Angiography-based Phisiology

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Potential conflicts of interest

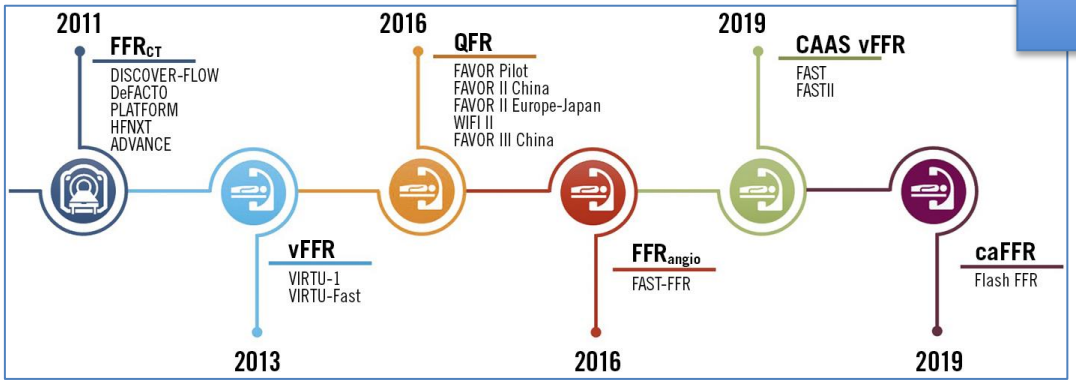
Speaker's name : Gianluca Campo

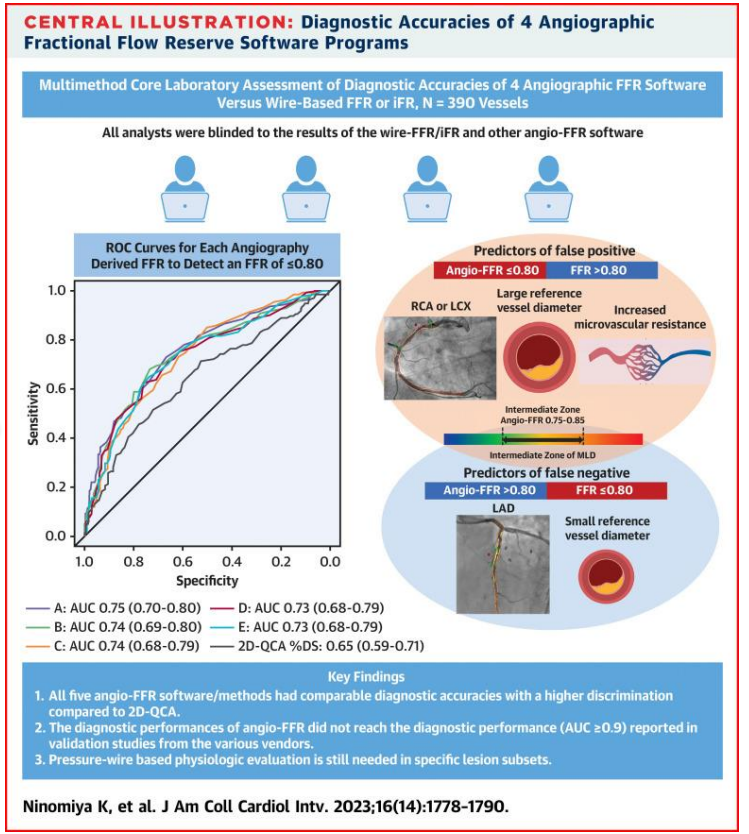
☑ I have the following potential conflicts of interest to declare:

Receipt of grants / research support: Abbott, GE HealthCare, Medis, Siemens Healthineers, SMT

Angiography-based Physiology

- **The first software was based on coronary CT**
- **By now, we have more than 5 software able to calculate FFR (+ pullback and IMR) starting from coronary artery angiography**
- **The performance between software is similar**
- **≈80% agreement with wire-based FFR**





Angiography-based Physiology

Advantages

- No wire, No hyperemia
- Faster
- Feasible online and offline

Limitations

- Ostial lesion, tortuous vessels
- Quality of angiography/projections
- Operator interaction

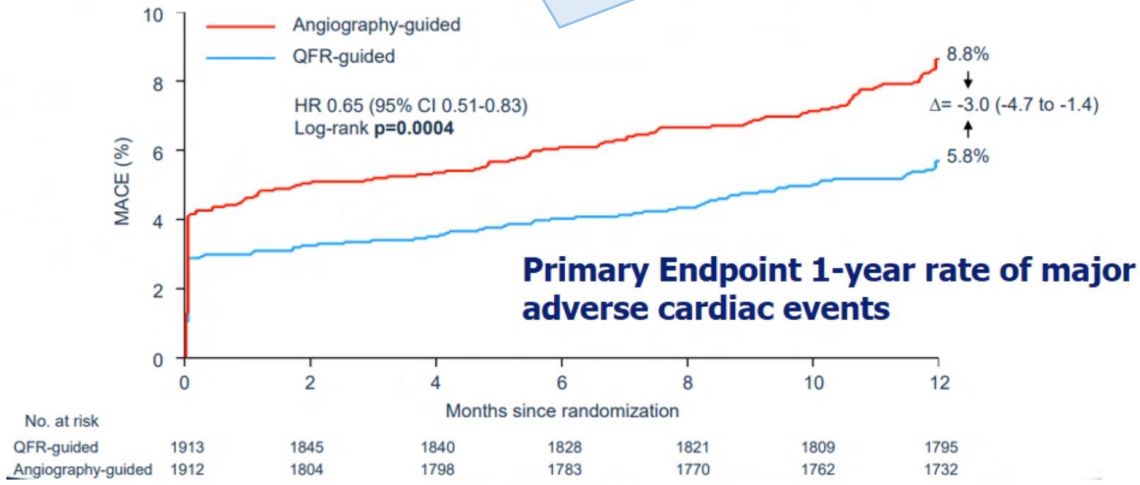
Applications

- Gatekeeper for PCI
- PCI procedural plan
- Microcirculation (angio-IMR)

Gatekeeper for PCI - Quantitative Flow Ratio (QFR) in stable patients

FAVOR III China

QFR-guided PCI resulted in 35% risk reduction of MACE at 1 year compared with angio-guided PCI



Key Procedural Results

	QFR-guided group (N=1913)	Angiography-guided group (N=1912)	p value
PCI performed	90.5%	99.1%	<0.0001
Number of stents placed per patient	1.45 ± 1.02	1.58 ± 0.97	<0.0001
Use of intravascular imaging	6.2%	6.3%	0.89
Contrast medium used per patient, ml	163.0 ± 75.6	169.7 ± 74.2	0.0060
Fluoroscopy time, min	14.1 ± 8.0	14.9 ± 7.4	0.0013
Procedure time, min	53.7 ± 30.4	59.4 ± 30.4	<0.0001
Adjusted procedure time, min	44.6 ± 28.8	49.5 ± 30.2	<0.0001
CI lesion success	99.0%	99.3%	0.38
esidual anatomic SYNTAX score	2.4 ± 3.6	2.4 ± 4.0	0.49
esidual functional SYNTAX score	0.7 ± 2.3	1.0 ± 2.8	<0.0001
Residual functional SYNTAX score=0	88.1%	82.2%	<0.0001

One-Year Clinical Outcomes

	QFR-guided group (N=1913)	Angiography-guided group (N=1912)	Hazard ratio (95% CI)	p value
Primary endpoint	5.8%	8.8%	**0.65 (0.51-0.83)**	**0.0004**
Death from any cause	0.7%	0.5%	1.44 (0.62-3.37)	0.40
Myocardial infarction	3.4%	5.7%	**0.59 (0.44-0.81)**	**0.0008**
Ischemia-driven revascularization	2.0%	3.1%	**0.64 (0.43-0.96)**	**0.031**
Major secondary endpoint	3.1%	4.8%	**0.64 (0.46-0.89)**	**0.0078**
Other secondary endpoints				
Cardiovascular death	0.5%	0.4%	1.28 (0.48-3.44)	0.62
Peri-procedural myocardial infarction	2.9%	4.2%	**0.69 (0.49-0.97)**	**0.033**
Non-procedural myocardial infarction	0.5%	1.6%	**0.33 (0.16-0.68)**	**0.0025**
Any revascularization	2.6%	3.5%	0.73 (0.50-1.05)	0.089
Target vessel revascularization	1.2%	1.3%	0.88 (0.50-1.56)	0.66
Stent thrombosis, definite or probable	0.2%	0.3%	0.50 (0.12-1.99)	0.33

Gatekeeper for PCI - Quantitative Flow Ratio (QFR) in NCLs of MI patients

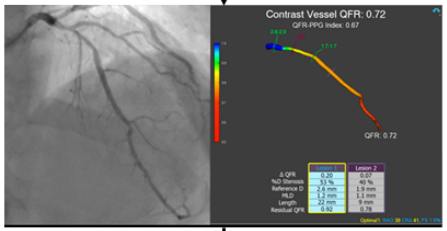
- **FIRE prespecified substudy assessing QFR for the Revascularization of Non-Culprit Lesions**
- **Older (≥75 years) MI patients with multivessel disease (n=1445) randomized to culprit-only vs. physiology-guided complete revascularization**

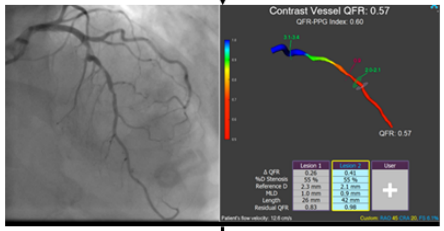
951 non-culprit vessels in the culprit-only arm

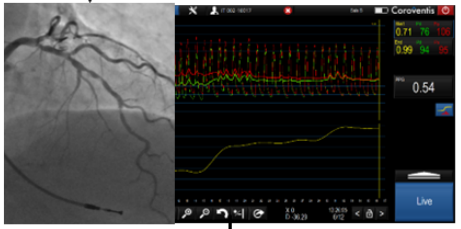
948 non-culprit vessels in the complete arm

320 non-culprit vessels with QFR guidance

589 non-culprit vessels with wire (FFR or NHPR) guidance



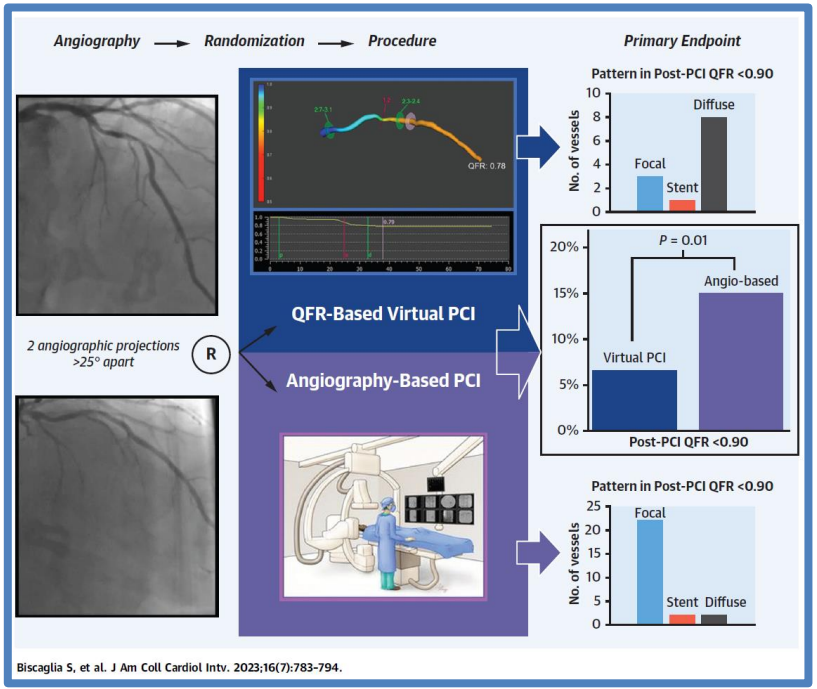




- **QFR ≤0.80 was an independent predictor of VOCE (adjHR 2.79; 95%CI 1.64-4.75)**
- **QFR was non inferior to wire-based FFR (adjHR HR 0.57 95%CI 0.28-1.15)**
- **This prespecified subanalysis provides evidence supporting the safety and efficacy of QFR-guided interventions for the treatment of non-culprit vessels in older (≥75 years) patients with MI**

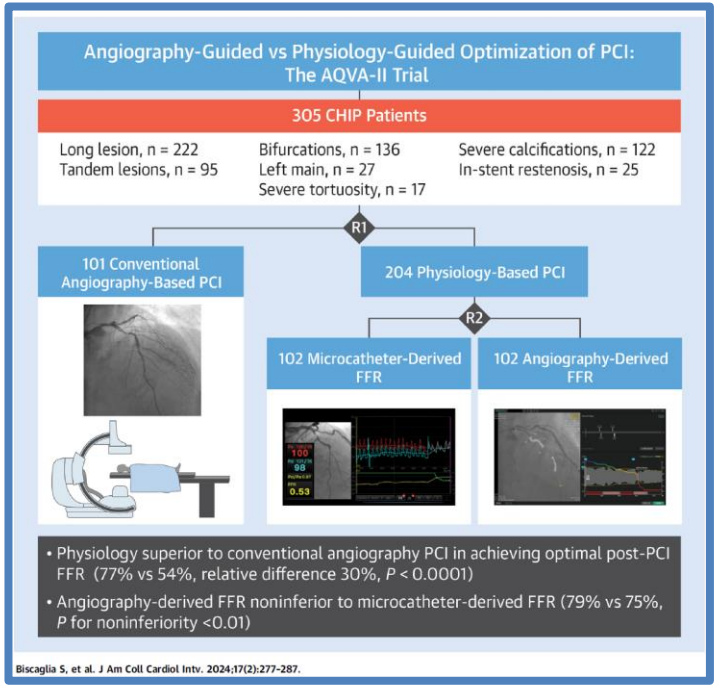
PCI procedural plan – AQVA series

AQVA: QFR is better than angio in simplex lesions



Biscaglia S, et al. J Am Coll Cardiol Intv. 2023;16(7):783-794.

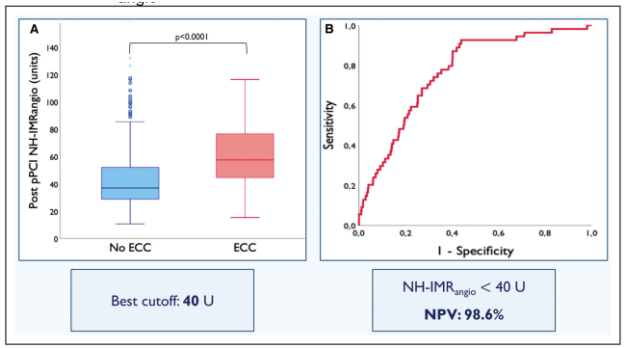
AQVA II: QFR is better than angio and non inferior to microcatheter FFR in CHIP procedures

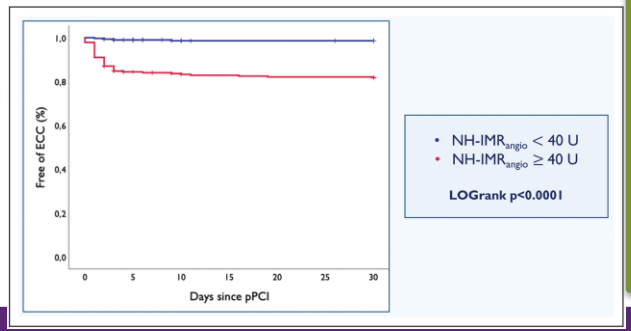


Biscaglia S, et al. J Am Coll Cardiol Intv. 2024;17(2):277-287.

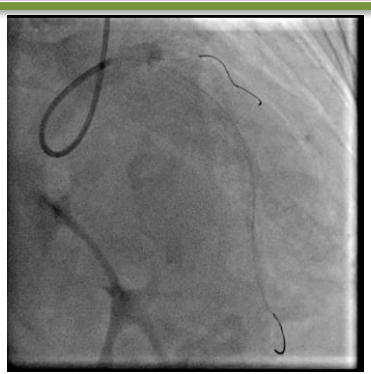
Microcirculation – Combining angio-FFR and angio-IMR

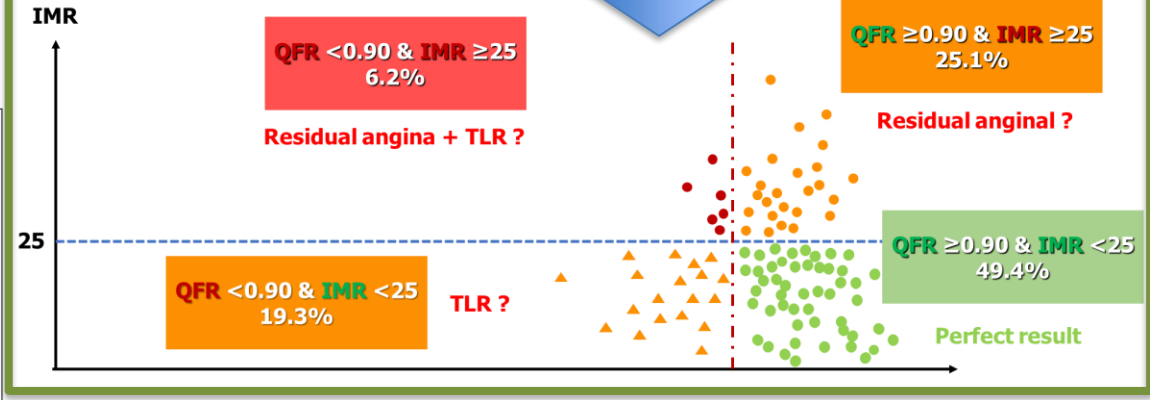
Angio-IMR after successful primary PCI





Post-PCI





This is not the end - Ongoing randomized clinical trials

	FAST III	ALL RISE	FAVOR III EU-JAPAN	PIONEER IV	FLASH FFR II	AIR STEMI
DEVICE	vFFR	FFRangio	QFR	QFR	CaFFR	µFR, QFR, vFFR
COMPARATOR	FFR	FFR	FFR	Angio, iFR/FFR	FFR	Angio
TRIAL DESIGN	Non-inferiority	Non-inferiority	Non-inferiority	Non-inferiority	Non-inferiority	Superiority
PTS	2228	1924	2000	2540	2132	1800
LOCATION	Europe	US	Europe/Japan	Europe	China	Italy/Pakistan
INCLUSION	Lesion 30%-80%	Lesion 30%-80%	Lesion 40%-90%	Lesion >50%	Lesion 40%-90%	NCLs STEMI
TRIAL ID	NCT04931771	NCT05893498	NCT03729739	NCT04923191	NCT04575207	NCT05818475

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Conclusions

Based on current data, angiography-derived FFR:

- **Should be considered one of the available tools for functional assessment**
- **Shows a good agreement with wire-based FFR**
- **Is superior as compared to conventional angiography in terms of adverse events and procedural planning**

Ongoing studies will confirm its reliability as compared to wire-based FFR

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