Friday 18:45 Shih-Hung Chan

A left main distal trifurcation lesion:

what did I do?

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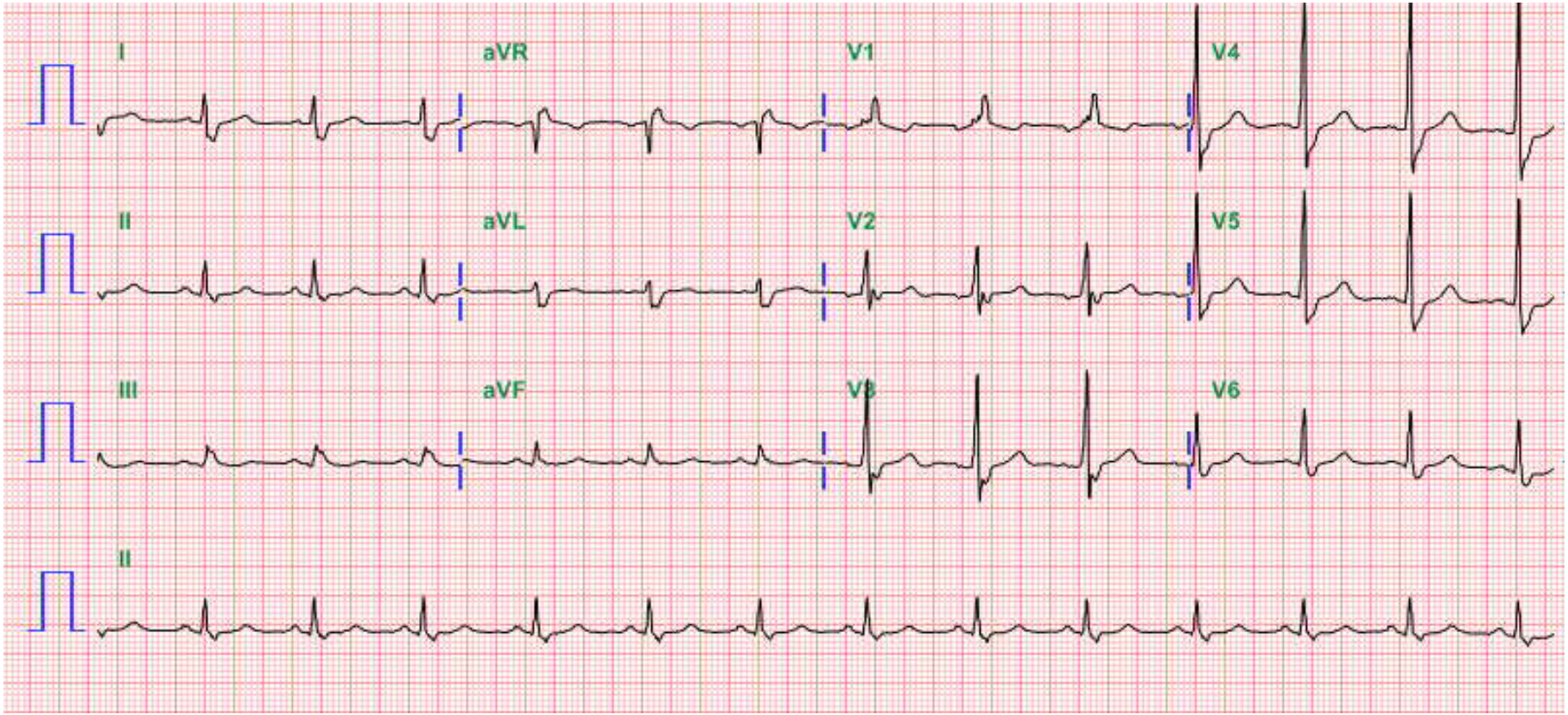
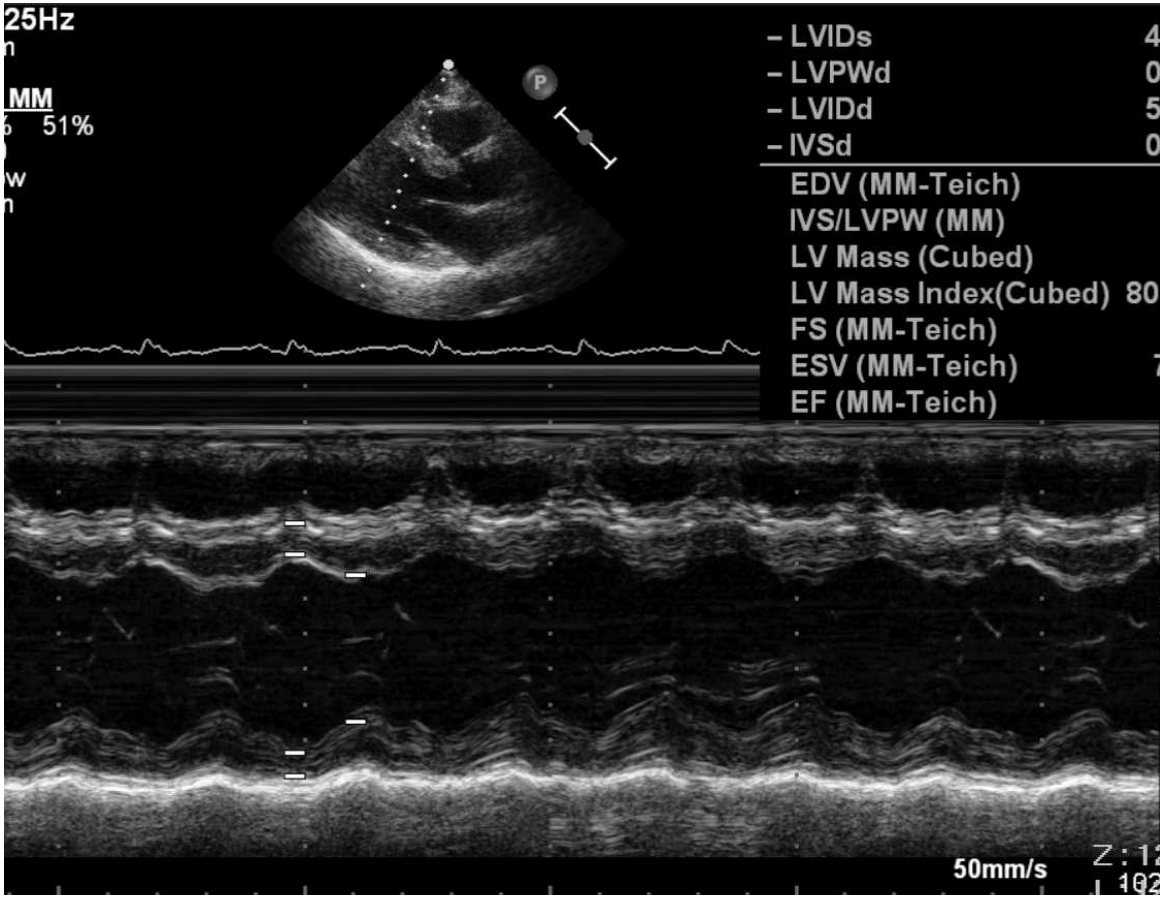
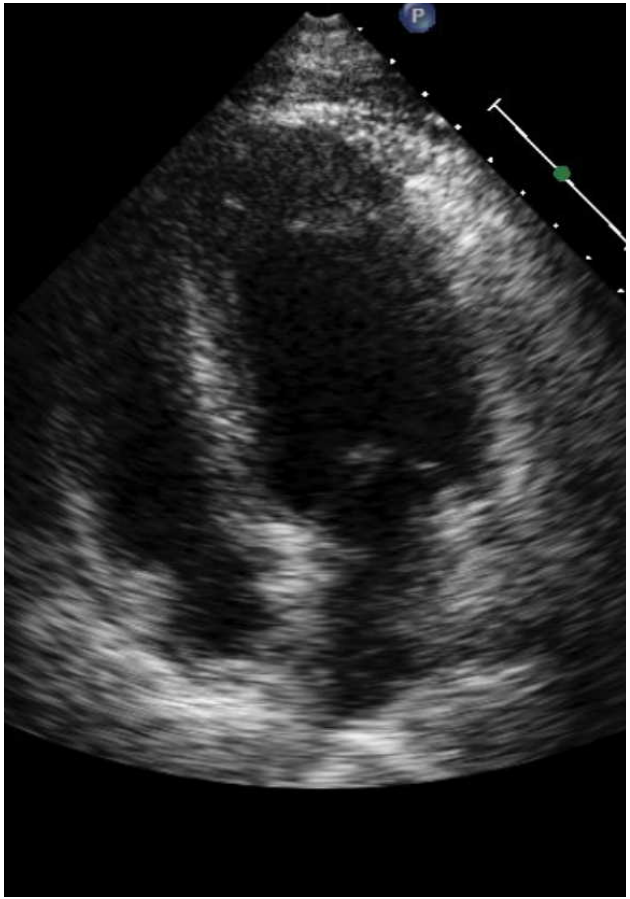
Tainan, Taiwan, R.O.C

Patient characteritics

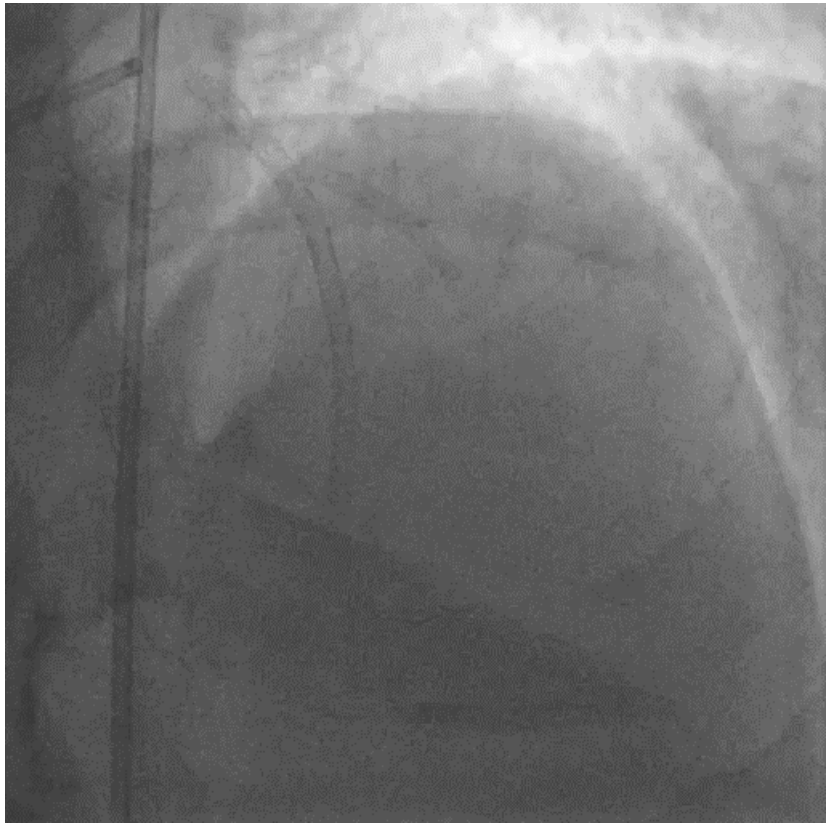
A 49-year-old male had hypertension and hyperlipidemia. He had already received percutaneous coronary intervention twice for non-ST elevation myocardial infarction and unstable angina pectoris in the past few years. This time, he presented with crescendo angina for 1 month. Renal function was normal.

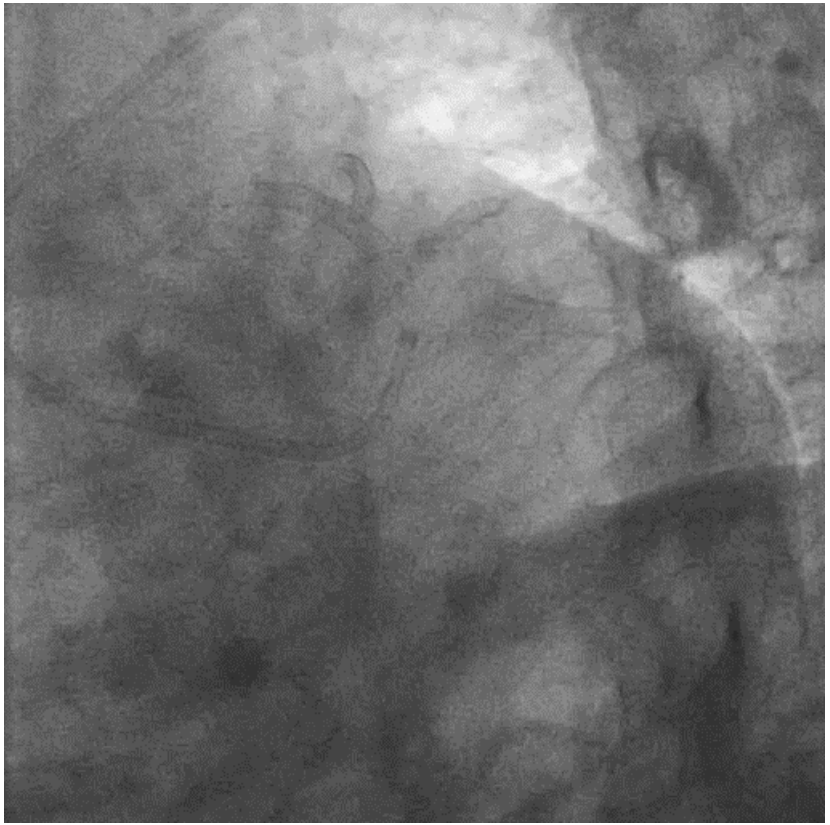

I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II


25Hz
MM
51%
– LVIDs
– LVPWd
– LVIDd
– IVSd
EDV (MM-Teich)
IVS/LVPW (MM)
LV Mass (Cubed)
LV Mass Index(Cubed) 80
FS (MM-Teich)
ESV (MM-Teich)
EF (MM-Teich)
50mm/s

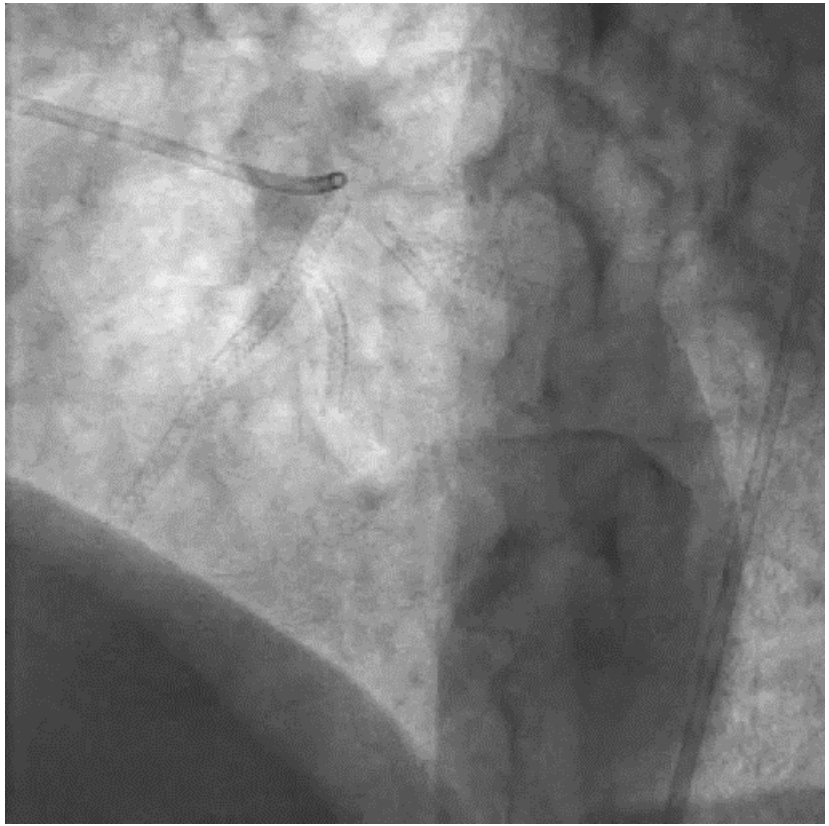


Diagnostic angiography

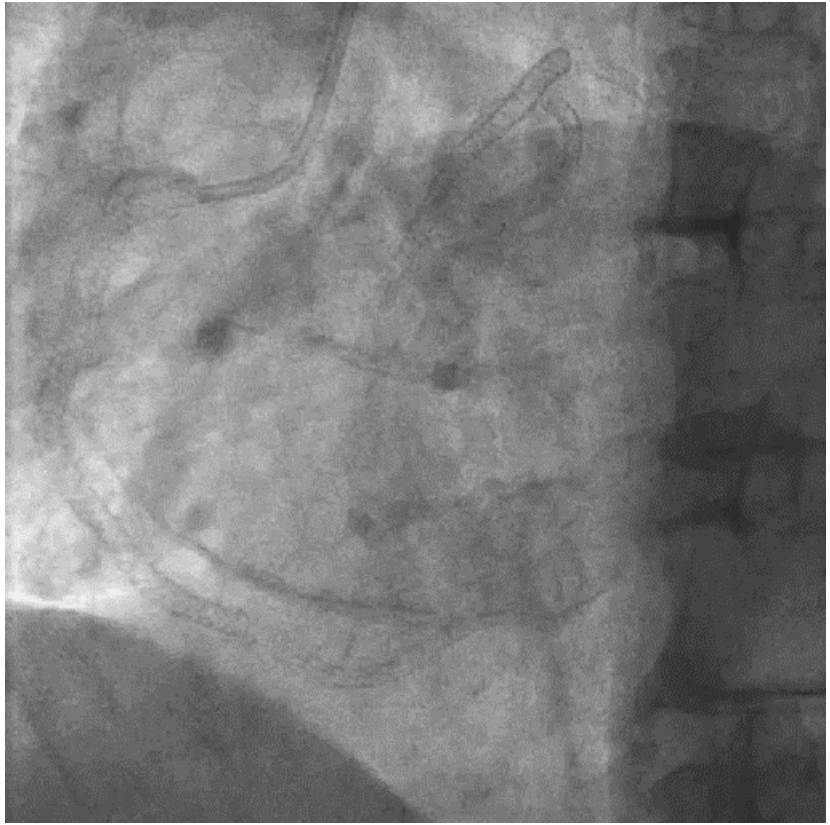




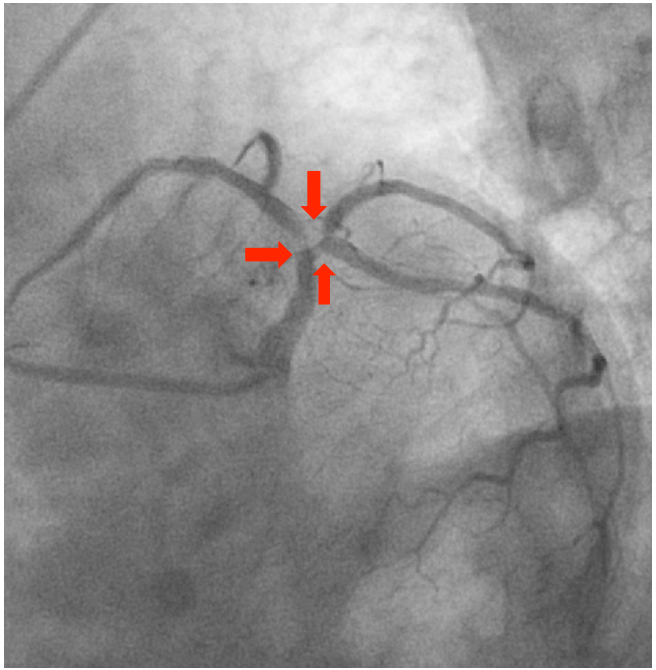
Diagnostic angiography

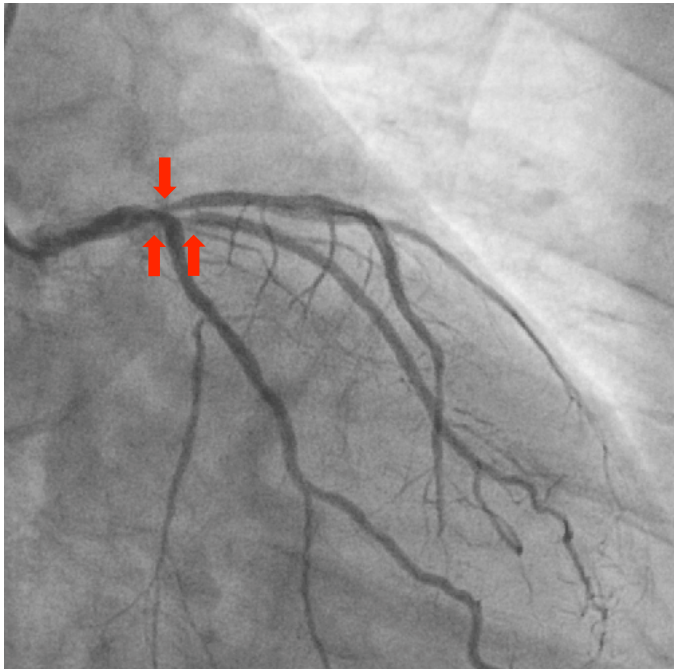


Diagnostic angiography



Target lesion





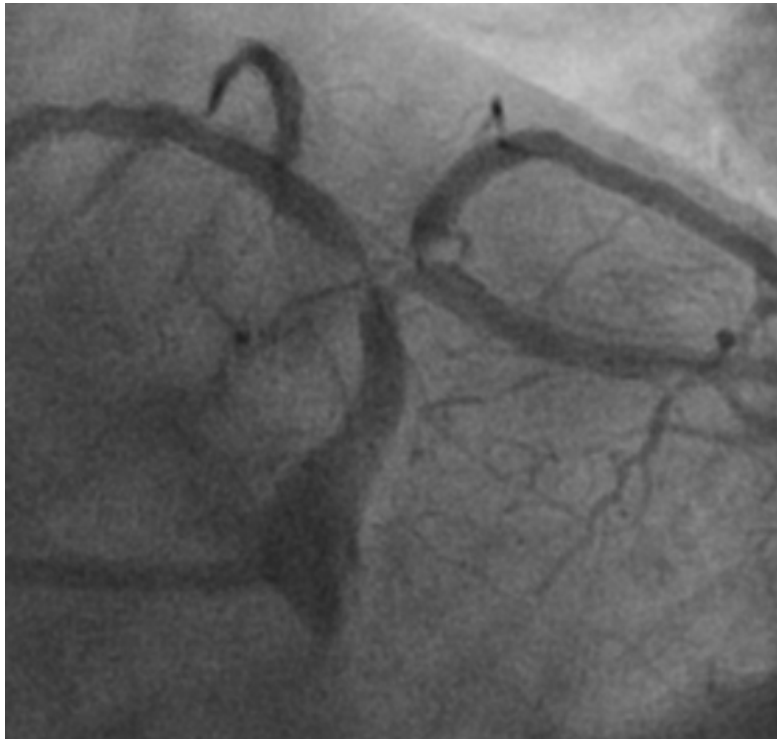
Distal left main
Ostium of left anterior descending artery (LAD)
Ostium of left circumflex artery (LCX)
Ostium of first obtuse marginal (OM) artery

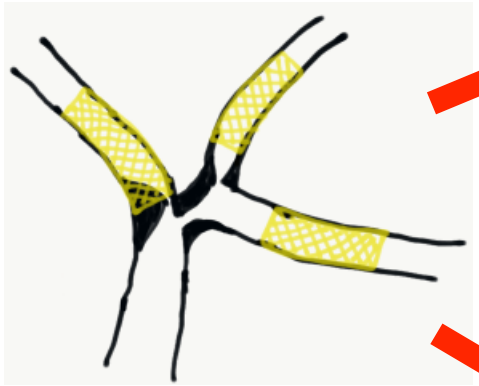
Four vessels and three ostial lesions!

Treatment strategies

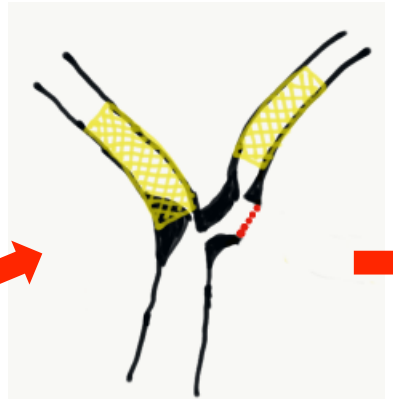
1. LV assistance device: nil
2. Debulking/plaque modification:
   1) No marked calcification: not needed in the beginning
   2) In case needed, considering cutting balloon, scoring balloon, or rotational atherectomy
3. Intravascular image:
   1) Definitely needed
   2) IVUS
4. Antithrombotic: aspirin, clopidogel, and heparin
5. Stenting strategy

Assessment of target lesion for stenting strategy

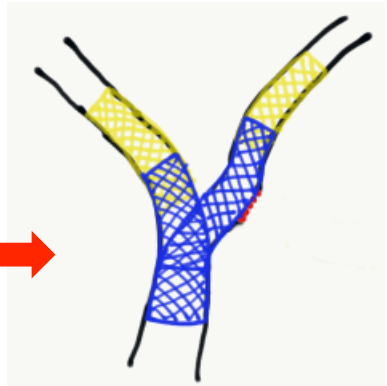




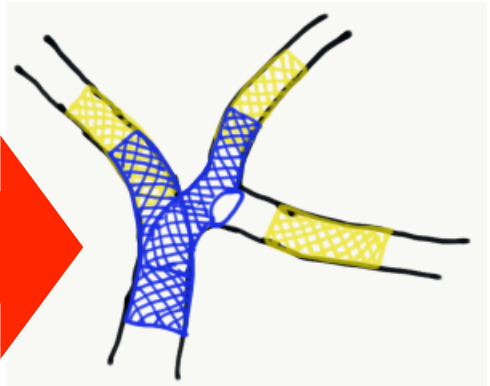
Medina 1,1,1,(1)

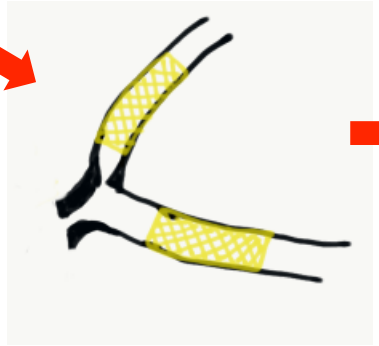


Medina 1,1,1

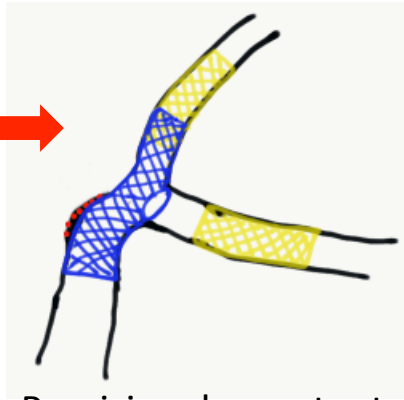


Culottes technique



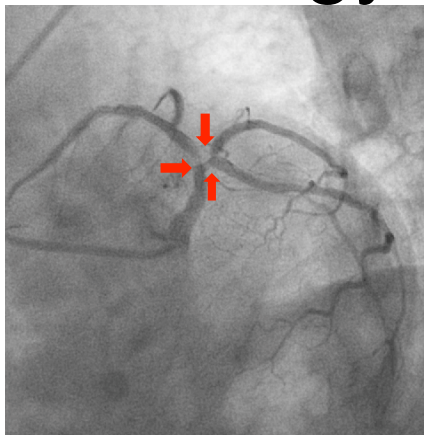


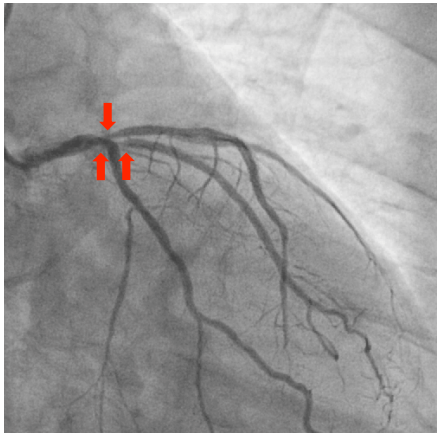
Medina 1,0,1 or 1,1,0

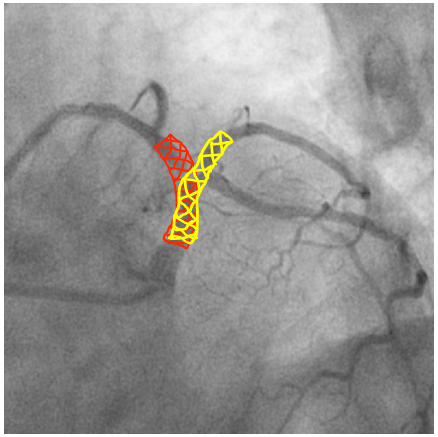


Provisional one stent

Target lesion and treatment strategy







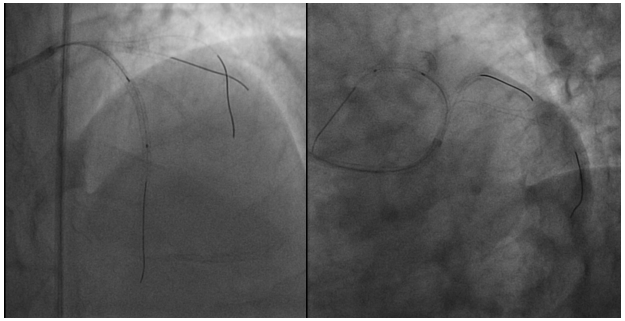
Target lesions:

- Distal left main
- Ostium of left anterior descending artery (LAD)
- Ostium of left circumflex artery (LCX)
- Ostium of first obtuse marginal (OM) artery

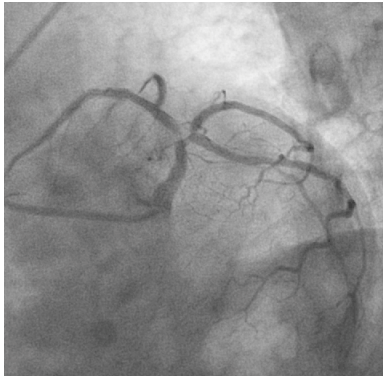
Strategies:

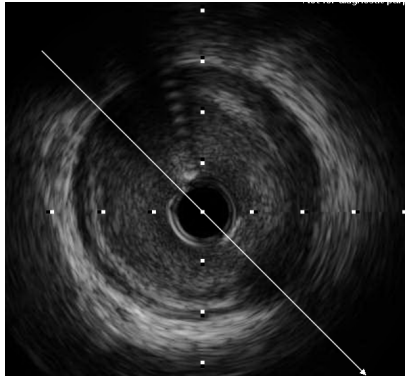
1. Two-stent strategy
2. Culottes technique for the LAD-OM bifurcation
3. Provisional one stent technique for the OM-LCX bifurcation

Wiring and intravascular ultrasound

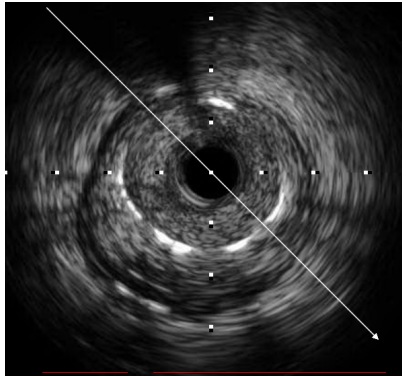


A 7Fr JL4 guiding catheter with side hole was used. A Runthrough hypercoat wire was placed in LAD, and Fielder wires in LCX and OM. Intravascular ultrasound for left main and LAD artery was performed after balloon (1.5 x 15 mm) pre-dilatation of ostium of LAD.

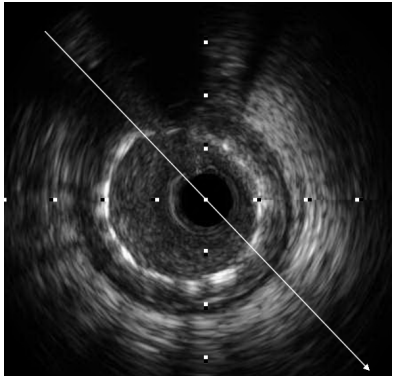




Left main

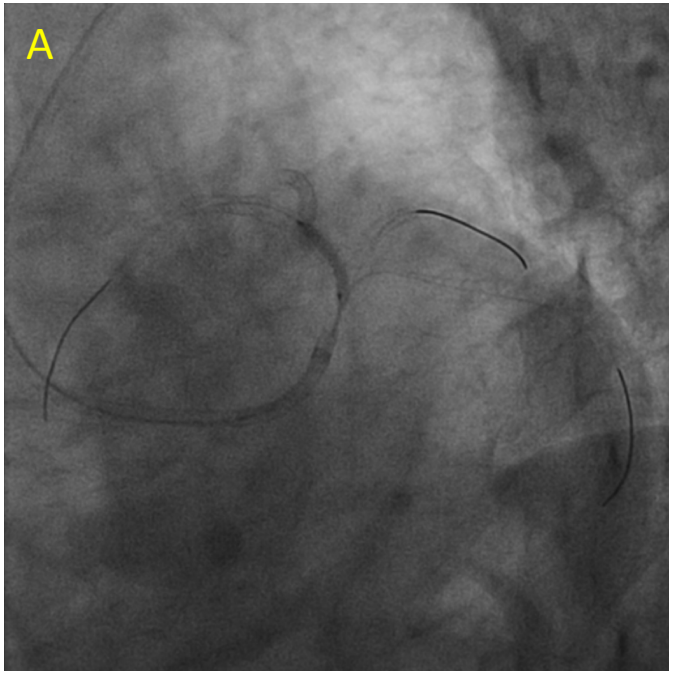


LAD ostium

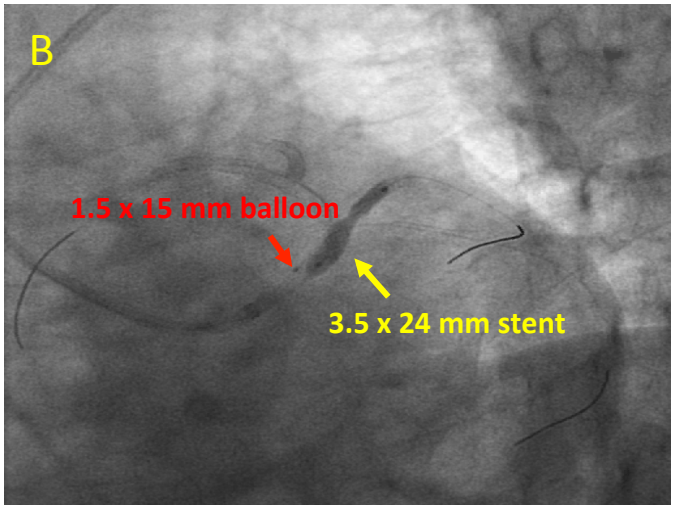


Proximal LAD

Implantation of LM-first OM stent

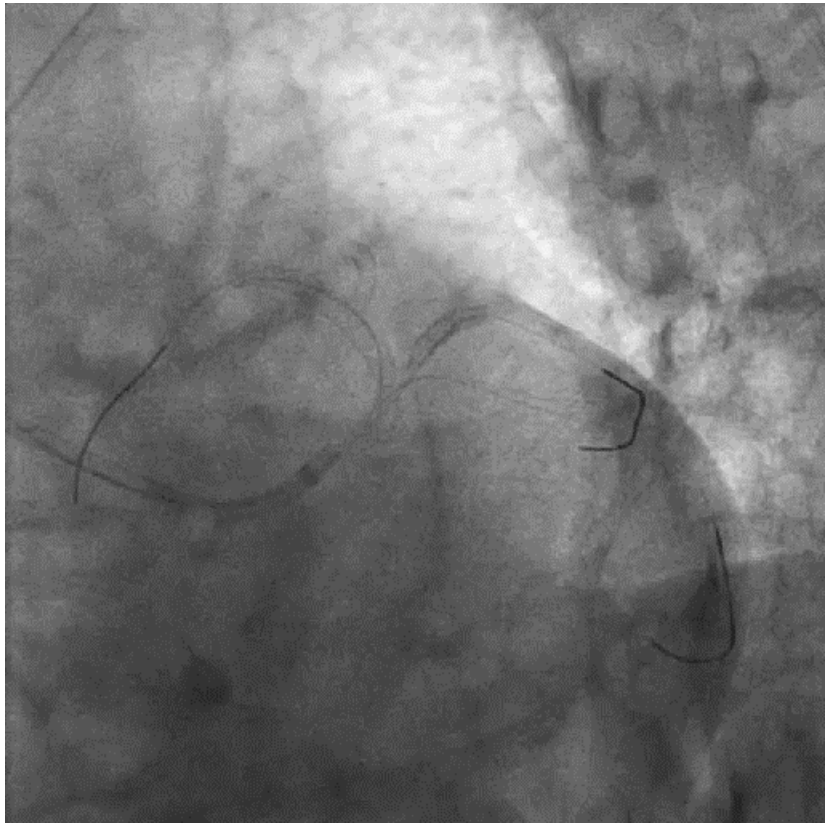


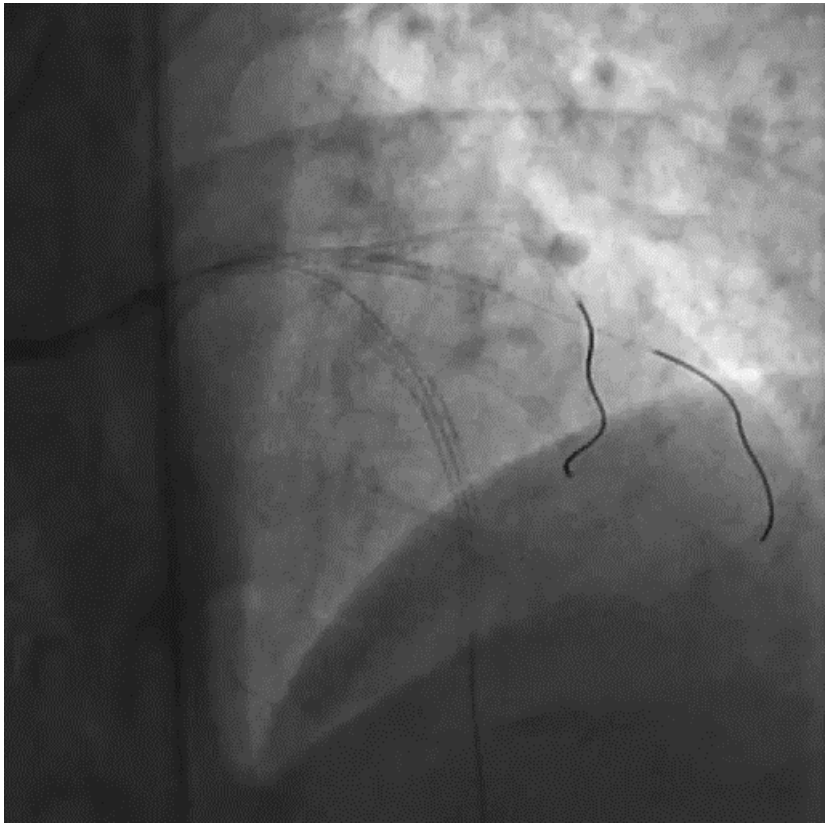
We first dilated the ostium of left anterior descending coronary artery using a balloon (2.0 x 20 mm) to avoid diminished blood flow in LAD in the sub-sequent procedure.



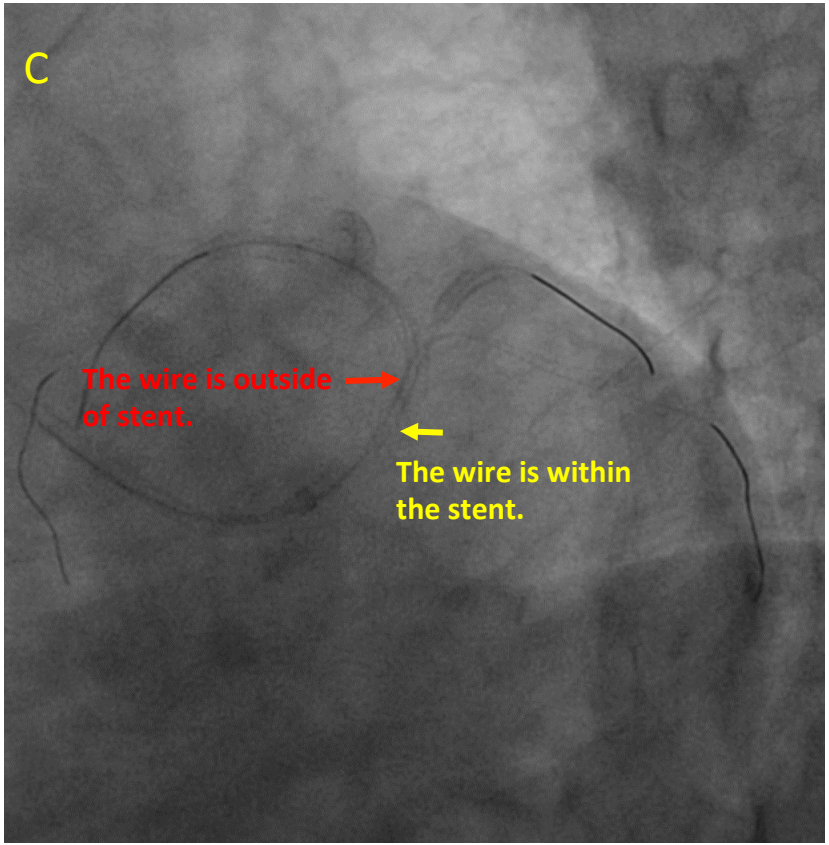
A drug-eluting stent (3.5 x 24 mm) was implanted in LM-OM1 with 10 bars with simultaneous inflation of a balloon (1.5 x 15 mm) in LM-LAD with 12 bars, higher than the LM-OM1 stent, to protect the LAD.

Angiography after LM-OM1 stenting



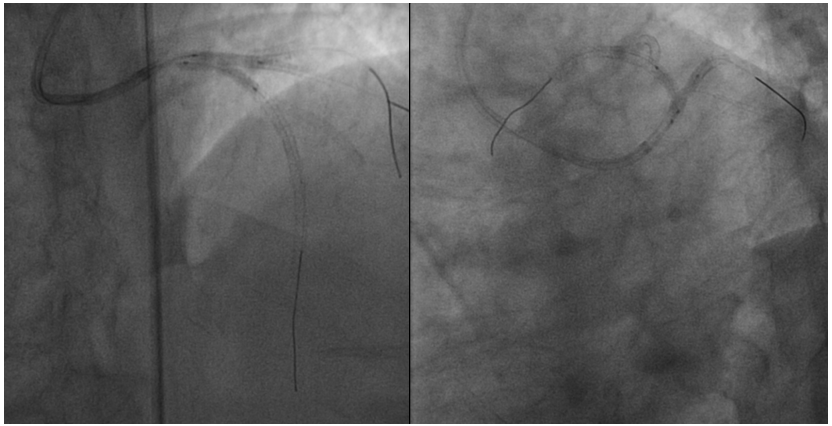


Rewiring after implantation of LM-first OM stent



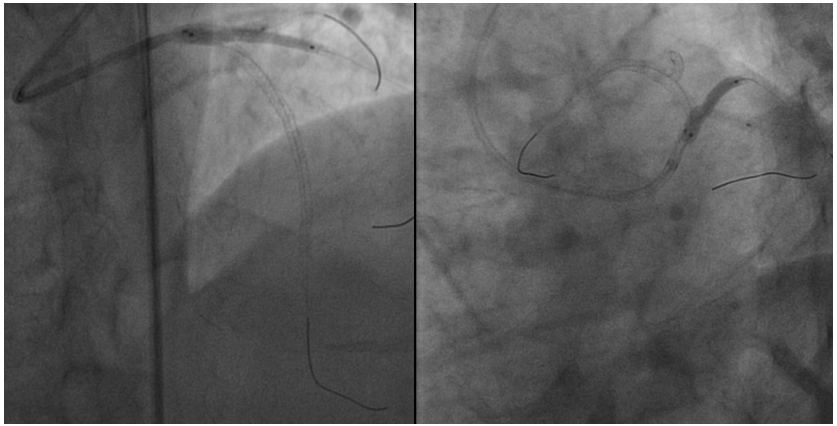
We wired the LM-LAD through the LM-OM stent struts with a Fielder wire with help of a double-lumen (Crusade) catheter to LM-OM. After wiring, there were two wires seen in LM-LAD; one was outside of the LM-OM stent, and another one was within the LM-OM stent. Similarly, we used the Crusade catheter to facilitate rewiring of LCX.

Kissing balloon for LAD-OM and OM-LCX bifurcation



A Mini Trek balloon (2.5 x 20 mm) at LM-LAD

A Trek balloon (3.0 x 15 mm) at LM-OM

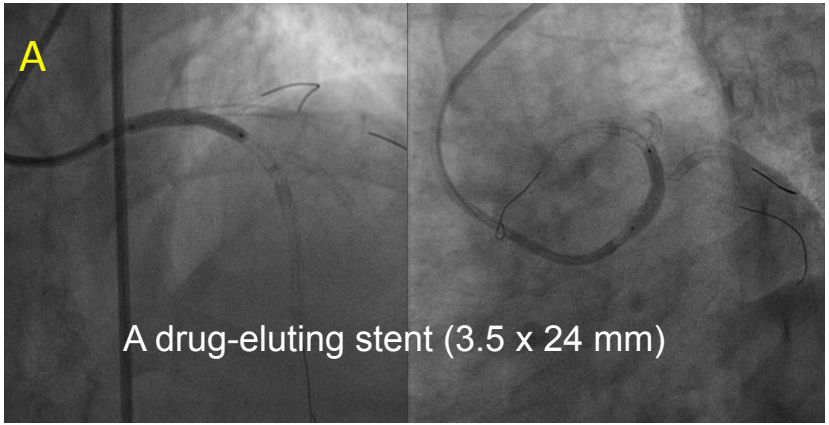


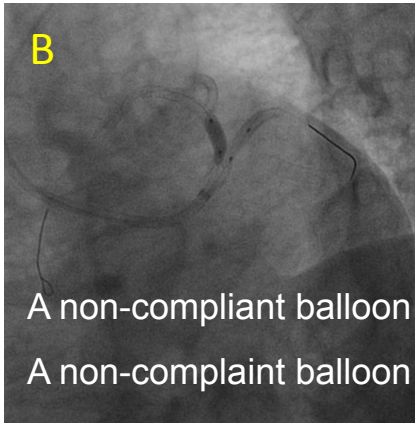
A Trek balloon (3.0 x 15 mm) for LM-OM

A Mini Trek balloon (2.5 x 20 mm) for LM-LCX

Kissing balloon for LAD-OM and OM-LCX bifurcation was done to open the stent struts.

LM-LAD Stent implantation

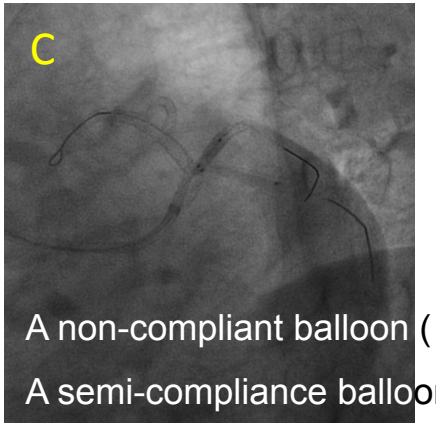




Kissing balloon with
minimal overlapping

A non-compliant balloon (3.5 x 12 mm) at LM-LAD

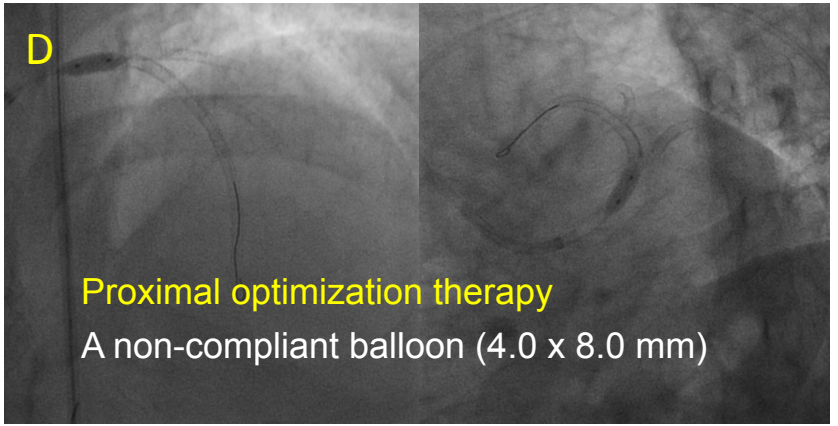
A non-complaint balloon (3.0 x 12 mm) at LM-OM



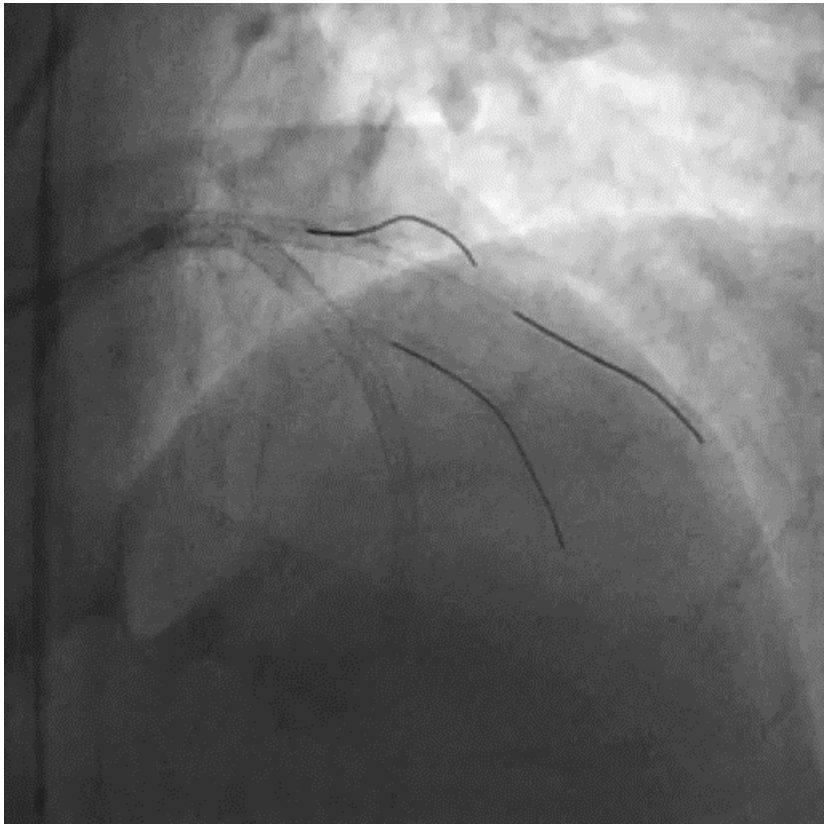
Kissing balloon with
minimal overlapping

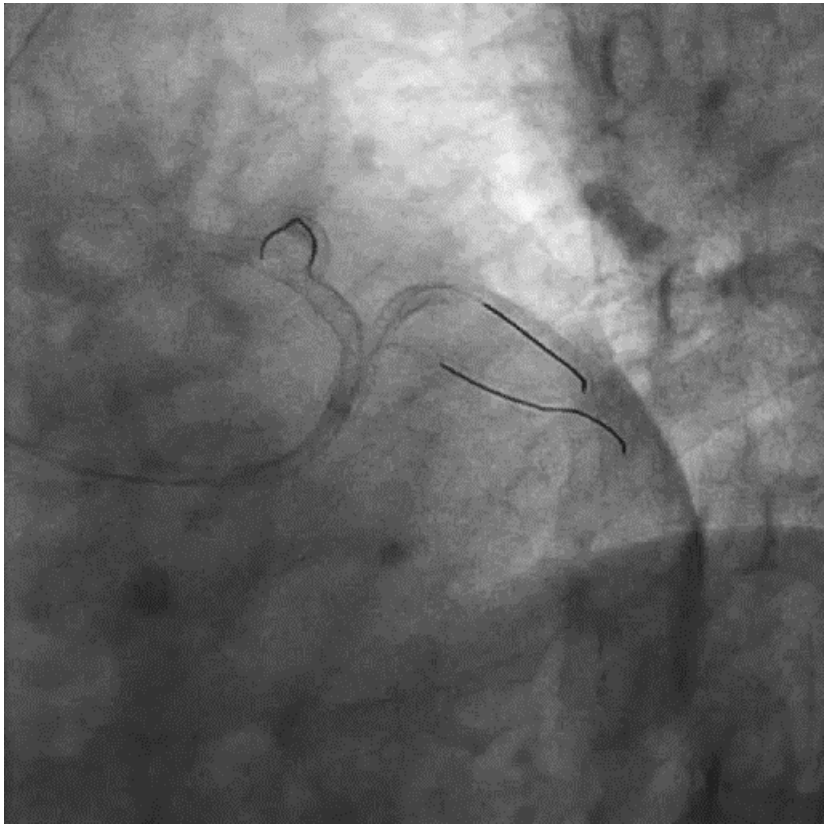
A non-compliant balloon (3.0 x 12 mm) at LM-OM

A semi-compliance balloon (2.5 x 20 mm) at LM-LCX

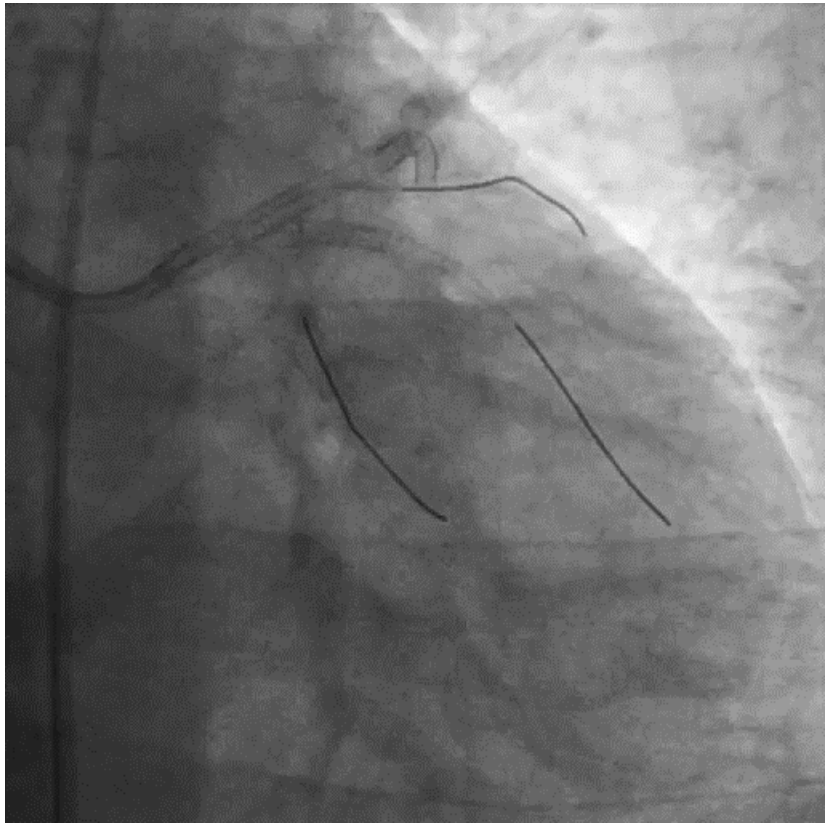


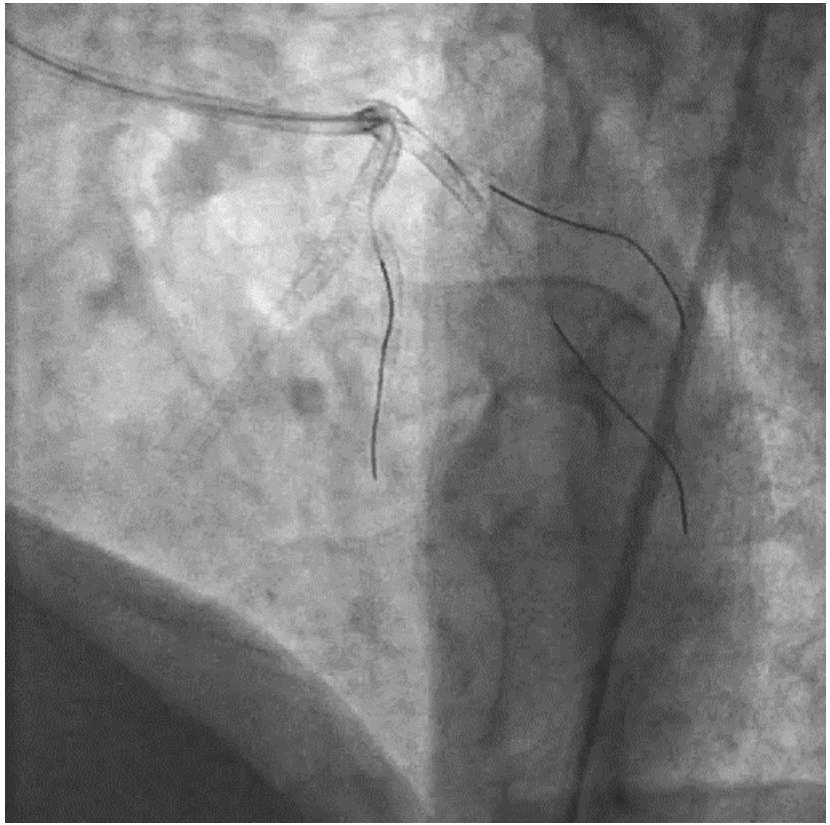
Final angiography



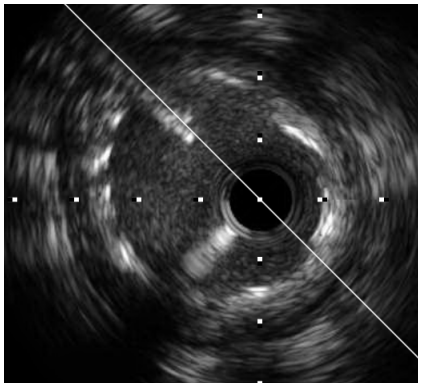


Final angiography

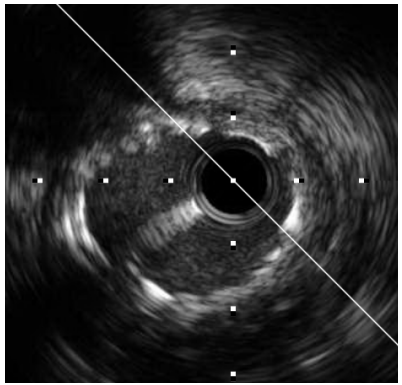




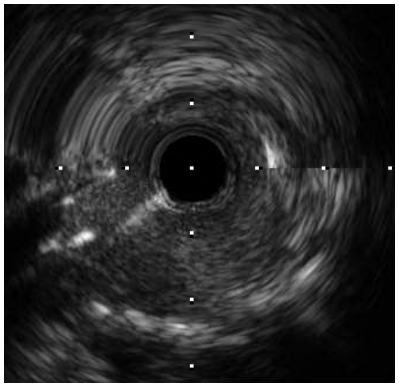
Final IVUS



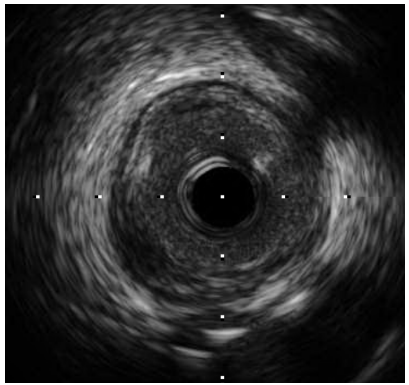
Left main



LAD ostium

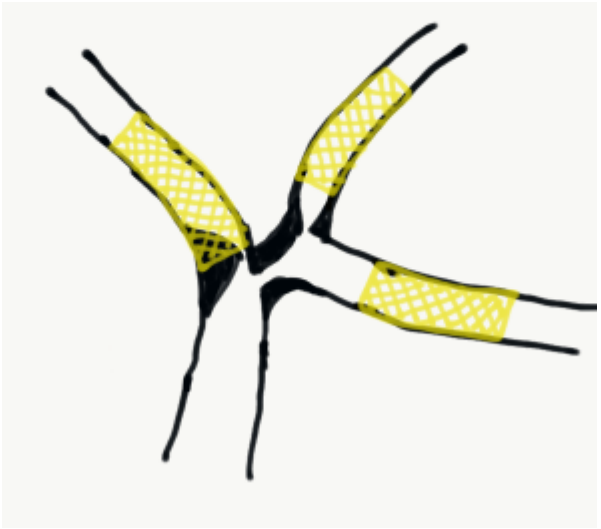


LCX & OM ostium

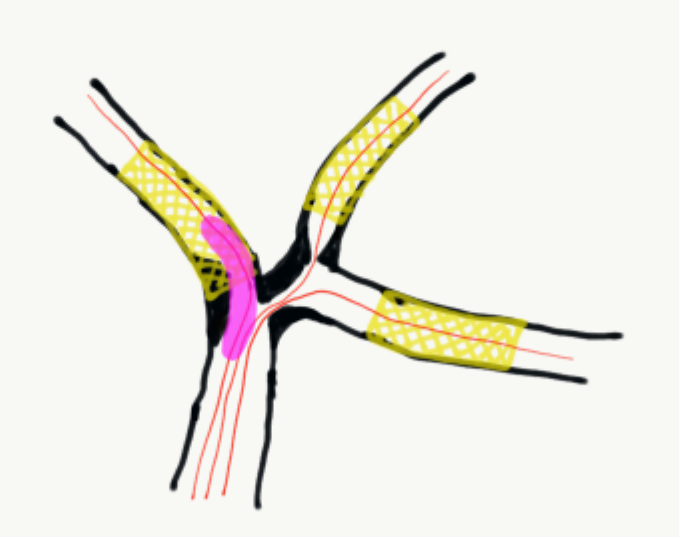


Proximal LCX

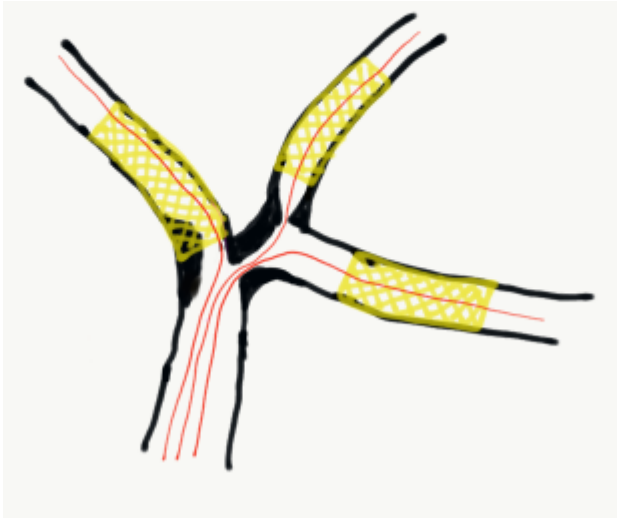
Summary of PCI procedures



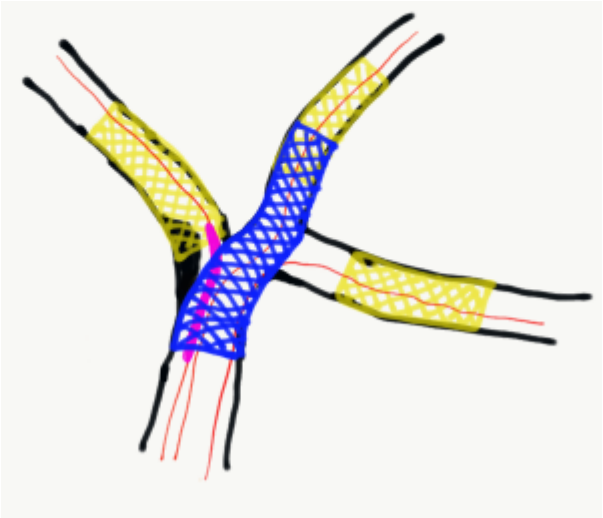
Three vessels wiring



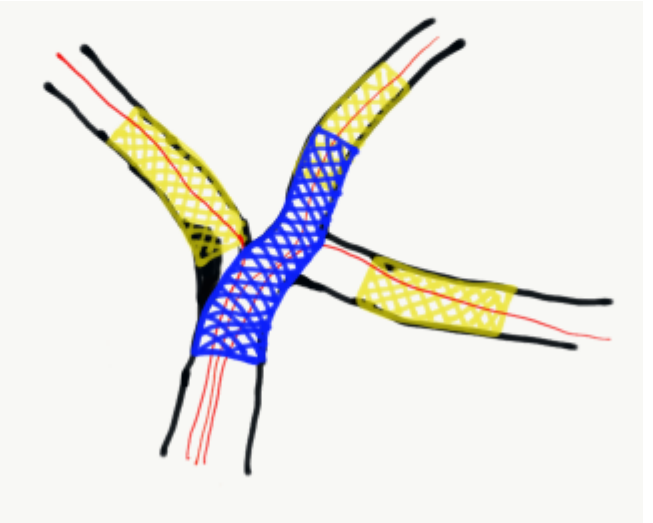
Predilatation with undersize balloon for IVUS & to increase LAD flow



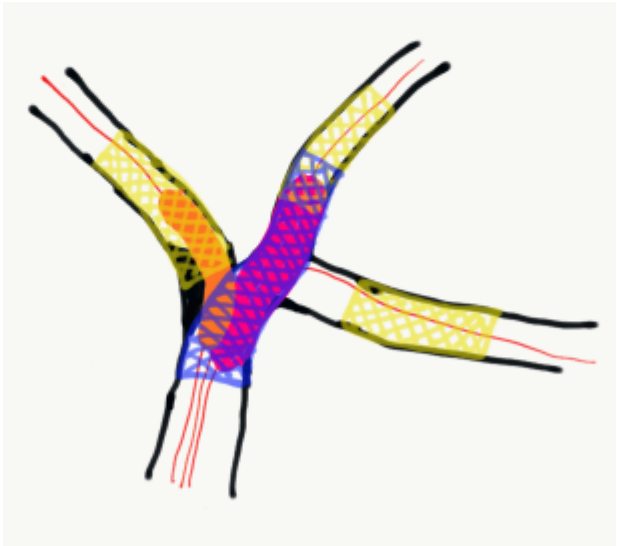
Increase in LAD lumen



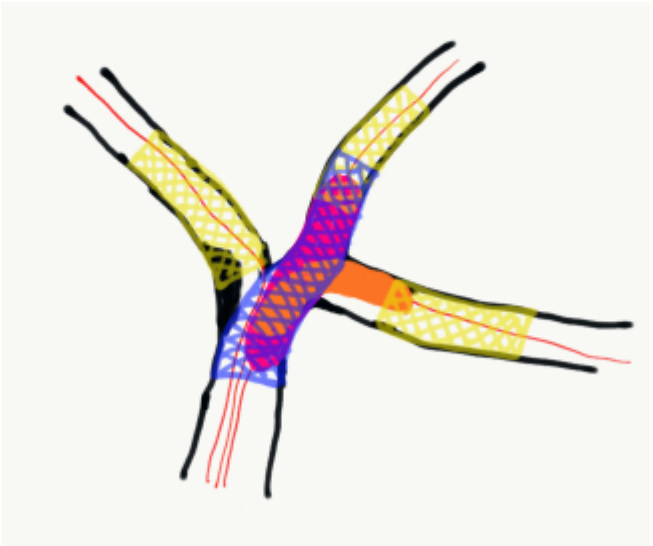
Implantation of LM-OM stent with jailed balloon in LAD for protection



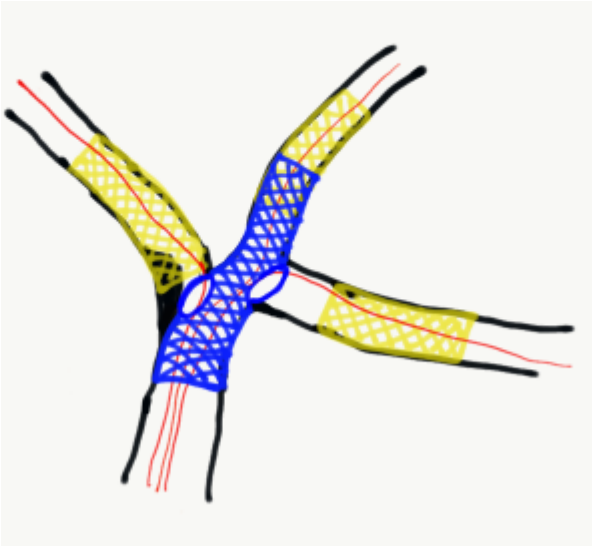
Rewiring LAD and LCX with assistance of double-lumen catheter



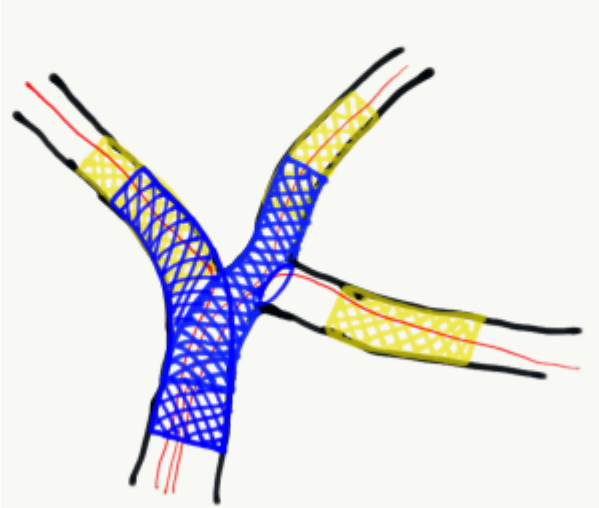
Kissing balloon technique to open stent strut



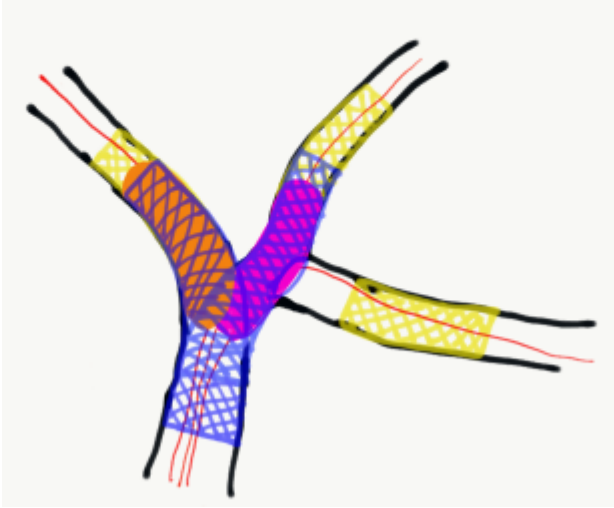
Kissing balloon technique to open stent strut



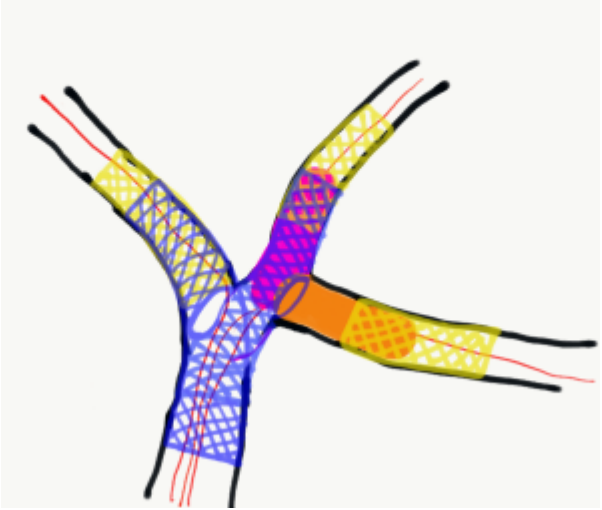
Stent strut opening towards LAD and LCX



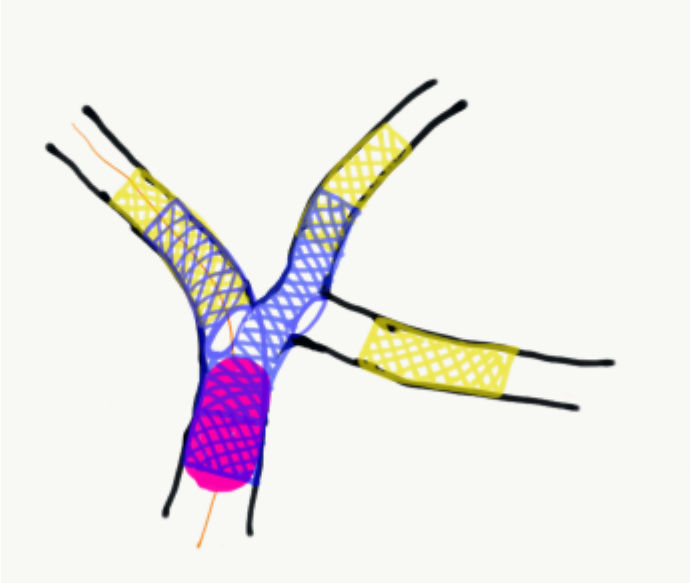
Implantation of LM-LAD stent and rewiring of OM



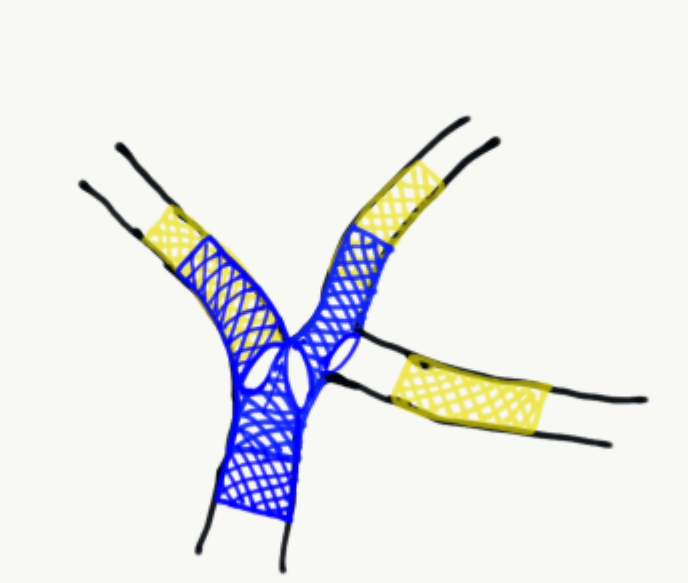
Kissing balloon technique for LAD and OM, then LCX rewiring



Kissing balloon technique for OM and LCX

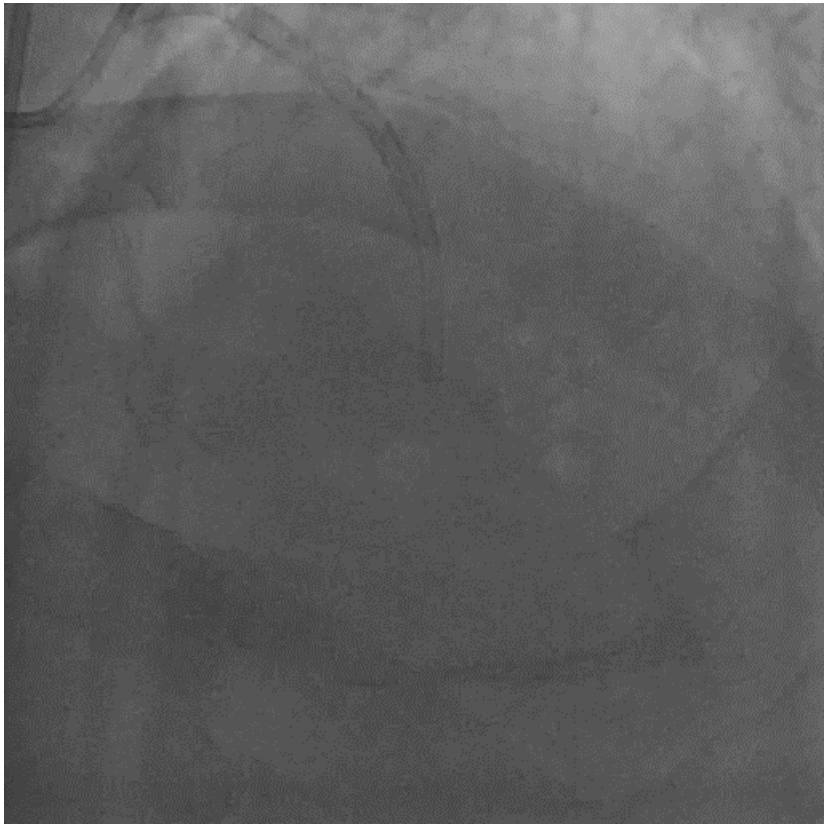


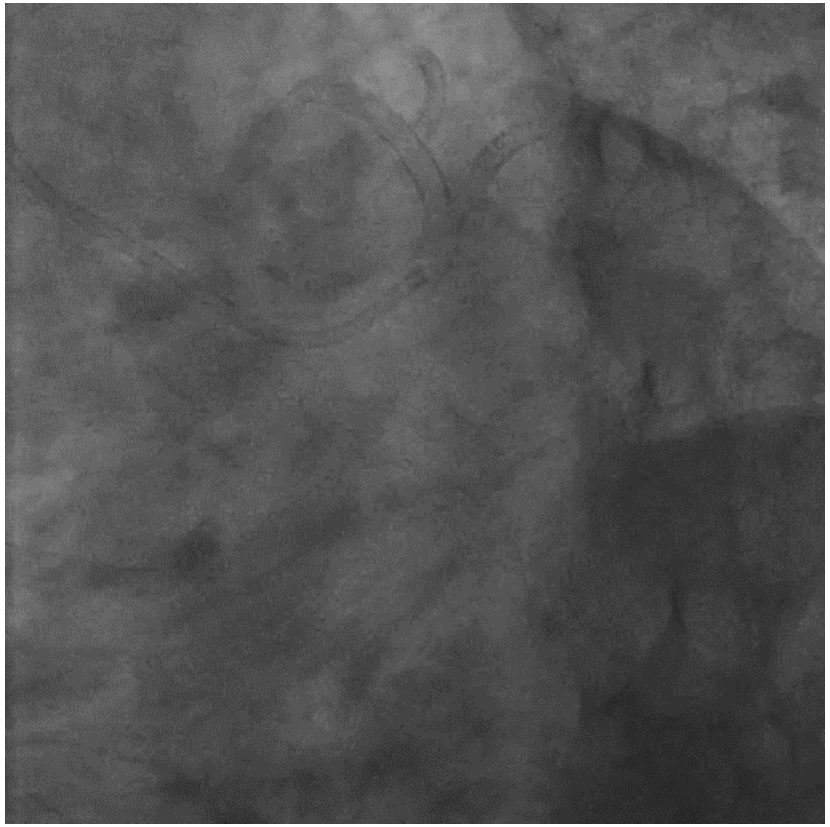
Proximal optimization treatment for left main artery



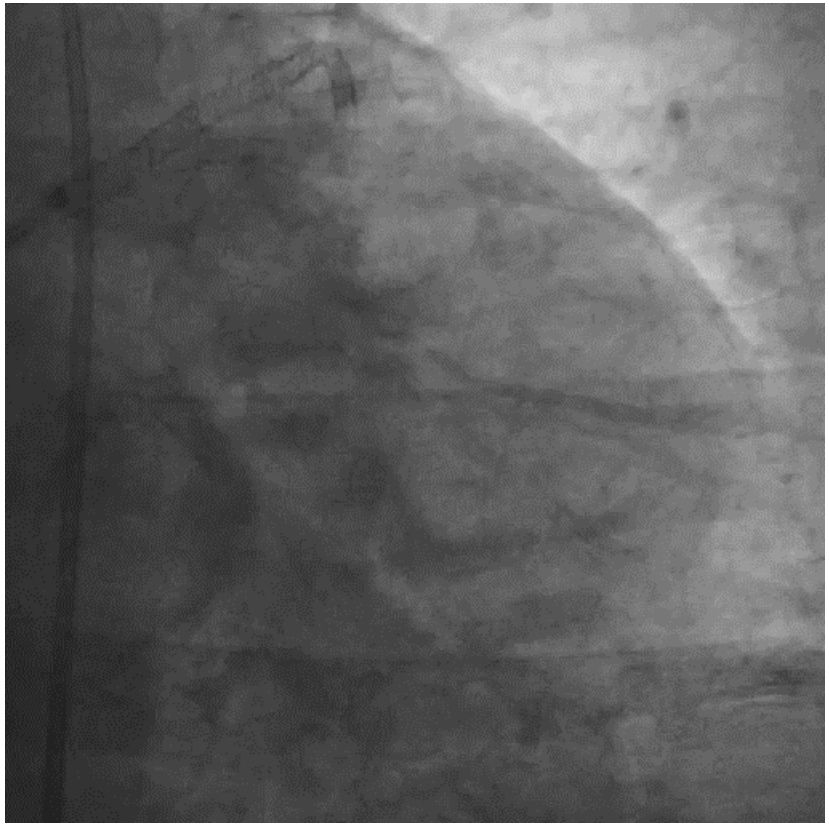
Final results

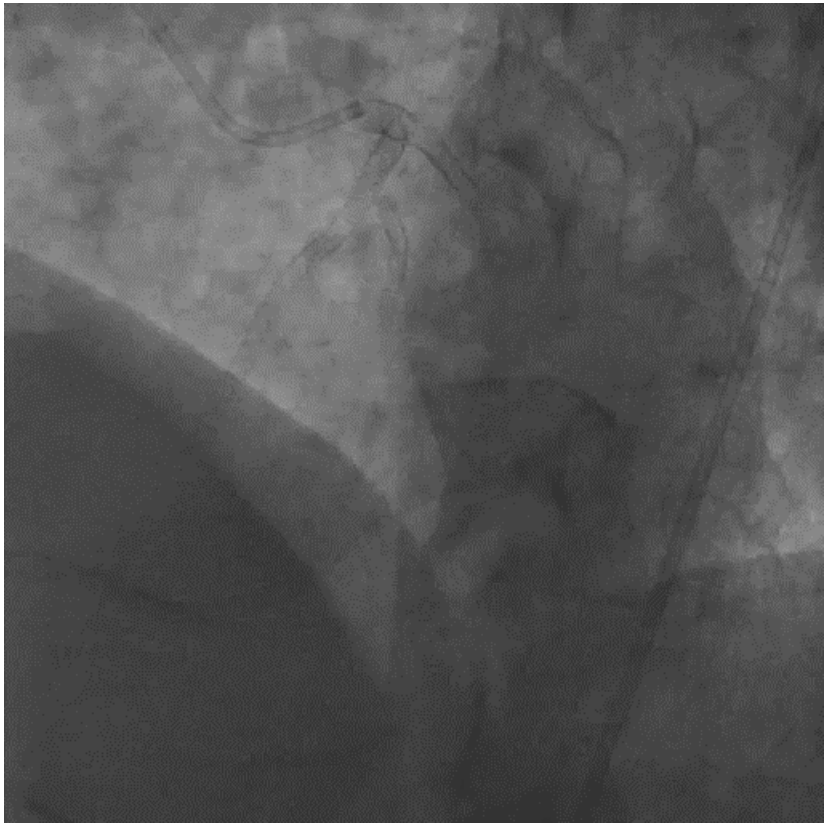
4-year follow-up coronary angiography





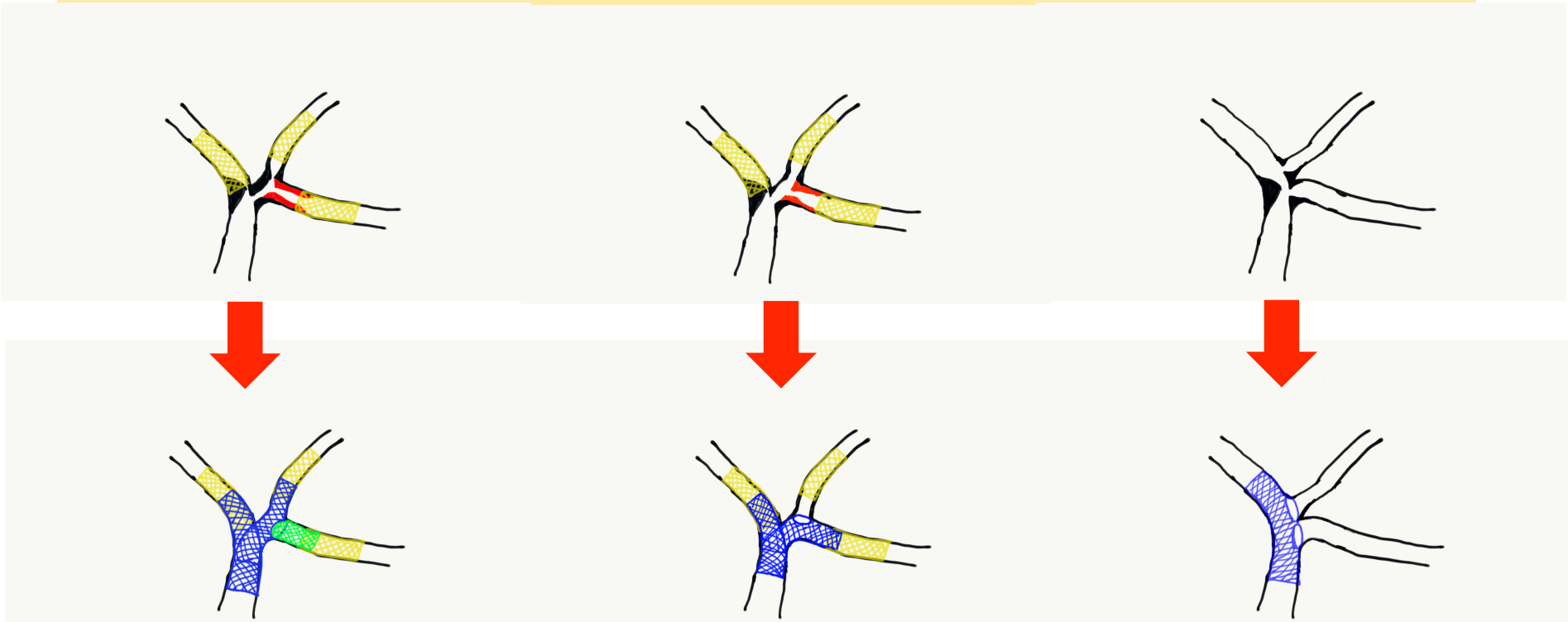
4-year follow-up coronary angiography





Take Home Messages

1. Percutaneous coronary intervention (PCI) for left main trifurcation lesion is challenging. No one-size-fits-all strategy is available



Take Home Messages

2. The choice of treatment strategy is depended on the discrepancy between vessel size, extent of calcification, angle between vessels, etc.
3. To be familial with various PCI techniques, including provisional one stent and two-stent technique as well as the way to protection side branch, is the key to successful PCI for left main trifurcation lesion.

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Culottes technique with assistance of jailed balloon to protect left anterior descending artery during treatment of distal left main trifurcation lesion

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