FFR in unstable angina and after MI

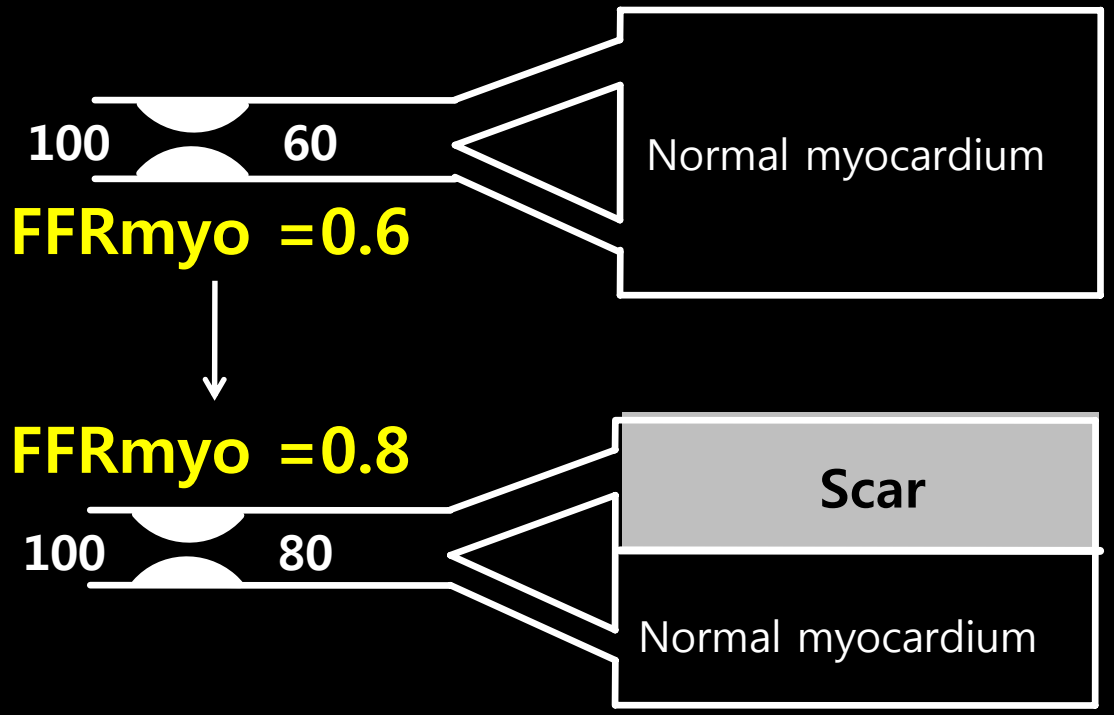
June-Hong Kim, MD. PhD

Cardiovascular center
Pusan National University Yangsan Hospital

양산부산대학교병원
PUSAN NATIONAL UNIVERSITY YANGSAN HOSPITAL

FFR tells you “physiologic stenosis severity’ rather than “anatomical stenosis severity” in myocardium with previous MI

Anatomic stenosis severity is identical
But, Physiologic stenosis severity has decreased

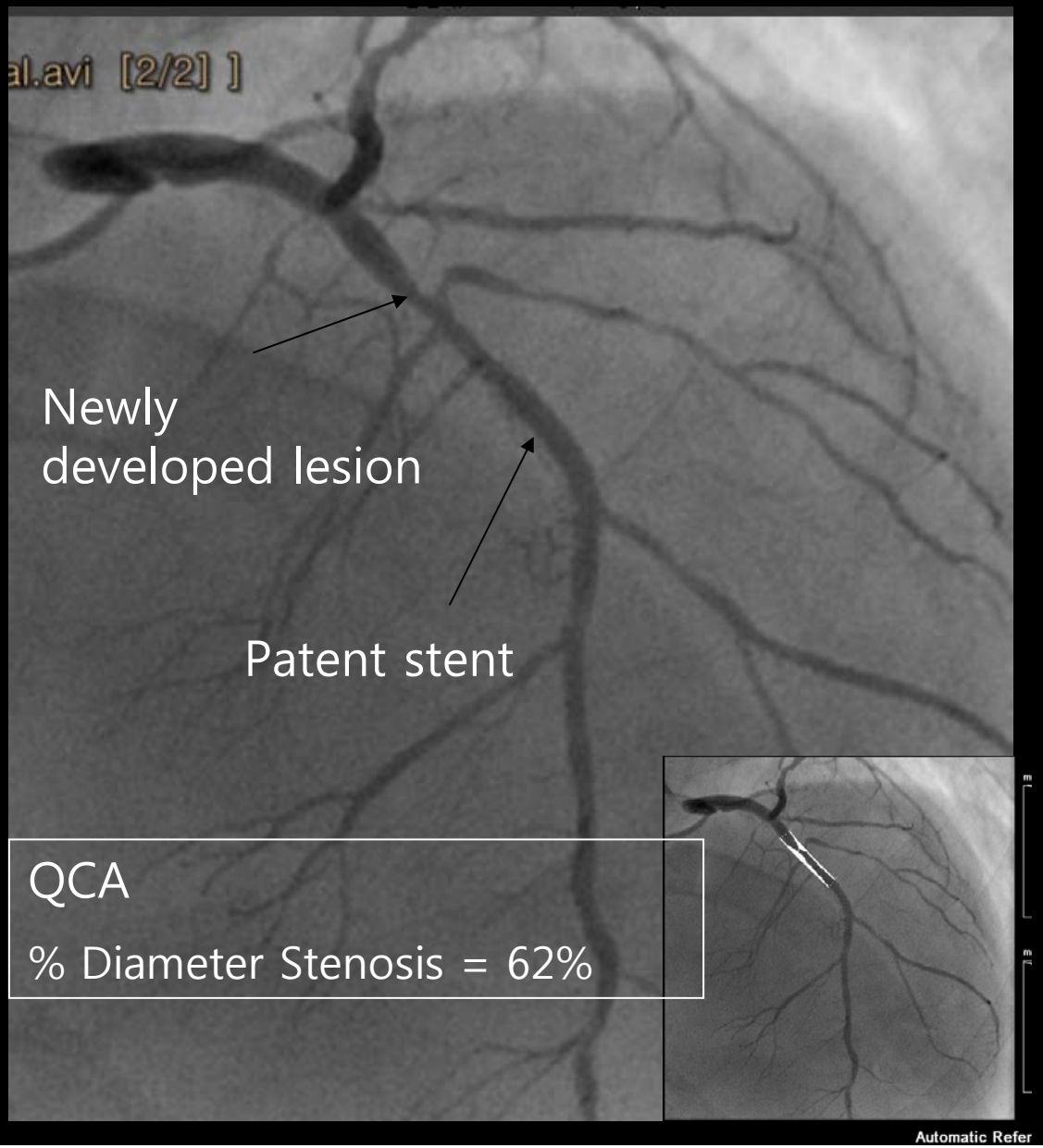


Nico H. j. Pijls European Heart Journal(2007) 28, 2301-2302

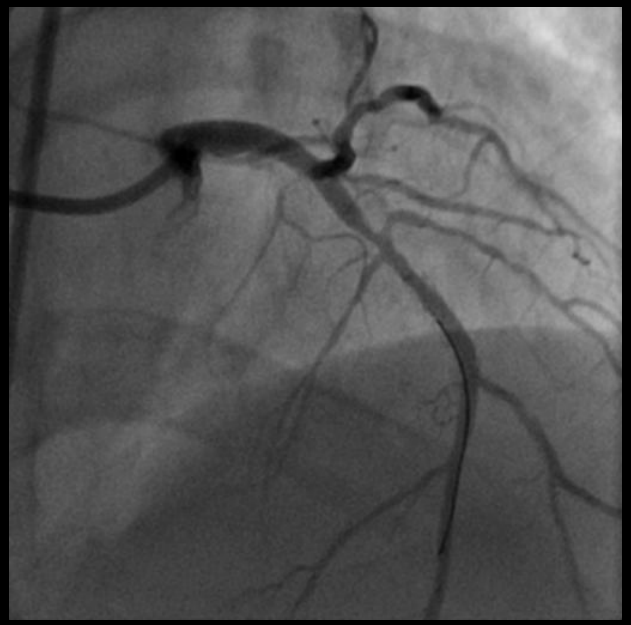
Case 1. 58 yr male, chest discomfort

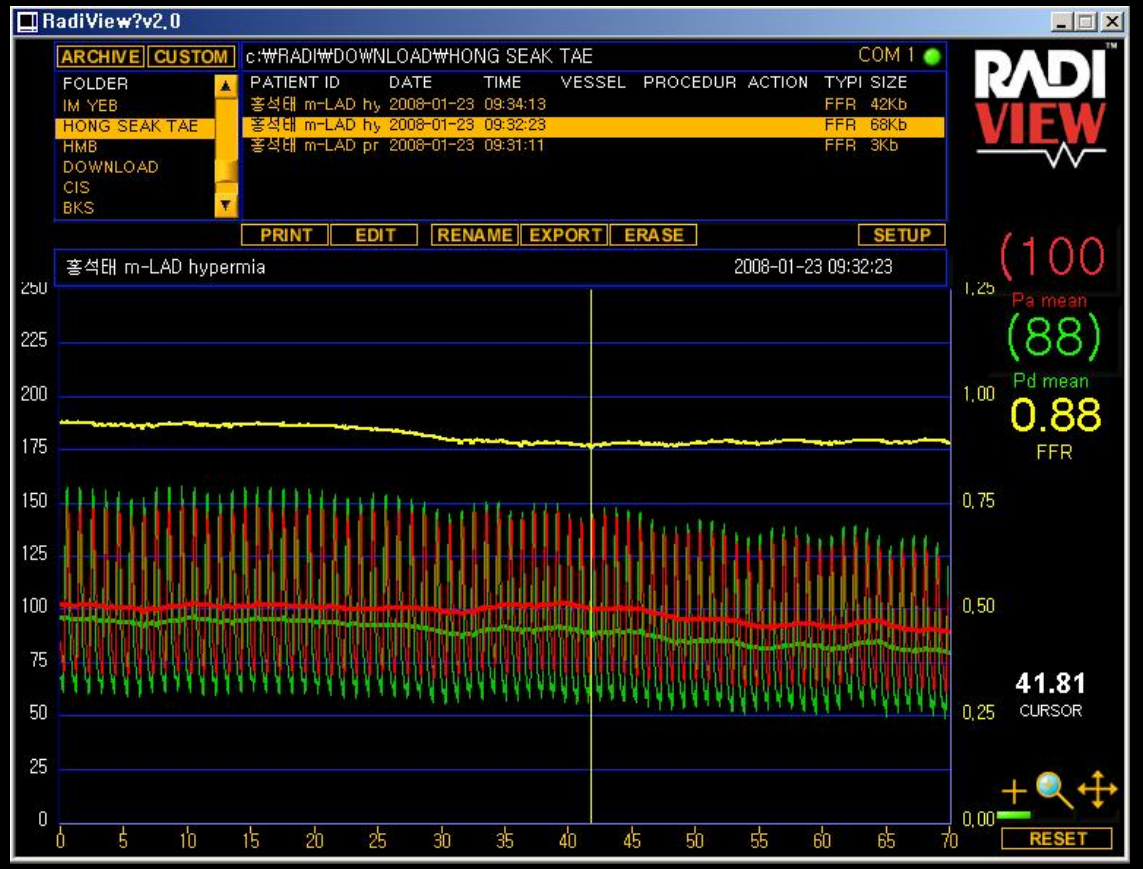
- 6 years ago : mLAD stenting due to STEMI
- He had been OK during follow-up
- Recently, chest discomfort developed

Case 1. Coronary angiogram



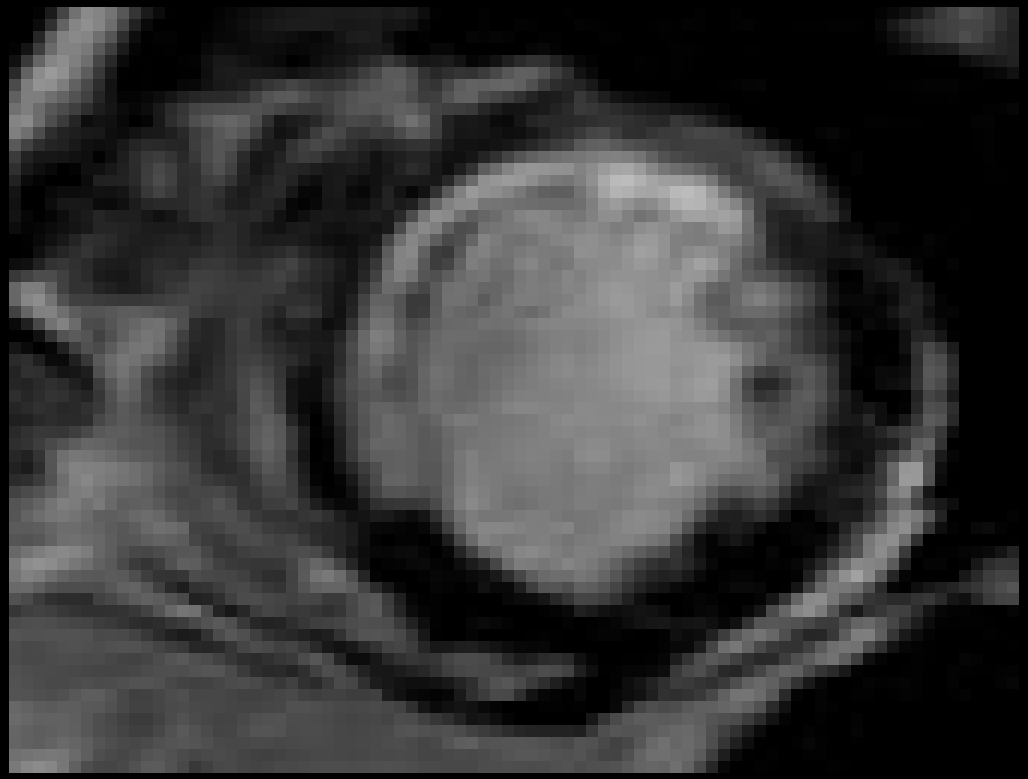
Case 1. FFR = 0.88



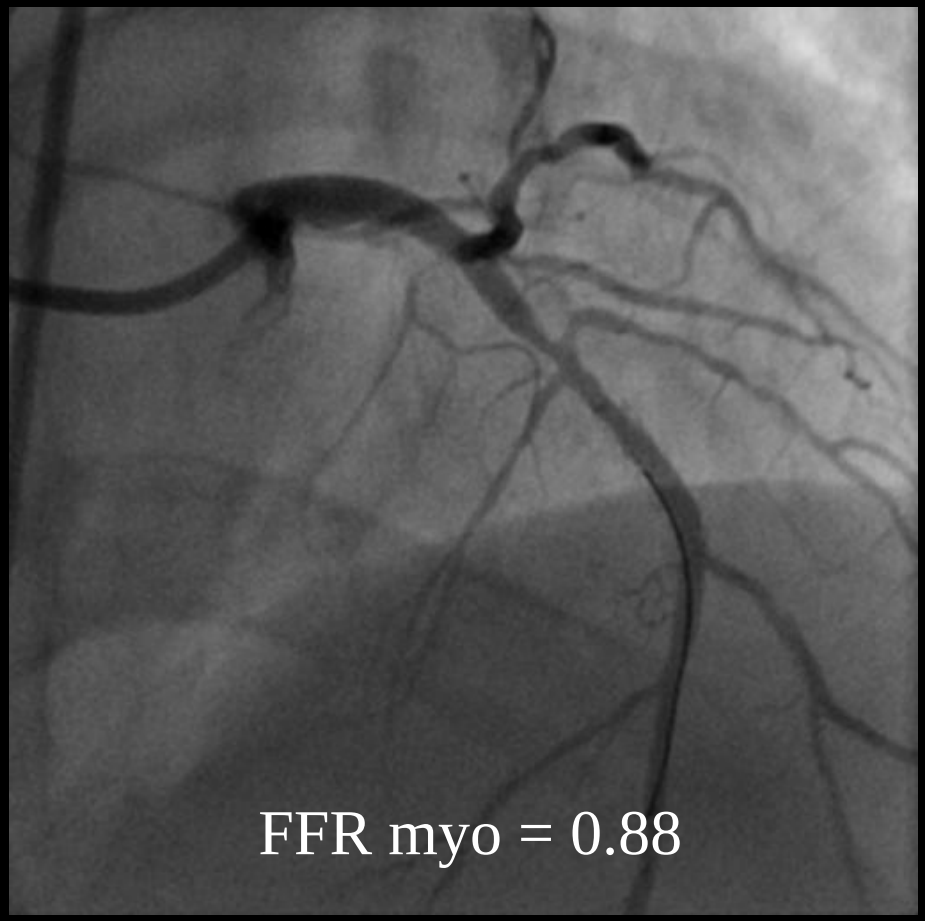


Case 1. Cardiac MRI finding

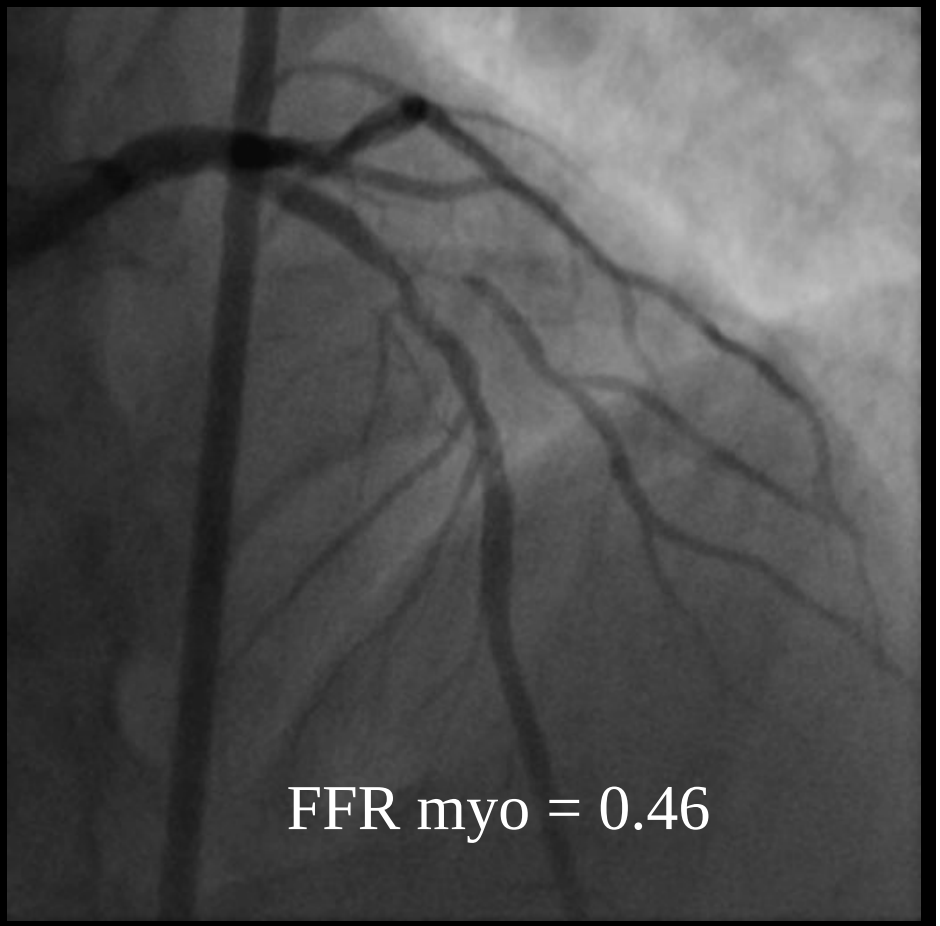
- **Was his FFR value influenced by Scar tissue at LAD territory?**



Yes, ‘Scar tissue’ does influence on FFR!



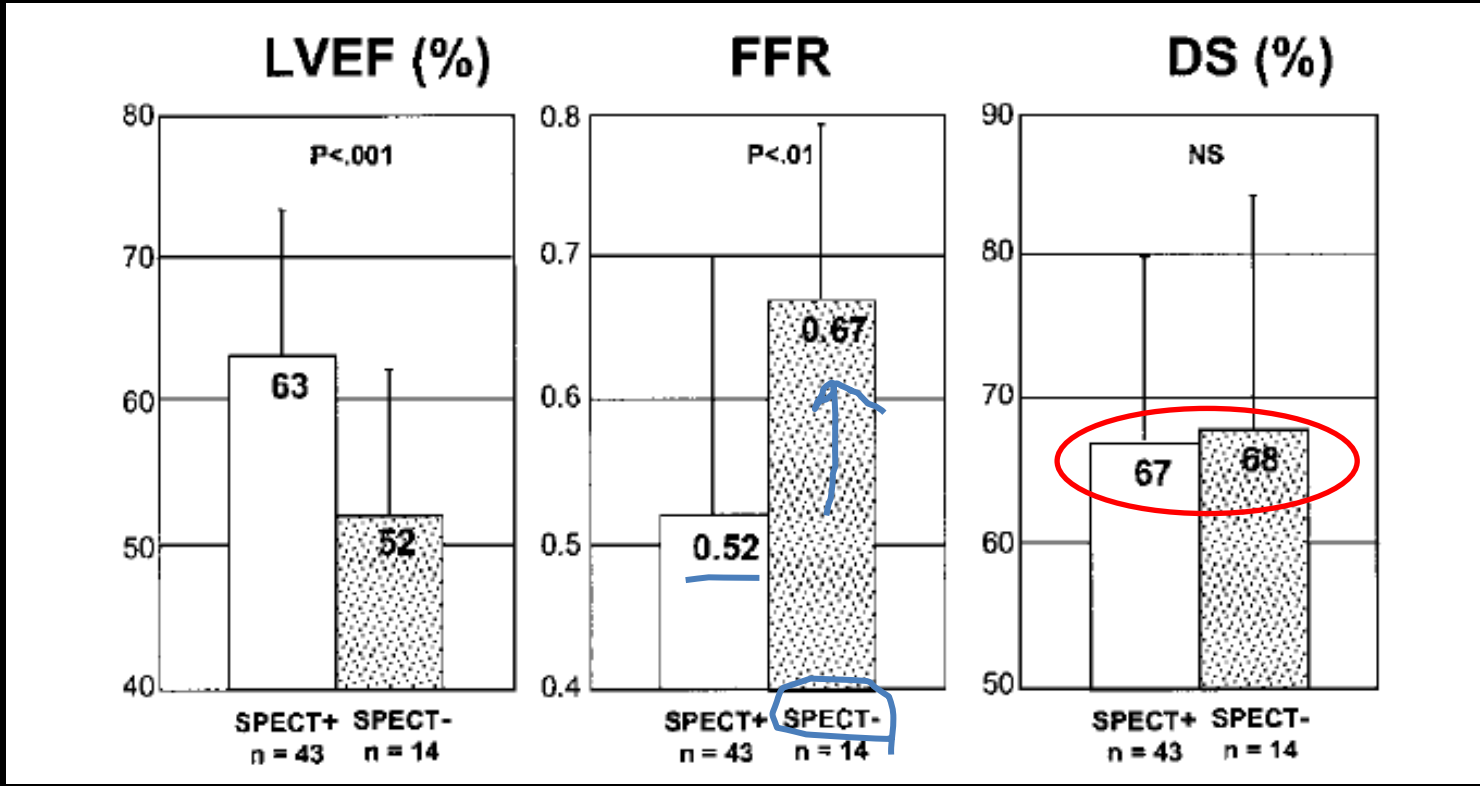
previous MI (+)



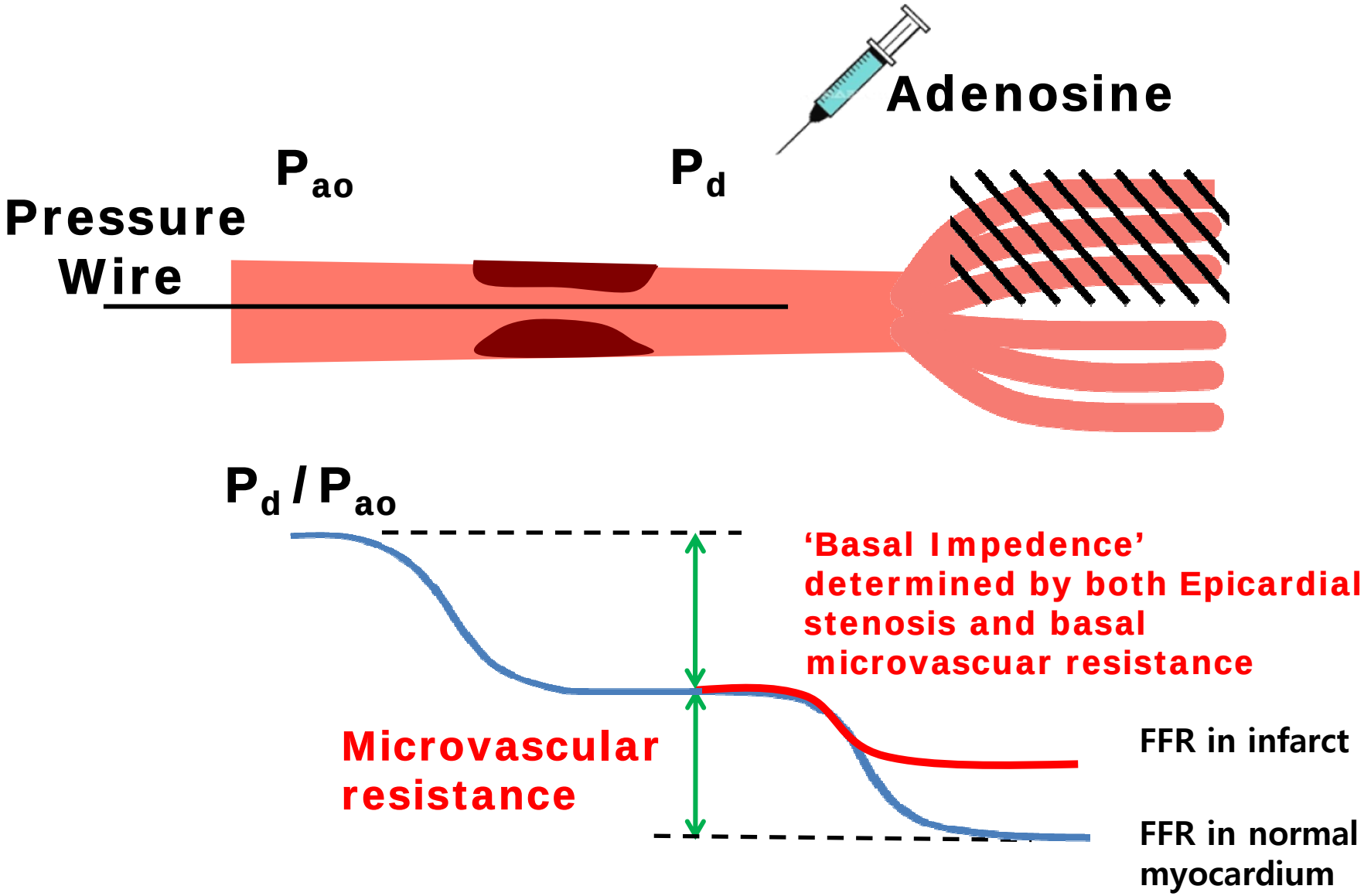
No previous MI

FFR in previous MI

- At similar degree of stenosis, higher FFR with negative Spect
- FFR depends on mass of viable myocardium at risk

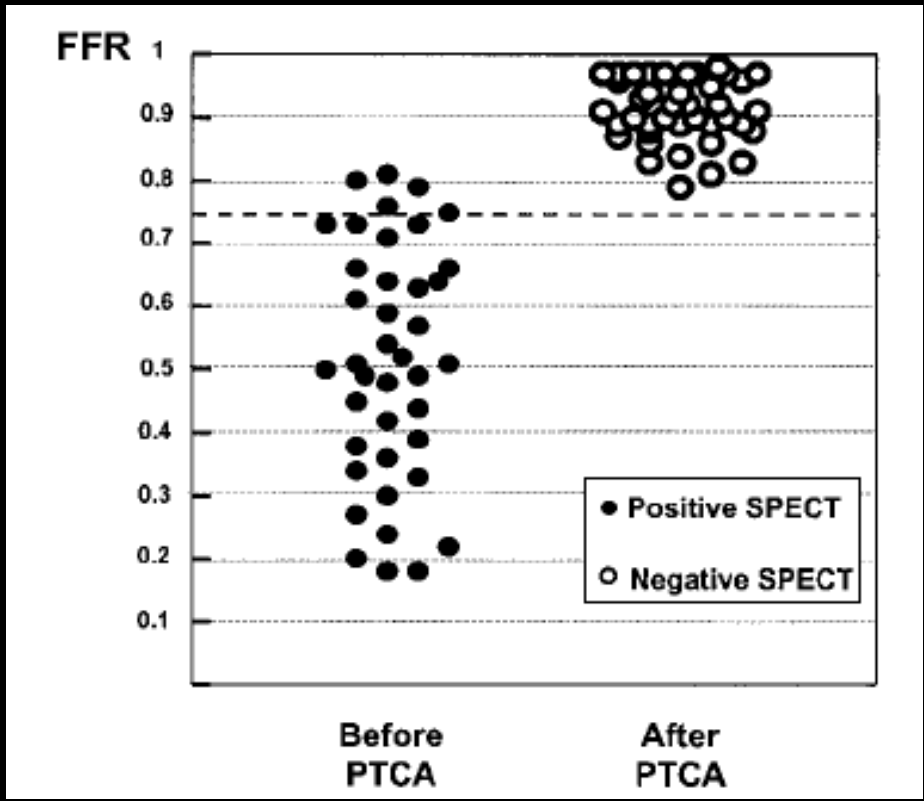


Bruyne et al. Circulation 2001;157-161


Adenosine
P_{ao}
P_d
Pressure Wire
P_d / P_{ao}
'Basal Impedence' determined by both Epicardial stenosis and basal microvascuar resistance
Microvascular resistance
FFR in infarct
FFR in normal myocardium

FFR in previous MI

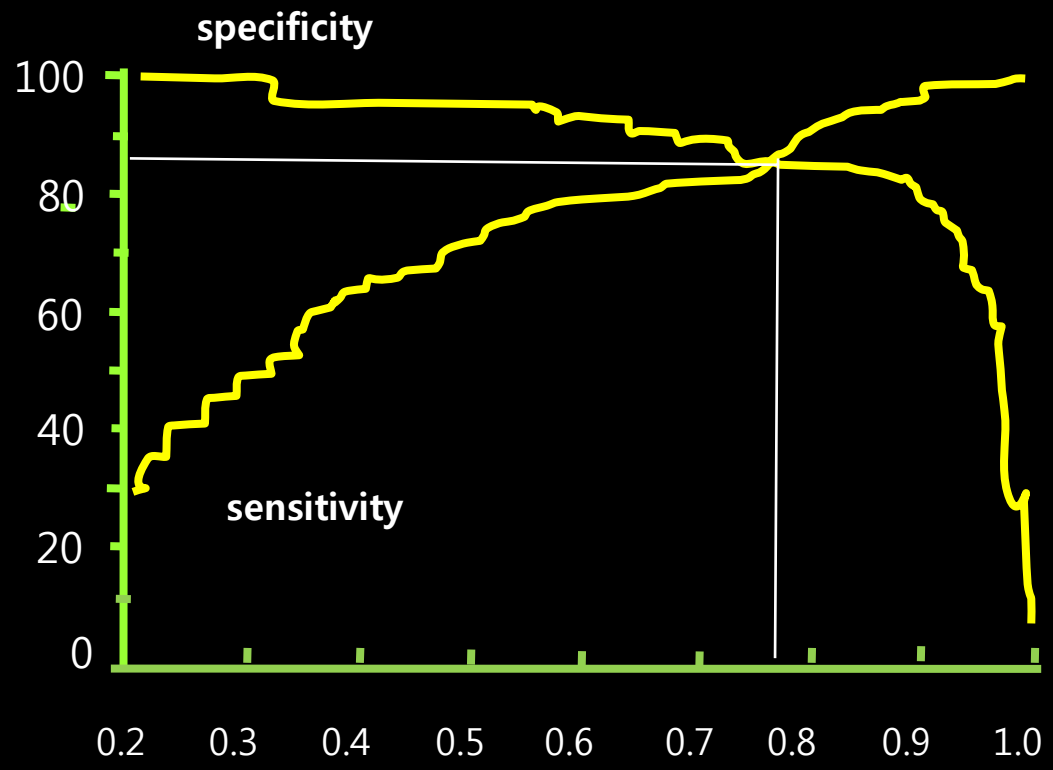
- **Most lesions with positve spect findings showed FFR < 0.8**



Bruyne et al. Circulation 2001;157-161

Cutt- off value of FFR in previous MI

- **The value of FFR for which sensitivity and specificity are equal (88%) was 0.78**



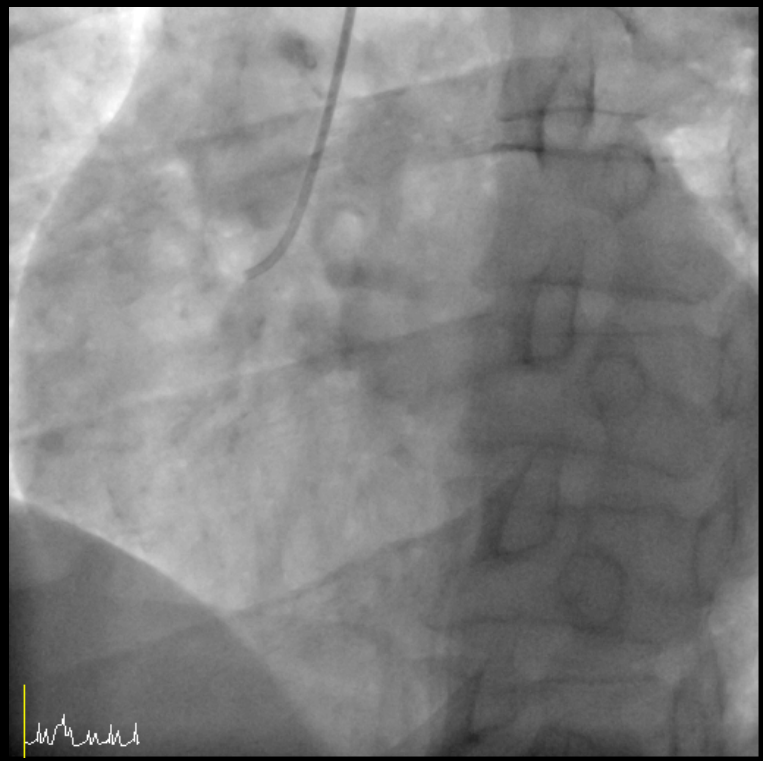
Bruyne et al. Circulation 2001;157-161

Myocardial Infarction, microvacular damage and FFR

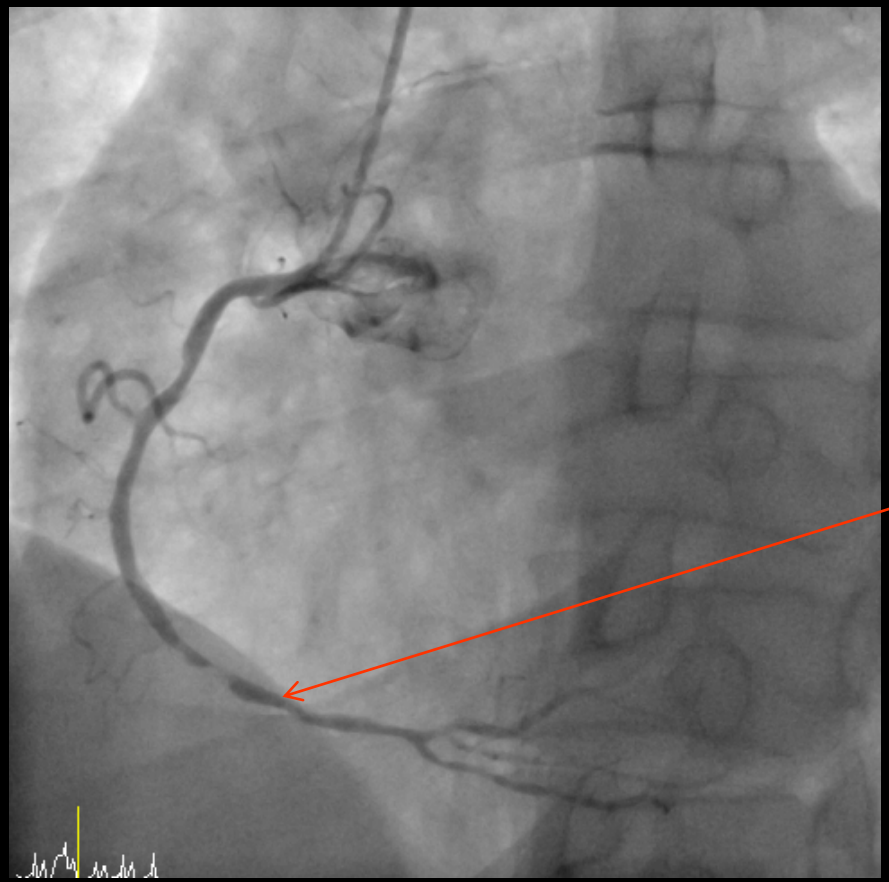
- ✓ The maximum achievable blood flow is reduced
  - ❖ There will be a higher FFR across any given epicardial stenosis
  - ❖ Higher FFR reflect the smaller amount of perfusable/viable myocardium
- ✓ This FFR still provides useful information about ‘physiologic significance’ rather than ‘anatomical significance’ alone in previous MI.

Case 2. FFR in “acute” STEMI case ??

- **M/43,**
- **Sudden chest pain with ST elevation in inferior leads.**
- **Primary PCI was done within 3 hours of chest pain onset**



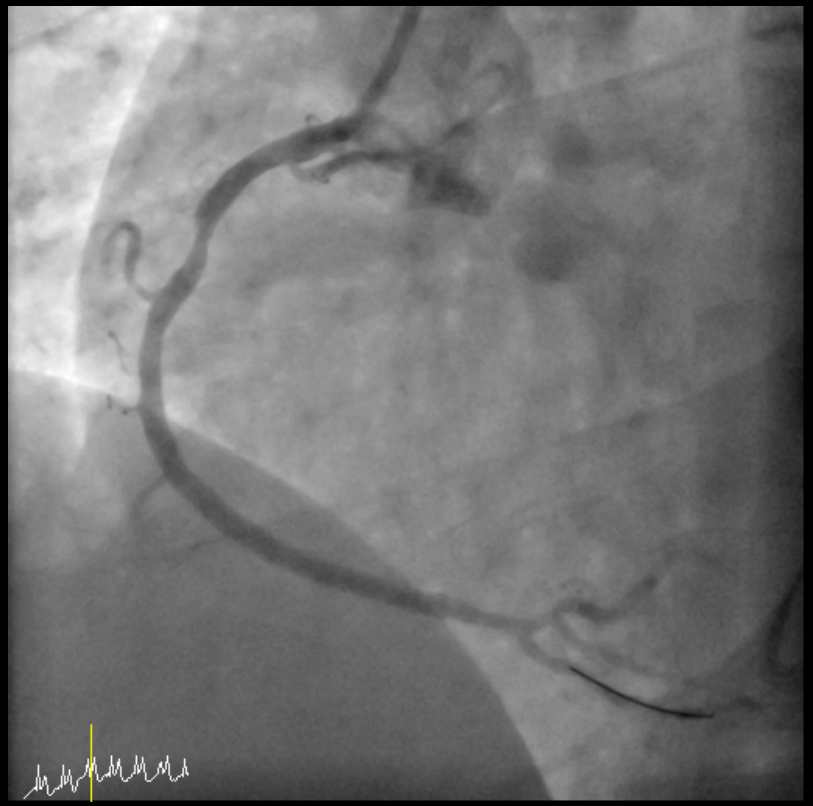
Should we rely on FFR on this lesion?

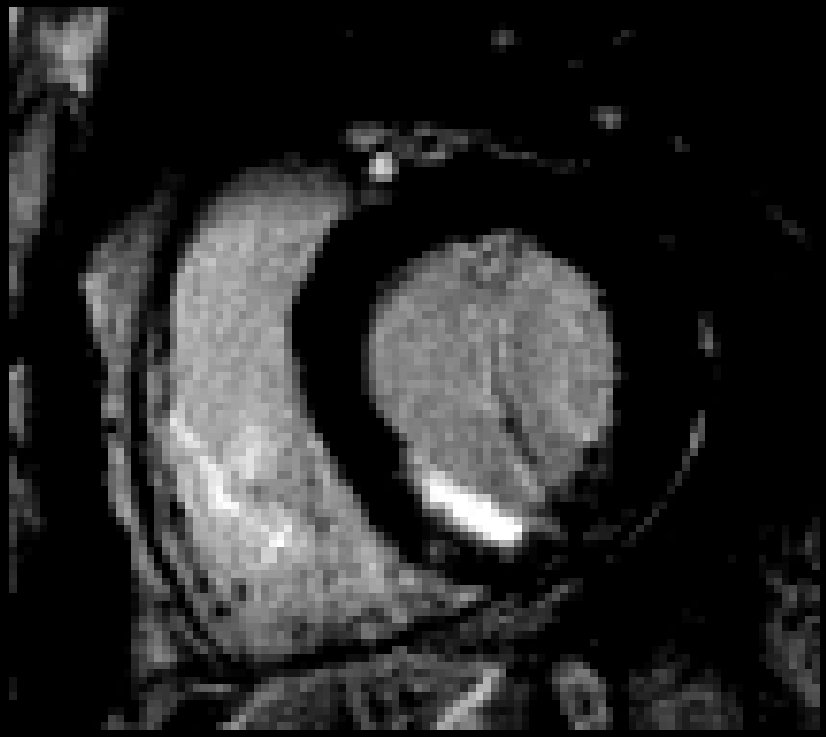


Is this ischemic territory mostly non-viable so that the FFR is ended up with higher than what you expect?

Should we rely on FFR on this lesion?

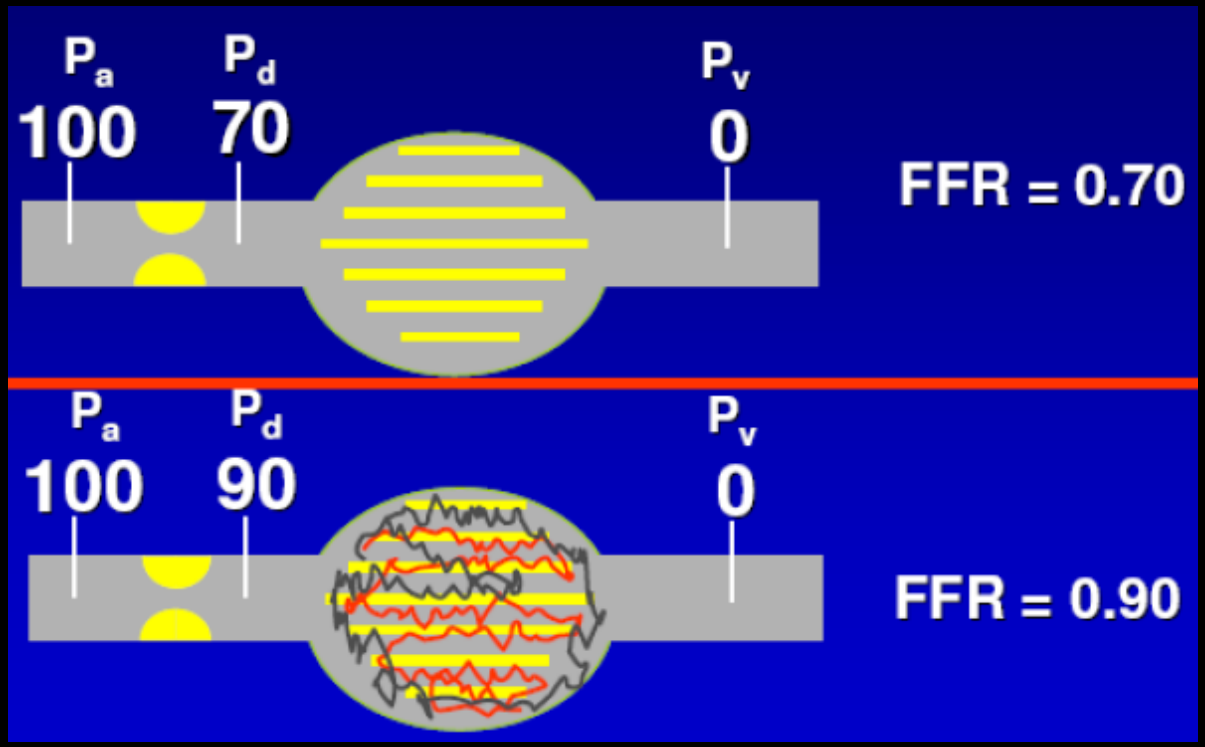
- C-MRI showed relatively small portion of sunendocardial infarction,
- Based on C-MRI finding, the lesion should be opened up





FFR during “acute” STEMI

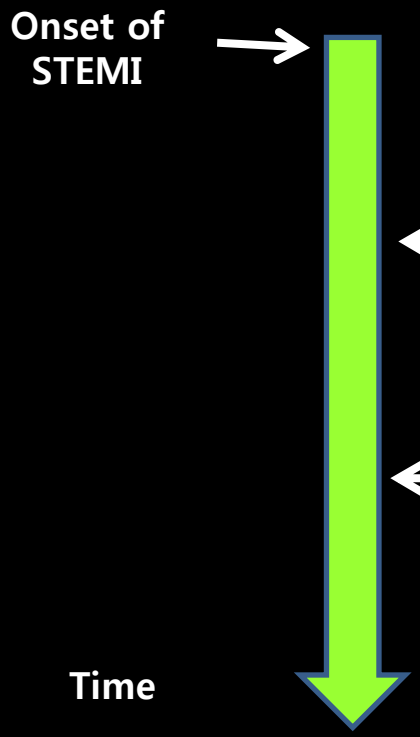
- FFR is not reliable in acute setting of STEMI
- Variable degree of microvascular stunning.
- Smaller gradient and Higher FFR in any given stenosis



How early is OK for FFR in STEMI ?

- **still remans an issue to be answered,**
- **3~6 days later?**

Proven data showing reliability of FFR in STEMI as early as ….



3 days Samady et al. JACC 2006:47;2187-2193

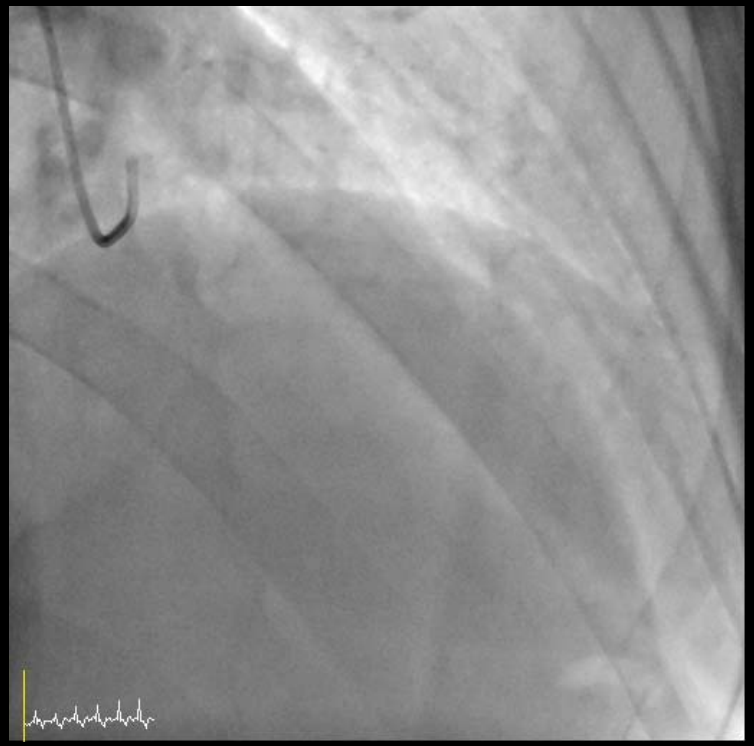
6 days Bruyne et al. Circulation 2001;157-161

Cases of FFR in unstable angina

- M/45,
- Recently developed CP with resting pain

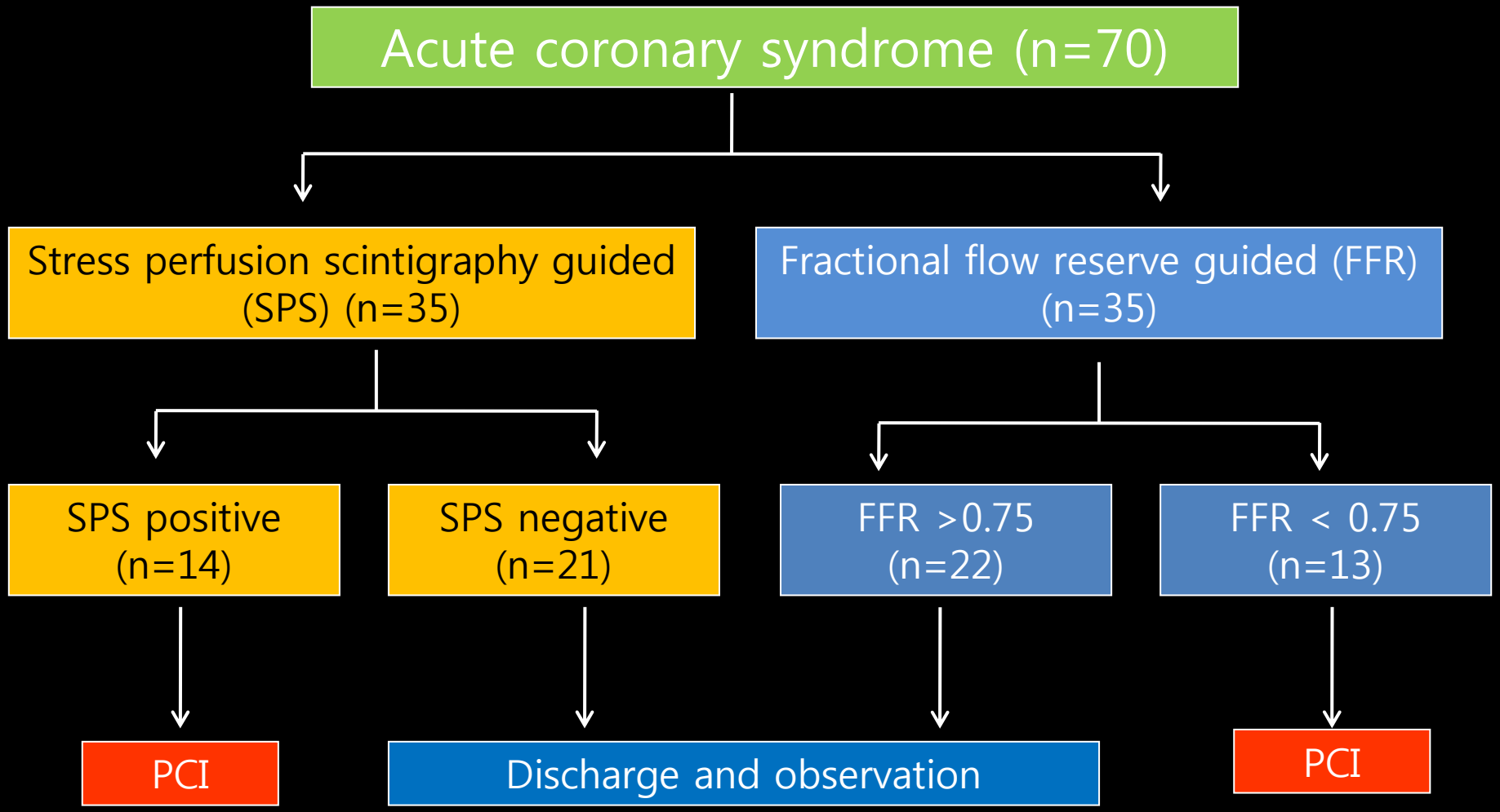
FFR=0.41

- M/52,
- newly developed chest pain



FFR=0.72

FFR in acute coronary syndrome (UA and NSTEMI)



Leesar MA et al. JACC 2003. 1115-21

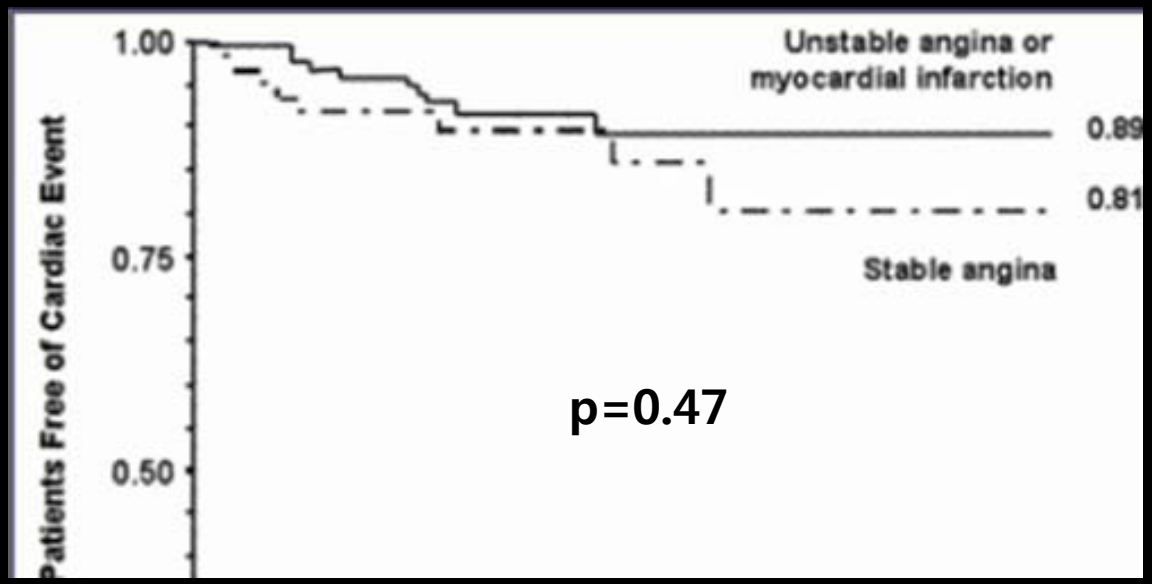
No difference of event rates during follow-up

	Group 1 (SPS) (n = 34)	Group 2 (FFR) (n = 34)
Average follow-up (months)	12.0 ± 0.8	14.0 ± 1.0
Death	0	0
Angina		
No angina (n)	17	24
CCS classification of angina (n)		
1–2	17	10
3–4 (admitted to the hospital)	6	5
Stress perfusion scintigraphy	4	4
Negative (n)	4	4
Cardiac catheterization	2	3
Results (no change)	2	2
Disease progression	0	1
MI	1	1
CABG including target vessel	1	2
PCI	0	0

Leesar MA et al. JACC 2003. 1115-21

No difference of event rates during follow-up

210 consecutive patients with 50% stenosis (2/3 with ACS) in which intervention was deferred based on FFR



Potvin st al. AJC 2006. 289-297

In summary

1. In the acute phase of STEMI, FFR measurement should not be used due to serious microvascular impairment, and treatment should be guided by the clinical symptoms and ECG. Pressure measurements are useful only after the artery has estabilised
2. For a given stenosis, FFR correlates inversely with the amount of viable myocardium.
3. In the setting of NSTEMI and UA, FFR appears accurate and safe.


Thanks for your attention
PNUH
양산부산대학교병원
PUSAN NATIONAL UNIVERSITY YANGSAN HOSPITAL