

# FFR: pitfalls

**Gabor Toth G.**

**Cardiovascular Centre Aalst**

OLV-Clinic Aalst, Belgium

# Fractional flow reserve measurement

~~Accurately measured coronary pressure ( $P_d$ )~~

~~Accurately measured aortic pressure ( $P_a$ )~~

~~Maximal hyperaemia~~

---

~~FFR~~

# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

## Tracing interpretation

- Cursor position

# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

## Tracing interpretation

- Cursor position

# Calibration

**‘teaching’ the system,  
what is *zero pressure***

# Calibration: PressureWire

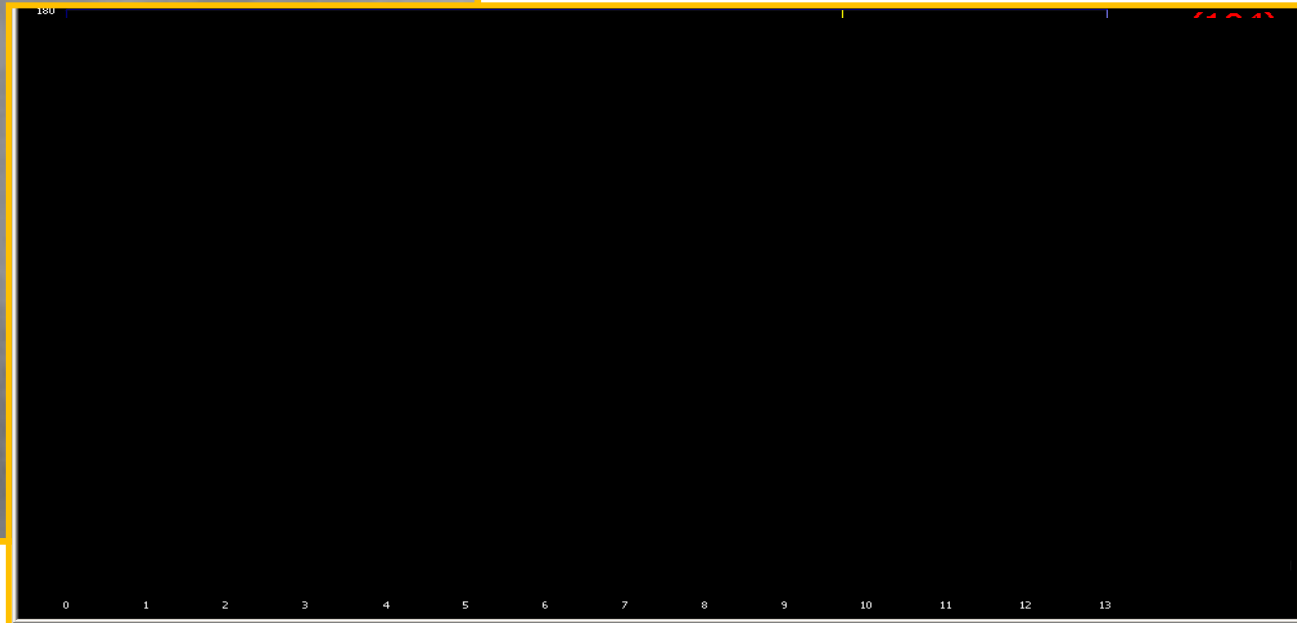
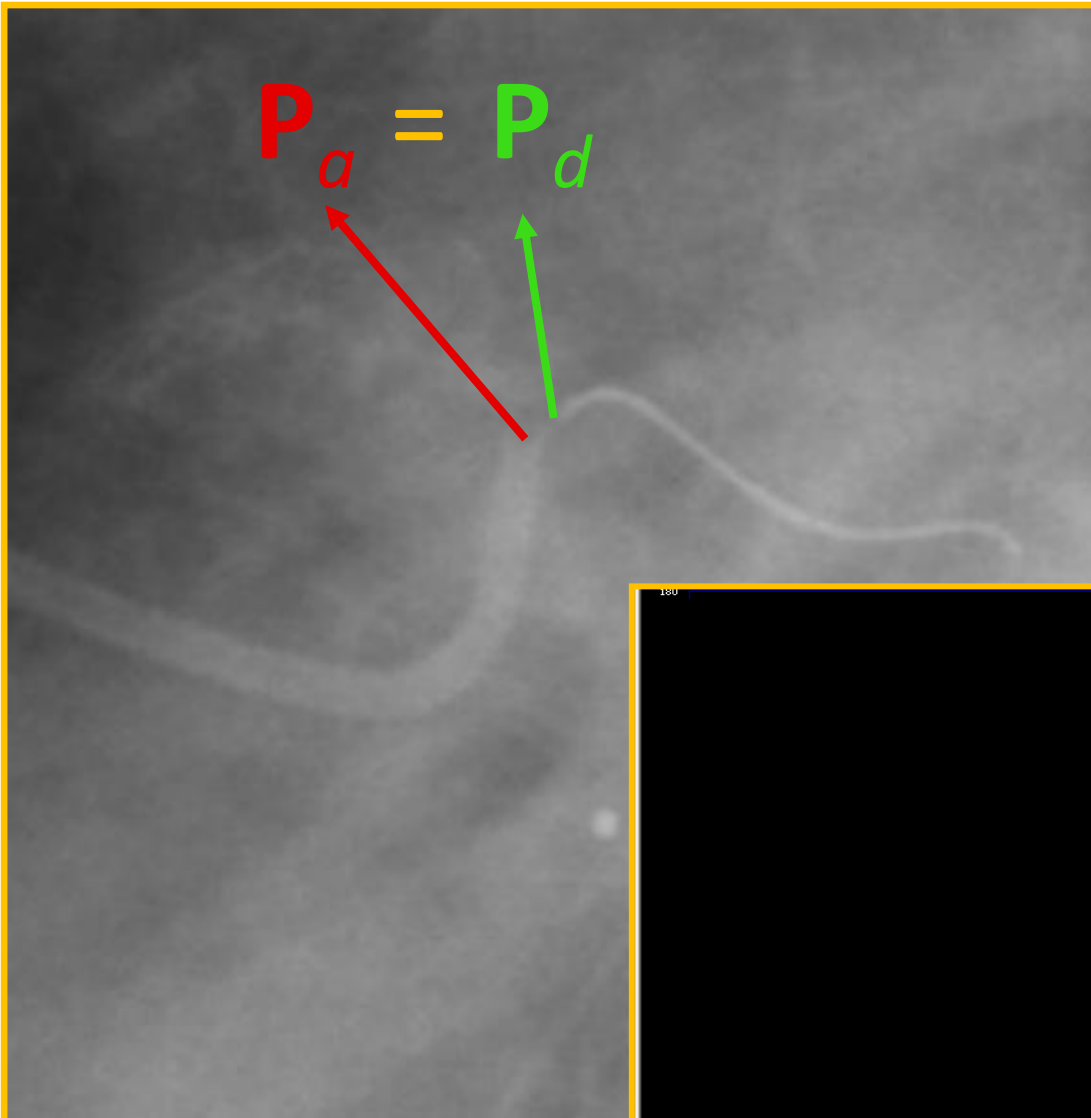
- **Fill the tube of the wire with saline**
- **Wait a 30-60 sec to have the wire completely and stably wet**
- **Perform calibration afterwards**

# Equalization



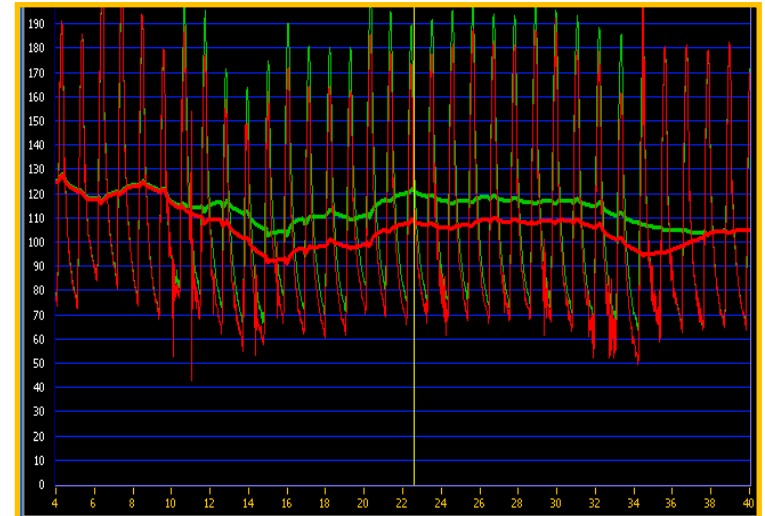
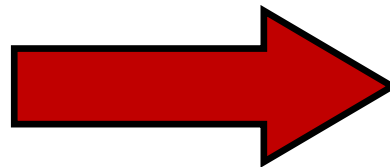
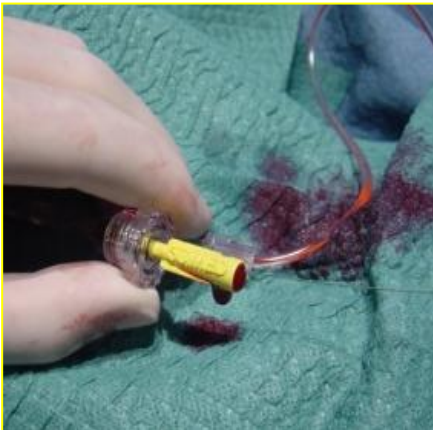
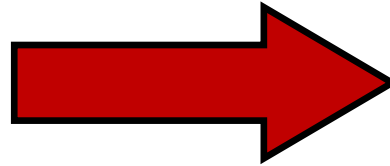
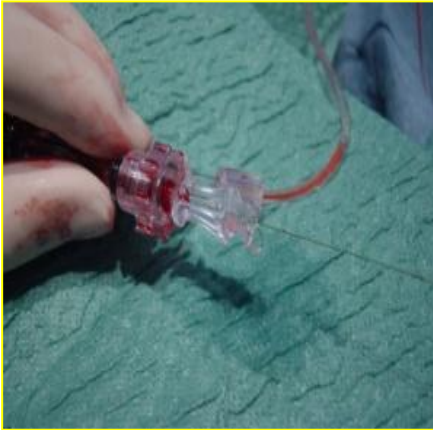
**‘teaching’ the two systems,  
to be synchronous**

# Equalization



# After equalization

## DO NOT CHANGE YOUR SETTING



# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

## Tracing interpretation

- Cursor position

# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

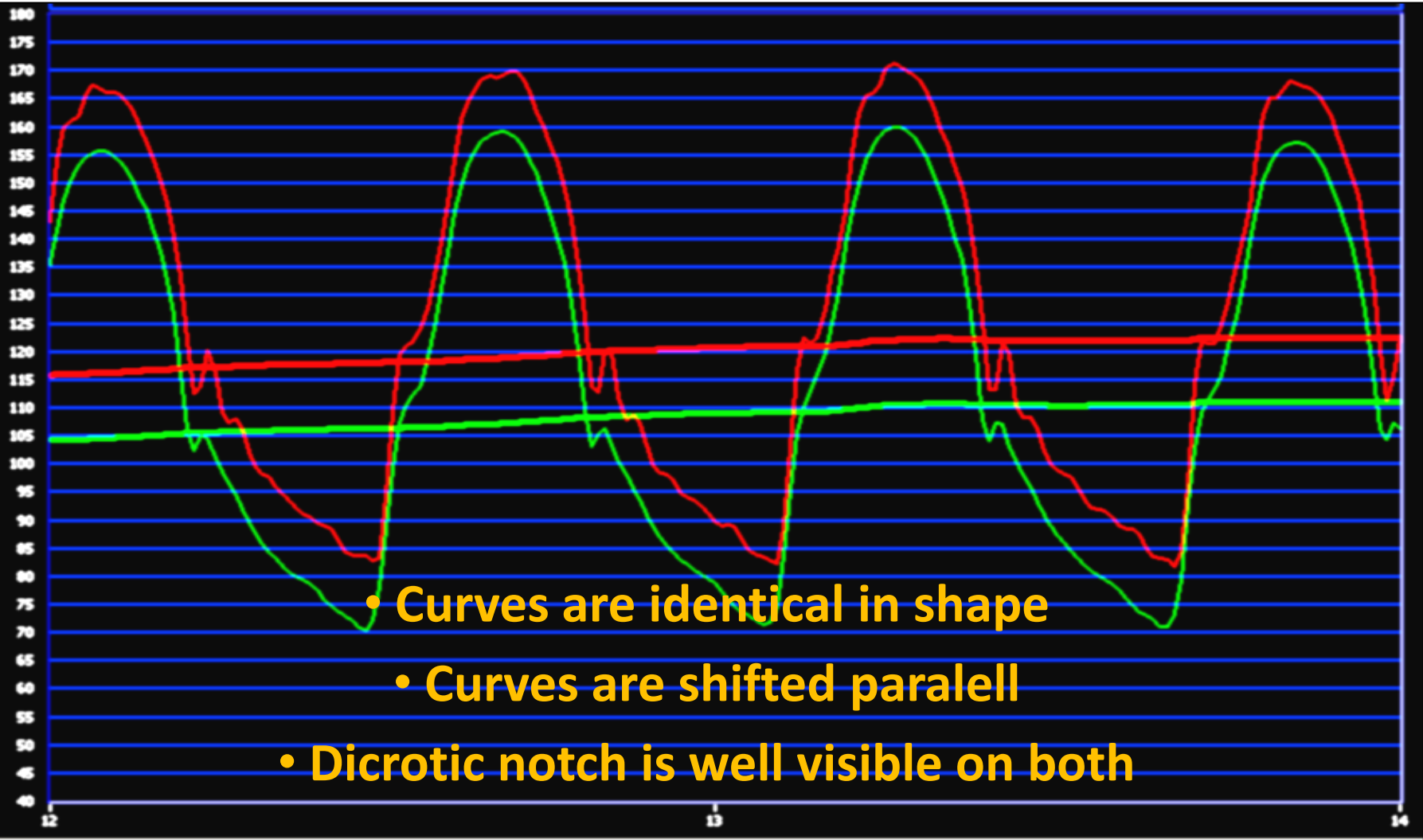
## Tracing interpretation

- Cursor position

# Drifting

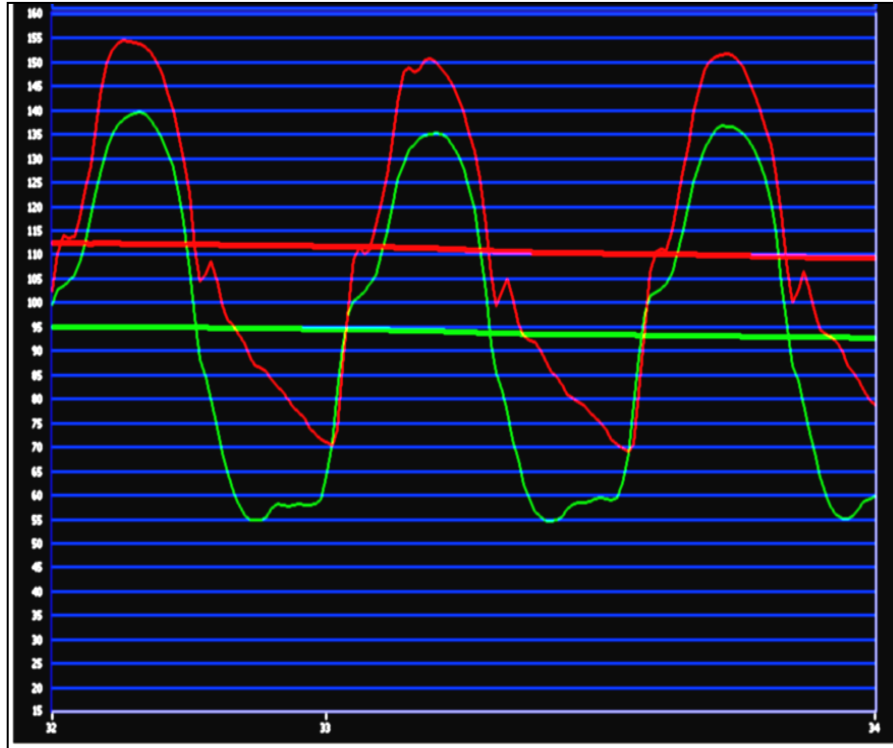
**When the two  
systems forget to be  
synchronous...**

# Clues to identify drift



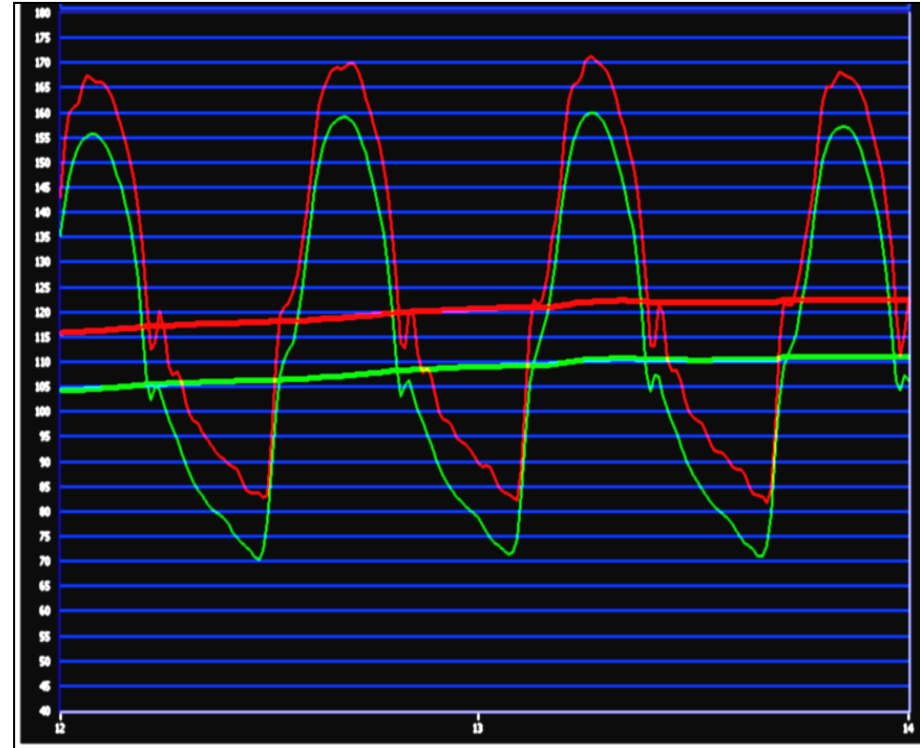


# Gradient or Drift??



## True Gradient

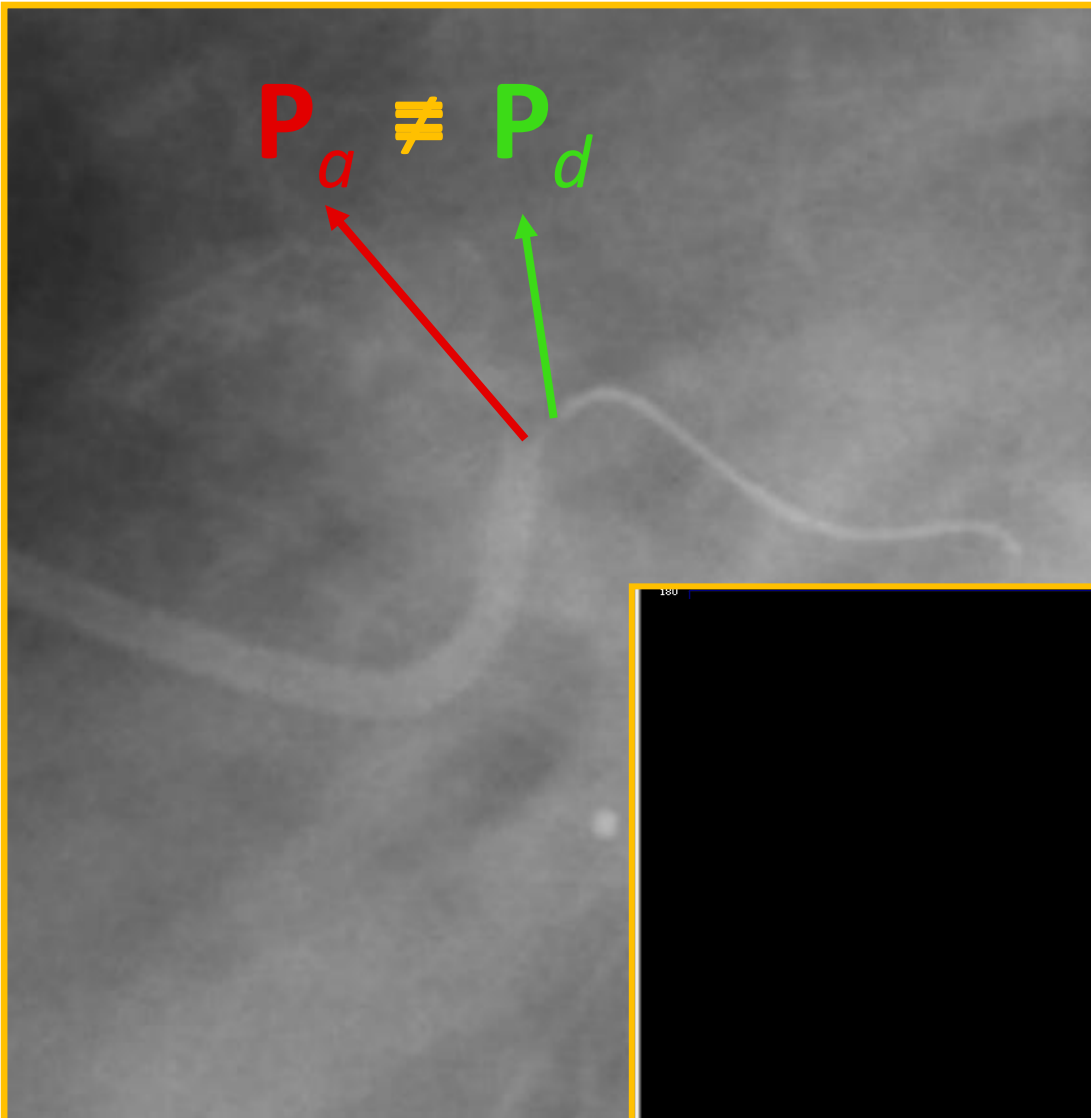
Different morphology  
Diastolic notch not visible



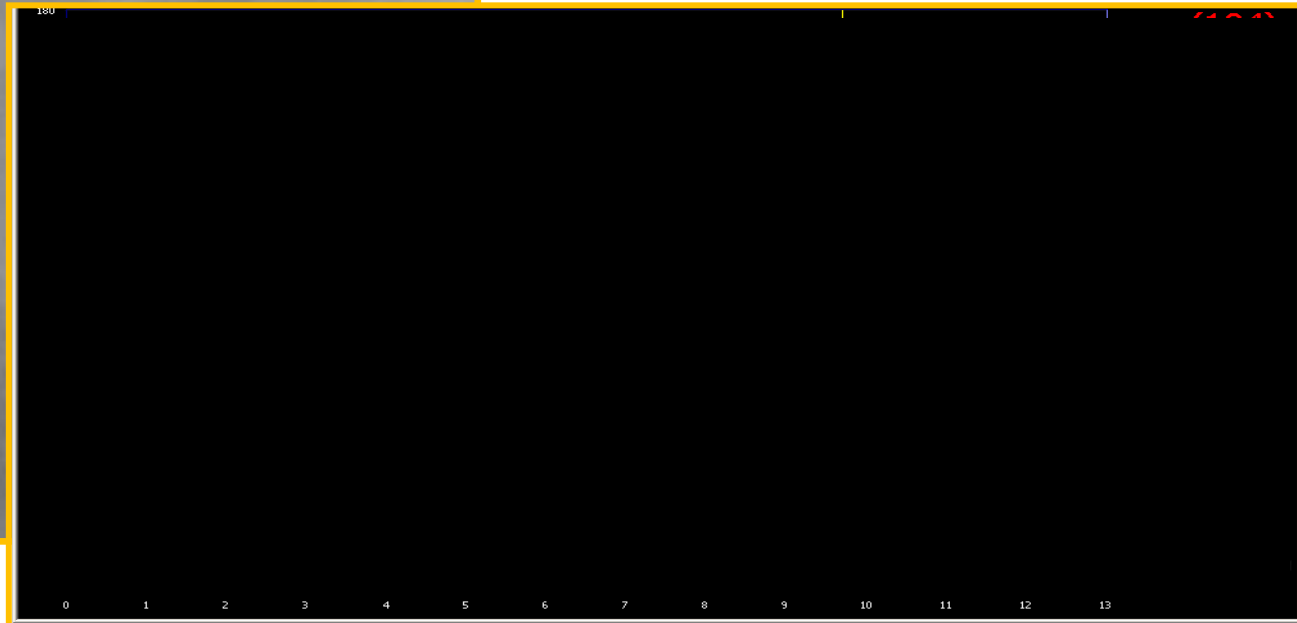
## Drift

Same morphology  
Paralell shifting  
Diastolic notch well visible

# Post-measurement check



~~Measure~~  
Drift!!!  
again

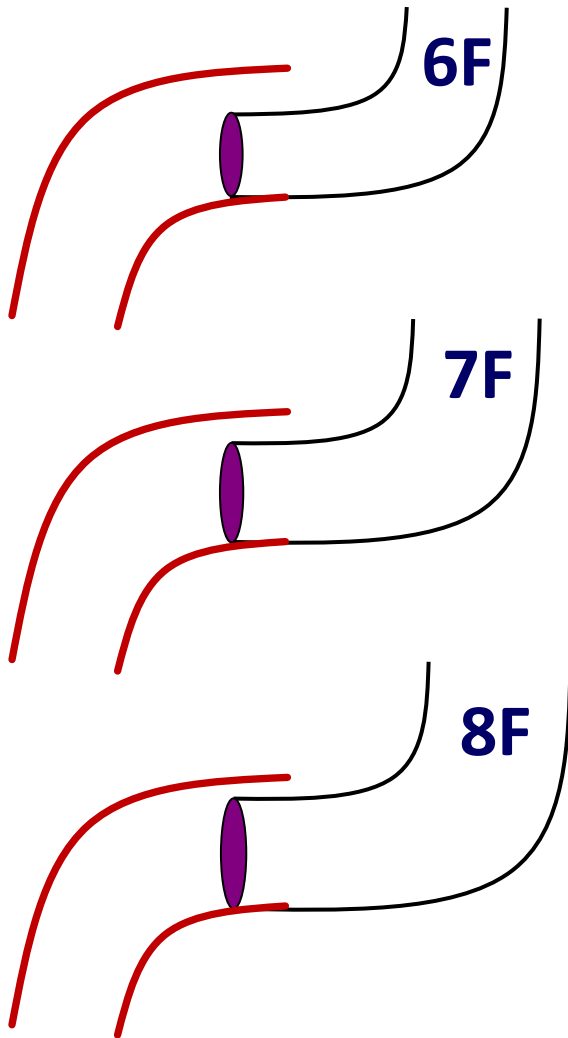


# Wedging

# **Aortic pressure is inaccurately measured...**

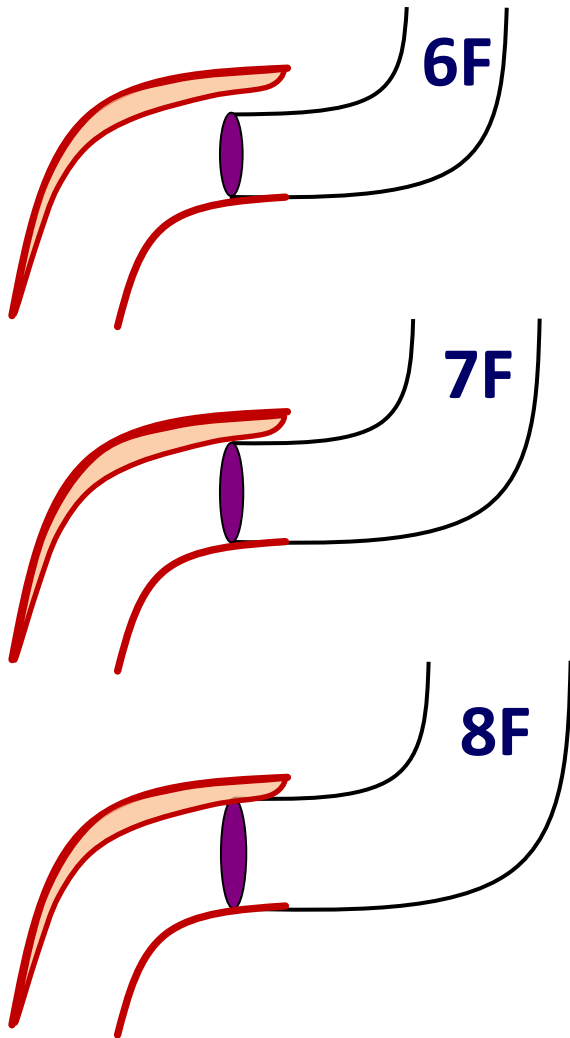
# Size of the guiding catheter

Induced  
area stenosis

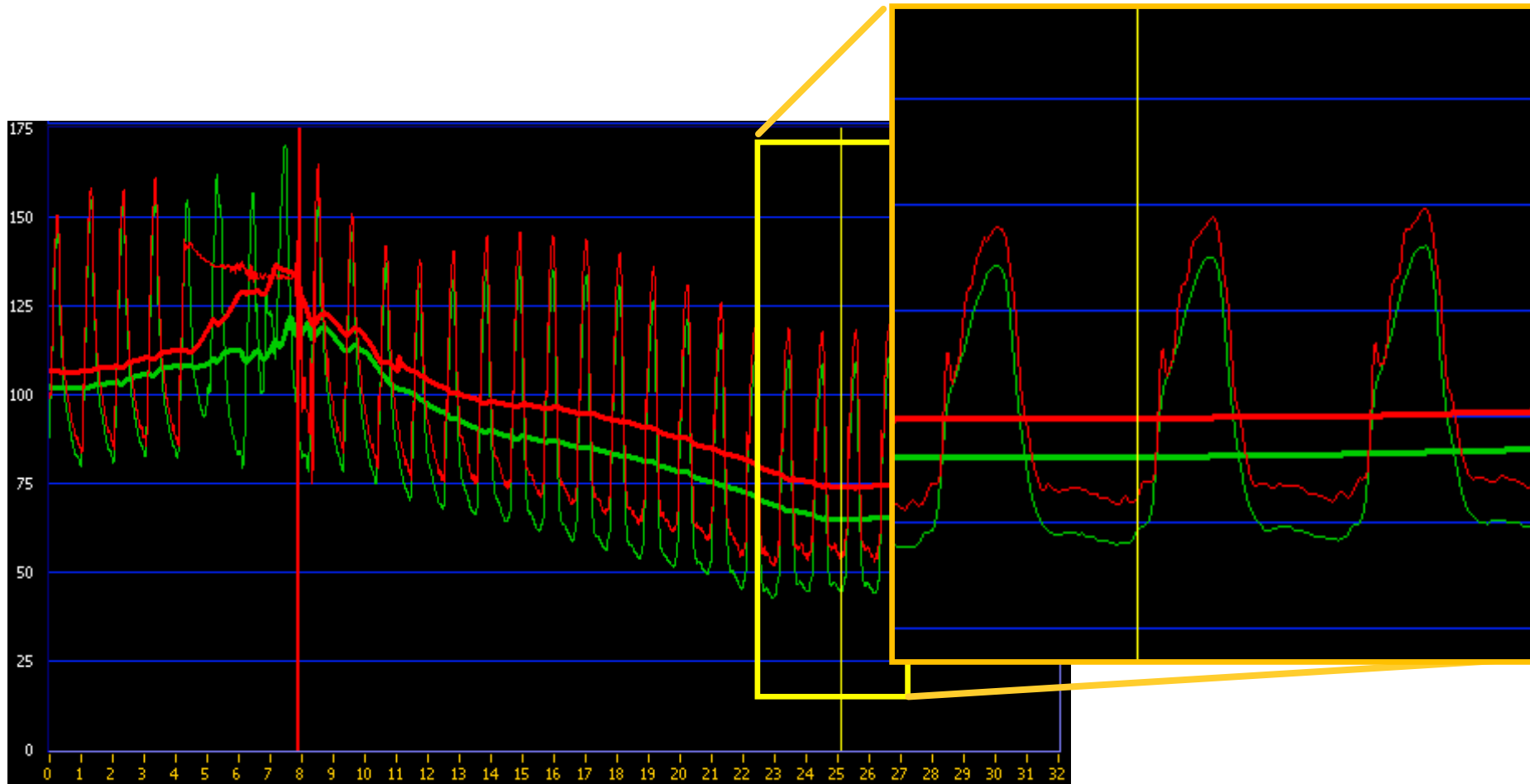


# Size of the guiding catheter

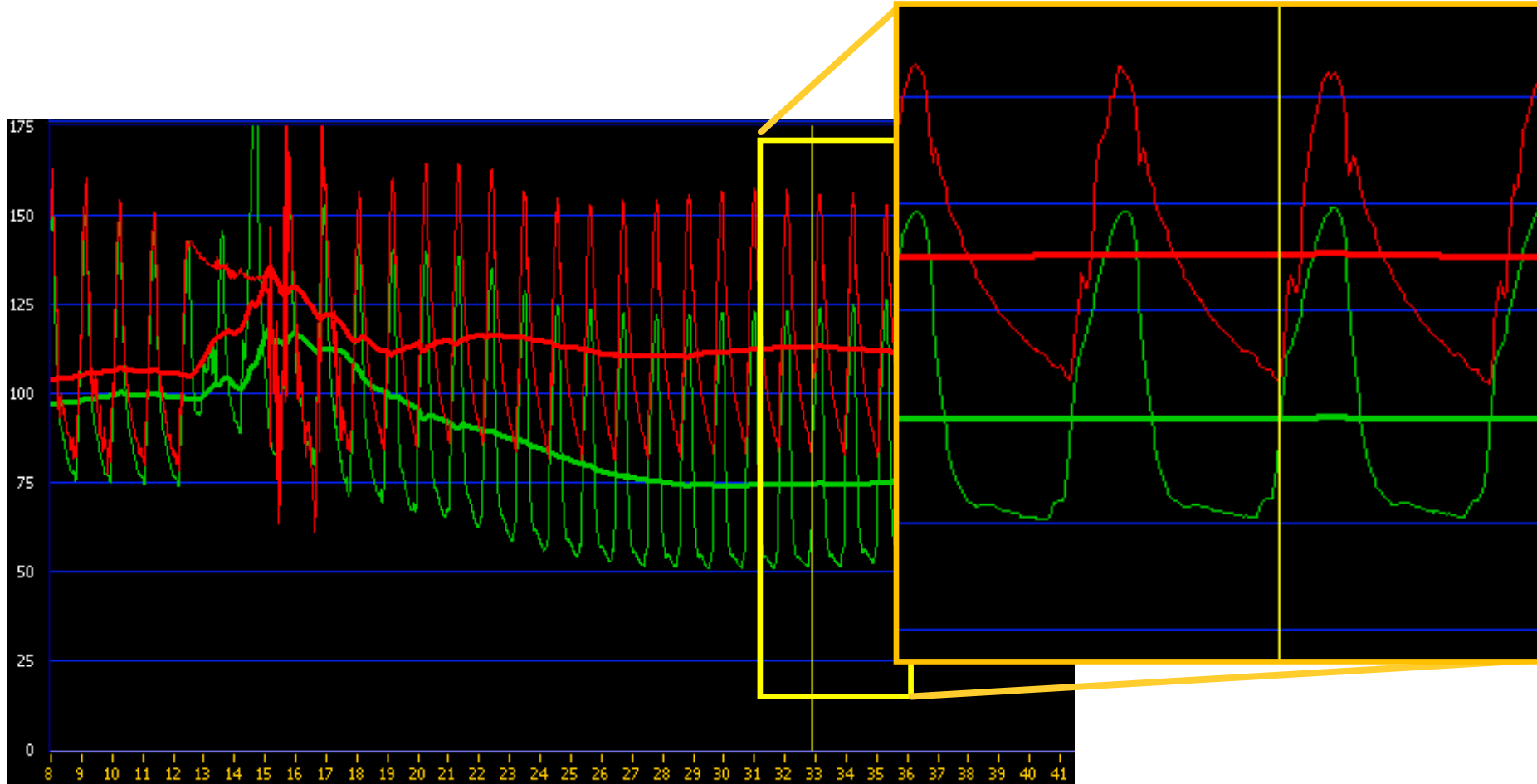
Induced  
area stenosis



# Wedging guiding catheter

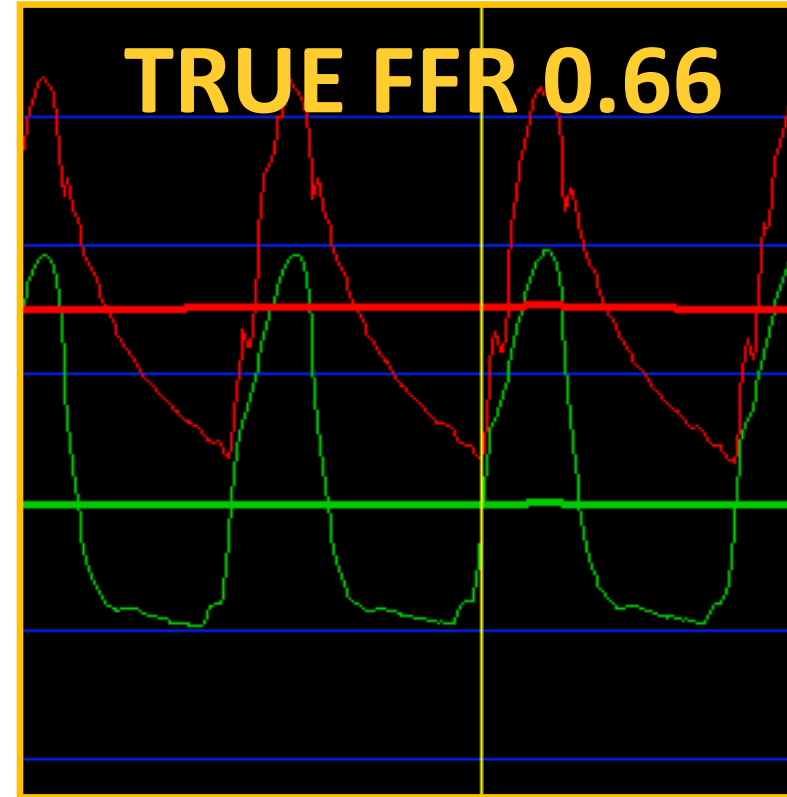
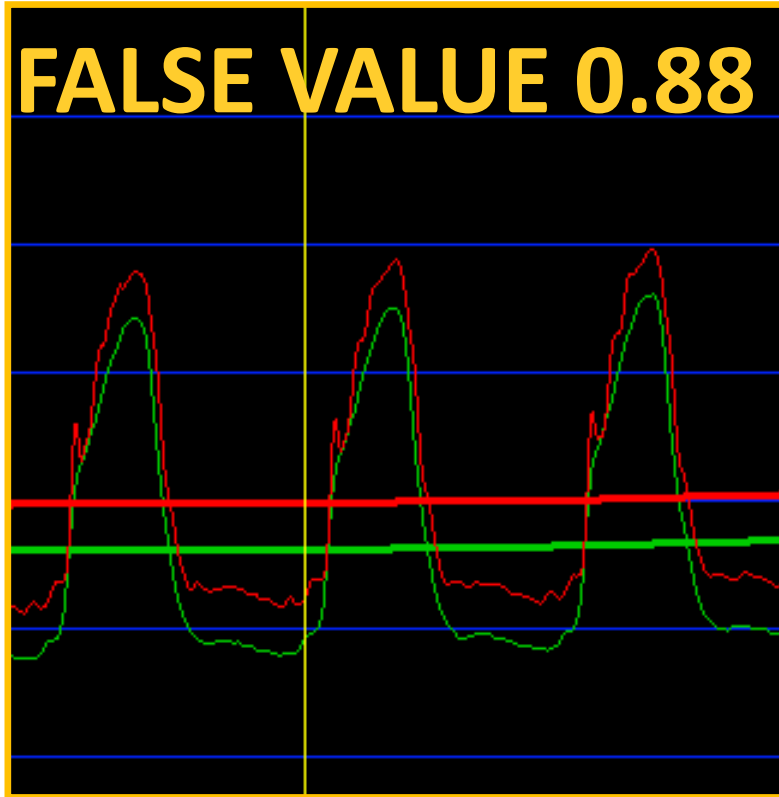


# Disengaged guiding catheter





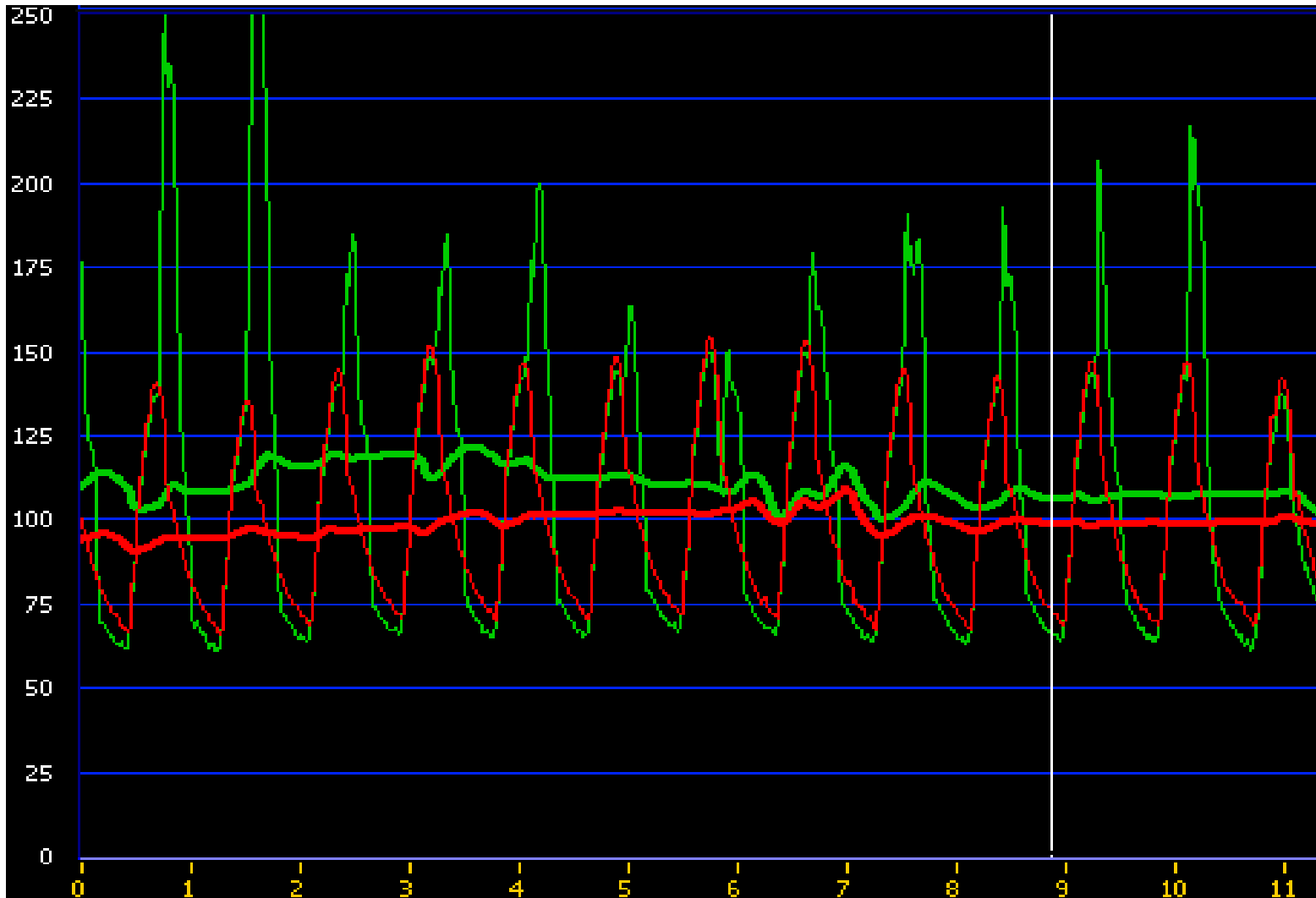
# Wedging guiding catheter



# Whipping

**Coronary pressure is  
inaccurately measured...**

# Whipping



# Hyperaemia

**Without maximal  
hyperaemia there is  
no FFR measurement**

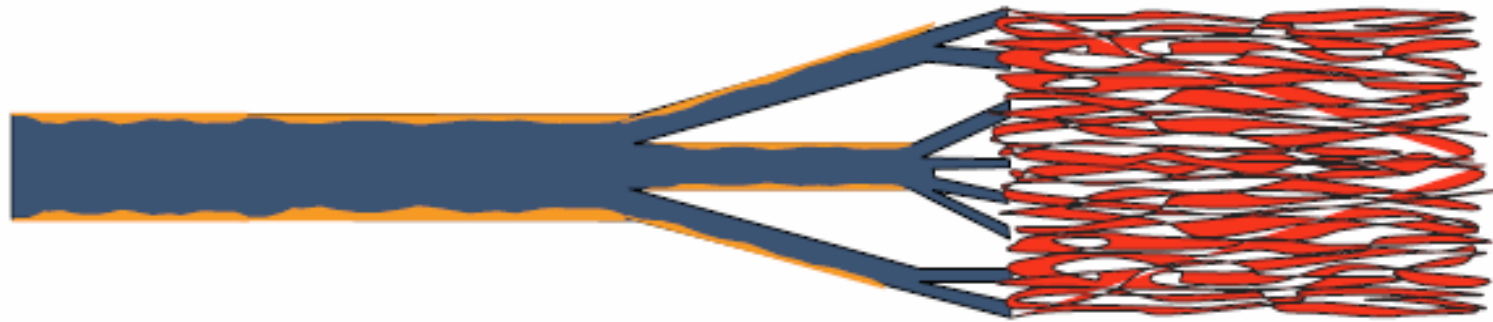
# Importance of Maximal Vasodilation

**Epicardial**

= Conductance  
Arteries > 550  $\mu$

**Microvasculature**

= Resistance  
Arteries < 550  $\mu$

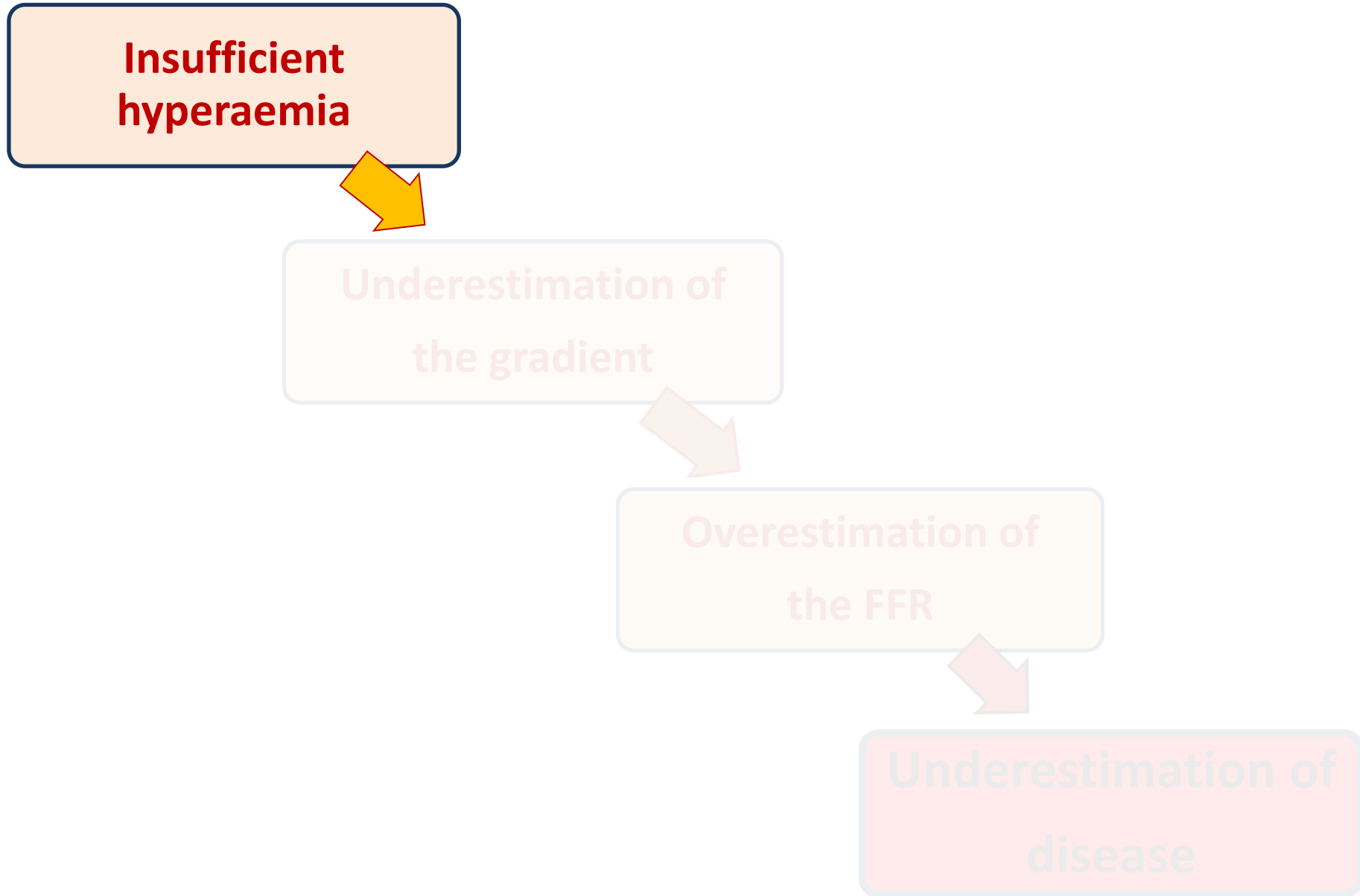


**Nitrates**

~~Vasospasm~~

**Adenosine**

~~Autoregulation~~





# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

## Tracing interpretation

- Cursor position

# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

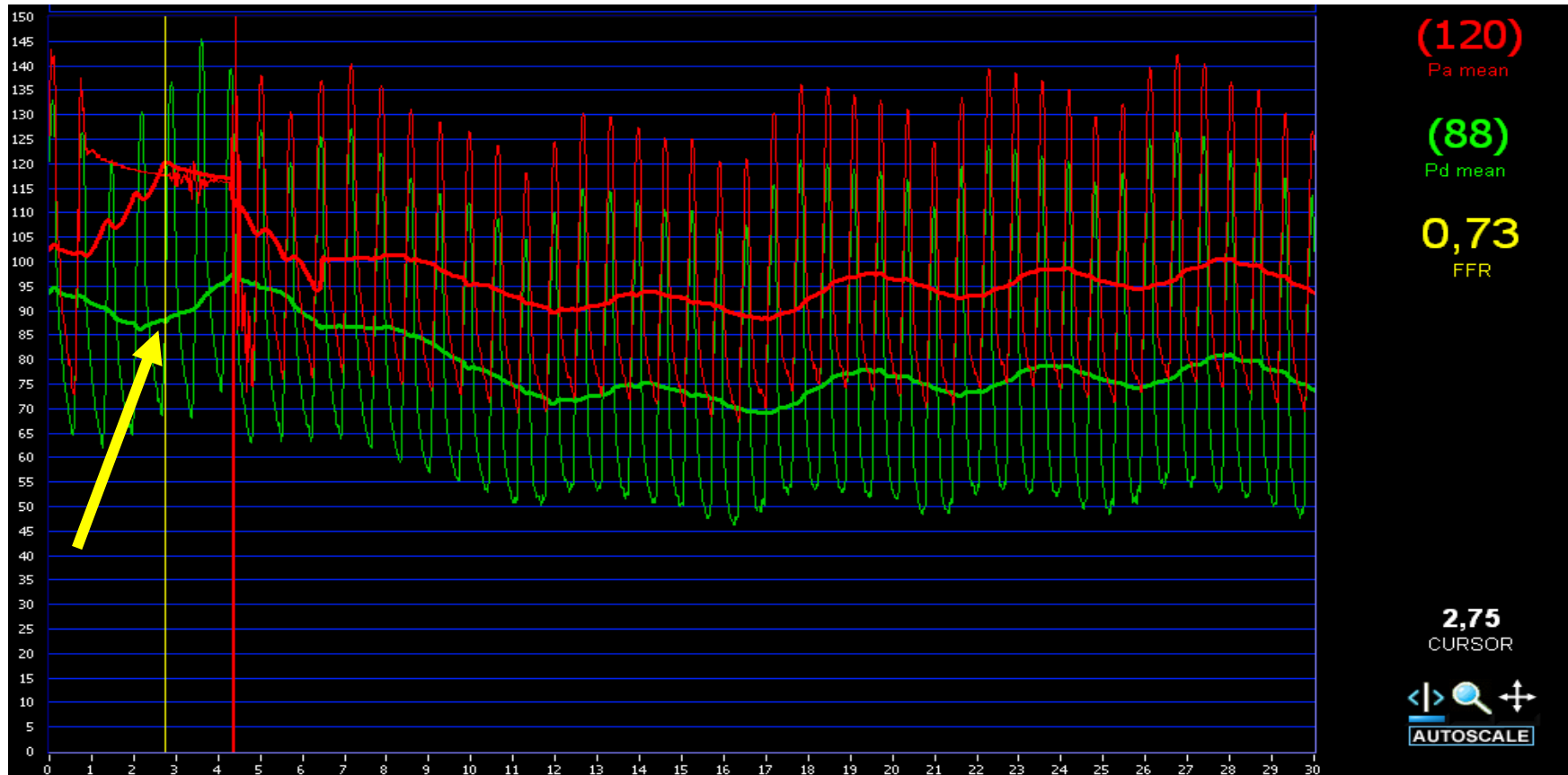
## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

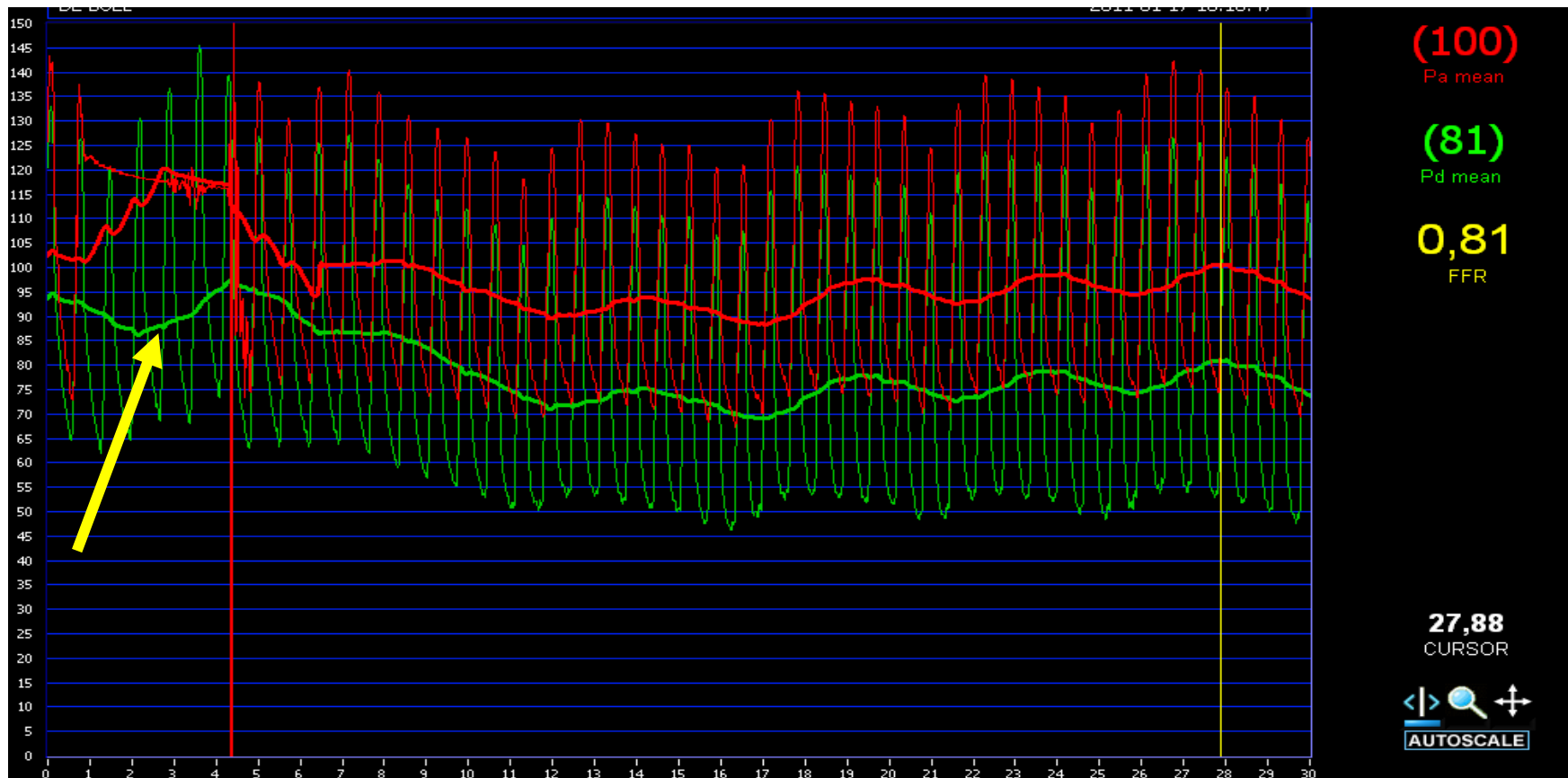
## Tracing interpretation

- **Cursor position**

# Position the cursor to the lowest value where indeed FFR was measured



# Position the cursor to the lowest value where indeed FFR was measured



# Pitfalls can be related to....

## Preparation

- Calibration
- Equalization

## Measurement

- Drifting
- Wedging
- Whipping
- Hyperaemia

## Tracing interpretation

- Cursor position

# Fractional flow reserve measurement

**Obtain accurate measurements**

**Induce proper maximal hyperaemia**

**Interpret the tracing appropriately**

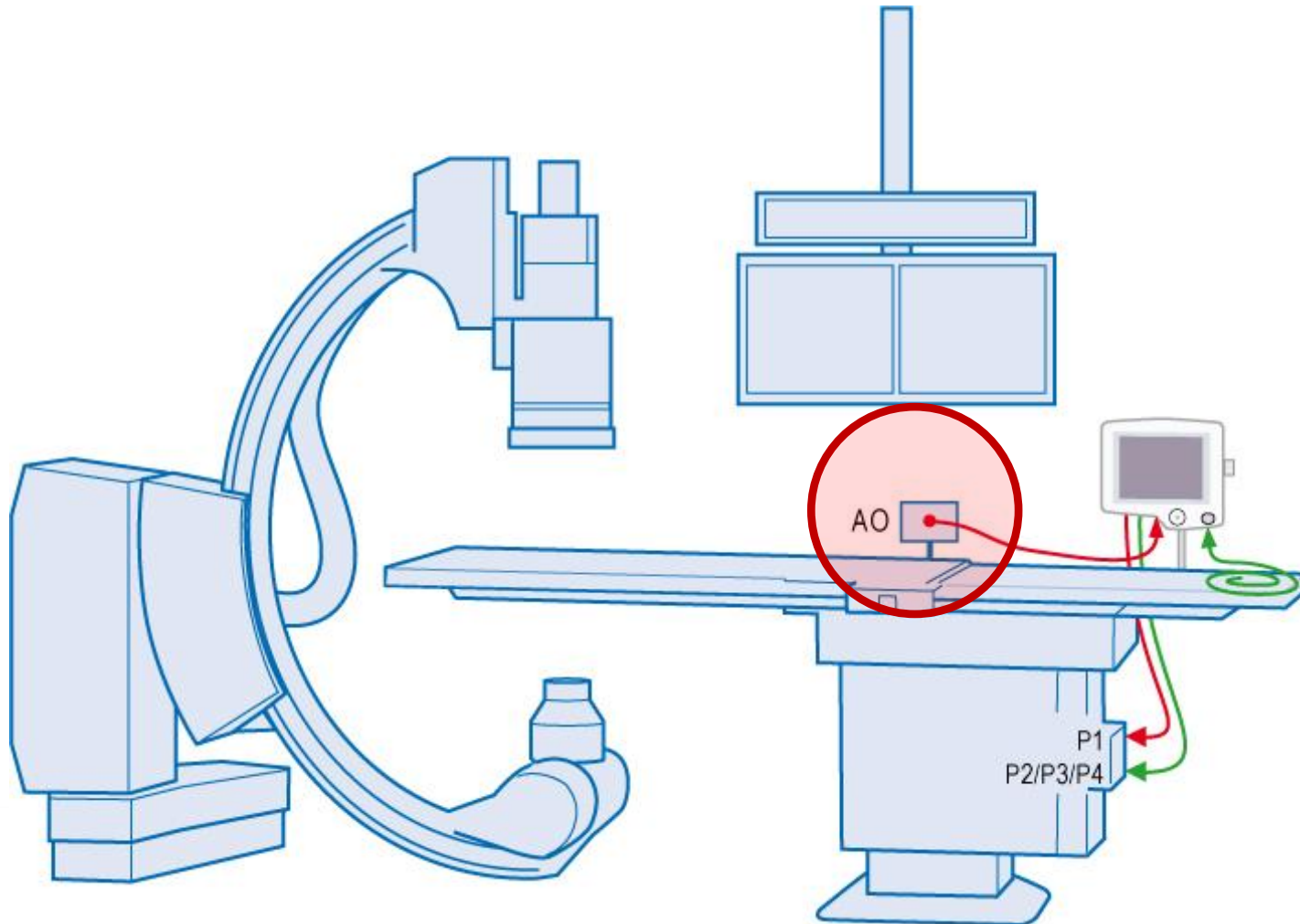
**Thank you for your attention!**

**Thank you for your attention!**





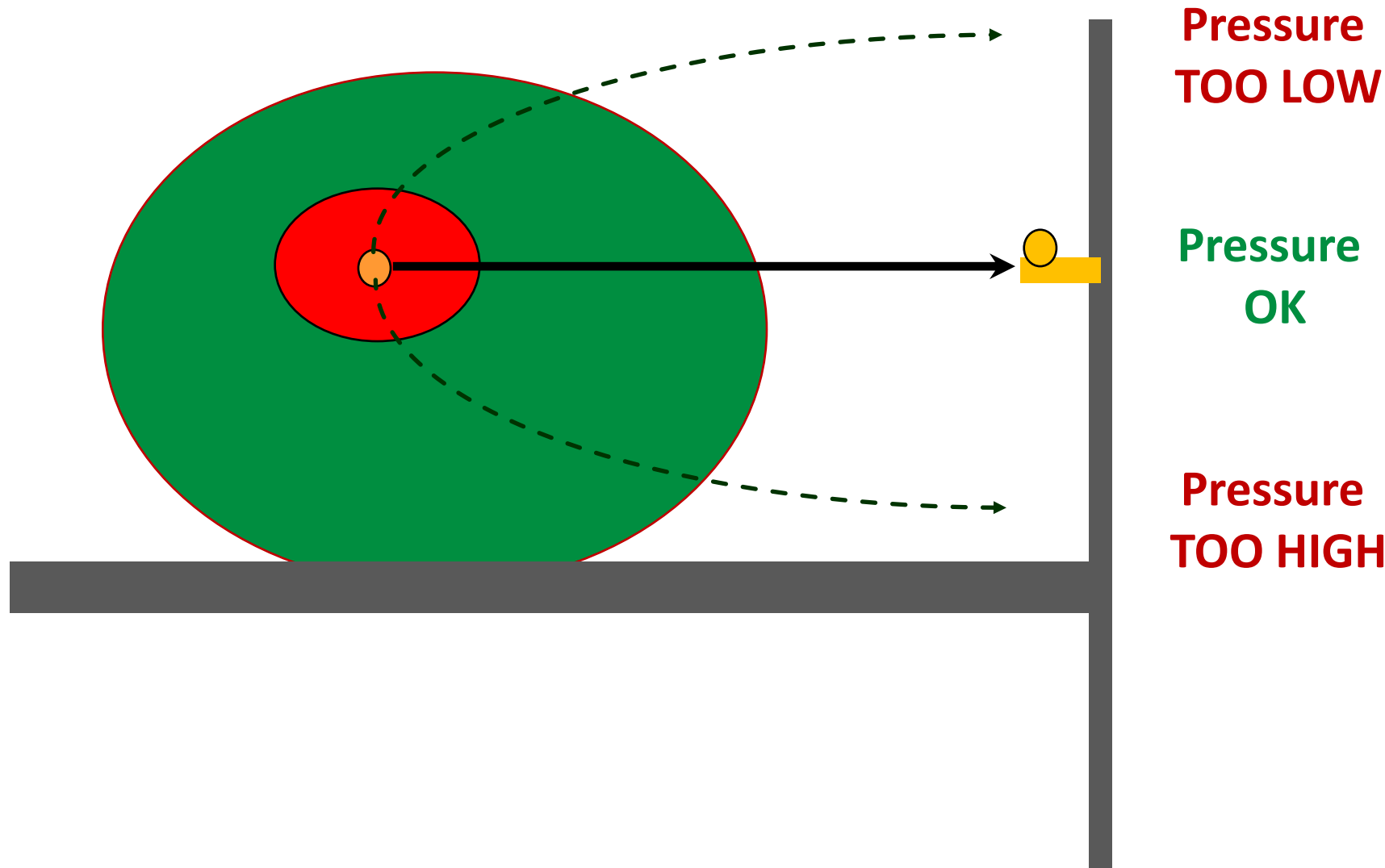
# Setting in the cathlab



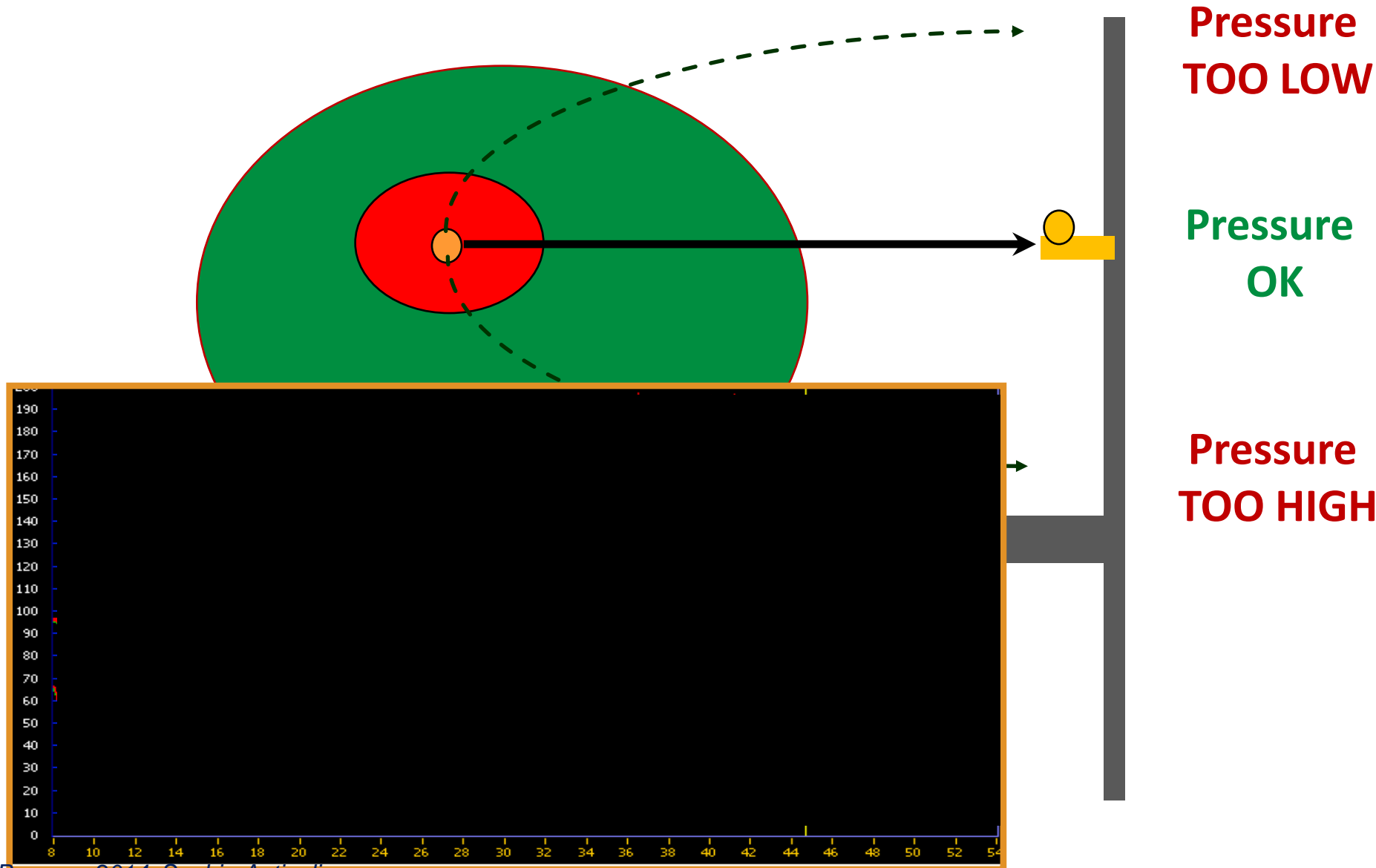
# Calibration: Position of the Transducer

- Aortic pressure is measured by the **fluid filled guiding catheter**
- Its value is a **relative pressure**, compared to the reference, measured at the transducer
- **Height of the transducer** has a measurable impact on the value

# Calibration: Position of the Transducer



# Calibration: Position of the Transducer



# Setting in the cathlab

