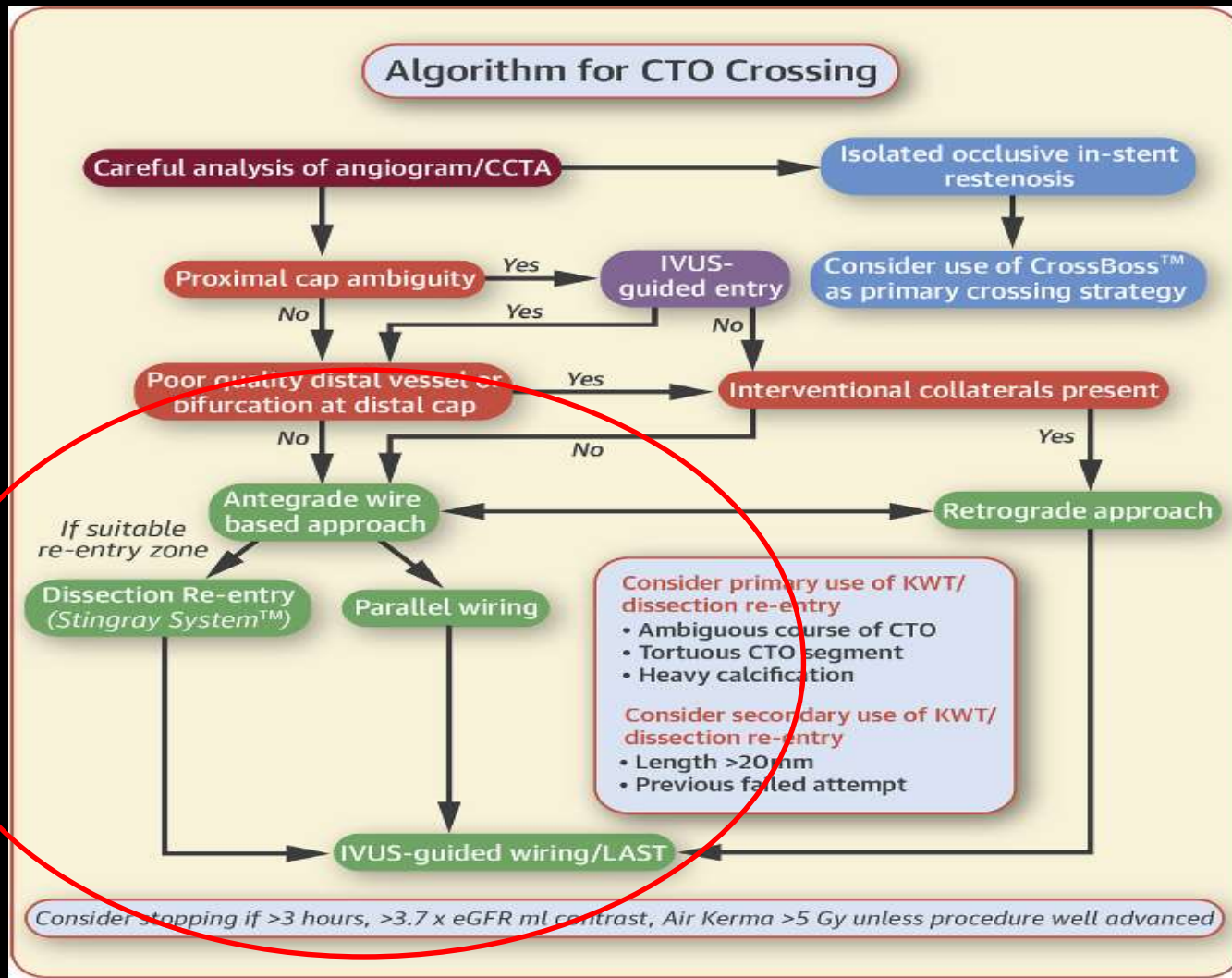


# **Modern Antegrade Approach in APCTO Algorithm**

**Jong-Young Lee, MD, PhD**

Kangbuk Samsung Hospital,  
Sungkyunkwan University School of Medicine, Seoul, Korea

# Algorithm for from Asia Pacific CTO club



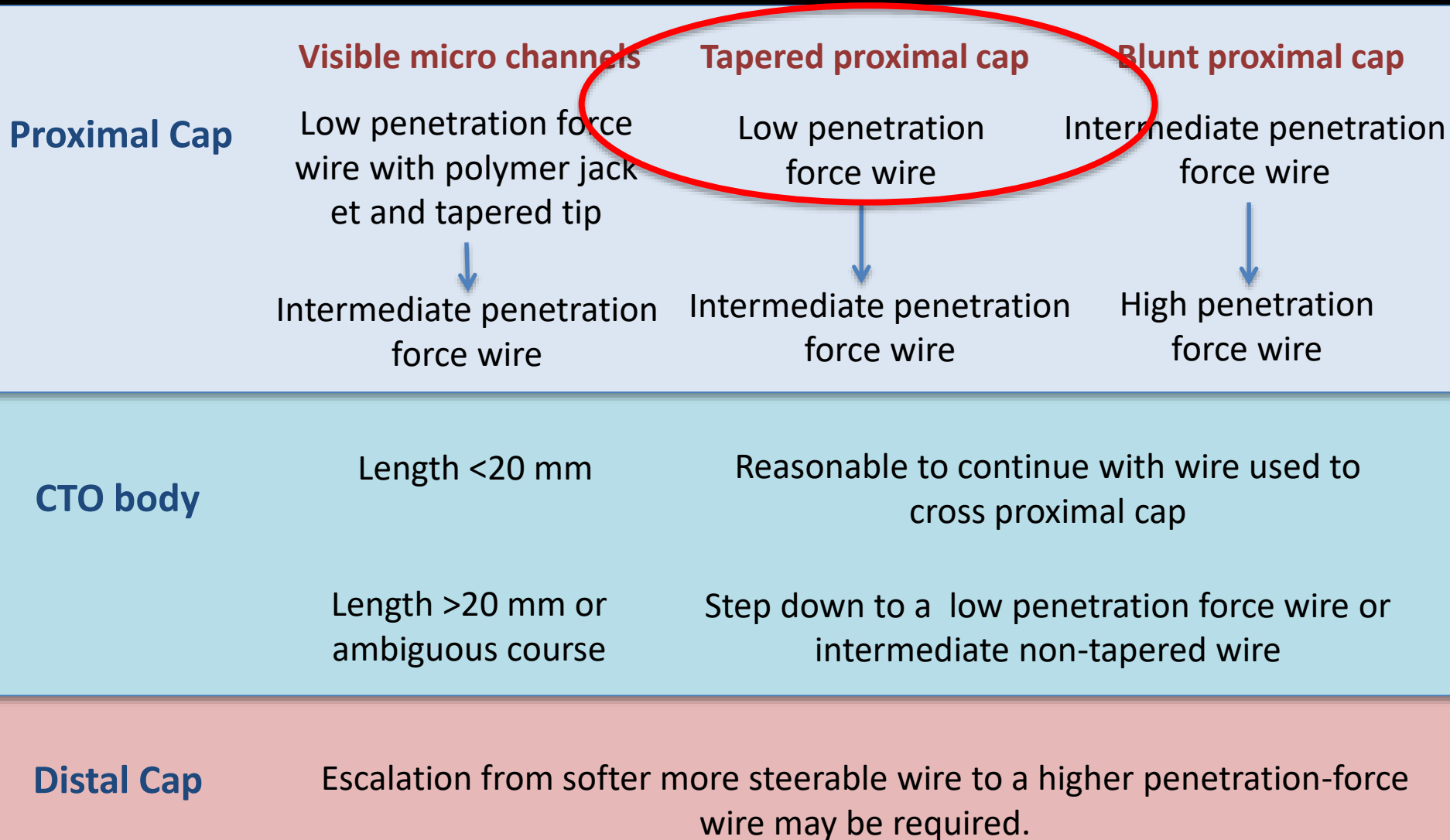
# Antegrade wire based strategies



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

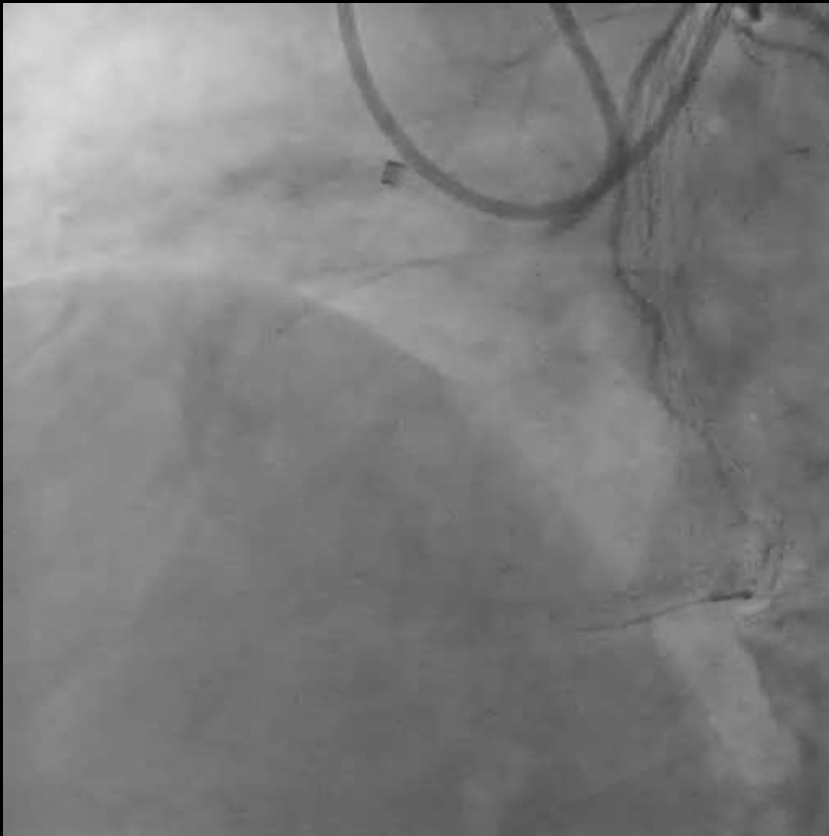
# **Single wire technique**

# Antegrade wire based strategy

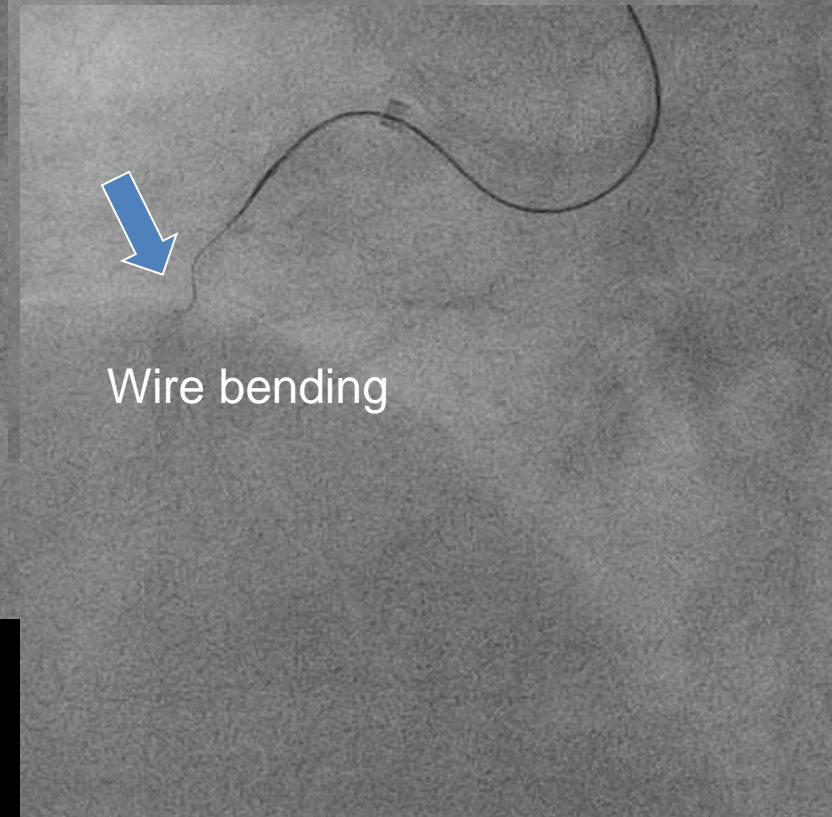
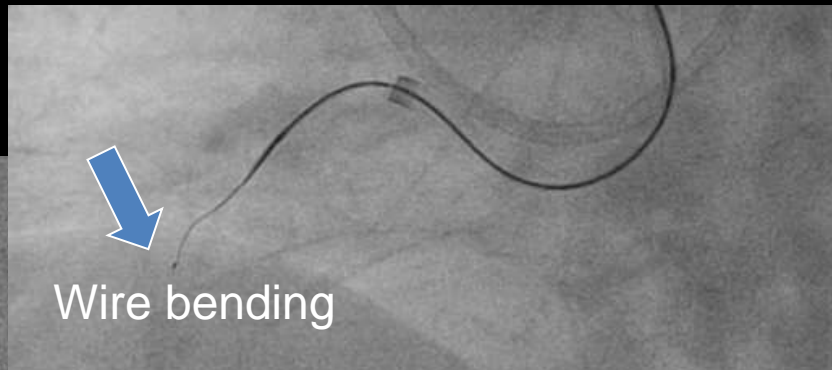
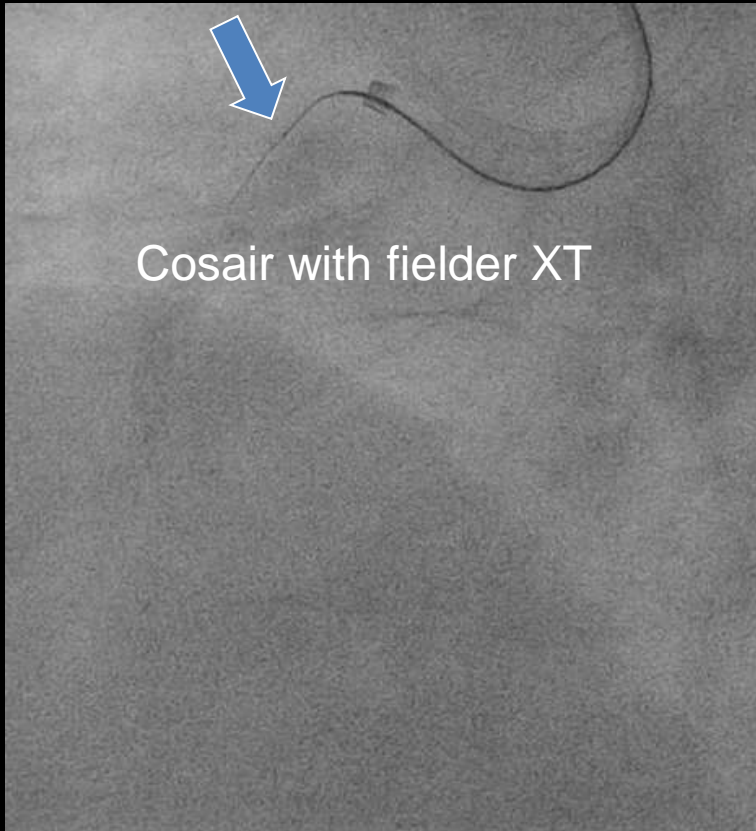


# 60/M, Long CTO with tapered cap

Poor distal target with good  
interventional collateral



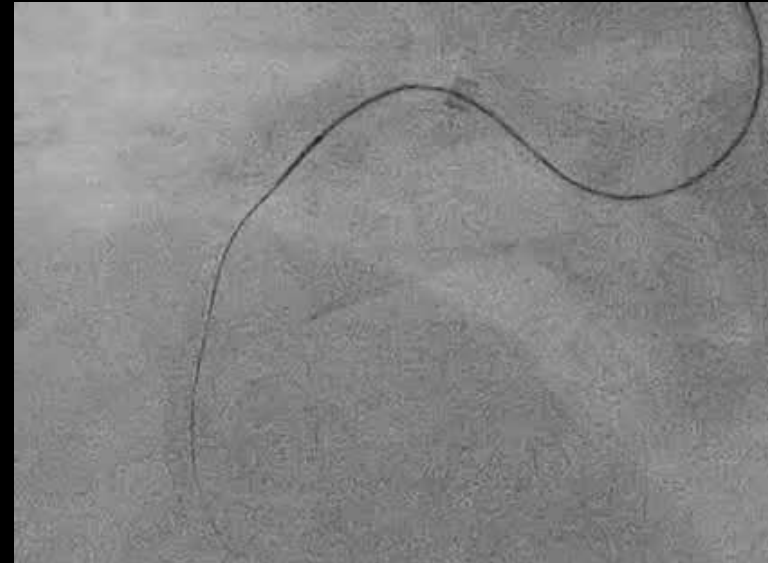
# Long CTO with tapered cap



# Long CTO with tapered cap



Corsair with fielder XT

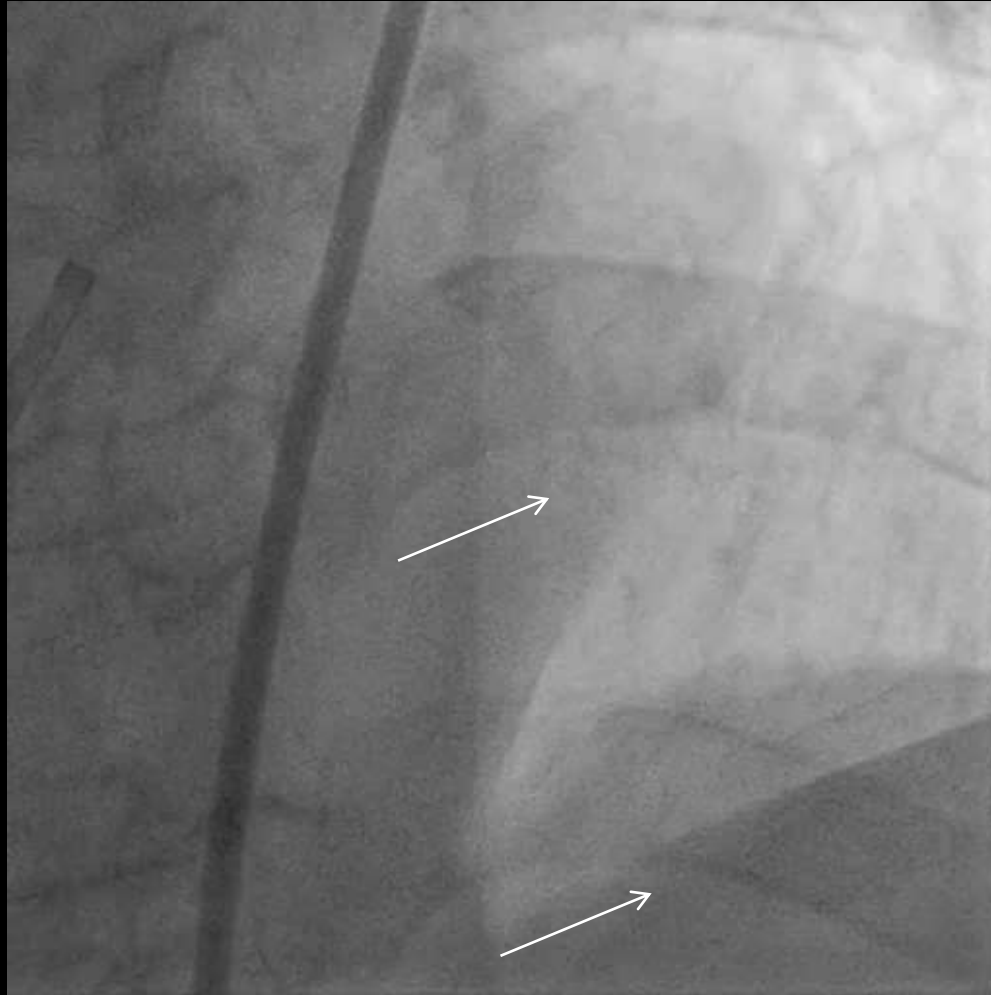


Corsair with fielder XT

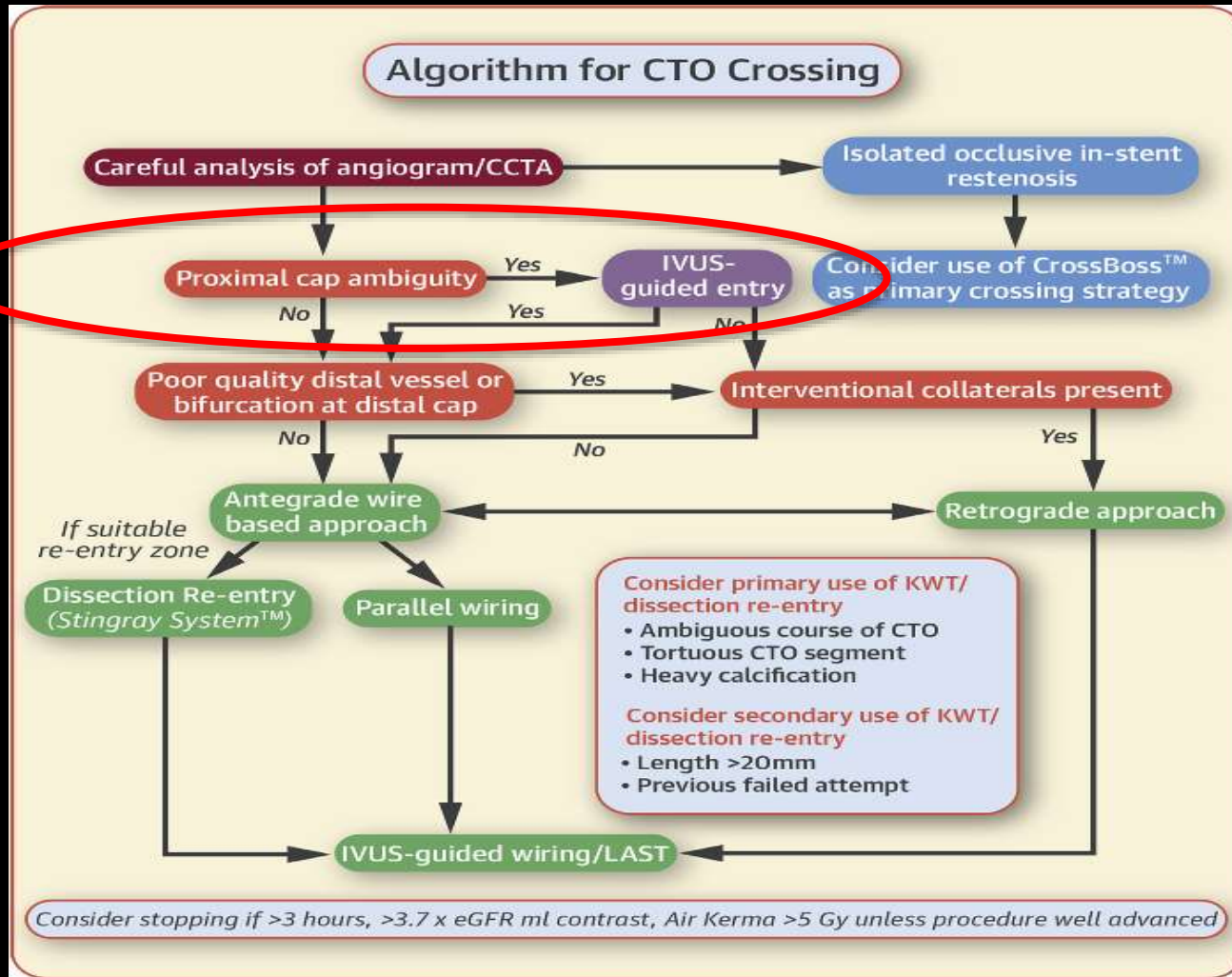


# 67/M Ambiguous stump

## Poor distal target



# Algorithm for from Asia Pacific CTO club



# Antegrade wire based strategy



## Proximal Cap

### Visible micro channels

Low penetration force wire with polymer jacket and tapered tip



Intermediate penetration force wire

### Tapered proximal cap

Low penetration force wire



Intermediate penetration force wire

### Blunt proximal cap

Intermediate penetration force wire



High penetration force wire

## CTO body

Length <20 mm

Reasonable to continue with wire used to cross proximal cap

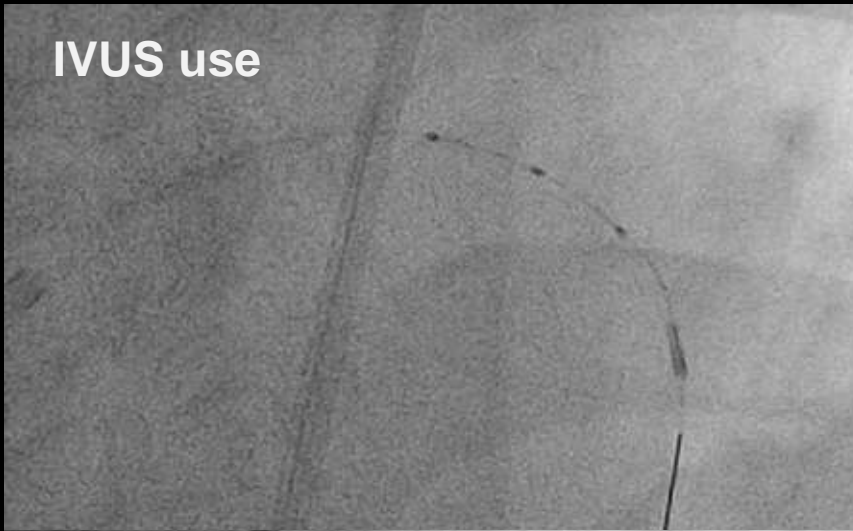
Length >20 mm or ambiguous course

**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.

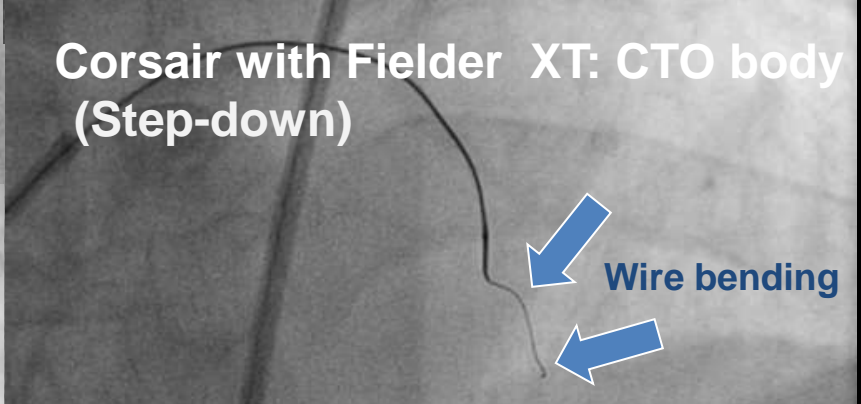
**IVUS use**



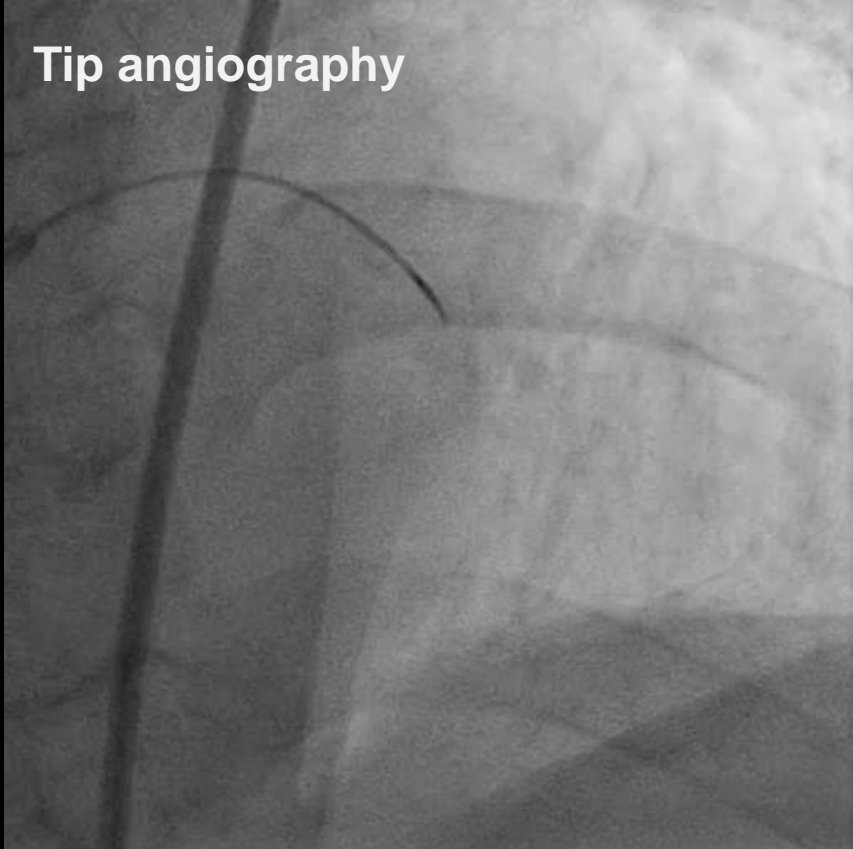
**Corsair with Gaia 2: cap puncture**



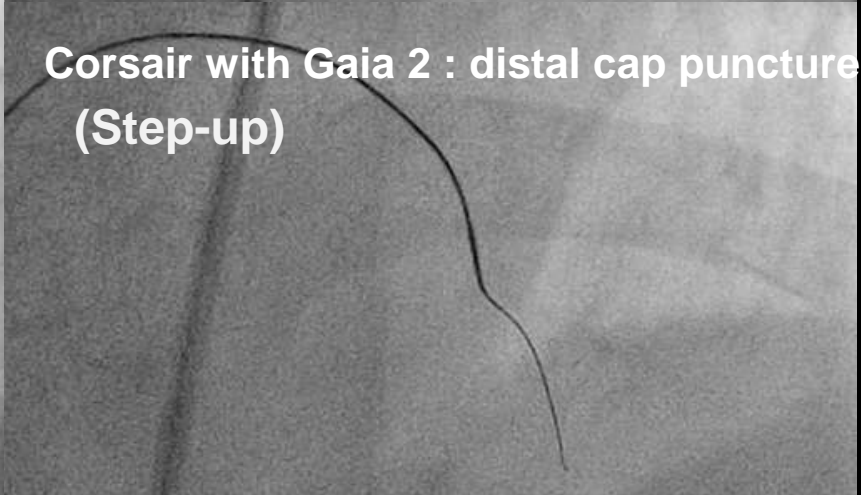
**Corsair with Fielder XT: CTO body (Step-down)**

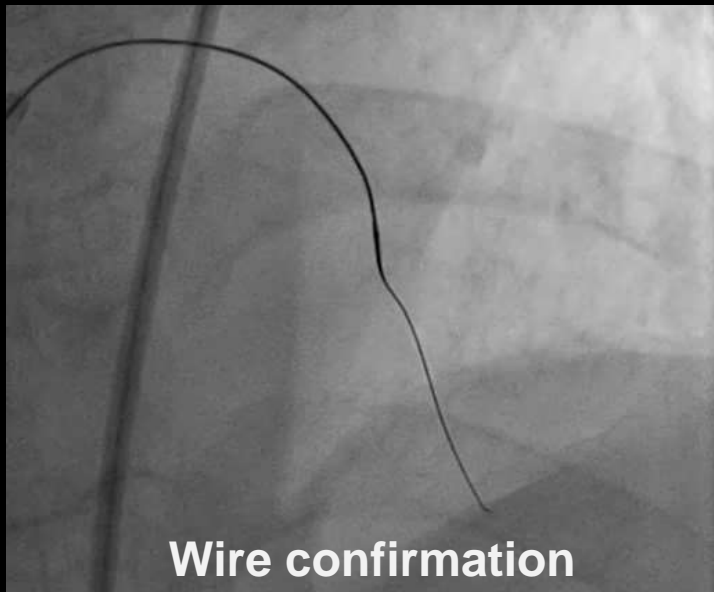


**Tip angiography**

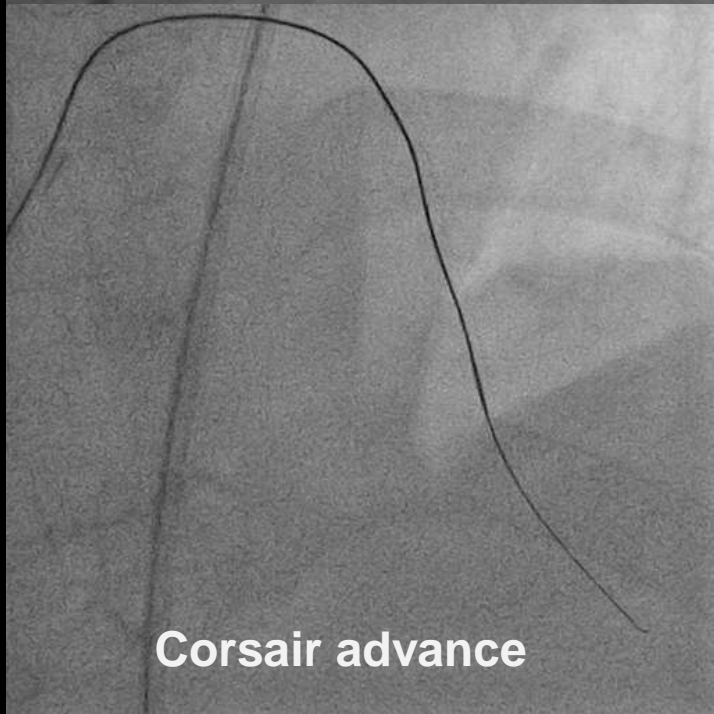


**Corsair with Gaia 2 : distal cap puncture (Step-up)**

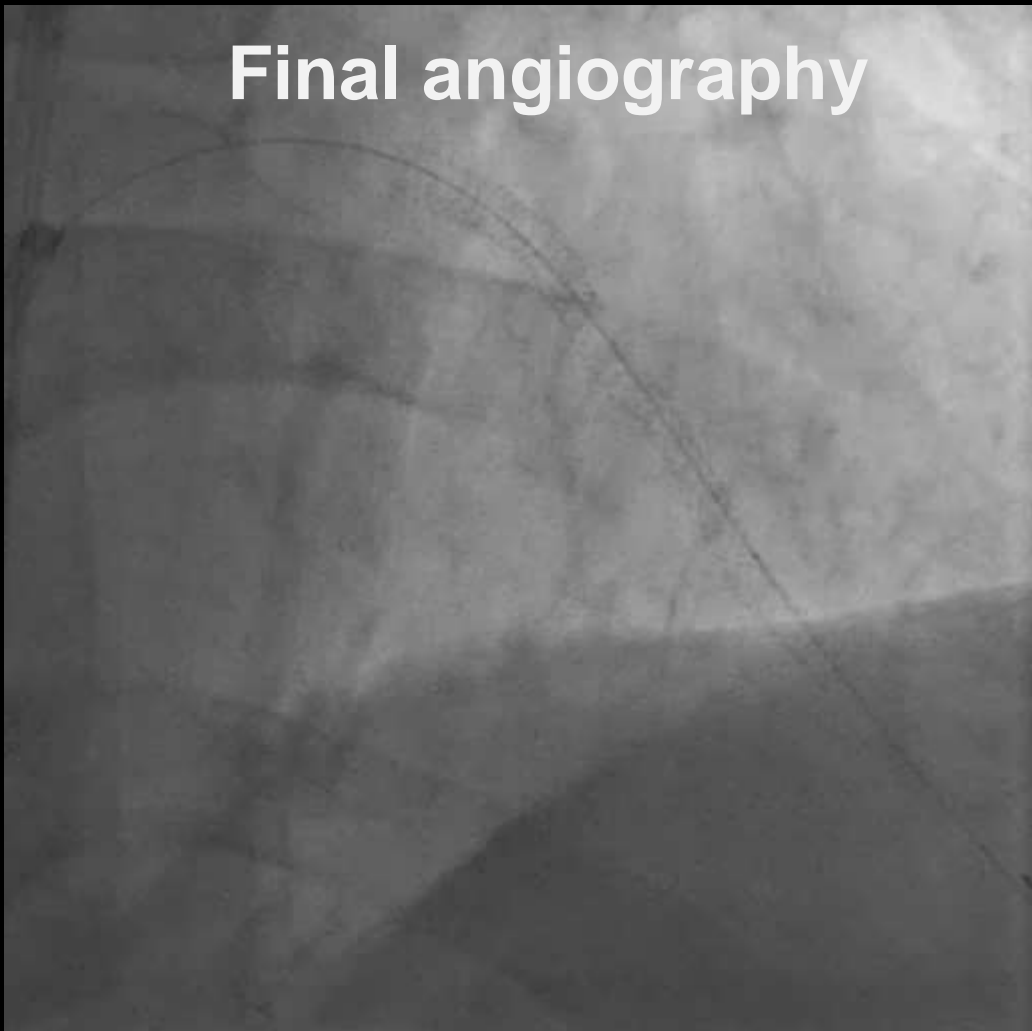




**Wire confirmation**

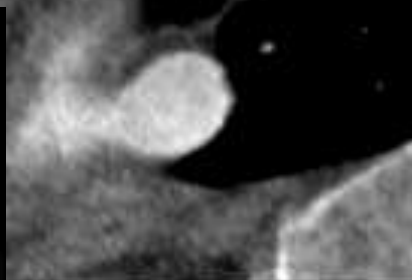
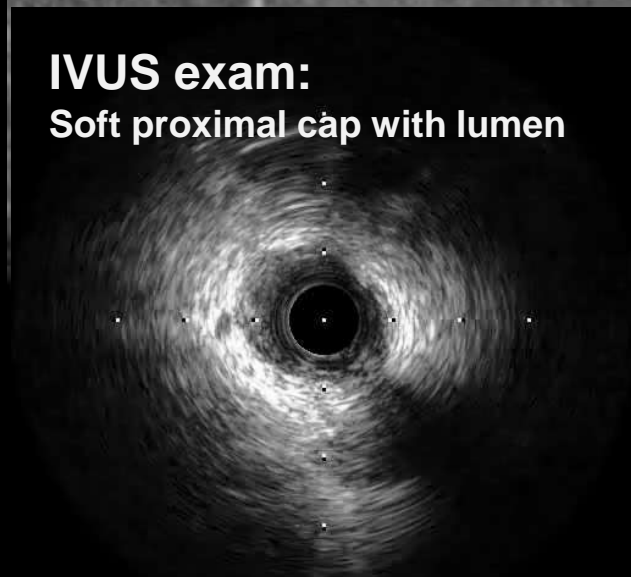
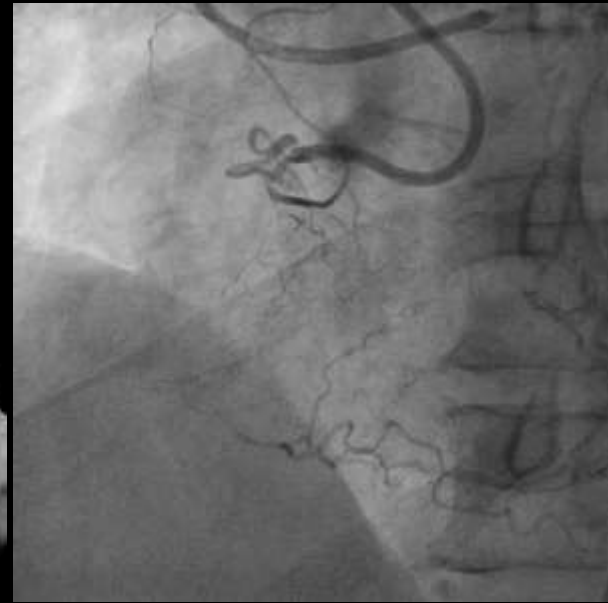
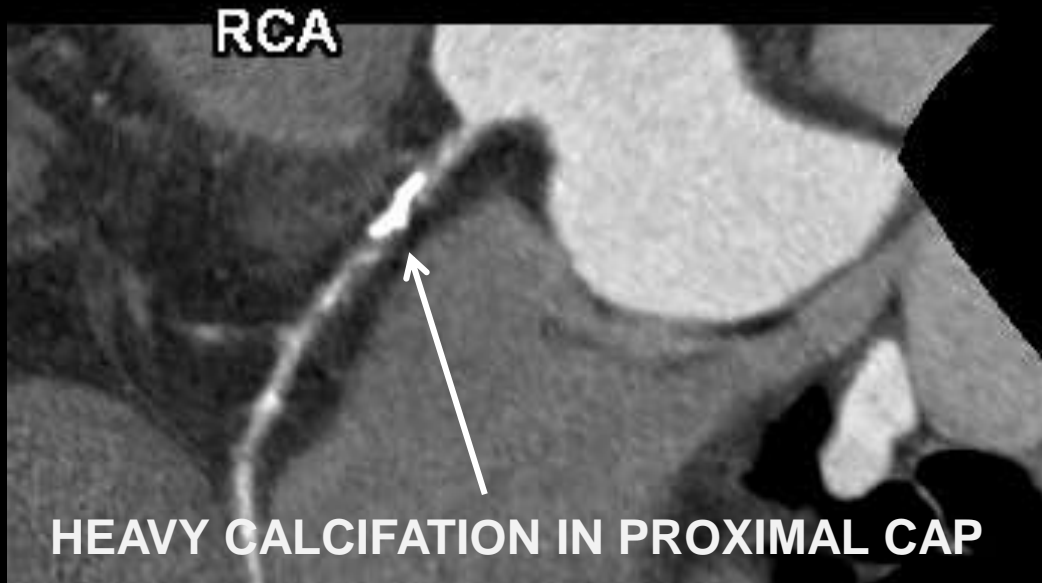


**Corsair advance**

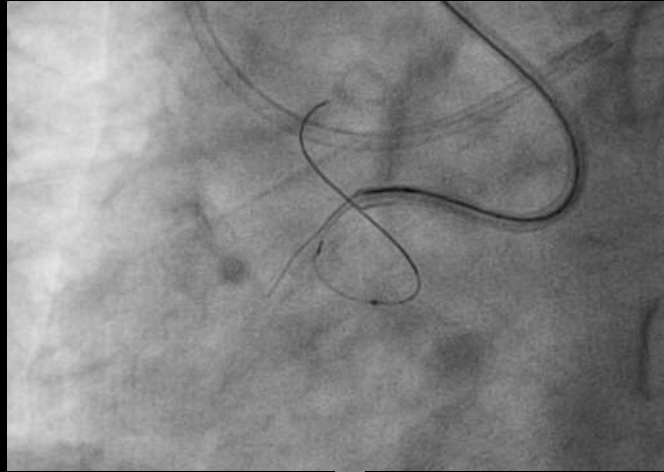


**Final angiography**

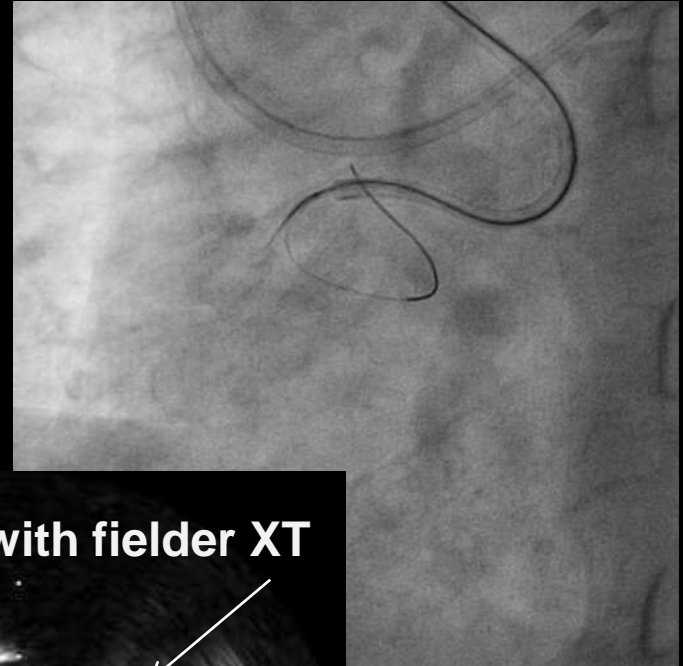
# 56/M, Long RCA CTO with no stump



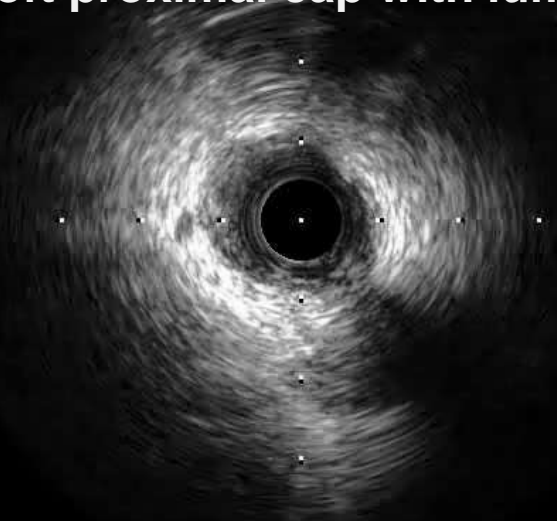
**IVUS-guided Fielder XT**



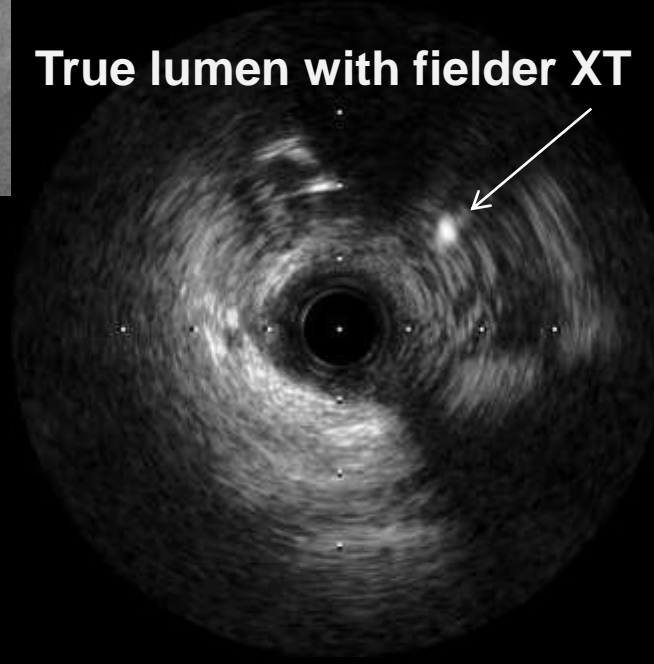
**Corsair advance**



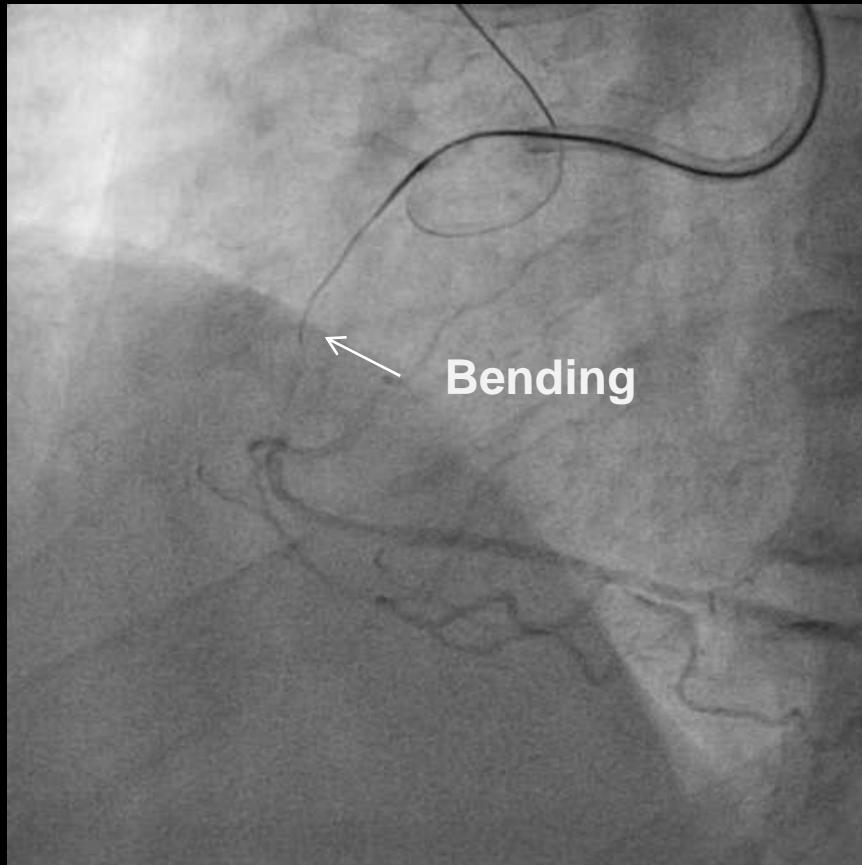
**IVUS exam:  
Soft proximal cap with lumen**



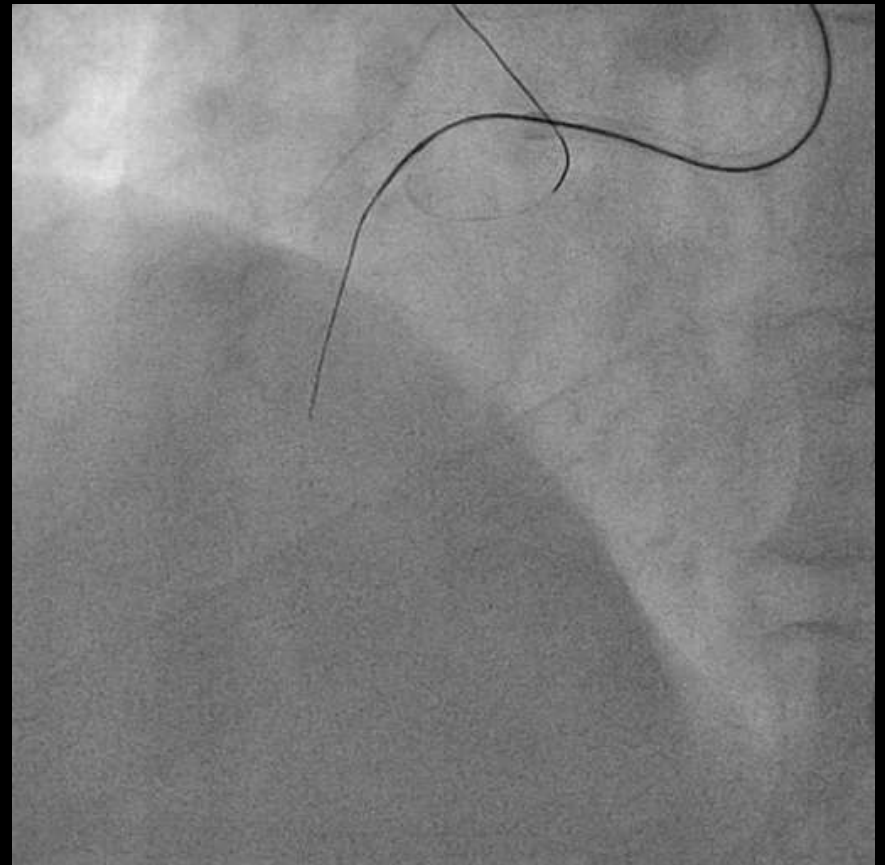
**True lumen with fielder XT**



**Fielder XT**

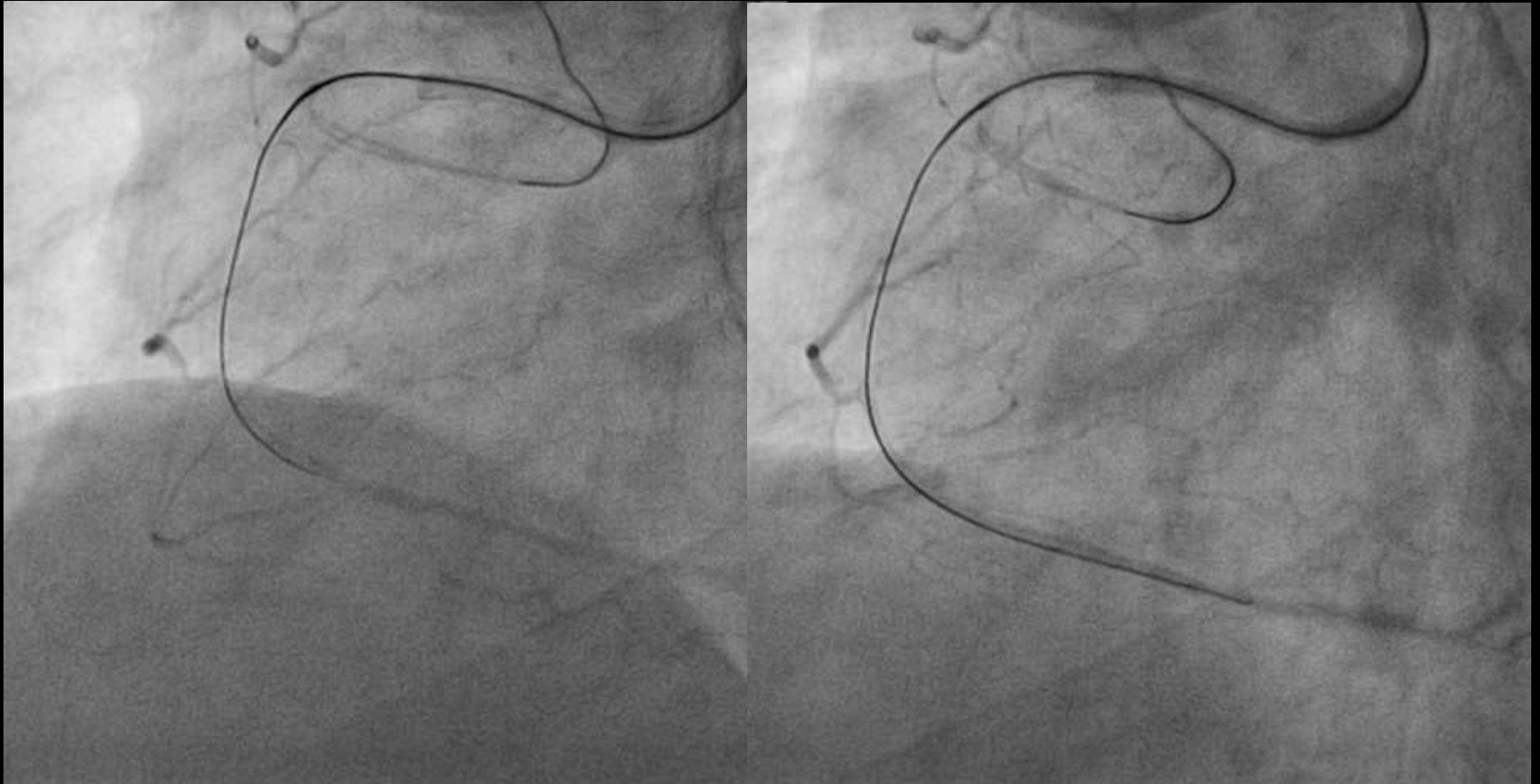


**Gaia 2 (step-up escalation)**

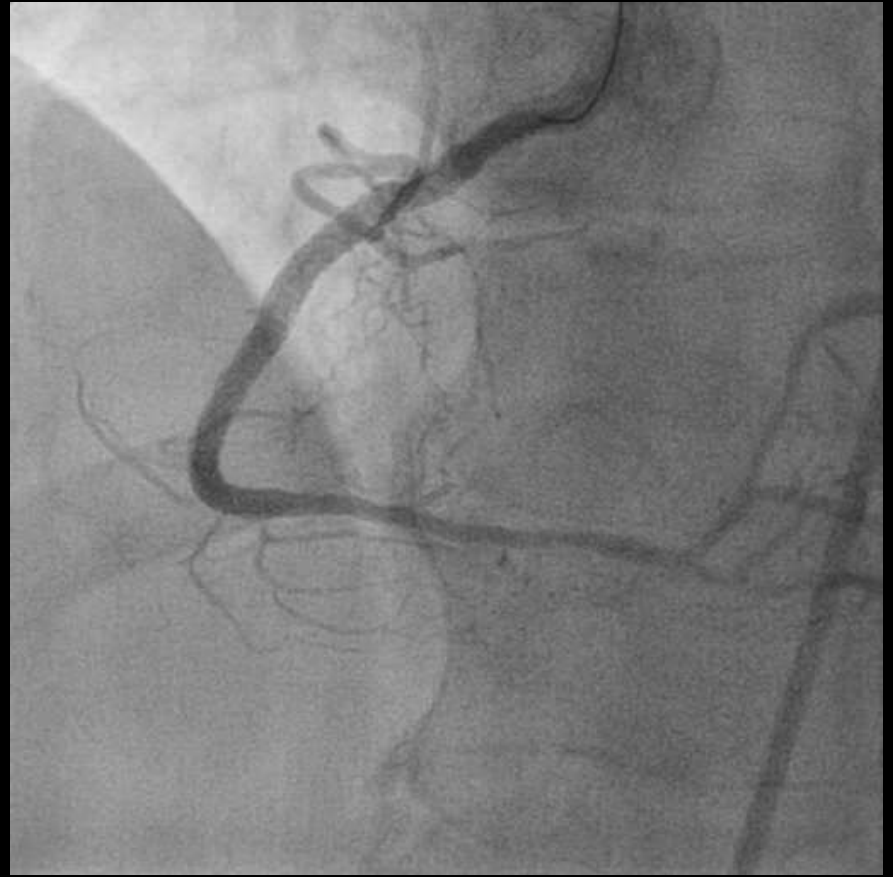
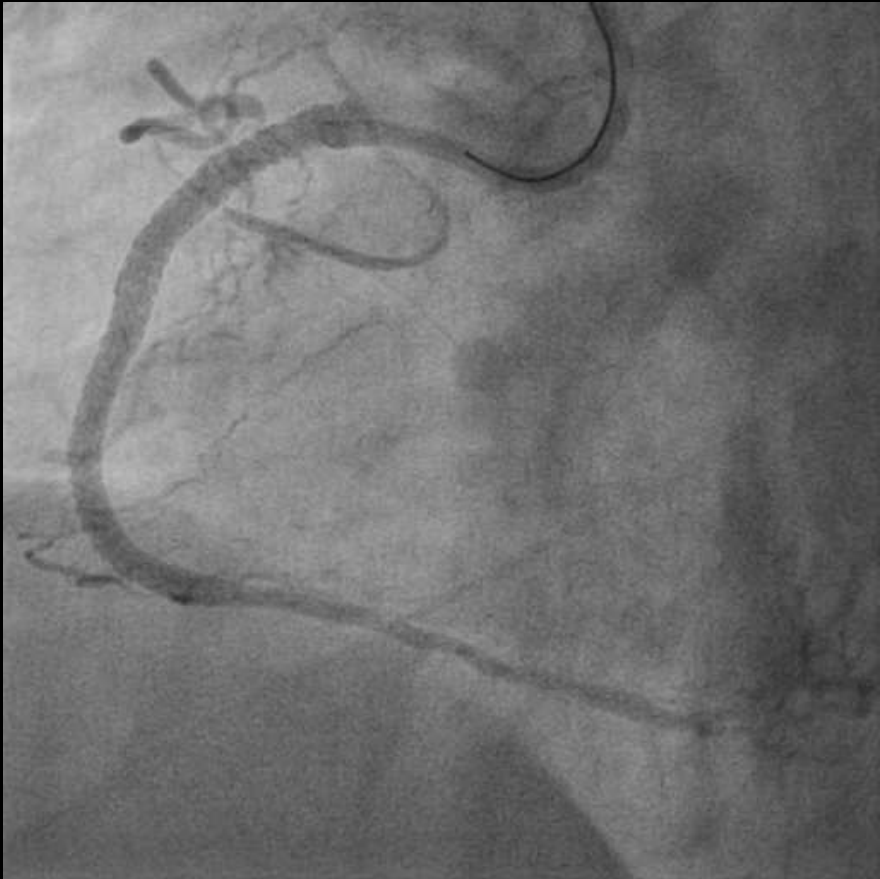




## Gaia 2 : Advance into true lumen

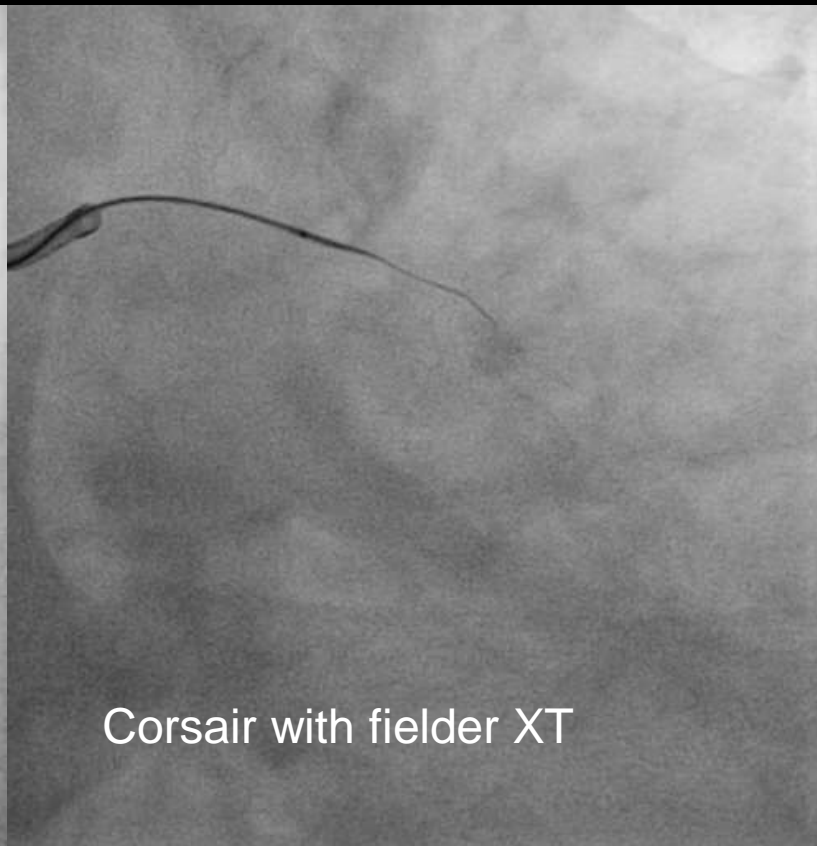
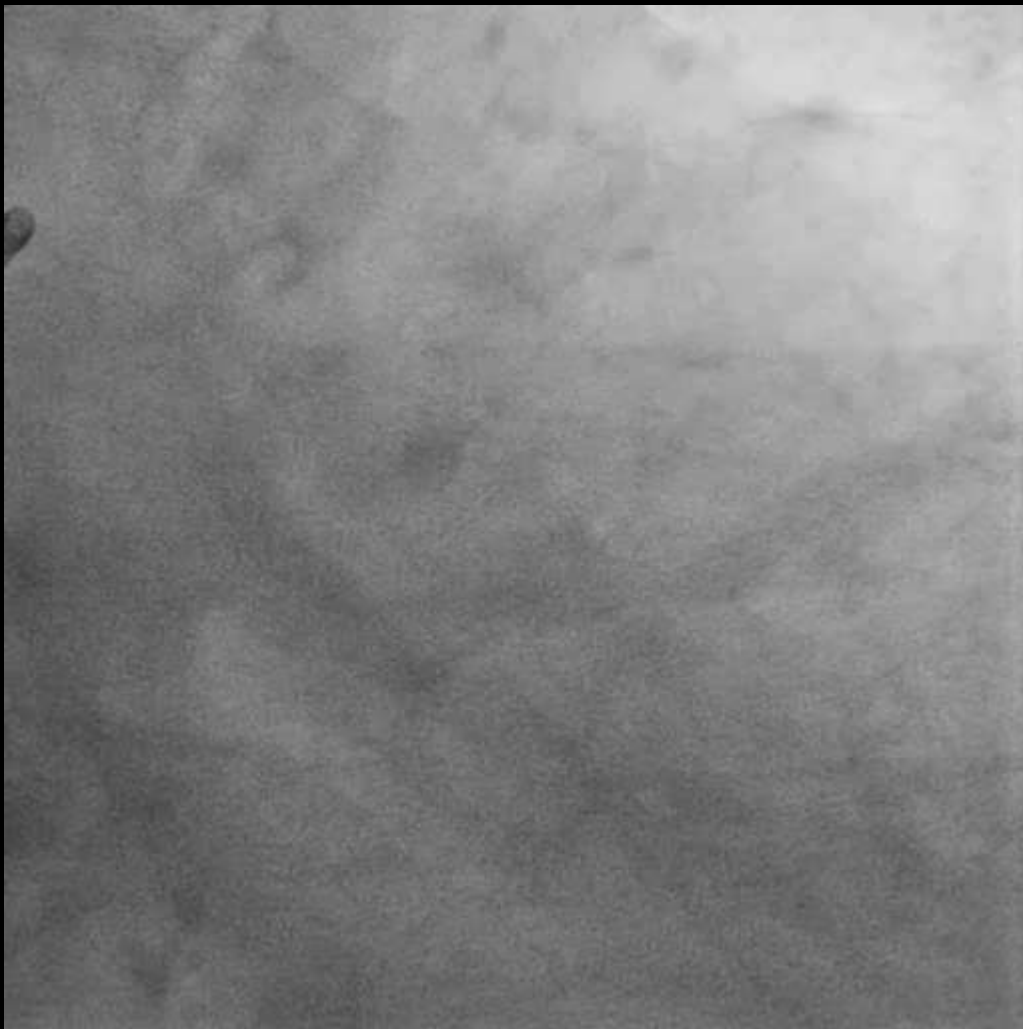


# Final angiography

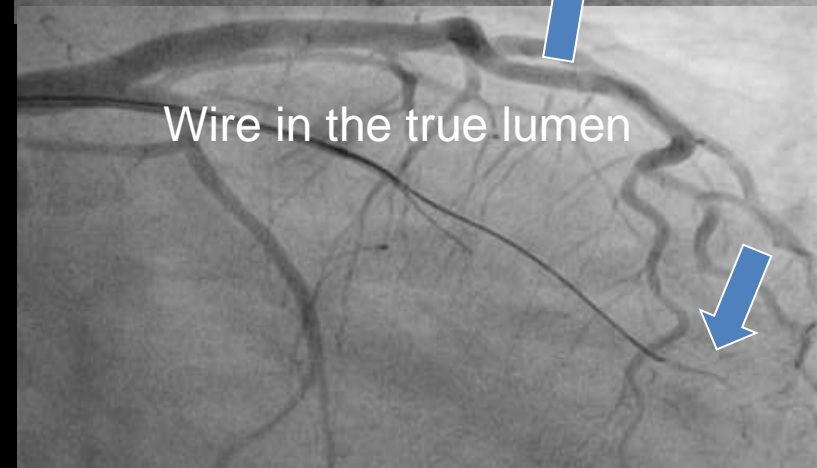
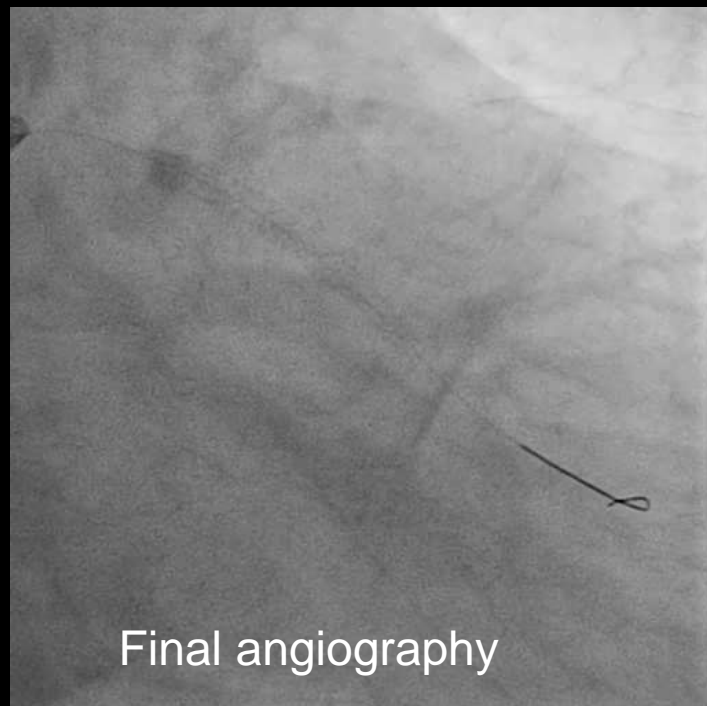
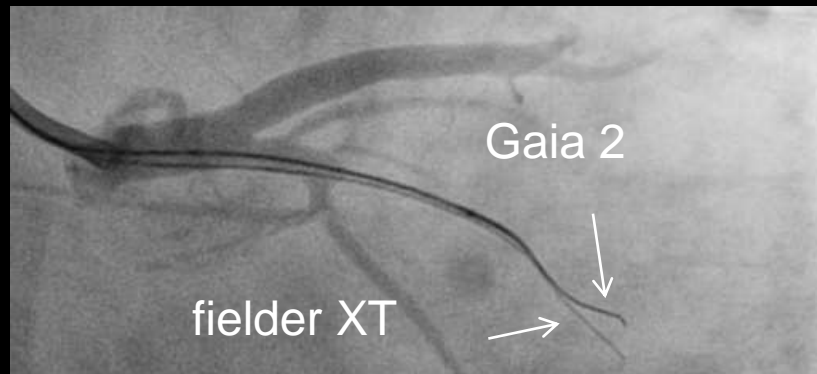
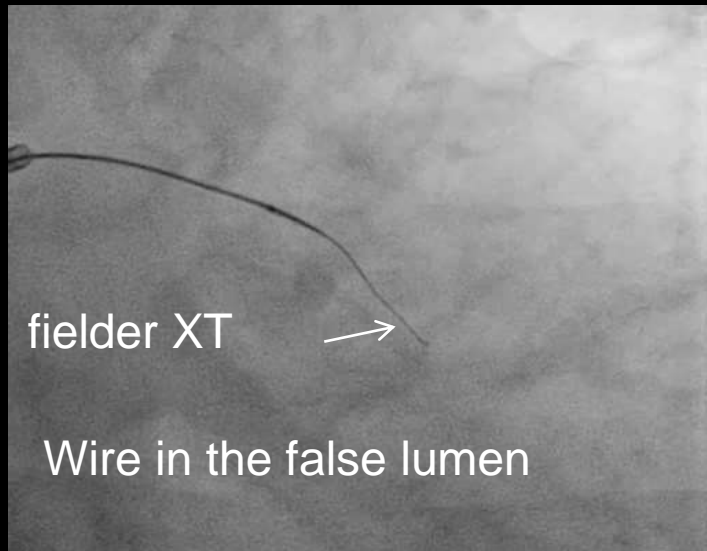


# **Parallel wire technique**

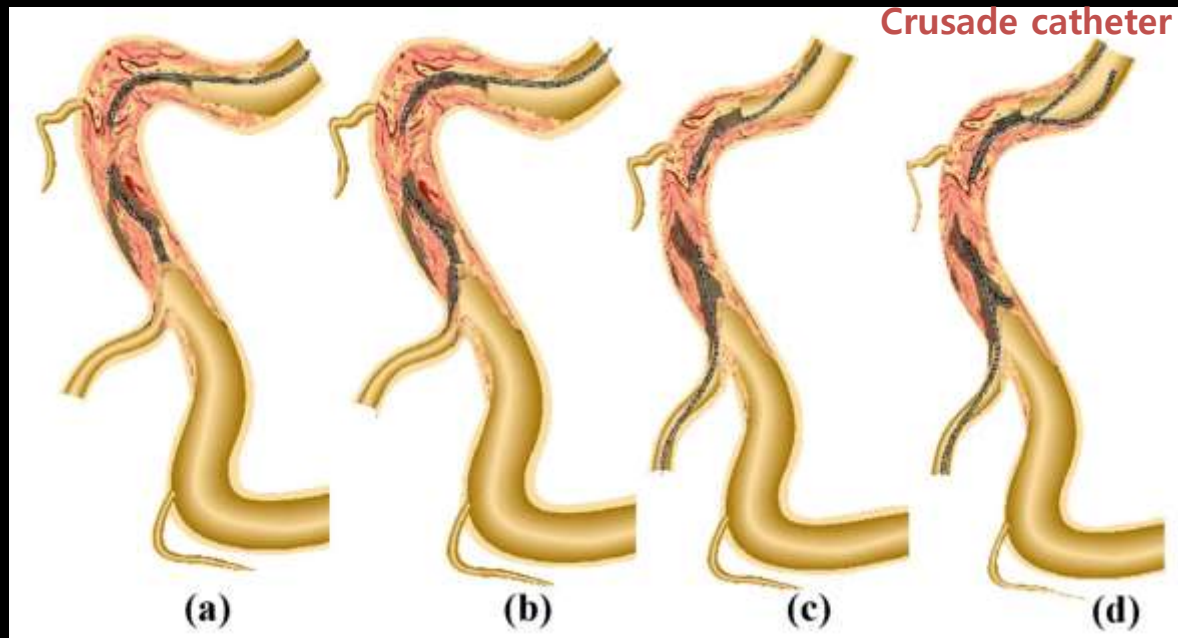
# 67/M, Failed OM CTO x 2 times



Corsair with fielder XT

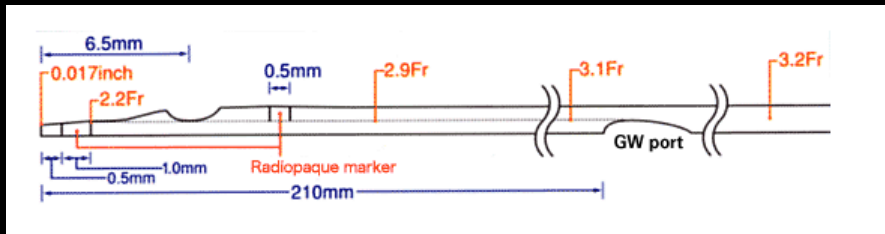


# Side Branch & Parallel Wire Technique



# Double lumen microcatheter

*In parallel wire technique, delivery of 2nd wire to the CTO site is sometimes cumbersome or difficult.*

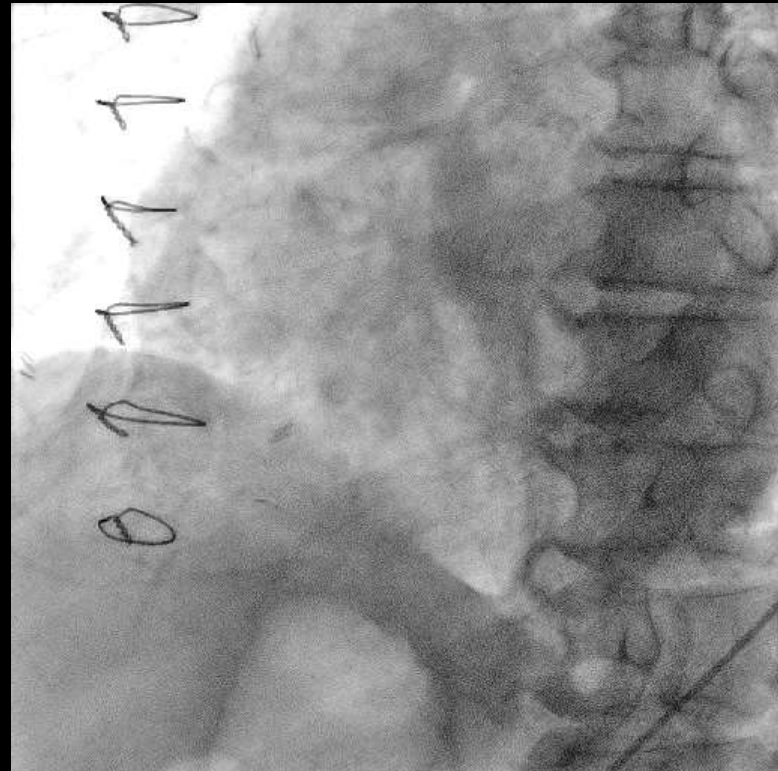
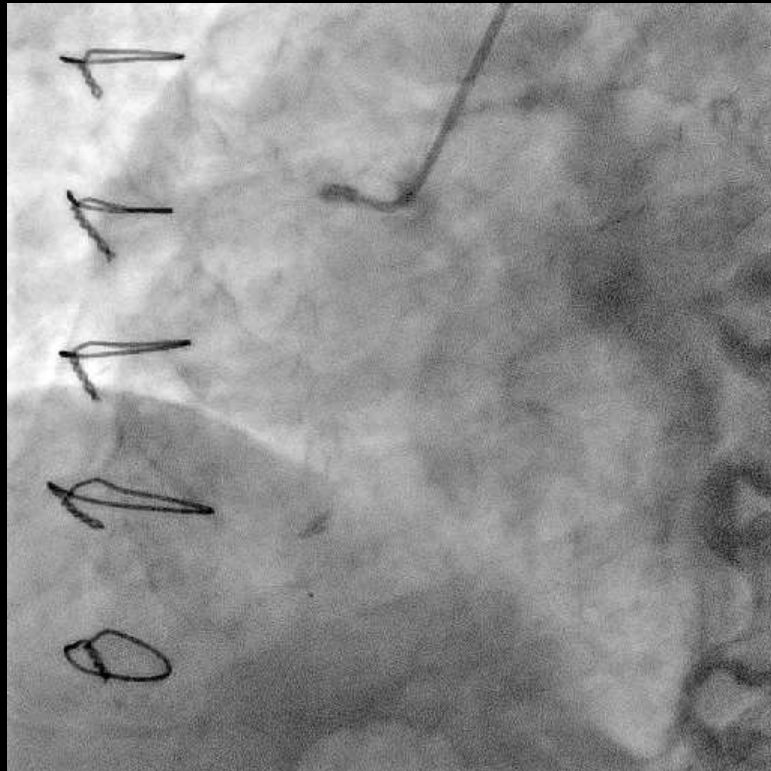


The Crusade Catheter (Kaneka, Osaka, Japan) is a double lumen microcatheter that contains both a monorail and an OTW port.

It is ideally suited to parallel wiring by allowing the introduction of multiple wires without removal of the catheter from an optimal position.

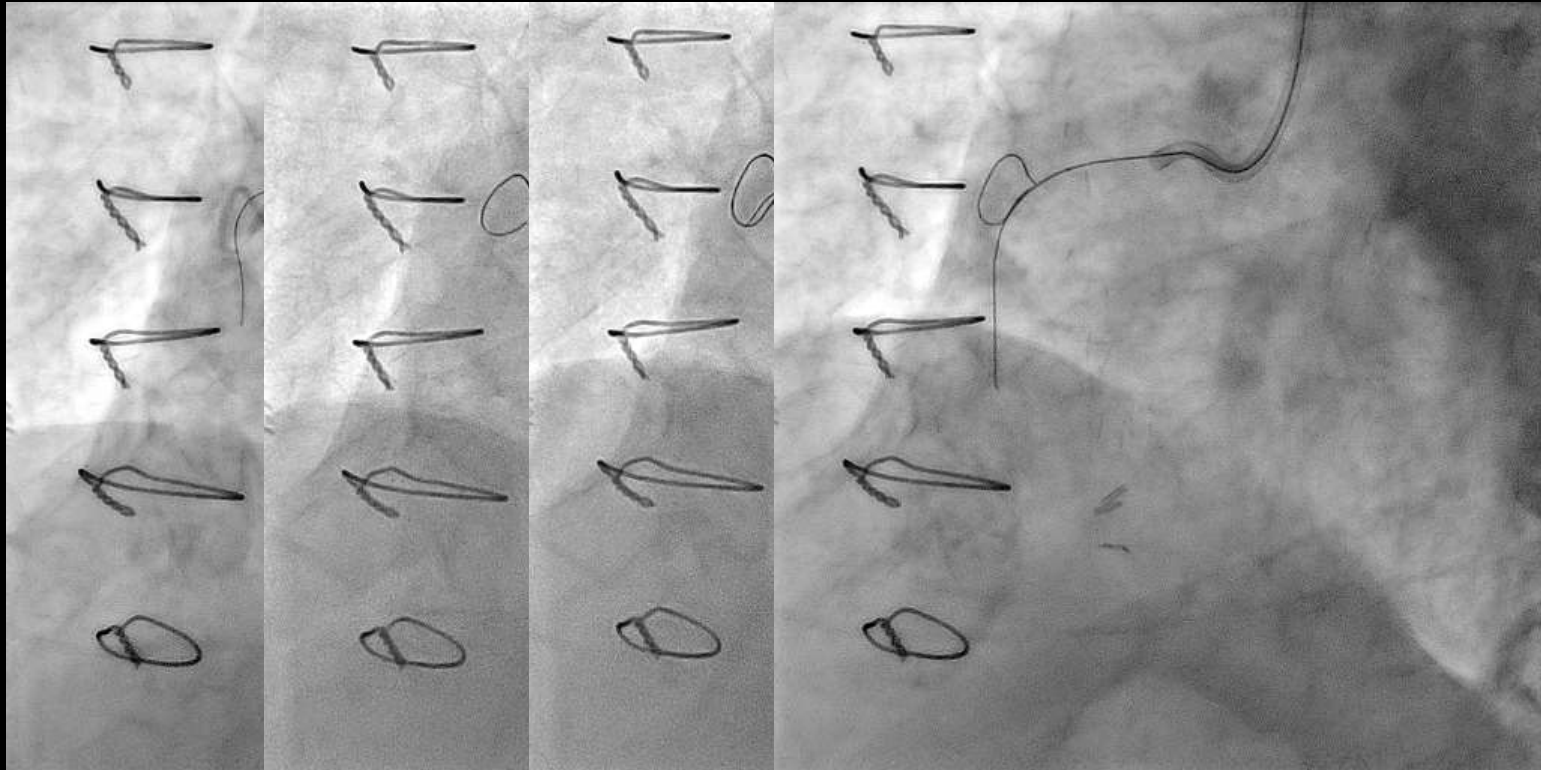


# Side Branch & Parallel Wire Technique

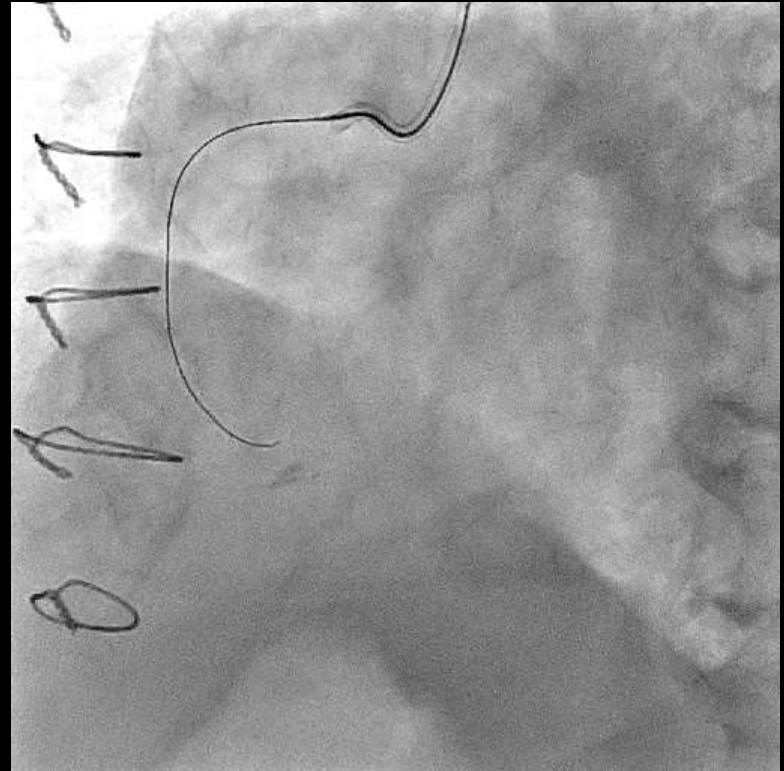
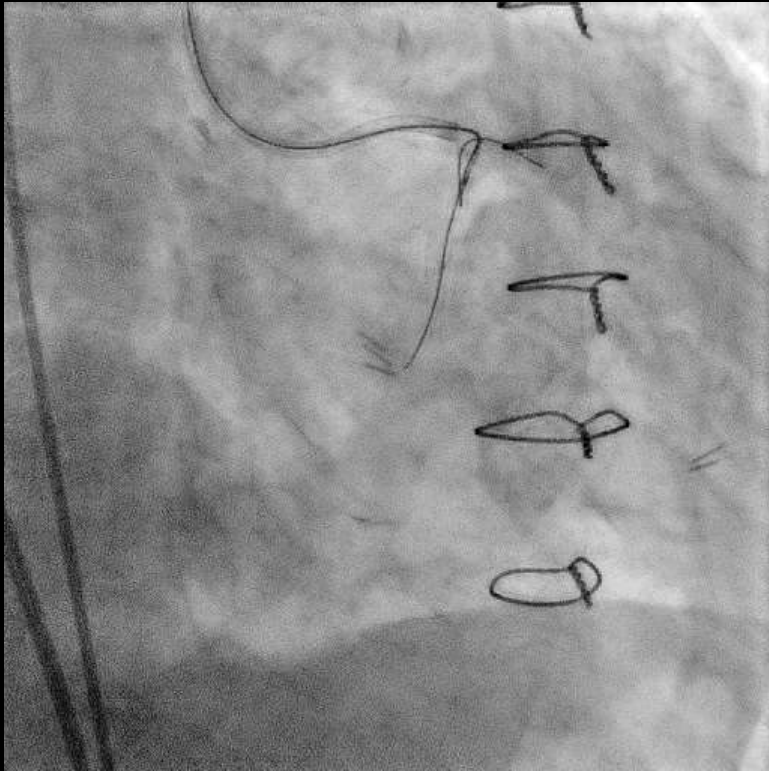




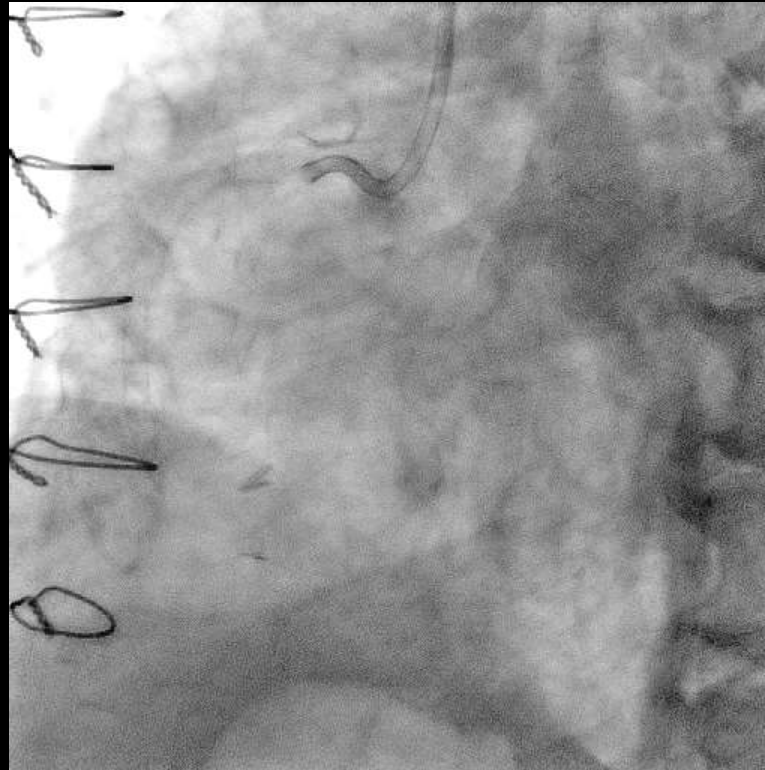
# Side Branch & Parallel Wire Technique



# Side Branch & Parallel Wire Technique

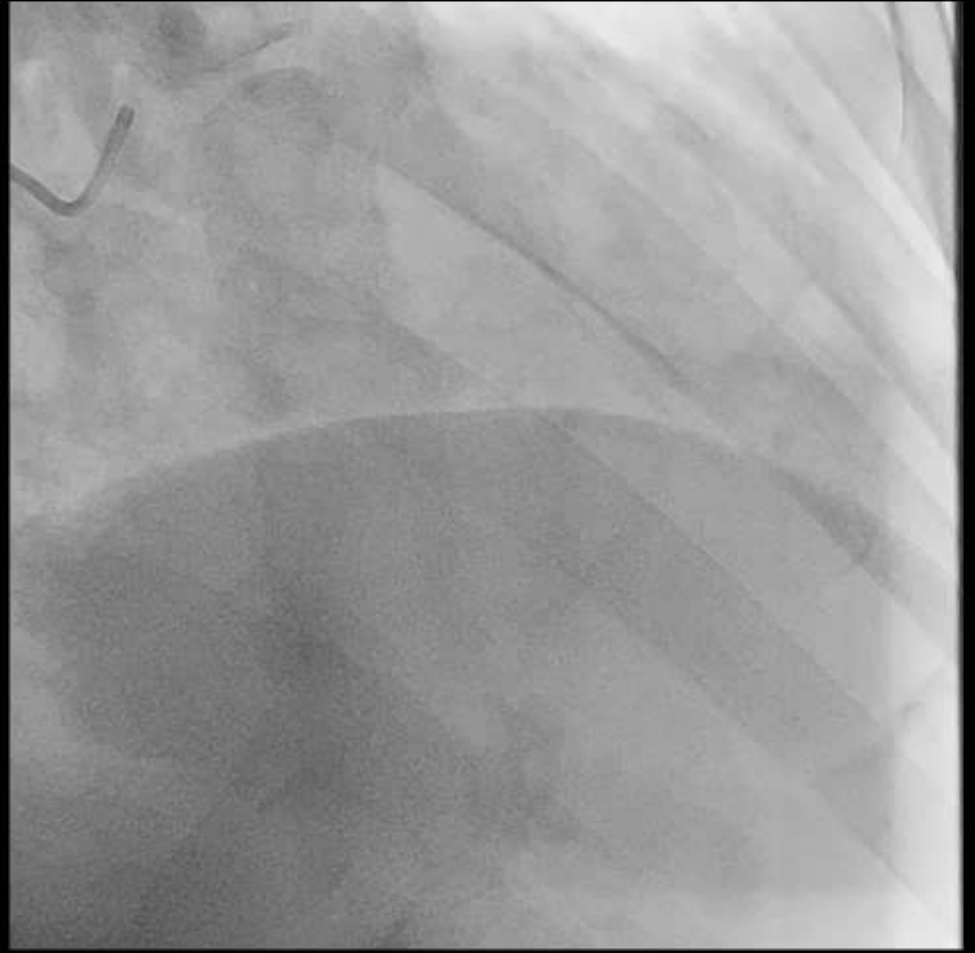
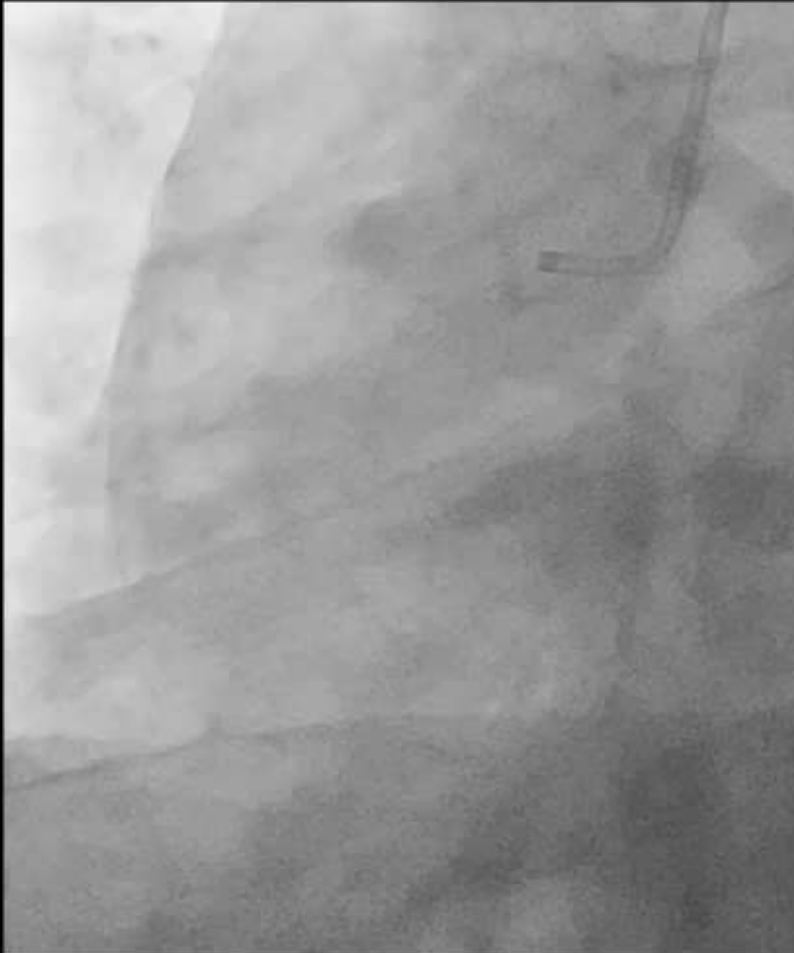


# Side Branch & Parallel Wire Technique

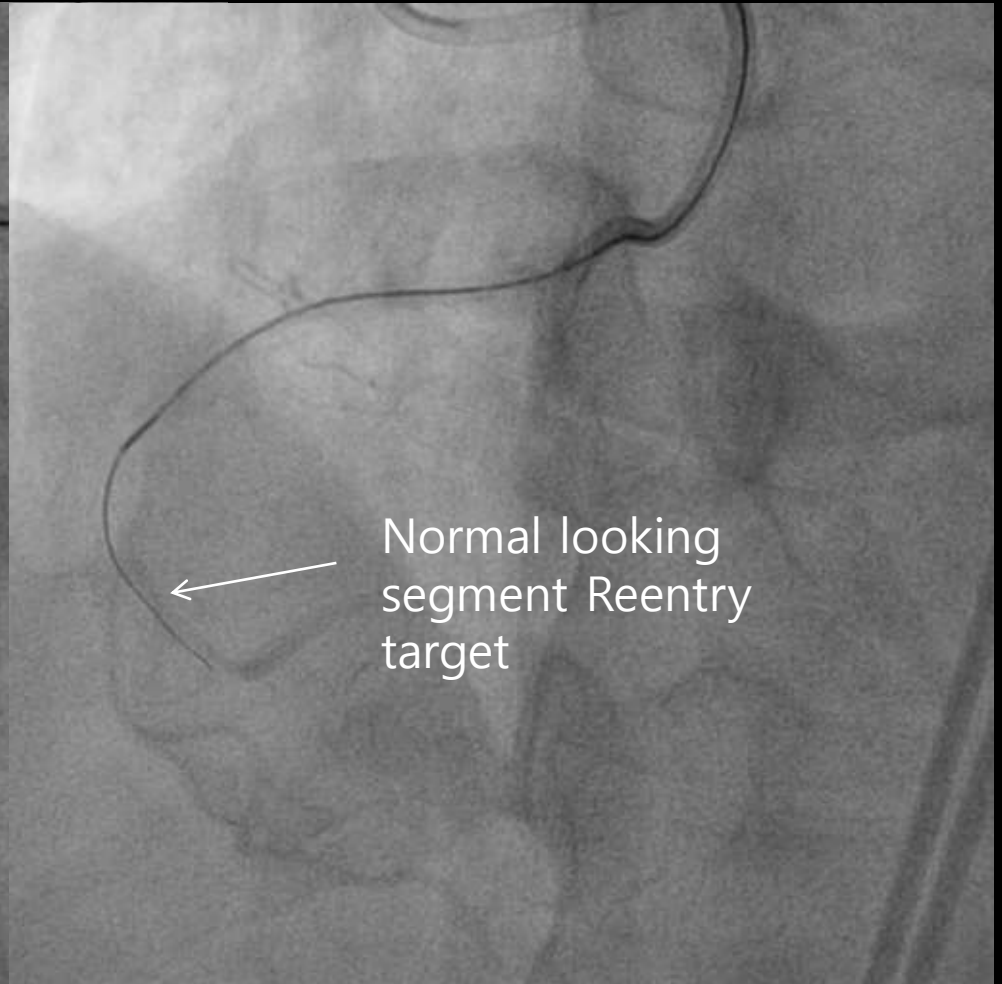
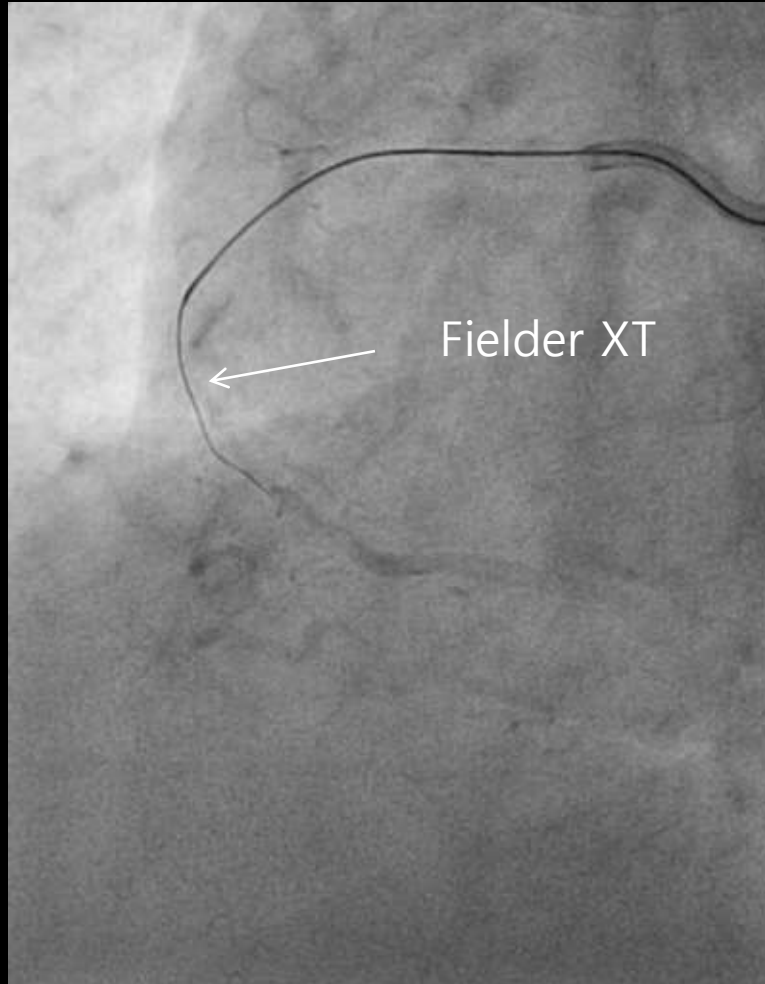


# **Dissection reentry**

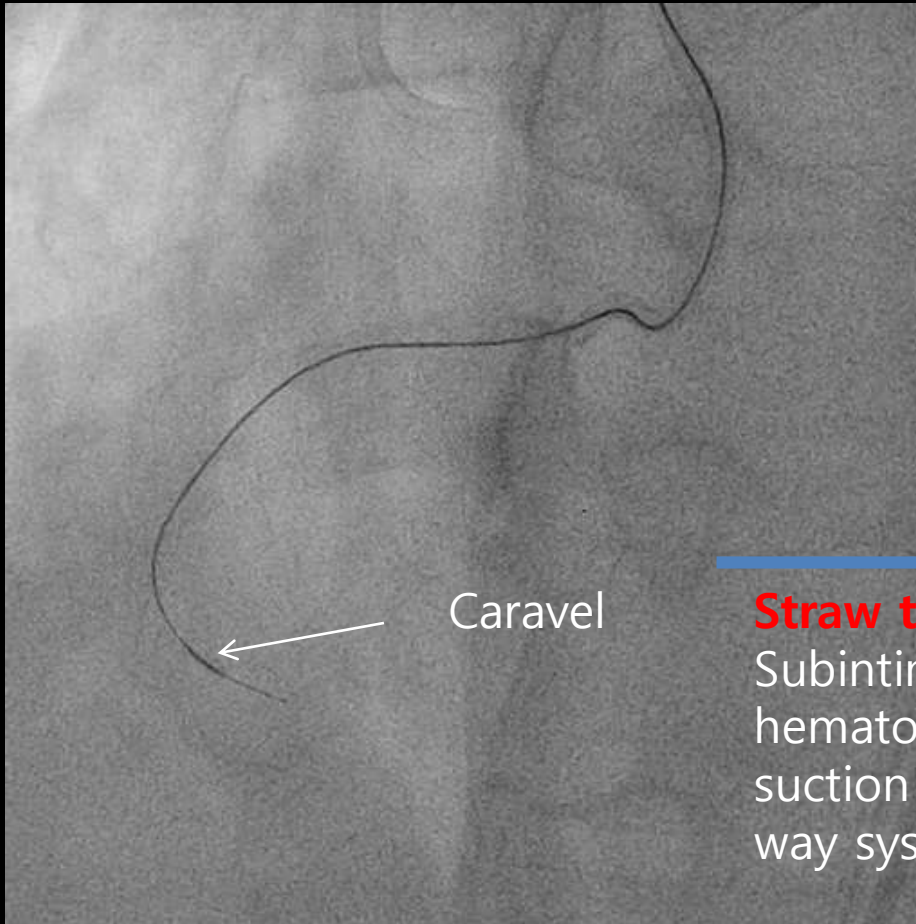
# ***Baseline angiography***



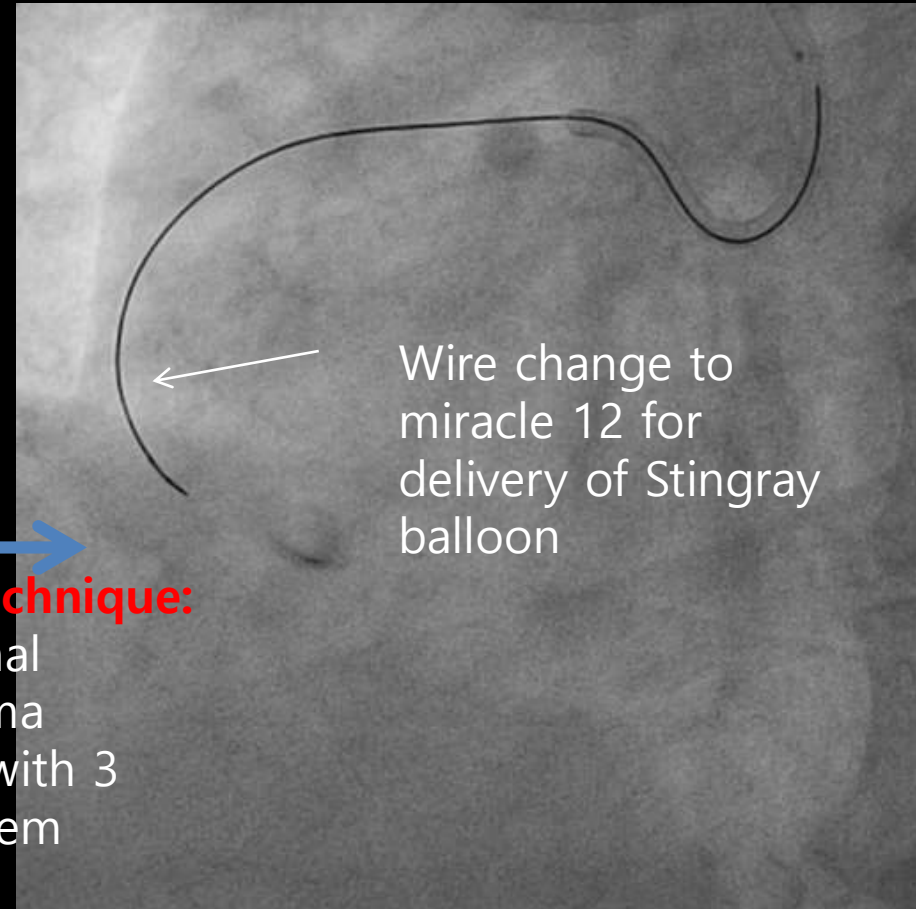
# ***Subintimal wiring with Caravel***



# Microcatheter advance and wire exchange

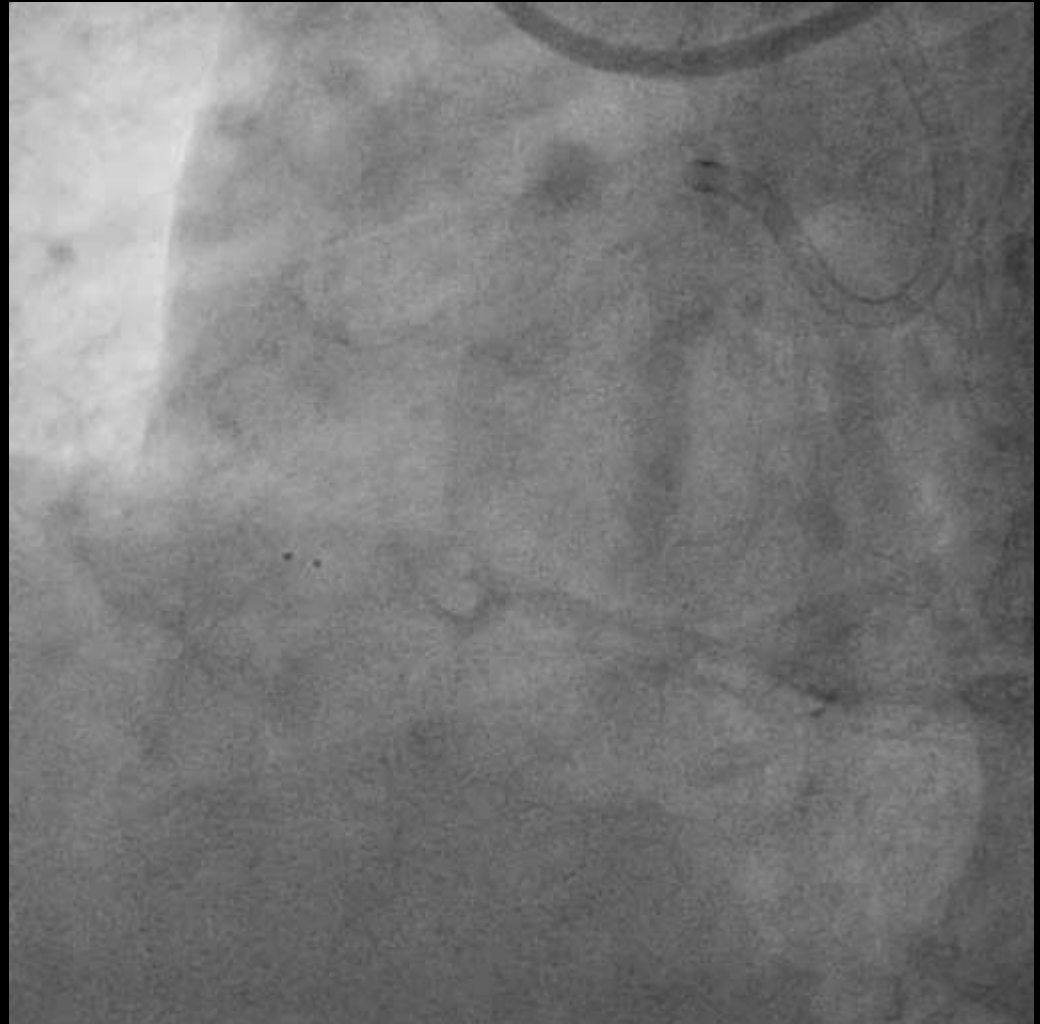
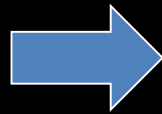


**Straw technique:**  
Subintimal  
hematoma  
suction with 3  
way system



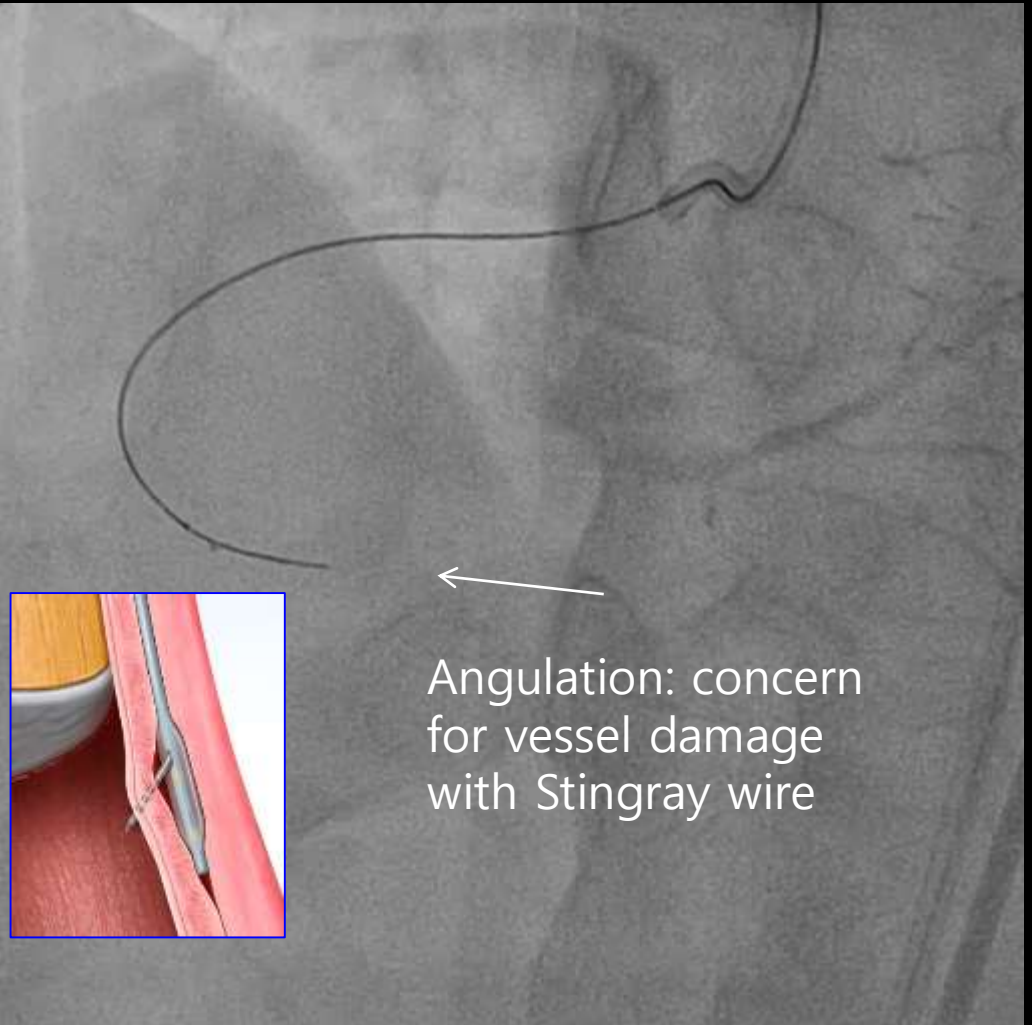
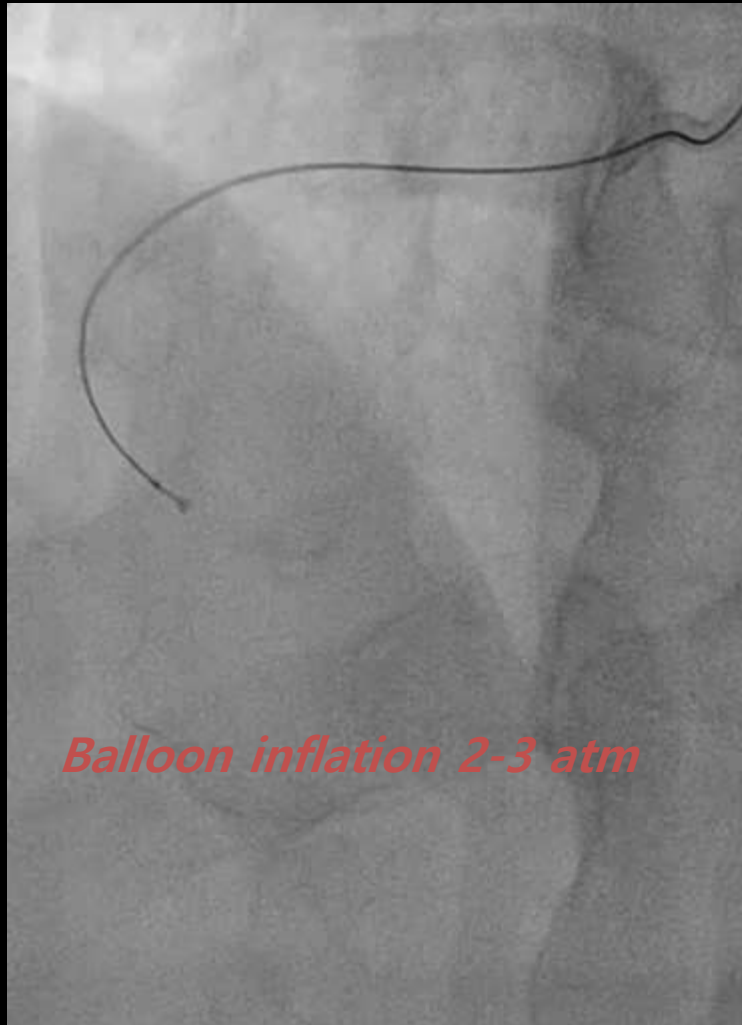
# **Wire removal and straw technique balloon positioning by angiography**

**Straw technique again  
through stingray  
balloon:** Subintimal  
hematoma suction with  
3 way system

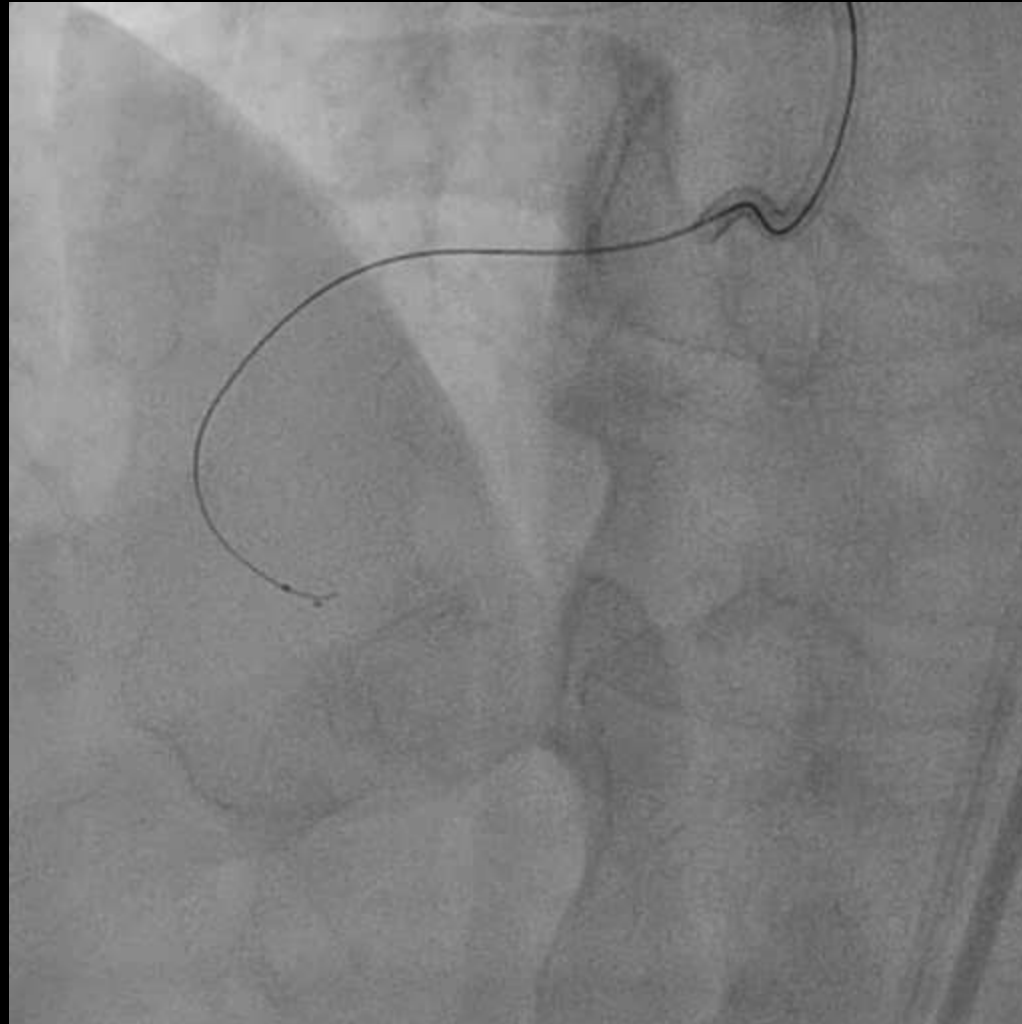




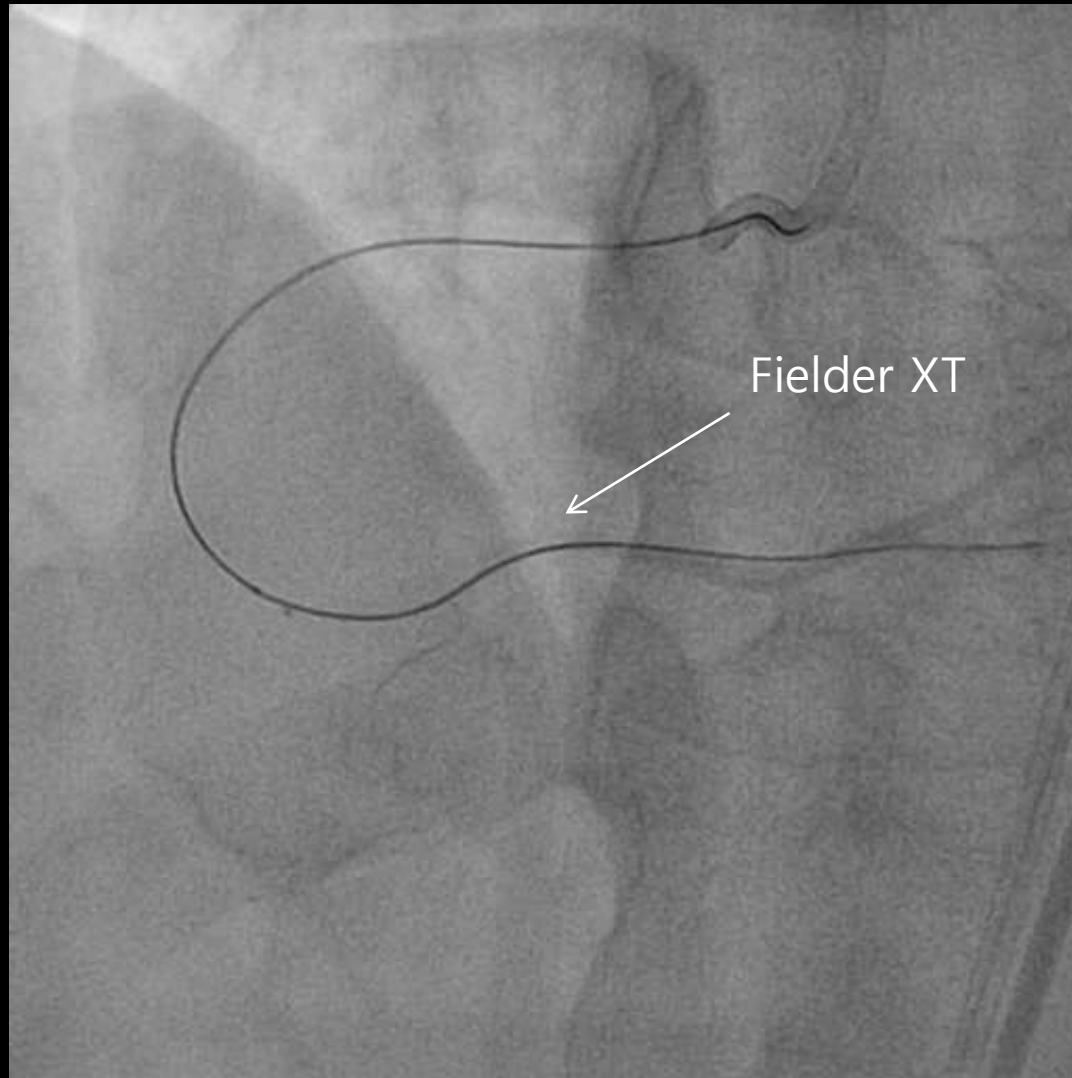
# Reentry using Stingray wire



# ***Stick and Swab using Fielder XT wire***



# ***Wire position confirmed***

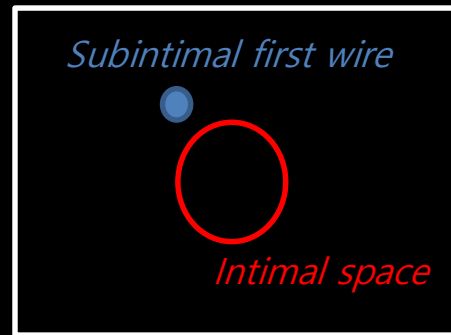
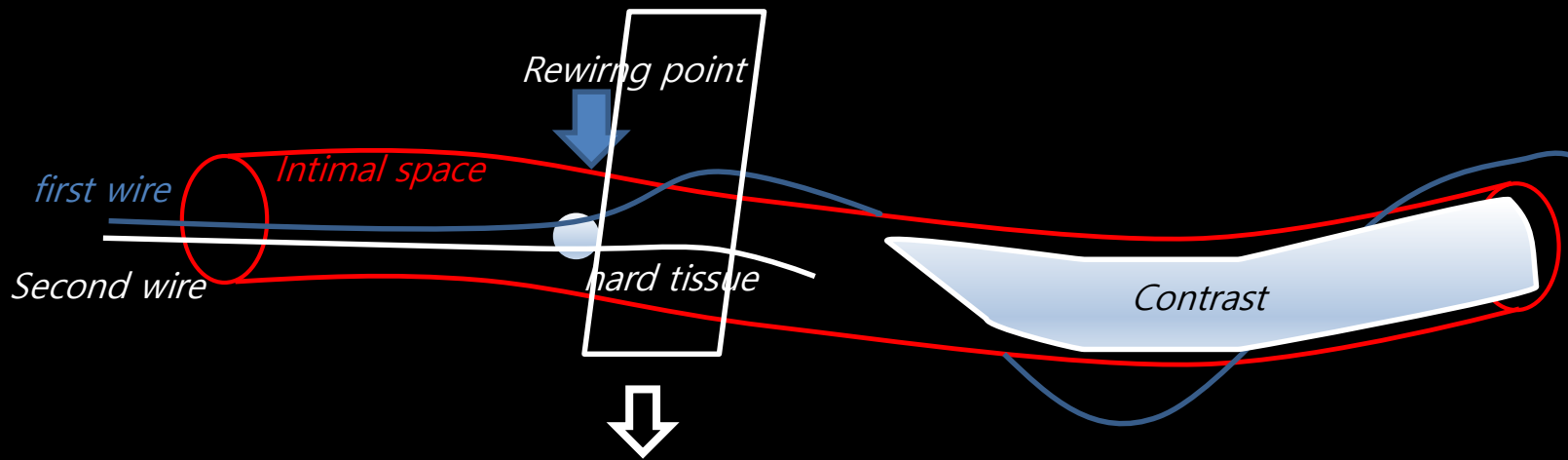


# ***Final angiography***



# **IVUS-guidance Re-entry**

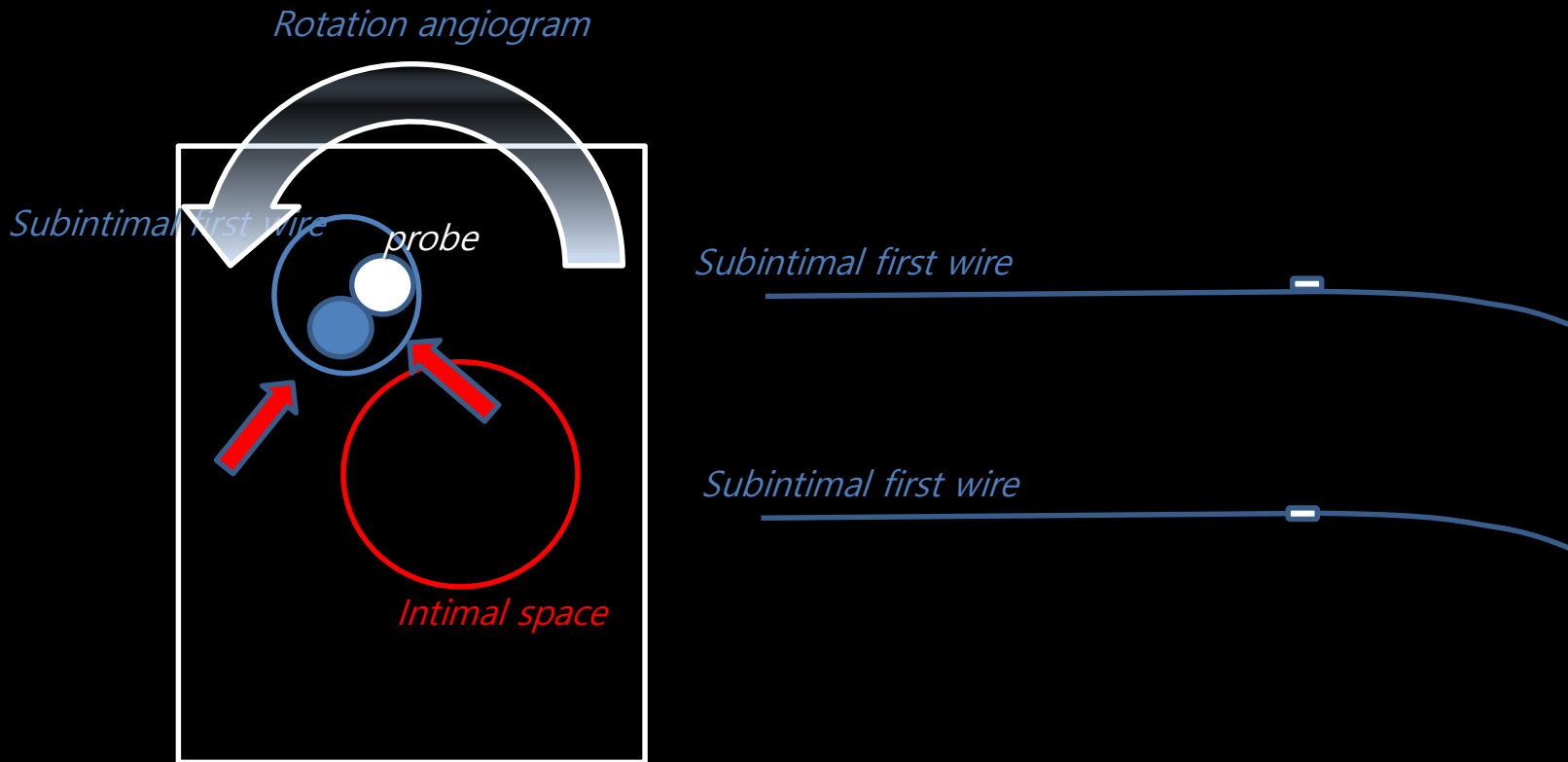
# IVUS guided rewiring technique is one of the CTO rewiring techniques



'Parallel wire technique'

'IVUS guided rewiring technique'

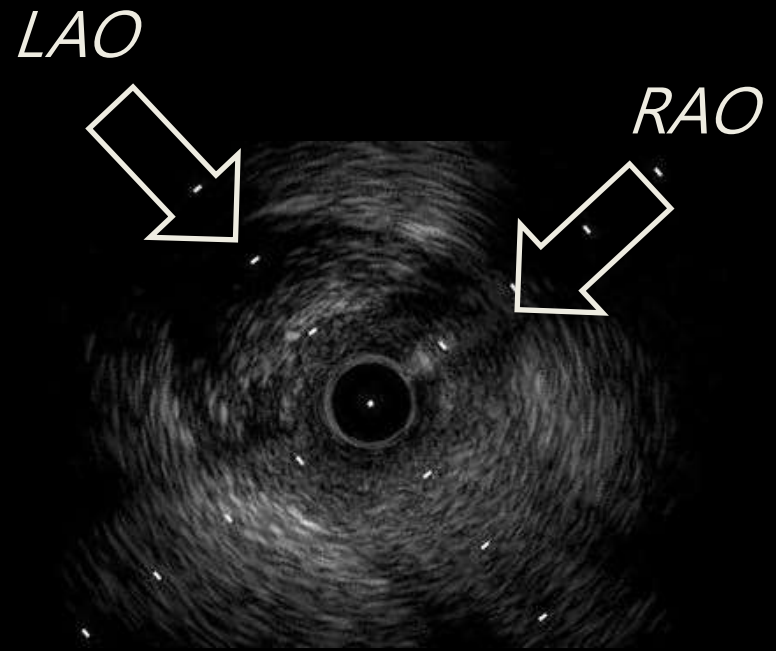
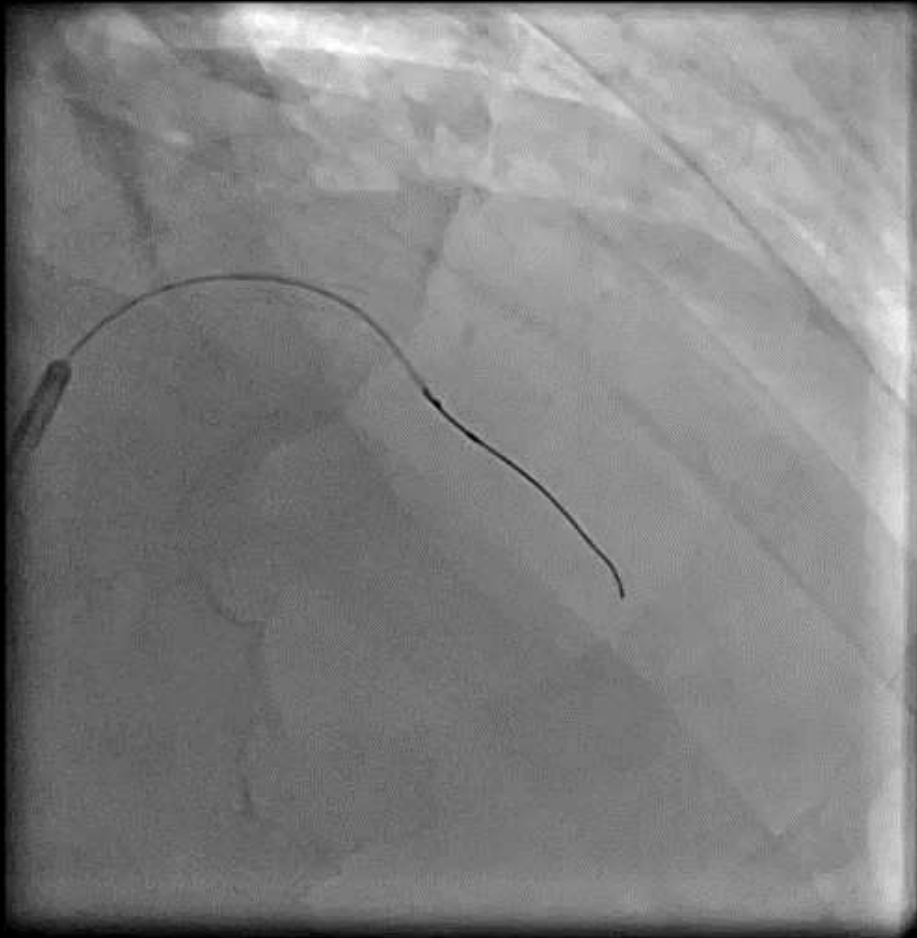
# Probe-wire guided.



## Tips:

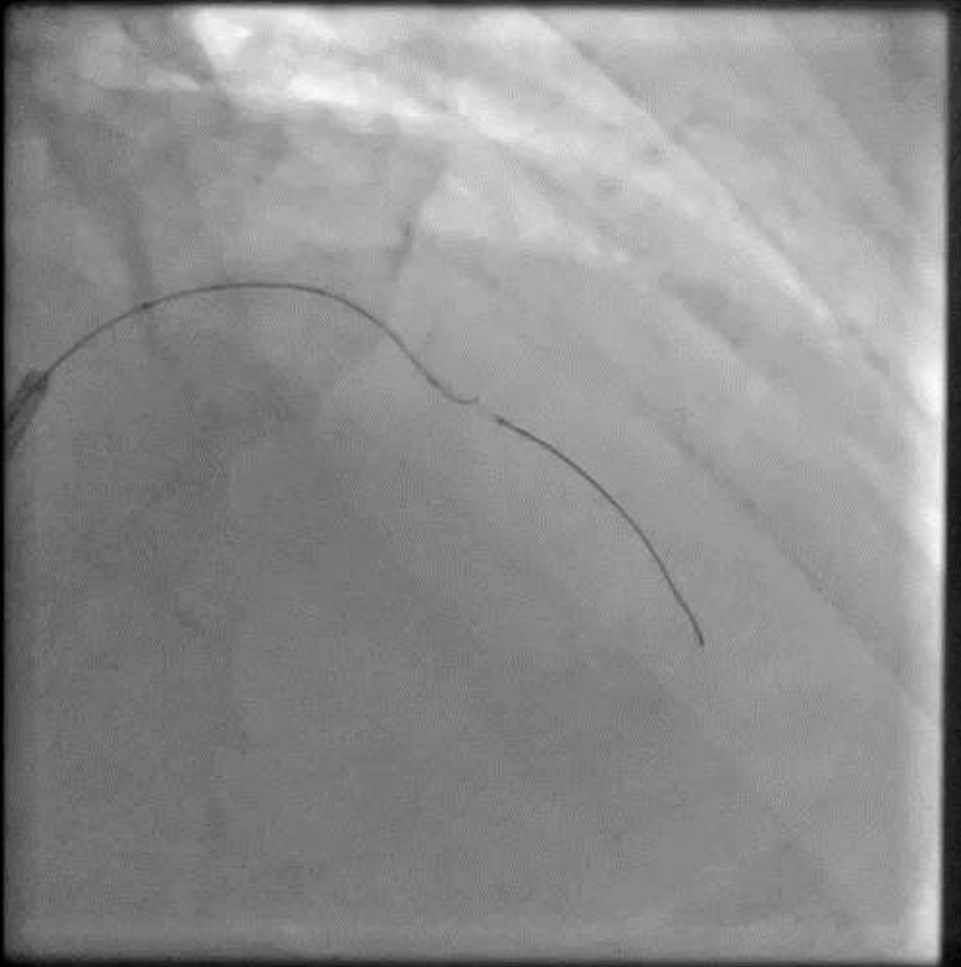
- Rotational angio is beneficial for recognizing of anatomy, especially using wire bias.
- Usually we need stiff wire as second wire. i.e. Miracle12, Gaia3, Conquest family.

# mLAD CTO



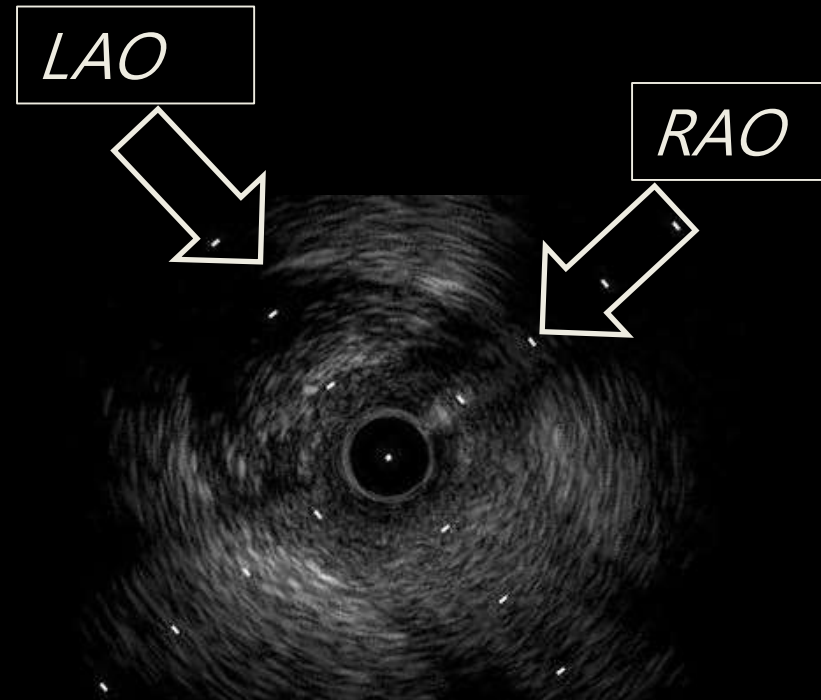
Probe and wire are in the same line in RAO  
and is separatedly located from the wire in LAO .

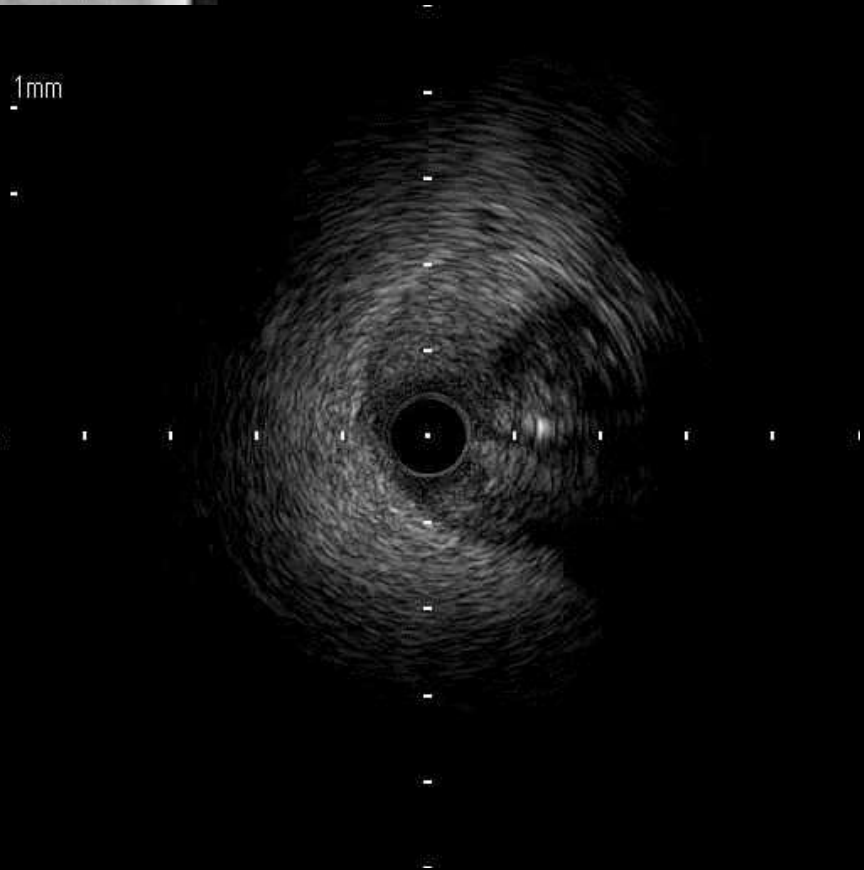
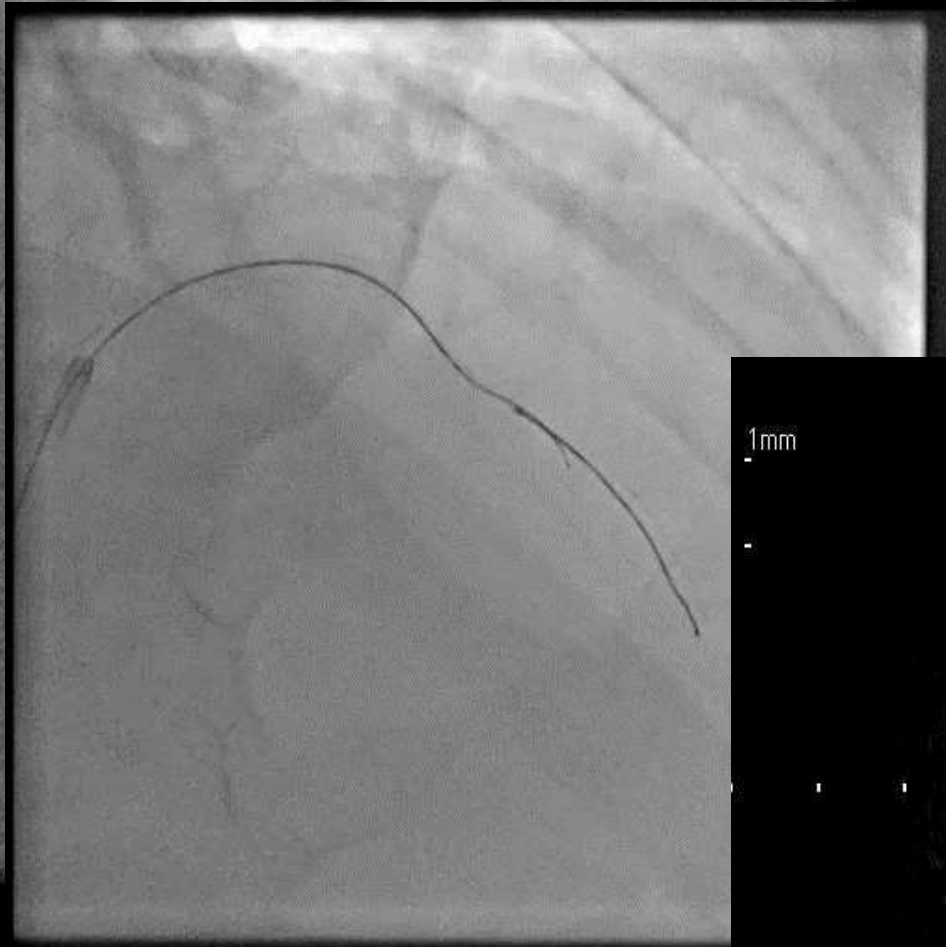




✓ Next landmark is the first wire.

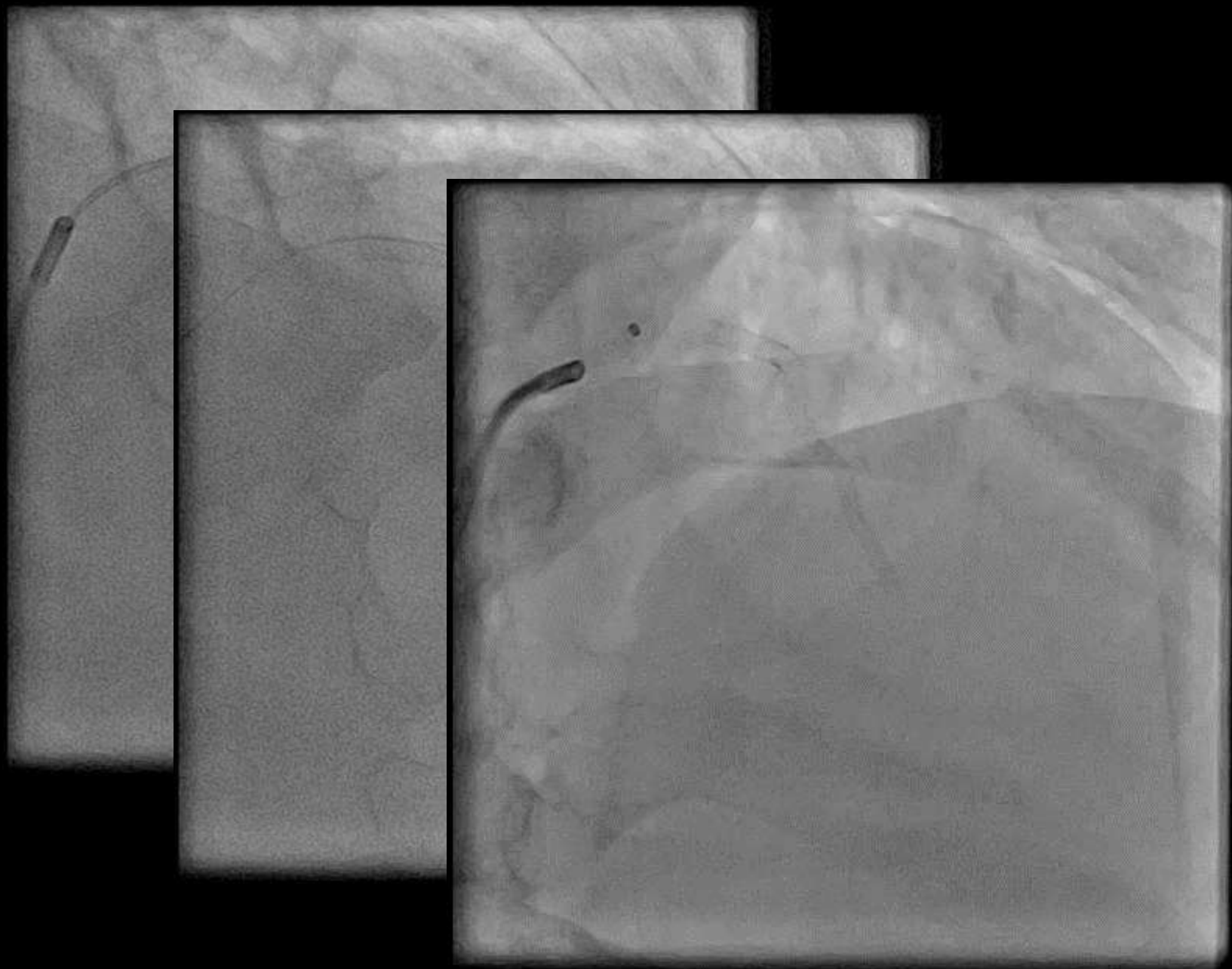
✓ Intimal space is epicardial (right)-sided in RAO and in the same line in LAO.





IVUS from subintimal wire

1mm



# Conclusions

- **Numerous antegrade approach technique, such as escalation, parallel, IVUS-guidance and ADR usually could be applied in majority of CTO lesion intervention.**
- **Therefore, antegrade approach is still main default strategy for less complex CTO and essential for success.**

Thank you for your attention