How to assess and treat LM with multi-vessel disease patient?

: Complex anatomy, more complex physiology, but simple treatment

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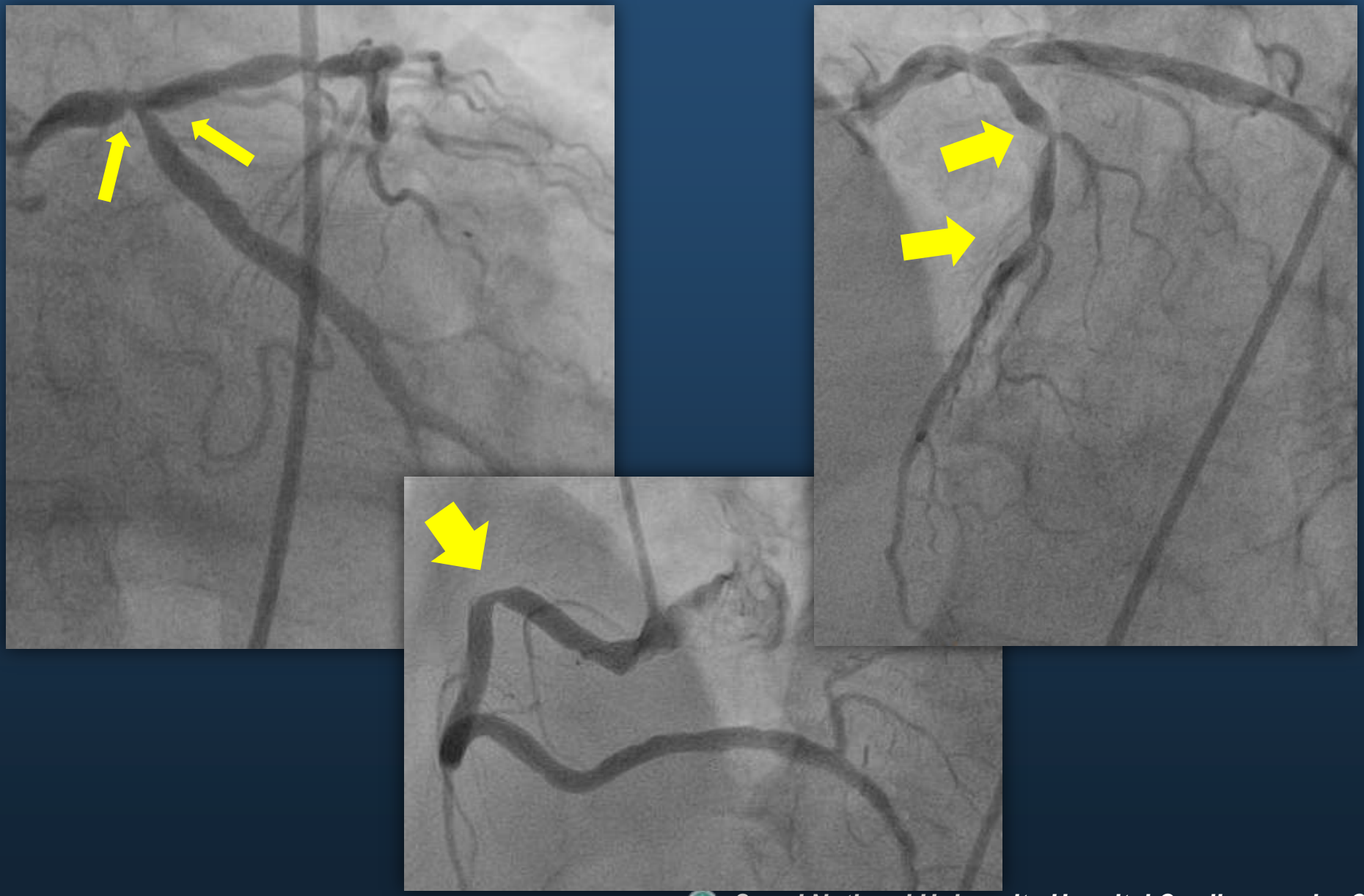
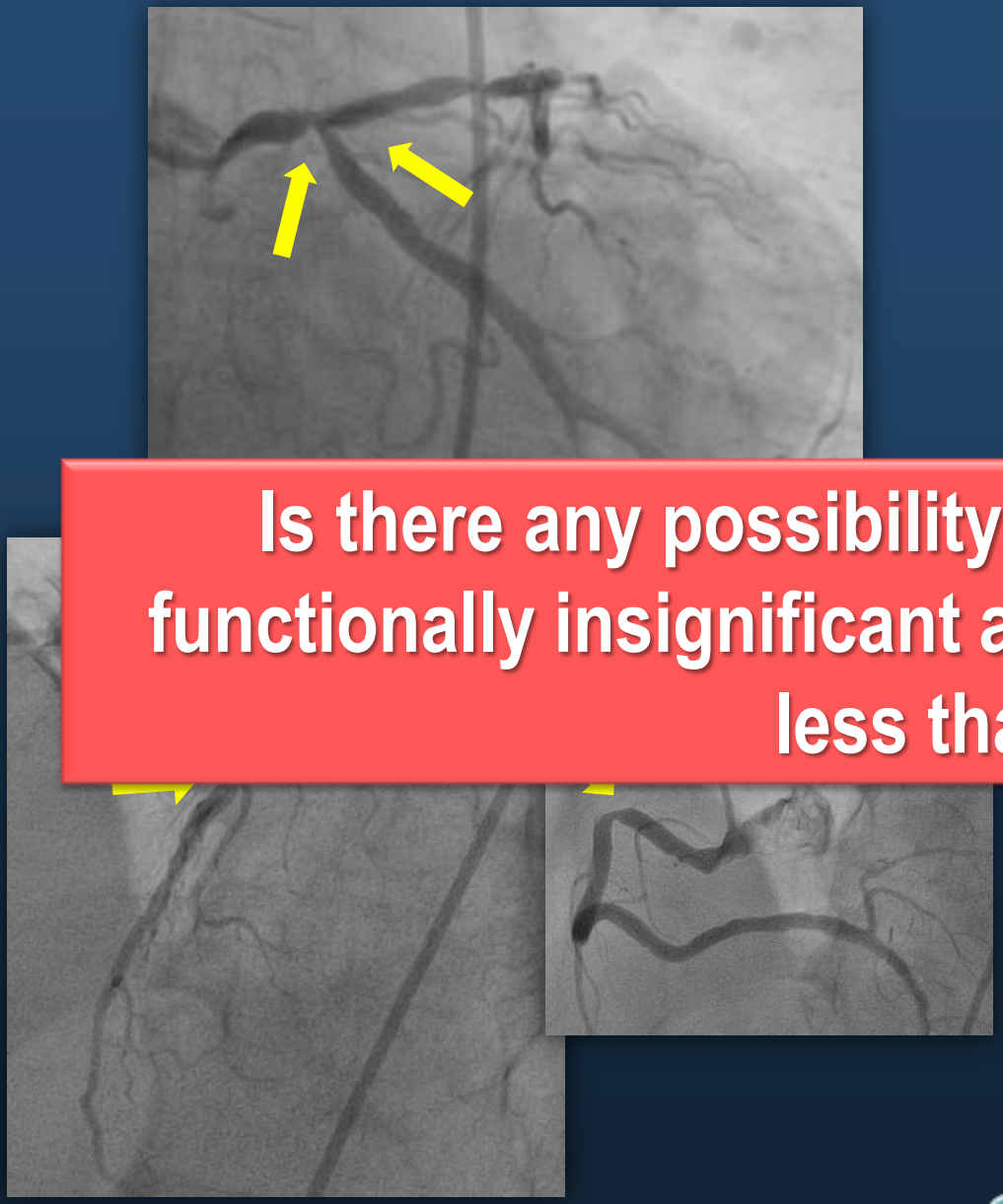
Case

- **Brief history**
  - M/77
  - Chest pain for 2 months
  - CAG at another hospital: CABG was recommended d/t LM with multi-vessel disease, but refused
- **Cardiovascular risk factors**
  - Hypertension (+) on medication
  - DM (+) on medication
  - Dyslipidemia (+) on medication

Coronary Angiography



Therapeutic Strategy: CABG vs. PCI?



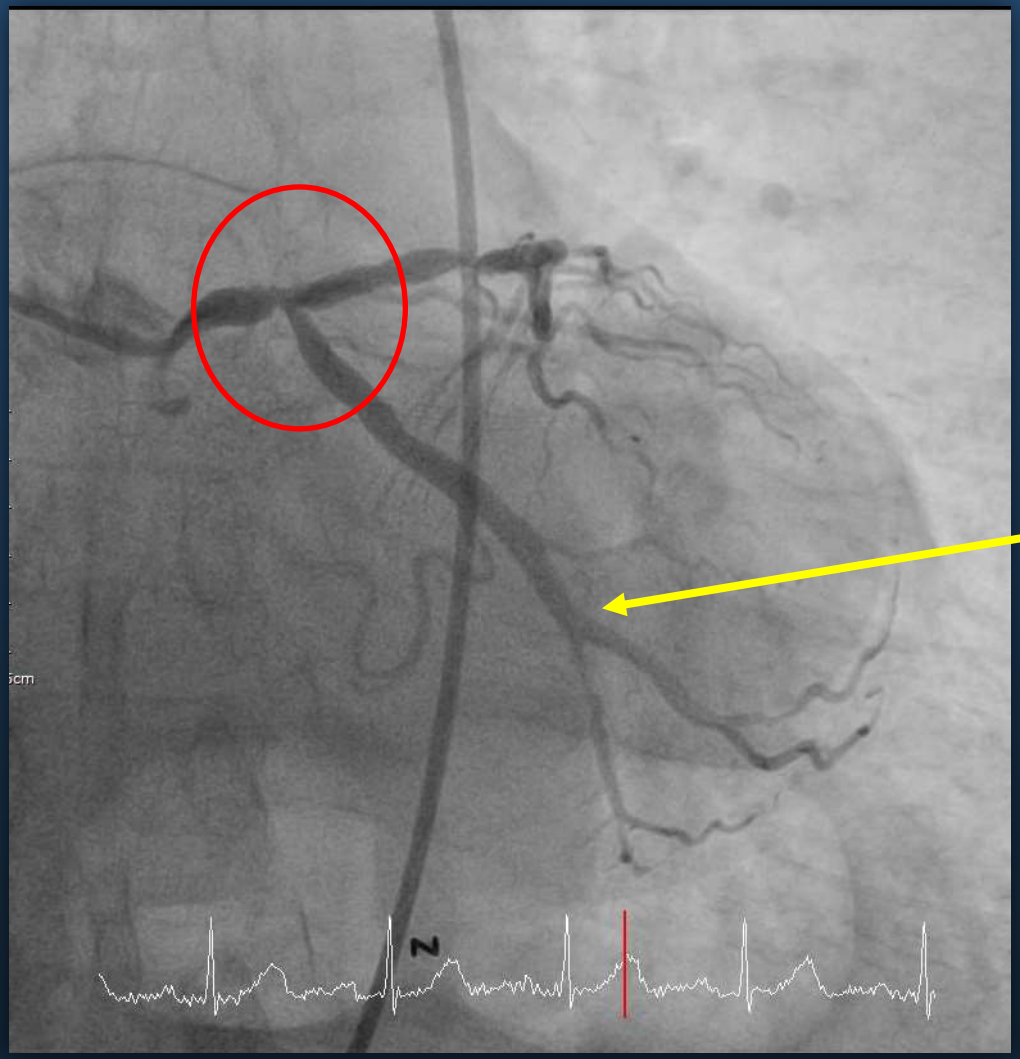
M/77, Diabetes

- Left Main disease

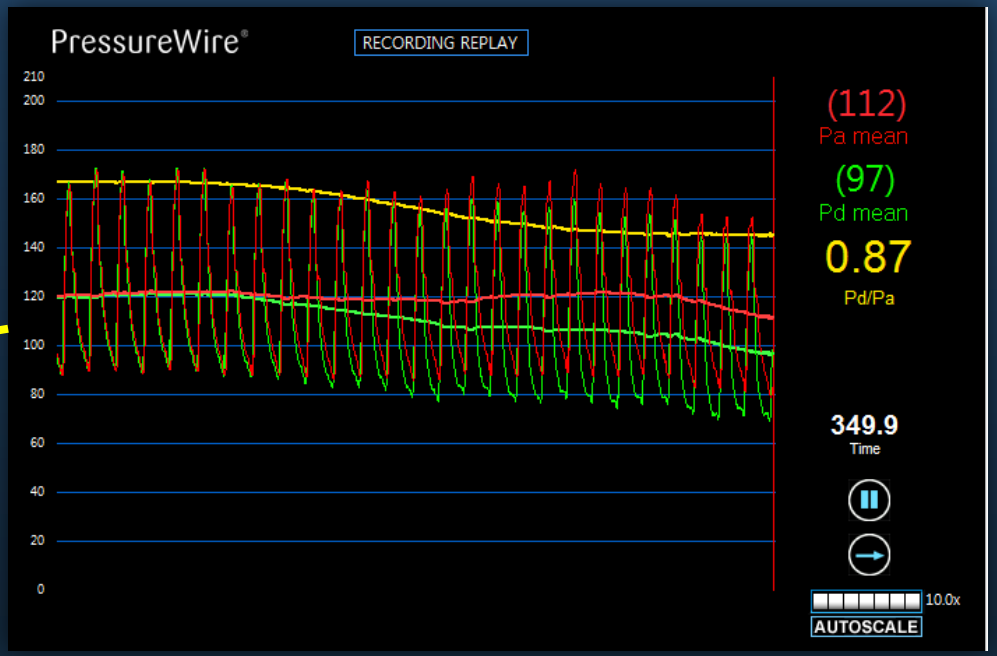
Is there any possibility that some lesions are functionally insignificant and SYNTAX score can be less than 35?

→ SYNTAX score 35!

Does this lesion require stenting?



FFR at LCx = [LM + LCX] FFR

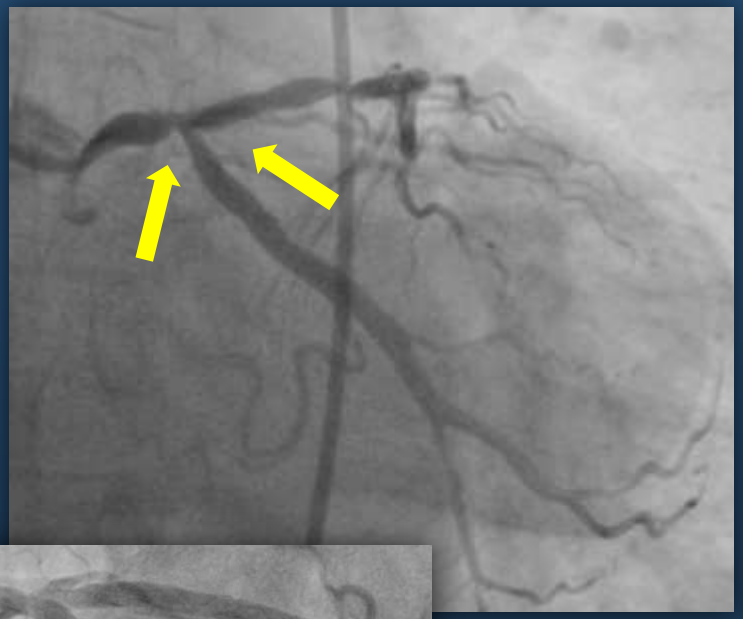


LCx FFR : 0.87

Does this lesion require stenting?

RCA FFR : 0.85

Therapeutic Strategy: CABG vs. PCI?

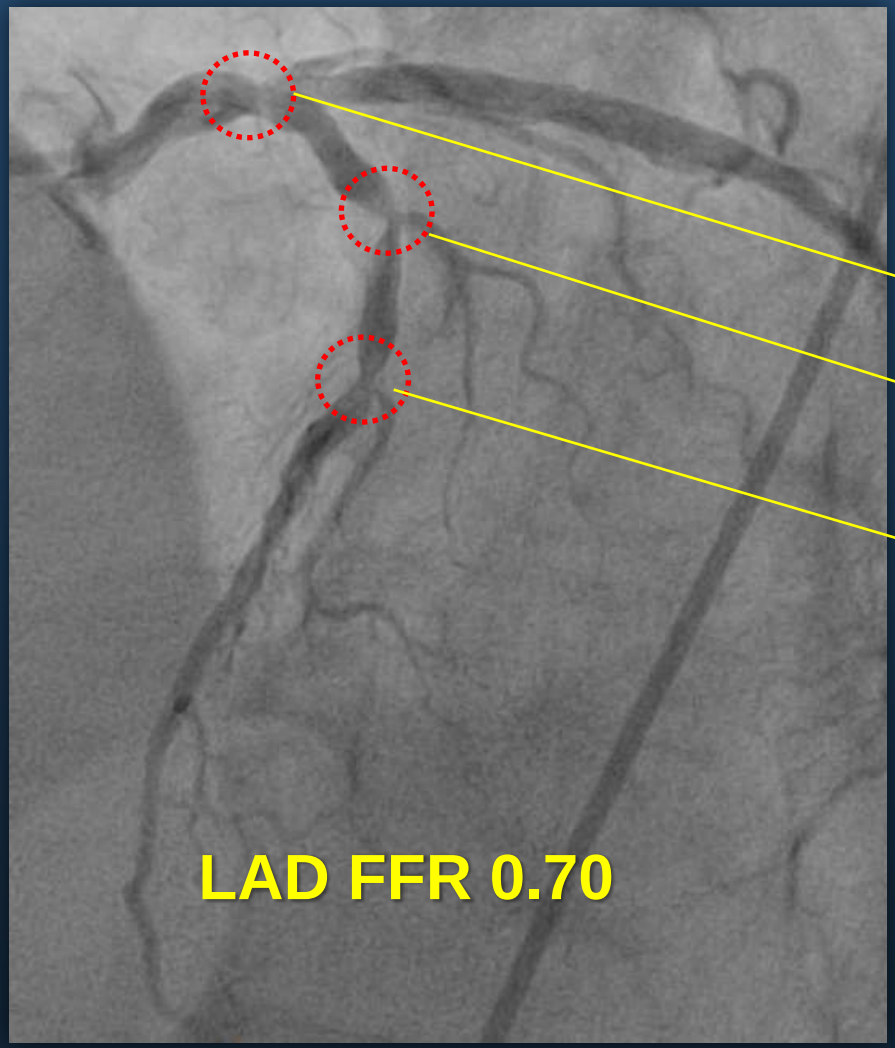


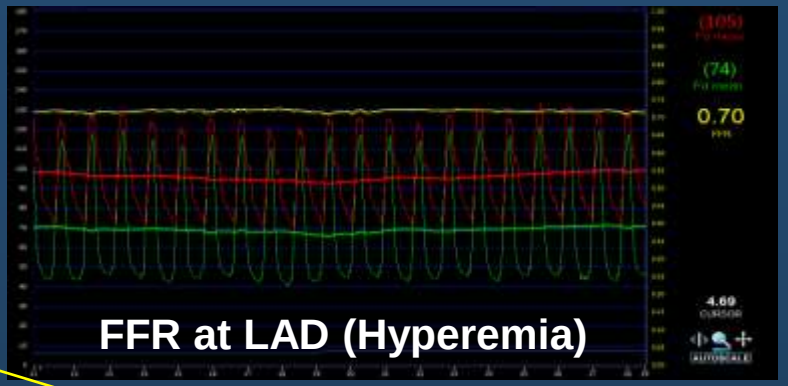
- ~~Left Main disease~~
- Multiple LAD stenoses
- ~~LCX os lesion~~
- ~~Proximal RCA stenosis~~

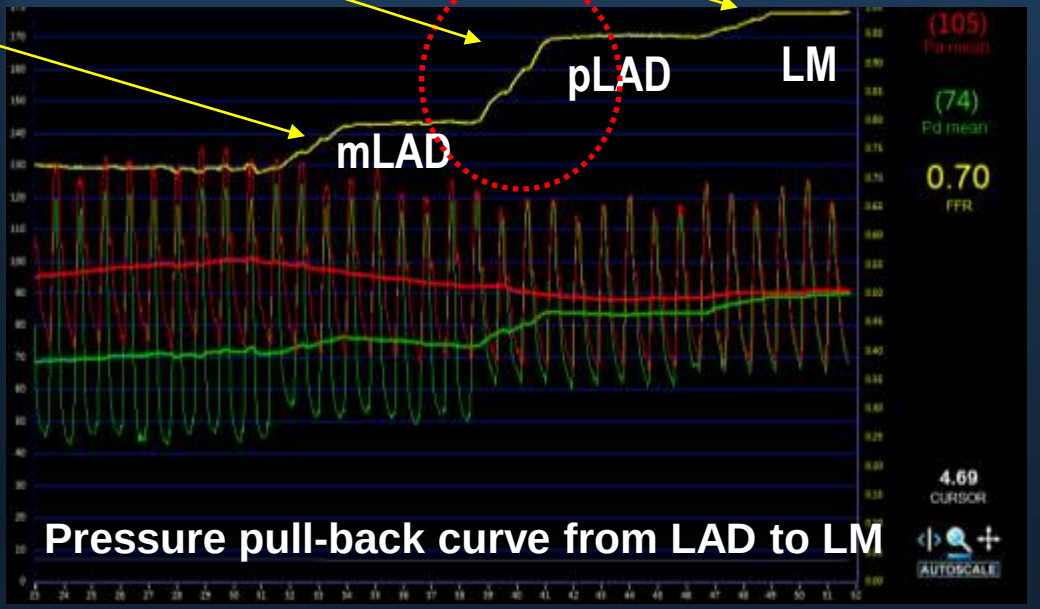
~~SYNTAX score 35!~~

Functional SYNTAX score 14!

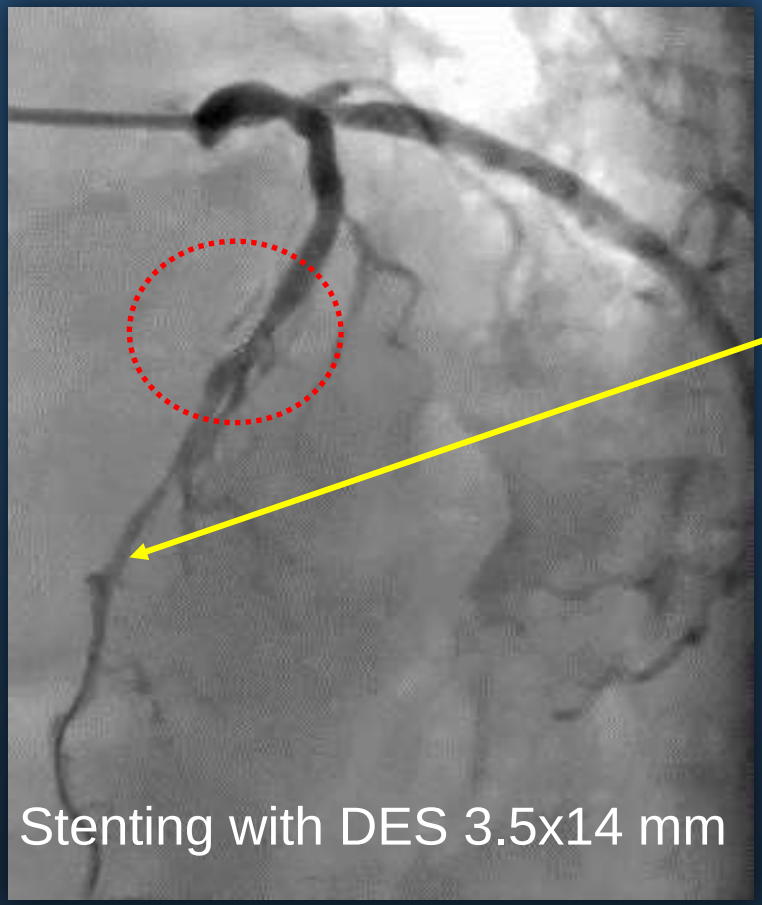
How to evaluate and treat serial stenoses in LAD

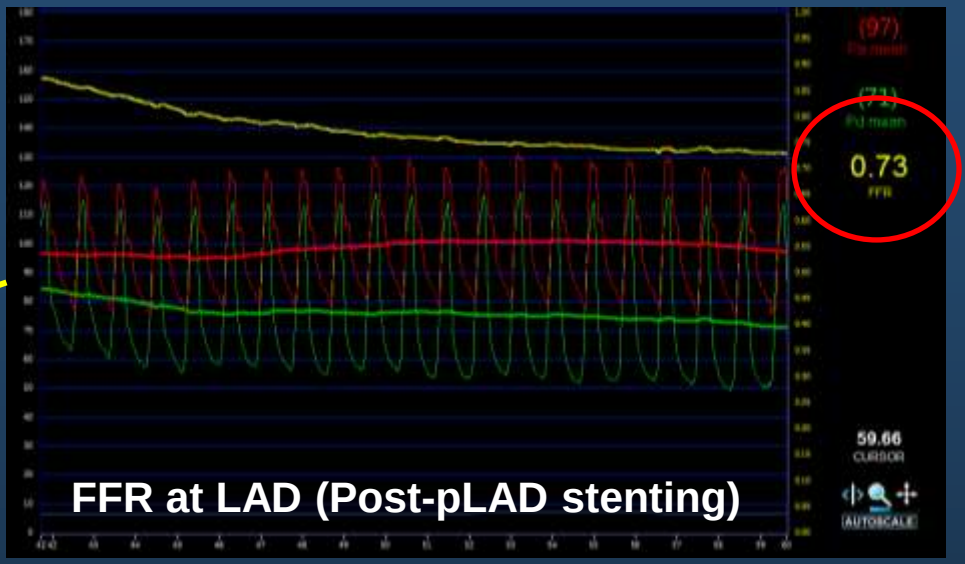




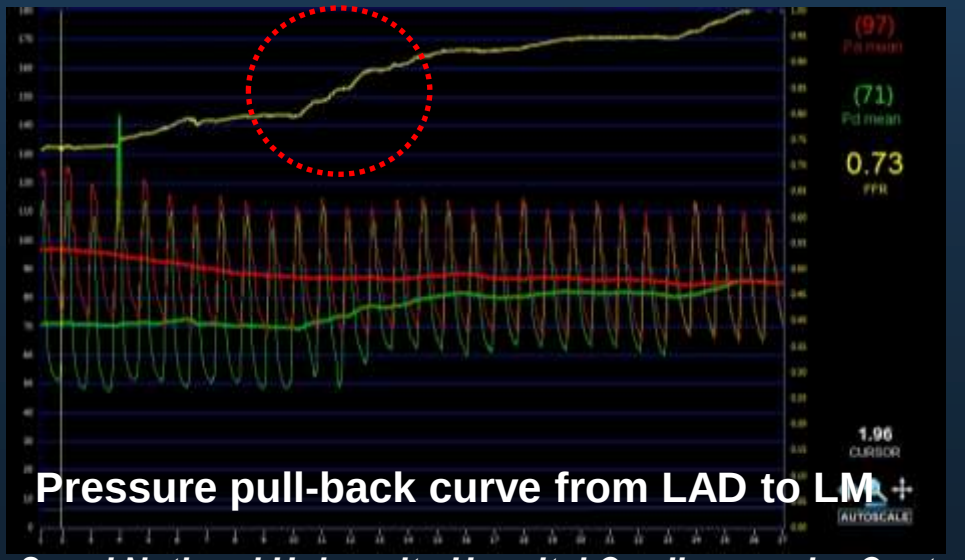


Is this satisfactory? Angiographically yes, but…





FFR at LAD (Post-pLAD stenting)

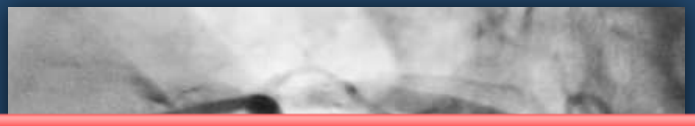


Pressure pull-back curve from LAD to LM

PRE and POST pLAD PCI

FFR 0.70 → 0.73

Pre and Post PCI



Functional Assessment by FFR

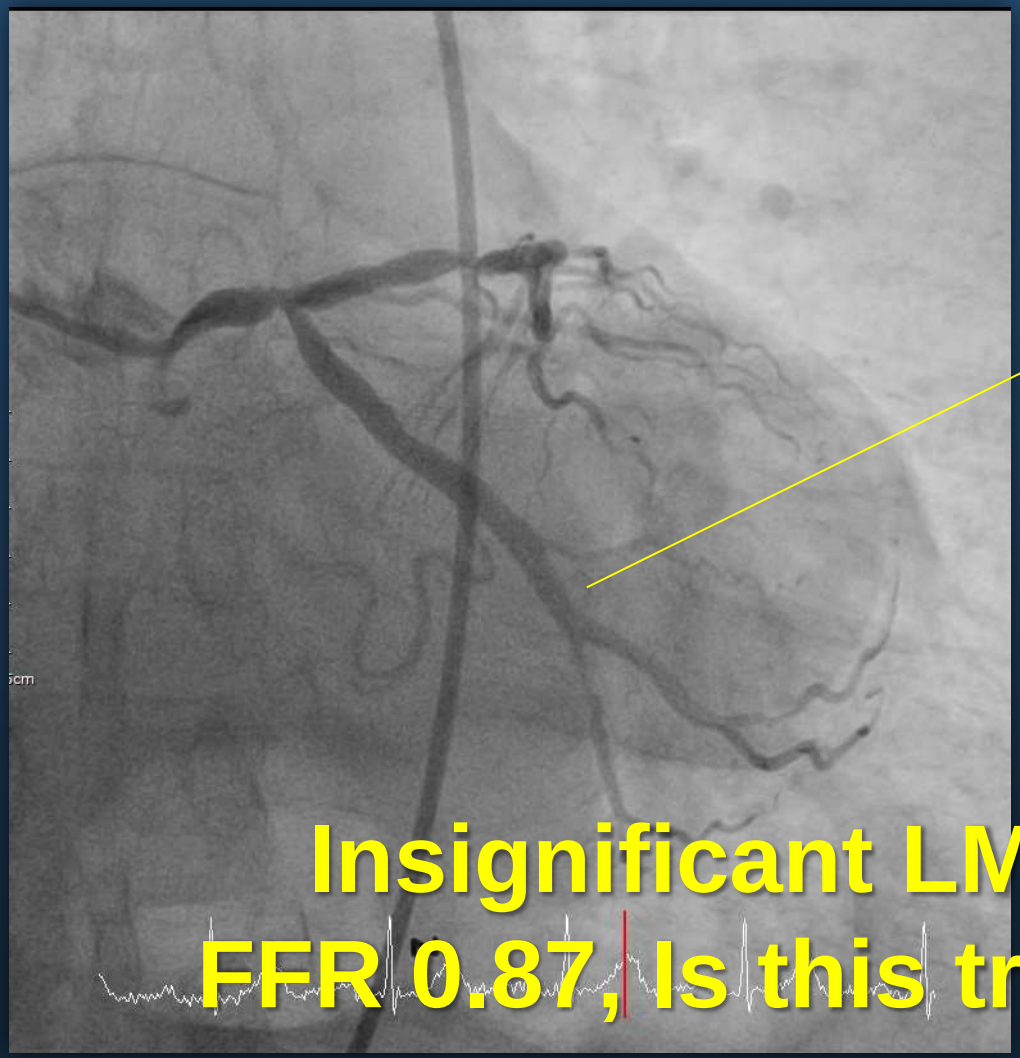
- FFR changed the risk profile
- Post stent FFR measurement revealed the residual ischemia.

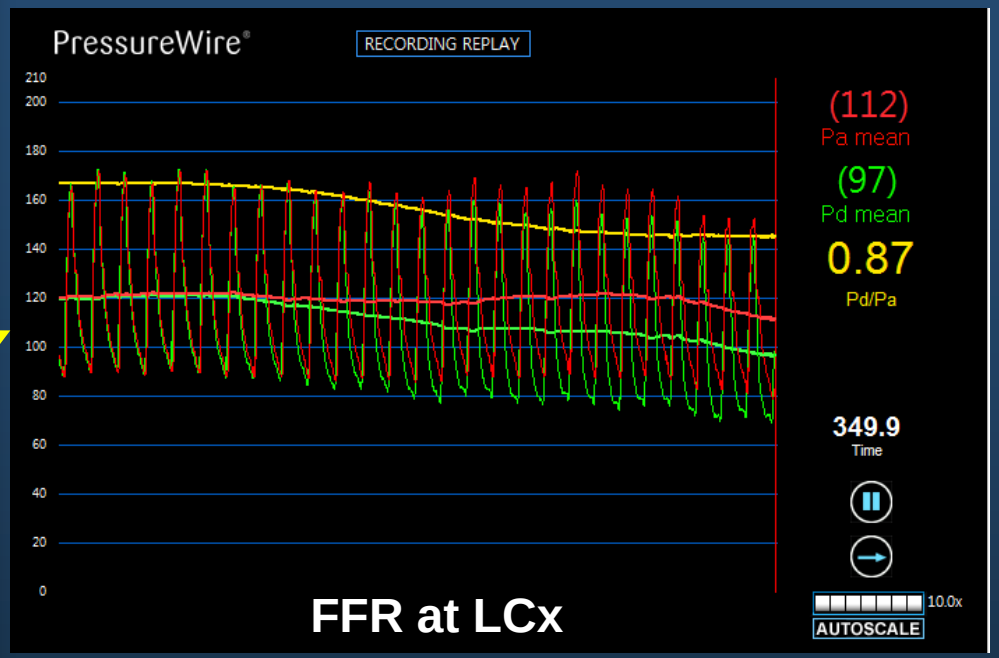
Is this the end of this story?

PRE and POST LAD FFR

0.70 → 0.73→ 0.86

FFR at LCx = LM + LCX FFR

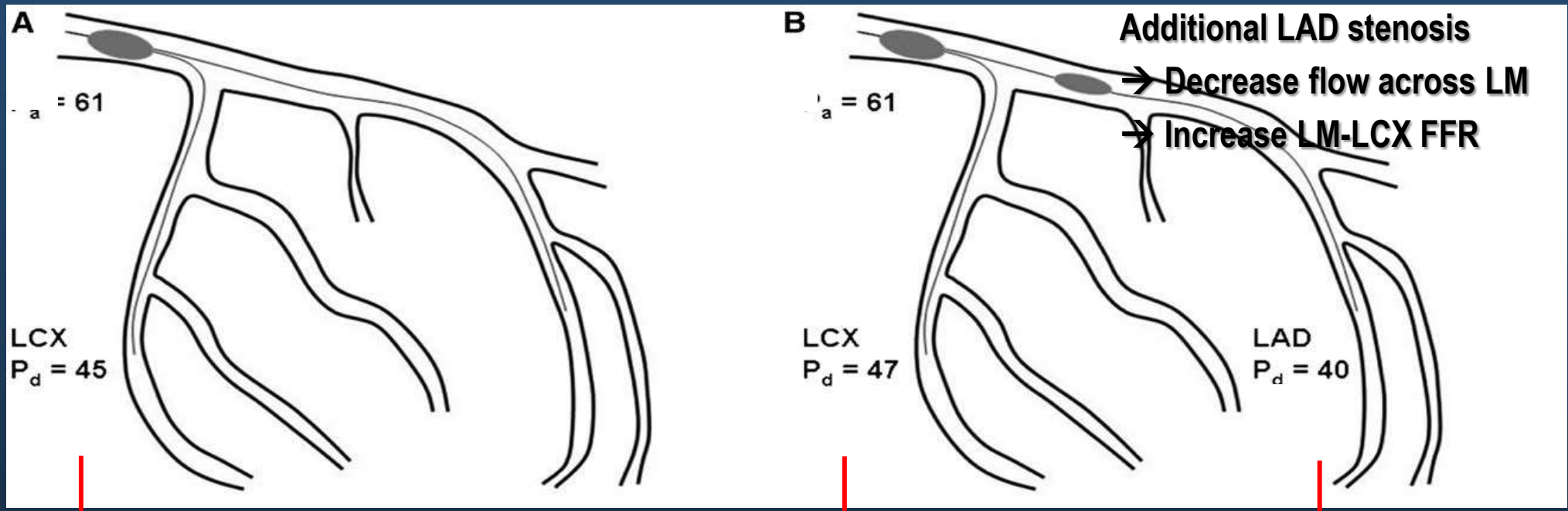




Insignificant LM/LCX disease?
FFR 0.87, Is this true LM/LCX FFR?

FFR of LM stenosis

Influence of LAD stenosis on LCX FFR



LCX FFR = 45/61 = 0.74

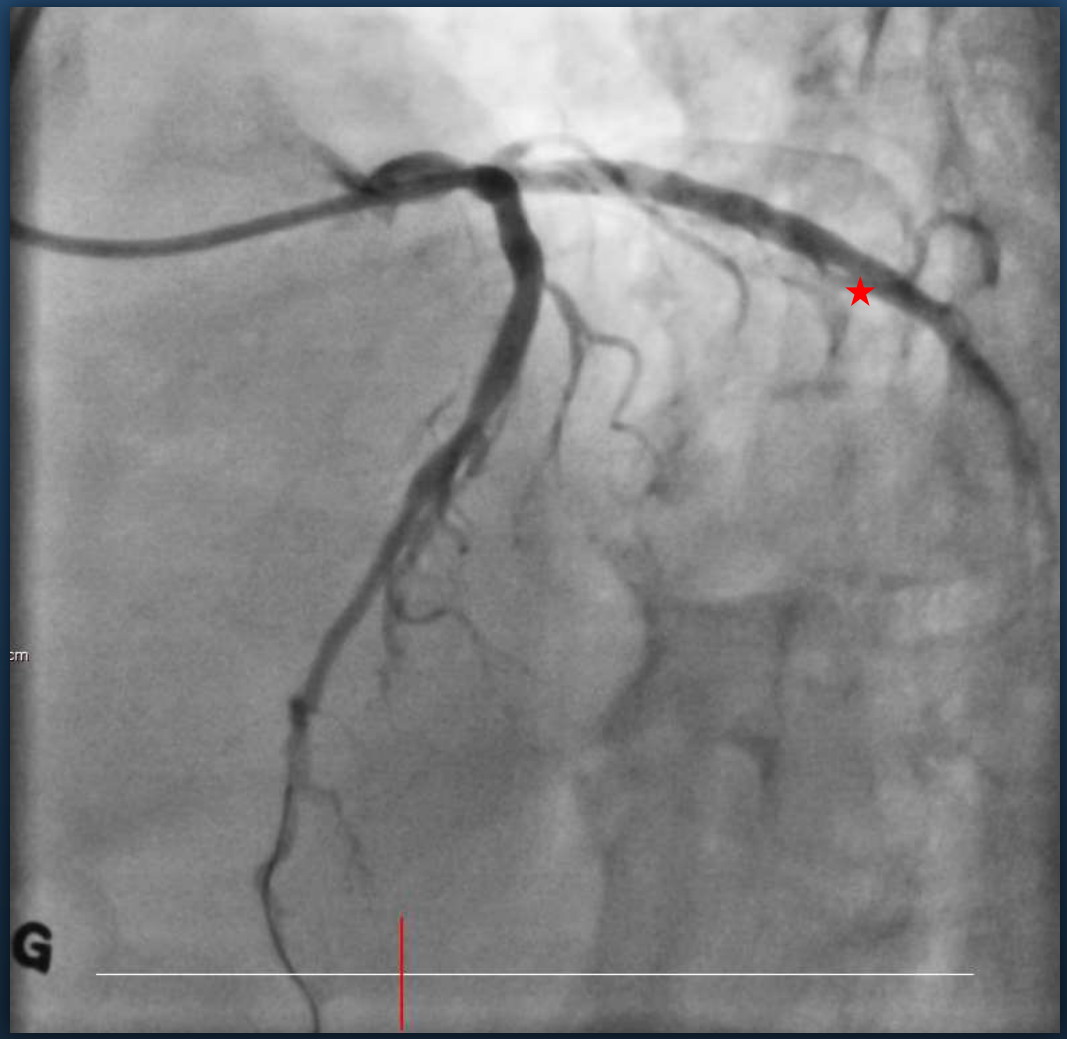
LCX FFR = 47/61 = 0.77

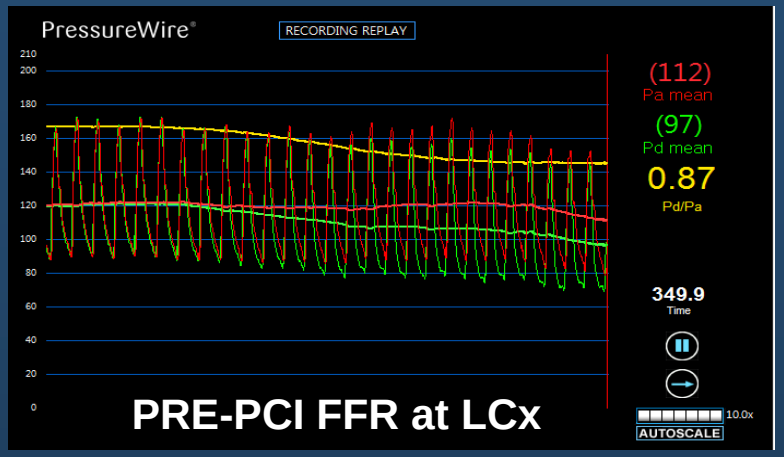
LAD FFR = 40/61 = 0.66

Additional LAD stenosis increases LCX FFR. However, clinically significant change occurs only when LAD stenosis is <u>proximal and severe.</u>

Yong et al. Circ Cardiovasc Interv. 2013;6:161-165.

What will be LM/LCX FFR after LAD stenting?



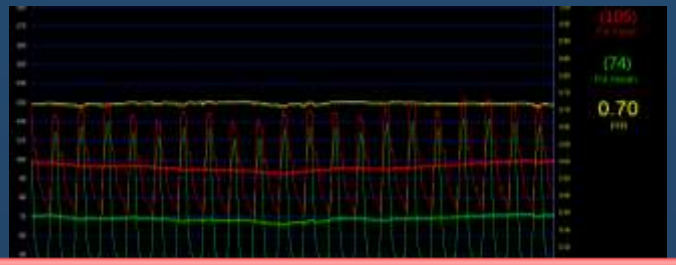


PRE and POST LCx FFR

0.87 → 0.84

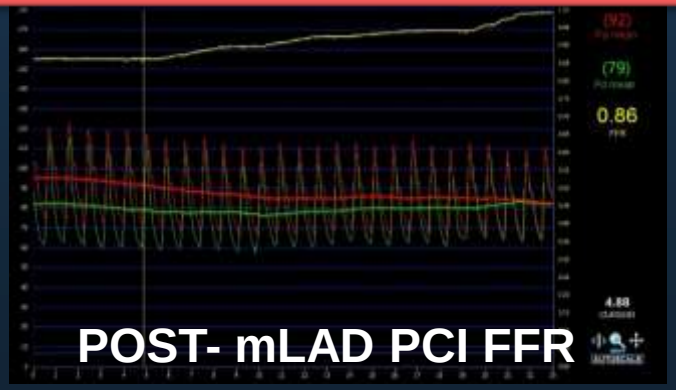
FFR-guided LAD PCI

:FFR and pullback → Stent → FFR and pull back → Stent → FFR

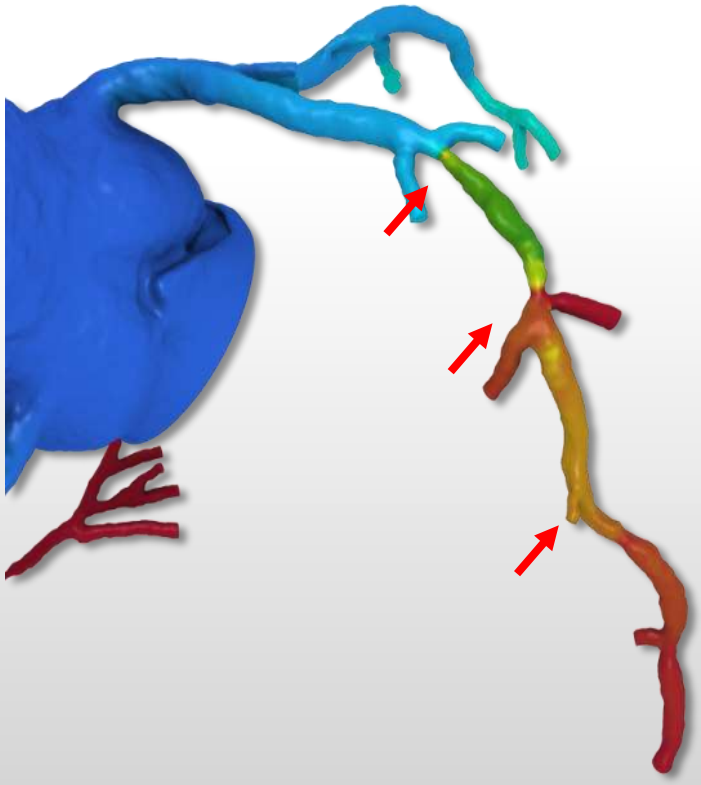


Our life can be simpler and easier and the lesion could have been treated with one long stent

if we can assess the functional significance of each lesion before the procedure.

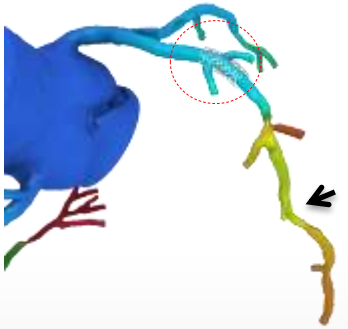


Treatment planning using virtual stenting and CT-derived computed fractional flow reserve (FFR_{CT})



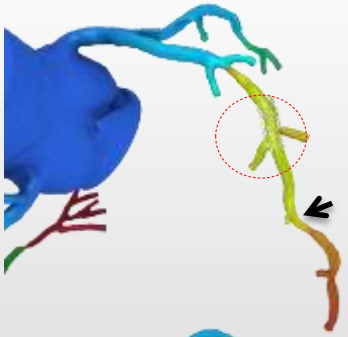
FFR_{CT} 0.72

Stent proximal lesion only



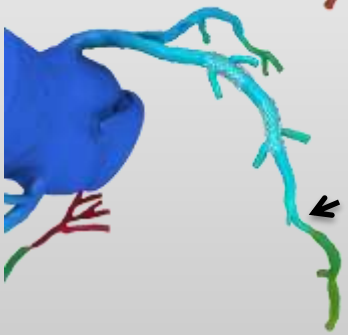
0.76

Stent mid lesion only



0.74

Stent both



0.86

Kim KH, Koo BK, et al. JACC intervention 2013

Take home message

- In patients with LM and multi-vessel stenoses, FFR-guided intervention can change the treatment strategy and reduce unnecessary complex PCI and CABG.
- However, application of FFR to this complex lesion is not easy. Adequate understanding of coronary physiology, skillful stepwise procedures and precise interpretation of the results of each steps are required.
- Clinical application of virtual stenting and FFR_{CT} may help planning the treatment strategy before the invasive procedure.