



***Learning from Retry Cases:  
Why the Previous Attempt was failed***

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## *Case*

**Patient:** Male 60's y.o.

**Diagnosis:** OMI (Inferior+RV), Effort angina

**Target lesion:** CTO lesions from the proximal to distal RCA

**Coronary risk factor:** HBP, dyslipidemia

**EF:** 48%, **e-GFR:** 64 ml/min./1.73m<sup>2</sup>

### **Present history:**

He suffered from chest pain on effort from May 2013.

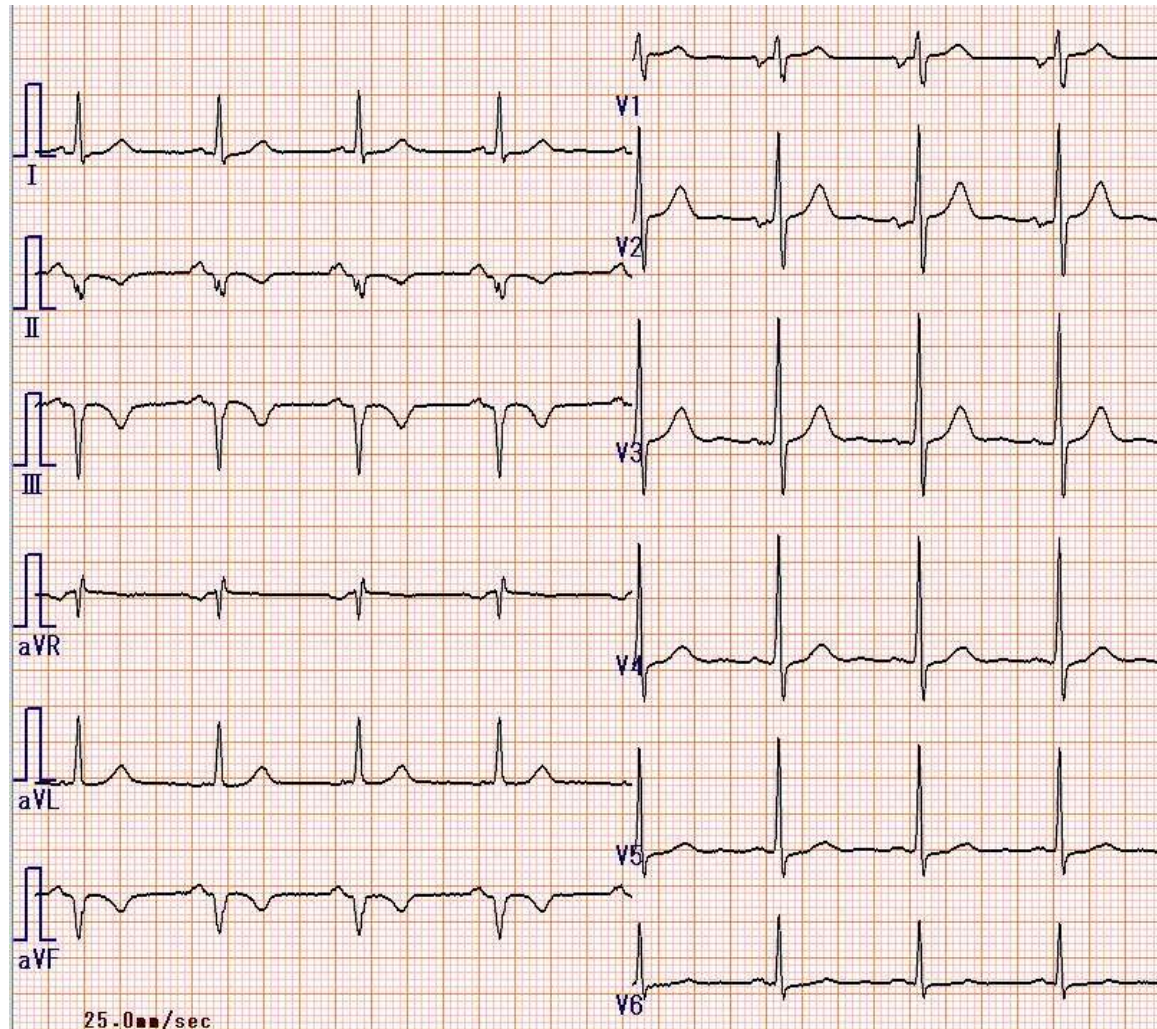
In August 2013, he was diagnosed with OMI (Inferior+RV) and effort angina by EKG and echocardiography.

In Sep. 2013, CAG revealed the CTO lesions from the proximal to distal RCA and ad-hoc PCI was performed for them. But PCI failed because the guidewires could not pass through them.

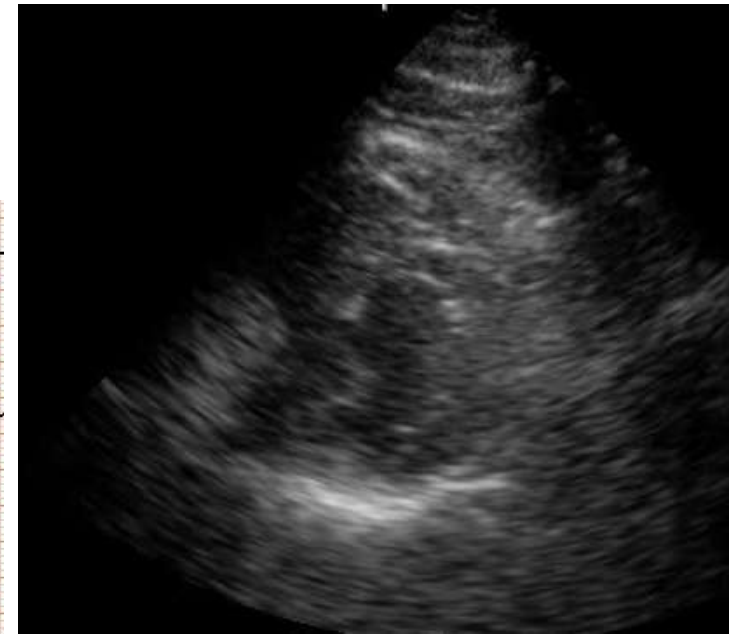
In Dec. 2013, he was admitted for retry PCI for the CTO lesions in our hospital.

## ***EKG and Echocardiography on admission***

### **EKG**



### **Echocardiography**



LVEF: 48%

LV: inferior-posterior & RV asynergy.



## ***1<sup>st</sup>-PCI Sep. 19, 2103***

**Target lesions:** CTO from the proximal to distal RCA

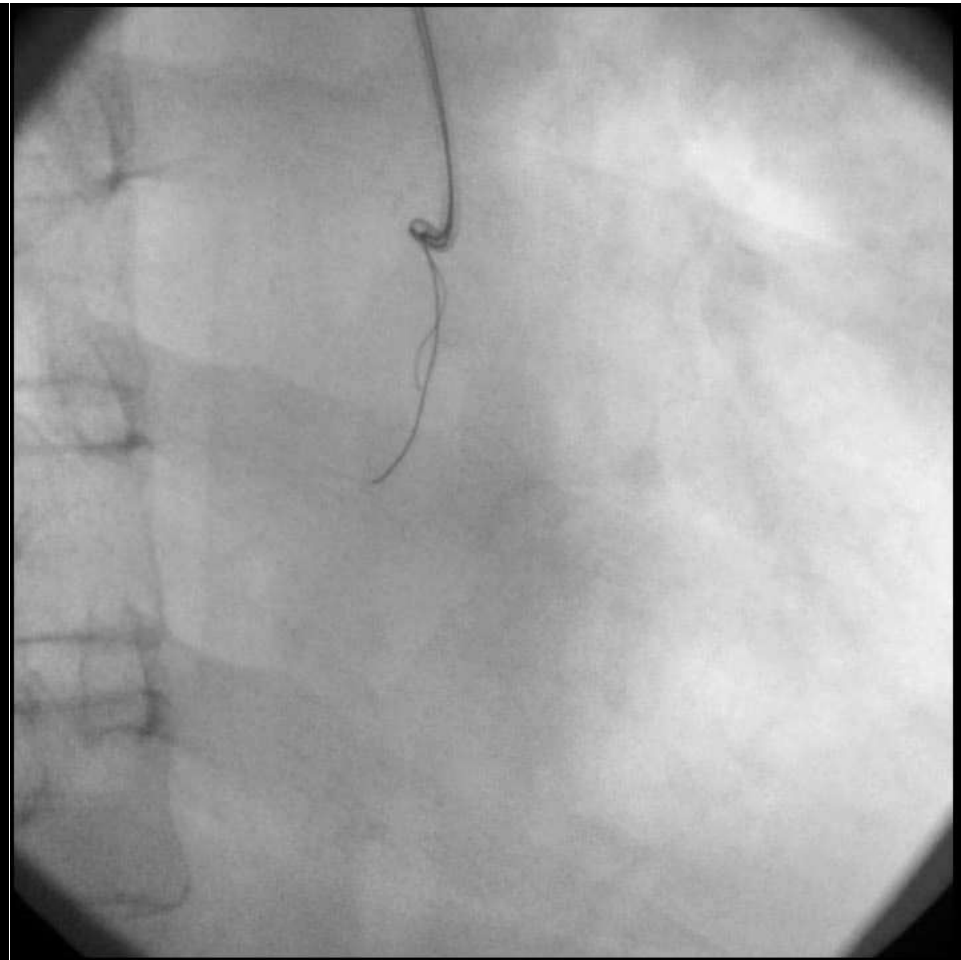
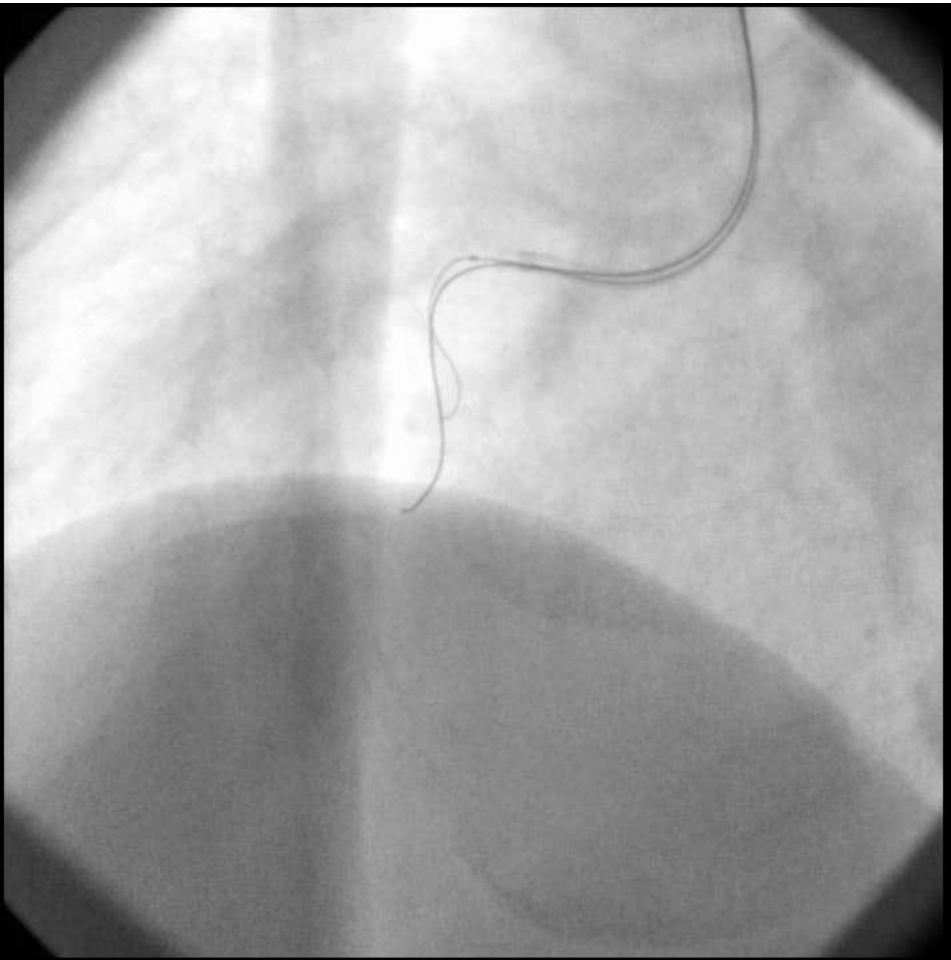
**Approach:** TRI

**Guide catheter:** Antegrade SAL 1.0 6 Fr



Antegrade approach including the parallel wire technique was performed.

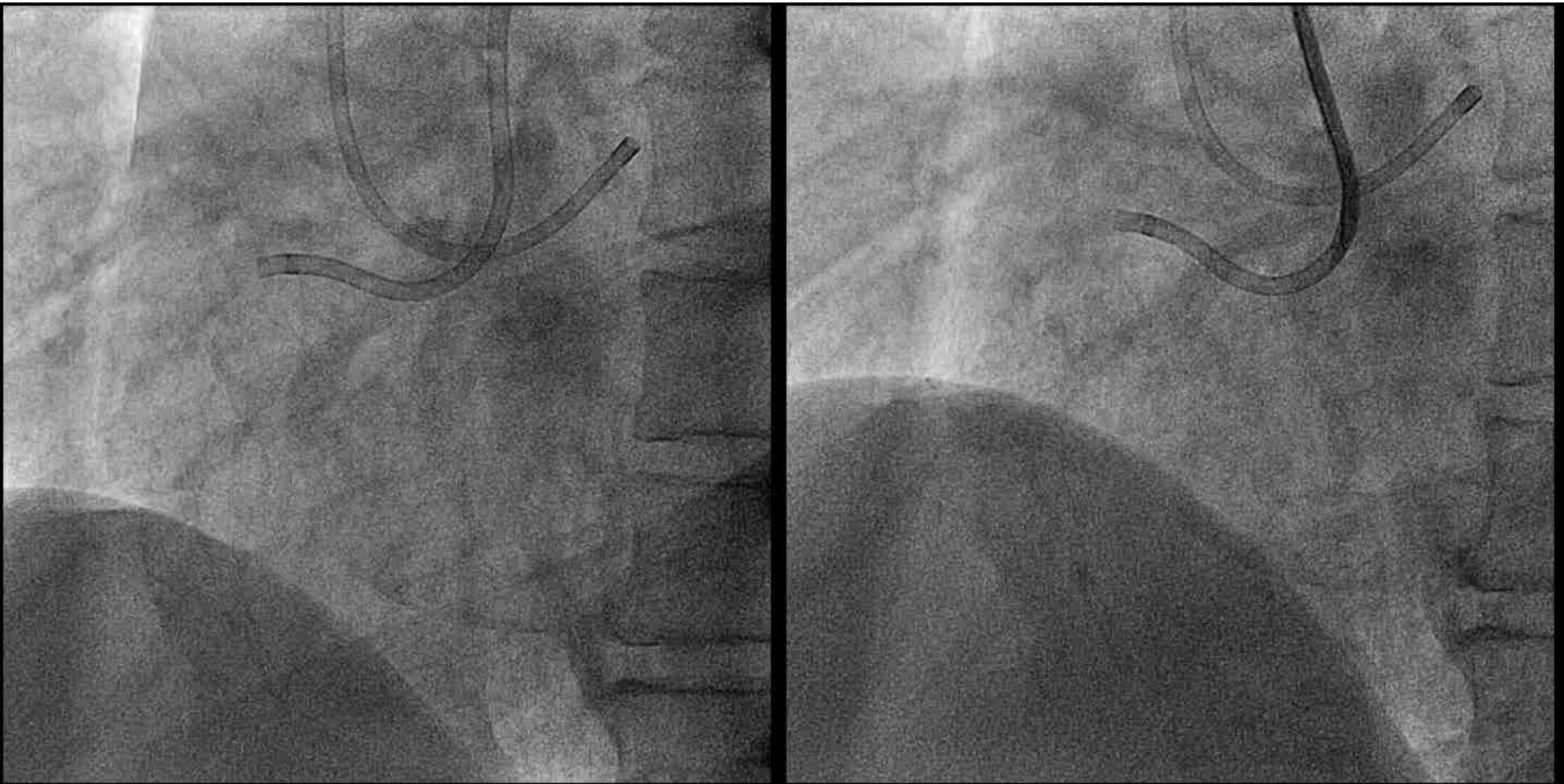
The guidewires could not pass the CTO lesions because the CTO root was not clear at the middle part of the CTO.



## ***Retry procedure: 2<sup>nd</sup>-PCI Dec. 15, 2013***

**Approach:** bilateral TFI

**Guide catheter:** Antegrade AL 0.75 SH 8 Fr, Retrograde SPB 3.5 SH 7 Fr



## ***My plan to the RCA CTO lesion***

Antegrade wiring with bilateral angiography



Retrograde approach through septal, PL, Kugel's artery channels



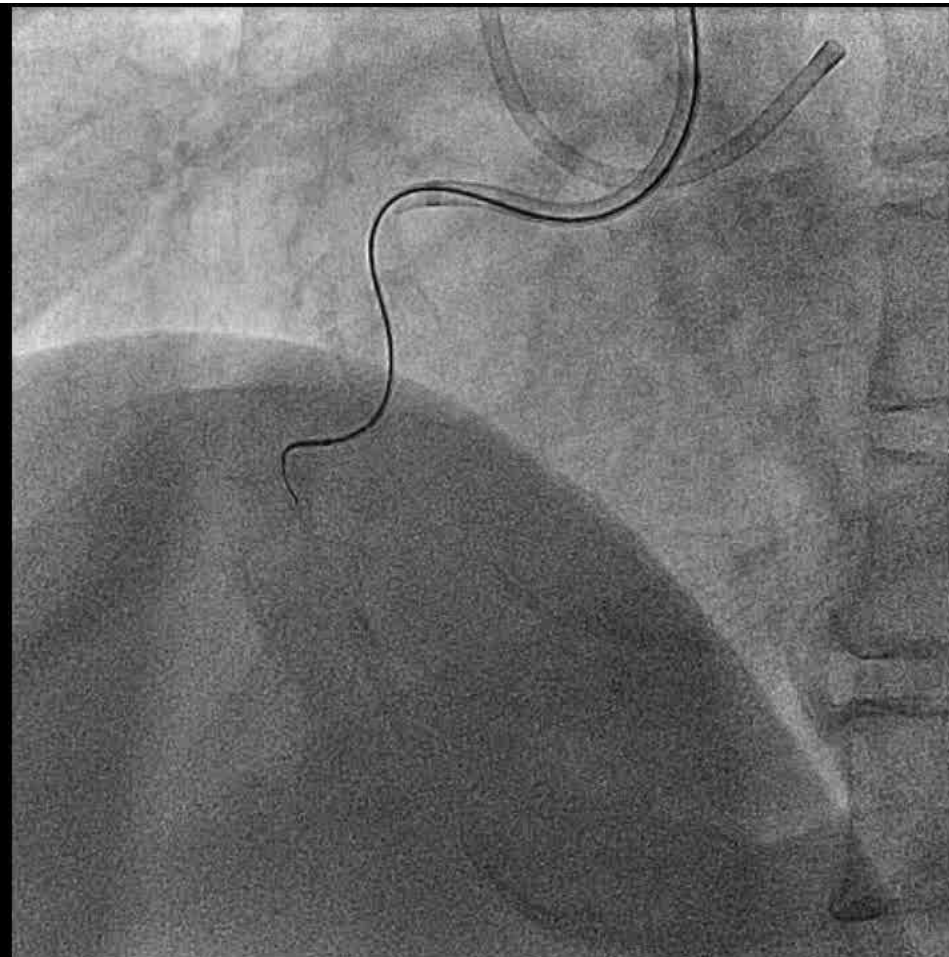
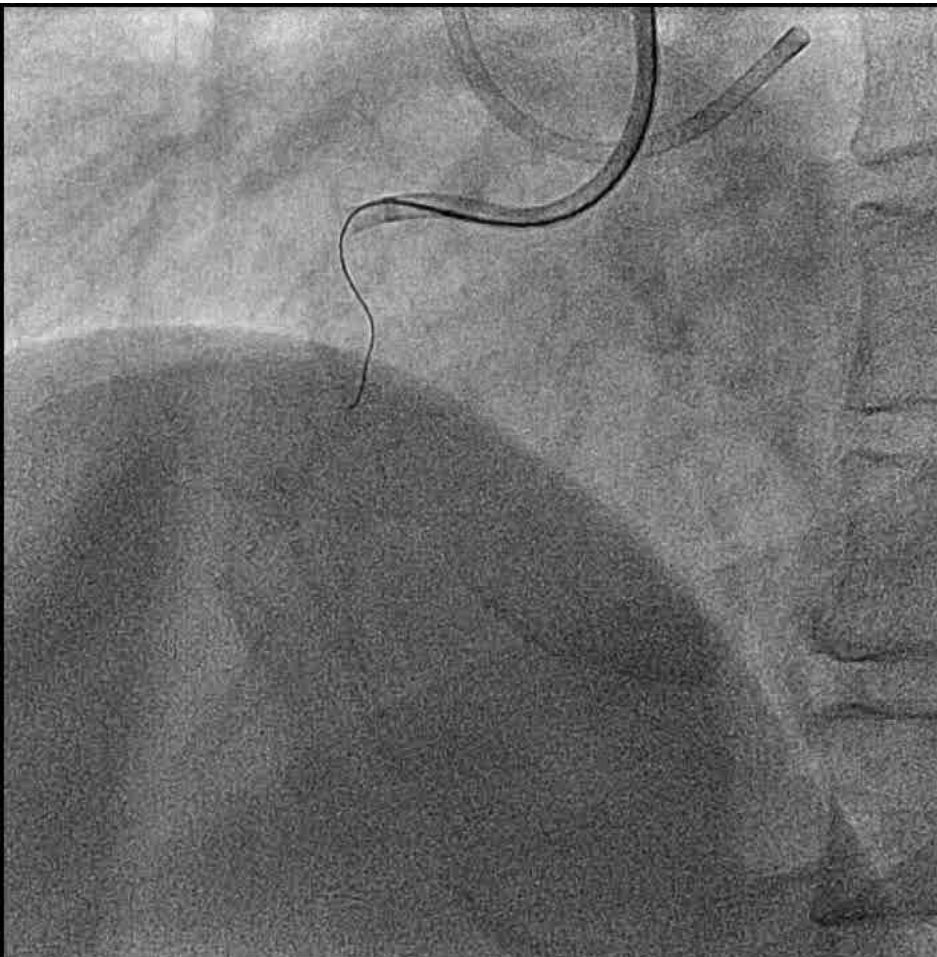
Antegrade wiring with IVUS guidance



# 1. Antegrade approach

A XT-R and GAIA 2<sup>nd</sup>- wires with a Corsair got into the proximal part of the CTO lesion, but the GAIA 2<sup>nd</sup>- wire stopped at the middle part of the CTO lesion.

Because the vessel root was not clear from this part, the GAIA 2<sup>nd</sup>- wire was changed into a UB 3 and Pilot 150 wires, but they could not advance.

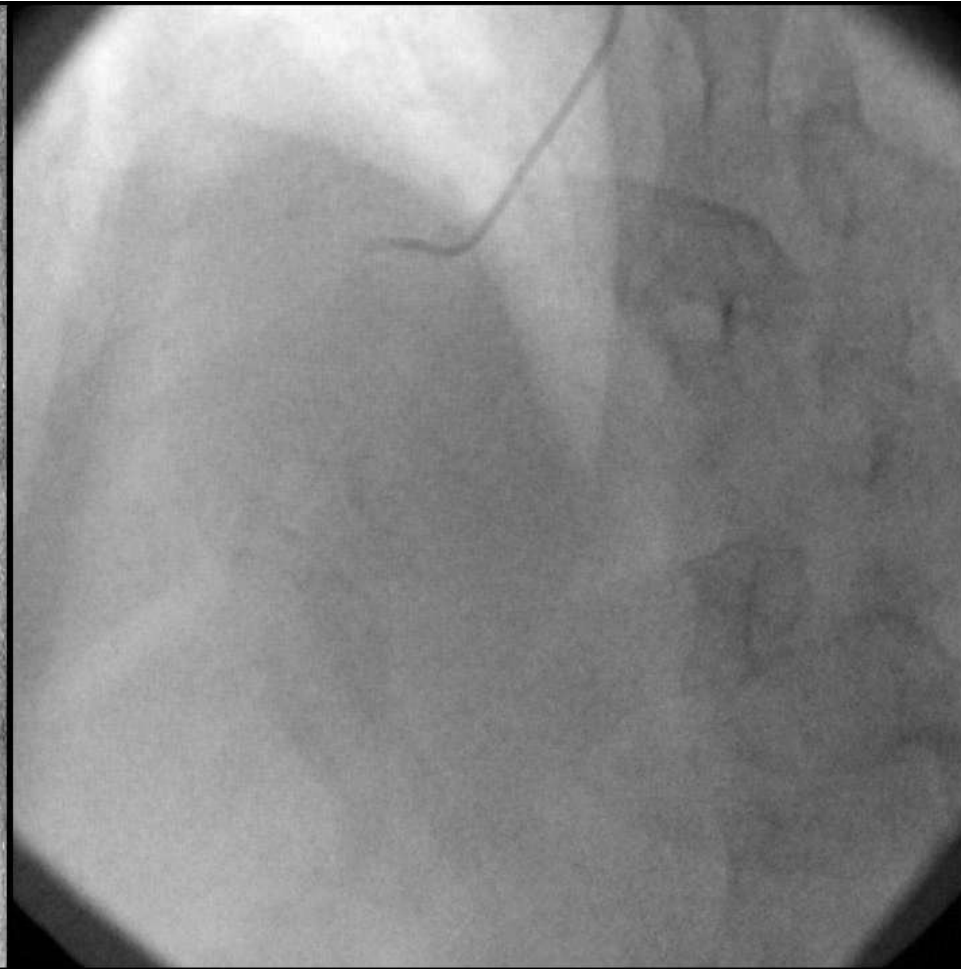
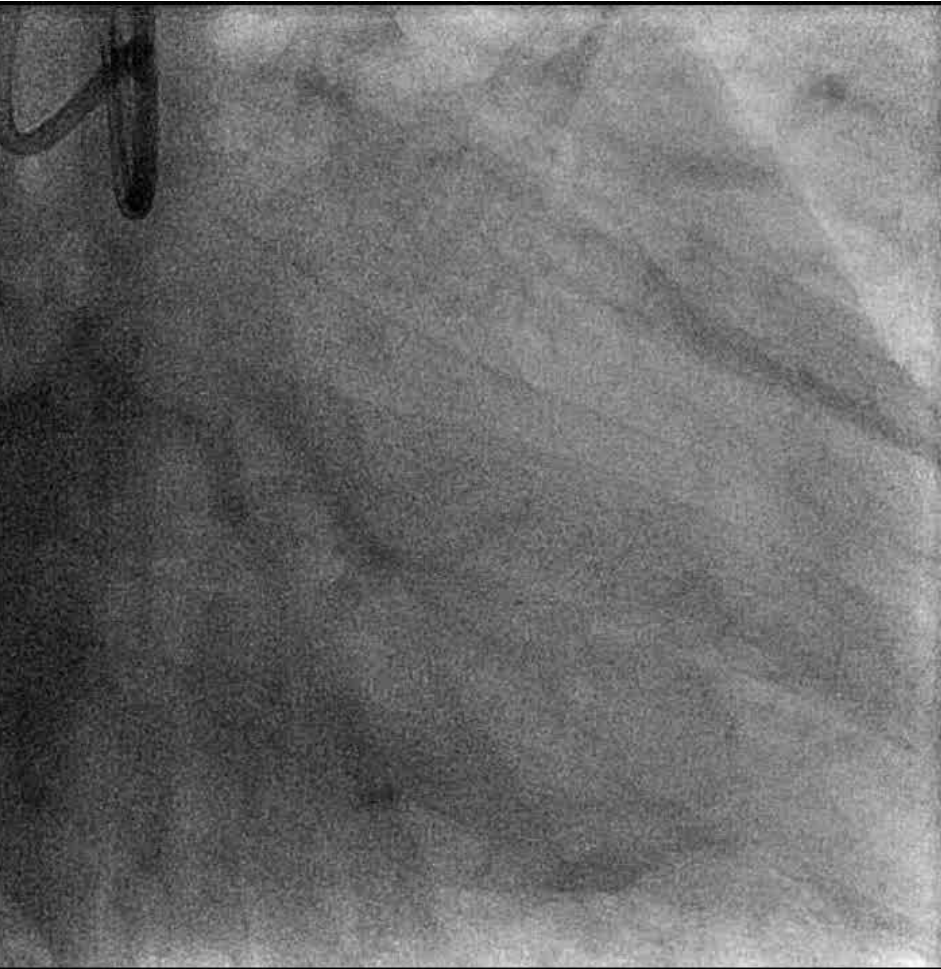




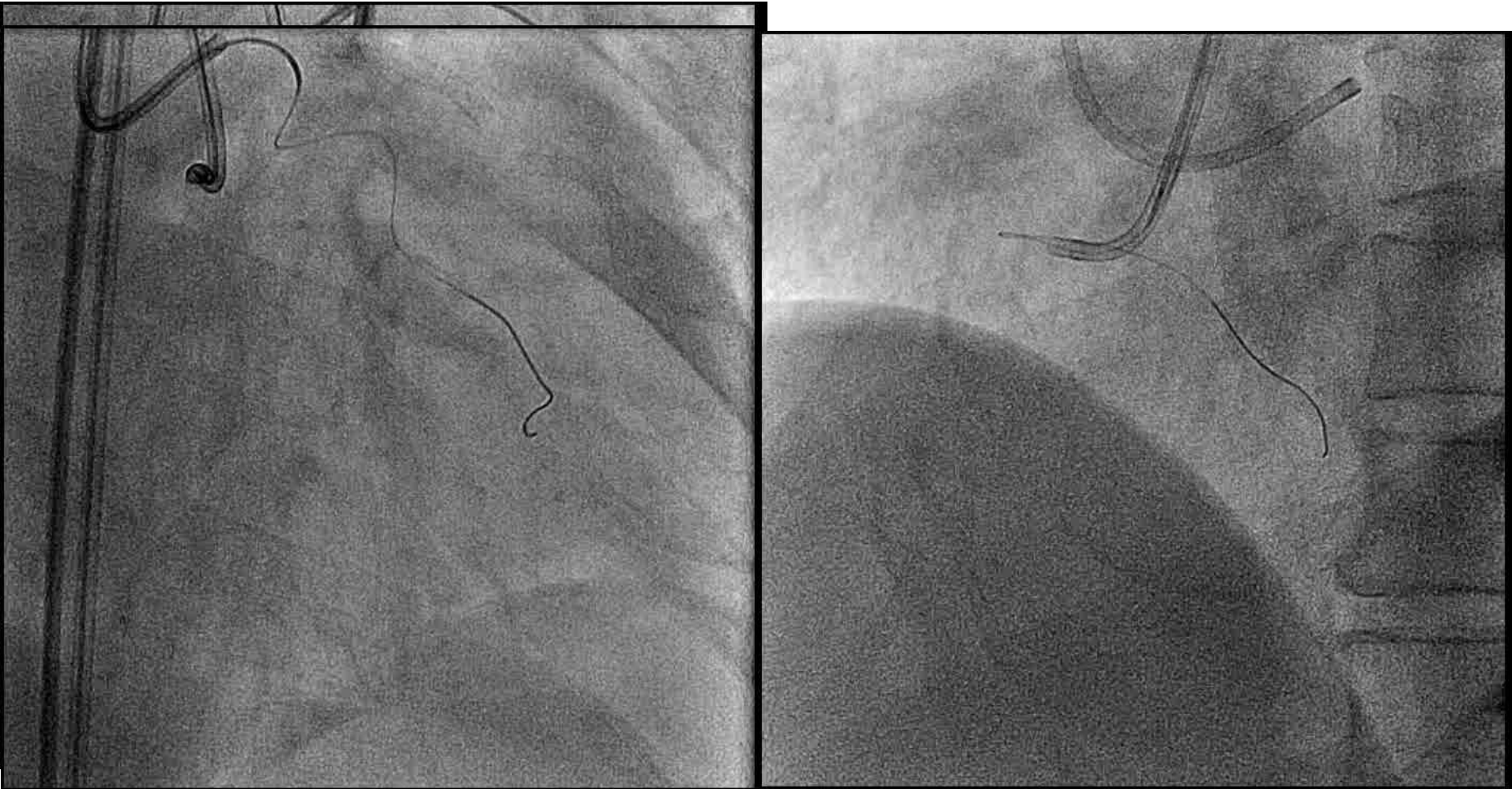
## 2. Retrograde approach

1. Septal channel from the LAD
2. PL channel from the LCX

3. Kugel's artery channel from the RCA

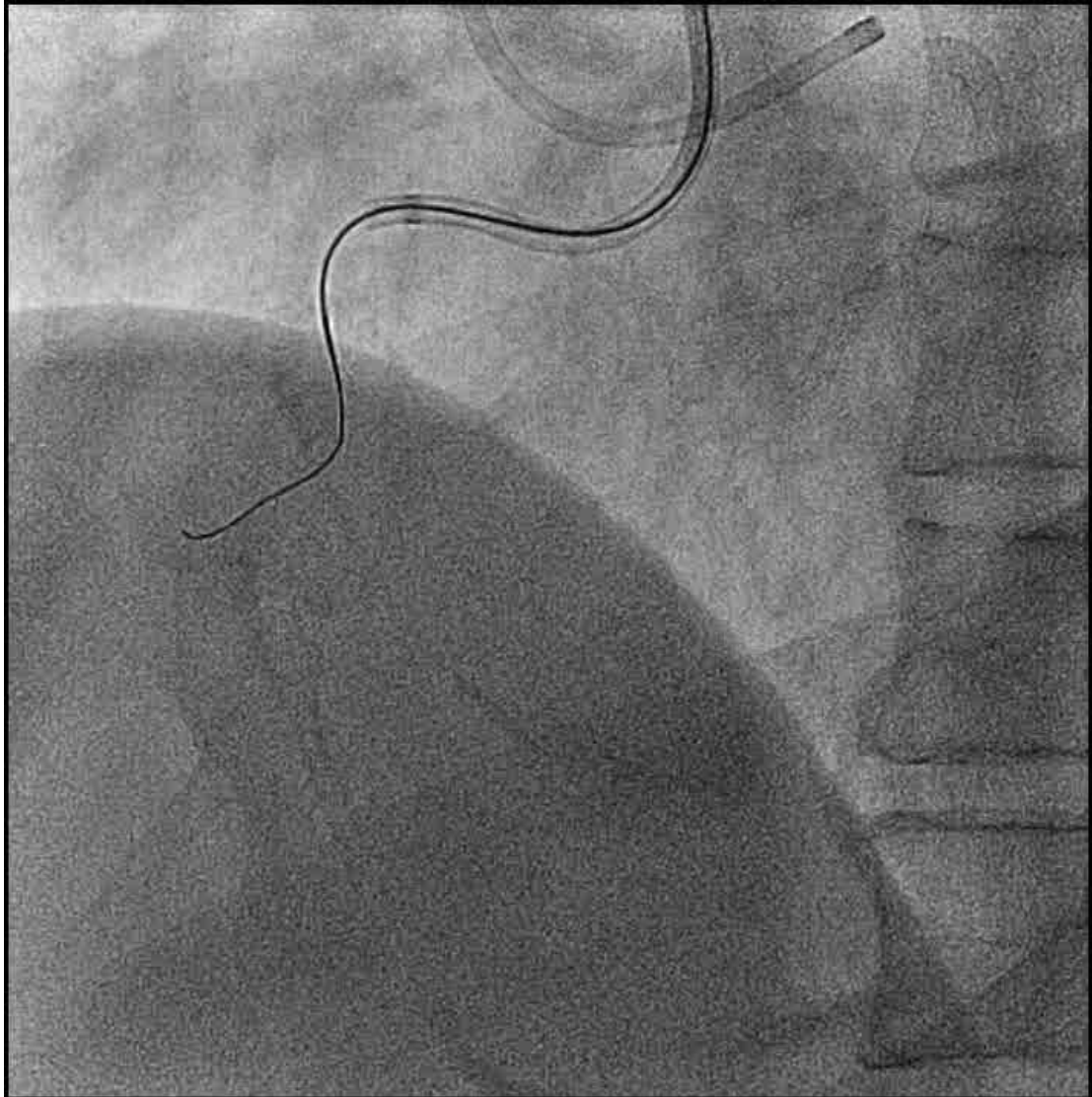


All the retrograde channels could not be passed through.



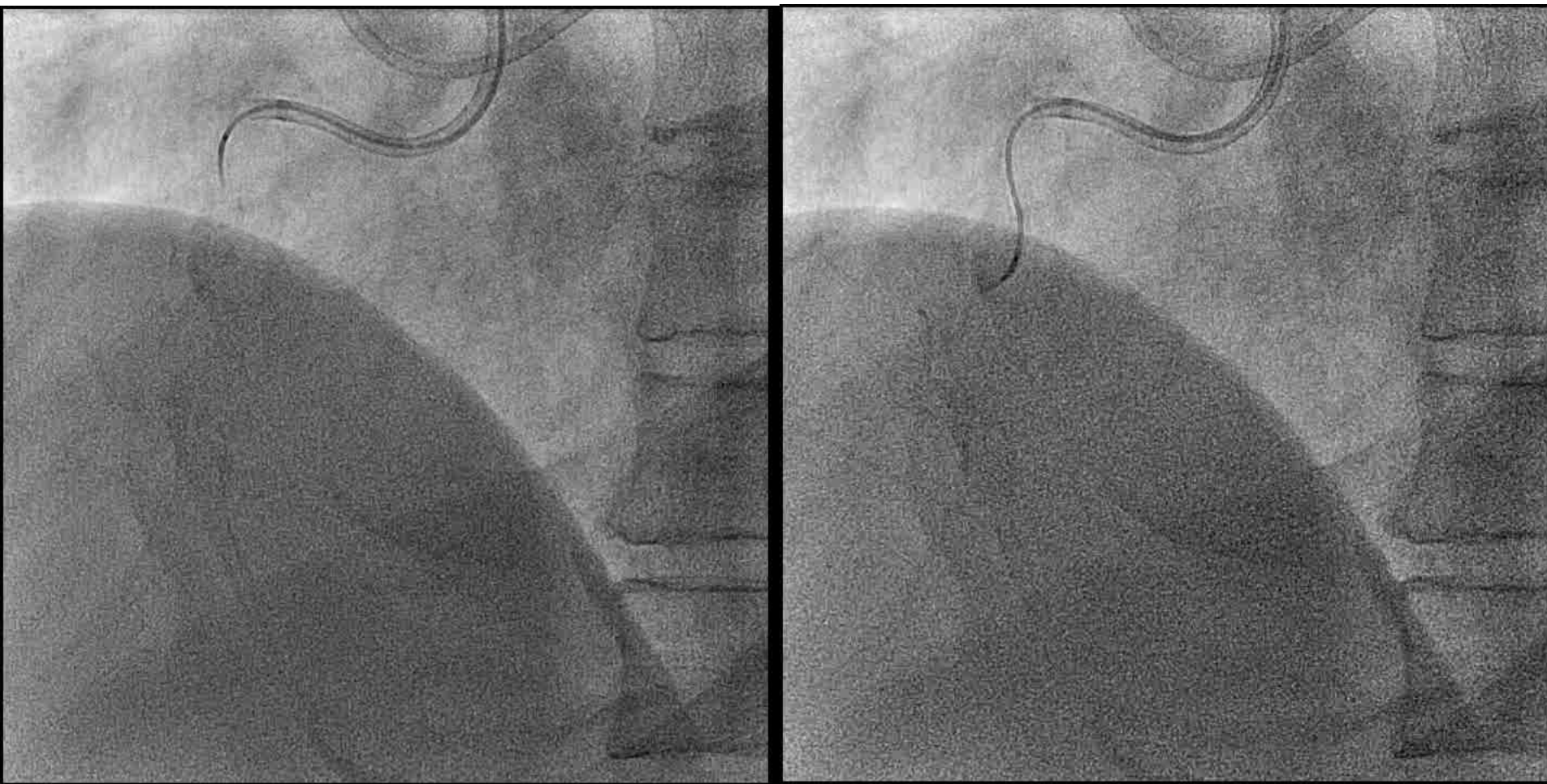
### 3. Back to the antegrade approach

The GAIA 2<sup>nd</sup>, UB 3 and Pilot 150 wires could not also advance beyond the middle part of the CTO, because the root might bend and was not clear.



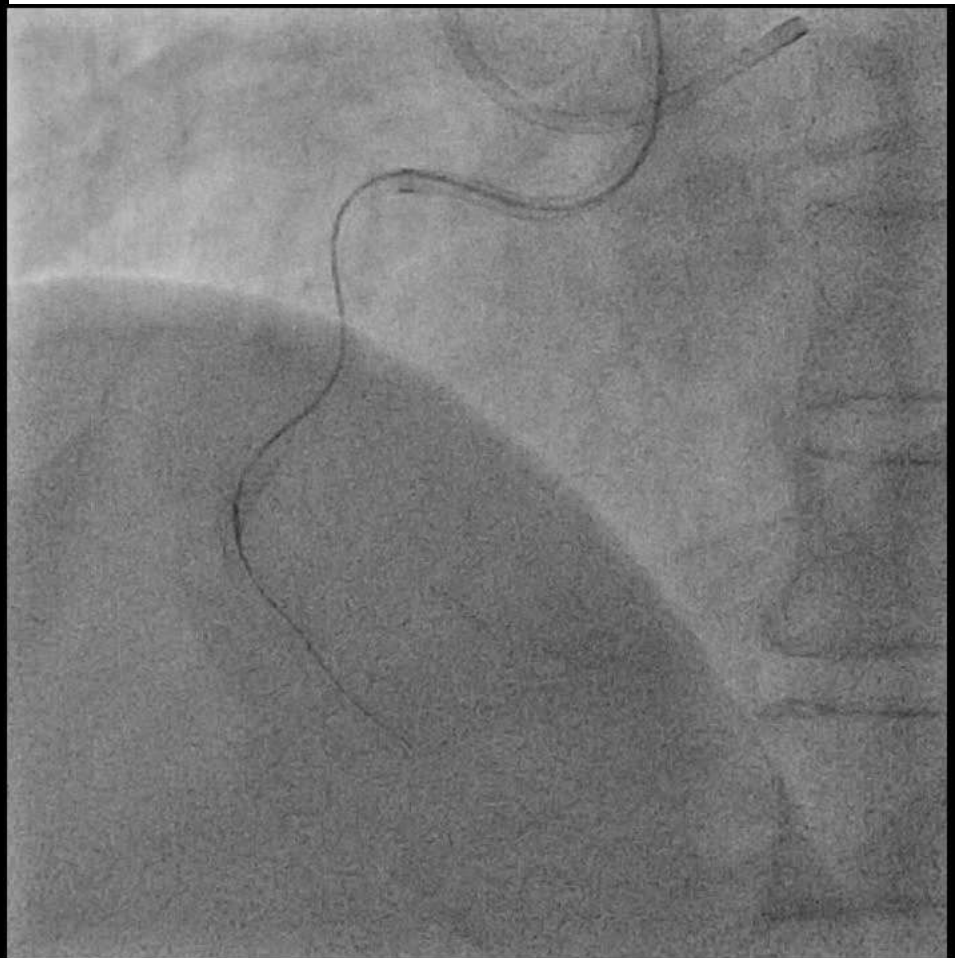
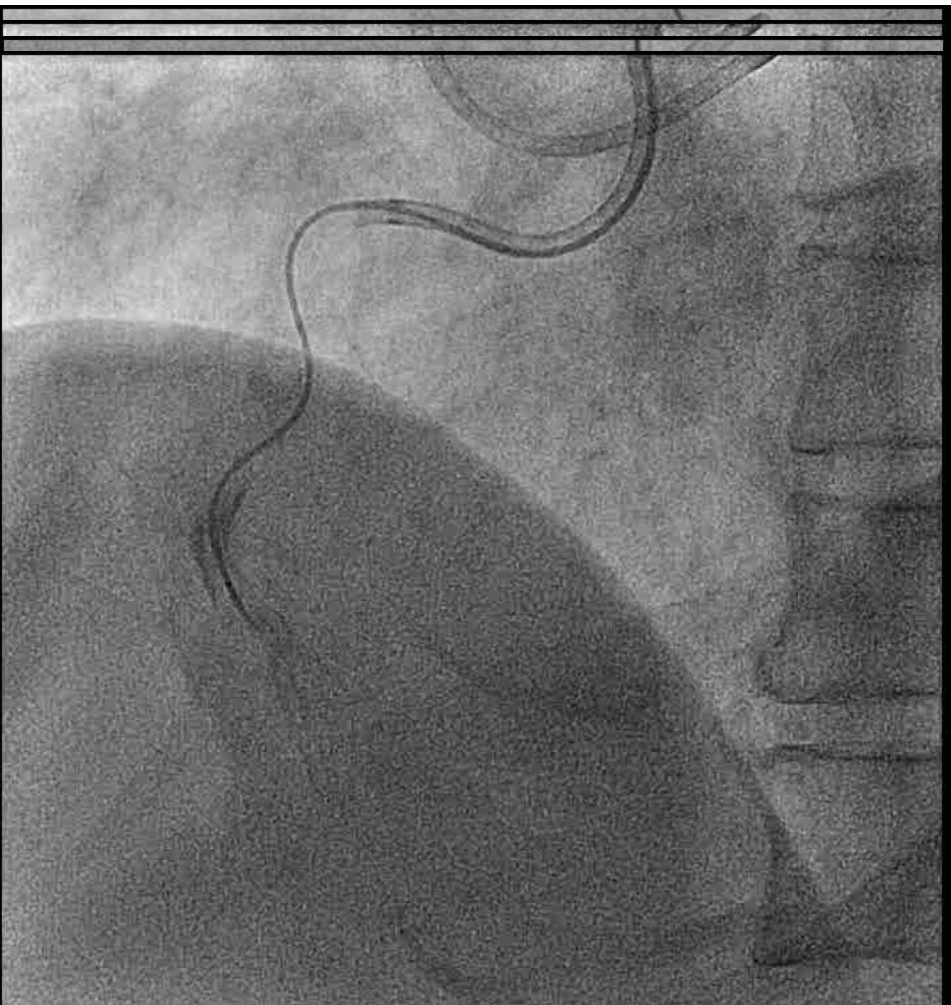


Instead of the knuckle wire technique, the very gentle tip injection of the contrast media through the Corsair by using a 1cc syringe was performed to visualize the root to minimize the vessel damage.



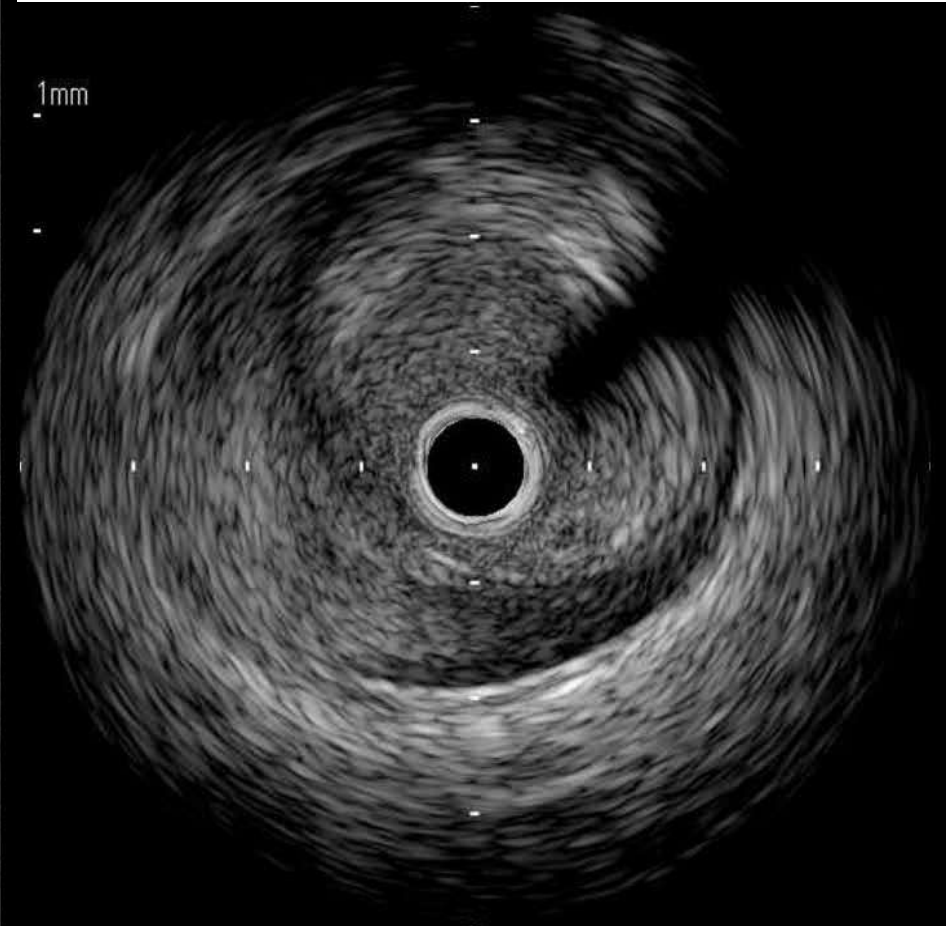
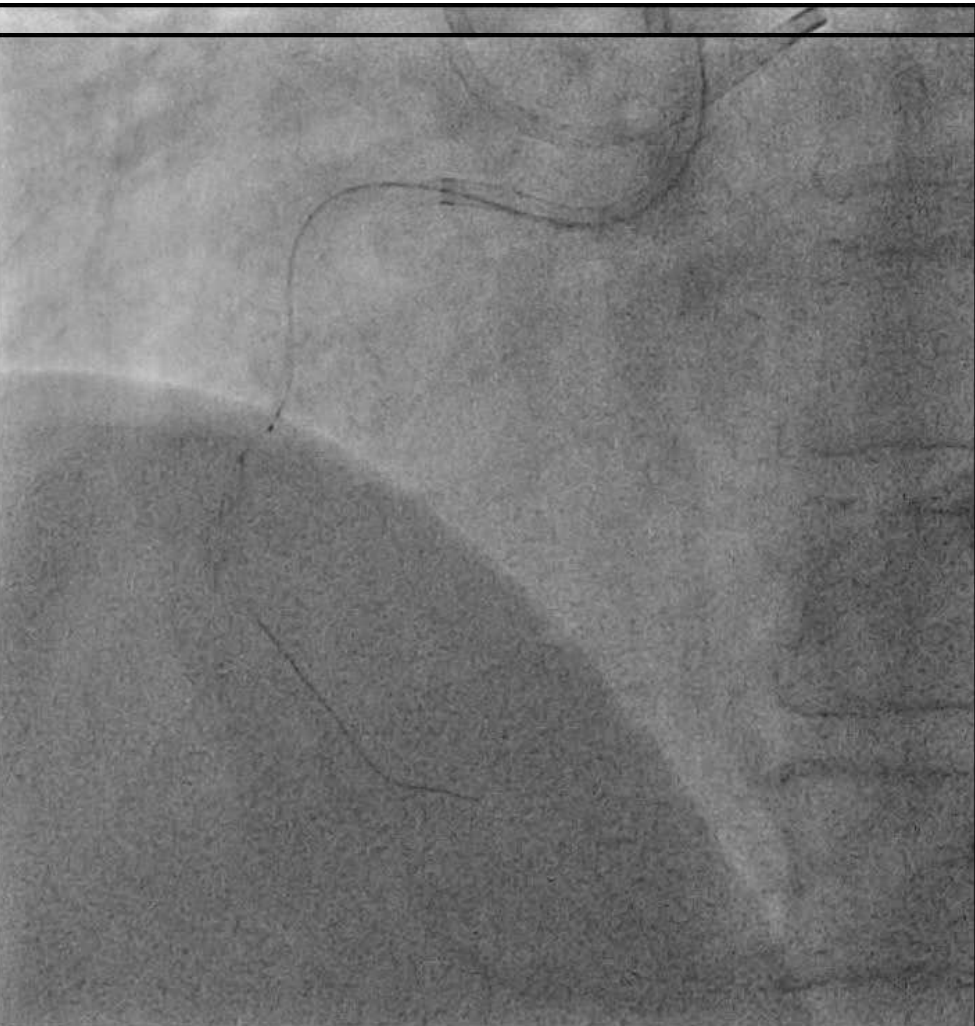
The GAIA 2<sup>nd</sup>-wire could advance in the center of the visualized vessel.

But it stopped at the distal part of CTO.



To advance Navifocus WR IVUS, POBA with a 1.5-mm and 2.0-mm balloons was performed from the proximal to middle lesions. It showed that the wire passed in the true lumen.

IVUS

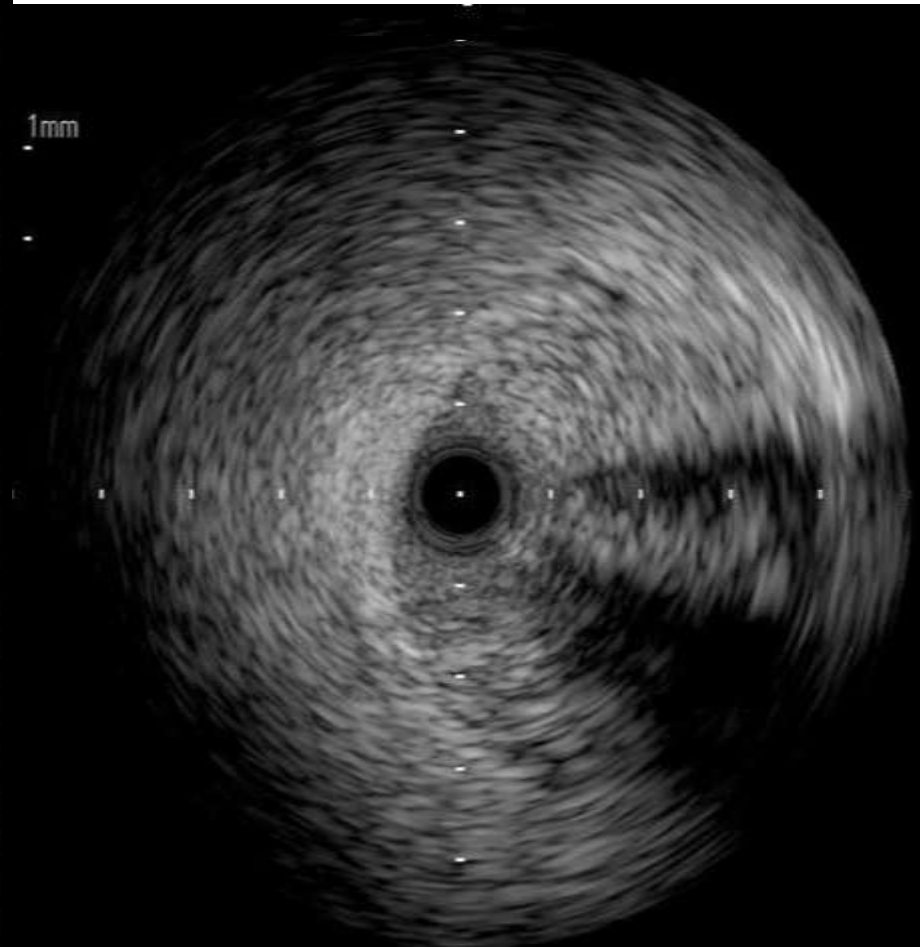
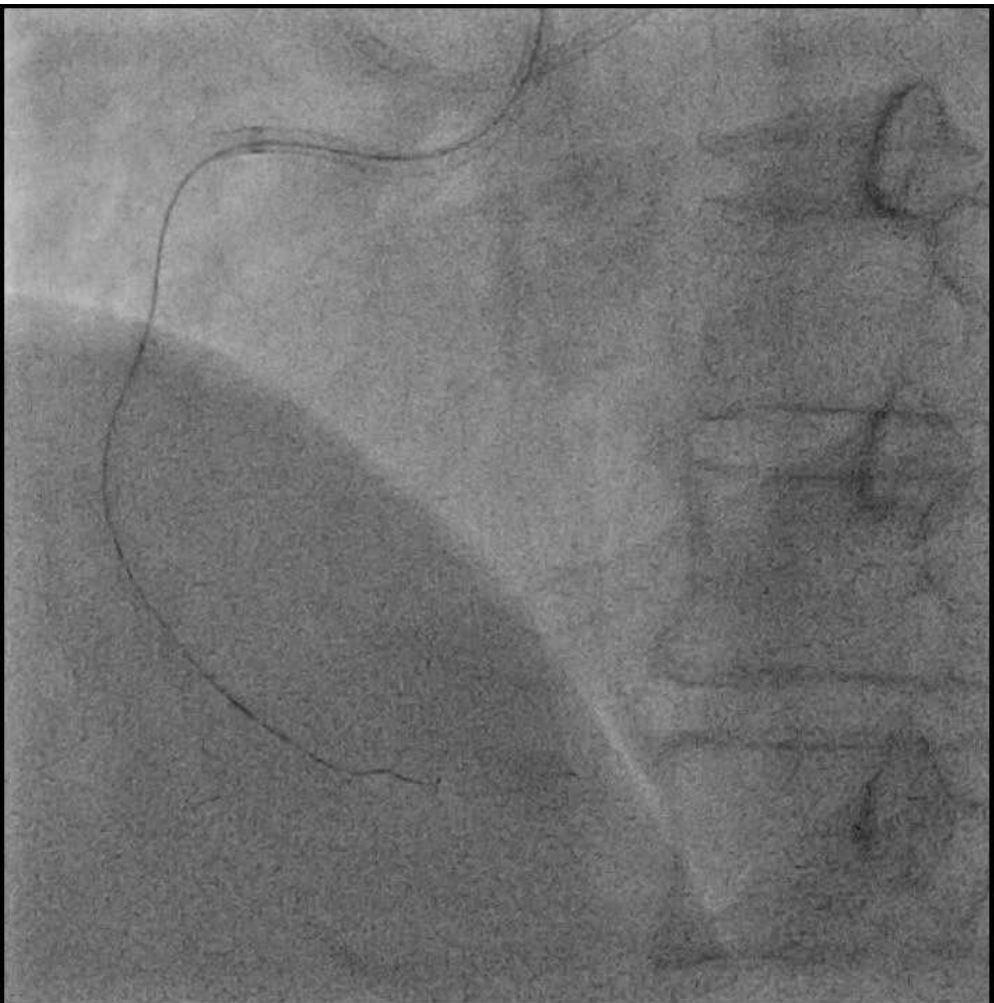




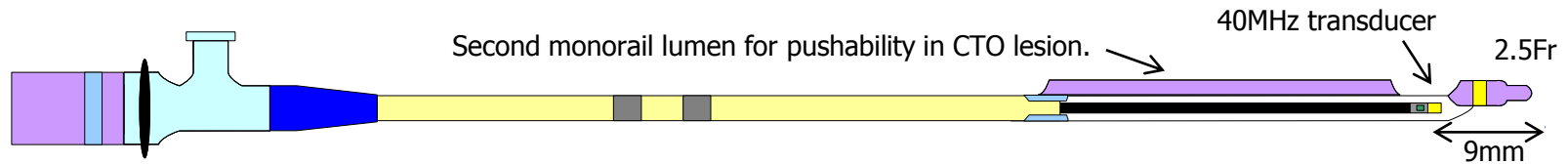
Navifocus WR IVUS advanced into the distal part of the CTO.

It showed that the wire got into subintimal space .

IVUS (43 MHz → 35 MHz)

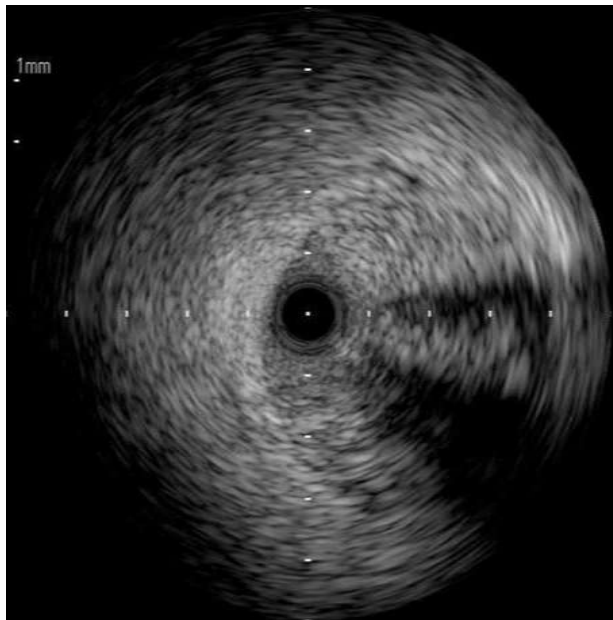
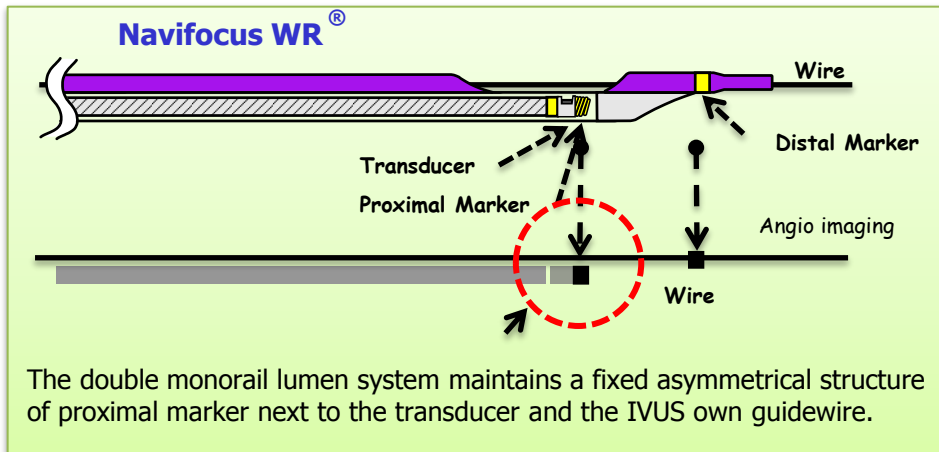


# Antegrade approach with Navifocus WR IVUS (Terumo Corp., Tokyo, Japan)

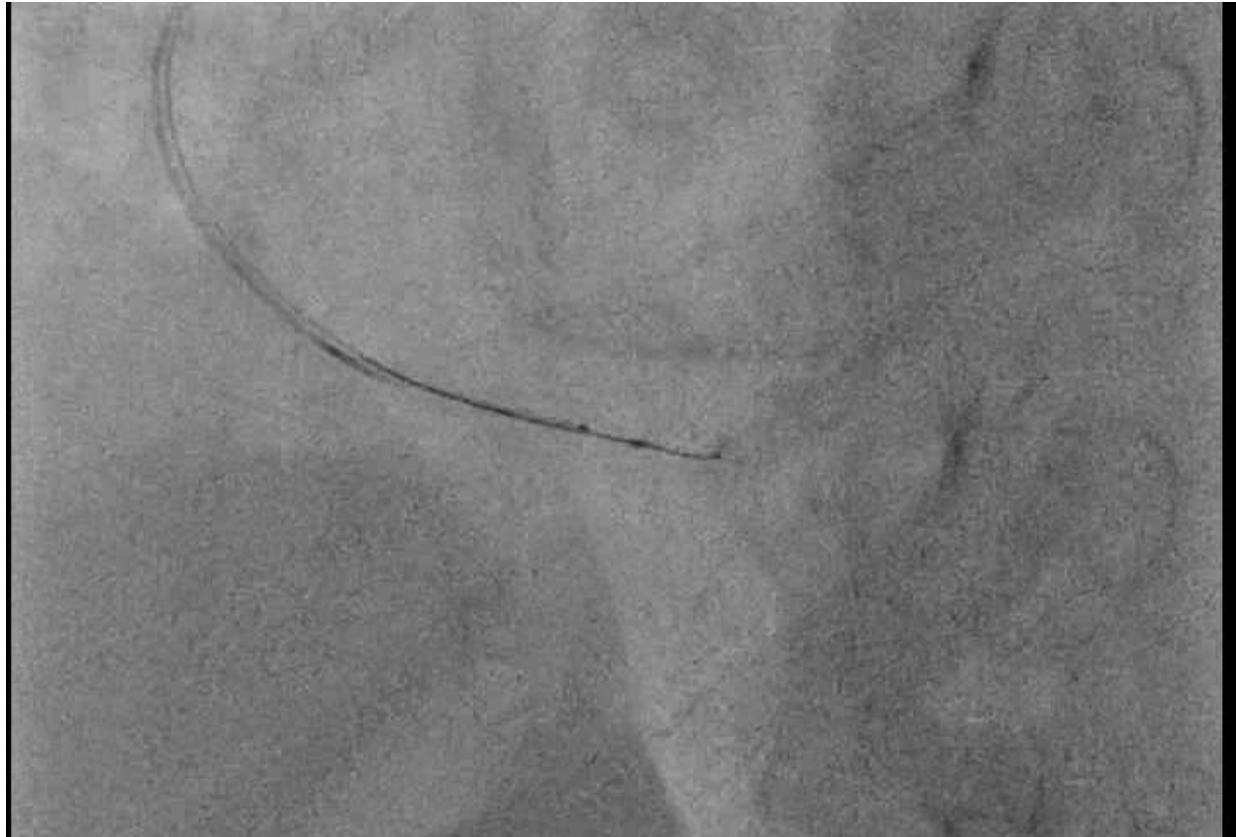
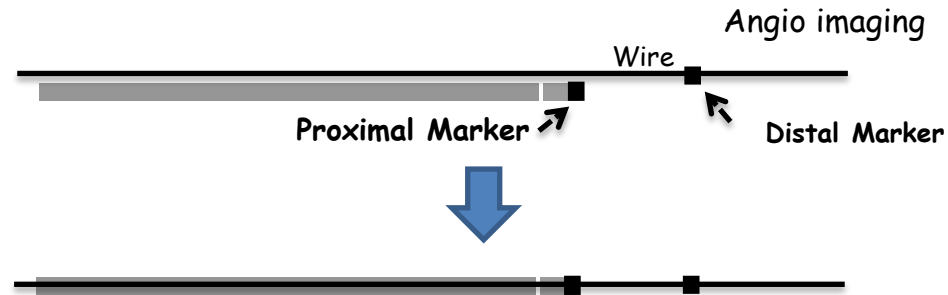


To transfer the direction of the IVUS image to that of the angiographic image, the following procedures were performed:

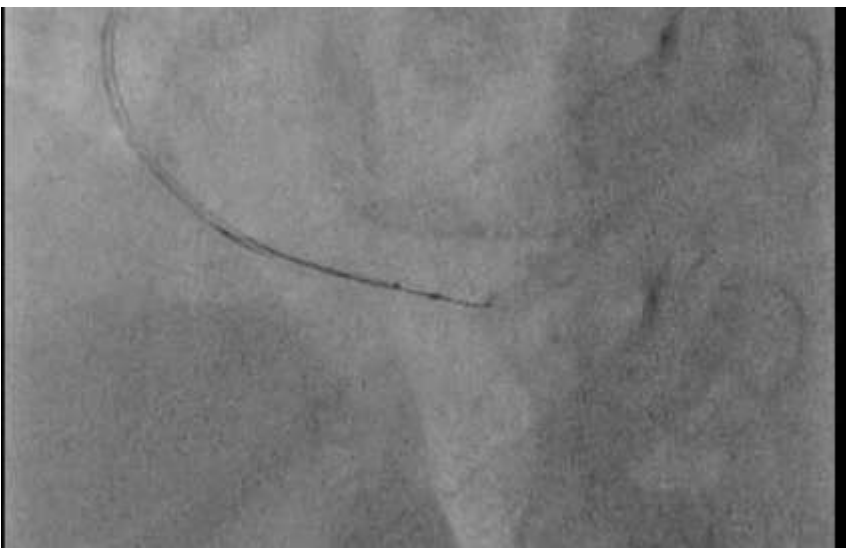
- 1) The IVUS transducer was placed at the transitional site of the true and subintimal spaces.
- 2) Rotational angiography was performed from LAO 40° CAU 30° - LAO 40° CRA 30°, which was orthogonal to the CTO lesion where the IVUS transducer was placed.



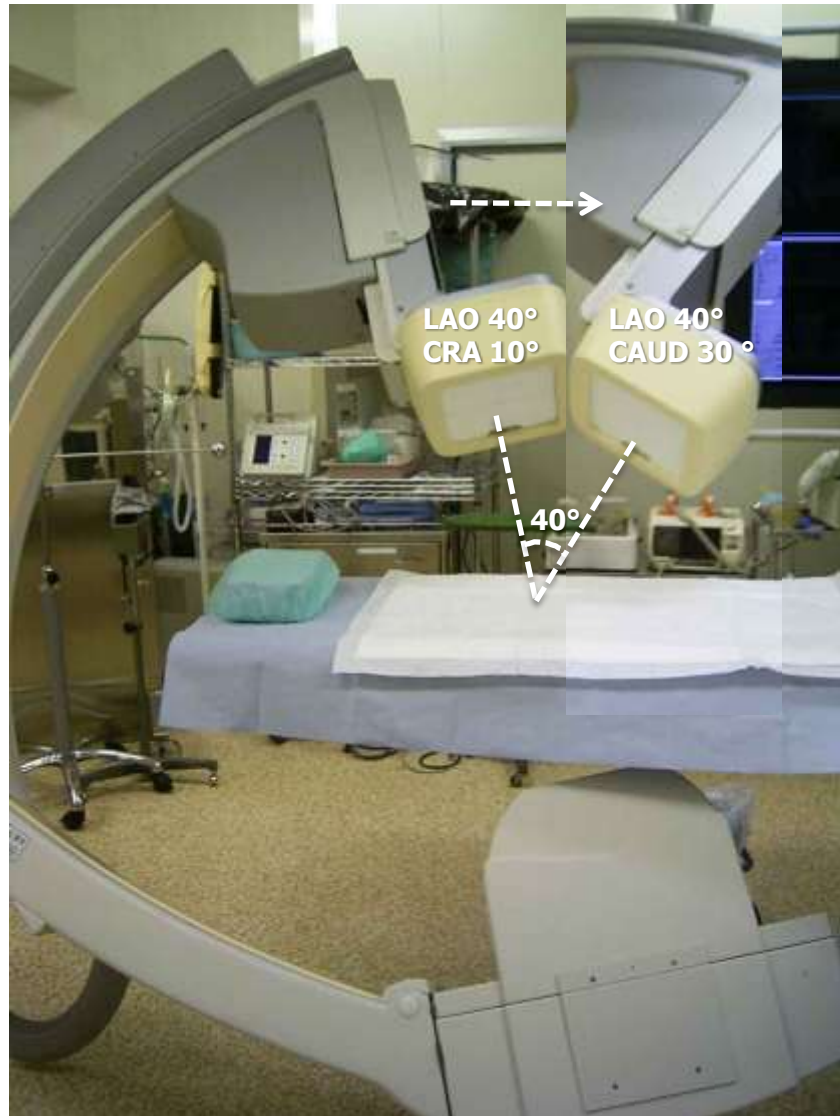
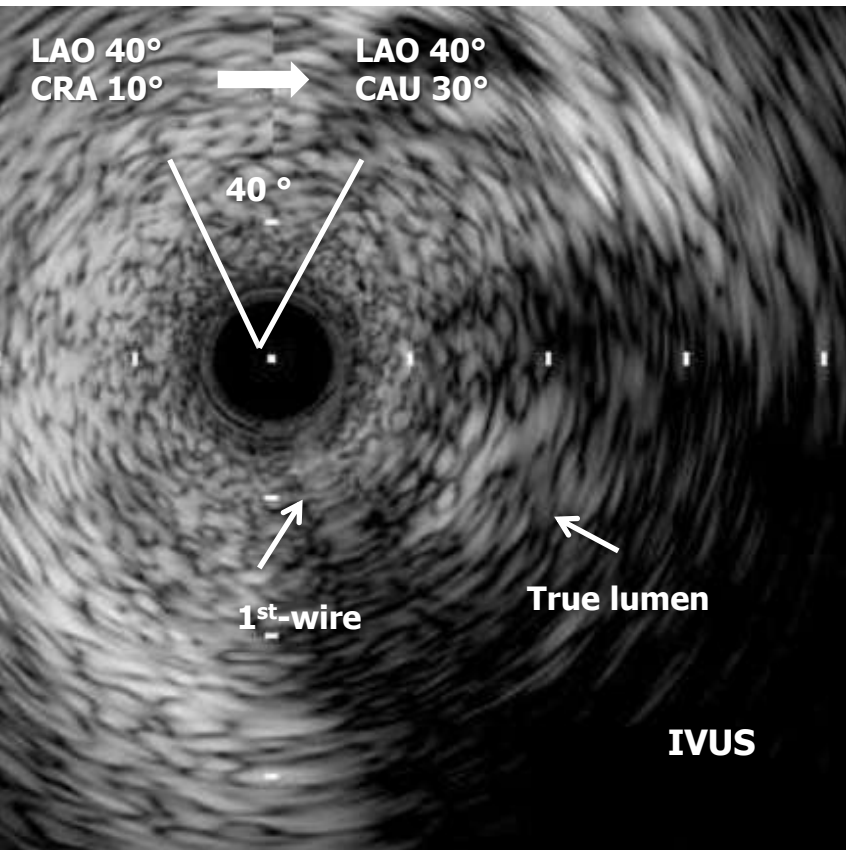
- 3) The detector direction where the proximal marker next to the IVUS transducer and the IVUS own guidewire coincided on the angiographic image was determined—in the present case, this detector direction was LAO 40° CRA 10°.



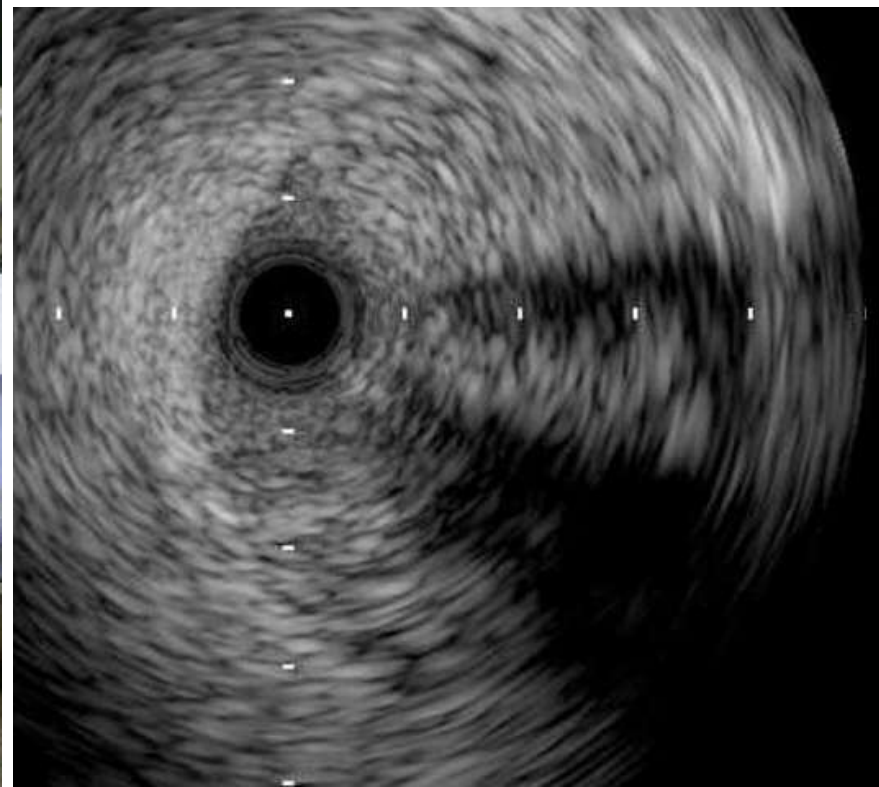
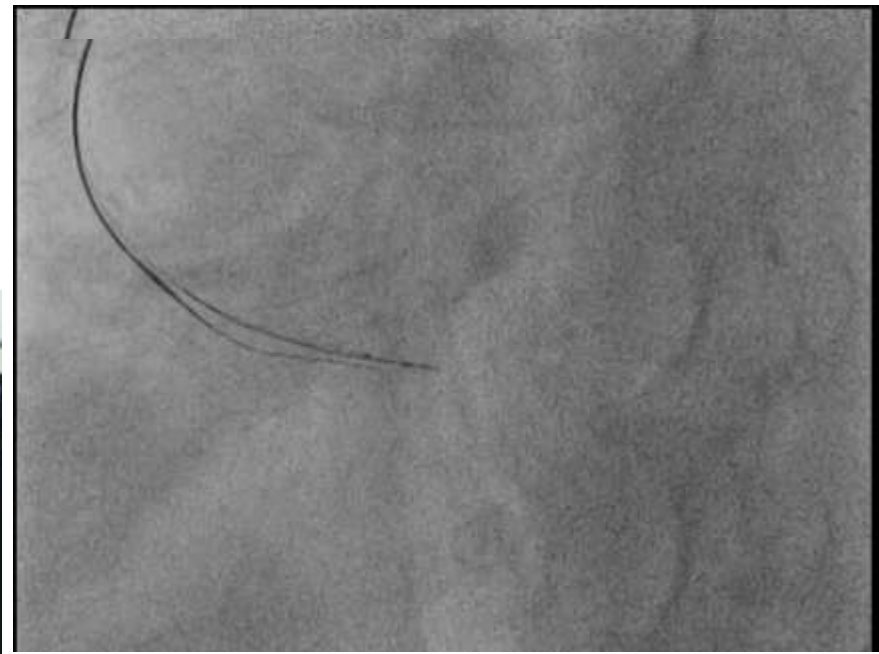
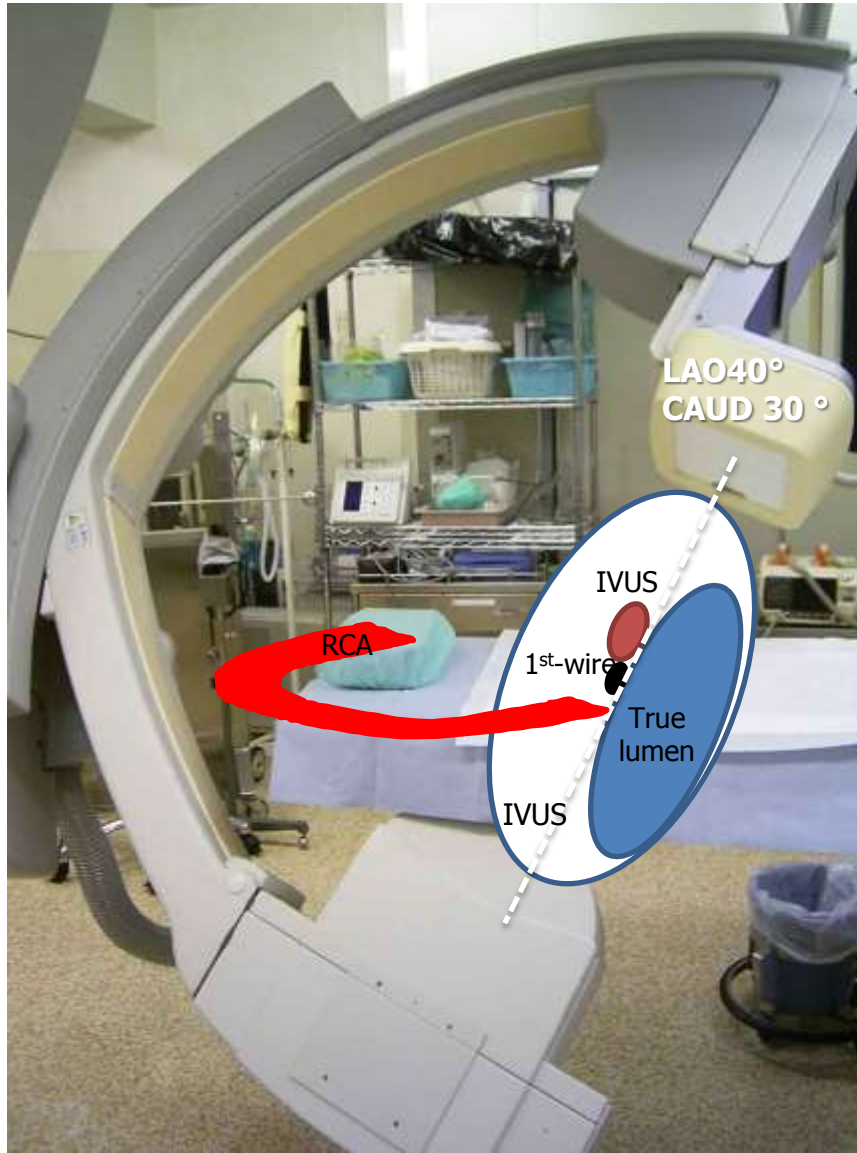




At 40° rotation clockwise from ° LAO 40° CRA 10° on the IVUS image, i.e., at LAO 40° CAU 30° of the angiographic detector position, the IVUS transducer and the true lumen were maximally separated and the true lumen was located at the the lower side of the proximal marker next to the IVUS transducer.

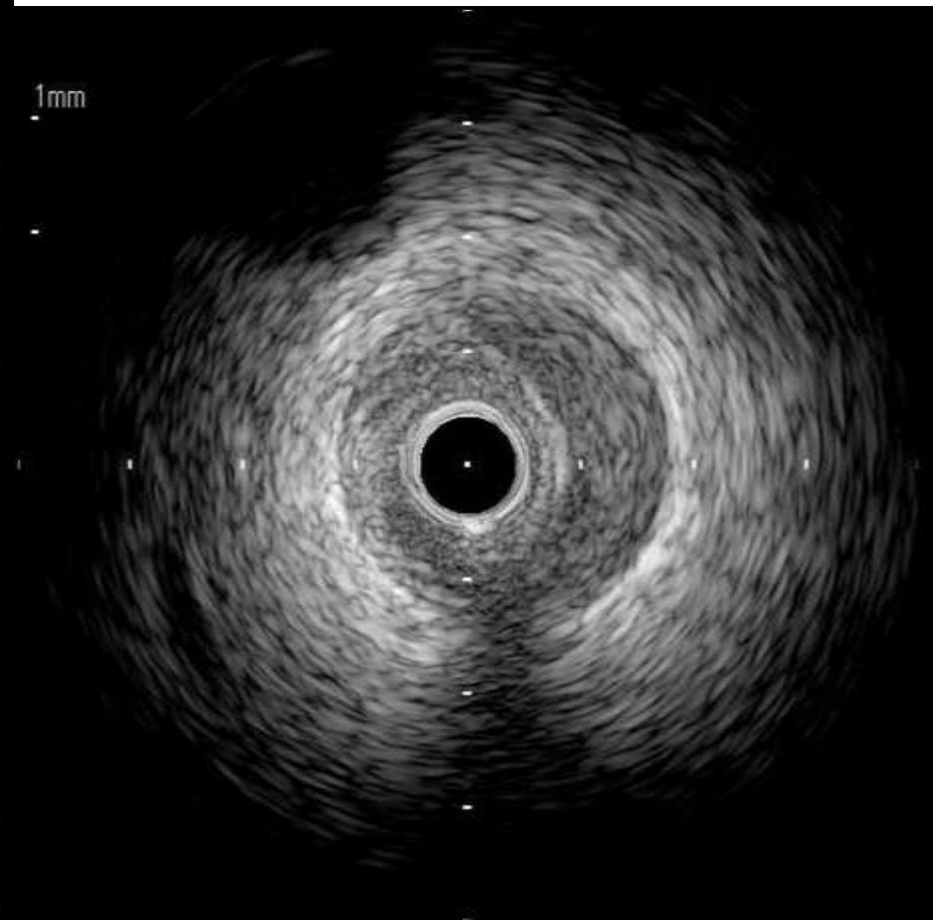


At LAO 40° CAU 30° detector position, a Conquest-pro wire was angiographically advanced with the Corsair to the lower side of IVUS proximal marker and entered the wire into true lumen which was confirmed by Navifocus WR.



The Conquest-pro wire advanced into PDA branch and Navifocus WR IVUS showed that it passed the CTO lesions throughout the true lumen.

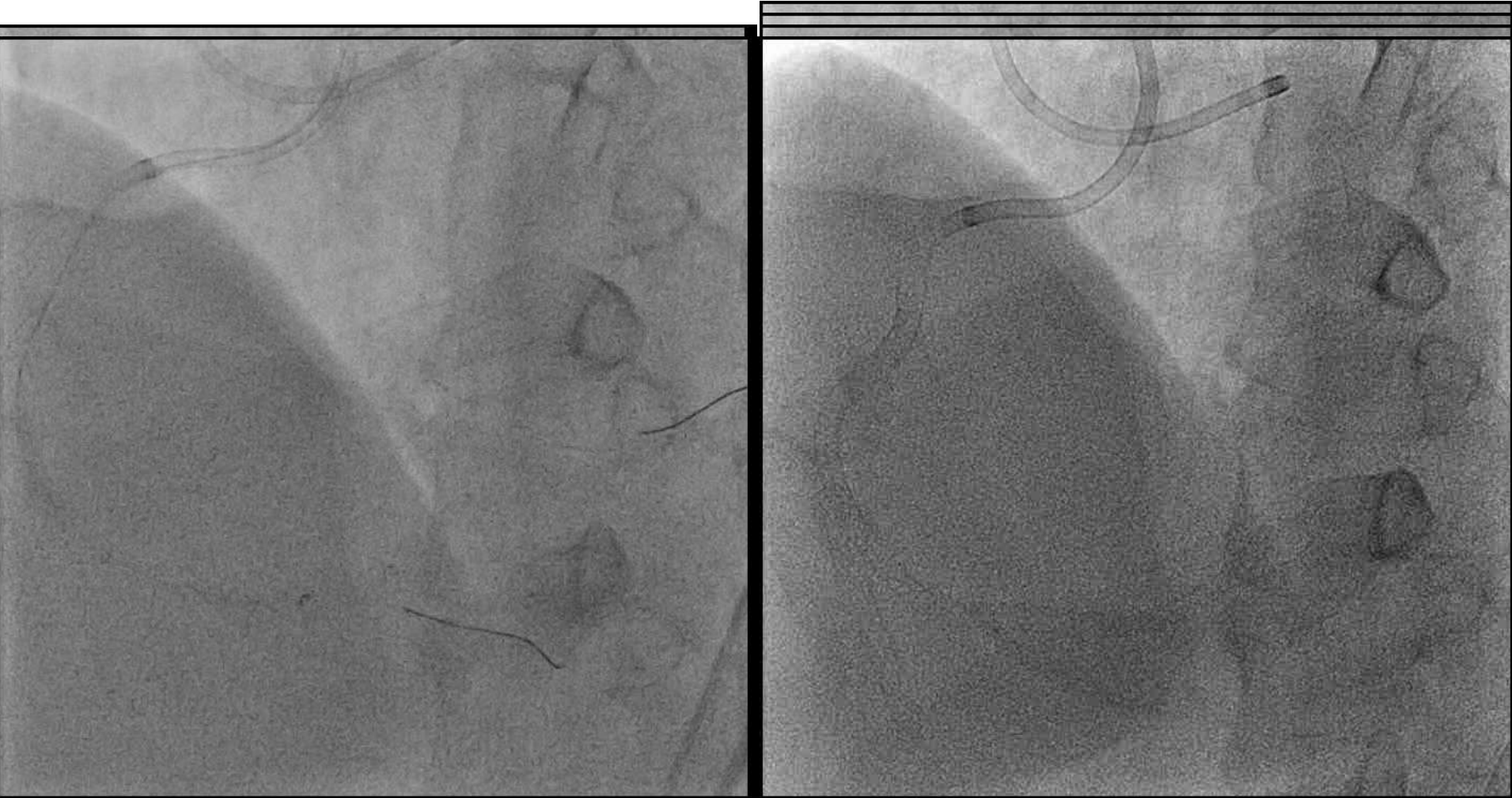
IVUS





A SION wire got into the PL branch with a Crusade.

Four DES were implanted from the PL branch to proximal RCA.  
TIMI-3 flow was obtained.





## *Summary*

In the 1<sup>st</sup>-PCI, the guidewires could not pass the CTO lesions because the root was not clear at the middle part of the CTO.

In the 2<sup>nd</sup>- PCI, we did contra-lateral injection, but the root was not clear. We used a UB 3 and Pilot 150 wires to advance to the middle part of CTO because these 0.014 inch wires can advance inside the vessel without coronary perforation. But these wires could not advance to that.

Because of the failure of the retrograde approach, we had to advance the antegrade guidewires without identification of the vessel root. Instead of the knuckle wire technique, the very gentle tip injection of the contrast media was performed to visualize the root. A GAIA 2<sup>nd</sup>-wire could advance to the center of the visualized vessel.

At the distal part of the CTO, the GAIA 2<sup>nd</sup>-wire got into the subintimal space and the 2<sup>nd</sup>-wire (Conquest-pro) could get into the true lumen with the IVUS guidance.

To stop the enlargement of the subintimal space, a 2.75 x 38-mm DES was implanted inside the true lumen at the middle part of the CTO.

The debris was absorbed by a thrombus suction catheter.

