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in Multi Vessel Disease

Cardiovascular center

Kim Hee jun RT



Definition

One vessel disease

Presence of at least one stenosis $> 50\%$ in 1 major coronary arteries (LAD, LCx, RCA or their major side branches)

Multi vessel disease

Presence of at least one stenosis $> 50\%$ in *at least 2* major coronary arteries (LAD, LCx, RCA or their major side branches) and/or in the left main stem



MVD : “What’s in a name”

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- 1. Anatomically

- 2 or 3 vessel disease ?
- Left main stem involvement ?
- Number of stenosis ?
- Lesions complexity ? (bifurcations, CTO, calcifications, ...)

- 2. Functionally

Which are the “significant” stenoses that need to be treated?



Role of Pressure Wire

- Intermediate or ambiguous coronary lesion
- Multi-vessel coronary artery disease
- Multifocal (tandem) lesion
- Diffuse long lesion
- Bifurcation lesion
- Non-culprit lesion in ACS
- In-stent restenosis lesion
- Microvascular dysfunction
- Post-procedure evaluation
- Risk evaluation in coronary artery disease
- Non-coronary disease evaluation

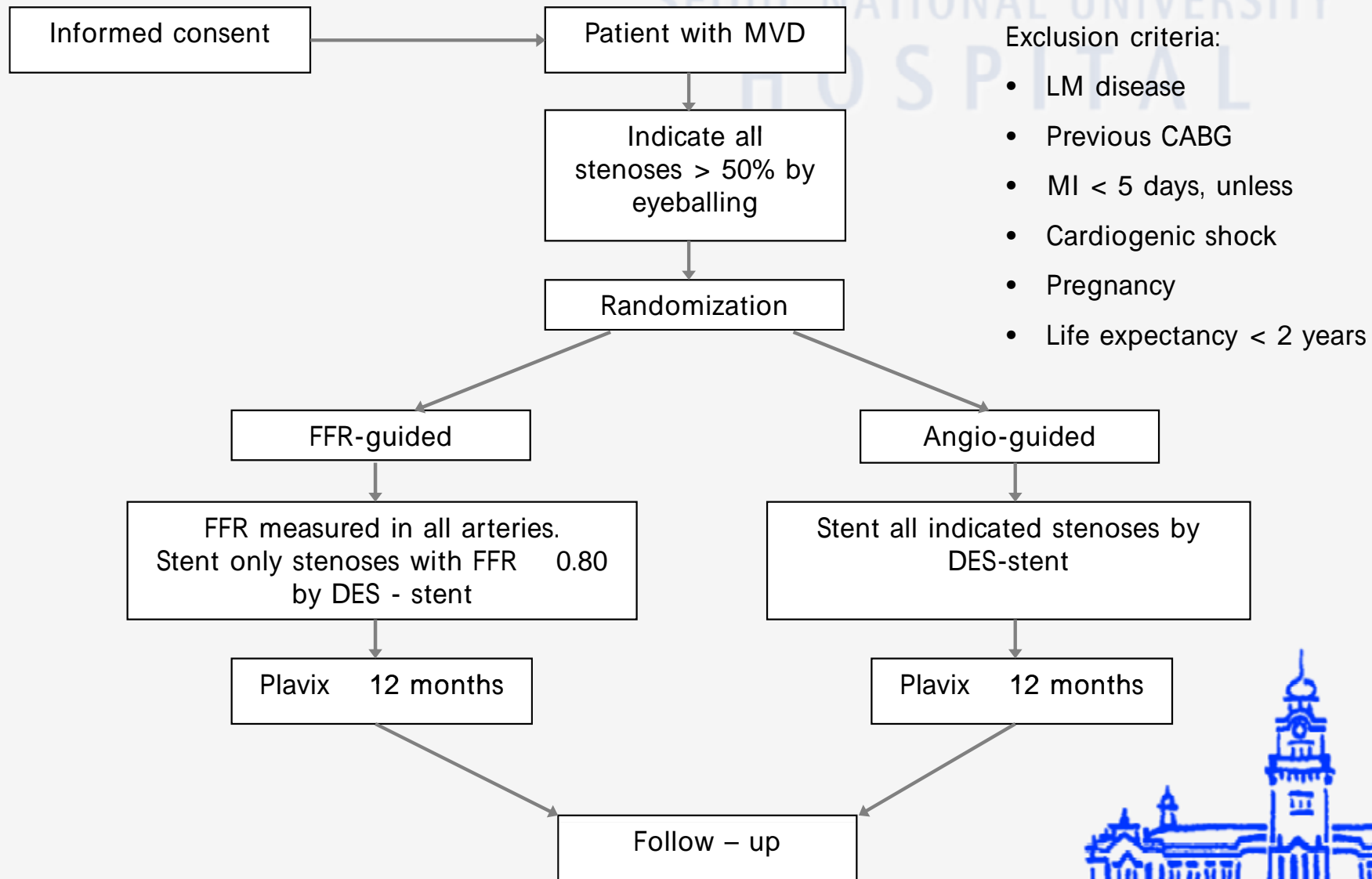


Lesion Specific Factors

- Degree of diameter stenosis
- Reference vessel diameter
(size of myocardium)
- Morphology
- Eccentricity
- Lesion length
- Plaque burden, Plaque rupture
- Surface roughness
- Viscous friction, flow separation, turbulence and eddies



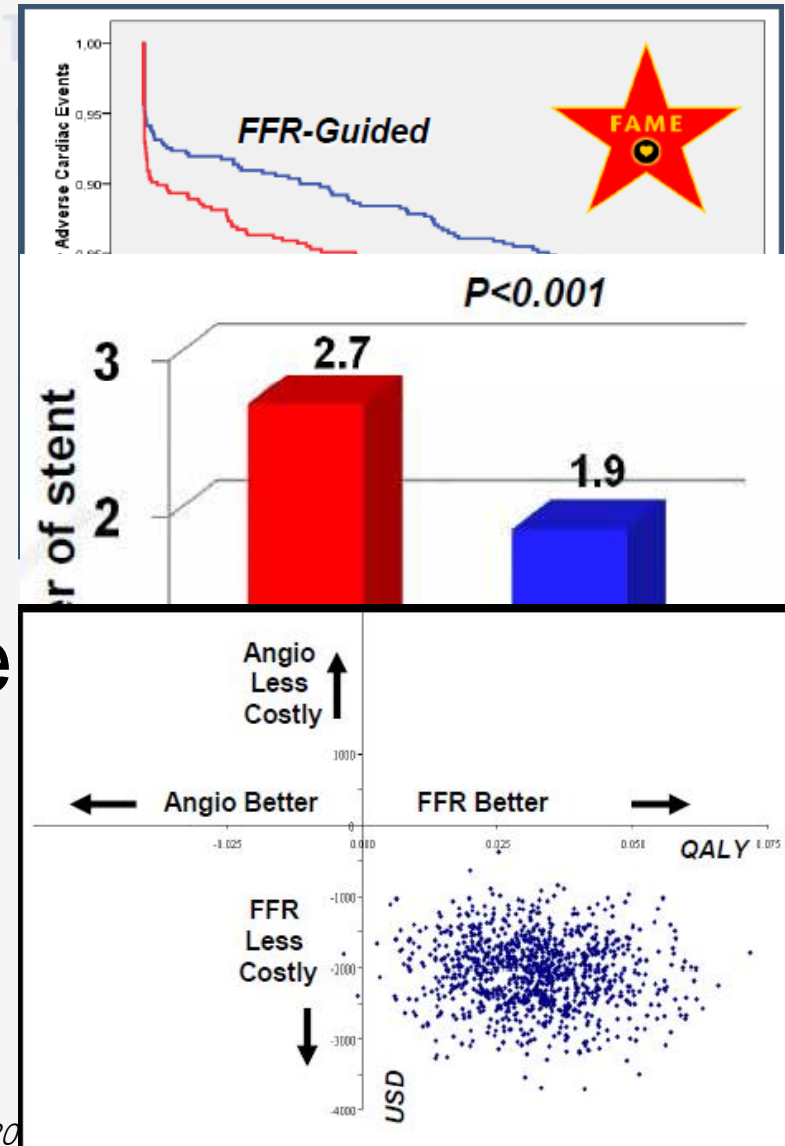
FFR vs Angiography for Multivessel Evaluation



FFR vs Angiography for Multivessel Evaluation

Results

- 1. Improved outcomes
- 2. Decreased cost
- 3. Less contrast use
- 4. Similar procedure time



Tonino PA *New Eng J Med* 2009

Pijl NH, *JACC* 2010;56:177-84

Fearon WF, *Circ* 2010;29

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CASE 1

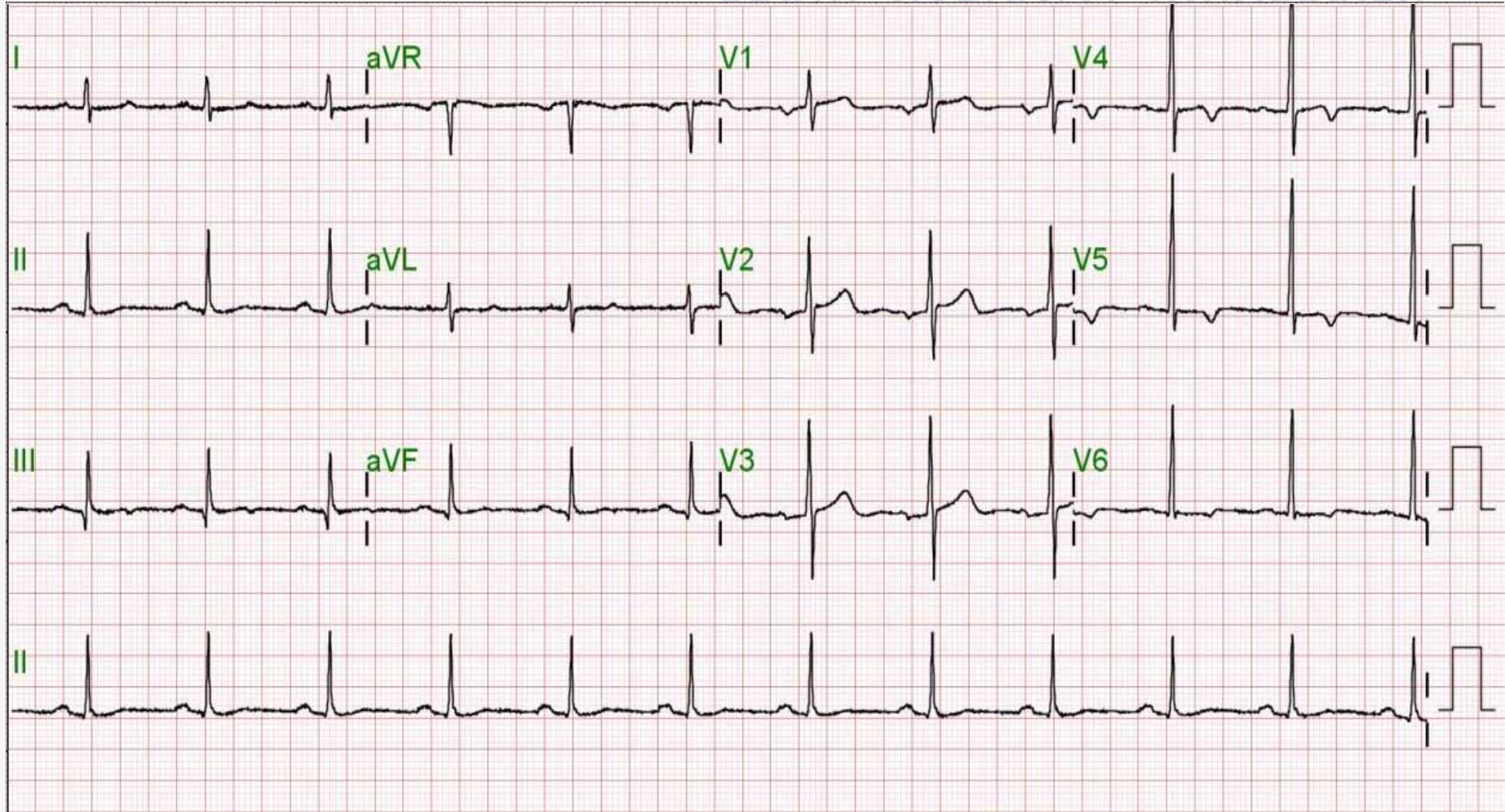


Clinical presentation

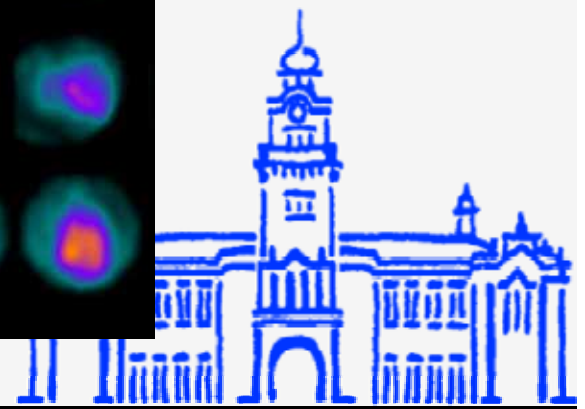
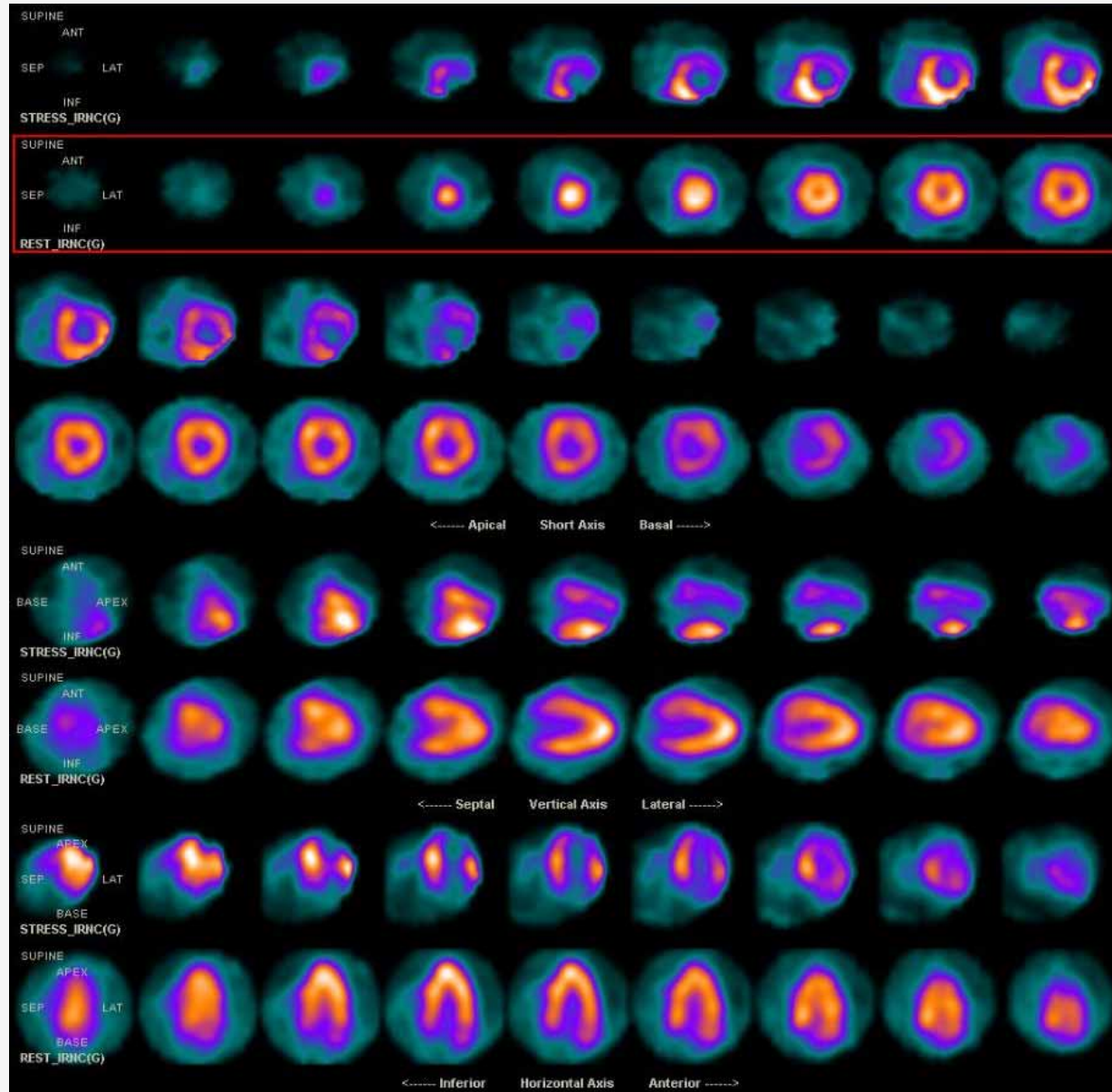
- 74 year-old Female
- C/C : exertional Chest pain
- Risk factors : DM, HTN , Dyslipidemia



ECG



MIBI SPECT

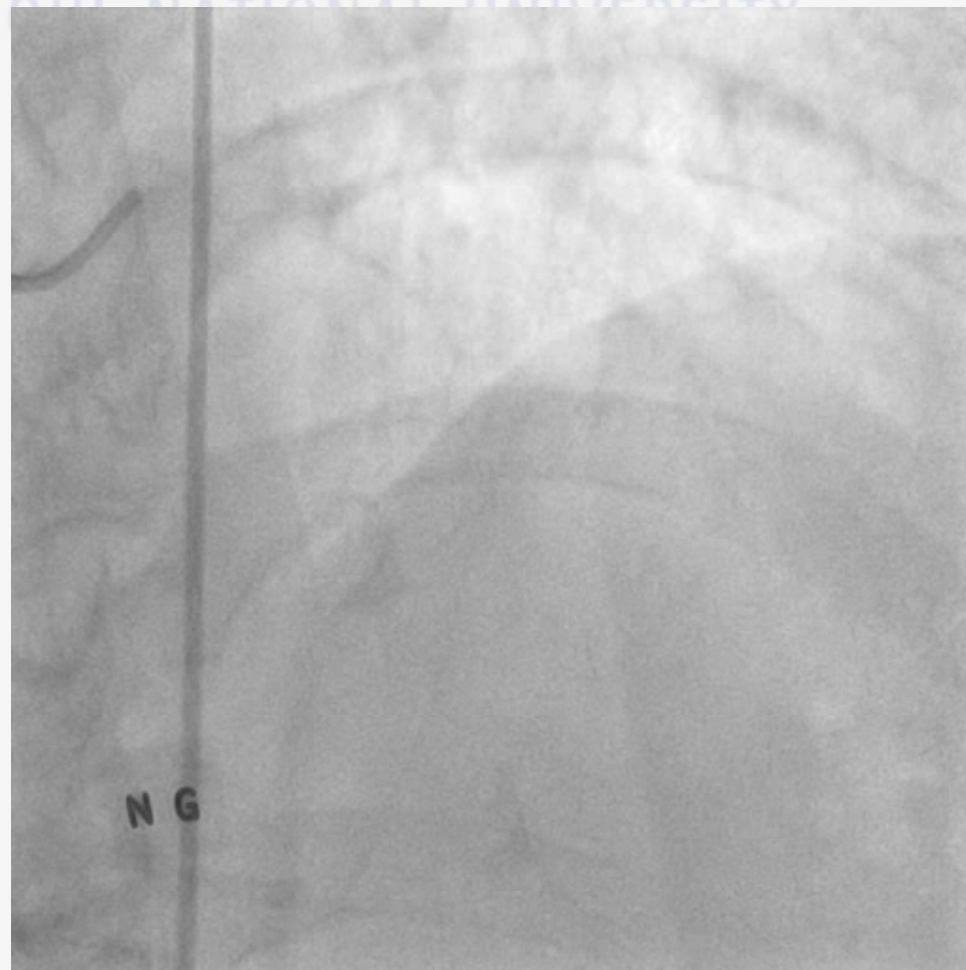
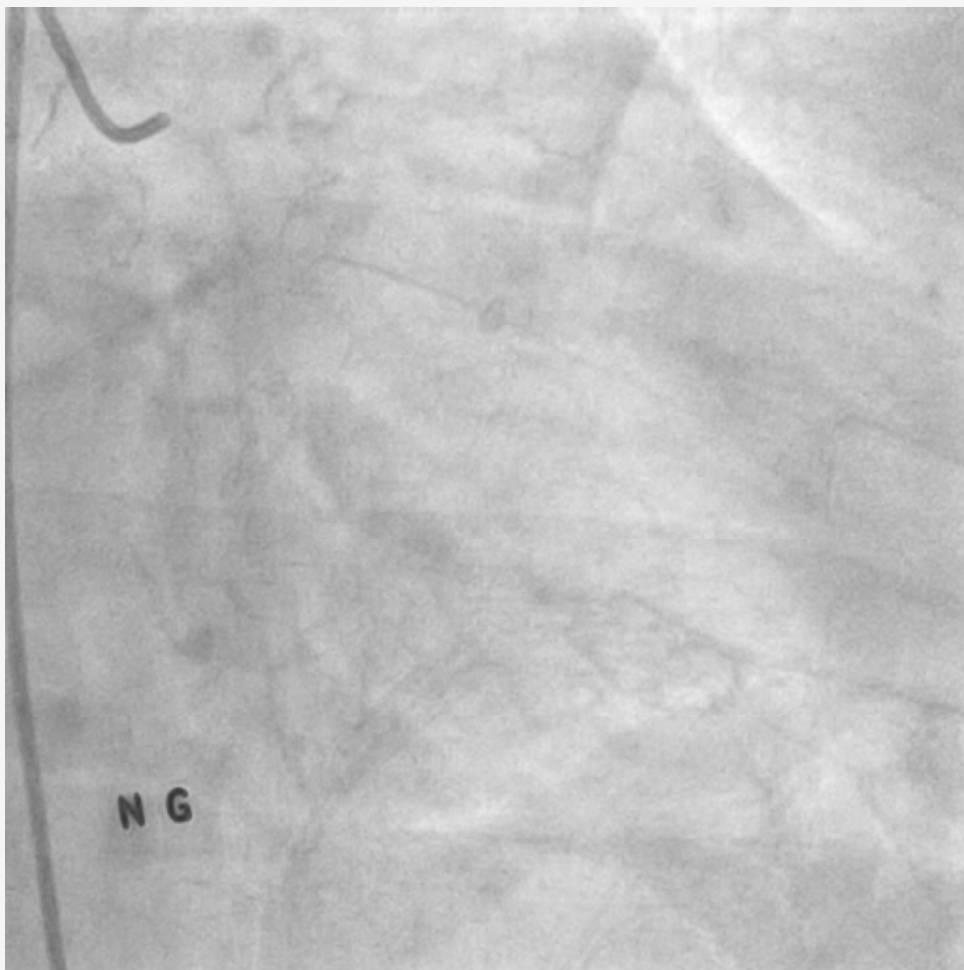


Laboratory Findings

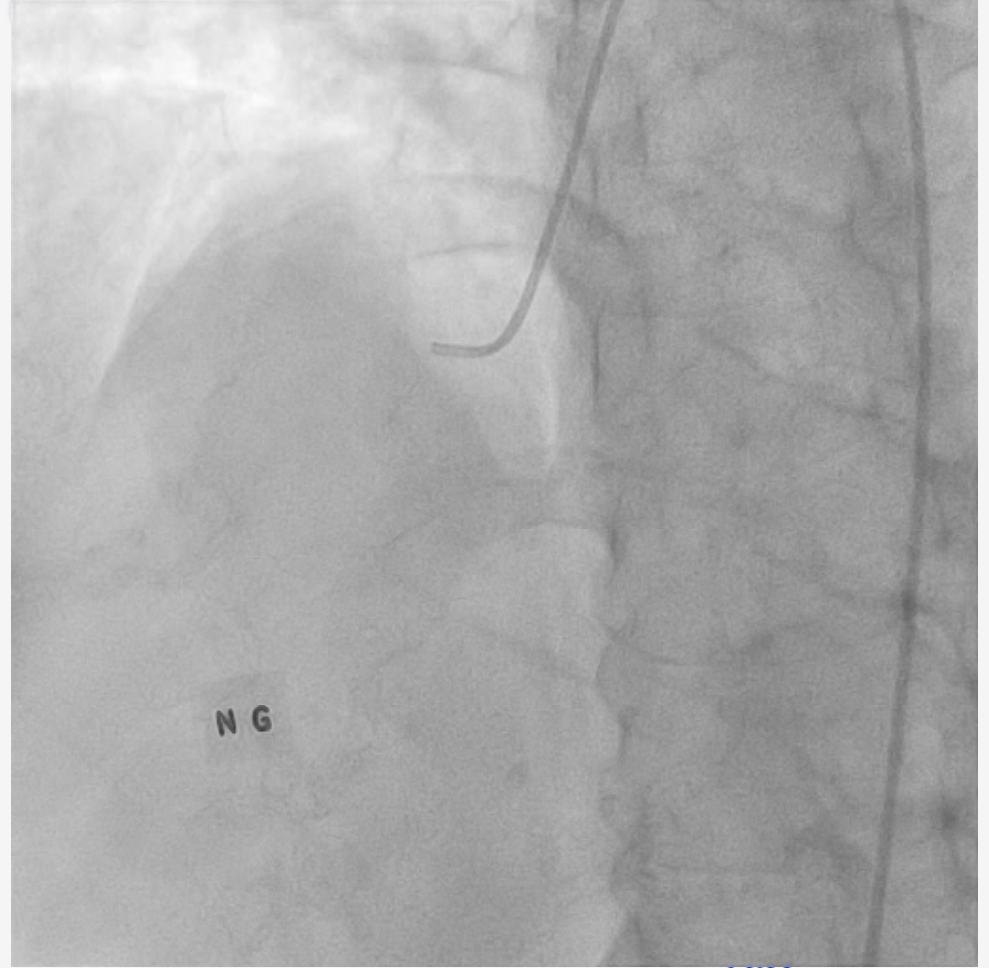
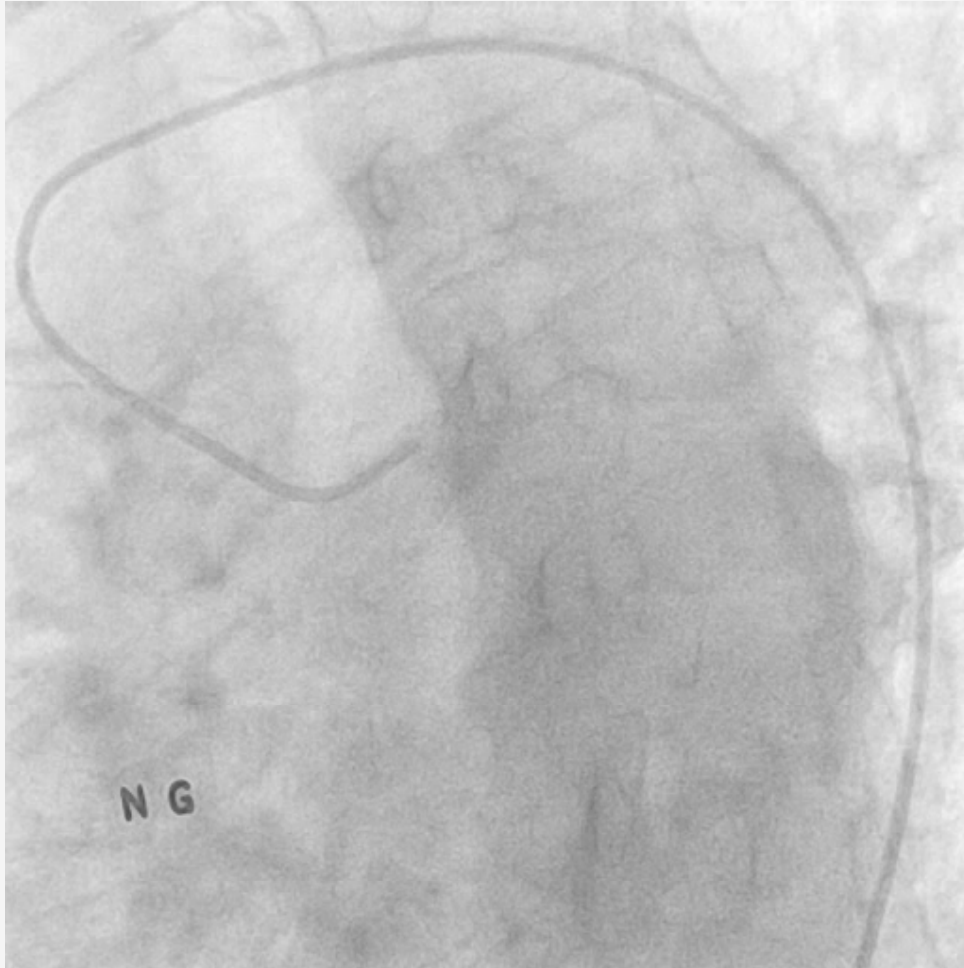
- CK-MB 1.3 ng/ml
- Tn-I 0.06 ng/ml
- TG 121 mg/dL
- HDL 45 mg/dL
- LDL 116 mg/dL
- aPTT 20.2 sec
- PT 1/100/10.2
(INR/%/sec)
- BUN 27mg/dL
- Cr 1.14mg/dL



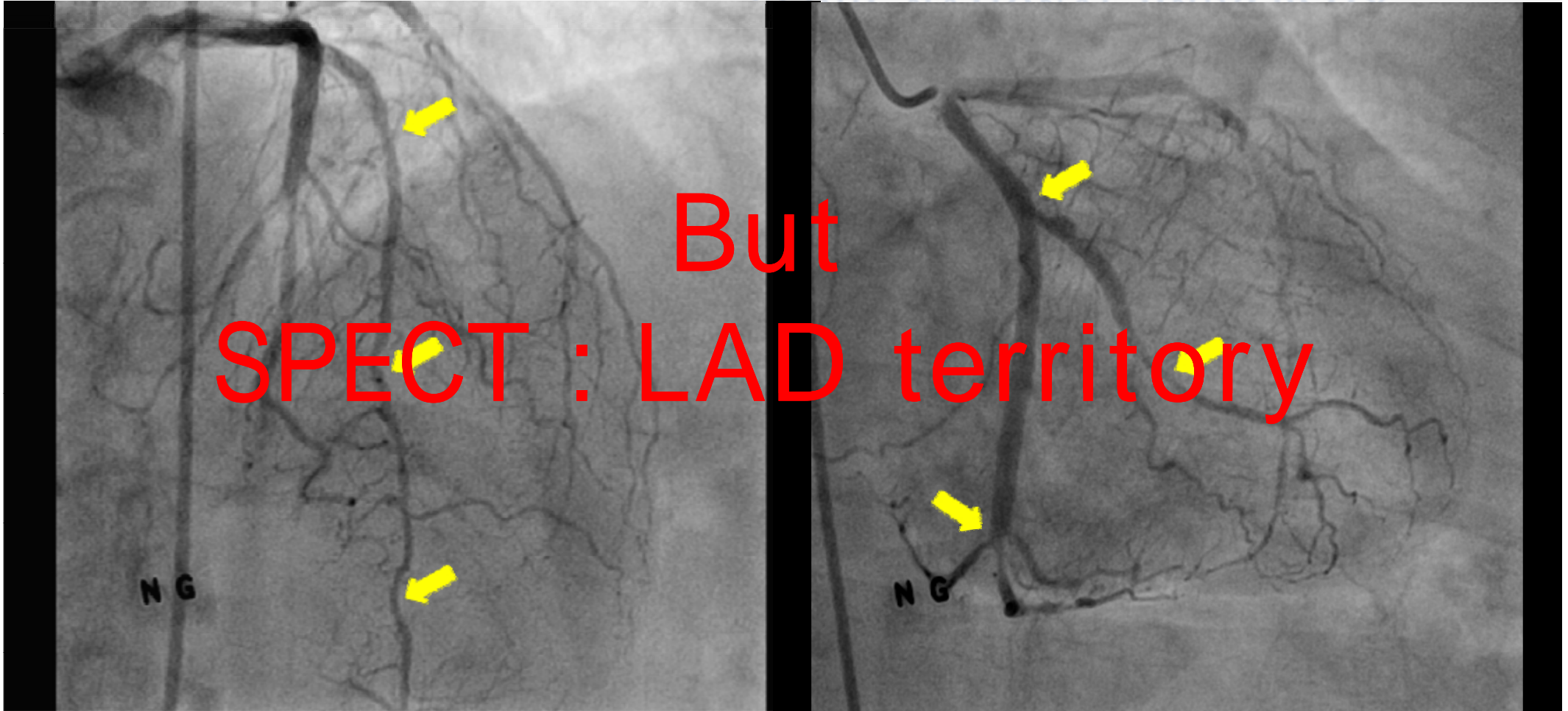
CAG



CAG



2VD



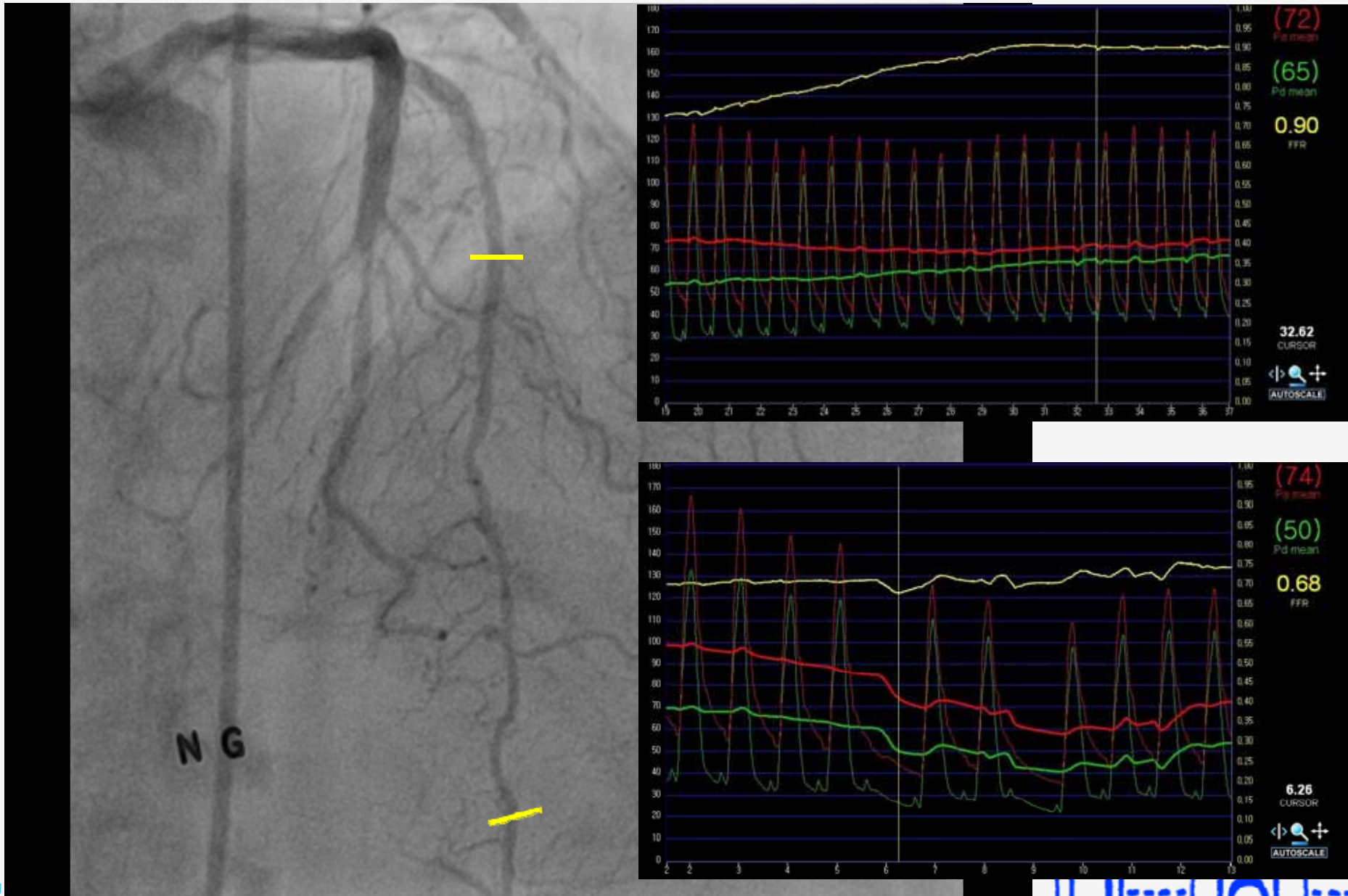
Anatomical revascularization

VS

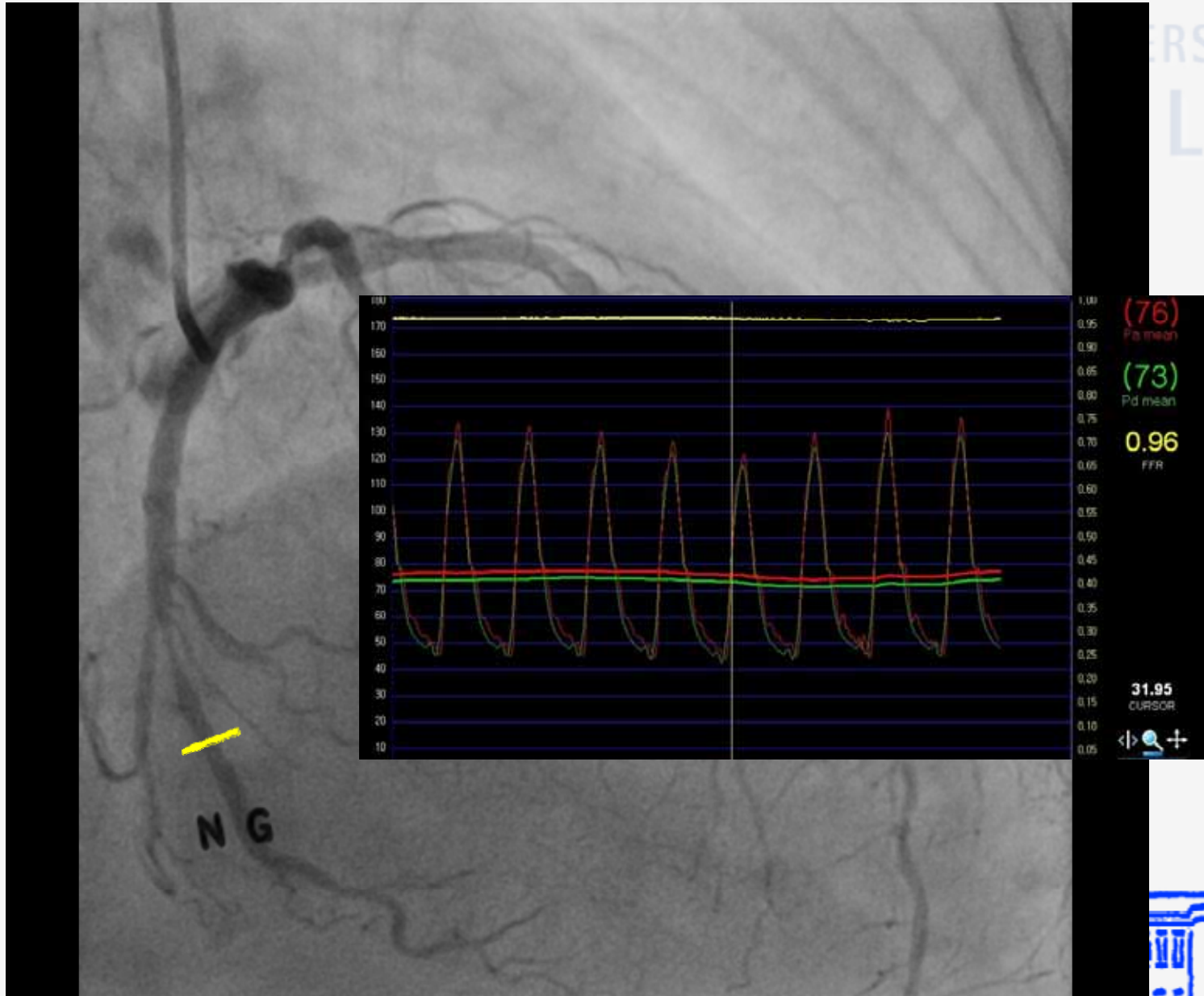
Functional revascularization



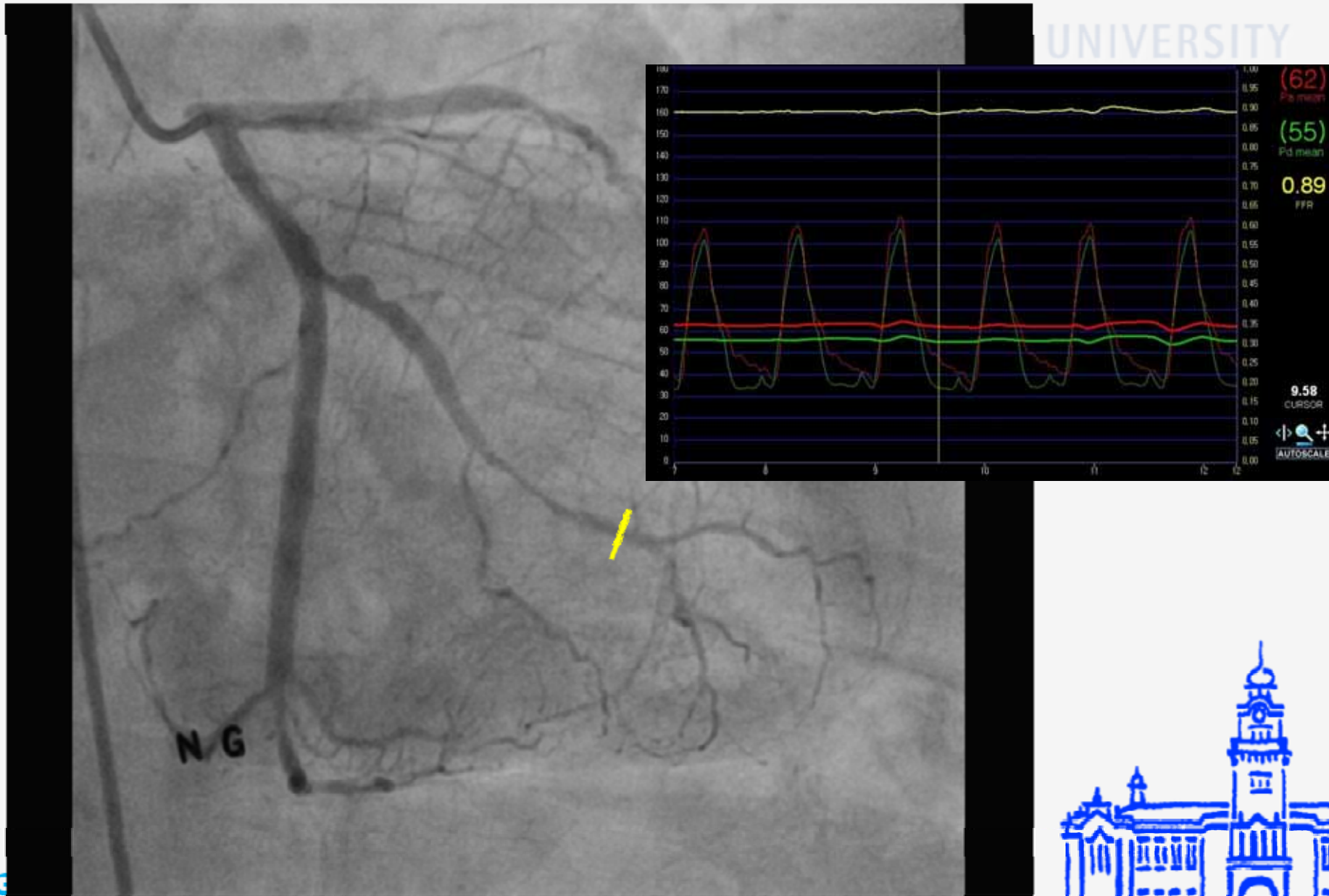
LAD FFR



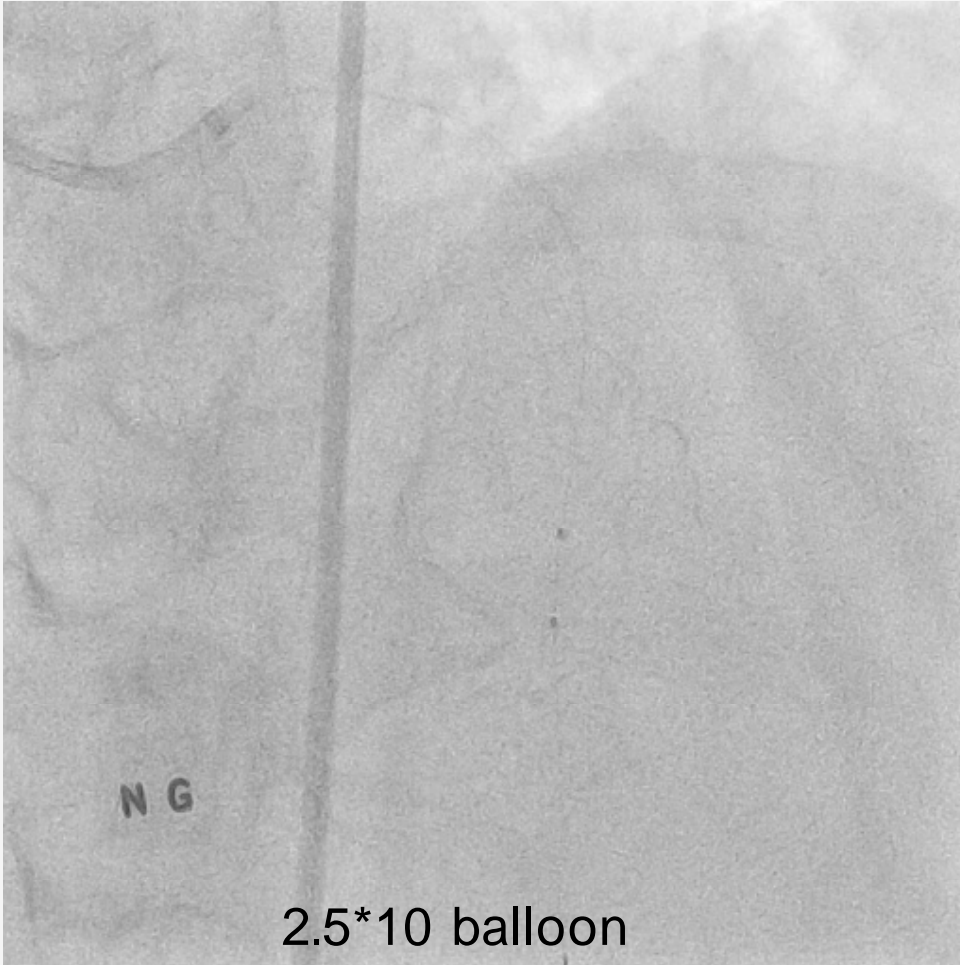
dLCx FFR



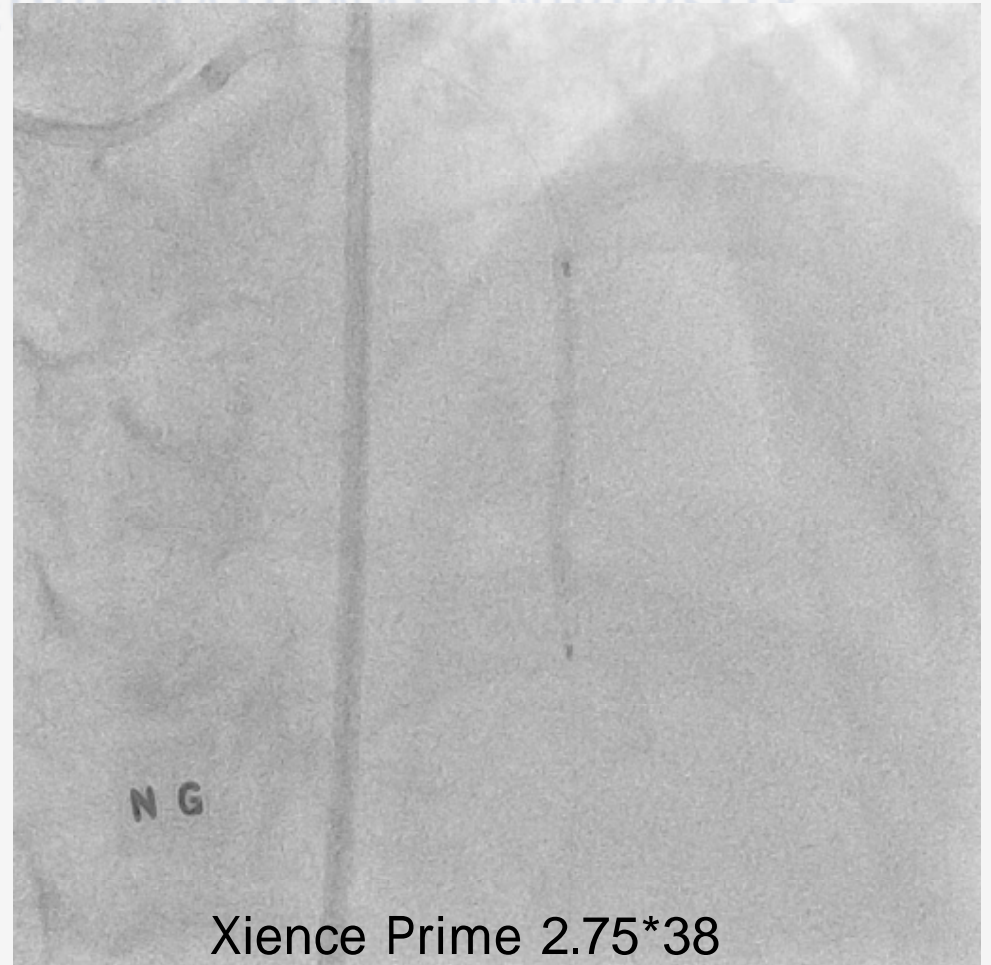
OM FFR



LAD PCI



2.5*10 balloon



Xience Prime 2.75*38



LAD PCI



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CASE 2

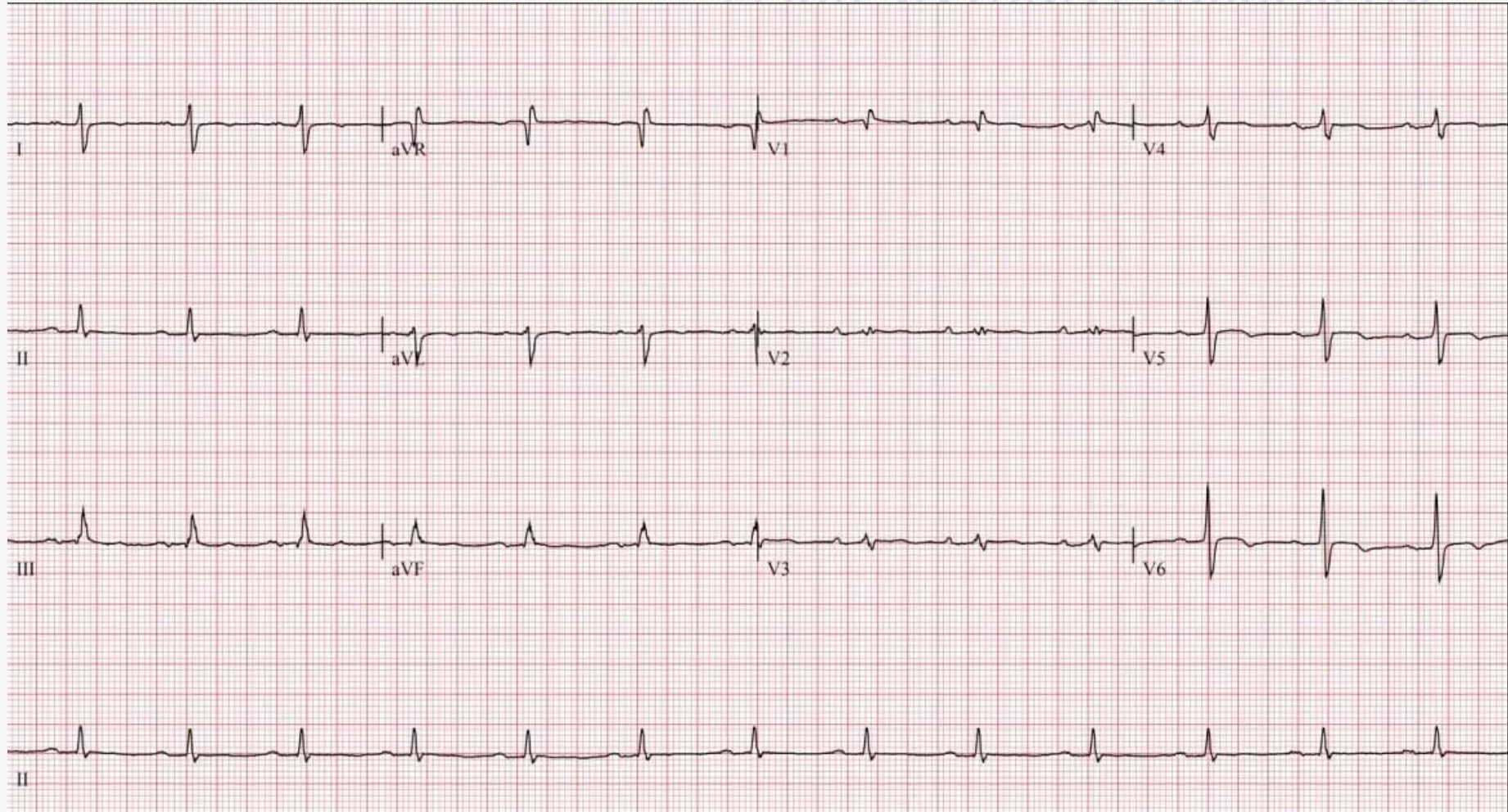


Clinical presentation

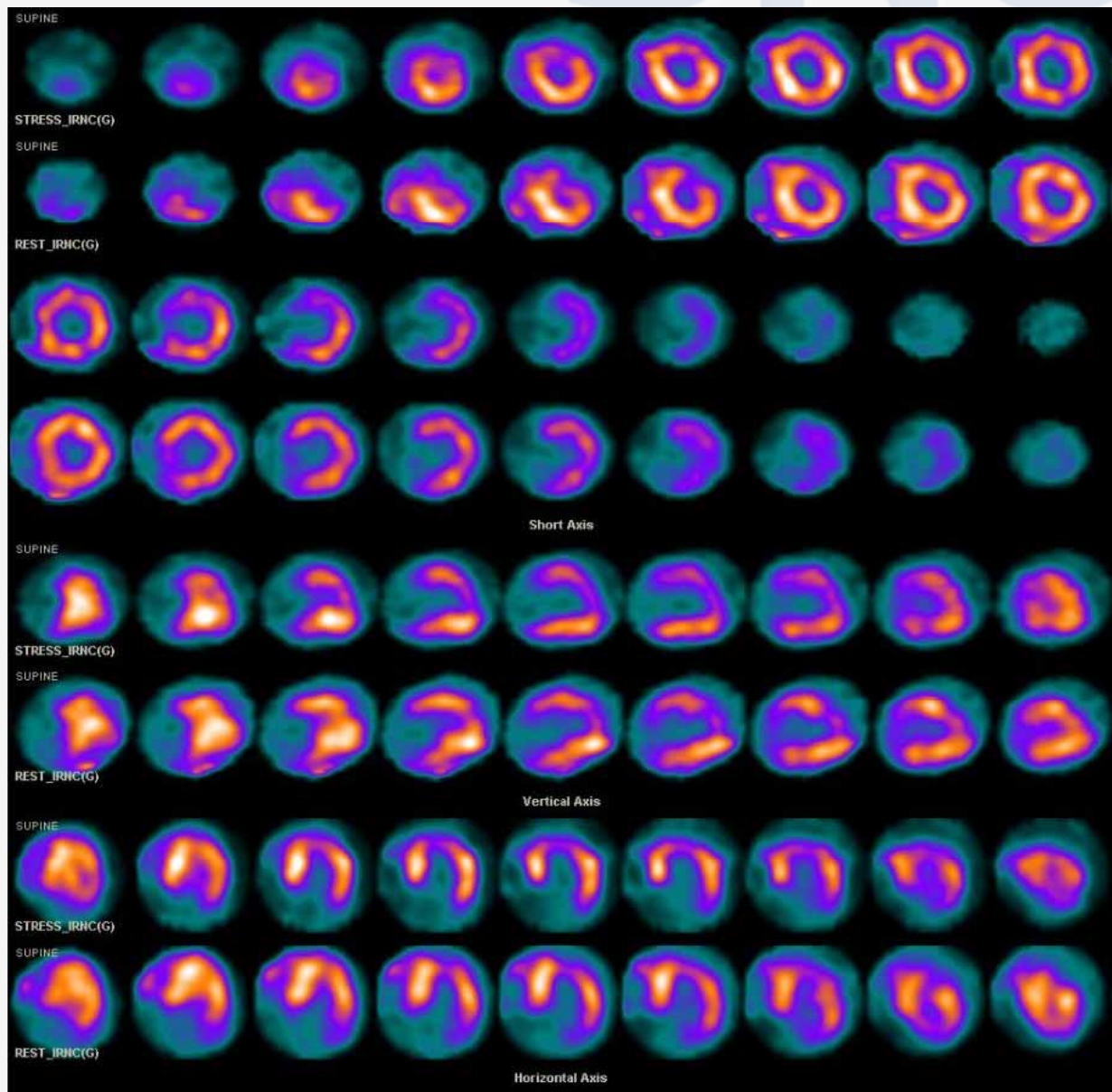
- 71 year-old Male
- h/o Lung Ca. s/p pneumonectomy
- C/C : Dyspnea
- ECG ST elevated subtly
- Risk factors : DM, HTN



ECG



MIBI SPECT



TTE

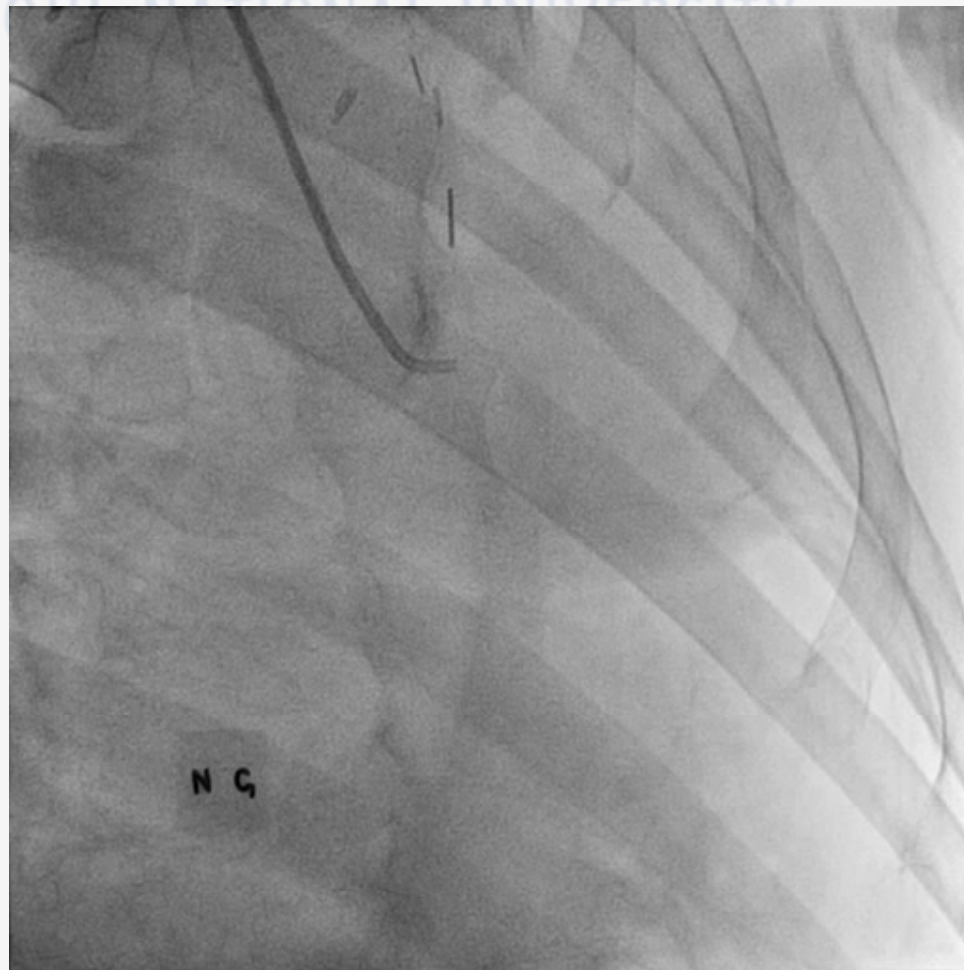
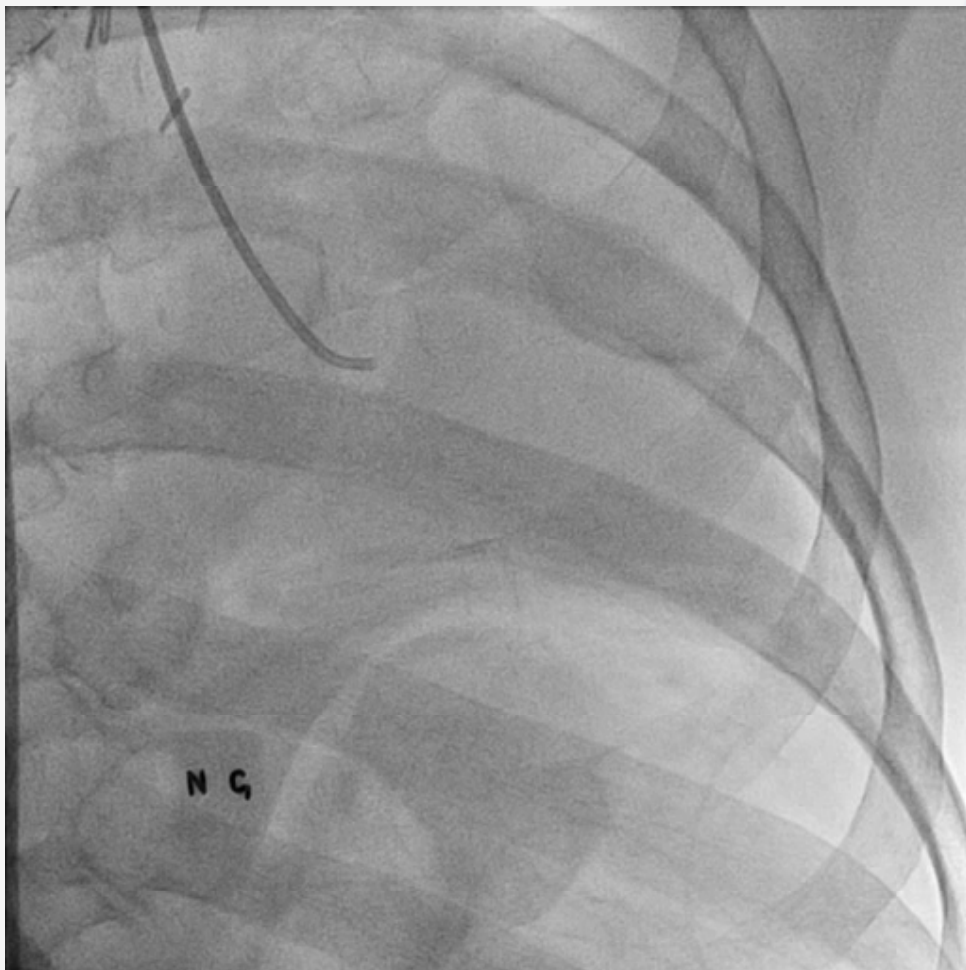


Laboratory Findings

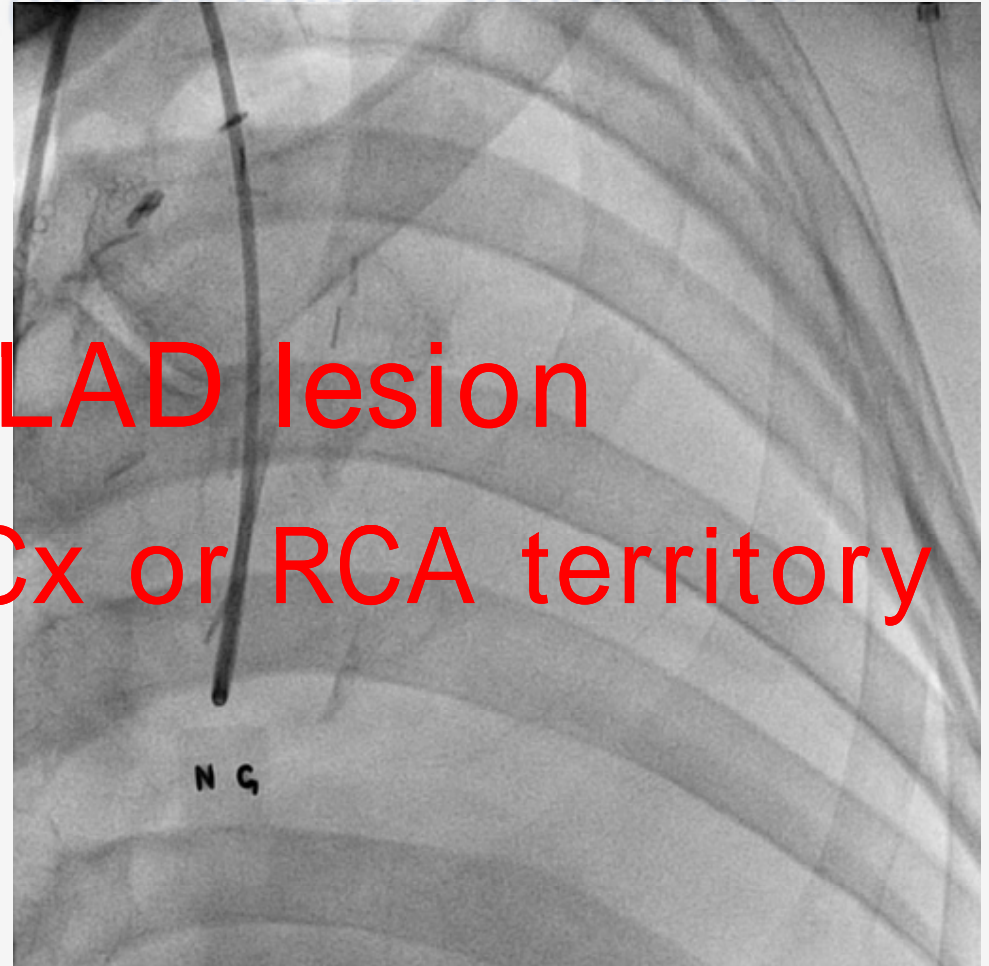
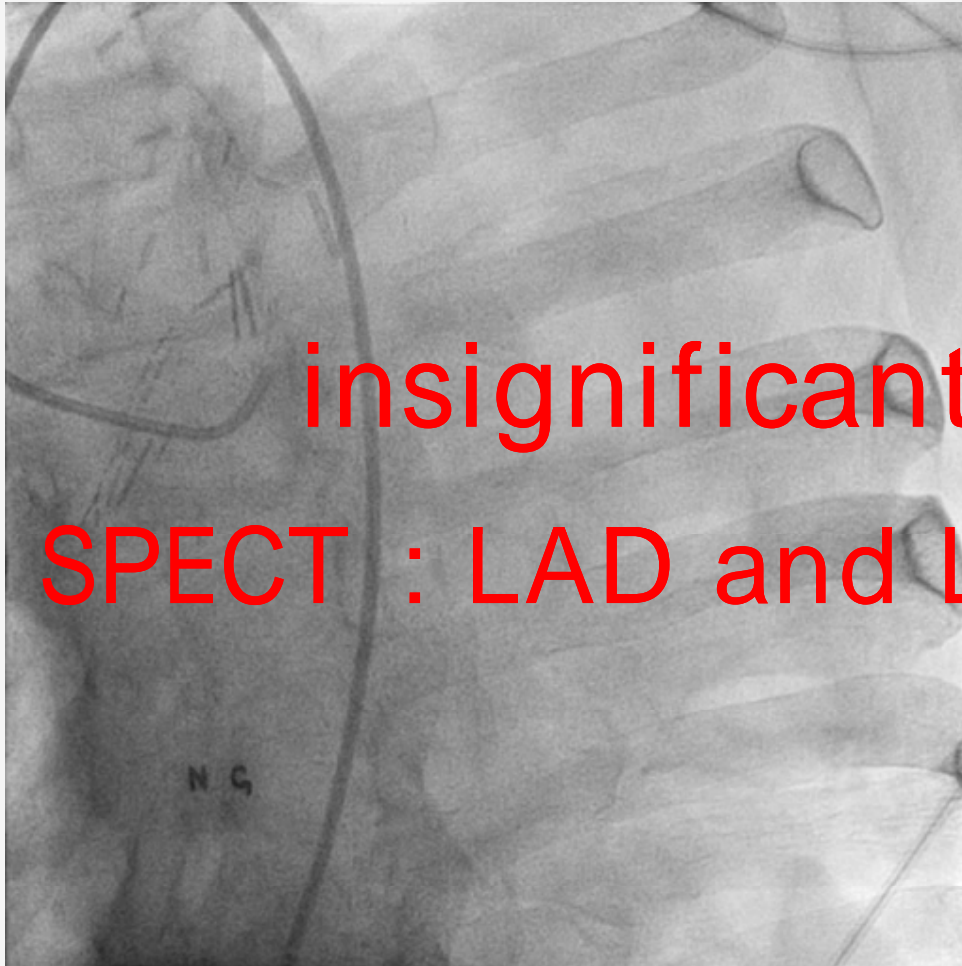
- CK-MB 0.7 ng/ml
- Tn-I <0.04 ng/ml
- TG 159 mg/dL
- HDL 30 mg/dL
- LDL 56 mg/dL
- aPTT 24.4 sec
- PT 1.07/86/11.5
(INR/%/sec)
- Hb 11.5 g/dL
- BUN 20mg/dL
- Cr 1.08mg/dL



CAG



CAG



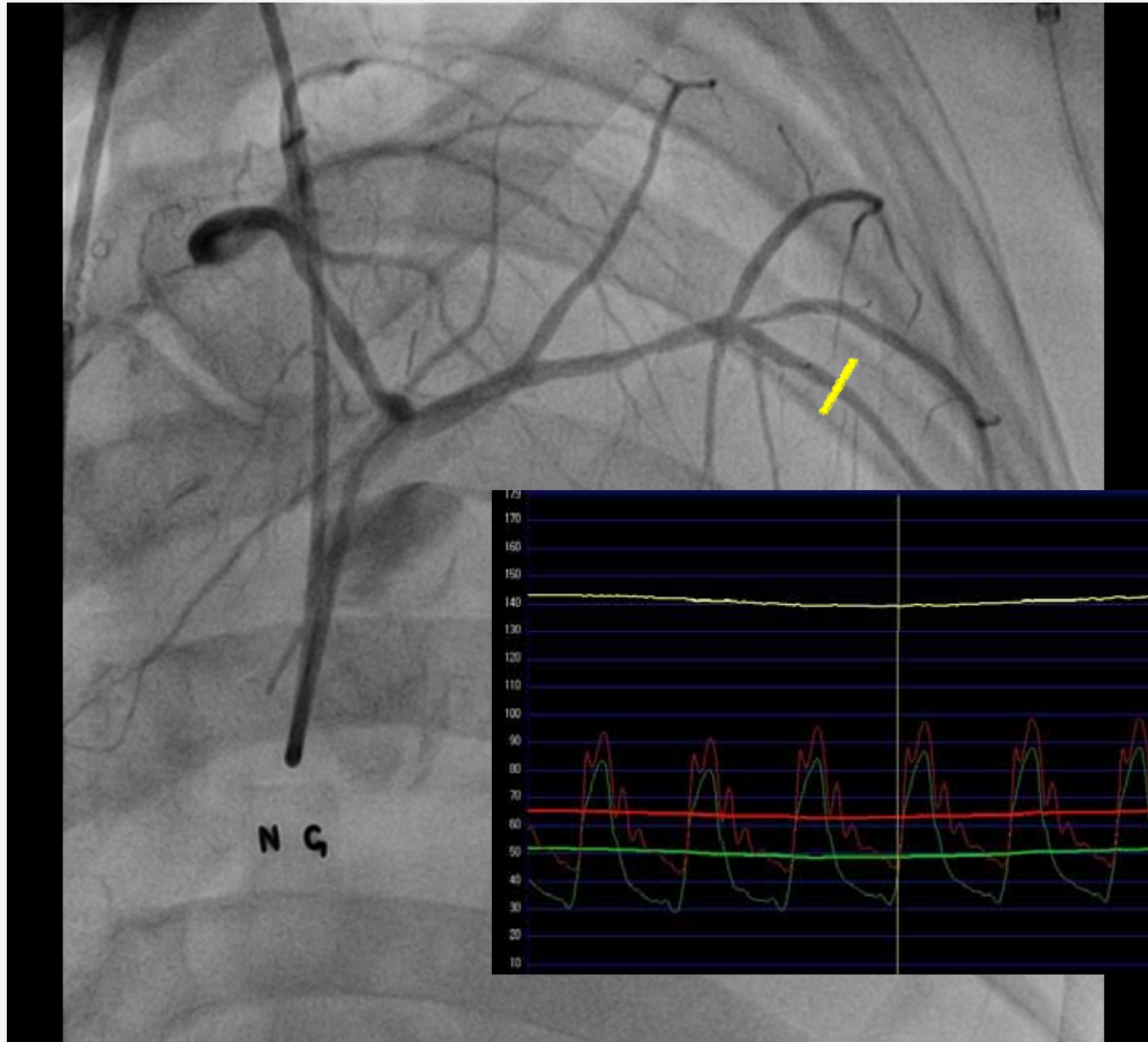
insignificant LAD lesion
SPECT : LAD and LCx or RCA territory



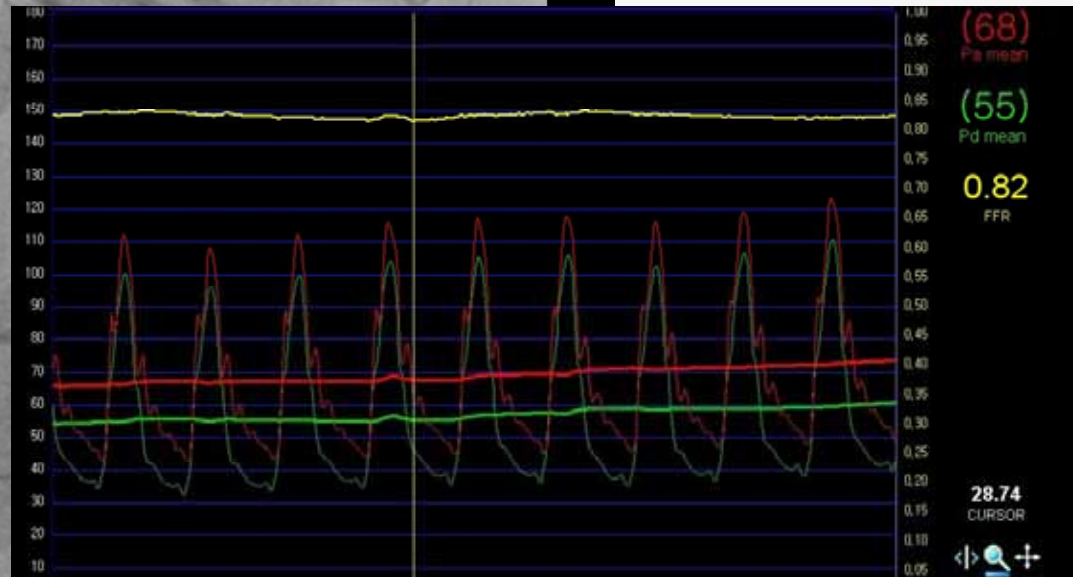
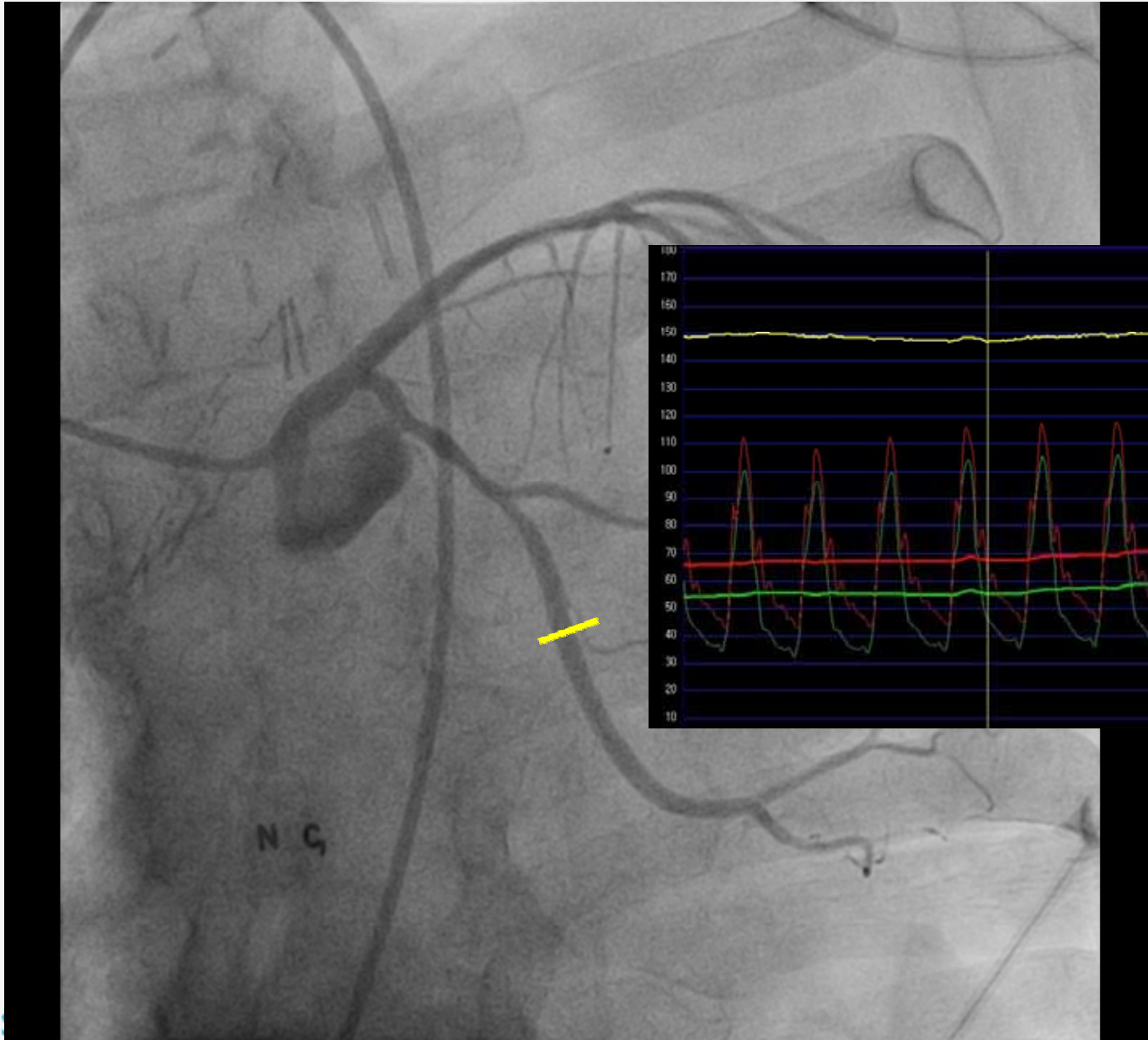
LAD FFR



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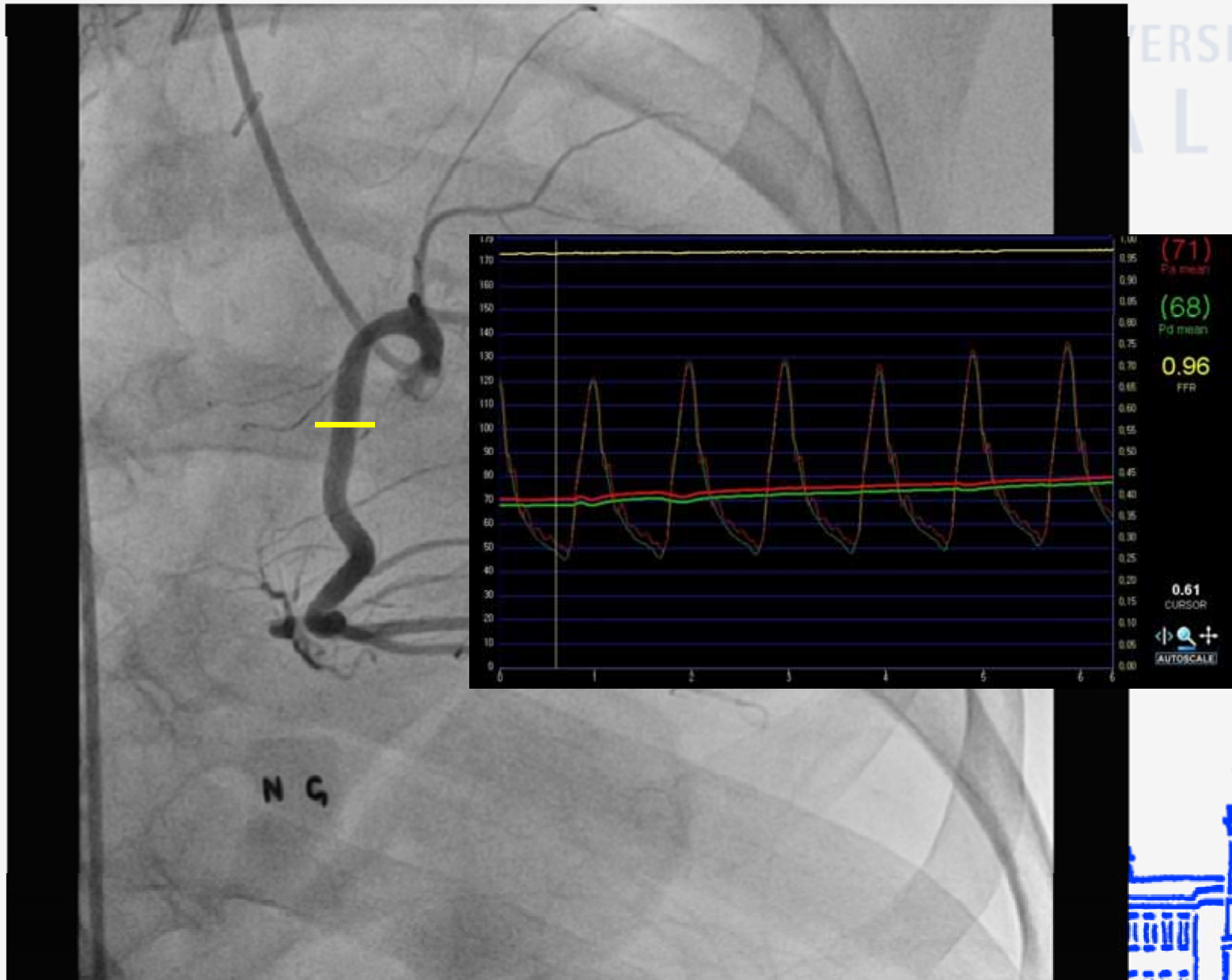
LCx FFR



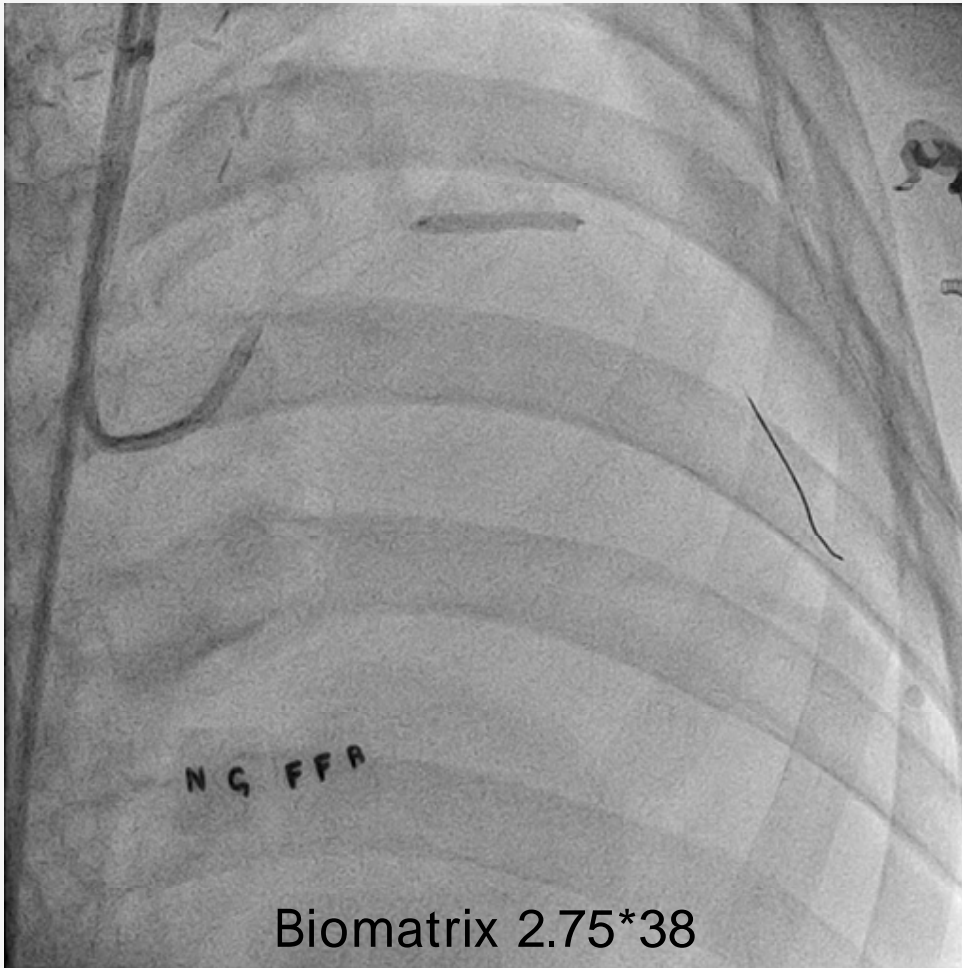
RCA FFR



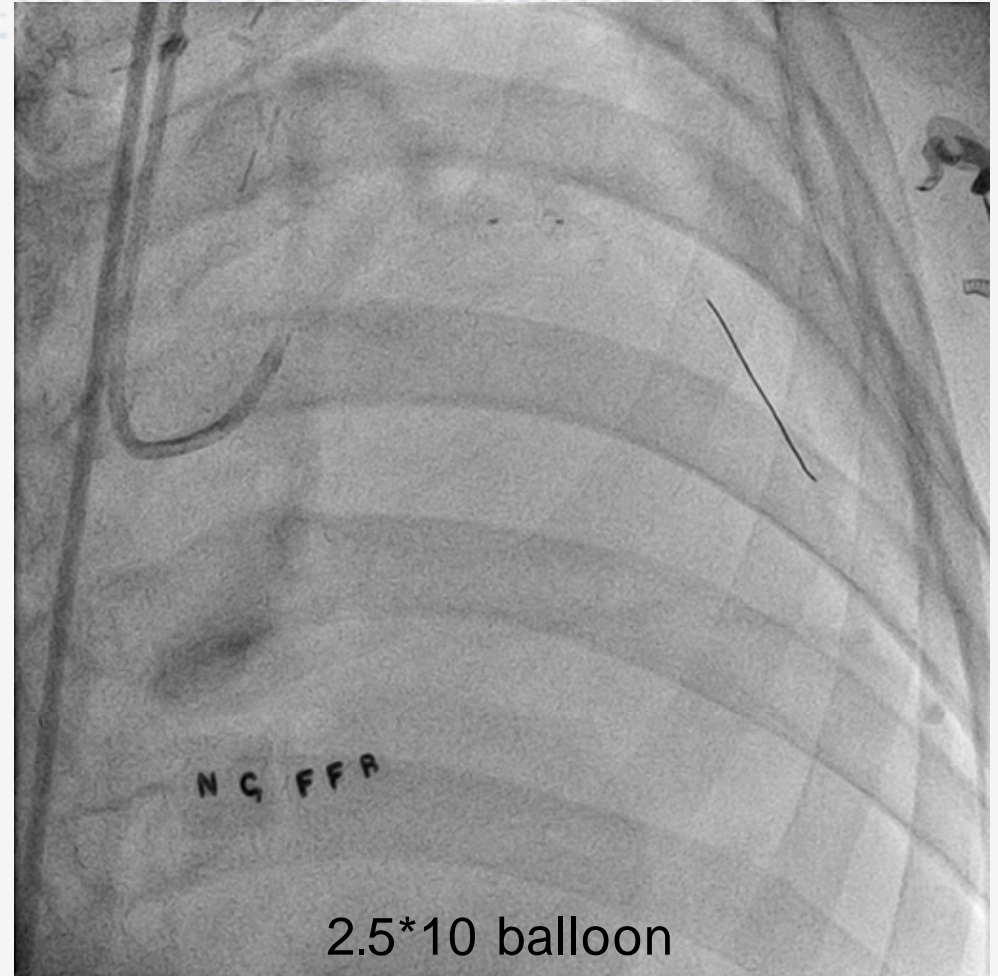
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LAD PCI



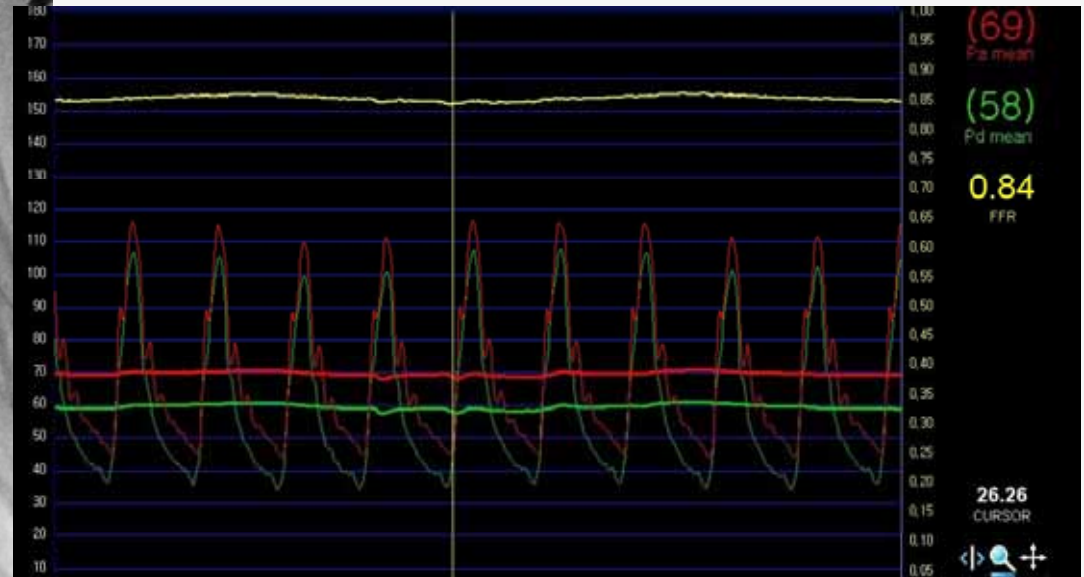
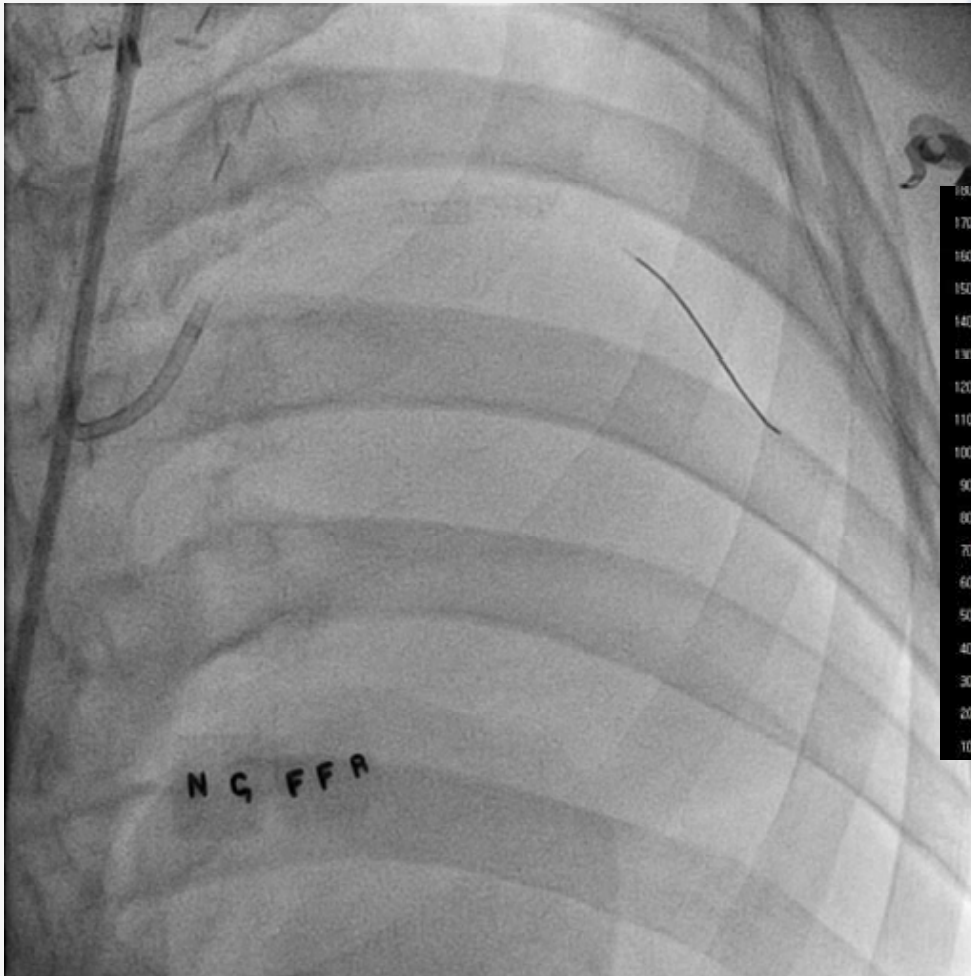
Biomatrix 2.75*38



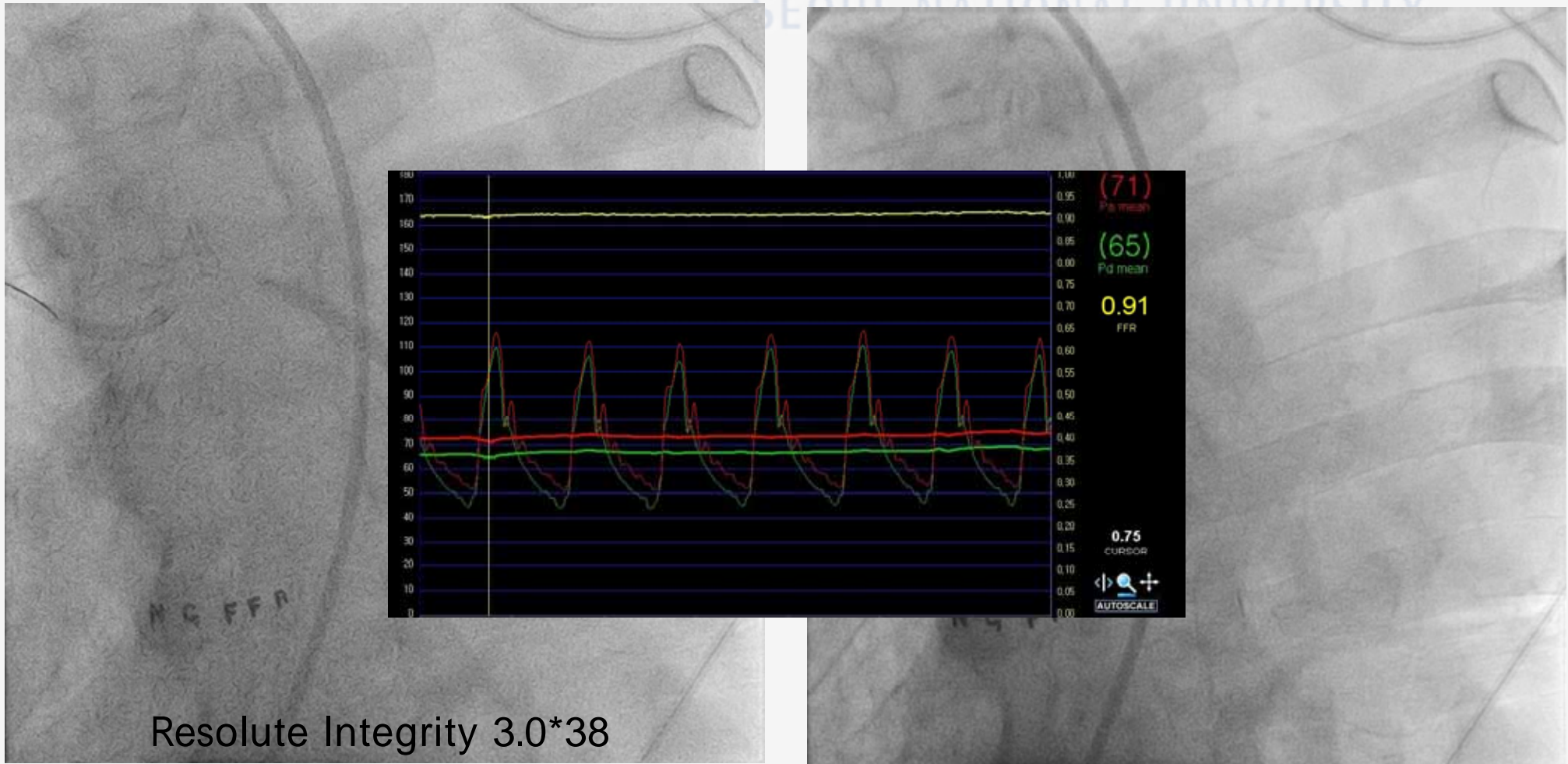
2.5*10 balloon



LAD PCI



LCx PCI



Resolute Integrity 3.0*38



Discussion

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What is the cause of negative and positive FFR in 2 cases?

Mismatch

Significant stenosis with **negative FFR**

- Older age
- Non-LAD
- Shorter lesion length
- Larger MLA by IVUS
- Larger MLD by QCA
- Smaller plaque burden

Reverse-Mismatch

Insignificant stenosis with **positive FFR**

- Younger age
- LAD
- Plaque rupture
- Smaller MLA by IVUS
- Larger plaque burden



Conclusion

In multi-vessel disease PCI, the advantage of the FFR guided PCI is variety. First of all, FFR guided PCI can reduce MACE, and gets better clinical outcomes than angio guided PCI.

