

Absolute Flow measurements in STEMI patients

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**Gedreven
door het
leven.**





Background

Hypothesis: absolute flow in STEMI:

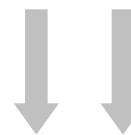
1) High flow – high flow



2) Low flow – high flow



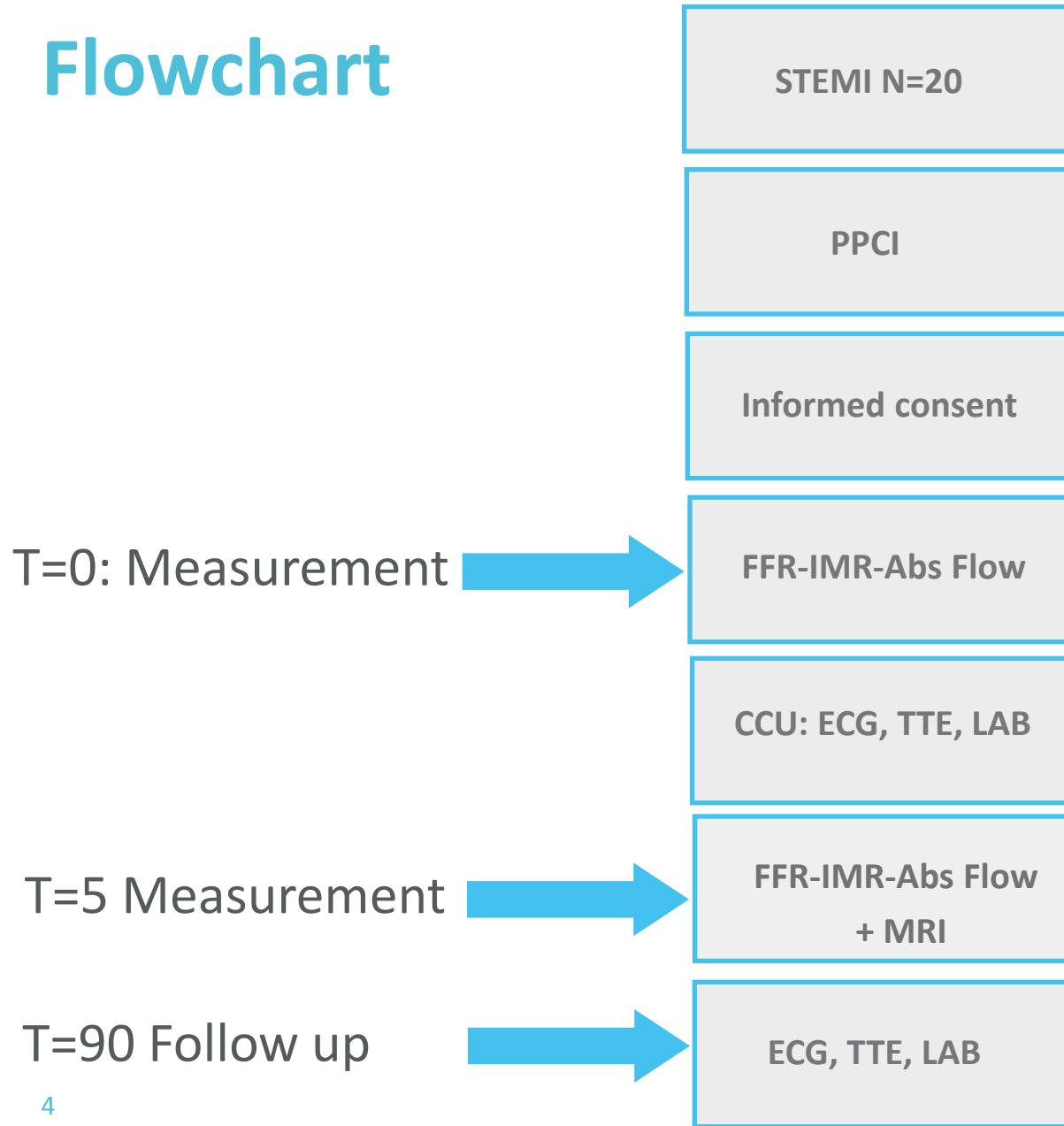
3) Low flow – low flow



Effect on LV function and outcome?



Flowchart



Case 1

Demographic data

♂ 46

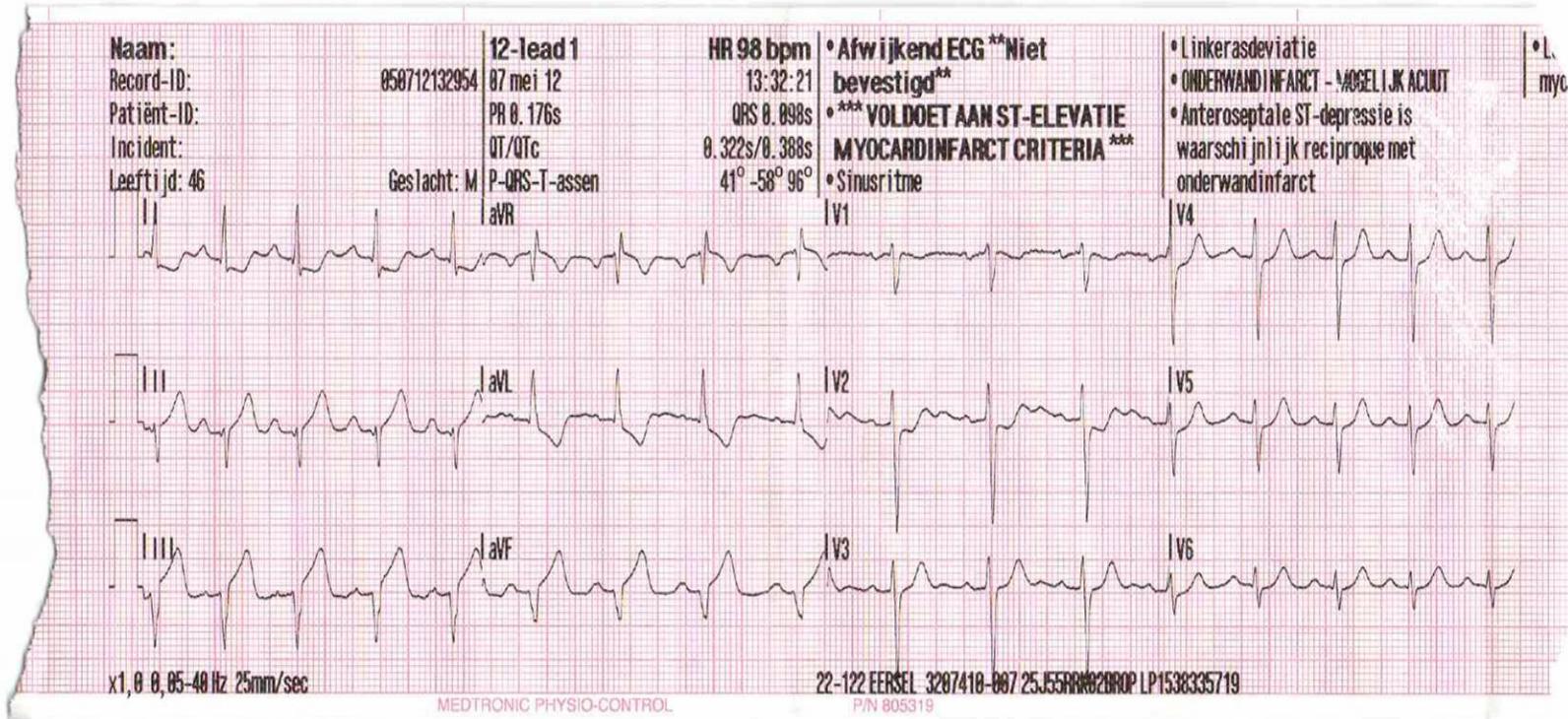
No risk factors CVD

Onset pain 12:30

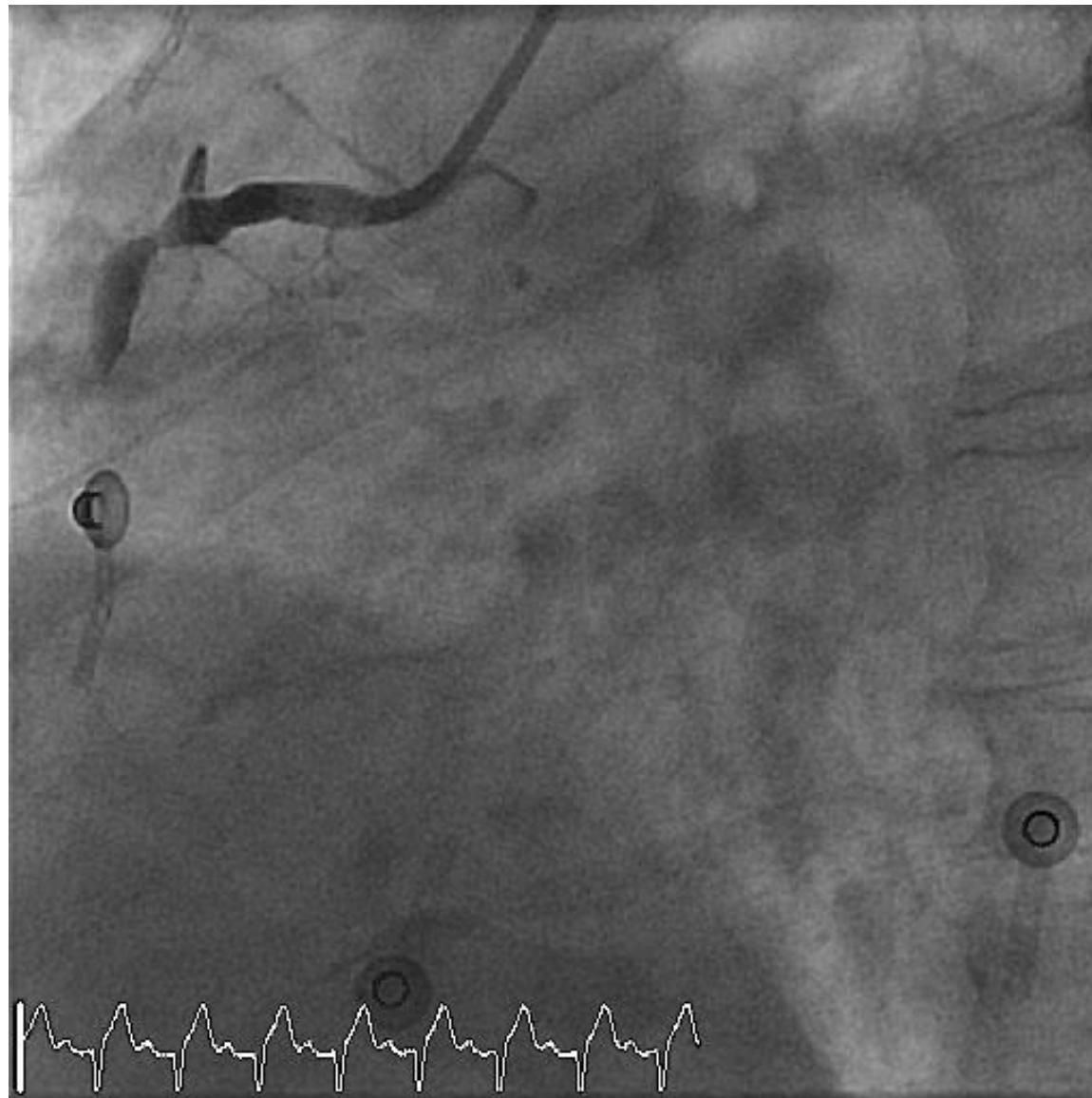
Time entering cathlab 14:30

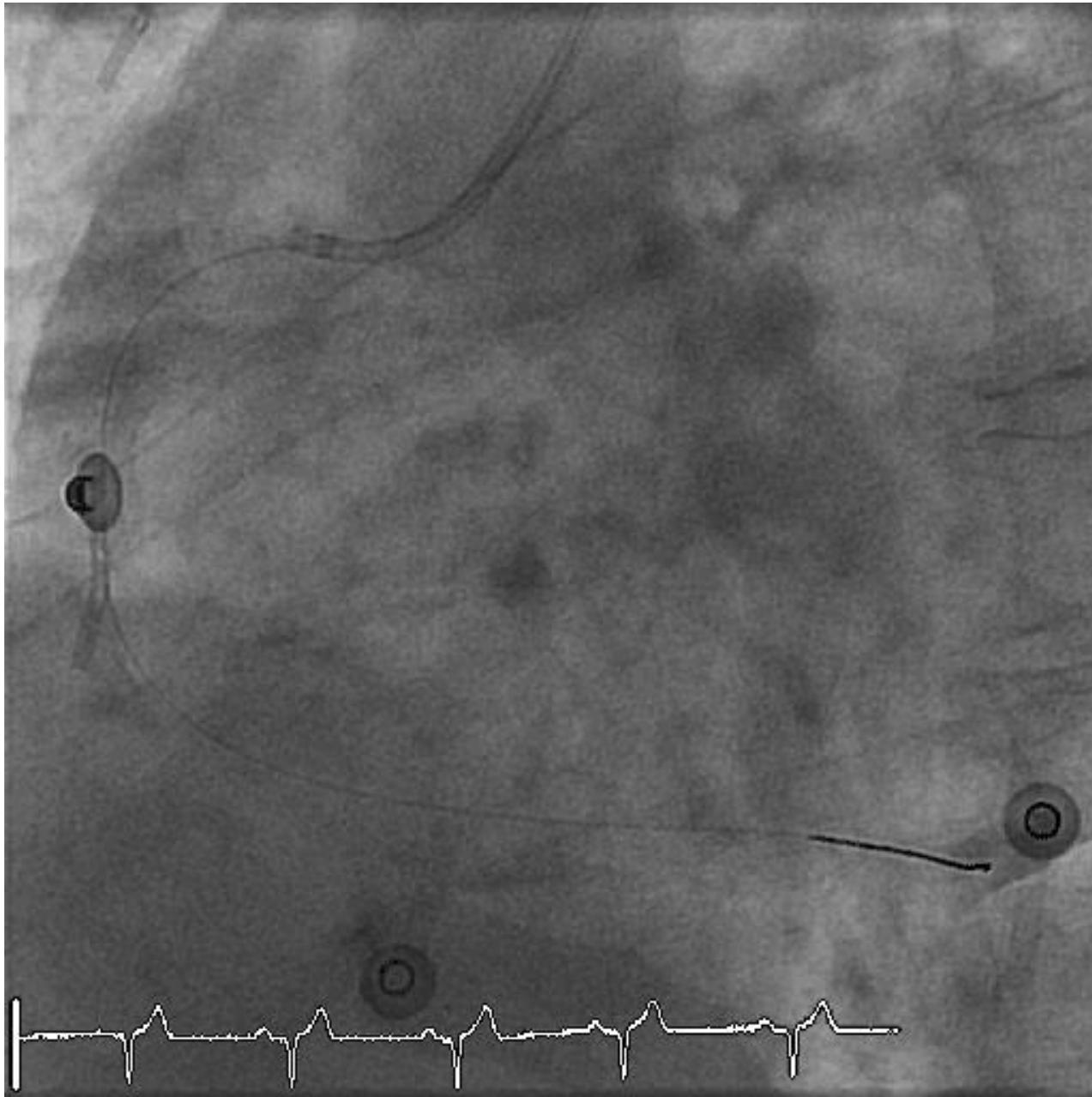
RR 105/68

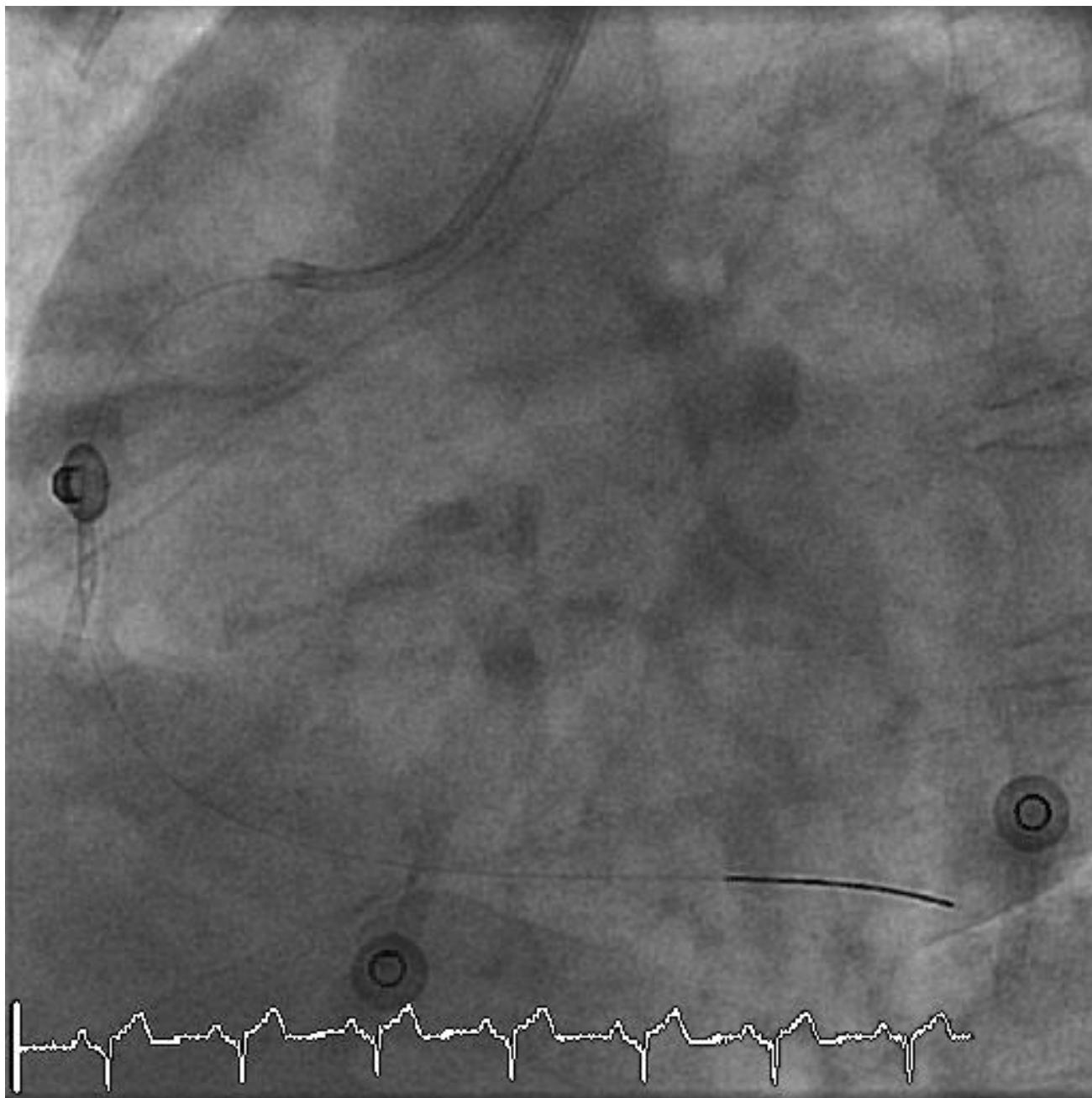
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Angiogram







Measurements

- FFR
- IMR
- Absolute flow



← adenosine



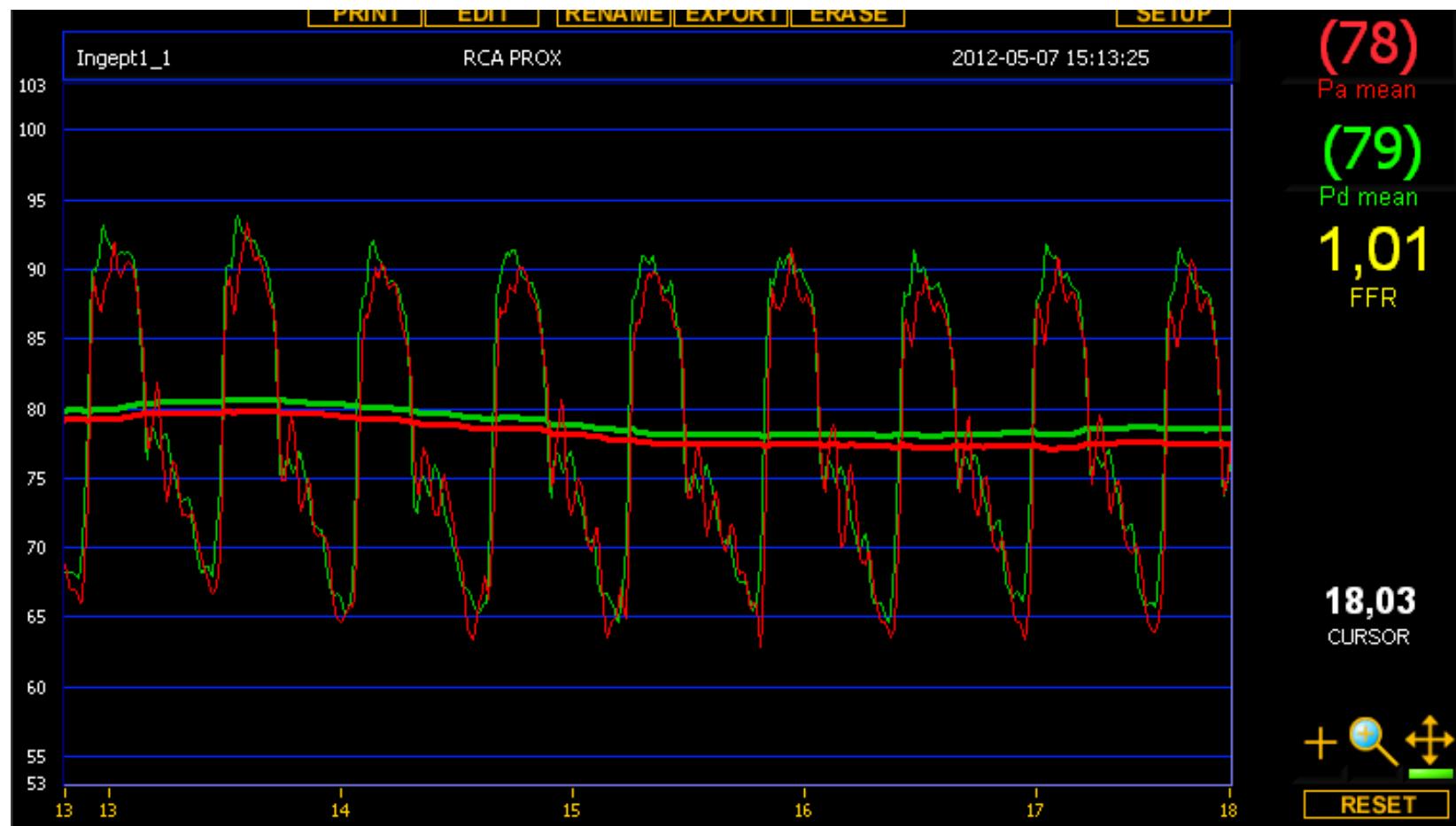
← infusion pump



← Analyzer



Case 1: FFR: after stenting



FFR: 1.00

Case 1: IMR: after stenting



$$\text{IMR} = (P_d - P_v) * T_{mn,\text{hyp}}$$

Tmn	Pd	IMR
0.82	73	59.9
0.84	70	58.8

IMR mean: 60

Case 1: Absolute flow:

Hyperemia

- Tb (set to 0)

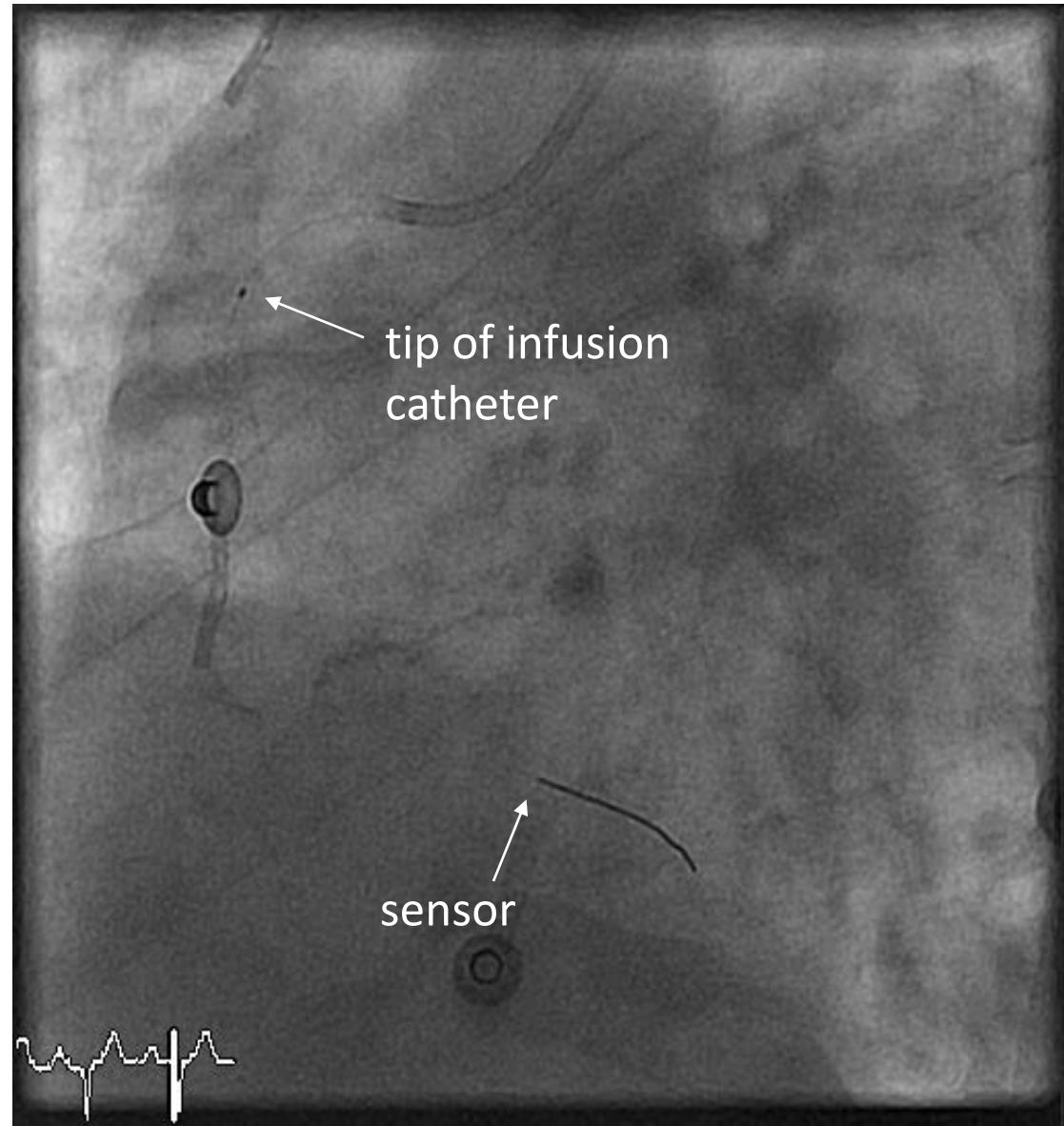
Start infusion

- Qi
- T

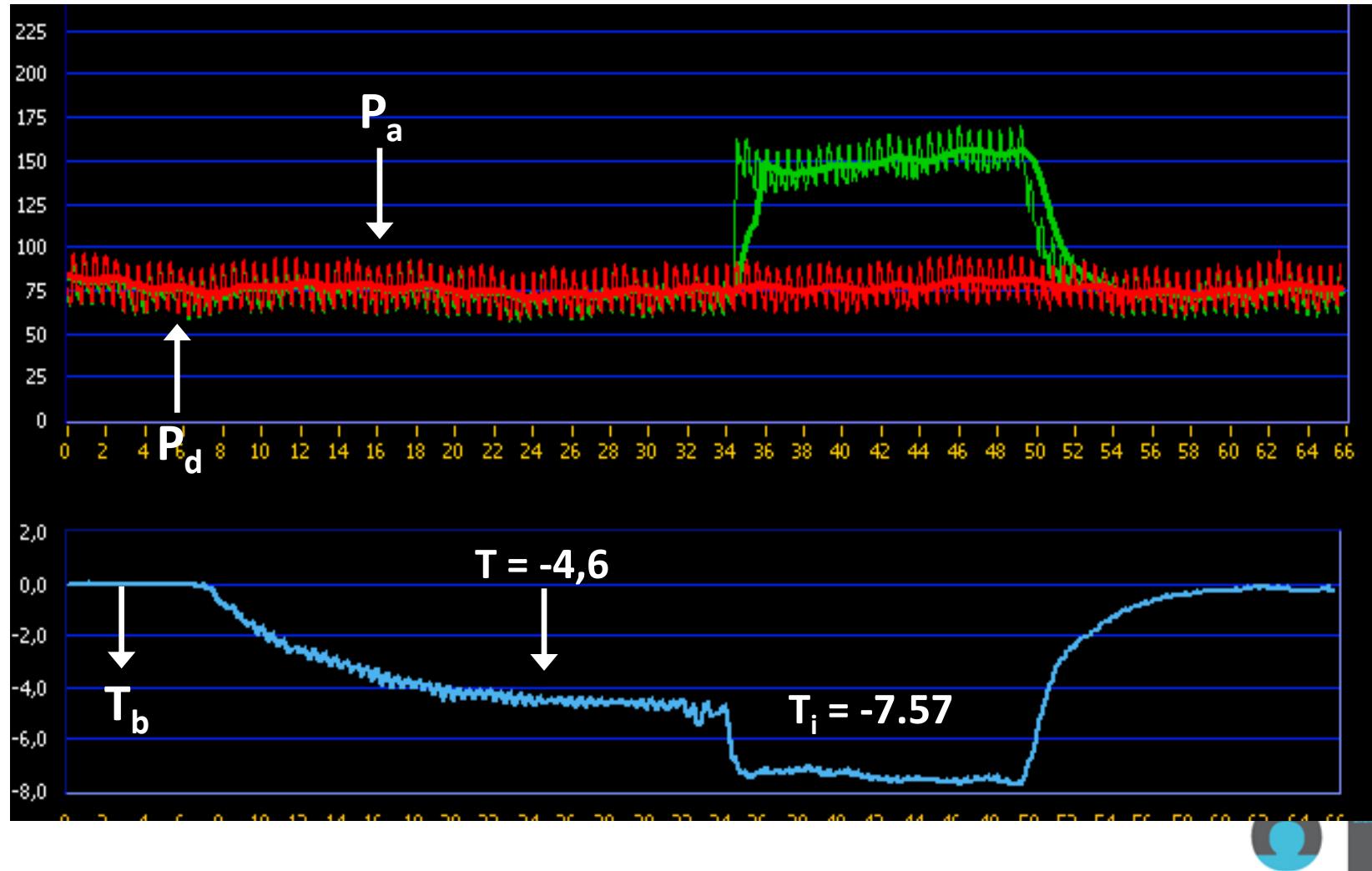
Pull back sensor

- In infusion cath
- Ti

Calculation afterwards



Case 1: Absolute flow: after stenting



Calculation

Qi = 20 ml/min

Tb = set to 0°

T = -4.6°

Ti = -7.57°

$$Q_{cor} = 1.08 \cdot \frac{(T_i)}{(T)} \cdot Q_i$$

$$Q_{cor} = 1.08 \cdot \left(\frac{7.5}{4.6} \right) \cdot 20 = 35.5$$

Q_{cor} mean: 34 ml/min

Case 1: Results

	T=0	T=5
FFR	1.00	0.95
IMR	60	14
Q_{cor} (ml/min)	34	144



Case 2

Demographic data

♂ 49

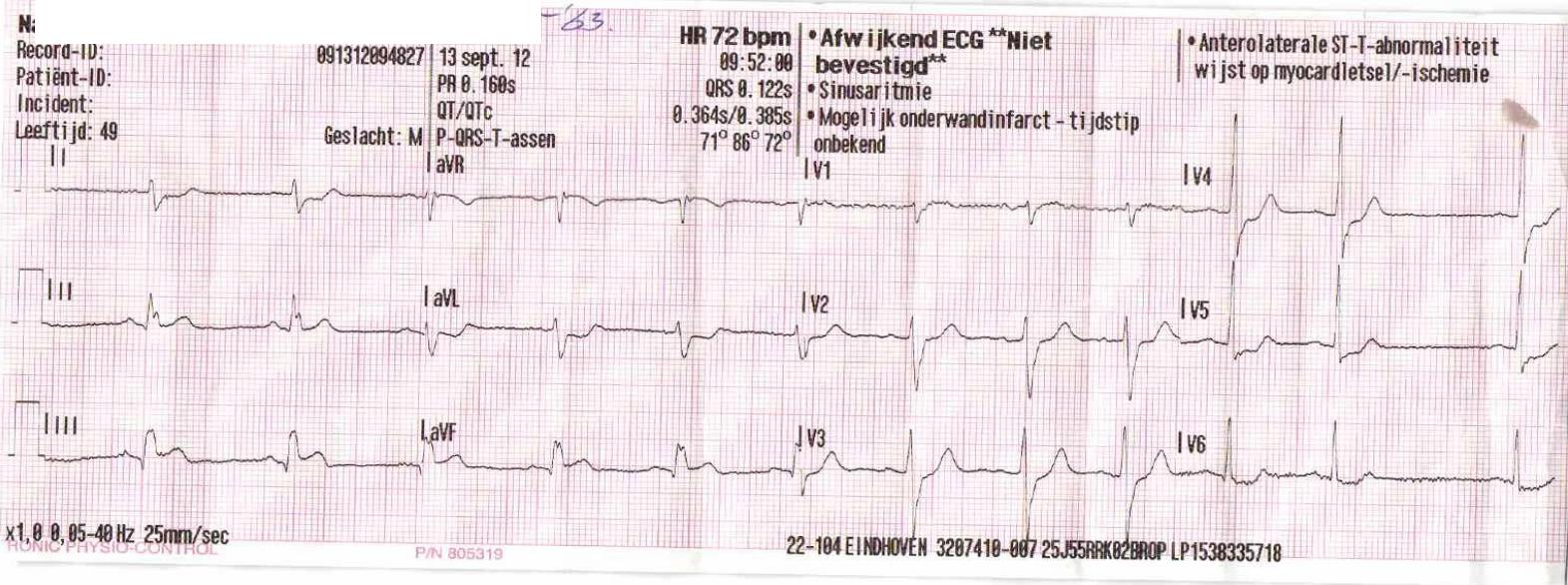
Risk factors CVD: smoking, family history

Onset pain 03:30

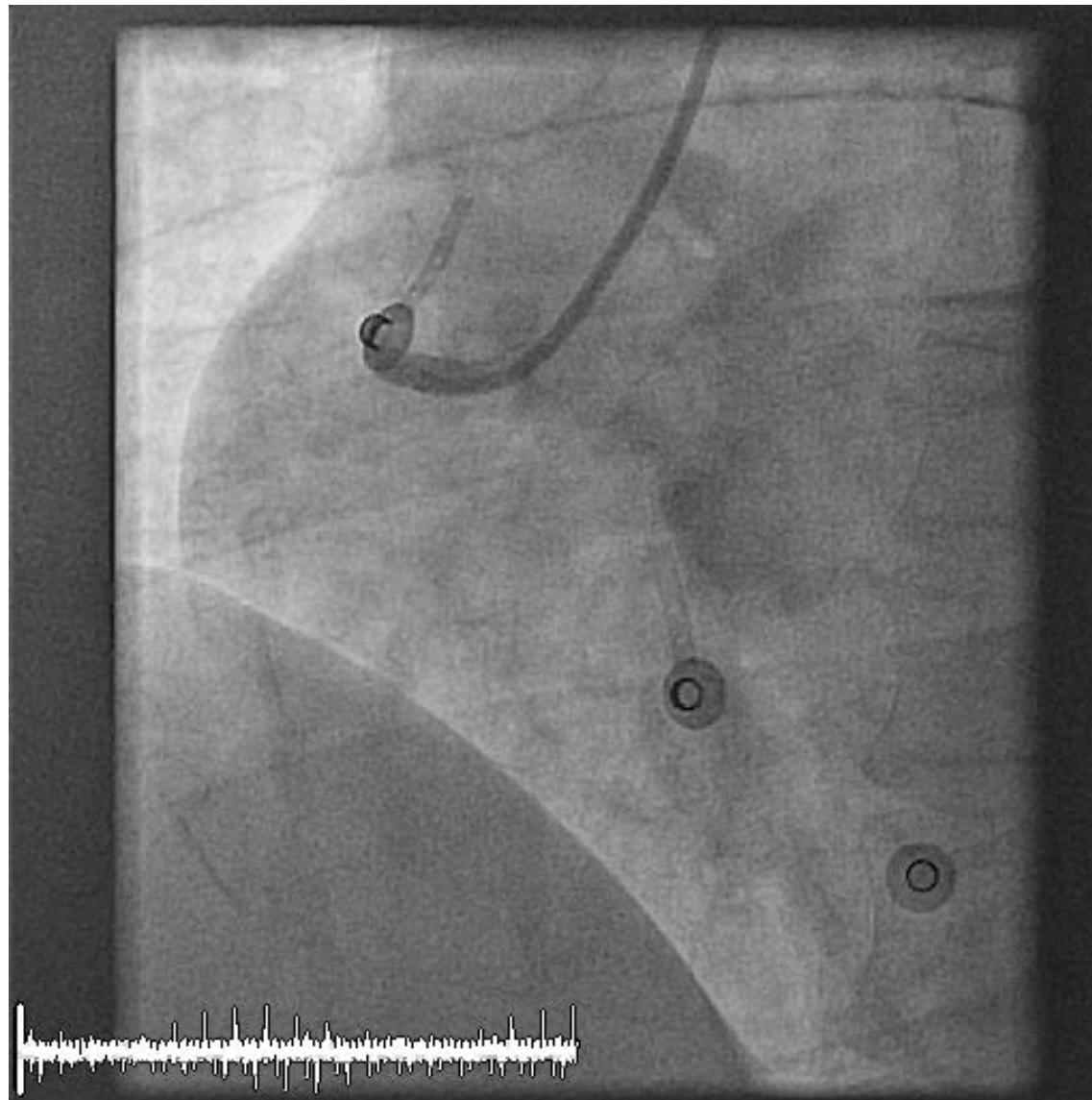
Time entering cathlab 10:15

RR 120/82

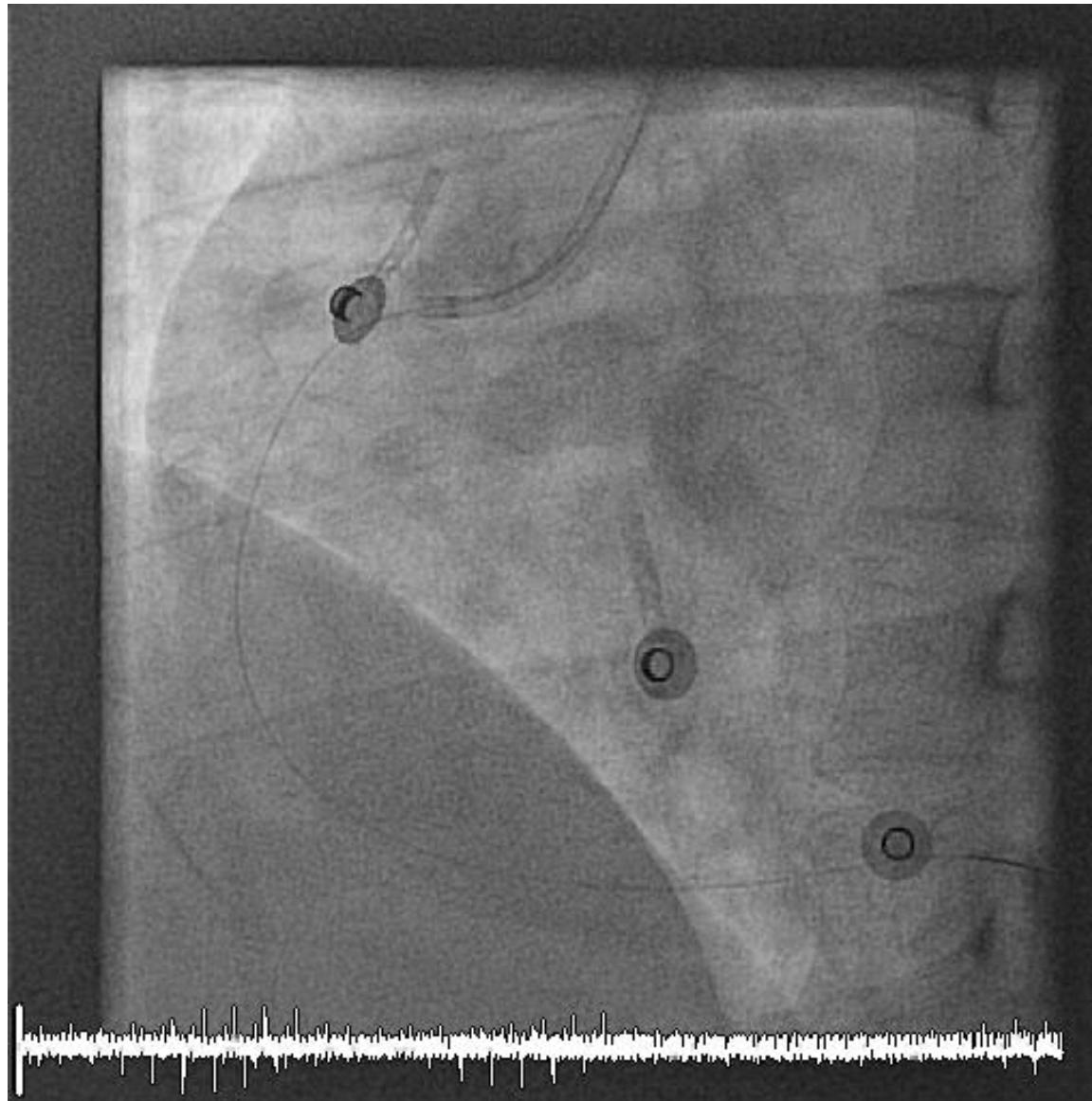
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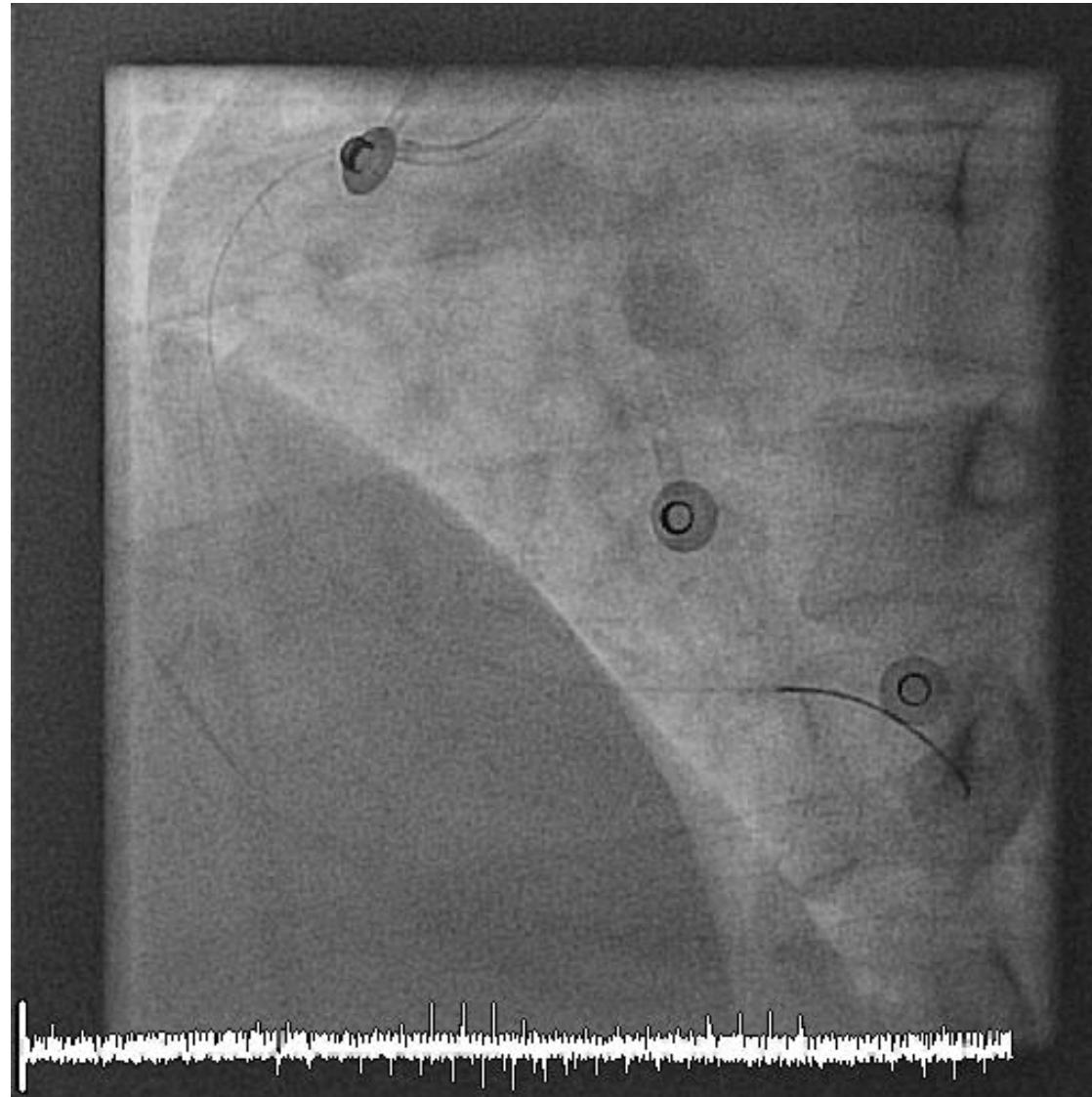
Angiogram



Angiogram

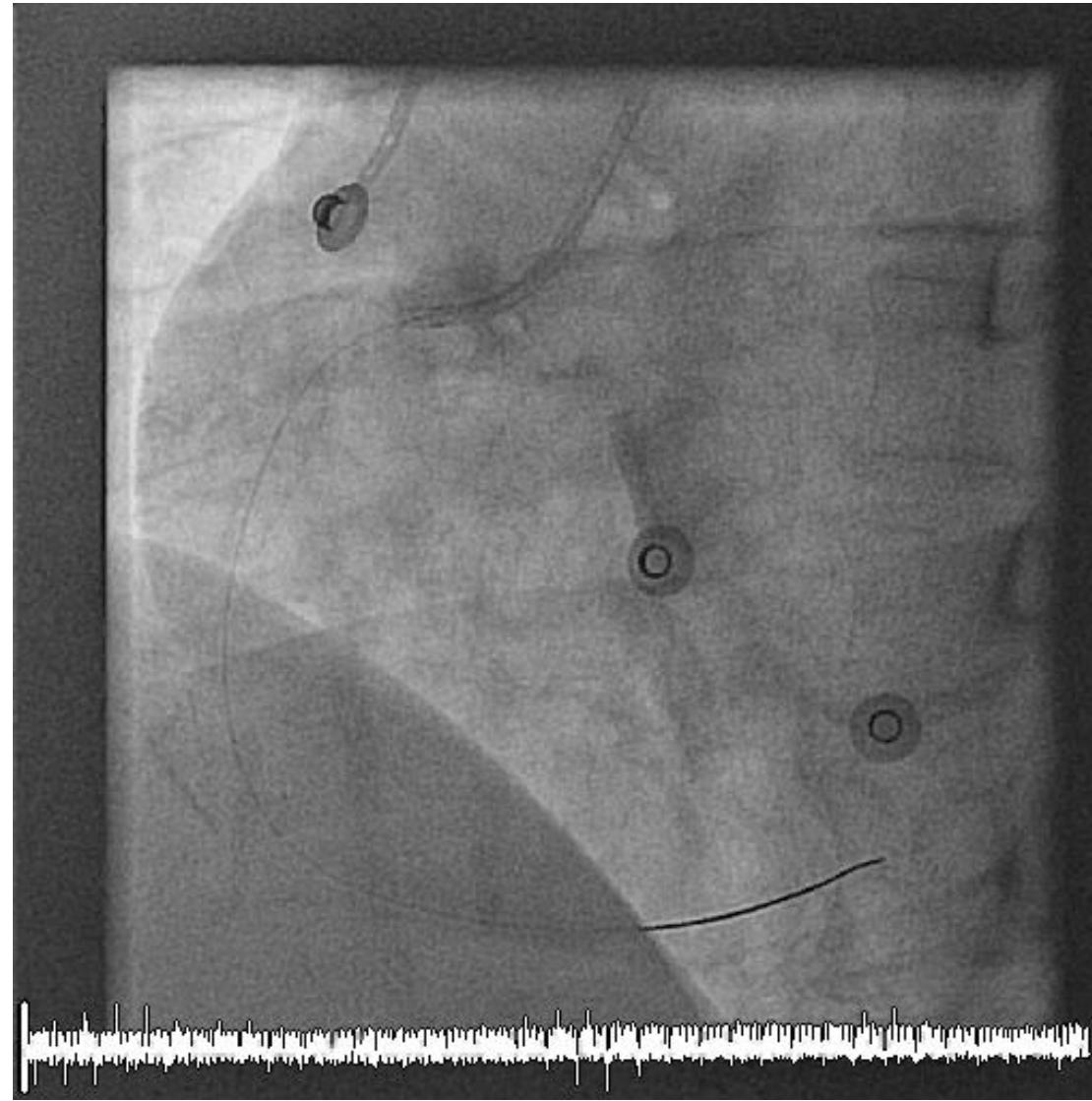


Angiogram

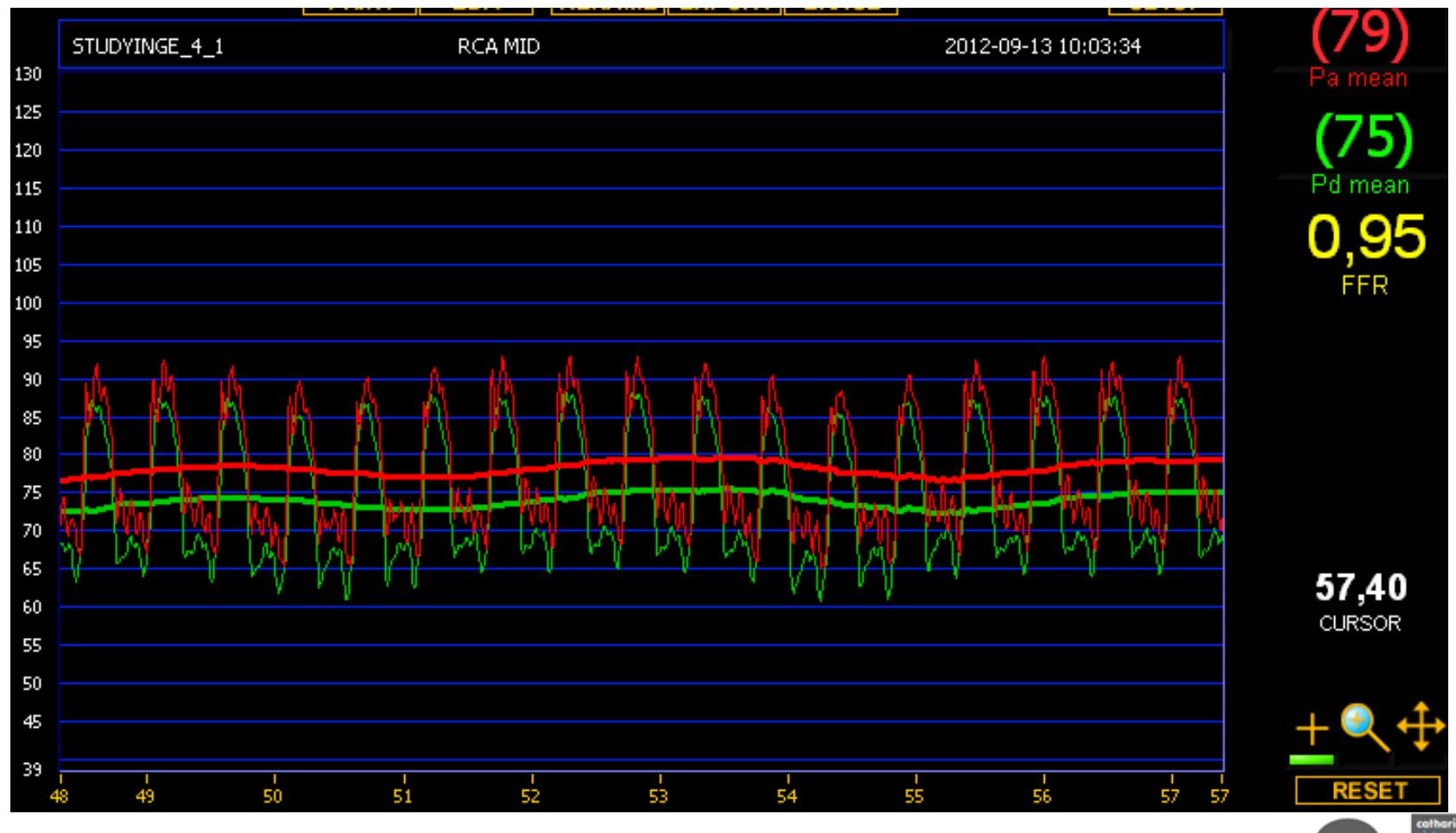


catharina
ziekenhuis

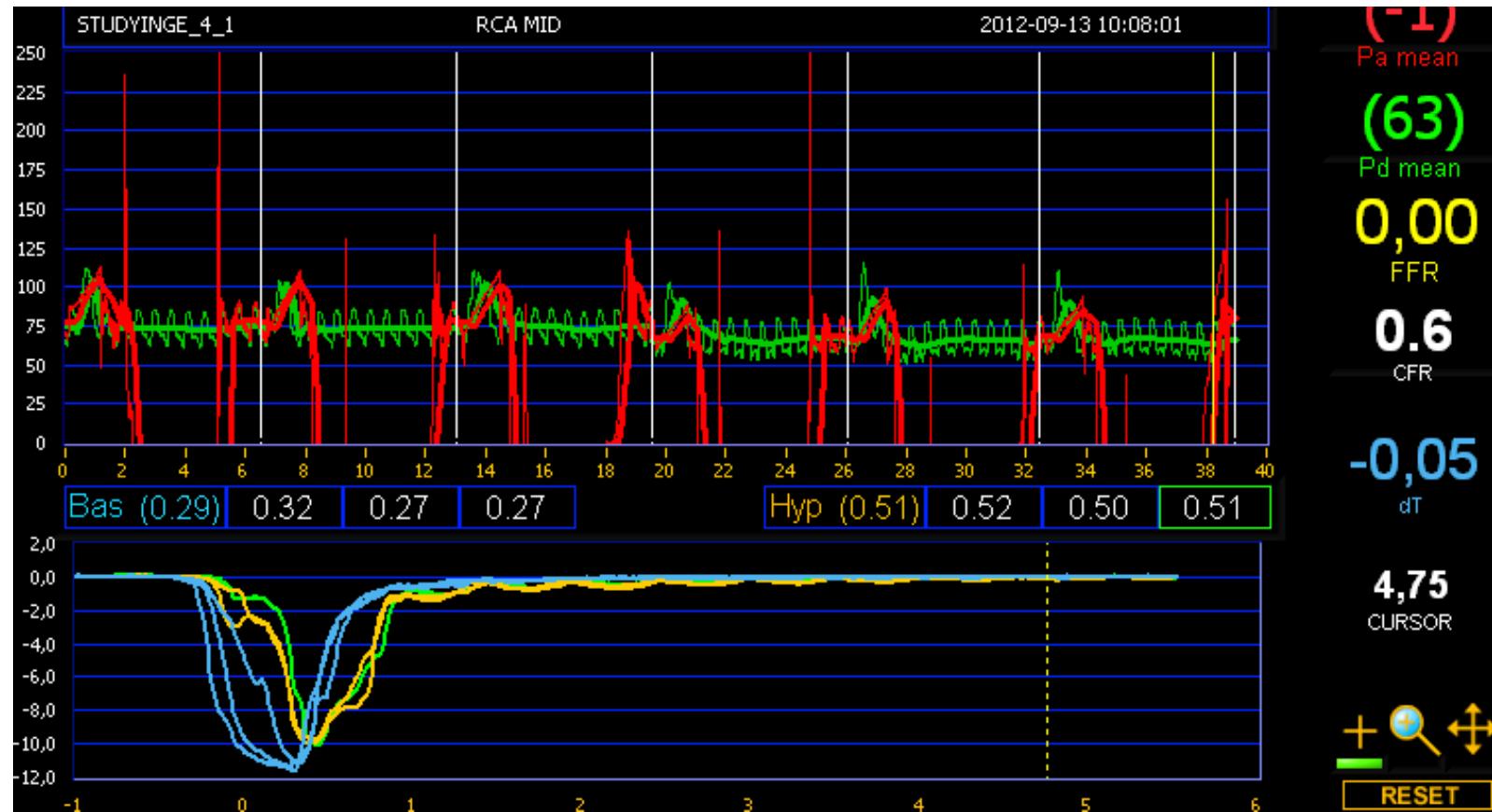
Angiogram



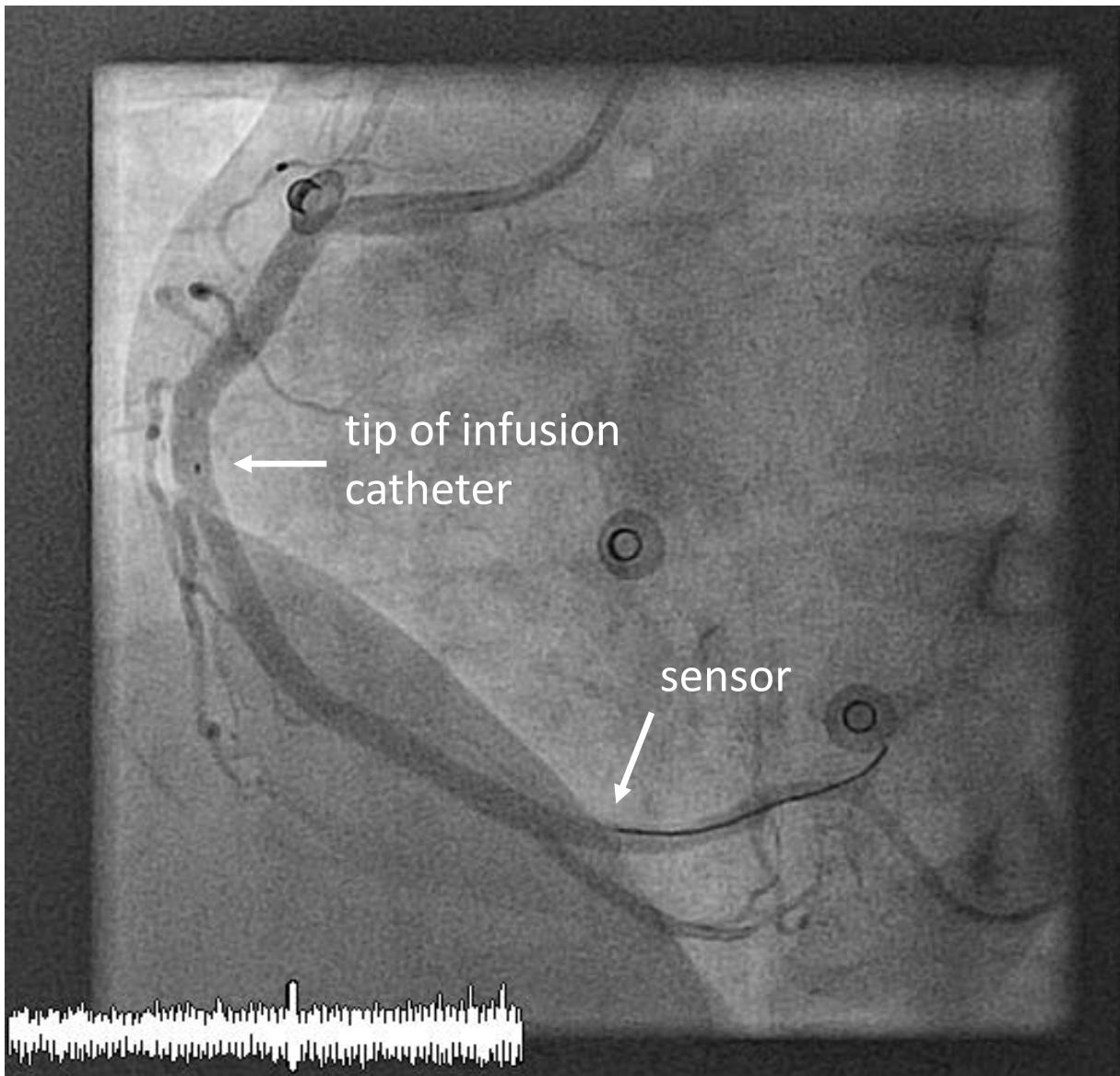
Case 2: FFR: after stenting



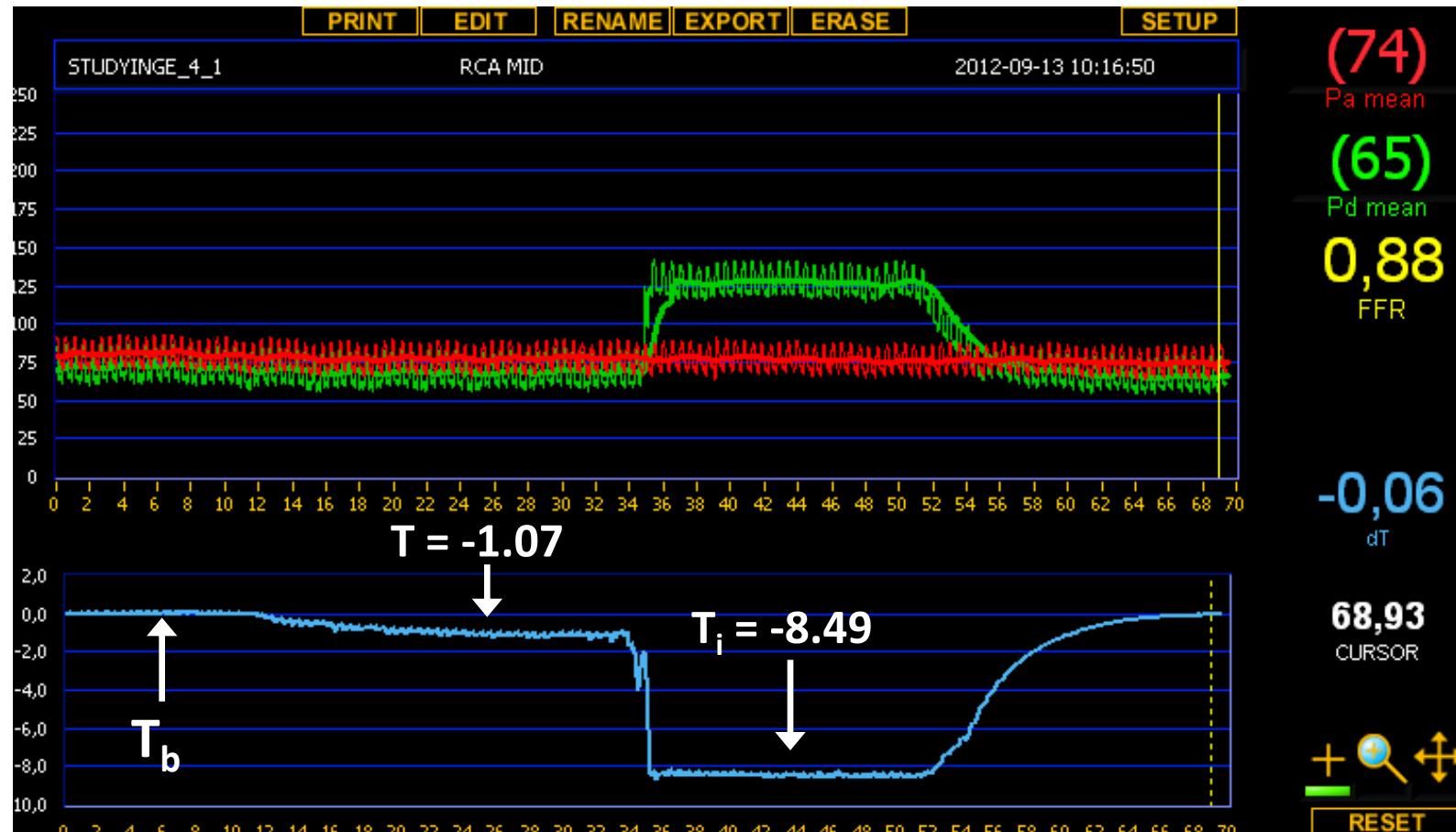
Case 2: IMR: after stenting



IMR mean: 33



Case 2: Absolute flow: after stenting



$Q_{cor \text{ mean}}: 172 \text{ ml/min}$

Case 2: Results

	T=0	T=5
FFR	0.95	0.98
IMR	33	27
Q_{cor} (ml/min)	172	197



Results

	IMR T_0	IMR T_5	Q_{cor} T_0	Q_{cor} T_5
Case 1	60	14	34	144
Case 2	33	27	172	197

MRI:

Case 1: MVO negative

Case 2: MVO positive

Peak MB:

Case 1: 130

Case 2: 330



LV function after 3 months

Case 1: EF 67%

Case 2: EF 33%



Discussion: possible explanations

- Case 1: low flow – high flow
 - Case 2: high flow – high flow / low flow – low flow
- =====
- Different areas at risk with variable recovery?
 - Longer ischemic time?
 - Thrombus burden?

