

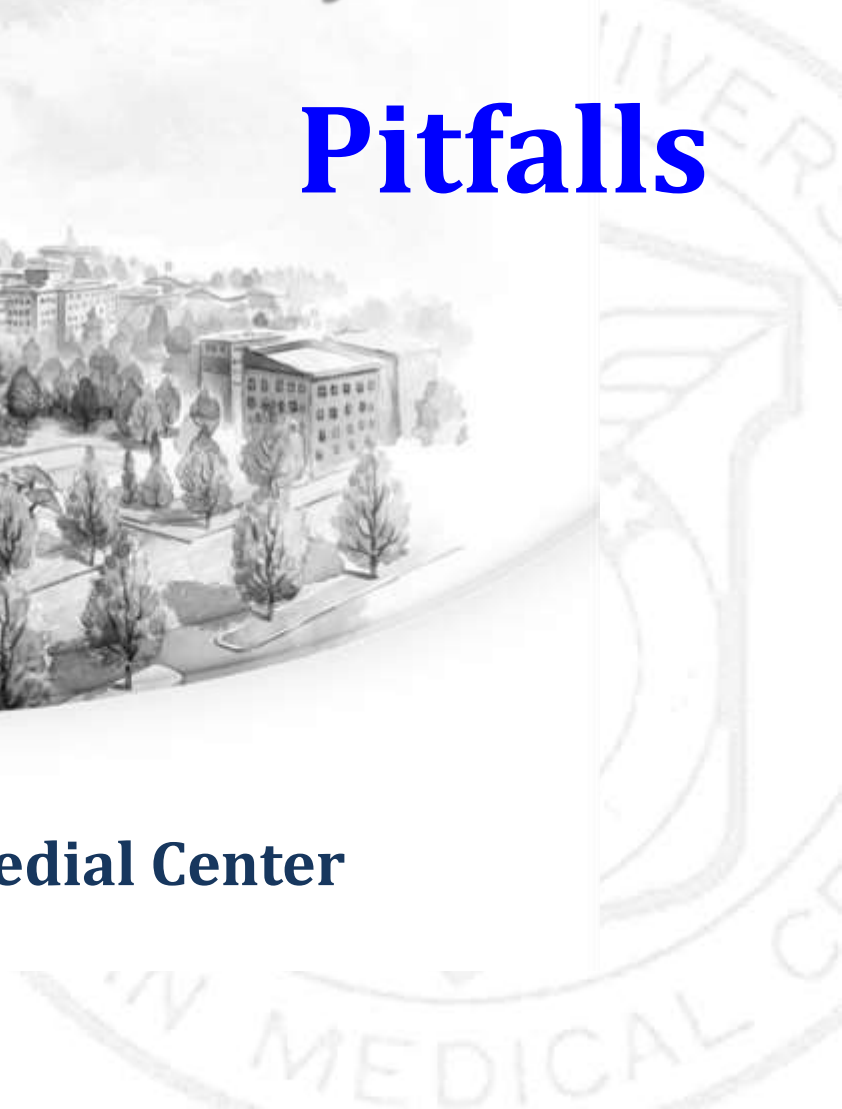


# *Practice and Application of FFR in the All-day Cathlab:*

## **Pitfalls**



**Keimyung University Dongsan Medical Center**  
**NAM, Chang-Wook MD, PhD**



# Evidences of FFR-guided PCI

Journal of the American College of Cardiology  
© 2007 by the American College of Cardiology Foundation  
Published by Elsevier Inc.

Vol. 49, No. 21, 2007

Physiologic Assessment of Tiled Side  
Fractional Flow Reserve versus Angiography

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1. [Variability of fractional flow reserve according to the methods of hyperemia induction.](#)  
Lim WH, Koo BK, Nam CW, Doh JH, Park JJ, Yang HM, Park KW, Kim HS, Takashima H, Waseda K, Amano T, Kato D, Kurita A, Oi M, Toyofuku M, vanNunen L, Pijls NH.  
Catheter Cardiovasc Interv. 2014 Nov 20. doi: 10.1002/ccd.25752. [Epub ahead of print]  
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2. [Long-Term Outcome After Deferral of Revascularization in Patients With Intermediate Coronary Stenosis and Gray-Zone Fractional Flow Reserve.](#)  
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3. [Coronary CT angiography-derived fractional flow reserve correlated with invasive fractional flow reserve measurements - initial experience with a novel physician-driven algorithm.](#)  
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Vol. 58, No. 12, 2011  
ISSN 0735-1097/836.00  
doi:10.1016/j.jacc.2011.06.020

Access published September 1, 2014

**FASTTRACK**  
**ESC HOT LINE**  
Acute coronary syndromes

vs. angiography in guiding  
re outcomes in non-ST-  
cardial infarction: the  
n FAMOUS-NSTEMI

urzen<sup>3</sup>, Arvind Sood<sup>4</sup>, Kanarath Balachandran<sup>5</sup>,  
Matthew M.Y. Lee<sup>1</sup>, Aadil Shaukat<sup>1</sup>,  
iggs<sup>6</sup>, Robert Henderson<sup>9</sup>,  
, on behalf of the FAMOUS-NSTEMI

K. Lance Gould, MD

To get these results and benefits in your daily practice, you need to have a confidence with your FFR measurement.

# 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

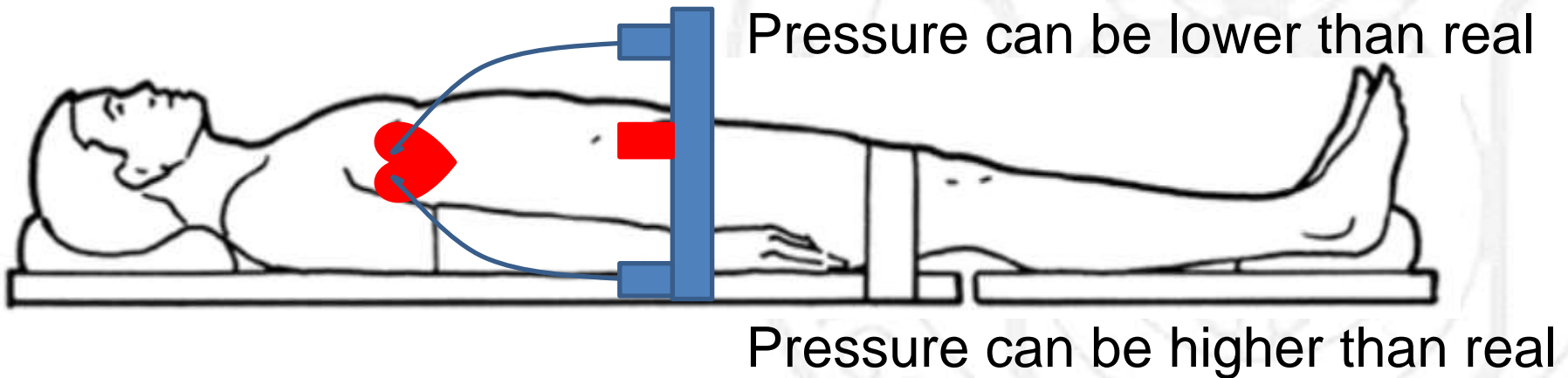
Each cath lab has their own ways for FFR setting

Infusion pump

IV connection site

...

Level of pressure transducer

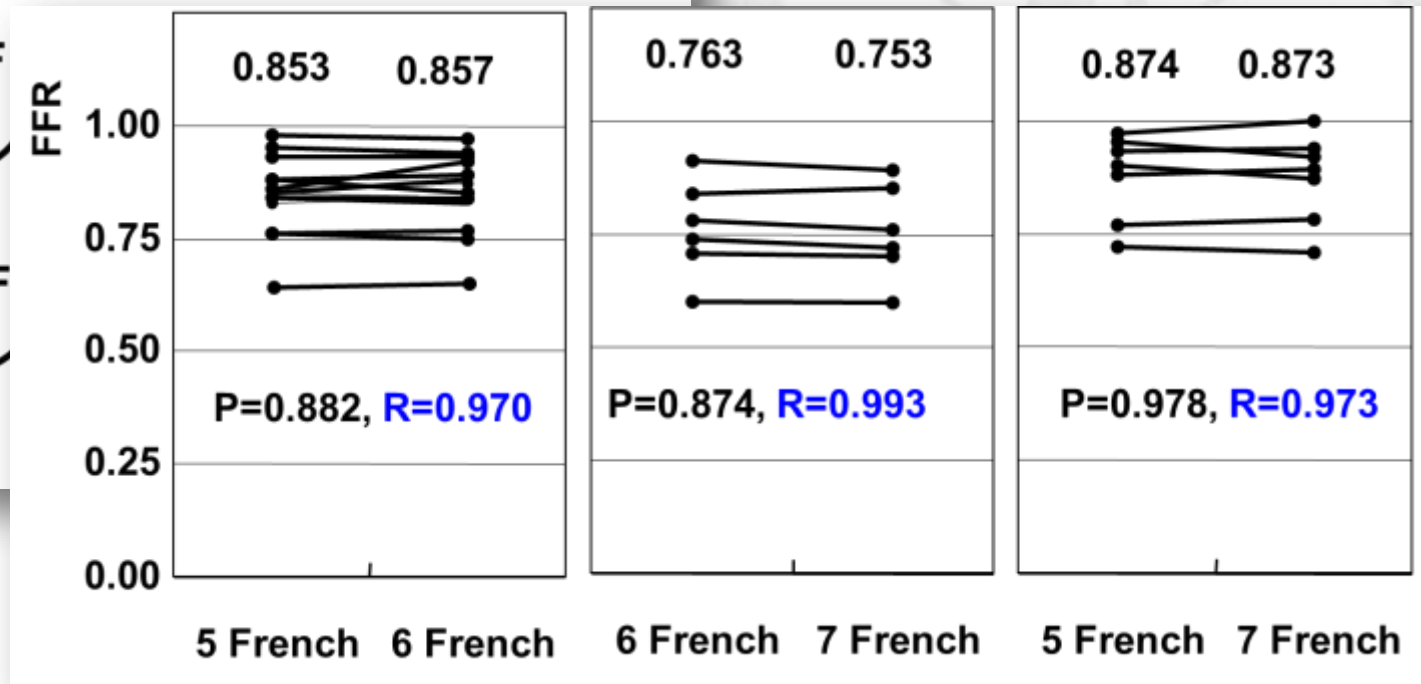
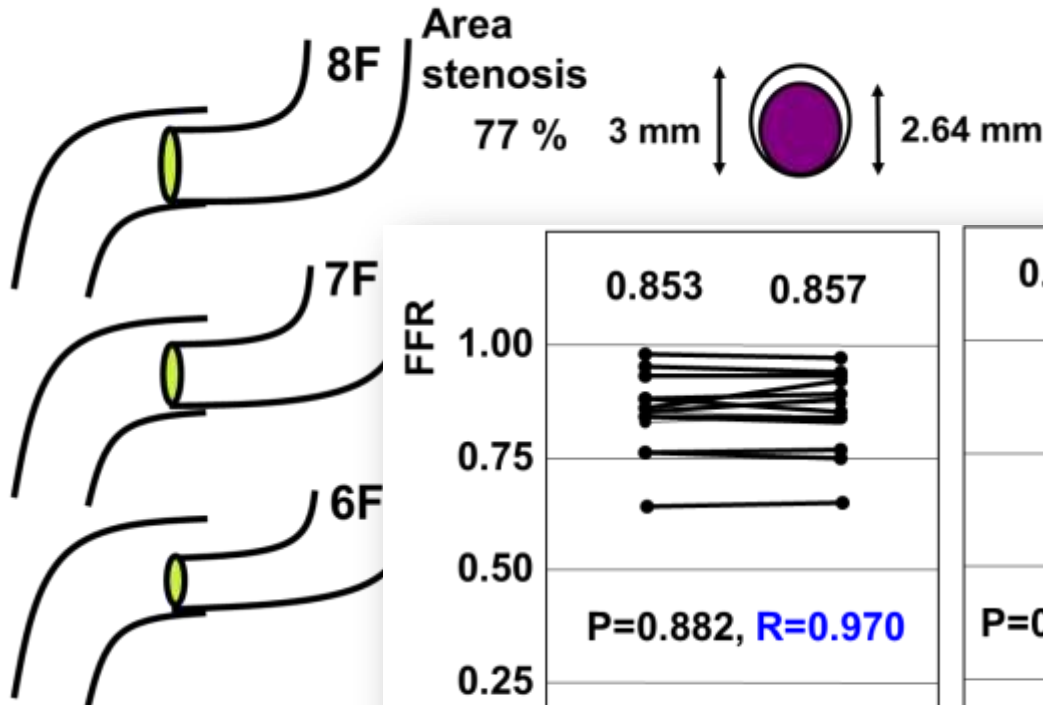




# 2. Issues for guiding catheter

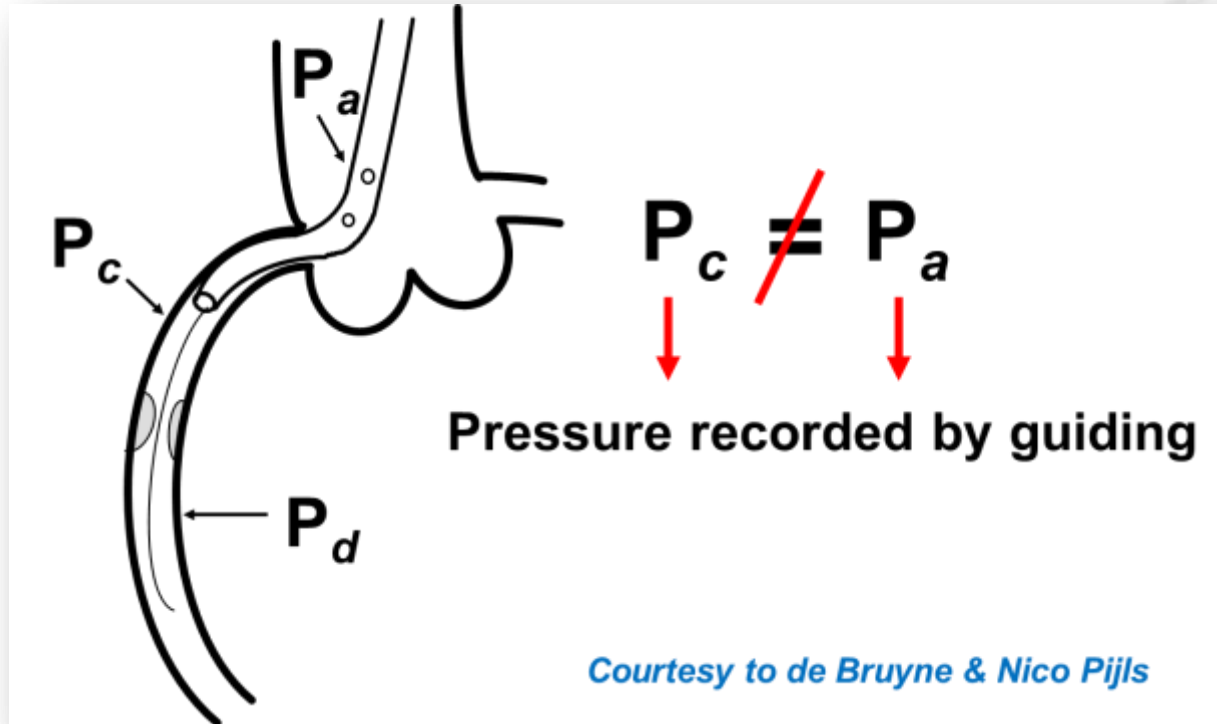
- Size of guiding catheter

## Selection of Guiding catheter



## 2. Issues for guiding catheter

- Size of guiding catheter
- Side hole guiding catheter

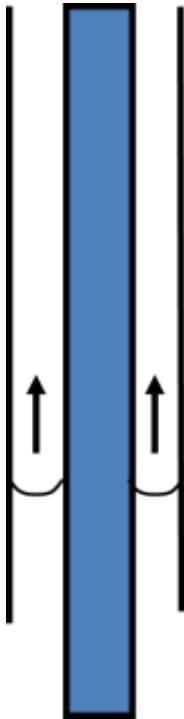


If you have to use side hole guiding catheter,

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

## 2. Issues for guiding catheter

- Size of guiding catheter
- Side hole guiding catheter
- **Pressure artifact due to capillary force**

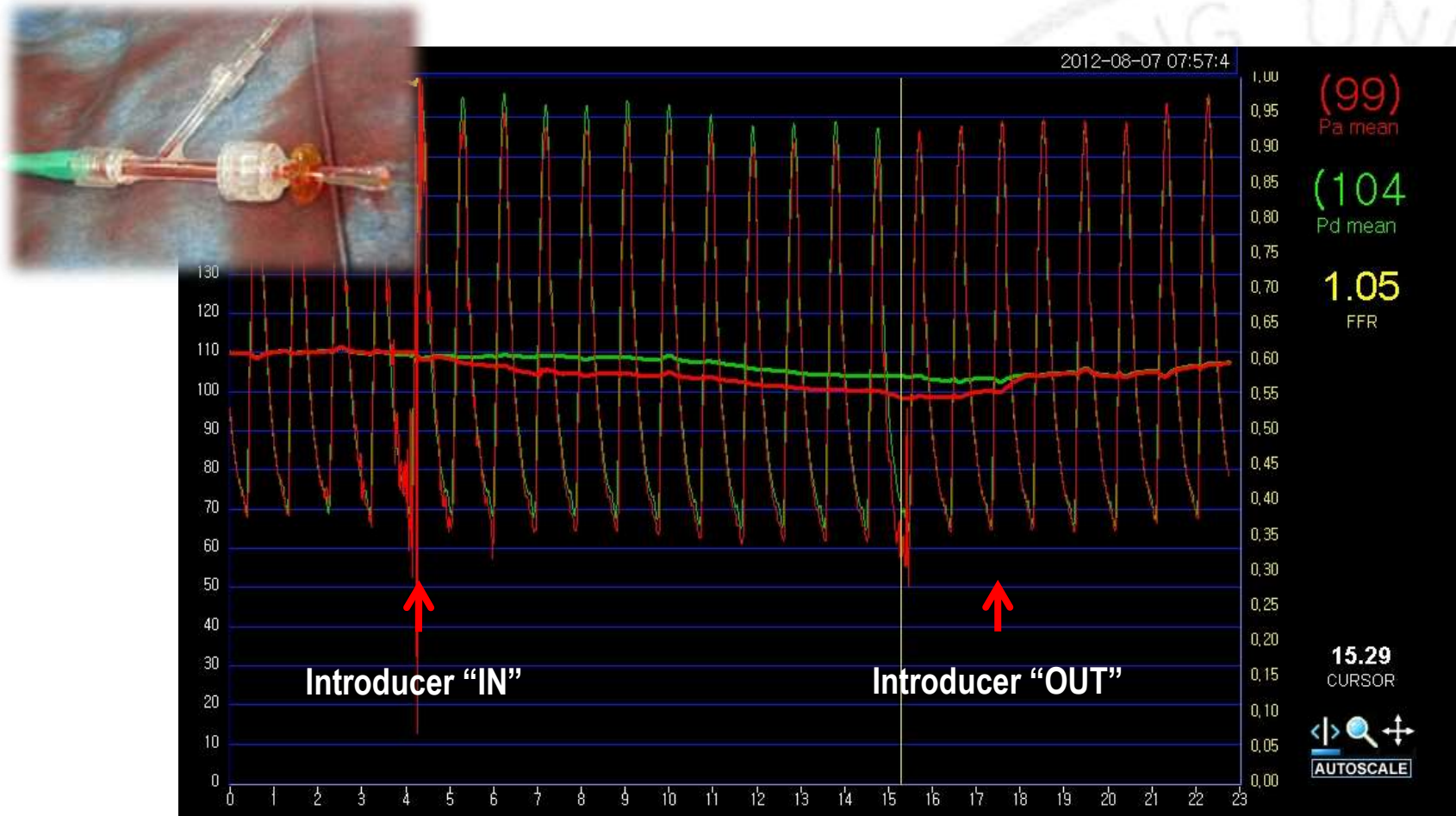


Pressure artifacts by **capillary forces** in small size guiding catheter ( $\leq 5\text{Fr}$ ), or residual contrast in catheter

*Manual saline flushing before FFR measurement*

# 3. Remove introducer from Y-connector

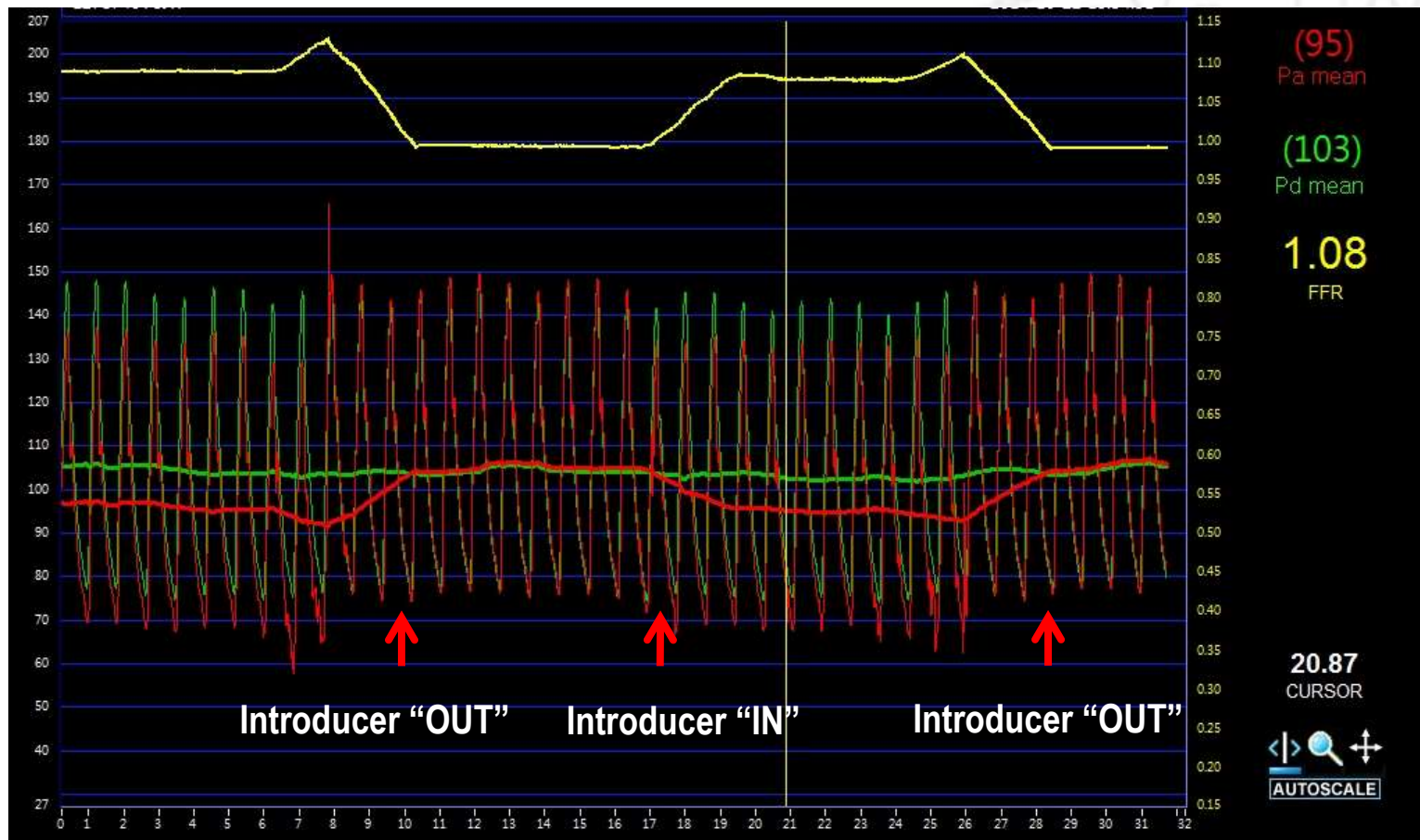
Don't measure FFR with an "INTRODUCER" in place





# 3. Remove introducer from Y-connector

Pressure difference can be augmented by hyperemia



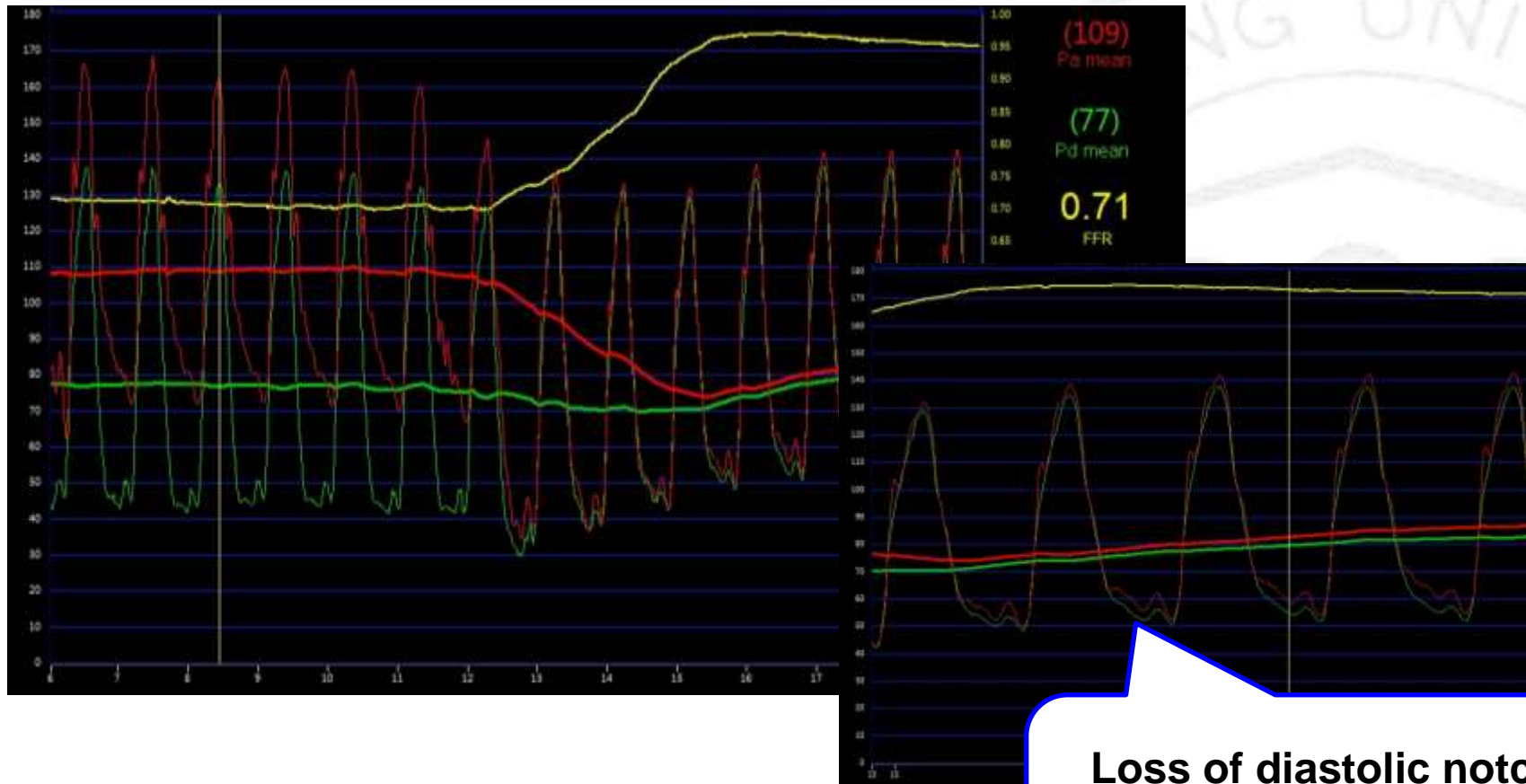
# 4. Start with equalization

Initial difference can make a different decision...



# 5. Damping during pullback

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



Loss of diastolic notch  
and ventricularization of  
Pa pressure

# 5. Damping during pullback

Frequent pitfall during pullback, even if with 5 Fr catheter

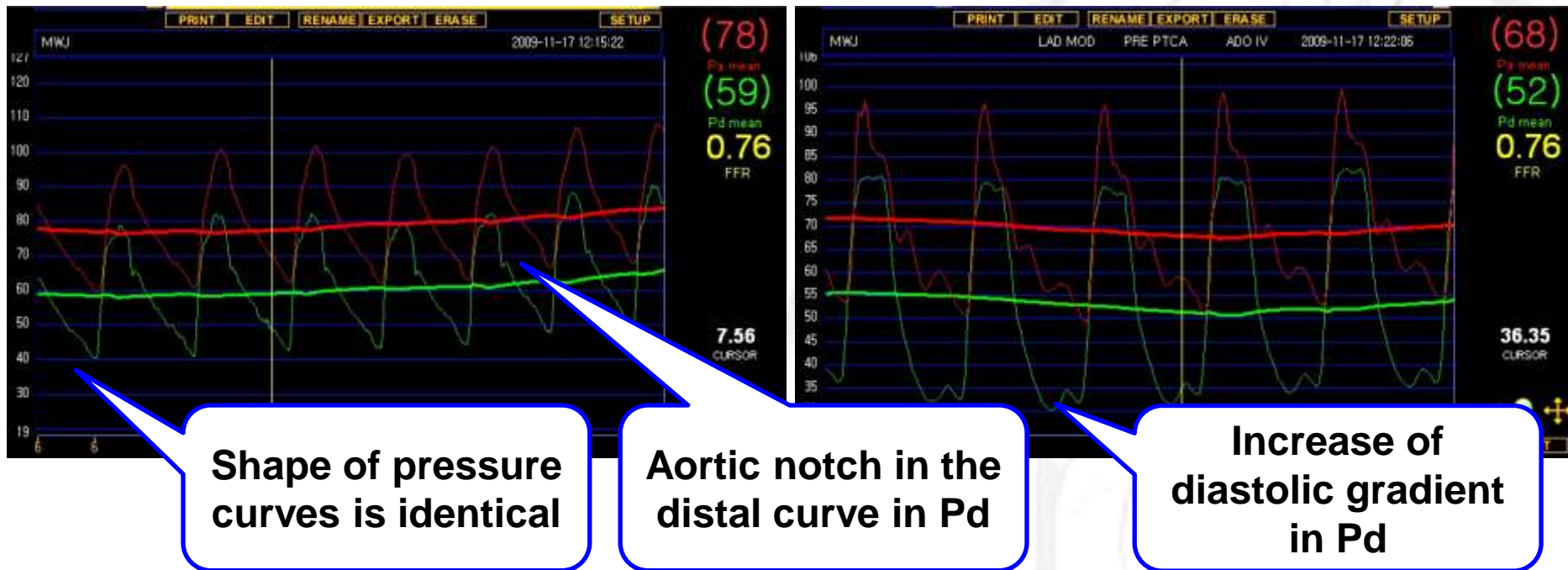


Loss of diastolic notch and ventricularization of Pa pressure



# 6. Drift

## Artificial gradient due to “DRIFT”

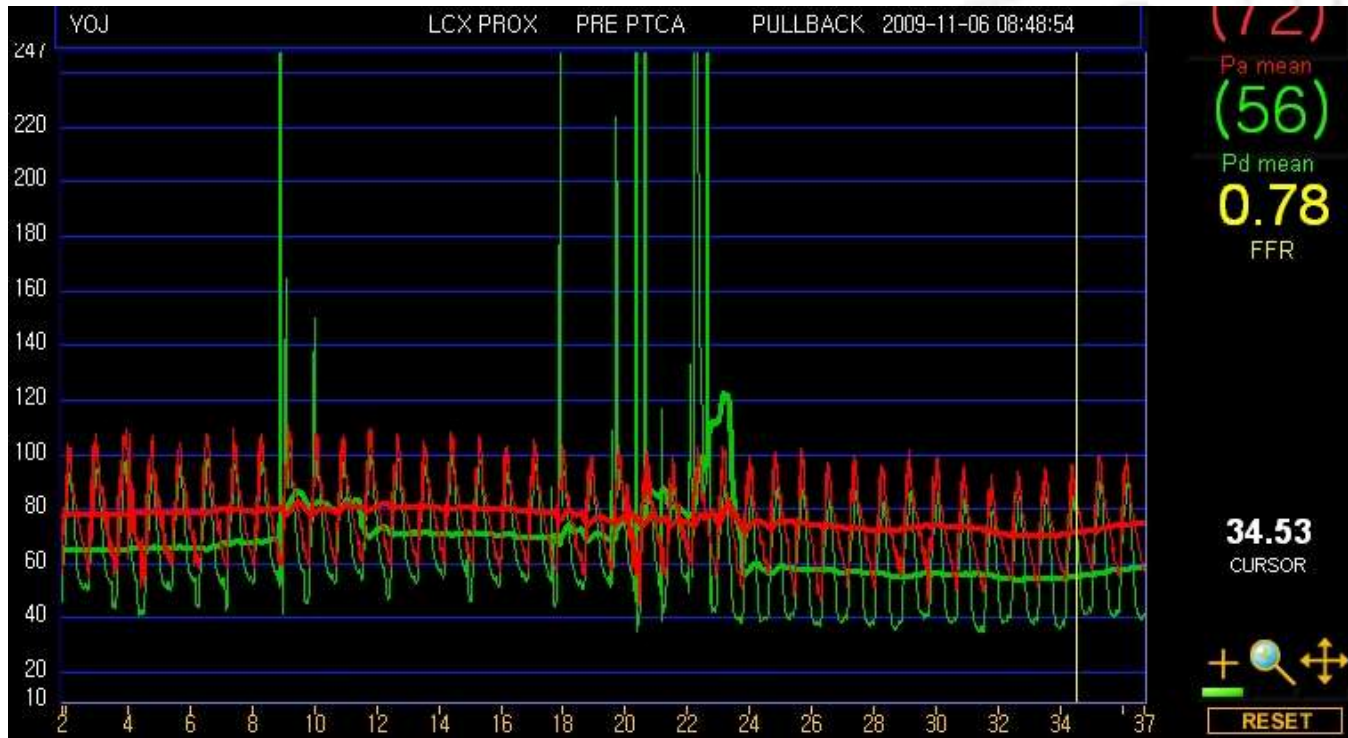


If drift is suspected “re-equalization” is necessary.



# 7. Whipping artifact

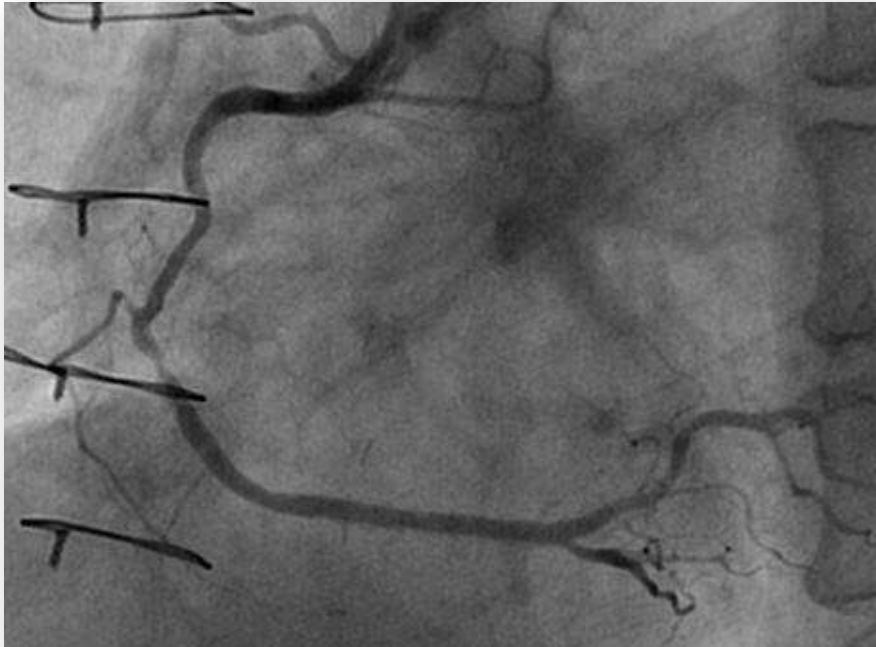
Coronary vessel wall hits the PW sensor



Move the PW sensor just a few millimeter

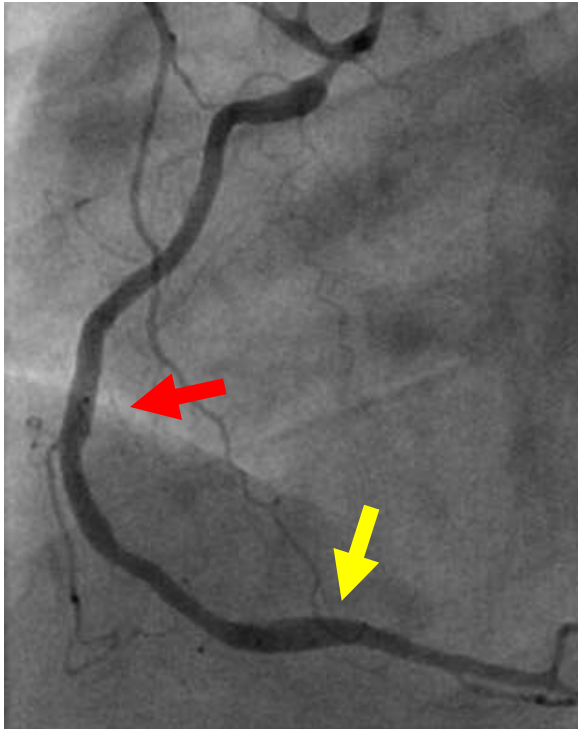
# 8. Spasm/Accordion effects

Pseudo-stenosis can make a wrong FFR value



# 9. Location of pressure sensor

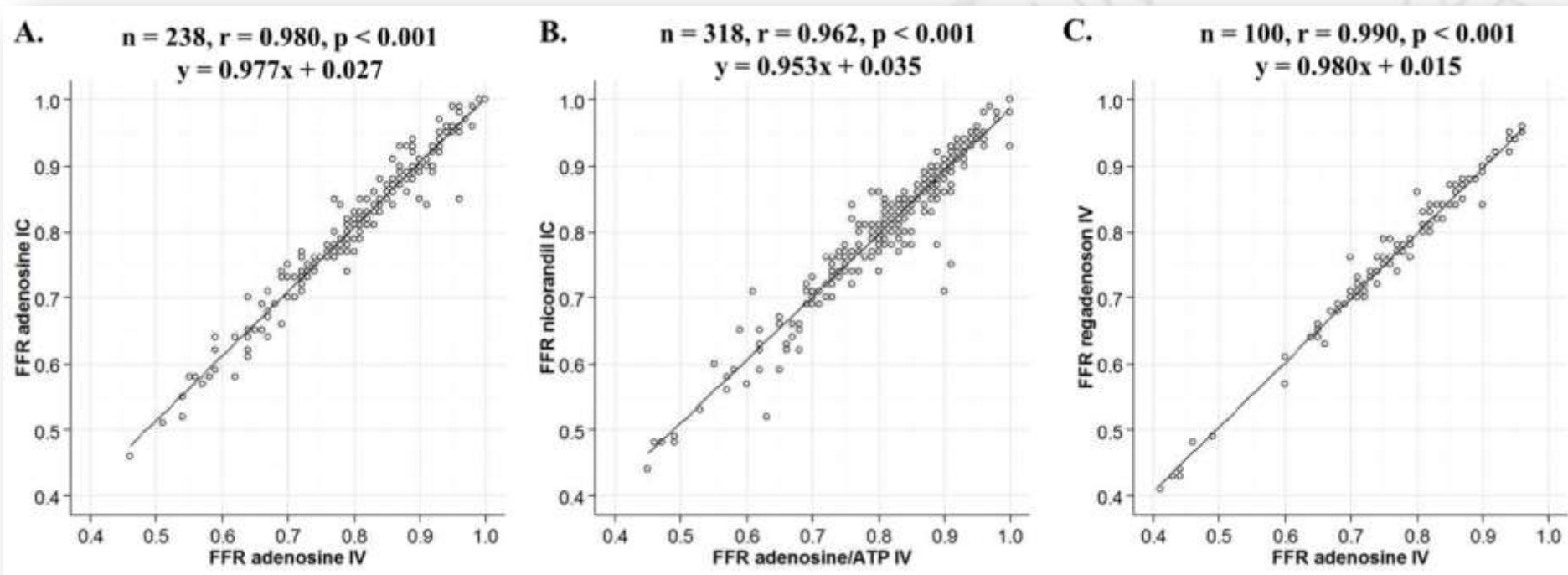
When you evaluate tandem lesion... even if mild 2<sup>nd</sup> lesion



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



# 10-point Check List for Your Practice

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PMC Images search for fractional flow reserve





**Thank You**

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**Pitfalls**

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NAM, Chang-Wook MD, PhD**