



Technical and Interpretational Pitfall in FFR measurement

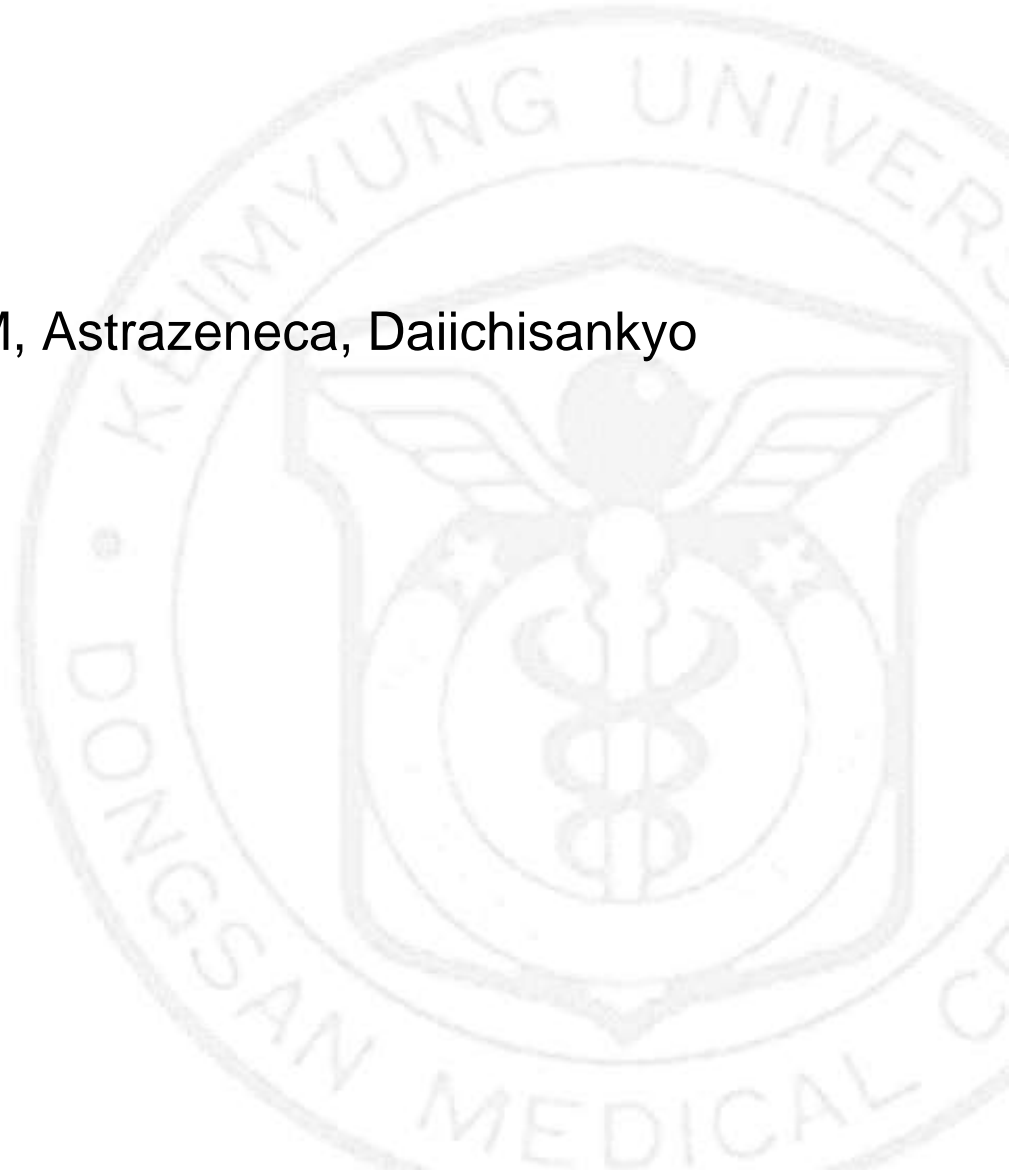


Keimyung University Dongsan Medical Center
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DISCLOSURE

- **Research grant:** Pfizer
Medtronic
Biosensors
- **Consultant:** Pfizer, SJM, Astrazeneca, Daiichisankyo



The Era of Evidence-Guided PCI

Moderator(s): Takashi Akasaka, Bon-Kwon Koo

Panelist(s): Joon-Hyung Doh, John McB. Hodgson, Soo-Jin Kang, Hitoshi Matsuo, Chang-Wook Nam, Eun-Seok Shin, Ping Tim Tsui, Alan C. Yeung

4:00 PM Technical and Interpretational Pitfall in FFR Measurement
Lecturer: Chang-Wook Nam

Integrated Use of FFR and IVUS

4:10 PM Case 1: Left Main Disease
Lecturer: Seung-Jung Park

4:20 PM Case 2: Bifurcation, Tandem and Diffuse Disease
Lecturer: Bon-Kwon Koo

4:30 PM Advantages/Disadvantages of FFR, iFR and Hybrid Strategy
Lecturer: Takashi Akasaka

4:40 PM Low FFR But Normal Thallium: How to Evaluate, Interpret and Treat It?
Lecturer: Soo-Jin Kang

4:50 PM Practical Aspect of IMR in AMI and Stable Angina
Lecturer: Jung-Min Ahn

5:00 PM Understanding About Low Post Stenting FFR
Lecturer: Joon-Hyung Doh

5:10 PM Prognostic Value of FFR: Insight from IRIS-FFR Registry
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5:20 PM Panel Discussion with Q & A

To get these evidences and benefits in your daily practice, you need to have a confidence with your FFR measurement and understand the meaning of result.

10-point Check List for Your Practice

1. General setting for FFR:

Infusion pump, IV connection site,
Level of fluid filled pressure transducer, etc

2. Issues for guiding catheter

Size, Side-holes, Pressure artifact, etc

3. Remove introducer from Y-connector

4. Start with equalization

5. Damping during pullback

6. Drift

7. Whipping

8. Spasm/Accordion effects

9. Location of pressure sensor

10. Issues for hyperemia

1. General setting for FFR

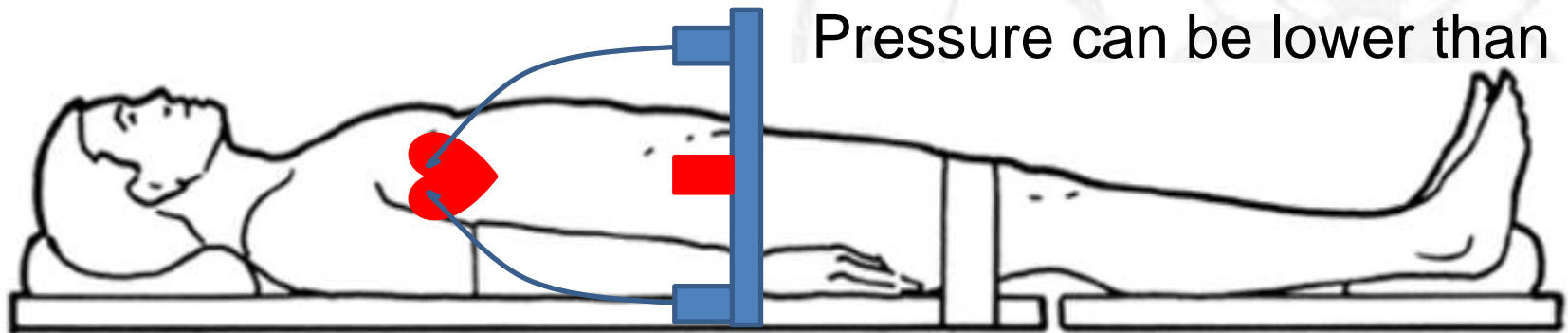
Each cath lab has their own setting for FFR measurement

Infusion pump

IV connection site

...

Level of pressure transducer

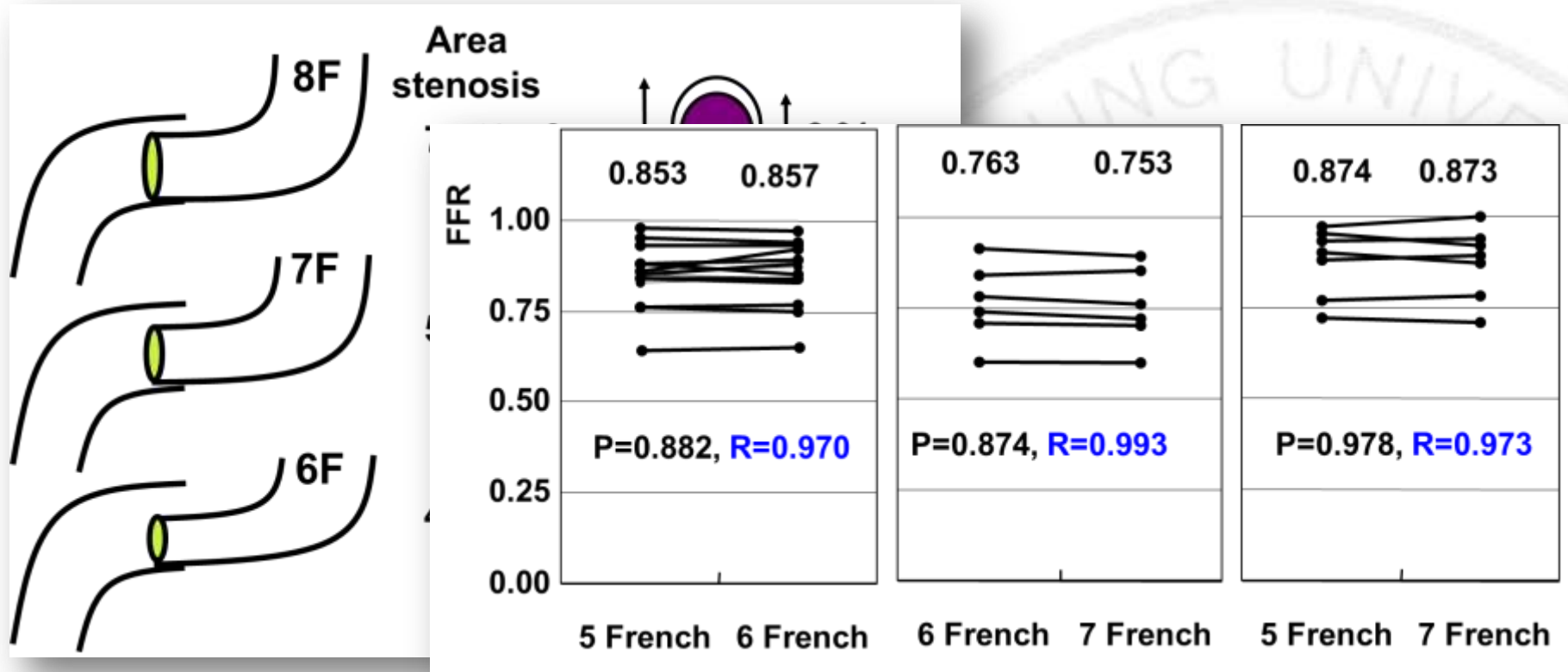


Pressure can be lower than real

Pressure can be higher than real

2. Issues for guiding catheter

- Size of guiding catheter

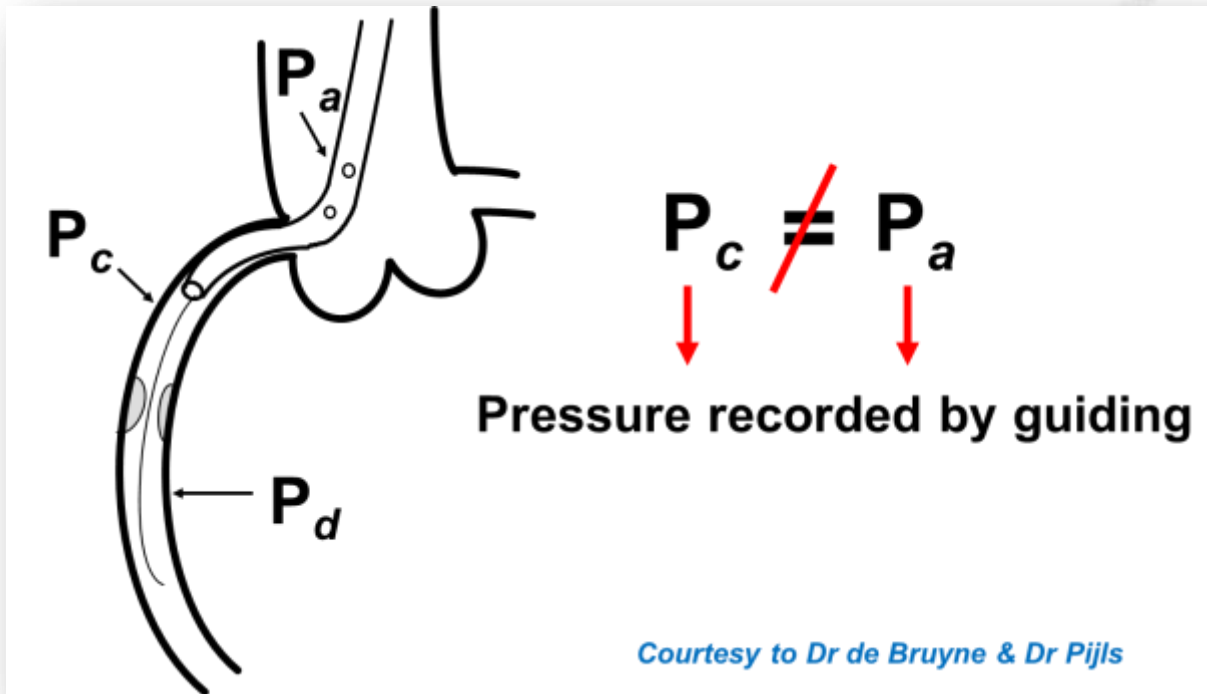


Pressure artifacts by **capillary forces** in small size guiding catheter ($\leq 5\text{Fr}$), or residual contrast in catheter

→ *Manual saline flushing before FFR measurement*

2. Issues for guiding catheter

- Size of guiding catheter
- Side hole guiding catheter

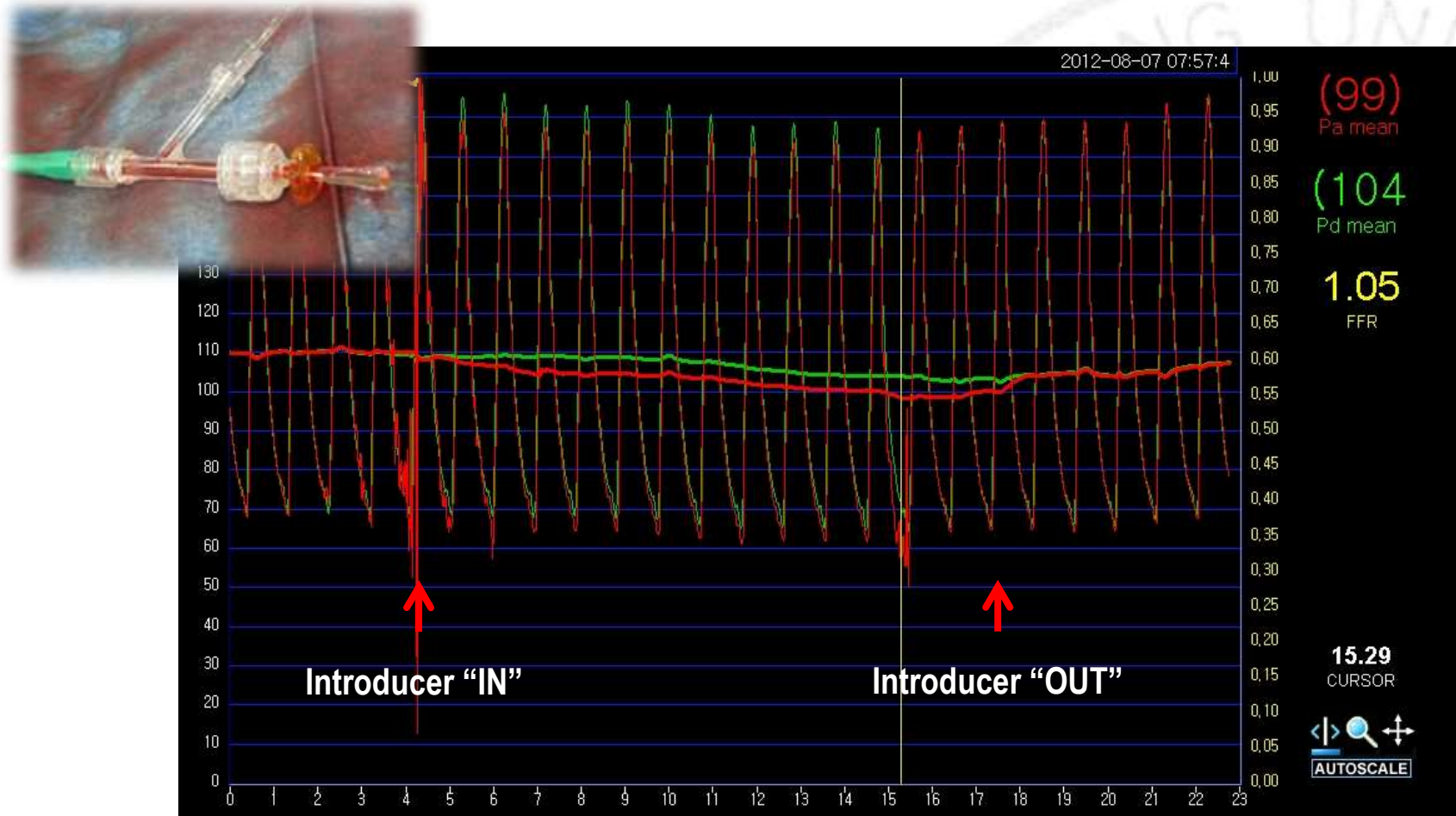


If you have to use side hole guiding catheter,

1. Remove catheter tip out of coronary ostium
2. Use continuous IV adenosine for hyperemia

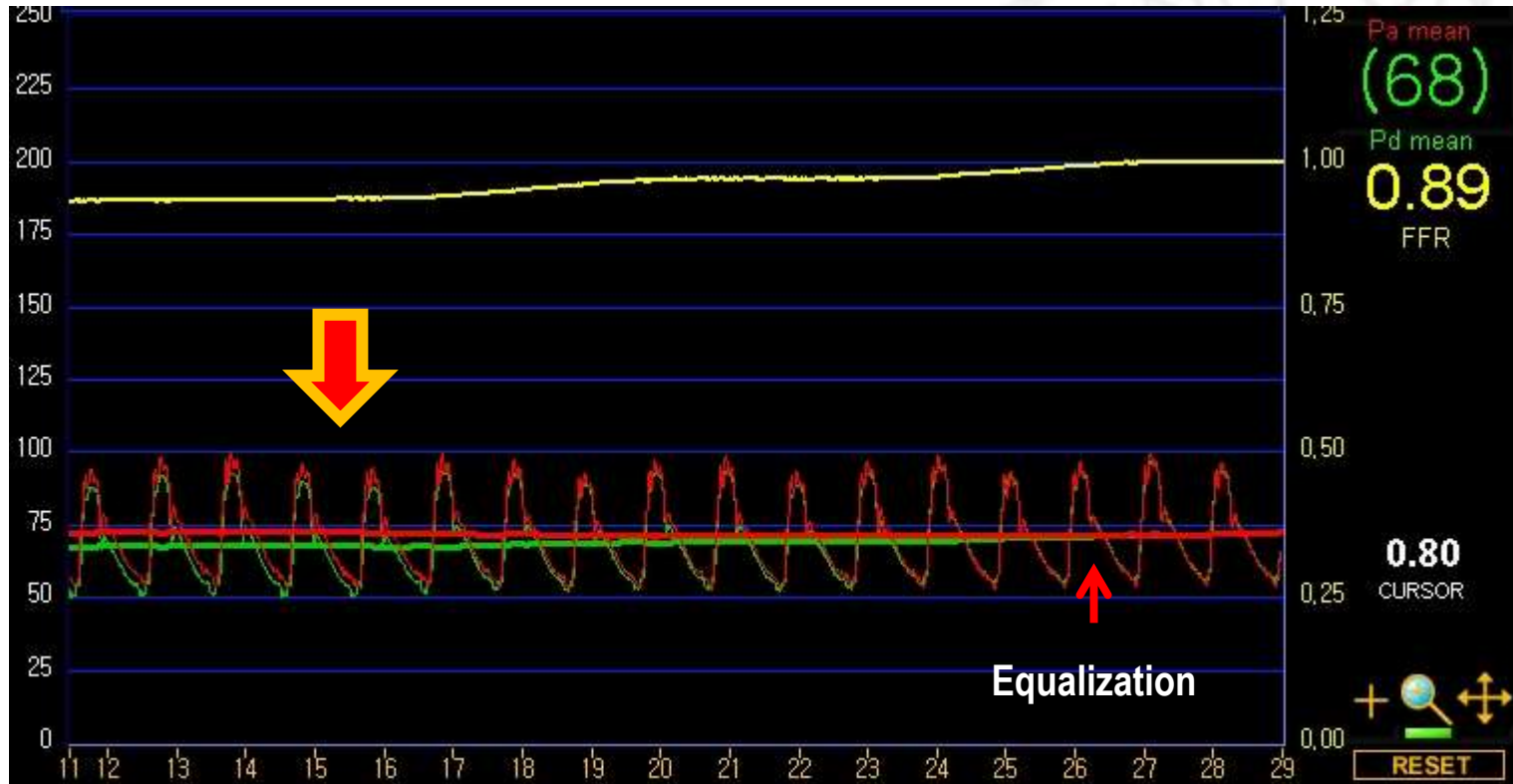
3. Remove introducer from Y-connector

Don't measure FFR with an "INTRODUCER" in place



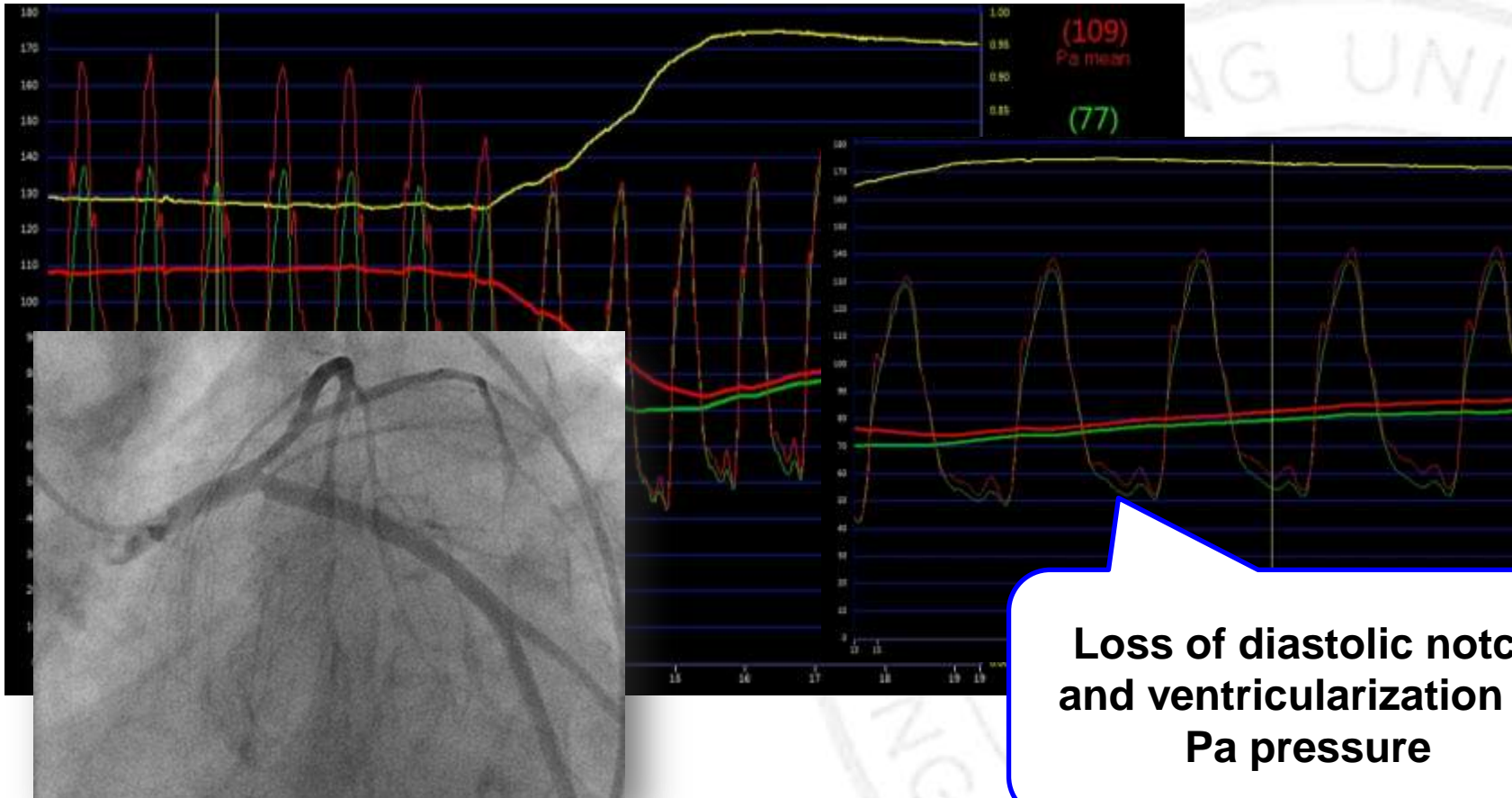
4. Start with equalization

Initial difference can make a different decision...



5. Damping during pullback

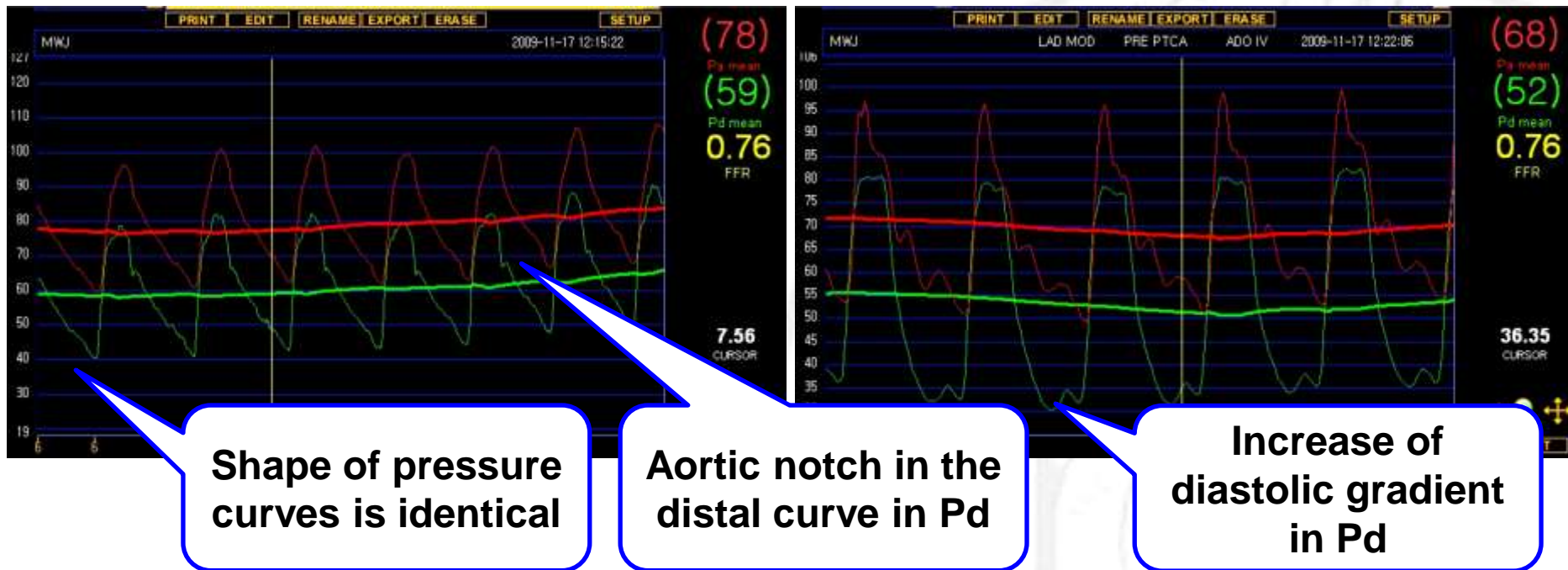
Focus not only FFR value, but also pressure curve...



Frequent pitfall during pullback, even if with 5 Fr catheter

6. Drift

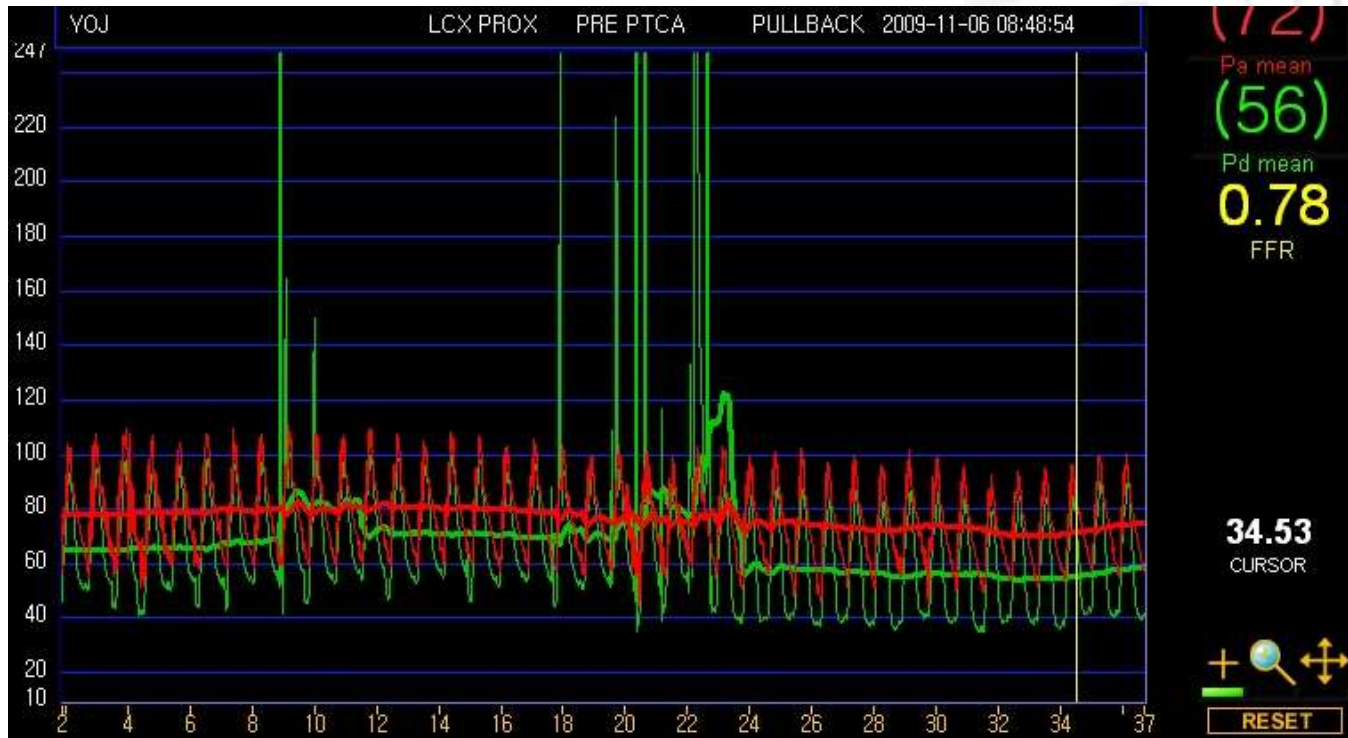
Artificial gradient due to “DRIFT”



If drift is suspected “re-equalization” is necessary.

7. Whipping artifact

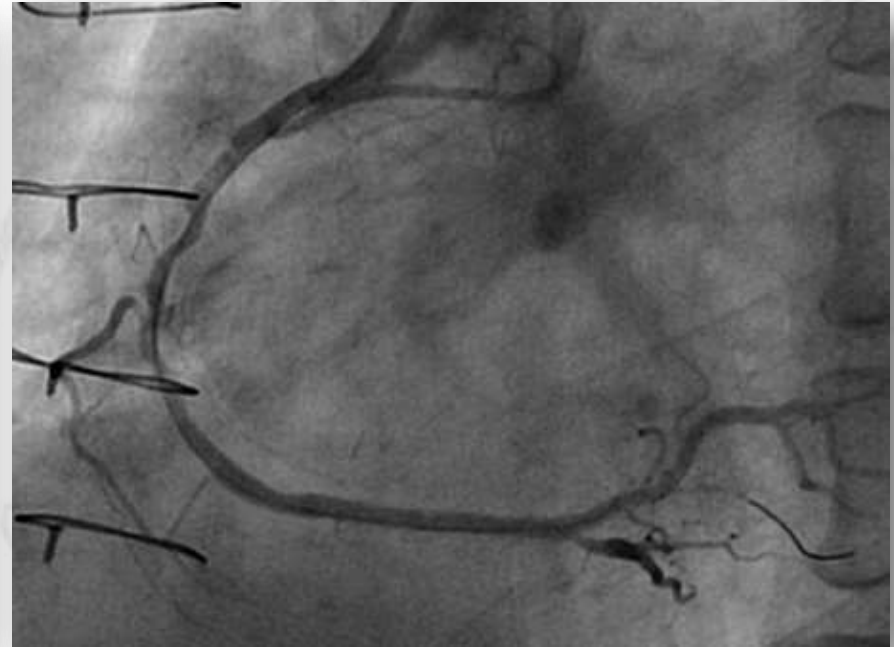
Coronary vessel wall hits the PW sensor



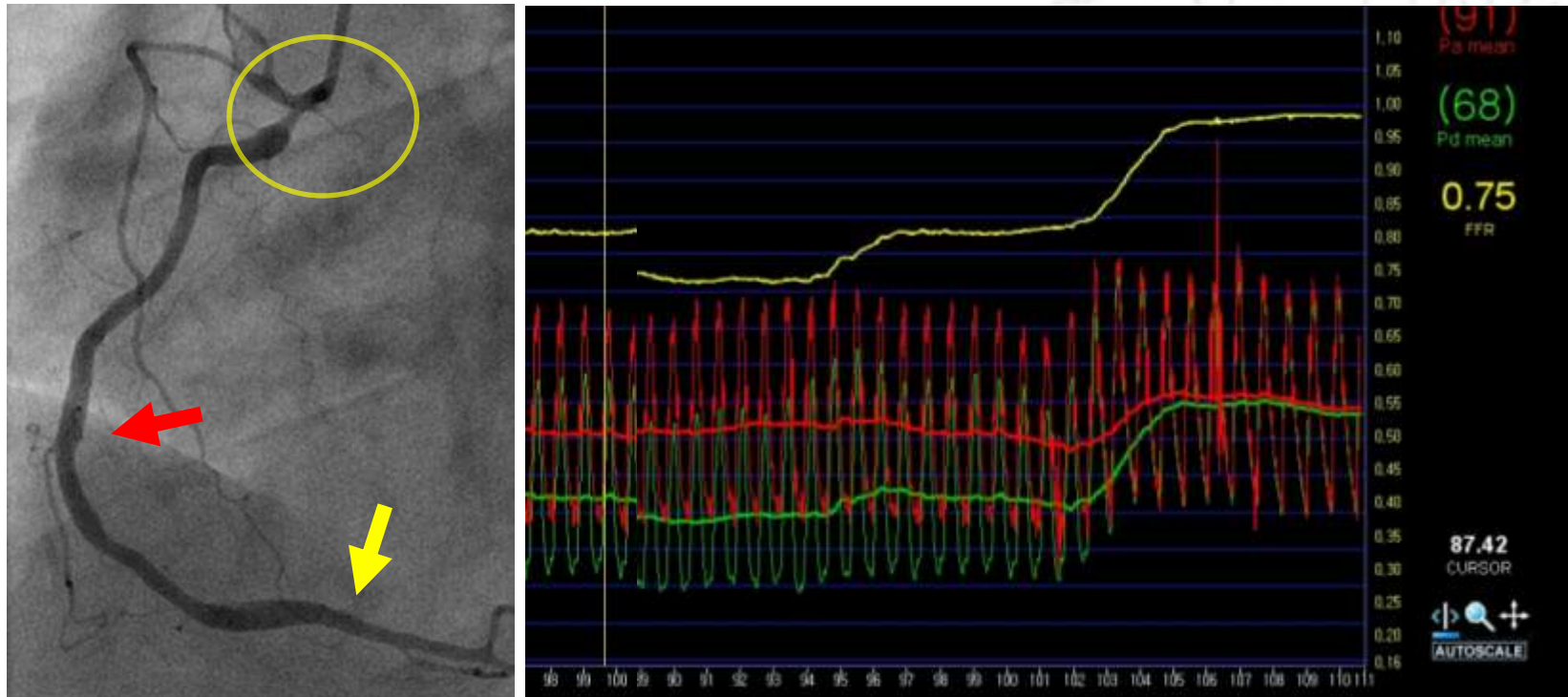
Move the PW sensor just a few millimeter

8. Spasm/Accordion effects

Pseudo-stenosis can make a wrong FFR value



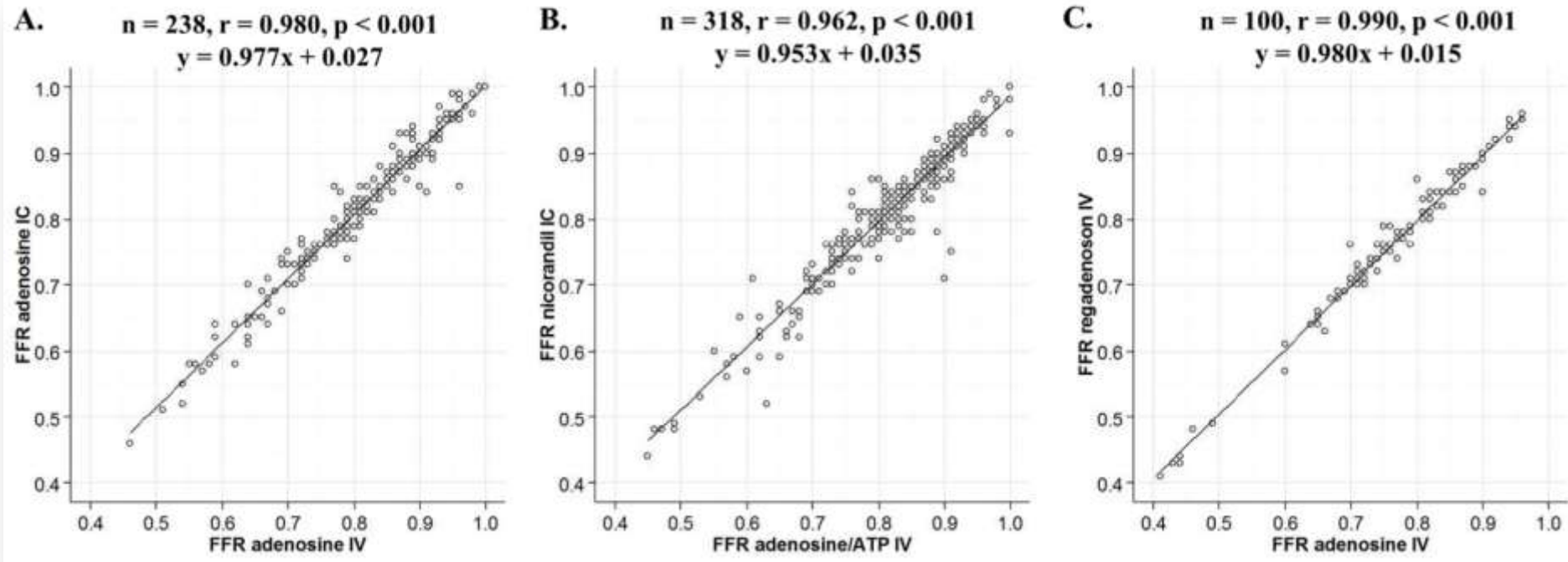
9. Location of pressure sensor



Measure FFR of all stenoses together from distal

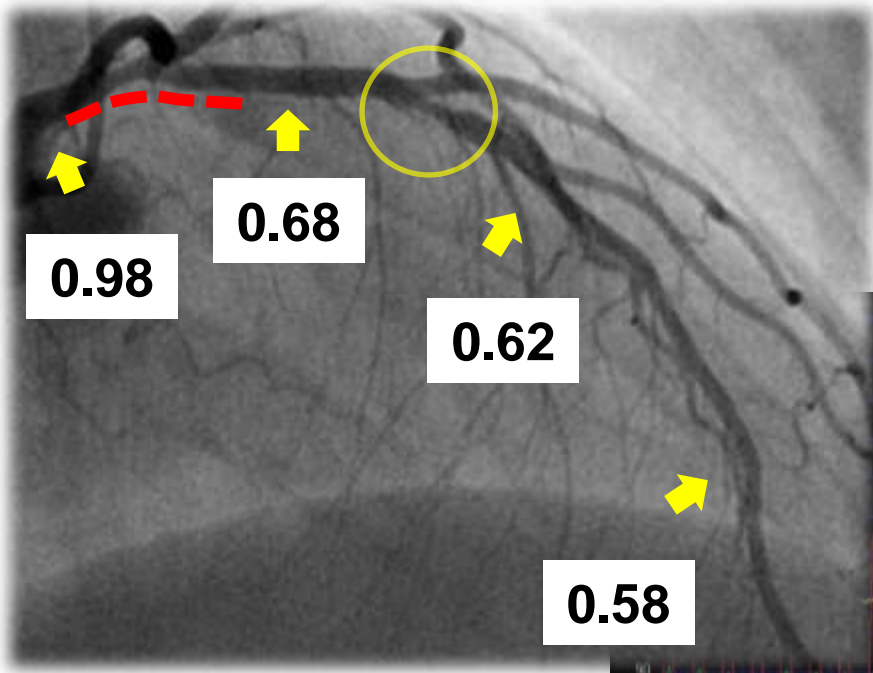
10. Issues for hyperemia

Major premise in the concept of FFR is
“Measuring pressure under maximal hyperemia”



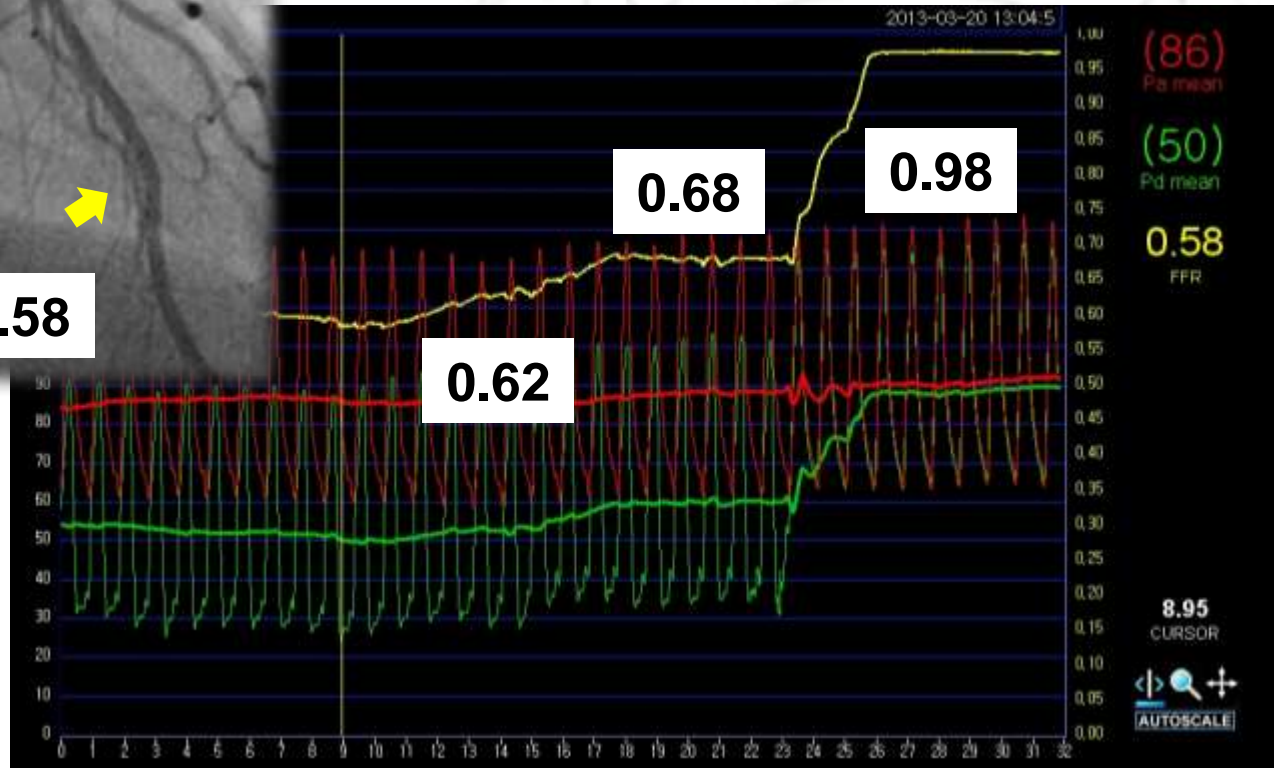
IV adenosine/ATP ~ IC adenosine ~ IC nicorandil ~ IV regadenoson

Interpretational Issue 1



Mid LAD
intermediate lesion

Tandem lesion
with LM disease

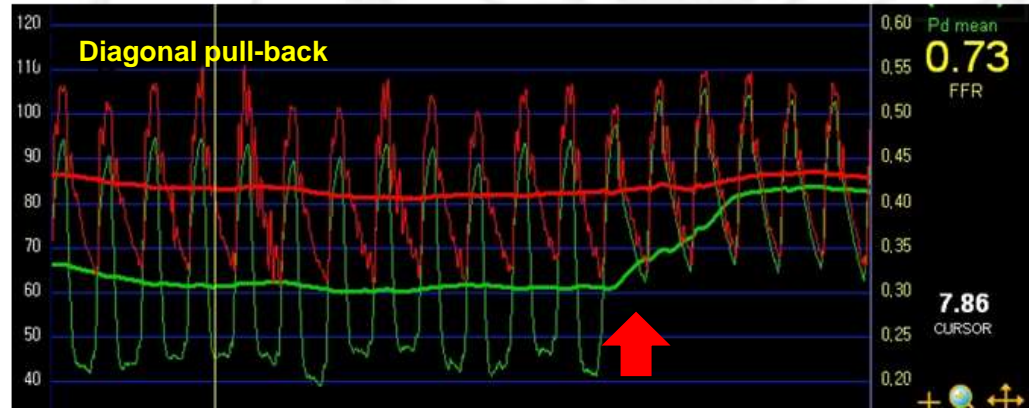
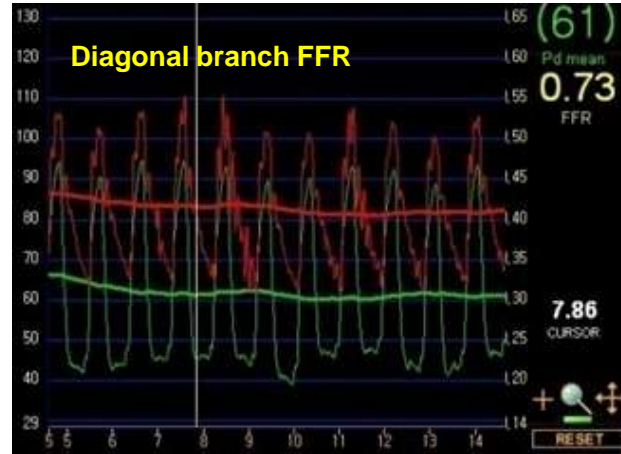
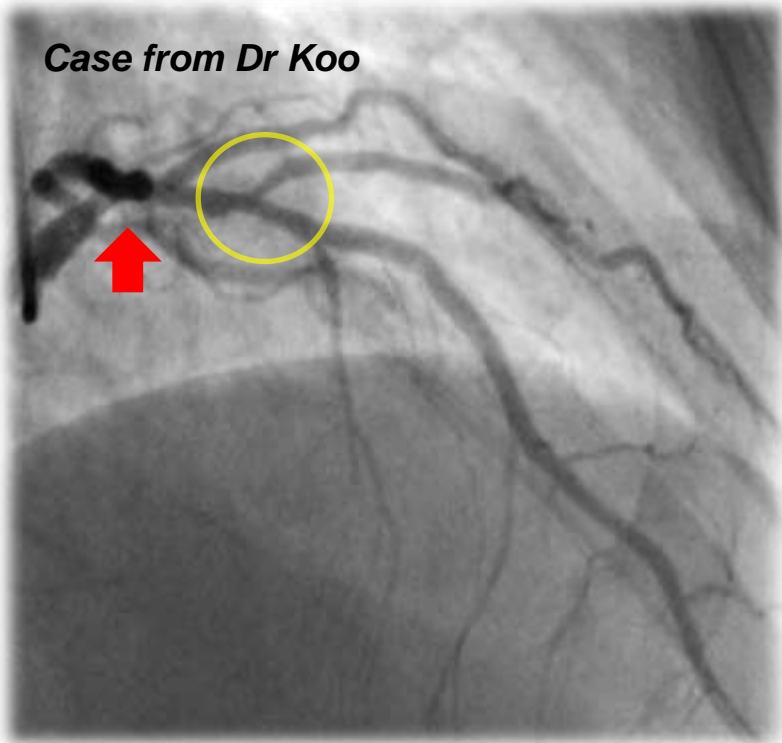


Pull-back curve !!!

Interpretational Issue 2

Functionally significant 0,0,1 lesion?

Case from Dr Koo



Angiographically diagonal bifurcated disease,
functionally intermediate LM disease

Pull-back curve !!!

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6. Drift

7. Whipping

8. Spasm/Accordion

9. Location of pressure

10. Issues for hyper

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Thank You

***Practice and Application of FFR
in the All-day Cathlab:***

Pitfalls

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NAM, Chang-Wook MD, PhD**