Step by step invasive physiological assessment to accomplish physiology guide PCI

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Disclosure

Speaker's name: Hitoshi Matsuo M.D. PhD.,

I have the following potential conflicts of interest to report in the field of this presentation:

Speaker at educational events and consultancies for:

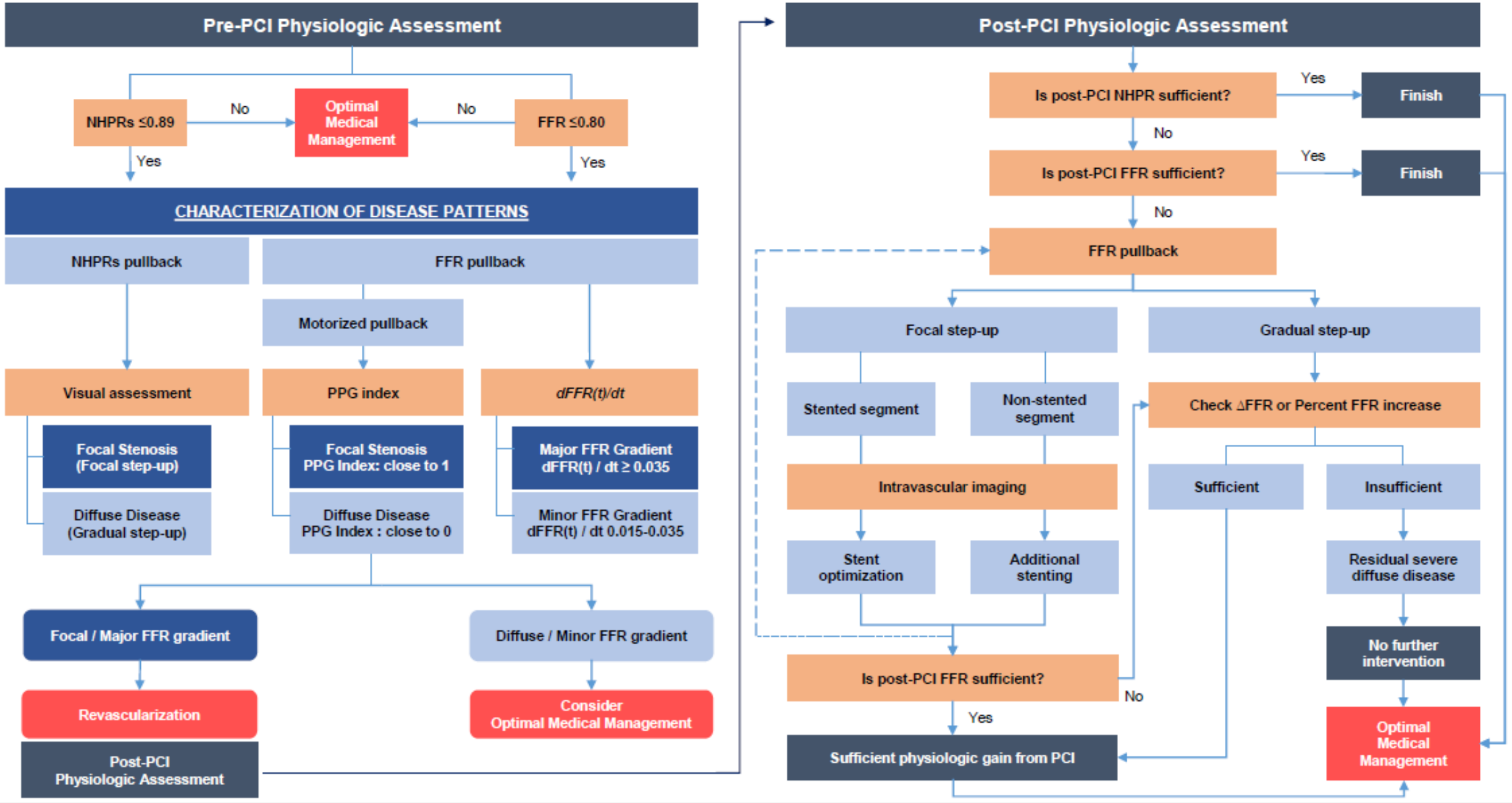
Abbott vascular, Phillips, Boston Scientific, Zeon Medical,
Nippon Mediphysics,
Amgen Biopharma.

The role of PW during PCI

- Single point FFR ➞ presence of ischemia (need revasc or not)
- pressure pullback ➞ Focal or diffuse disease (effectiveness of PCI)
- Pressure monitor during PCI ➞ necessity of Additional treatment
- Final pressure pullback curve ➞ the endpoint of the procedure

Central Illustration. Flow Diagram of Physiologic Assessment to Optimize PCI

Lee JM et al. JACC: Asia 2021;1:14–36

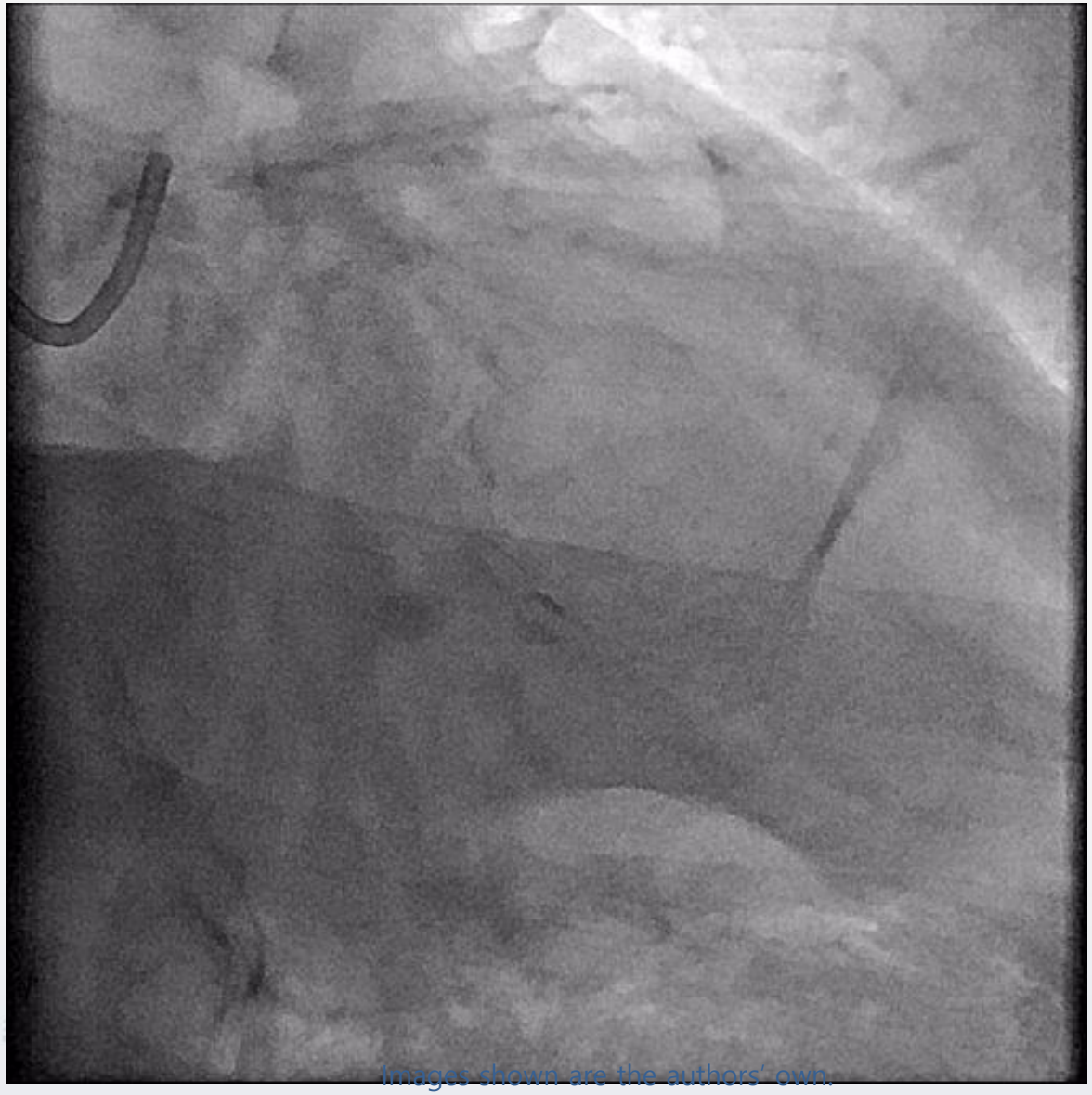


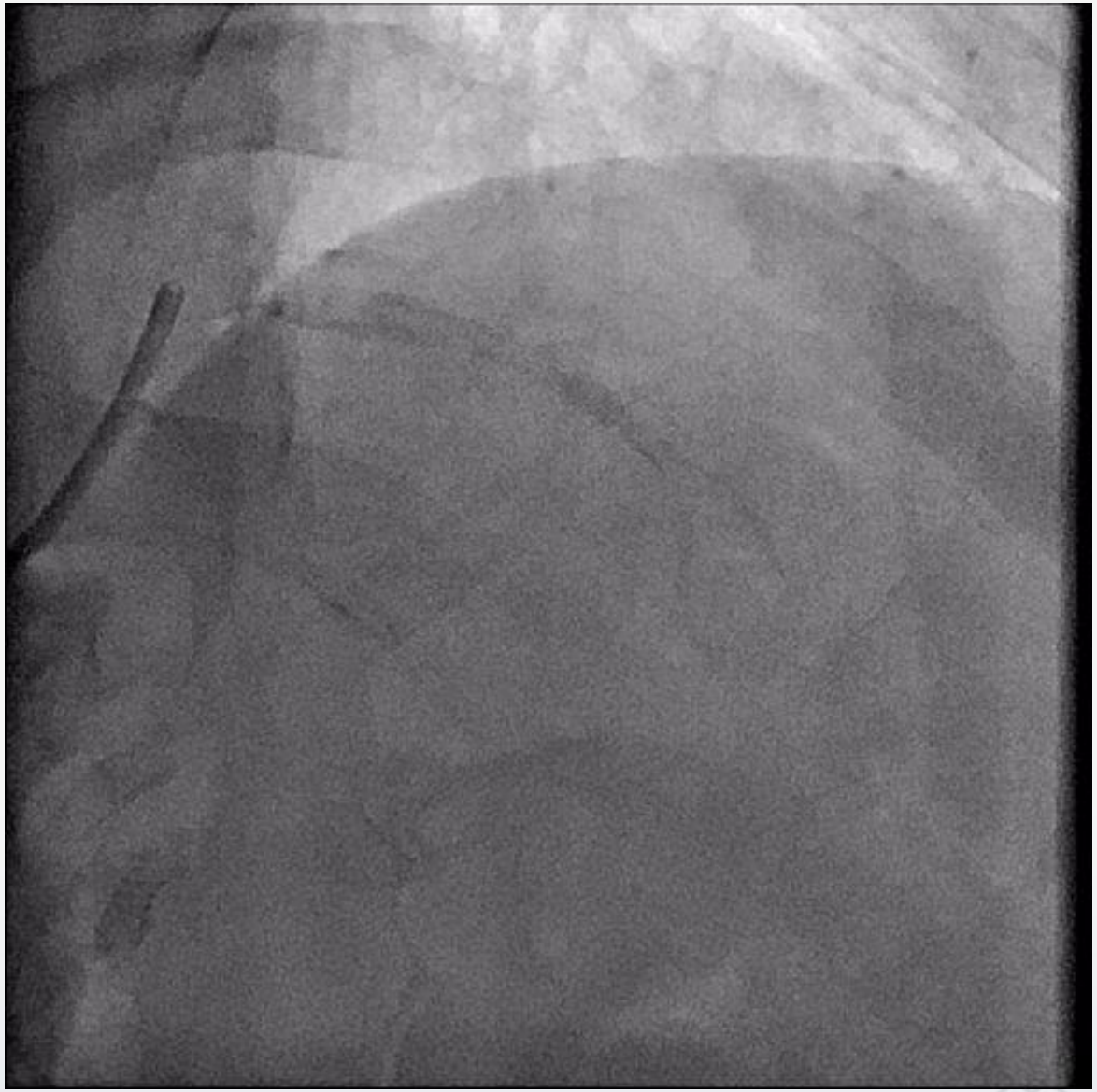
Case1

- Age: 74 y.o. male.
- Inferior MI with severe stenosis in LAD.
- Risk factors: past smoker, HT, DM, Dyslipidemia.
- RCA BMS in mid RCA.
- Transient perfusion defect in anteroseptal wall and persistent defect in inferior wall by SPECT.
- Angiography showed LAD diffuse calcified bifurcative lesion, and no restenosis in RCA.

MI, myocardial infarction, LAD, left anterior descending, HT, hypertension, DM, diabetes mellitus, RCA, right coronary artery, BMS, bare metal stent, SPECT, single-photon emission computed tomography.

Coronary Angiography





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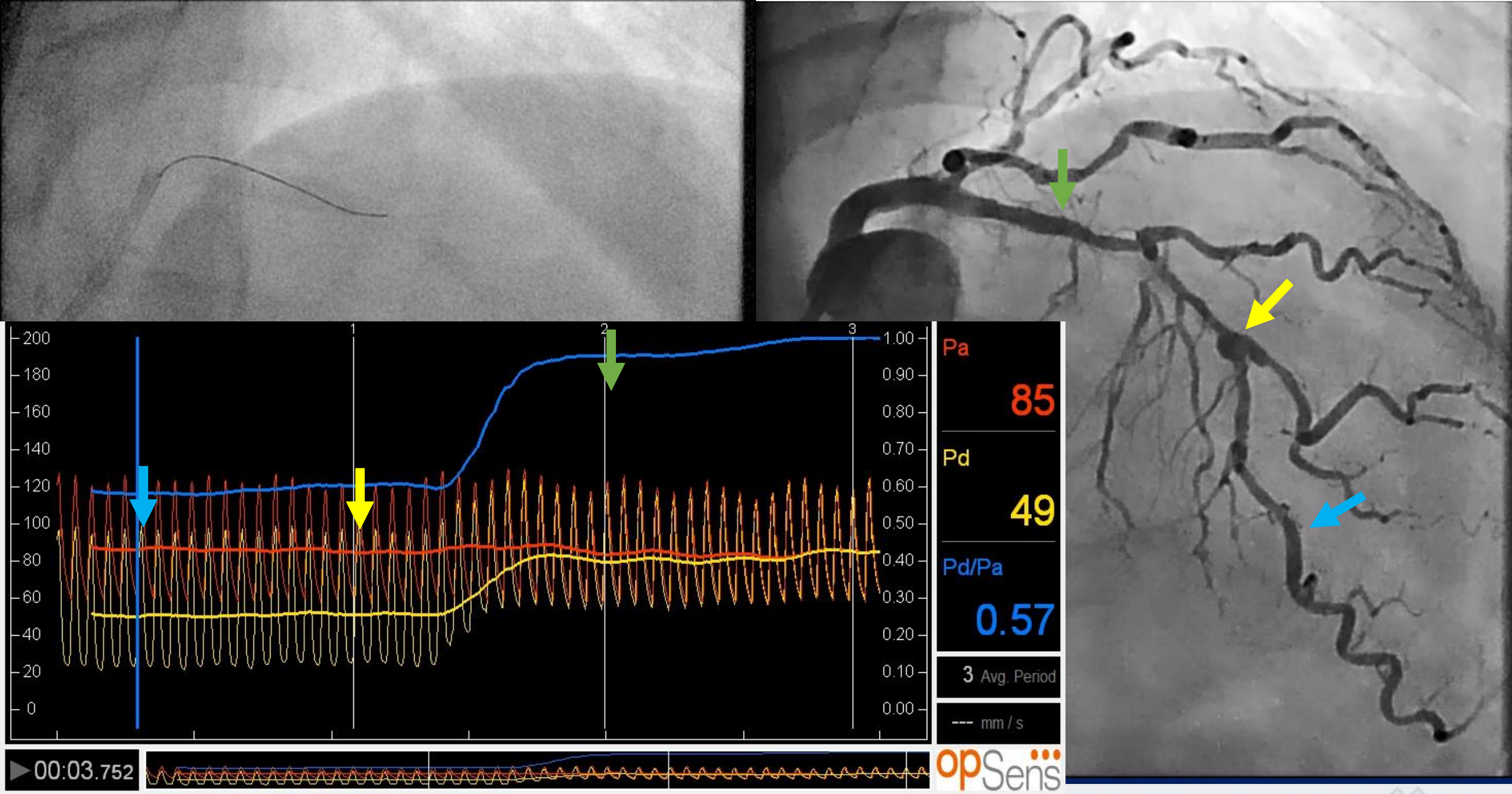

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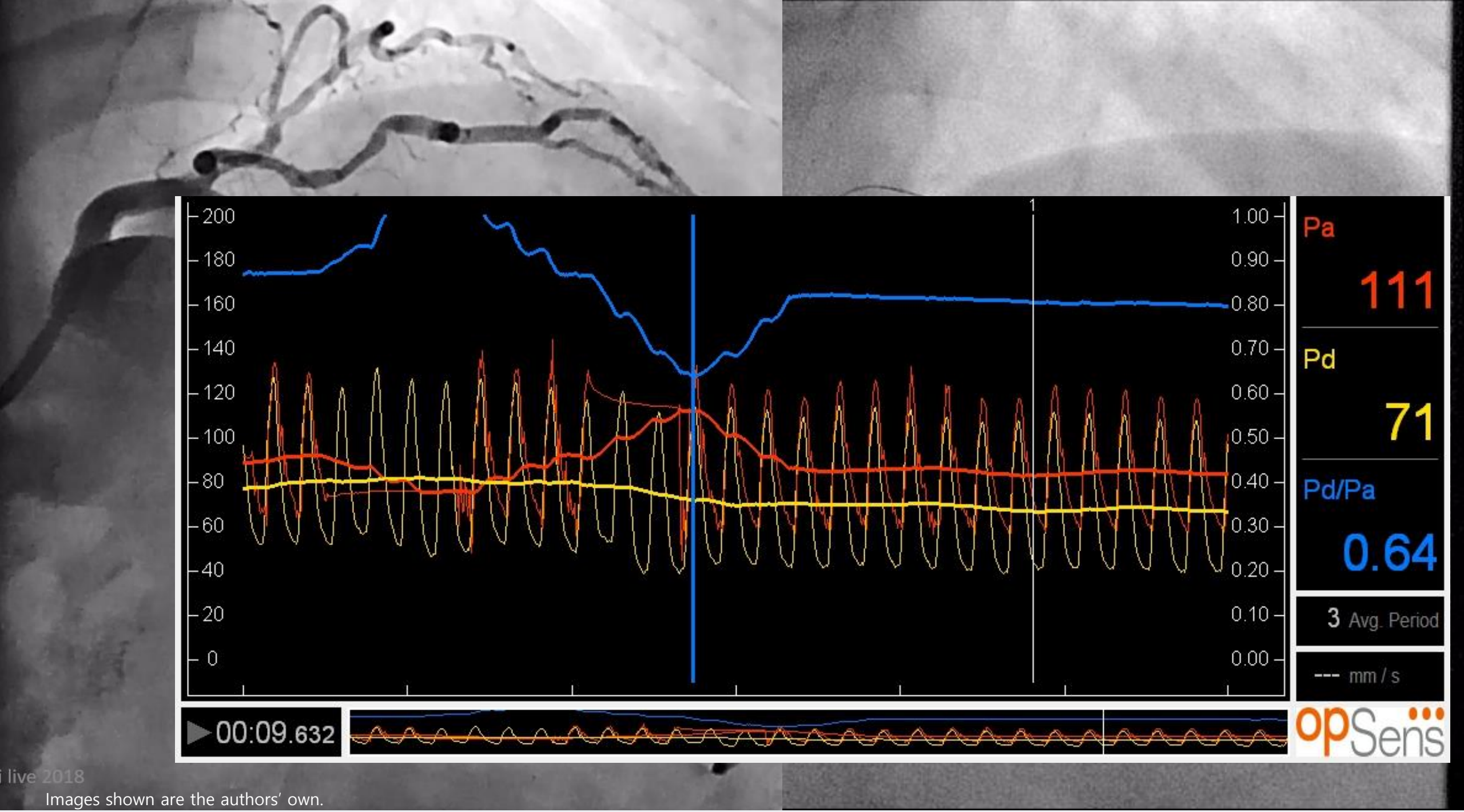

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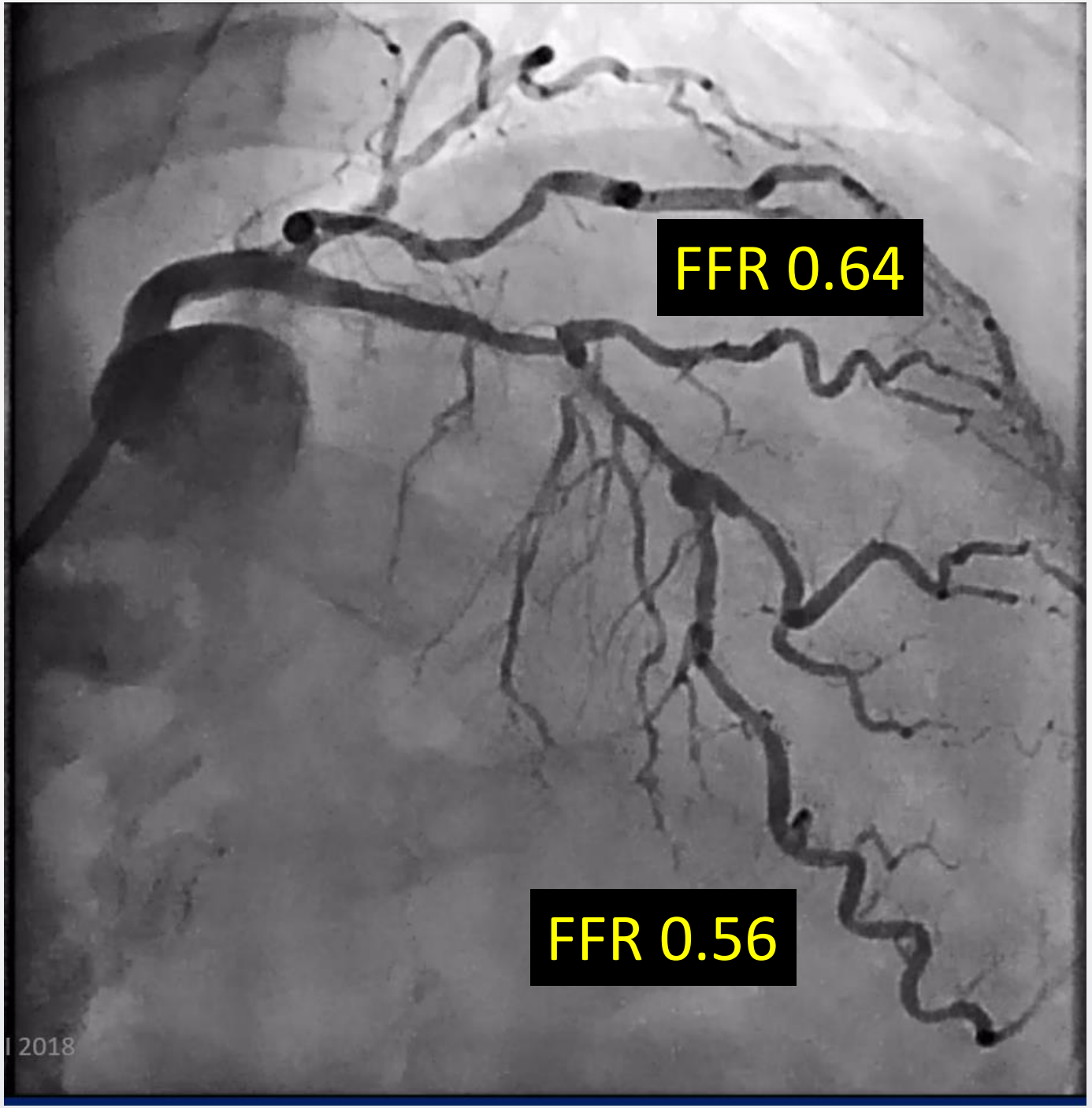

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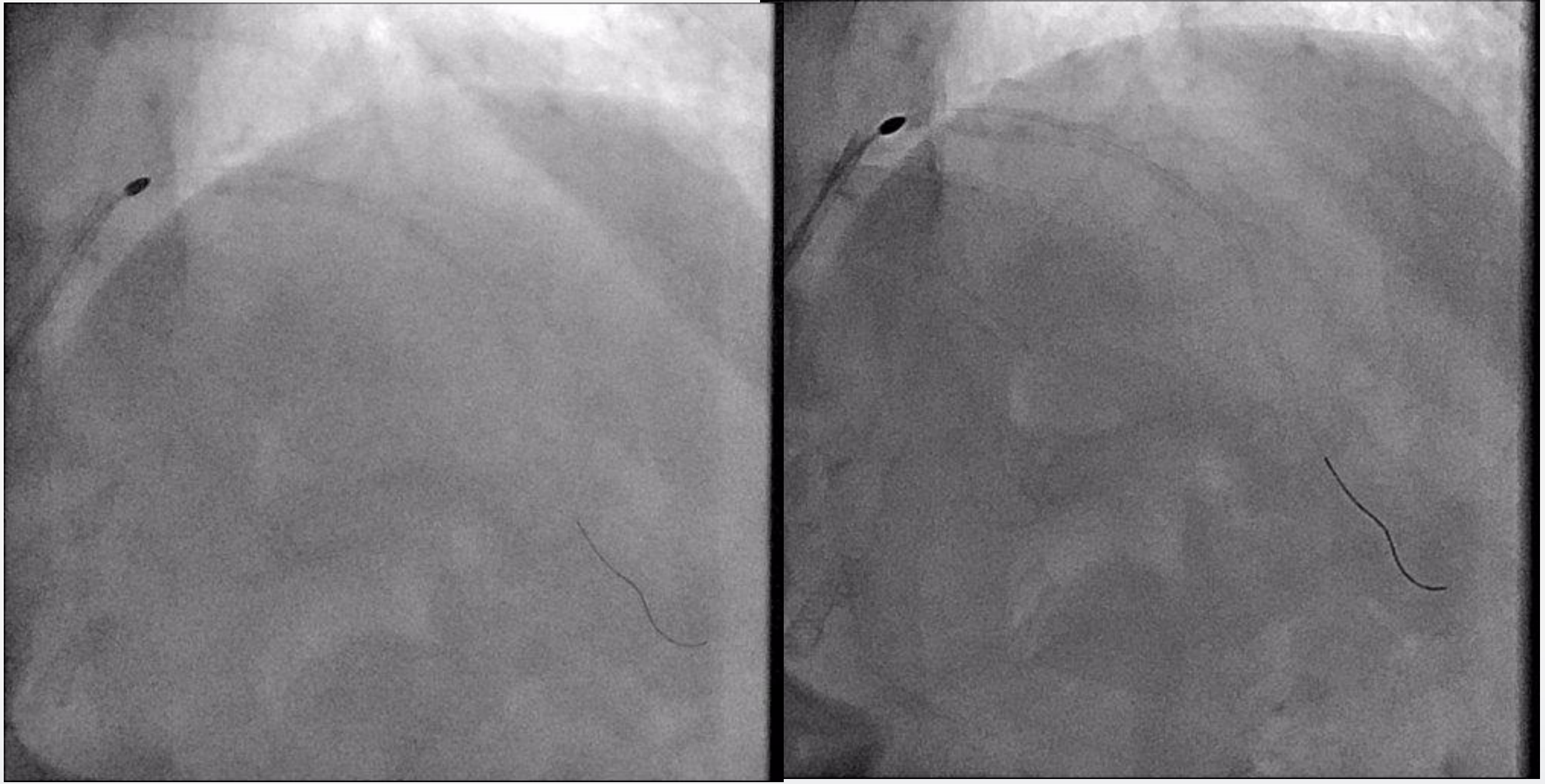

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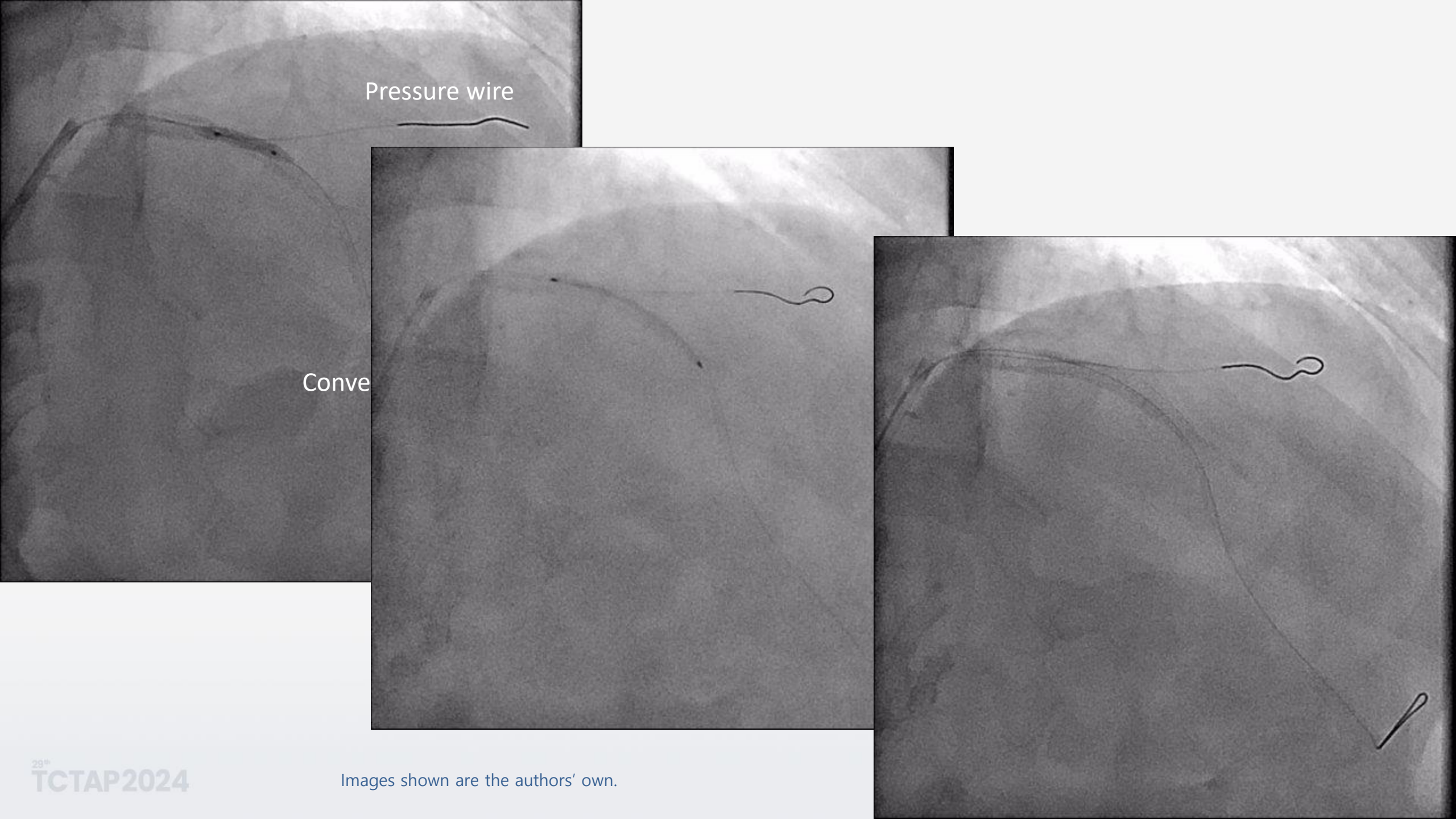

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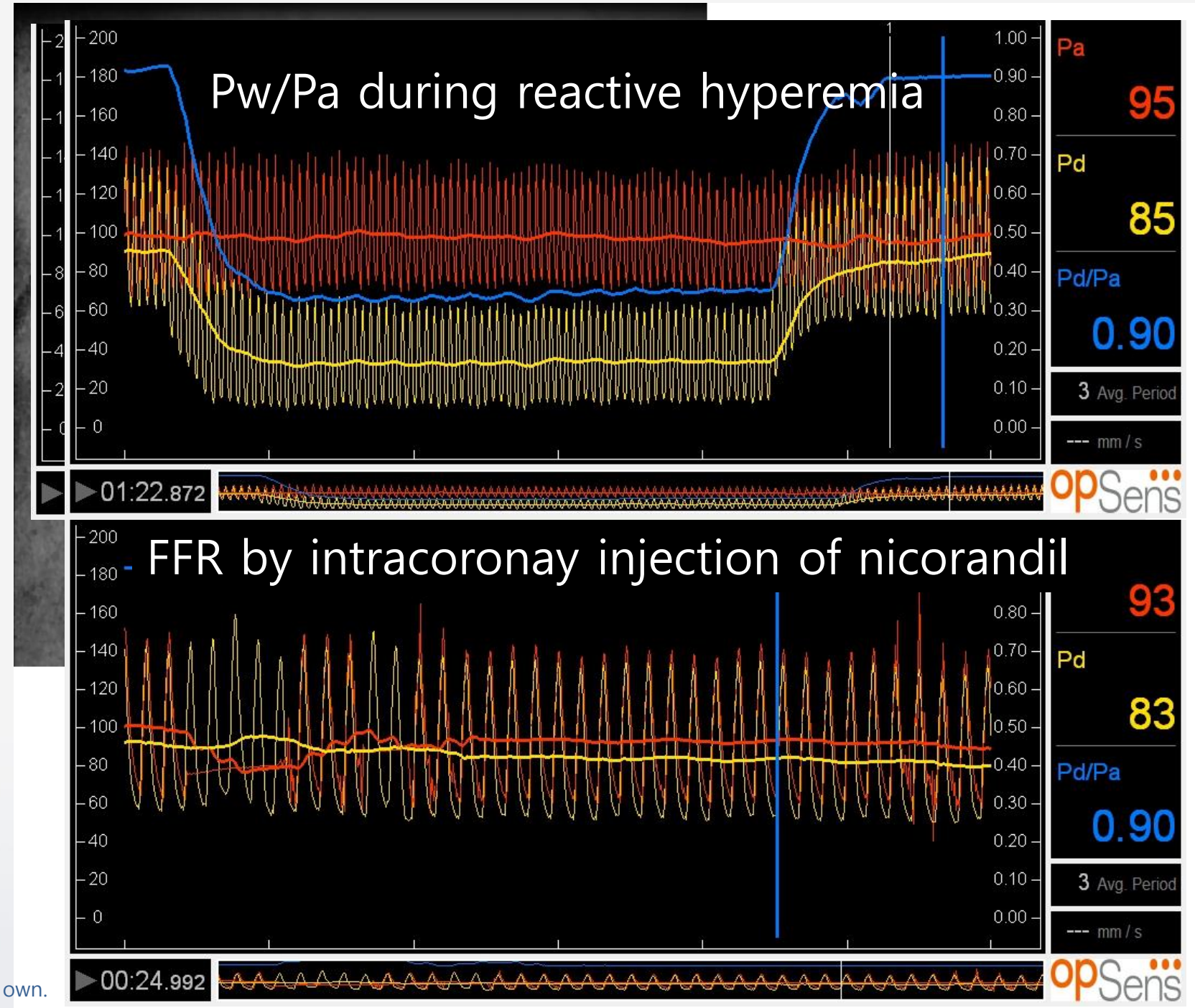

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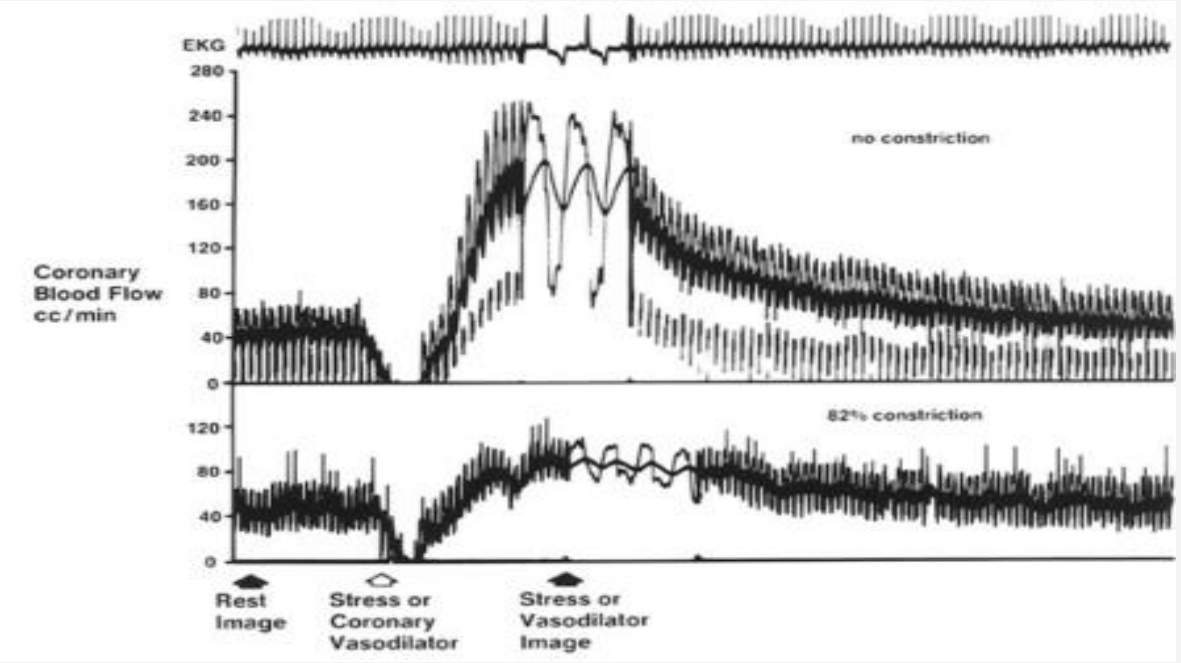
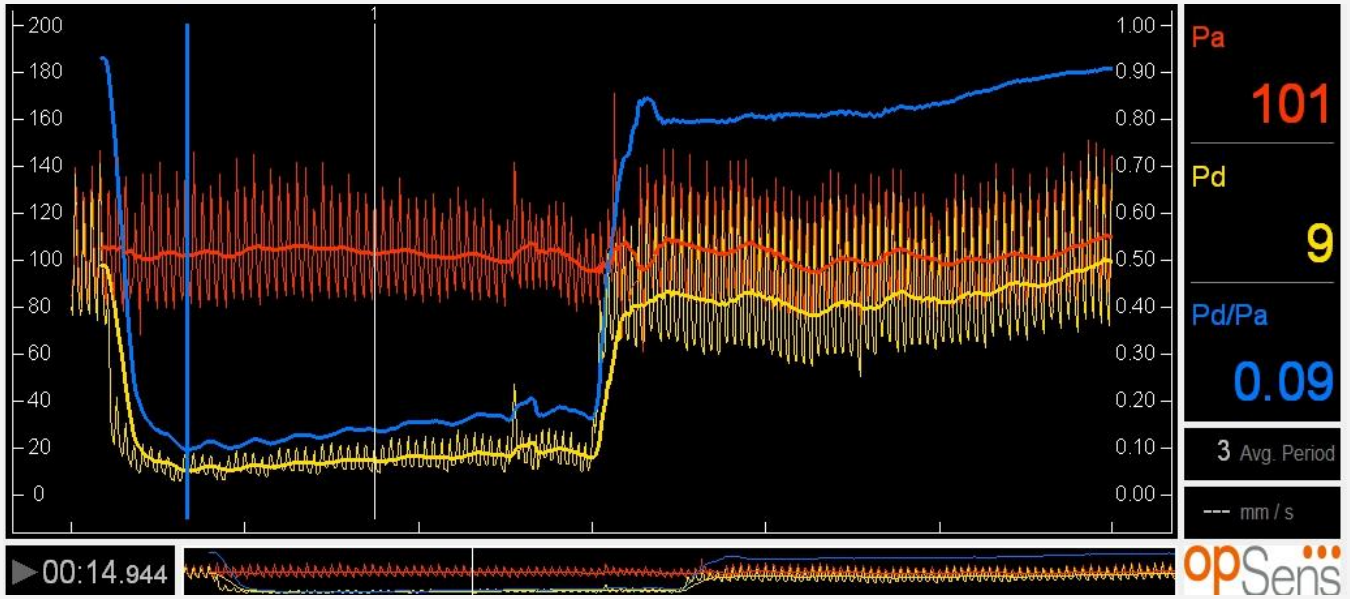
Post-ballooning Hyperemia

FFR by postocclusional hyperemia





FFRcoll

Adapted from: Gould KL, et al. Am J Cardiol 1974:33;87-94. https://doi.org/10.1016/0002-9149(74)90743-7.

Circulation:
Cardiovascular Interventions

ORIGINAL ARTICLES

Postocclusional Hyperemia for Fractional Flow Reserve After Percutaneous Coronary Intervention

Yoshiaki Kawase, Hiroyuki Omori, Masanori Kawasaki, Toru Tanigaki, Tetsuo Hirata, Syuuichi Okamoto, Hideaki Ota, Jun Kikuchi, Munenori Okubo, Hiroki Kamiya, Akihiro Hirakawa, Takahiko Suzuki, Hitoshi Matsuo

DOI https://doi.org/10.1161/CIRCINTERVENTIONS.117.005674
Circulation: Cardiovascular Interventions. 2017;10:e005674
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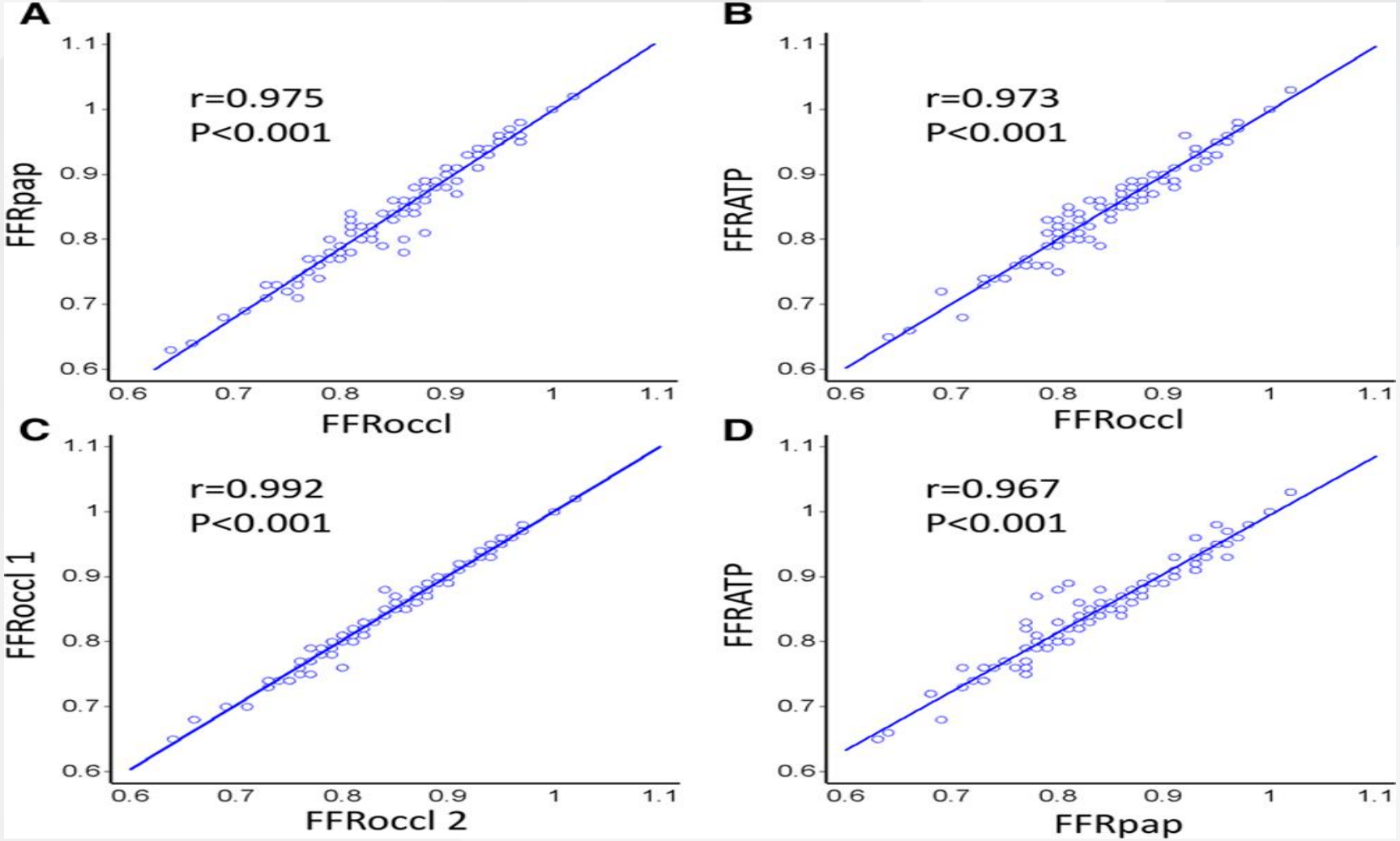
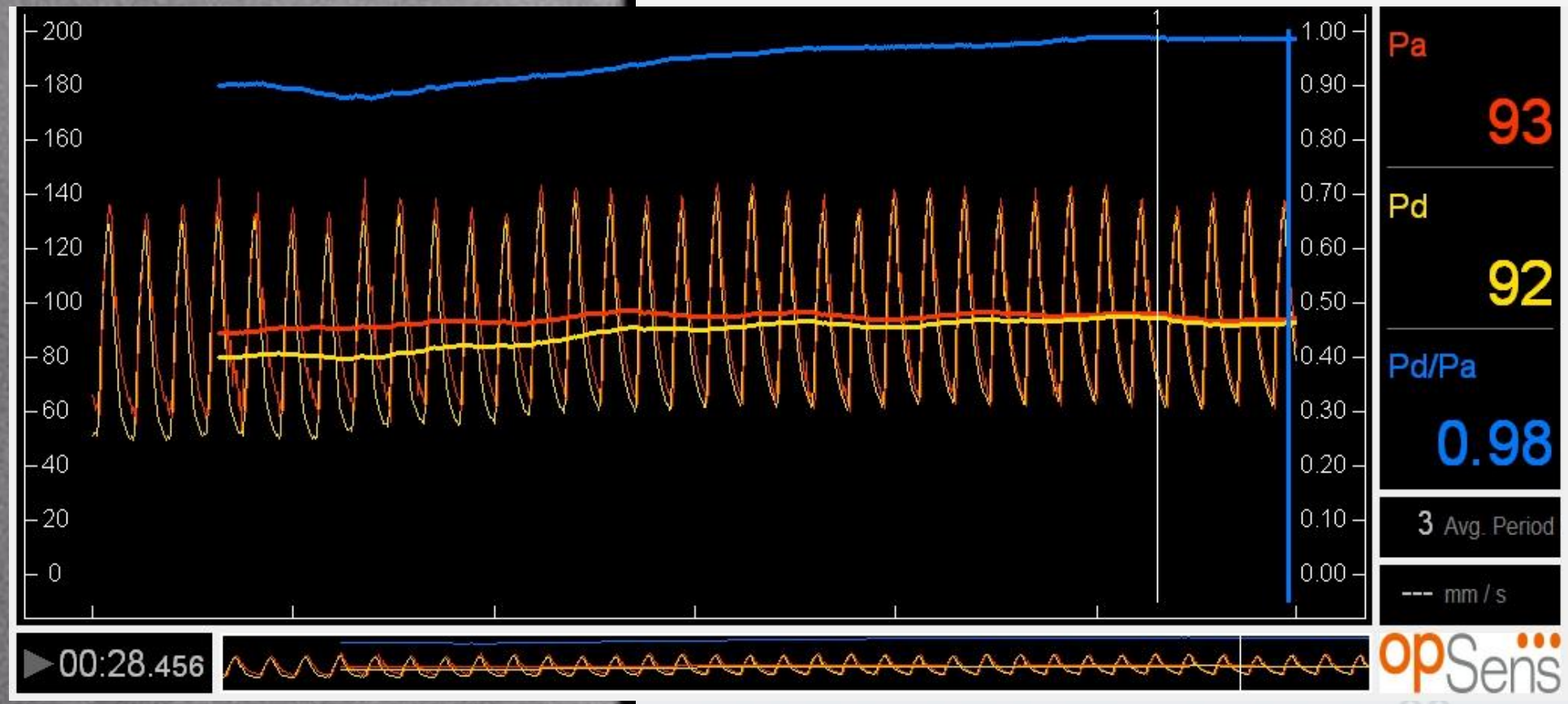


Kawase Y, et al. *Circ. Cardiovascular Interv.* 2017:10(2);e005674. DOI: 10.1161/CIRCINTERVENTIONS.117.005674.

Drift was only 1 mmHg!!!



Images shown are the authors' own.

Pressure wire assessment of jailed balloon technique efficacy in a patient with complex bifurcated lesion

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Department of Cardiovascular Medicine, Gifu Heart Center, Gifu, Japan

ORIGINAL STUDIES

Feasibility and safety of jailed-pressure wire technique using durable optical fiber pressure wire for intervention of coronary bifurcation lesions

Hiroyuki Omori MD[1] | Yoshiaki Kawase MD[1] | Masahiko Hara MD, PhD[2] | Toru Tanigaki MD[1] | Shuuichi Okamoto MD[1] | Tetsuo Hirata MD[1] | Jun Kikuchi MD[1] | Hideaki Ota MD[1] | Yoshihiro Sobue MD, PhD[1] | Taiji Miyake MD[1] | Itta Kawamura MD, PhD[1] | Munenori Okubo MD, PhD[1] | Hiroki Kamiya MD, PhD[1] | Kunihiko Tsuchiya MD, PhD[1] | Takahiko Suzuki MD, PhD[3] | Nico H.J. Pijls MD, PhD[4] | Hitoshi Matsuo MD, PhD[1]

Omori H, et al. *Catheter Cardiovasc Interv.* 2019:1-6. Doi: 10.1002/ccd.28106. [Epub ahead of print].

Omori H, et al. *EuroIntervention.* 2018:14(3):316-317.

Safety of Jailed-Pressure Wire Technique

	n = 51
Primary endpoint	
Complication associated with SB maneuver, n (%)	
Spasm	0 (0.0)
Thrombosis	0 (0.0)
Dissection	0 (0.0)
Secondary endpoints	
Successful FFR measurement, n (%)	51 (100.0)
Wire disruption, n (%)	0 (0.0)
Resistance of jailed-wire pullback	
Smooth	46 (90.2)
Moderate	4 (7.8)
Severe	1 (2.0)
Final drift *	2 (4.1) *

Omori H, et al. *Catheter Cardiovasc Interv.* 2019:1-6. Doi: 10.1002/ccd.28106. [Epub ahead of print].

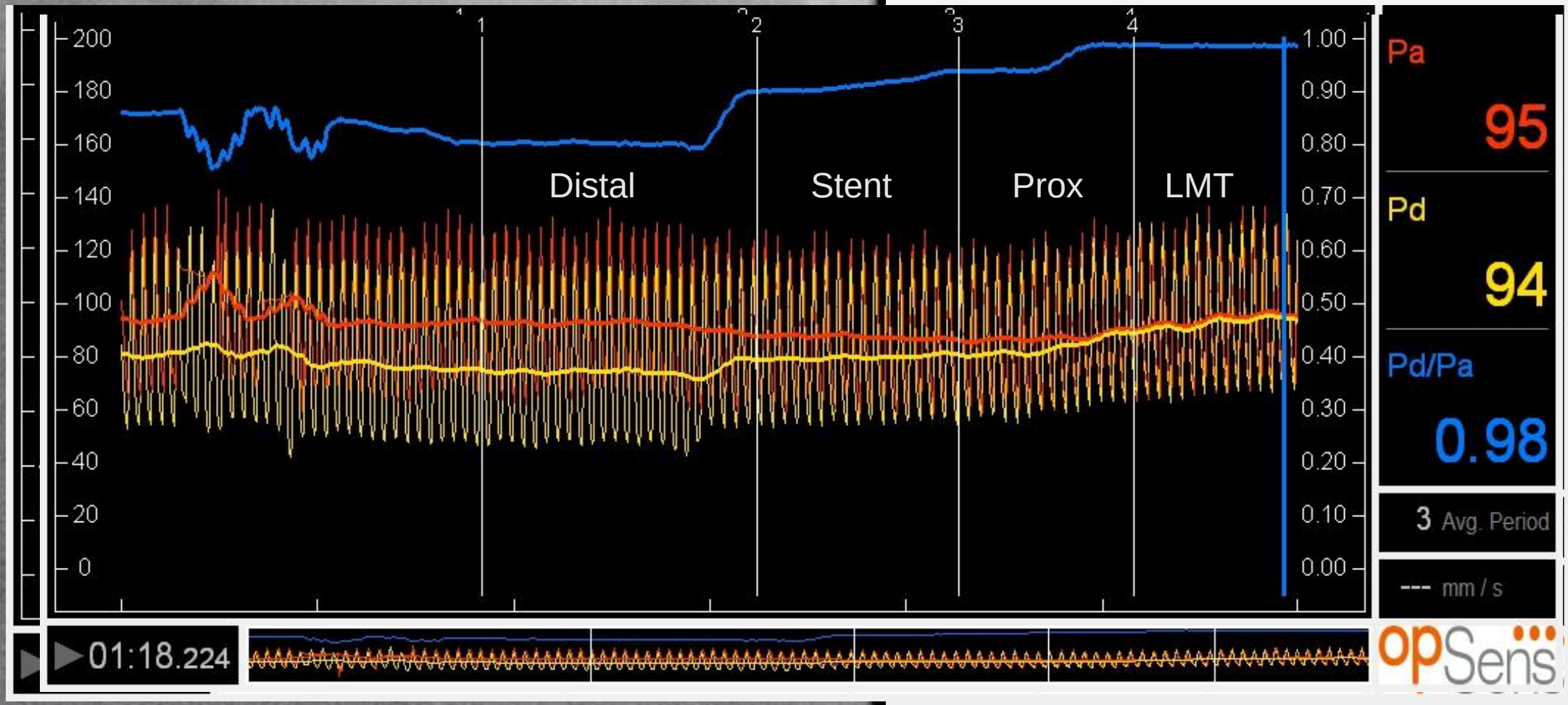
Feasibility of Jailed-Pressure Wire Technique

FFR ≧ 0.75 (Defer)	n = 38
FFR	0.89 (0.85–0.93)
Angiographic stenosis > 50%, n (%)	24 (63.2)
Non-significant stenosis, n (%)	14 (36.8)
FFR < 0.75 (positive)	n = 13
FFR	0.70 (0.54–0.73)
Angiographic stenosis > 50%, n (%)	12 (92.3)
Non-significant stenosis, n (%)	1 (7.7)
Success of re-crossing the wire into SB for FKBD	13 (100.0)
Change a decision of FKBD	25 (49.0)
Defer FKBD, n (%)	24 (47.1)
Perform FKBD, n (%)	1 (2.0)

SB, side-branch.

Omori H, et al. *Catheter Cardiovasc Interv.* 2019:1-6. Doi: 10.1002/ccd.28106. [Epub ahead of print].

Drift was only 1 mmHg!!!



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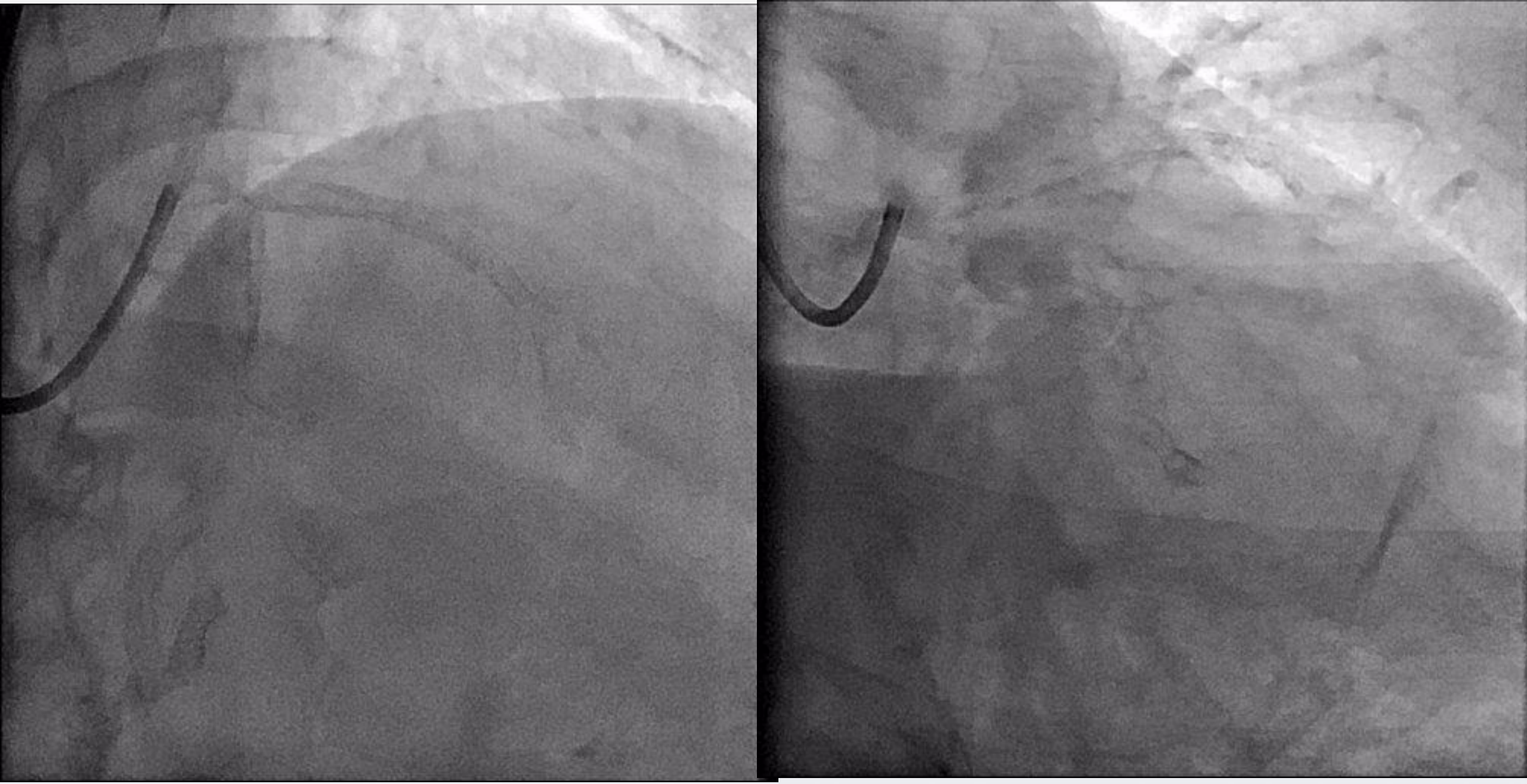

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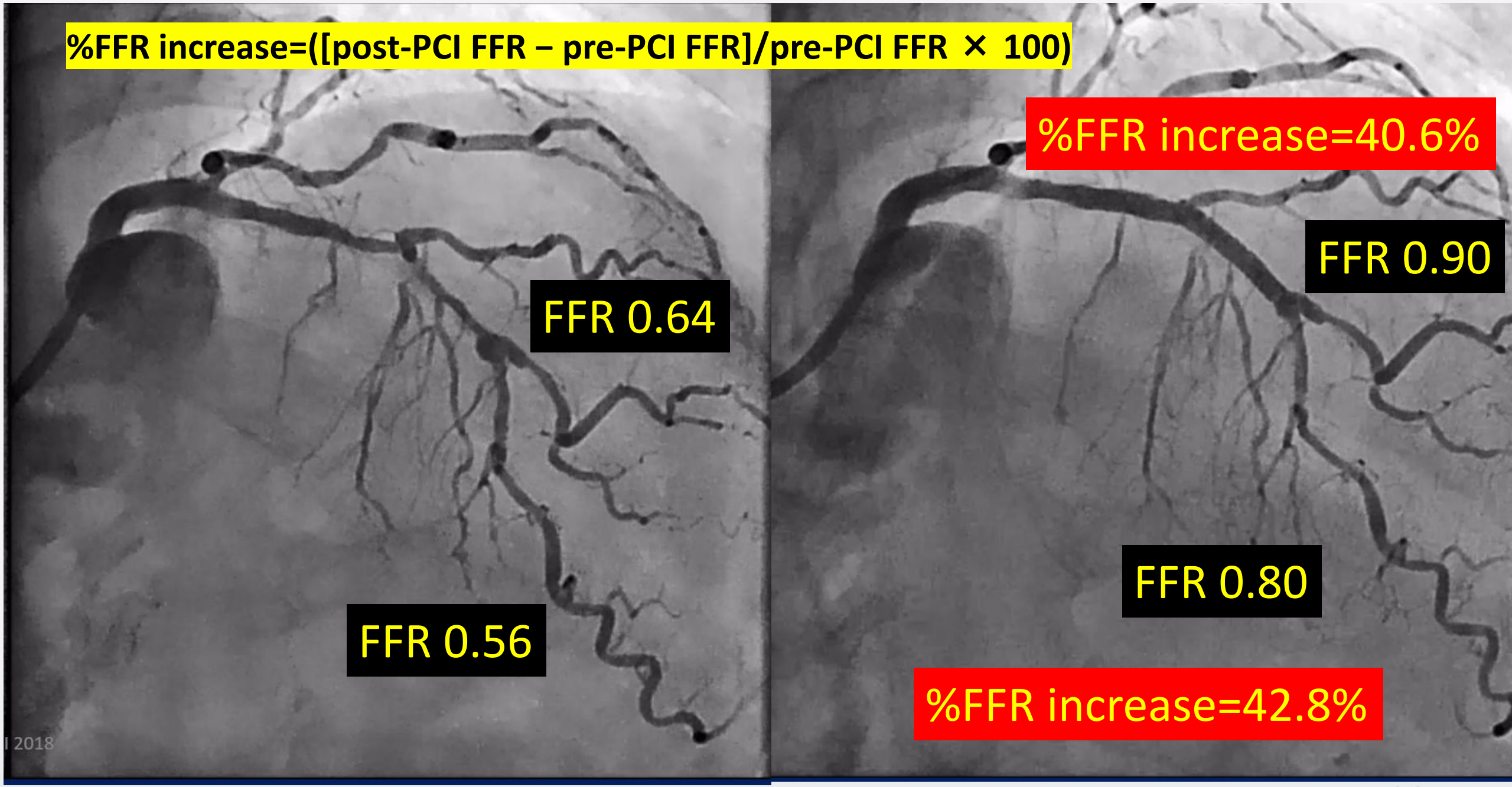
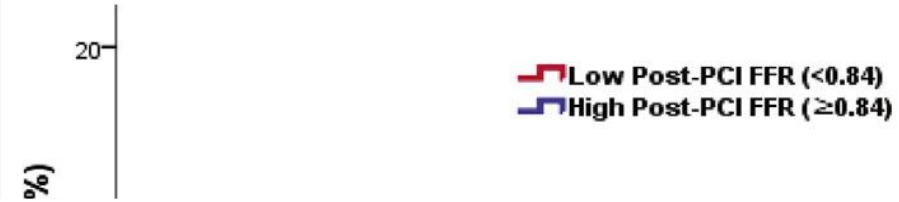


Images shown are the authors' own.

A Post-PCI FFR



B Percent FFR increase

([post-PCI FFR – pre-PCI FFR]/pre-PCI FFR × 100)

	High Post-PCI FFR (≥0.84)			Low Post-PCI FFR (<0.84)		
	High %FFR Increase (>15%)	Low %FFR Increase (≤15%)	p Value	High %FFR Increase (>15%)	Low %FFR Increase (≤15%)	p Value
Patients	328/410 (80.0)	82/410 (20.0)		102/211 (48.3)	109/211 (51.7)	
Cardiac death	0.0 (0)	0.0 (0)	0.999	2.6 (2)	1.9 (2)	0.928
Target vessel myocardial infarction	0.0 (0)	0.0 (0)	0.999	0.0 (0)	0.9 (1)	0.341
TVR	2.6 (6)	2.8 (2)	0.691	1.5 (1)	13.1 (9)	0.004
TLR	1.8 (4)	2.8 (2)	0.389	0.0 (0)	11.5 (8)	0.002
Non-TLR TVR	0.8 (2)	0.0 (0)	0.485	1.5 (1)	4.8 (3)	0.212
Non-TVR	0.3 (1)	0.0 (0)	0.618	1.1 (1)	3.0 (2)	0.501
Target vessel failure*	2.6 (6)	2.8 (2)	0.691	4.1 (3)	14.3 (11)	0.014

Lee JM, Koo BK, Matsuo H et al. *JACC Cardiovasc Interv*. 2018:11(20):2099-2109.

Conclusion

- Because of the improved performance and durability of pressure wire, wire based FFR could be utilized effectively during complex PCI.
- Whether Functional coronary angiography (Virtual FFR) can provide same quality of pressure data as wire based assessment in real time, should be clarified.