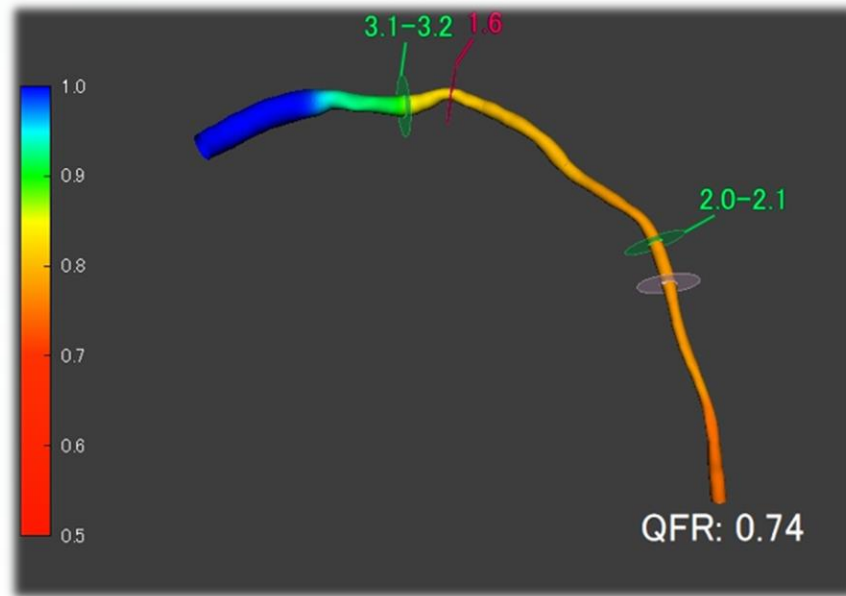


Angio-derived FFR for PCI



Hitoshi Matsuo, MD.,PhD
Gifu Heart Center, Japan

Disclosures

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

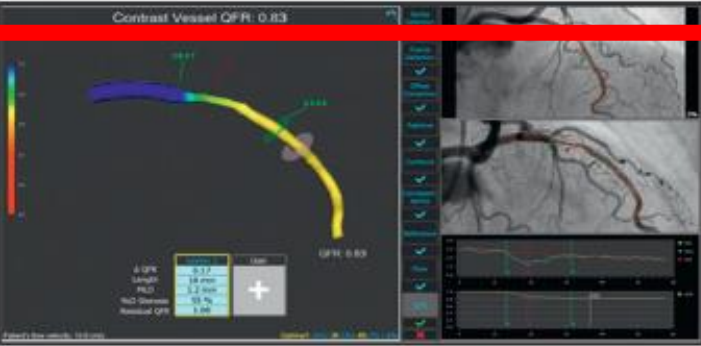


I have the following potential conflicts of interest to report in the field of this presentation:

Speaker at educational events and consultancies for:

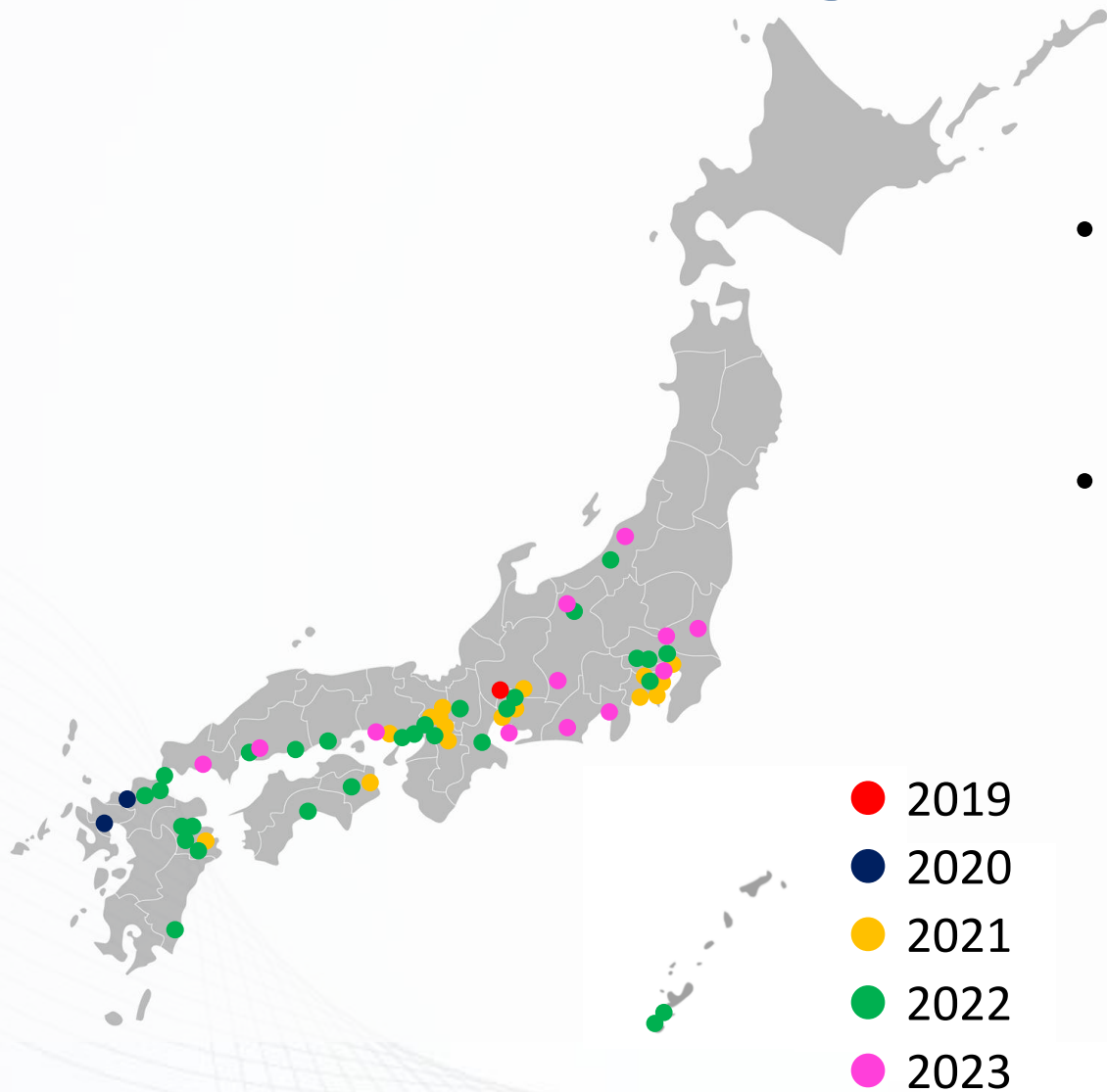
Abbott vascular, Phillips-Volcano, Boston Scientific, Nippon Mediphysics, Zeon Medical, Astellas Pharma, Amgen Biopharma, Cathwork Japan.

Angiography-derived FFR

Current commercially available functional indices based on invasive coronary angiography.

	User display	Projections needed	Pressure sensor	Microcirculation	Side branches	Available data
QFR		2	No	Yes	No	
CAAS vFFR		2	No	No	No	
caFFR		2	Yes	Yes	No	

Penetration of FFRangio in Japan : 65 institutions (as of April 2023)



- PMDA approved the use of FFRangio as the substitute of wire based FFR in 2019.
- Insurance coverage started from December 2020 with the payment of 72,000 Yen (720,000 KRW, 530 USD)/case.

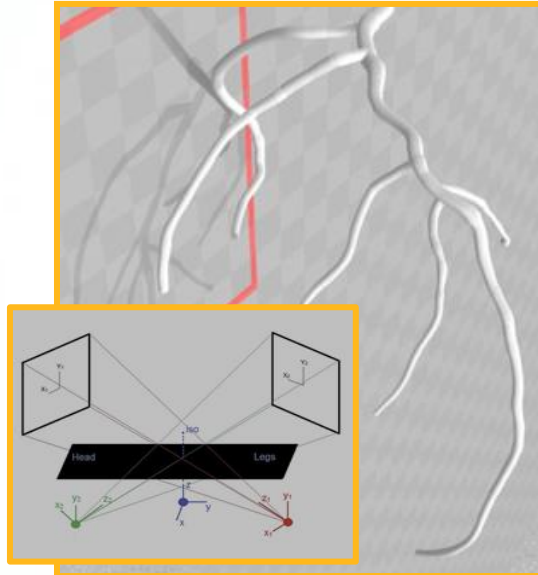
FFRangio provides functional angiography mapping of the coronary tree with superimposed colour-coded FFR values

1 Optimal 2D Angiography



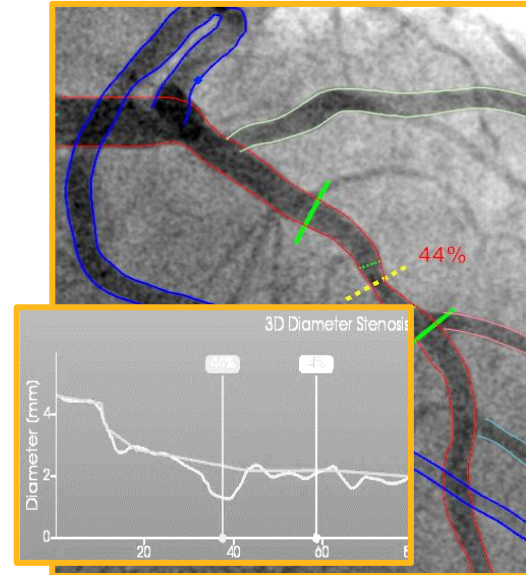
- Optimal Projections
- Optimal Frame
- Motion Compensation

2 3D Model Reconstruction



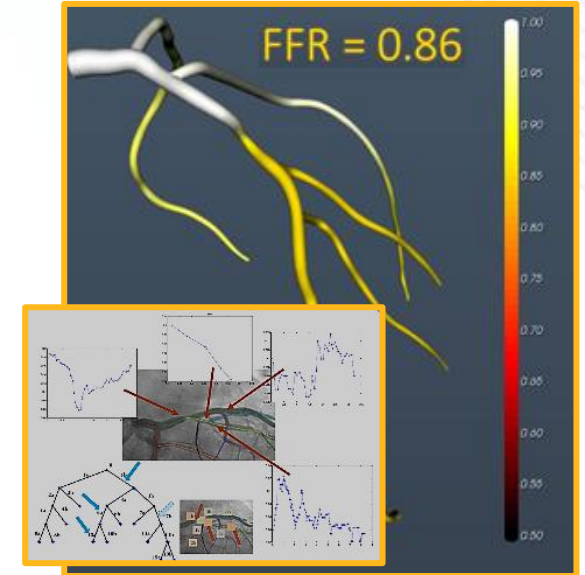
- Reconstructing centerlines, cross-sections and tree topology in 3D

3 Stenosis Assessment



- Bifurcation Analysis
- 2D&3D-QCA Analysis
- Estimating Diameters

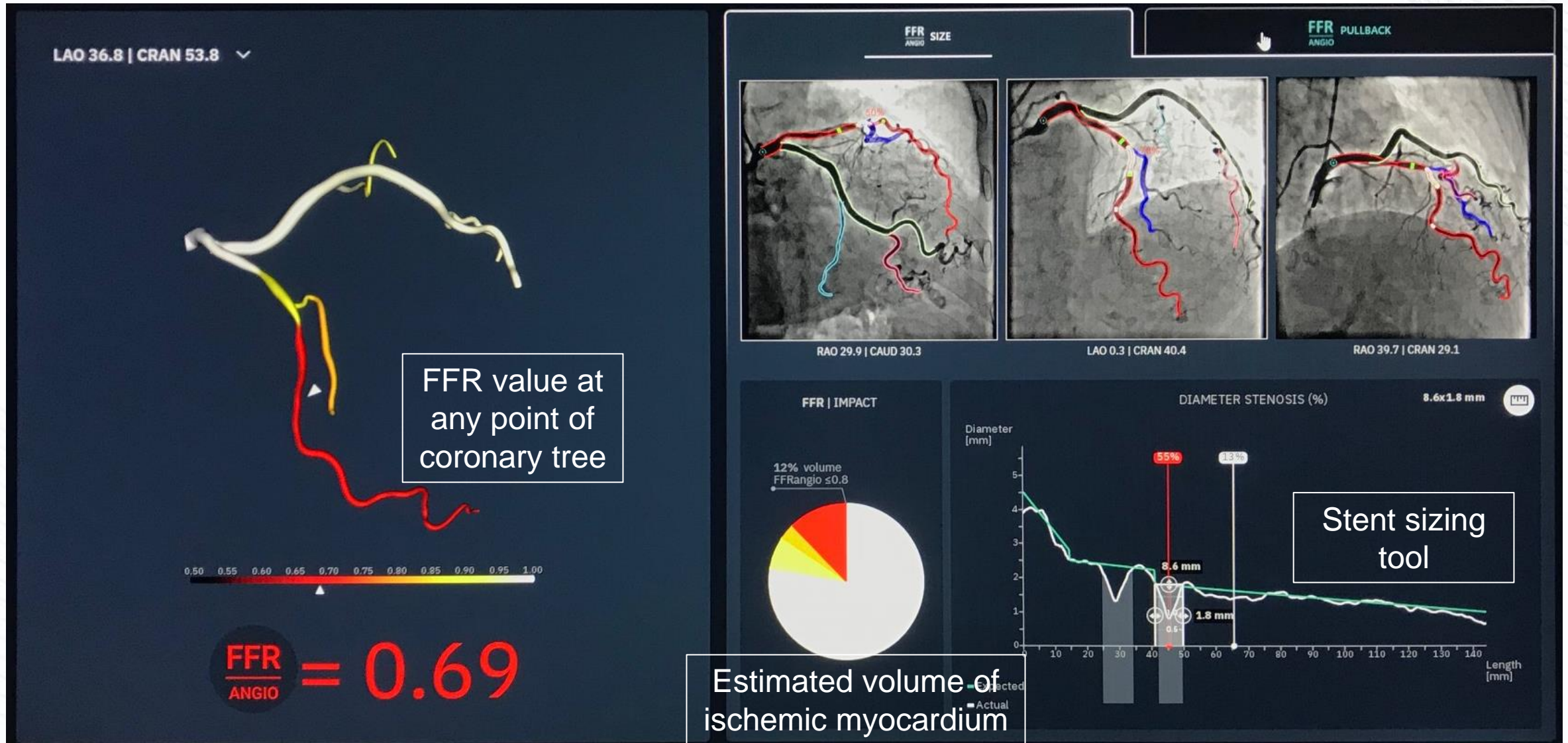
4 Hemodynamic Evaluation



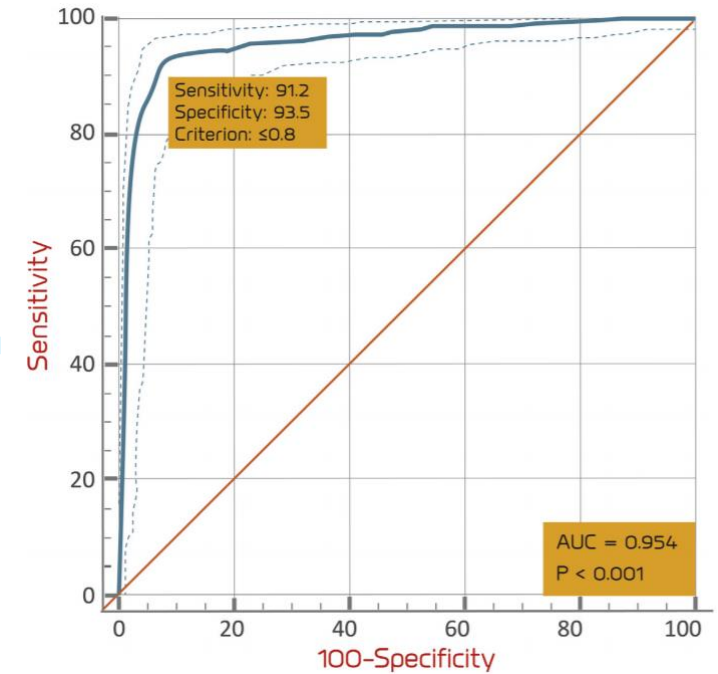
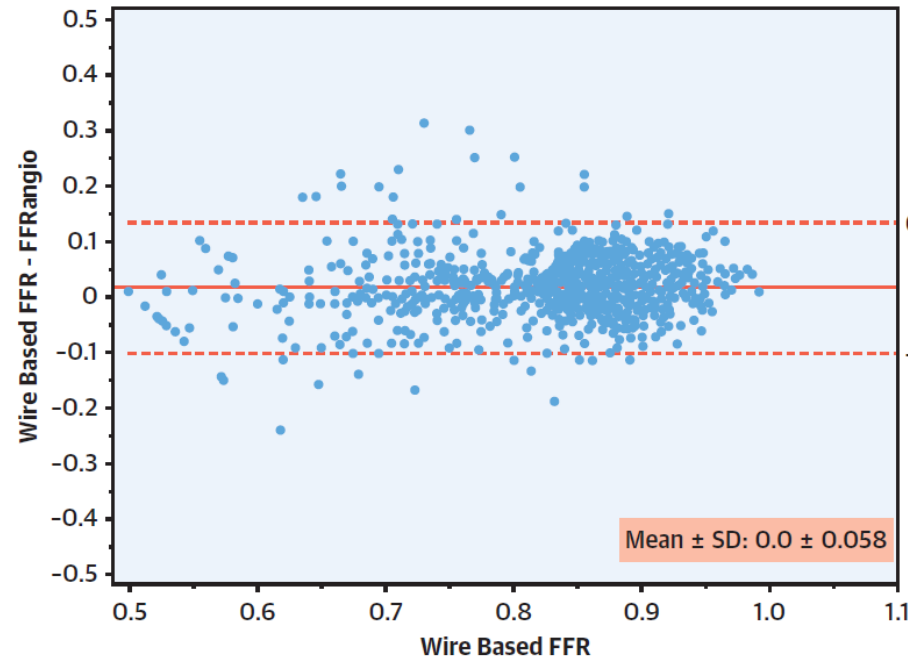
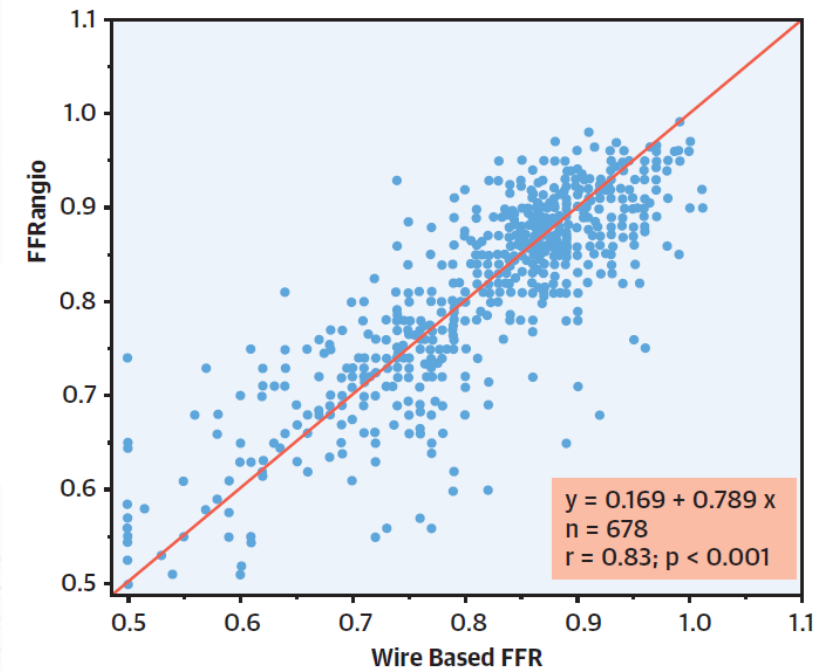
- Resistance Mapping
- Maximum Blood Flow
- Flow-rate Ratio / FFR

All stenoses are converted into resistances in a lumped model, utilizing Poiseuille's law. the algorithm is doing blood flow calculations based on the lumped model and showing 3D simulation of the coronary tree and FFR values of the vessel of interest.

FFRangio results



Diagnostic performance of FFRangio



All lesions

Sensitivity	91.2
Specificity	93.5
Positive predictive value	91.2
Negative predictive value	93.5
Overall accuracy	92.6

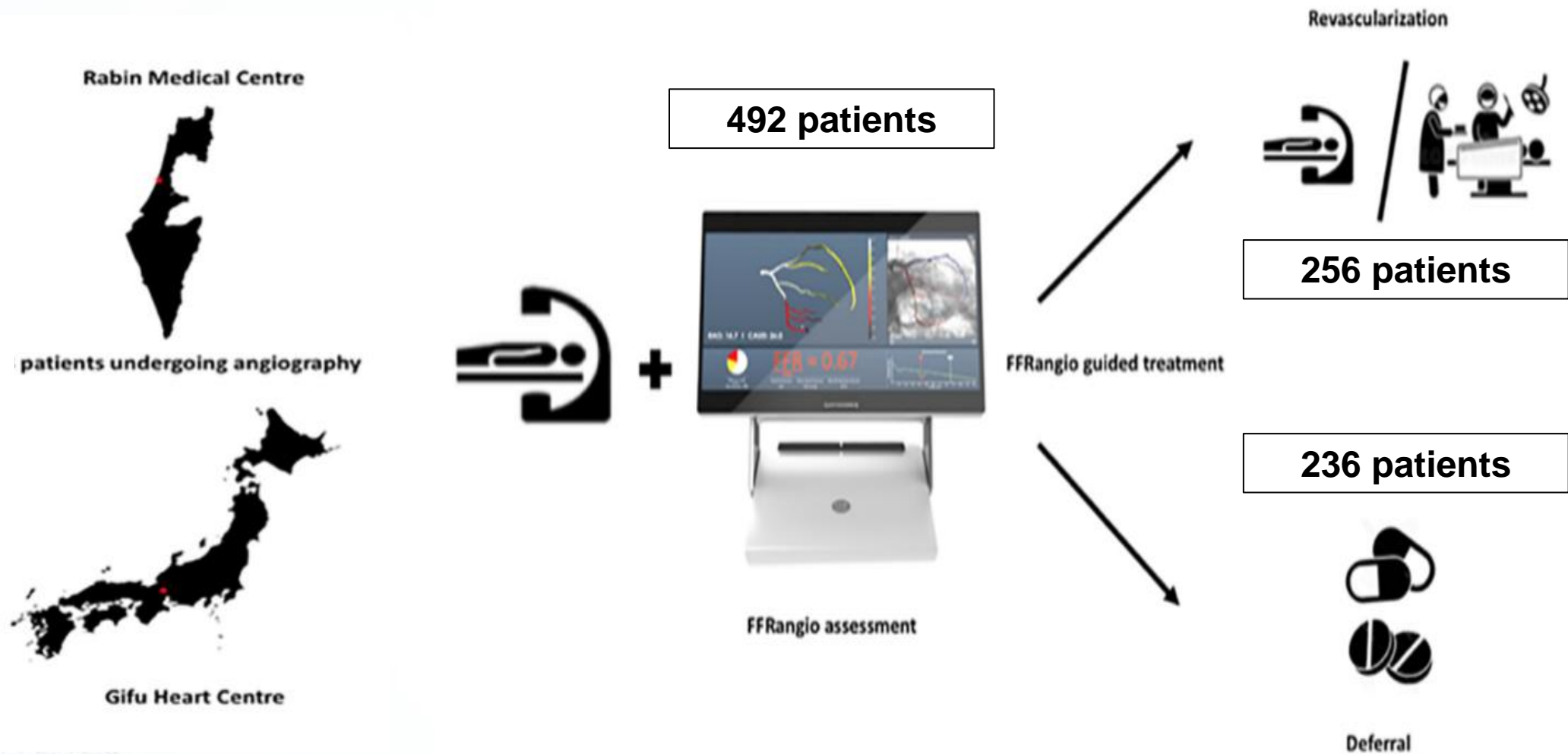
From 5 cohort studies, A total of 700 lesions from 588 patients were analyzed.



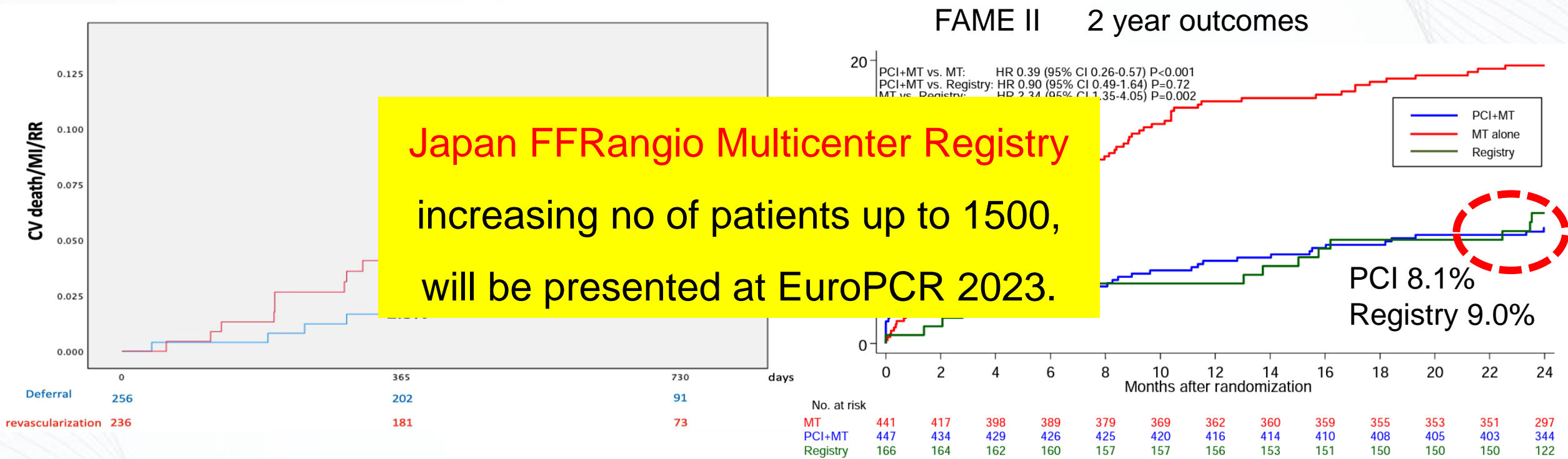
GIFU HEART CENTER

Witberg G. et al. J Am Coll Cardiol Interv. 2020;

Clinical outcome of FFRangio-guided treatment



Clinical outcome of FFRAngio-guided treatment

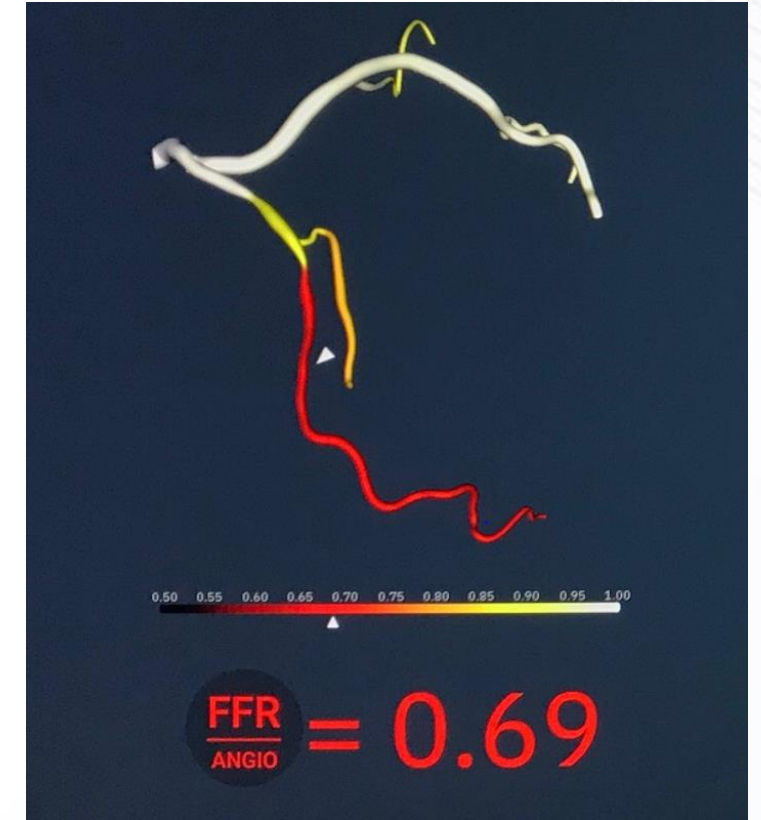
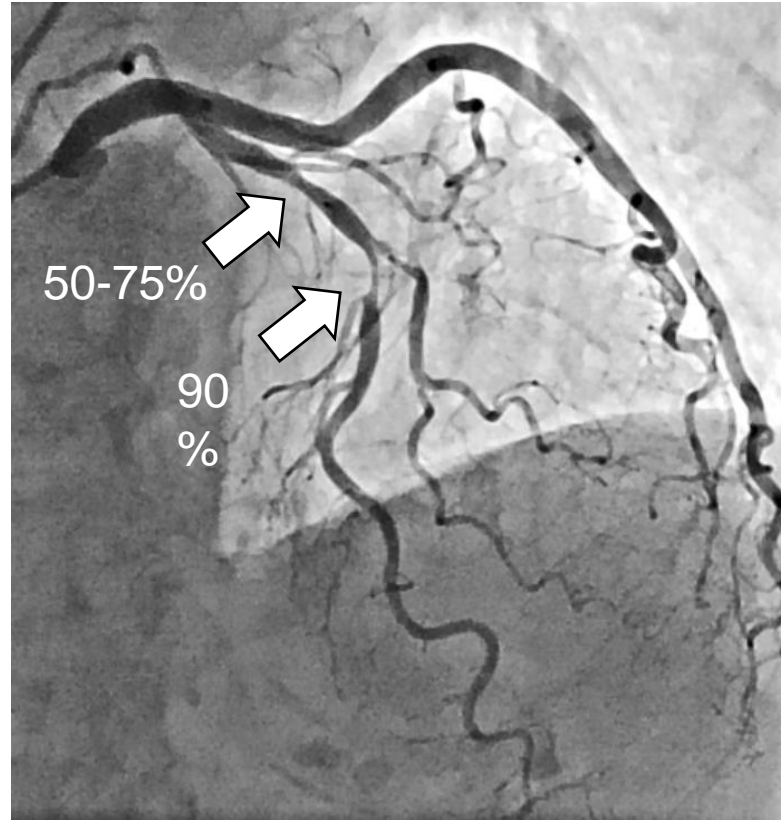
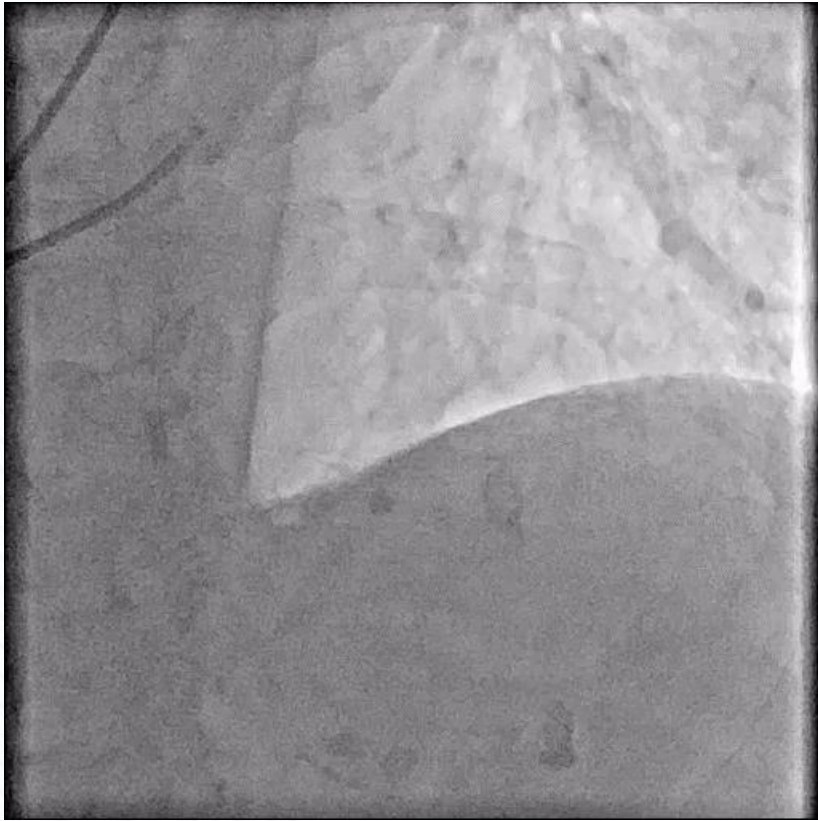


Japan FFRAngio Multicenter Registry
increasing no of patients up to 1500,
will be presented at EuroPCR 2023.

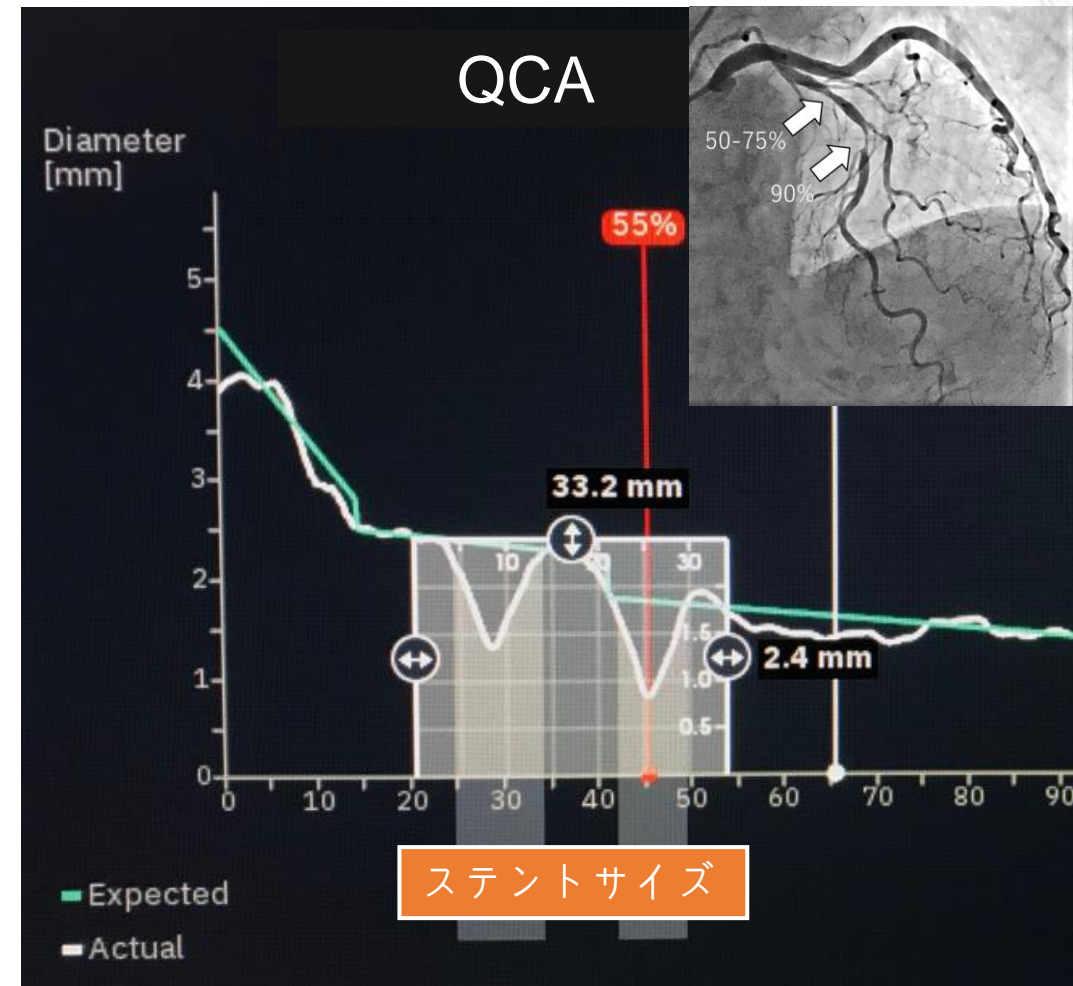
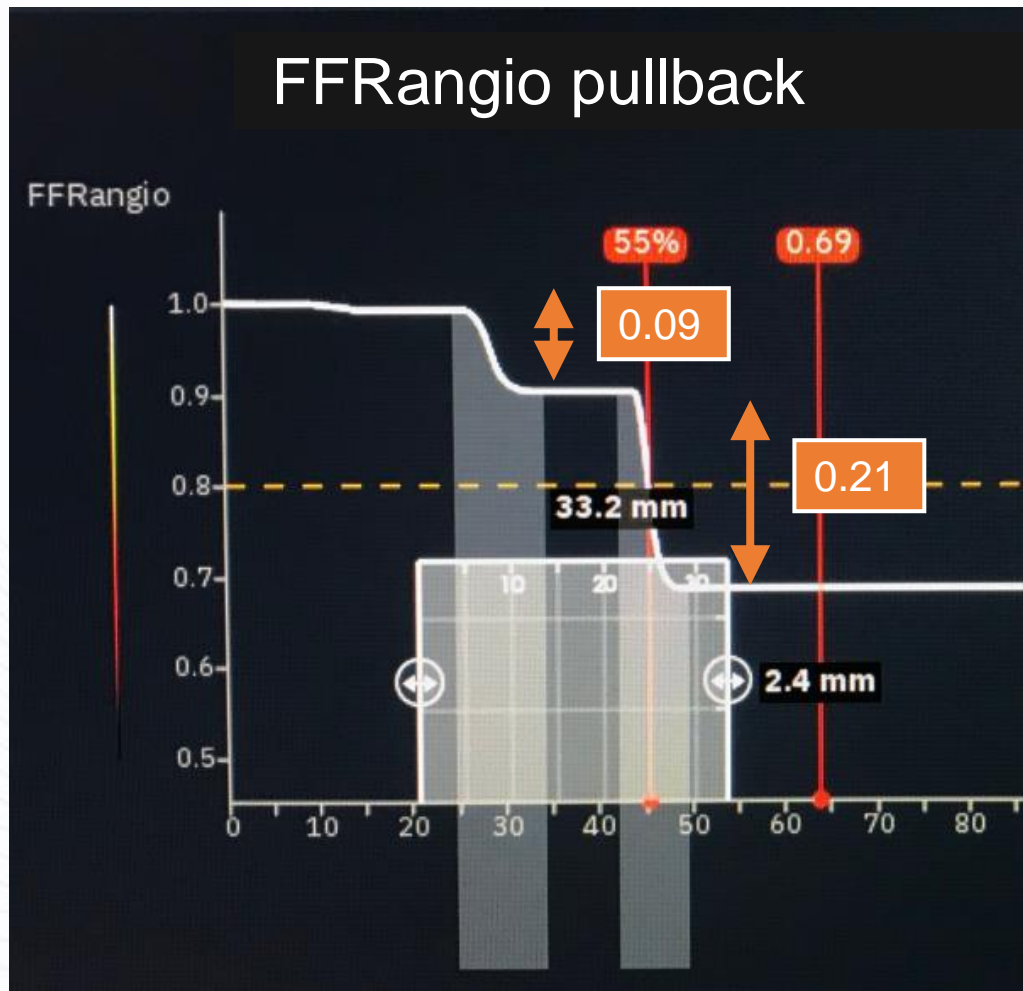
	Deferred (n=256)	Revascularization(n=236)
CV death/MI/RR	3.5%	7.6%
CV death	0.4%	0.9%
MI	0.8%	1.3%
RR	2.8%	5.5%

FFRangio-guided PCI – case1, tandem lesions –

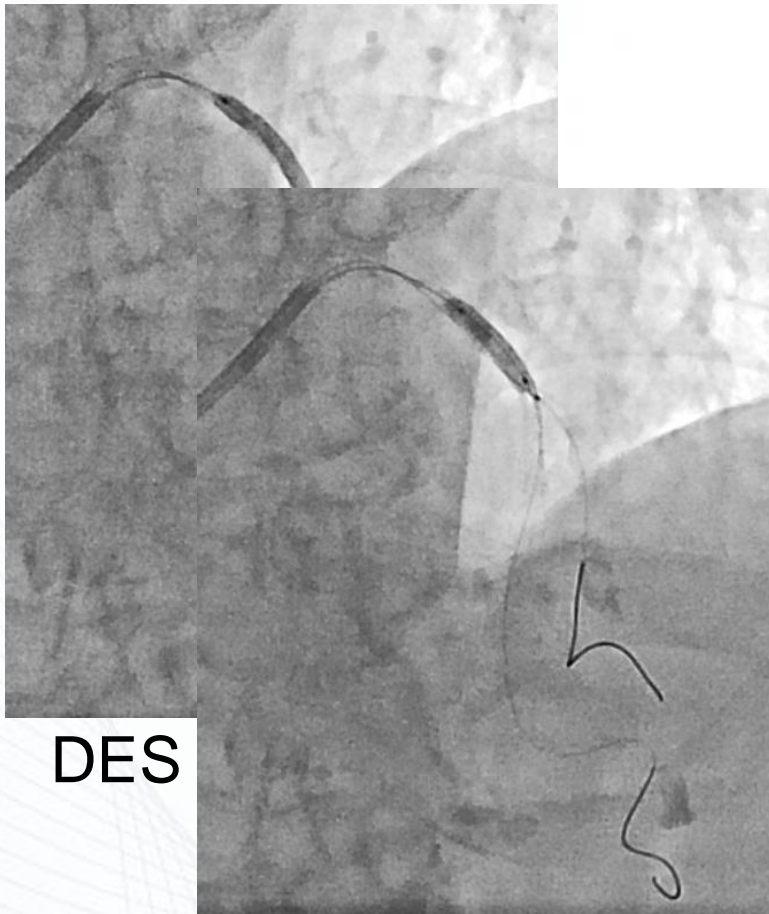
69 years old male with DM, and dyslipidemia. Effort angina CCS class2



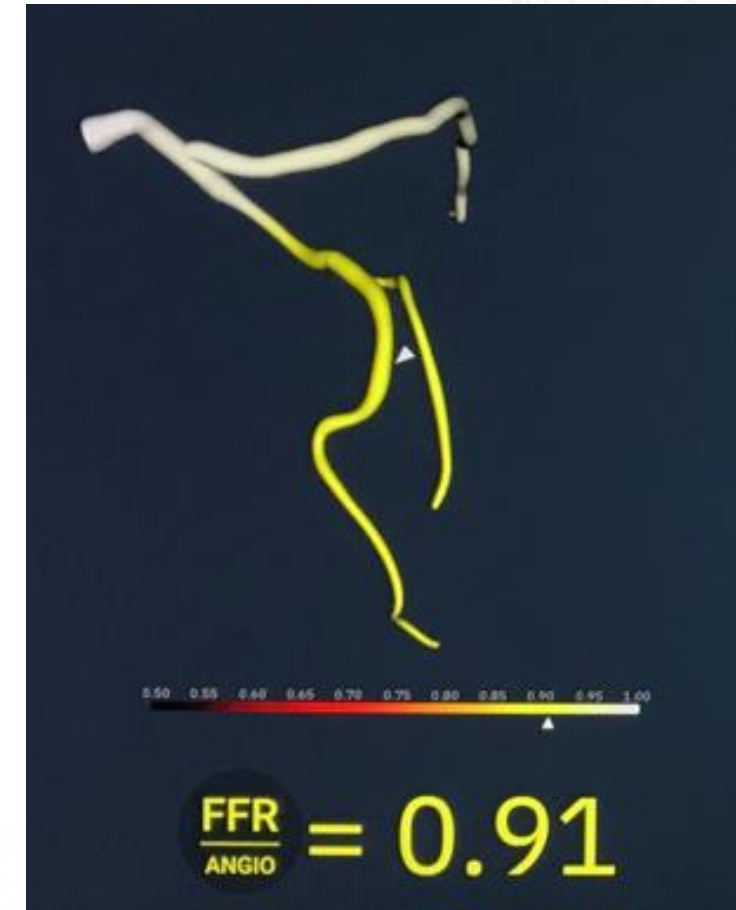
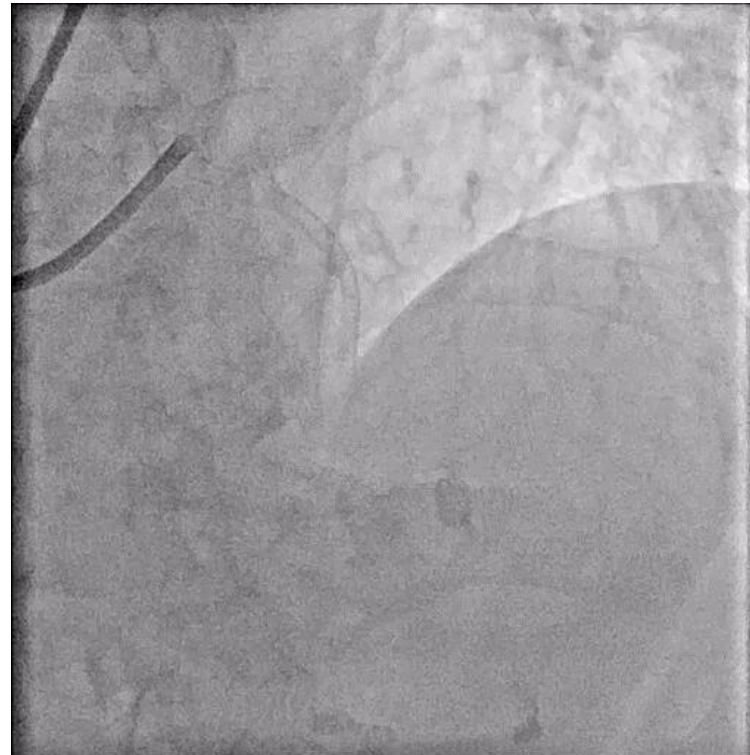
FFRangio-guided PCI – case 1, tandem lesions –



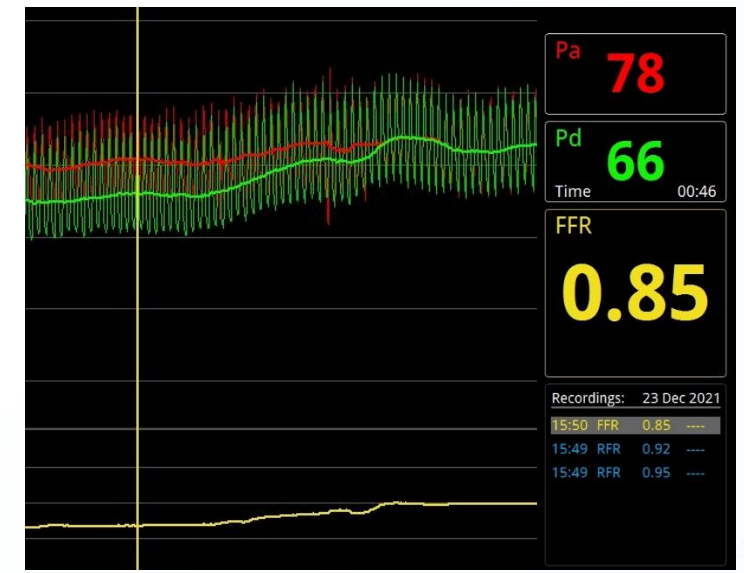
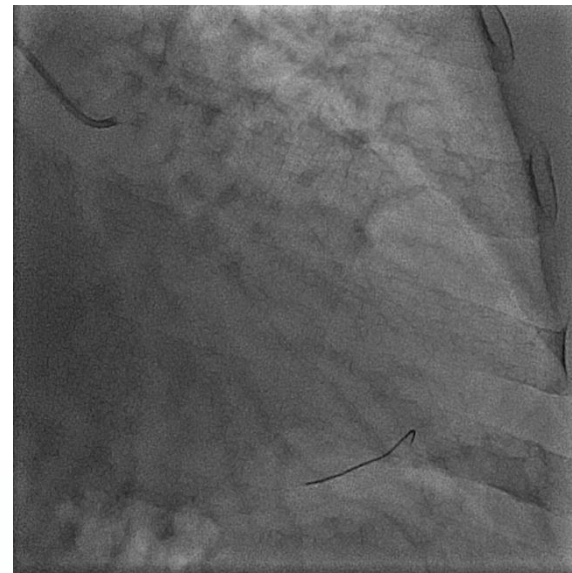
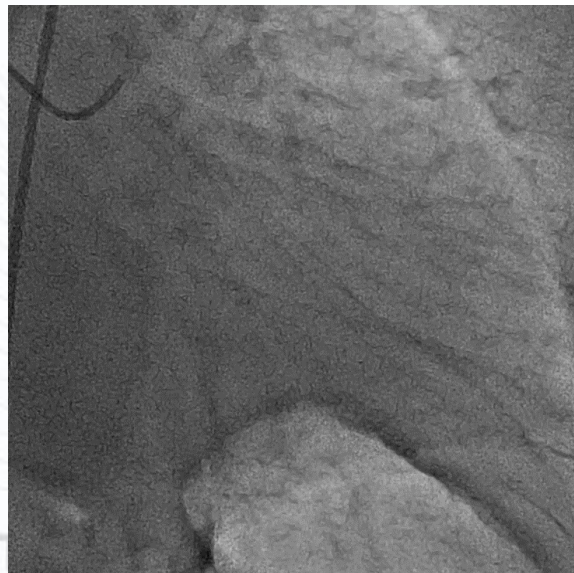
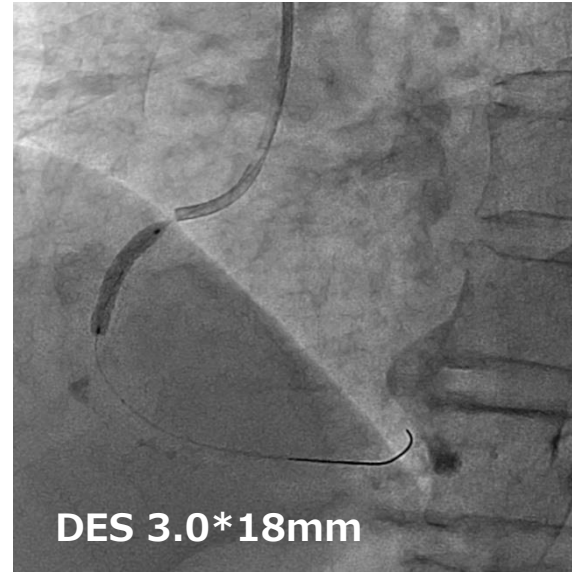
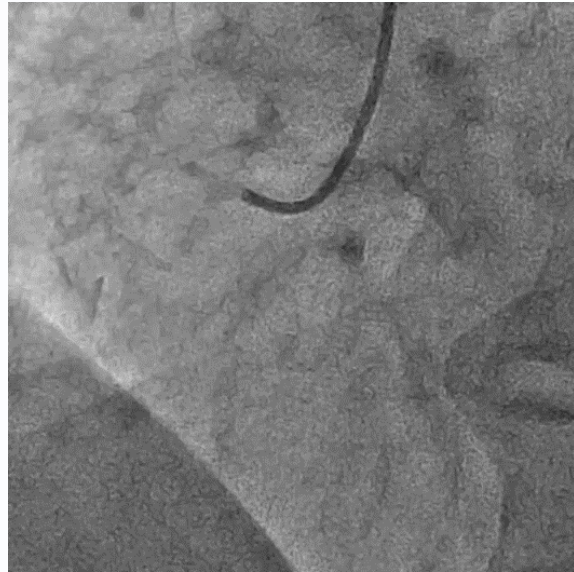
FFRangio-guided PCI – case 1, tandem lesions –



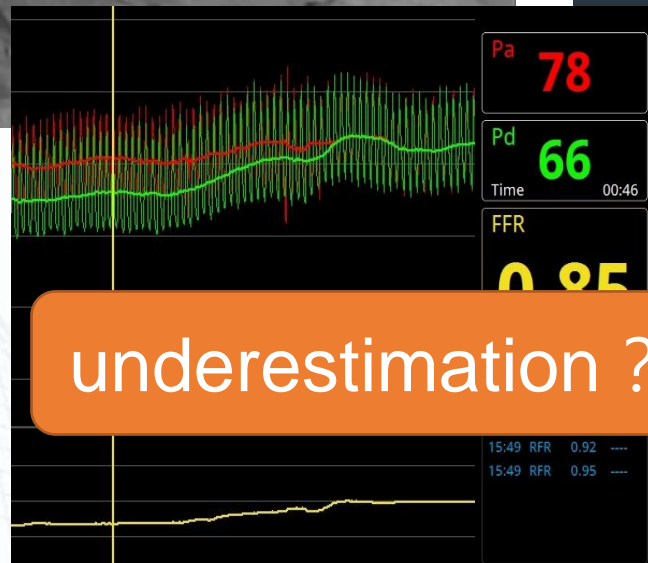
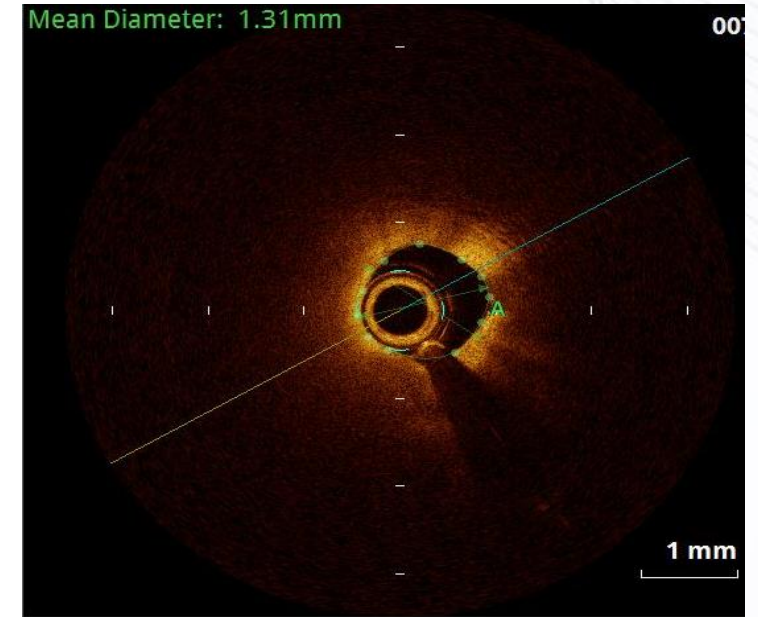
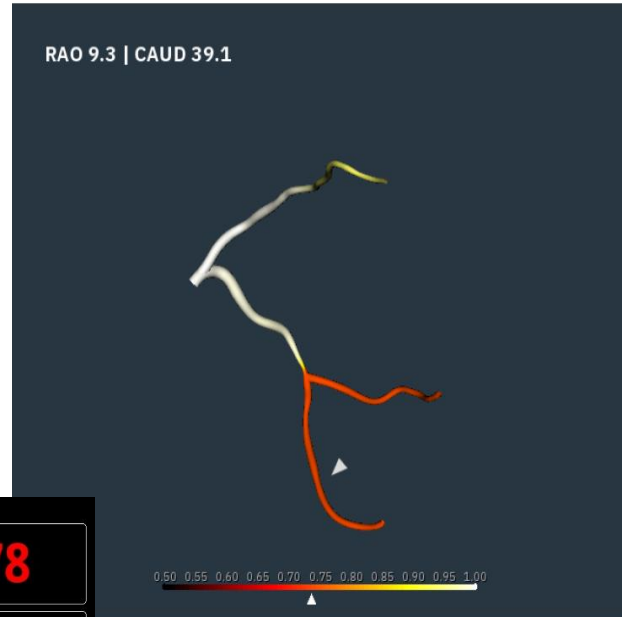
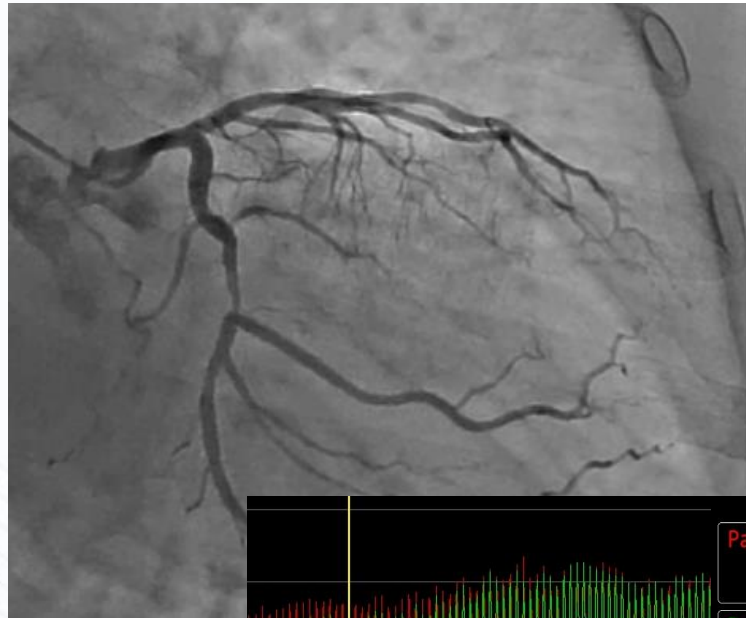
3.0*15mm



FFRangio-guided PCI – case 2, NCL in ACS –



FFRangio-guided PCI – case 2, NCL in ACS –



FFRangio ≤ 0.80

+

MLA 1.35mm²
Lipid rich plaque

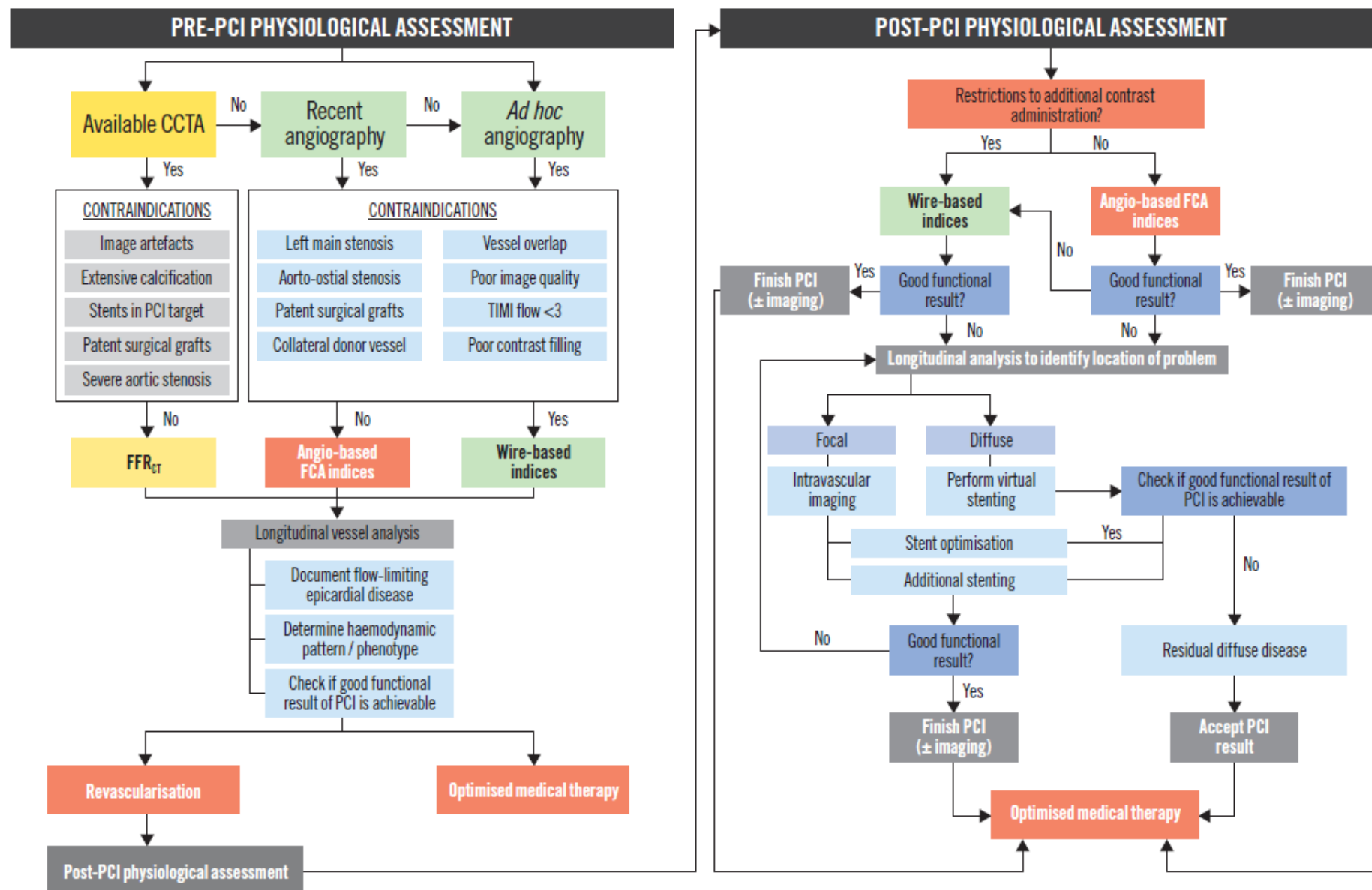
Limitation of Angio-derived FFR

- Technical issues : multiple operator dependent process including indication of landmark, manual correction of vessel contours
- Lack of standardization of contrast injection
- A few outcome studies
- Severity of microvascular dysfunction may influence the diagnostic accuracy of angio-derived FFR (QFR)

Limitation of Angio-derived FFR (Anatomical subset)

- Aorto-ostial lesions
- LMTD
- Bifurcation
- CTO
- Collateral donor artery
- Diffuse disease
- Small vessel
- Vessel overlap
- Severe Microvascular dysfunction
- Heart failure
- Recent MI
- CKD
- Tachycardia
- Intracardiac device
- Post CABG
- Post valve replacement

Decision-making algorithm for the usage of FCA in pre- and post-PCI settings.



Conclusion

- Major technical developments in the field of invasive angiography have made it possible to obtain functional information from angiogram.
- Angio-based FFR now allow a wireless-based evaluation, with preliminary studies demonstrating good correlation with invasive FFR and overall good reproducibility and feasibility.
- Decision making during PCI based on anatomical and functional angiography is feasible and can be incorporated with routine clinical practice. .