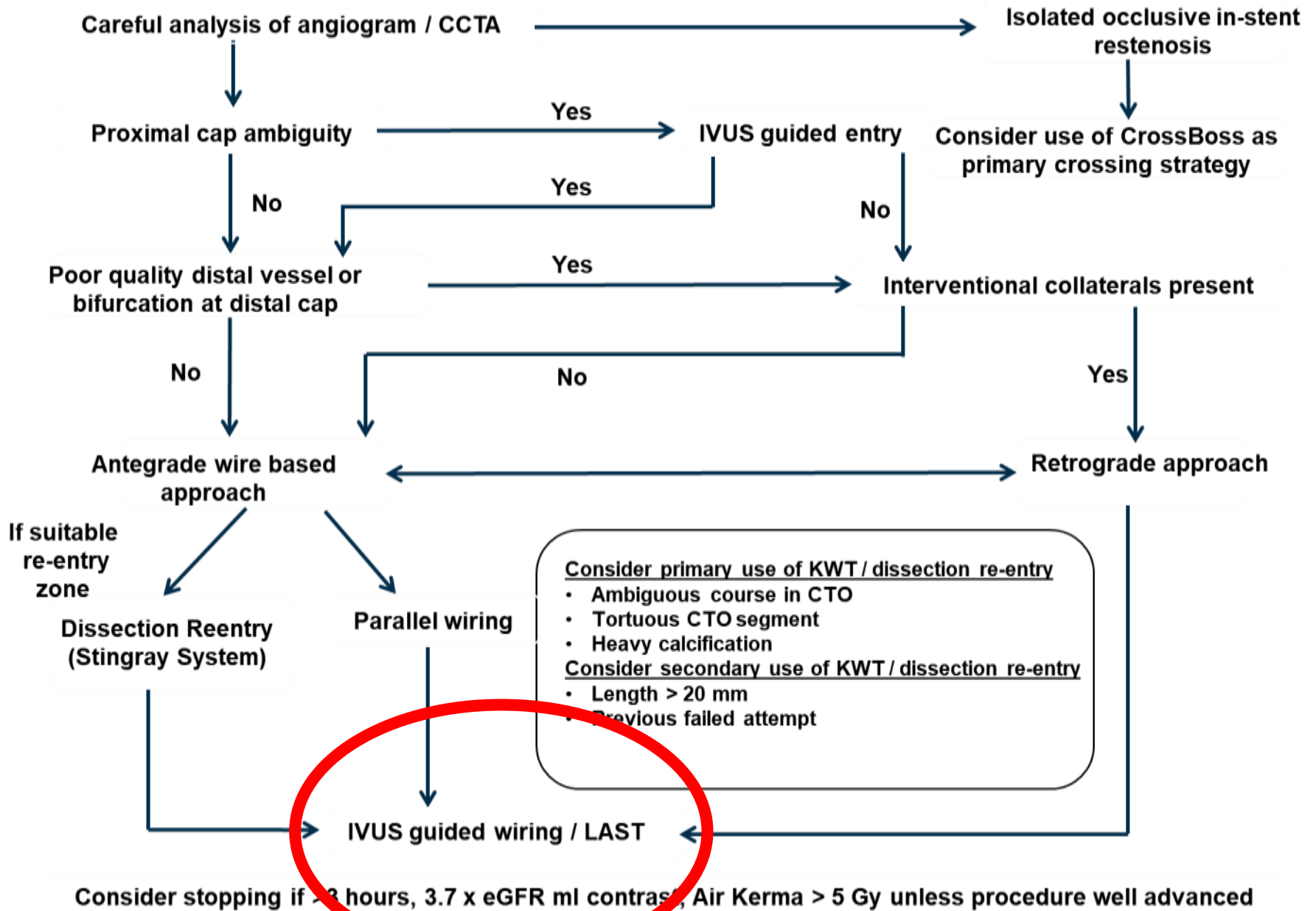


IVUS-Guided Rewiring: Step by Step Approach

Jong-Young Lee, MD, PhD

Division of Cardiology, Kangbuk Samsung Hospital,
Sungkyunkwan university school of medicine, Seoul, Korea



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

The summary of IVUS-Guided Re-Wiring in the Antegrade Approach: When

- The algorithm from AP-CTO club and my experiences-

If the angiographic guided antegrade wiring is failed, you should select retrograde approach, dissection reentry or IVUS guided re-wiring in this order.

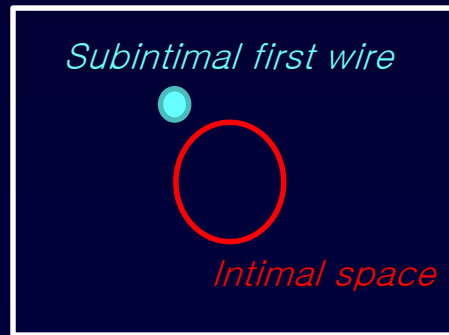
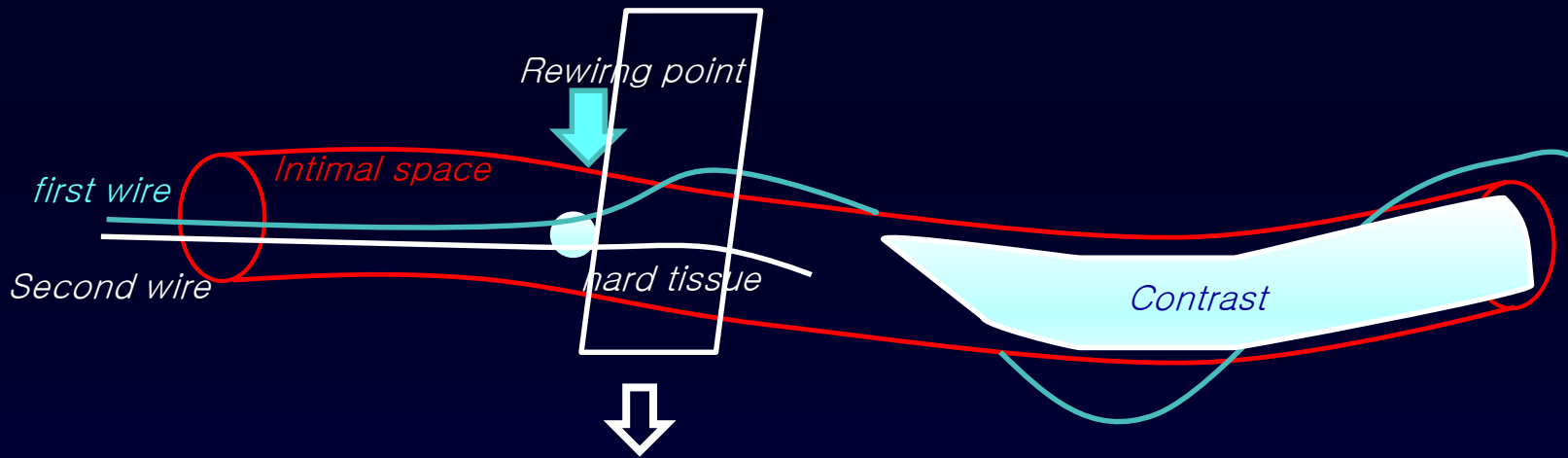
- 1. Retrograde approach:** If interventional collaterals present.
- 2. Dissection reentry:** If there is the suitable re-entry zone.
- 3. IVUS guided re-wiring:** You should consider whether the IVUS can be inserted into the CTO body and there is the chance of intentional re-wiring such as not tortuous and/or not heavy calcified lesion.

IVUS-guided Re-wiring

Requiring experience and skill

- Last option in antegrade (and/or retrograde) approach
- Must understand 3-D anatomy and connection between devices

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



‘Parallel wire technique’

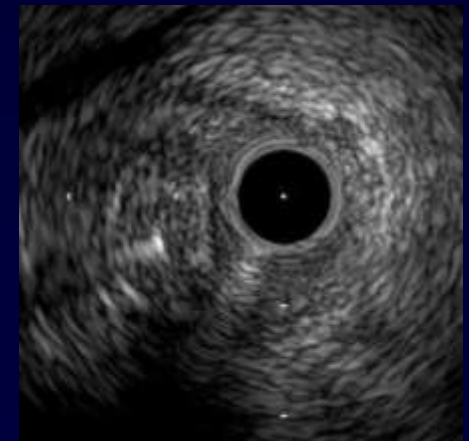
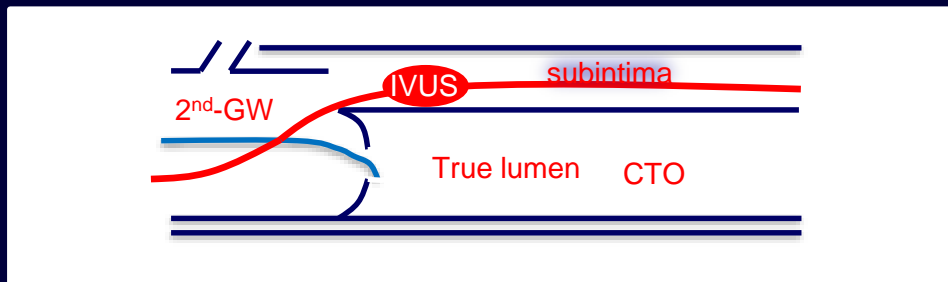
‘IVUS guided rewiring technique’

IVUS-Guided Re-Wiring in the Antegrade Approach: How

Commercial IVUSs

Spec. of IVUS	Boston OptiCross	Volcano Revolution	Volcano Eagle eye	Acist HDi	Terumo AltaView	Terumo Navifocus WR
Frequency	40MHz	45MHz	20MHz	40/60MHz	40/60MHz	40MHz
Profile at Imaging window	2.6Fr	3.2Fr	3.5Fr	2.5Fr	2.6Fr	2.5Fr
Distance from Tip to transducer	20mm	28mm	10.5/2mm	20mm	22mm	9mm

IVUS-guided re-wiring : IVUS observation from the subintimal space.



Basics of IVUS-guided rewiring

1. Understanding plaque distribution on angiography

IVUS guided rewiring is always performed on angio screen...
Linkage between angio and IVUS findings is needed.

2. How can we link these findings?

Angiographic view is 2D, however, coronary arteries are 3D.

Fundamental Questions of IVUS-guided rewiring

1. Where we have to insert?

2. Which direction we have to insert?

Basics of IVUS-guided rewiring

Q: Where we have to insert?

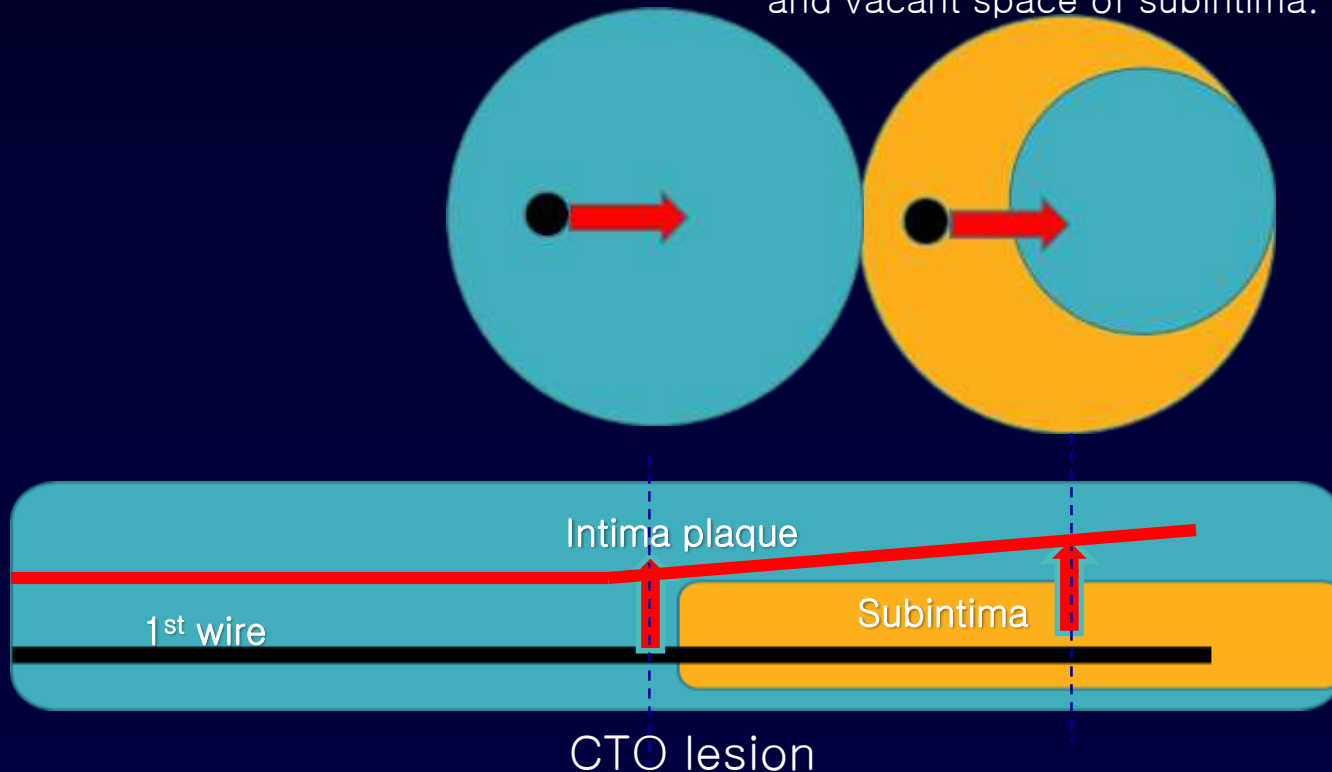
A: We have to insert from intima space.

O.K.

We can confirm where is starting point of subintima space using IVUS.

No.

Very difficult to insertion from subintima space
Due to hard wall between intima and subintima and vacant space of subintima.

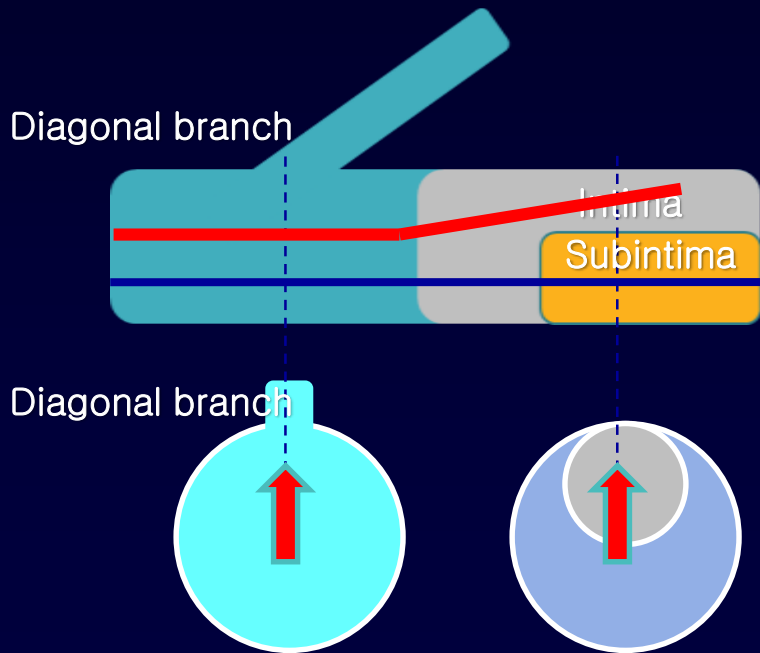


Basics of IVUS-guided rewiring

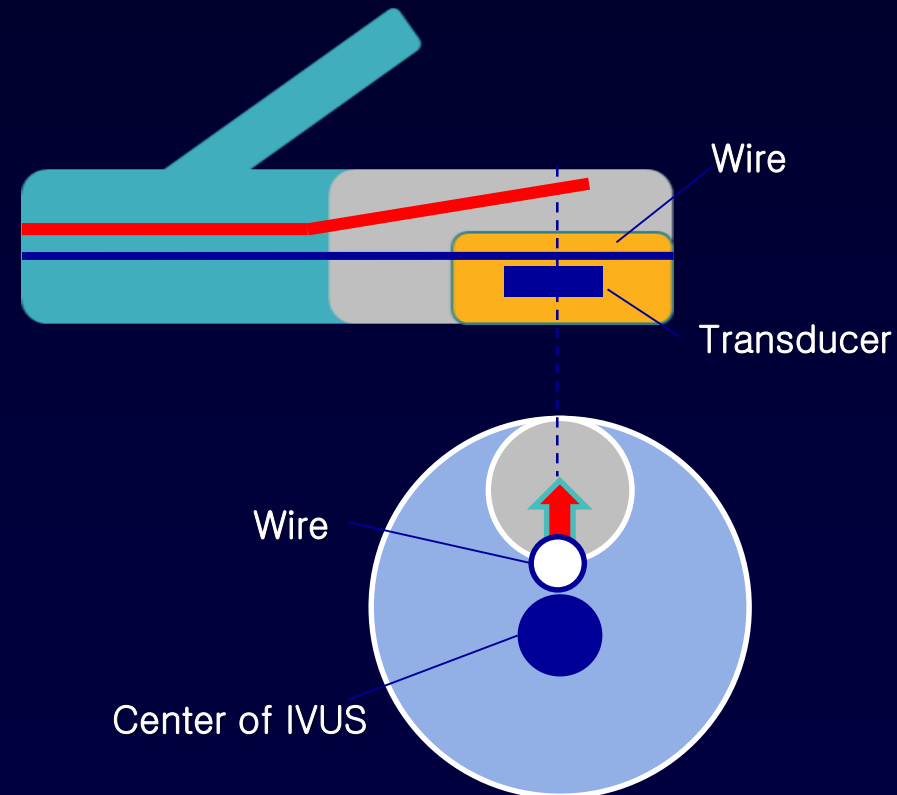
Q: Which direction we have to insert?

A: We can confirm the direction by side branch and wire bias.

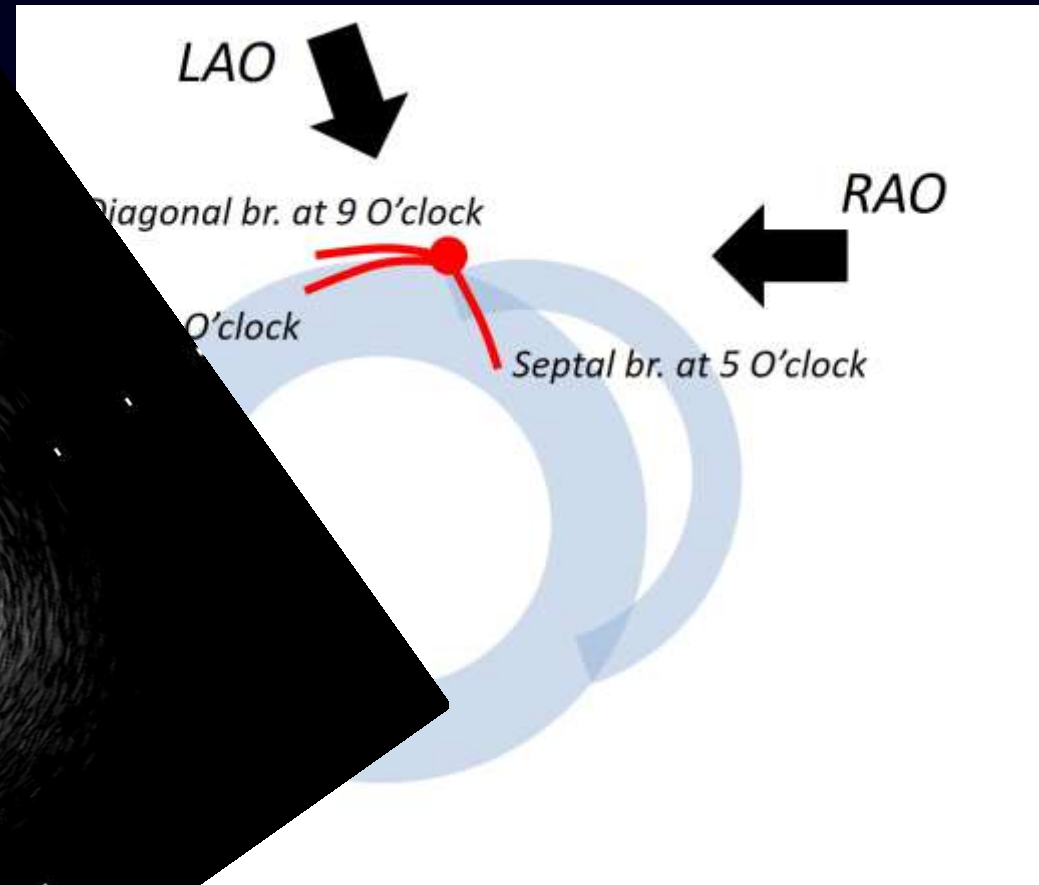
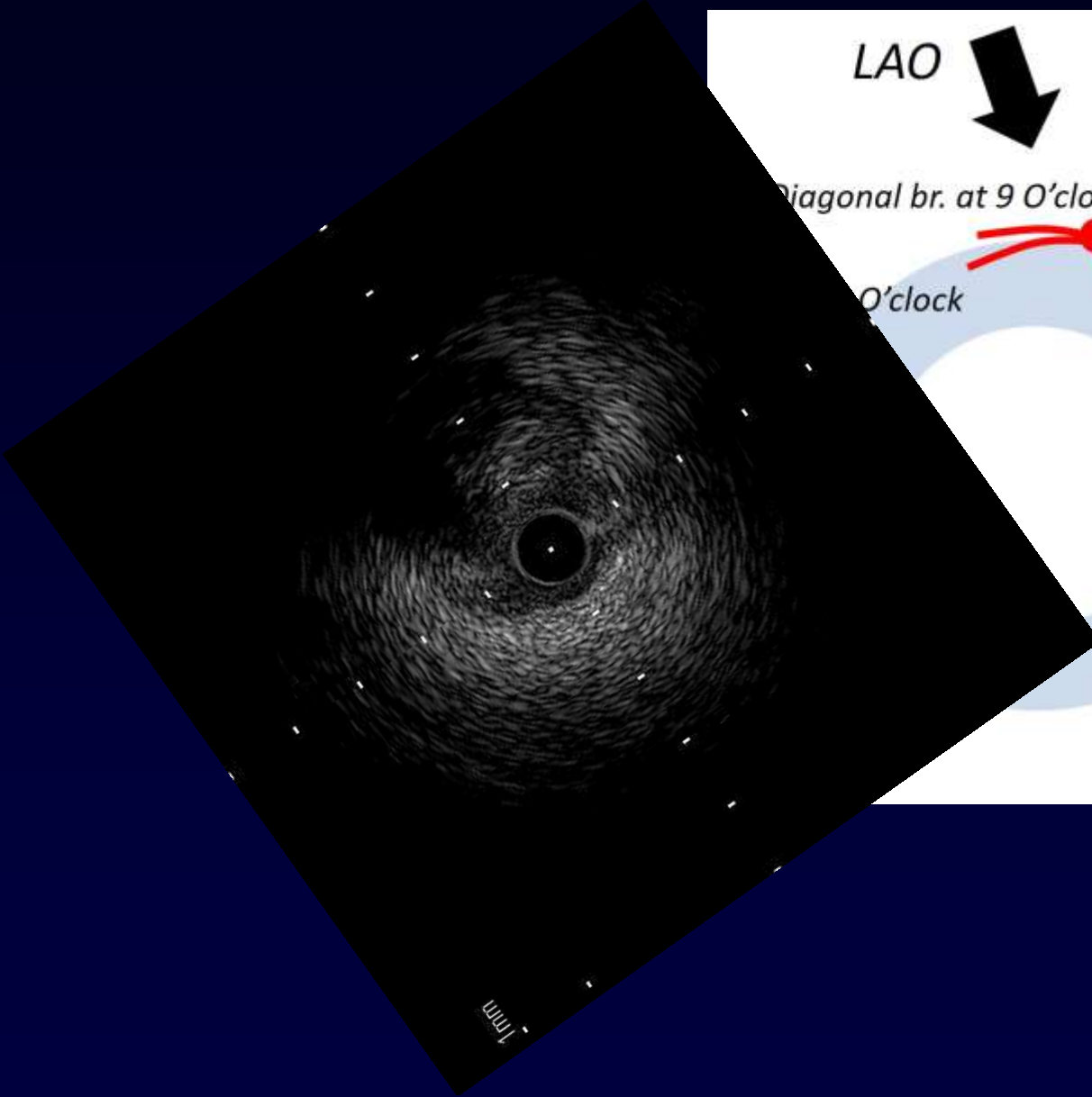
Using side branch

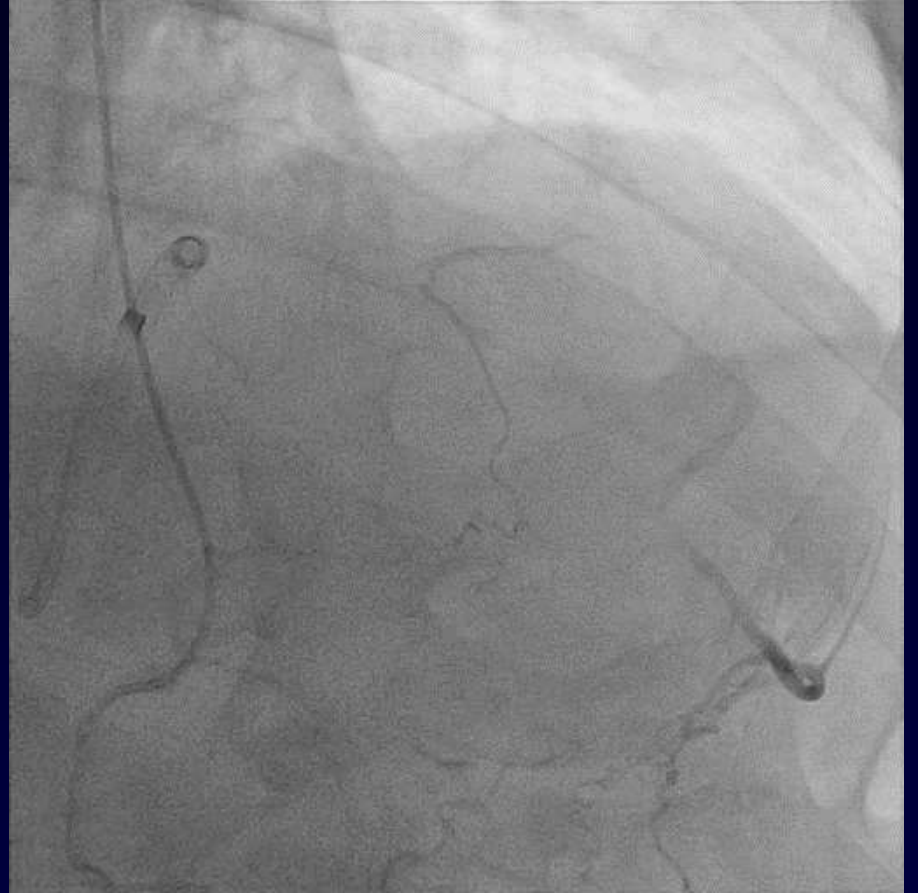


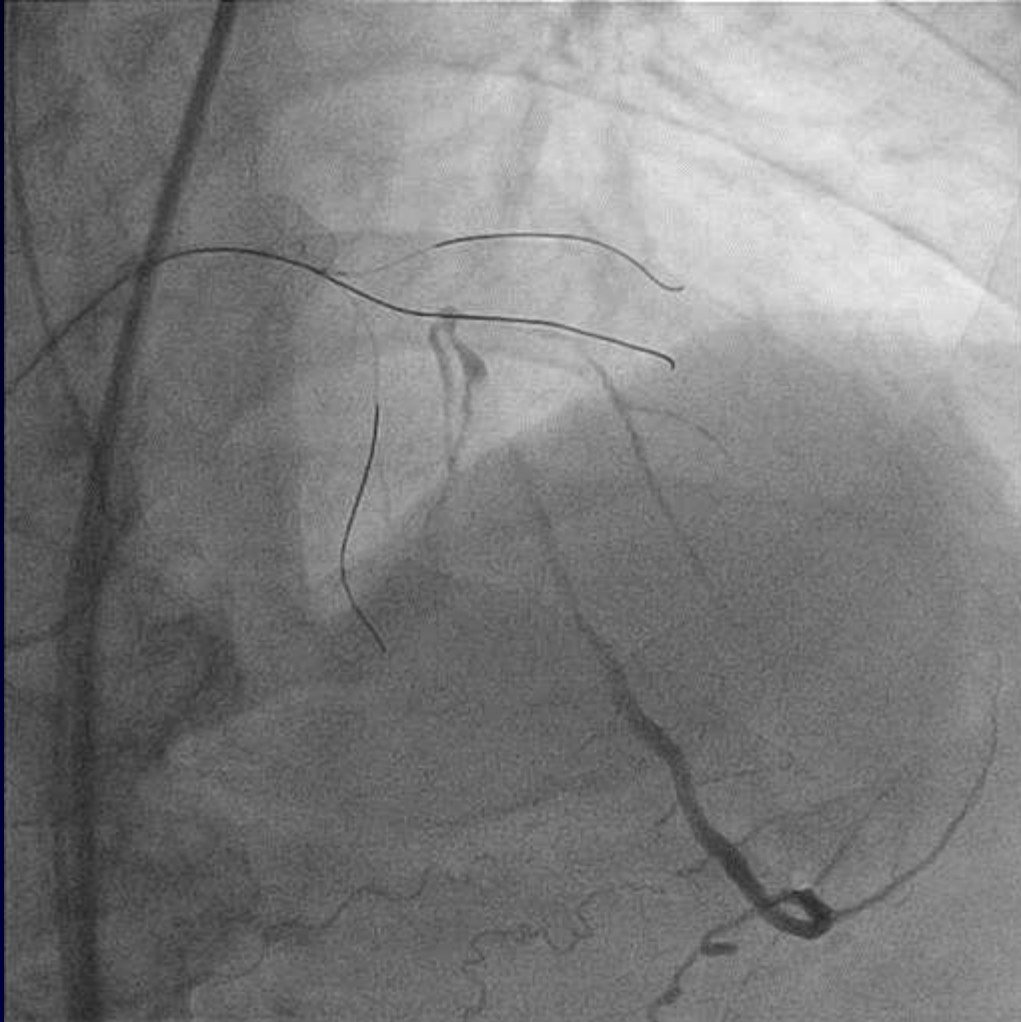
Using wire bias



1. Major branch guided.

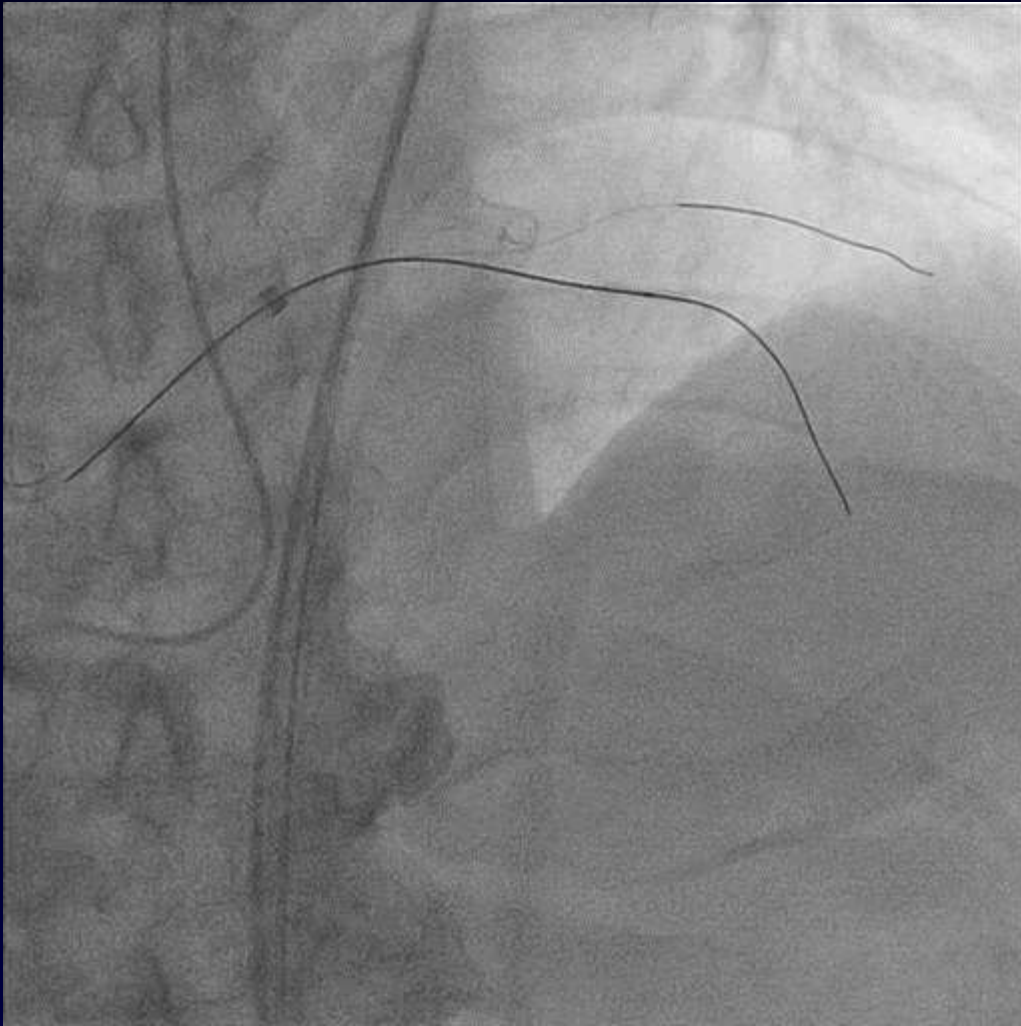




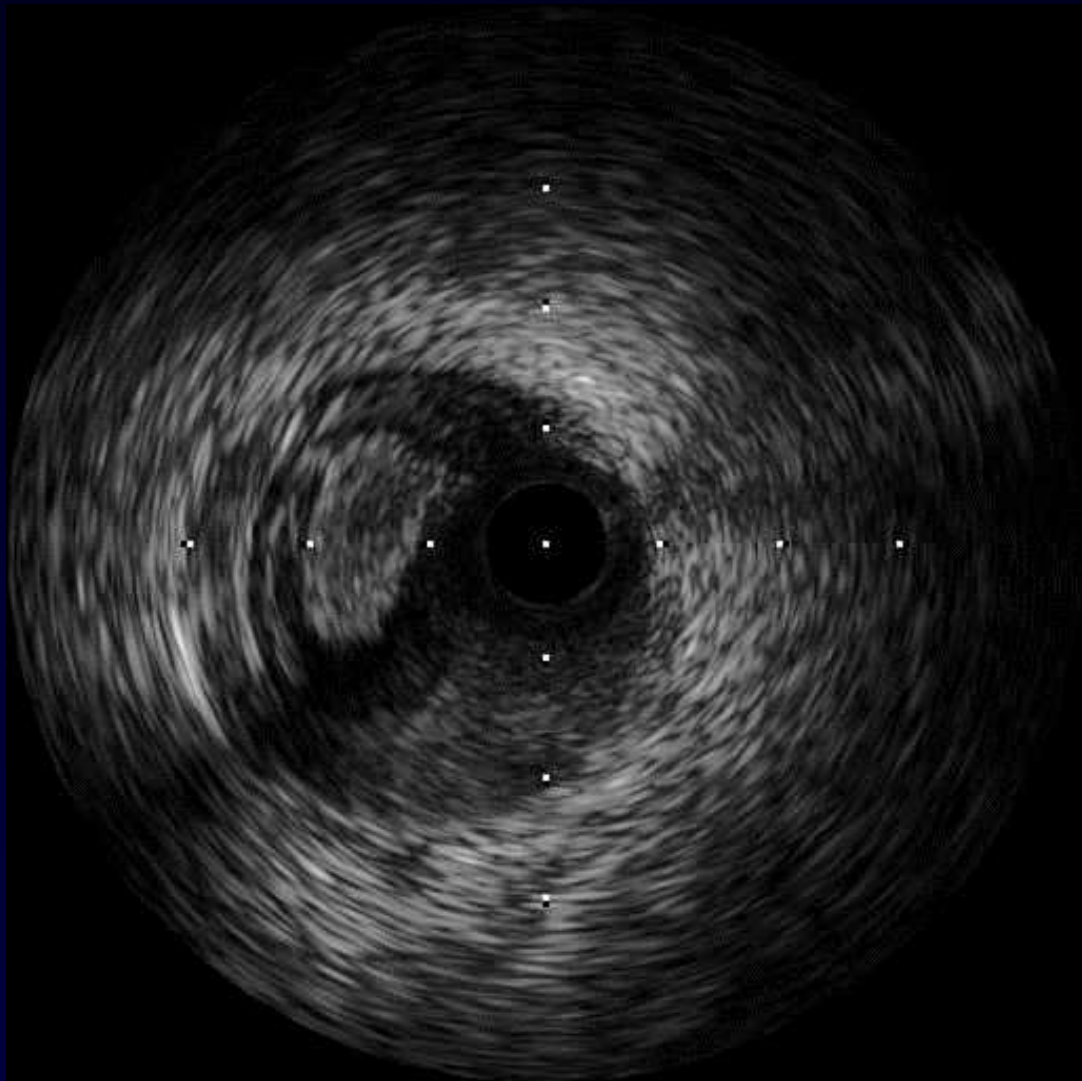
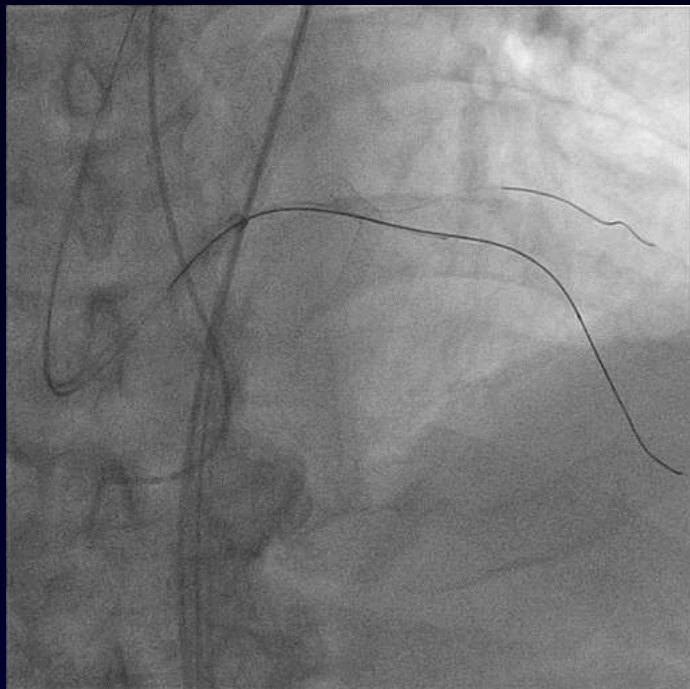


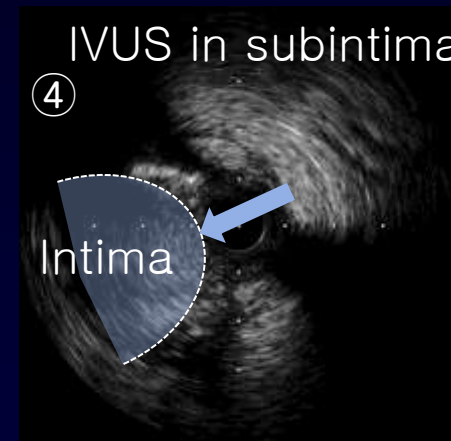
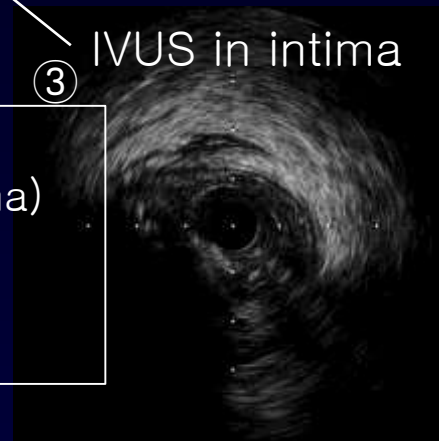
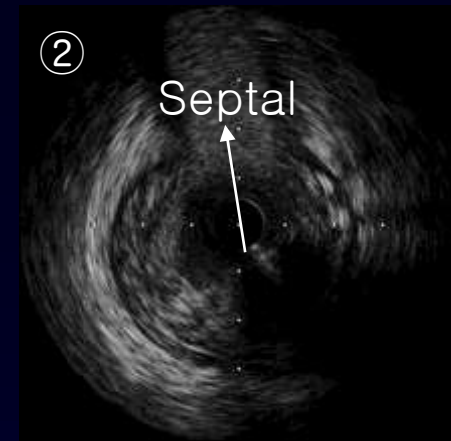
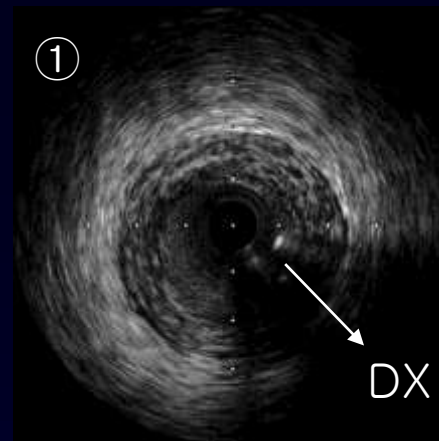
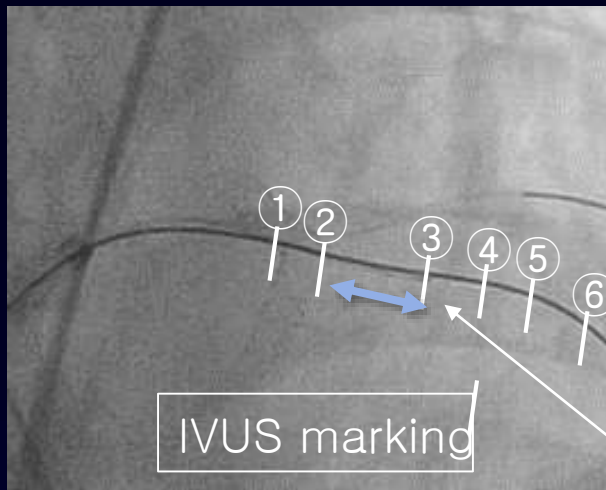
Passed through CTO wire to Dx subintima space.

Switched to IVUS re-wiring procedure.



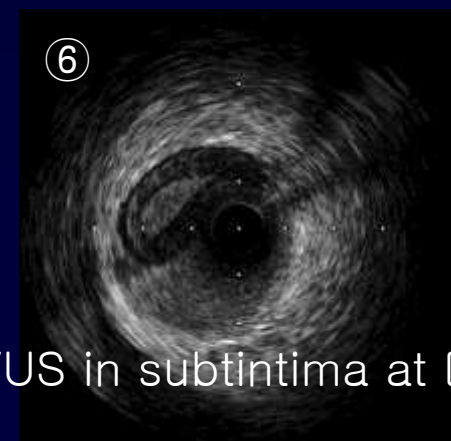
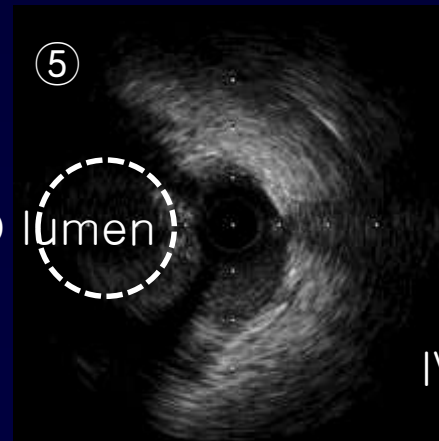
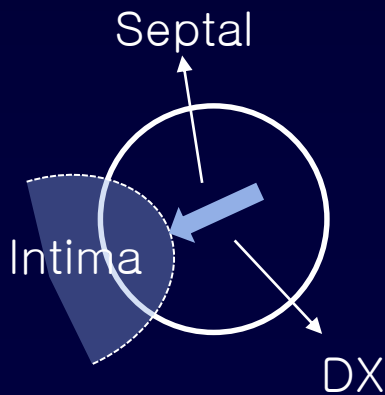
Opened by 1.5mm balloon
for insertion IVUS

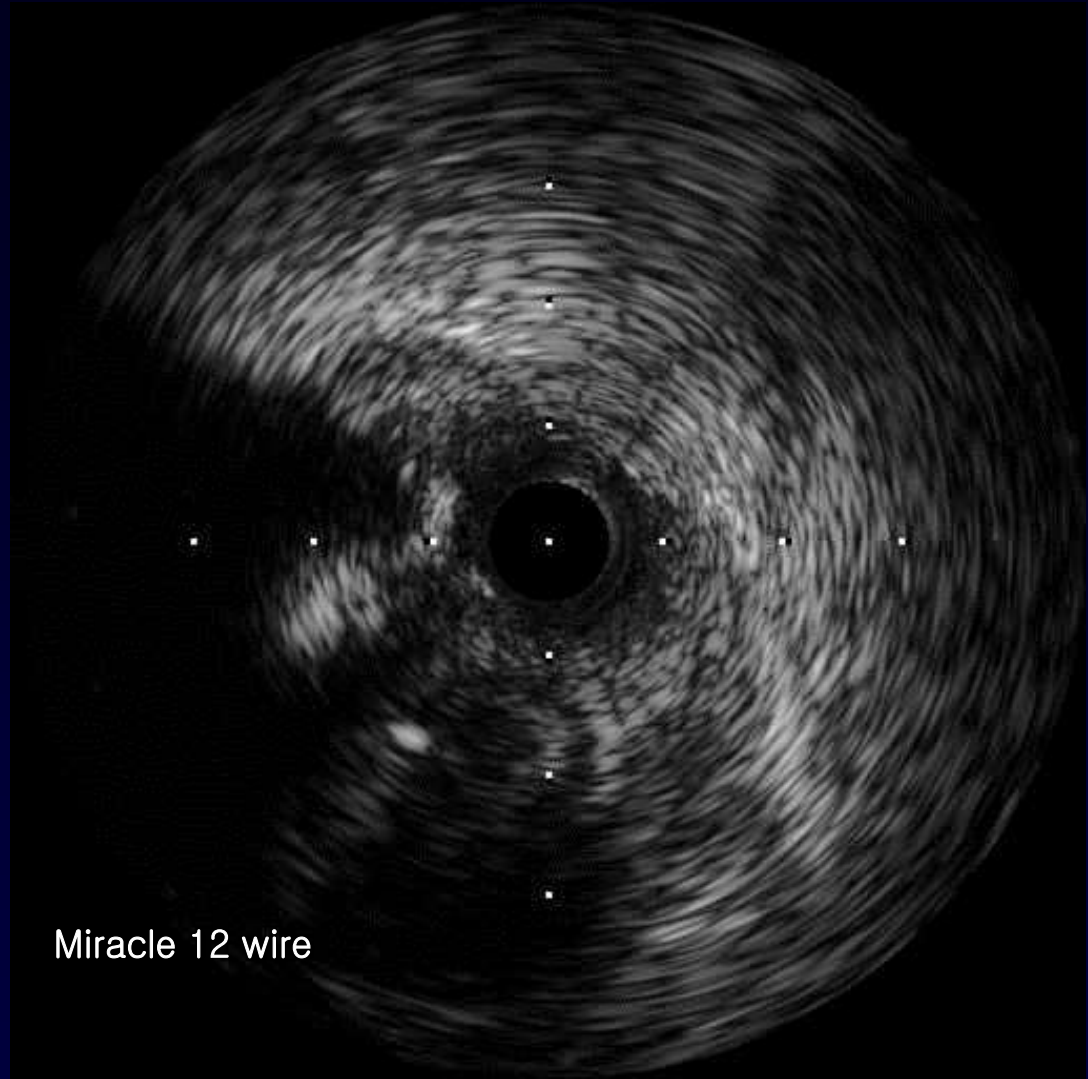
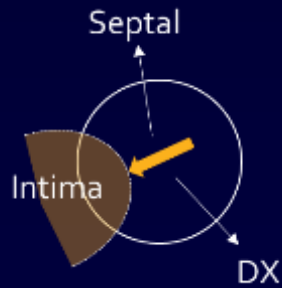
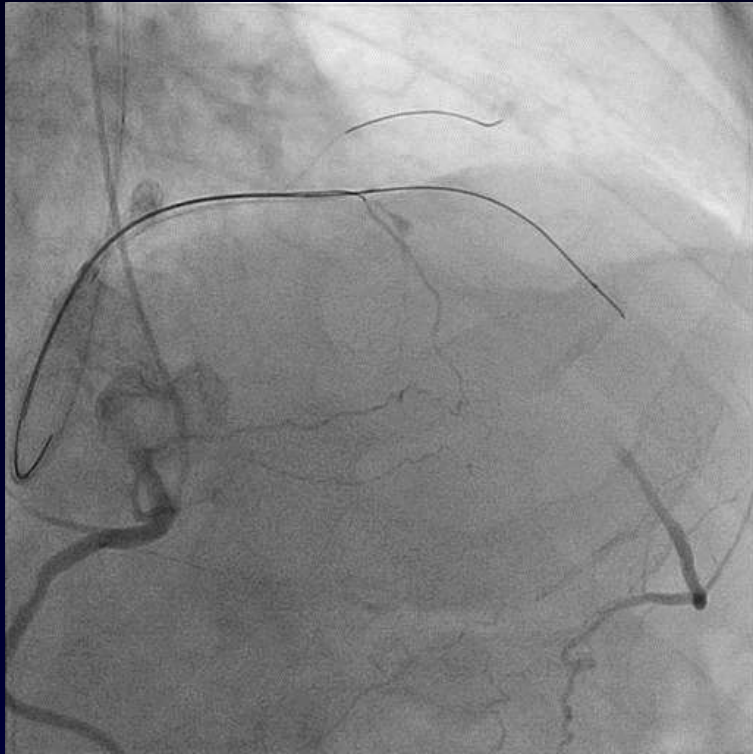




Where we have to insertion:
Between blue arrow (Proximal part of subtintima)

Which direction:
Between Dx and septal, RV direction

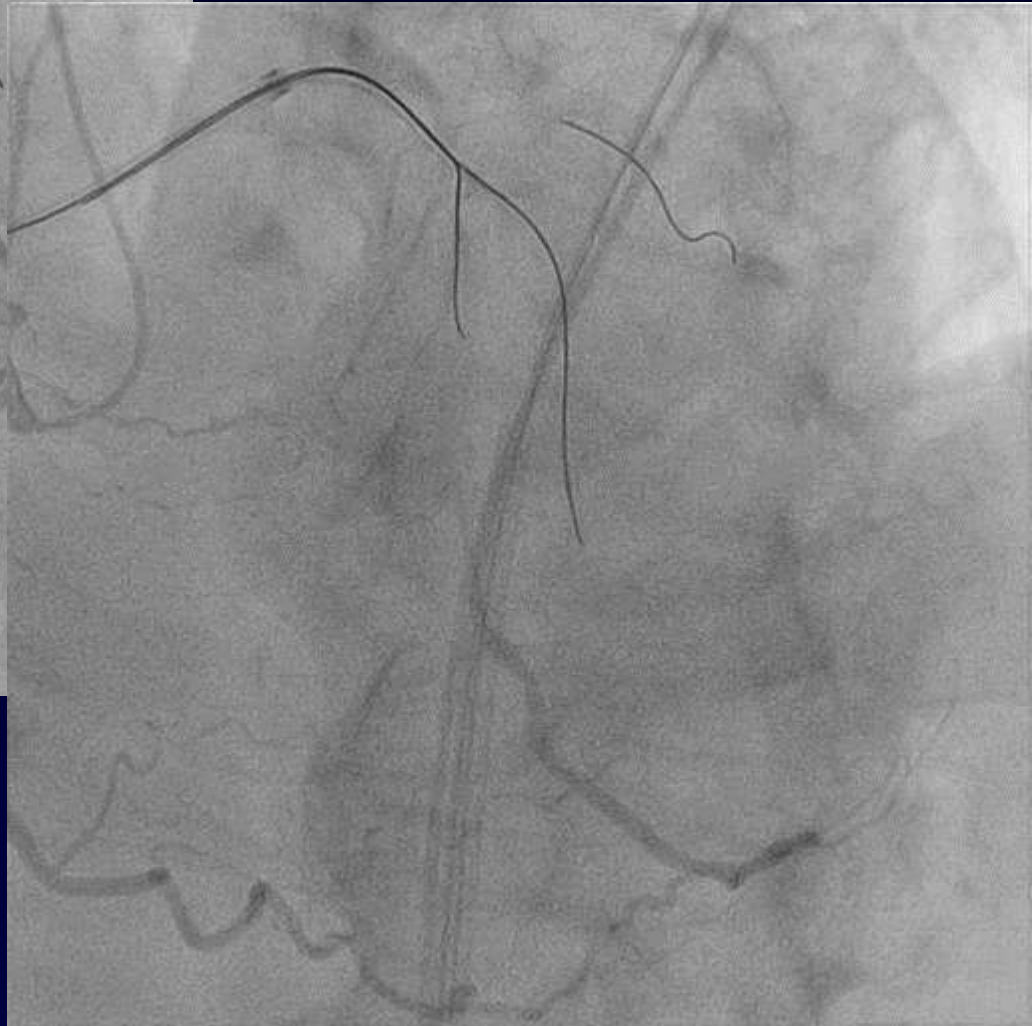
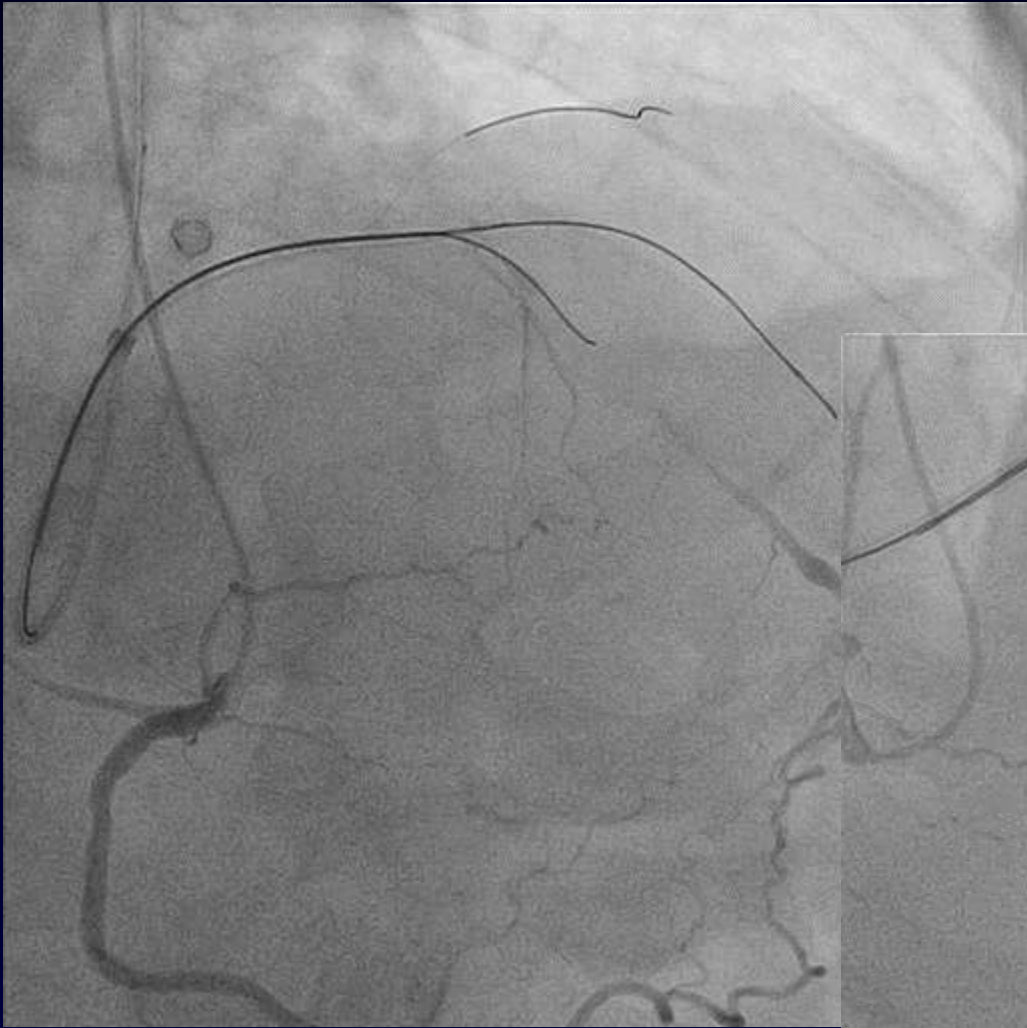


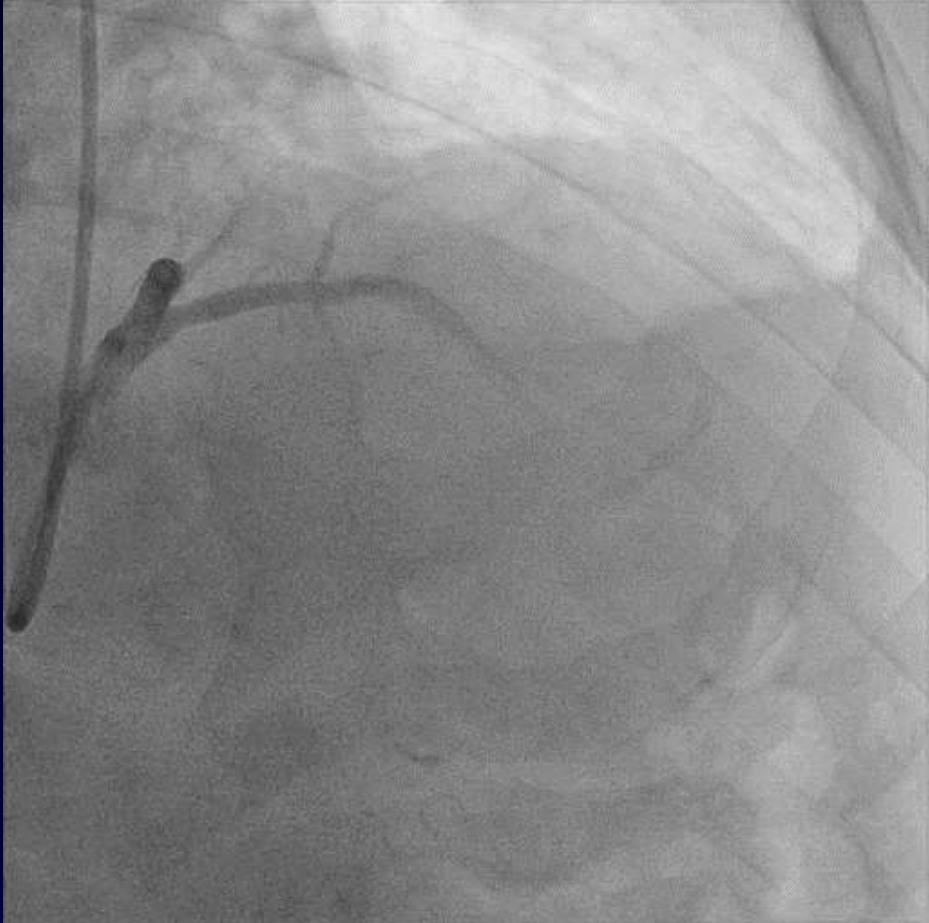


Miracle 12 wire

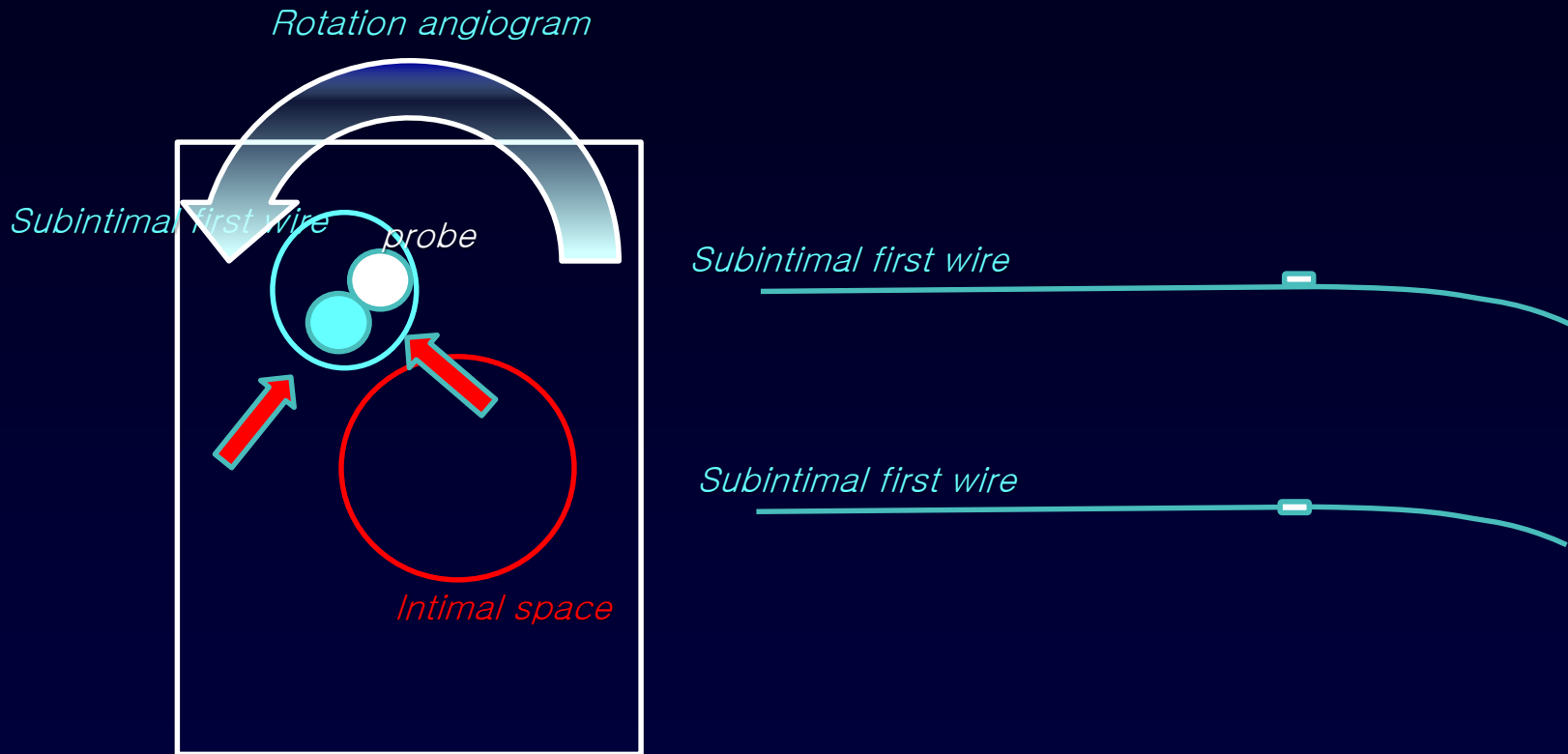
Tips:

- 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.





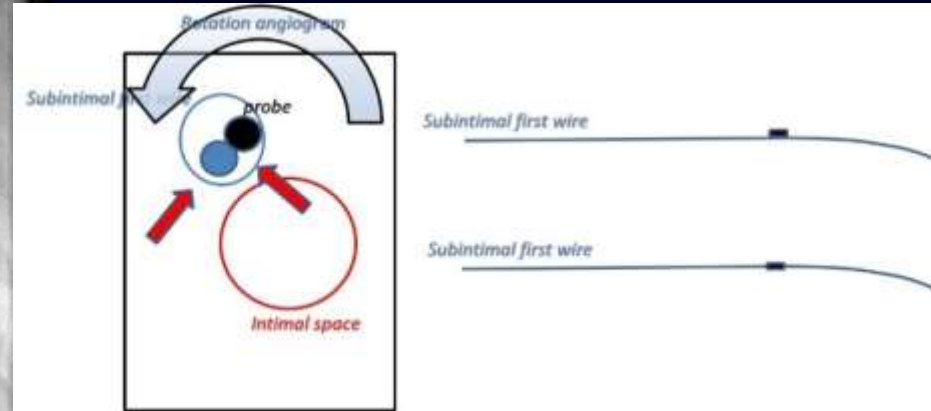
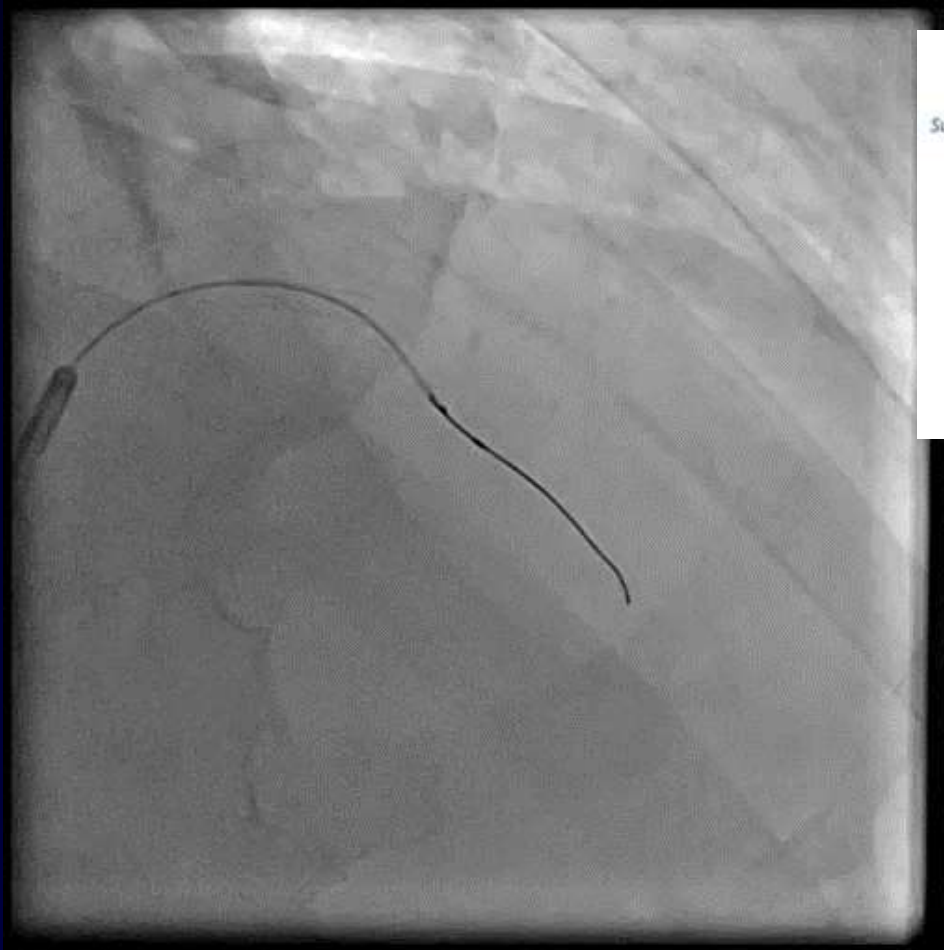
2. Probe-wire guided.



Tips:

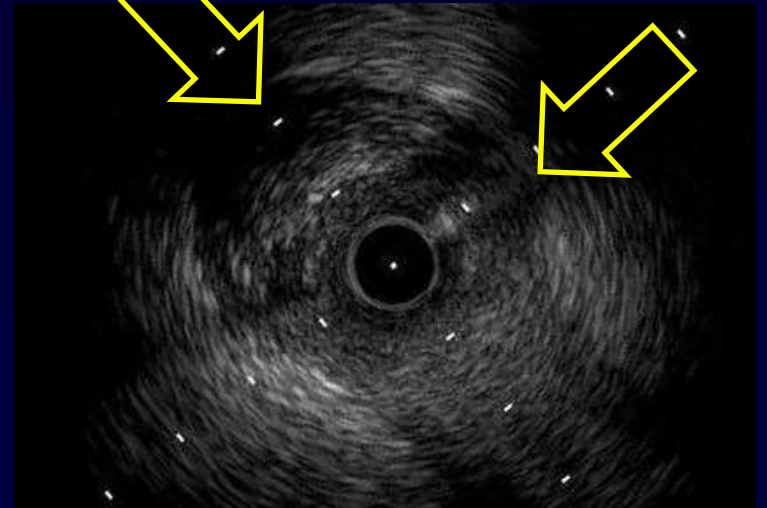
- Rotational angio is beneficial for recognizing of anatomy, especially using wire bias.
- Usually we need stiff wire as second wire. i.e. Miracle12, Gaia3, Conquest family.

mLAD CTO

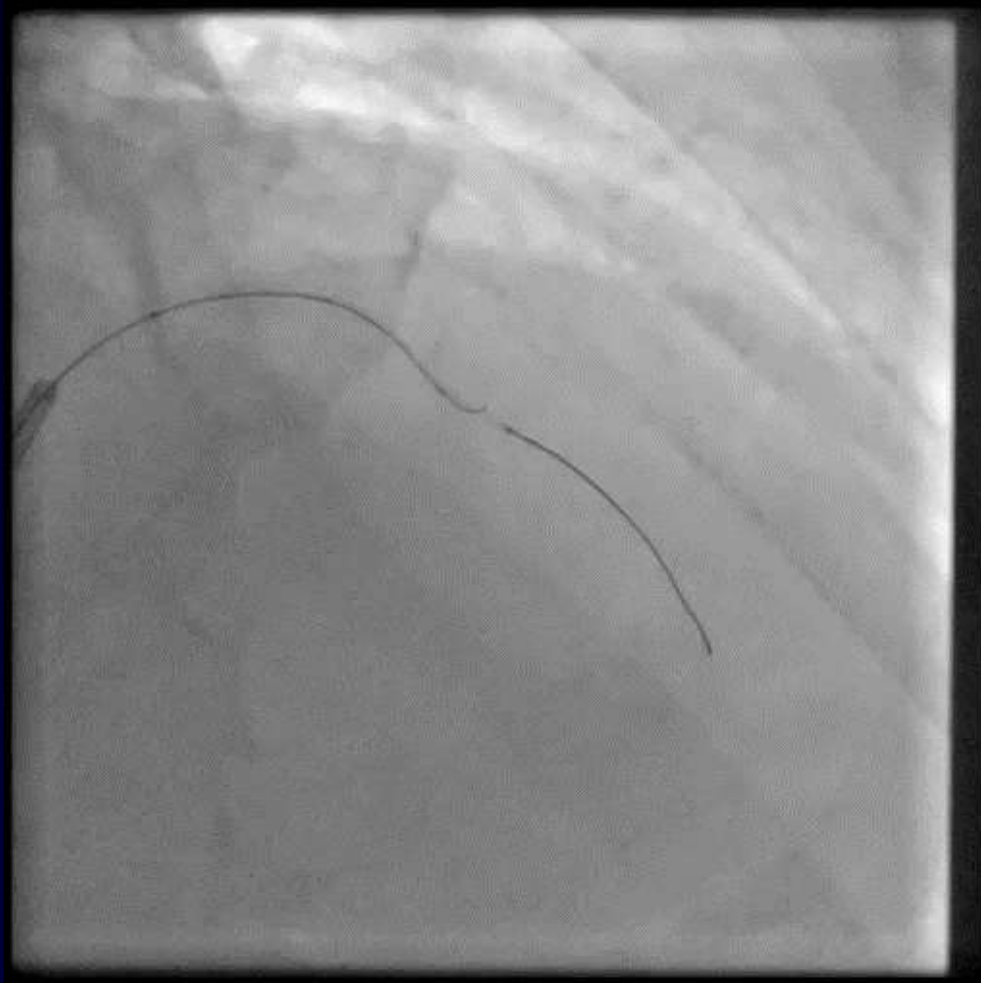


LAO

RAO

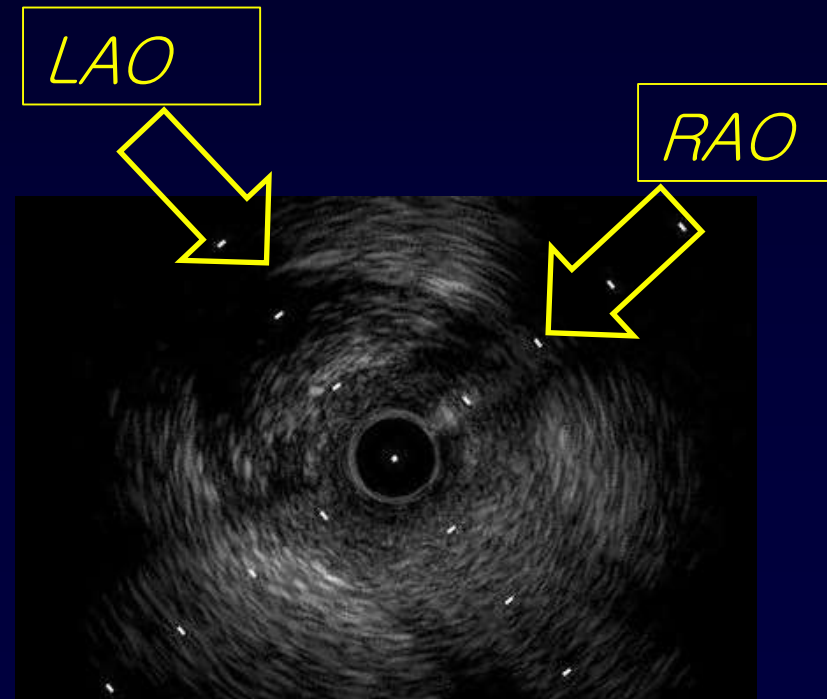


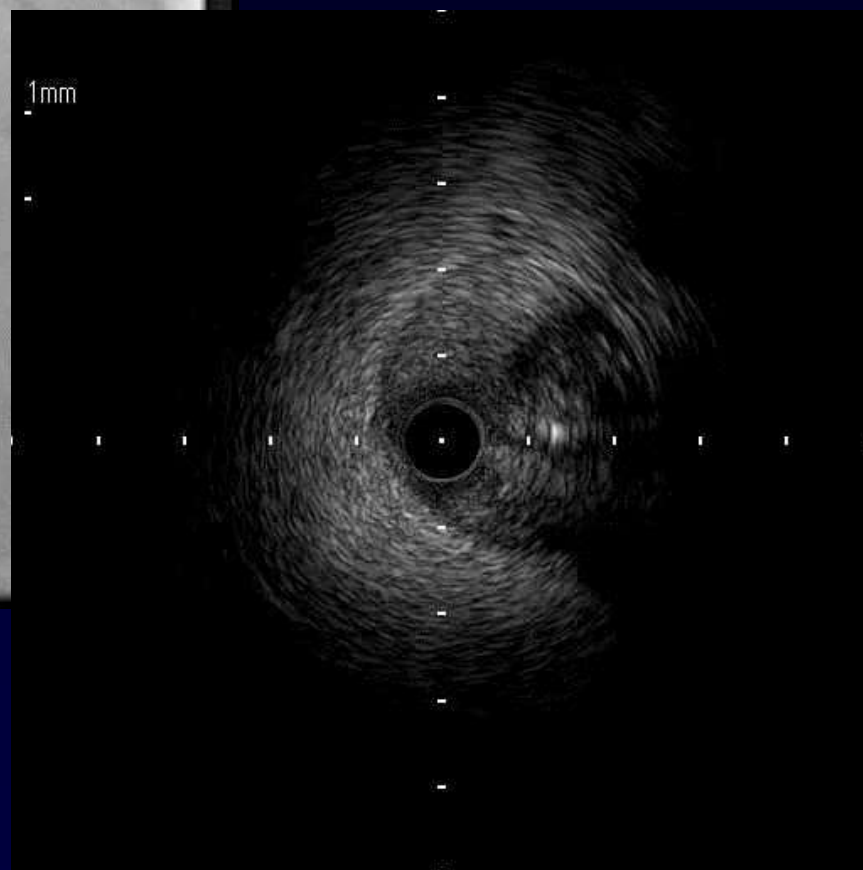
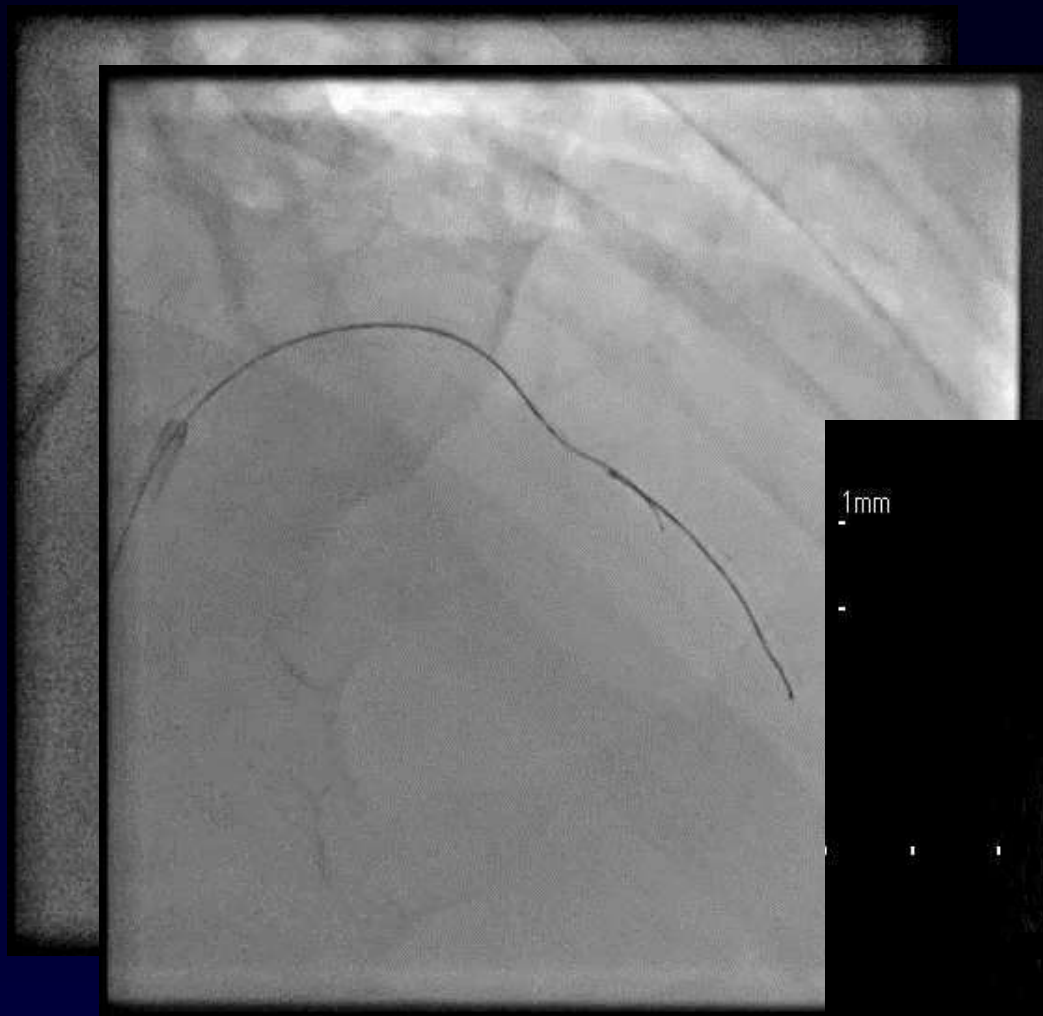
Probe and wire are in the same line in RAO and is separatedly located from the wire in LAO .



✓ Next landmark is the first wire.

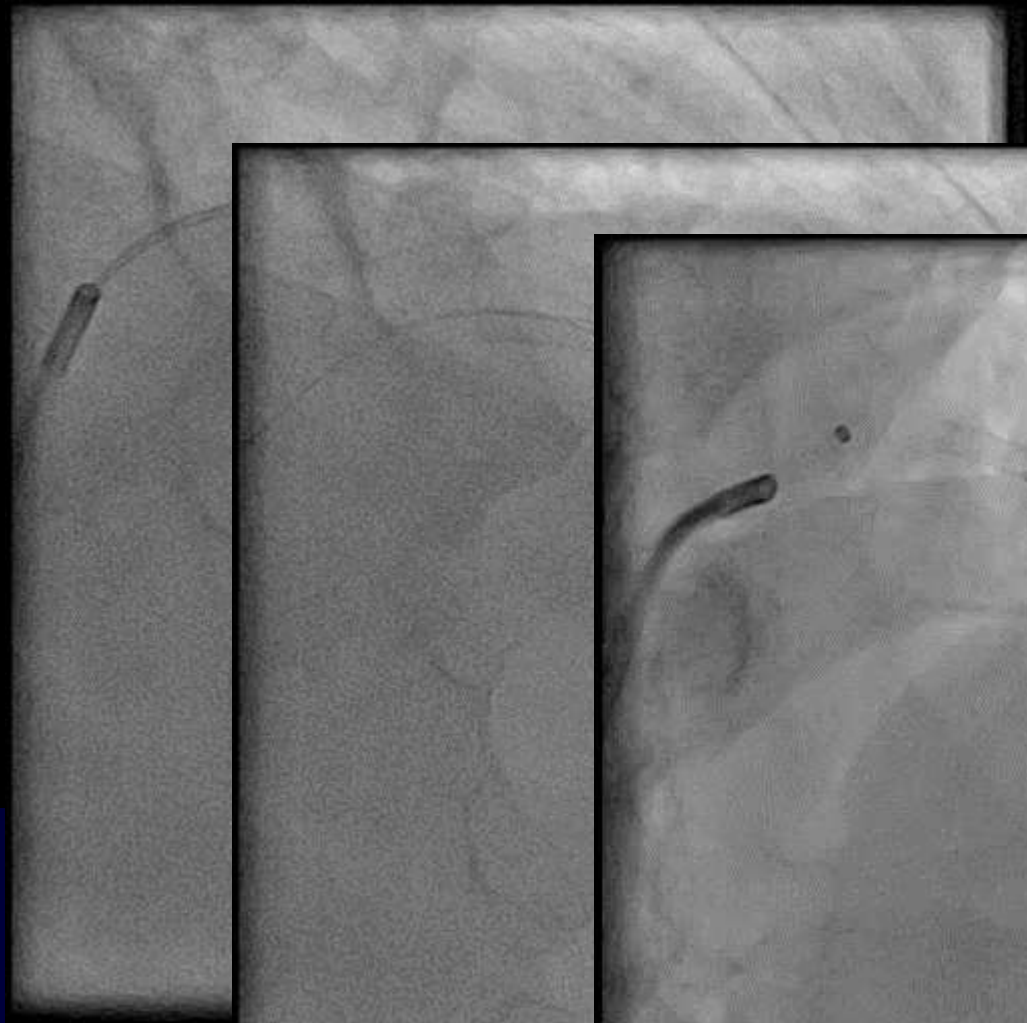
✓ Intimal space is
epicardial (right)-sided in RAO
and in the same line in LAO.



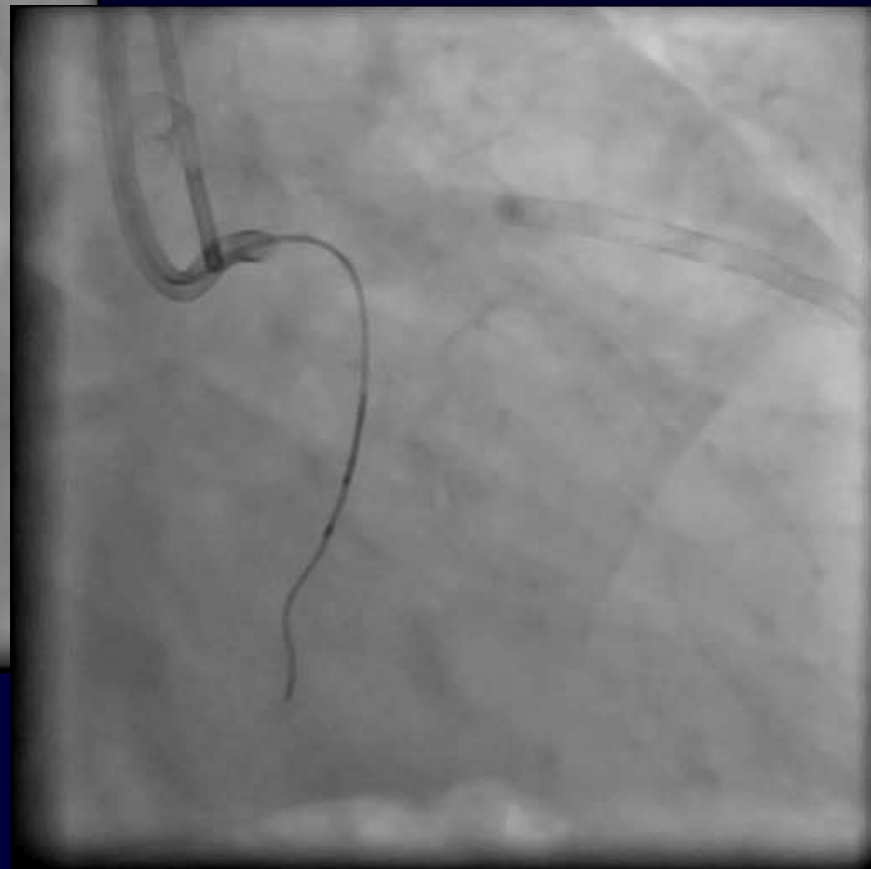


IVUS from subintimal wire

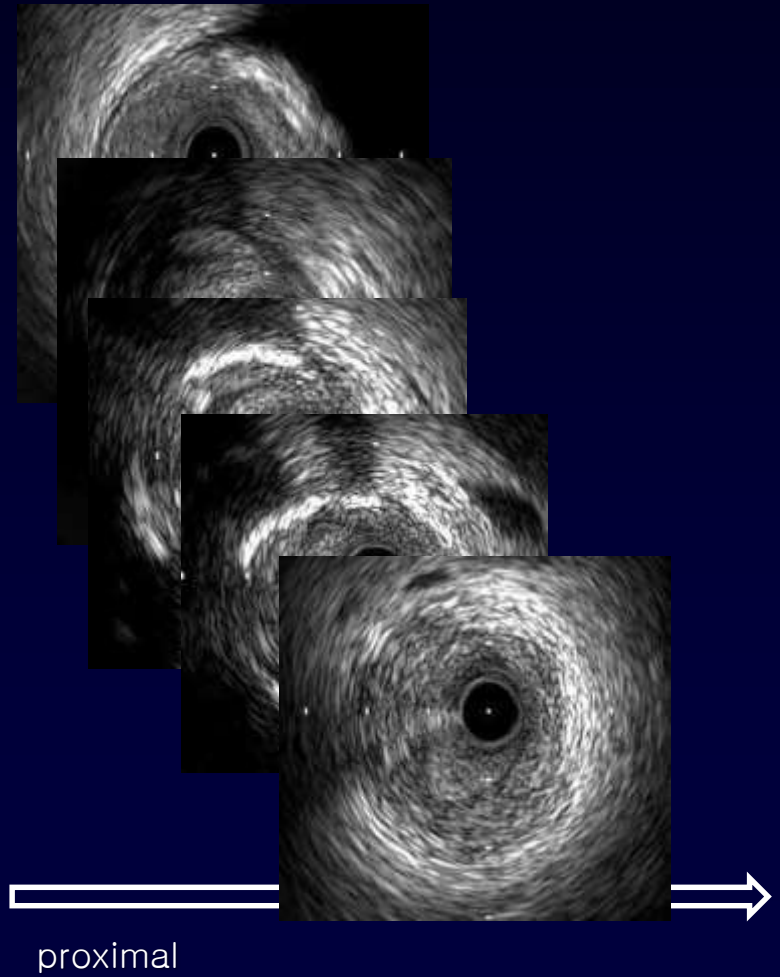
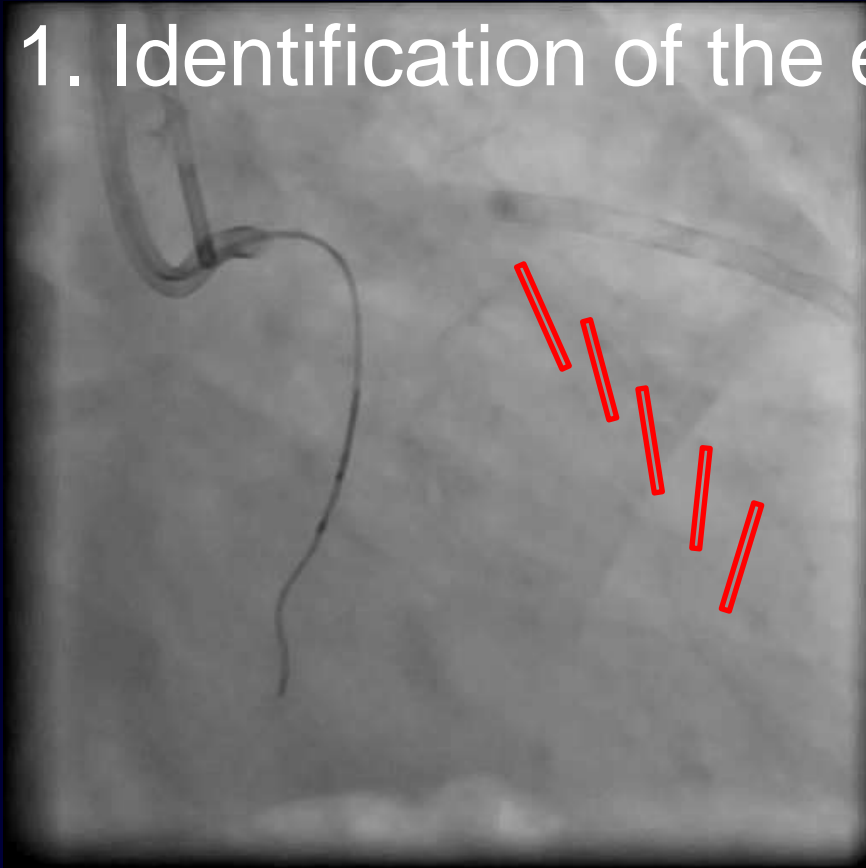
1mm



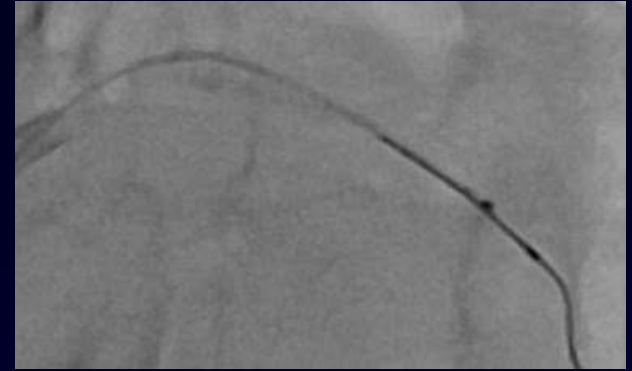
LCX CTO case



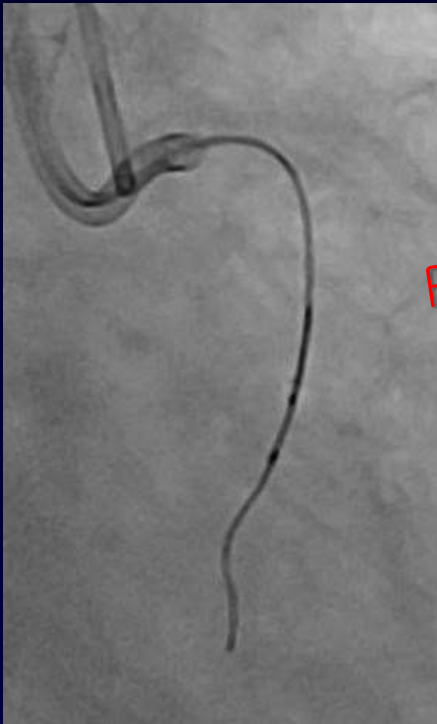
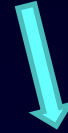
1. Identification of the entry.



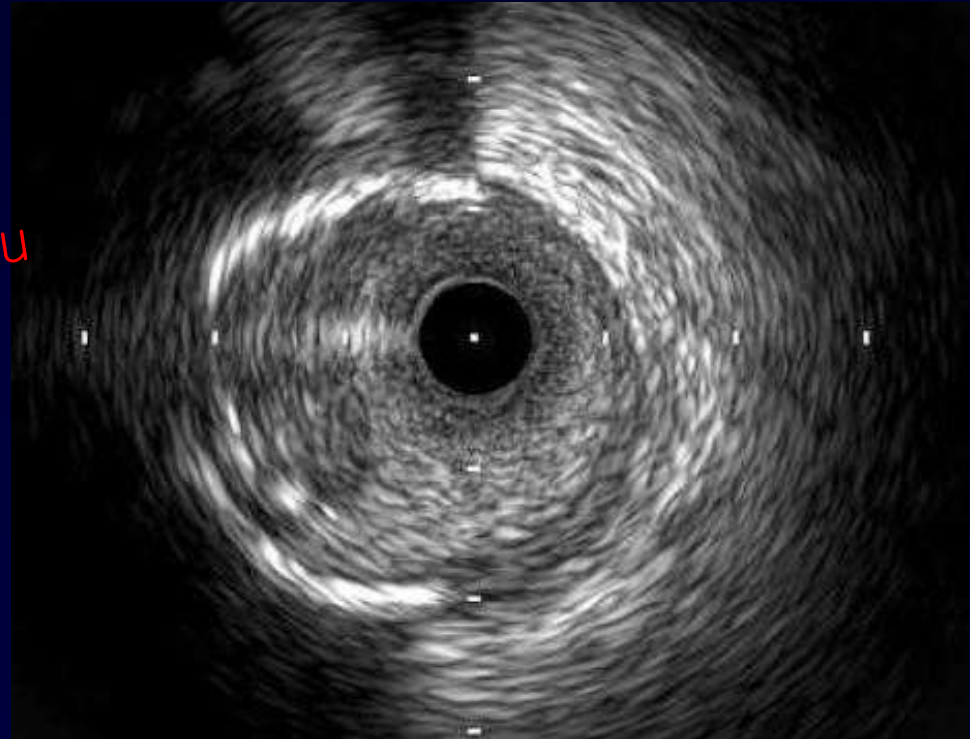
2. Identification of intimal direction.

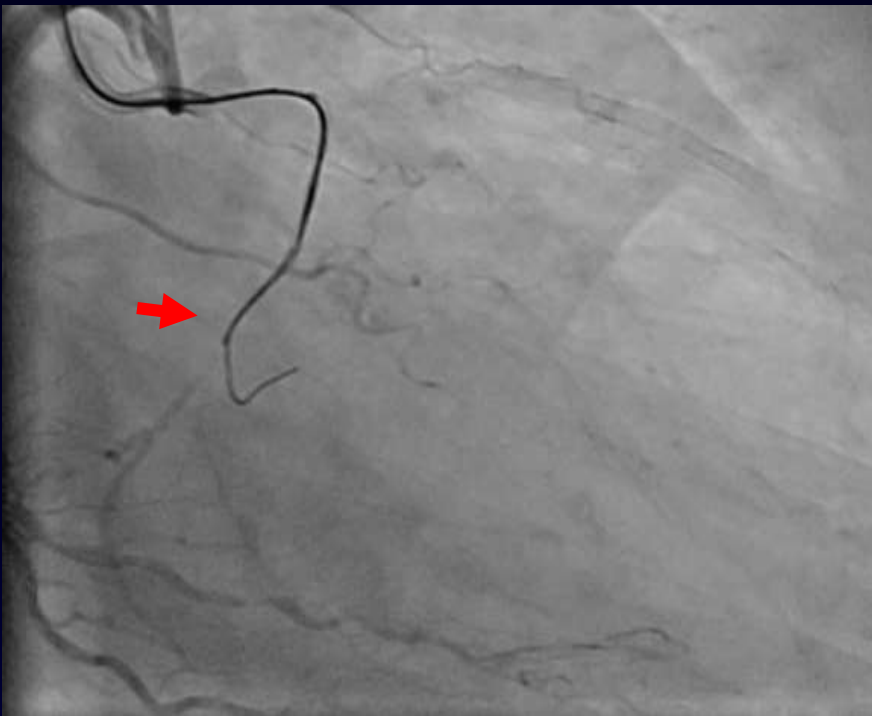


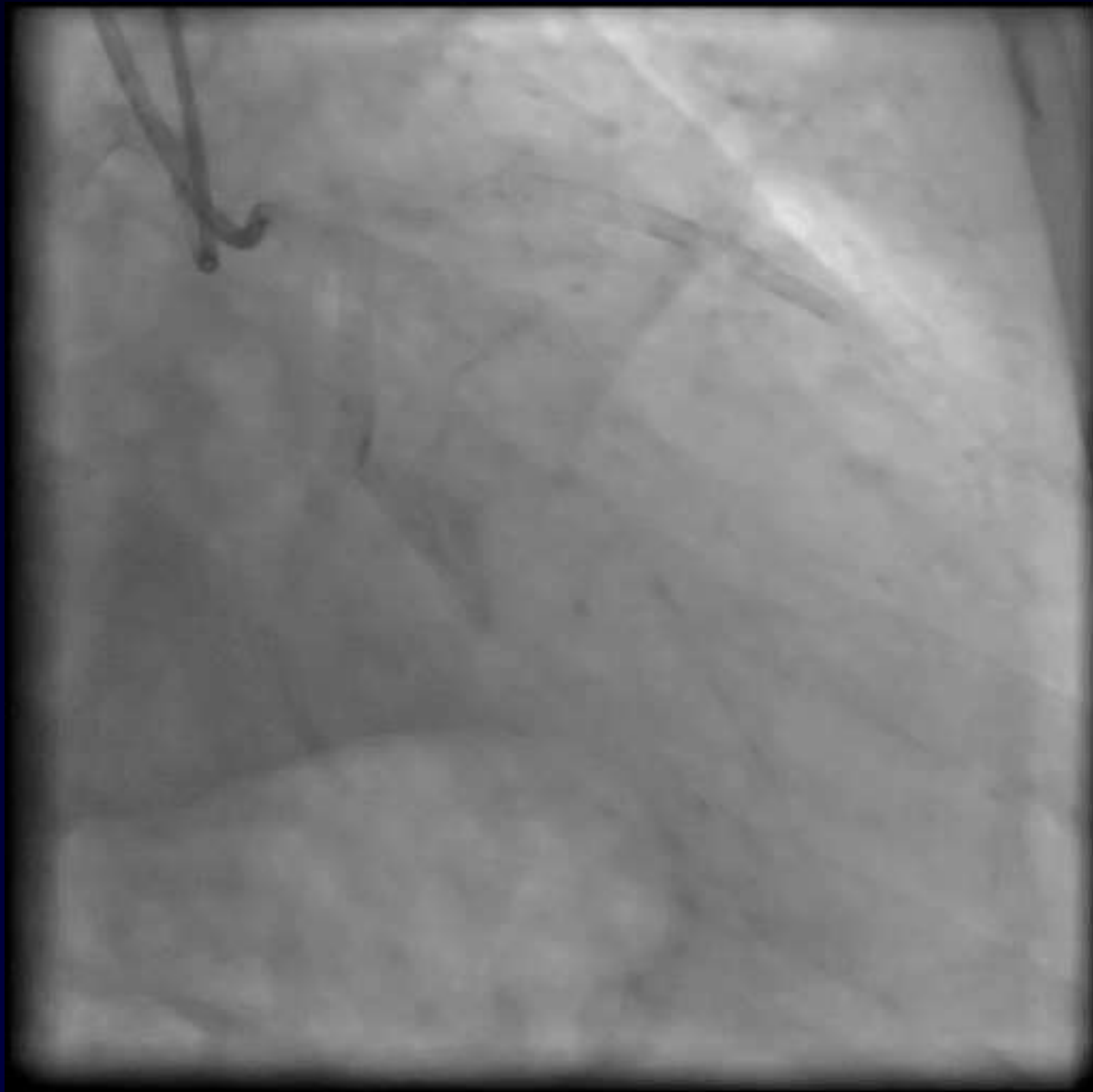
LAO Cau



RAO Cau





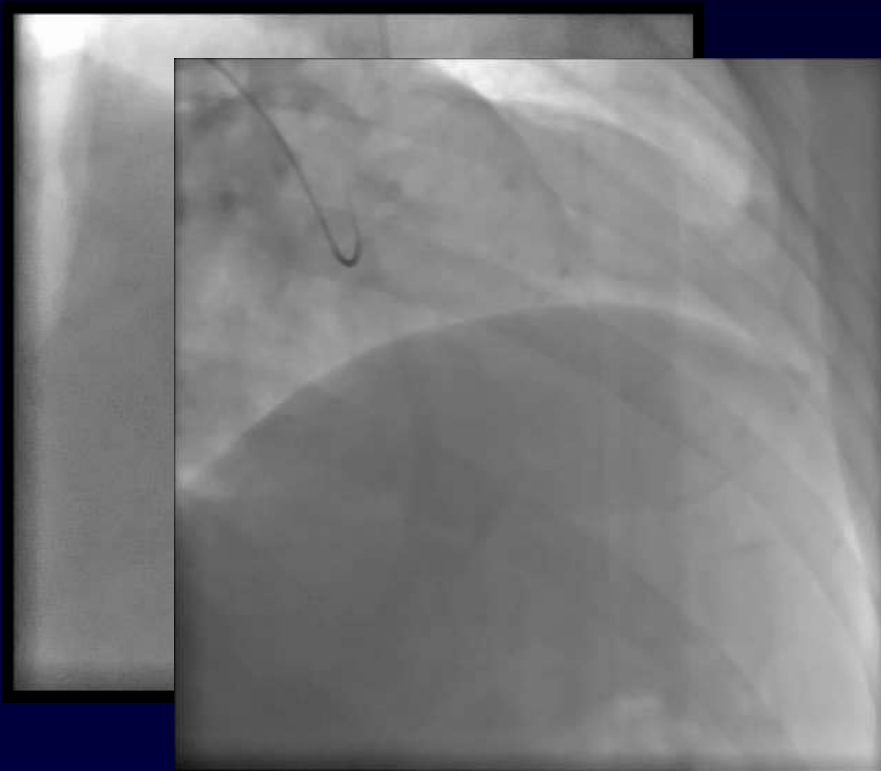


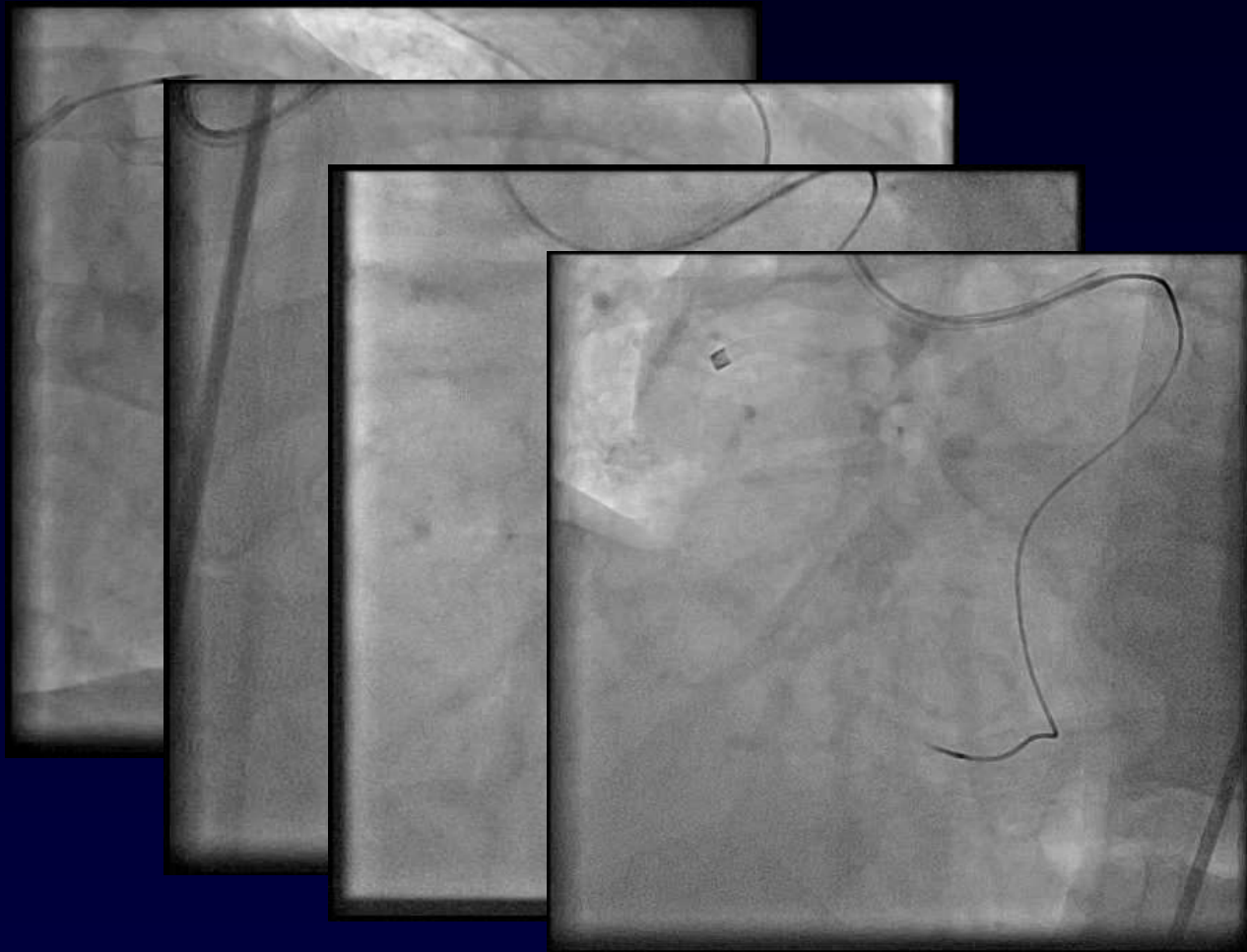
IVUS guided rewiring

- Guiding catheter
 - ≥ 8Fr (some IVUS catheters are available 7Fr system. Terumo, BS)
- Linkage angiographic finding with IVUS is important.
- Side branch and wire bias are useful for understanding plaque distribution.
- Rewiring should be started at the entry of sub-intimal space to get true lumen.
- Re-entry from sub-intimal space to true lumen is usually very difficult.

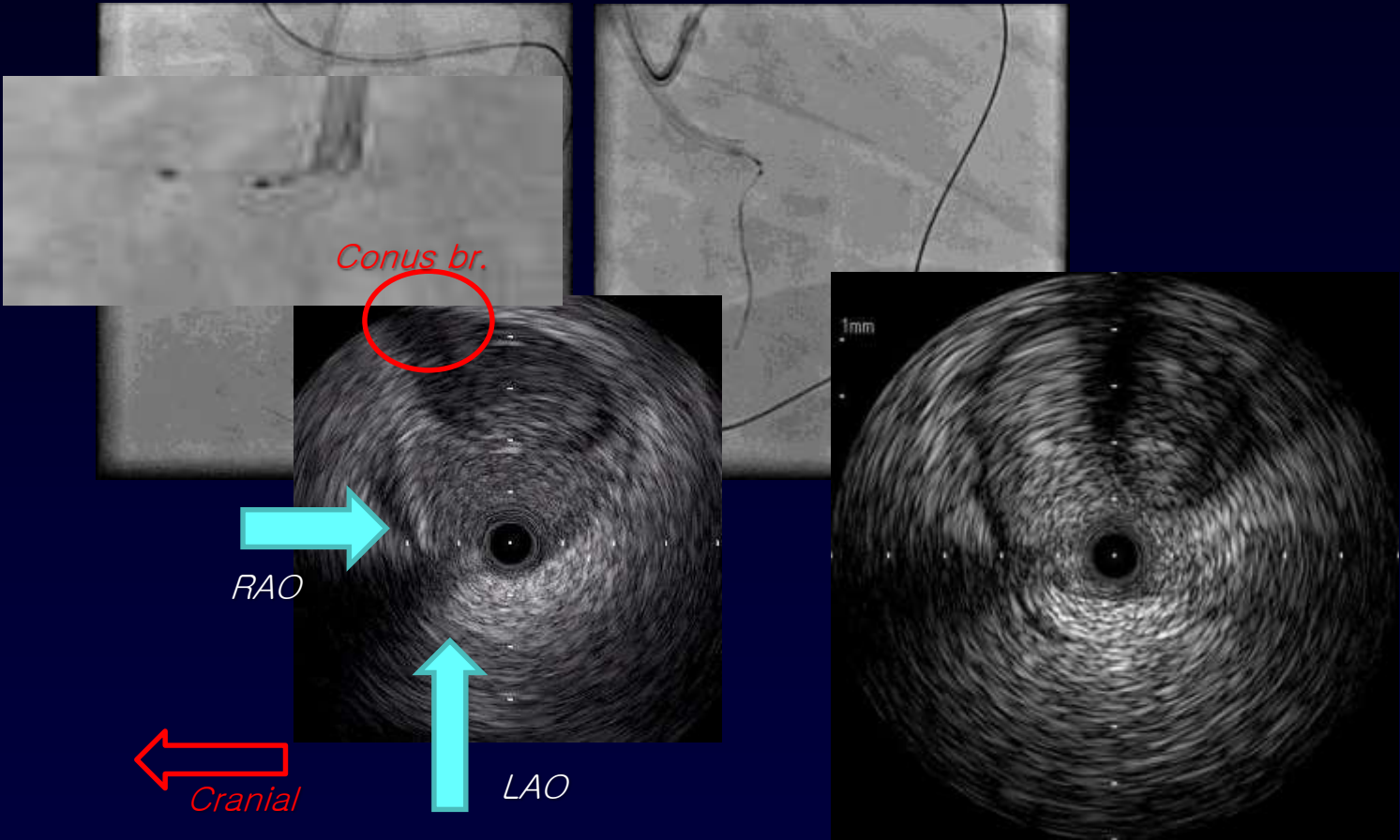
This technique is also effective in bailout of guiding catheter injury.

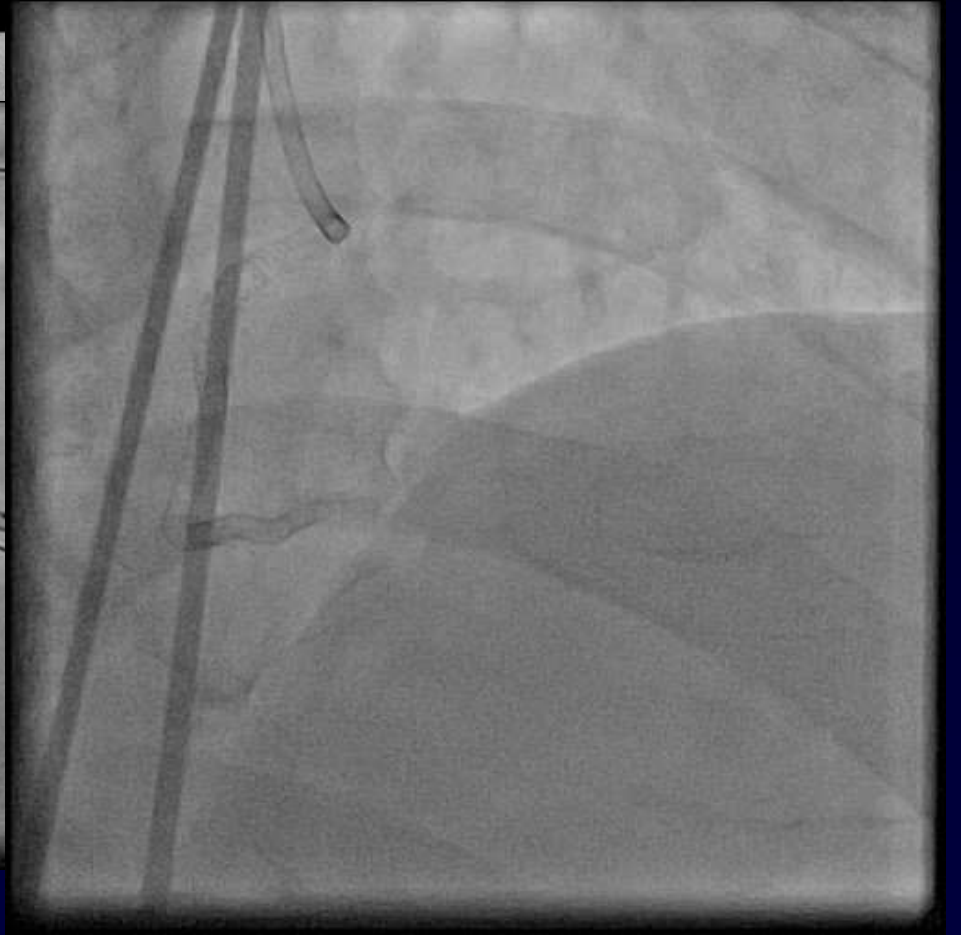
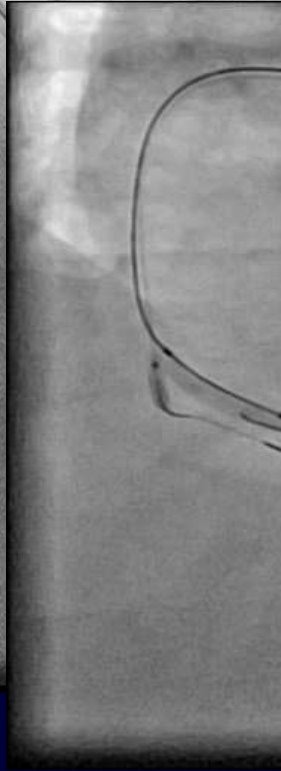
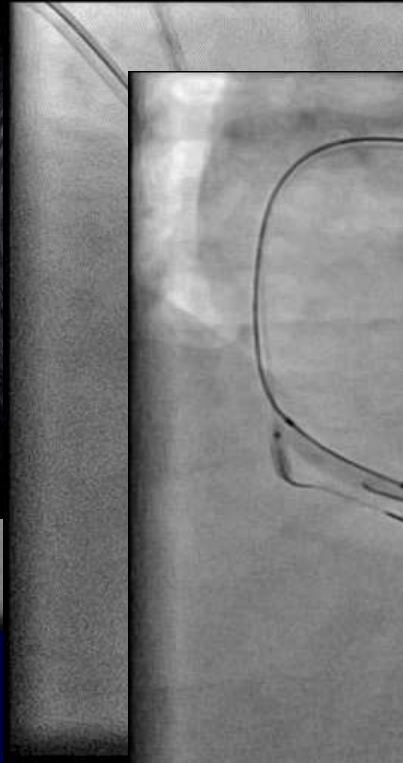
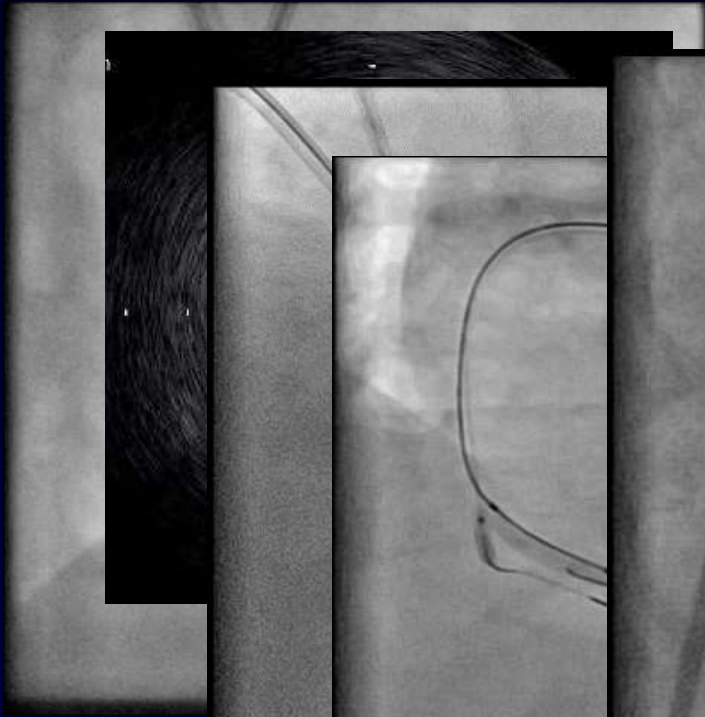
!!





After failure of retrograde XT-R direct crossing, we rewired SION antegradely under IVUS guidance.





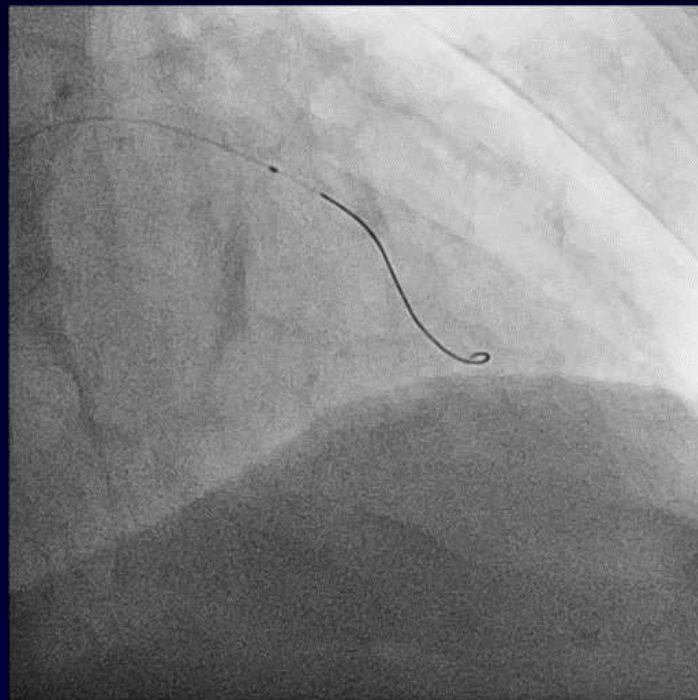
IVUS guided rewiring technique is effective not only in CTO procedure, but also bailout procedure of vessel injury.

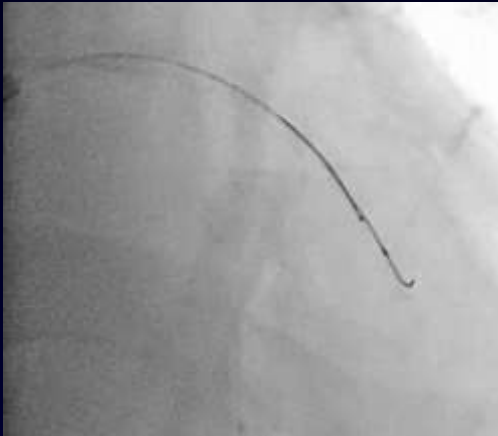
Conclusions

- In the modern approach for CTO intervention, use of IVUS may be helpful and last resort in CTO intervention.
- There are largely fundamental techniques,
 - During antegrade approach**
 - IVUS-guided proximal cap identification and penetration
 - IVUS-guided rewiring technique, in the case of first wire in the false lumen (should be done before false lumen is enlarged)
 - During stent optimization**
- It needs some time and efforts to get used to execute.
- Three dimensional recognition is important in this strategy.

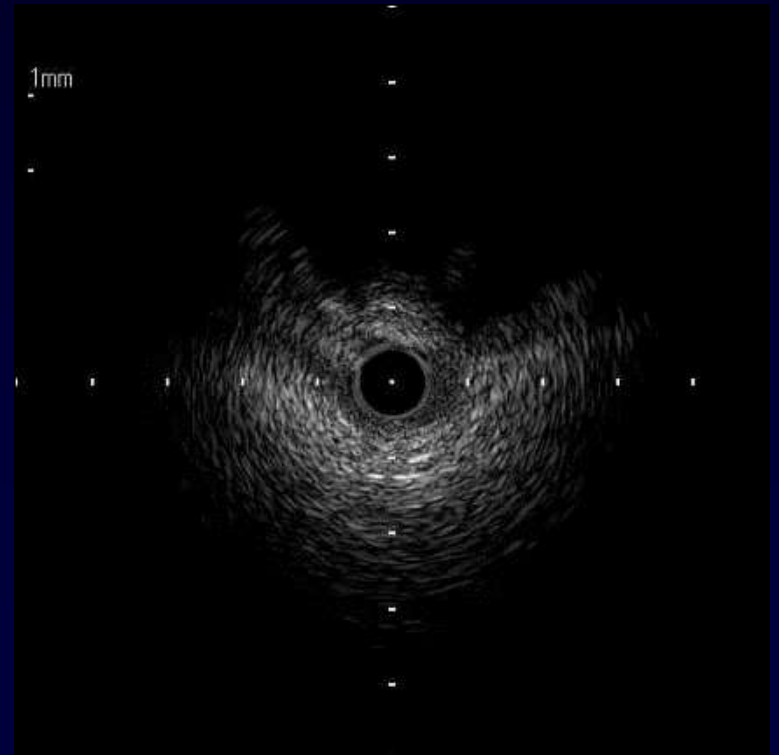
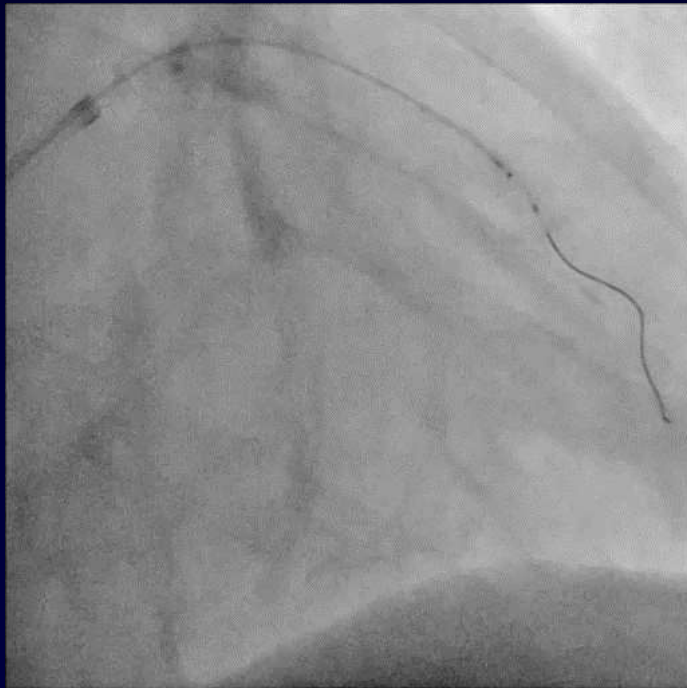
Thank You For Your Attention

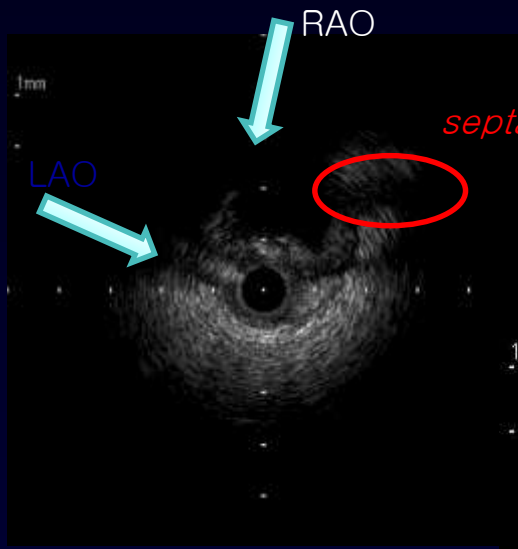
Bailout case





After 'rewired' wire could not track the bent, we progressed the wire distally to stretch it.





Gaia1 manipulation, down in RAO view and left in LAO view.

