

# ***CASE from South Korea***

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## F/56

- **Chief complaint:** Angina with recent aggravation, CCS II~III
- **Brief history:**
  - # Stroke 5 years ago
  - # Hypertension, Hypercholesterolemia under medication
  - # Medical treatment for stable angina since 4 years ago
- **EKG, CXR:** normal
- **Echo:** normal LV function, no regional wall motion abnormality

**F/56 Stable angina for 4 years with recent aggravation**

## **What would you do?**

- Medical treatment
- Exercise stress test (TMT)
- Dobutamine stress Echo
- Myocardial perfusion SPECT scan
- Coronary CT angiography
- Coronary angiography

F/56

Stable angina for 4 years with recent aggravation



### [Conclusion] (CT coronary Angiography)

Atherosclerosis, **definite significant stenosis** in the coronary artery

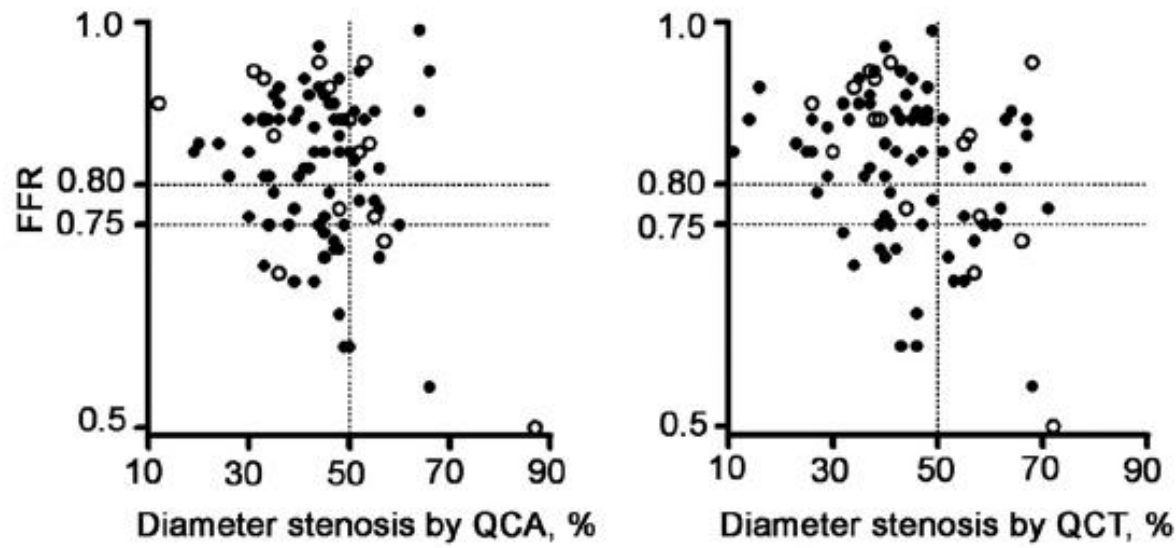
**Proximal LAD:** mixed plaque with up to 50-60% stenosis

**Proximal and distal LCX:** multifocal stenosis up to 70%

**RCA os:** 40-50% stenosis with calcified plaque

[Conclusion] (CT coronary Angiography) Atherosclerosis, **definite significant stenosis** in the coronary artery

# Is significant stenosis by CCTA “significant”?

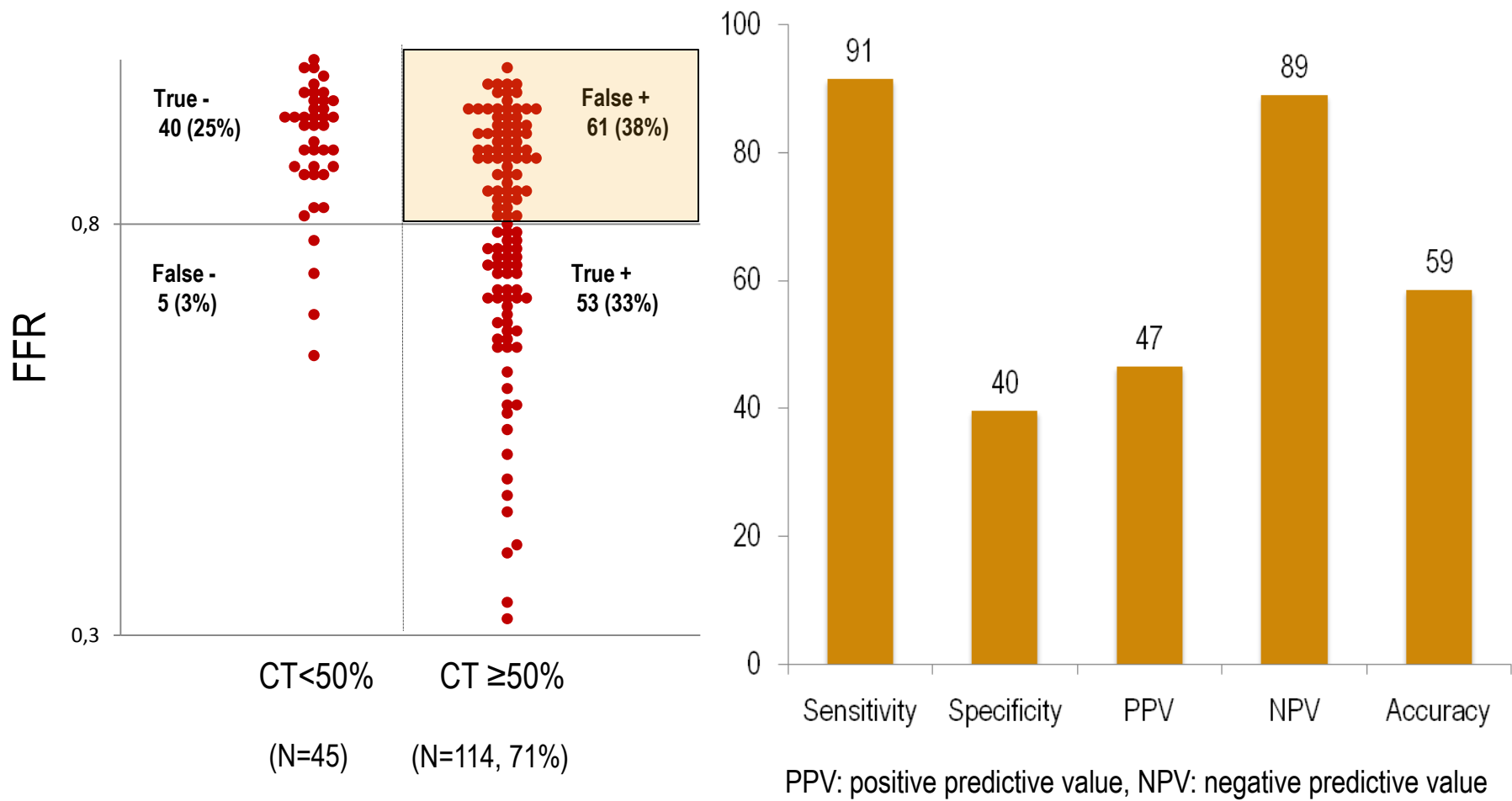


	True Positive	True Negative	False Positive	False Negative	kappa	Sensitivity, %	Specificity, %	Diagnostic Accuracy, %
FFR <0.80 (n = 31)								
CT coronary angiography, visual score	29	28	30	2	0.35	94 (58-100)	48 (35-61)	64 (54-74)
Quantitative CT coronary angiography	14	46	12	17	0.25	45 (28-63)	79 (69-90)	67 (58-77)
Conventional coronary angiography, visual score	17	36	22	14	0.16	55 (37-72)	62 (50-75)	60 (49-70)
Quantitative coronary angiography	17	41	18	13	0.25	57 (39-74)	69 (58-81)	65 (55-75)

[Conclusion] (CT coronary Angiography) Atherosclerosis, **definite significant stenosis** in the coronary artery

# Is significant stenosis by CCTA “significant”?

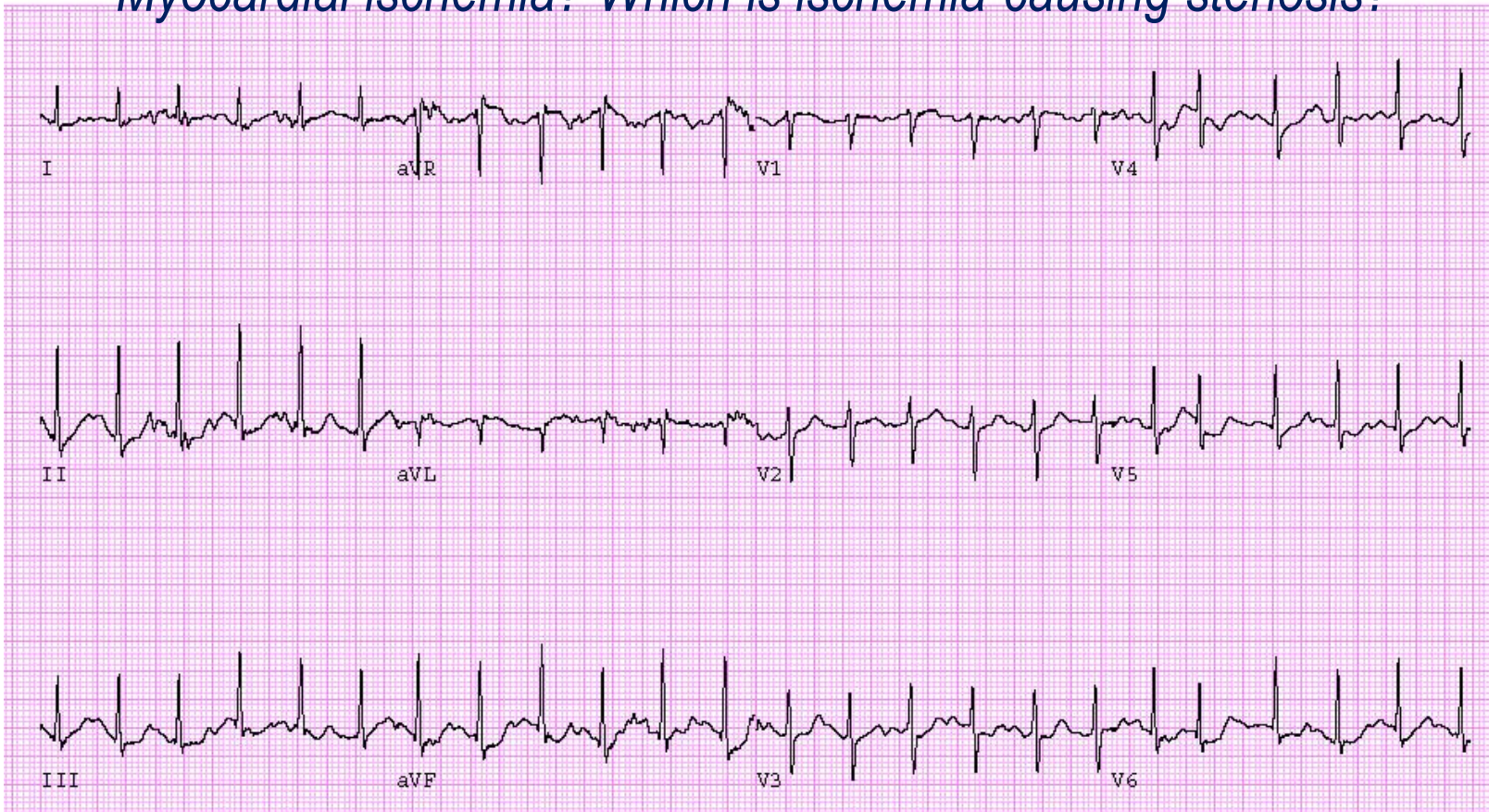
DISCOVER FLOW study: Per-vessel analysis (n=159)



## F/56 Stable angina with recent aggravation

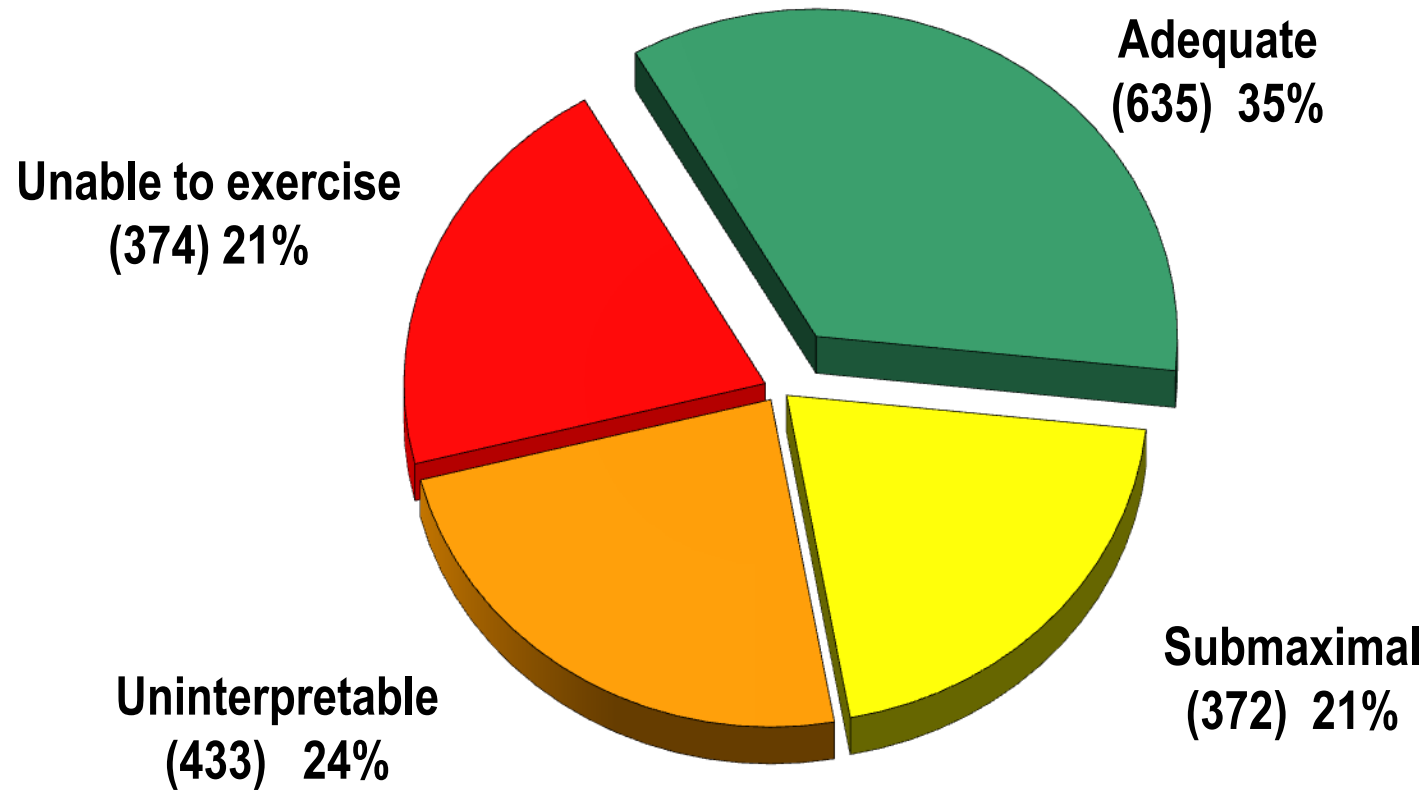
Coronary CT angiography: Proximal LAD 50-60%, prx and dist LCX 70%, RCA os 40-50%

*Myocardial ischemia? Which is ischemia-causing stenosis?*



- Exercise was terminated at stage II (7METs) due to general weakness and chest pain
- **Conclusion:** Suggestive of positive test

# Proportion of patients with adequate Exercise ECG (n=1814)

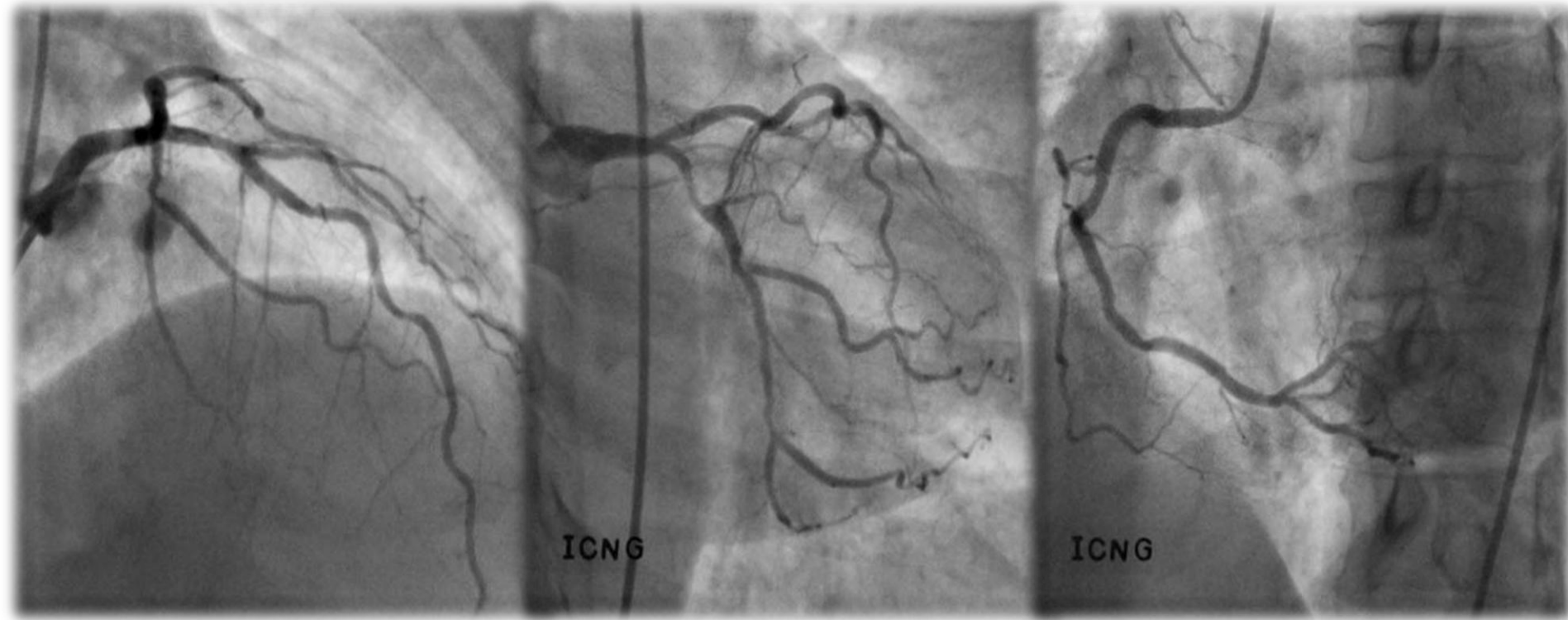


## F/56 Stable angina with recent aggravation

Coronary CT angiography: Proximal LAD 50-60%, prx and dist LCX 70%, RCA os 40-50%

Exercise stress test: suggestive of positive

After 2 non-invasive tests, the patient was admitted for invasive angiography.....



**Which one is ischemia-causing stenosis?**

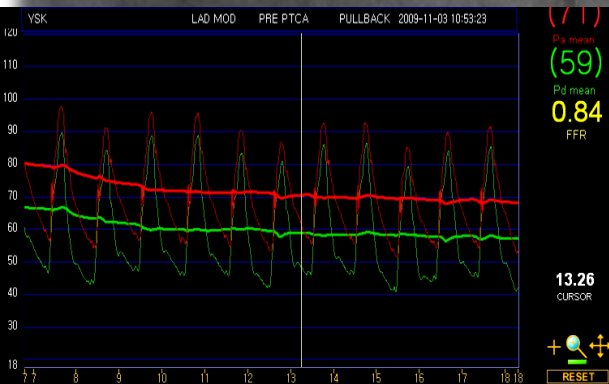
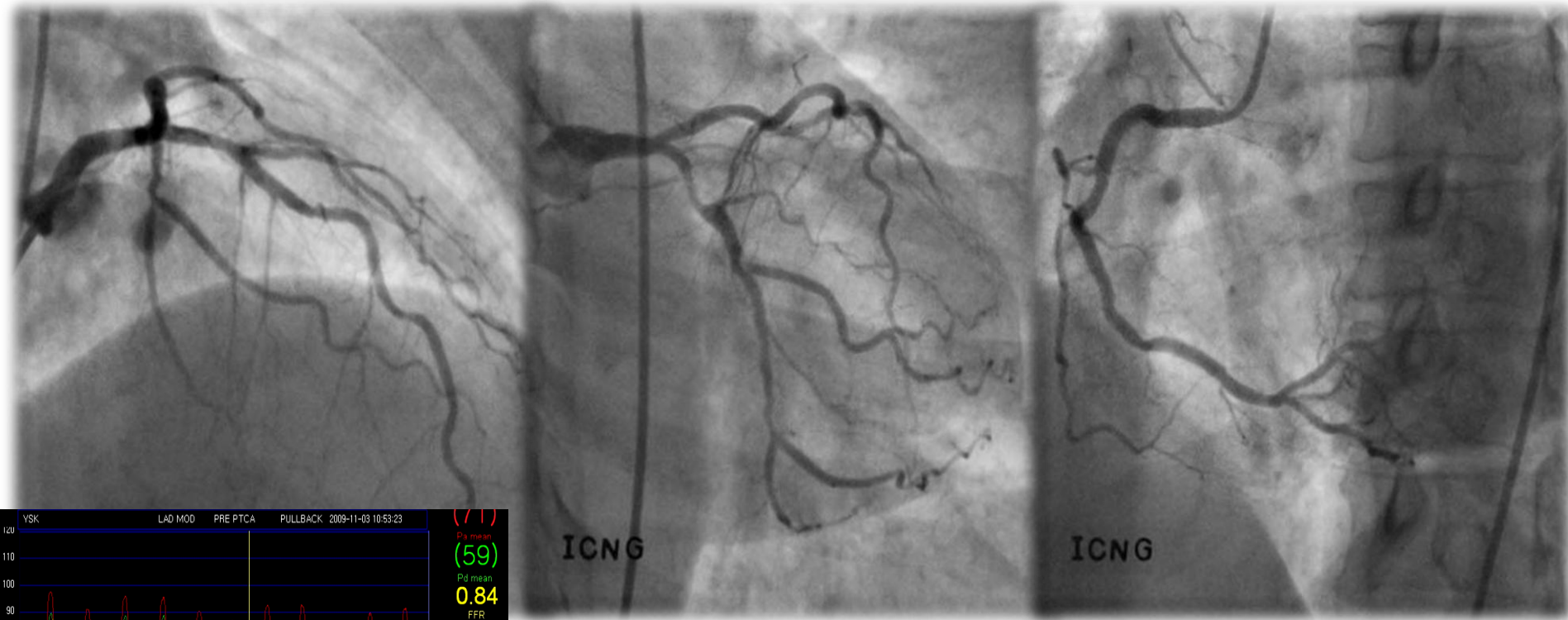
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## F/56 Stable angina with recent aggravation

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Exercise stress test: suggestive of positive

CAG: 1 vessel disease – proximal and distal LCX



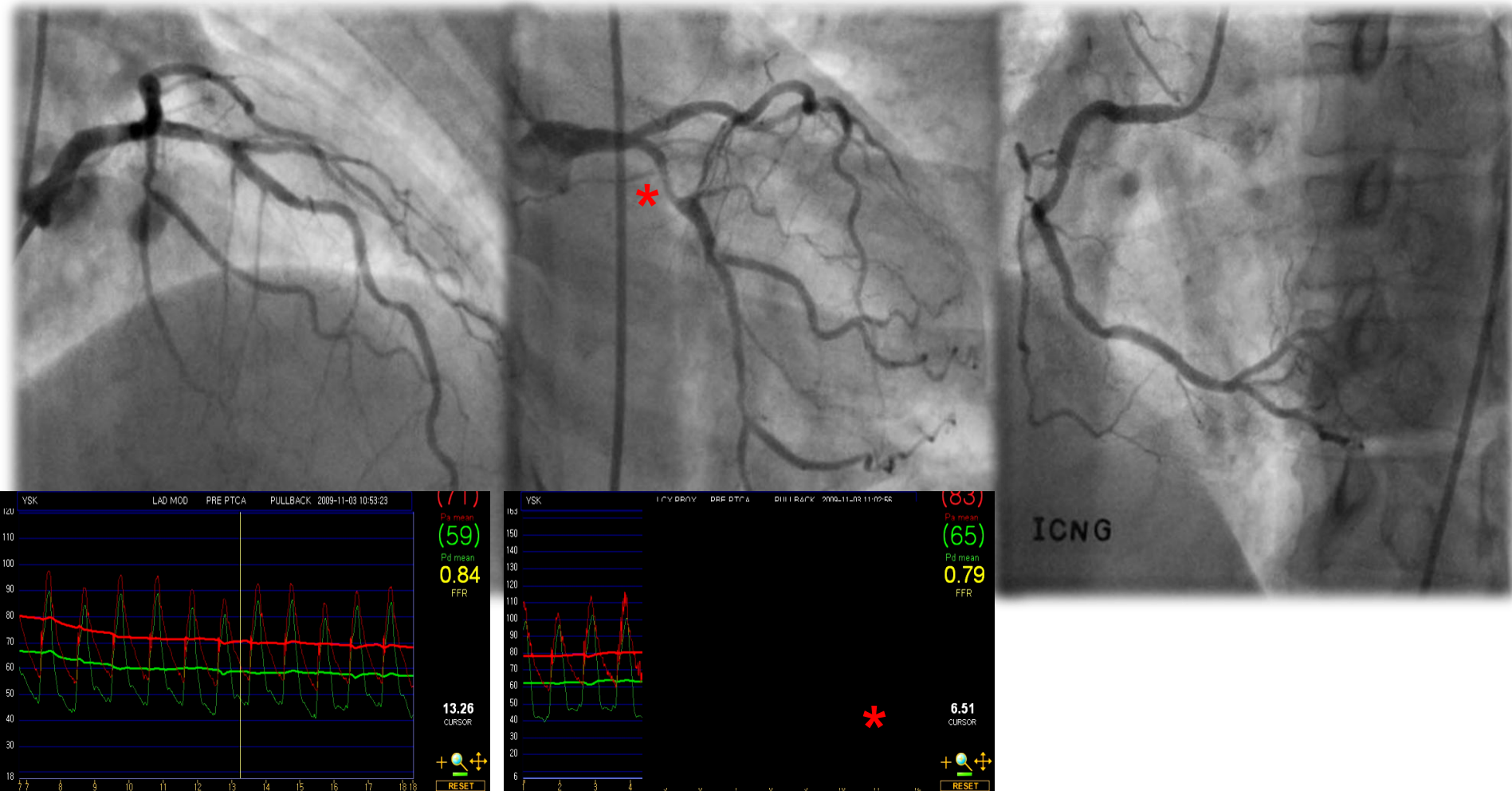
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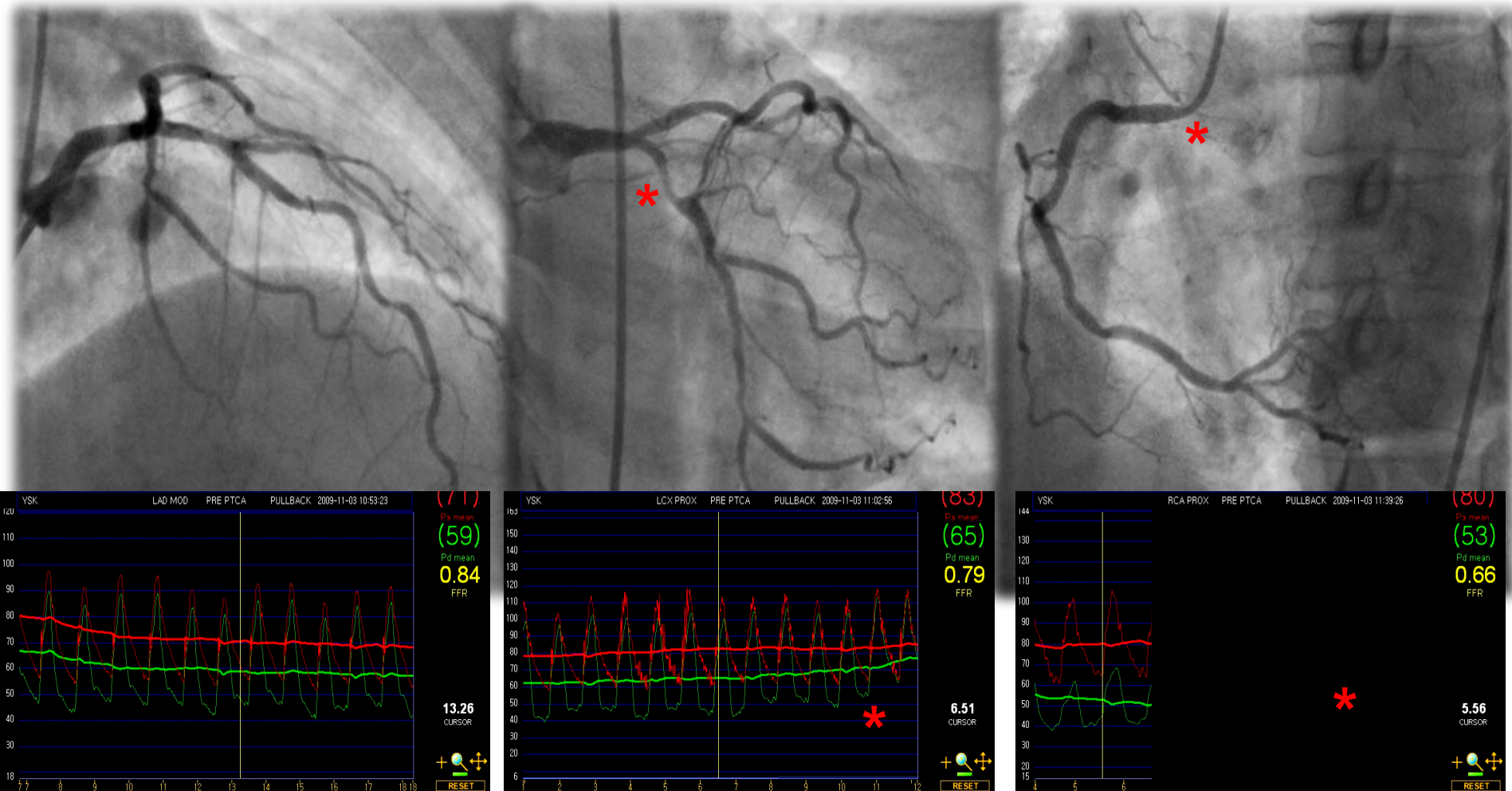
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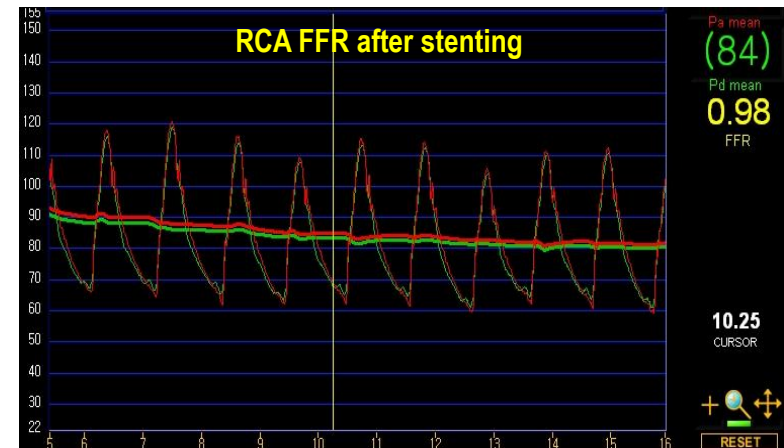
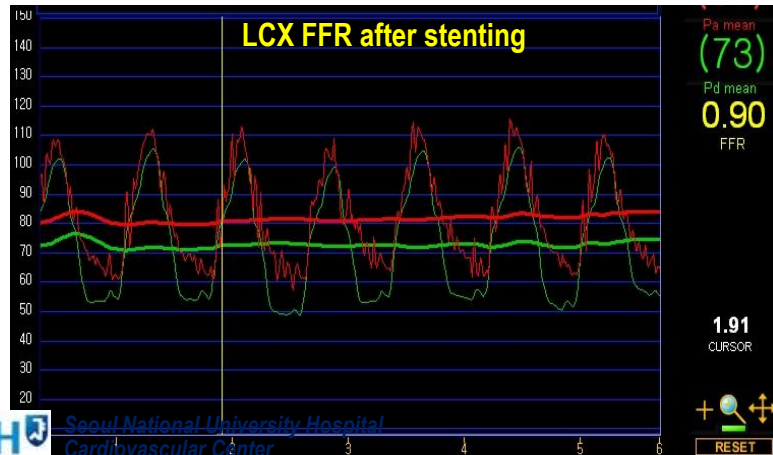
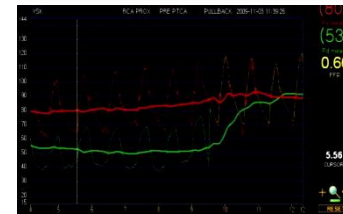
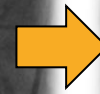
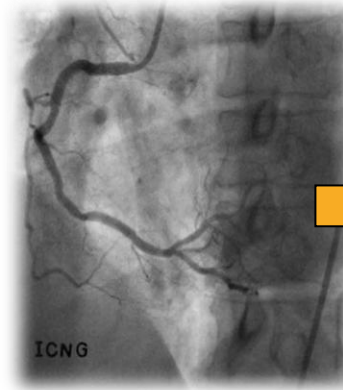
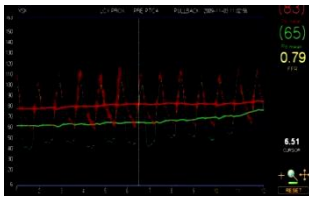
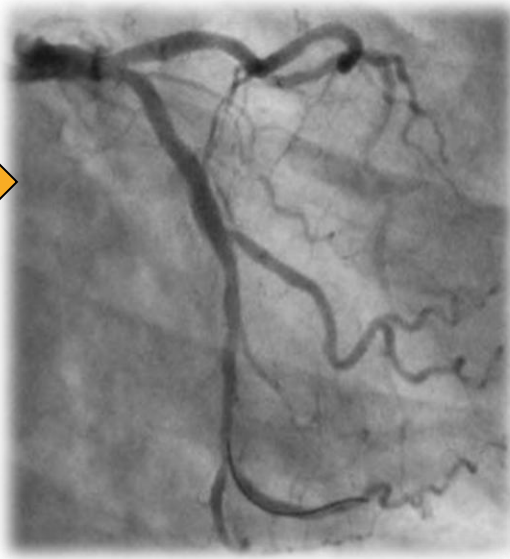
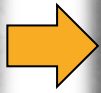
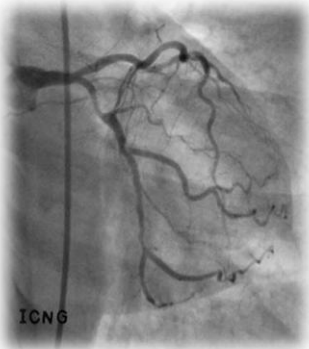


## F/56 Stable angina with recent aggravation

Coronary CT angiography: Proximal LAD 50-60%, prx and dist LCX 70%, RCA os 40-50%

Exercise stress test: suggestive of positive

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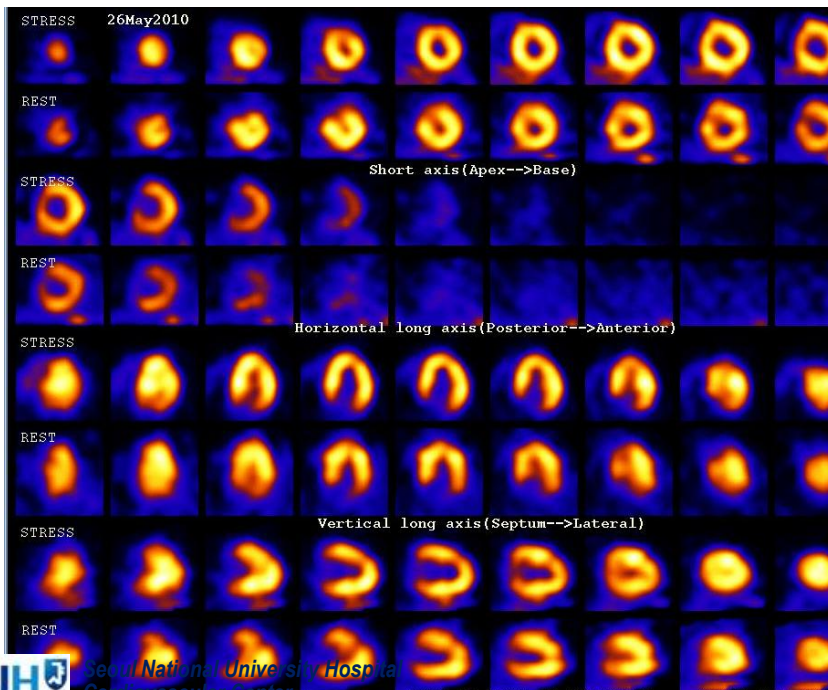
CAG: 1 vessel disease – proximal and distal LCX

**FFR: 2 vessel disease – proximal LCX and RCA os**

→ Functionally complete revascularization with 2 drug-eluting stents

→ Patient's symptom was improved

→ 6 mo after PCI, patient complained resting chest discomfort



[Stress image] No significant perfusion decrease.

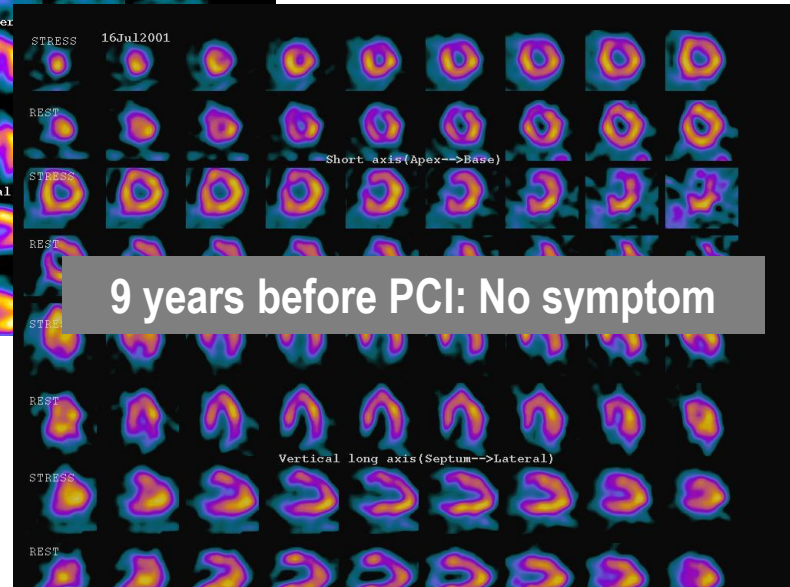
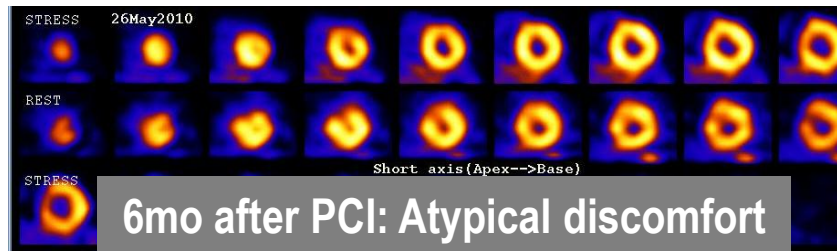
[Rest image] No significant perfusion decrease.

[24hour delay image] Not done

**[Compared with previous scan] No change**

[LV wall motion] Normal.

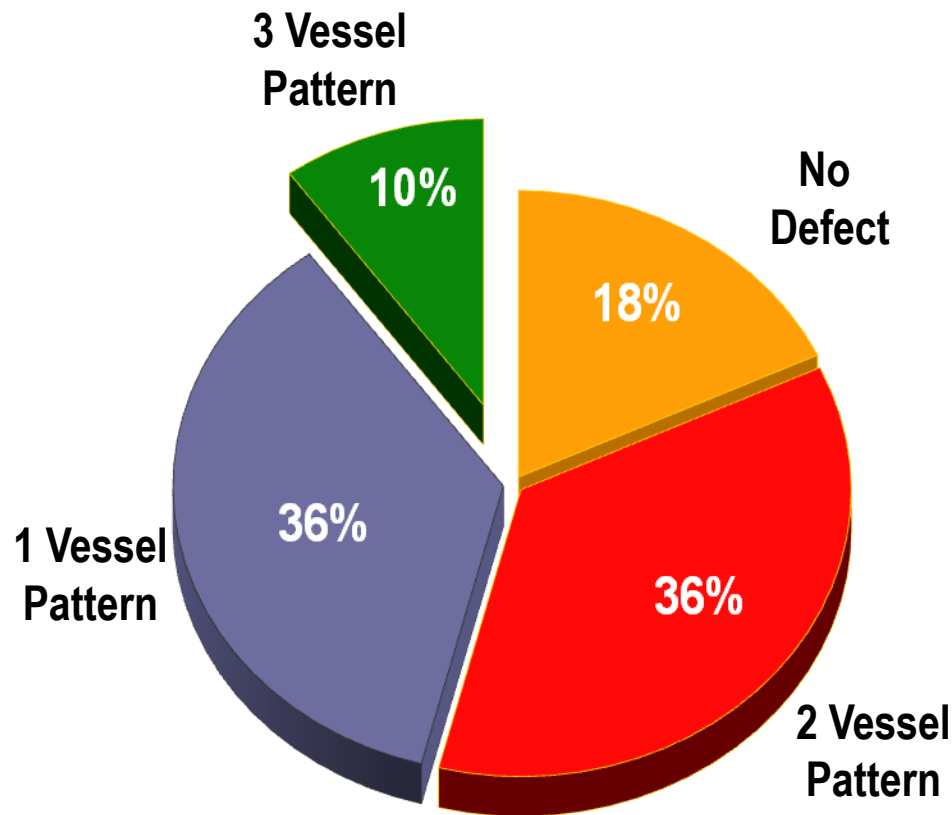
## F/56 Stable angina with recent aggravation



**Always negative, regardless of patient's symptom!**

# Inaccuracy of perfusion SPECT in multi-vessel disease

143 severe 3-vessel disease patients and Tc-SPECT



Lima RS, et al JACC 2003

## Per-Vessel analysis

	positive	negative
$\text{FFR} < 0.80$	38	42
$\text{FFR} > 0.80$	24	97

PPV 61%, NPV 70%

Melikian, et al, JACC intv, 2009

# Which is the Best Modality for the Ischemia-guided Functional Angioplasty? SPECT, CT, Exercise ECG, CAG and FFR

## F/56 Stable angina with recent aggravation

**Myocardial SPECT:** 9 years ago – no perfusion defect

**Myocardial SPECT:** 3 years ago – no perfusion defect

**Coronary CT angiography:** Proximal LAD 50-60%, prx and dist LCX 70%, RCA os 40-50%

**Exercise stress test:** suggestive of positive

**CAG:** 1 vessel disease – proximal and distal LCX

**Myocardial SPECT** 6 month after PCI: no perfusion defect

**FFR:** 2 vessel disease – proximal LCX and RCA os

→ Functionally complete revascularization with 2 drug-eluting stents

→ Patient's symptom was improved

# Which is the Best Modality for the Ischemia-guided Angioplasty?

: CCTA, Ex-stress test, MPI, IVUS, OCT, FFR.....



**“Ischemia-guided angioplasty”**

Stenting of ischemic lesions and medical treatment of non-ischemic ones

## Fractional Flow Reserve