

Learning from Cases of CCT2014

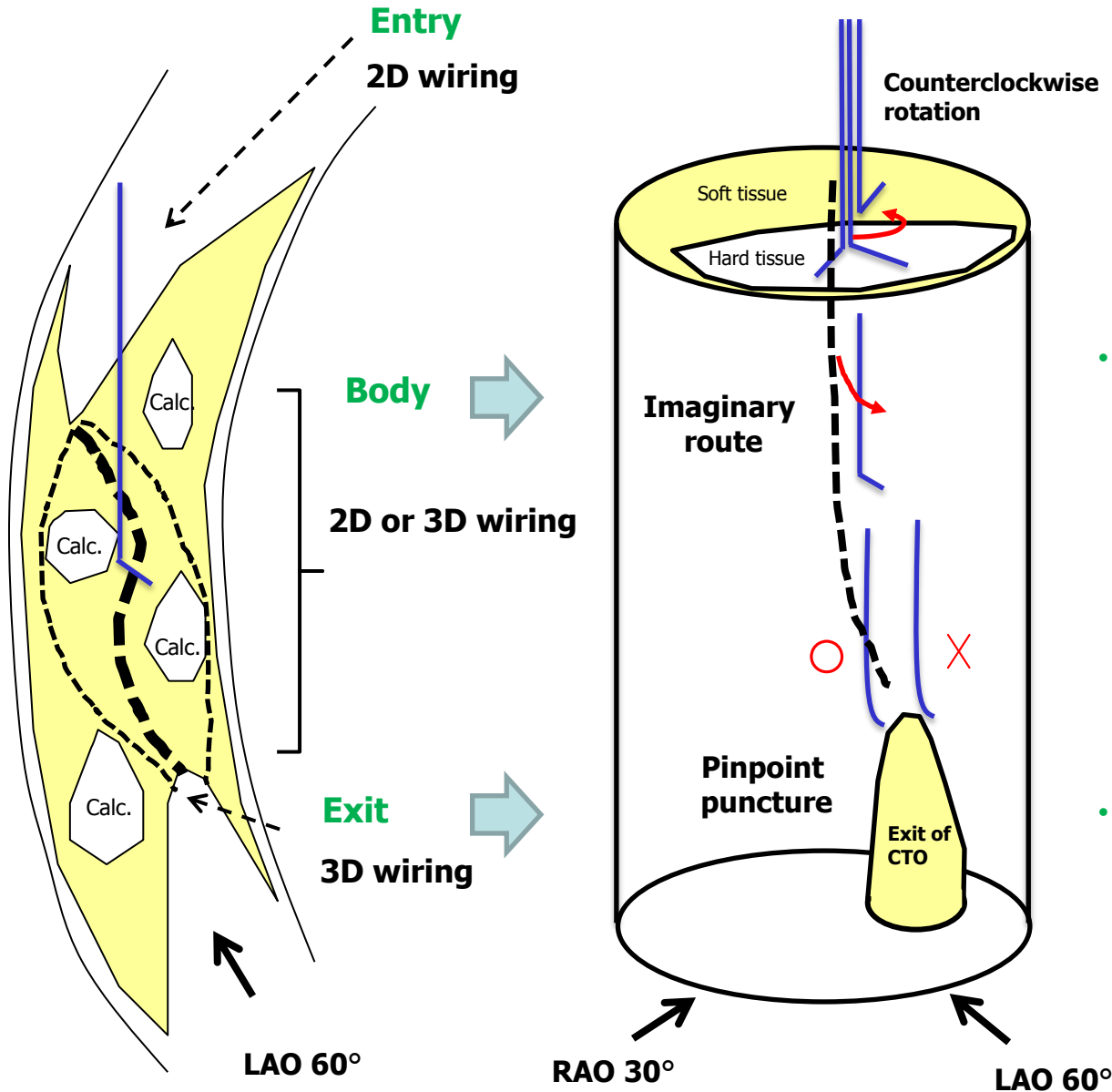
Case 1: LCX proximal CTO

Cardiovascular Center, Sakurabashi Watanabe Hospital

Atsunori Okamura

3D wiring is the one of the methods to perform the accurate GAIA wire control in the CTO lesion

Mid-RCA CTO



- **At the CTO entrance:**

2D wiring is sufficient because it is difficult to control GW accurately in the blood-filled lumen.

- **At the CTO body:**

The imaginary route is traced with 3D wiring except in cases that you cannot create the route image, the GW torque response is not maintained, or the GW are likely to enter the sub-intima or the GW.

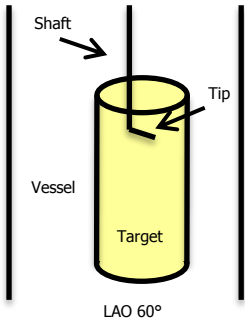
- **At the CTO exit:**

3D wiring is necessary for pinpoint puncture.

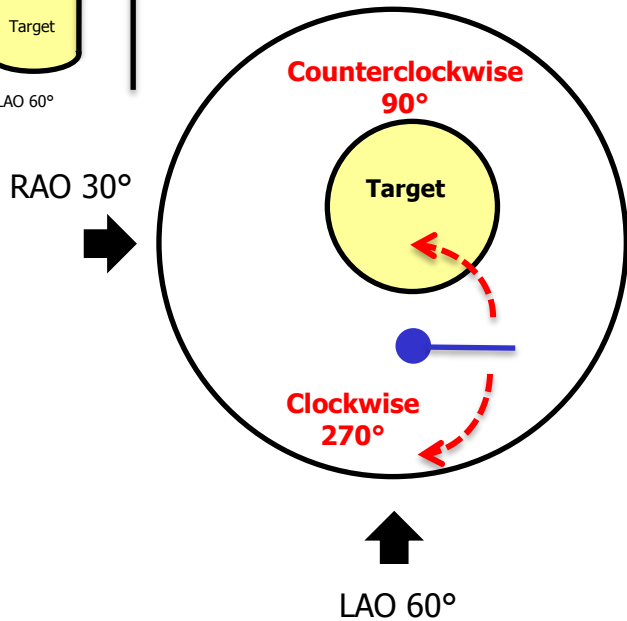
Advantage of the 3D wiring

When you advance GW to the target, there are 2 rotation directions to reach the target, *i.e.*, **clockwise or counterclockwise**.

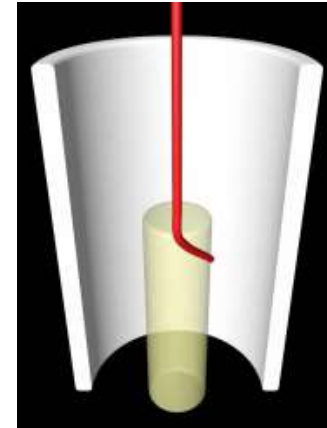
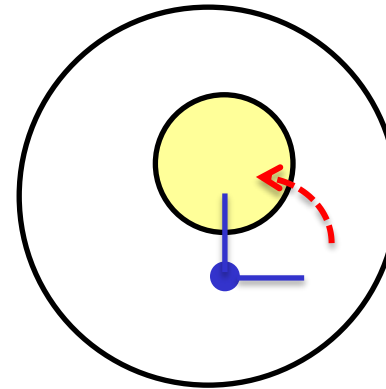
Longitudinal image



Cross-sectional image



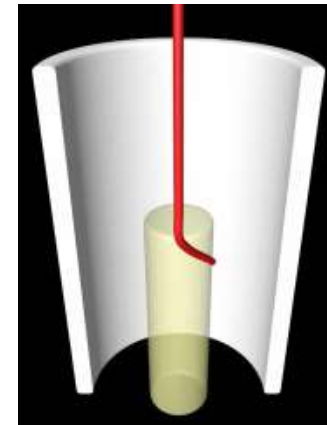
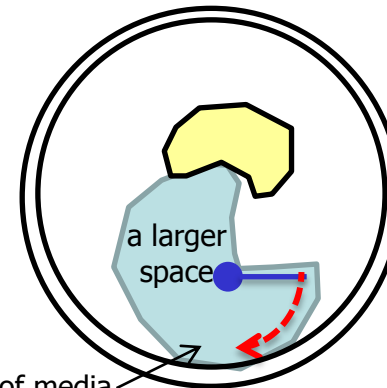
Correct direction



Clockwise 270°

- Not accurate GW control
- Creation of a larger space, compressing the target and not supporting the GW during target penetration.
- Advancement of the GW into the sub-intimal space.

Incorrect direction



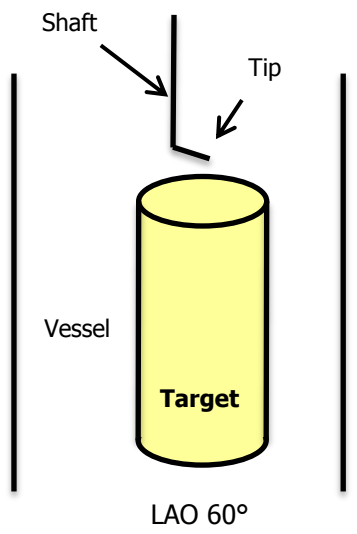
Target

- Route in CTO body
- CTO exit
- Retrograde GW

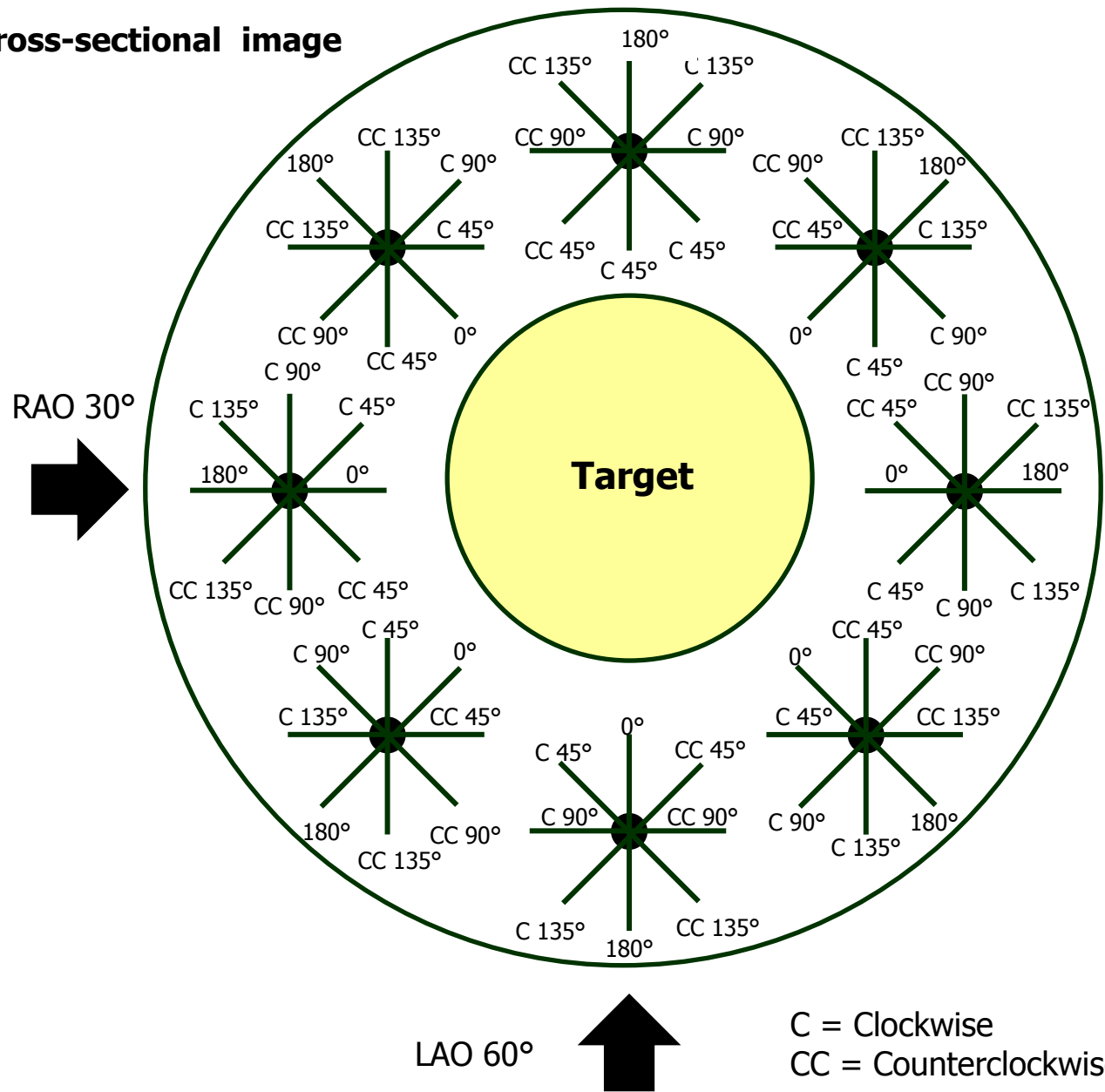
There are 64 rotation direction patterns to determine the degree of GW rotation within 45°.

64 rotation direction patterns = 8 patterns of shaft vs. target X 8 patterns of tip vs. target in each shaft.

Longitudinal image



Cross-sectional image



- Target**
- Route in CTO body
 - CTO exit
 - Retrograde GW

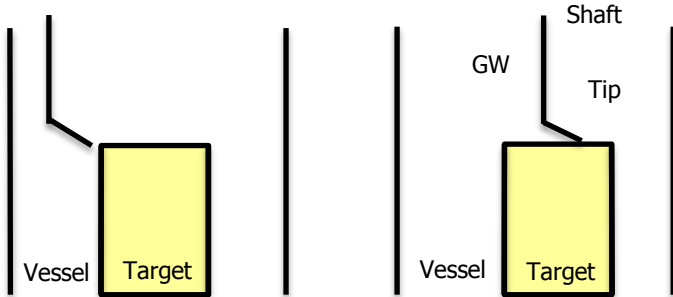
C = Clockwise
CC = Counterclockwise

How to determine these 64 patterns from 2 perpendicular angles of the X-ray system detector

2 perpendicular angles of the X-ray system detector

Mid-RCA image

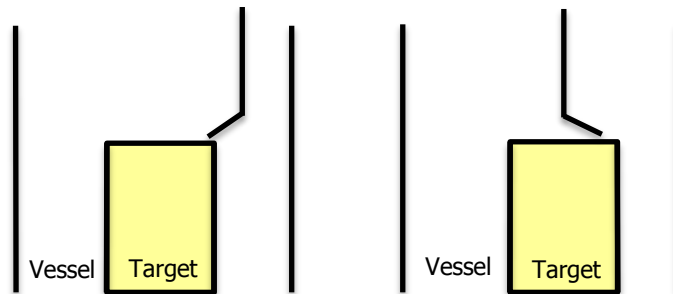
Pattern 1



RAO 30°

LAO 60°

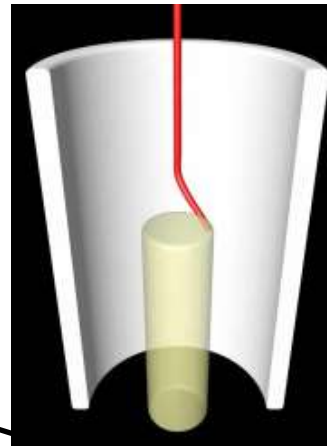
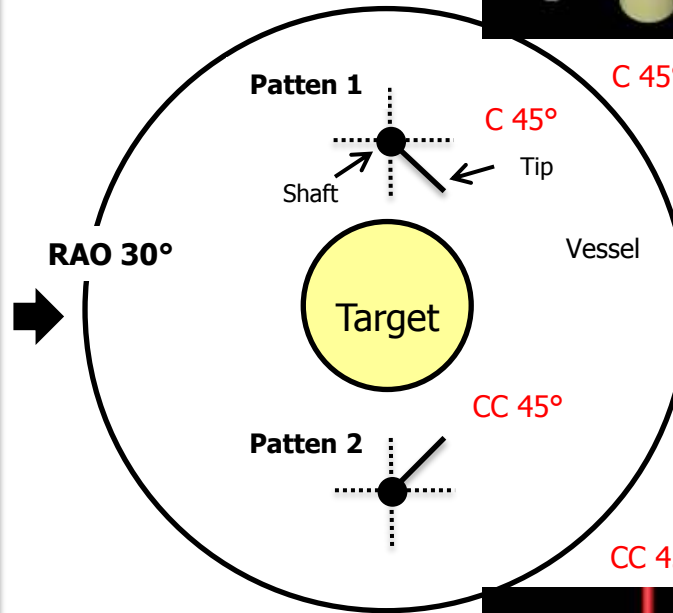
Pattern 2



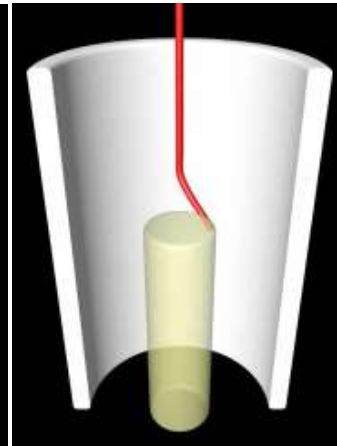
RAO 30°

LAO 60°

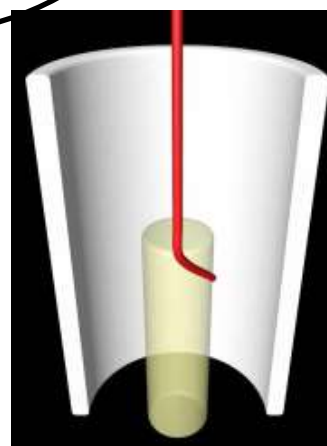
Cross-sectional image
(Like IVUS image)



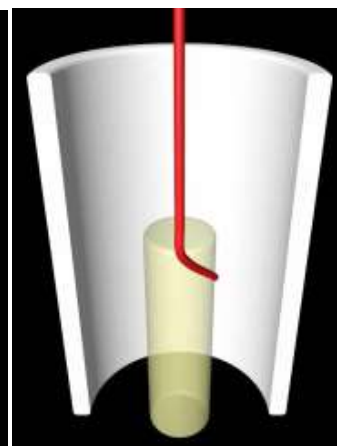
C 45°



CC 315°



CC 45°



C 315°



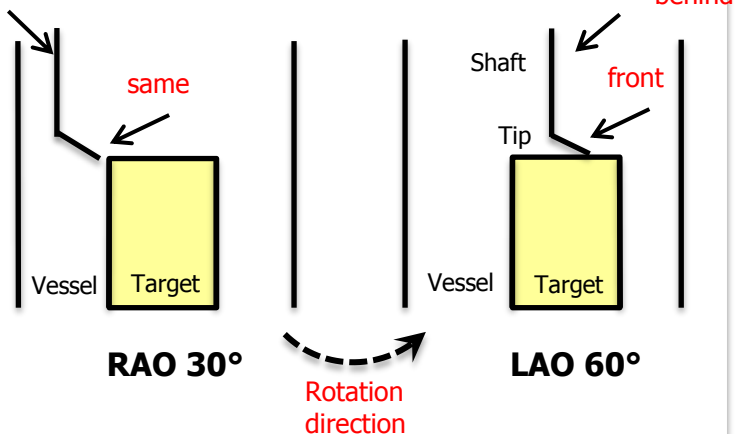
C = Clockwise
CC = Counterclockwise

3D image guideline: The object (shaft or tip) is always in front (behind) after rotation if on the same (opposite) side as the rotation direction.

2 perpendicular angles of the X-ray system detector

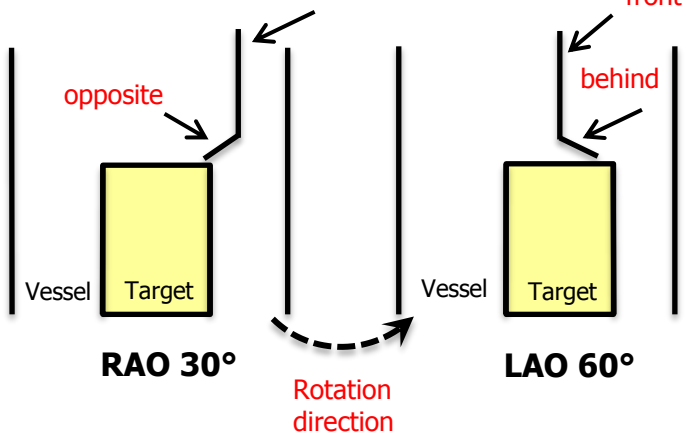
Pattern 1

Opposite for target



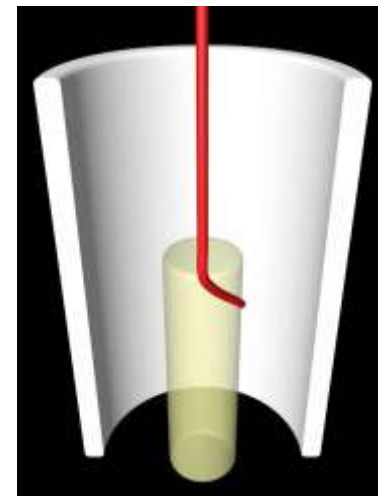
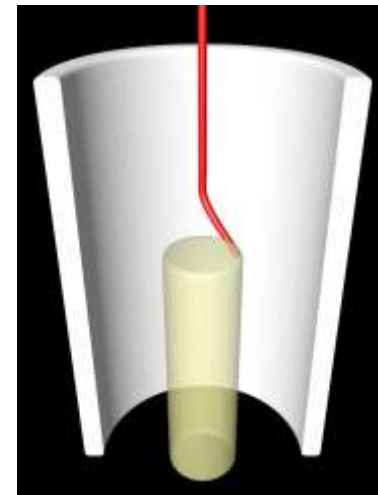
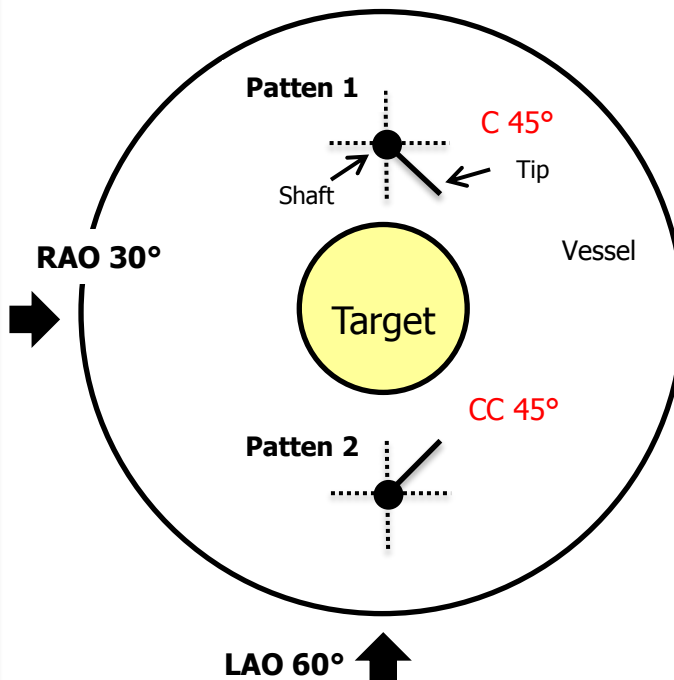
Pattern 2

Same for target



Cross-sectional image (Like IVUS image)

C = Clockwise
CC = Counterclockwise



Coronary Special Focus Live



Audio Receiver Ch1: Japanese
Ch2: English Ch3: Chinese

Higashi Takarazuka Satoh Hospital

CCT2014

CCT2014 PCI Live Case Transmission

Higashi Takarazuka Satoh Hospital

Takarazuka Case 4

85454 H.T.
Dr Okamura

60 y male Target Lesion: LAD (C1)

Diagnosis ■ AP
Pronounced ■ 140388 - lesion: LAD (C1)
Coronary Calcification ■ DL
c-ATP ■ 37.9
Systolic score ■ 15.5
Lesion CAD Fraction ■ 14 (20%)
LAD 100%
LV EF ■ 66% (LAD)
c-ATP score ■ 2

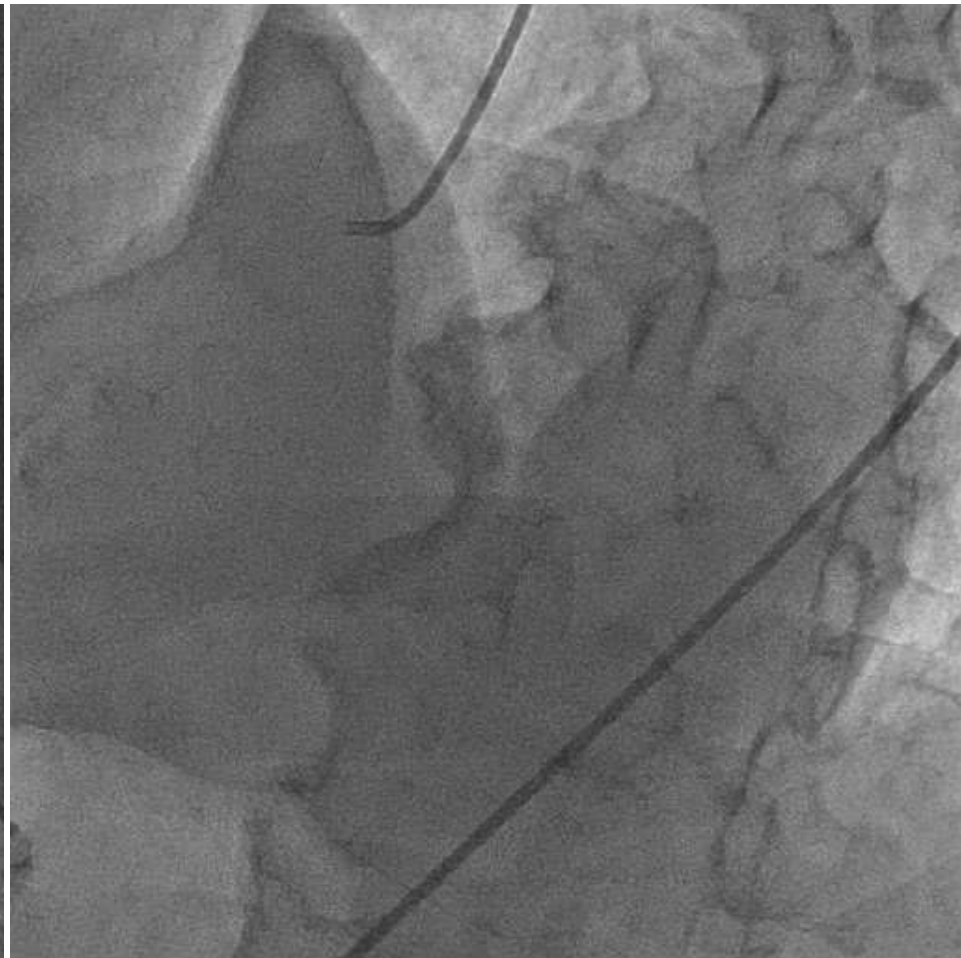
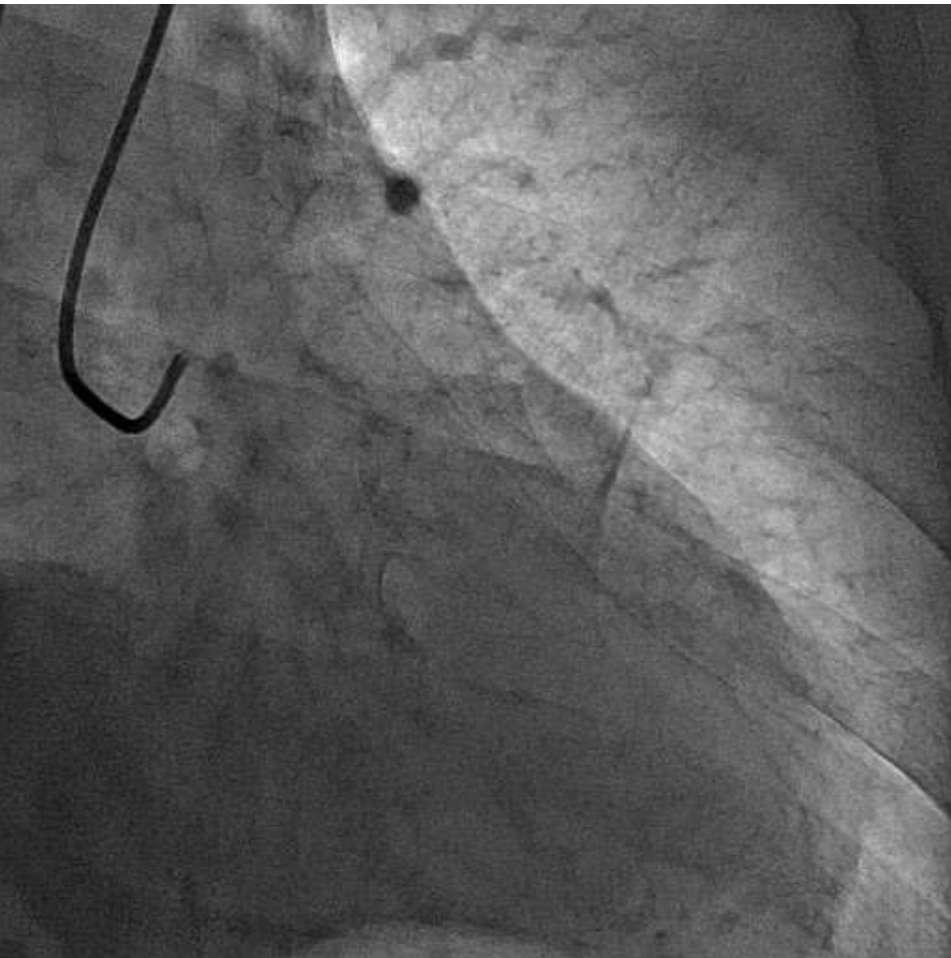


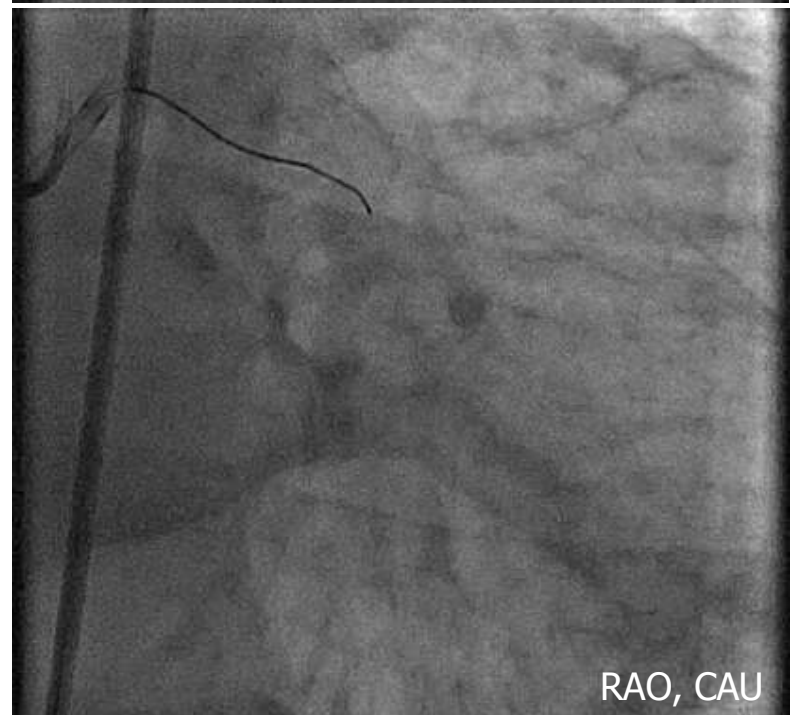
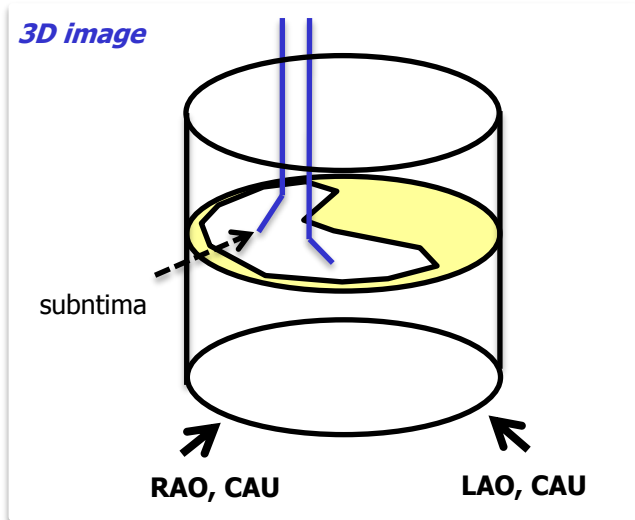
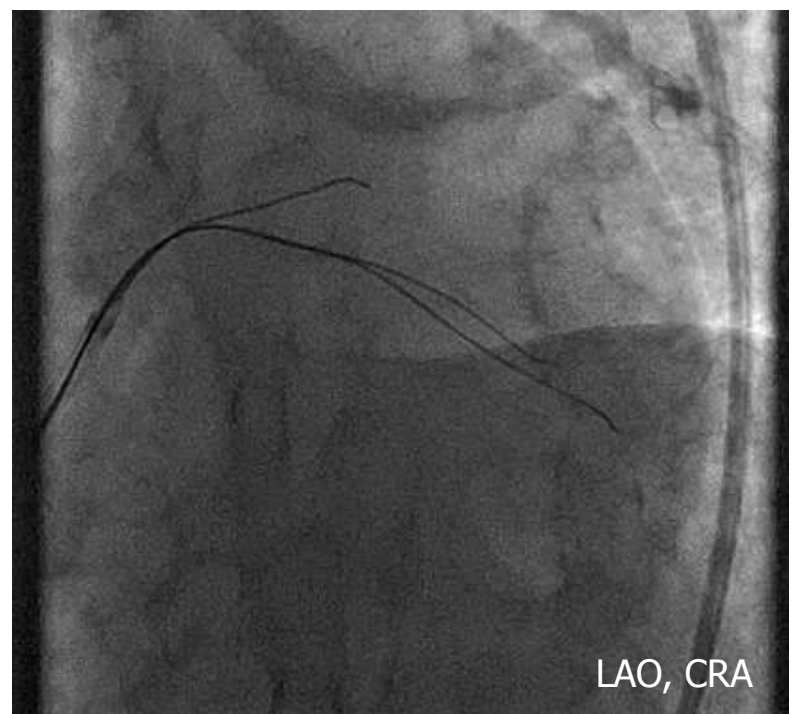
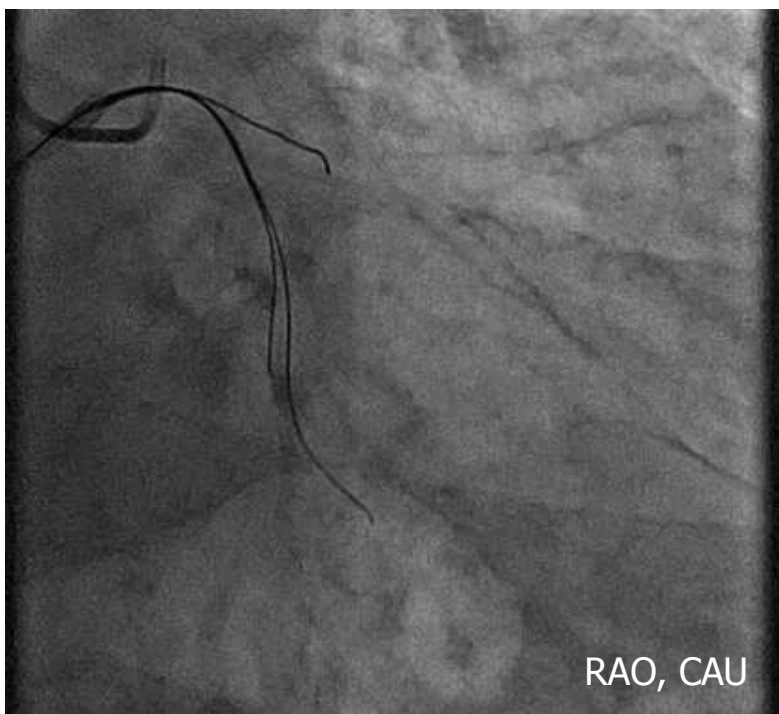
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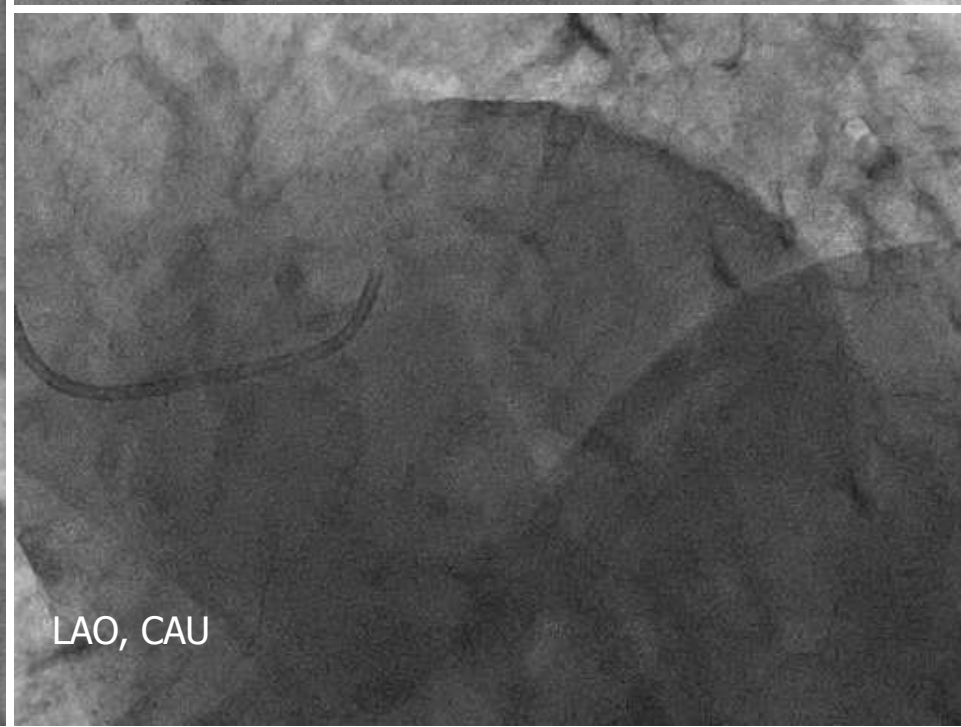
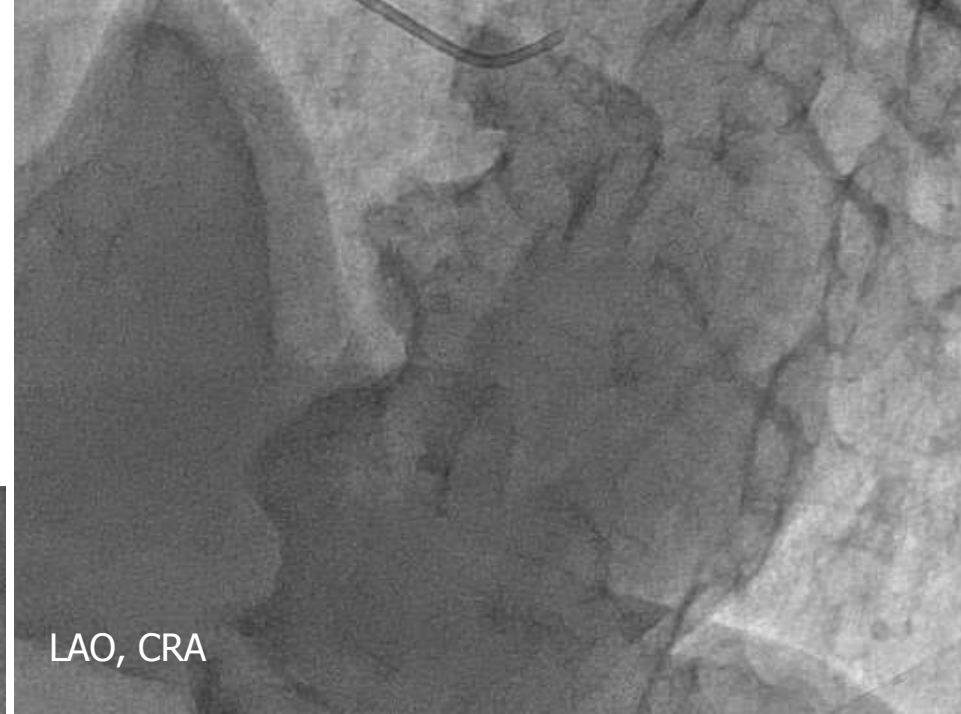
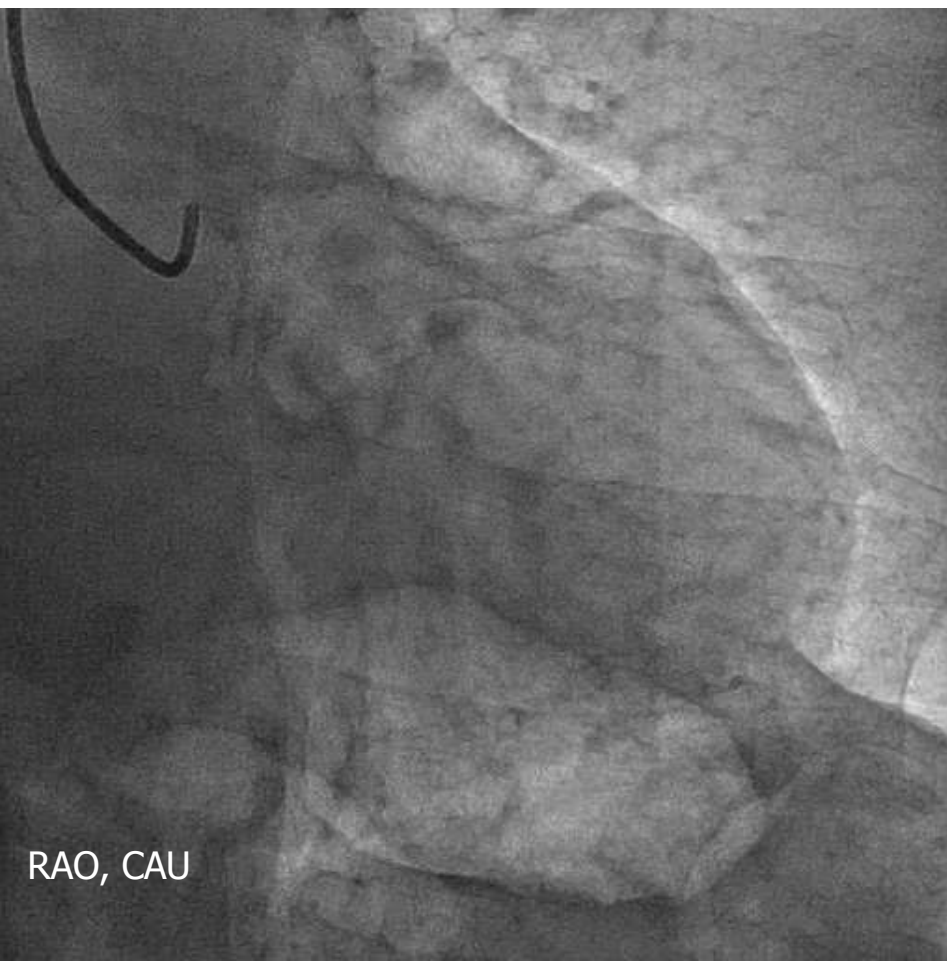
CCT2014

1st-PCI for proximal LCX CTO on March 6 2014





CAG pre CCT 2014 on October 23 2014



Retrograde channel from RCA LA branch channel to proximal LCX.

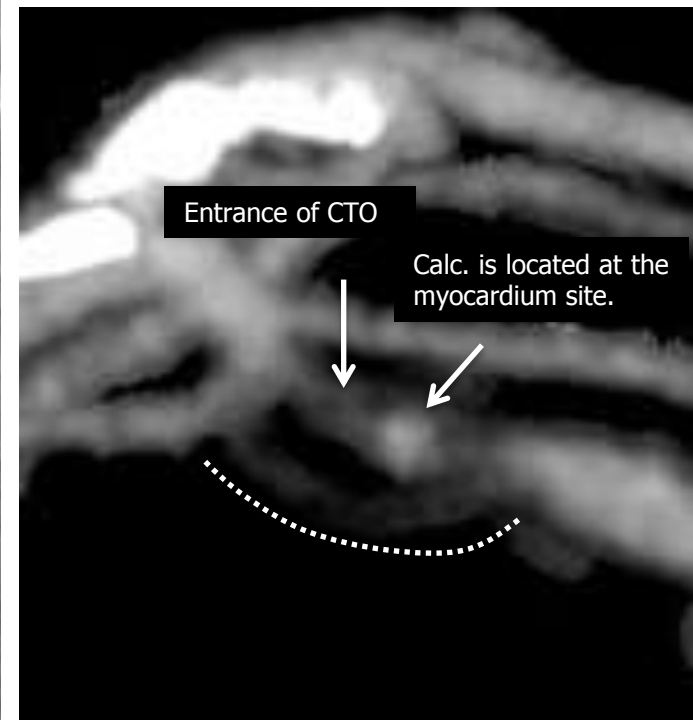
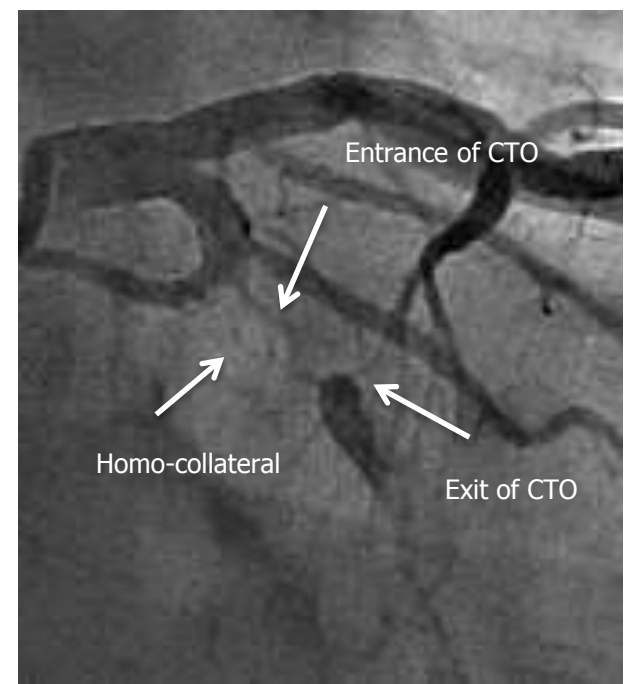
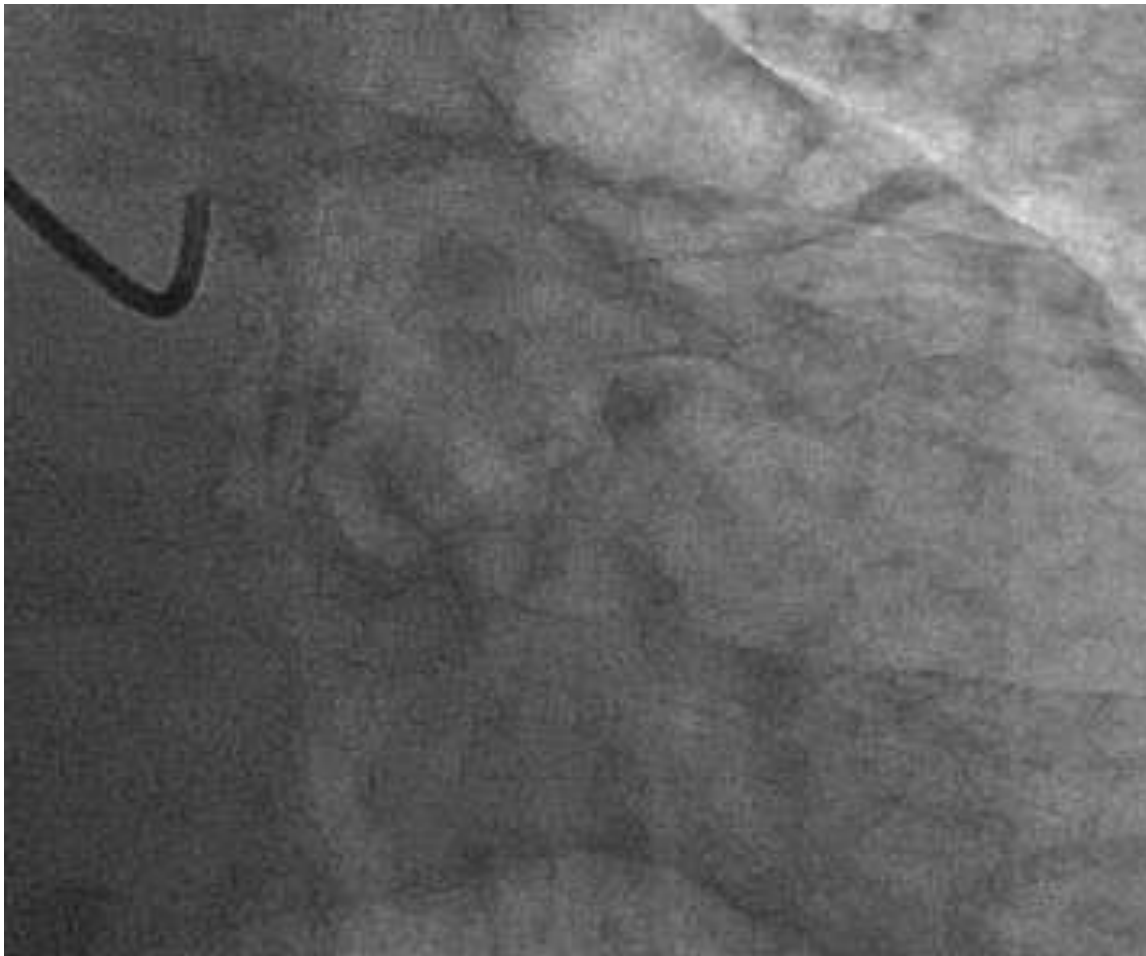


Retrograde channel from RCA PL channel to LCX.



Information of angiogram and MDCT

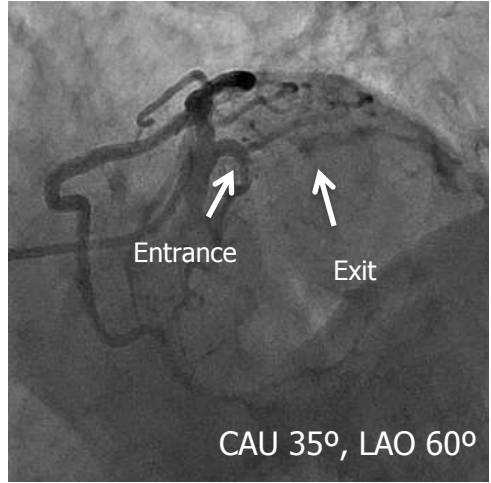
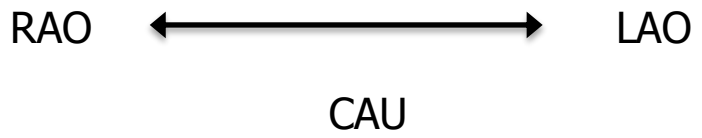
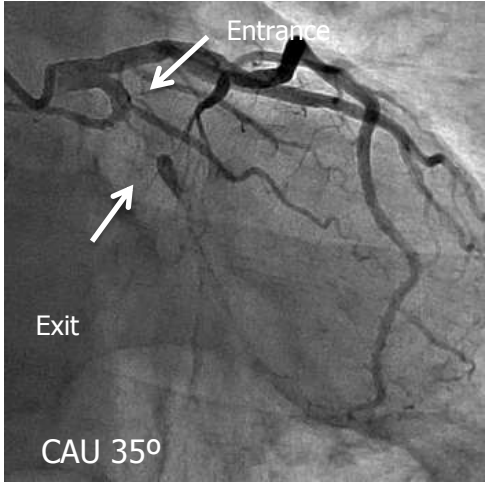
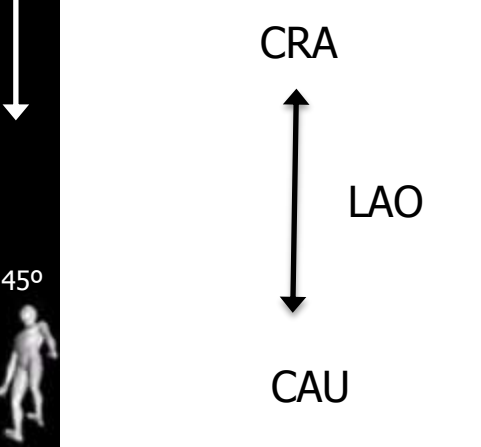
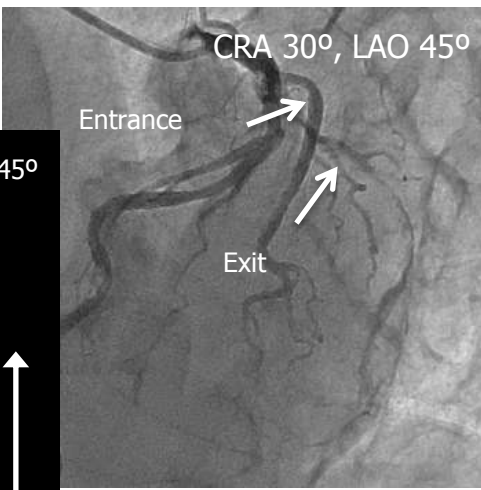
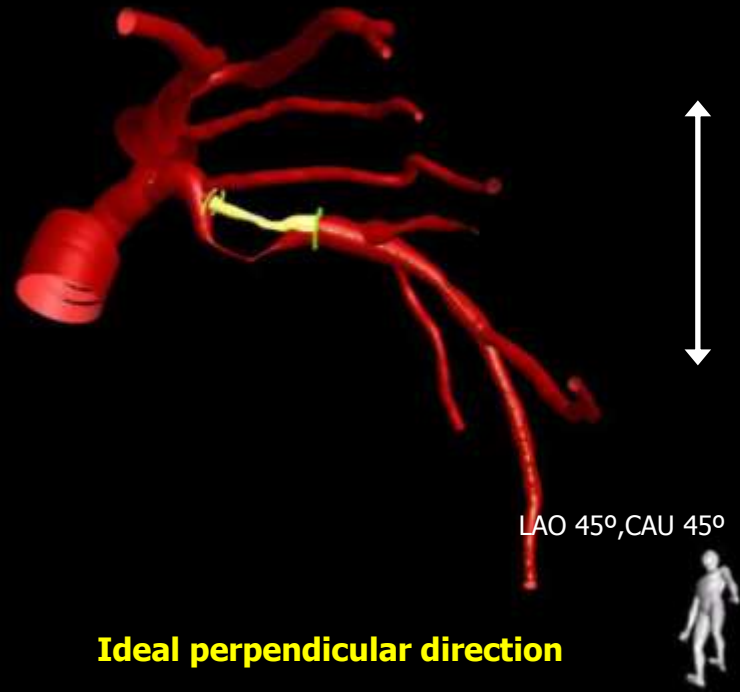
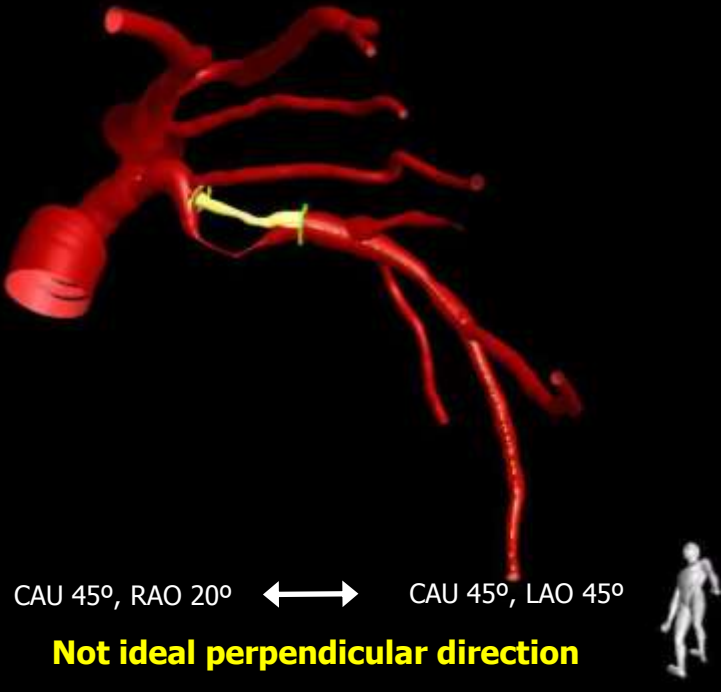
1. Entrance of CTO
2. Location of calcification
3. Perpendicular direction of the X-ray system detector



Information of angiogram and MDCT

3. Perpendicular direction of the X-ray system detector

PHILIPS True view



My plan to the CCT 2014 case (LCX CTO lesion, retry procedure)

Retrograde approach through RCA PL channel including the preparation of tip injection from this channel



Antegrade approach with 3D wiring



Antegrade approach IVUS guidance with Navifocus WR IVUS

CCT 2014 October 31 2014

Target lesion: CTO in the Proximal LCx

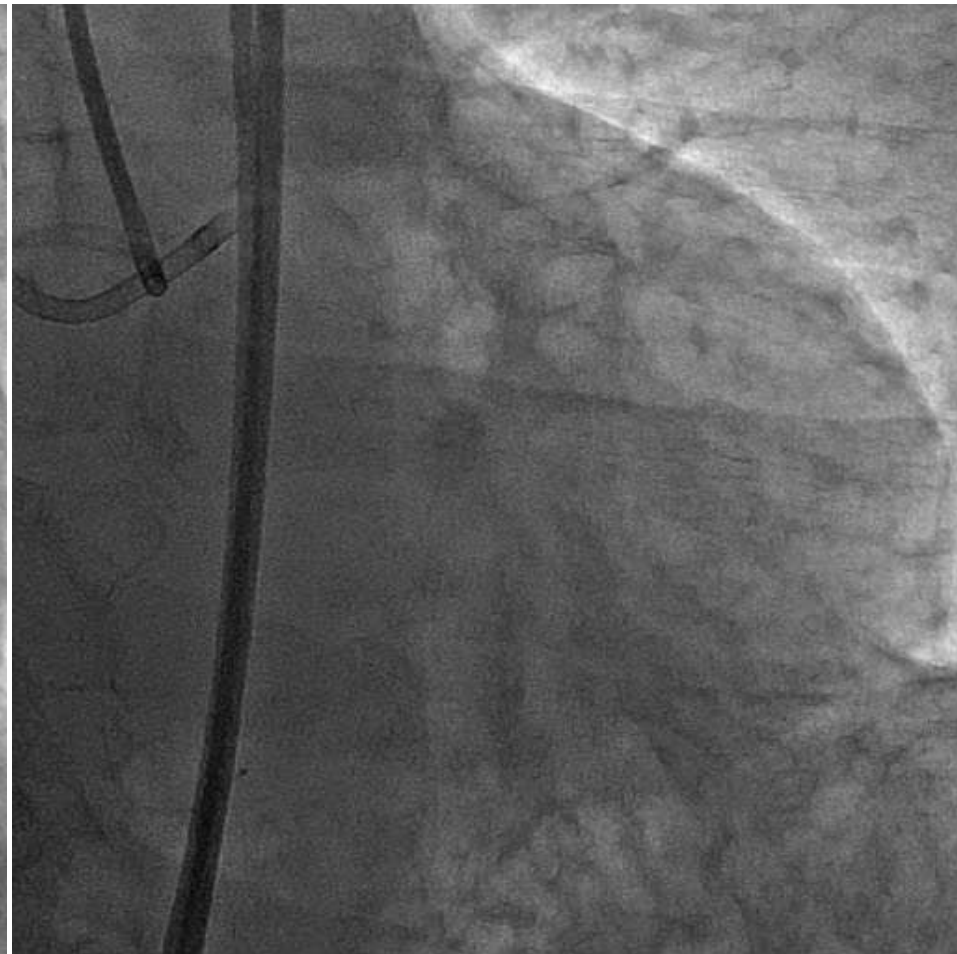
Approach: Bilateral TFI

Guide catheter:

Antegrade EBU 3.5 SH 8 Fr, Retrograde JR4 SH 7 Fr

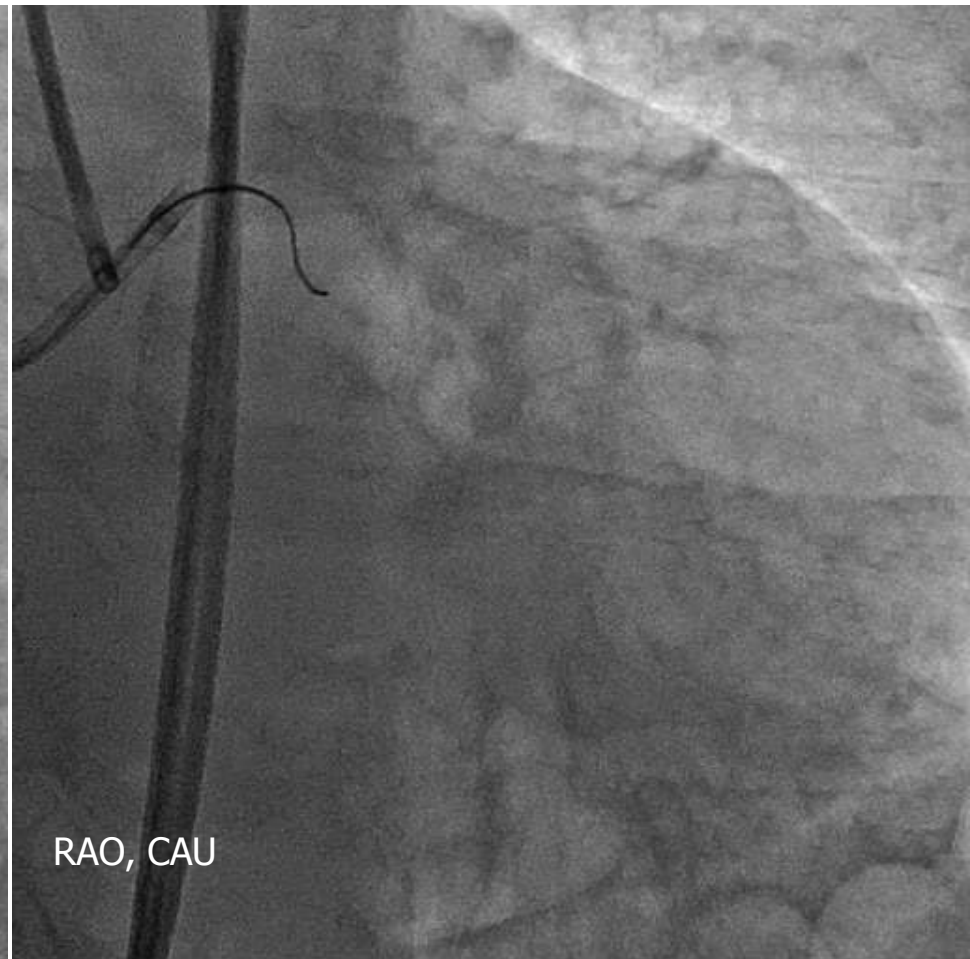
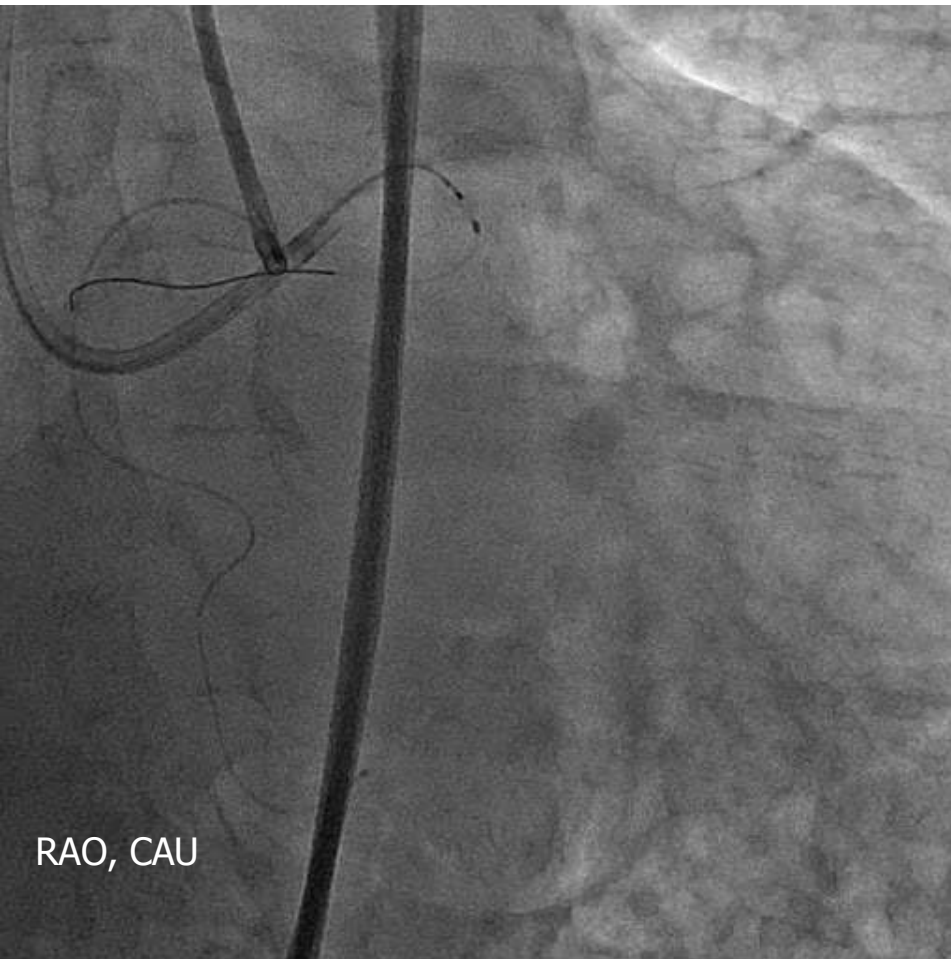
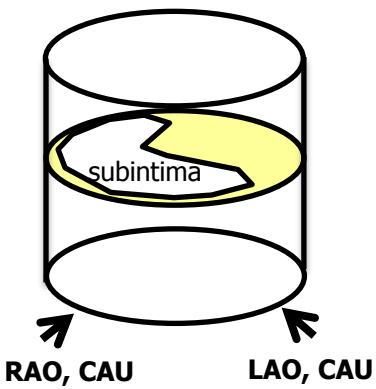
Retrograde approach through RCA PL channel with a SION wire under a Finecross GT.

I moved to antegrade approach.

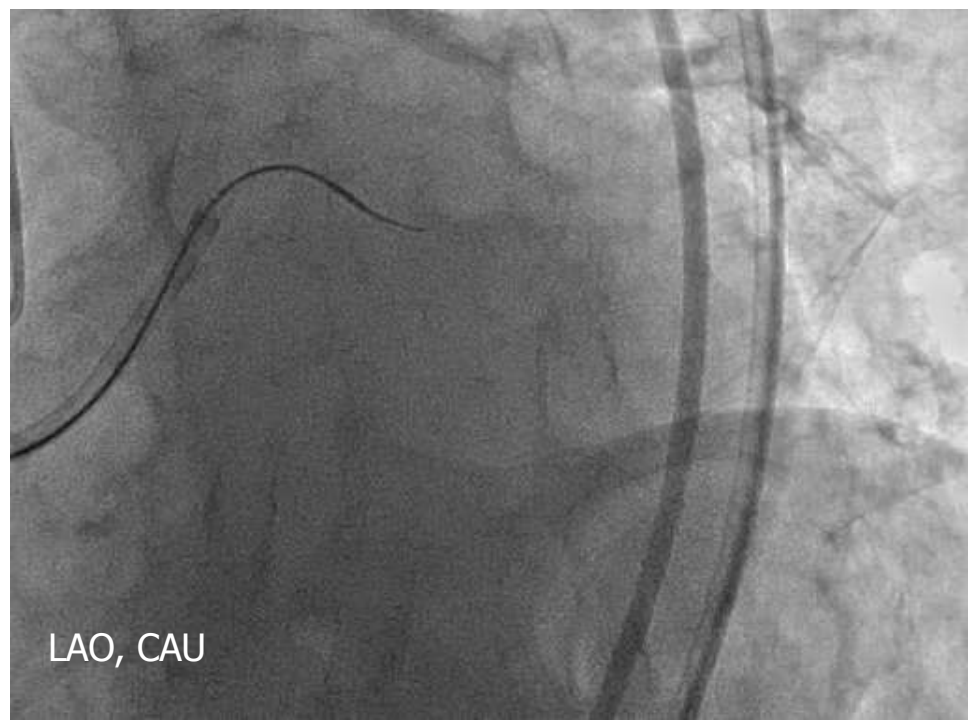
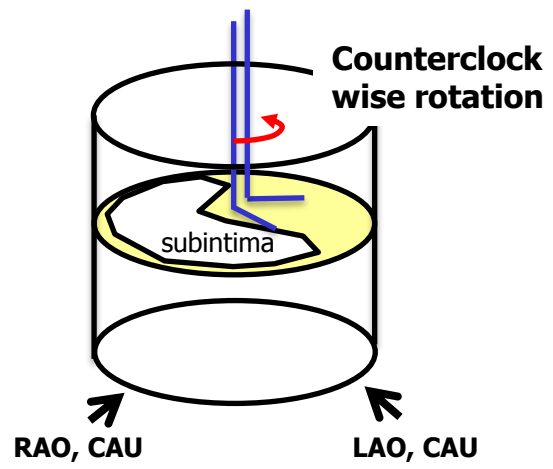


Navifocus WR IVUS could not be advanced into SN branch.

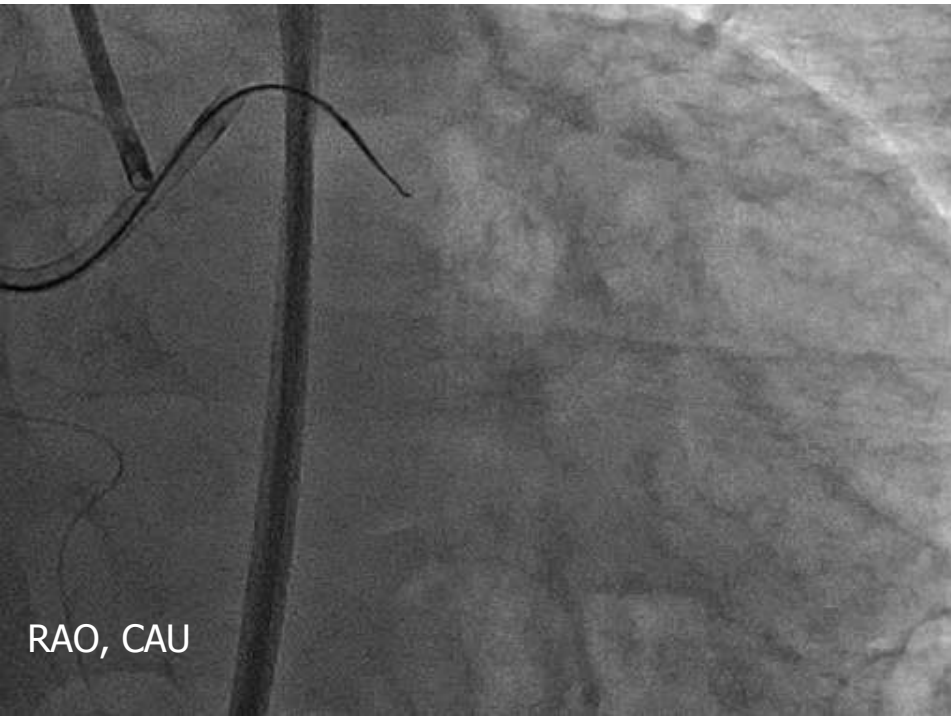
Under a Corsair, a XT-R wire was advance at the entrance of CTO.



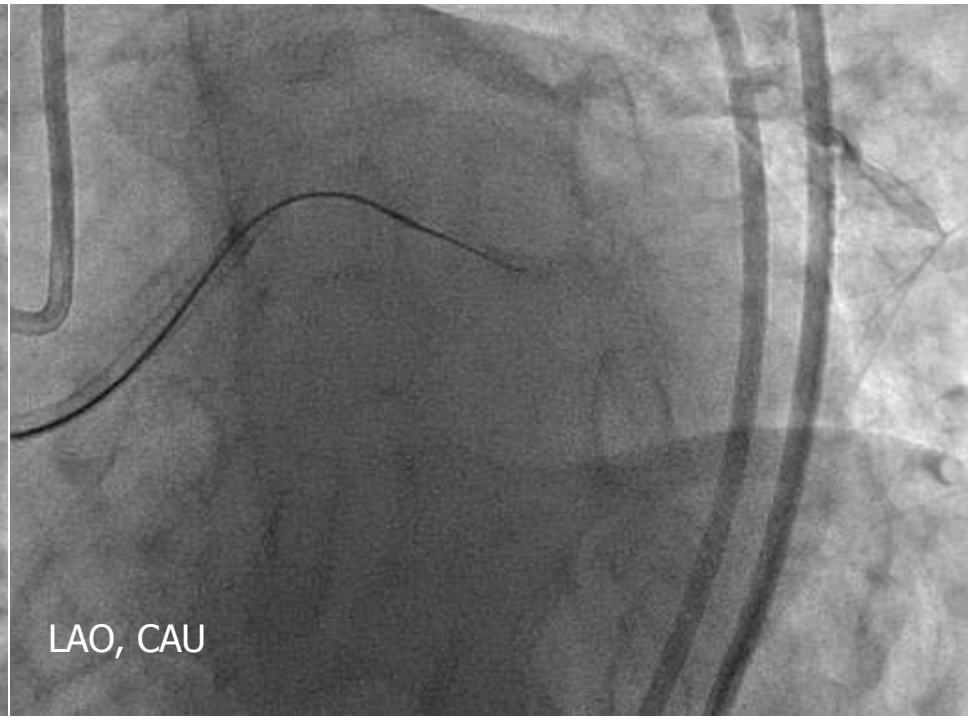
The XT-R wire was changed into a GAIA 2nd-wire.



LAO, CAU



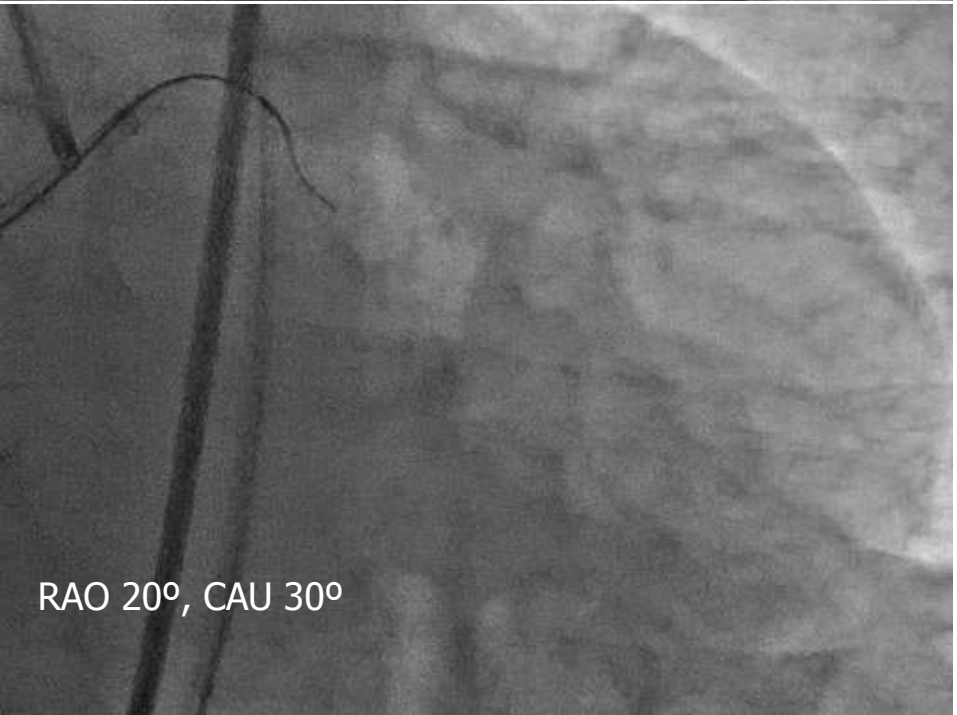
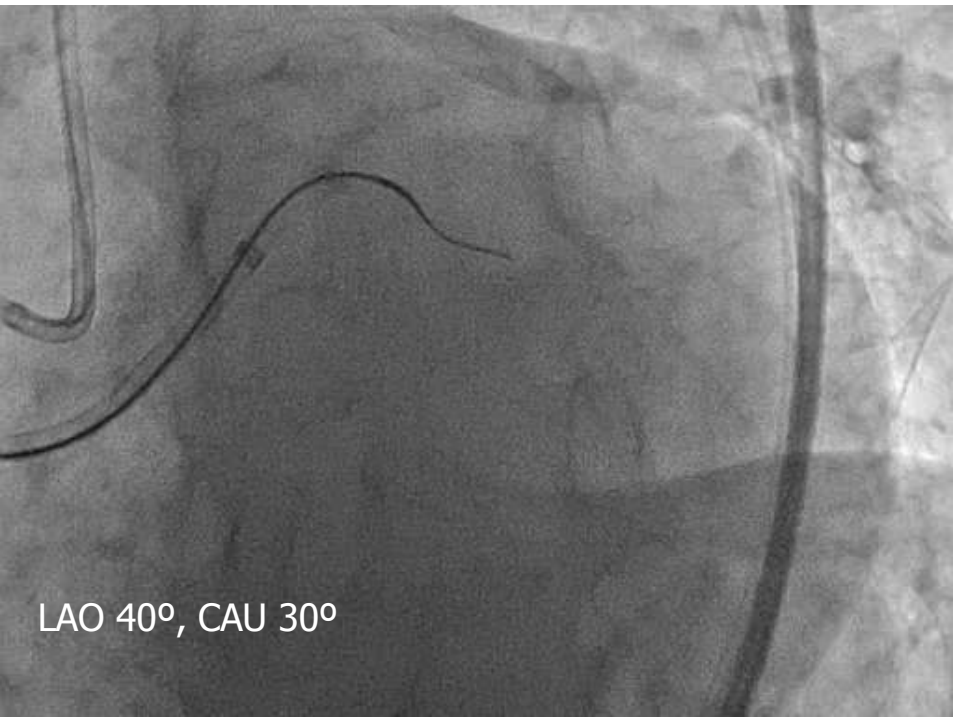
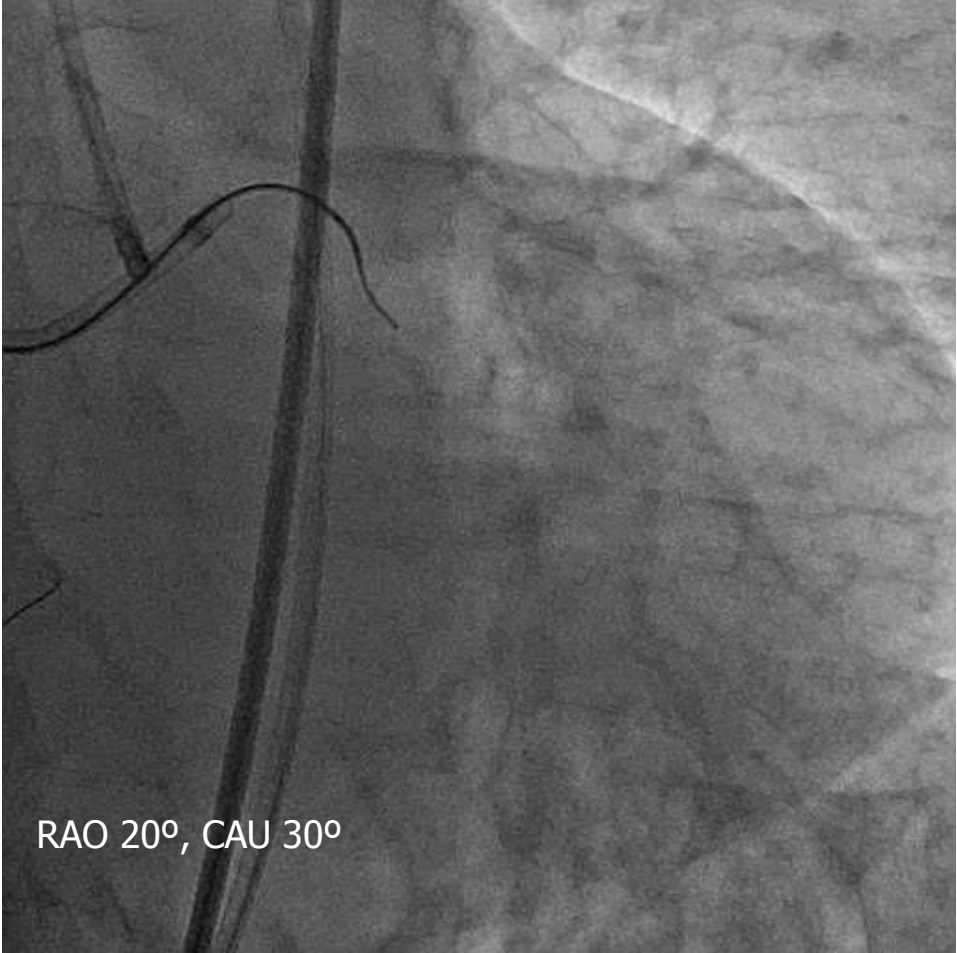
RAO, CAU



LAO, CAU

**Under not ideal perpendicular direction,
I performed 3D wiring.**

The GAIA 2nd-wire was rotated 135° counterclockwise to direct the tip toward the center of the target, the tip was slipped at the exit.



CRA 30°, LAO 40°

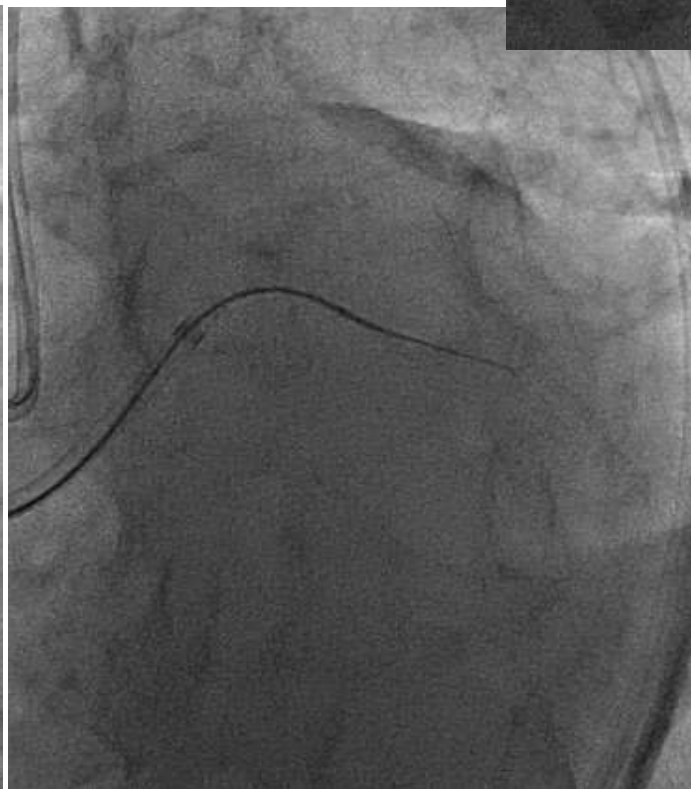
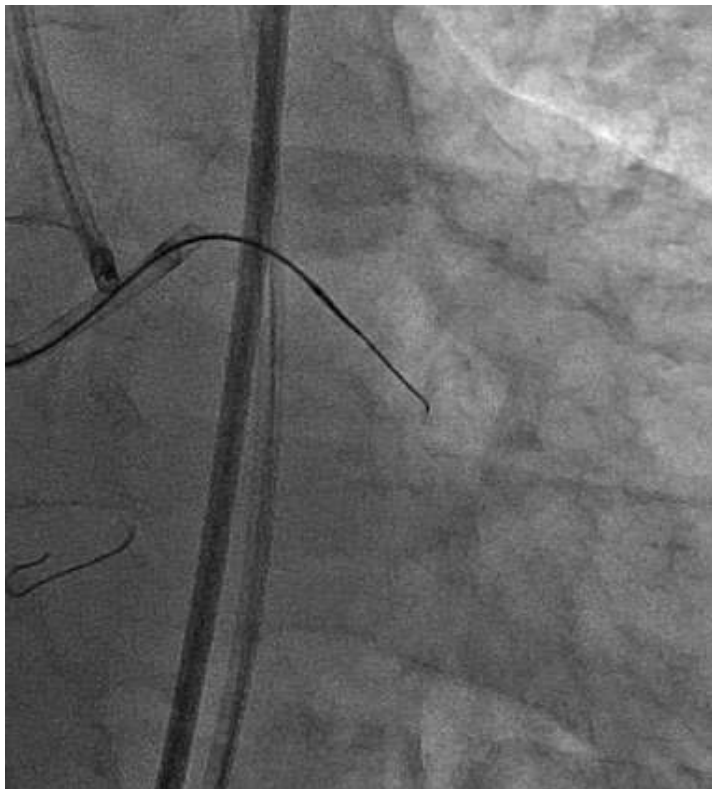
Ideal perpendicular
direction



CAU 30°, RAO 20°

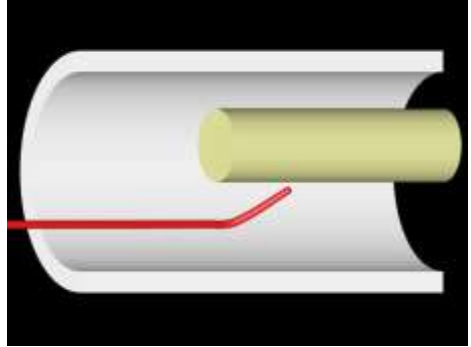


CAU 30°, LAO 40°



Under ideal perpendicular direction, I performed pinpoint puncture with 3D wiring.

By using Crusade, the GAIA 3rd was advanced just before the exit. I constructed 3D image from ideal the 2 perpendicular angles.



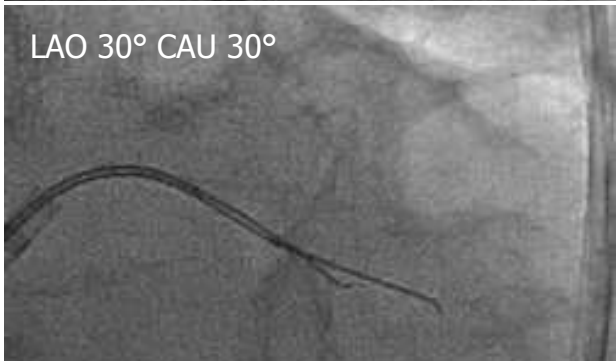
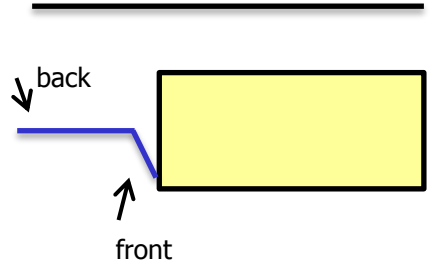
LAO 30° CRA 30°



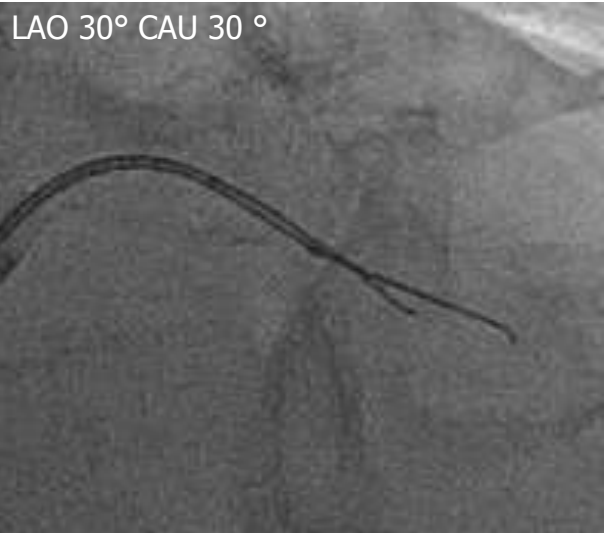
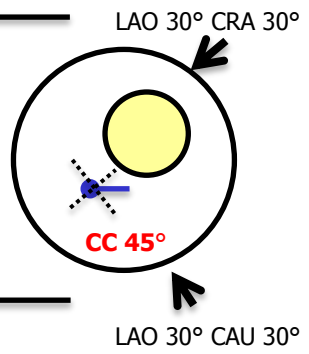
Counterclockwise 45° →



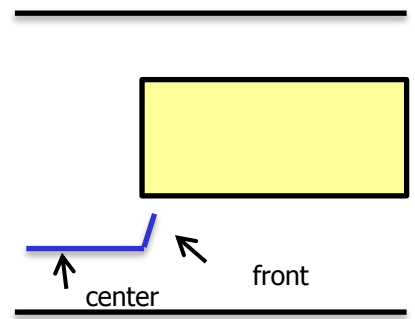
LAO 30° CRA 30°



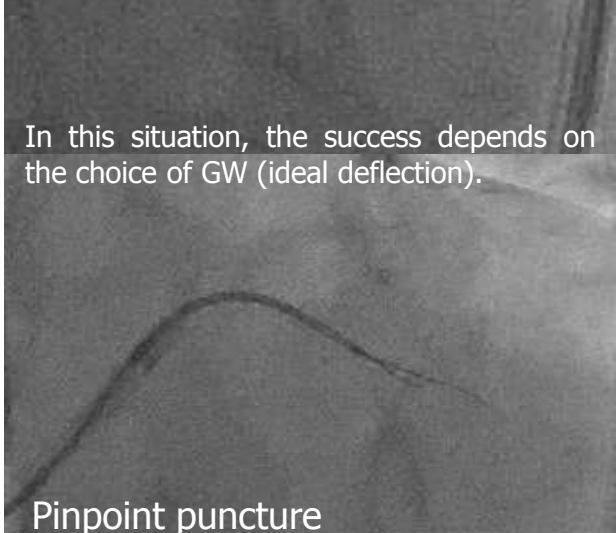
LAO 30° CAU 30°



LAO 30° CAU 30°



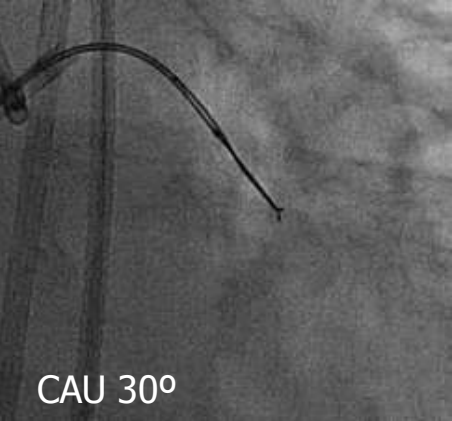
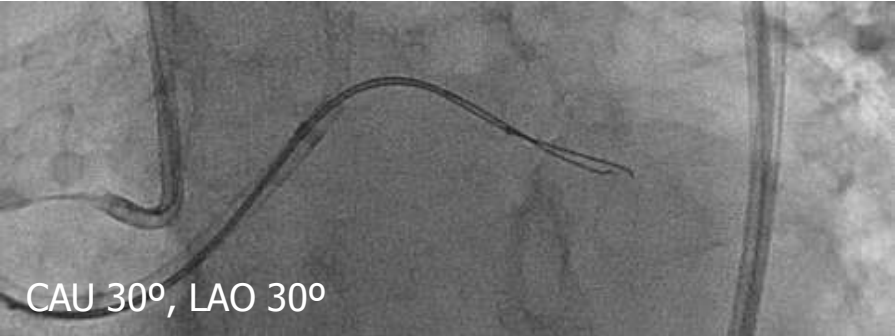
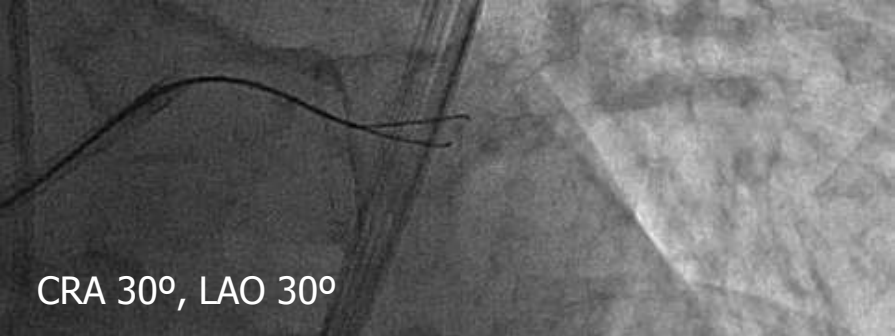
In this situation, the success depends on the choice of GW (ideal deflection).



Pinpoint puncture

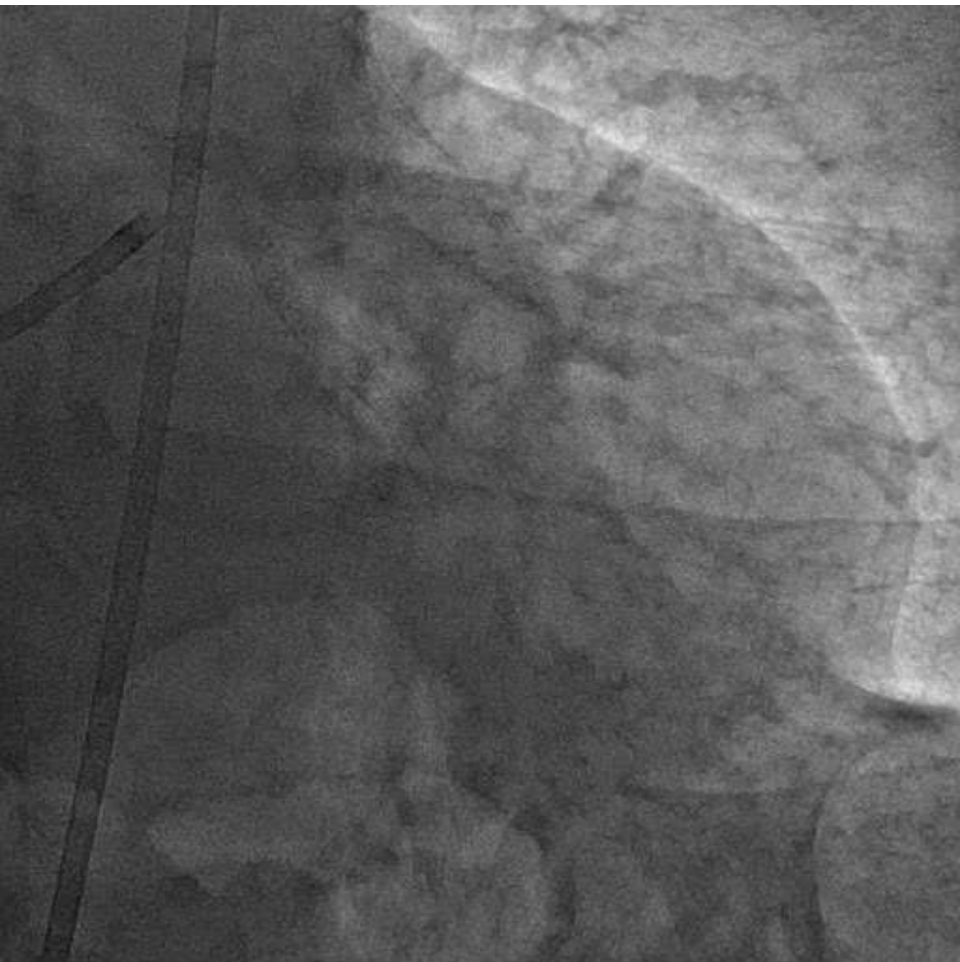
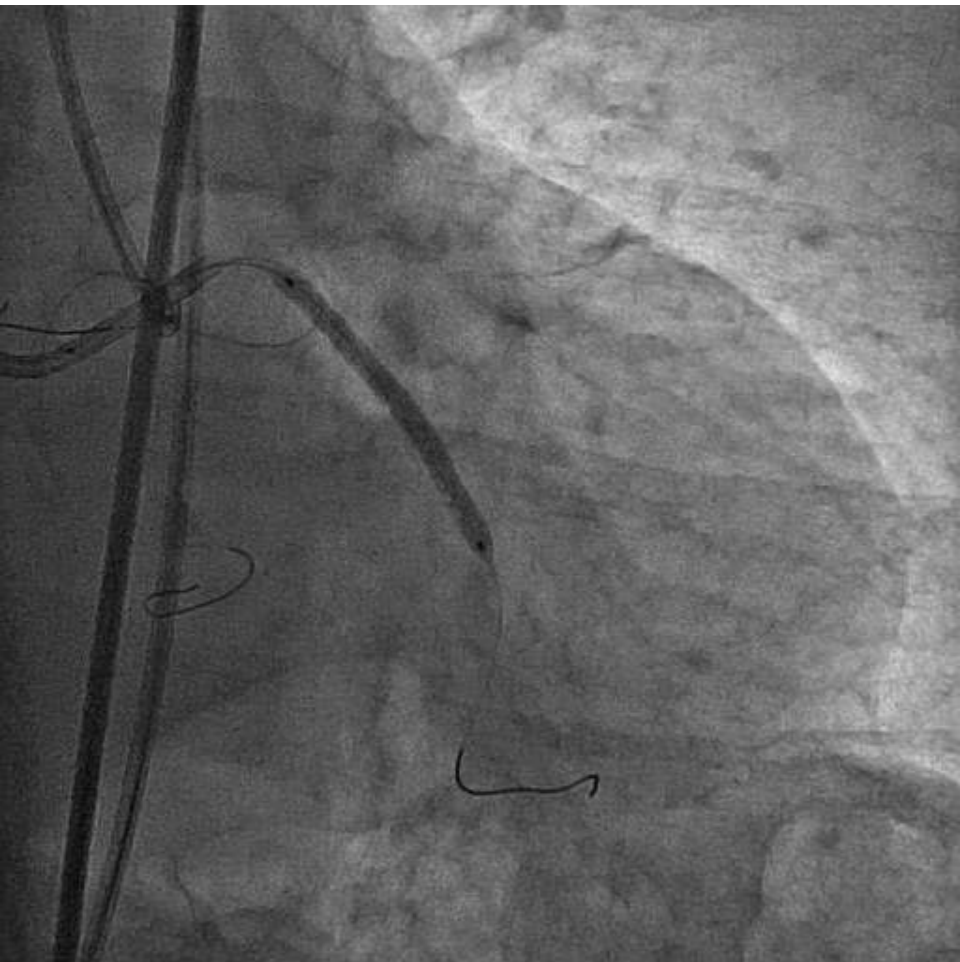
The images of the 2 perpendicular angles (CRA 30°, LAO 30° & CAU 30°, LAO 30°) and CAU 30° showed that the GW was inside the lumen beyond the exit.

The 2 perpendicular angles



The CTO lesion was dilated with a drug-eluting stent.

TIMI-3 flow was achieved.



Coronary Special Focus Live Case 4

Higashi Takarazuka Satoh Hospital



TOSHIBA
NDA 100% 

LAO 28°
CRA 28°
SID 100 cm
θ 6°
C_{rot} 0°
+ 97 cm
✓ 48°C
② L 39.2 min





Audio Receiver Ch1: Japanese
Ch2: English Ch3: Chinese

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Coronary Special Focus Live Case 4

Higashi Takarazuka Satoh Hospital



Audio Receiver Ch1: Japanese
Ch2: English Ch3: Chinese

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Take home message form my CCT case in 2014.

- Due to the sufficient torque for rotation, the GAIA wires enables us to trace the imaginary ideal route in the CTO body and penetrate the CTO exit with pinpoint puncture.
- In choosing GW, you have to consider the condition around the target, *i.e.*, plaque hardness, creation of the space in intima or sub-intima, and shape of the exit.
- 3D wiring is the one method to improve the accurate GAIA GW control because you can choose the correct rotation direction and rotate the GW with high angular precision.
- 2D and 3D wiring should be selected depending on the situation. 3D wiring does not always work because the route or exit of CTO is not always clear on the X-ray system, or the GW torque response is not always maintained, or the GW may enter the sub-intimal space. In these situations, 2D wiring while feeling the lesion hardness or other strategies (retrograde approach, or IVUS guide) are recommended.