APCTO Club Sub-Algorithm for the Antegrade Approach

WELLINGTON CARDIOLOGY

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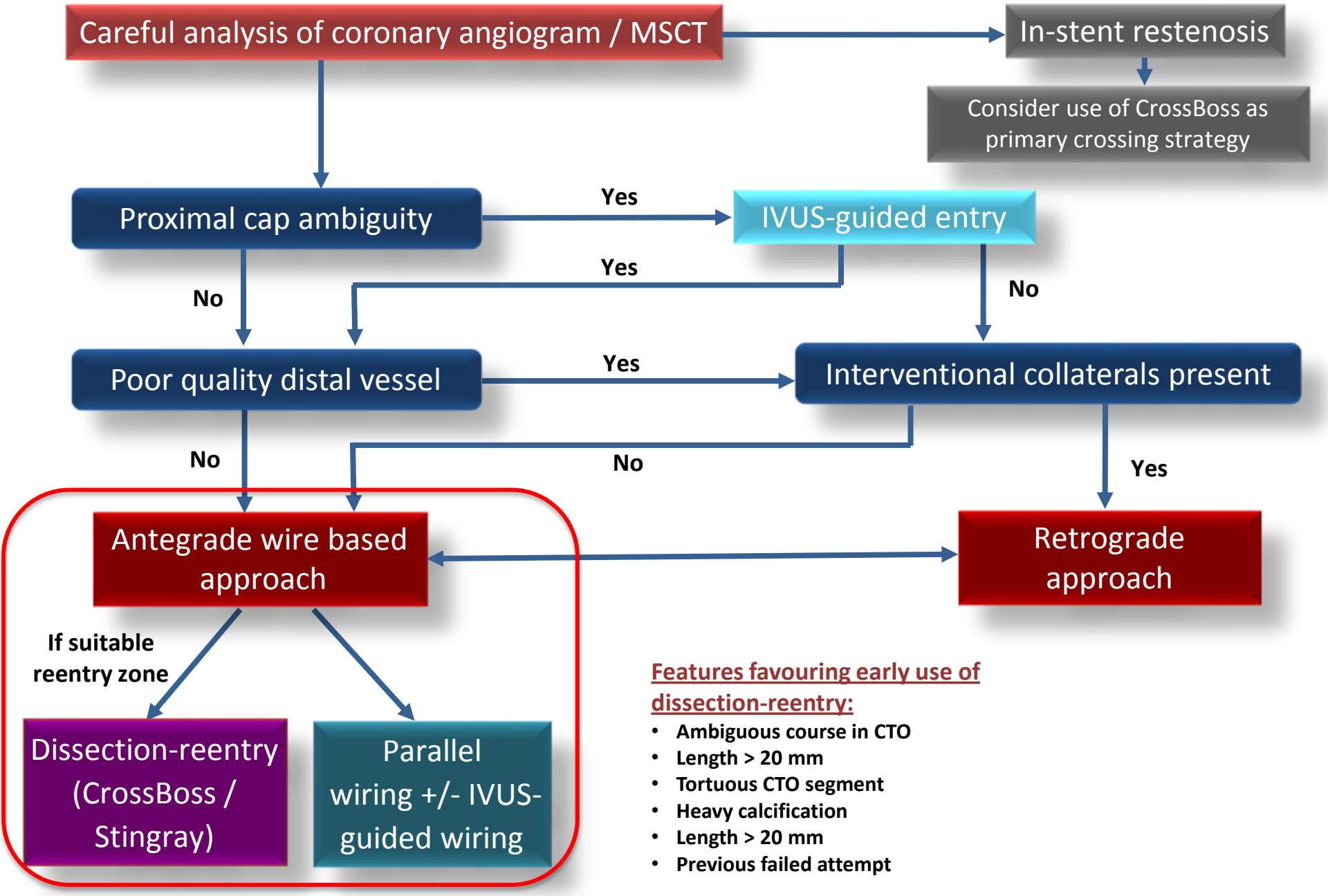


Features favouring early use of dissection-reentry:

- Ambiguous course in CTO
- Length > 20 mm
- Tortuous CTO segment
- Heavy calcification
- Length > 20 mm
- Previous failed attempt

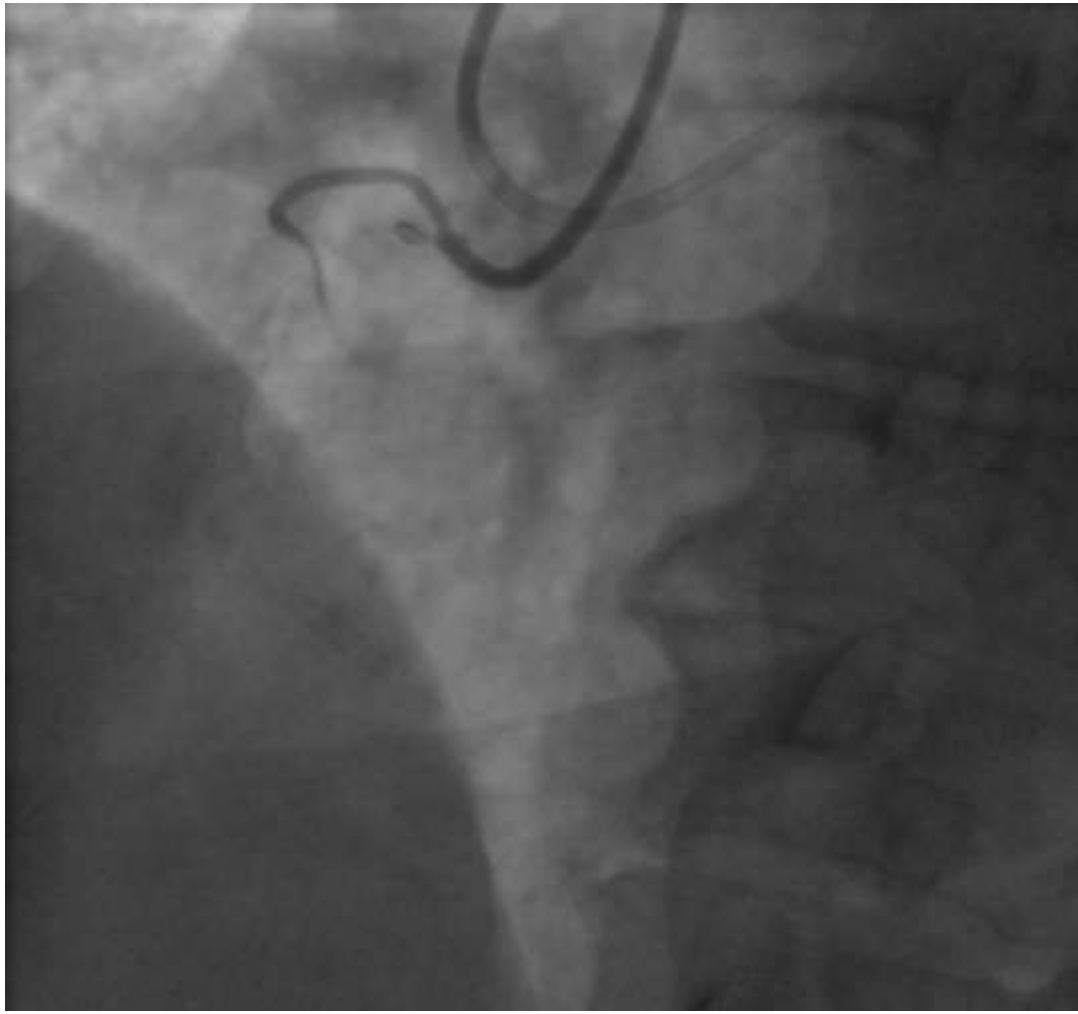
Consider stopping if > 3 hr; 3.7x eGFR ml contrast; Air Kerma > 5 Gy unless procedure well advanced.

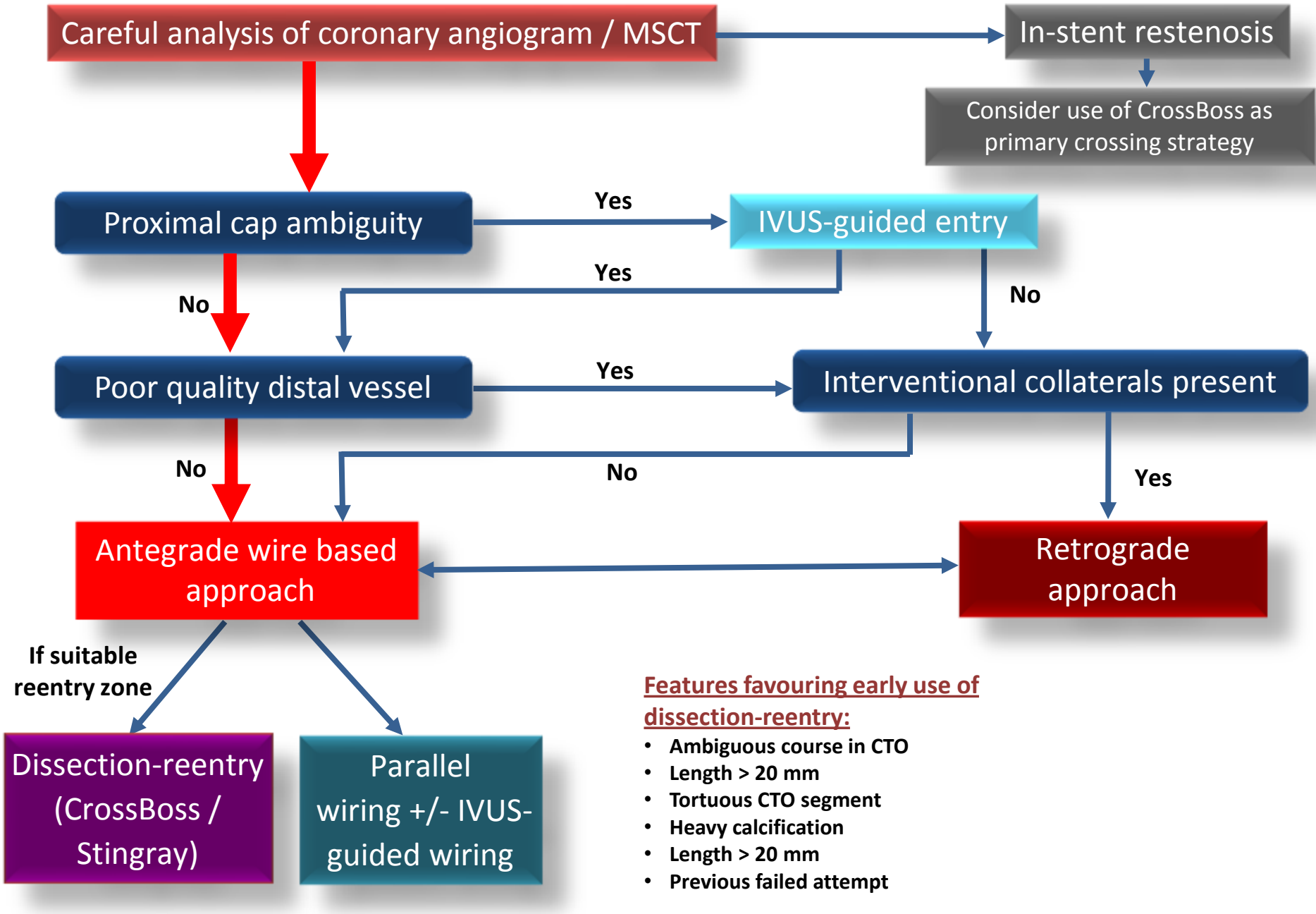
Antegrade wire based strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap	
	Length >20 mm or ambiguous course	Step down to a low penetration force wire or intermediate non-tapered wire	
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.		

Case 1

- Tapered non ambiguous proximal cap
- Distal bifurcation location unclear.
- Interventional collaterals present
- Length >20 mm
- Course not ambiguous
- Mild calcification
- Mild to moderate tortuosity





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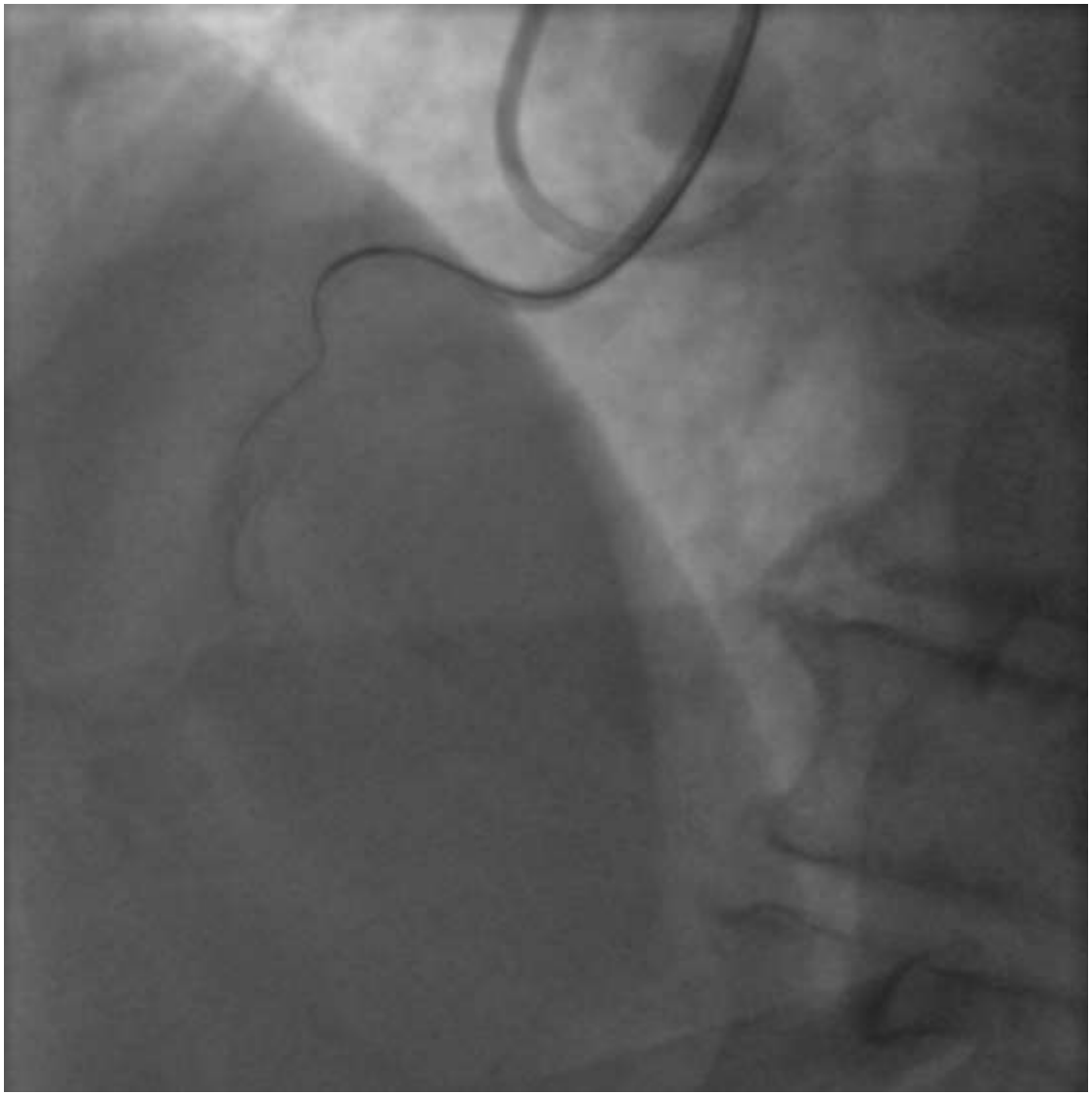
Case 1

Primary approach antegrade wiring

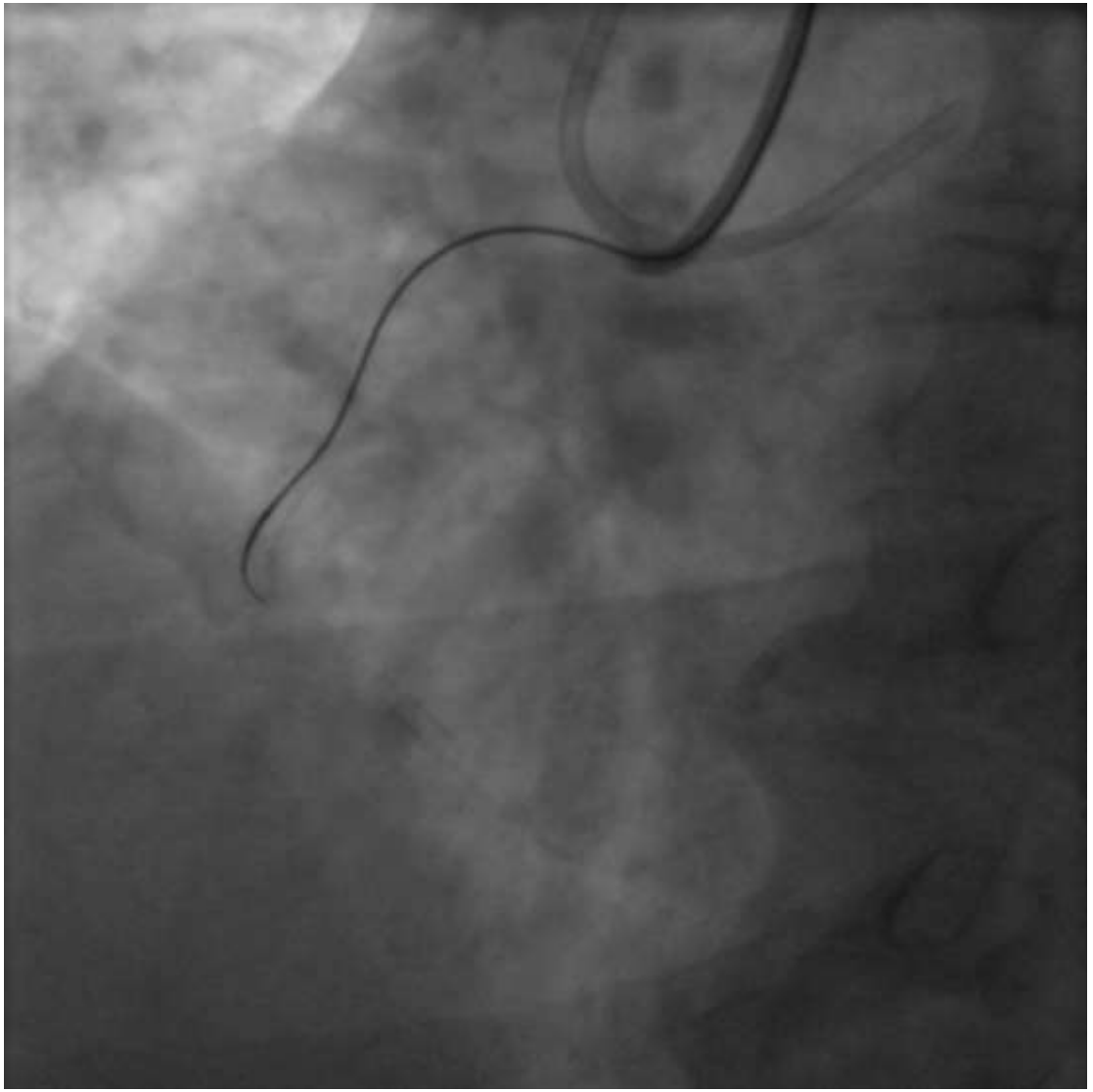
As tapered proximal cap start with XT-A



Case 1

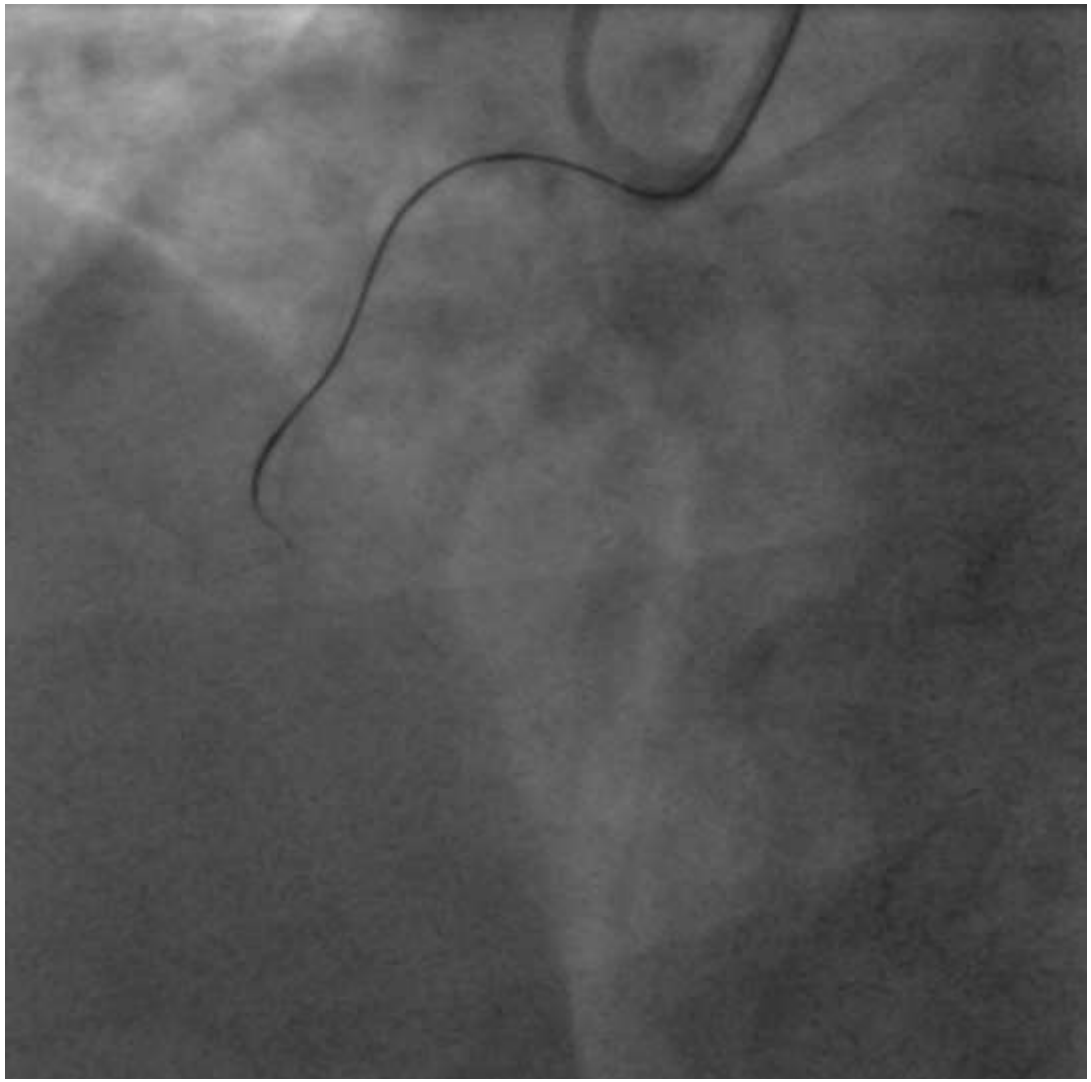
Unable to advance or steer XT-A

Exchanged for GAIA 2nd which was able to be steered into and through the stent.



Case 1

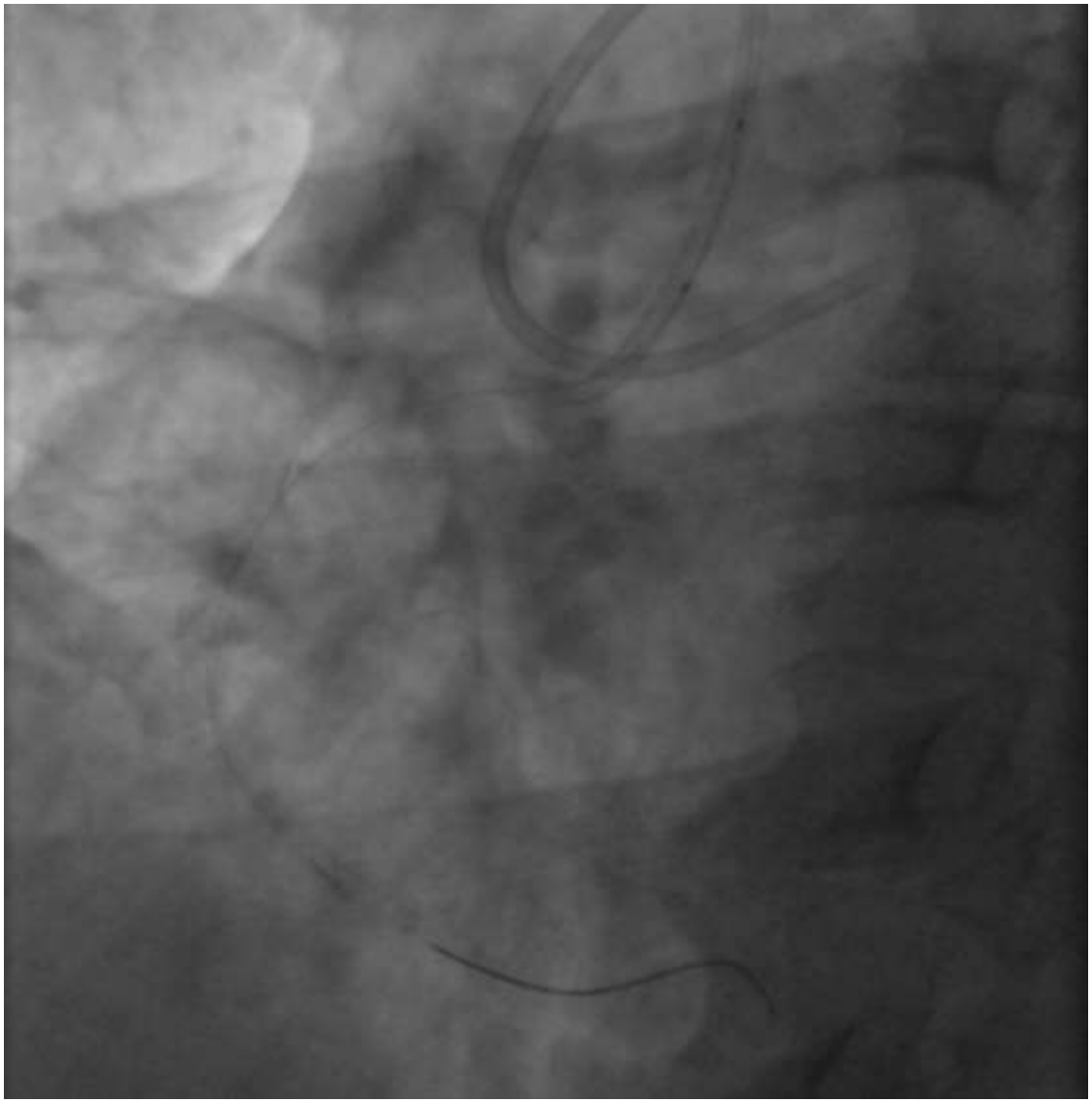
GAIA 2nd wire changed back to XT-A which was advanced into the distal vessel.



Case 1

Angiogram demonstrating distal cap was at end of the stent in the mid vessel.

The PDA arises just distal to the CTO segment and is severely diseased.

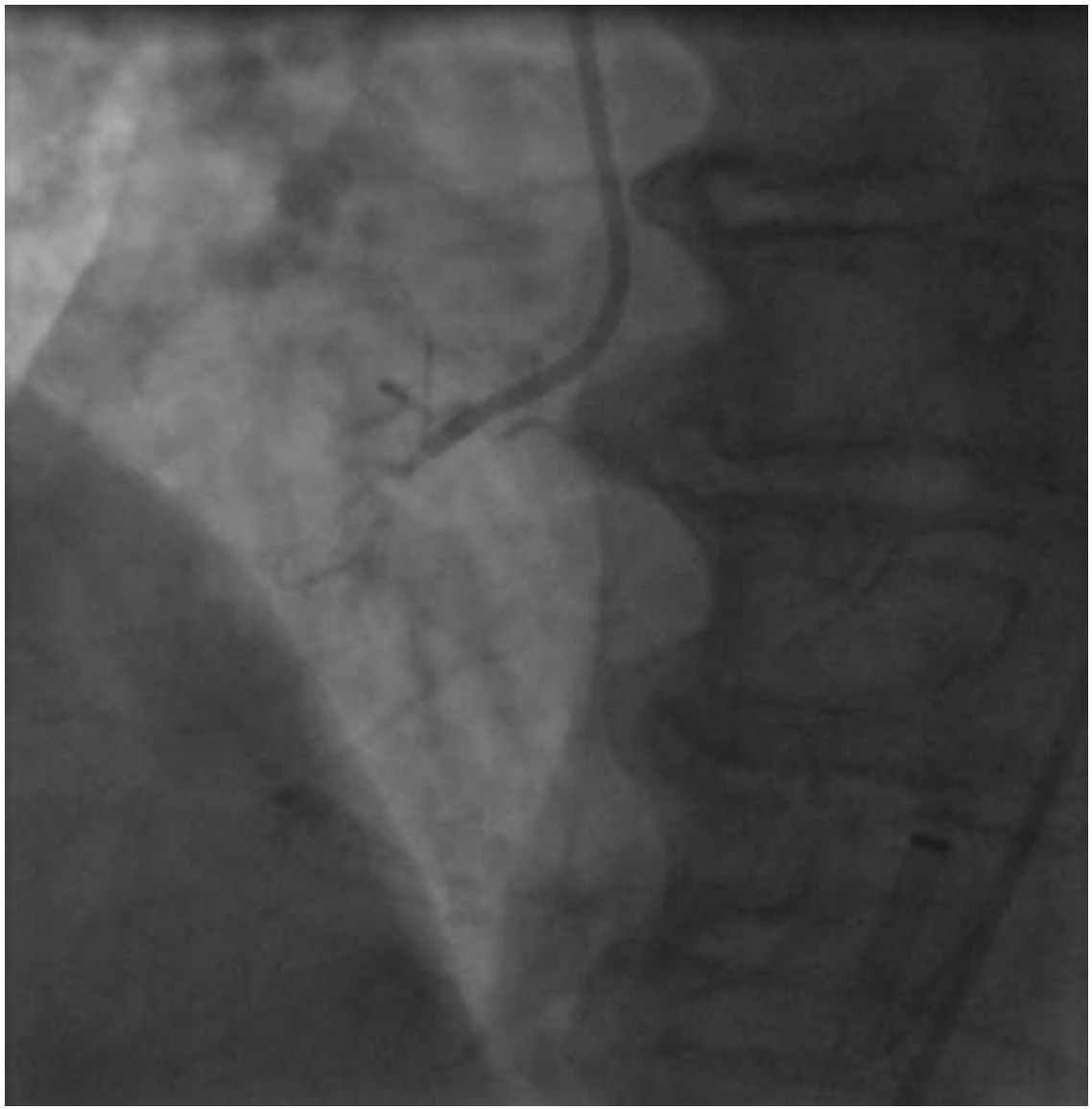


Case 1

Final result.

Case 2

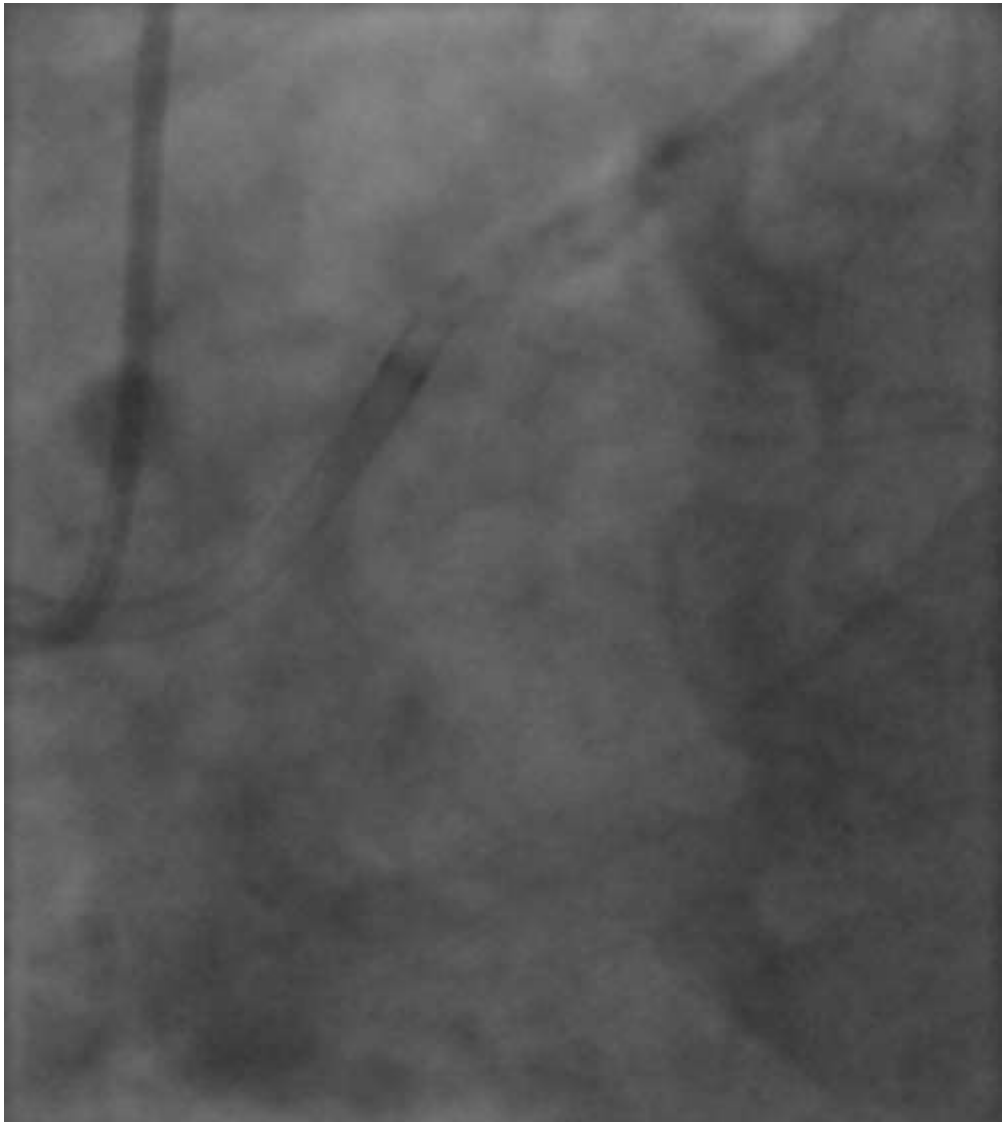
Long CTO of proximal RCA



Case 2

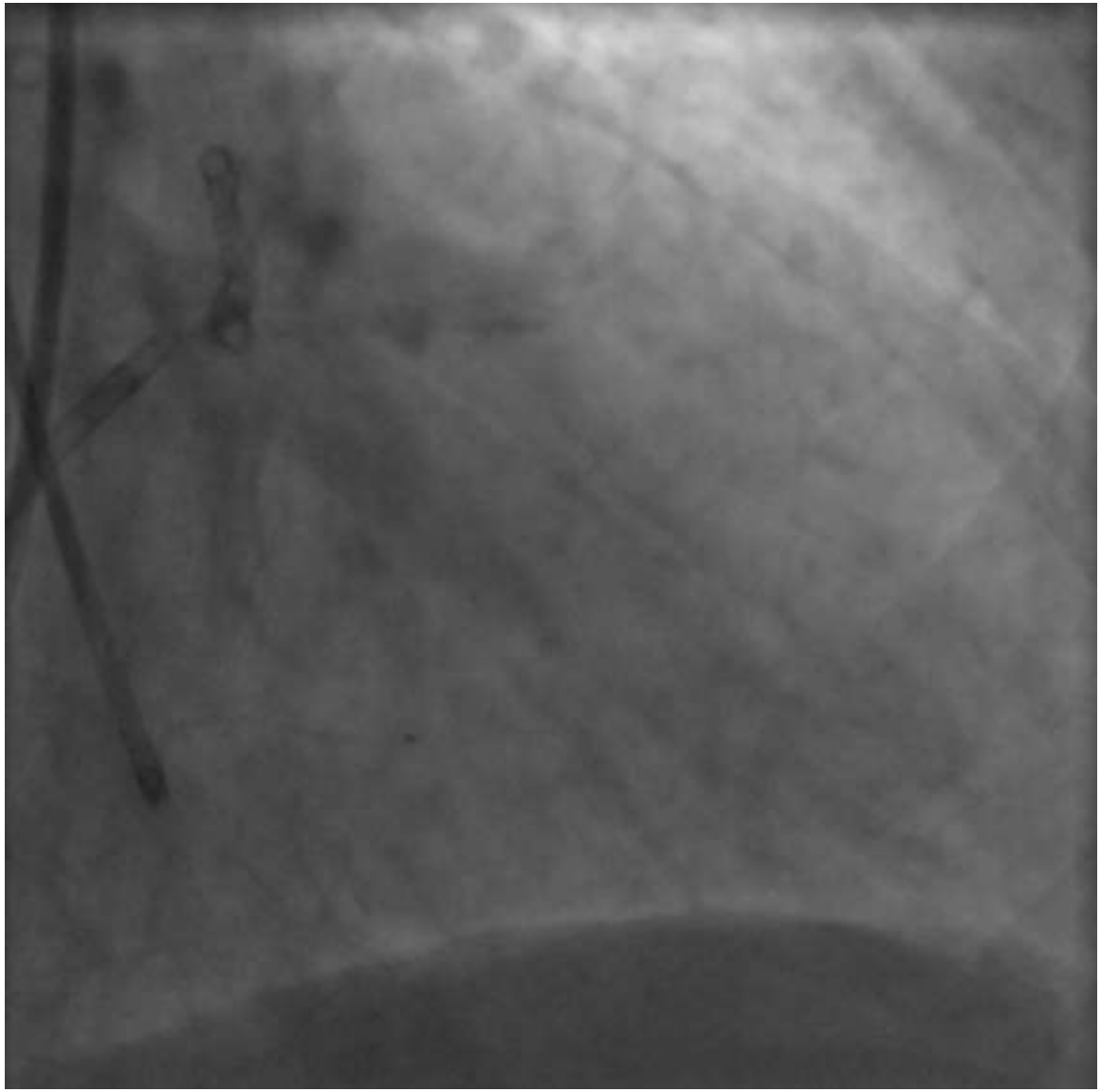
Ostial occlusion of LAD

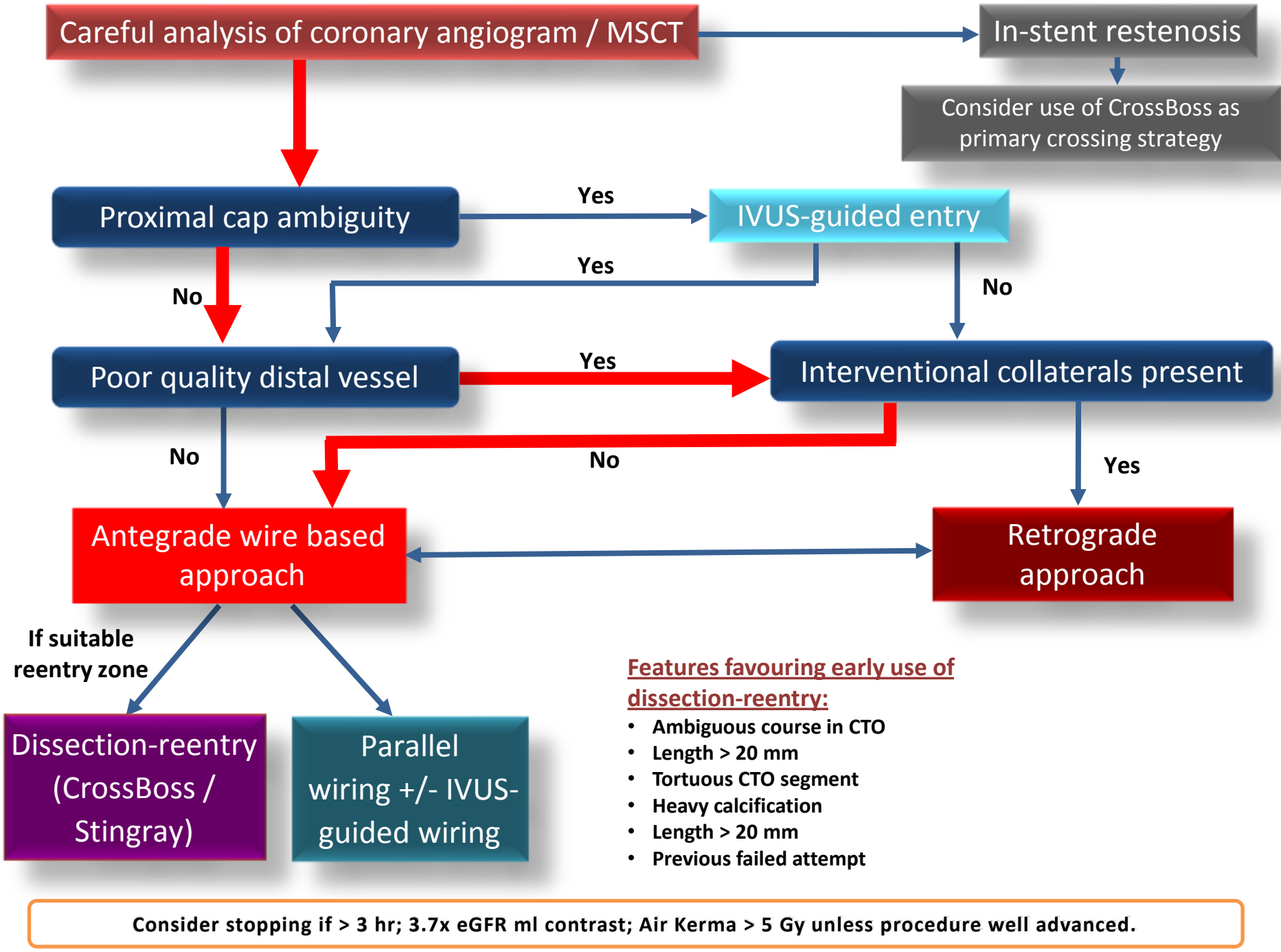
Non-ambiguous proximal cap



Case 2

RAO cranial demonstrating LAD occlusion is about 20 mm with the LAD distal to the occlusion being heavily calcified and diseased.





Features favouring early use of dissection-reentry:

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- **Tortuous CTO segment**
- **Heavy calcification**
- **Length > 20 mm**
- **Previous failed attempt**

Consider stopping if > 3 hr; 3.7x eGFR ml contrast; Air Kerma > 5 Gy unless procedure well advanced.

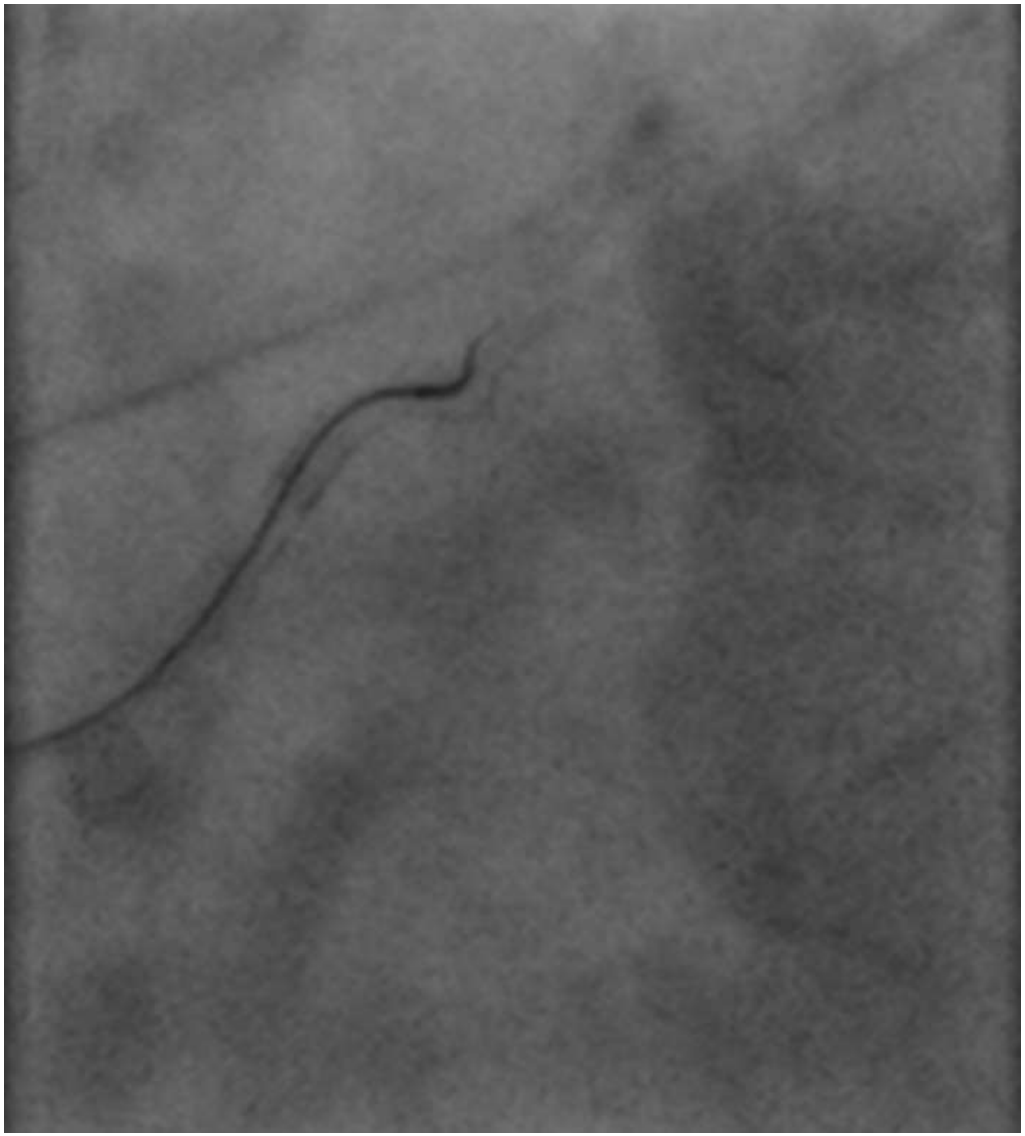
Antegrade wire based strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap	
	Length >20 mm or ambiguous course	Step down to a low penetration force wire or intermediate non-tapered wire	
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.		

Case 2

Proximal Cap puncture with a Corsair with GAIA 2nd and then GAIA 3rd was unsuccessful

Exchanged for Conquest Pro 12 - successful



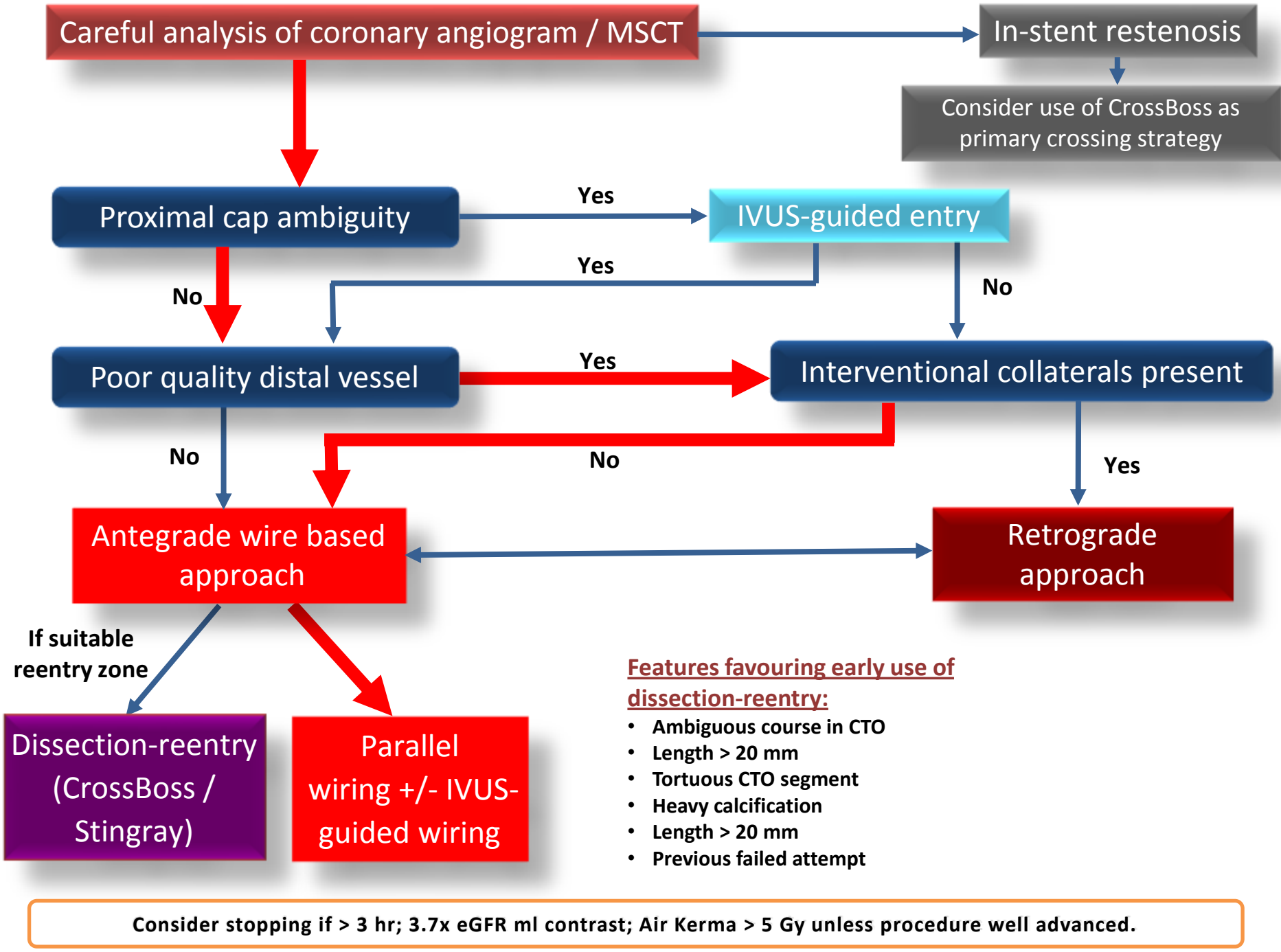
Case 2

Step down of wire from Conquest Pro 12 to GAIA 2nd

Wire position superior to distal true lumen

Following failure of initial wire should we:

- Redirect the wire?
- Parallel wire?
- Switch and use stingray?
- Attempt retrograde?


Careful analysis of coronary angiogram / MSCT
In-stent restenosis
Consider use of CrossBoss as primary crossing strategy
Proximal cap ambiguity
Yes
IVUS-guided entry
Yes
No
No
Poor quality distal vessel
Yes
Interventional collaterals present
No
No
Yes
Antegrade wire based approach
Retrograde approach
If suitable reentry zone
Dissection-reentry (CrossBoss / Stingray)
Parallel wiring +/- IVUS-guided wiring
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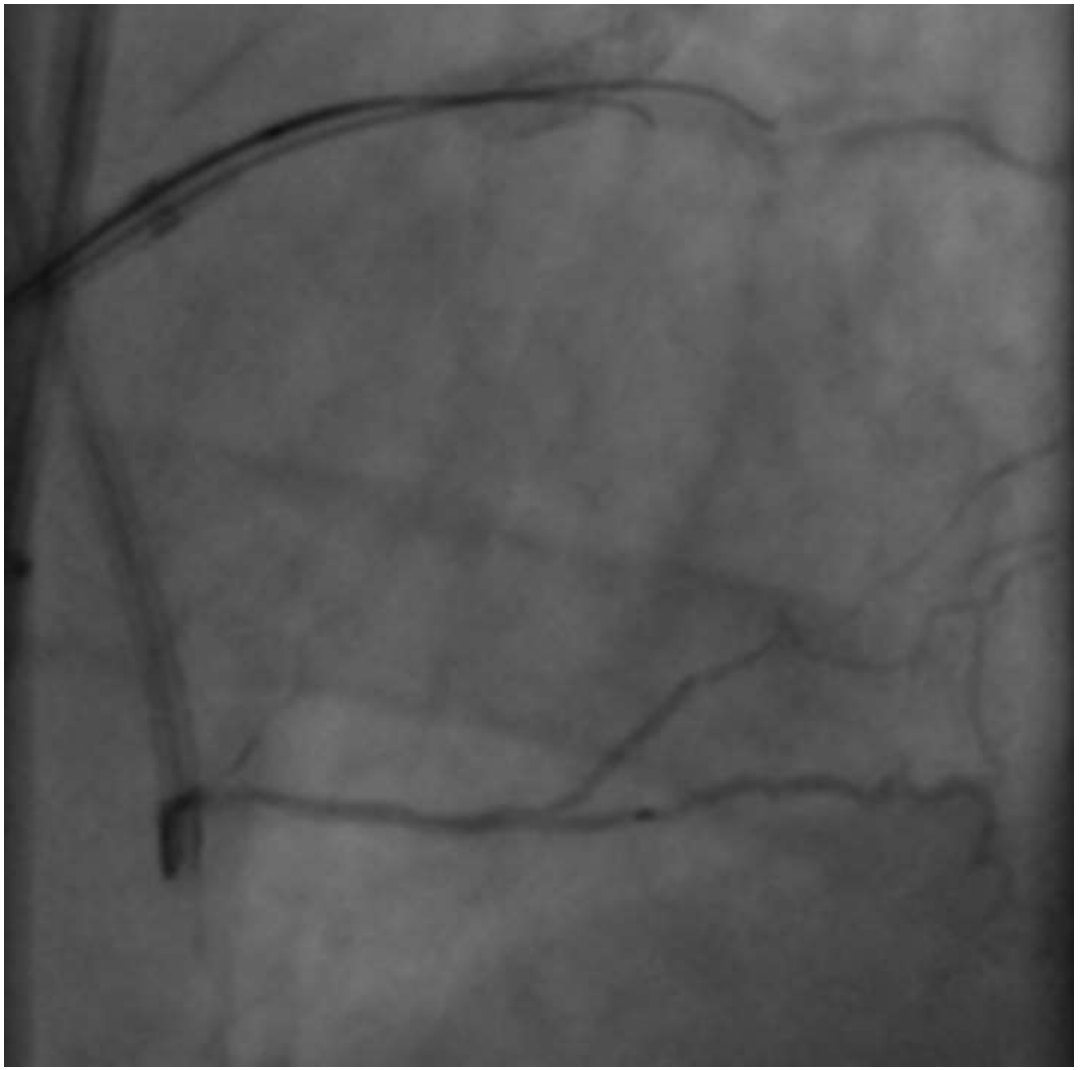
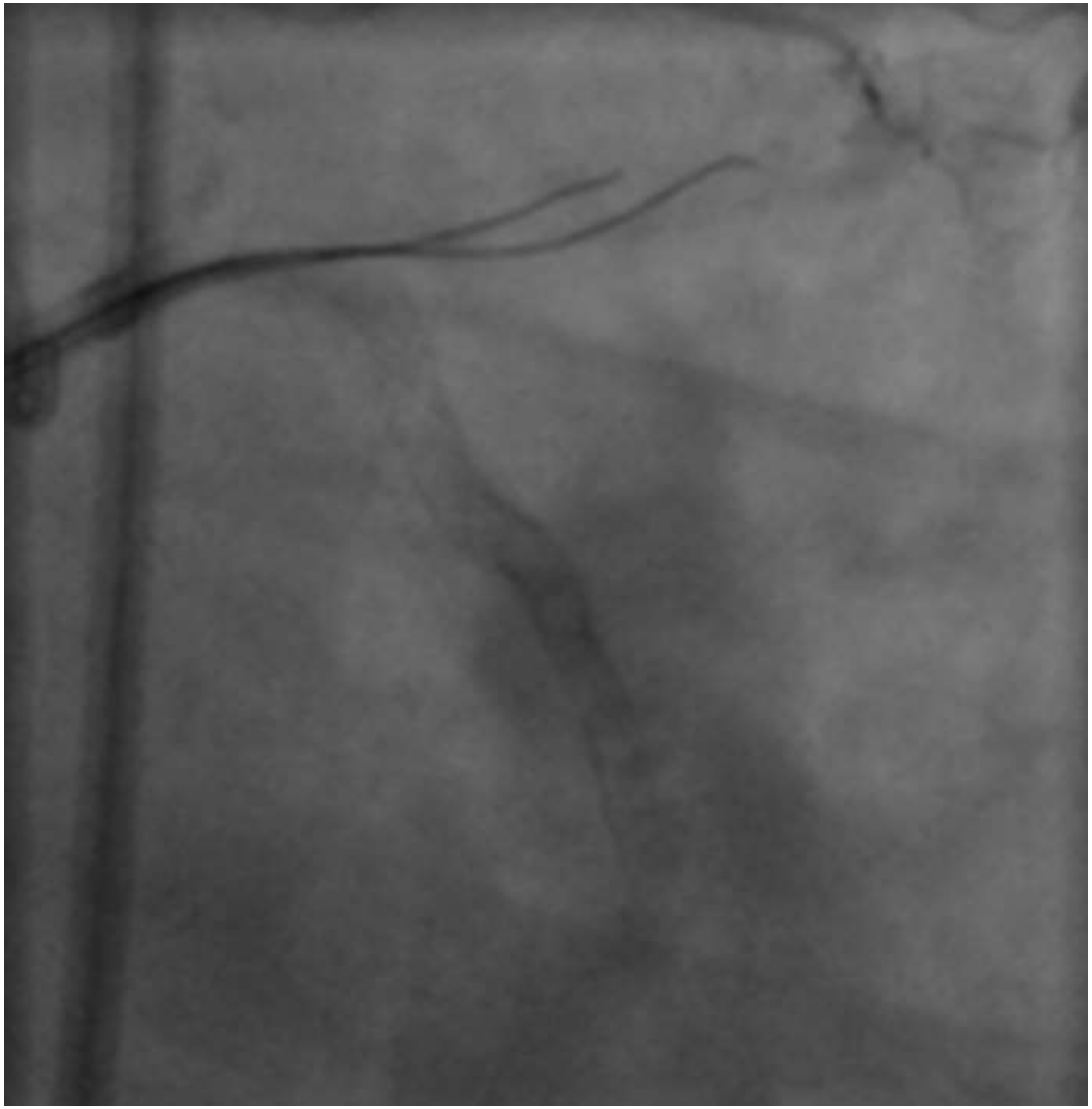
Case 2

As the vessel course was not ambiguous and there was severe disease with heavy calcification in the vessel segment distal to the CTO parallel wiring using GAIA 3rd was chosen



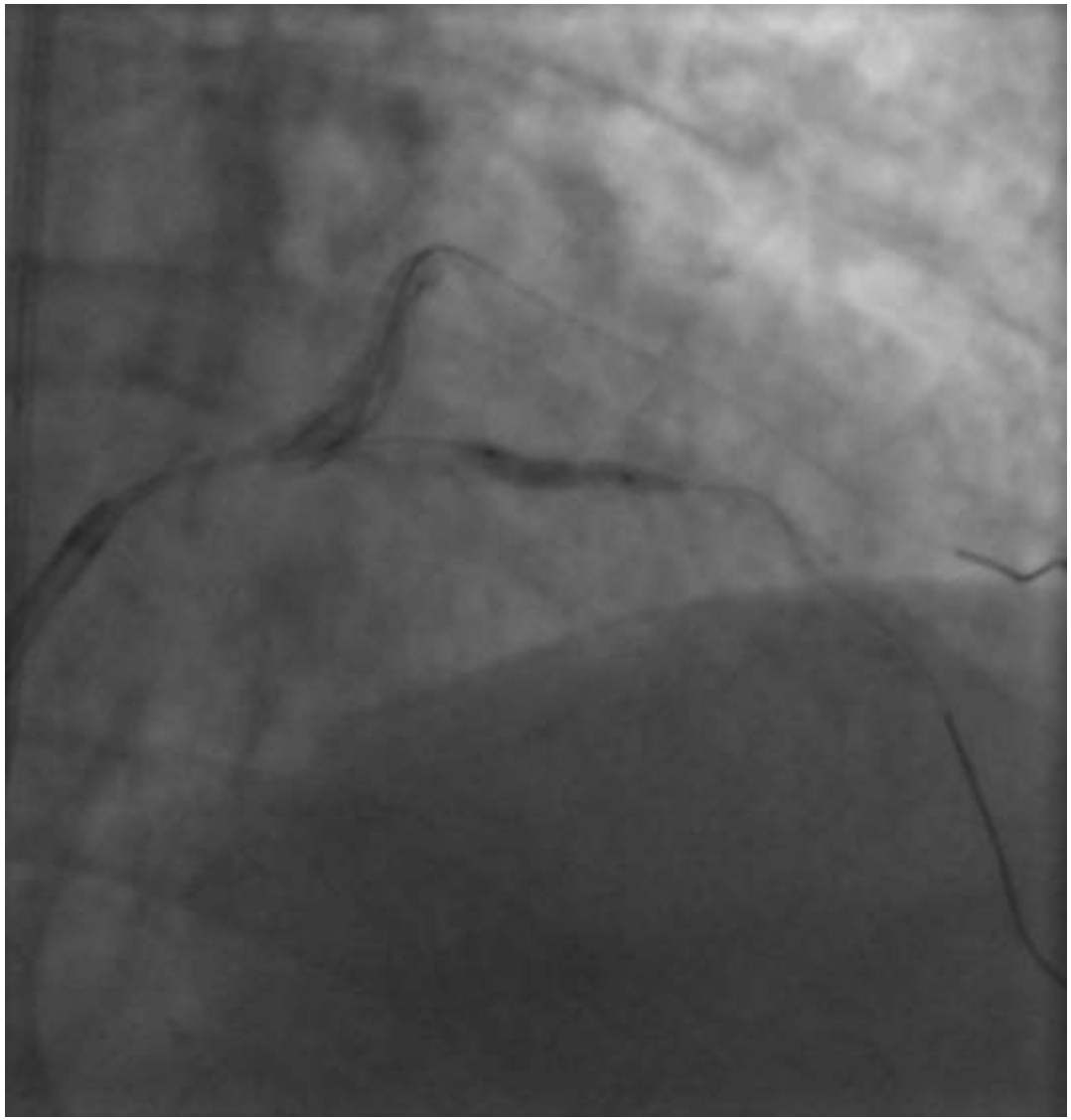
Case 2

GAIA 3rd redirected and subsequently passed into the distal true lumen



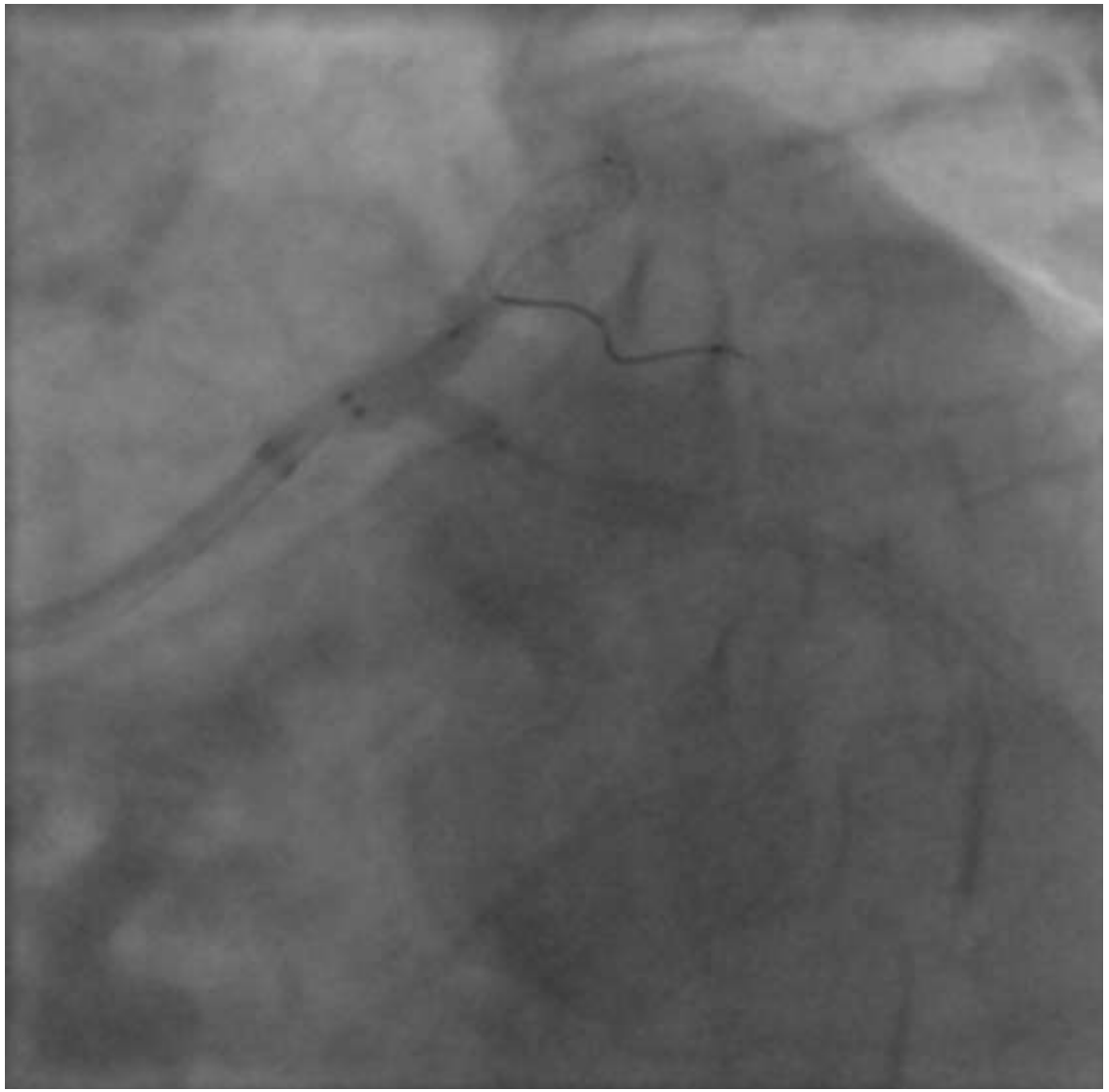
Case 2

The GAIA 3rd advanced into the distal vessel exchanged for a soft wire and then ballooning and stenting of the LAD performed



Case 2

T stenting of the LMCA



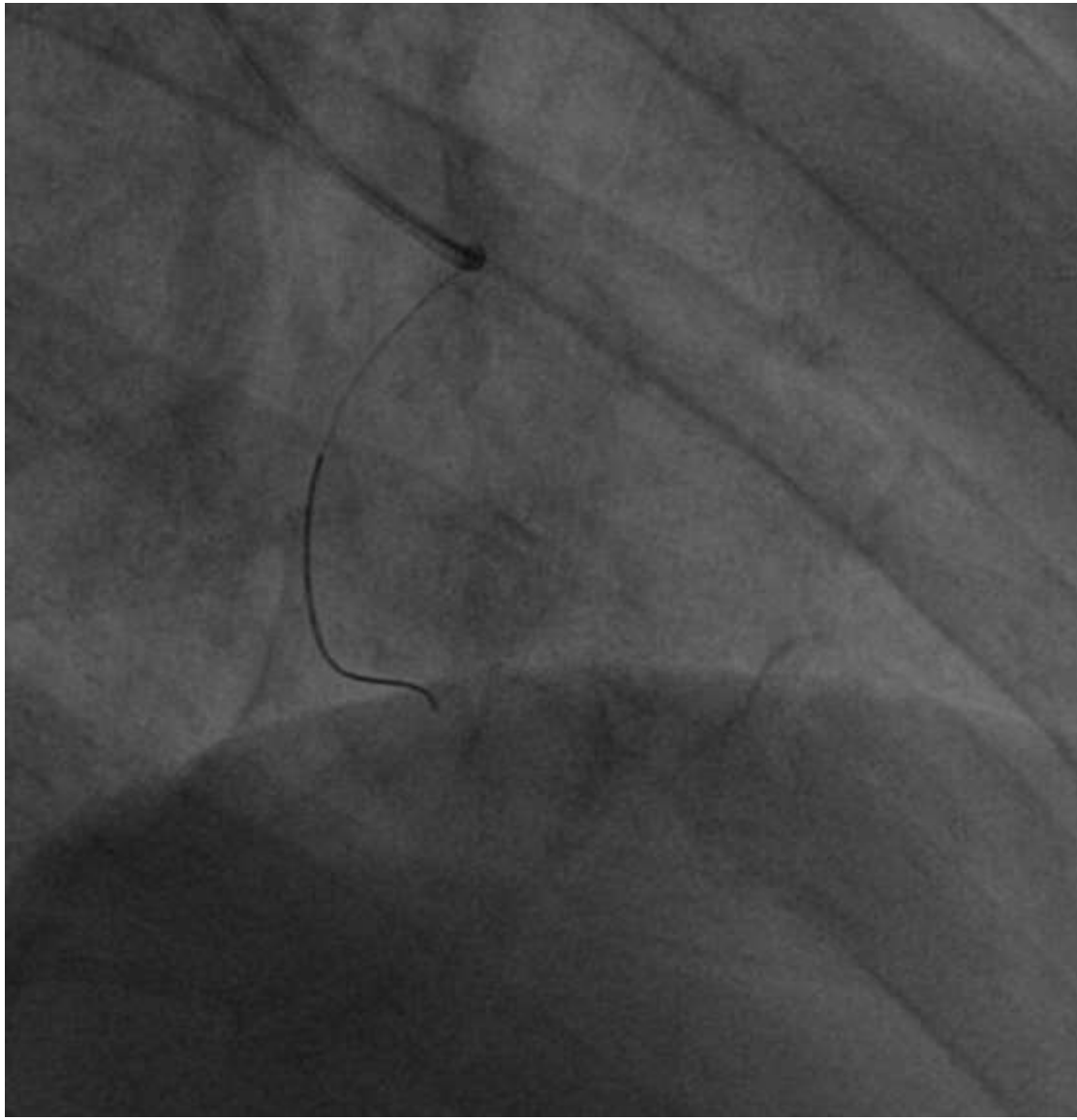
Case 2

Final result

Case 3

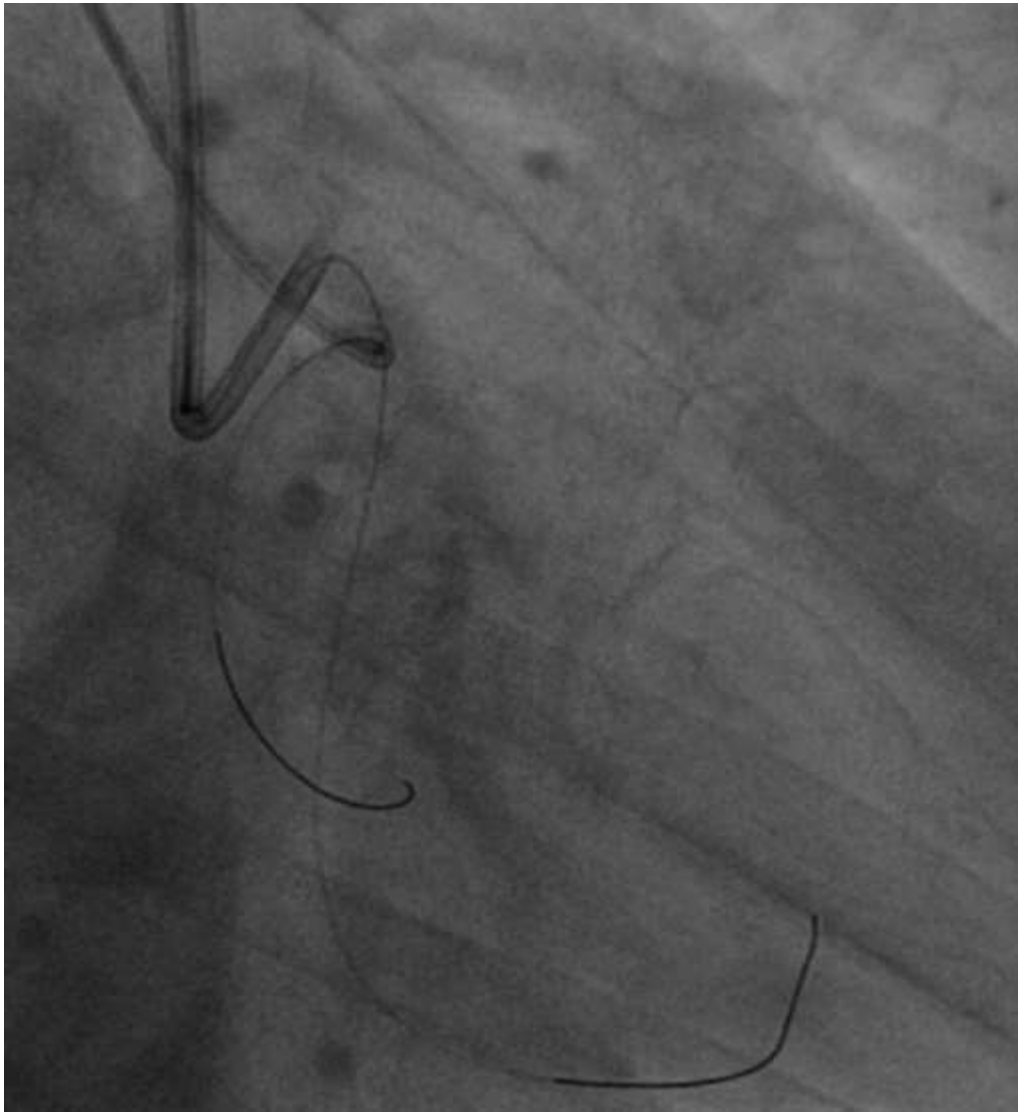
Dual CTO of the LAD

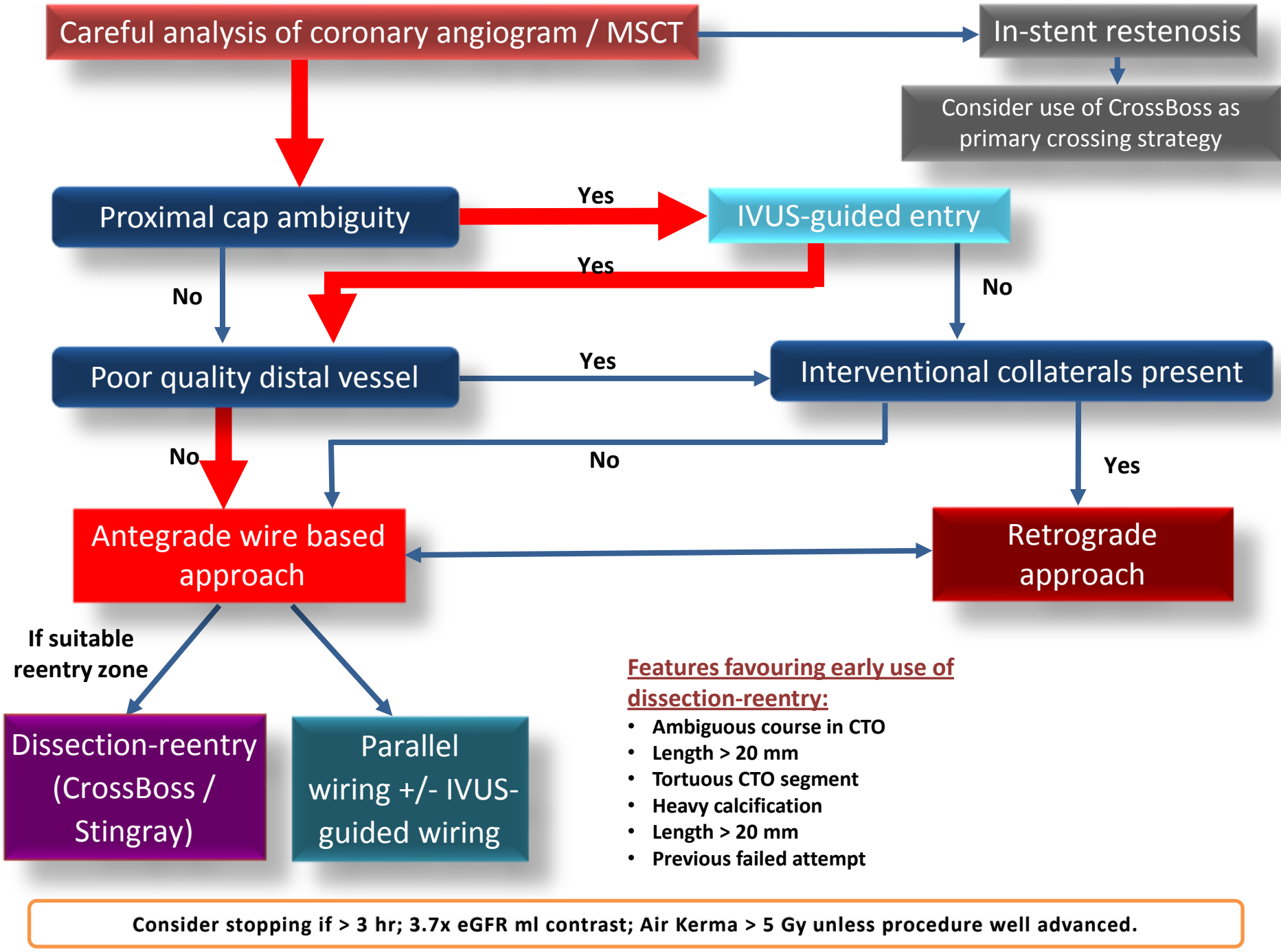
Dominant collateral from the RV marginal branch to the mid and distal LAD



Case 3

- Blunt ambiguous proximal cap
- Good distal vessel.
- No Interventional collaterals present
- Length >20 mm
- No bifurcation at distal cap
- Course not ambiguous
- No significant tortuosity
- Mild calcification





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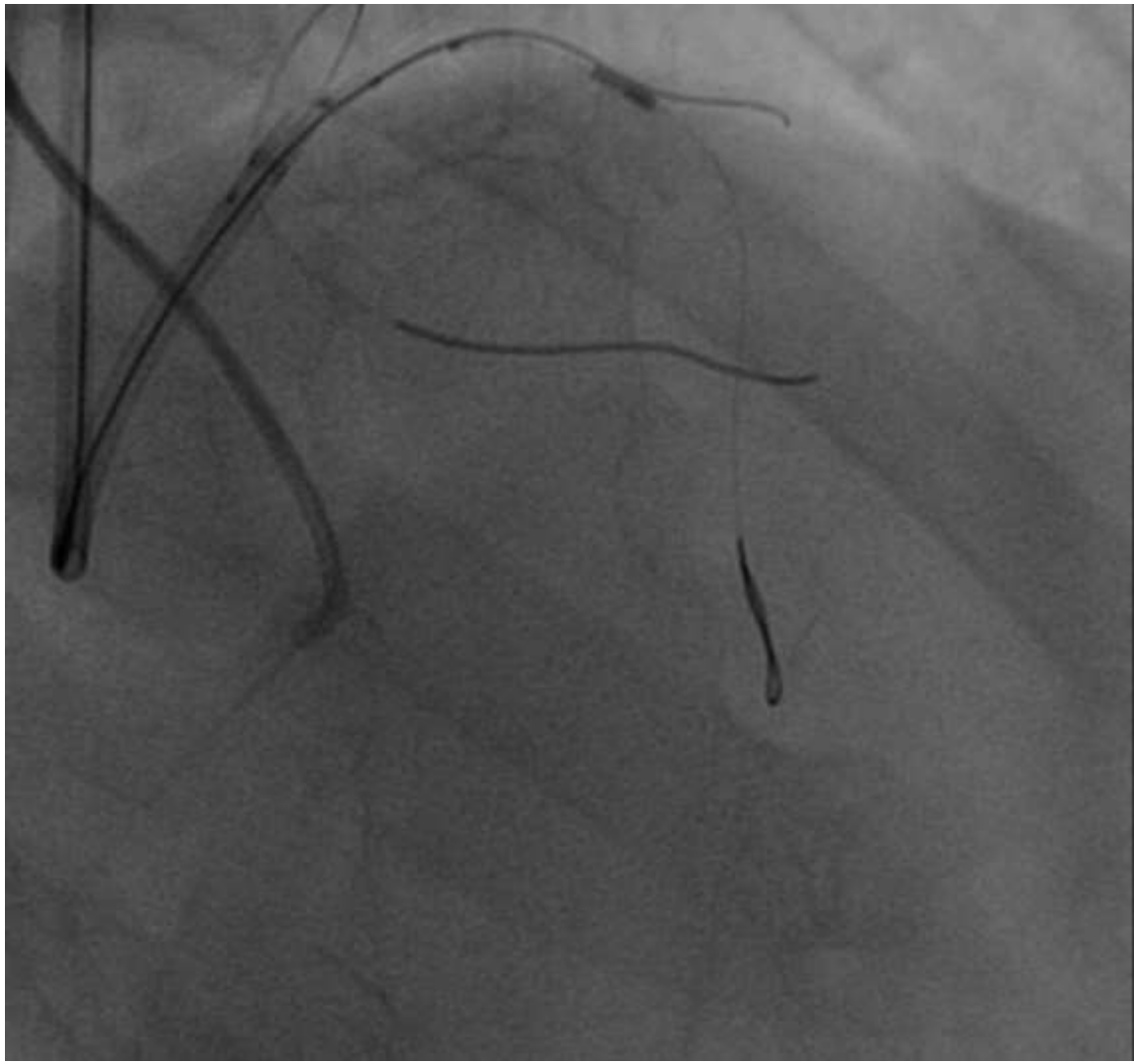
Case 2

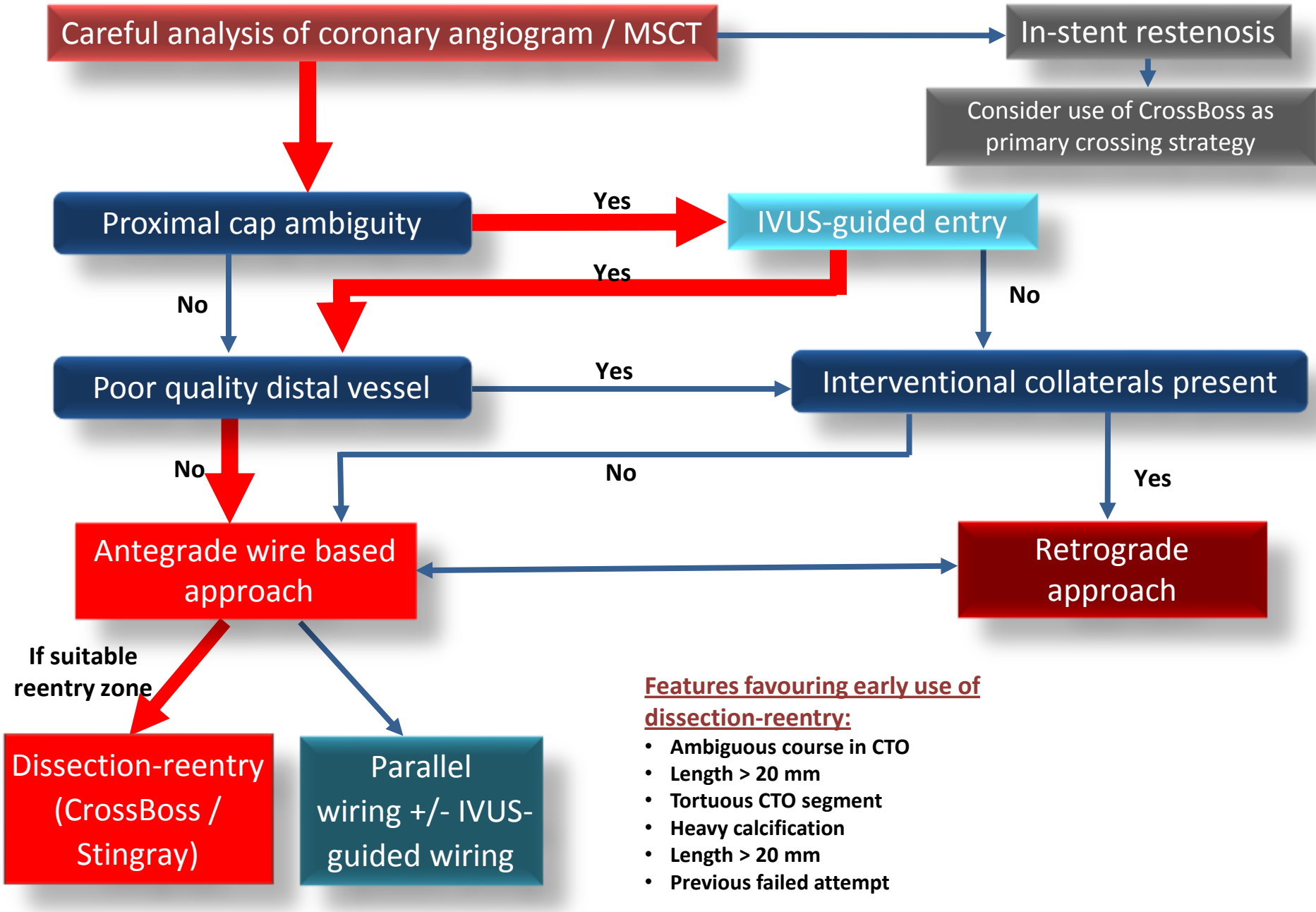
IVUS guided wiring using a GAIA 2nd



Case 2

GAIA 2nd clearly subintimal

An attempt to redirect was unsuccessful



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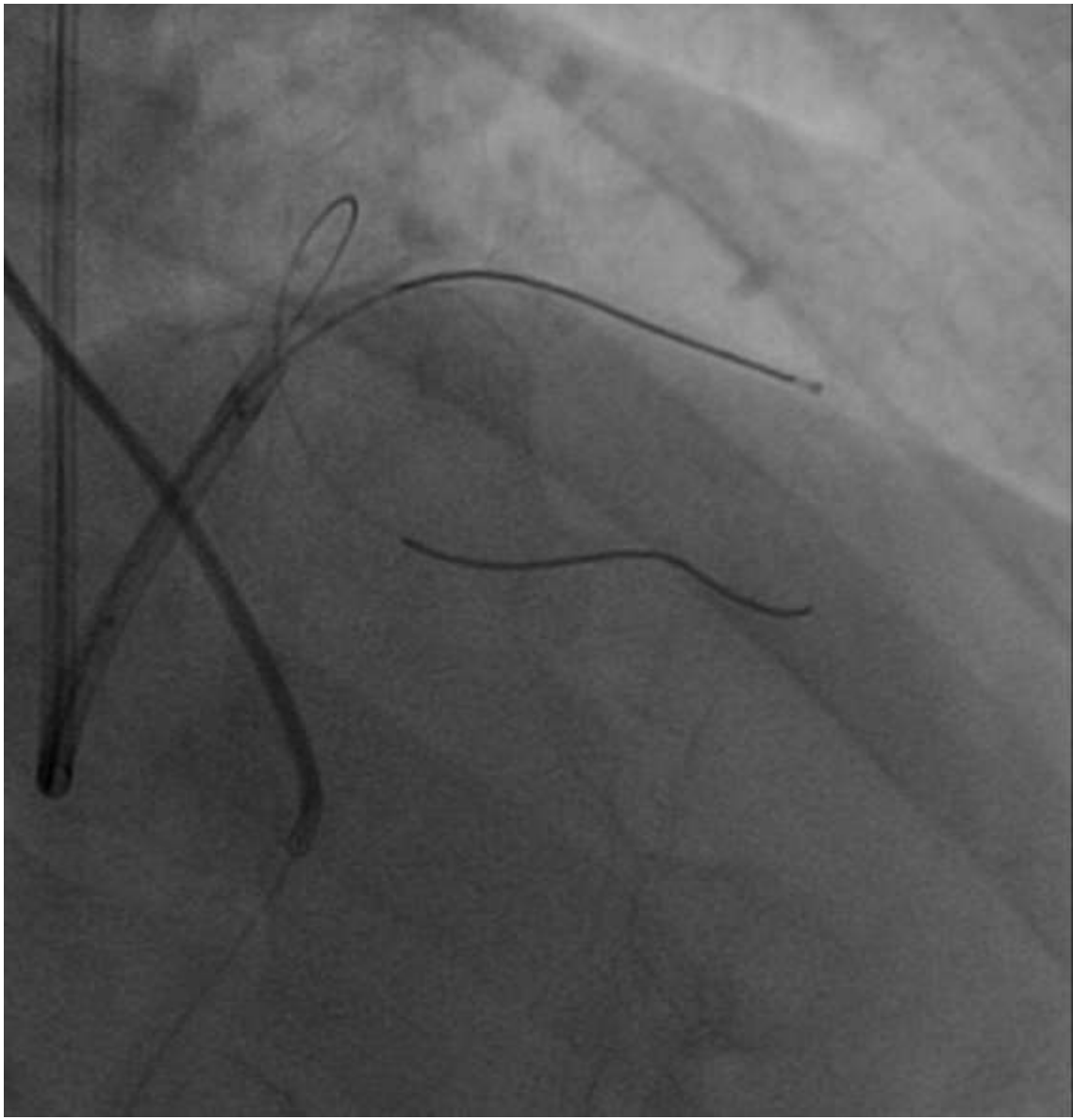
Case 3

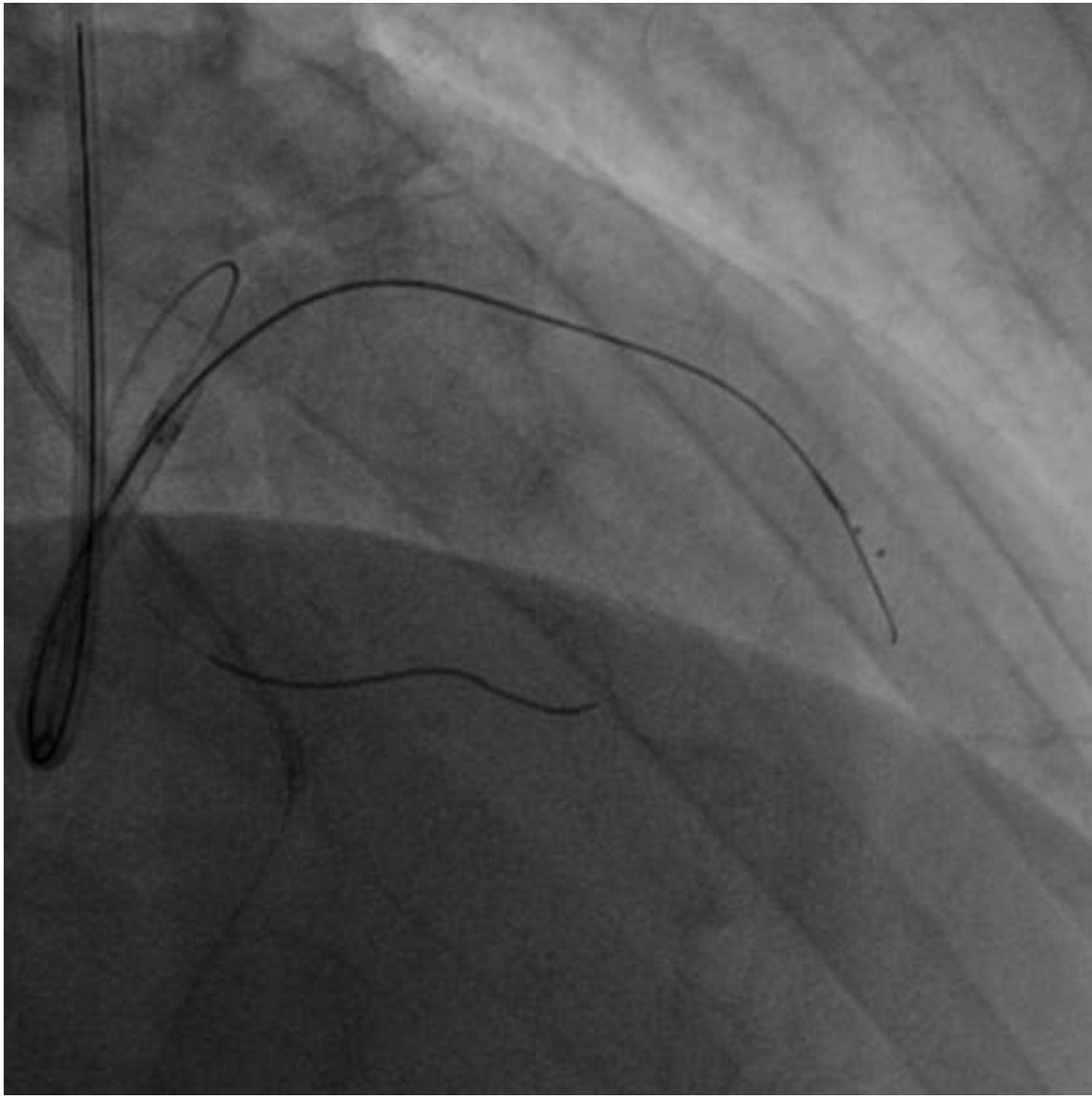
As good quality distal vessel re-entry using the Stingray chosen

CrossBoss advanced into the re-entry zone



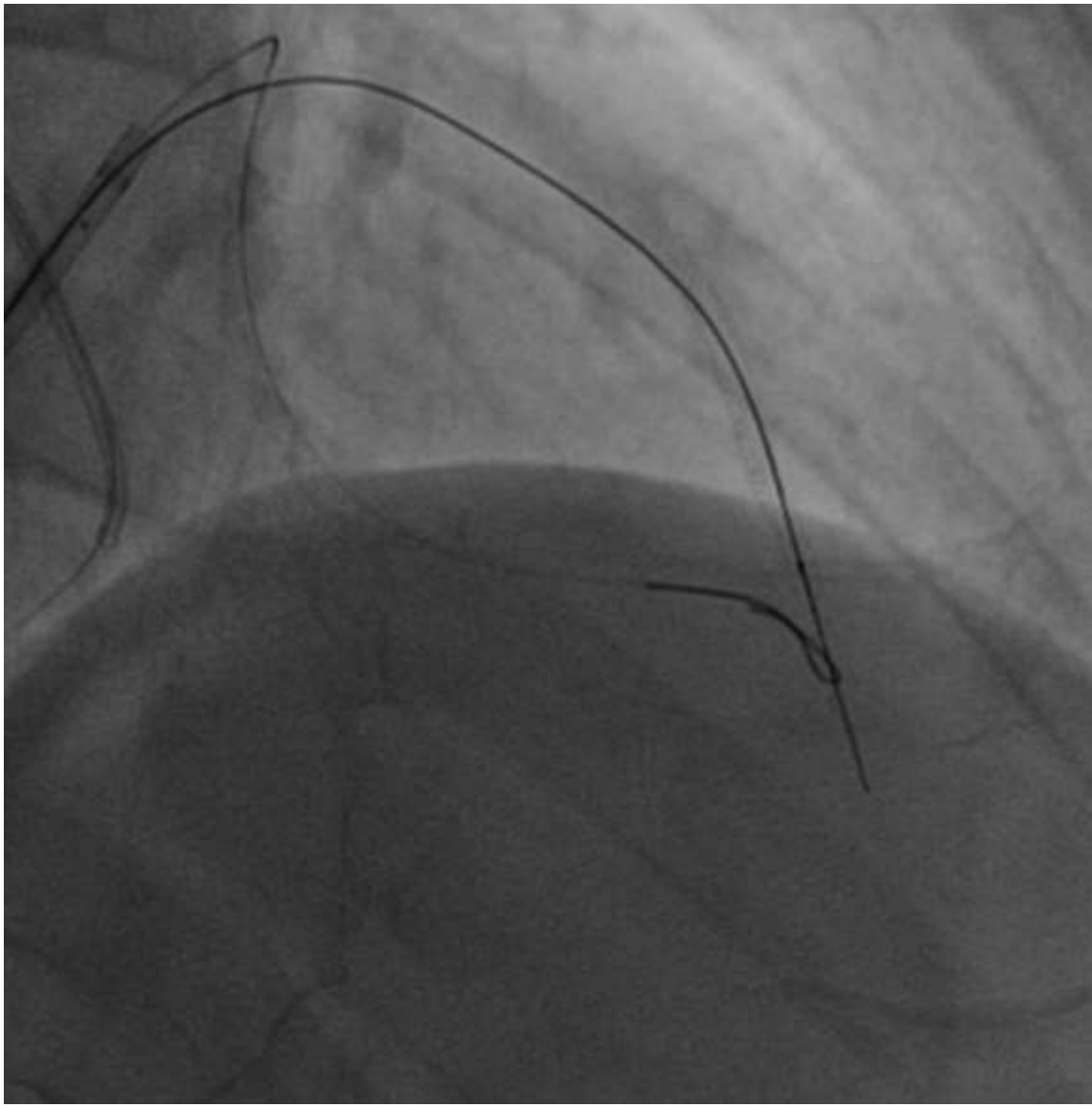
Case 3

Re-entry using the Stingray balloon and wire.



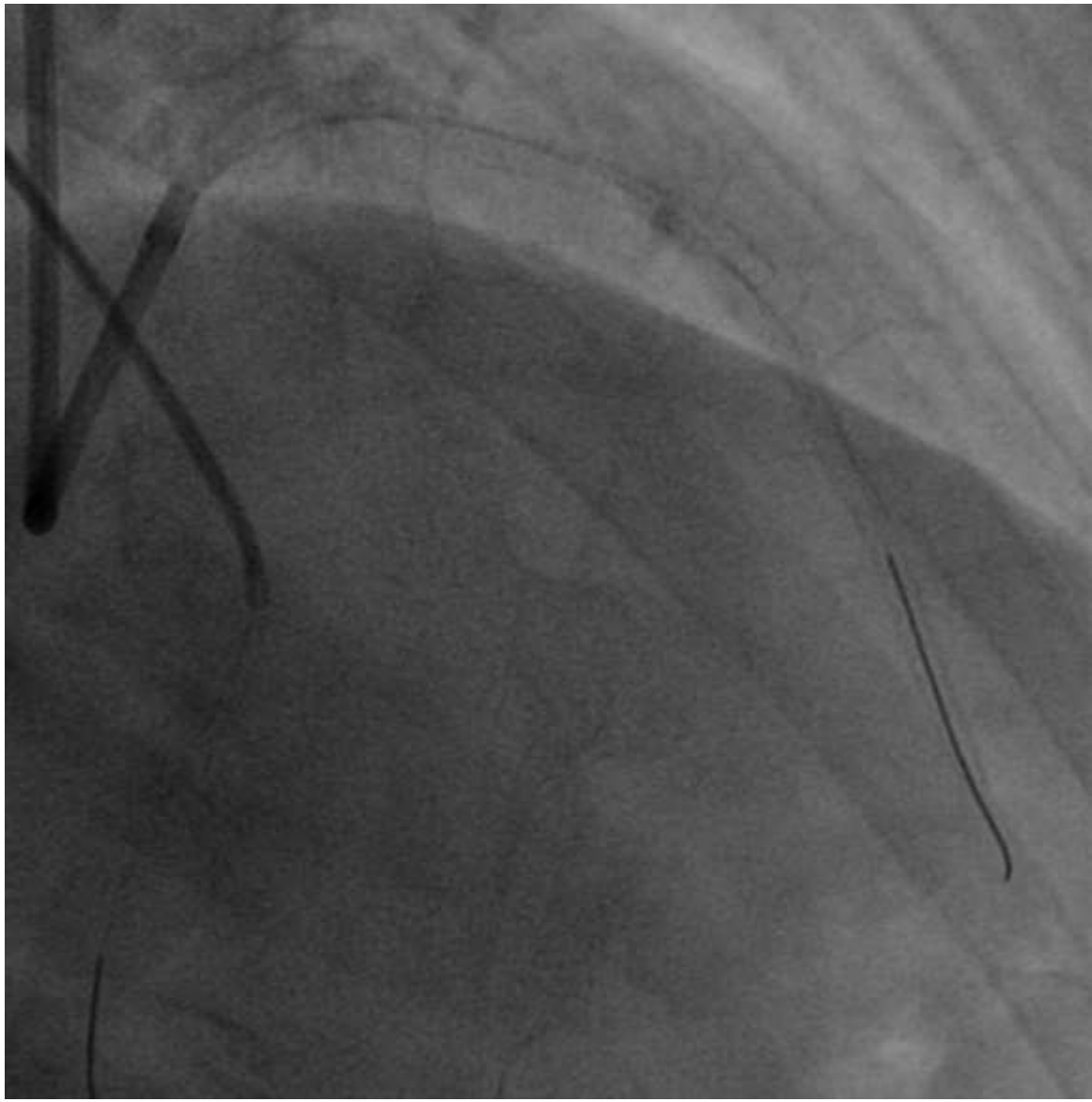
Case 3

- Stingray wire advance and exchanged.
- Mid LAD stented.
- Distal LAD wired with GAIA 2nd escalating to a Conquest Pro



Case 3

Final result.



APCTO Club
Antegrade Sub-Algorithm

- Incorporates use of different wires such as GAIA
- When first antegrade wire fails recognises the role of wire redirection and parallel wiring
- Recognises that use ADR may be useful in some situations
- Use of dissection re-entry techniques not dictated by CTO lesion length alone.
- Includes IVUS guided wiring as last resort