



1·2·3 FÉVRIER 2023

MARSEILLE·PALAIS DU PHARO



Études qui pourraient changer la pratique

FFR vs. Angiography-guided PCI in AMI with multivessel disease

FRAME-AMI trial

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FRAME-AMI: Background

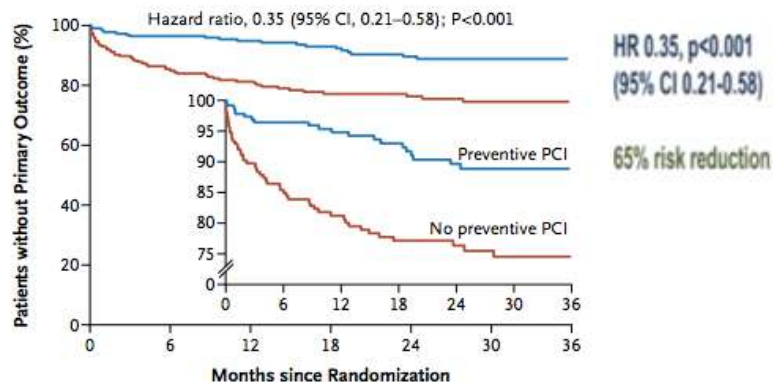


- **Nearly half of patients with STEMI have multivessel disease** with significant stenoses in non-culprit vessels, and these patients showed **higher risks of death or re-infarction** after primary percutaneous coronary intervention (PCI)
- In patients with ACS and multivessel disease , **PCI of non infarct related artery for complete revascularization improves outcomes**

Non-culprit Lesion PCI after Primary PCI - Angio-guided Complete Revascularization vs. Culprit-Only PCI-

PRAMI – cardiac death, non-fatal MI, refractory angina

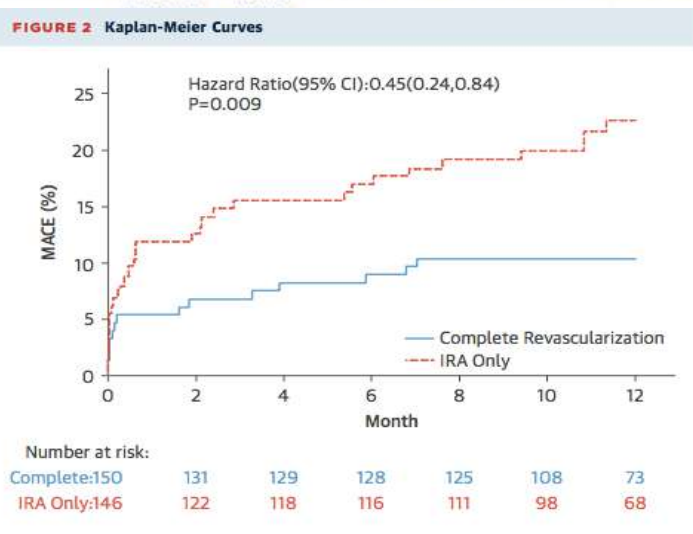
CvLPRIT – all death, recurrent MI, HF, ischemia-revascularization



No. at Risk	0	6	12	18	24	30	36
Preventive PCI	234	196	166	146	118	89	67
No preventive PCI	231	168	144	122	96	74	50

Figure 2. Kaplan–Meier Curves for the Primary Outcome.

Preventive PCI for non-culprit lesion >50% DS



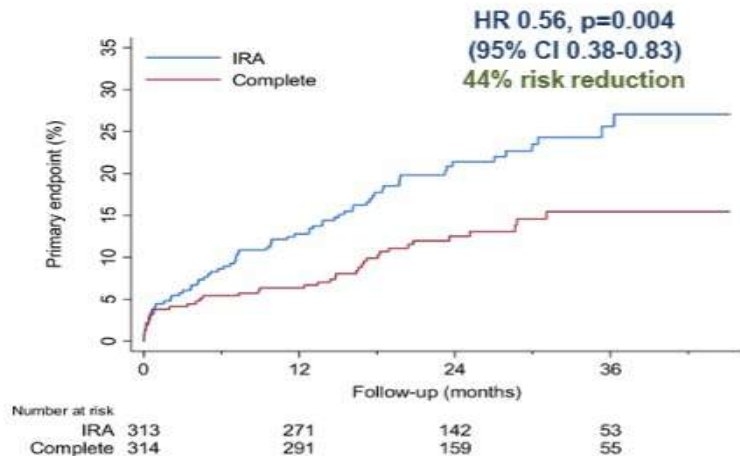
Number at risk:	0	2	4	6	8	10	12
Complete:150	131	129	128	125	108	73	
IRA Only:146	122	118	116	111	98	68	

**Preventive PCI for non-culprit lesion
> 70% DS or > 50% DS in 2 views**

Non-culprit Lesion PCI after Primary PCI in STEMI

- FFR-guided Complete Revascularization vs. Culprit-Only PCI -

DANAMI-3-PRIMULTI



COMPARE ACUTE Trial

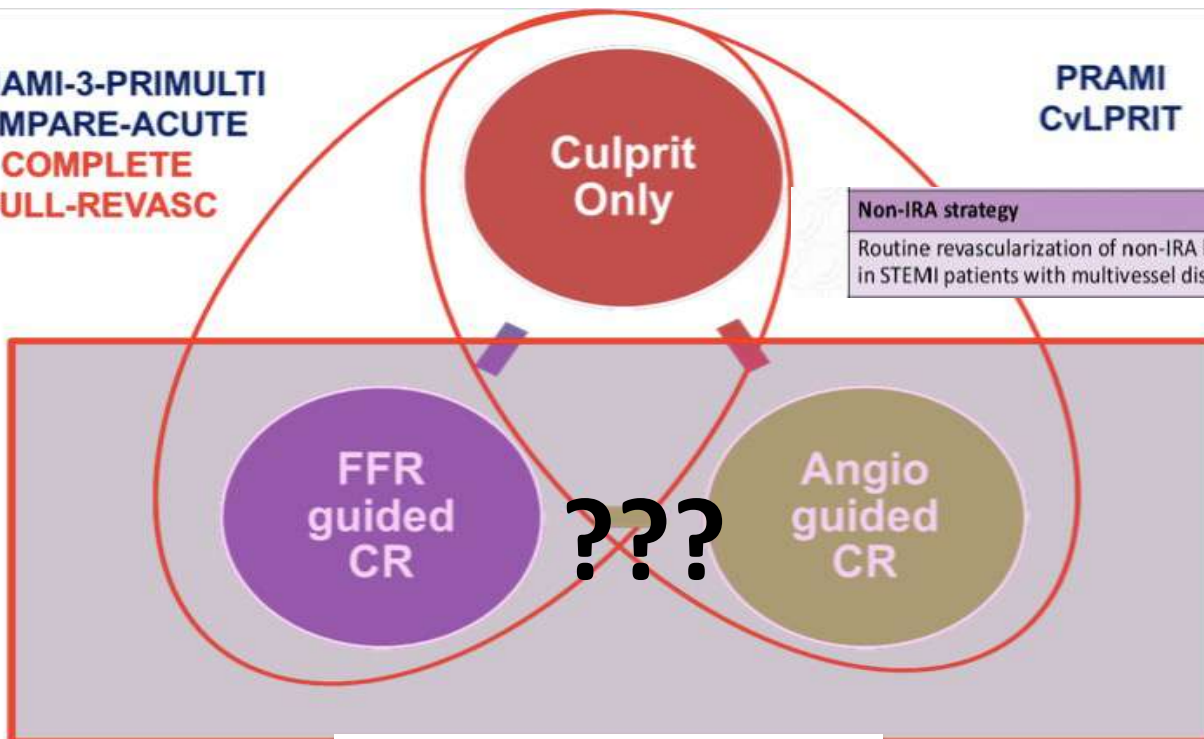


- **“FFR-guided” Complete Revascularization showed Significant benefit in terms of composite endpoints (Any Death, MI, I-D revascularization)**

Non-culprit PCI in STEMI multivessel Updated ESC Guideline

DANAMI-3-PRIMULTI
COMPARE-ACUTE
**COMPLETE
FULL-REVASC**

PRAMI
CvLPRIT

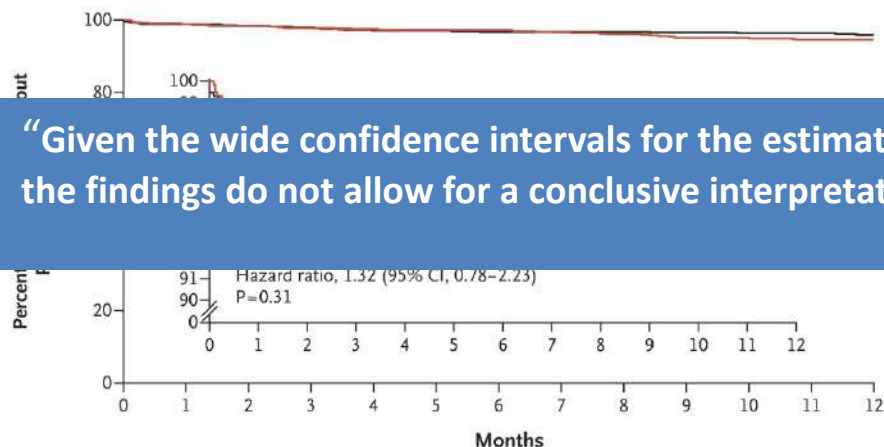


Ila **A**

Multivessel PCI Guided by FFR or Angiography for Myocardial Infarction

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for the FLOWER-MI Study Investigators^{*}

N ENGL J MED 385;4 NEJM.ORG JULY 22, 2021



No. at Risk	0	1	2	3	4	5	6	7	8	9	10	11	12
Angiography-guided PCI	577	570	567	565	560	560	557	555	555	554	552	548	371
FFR-guided PCI	586	577	573	570	567	566	566	562	559	553	553	549	385

“Given the wide confidence intervals for the estimate of effect, the findings do not allow for a conclusive interpretation”.

an-expected incidence of events:
cal power than intended
8000 patients would be needed
5% lower relative risk of
the composite outcome

Objective

- **To compare fractional flow reserve (FFR)-guided PCI with angiography-guided PCI for non-IRA lesions among patients with AMI and multivessel disease**

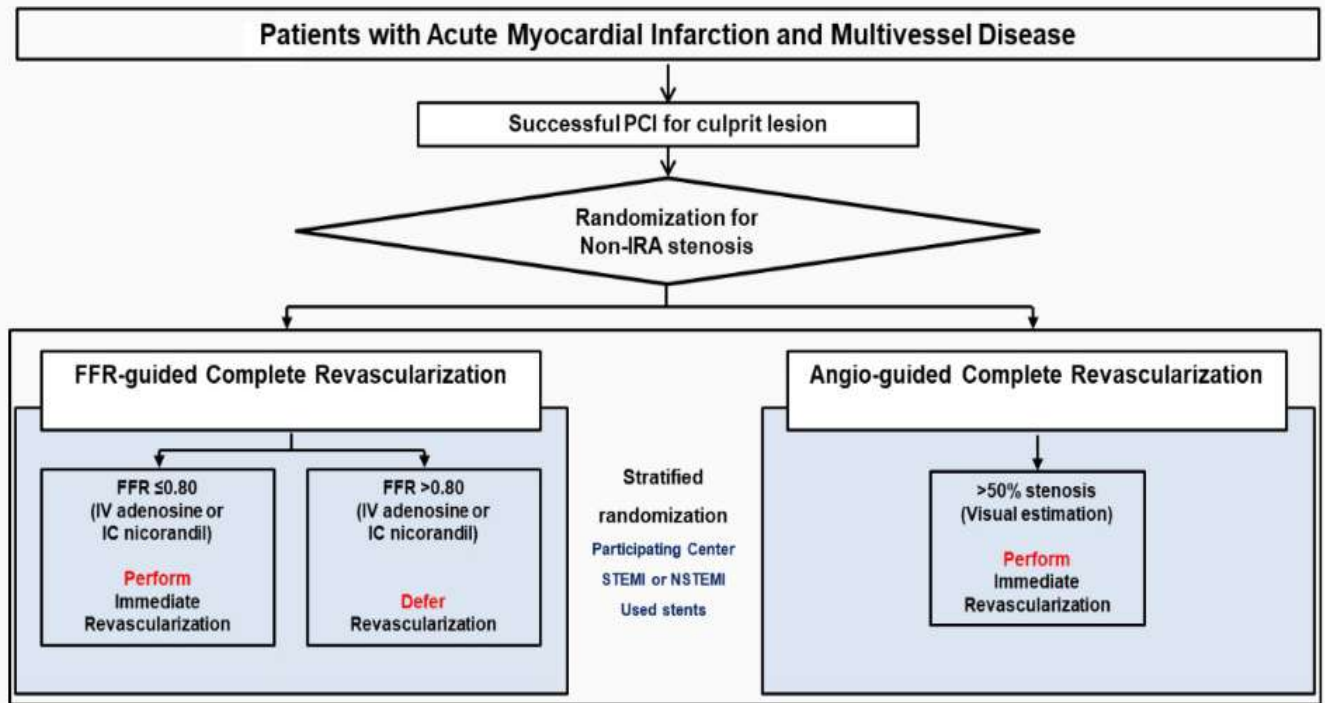
- **Hypothesis**
Selective PCI guided by FFR is superior to routine PCI guided by angiography alone for treatment of non-IRA lesions in patients with AMI and multivessel disease.

Study design

FRAME-AMI Trial (NCT02715518)

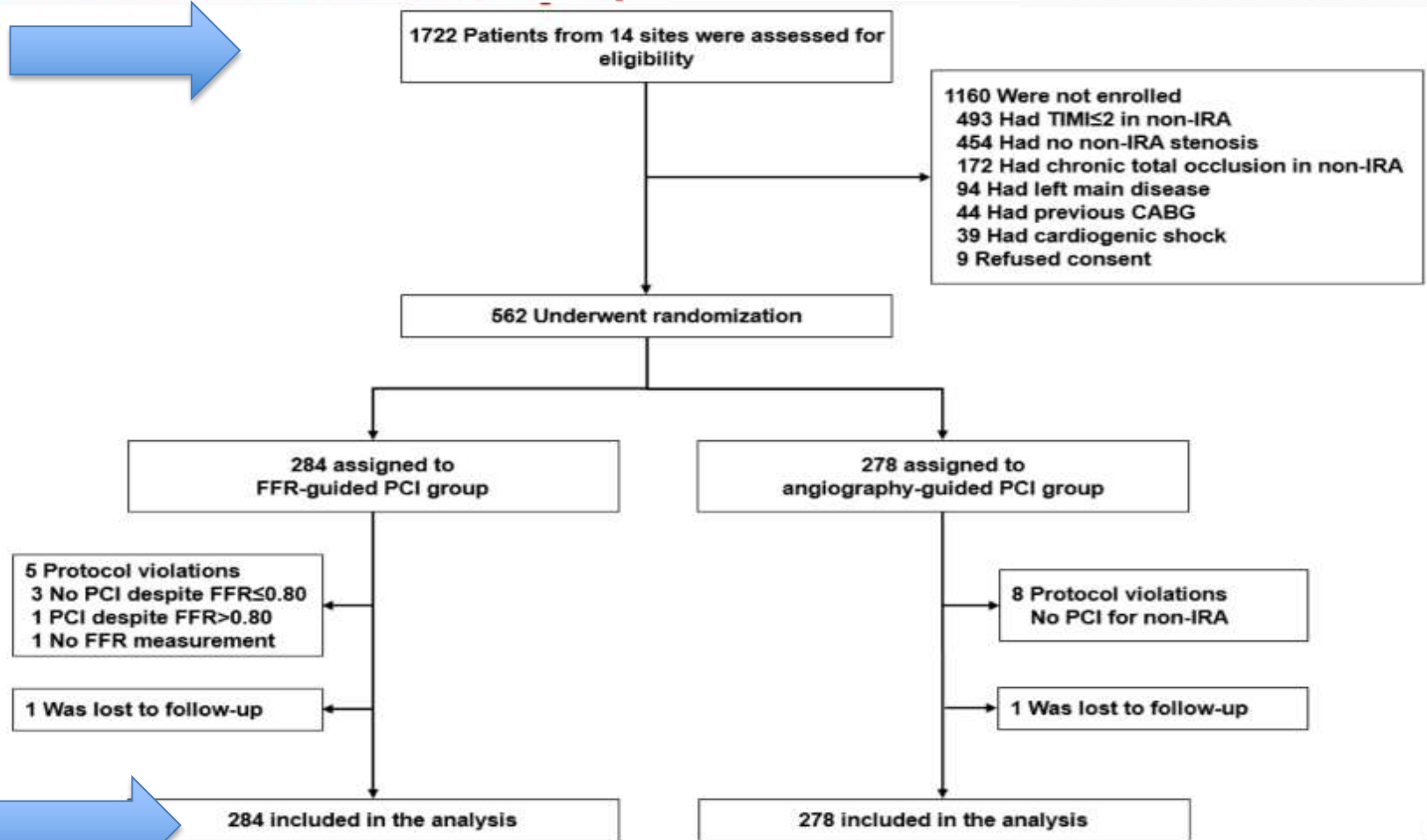
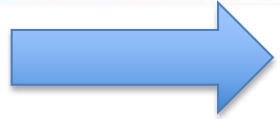


An investigator-initiated, randomized trial at 14 sites in Korea



Enrollment and follow-Up

FRAME-AMI trial



	FFR-guided PCI (N=284)	Angiography-guided PCI (N=278)
Age, years	63.9±11.4	62.7±11.5
Male, n (%)	240 (84.5%)	234 (84.2%)
Diabetes mellitus	97 (34.2%)	86 (30.9%)
LV ejection fraction, %	53.2±9.8	53.6±10.2
Initial presentation, no. (%)		
ST-segment elevation MI	131/284 (46.1%)	134/278 (48.2%)
Non-ST-segment elevation MI	153/284 (53.9%)	144/278 (51.8%)
Location of infarct related artery, no. (%)		
Left anterior descending artery	90 (31.7%)	105 (37.8%)
Left circumflex artery	69 (24.3%)	61 (21.9%)
Right coronary artery	125 (44.0%)	112 (40.3%)
Radial access, no. (%)	242 (85.2%)	229 (82.4%)

Lesion and procedural characteristics: non-IRA (I)

Per patient

	FFR-guided PCI (N=284)	Angiography-guided PCI (N=278)	P Value
Timing of non-infarct related artery PCI, no. (%)			0.770
Immediate PCI during same procedure	172 (60.6%)	165 (59.4%)	
Staged intervention during same hospitalization	112 (39.4%)	113 (40.6%)	
Number of non-IRA lesions	1.4 ± 0.6	1.3 ± 0.6	0.068

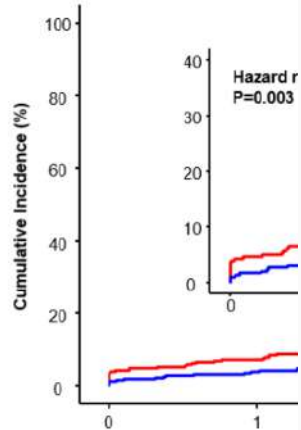
FFR data

FFR	0.79 ± 0.11	-
Post-PCI FFR	0.88 ± 0.06	-
Non-IRA PCI	226/386 (58.5%)	345/366 (94.3%)

FRAME-AMI trial

Primary end point

A composite of death, MI,



No. at Risk		
Angiography-guided PCI	278	257
FFR-guided PCI	284	271

Clinical outcomes

End Point	FFR-guided PCI (N=284)	Angiography-guided PCI (N=278)	Hazard Ratio (95% CI)	P Value
Death, myocardial infarction, and repeat revascularization	18 (7.4%)	40 (19.7%)	0.43 (0.25-0.75)	0.003
All-cause Death	5 (2.1%)	16 (8.5%)	0.30 (0.11-0.83)	0.020
Cardiac death	3 (1.4%)	15 (8.2%)	0.19 (0.06-0.67)	0.010
Myocardial infarction	7 (2.5%)	21 (8.9%)	0.32 (0.13-0.75)	0.009
Procedure-related myocardial infarction	3 (1.1%)	11 (4.0%)	0.26 (0.07-0.94)	0.041
Spontaneous myocardial infarction	4 (1.4%)	10 (5.0%)	0.39 (0.12-1.23)	0.108
Repeat revascularization	10 (4.3%)	16 (9.0%)	0.61 (0.28-1.34)	0.216
Infarct-related artery	4 (2.2%)	8 (5.0%)	0.49 (0.15-1.61)	0.237
Non-infarct related artery	7 (2.6%)	12 (5.7%)	0.56 (0.22-1.43)	0.230
Definite stent thrombosis	0 (0.0%)	1 (0.4%)	NA	NA
Cerebrovascular accident	4 (1.4%)	3 (1.1%)	1.30 (0.29-5.81)	0.730

Conclusions

- Among patients with AMI and multivessel disease, a strategy of selective PCI using FFR-guided decision making was superior to a strategy of routine PCI based on angiographic diameter stenosis for treatment of non-IRA lesions regarding a composite of death, MI, or repeat revascularization.

FLOWER MI vs FRAME AMI



STEMI

STEMI et NSTEMI

Table 3. Prespecified Clinical Outcomes at 1 Year.*

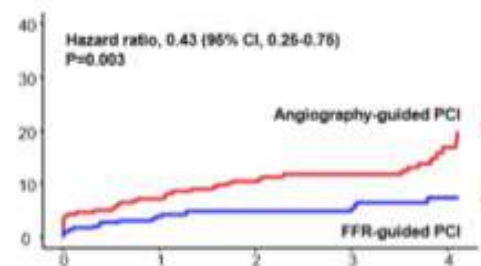
Outcomes	FFR-Guided Group (N=586)	Angiography-Guided Group (N=577)	Hazard Ratio or Difference (95% CI)†	P Value
Primary outcome				
Composite outcome — no. (%)‡	32 (5.5)	24 (4.2)	1.32 (0.78–2.23)	0.31
Death from any cause	9 (1.5)	10 (1.7)	0.89 (0.36–2.20)	
Nonfatal myocardial infarction§	18 (3.1)	10 (1.7)	1.77 (0.82–3.84)	
Unplanned hospitalization leading to urgent revascularization				
Secondary outcomes				
Key outcomes — no. (%)				
Stent thrombosis	4 (0.7)	6 (1.0)	0.65 (0.19–2.32)	
Any revascularization¶	38 (6.5)	26 (4.5)	1.45 (0.88–2.38)	
Hospitalization for heart failure	9 (1.5)	11 (1.9)	0.82 (0.34–1.98)	
Hospitalization for recurrent ischemia	32 (5.5)	19 (3.3)	1.68 (0.95–2.97)	
Any hospitalization in a cardiology department or service	68 (11.6)	46 (8.0)	1.49 (1.03–2.17)	

Flower MI
1 year follow up

Clinical outcomes

End Point	FFR-guided PCI (N=284)	Angiography-guided PCI (N=278)	Hazard Ratio (95% CI)	P Value
Death, myocardial infarction, and repeat revascularization	18 (7.4%)	40 (19.7%)	0.43 (0.25-0.75)	0.003
All-cause Death	5 (2.1%)	16 (8.5%)	0.26 (0.10-0.65)	0.020
Cardiac death	3 (1.4%)	15 (8.2%)	0.17 (0.05-0.54)	0.010
Myocardial infarction		21 (8.9%)	0.32 (0.13-0.75)	0.009
Procedure-related myocardial infarction		11 (4.0%)	0.26 (0.07-0.94)	0.041
Spontaneous myocardial infarction				
Repeat revascularization				
Infarct-related artery				
Non-infarct related artery				
Definite stent thrombosis				
Cerebrovascular accident				

ESC 2022



FRAME AMI
4 year follow up

Take « practical » home messages

- FFR safe and reliable in ACS: microvascular damage is a regional problem
- Complete revascularization improves outcomes in ACS with multivessel disease
- FFR superior to angio guided revascularization in ACS (non culprit lesions) and CCS
- Immediate or defer complete revascularisation is possible and safe in ACS