

Beauty of 4Ps

- A case of PCI for LMT CTO -

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Introduction

If... We faced the really difficult situation
of treatment of CAD: PCI...

Personally, I think , better to think "4 Ps"

1st P : **P**ower of image

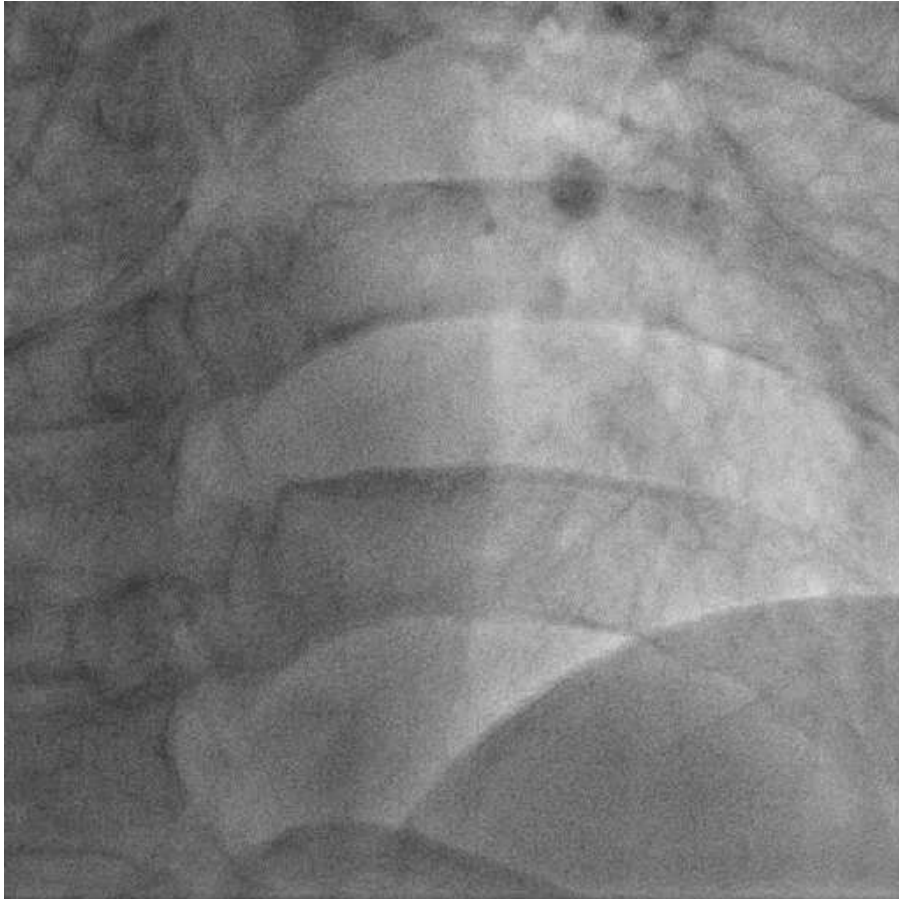
2nd P : **P**lan your strategy

3rd P : **P**roduct knowledge

4th P : **P**rofessionalism/ Perseverance

Case: 56yo, M

5 years history of Angina, No coronary risk factor except smoking and dyslipidemia. (No DM, HT, moderate CKD).... A very small ECG change, UCG: EF was 58 %, moderate decreased anterior wall motion. Big ischemic area by scintigraphy.



Angina : LMT CTO

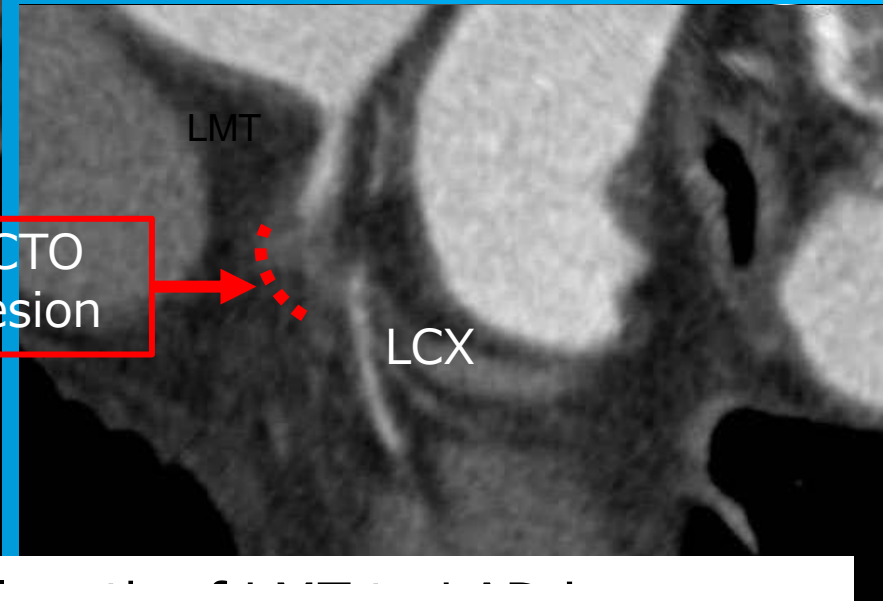
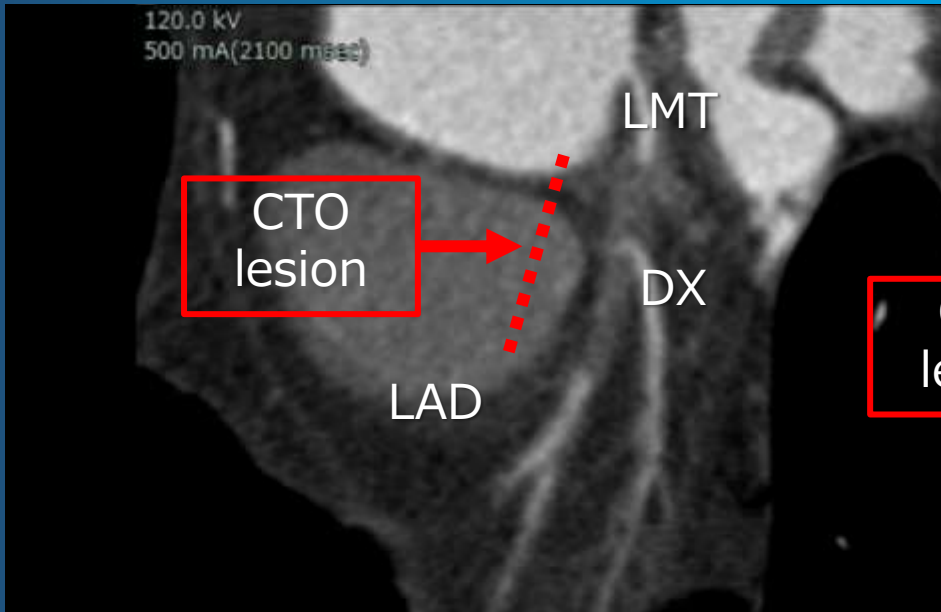
1. It is rare and, since it is located the most proximal lesion, clinical status of a patient with such lesion is far from stable. When PCI is performed on such a patient, it is crucial to control patient's clinical status during the procedure.
2. Due to the position of the lesion, namely the most proximal lesion, directional control of CTO guidewire is difficult.
3. On top of that, the lesion accompanies LAD and LCX bifurcation lesion. Therefore it is not simple to focus on revascularization of them but it is critical to keep their patency at chronic phase which requires us to pay the closest attention for the PCI procedure.

1st P : Power of image

There are various imaging modalities which should be fully utilized. For maximizing their advantages, we have to know what can be done and what cannot be done for each device and acquire the skill of interpretation of images that are obtained from these modalities. By combining these modalities, much lesion information can be obtained as the preparation of PCI.

**We have angio, IVUS, and
Coronary CT...**

1st P: Coronary CT...



3. Ostium of LCX is not open but without lesion at LMT side.
25mm, while occlusion at LCA is 7mm.

Length of CTO: LAD
LMT-LAD 25mm

Length of CTO: LAD
LMT-LCX 7mm

Learning Coronary Angio.

1. It is LMT CTO lesion. And not significant lesion at RCA
2. Collateral is developed from RCA to LAD and LCX direction.
3. Collaterals toward LAD from RCA is mainly developed as epicardia vessels not as septum. They are corkscrew vessels which require advanced technique in retrograde approach
4. Major collaterals developed from RCA to LCX are also on epicardium and they are so severe corkscrew type that it is difficult to identify their routes clearly. Therefore retrograde approach seems to be very difficult.
5. Antegrade approach for LMT to LAD lesion looks possible.

2nd P : Plan your strategy

Strategy based on these findings:

1. Technically the lesion is PCI treatable. For this patient prognosis, PCI for this lesion must be completed in success.
2. Unless recanalization of LMT to LAD should be done by capturing true lumen all the way, LCX cannot be accessed.
3. Therefore capturing the true lumen is the first priority both in antegrade and retrograde approach.
4. Since LCX ostium lesion is short in length, once LMT to LAD is properly treated, it may not be difficult to treat.

3rd P : Product knowledge

4th P : Professionalism/ Perseverance

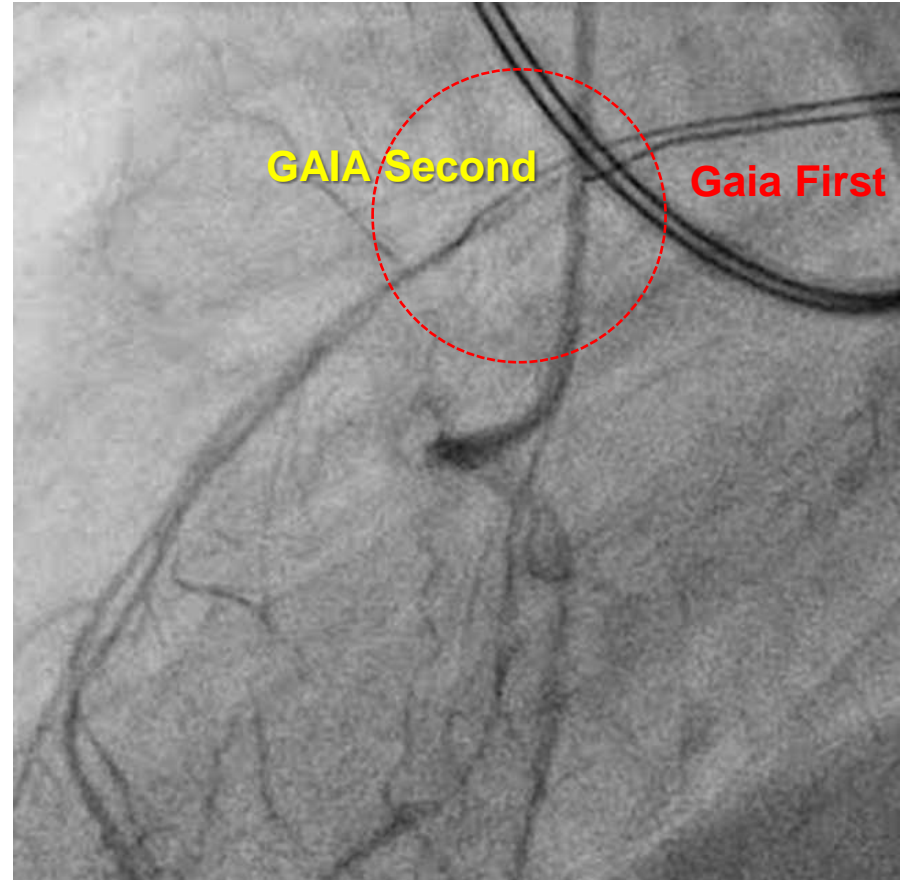
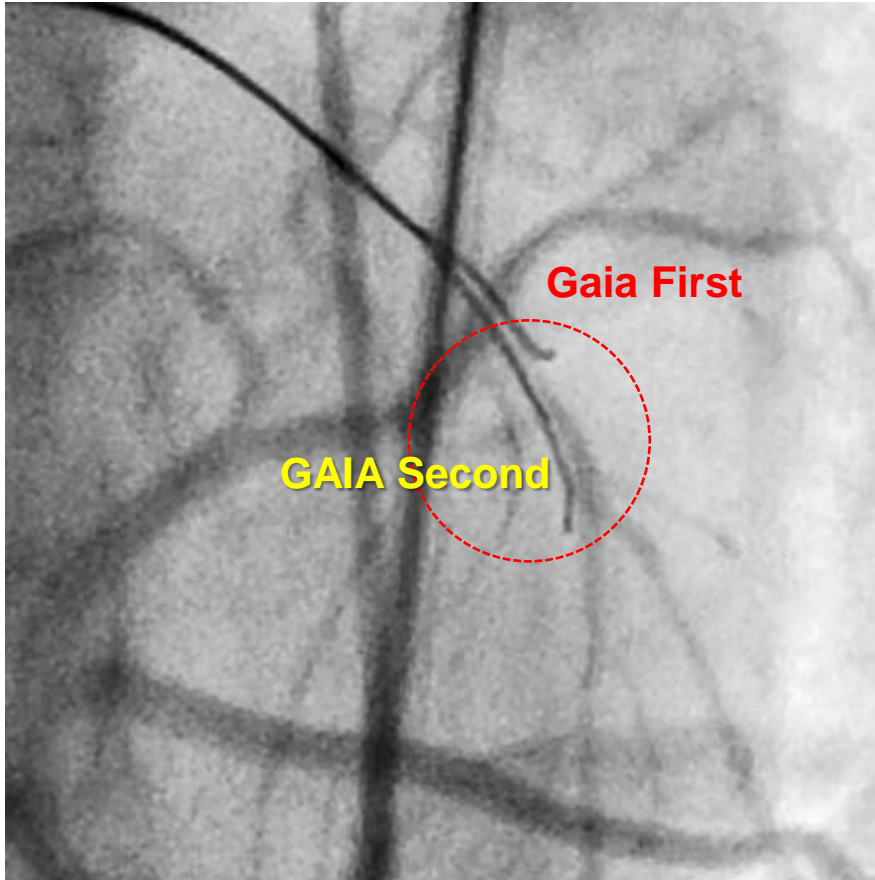
Finally, your professionalism as an interventional cardiologist is crucial for the success of the procedure.

Sense of mission as a cardiologist will drive you to
Seek for further improvement of your skill constantly.

Perseverance is the indispensable quality that
you have to demonstrate as professional cardiologist.

PCI for LMT-LAD : Antegrade Approach

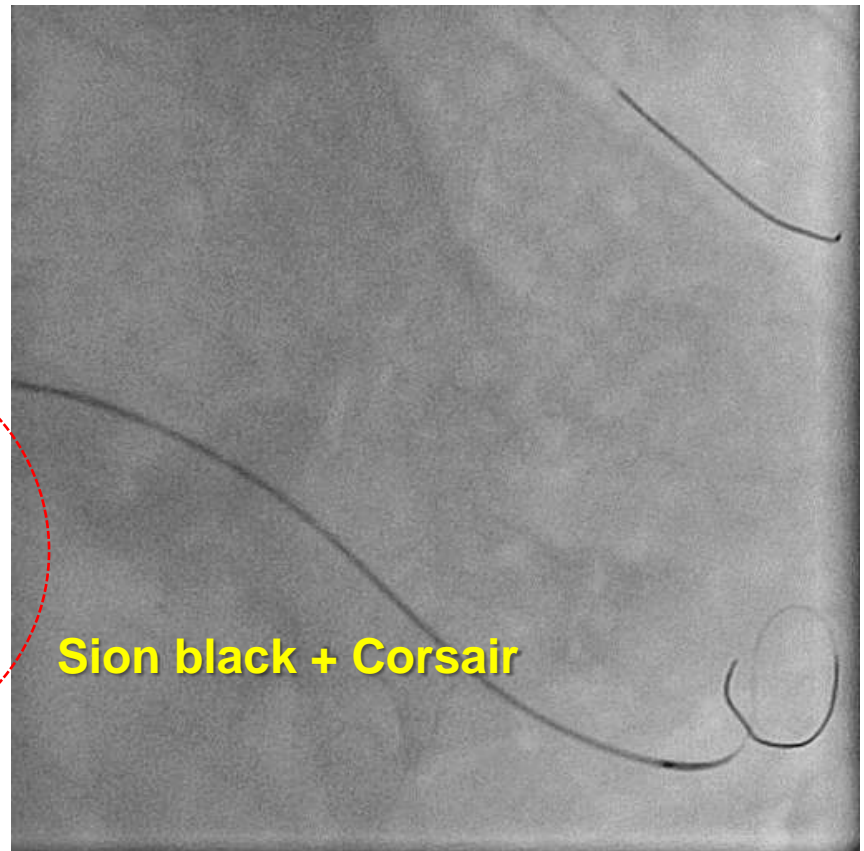
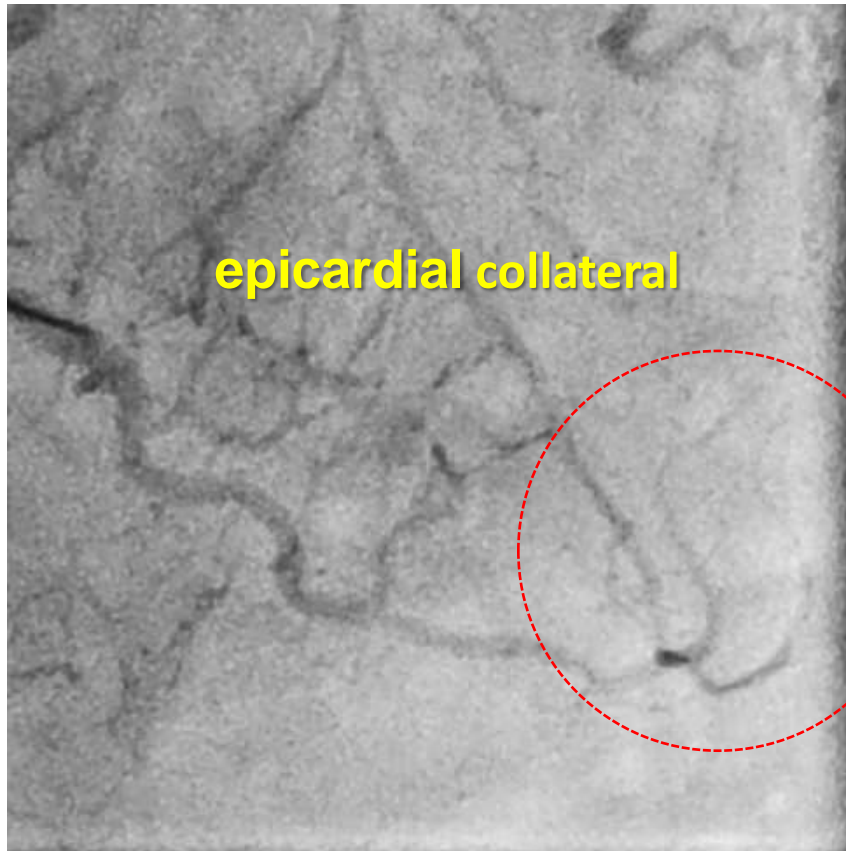
Collateral angiogram indicated slight deviation even after parallel wire method



At this stage, we scrutinized collateral angiogram to find out that it was almost impossible for both GW to go through true lumen.

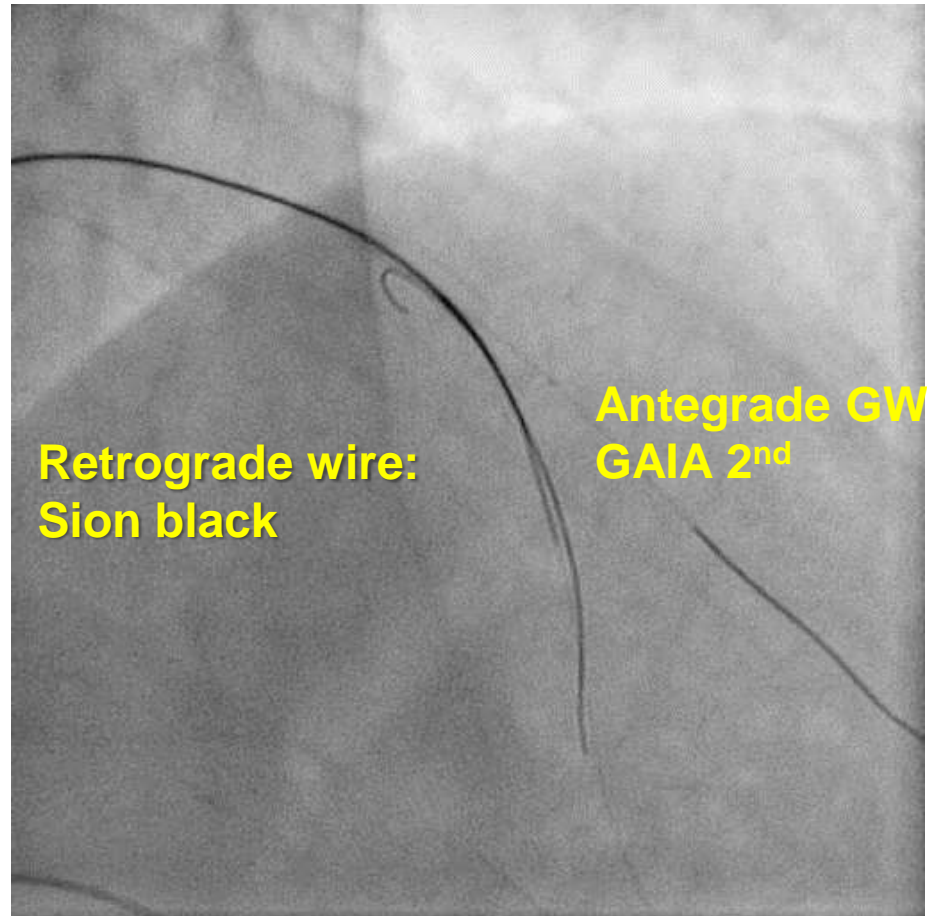
PCI for LMT-LAD : Retrograde Approach

In this particular case, capturing true lumen was prioritized



Therefore GW was advanced both in antegrade and retrograde manner and finally they achieve **rendezvous**

PCI for LMT-LAD : Just we ant Rendezvous in true lumen



After crossing, using IVUS to confirm that they are in the true lumen before moving to the next step, namely, ballooning, stenting.

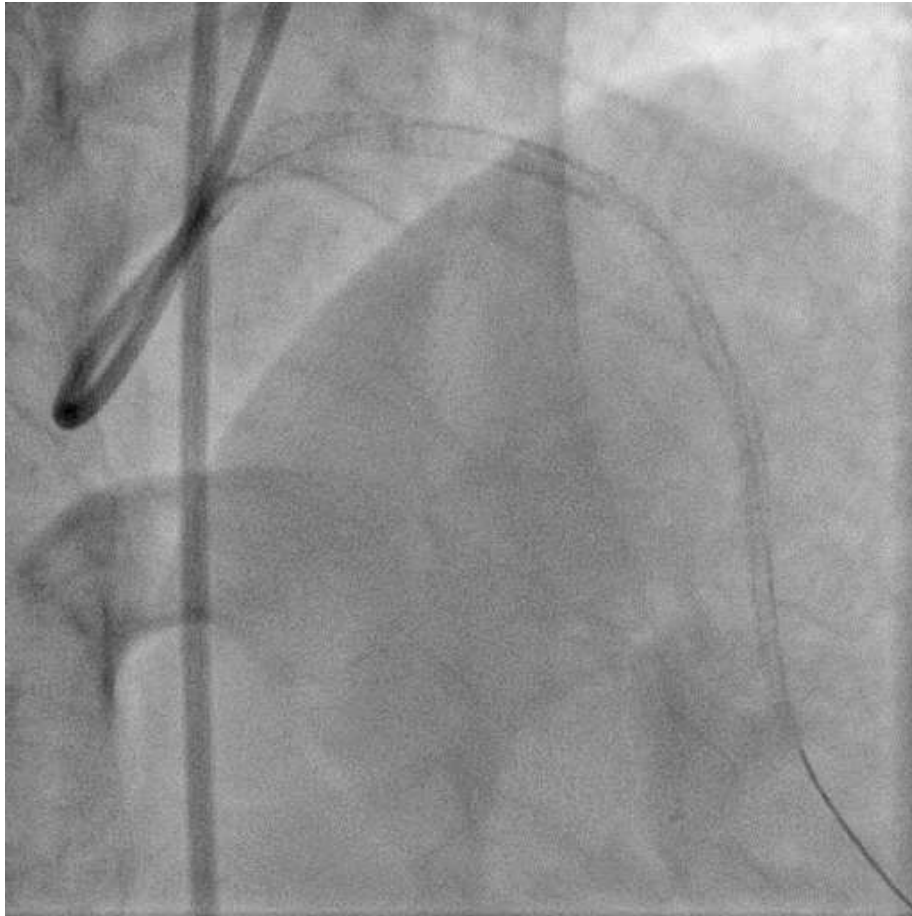
**After checking IVUS,
Just balloon and Stent !!**

**Xience Alpine
2.25x28mm**

**Xience Alpine
2.5x38mm**

**Xience Alpine
3.5x38mm**

Final Angiogram of 1st Session

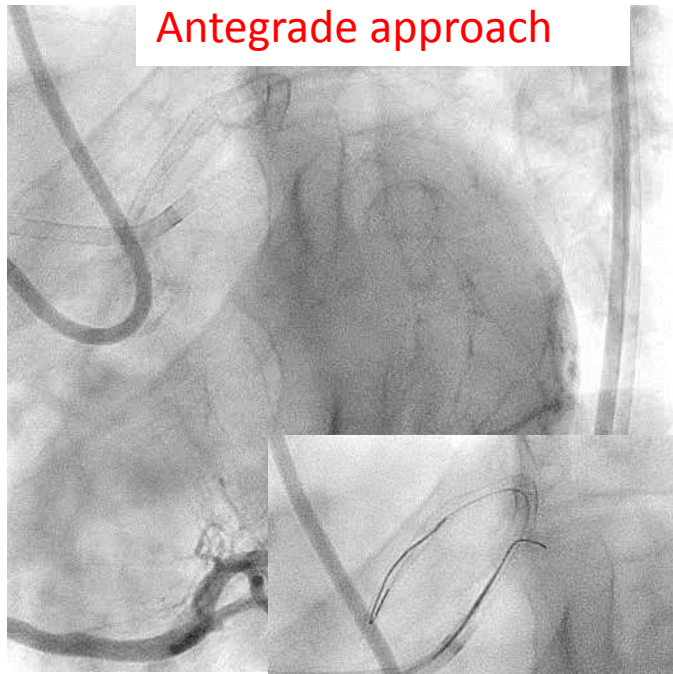


Because of the Pt's condition of Kidney, procedure on that day was ended.

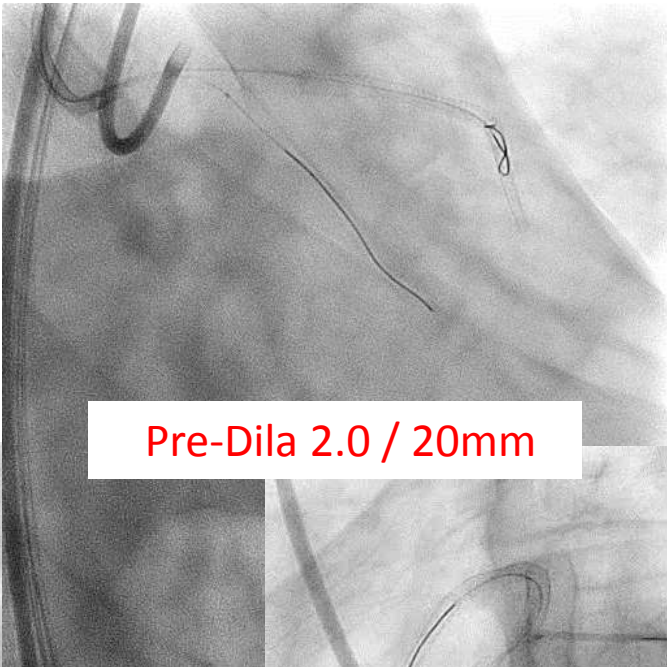
But we were confident that the route from LMT to LAD was all the way

in the true lumen, we believed that revascularization of LCX in the next step should be easily conducted by antegrade approach.

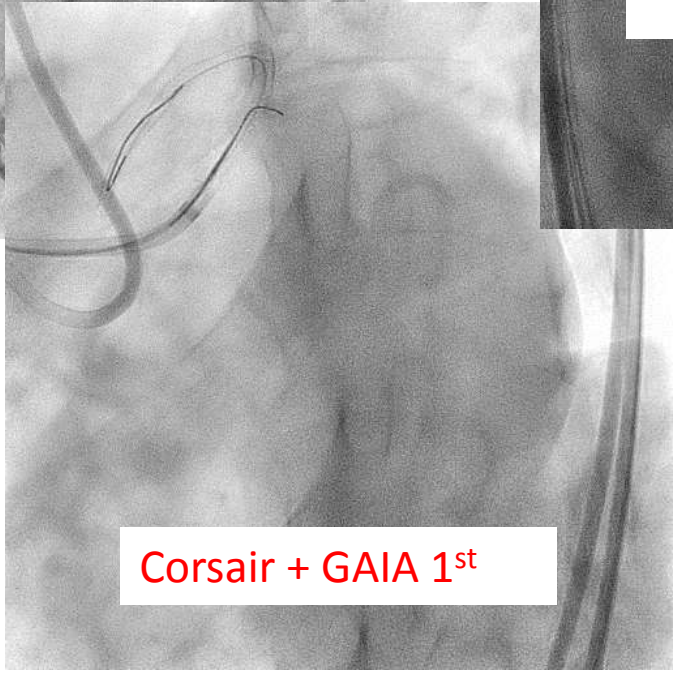
PCI for LMT-LCX CTO 2nd Session



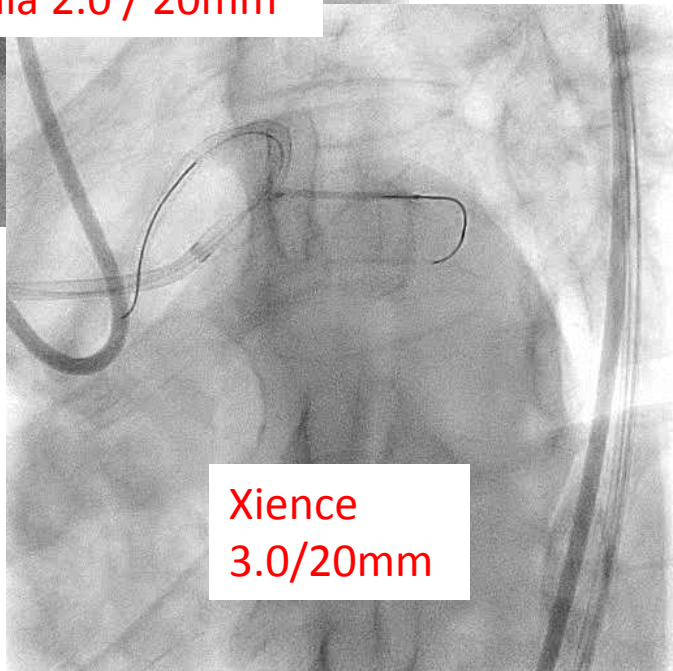
Antegrade approach



Pre-Dila 2.0 / 20mm



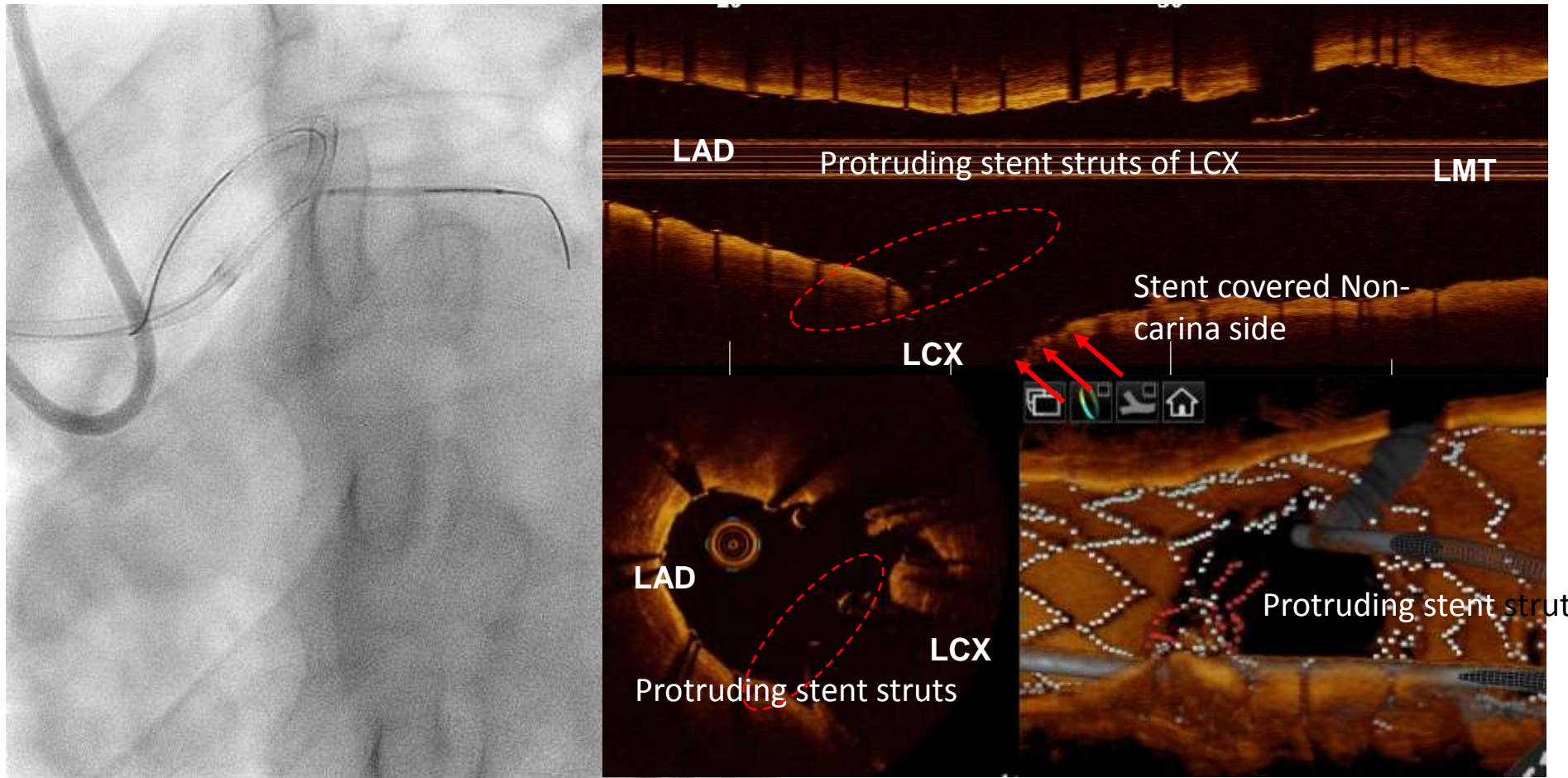
Corsair + GAIA 1st



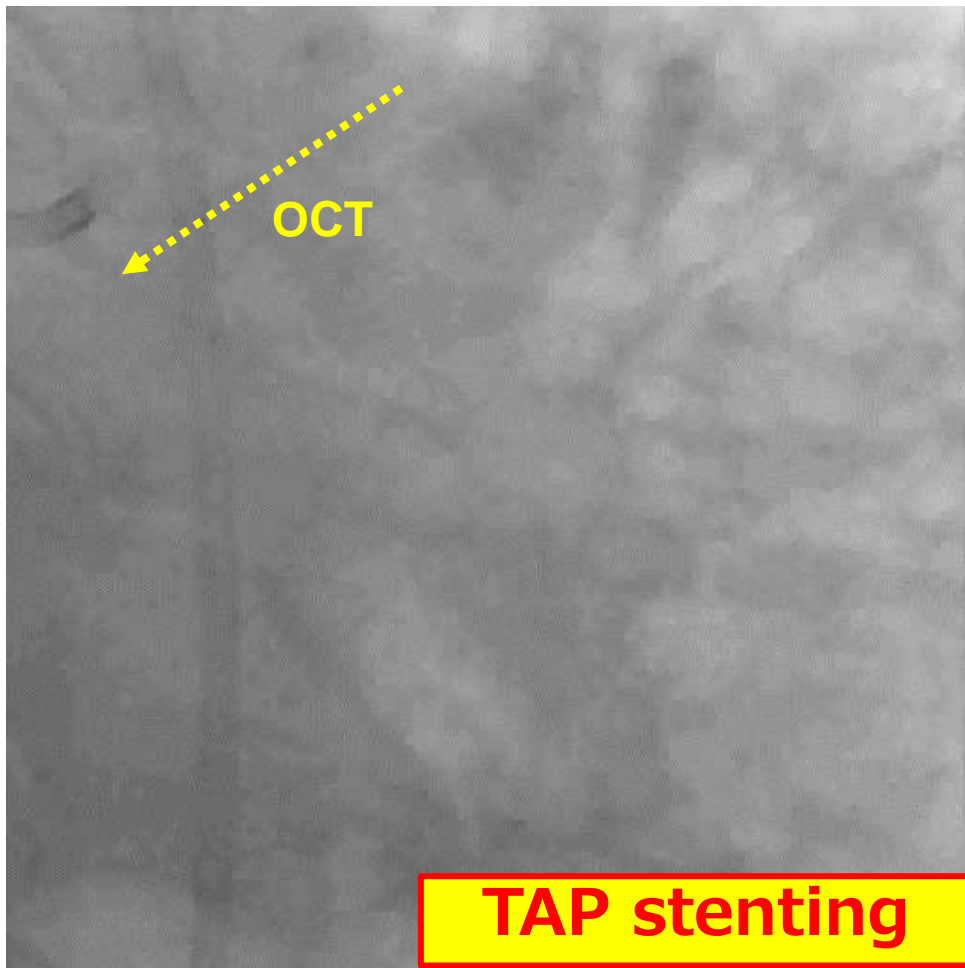
Xience
3.0/20mm

Without any problem, LCX was reached by GAIA 1st , and after confirmed with IVUS...

TAP stenting technique



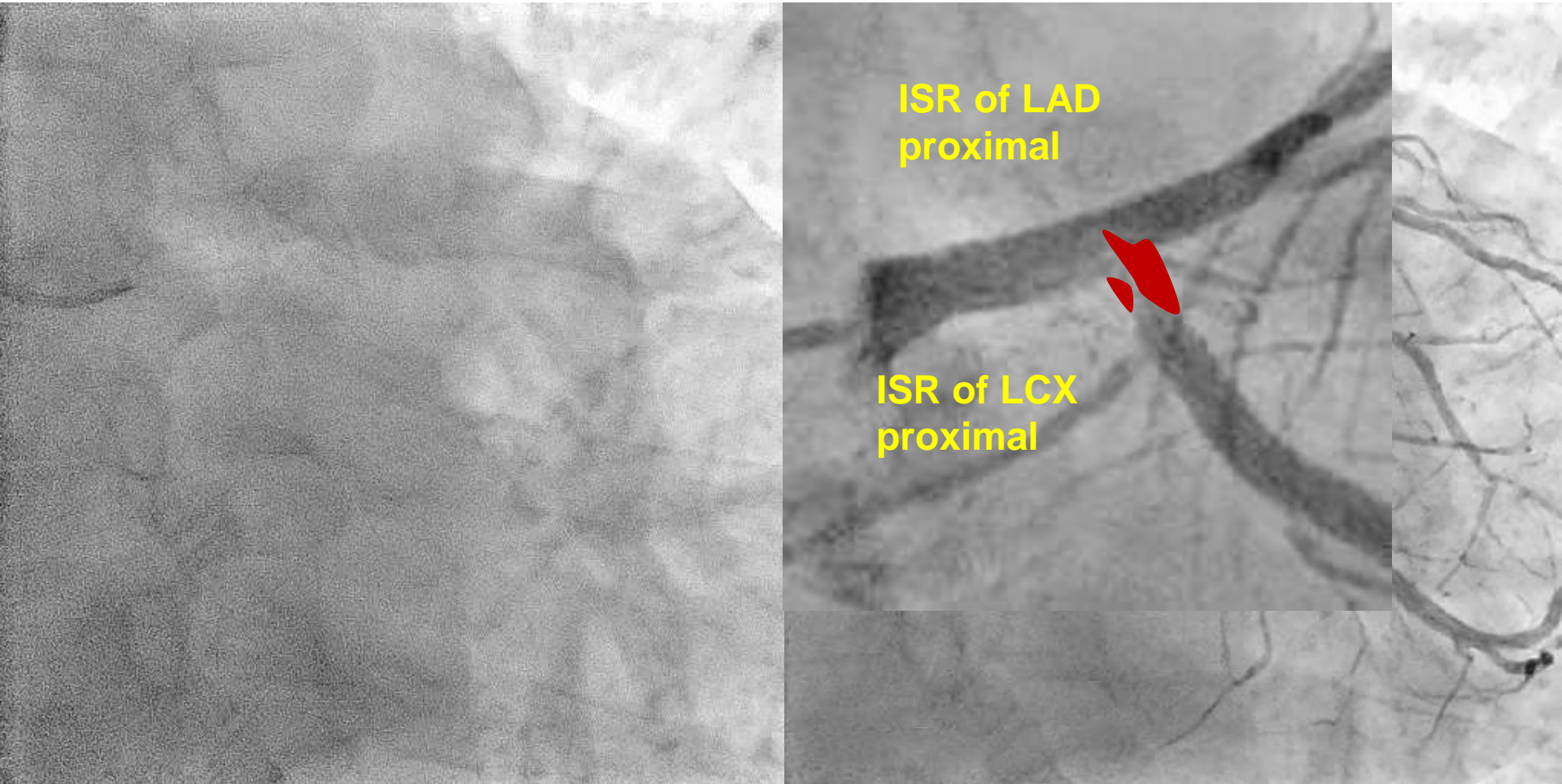
We conducted with TAP technique.... We are the family of EBC, so...



TAP stenting



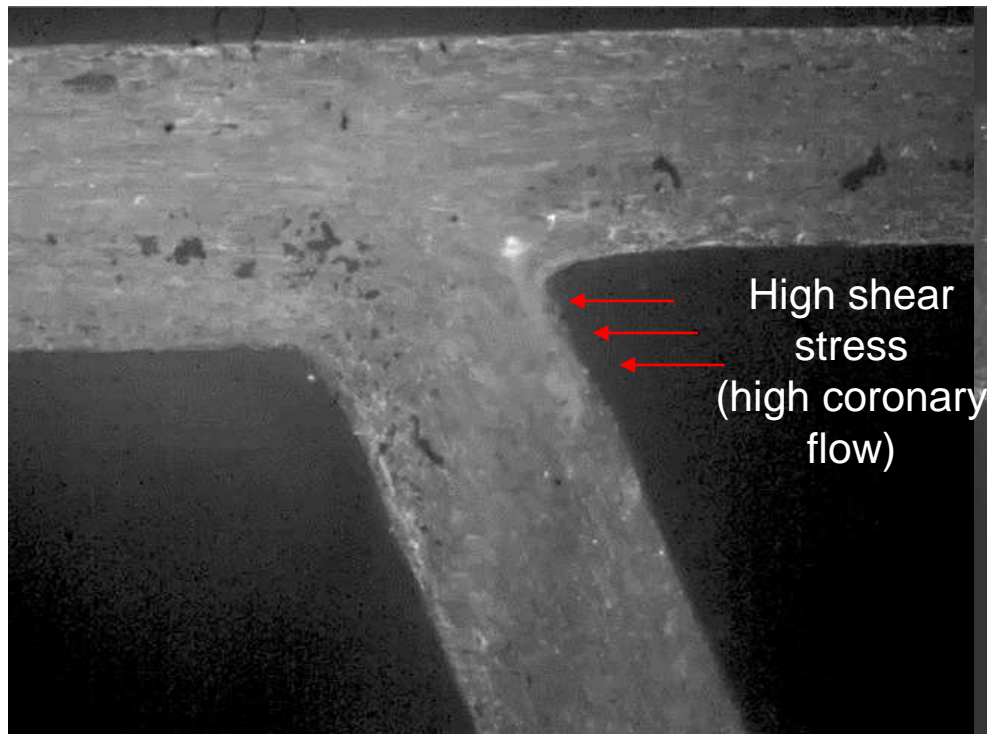
Follow-up CAG after PCI



Experimental model to study flow pattern

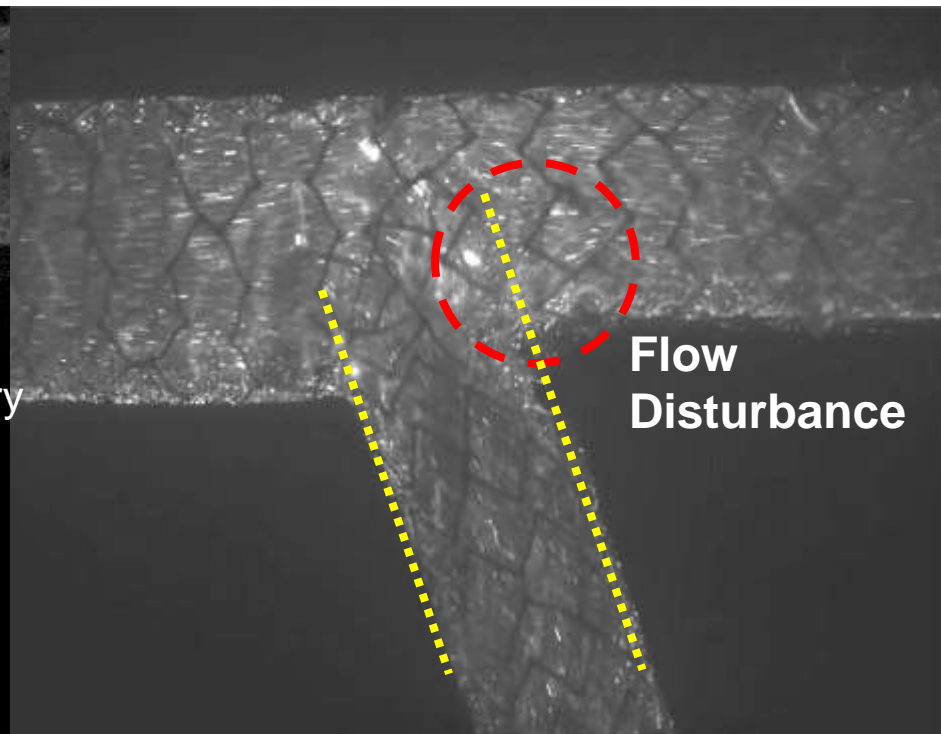
Without stent placement

Blood flow at carina is quite fast.

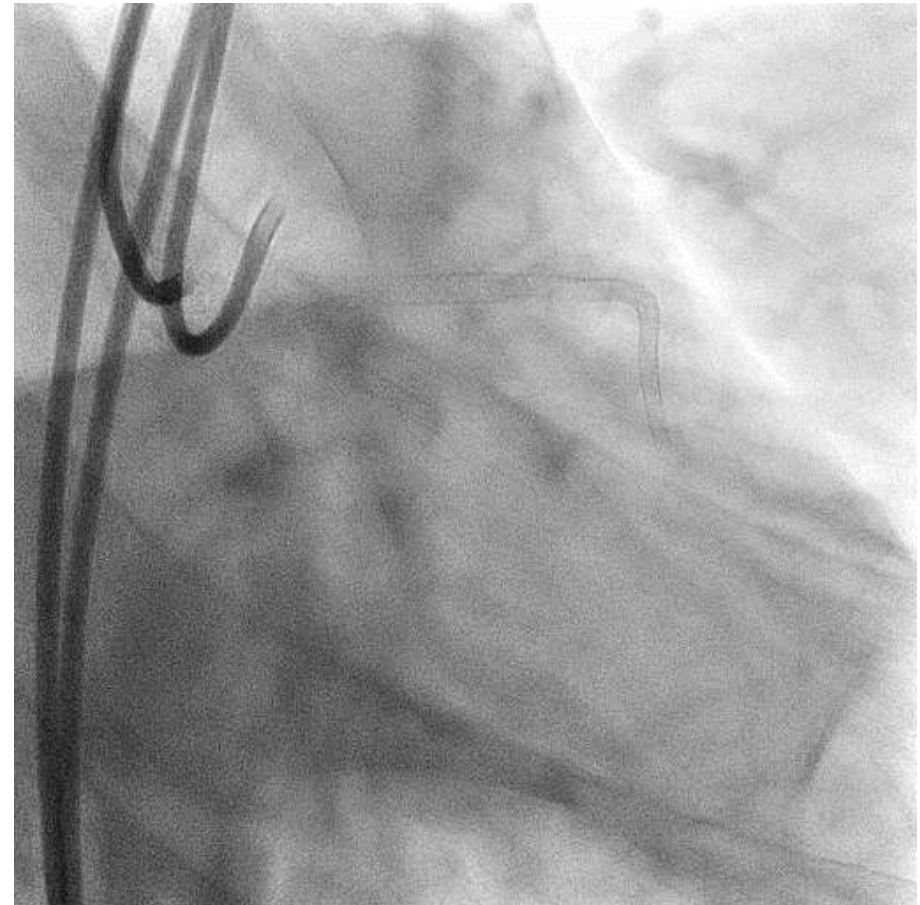
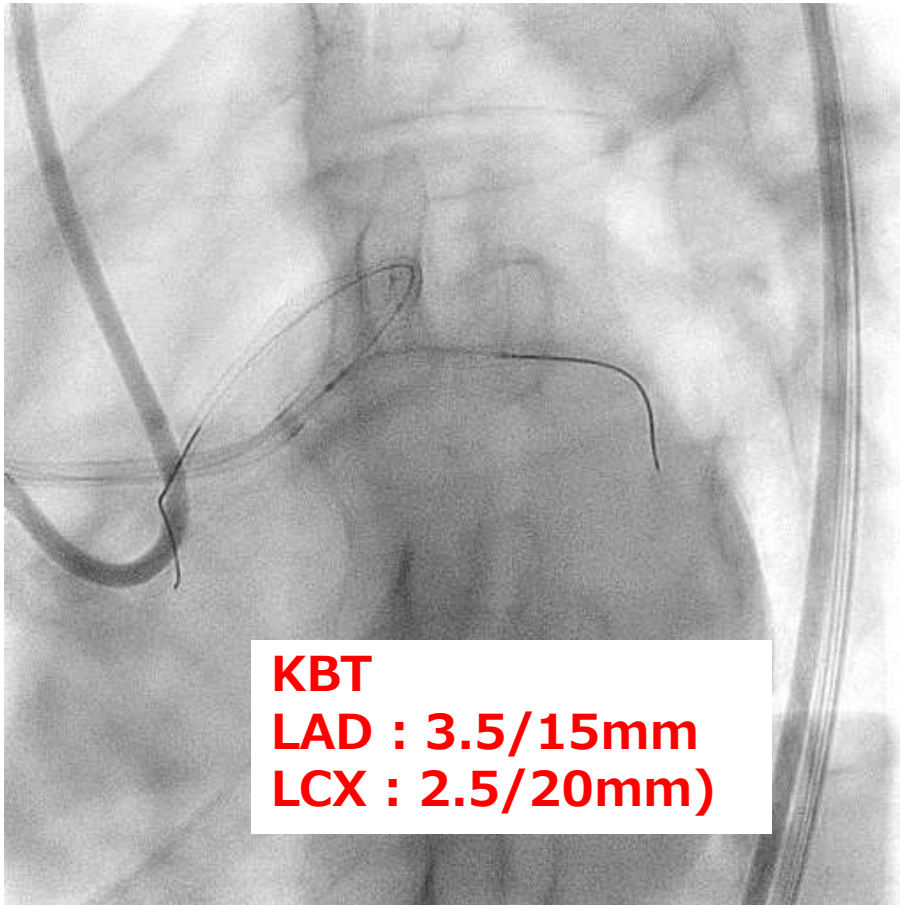


Unfavorable TAP stent

Flow is roiling, causing turbulence.



Final Angiogram following by KBT

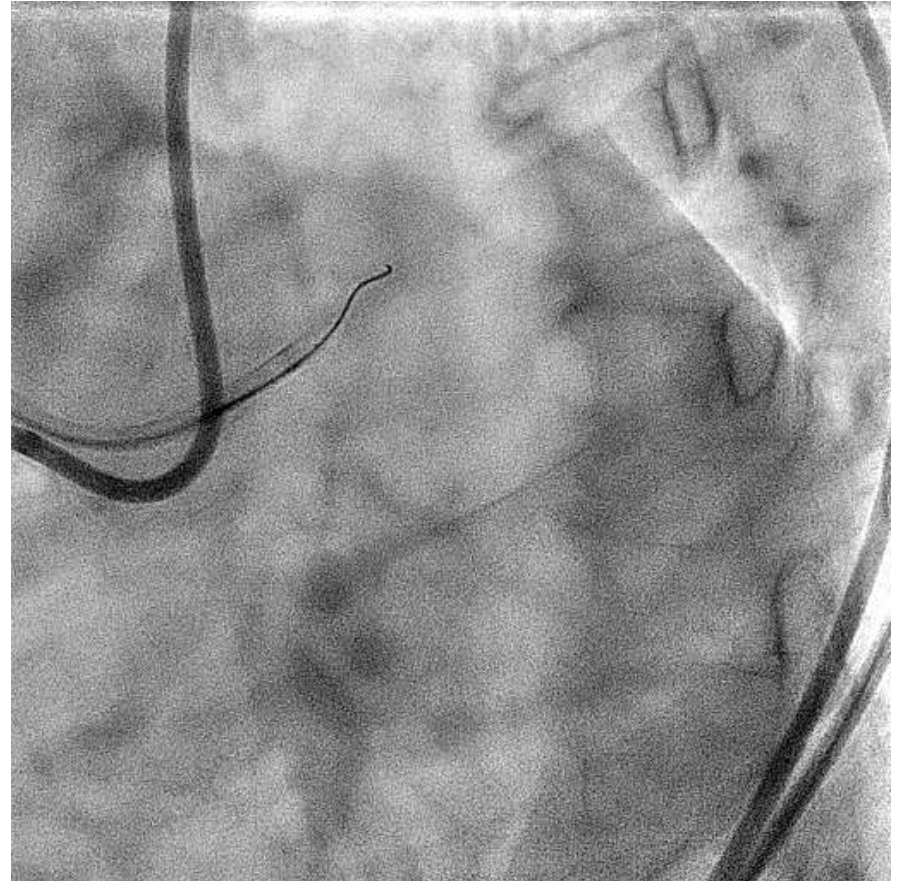
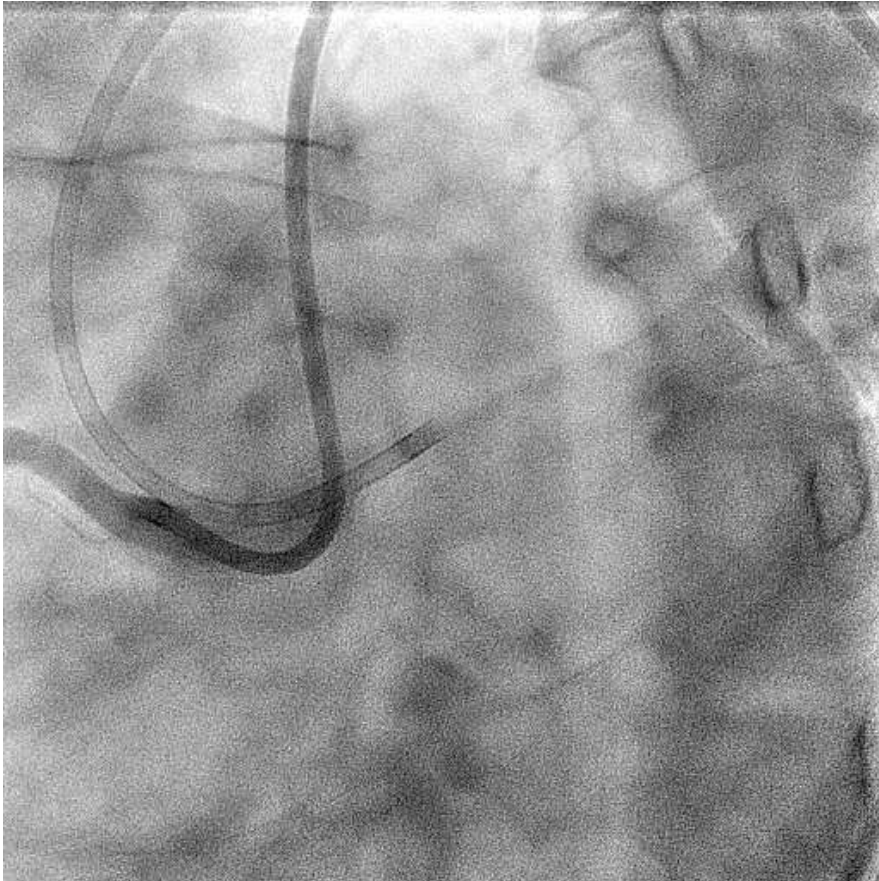


Points of this case

1. CTO of LMT is rare pathology. When PCI is conducted on such case, meticulous case discussion and precise PCI technique are indispensable.
2. Coronary CT is significantly useful in reviewing lesion morphology and planning strategy. Sometime it may greatly change PCI strategy of PCI on CTO.
3. Most of LMT lesion involves bifurcation lesion. In actual treatment with stenting, not only technique for CTO but also sufficient knowledge of bifurcation lesion is also needed.

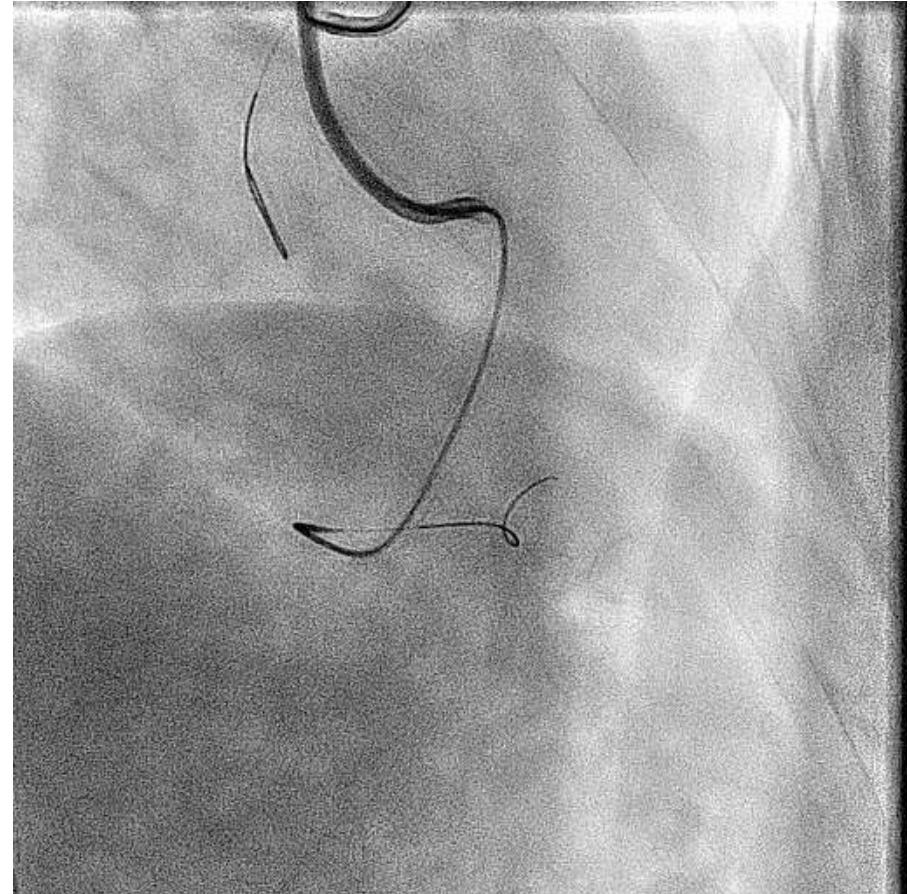
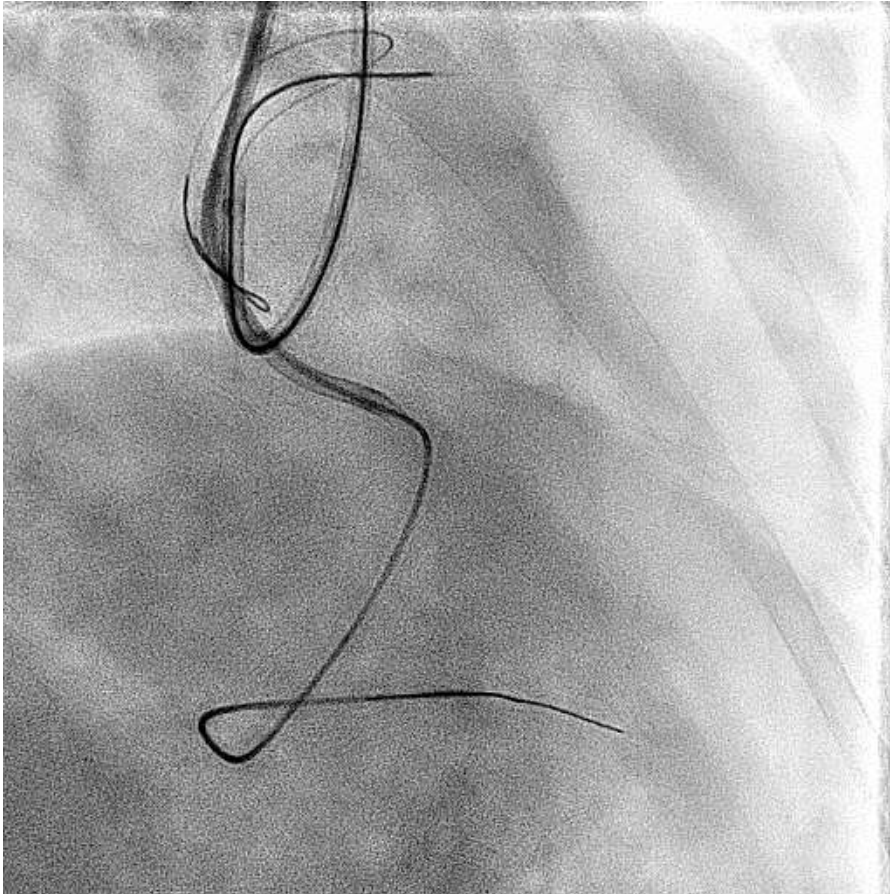
67yo, M: UAP, LAD-CTO with LCX ost. stenosis

Case: LAD CTO whose LCX ostium is severely stenotic. Collaterals are well developed at septal route from RCA. First, I tried antegrade approach to search LAD ostium.



67yo, M: UAP, LAD-CTO with LCX ost. stenosis

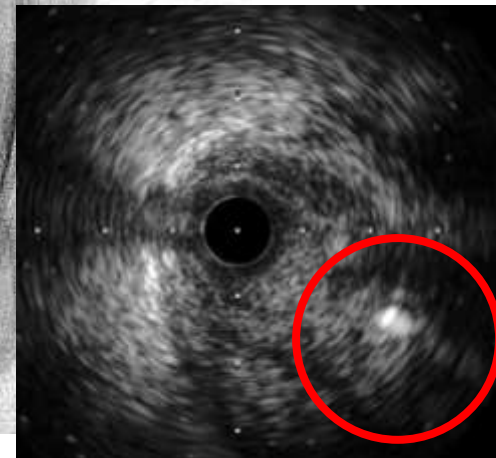
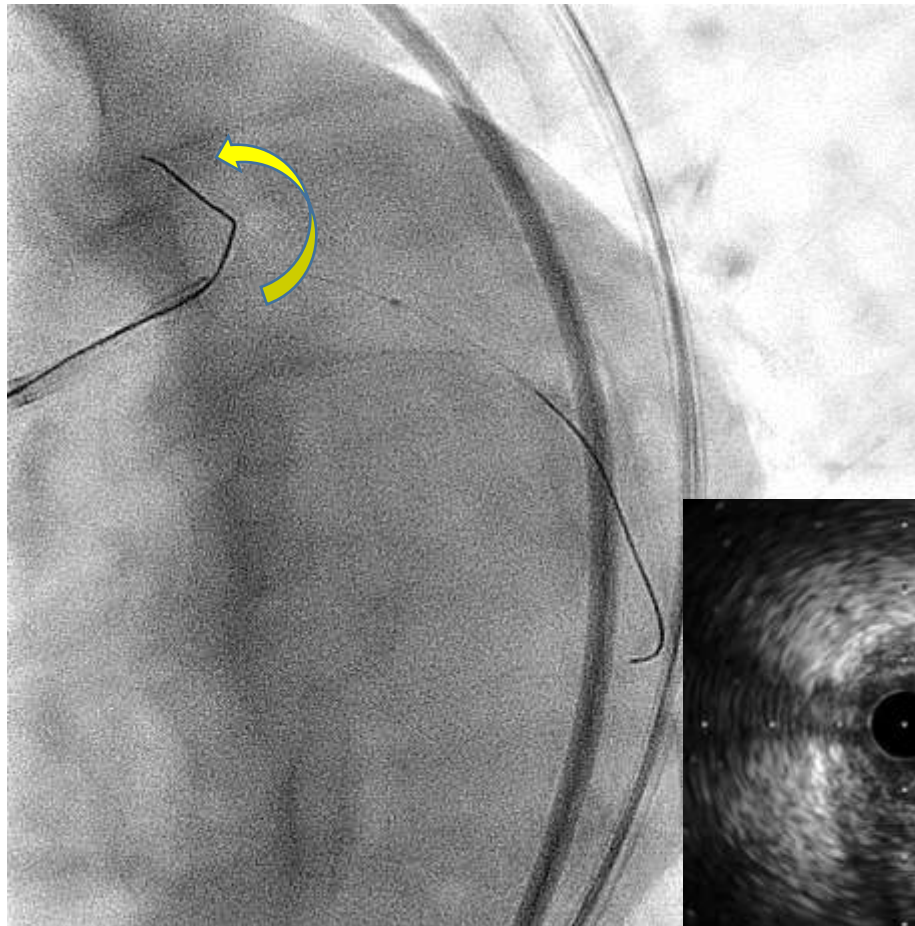
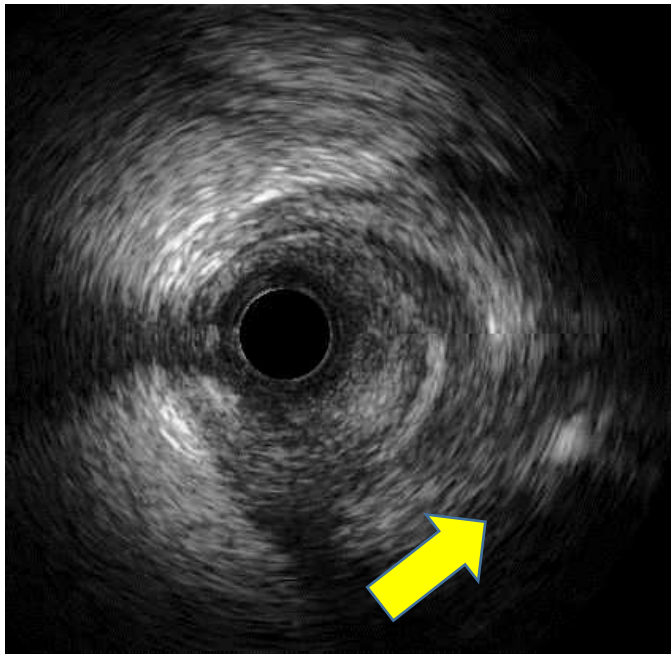
Because of the very difficulty of re-canalizing by antegrade approach, I switched to retrograde approach to select the most distal collateral. However, there was corkscrew portion in that collateral where the guide wire was stuck and never advanced.



67yo, M: UAP, LAD-CTO with LCX ost. stenosis

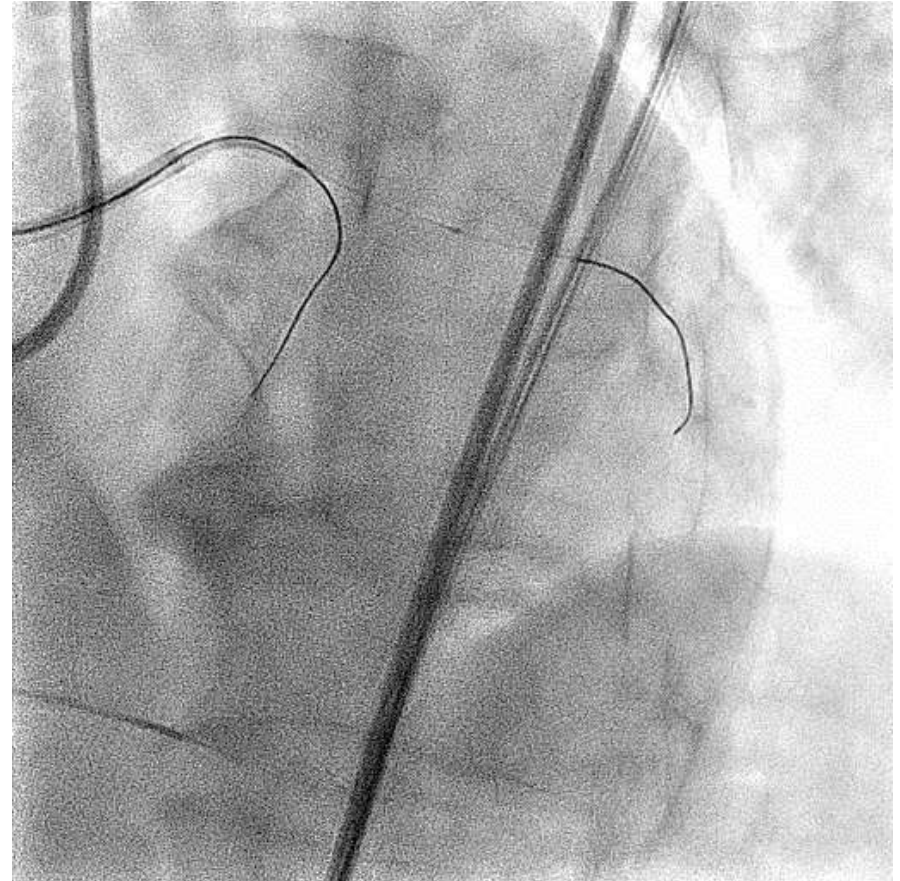
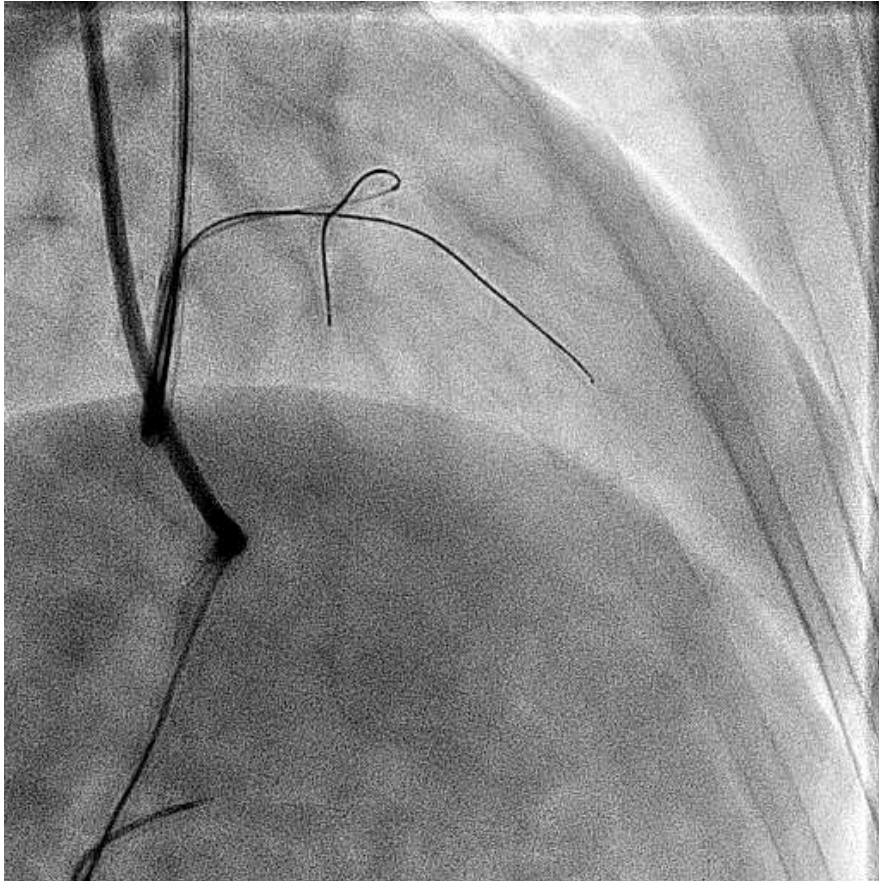
Therefore I decided to go back to antegrade approach for **IVUS guided procedure.**

The core point of this case is the stenosis at LCX ostium. Thanks to this stenotic lesion at LCX ostium, It is easy to find entry point of LAD CTO lesion by IVUS. Once it was identified, guidewire (GAIA 1st) was able to advanced with confidently.



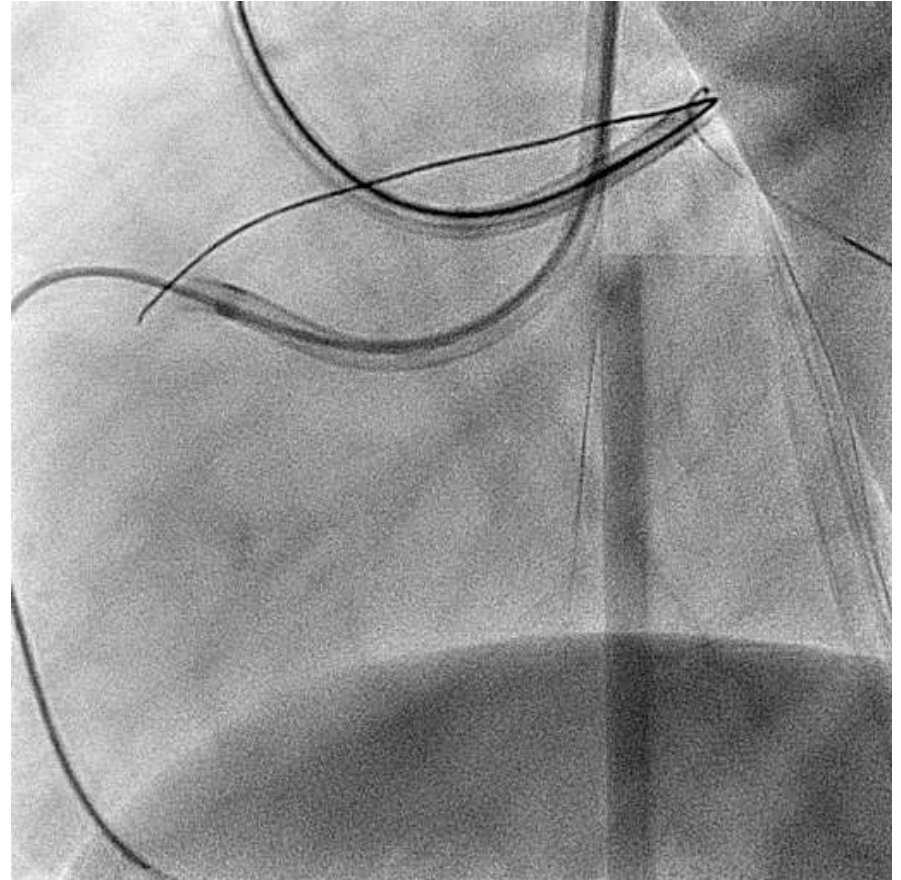
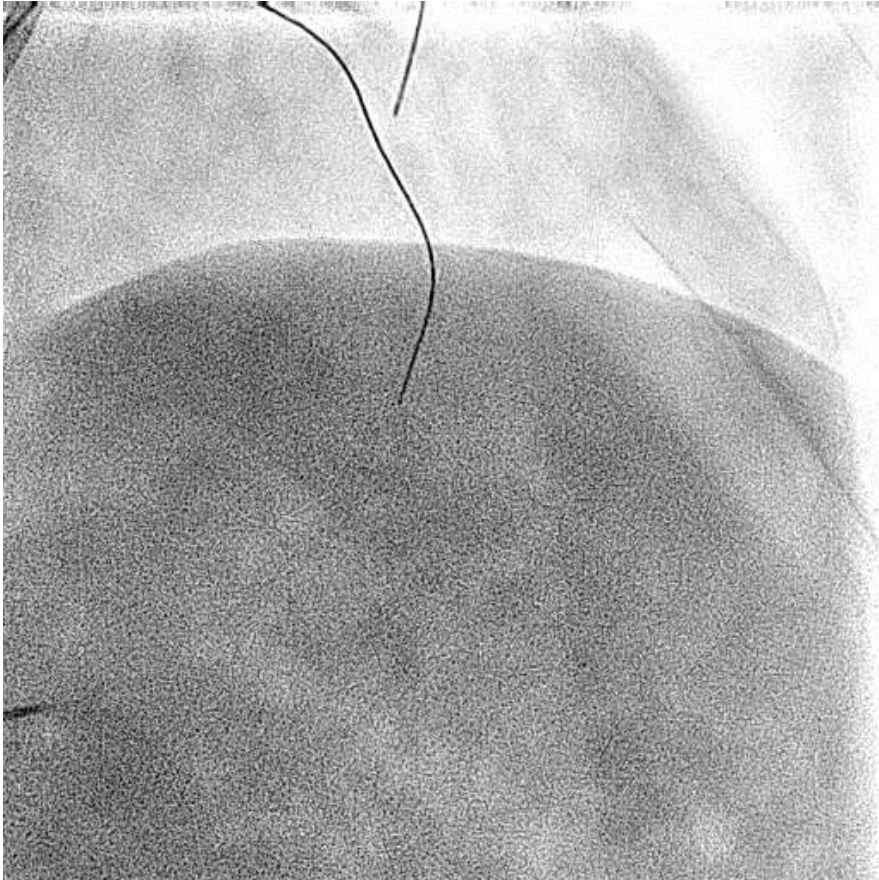
67yo, M: UAP, LAD-CTO with LCX ost. stenosis

While guidewire was carefully advanced, two appropriate orthogonal views were selected to check guidewire location. Start with Spider view and LAO caudal view, then RAO cranial and LAO cranial view were used to confirm guidewire position.



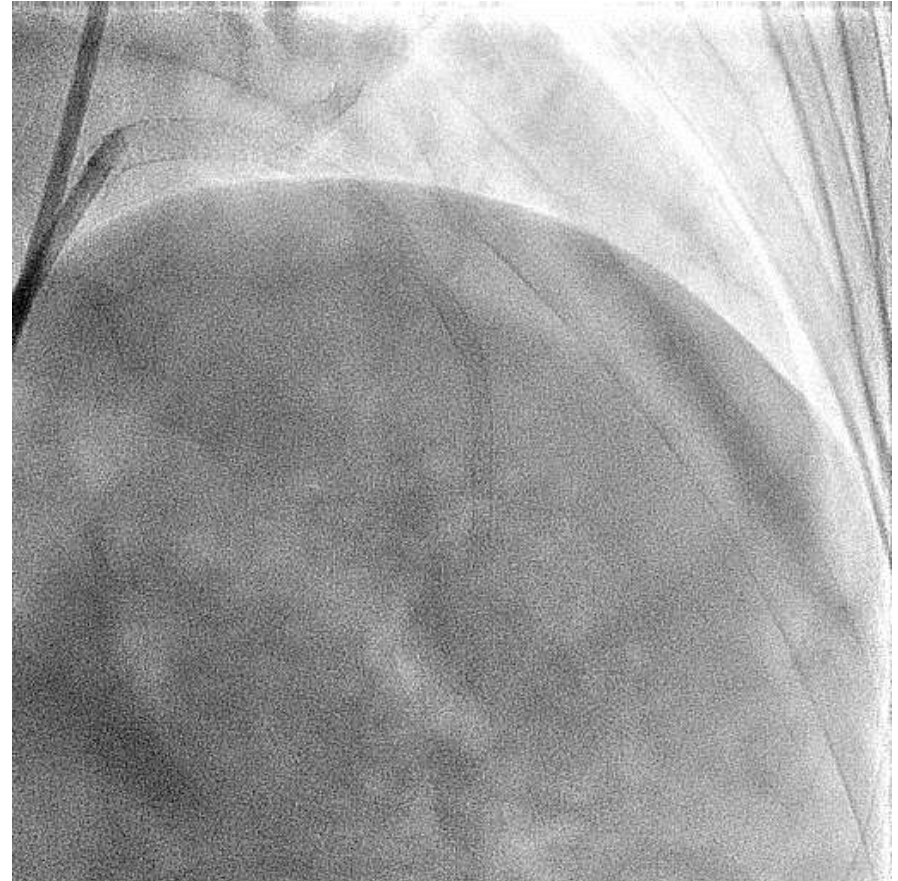
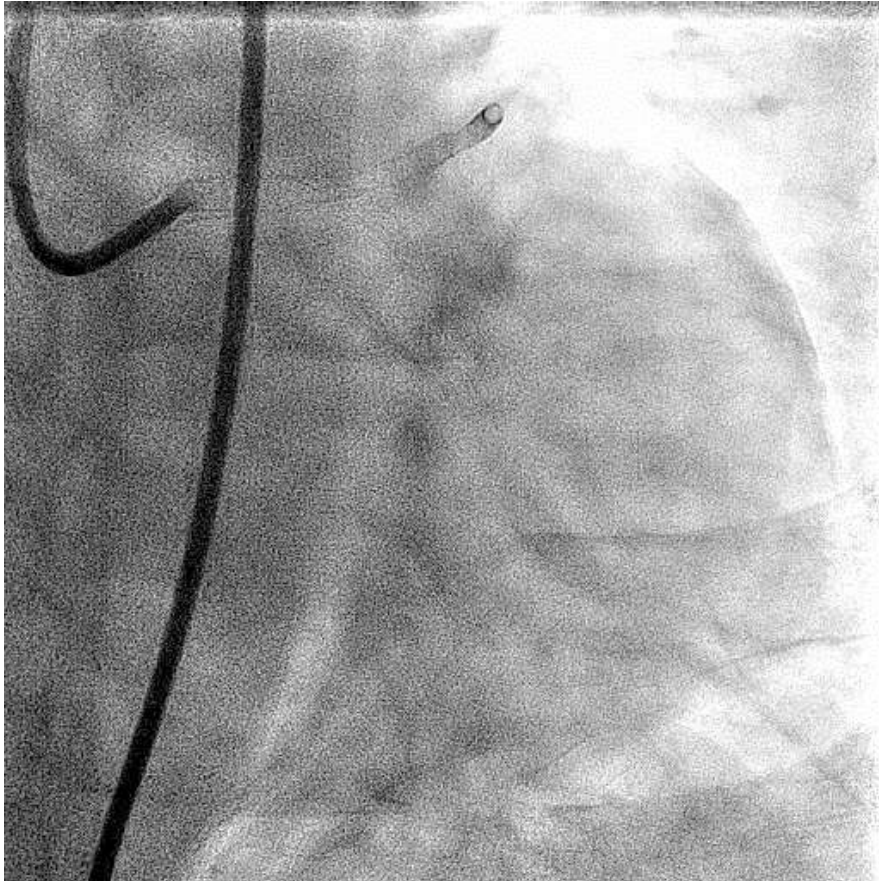
67yo, M: UAP, LAD-CTO with LCX ost. stenosis

If the guidewire was reached to middle part of LAD, we should use AP cranial and 90° true lateral view to check the guidewire location precisely. Now my guide wire tip is on the LAD precisely. After crossing the guide wire, it was switched to regular GW and implanted stents one to the other.



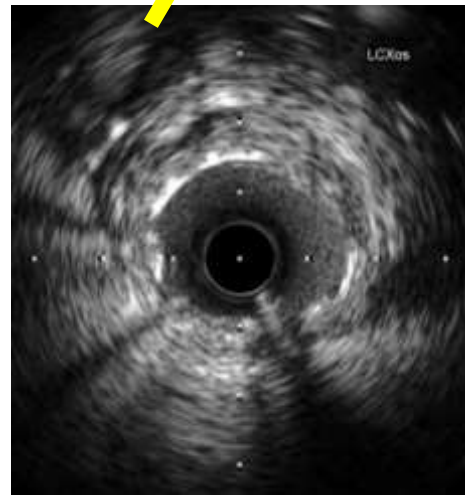
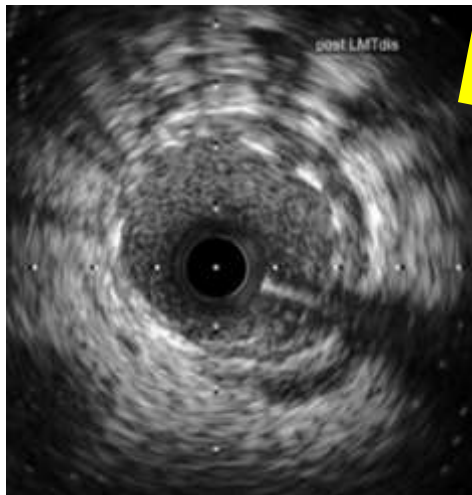
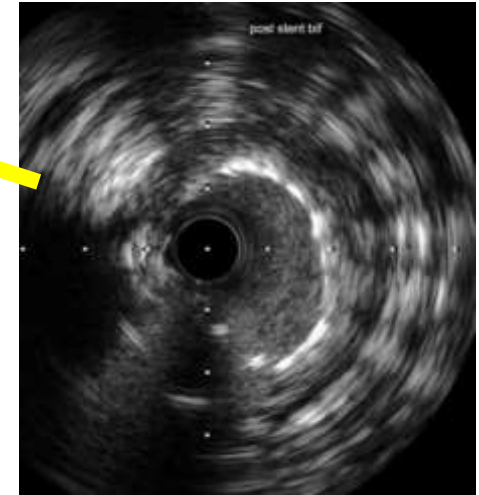
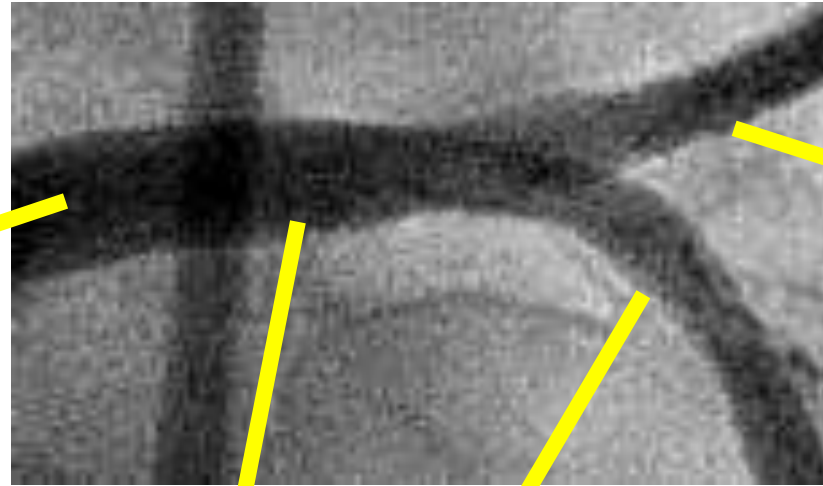
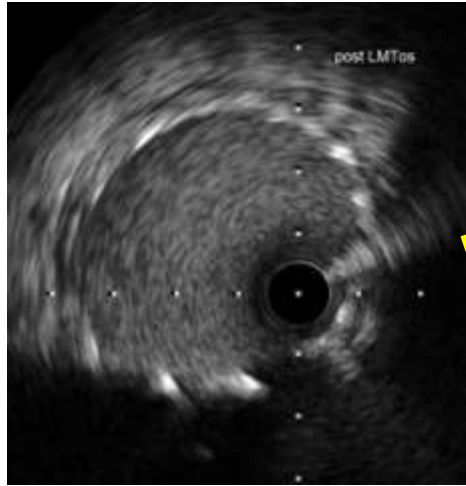
67yo, M: UAP, LAD-CTO with LCX ost. stenosis

At the area of LMT, mini-crush stenting technique was used in deploying stents.
This is the final angiogram.



67yo, M: UAP, LAD-CTO with LCX ost. stenosis

Final IVUS findings: LMT ostium, LMT body, Bifurcated area, LCX proximal, LAD proximal
In all of the lesion, apposition of the stent strut is quite OK !!



Happy End... Not Always !!





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Thank You Very Much

