

Retrograde Challenges in 2018

- Beauty of 4Ps in 2018 – 10min

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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 : Power of image

2nd P : Plan your strategy

3rd P : Product knowledge

4th P : Professionalism/ Perseverance

1st P : Power of image

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.

2nd P : Plan your strategy

Based on the information that you get, plan your PCI strategy. Think scenarios as many as possible and scrutinize them based on lesion information and target of that particular patient.

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.

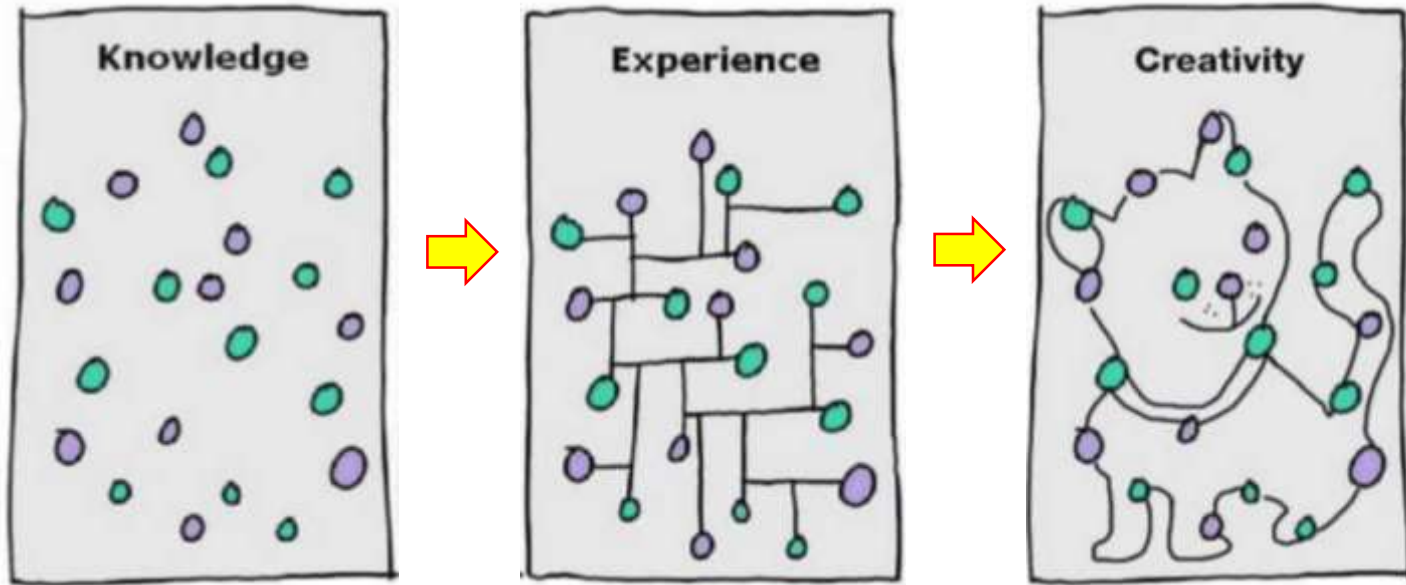
Perseverance is the indispensable quality that you have to demonstrate as professional cardiologist.

Case 1 ; Wisdom guide approach

If you face really difficult situation,
you need to give full play of your
comprehensive competence !!

**In case, you lost the way, you should focus on
surviving with your knowledge and experience**

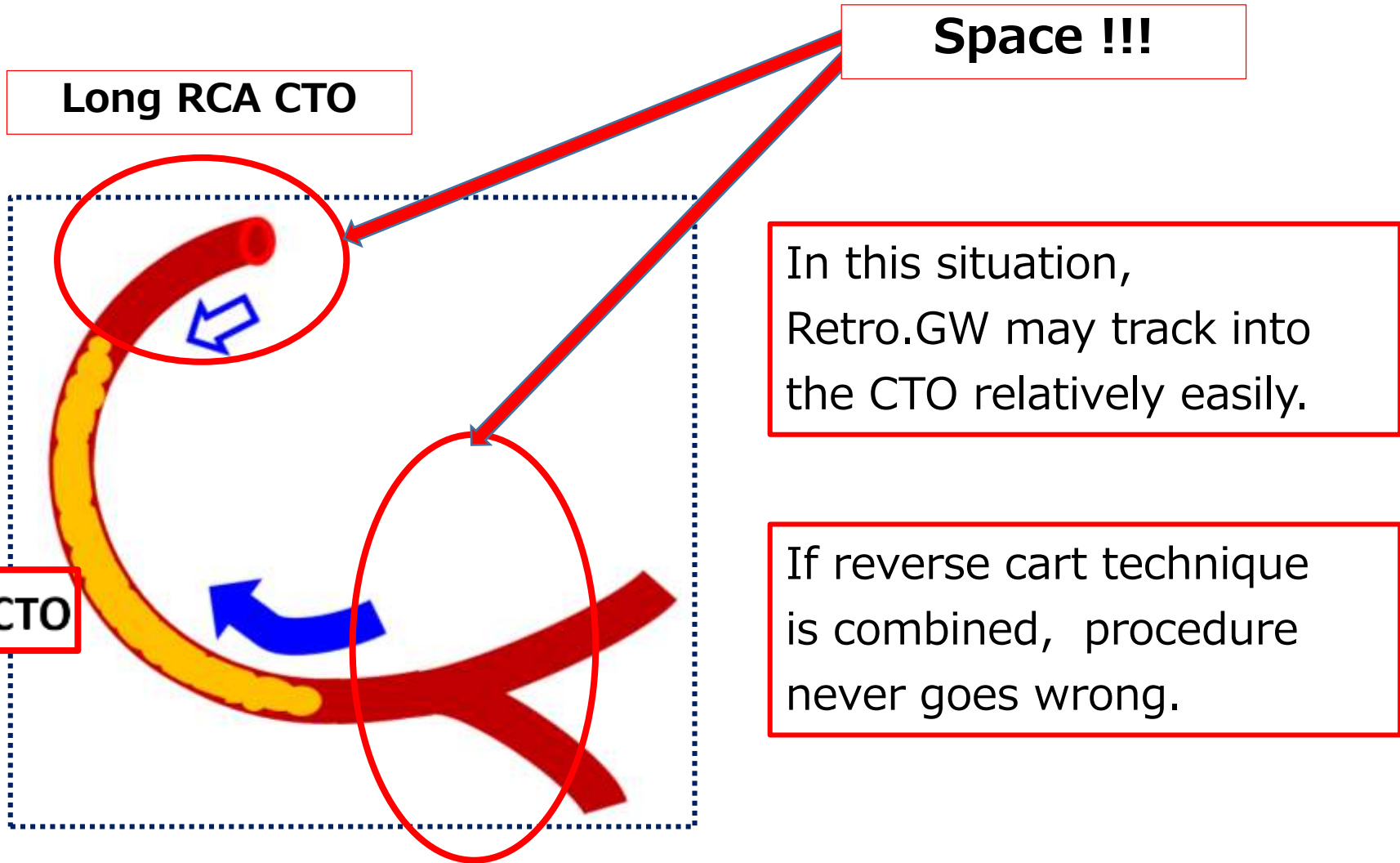
Wisdom



Wisdom is the daughter of experience.

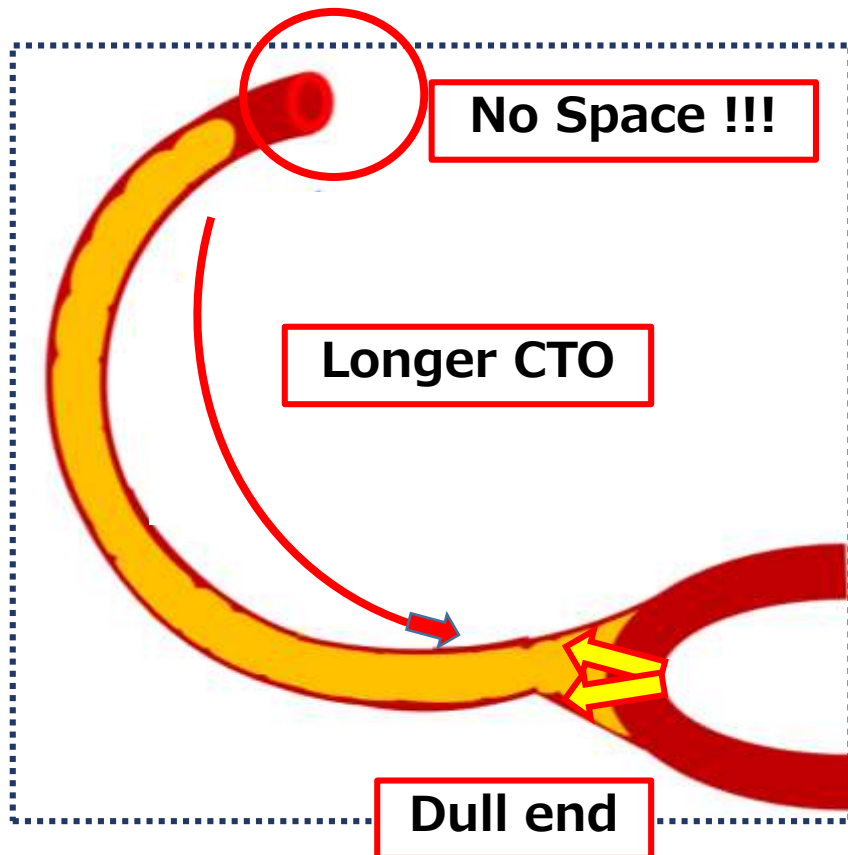
Leonardo da Vinci 1452-1519

Very Suitable for Retrograde approach



Retrograde approach : Need Something More

If the shape of the ending zone is dull stump, retrograde wire is difficult to be controlled to let them get into the CTO. **There is no guarantee from the 3rd position of RCA or beyond from there.**

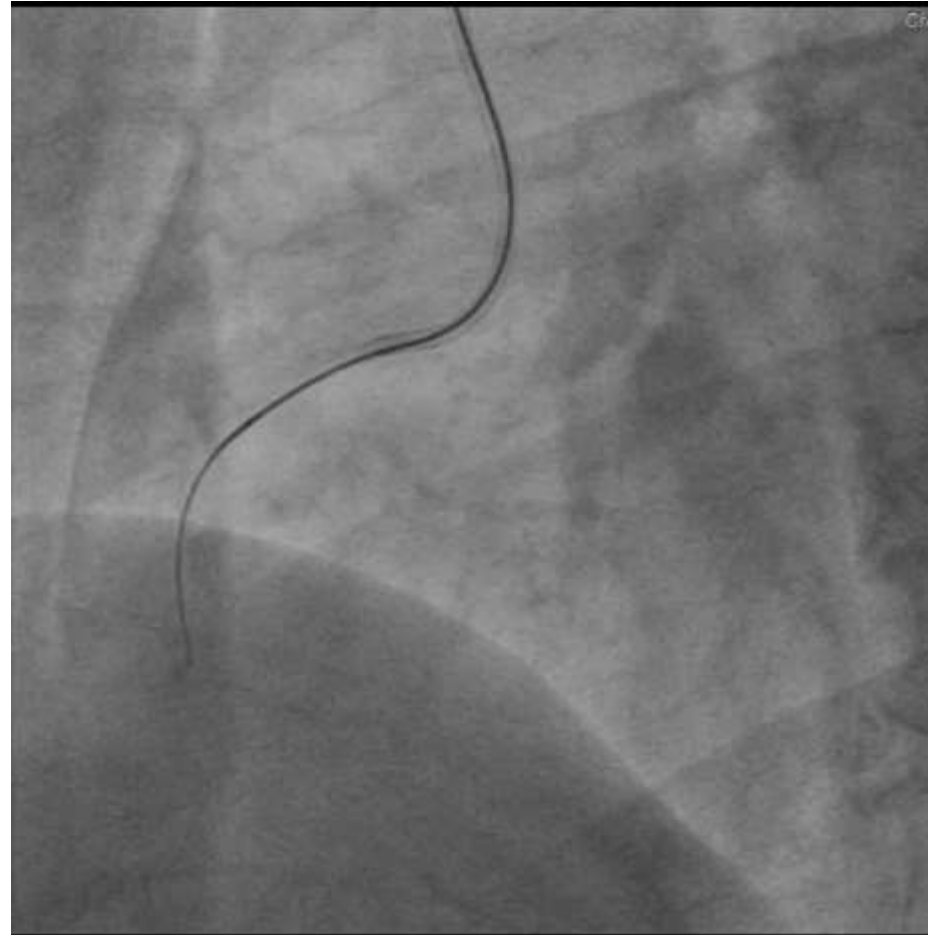
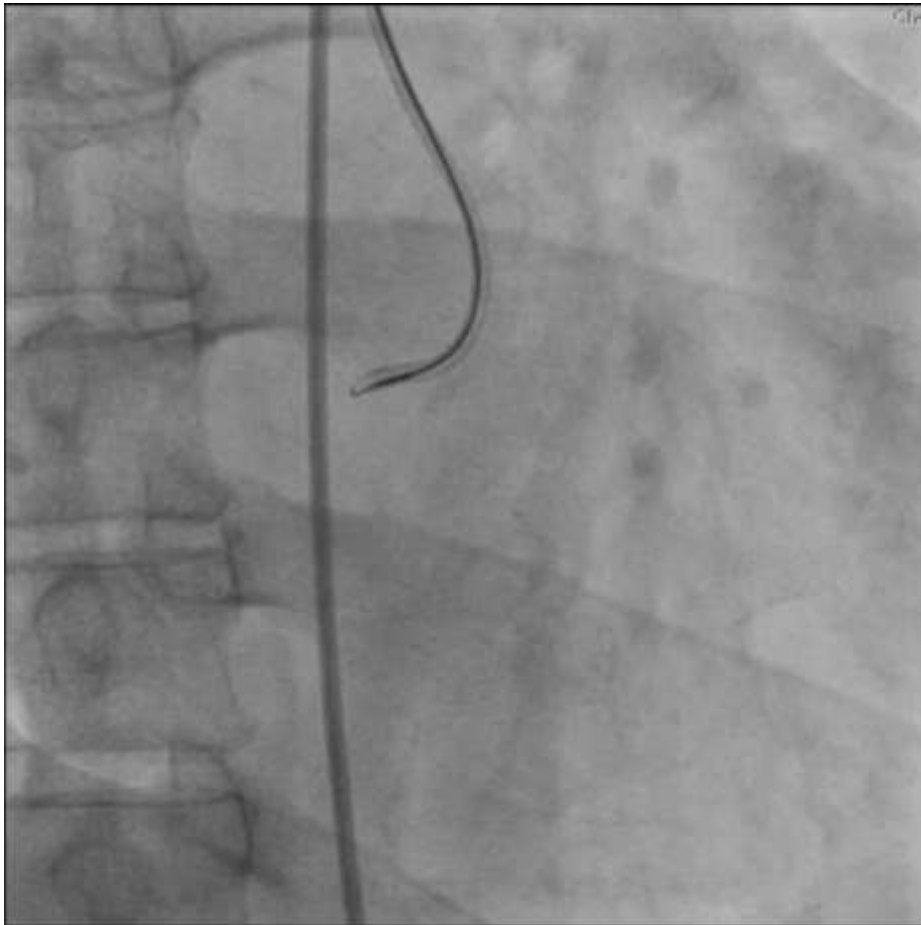


If directional wire control from retrograde is difficult, antegrade wiring has to be precisely done as a guidepost and make the advancement.

Then restart Retro. approach, by referring the antegrade wire as a guidepost.

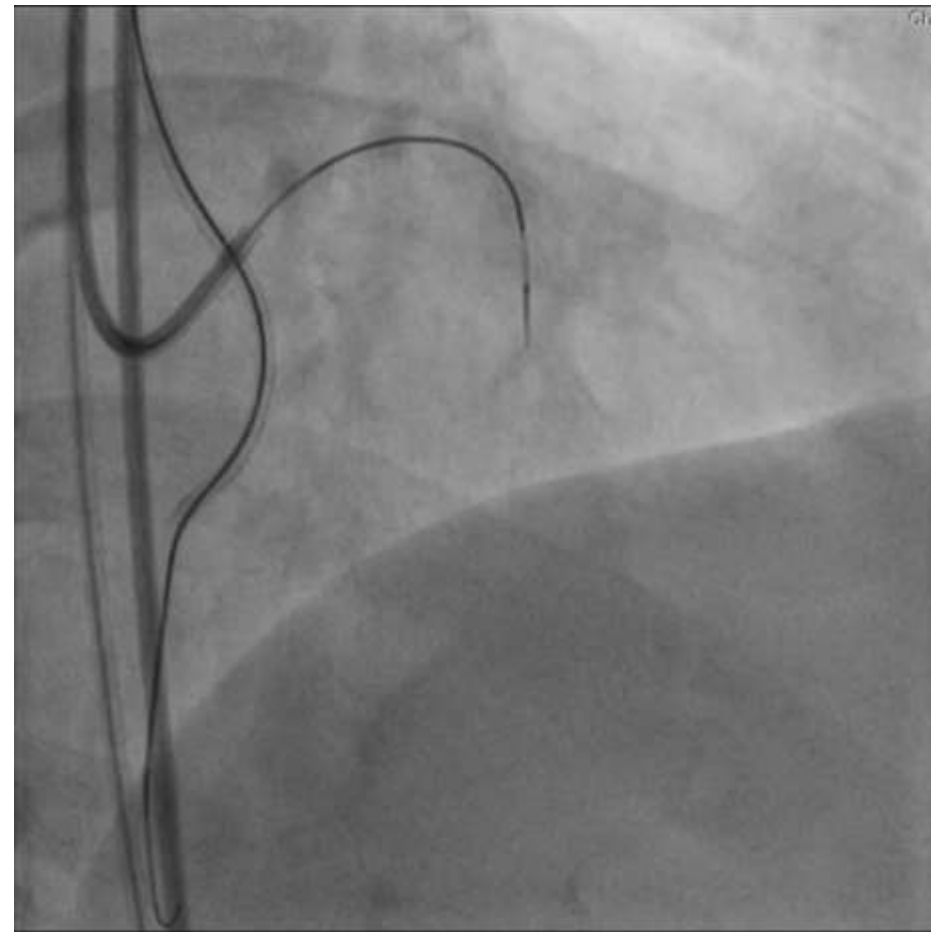
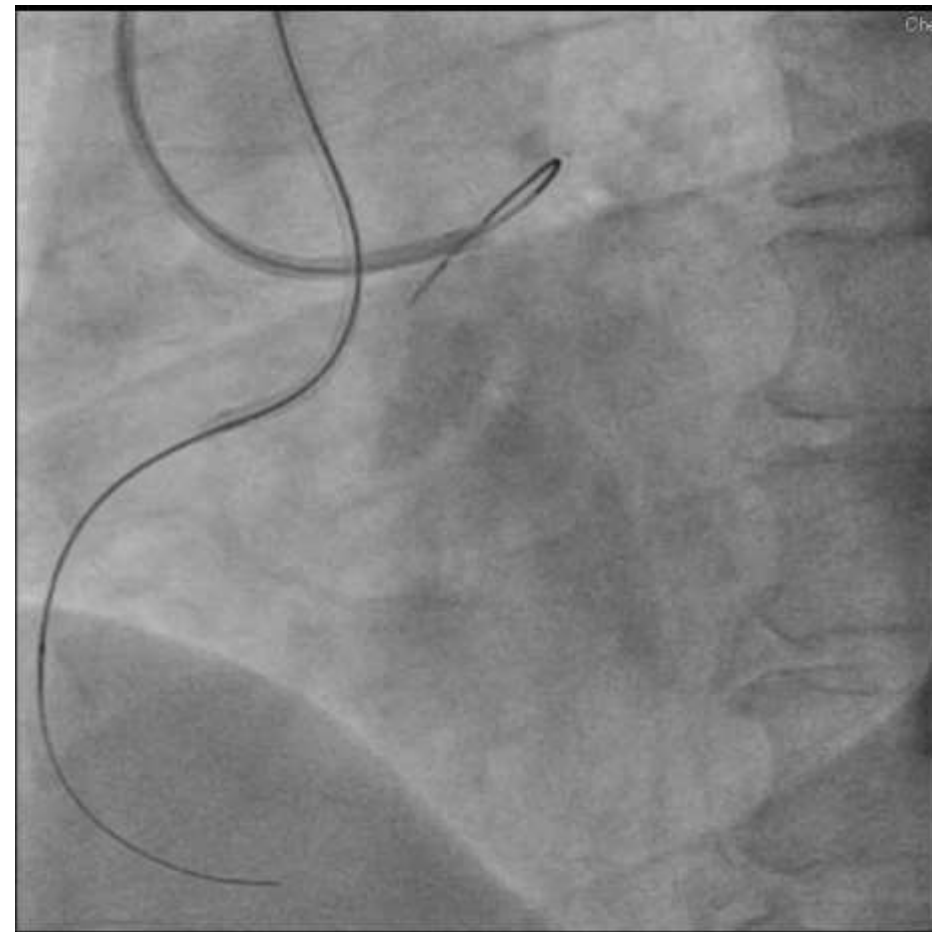
Case : RCA long CTO with distal dull end bifurcated lesion

Due to the condition of the CTO, first, we started antegrade approach. We prepared **Gaia wire** with Corsair and advanced to get into the lesion.



Case : RCA long CTO with distal dull end bifurcated lesion

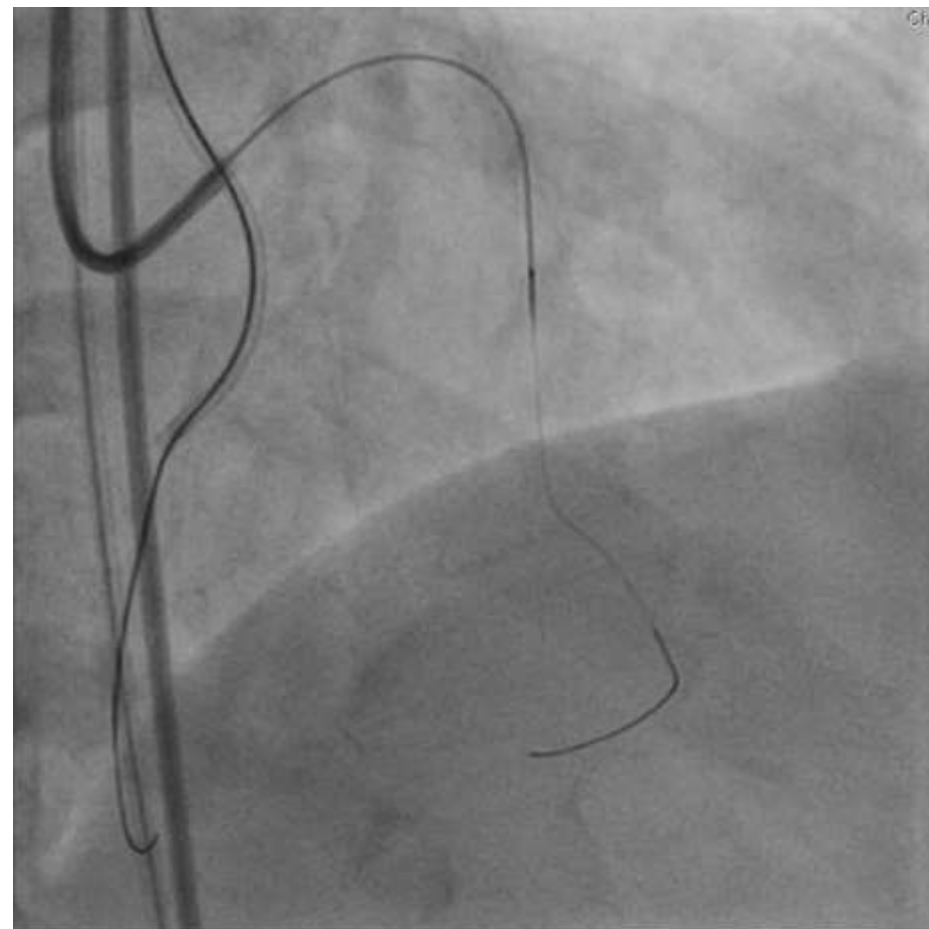
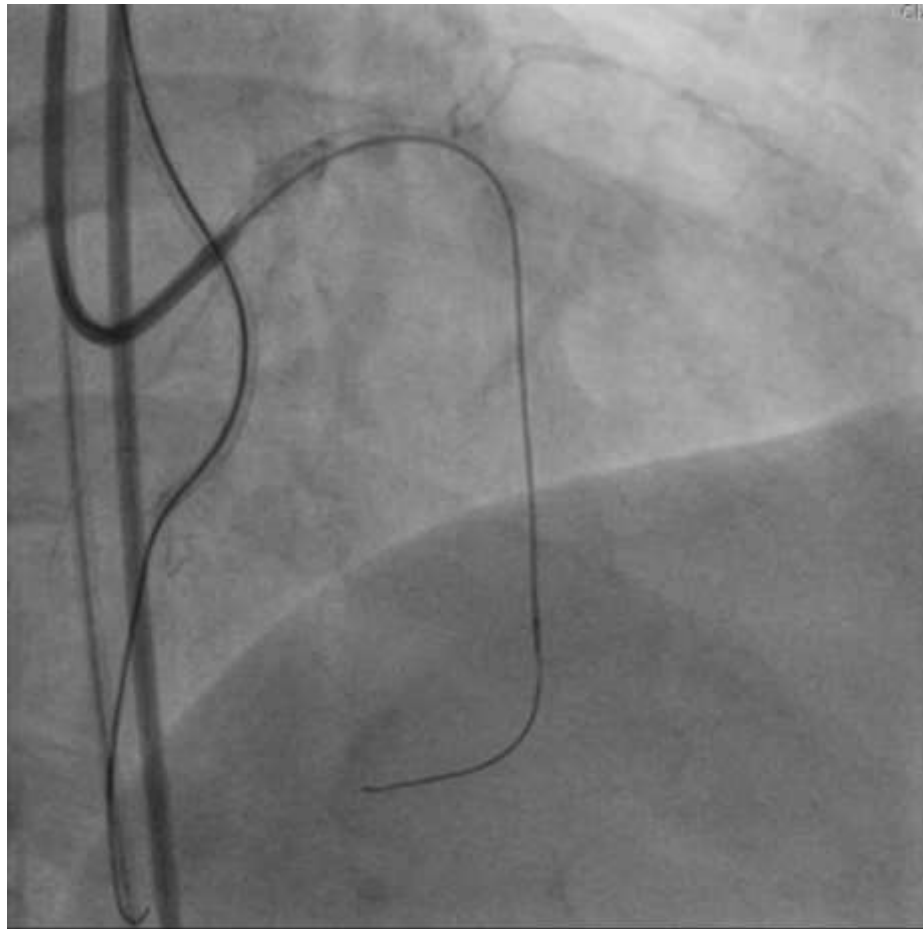
Check the route of wire movement repeatedly, comparing to the anatomical rule and advance the wire. When antegrade wire reaches to the vicinity of the last bifurcation area of RCA, finally it is now **ready to start retrograde wiring.**



Case : RCA long CTO with distal dull end bifurcated lesion

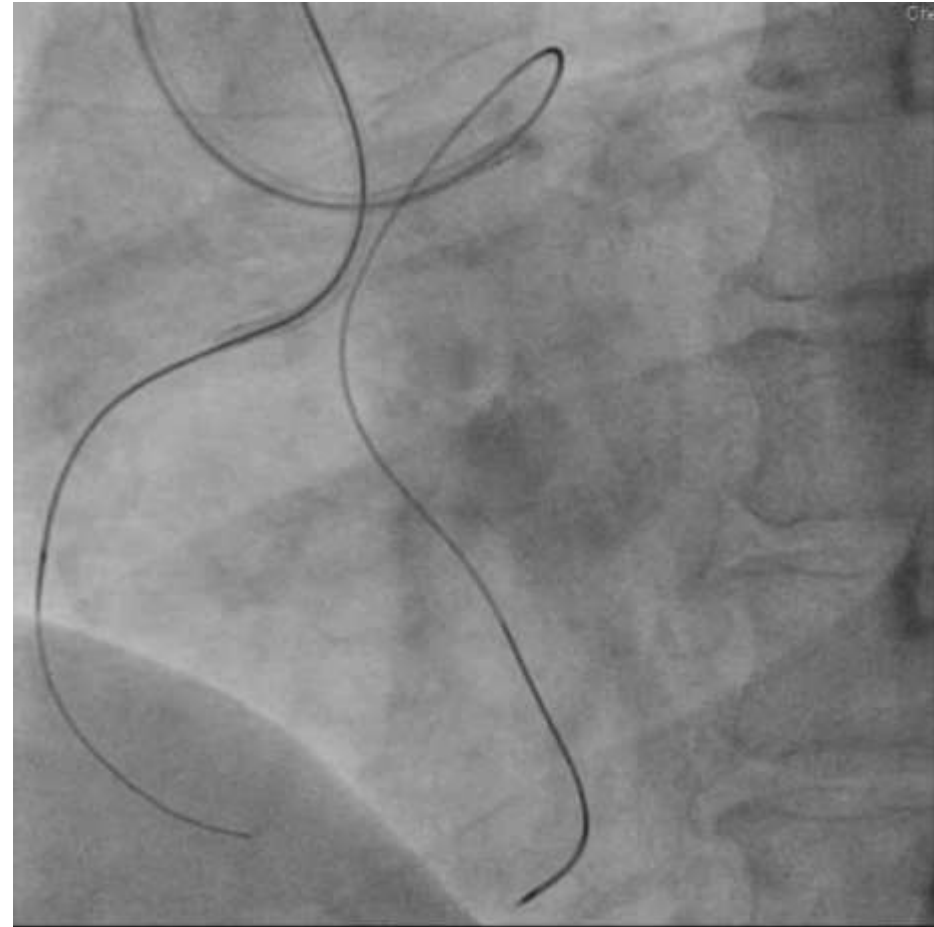
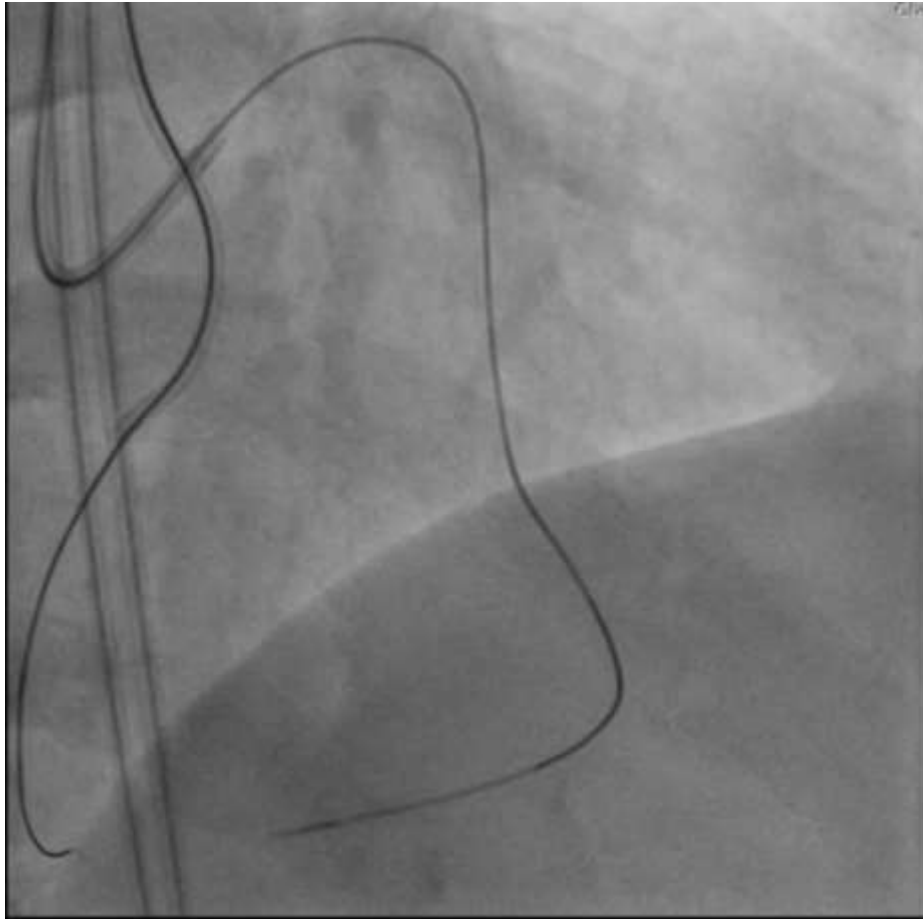


Retrograde GW surfed into RCA distal easily but the distal bifurcation lesion looks dull end.



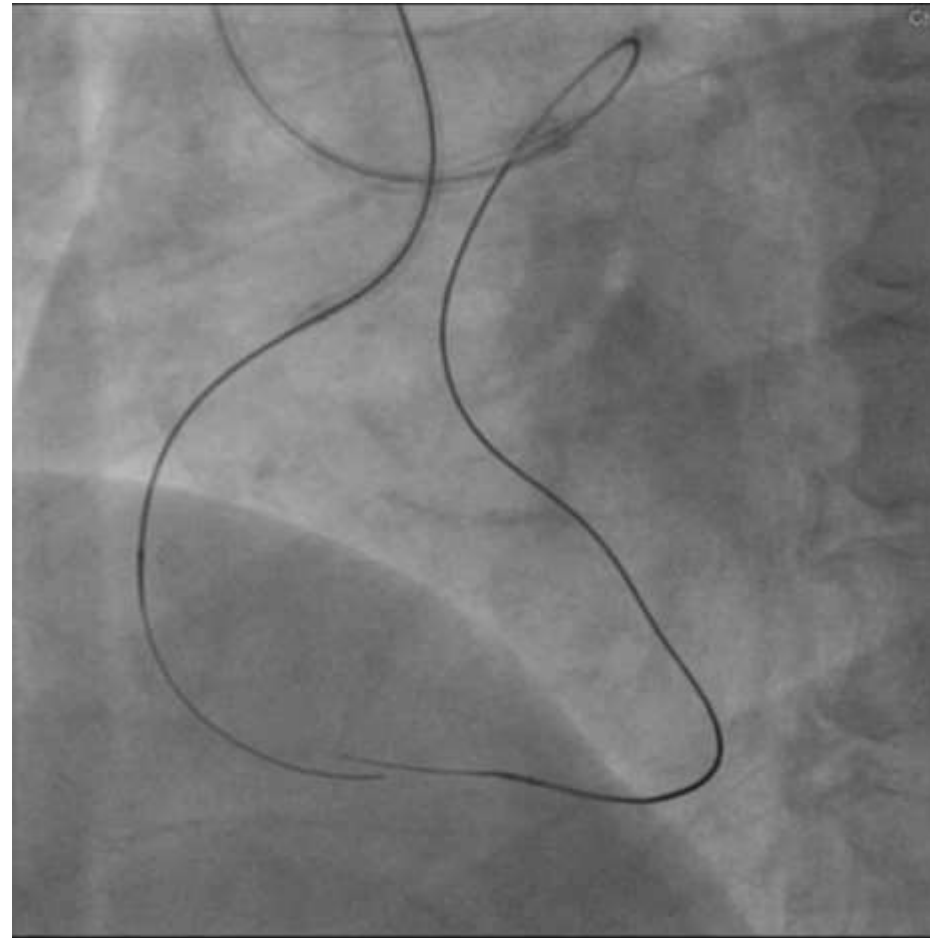
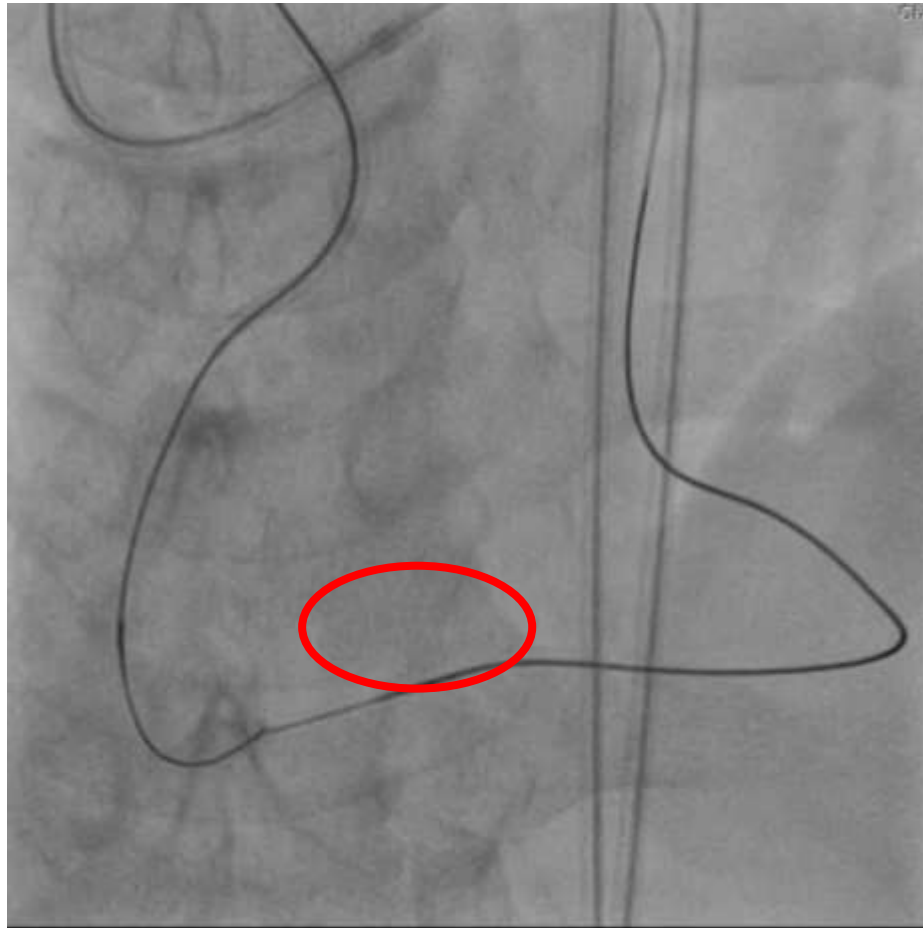
Case : RCA long CTO with distal dull end bifurcated lesion

Even after getting into RCA, We have a AV-PD dull angle bifurcation lesion, So...direction to the mid of RCA is still uncertain.

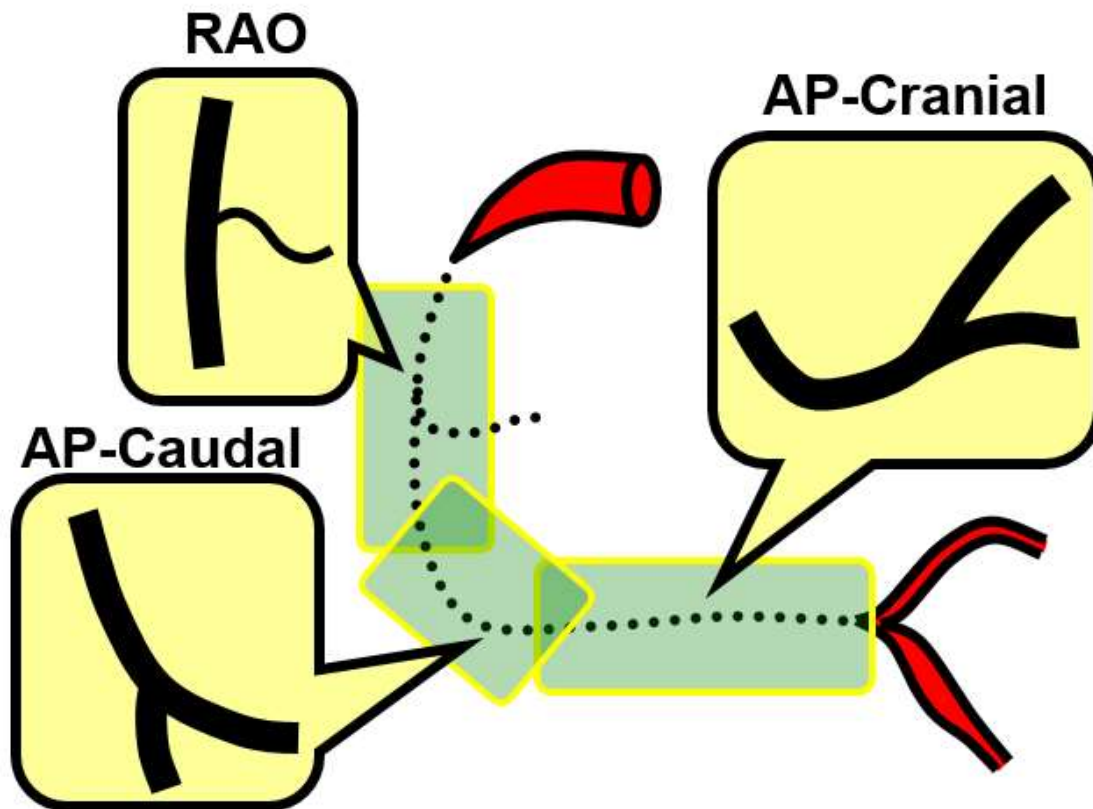


Case : RCA long CTO with distal dull end bifurcated lesion

In this case, We used Miracle Neo GW to struggle, and looks "reached to the mid RCA". But, it is not meeting with antegrade wire.



Note !!: Select optimum angle of angiogram projection :
2-orthogonal projections , RCA CTO



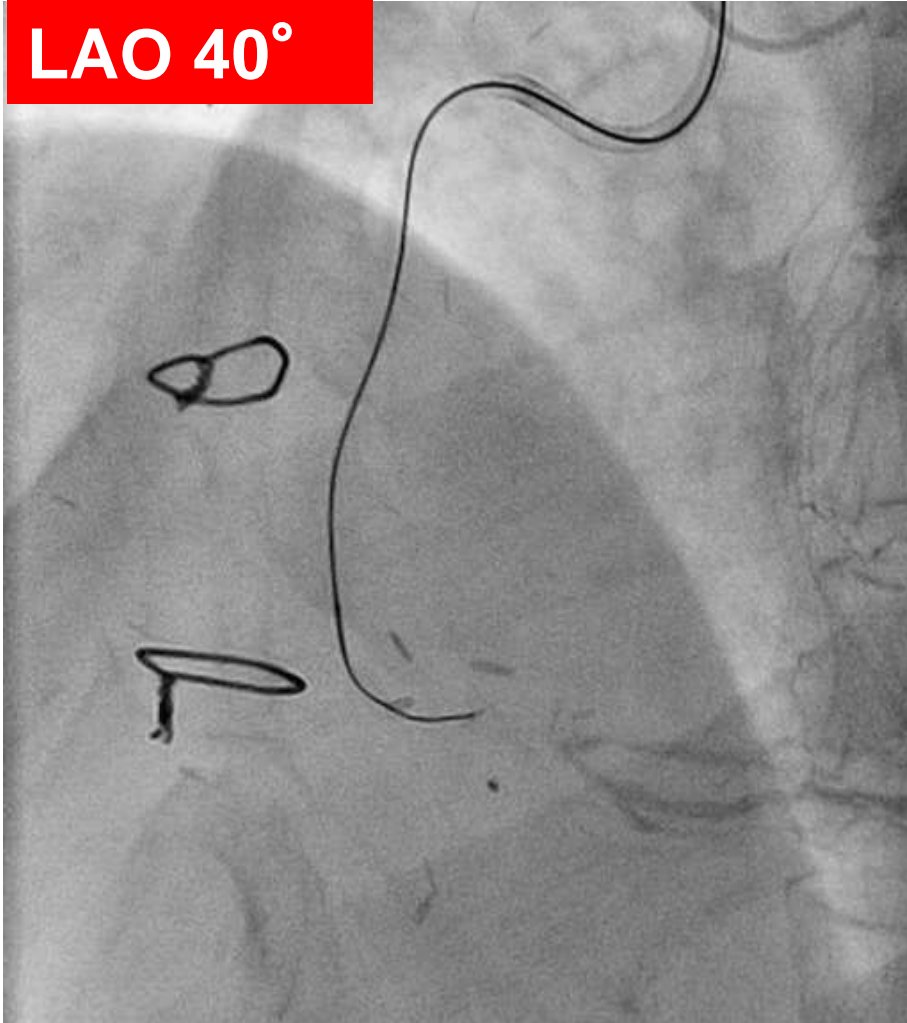
LAO + RAO,
LAO + AP-caudal...
Location of CTO
lesion gives a rough
idea of which view-
angle is the best.

For CTO PCI, make sure to select orthogonal 2 angle projection to check the validity of GW advancement route during the procedure. By adding the orthogonal plane of that view, 3D location of a GW can be easily understood. Orthogonal two angle projection enhances the understanding the wire position

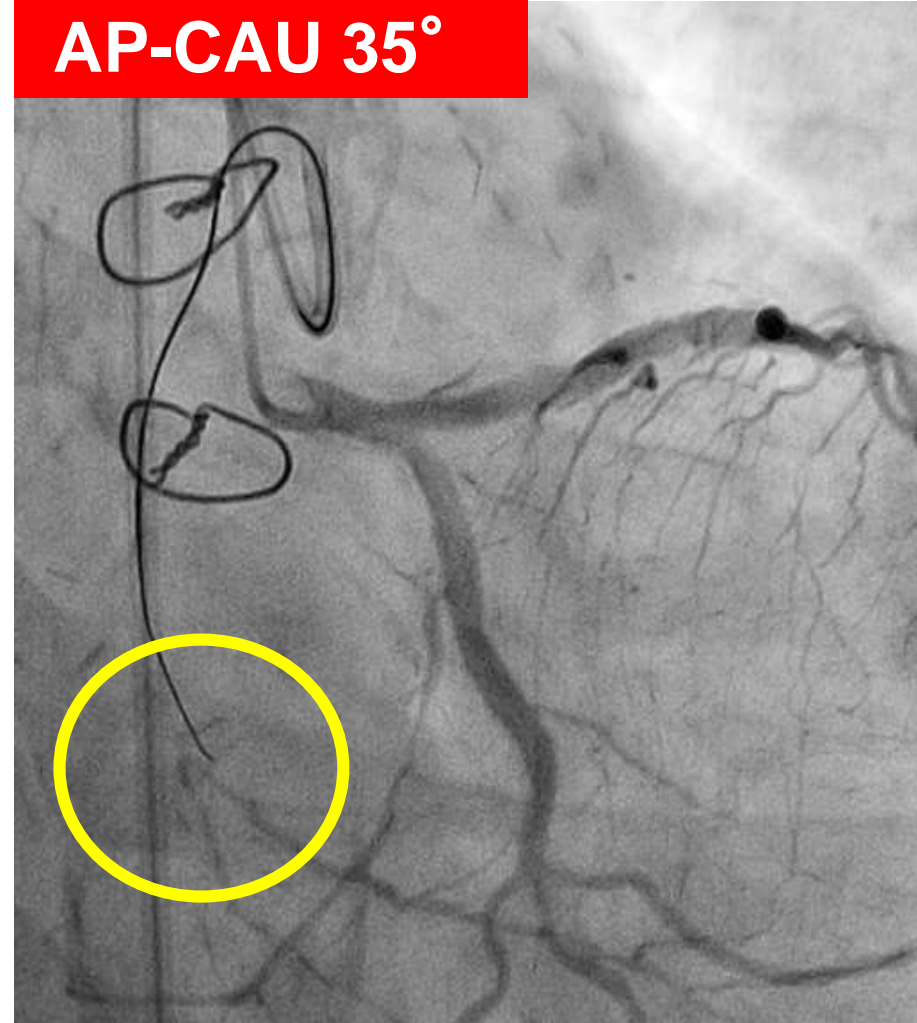
Select optimum angle :RCA long CTO

AP-Caudal view is a one of the most important projection to see mid-RCA

LAO 40°



AP-CAU 35°

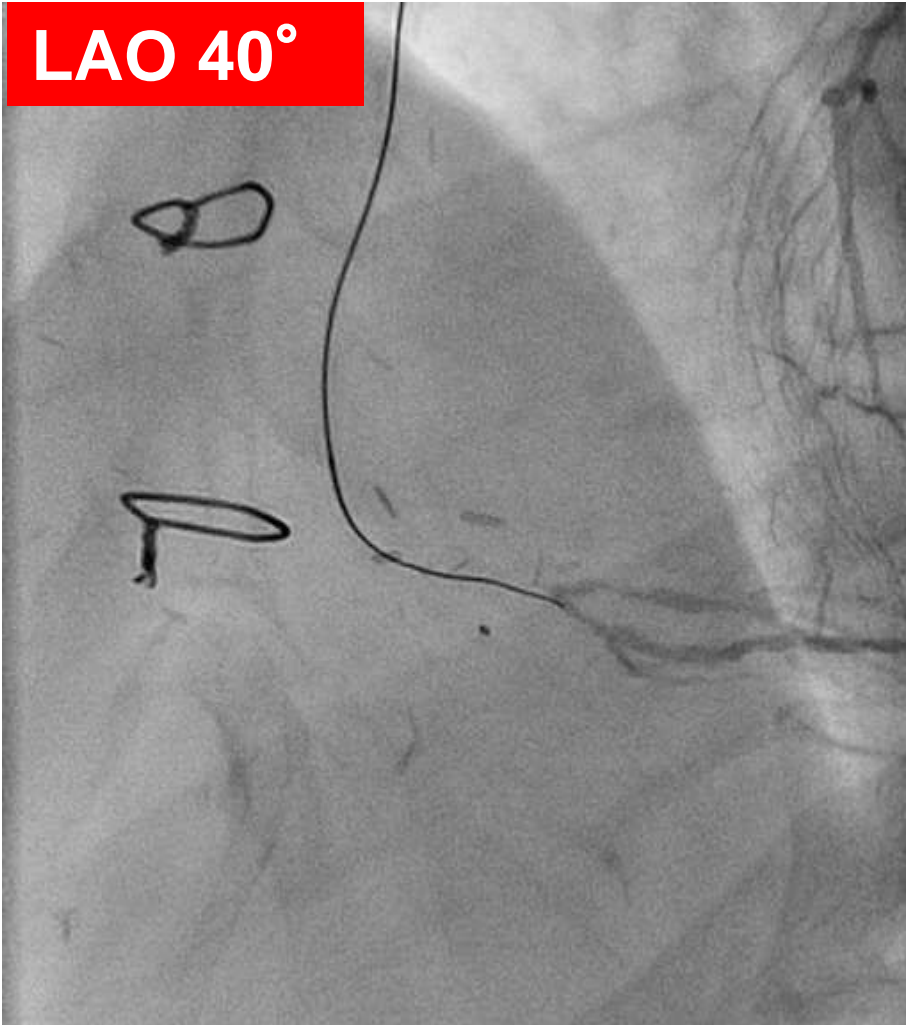


You can clearly understand the wire position in the middle part of RCA CTO

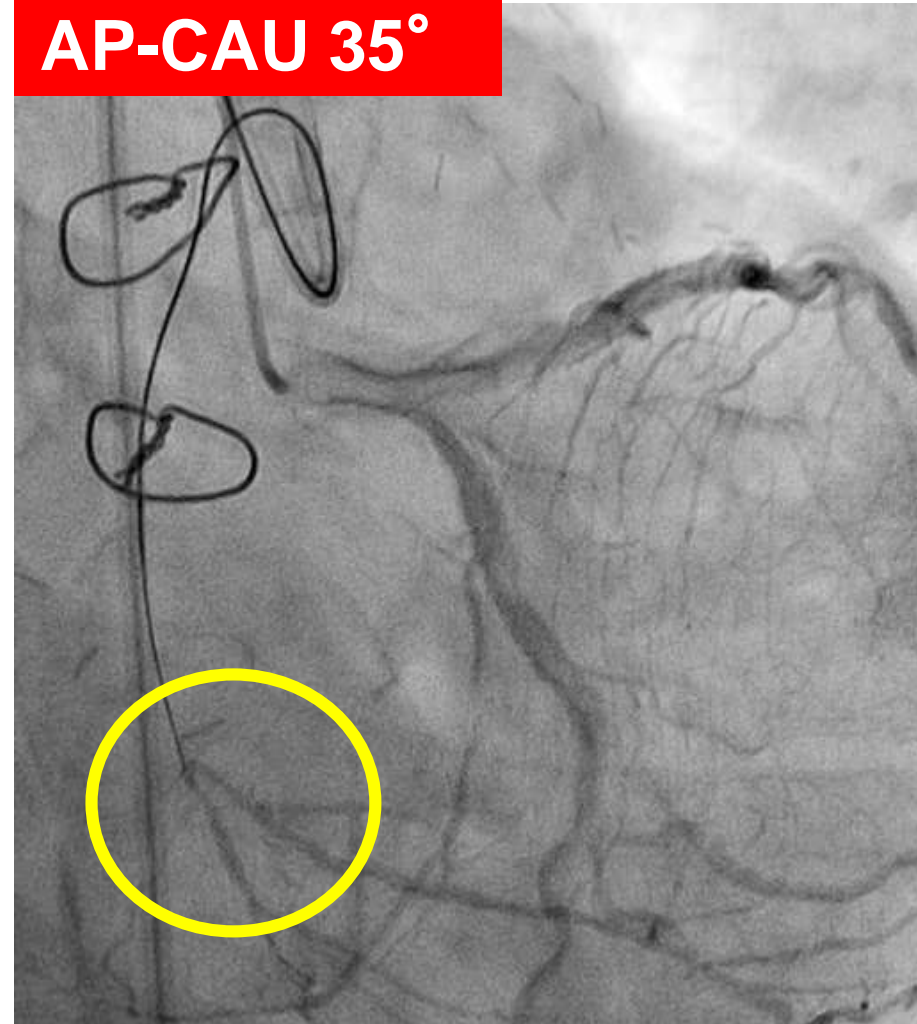
Select optimum angle :RCA long CTO

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LAO 40°



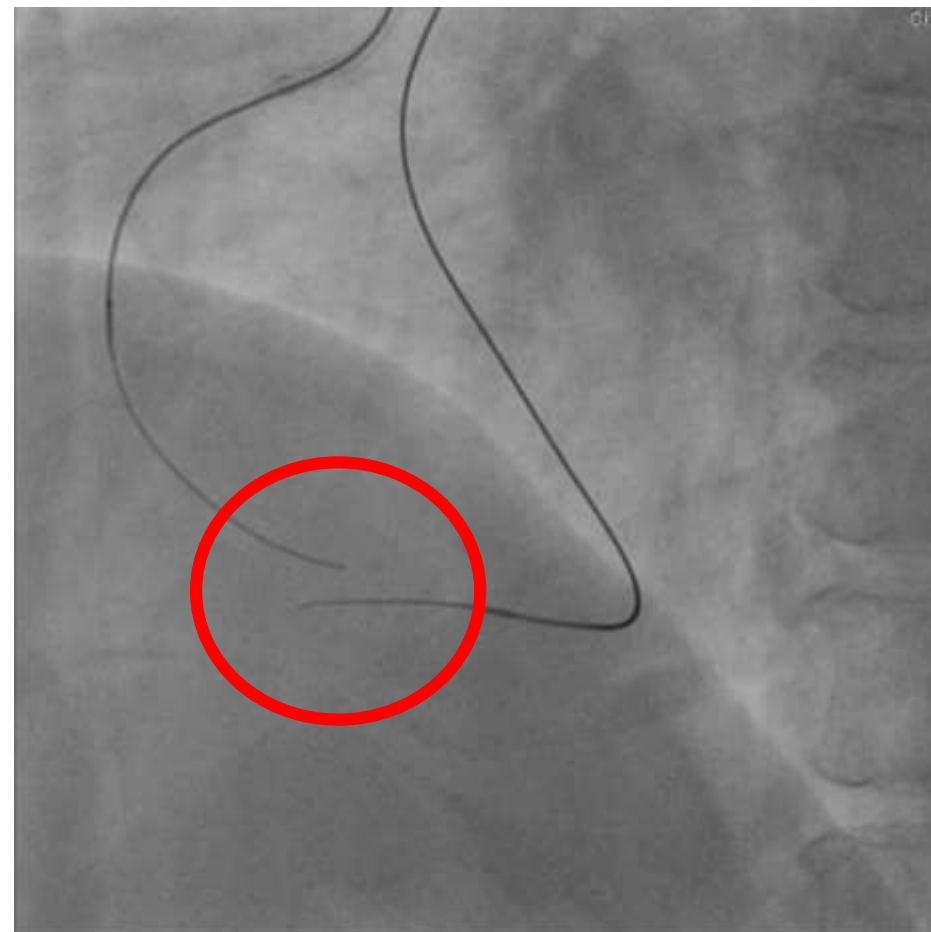
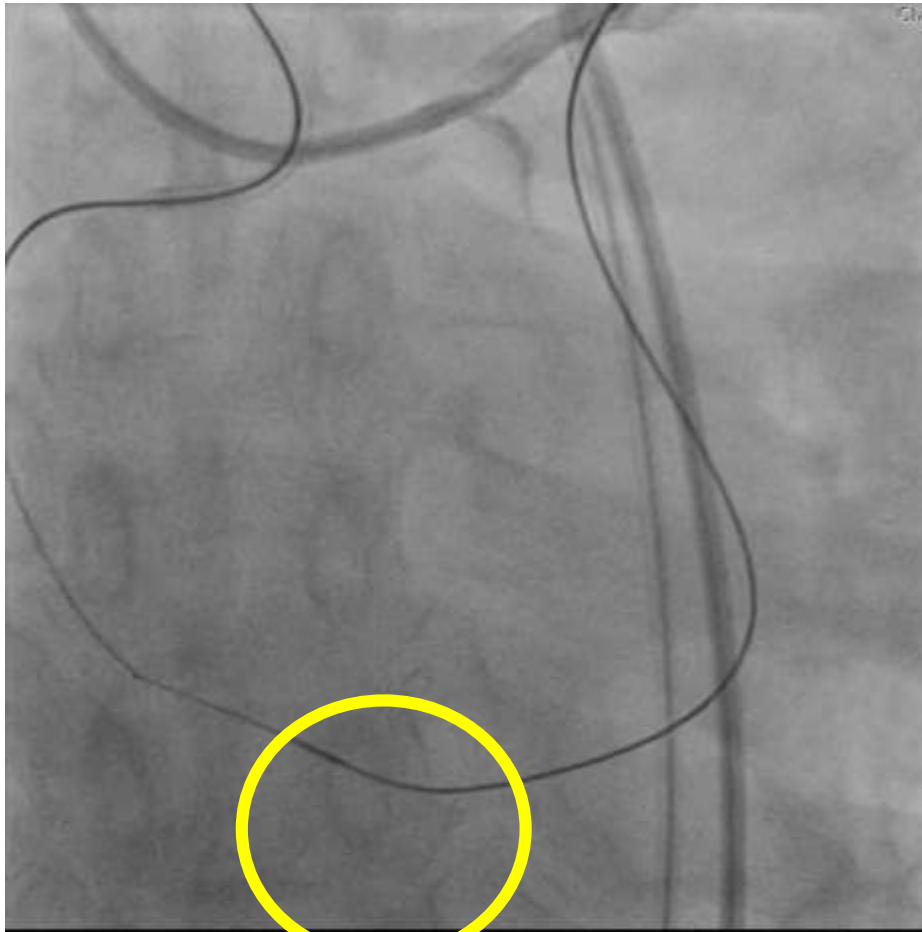
AP-CAU 35°



You can clearly understand how much the wire deviates !!!

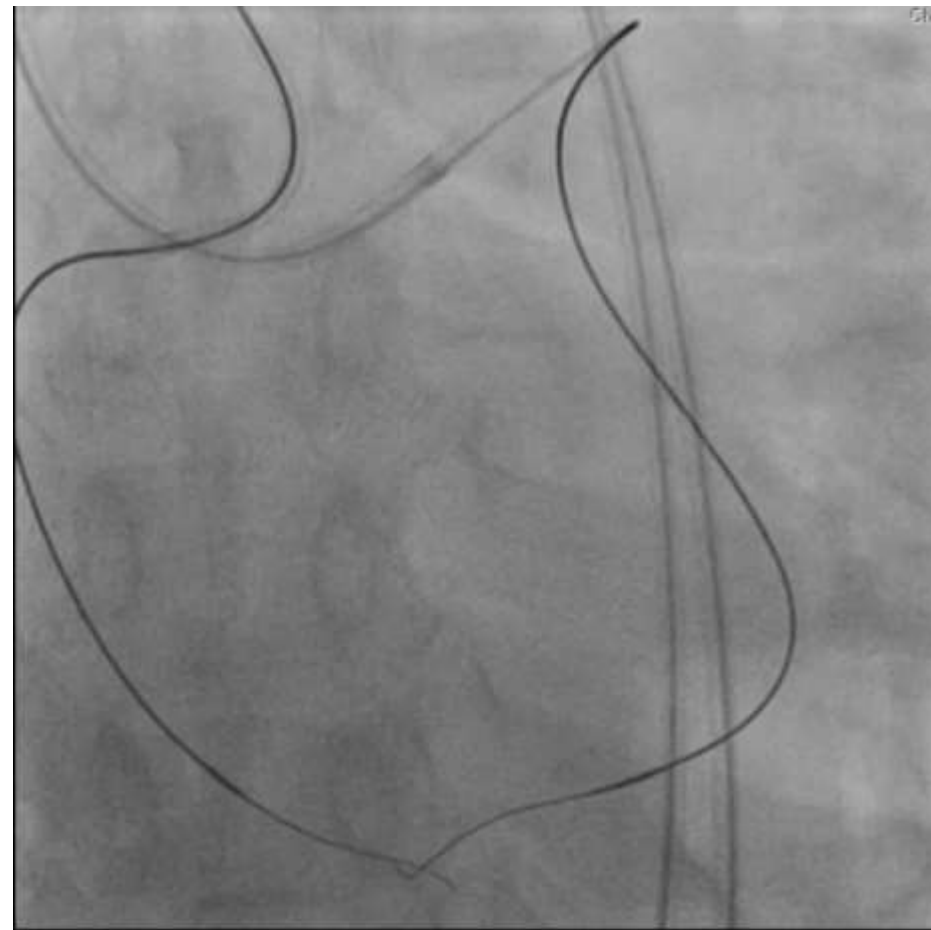
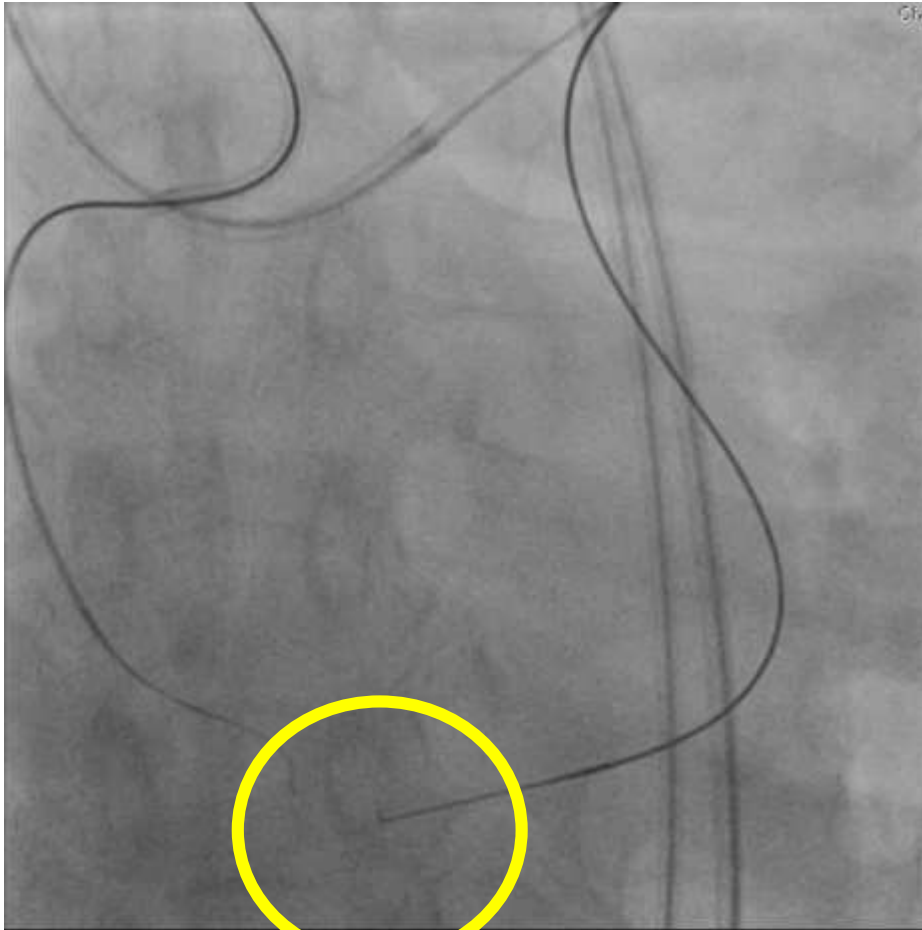
Case : RCA long CTO with distal dull end bifurcated lesion

- View angle is changed to AP-Caudal view which clearly shows position of antegrade wire and retrograde wire. It also revealed that there is too much deviation in the retrograde wire



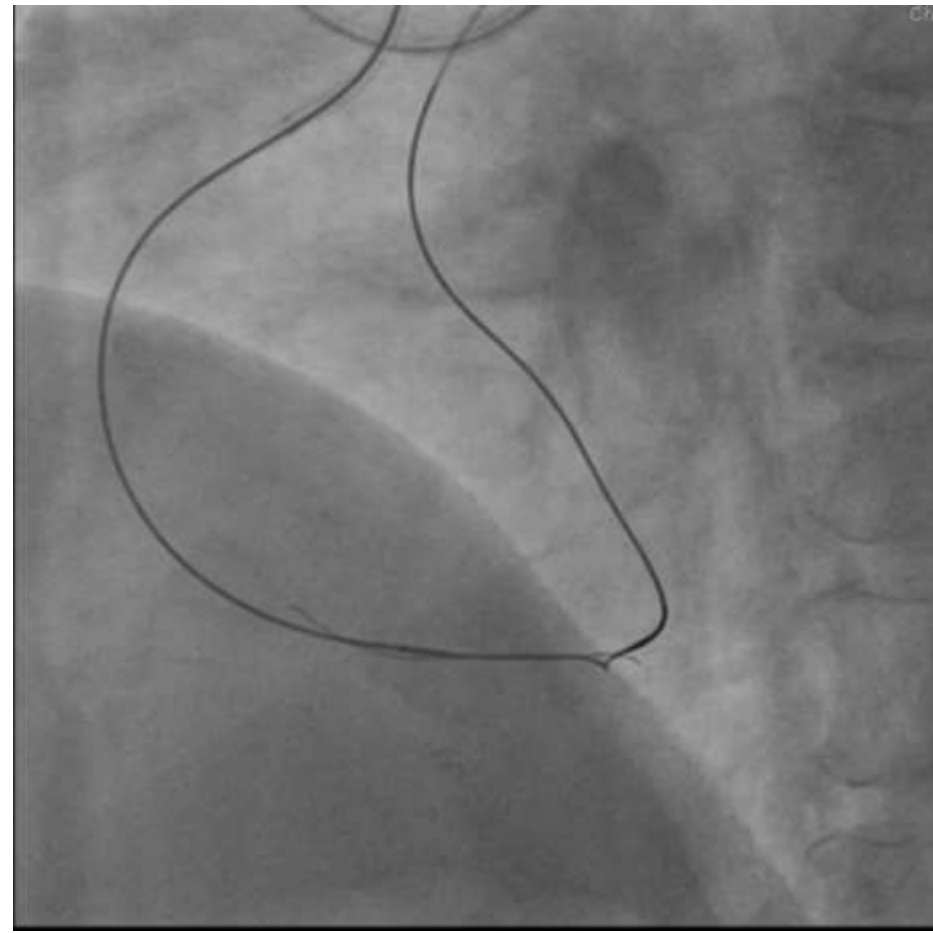
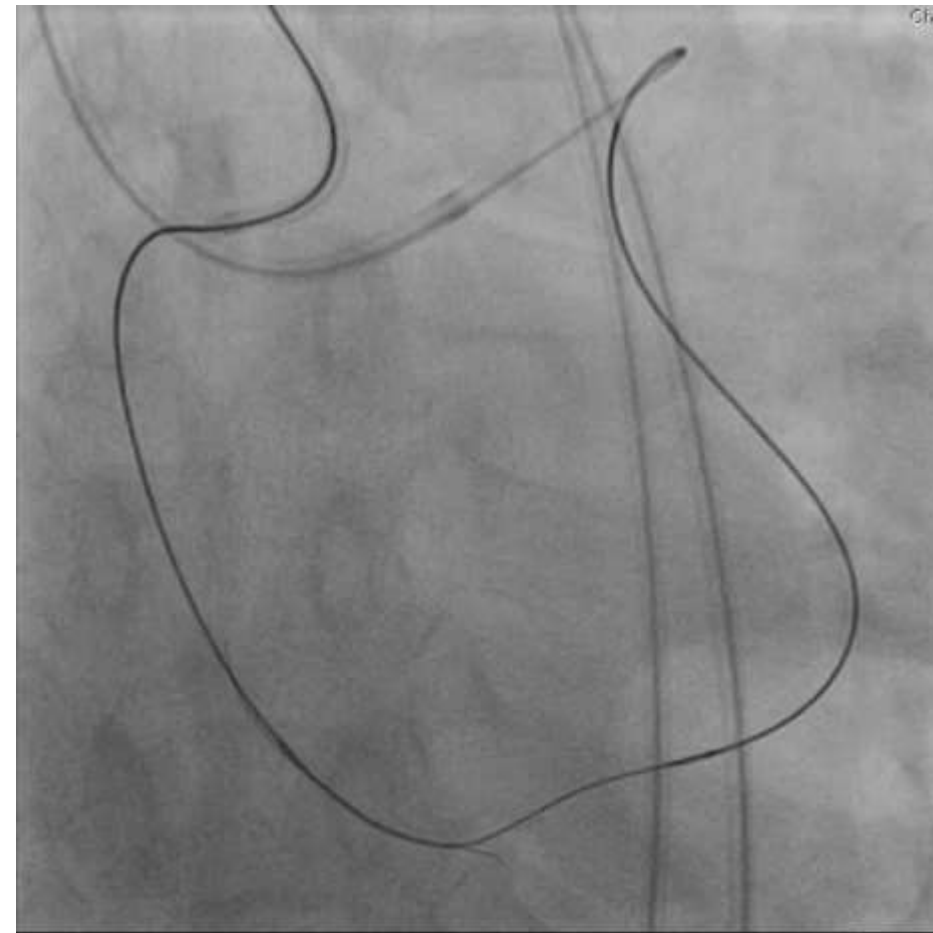
Case : RCA long CTO with distal dull end bifurcated lesion

I advanced retrograde GW more distal and wanted to make a very sharp turn into the RCA proximal but very difficult. So I tried to advanced antegrade GW to distal RCA to catch it even in the false lumen to stabilized 2 GWs.



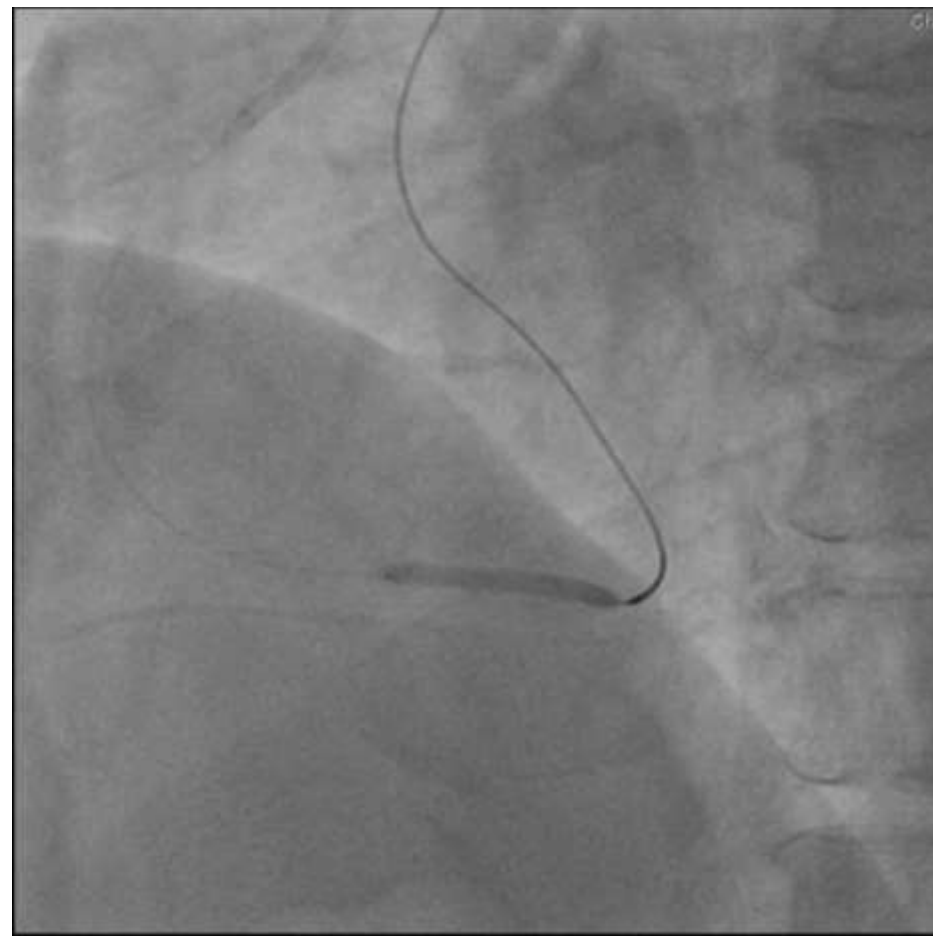
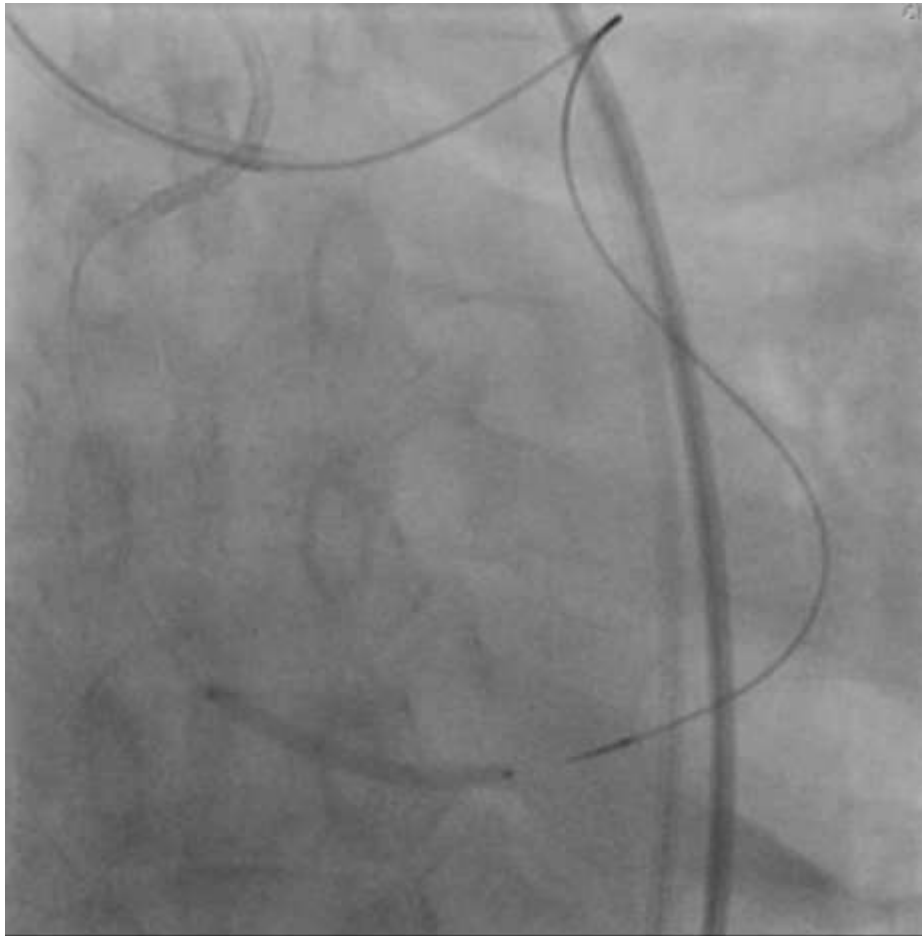
Case : RCA long CTO with distal dull end bifurcated lesion

By doing so, retrograde wire is aligned with antegrade wire. Then retrograde wire was advanced along the antegrade wire to the mid and proximal RCA.



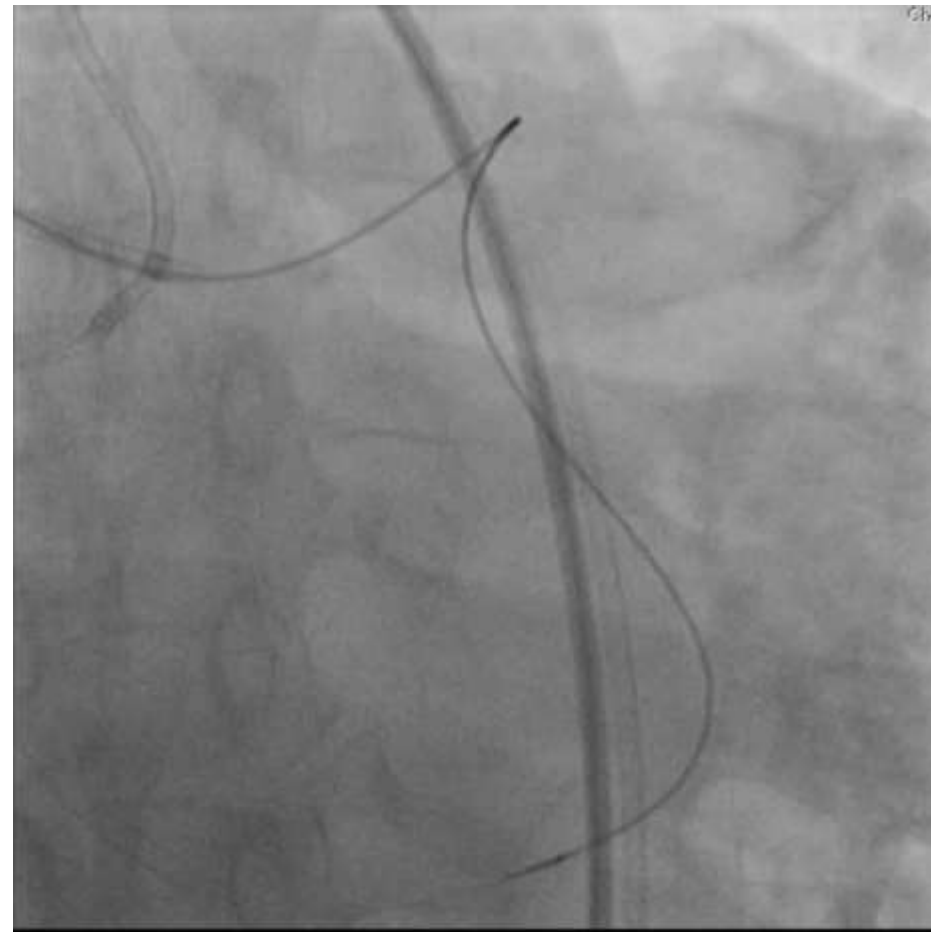
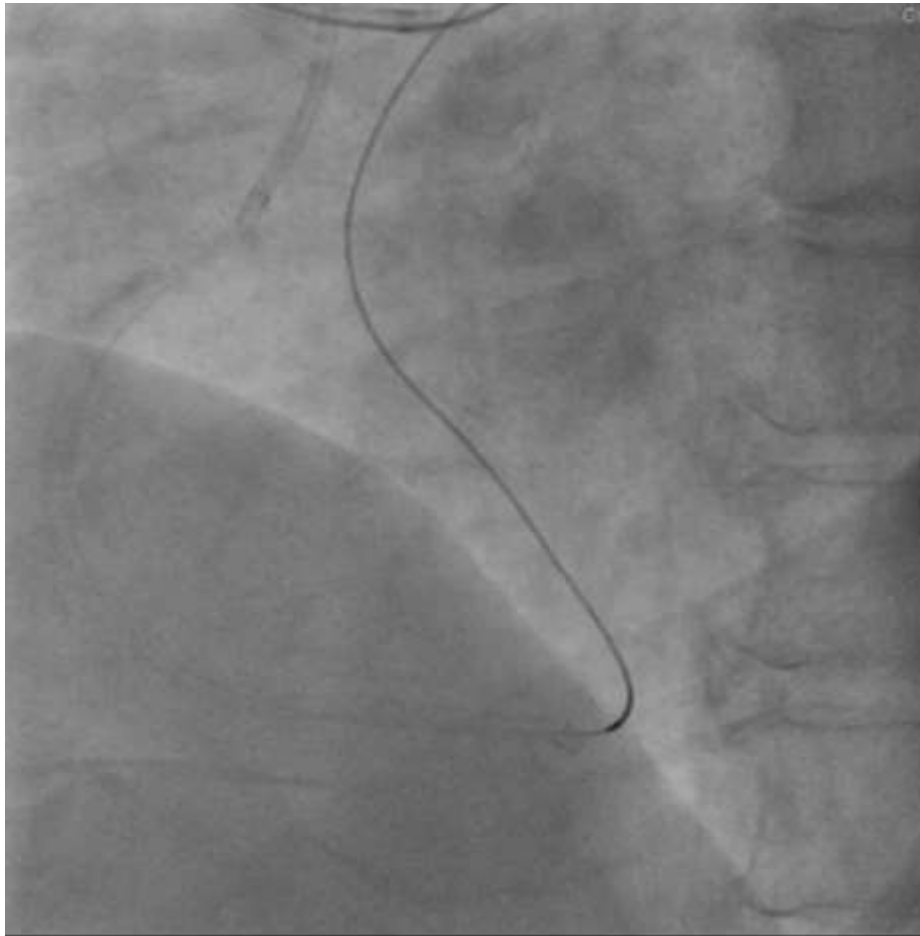
Case : RCA long CTO with distal dull end bifurcated lesion

The remaining part is the standard procedure of the retrograde approach: complete externalization of retrograde wire. From the tip of the wire, balloon and stent were delivered antegradely.



Case : RCA long CTO with distal dull end bifurcated lesion

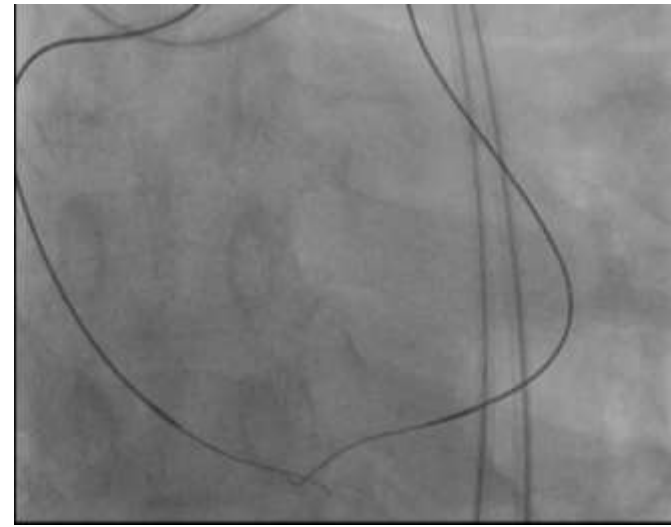
The case was completed with 3 DES and obtained a beautiful angiogram. About CTO PCI...After all, **comprehensive competence is required in dealing with a challenging case.**



Key Message 1



If you face really difficult situation,
you need to give full play of
your comprehensive competence !!
You are given Ordeal by God.



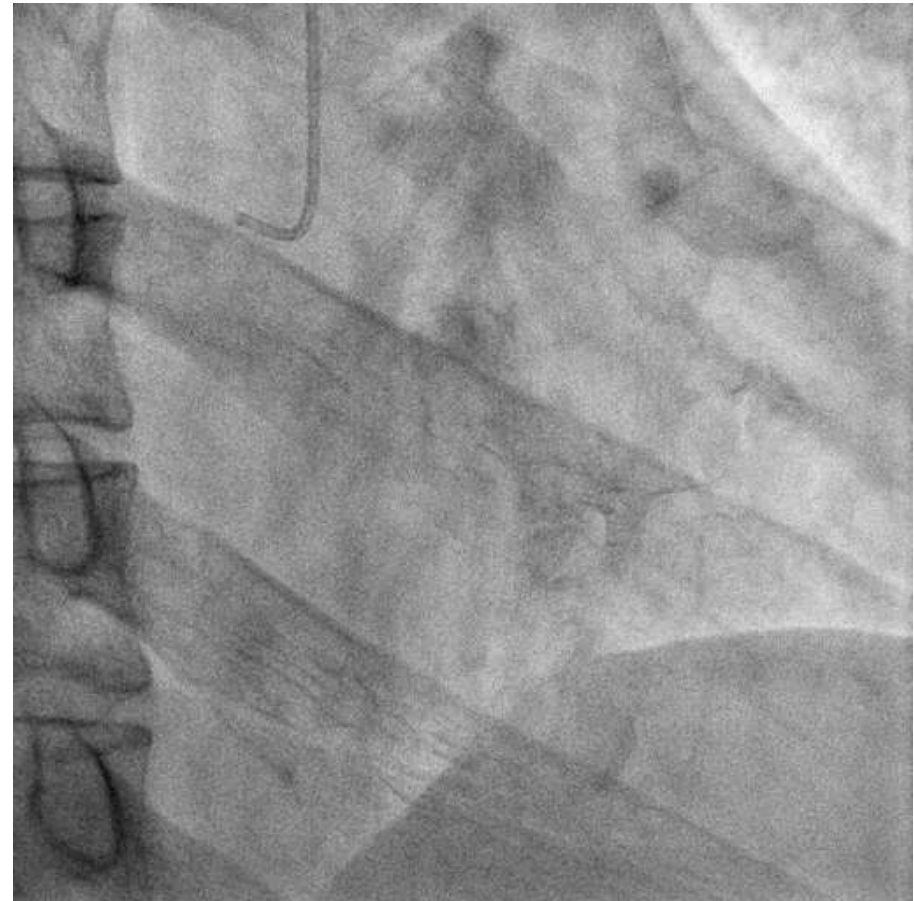
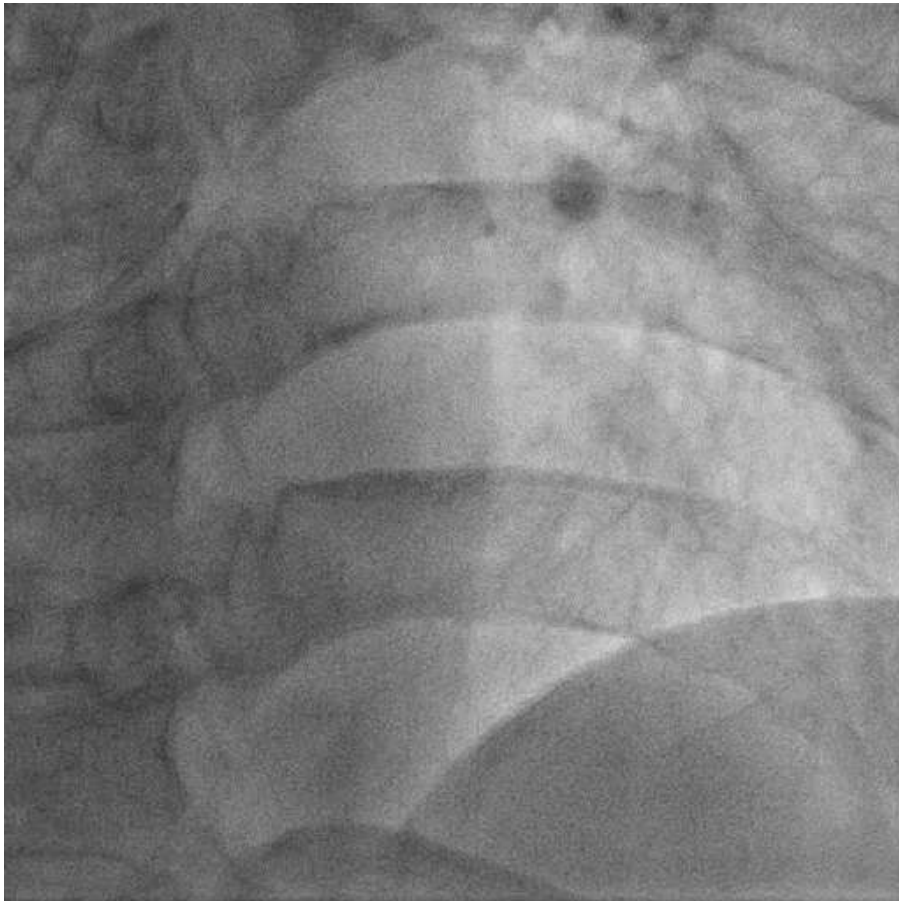
Case 2 ; CT image guide approach

LAD ostium No Stump CTO without any fine route of retrograde approach, we need another guide for climbing route.

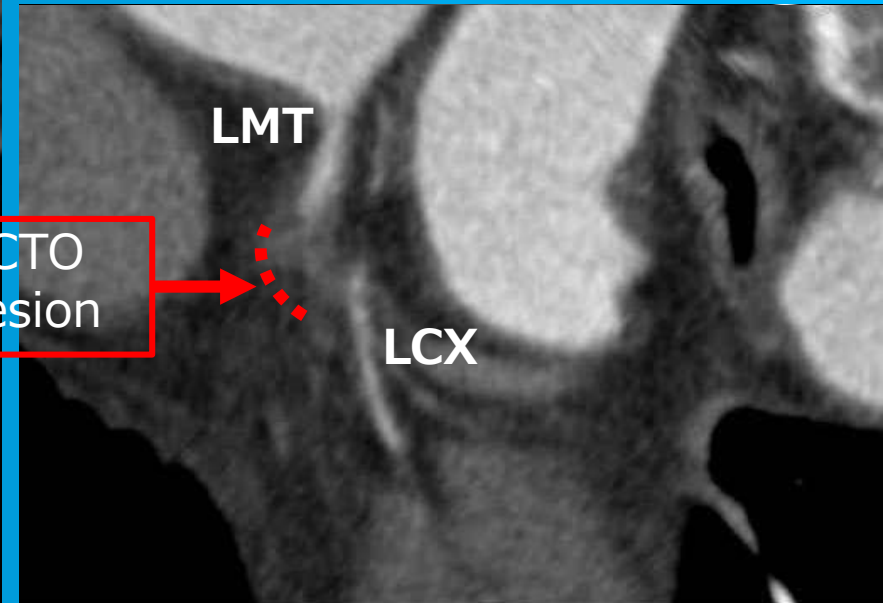
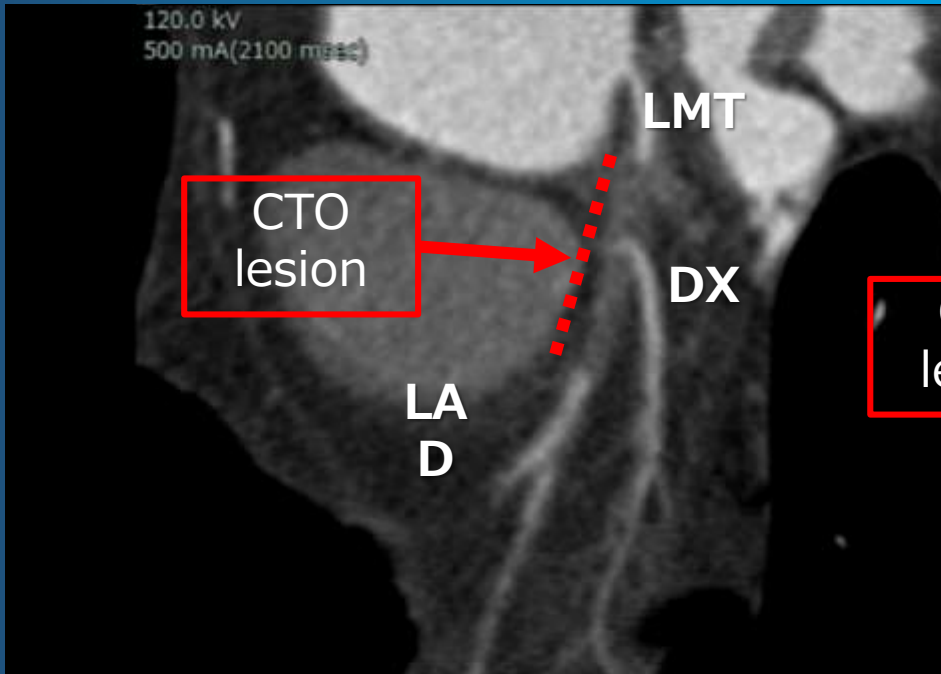
In case, Angio-coronary CT co-registration System guide GW-ing is useful.

Case : 56yo, M LMT CTO

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



Coronary CT...



Ostium of LCX is not open but without lesion at LMT side.

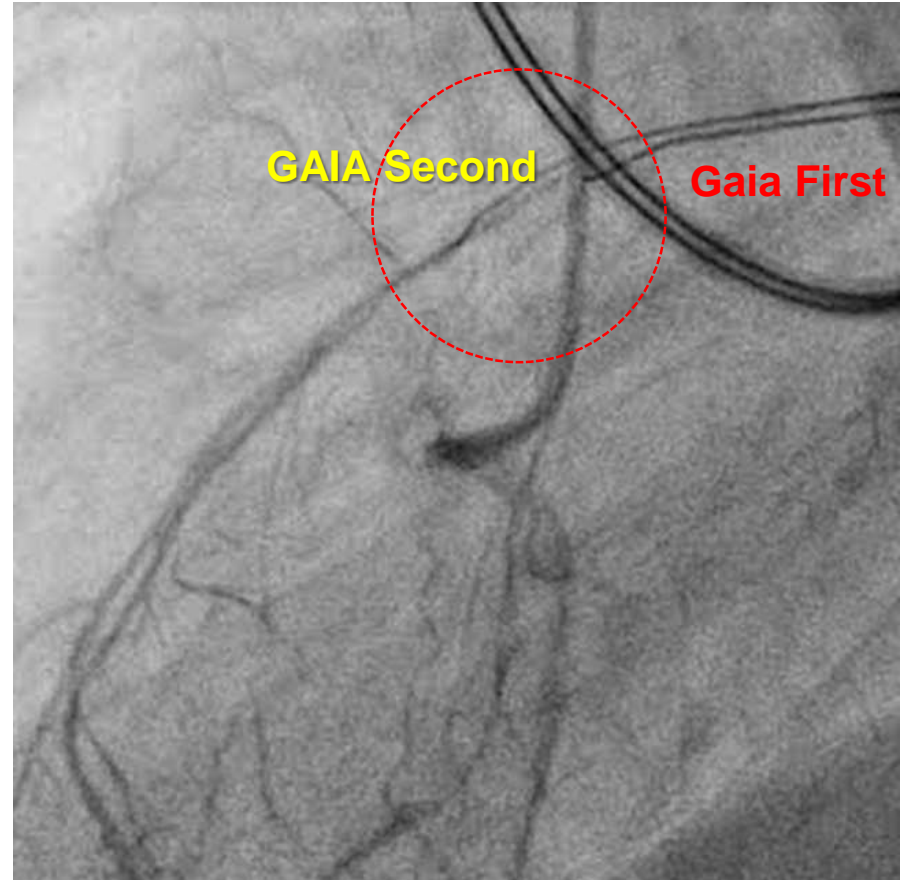
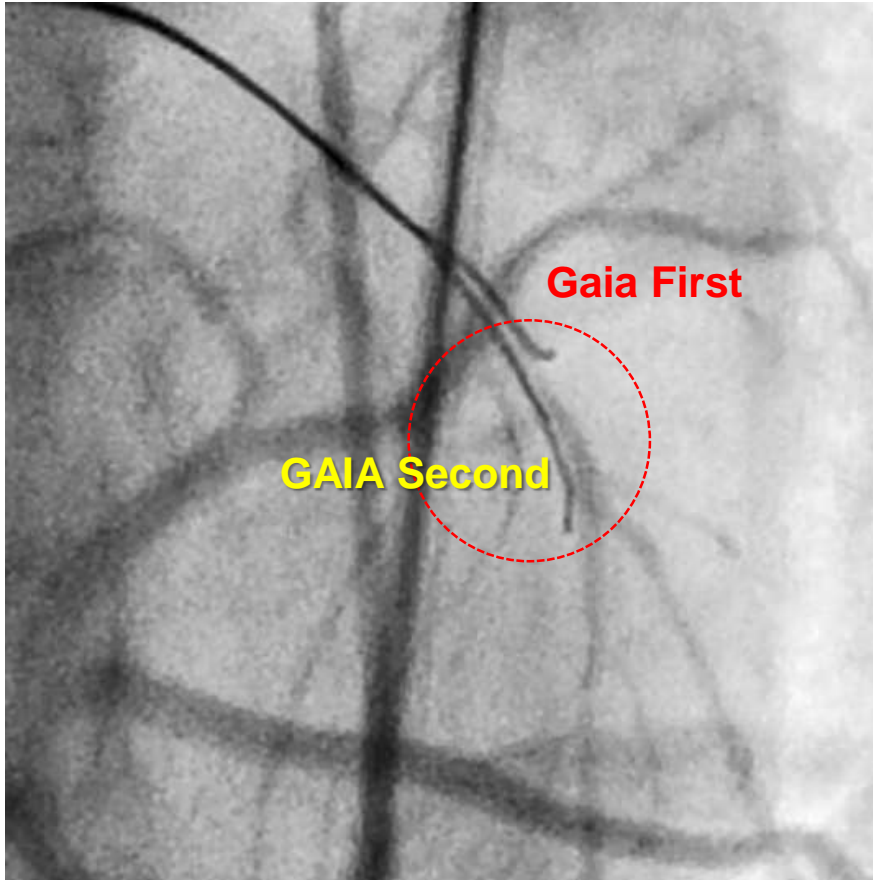
Length of CTO: LAD
LMT-LAD 25mm

Length of CTO: LAD
LMT-LCX 7mm

Case : 56yo, M LMT CTO

Antegrade Approach:

Collateral angiogram indicated slight deviation even after parallel wire method

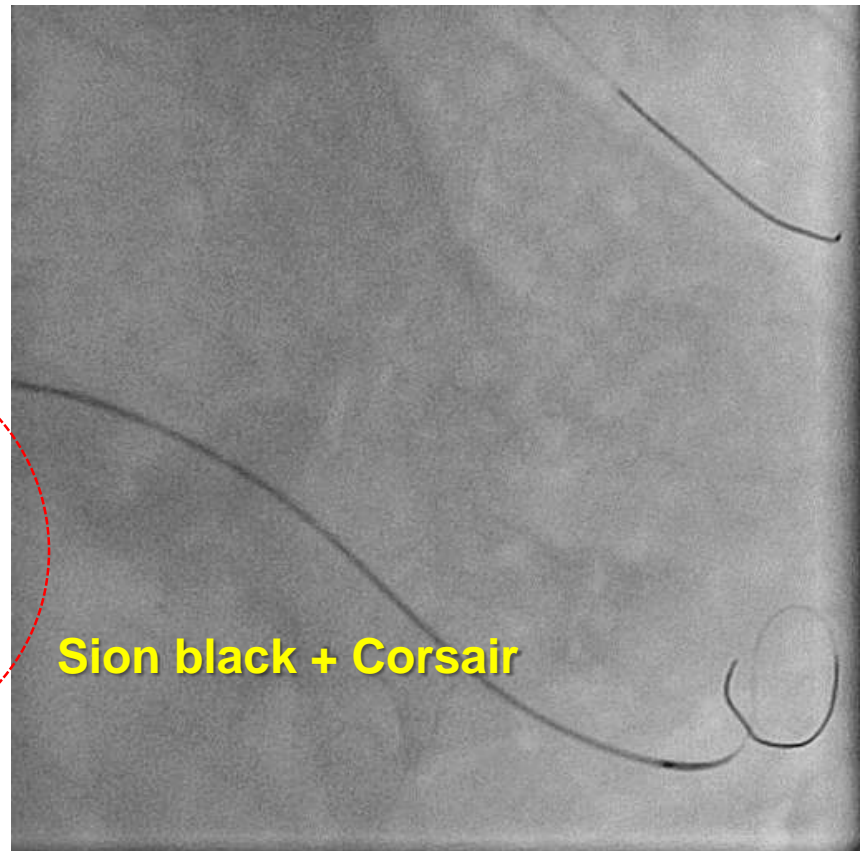
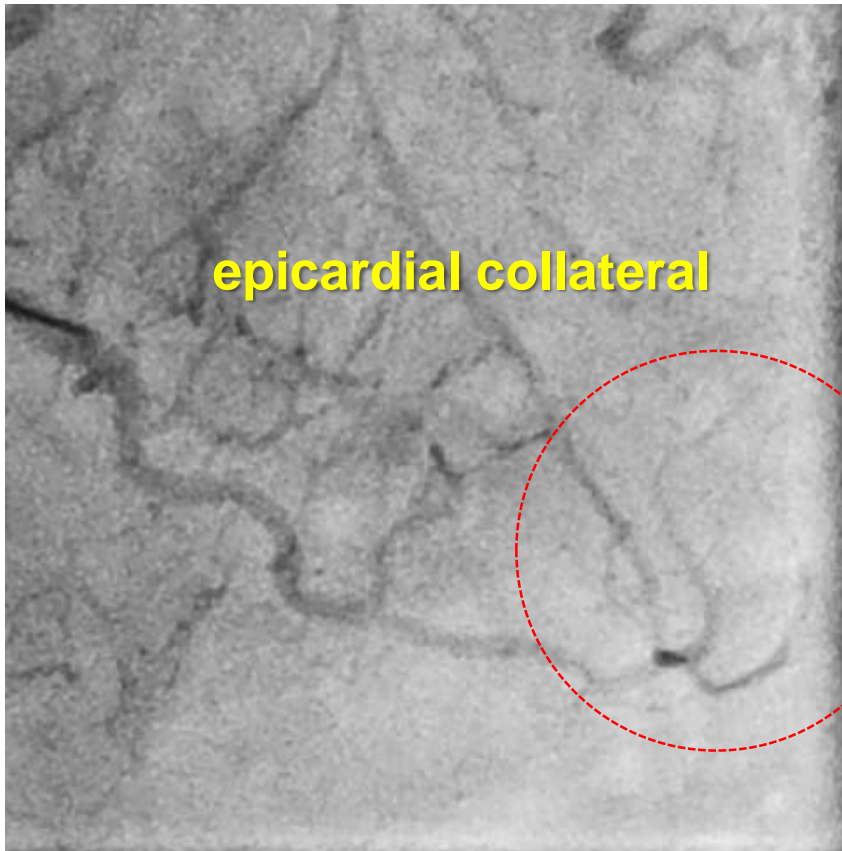


At this stage, we scrutinized collateral angiogram to find out that it was almost impossible for both GW to go through true lumen.

Case : 56yo, M LMT CTO

Retrograde Approach

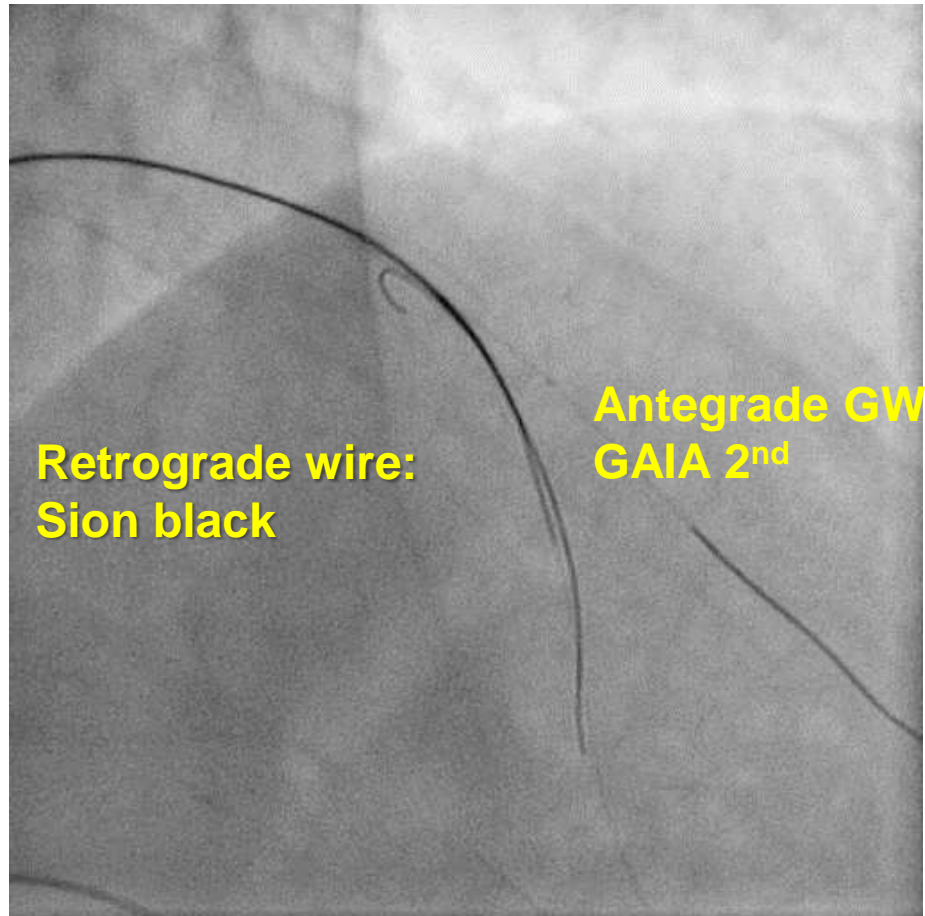
In this particular case, capturing true lumen was prioritized



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

Case : 56yo, M LMT CTO

Just we did 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**

PCI for LMT-LCX CTO

Antegrade approach

Pre-Dila 2.0 / 20mm

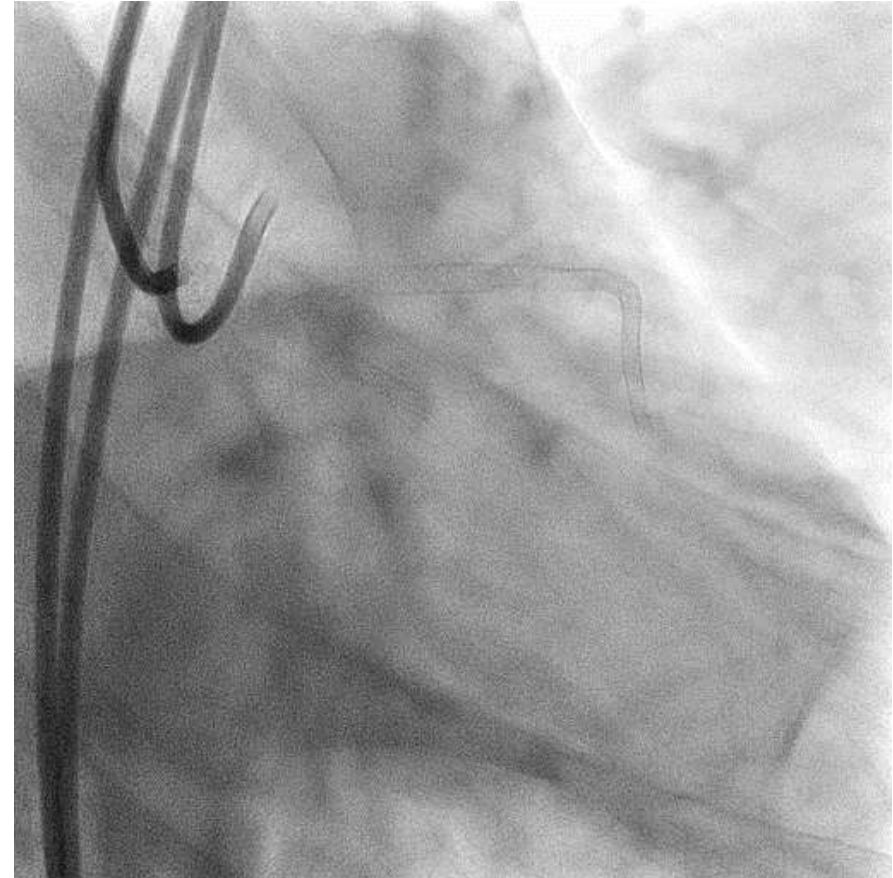
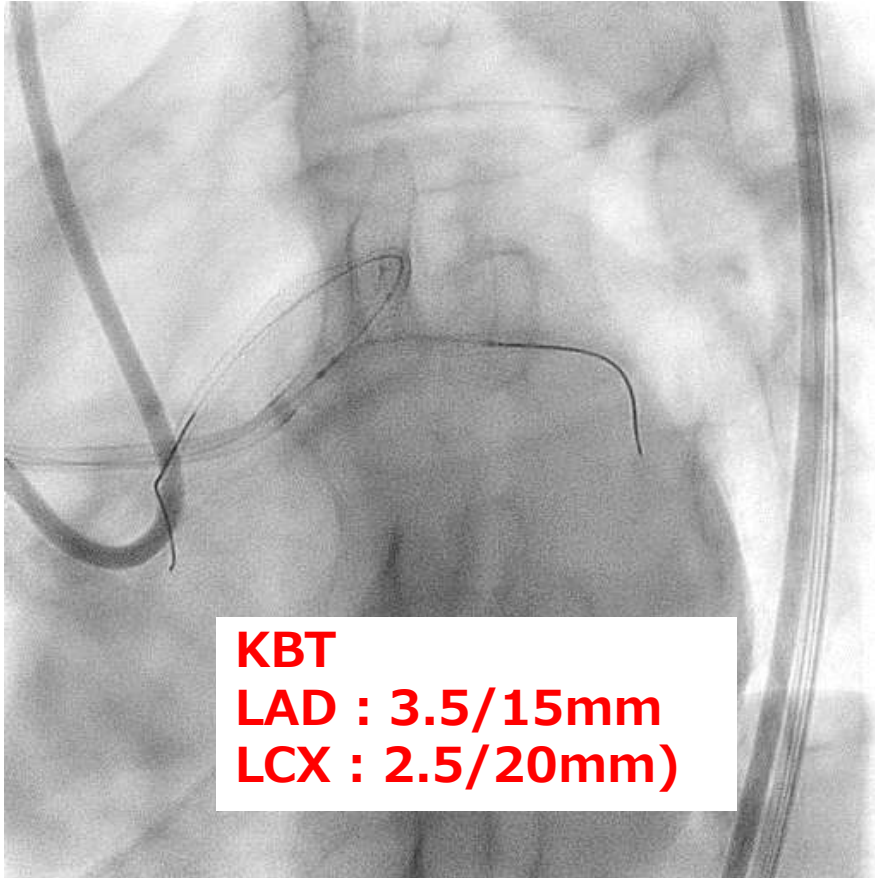
Corsair + GAIA 1st

Xience
3.0/20mm

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

Case : 56yo, M LMT CTO

Final Angiogram Following by KBT





Key Message 2

- Read from imaging picture -

Coronary CT is significantly useful in reviewing lesion morphology and planning strategy. Sometime it may greatly change PCI strategy.

Most of LMT lesion involves bifurcation lesion. So we need ... not only technique for CTO but also sufficient knowledge of bifurcation PCI.

Case 3 ; Quadratic Equations or Cubic ???

When you want to find the way, General rule is...
“simultaneous quadratic equations in one unknown”.

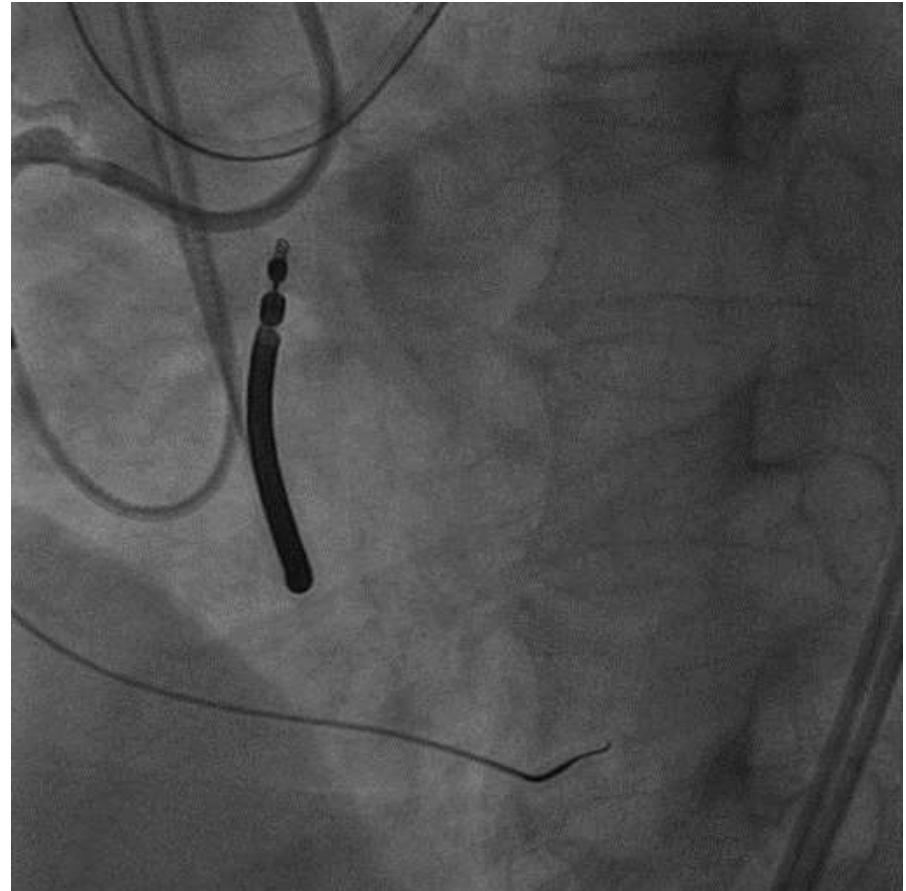
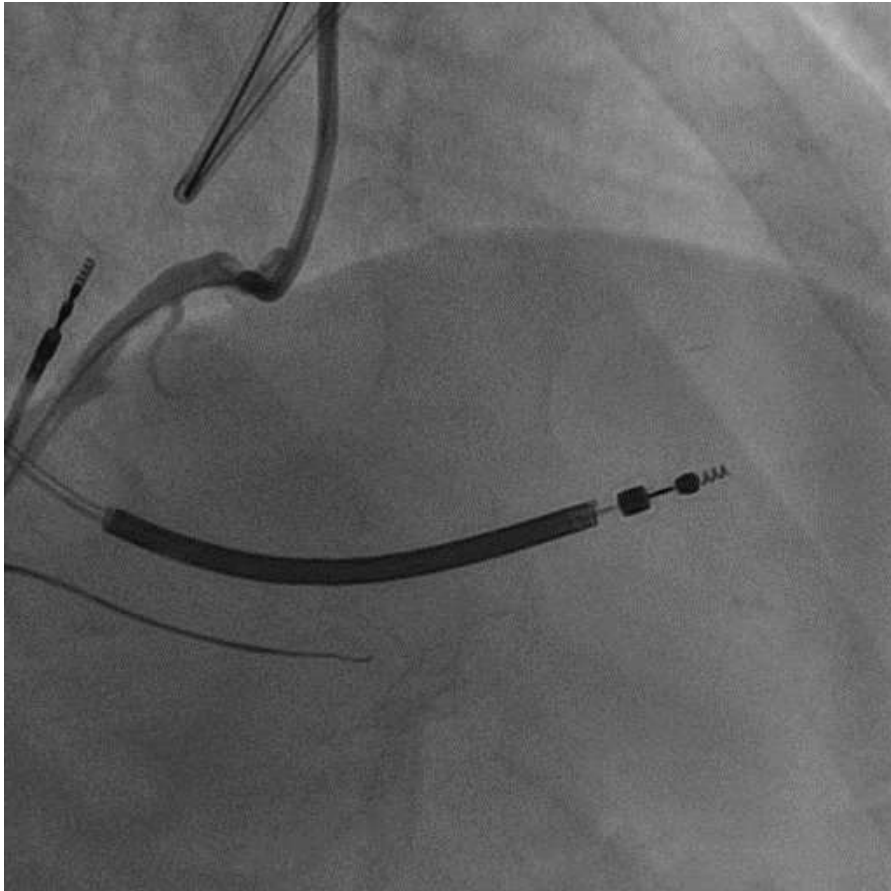
But sometimes you need cubic equations !!!

There is no rule without exceptions.

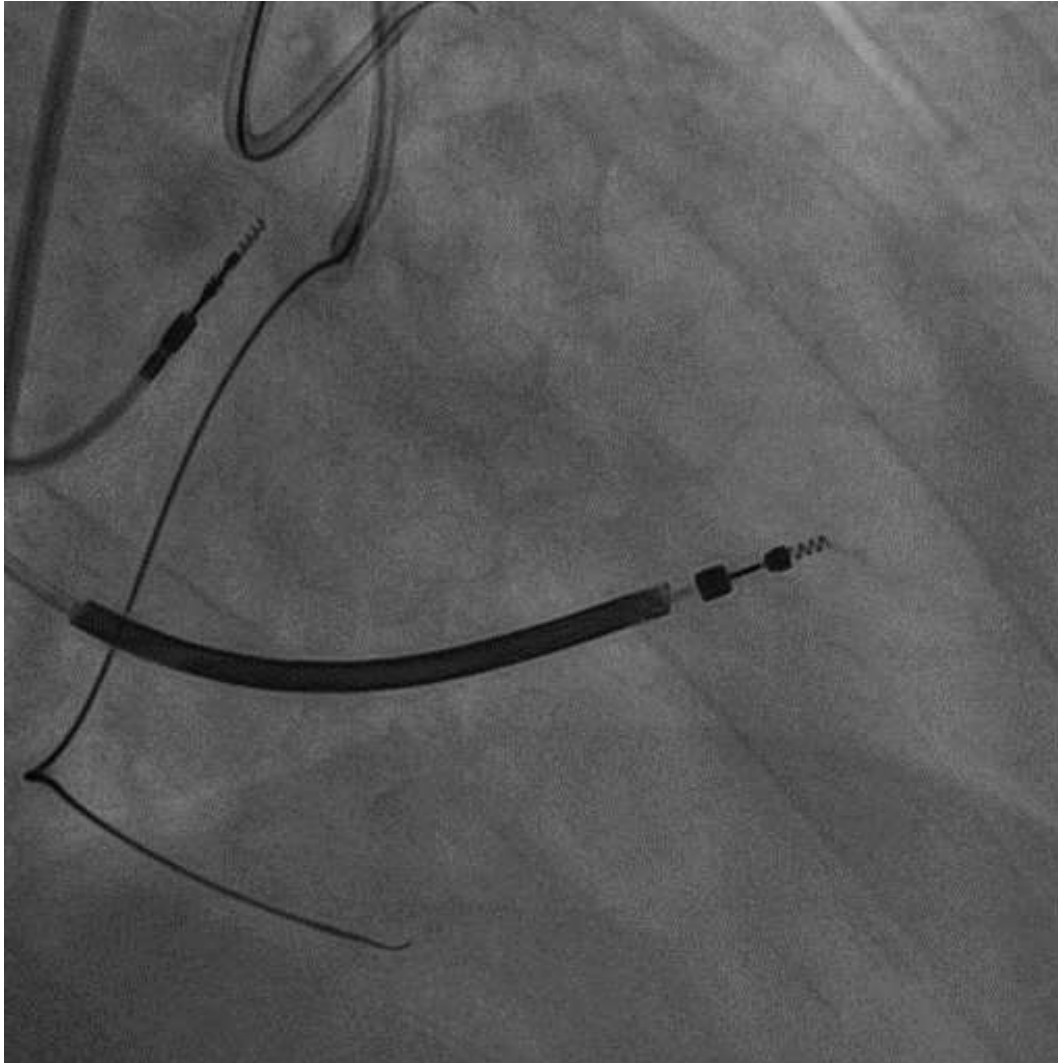
Case : LAD CTO : long CTO with collateral from RCA



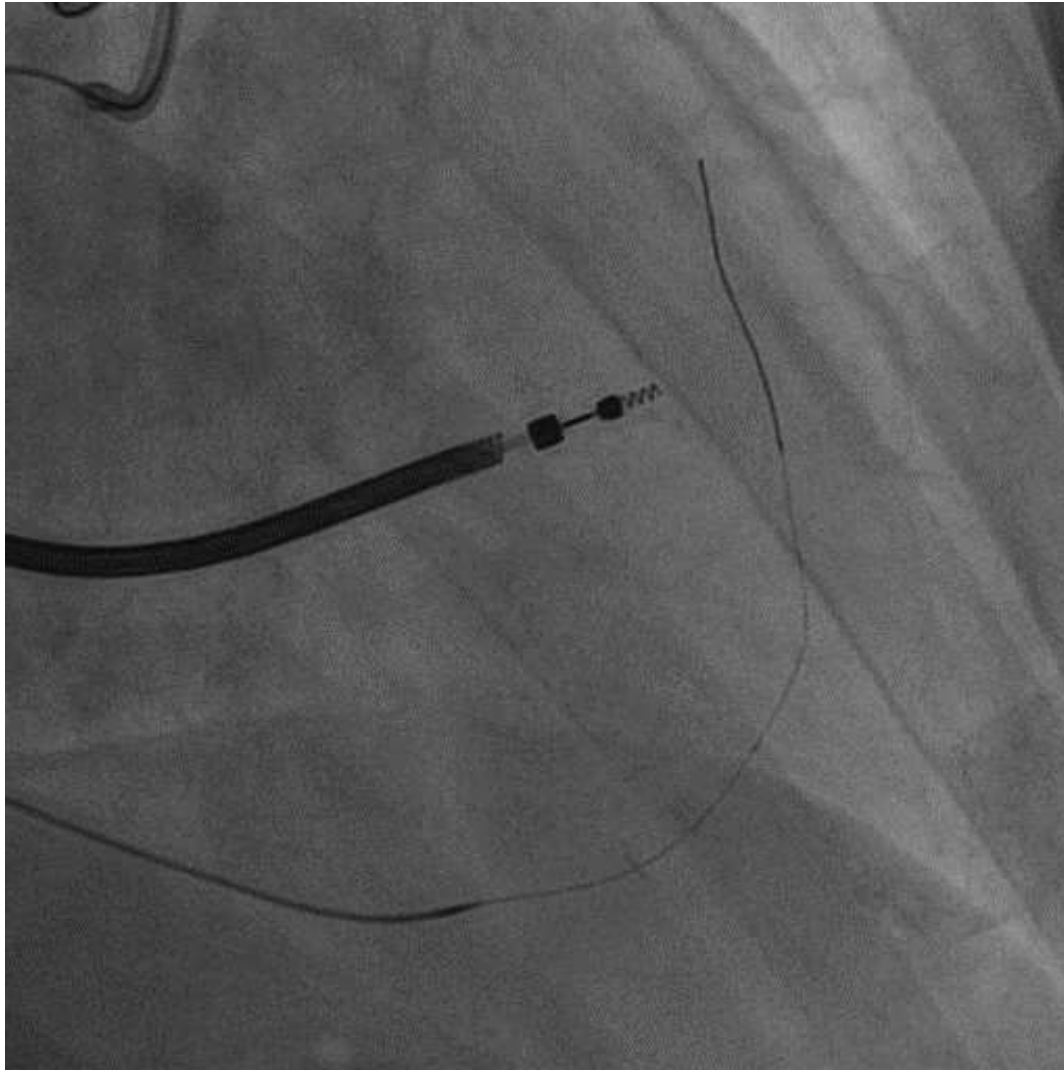
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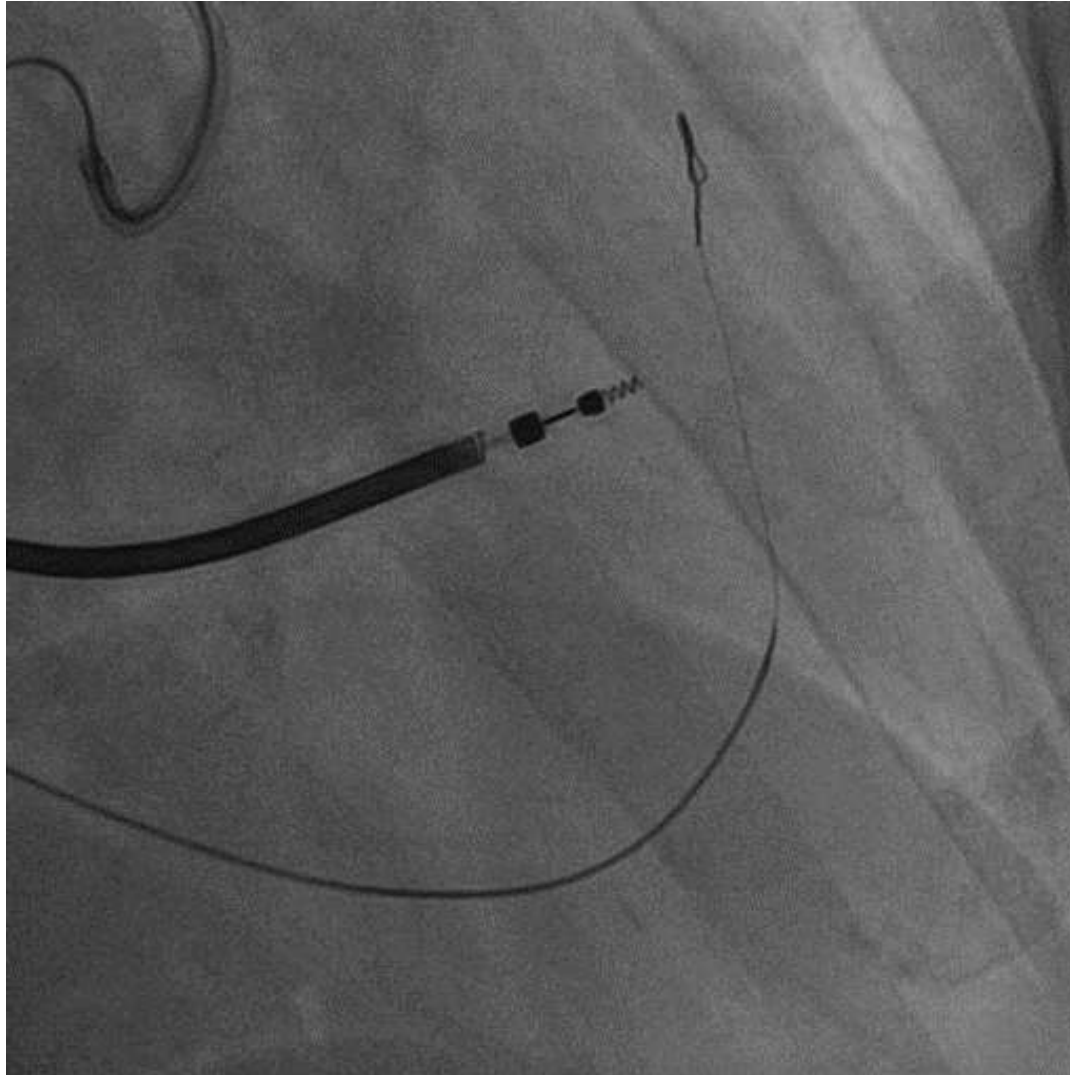
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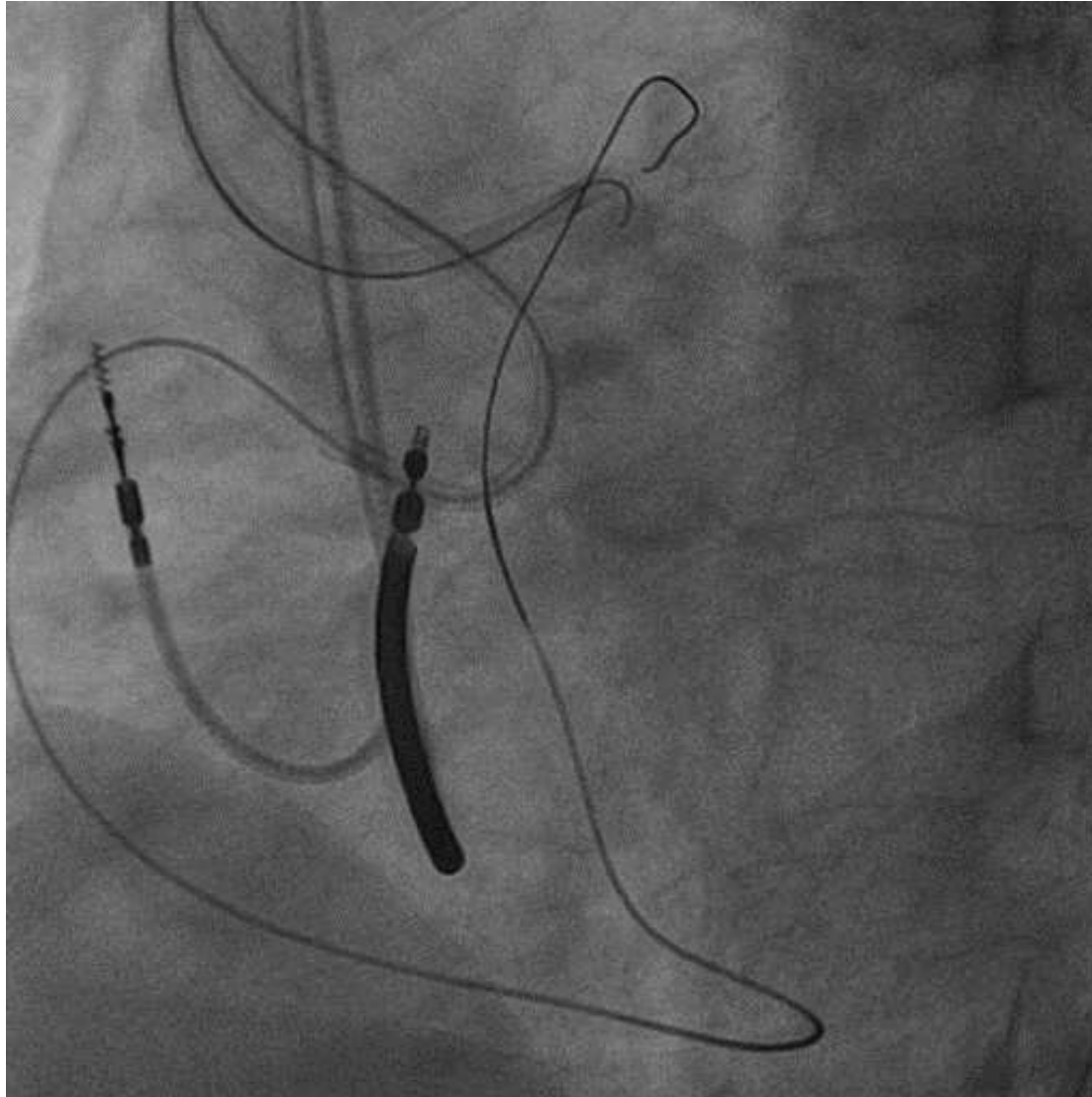
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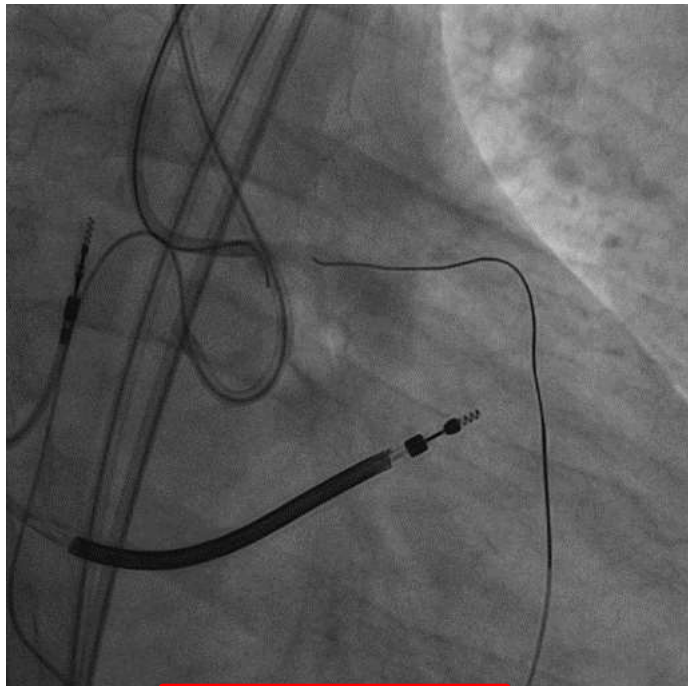


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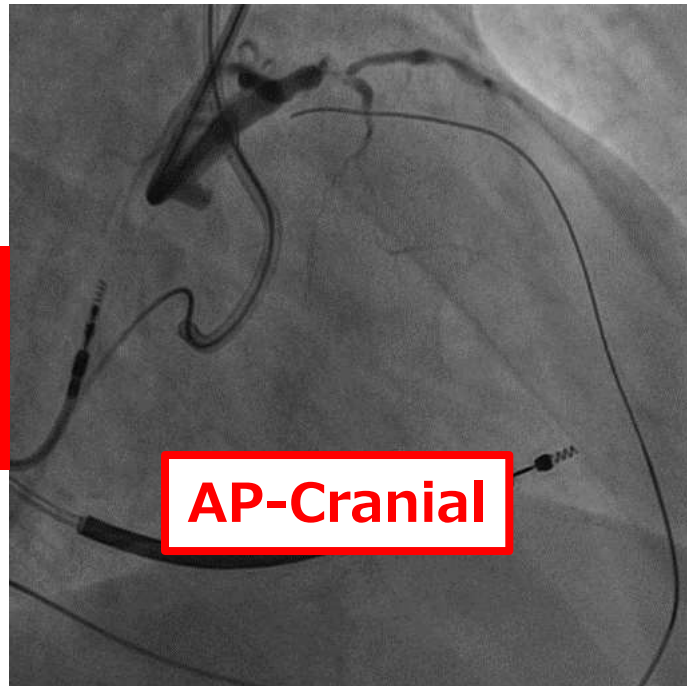
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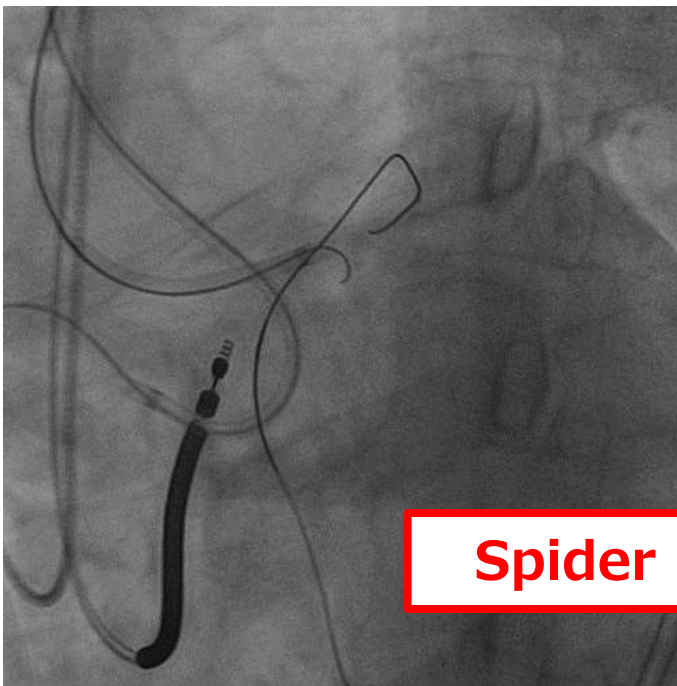


AP-Caud

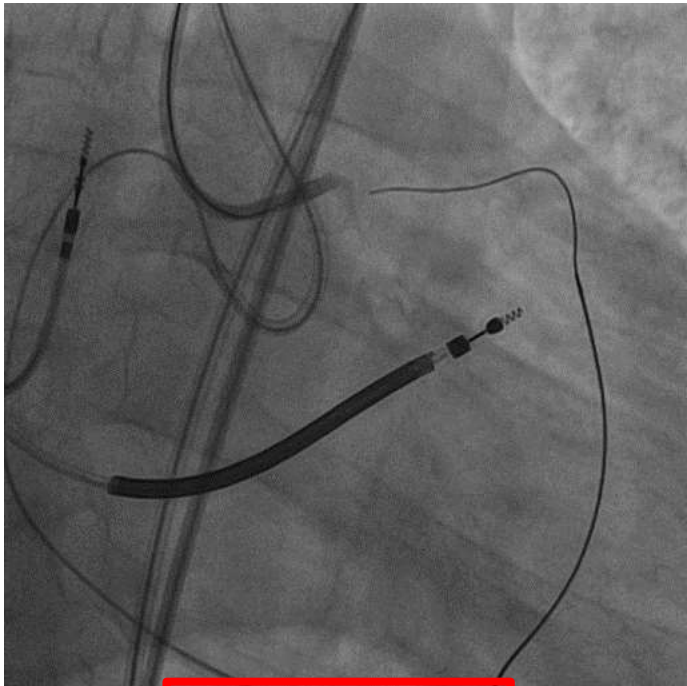
**Attention !!
This is not OK !!**



AP-Cranial

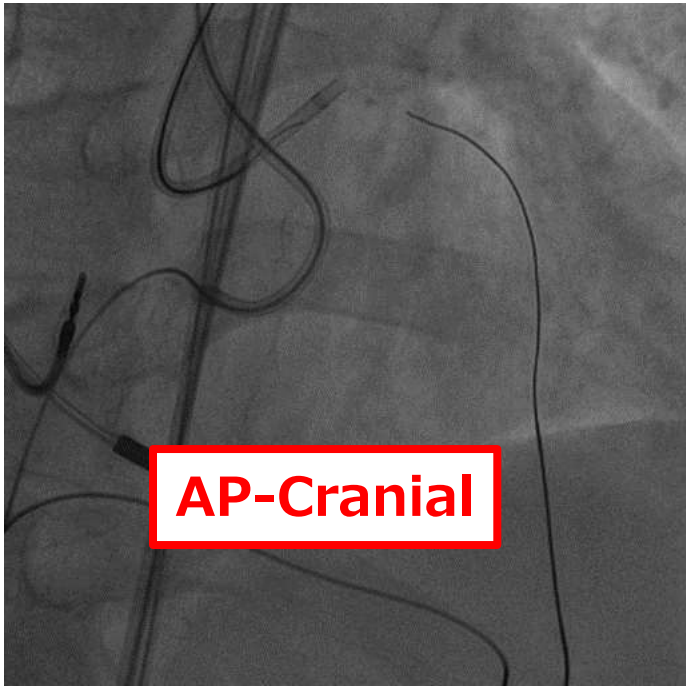


Spider

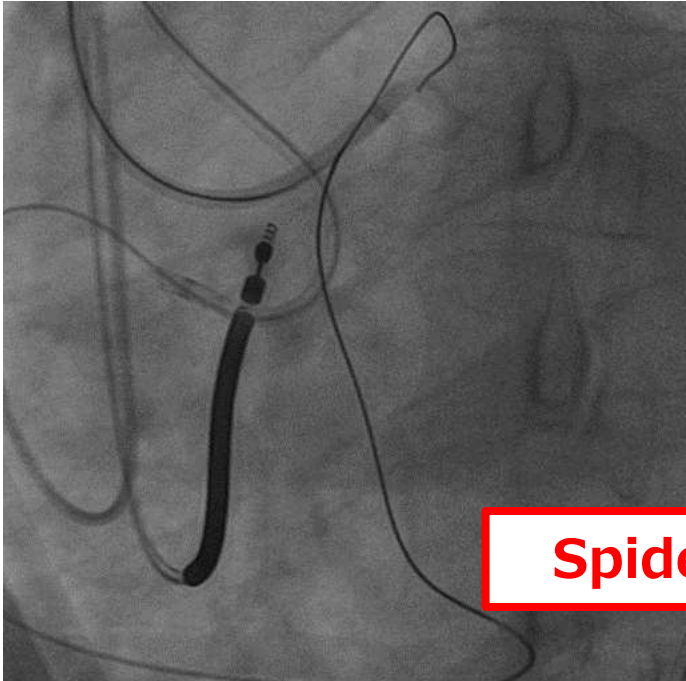


AP-Caud

**Attention !!
This is OK !!**

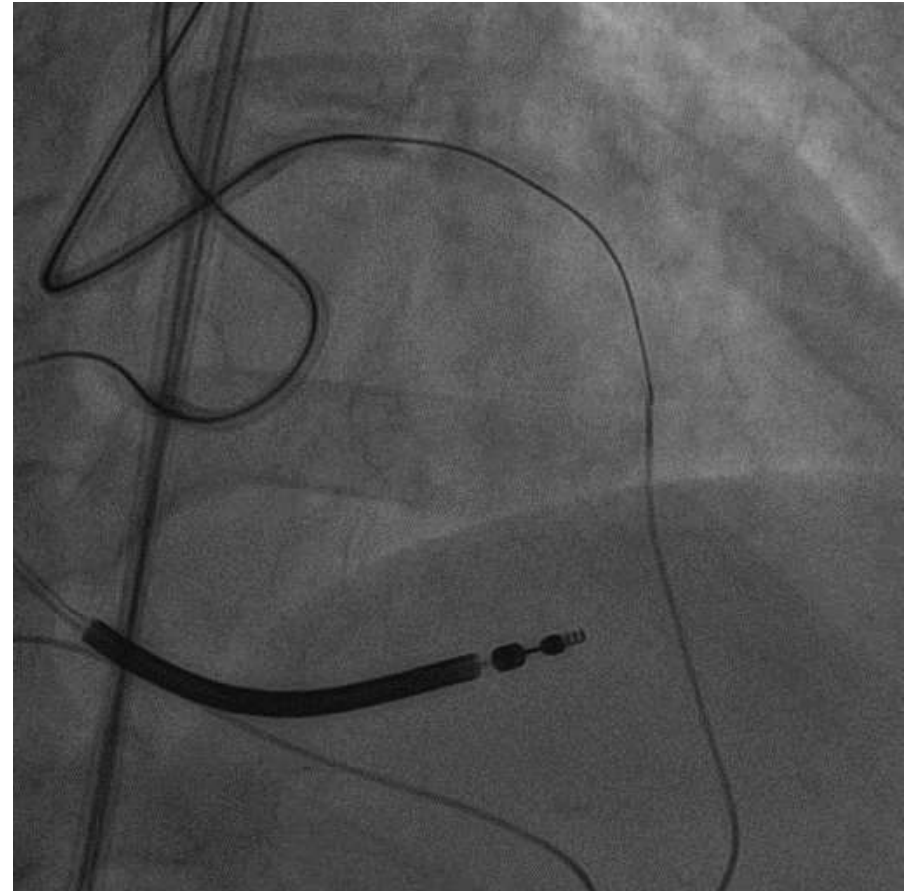
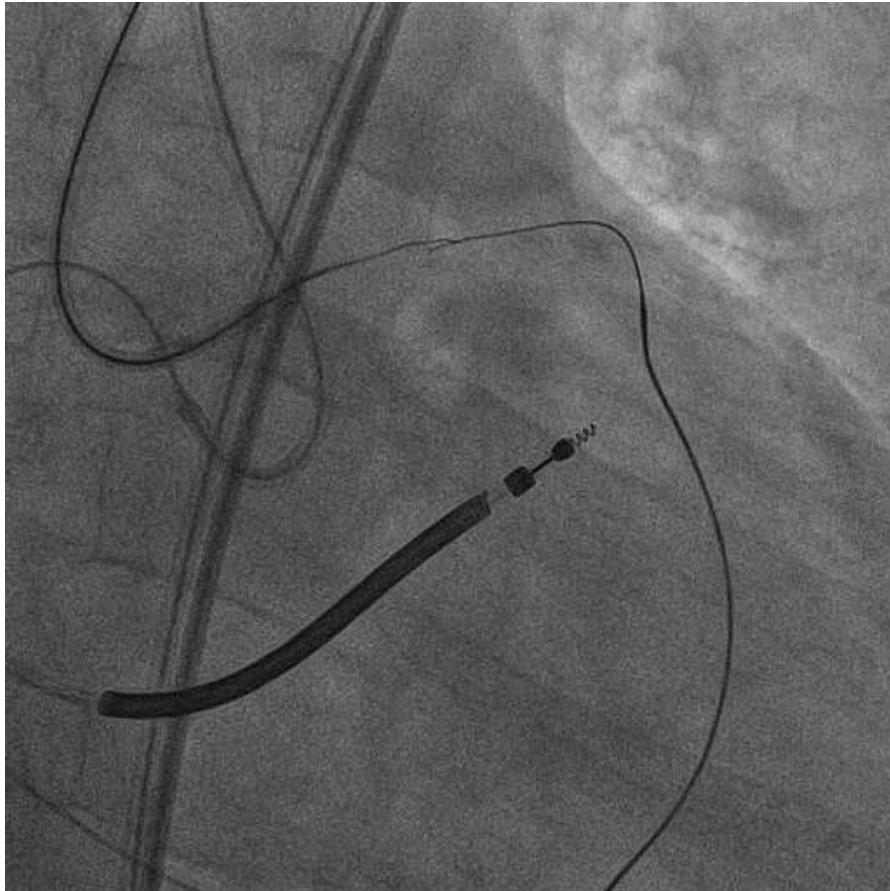


AP-Cranial

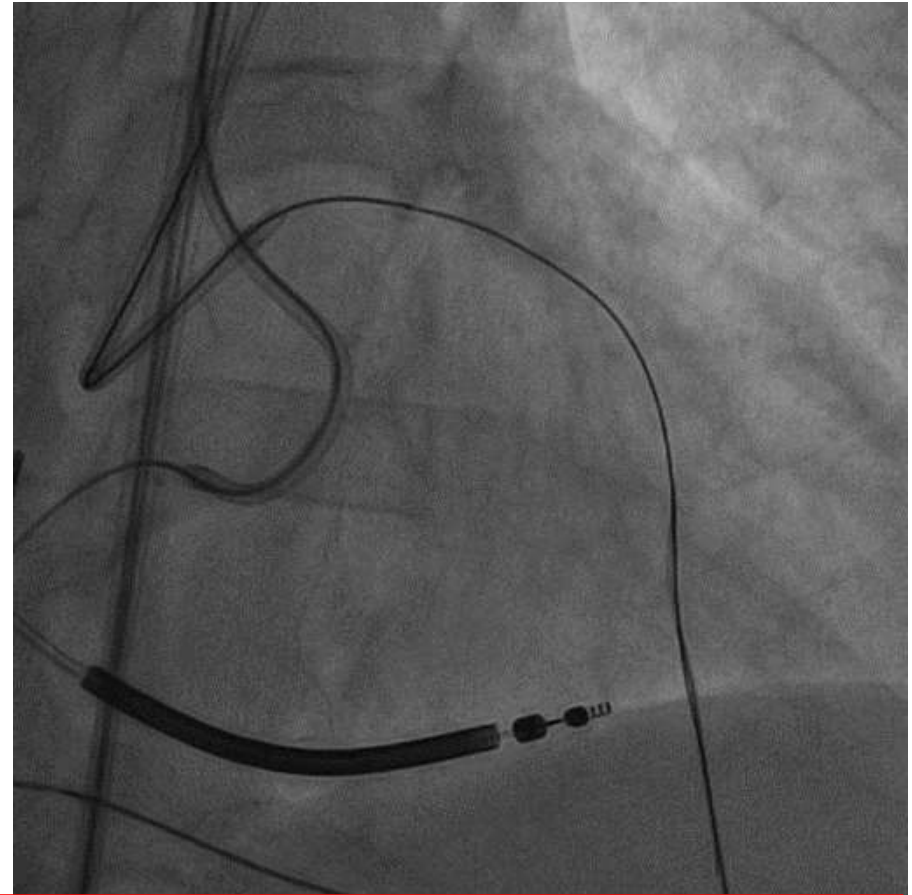
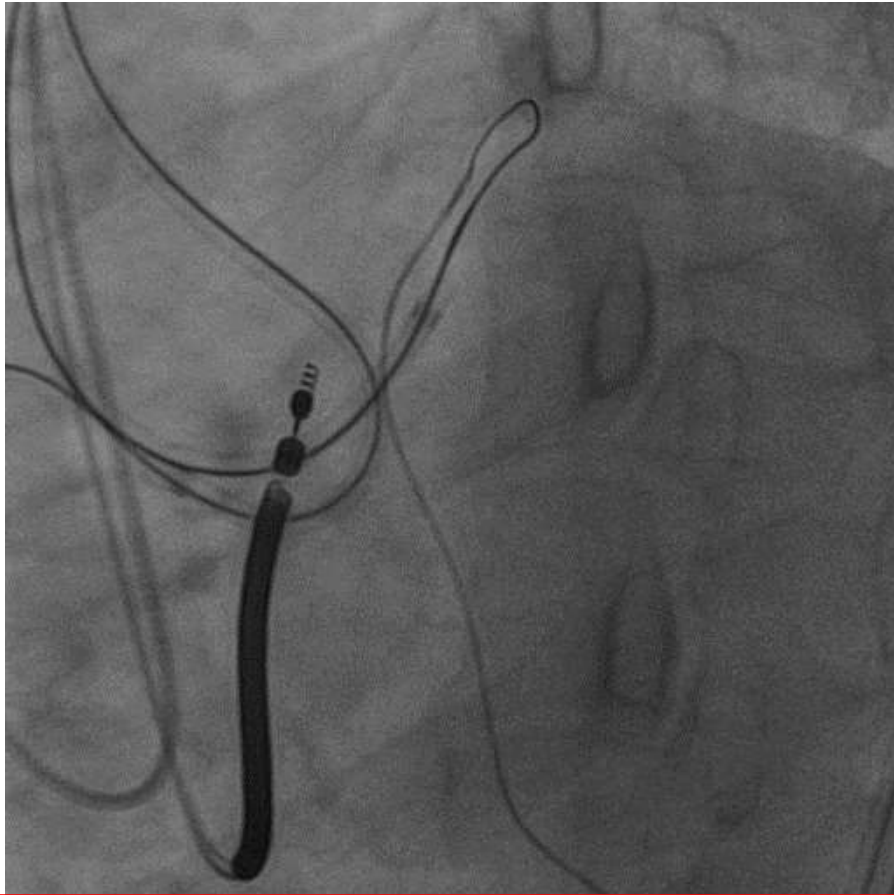


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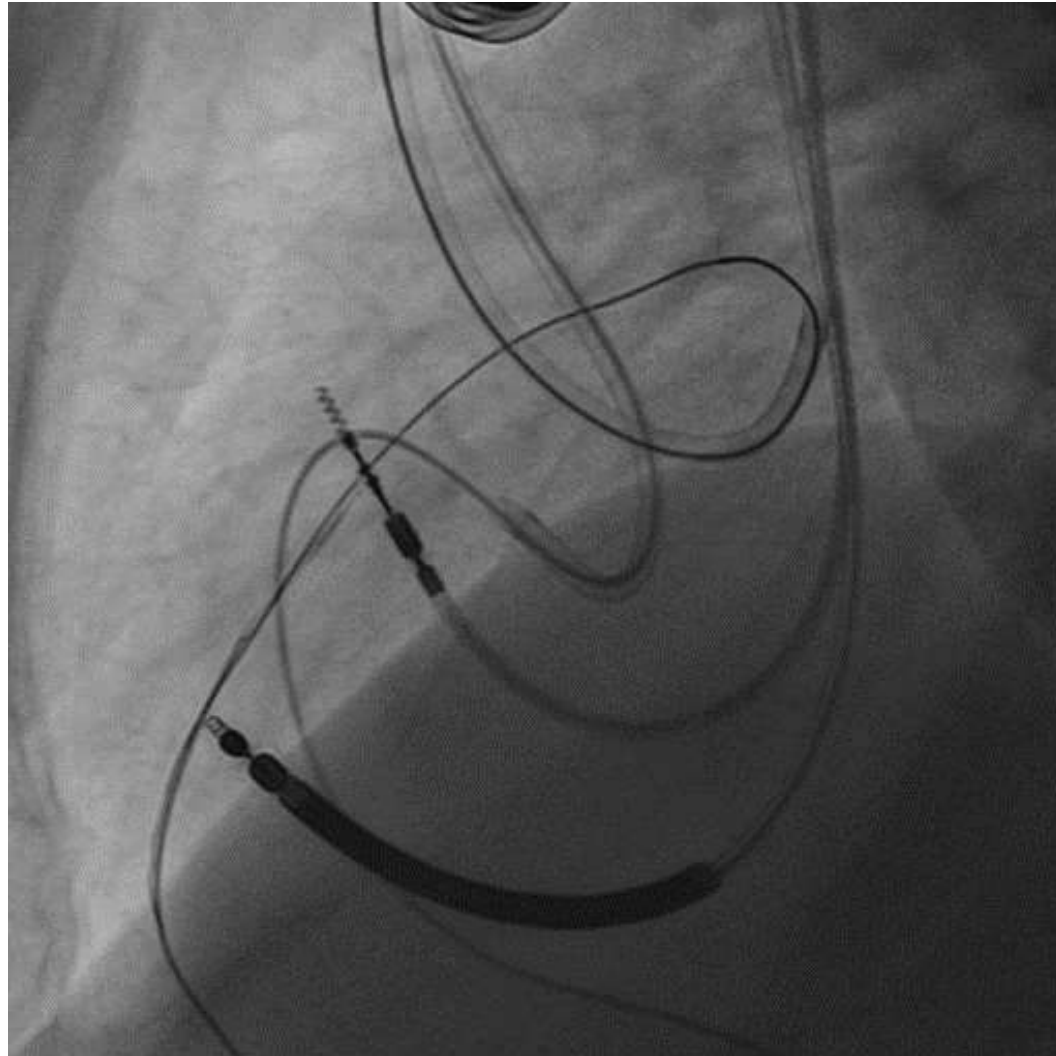
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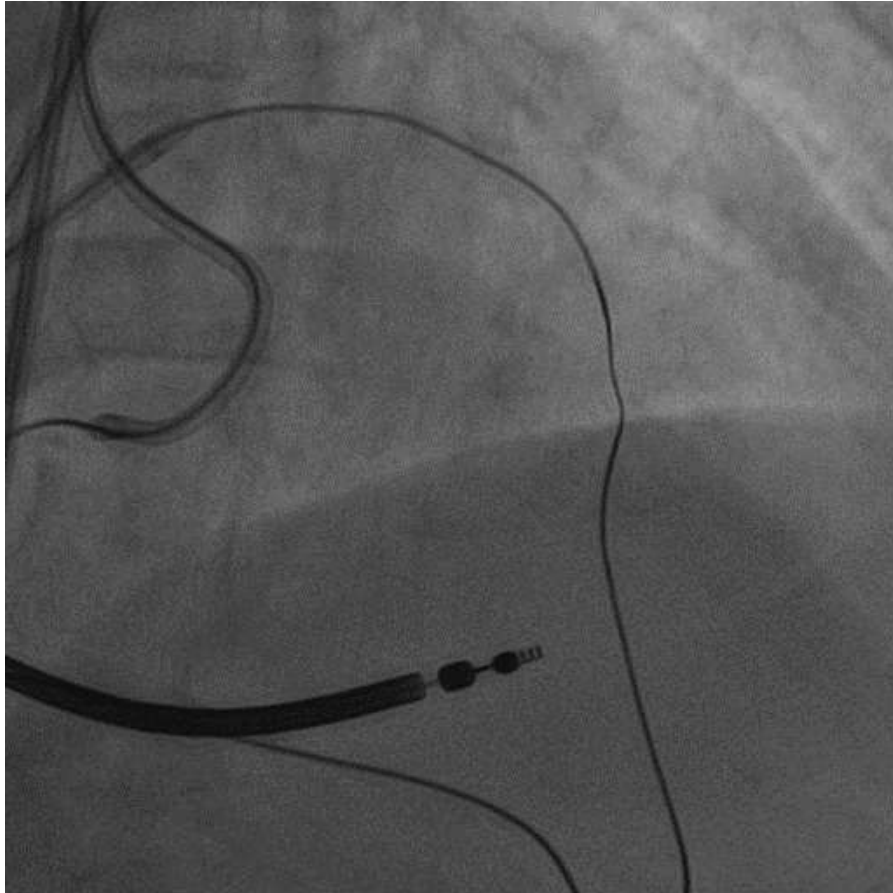
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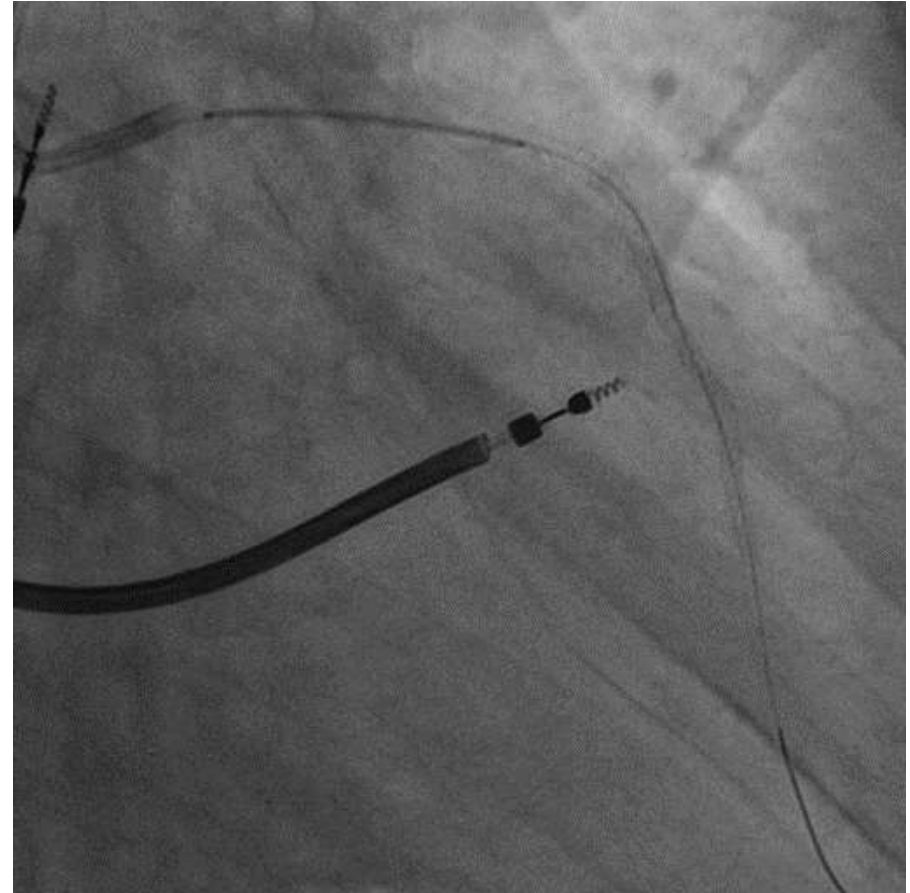
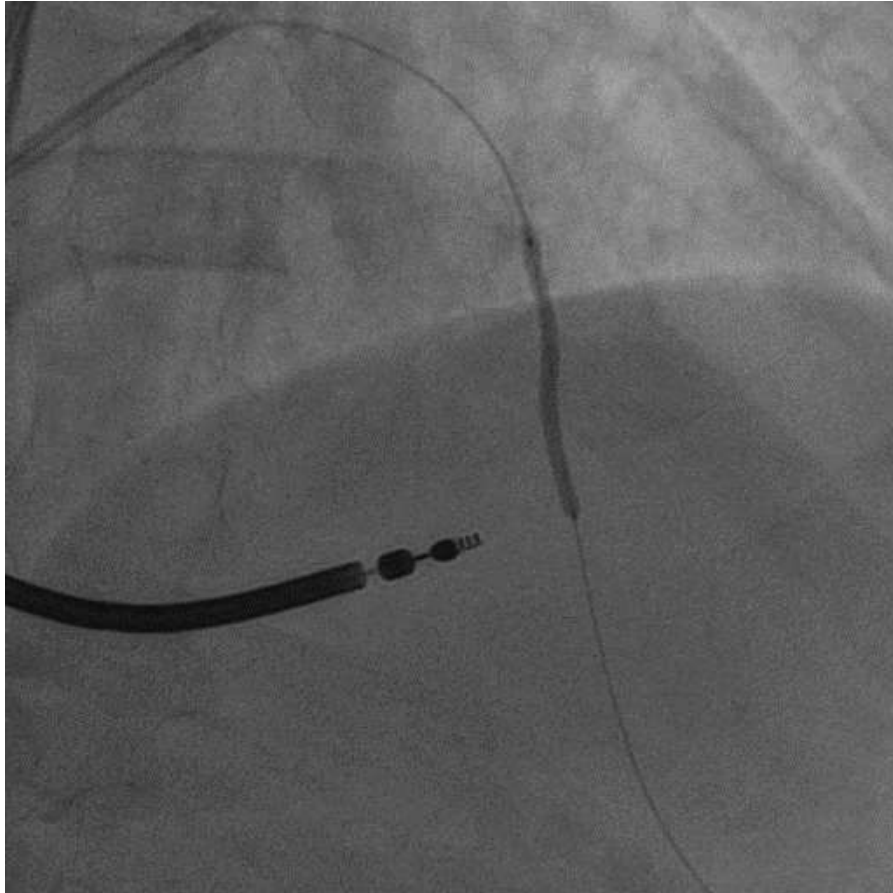
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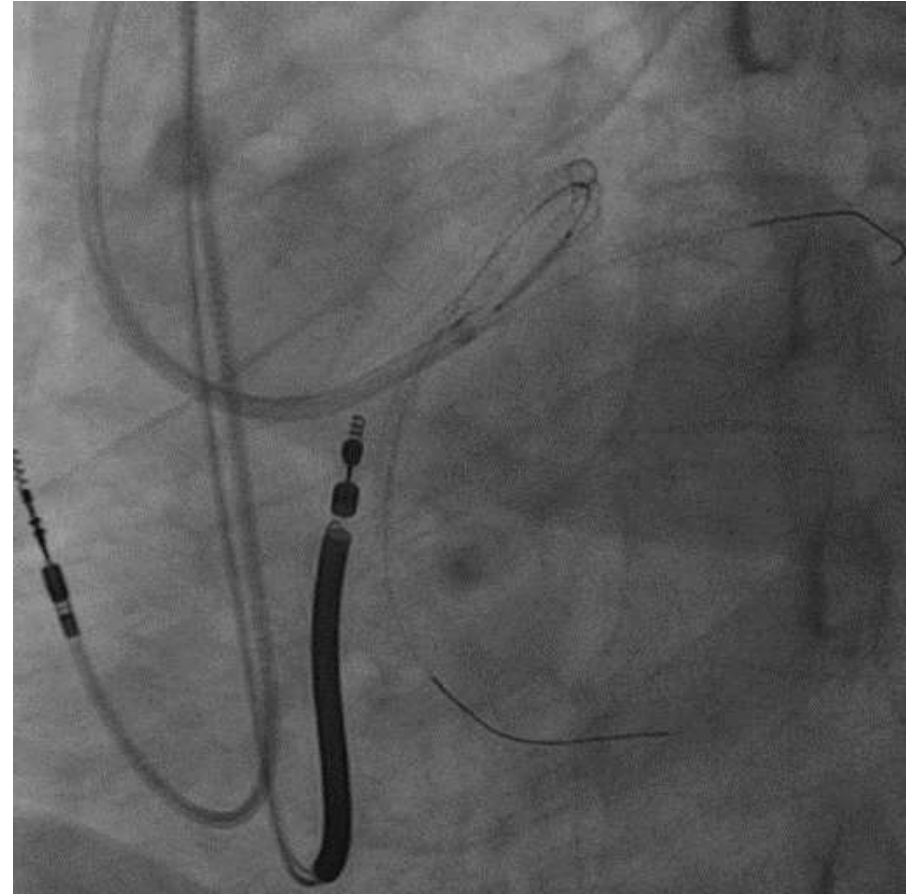
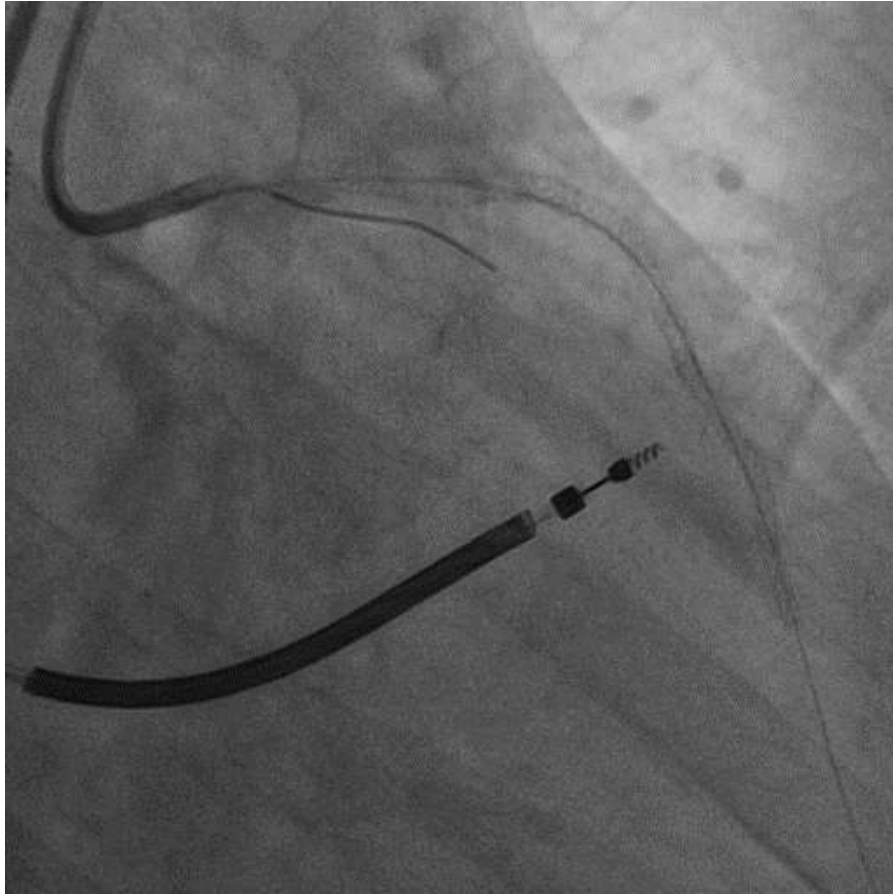
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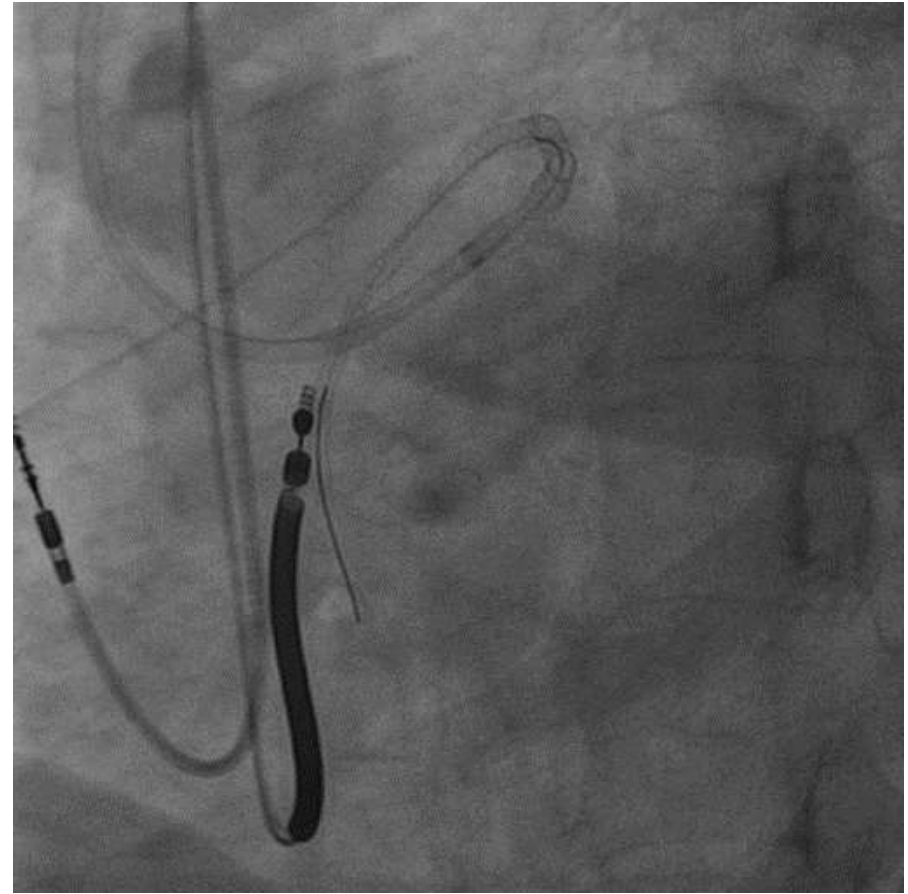
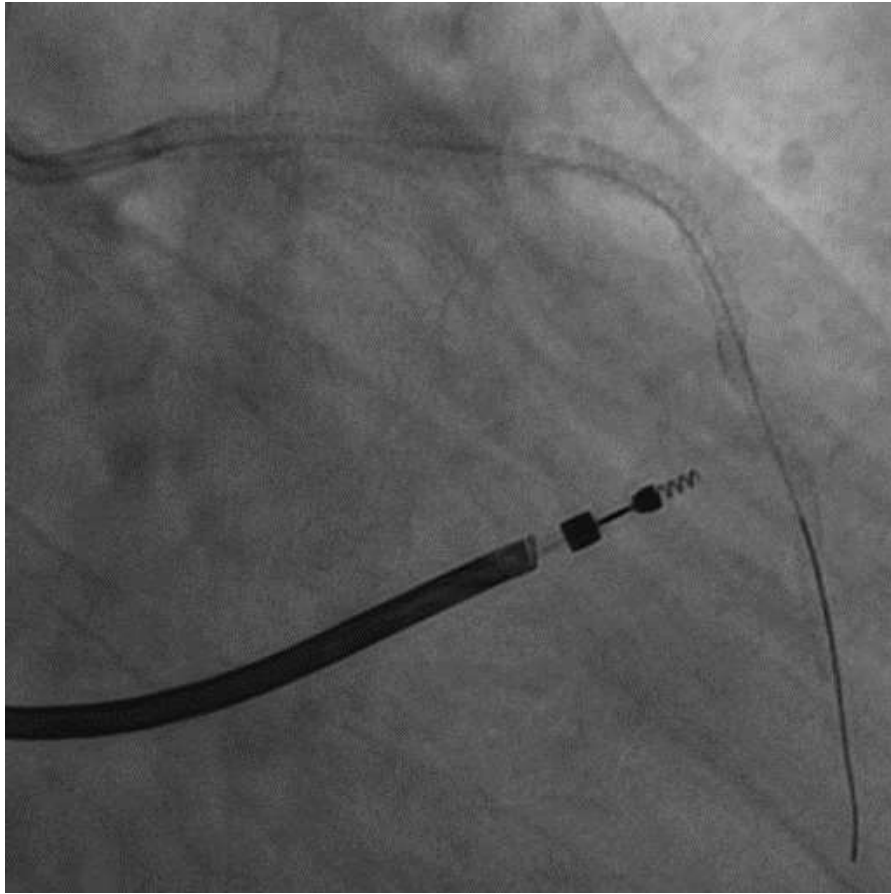
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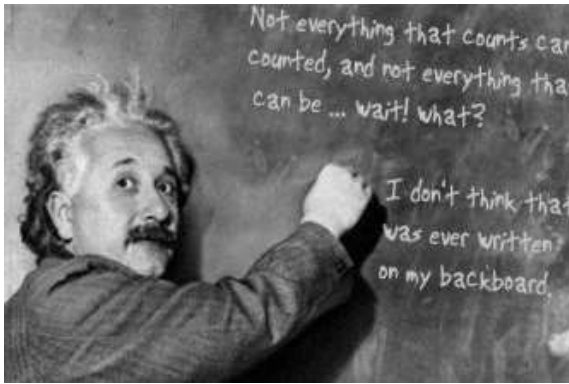


Case : LAD CTO : long CTO with collateral from RCA



Case : LAD CTO : long CTO with collateral from RCA





Albert Einstein (1879-1955)

Key Message 3

- There is no rule without exceptions -

When you want to find the way, General rule is...
“simultaneous quadratic equations in one unknown”.

But sometimes you need cubic equations !!!

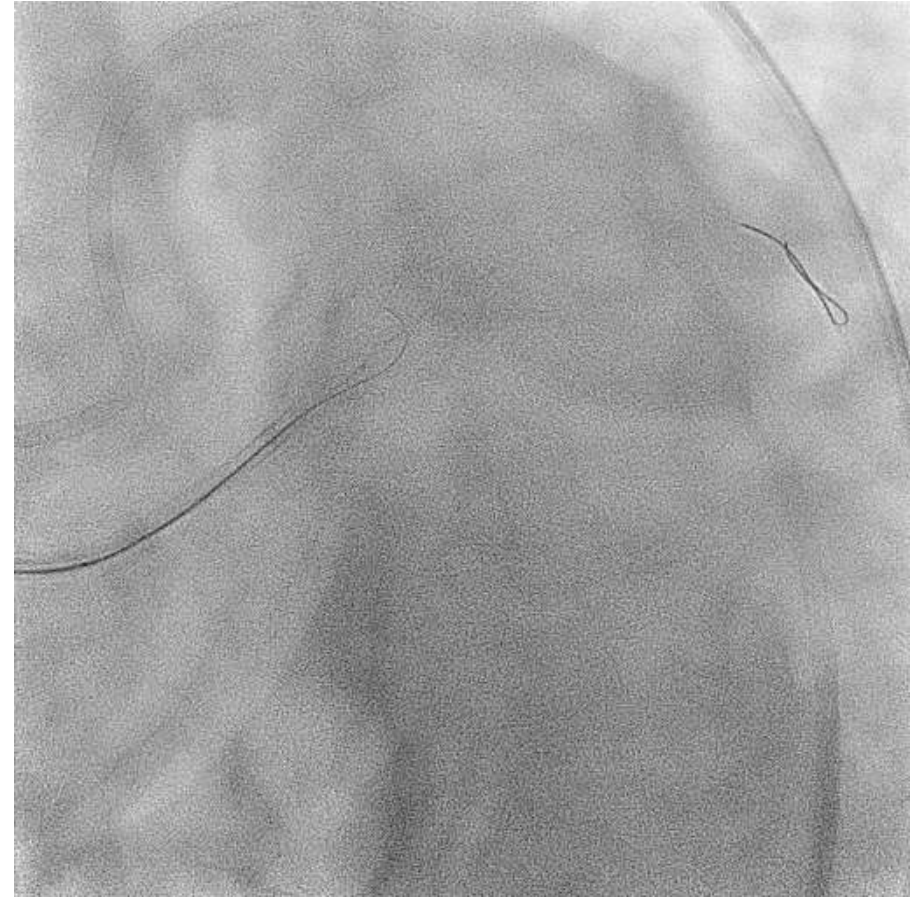
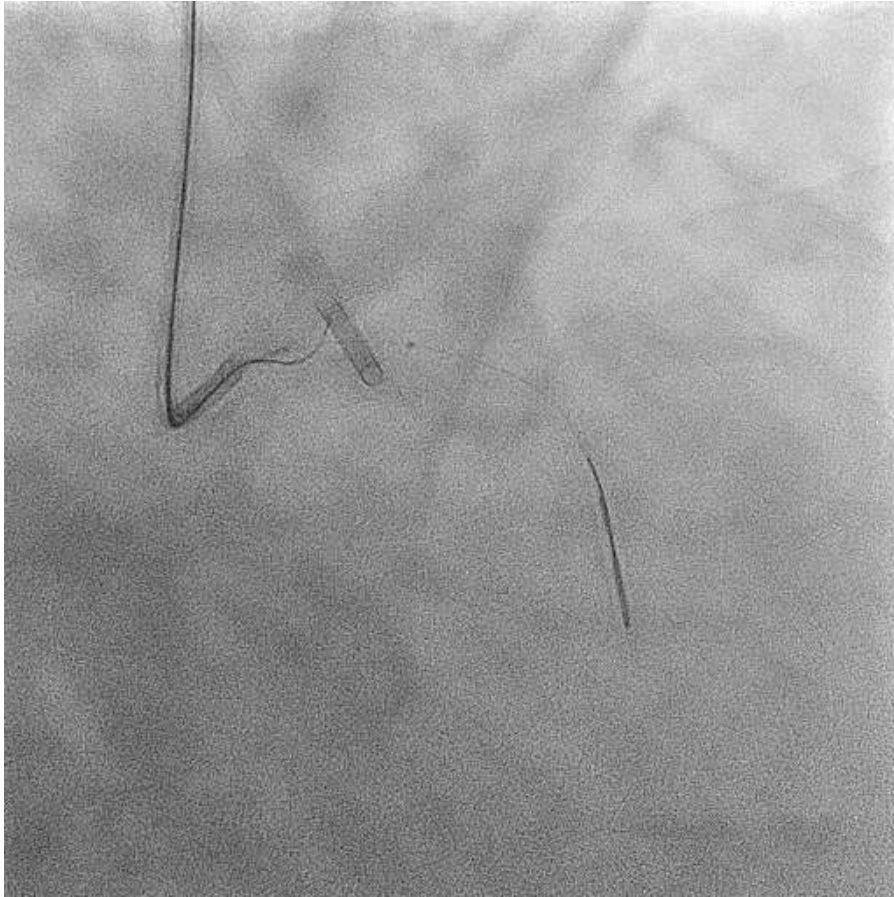
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LAD ostium No Stump CTO without any fine route of retrograde approach, we need another guide for climbing route.

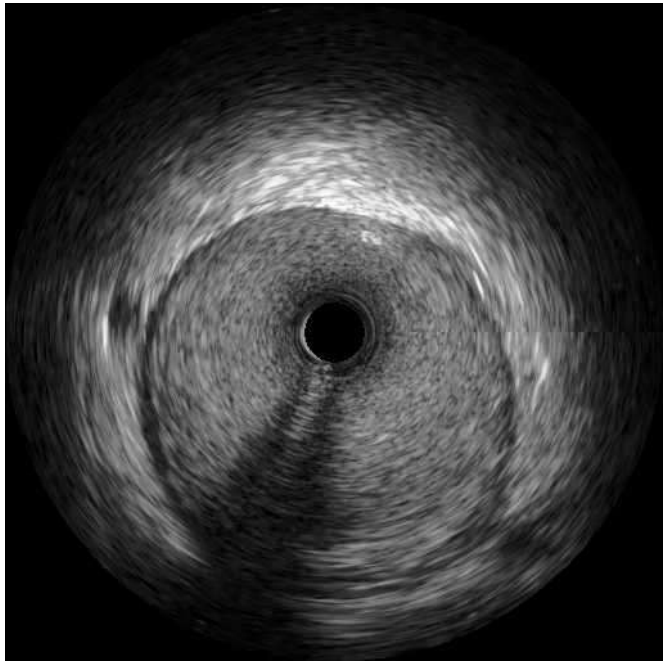
In case, Angio-coronary CT co-registration System guide GW-ing is useful.

Case 1 : 70yo, M,

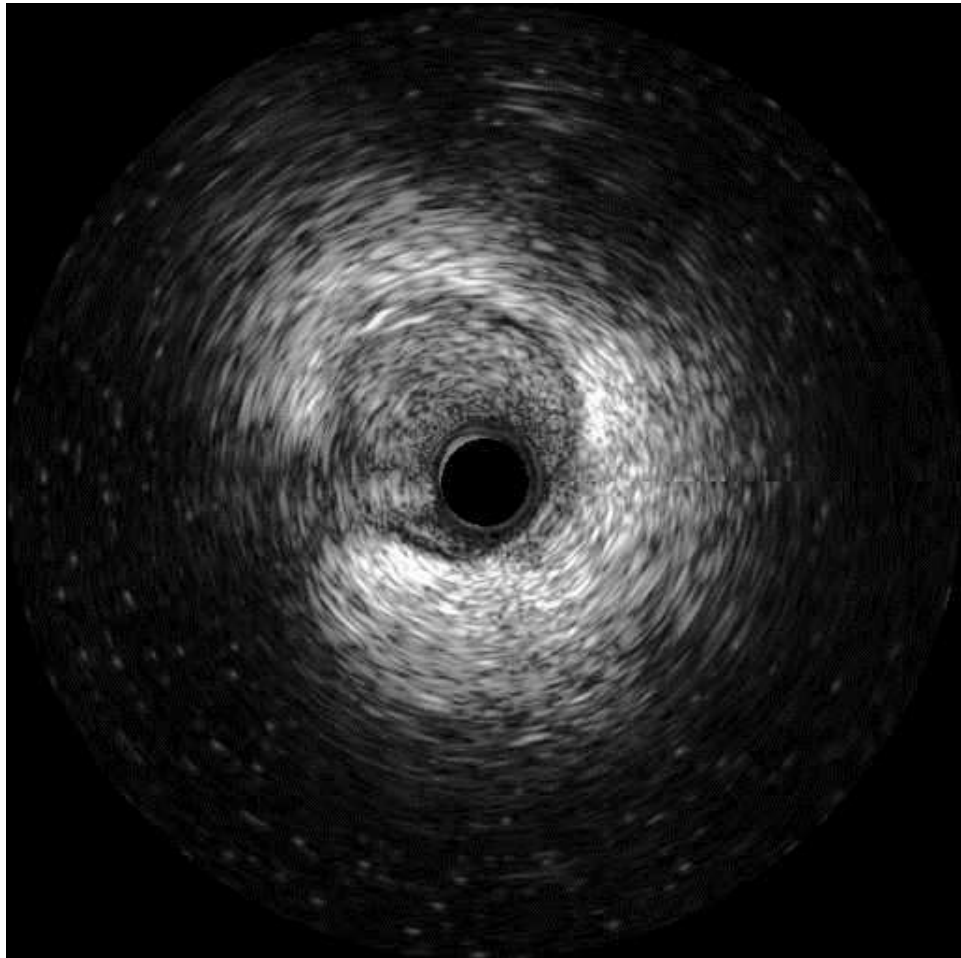
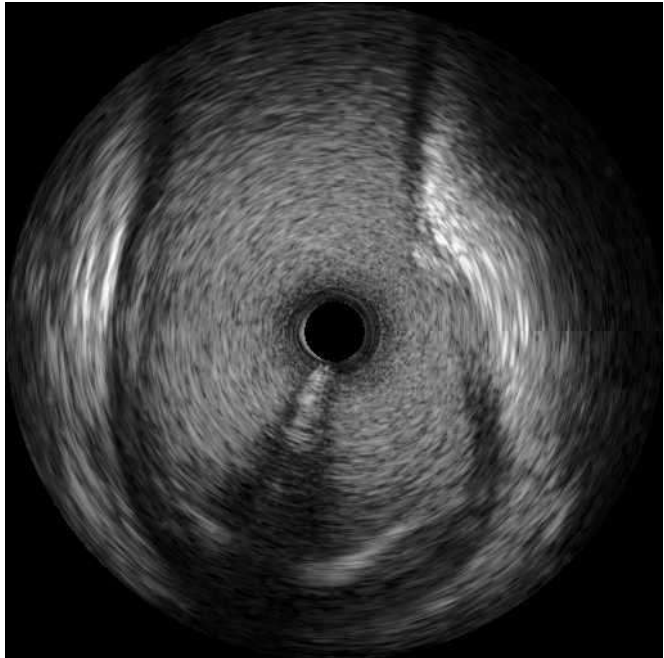
7 years history of Angina, moderate coronary risk factor (HT, Dyslipidemia , No CKD).... A very small ECG change, UCG: EF was 52 %, moderate decreased anterior wall motion. Big ischemic area by scintigraphy.



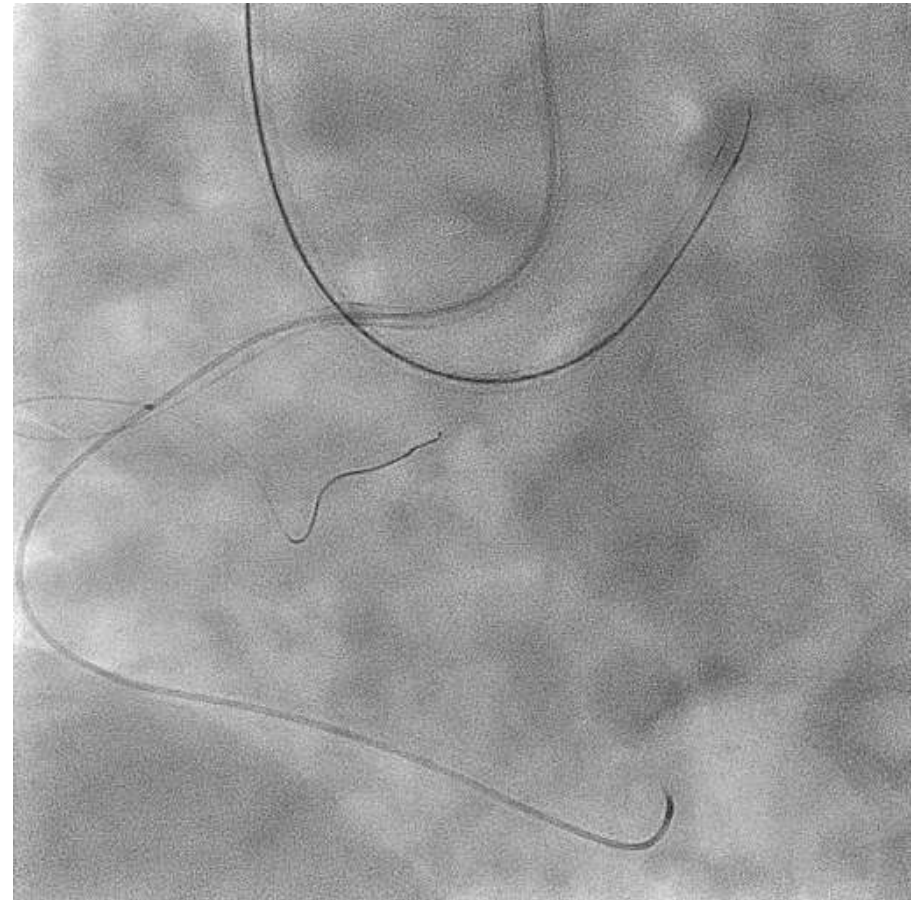
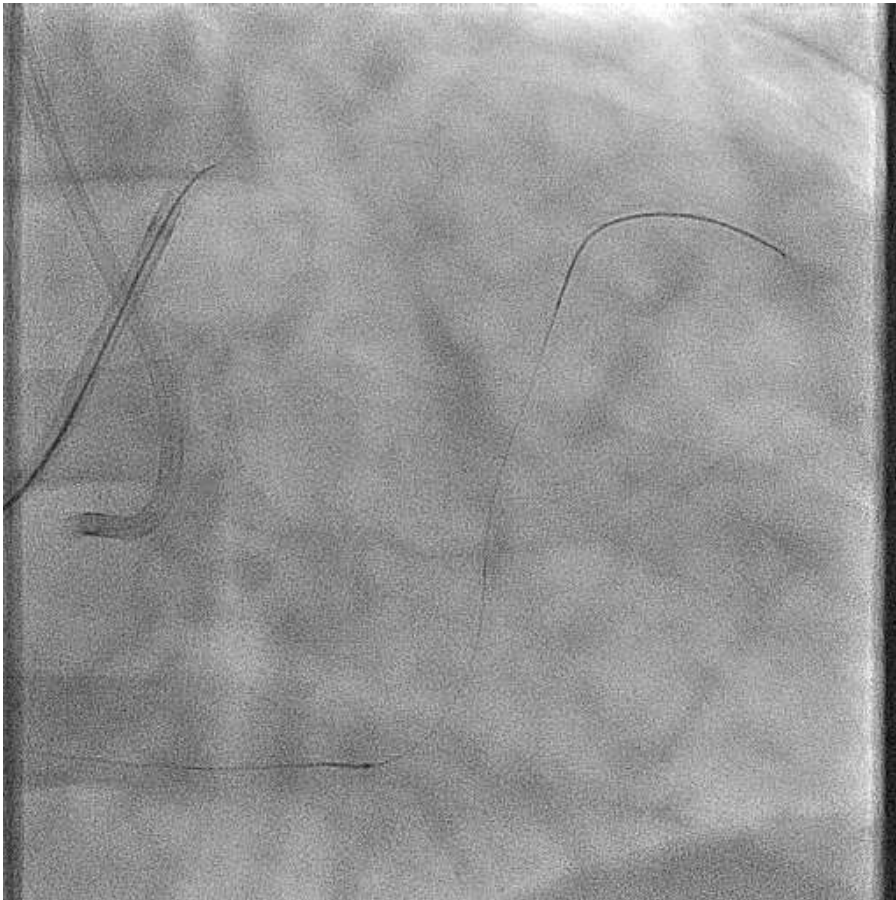
No Stamp LAD CTO



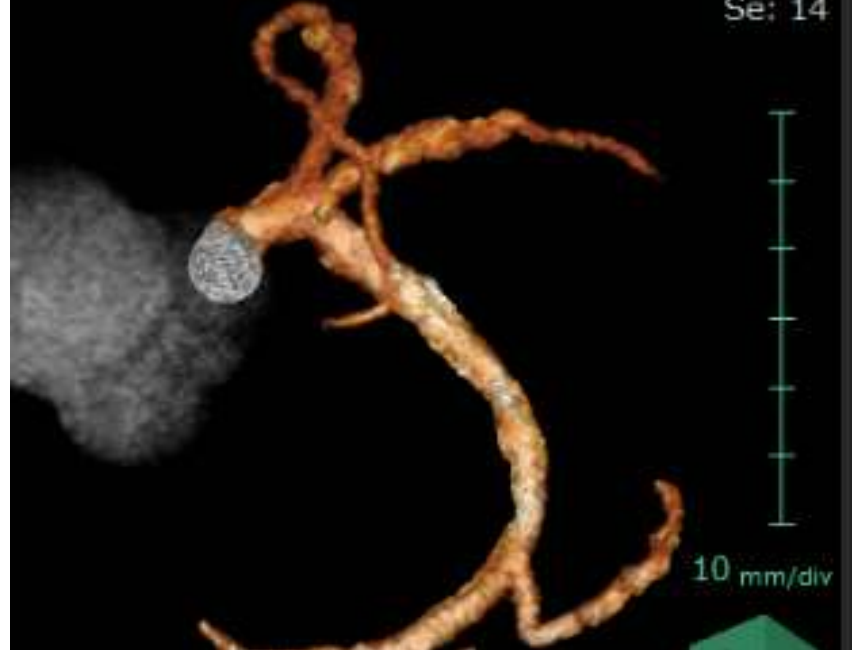
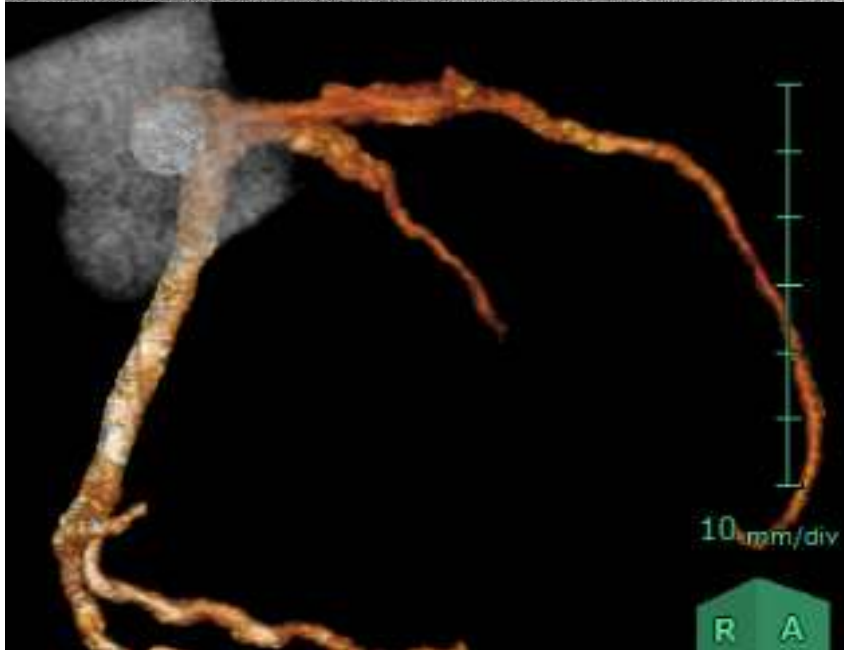
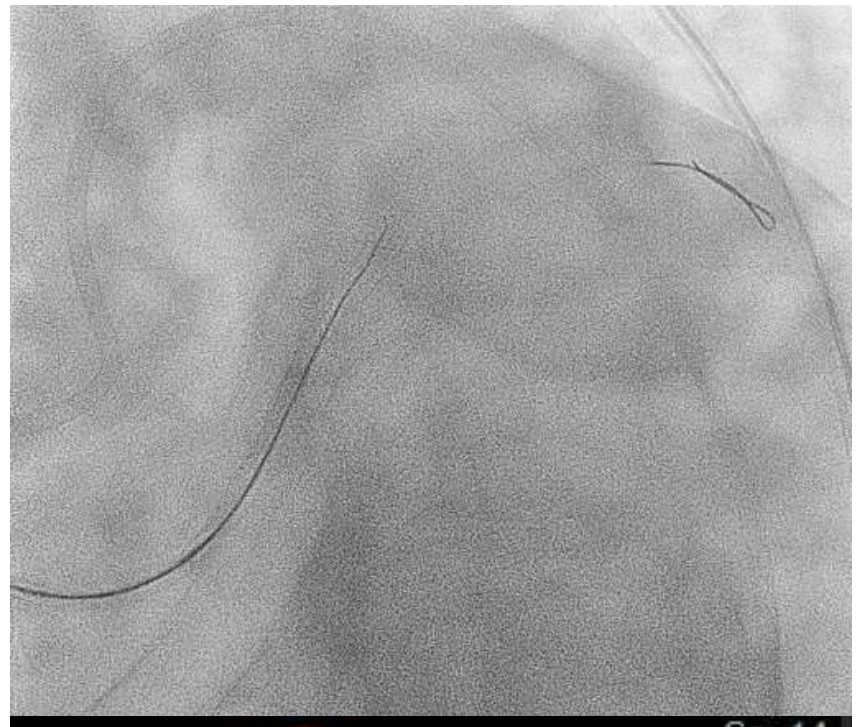
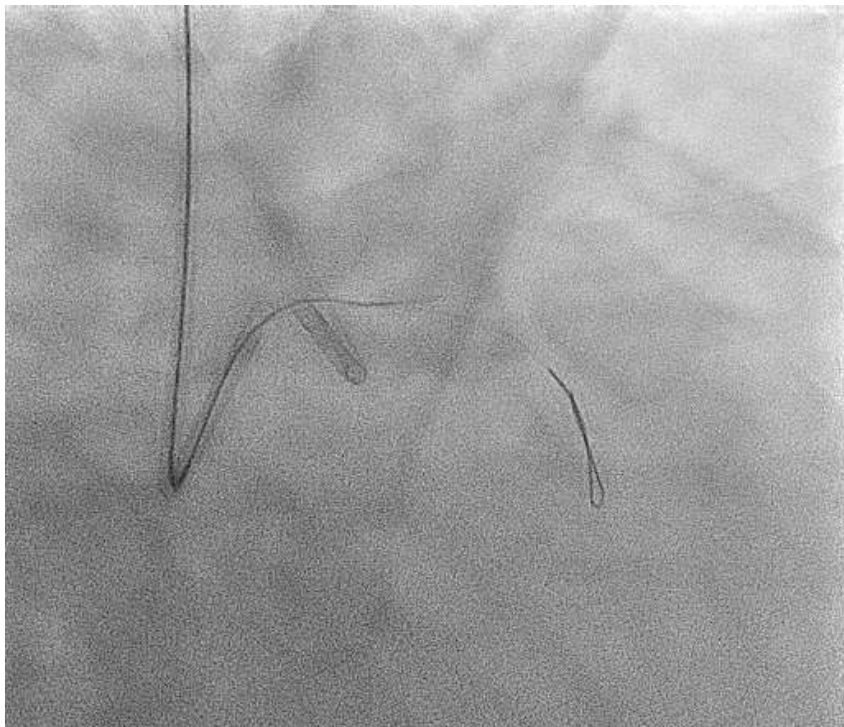
If we checked IVUS from OM to LMT,
We can not find entry of LAD CTO,
But if we review CT finding...

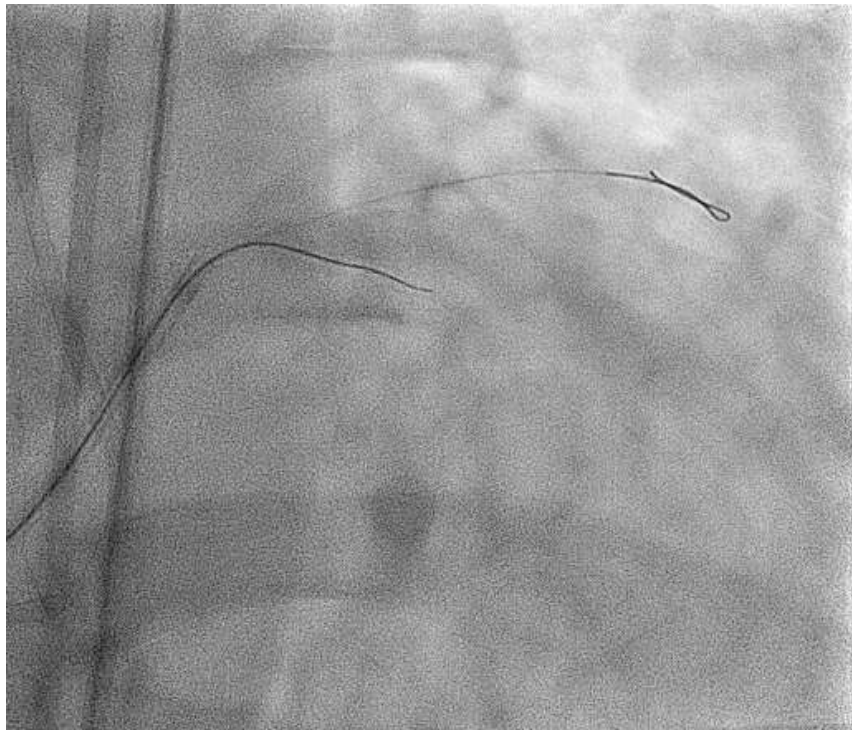


Case 1 : No Stump LAD CTO

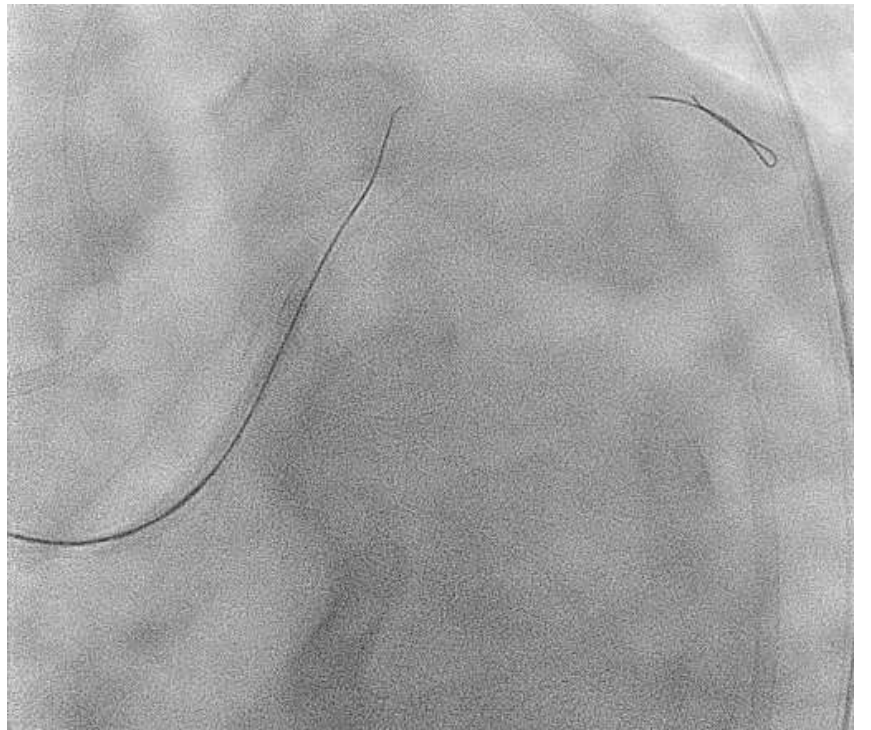


No appropriate retrograde channel for retrograde approach

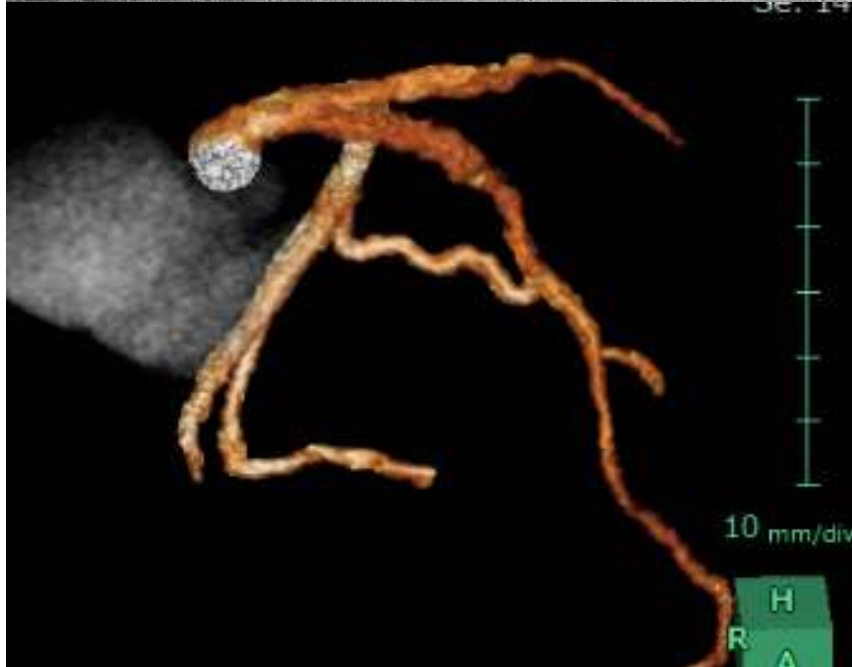




Se: 14

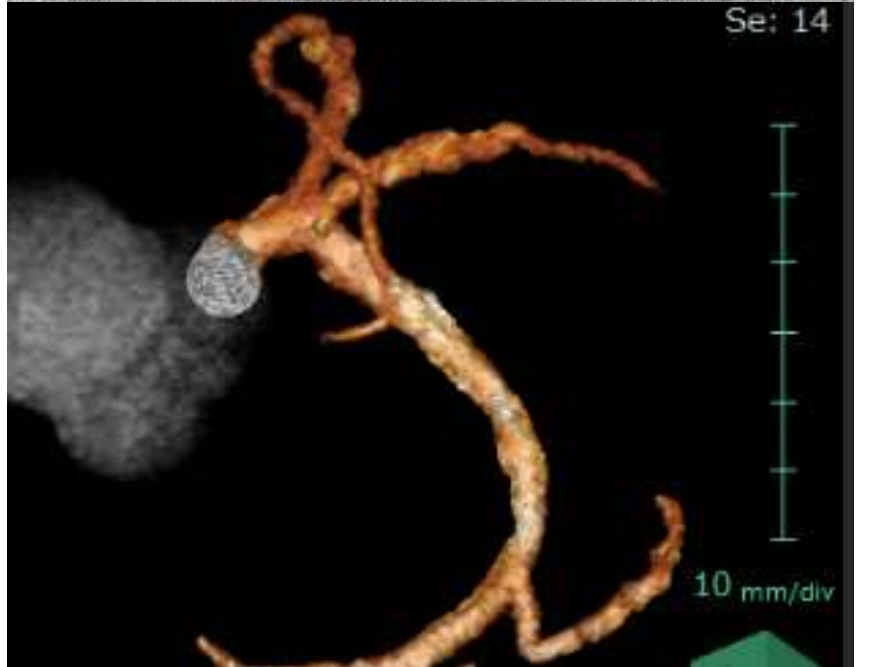


Se: 14



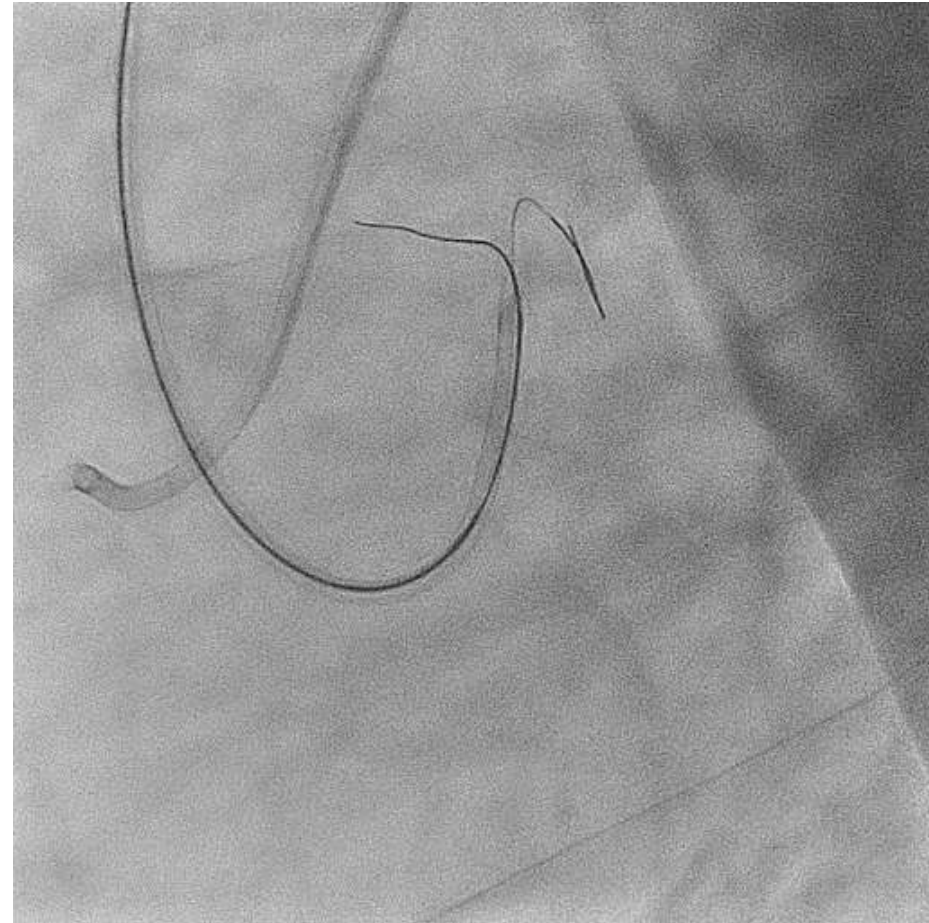
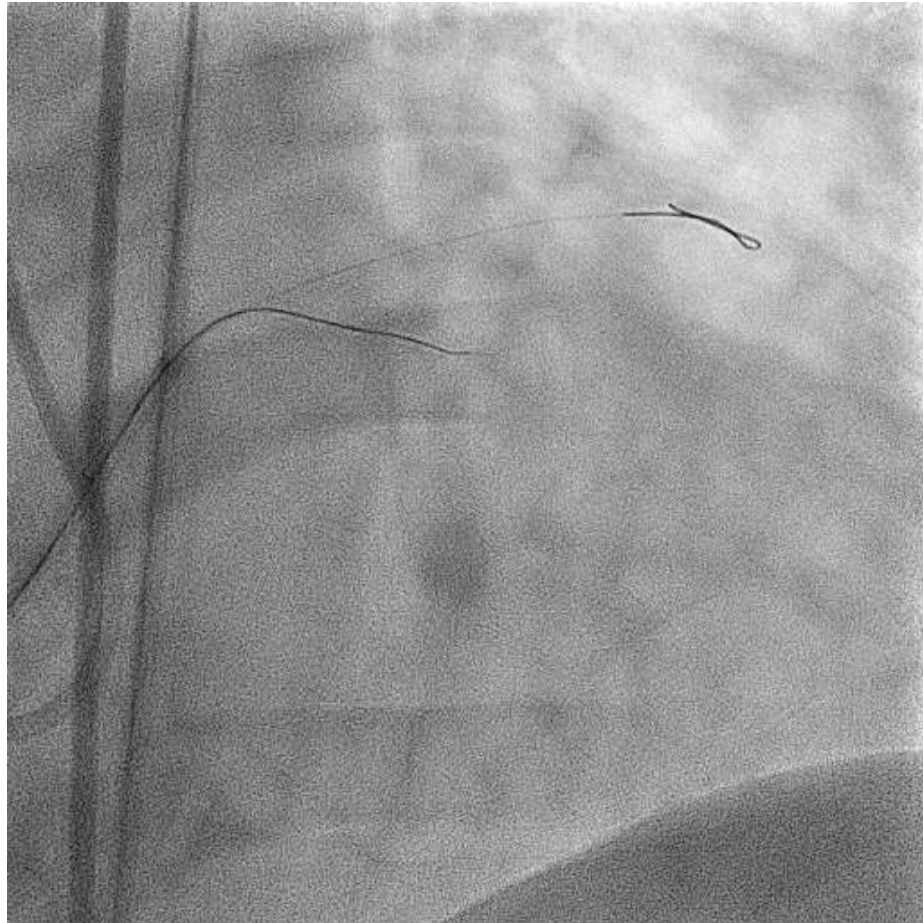
10 mm/div

H
R



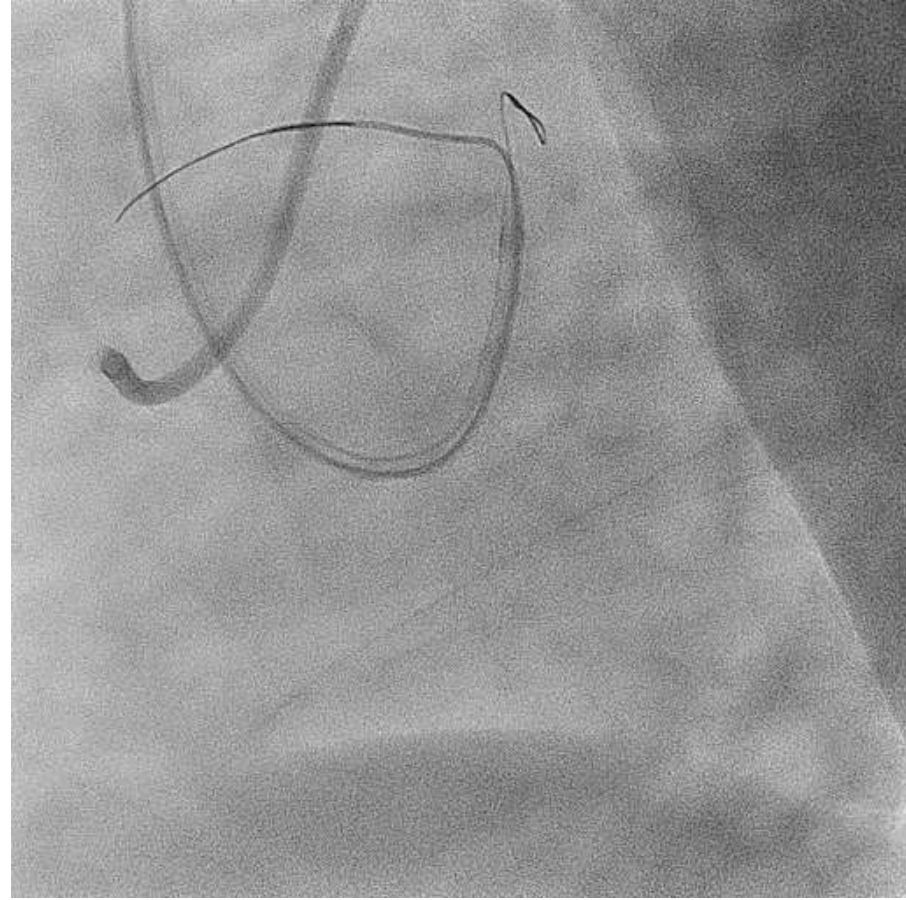
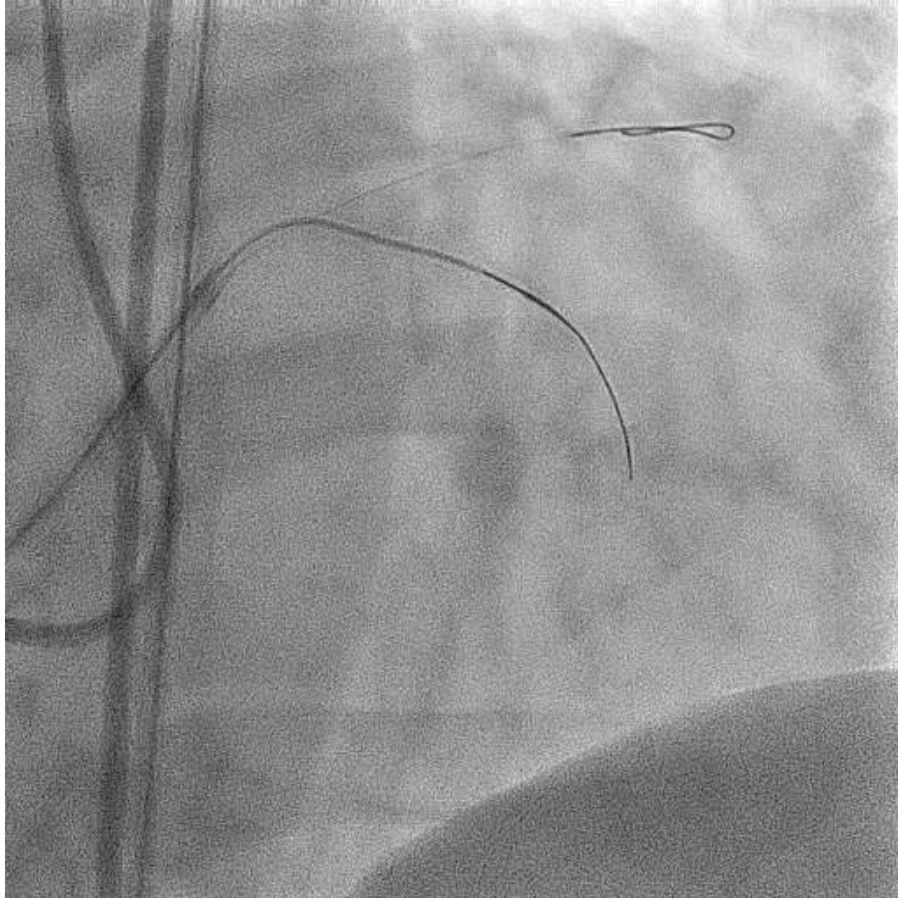
10 mm/div

Case 1 : No Stump LAD CTO



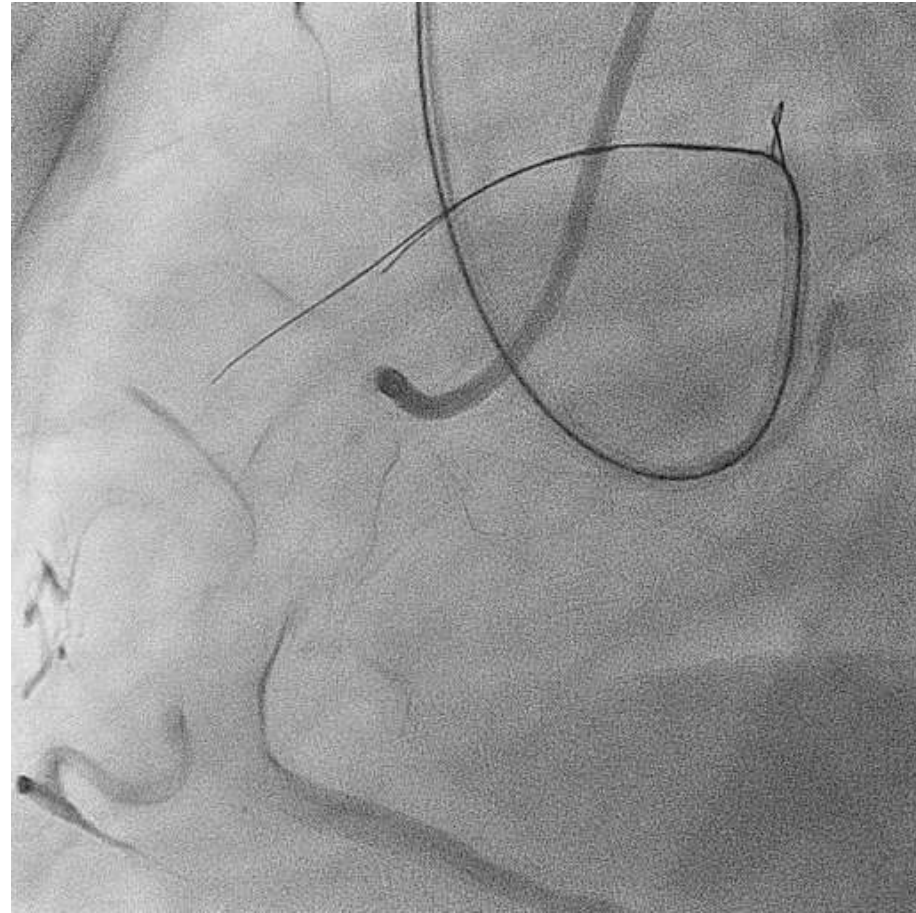
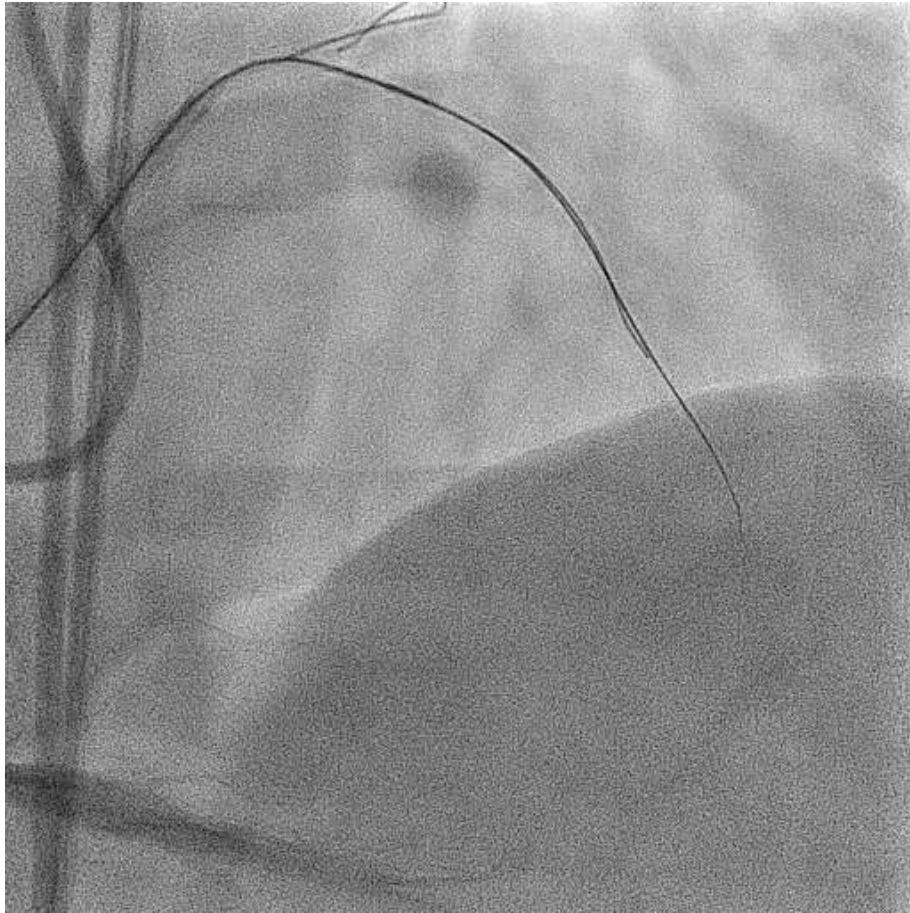
We successfully could enter GW in the lumen of LAD CTO.

Case 1 : No Stump LAD CTO



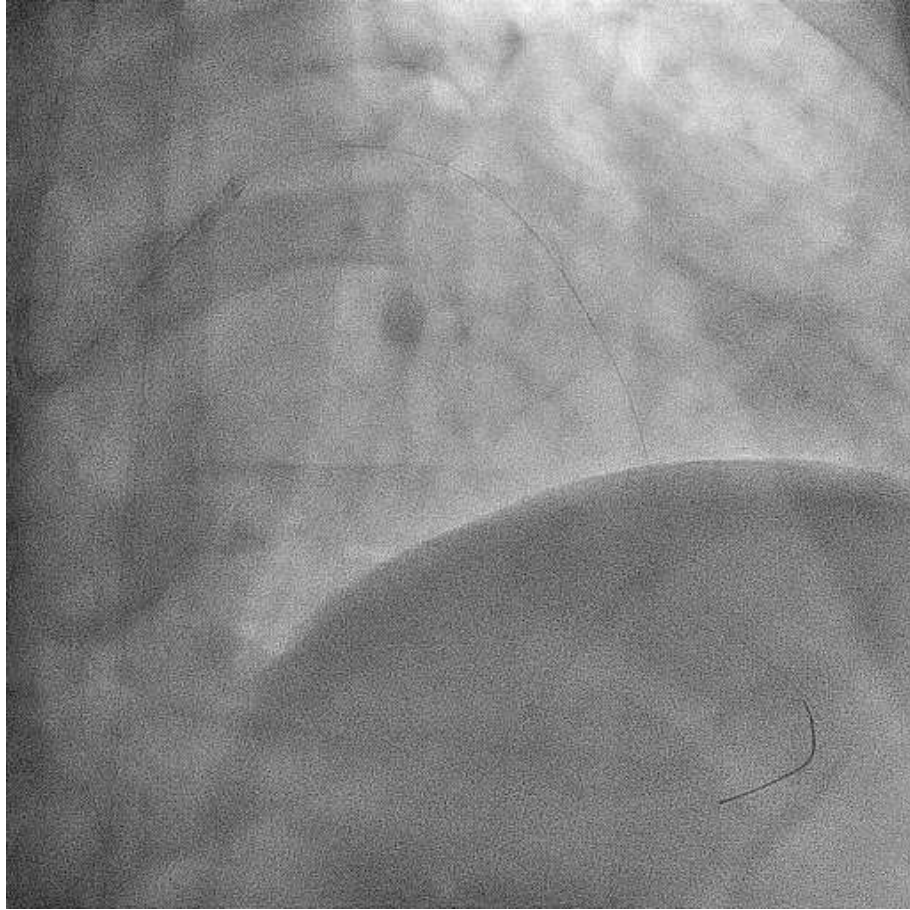
Checked GW position with several view to confirm the GW position.

Case 1 : No Stump LAD CTO



Now, our GW was already inside of true lumen, then ballooning and stenting

Case 1 : No Stump LAD CTO



Final Result



Key Messages 4

In case of LAD no stamp CTO, usually, we can not see the entry point by IVUS, because of the big space of LMT.

However, careful observation of CT image of coronary artery is more important than anything else to conjecture of coronary artery route.

Calcification is a FINAL Frontier !!

