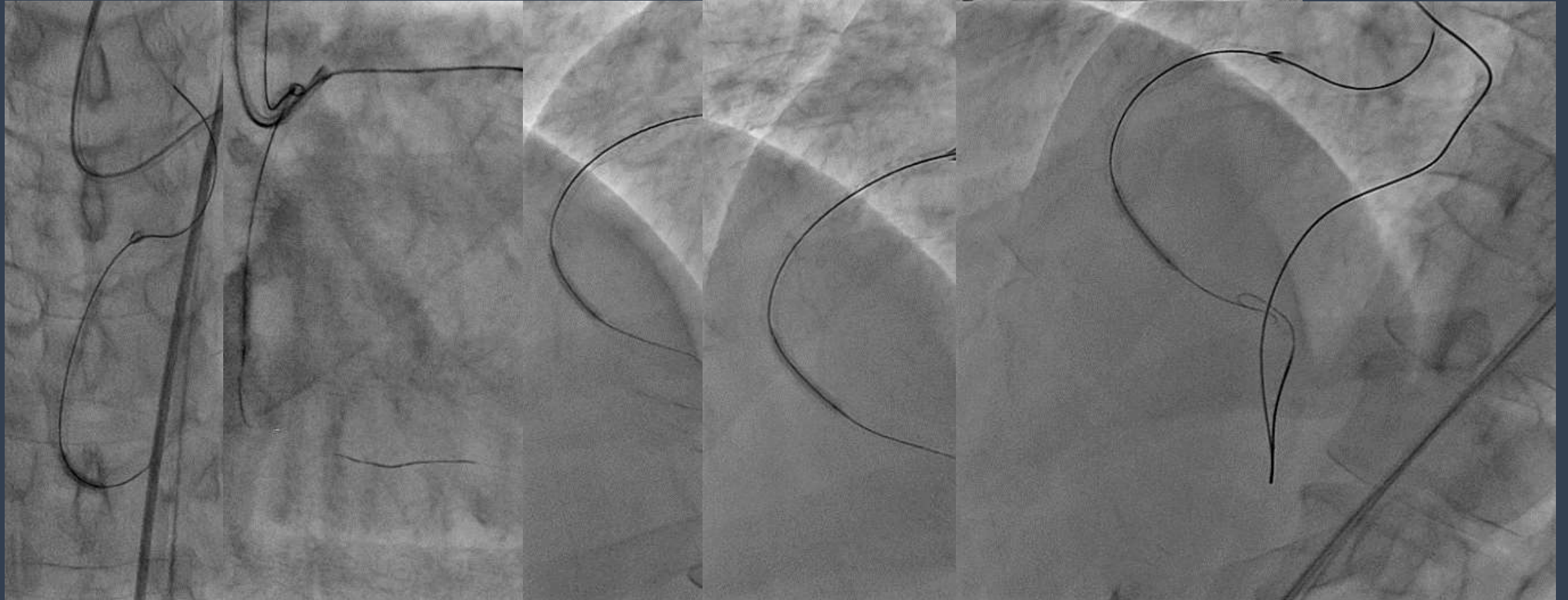
RCA retry, ISR, long, angulated, distal poor target, bifurcated, triple CTO
in Japanese Livedemonstration (JCTO 3)



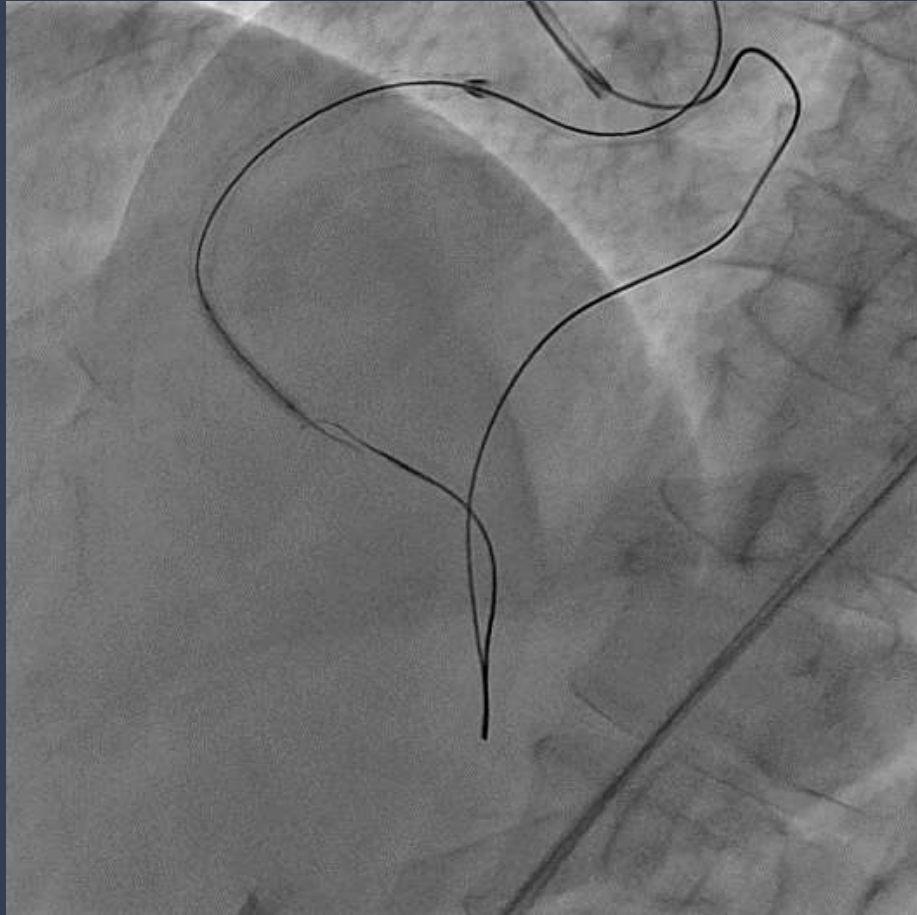
Antegrade wiring: OTW, Conquest8-20, AL2 8F



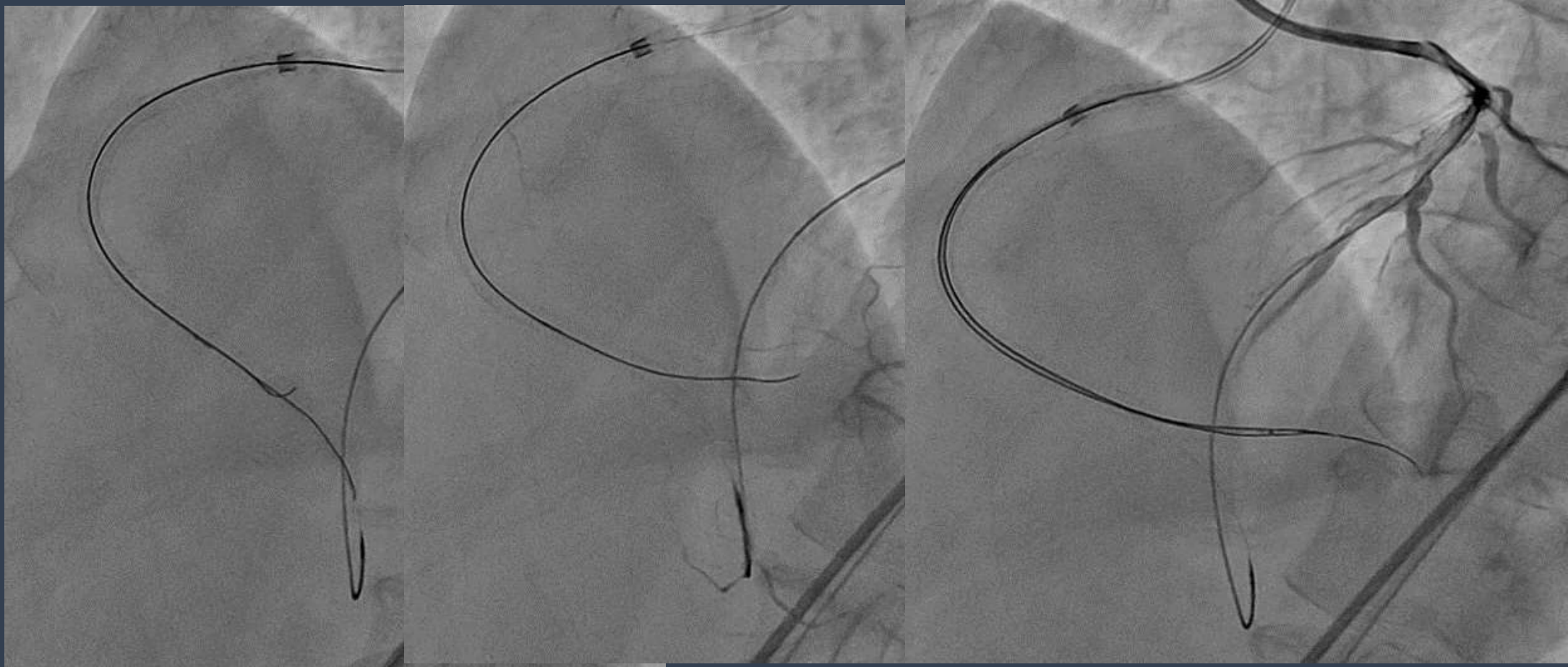
Retrograde wiring



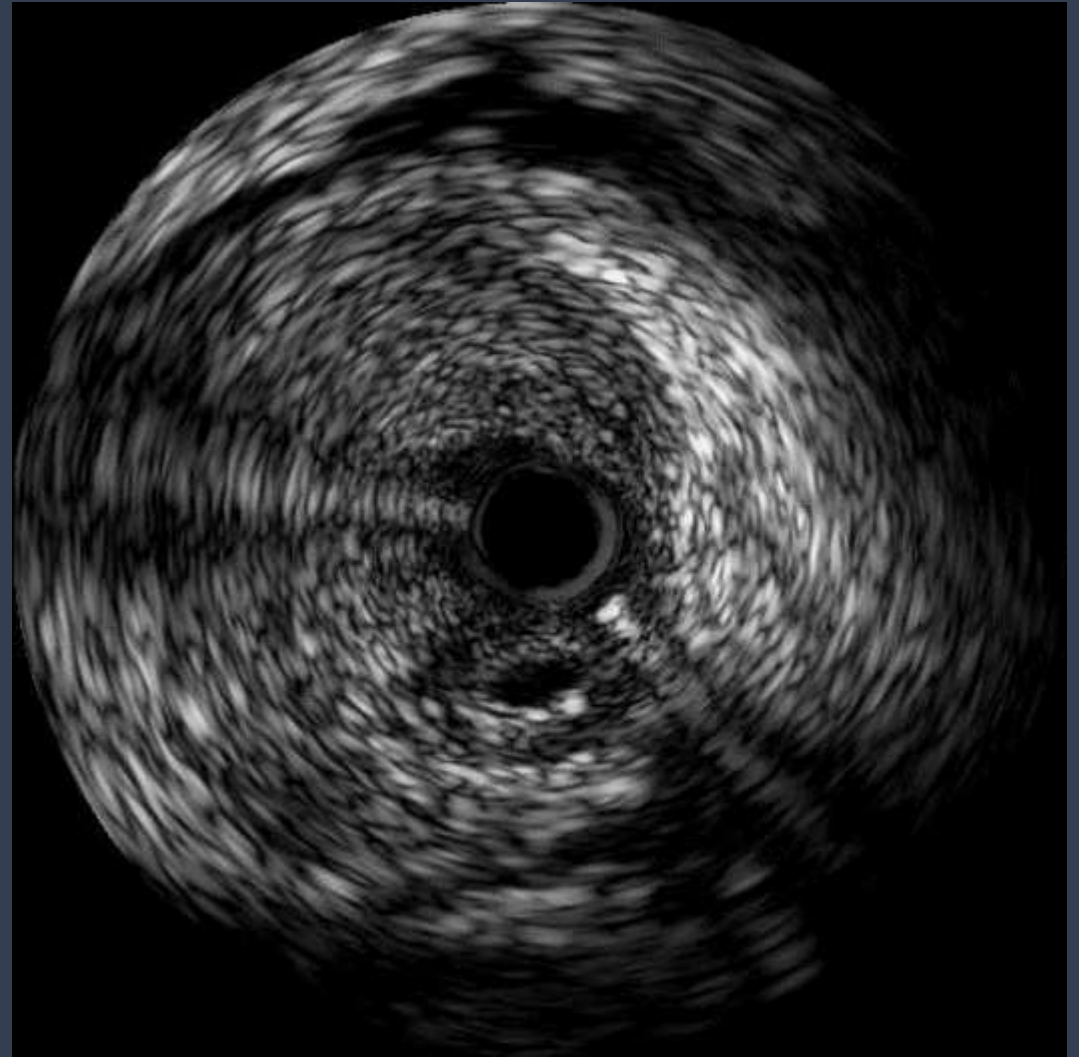
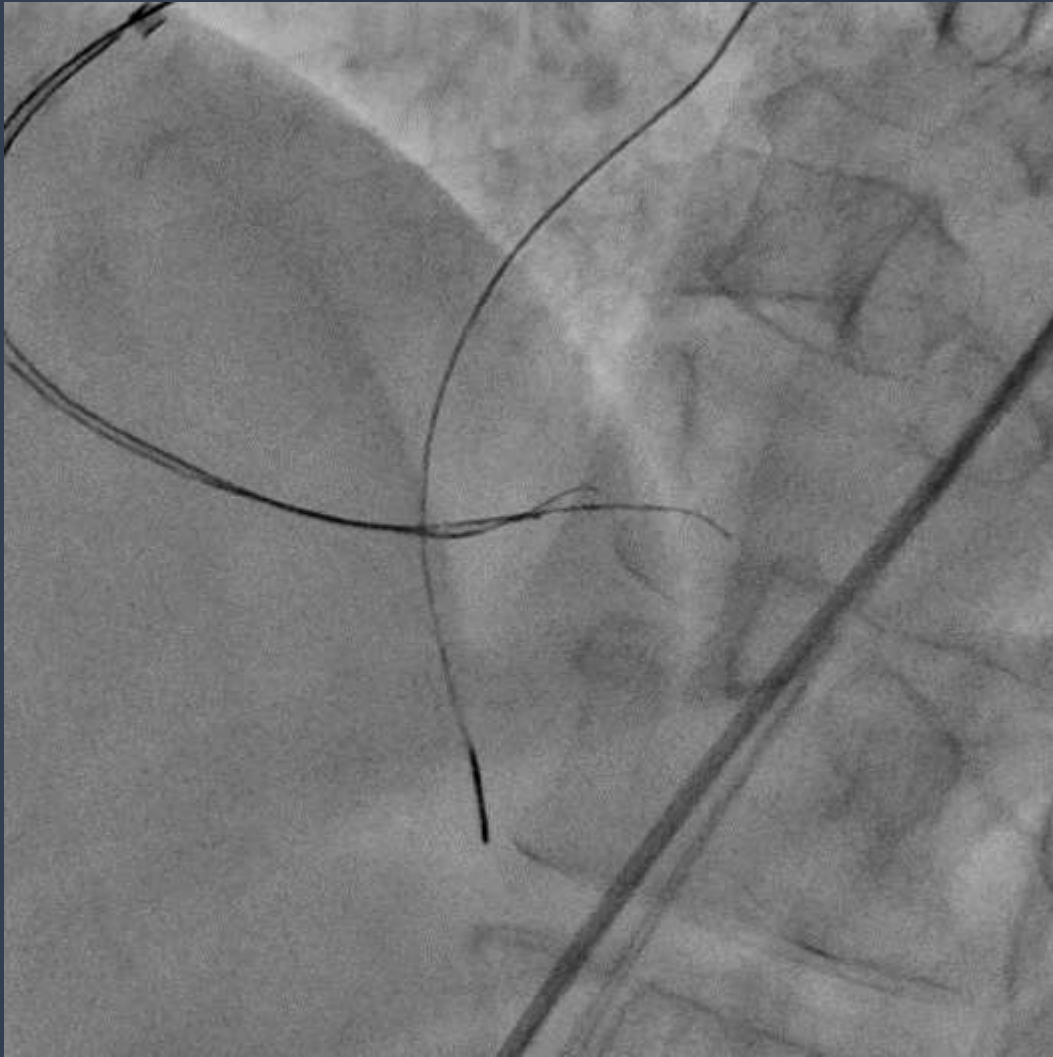
Retrograde wiring



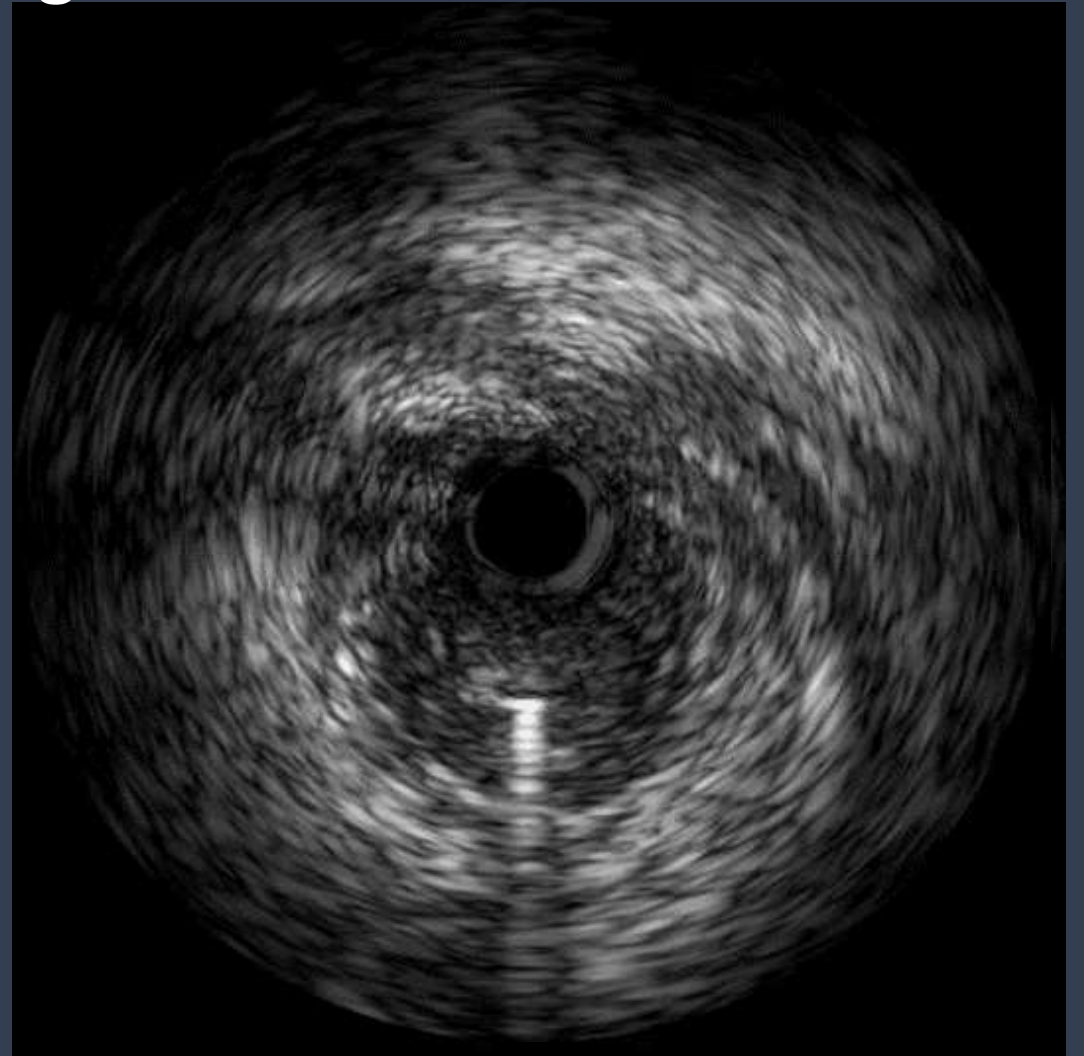
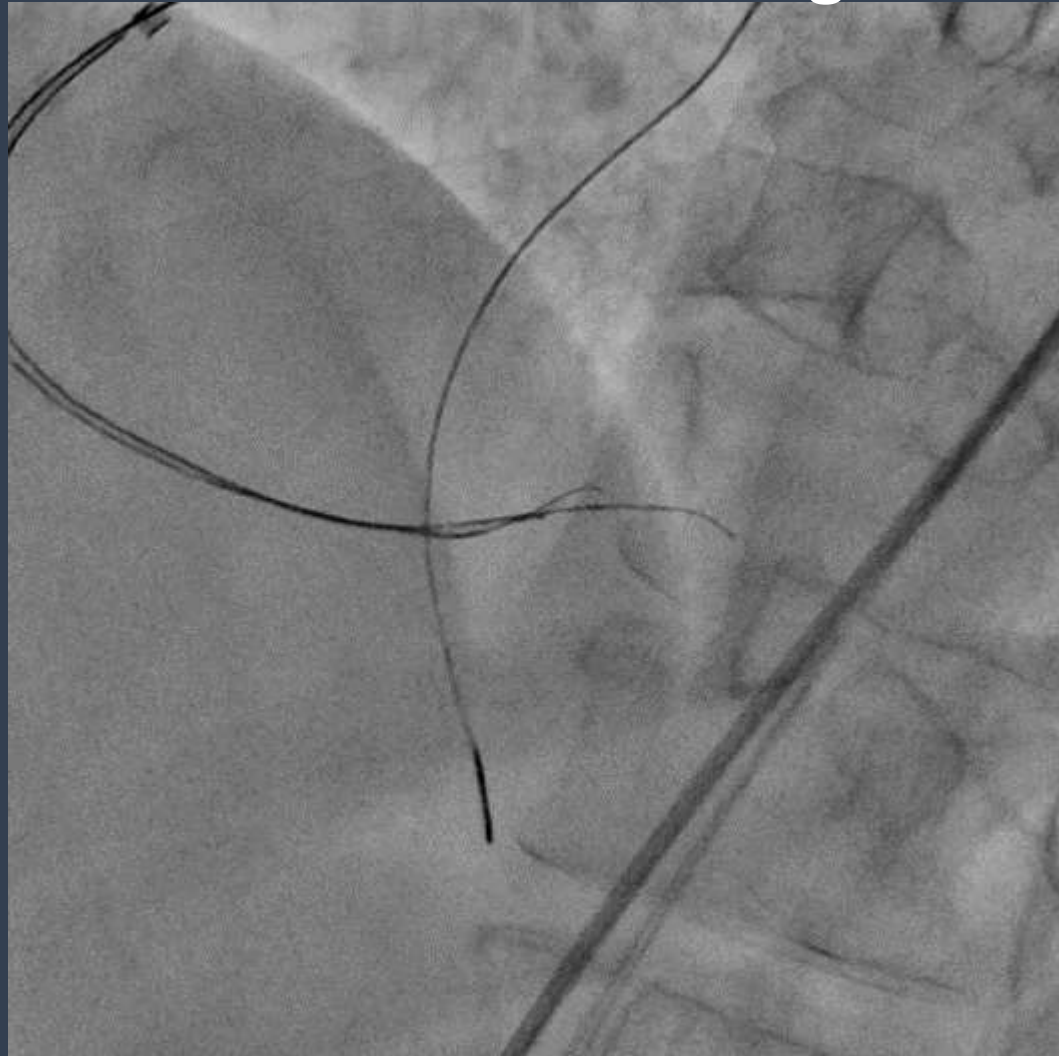
Antegrade wiring to PL branch



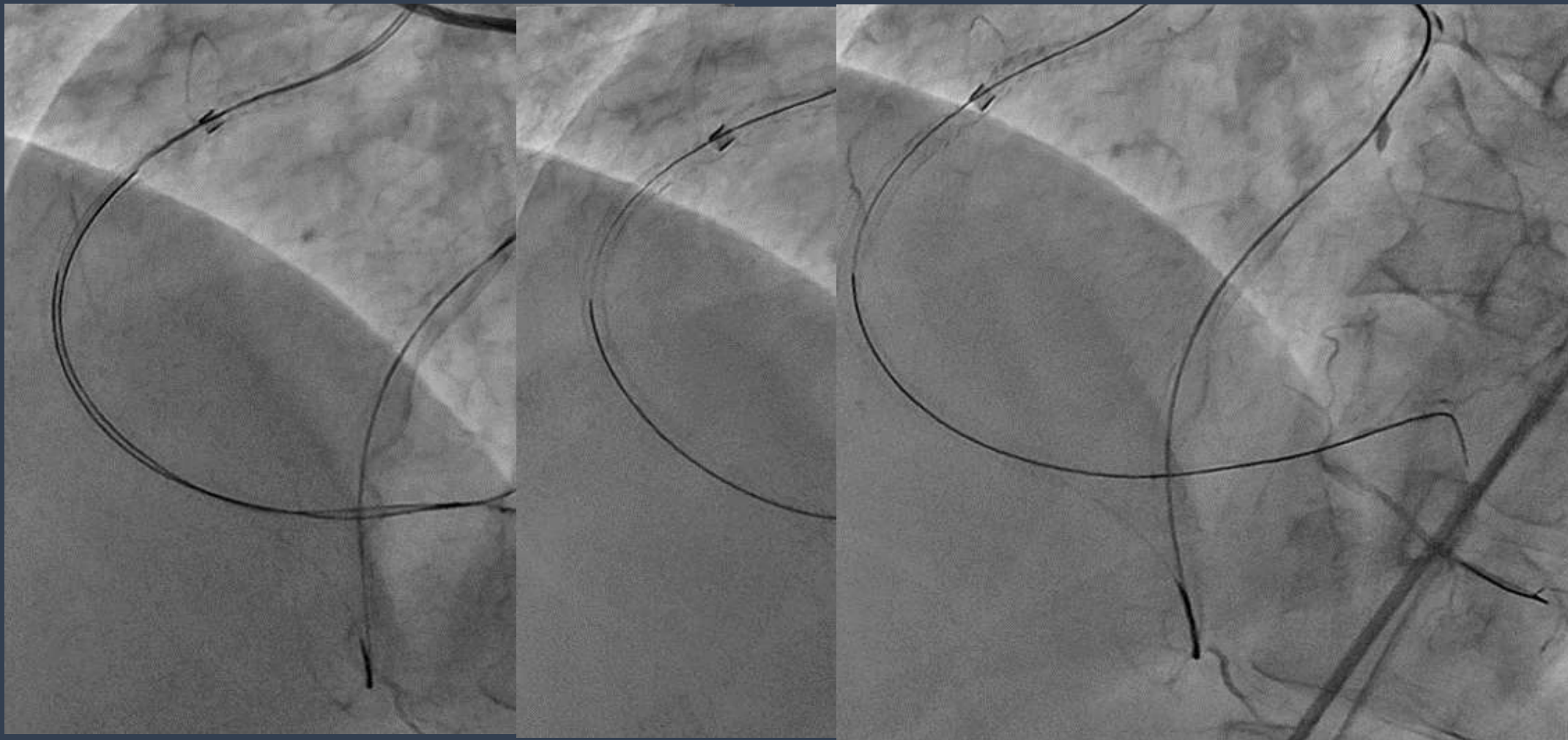
IVUS guided wiring to PL branch



Antegrade wiring to PL branch



Antegrade wiring to PL branch



Multiple complex stenting to PL branch and distal bifurcation



Final angiogram



Procedure

- 1) ISR antegrade wiring
- 2) Retrograde AC channel wiring
- 3) Septal wiring
- 4) Reverse CART in ISR
- 5) Antegrade wiring to PL
- 6) IVUS guided wiring
- 7) Complex stenting to distal RCA

Priority of CTO PCI

- 1) Safe procedure
- 2) Clinical success
- 3) Low cost and short procedure time

Final angiogram



Procedure Time	470min
Dyne dose	380cc
Fluoro time	246min
Skin dose	13050gray
DES	3
DEB	3
IVUS	1
Balloon catheter	5
Micro catheter	3
Wires	>10

3M later IS occlusion was confirmed by CCT

Summary

I treated re-attempt, ISR, long, bifurcated, triple CTO case successfully by using latest several CTO techniques.

However, after multiple stenting to recanalized long CTO, all side branches usually remain to be occluded.

To keep long term patency of long CTO, pre-procedural evaluation of CTO distal perfusion area and viability is indispensable.

Thank you for your attention