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PHYSIOLOGY
SUMMIT2015

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Coronary Hyperemia Is Mandatory? No, Today We Have a Bunch of Data

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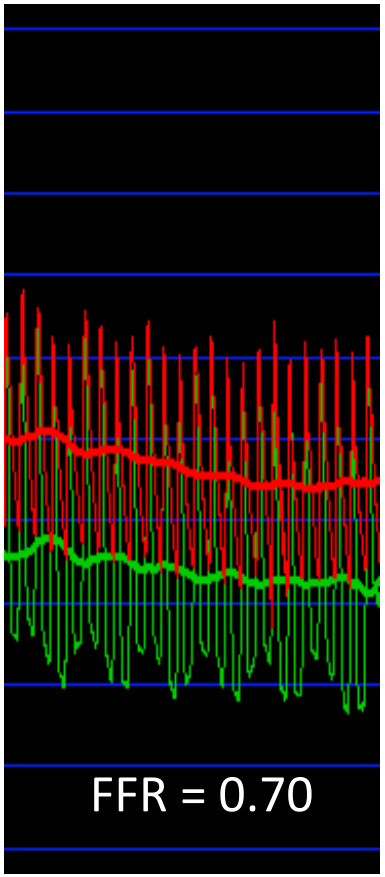
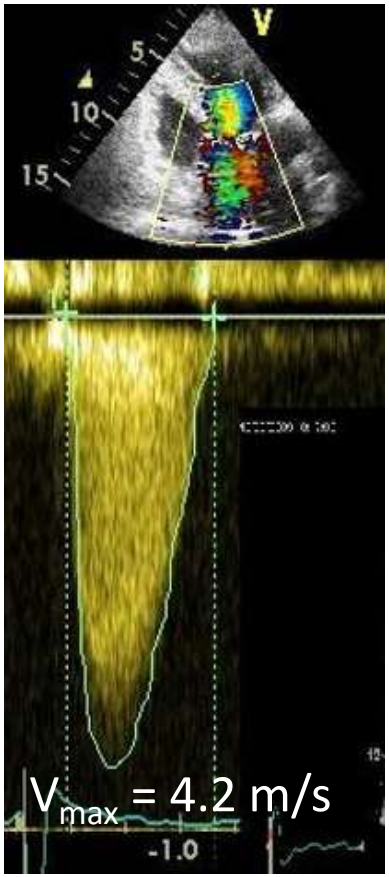
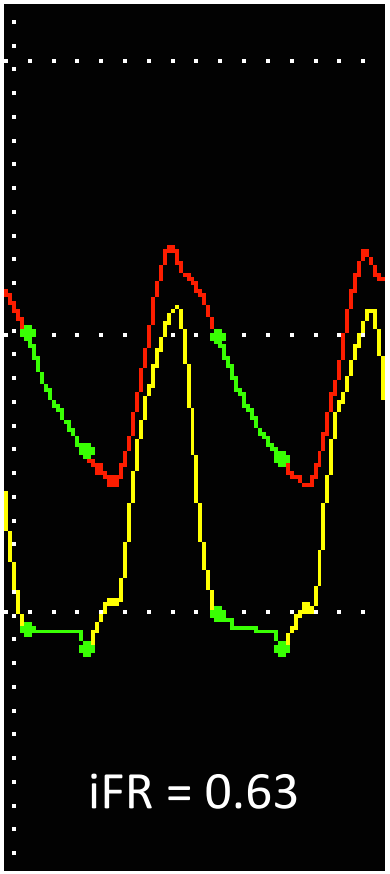
Madrid / Spain

Eloquence of functional indices







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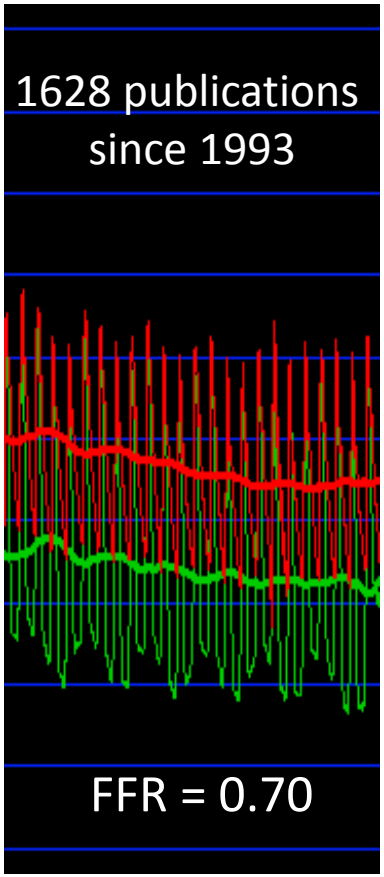
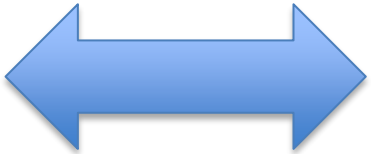
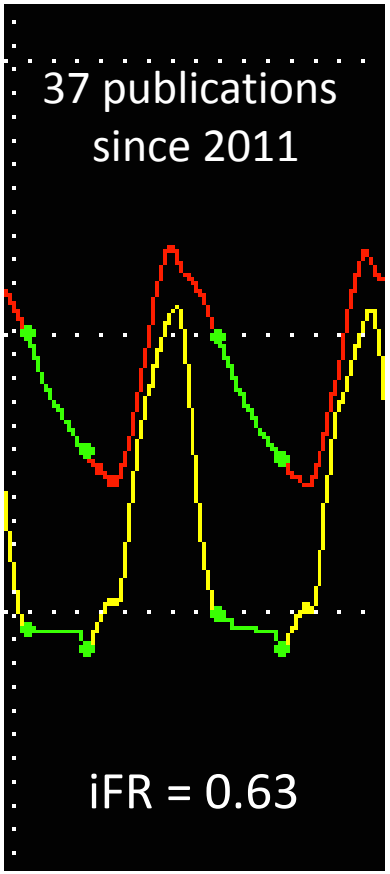


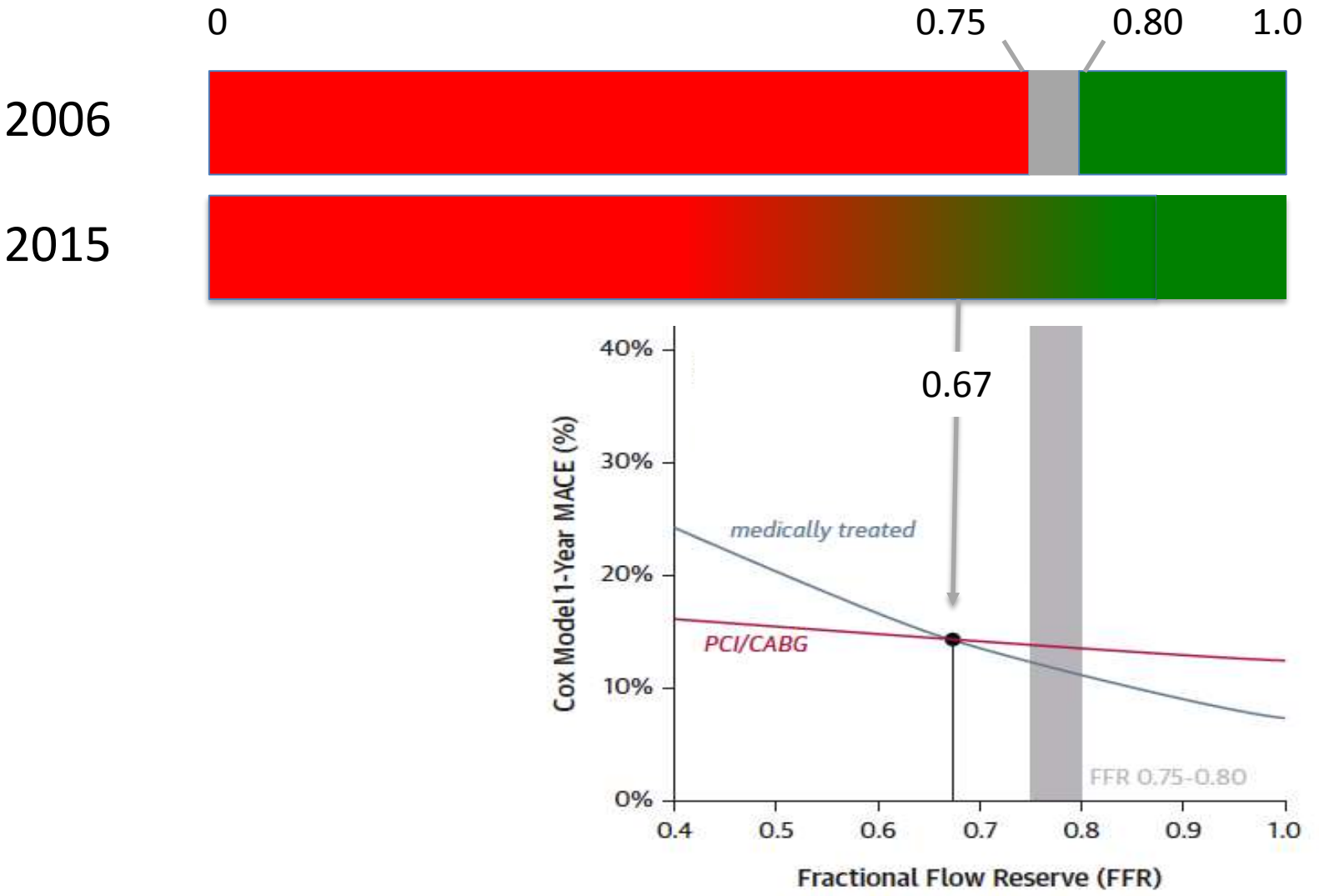




Functional stenosis assessment: frequently discussed topics in 2015

- Angiography alone is an unreliable tool to decide revascularisation in stable CAD.
- Low adoption of FFR constitutes an barrier to the translation of evidence to clinical practice.
- FFR values reflect a continuum of ischemic risk.
- Non-hyperemic pressure-derived indices convey valuable diagnostic information.

FFR as a continuous marker of risk



Johnson N et al JACC 2014;64:1641–54

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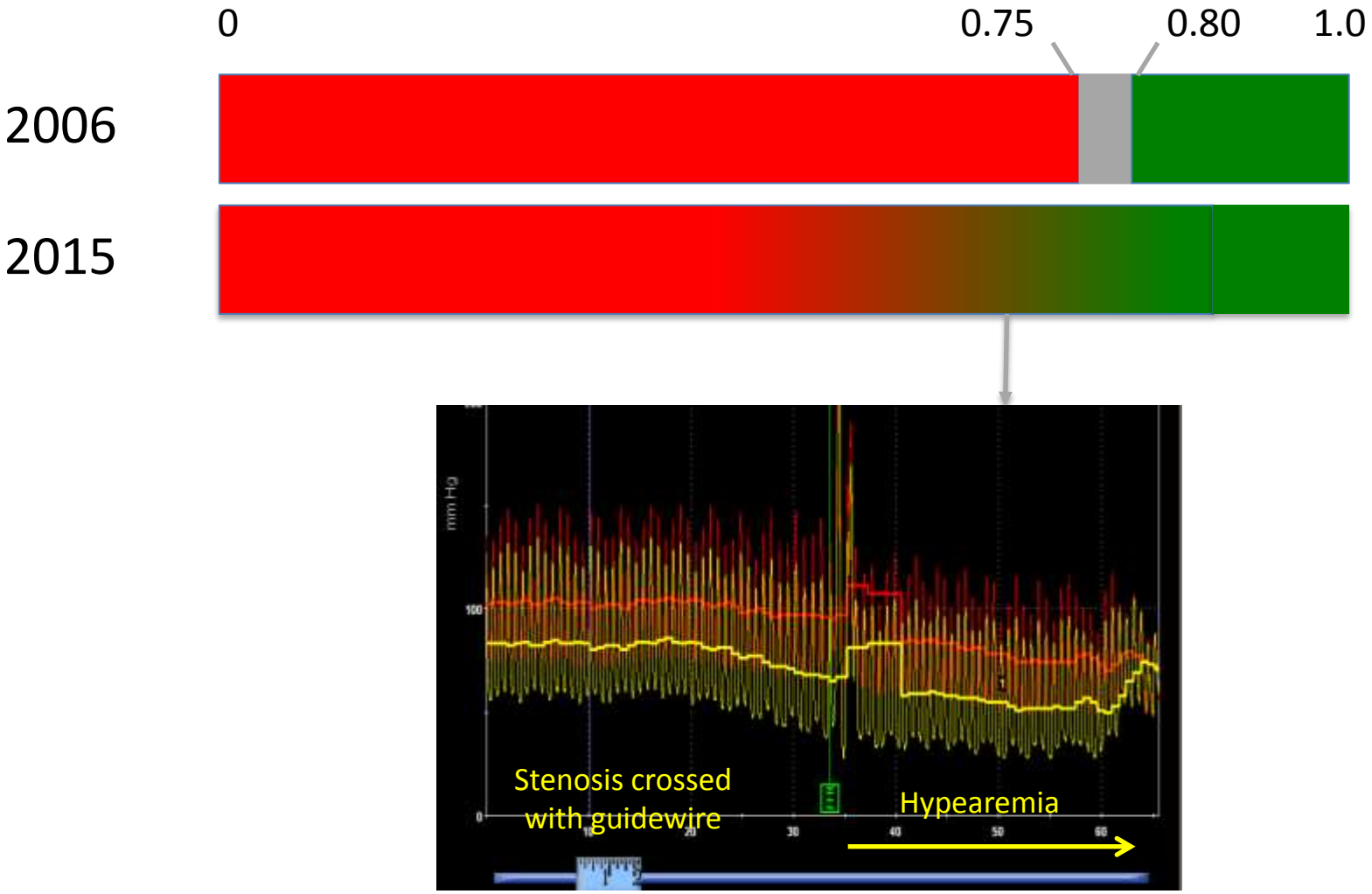

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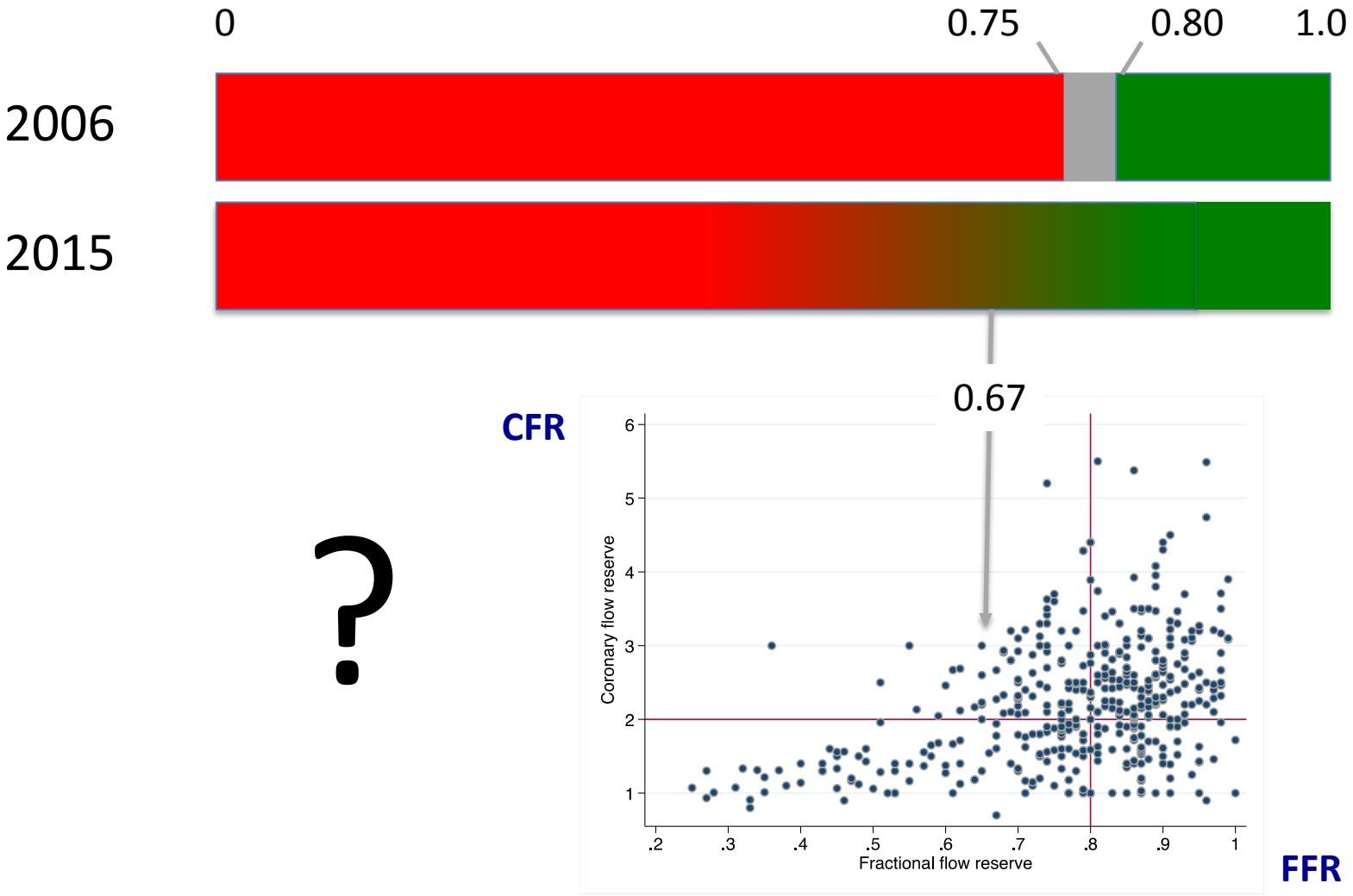
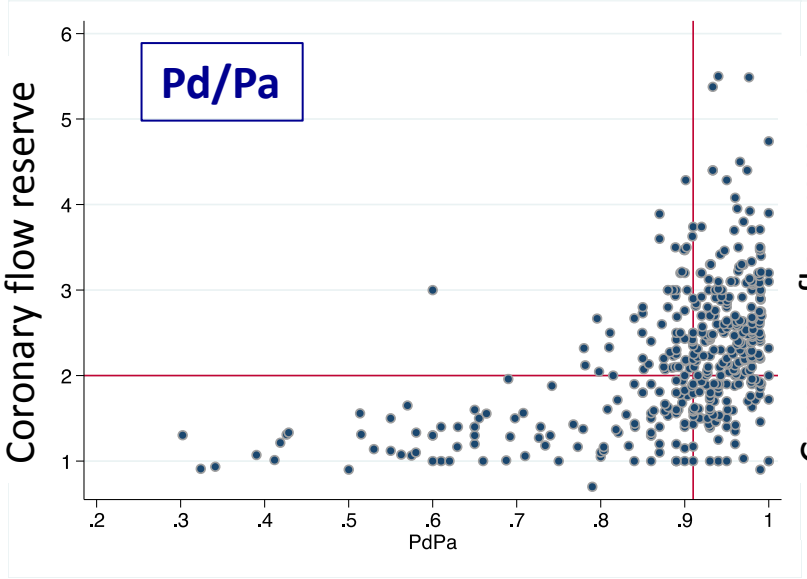
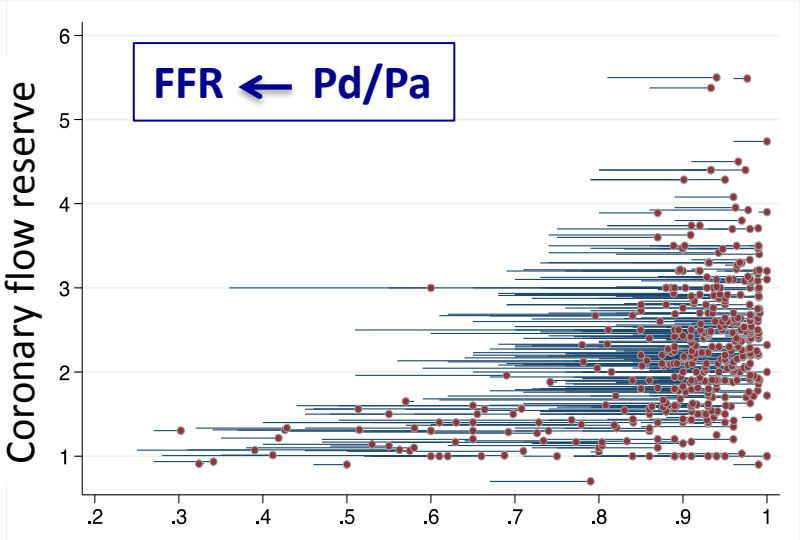


Modification of resting Pd/Pa by adenosine

467 coronary stenoses assessed with pressure and flow (Doppler or thermodilution)





Echavarría Pinto et al J Am Coll Cardiol Intv 2015;8:1681–91 (Figures not included in article)

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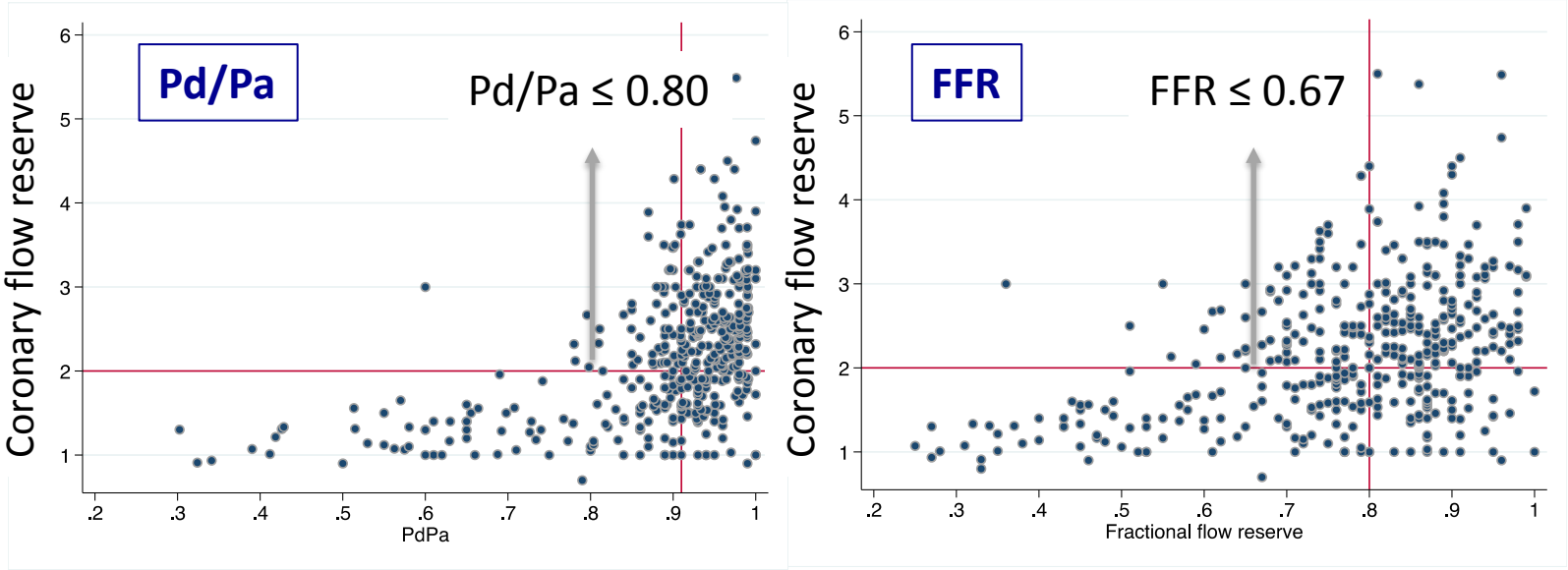

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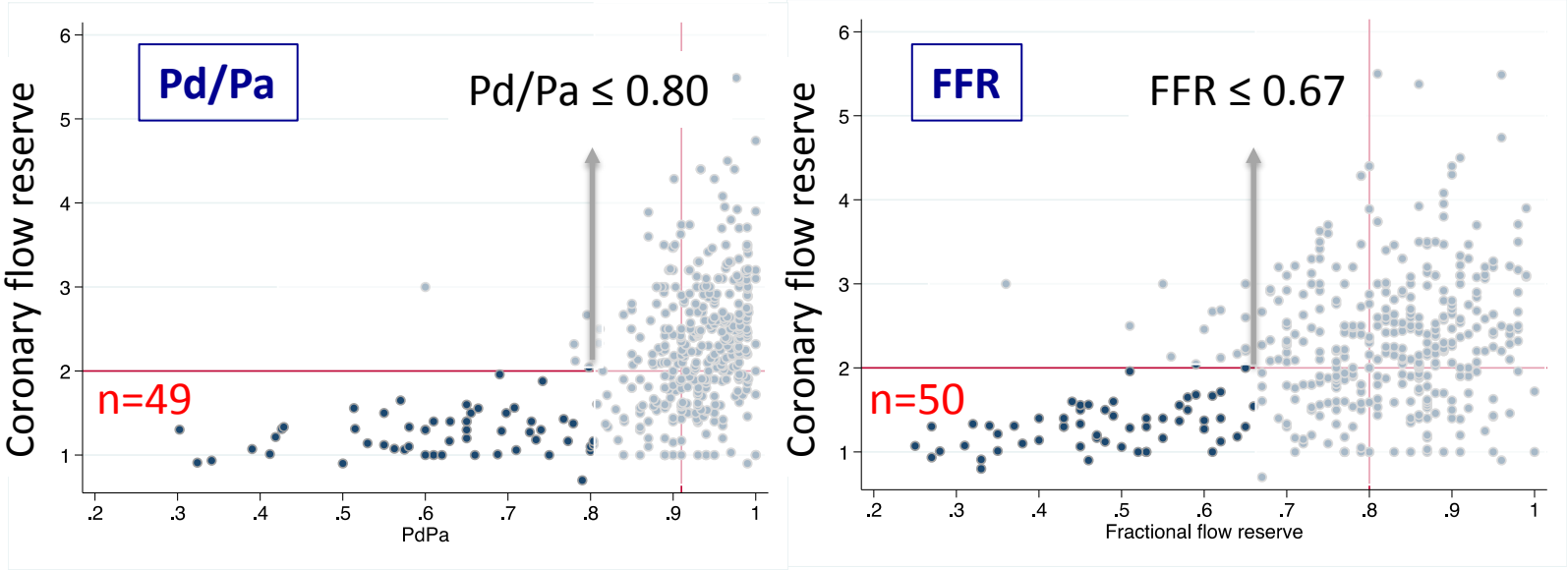

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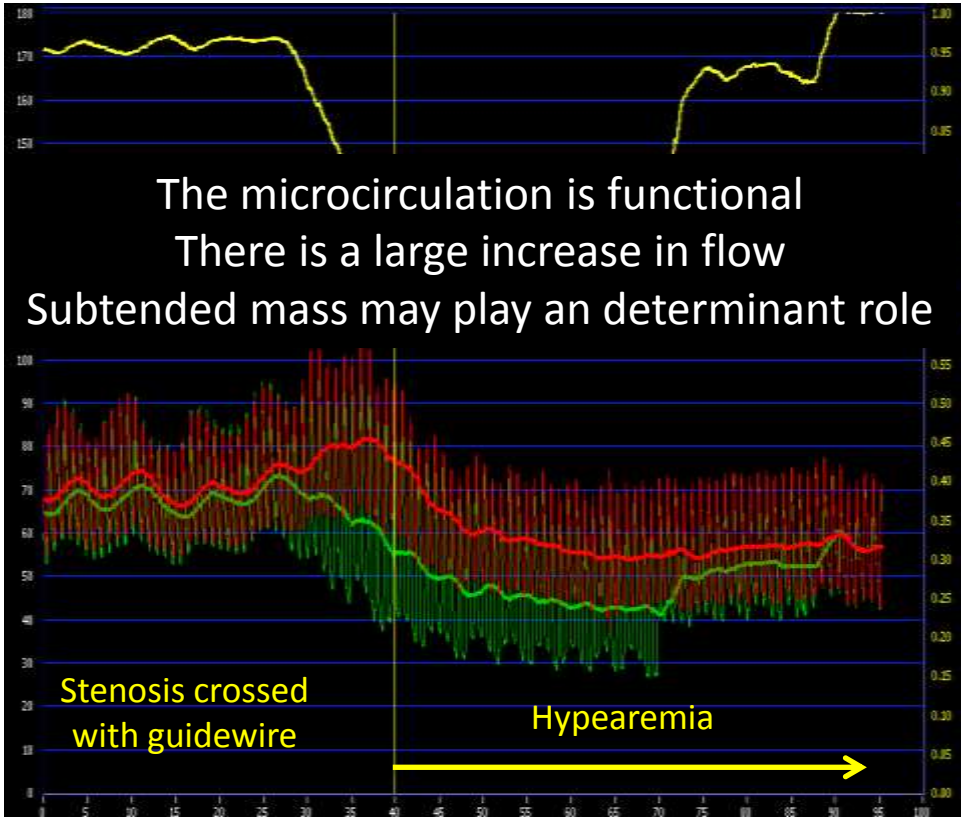
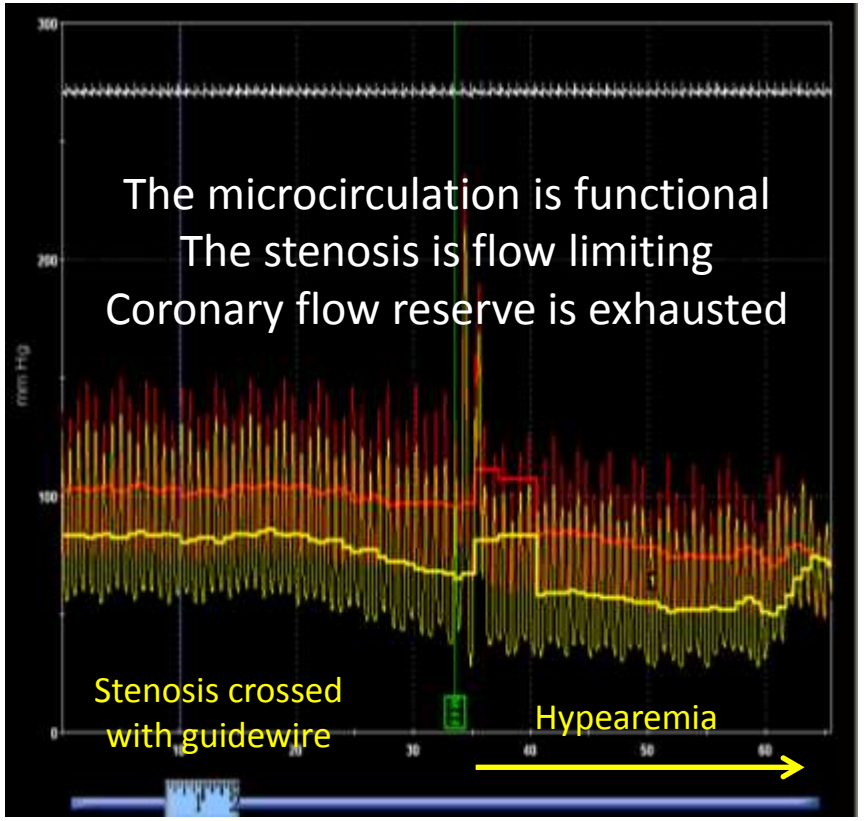
Modification of resting Pd/Pa by adenosine

High resting Pd/Pa -> Low hyperemic Pd/Pa

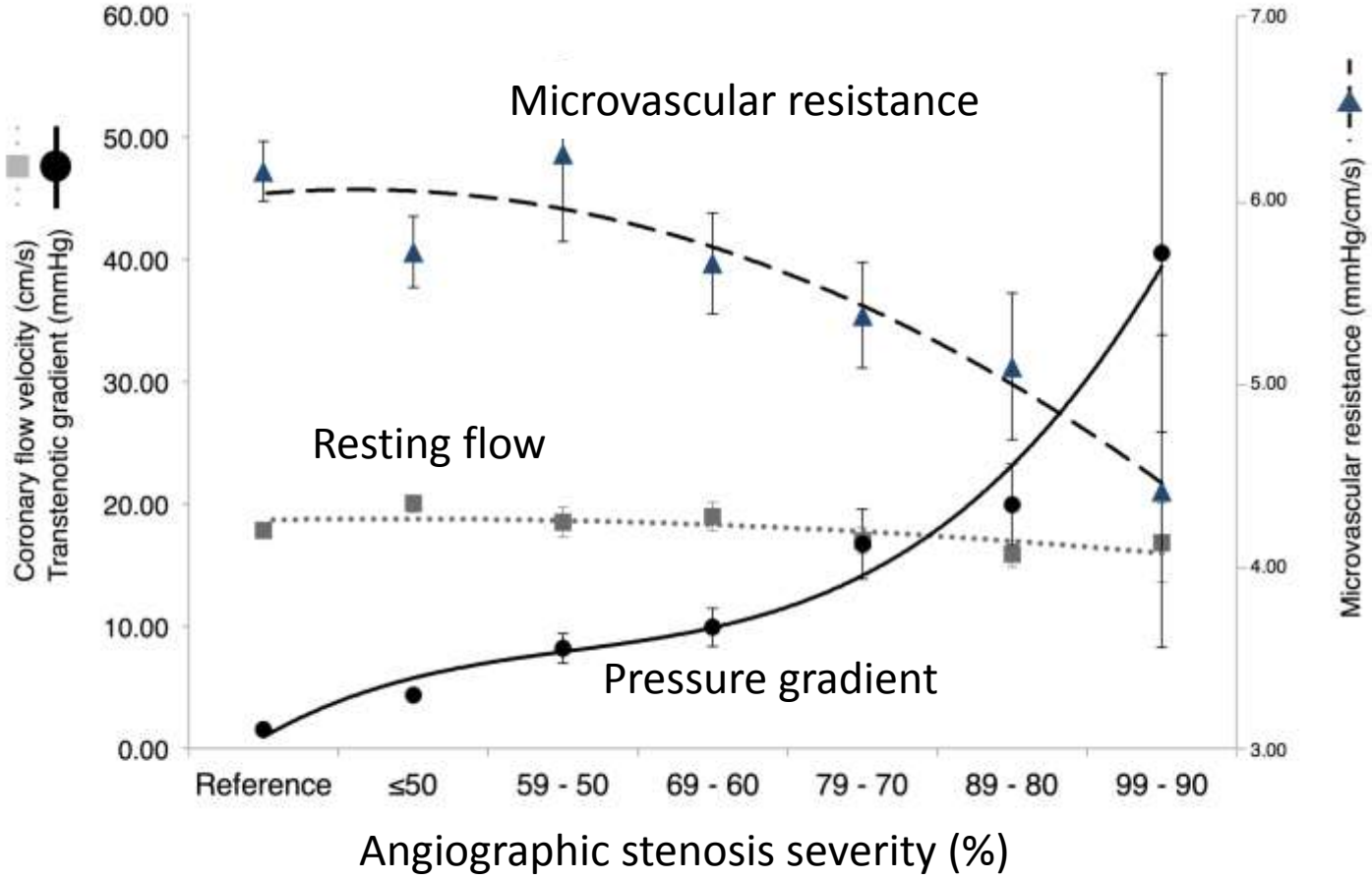


Low resting Pd/Pa -> Low hyperemic Pd/Pa



Coronary autoregulation: in-vivo observations

567 vessels interrogated with intracoronary pressure and Doppler



Nijjer S, de Waard G, Iberian-Dutch-English (IDEAL) investigators: Eur Heart J 2015 (ahead of print)

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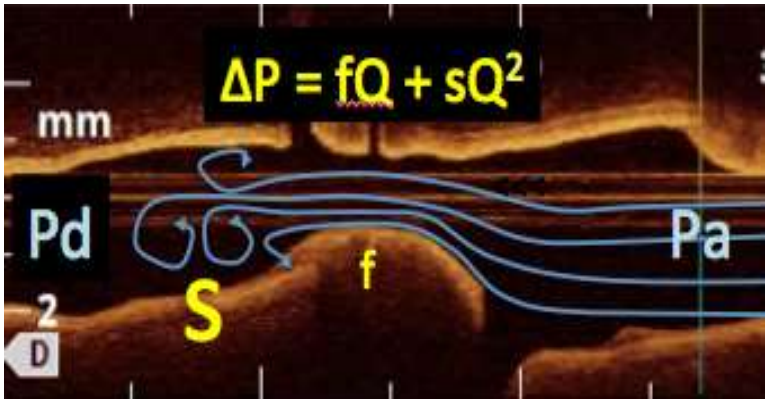

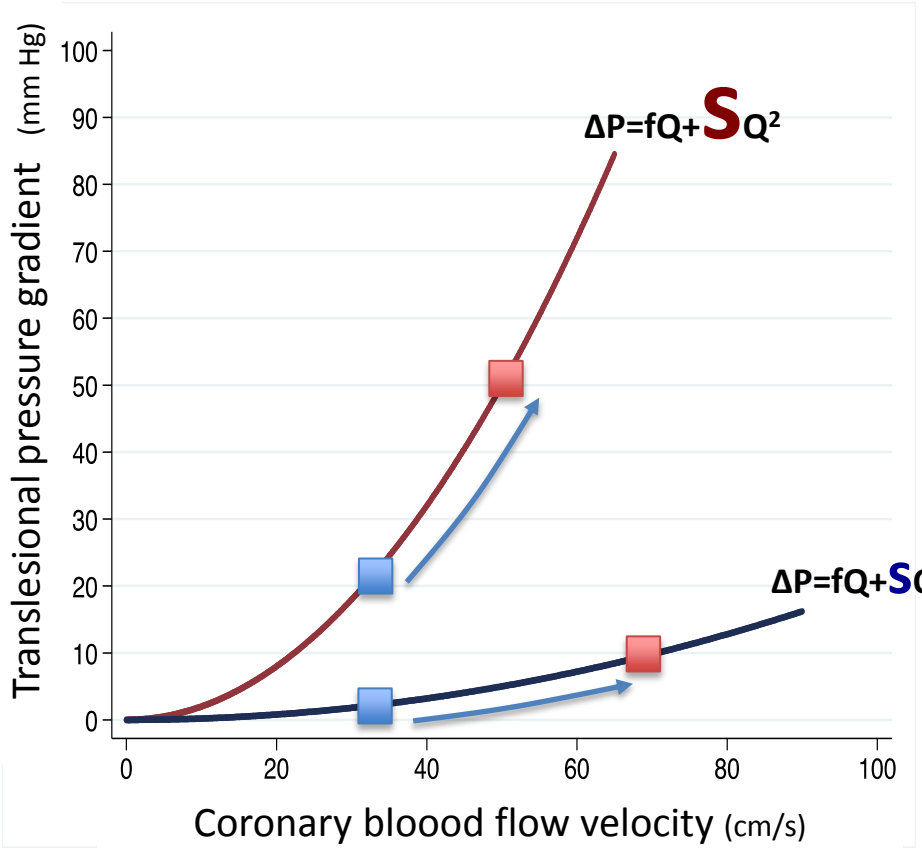

Translesional gradient modality and FFR

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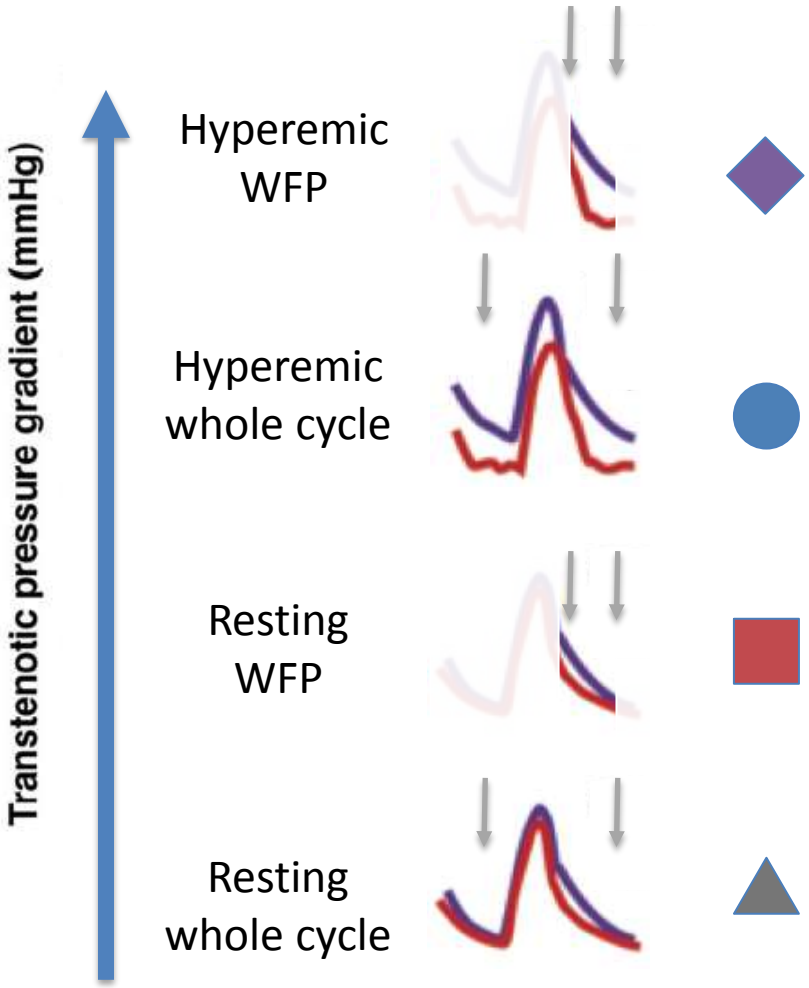

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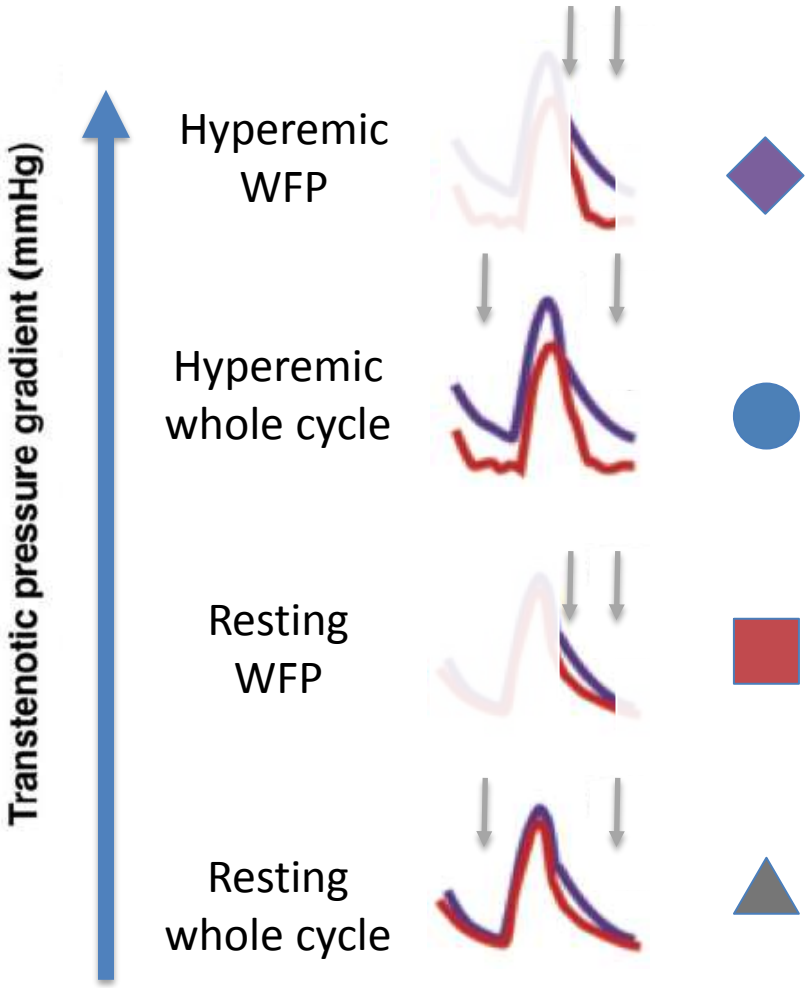

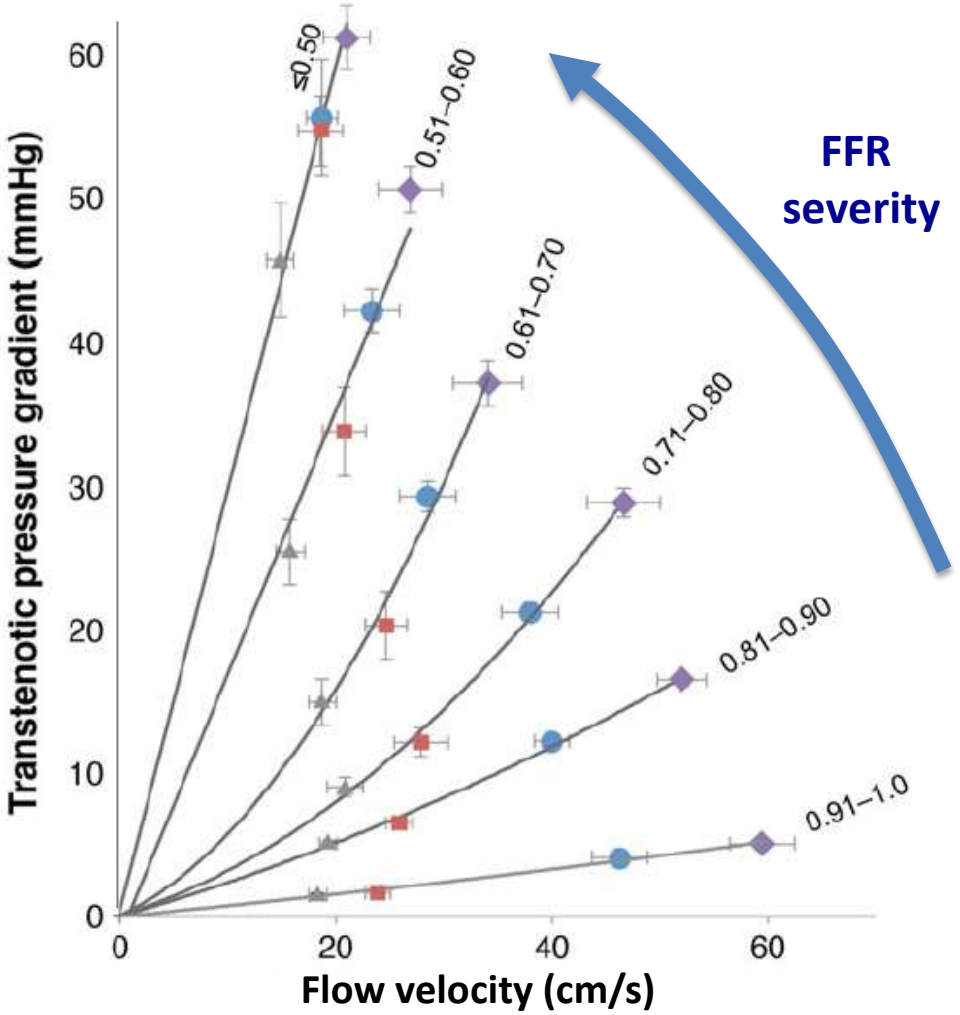

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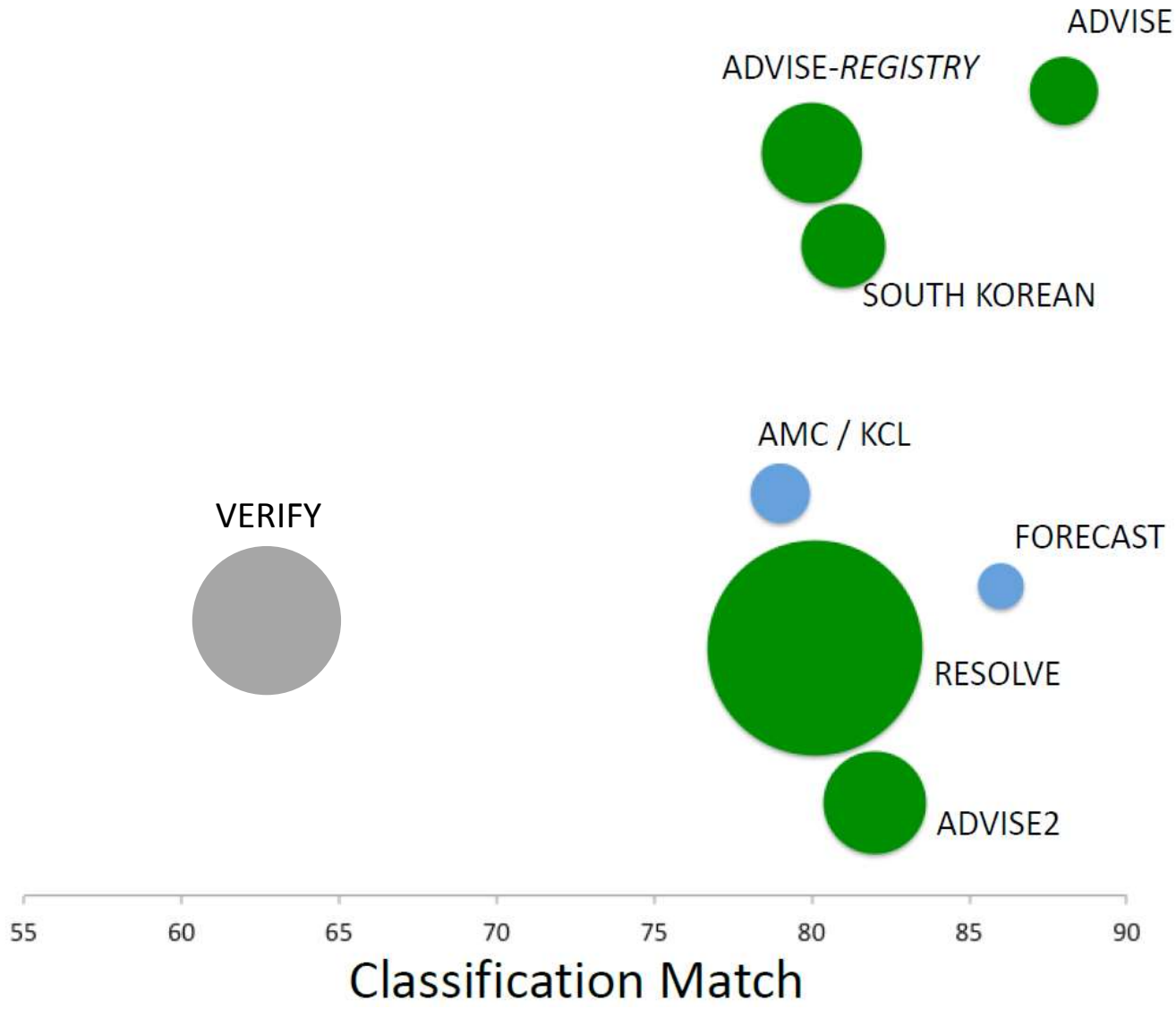
Validation of non-hyperemic indices

- Comparisons of iFR and Pd/Pa with FFR
- Head-to-head comparisons of iFR, Pd/Pa and FFR against non-invasive imaging
- Clinical trials on non-inferiority of iFR-related outcomes compared with FFR

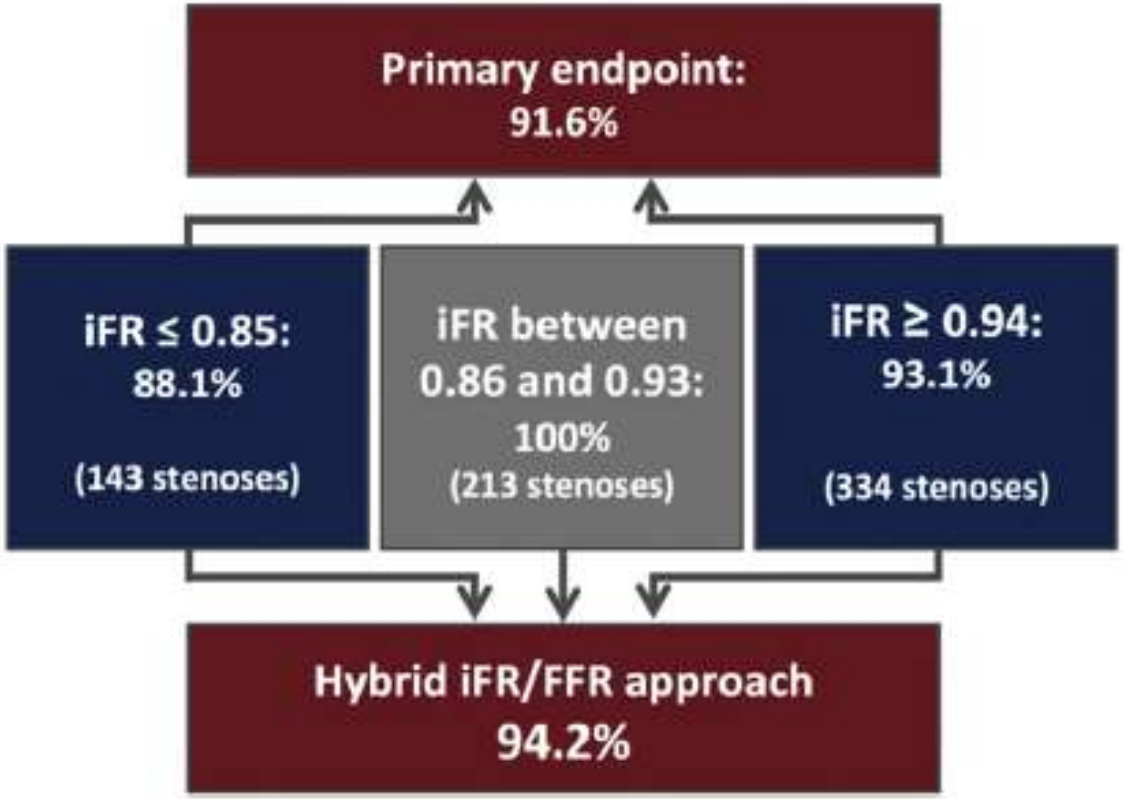
iFR compared against FFR



iFR compared against FFR

Insights from the ADVISE II study

Classification agreement in terms of stenosis severity



Escaned J et al JACC Cardiovasc Interv. 2015;8:824-33.

iFR and Pd/Pa compared against FFR

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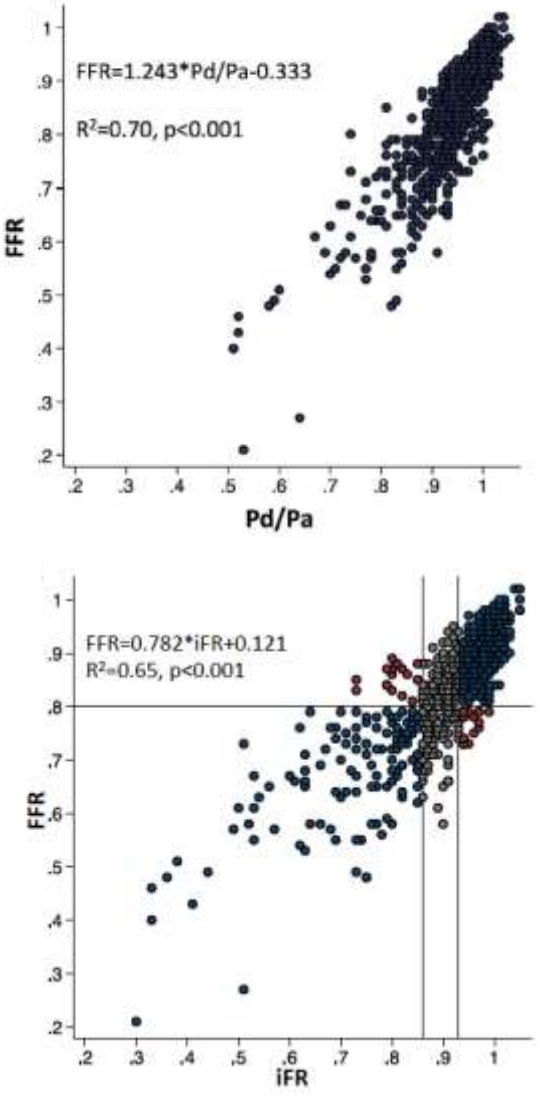
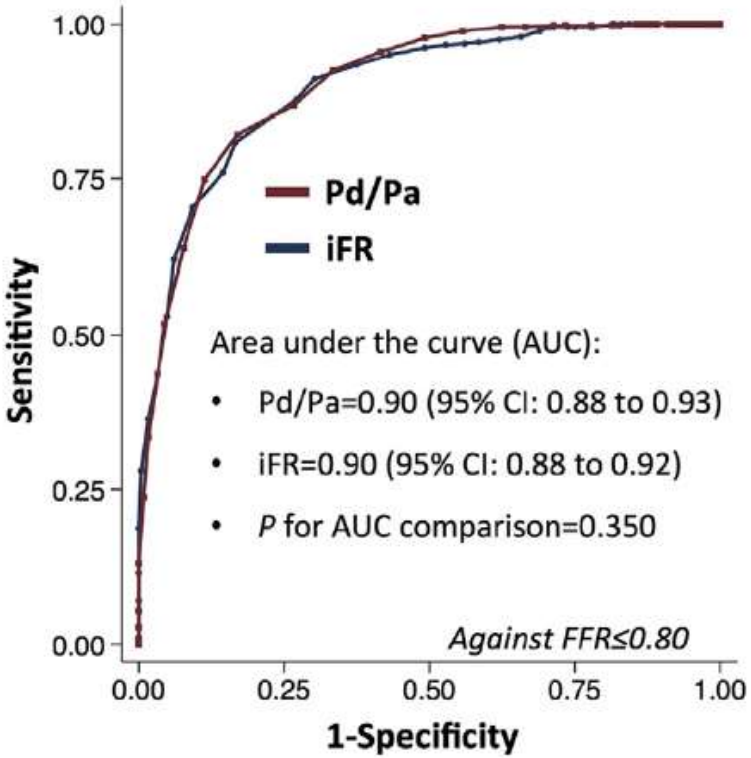
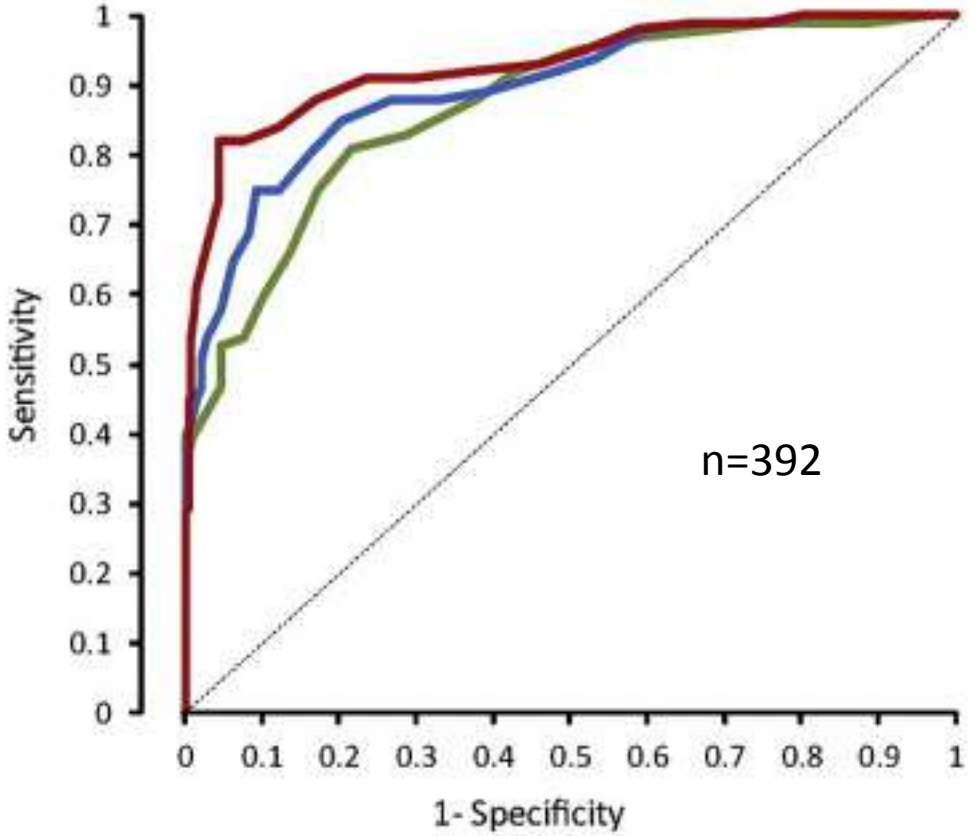




Escaned J et al JACC Cardiovasc Interv. 2015;8:824-33.

Real life comparison of iFR against FFR

Insights from the ADVISE *in practice* study



Classification agreement between iFR and FFR

	FFR 0.8	FFR 0.75	FFR gray zone*
iFR cut-off	0.9	0.85	0.85
ROC AUC	0.87	0.90	0.93
Classification match	80%	88%	92%
Sensitivity	81%	75%	82%
Specificity	79%	91%	96%
PPV	71%	70%	86%
NPV	87%	93%	95%

* Accounting for the 0.75 - 0.8 FFR gray zone

Petraco R et al Am Heart J. 2014; 168: 739–748.

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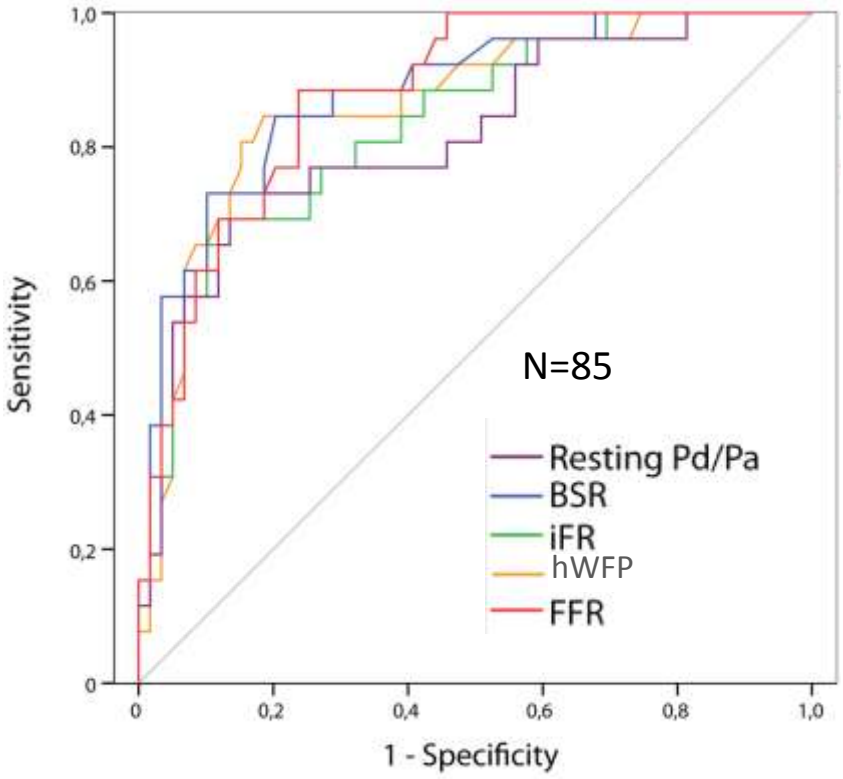
Head-to-head comparisons of FFR and non-hyperemic indices

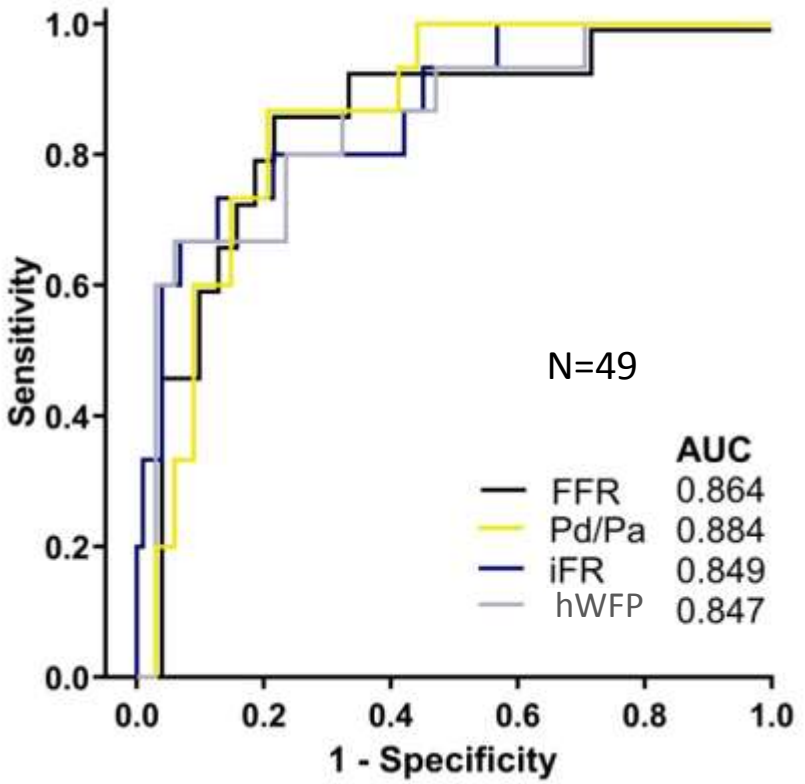
Comparator: MPI



P=0.03 between BSR and Pd/Pa

van de Hoef, et al. EuroIntervention 2014

Comparator: $[^{15}O]H_2O$ PET

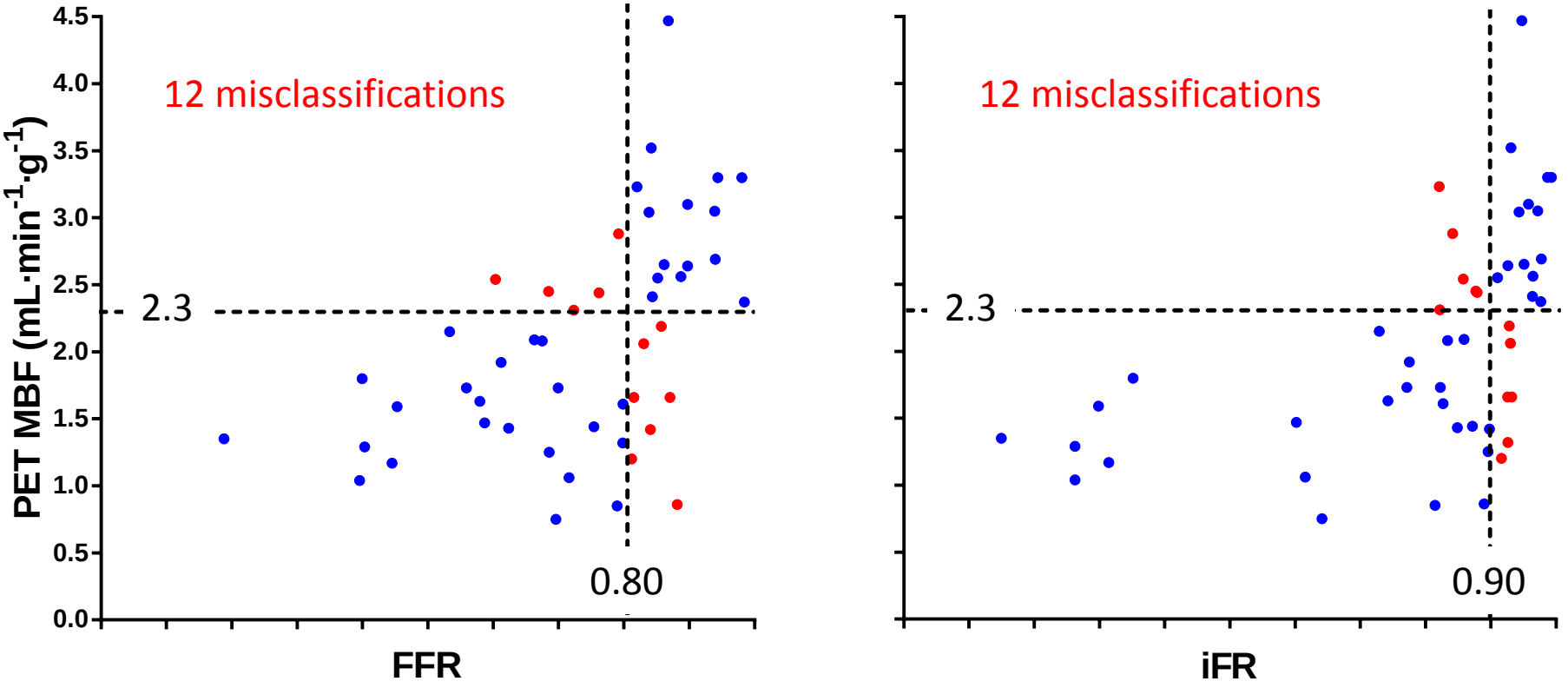


P=NS between any two indices for AUC

De Waard G et al. ACC 2015

Head-to-head comparisons of FFR and non-hyperemic indices

Comparator: $[^{15}O]H_2O$ PET



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DEFINE FLAIR

Functional **L**esion **A**ssessment of **I**ntermediate stenosis to guide **R**evascularisation

Total number of patients: 2500

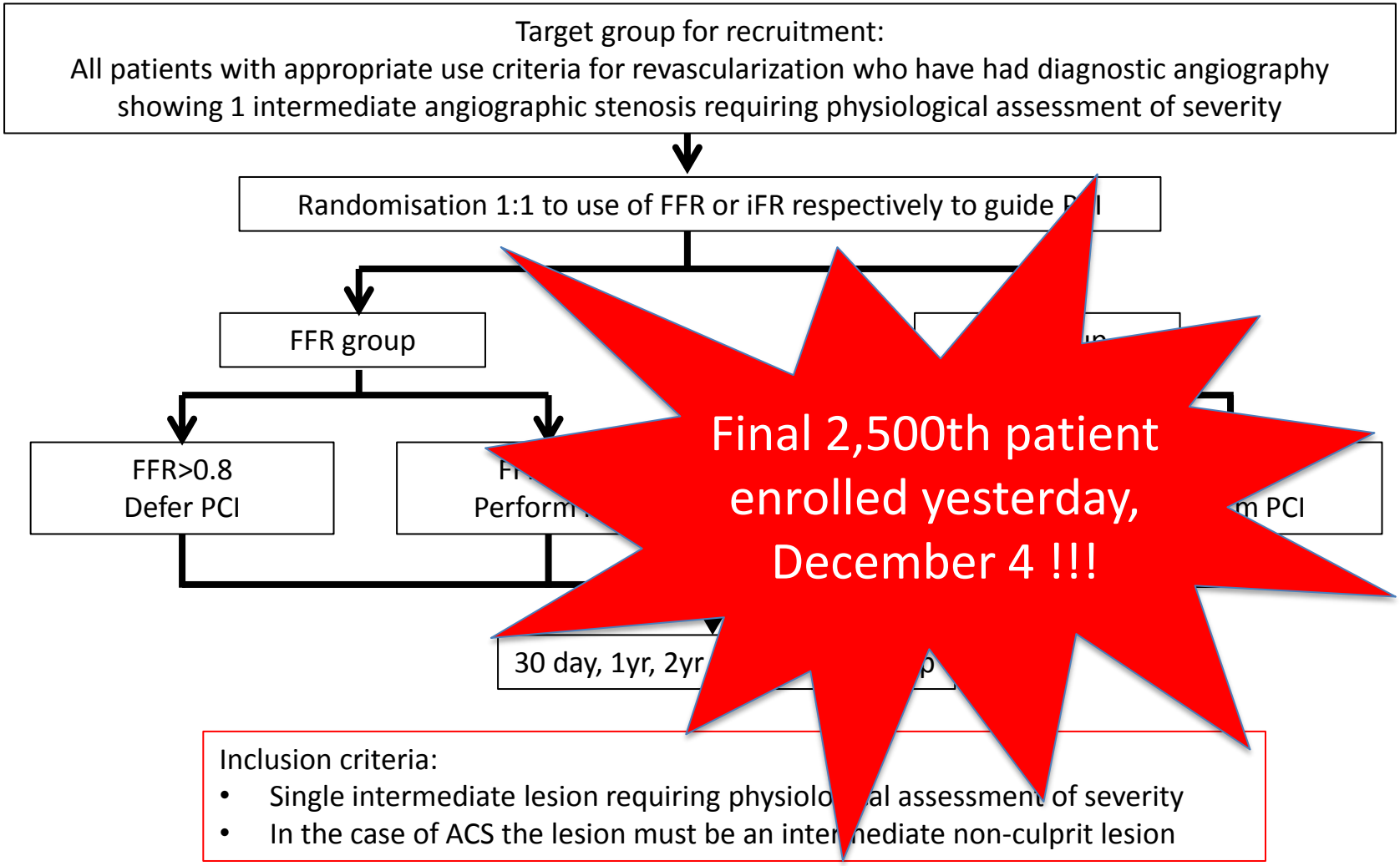
Study design: Non-inferiority, multicenter, double blind (follow-up) randomized clinical trial

Primary endpoint:
Major adverse cardiac events (MACE) rate in the iFR and FFR groups at 30 days, 1, 2, and 5 years.

MACE is defined as a combined endpoint of death, non-fatal myocardial infarction (MI), or unplanned revascularisation.

DEFINE FLAIR: Clinicaltrials.gov identifier NCT02053038

DEFINE FLAIR: Study characteristics



DEFINE FLAIR: Clinicaltrials.gov identifier NCT02053038

The iFR-SWEDEHEART study

Total number of patients: 2000

Study design: Non-inferiority, multicenter, randomized clinical trial

Composite primary endpoint includes:

- All cause death (National death registry, 100% follow-up)
- Myocardial infarction (Riks-HIA Swedeheart ≈ 95% follow-up)
- Unplanned revascularization (TLR) (SCAAR [Swedeheart] > 99% follow-up)

Outcome will be followed in the national registries
Enrollment completed September 2015

iFR-SWEDEHEART : Clinicaltrials.gov identifier NCT02166736

2016: Year of non-hyperemic indices?

The results of two randomised clinical trials comparing clinical outcomes of FFR and iFR will be presented in 2016

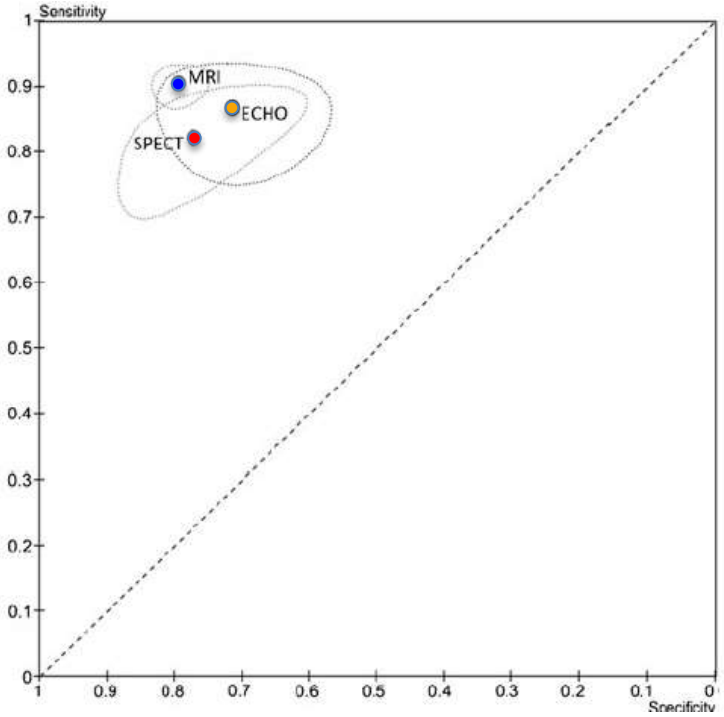
Adoption of ischaemia detection techniques: lessons from non-invasive testing

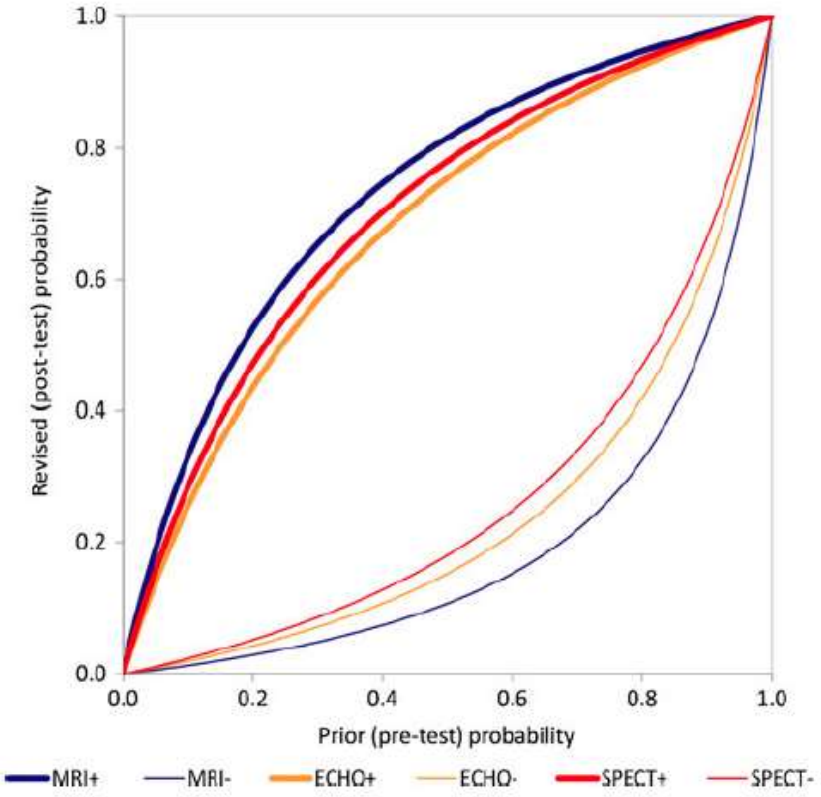
	Sensitivity (%)	Specificity (%)
Exercise ECG	45–50	85–90
Exercise stress echocardiography	80–85	80–88
Exercise stress SPECT	73–92	63–87
Dobutamine stress echocardiography	79–83	82–86
Dobutamine stress MRI	79–88	81–91
Vasodilator stress echocardiography	72–79	92–95
Vasodilator stress SPECT	90–91	75–84
Vasodilator stress MRI	67–94	61–85
Coronary CTA	95–99	64–83
Vasodilator stress PET	81–97	74–91

ESC Guidelines on Stable Angina / European Heart Journal (2013) 34, 2949–3003

Stress myocardial perfusion imaging for CAD: a diagnostic test metanalysis of 51 studies

MRI: 28 studies / 2,970 patients
Echocardiography: 10 studies / 795 patients
SPECT: 13 studies / 1,323 patients





De Jong MC et al. Eur Radiol (2012) 22:1881–1895

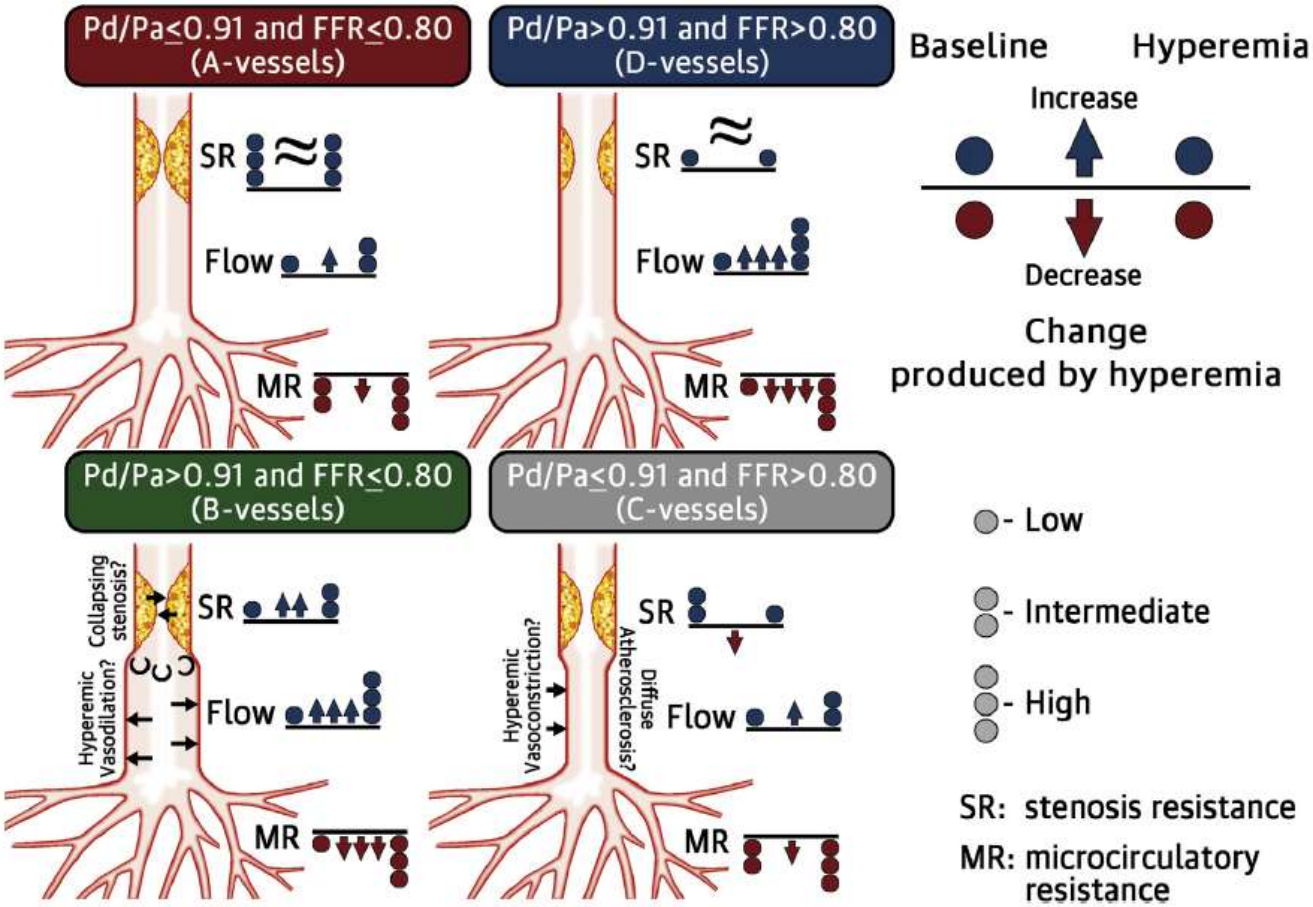
Some final personal considerations

- Non-hyperaemic indices will stay, contribute to simplify the assessment of epicardial stenosis by FFR and, hopefully, increase adoption of functional stenosis assessment.

- This will take place particularly in growingly complex anatomical and clinical scenarios, in which even contrast FFR might not be an alternative (multivessel disease, CKD, vessel pressure mapping, etc).

- Hyperemia will still be required to assess the coronary microcirculation as part of a comprehensive assessment of the patient with CAD.

Combining Pd/Pa and FFR in physiological coronary assessment



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Thank you for your attention