

# Epicardial & Microvascular assessment in ACS (culprit & non-culprit)



Madrid Microcirculation  
Meeting - 4th Edition -



Hospital Universitario  
de La Princesa

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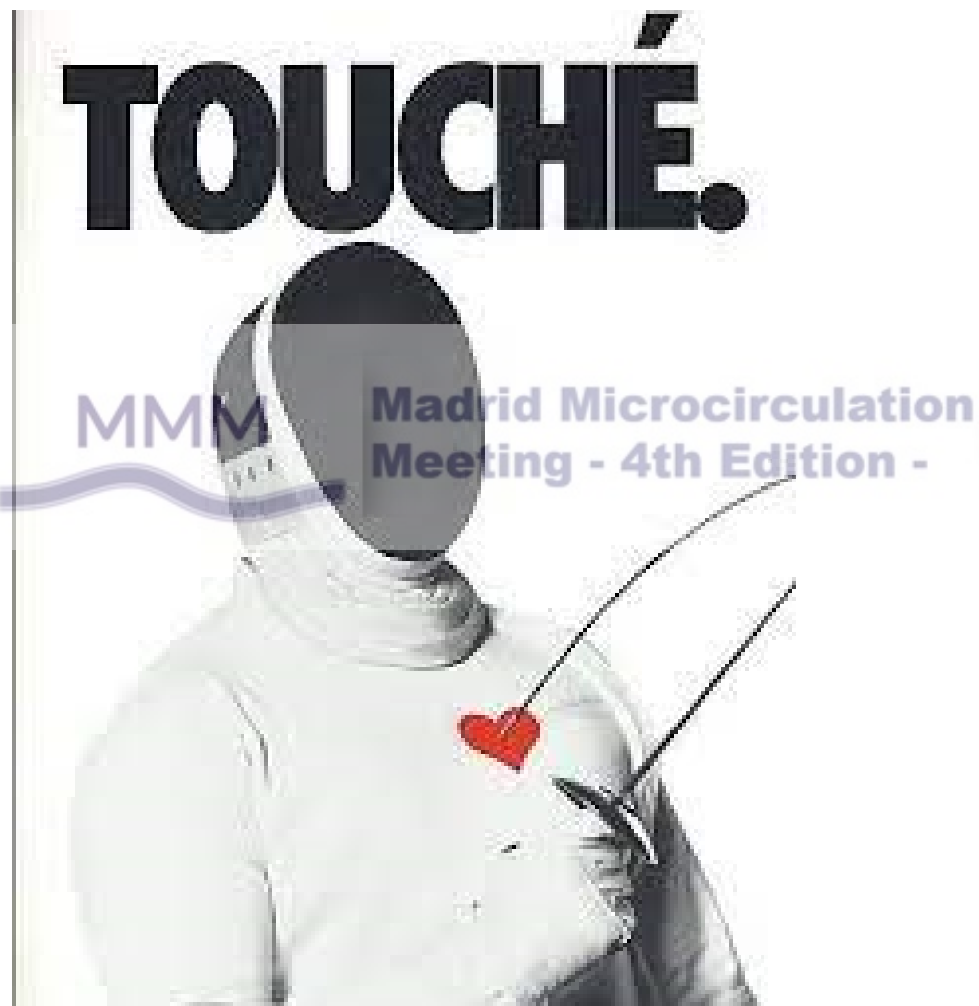


We'll  
change all  
the pipes

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# WE NO LONGER NEED PRESSUREWIRES IN ACS



## Multivessel disease in haemodynamically stable STEMI patients undergoing PPCI

Complete revascularization is recommended either during the index PCI procedure or within 45 days.<sup>508-511,531</sup>

I

A

It is recommended that PCI of the non-IRA is based on angiographic severity.<sup>511,524</sup>

I

B

Invasive epicardial functional assessment of non-culprit segments of the IRA is not recommended during the index procedure.

III

C

## Multivessel disease in haemodynamically stable NSTEMI-ACS patients undergoing PCI

In patients presenting with NSTEMI-ACS and MVD, complete revascularization should be considered, preferably during the index procedure.<sup>513,514</sup>

IIa

C

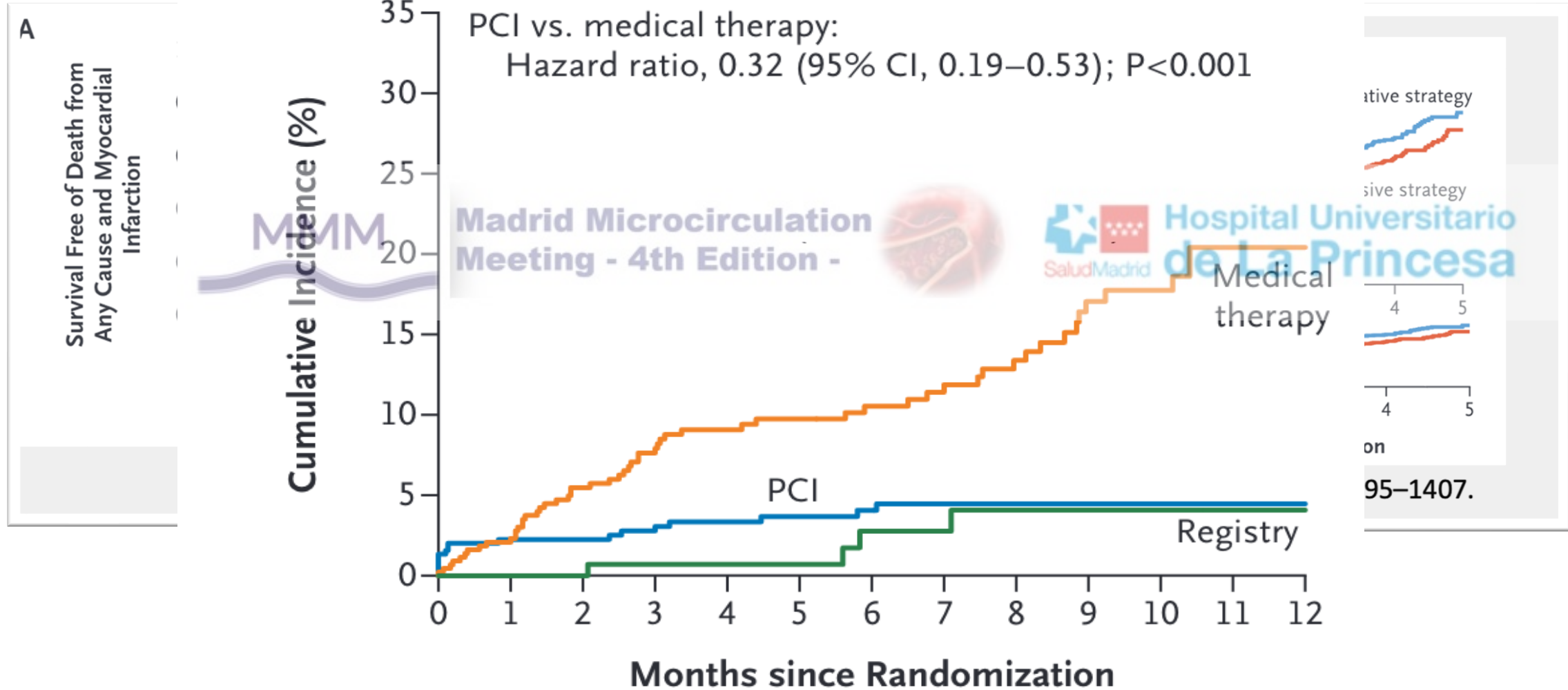
Functional invasive evaluation of non-IRA severity during the index procedure may be considered.<sup>518,527,528,532</sup>

IIb

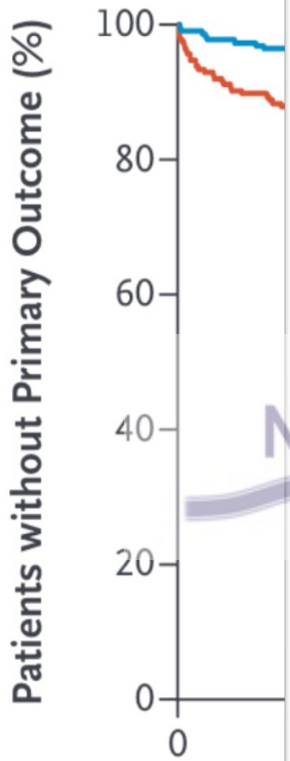
B

# WHY ARE PEOPLE SAYING THESE THINGS?

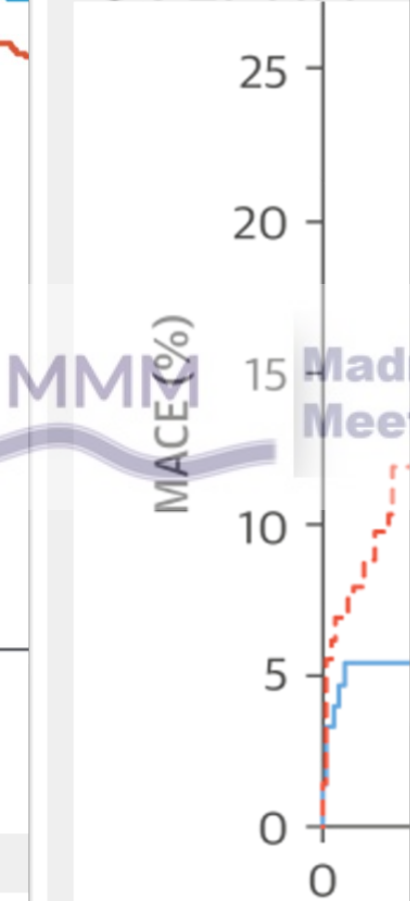
FAME II



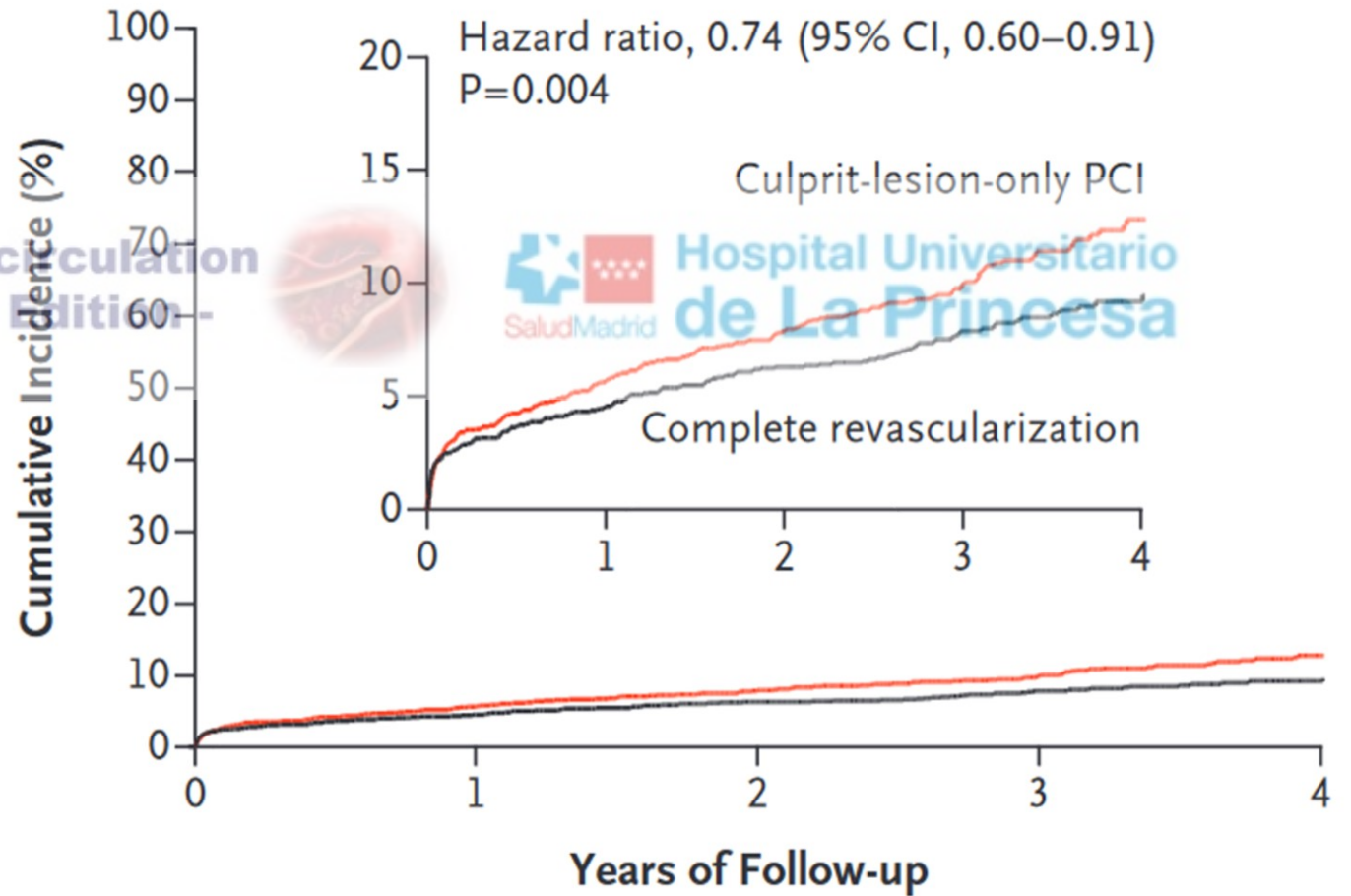
# PRAMI



# CVLPRIT



# COMPLETE



# A change of paradigm?

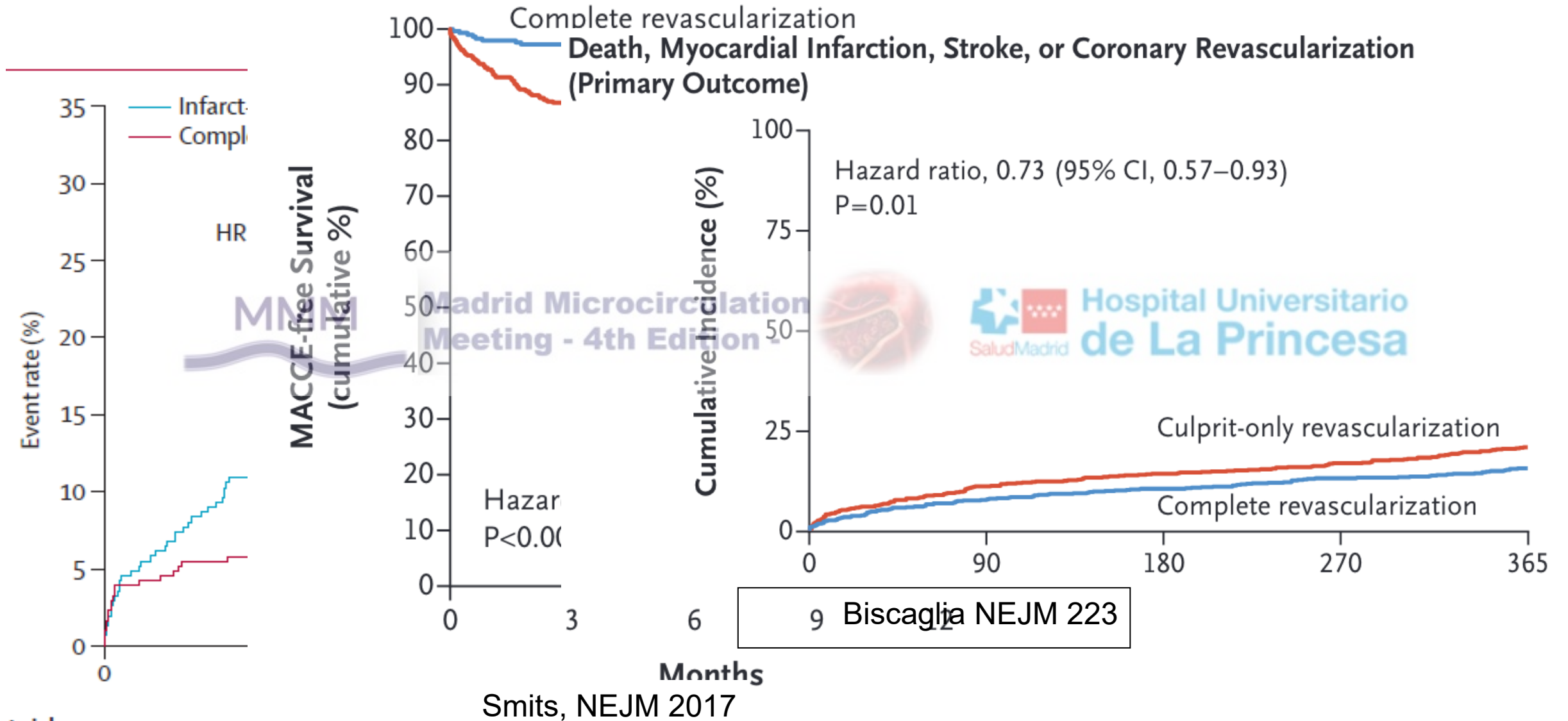


Myself, evaluating a 60% stenosis



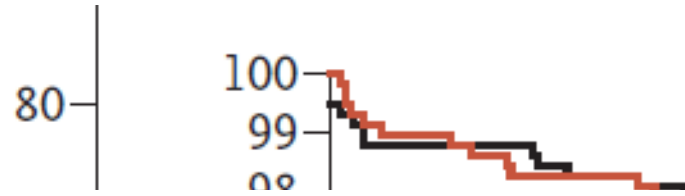
New protocol

# TRIALS WITH FFR ALSO DID WELL



Engstrom, Lancet 2015; 386: 665-671

# FLOWER-MI TRIAL



Variable	FFR-Guided Group (N=586)	Angiography-Guided Group (N=577)
Lesions with FFR		
≤0.80 — no./total no. (%)	460/826 (55.7)	NA
>0.80 — no./total no. (%)	366/826 (44.3)	NA
Lesions with PCI — no./total no. of lesions (%)	546/980 (55.7)	806/891 (90.5)
Patients with ≥1 PCI — no./total no. of patients (%)	388/586 (66.2)	560/577 (97.1)

MMM

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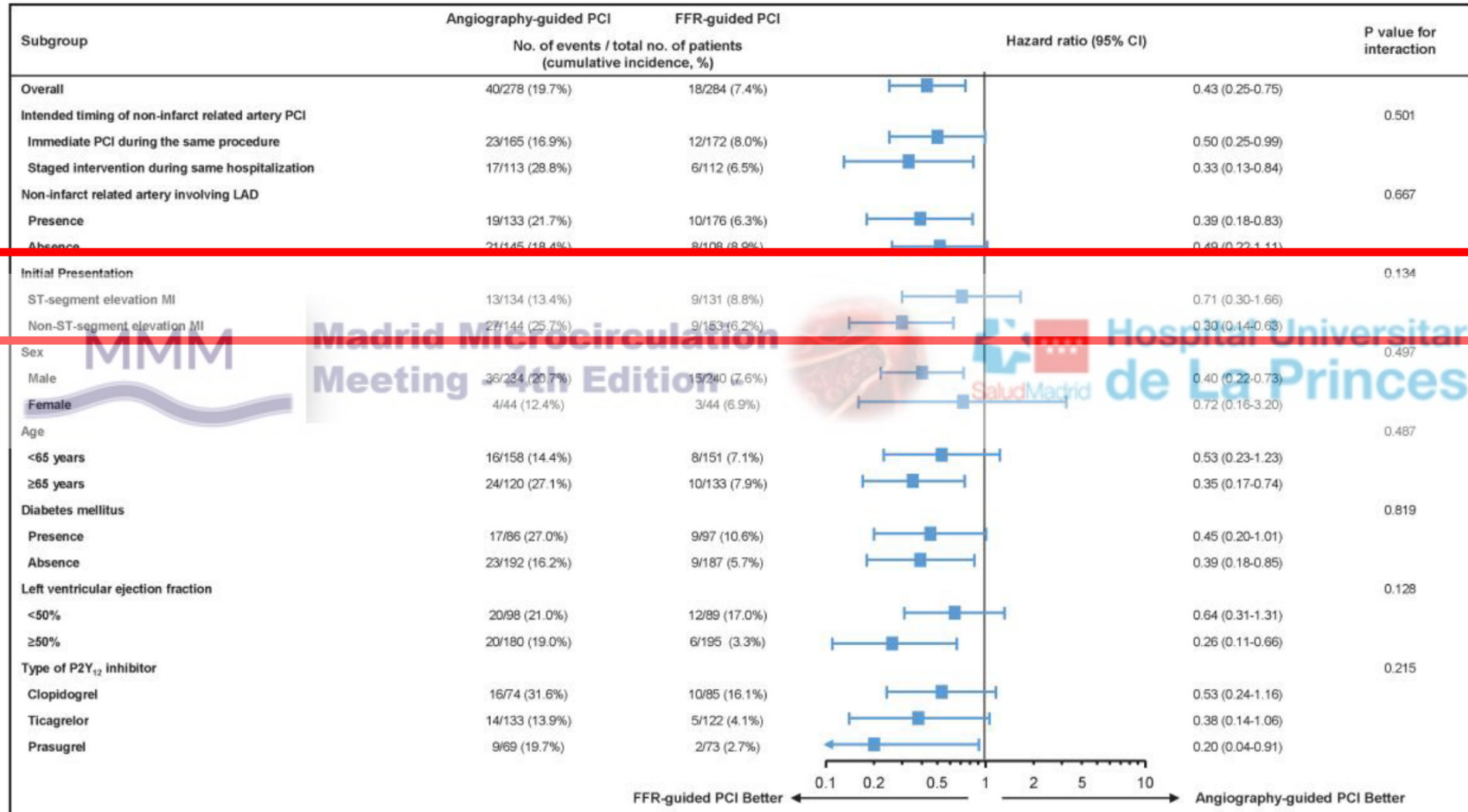


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# FRAME-MI TRIAL

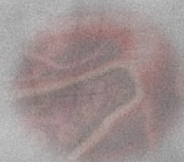


Nombre des-identificado  
Coronariografía 15 cps Media  
Serie 6  
Imagen 44 / 1  
29-Nov-2023, 11:01

Nombre des-identificado  
Coronariografía 15 cps Media  
Serie 2  
Imagen 46 / 1  
29-Nov-2023, 11:02



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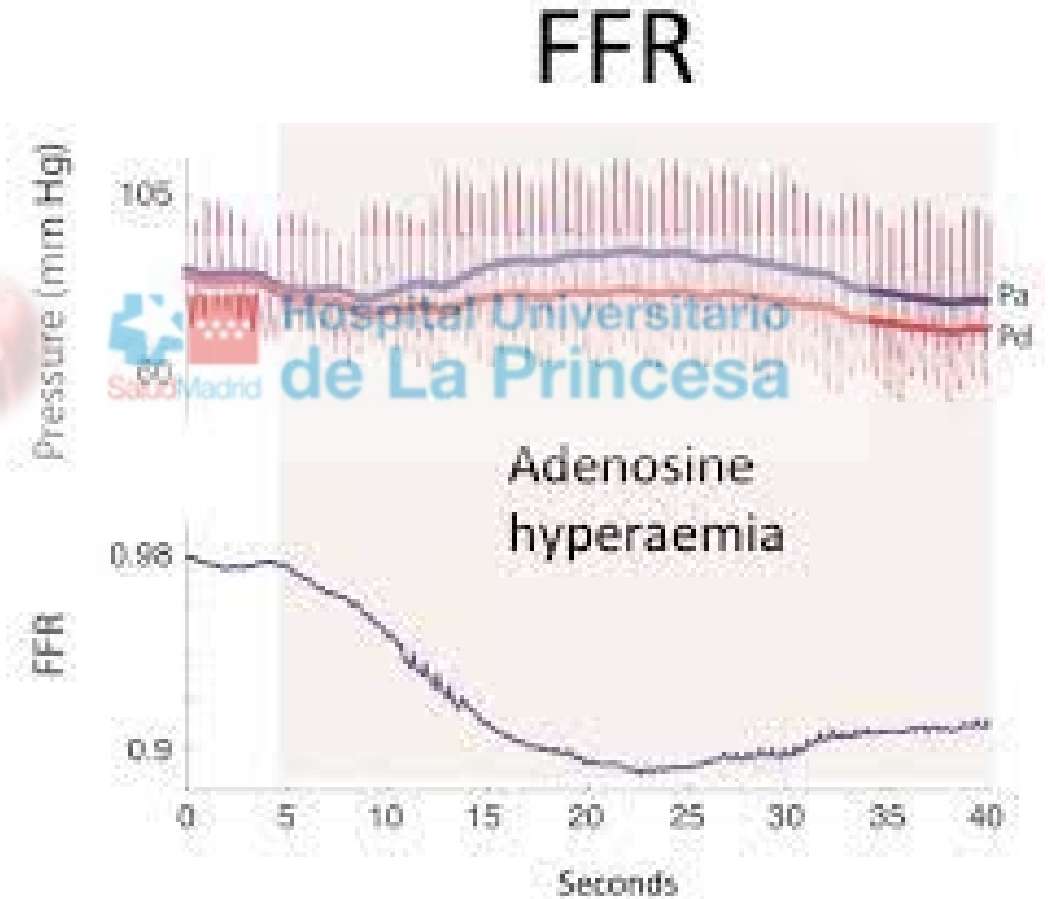
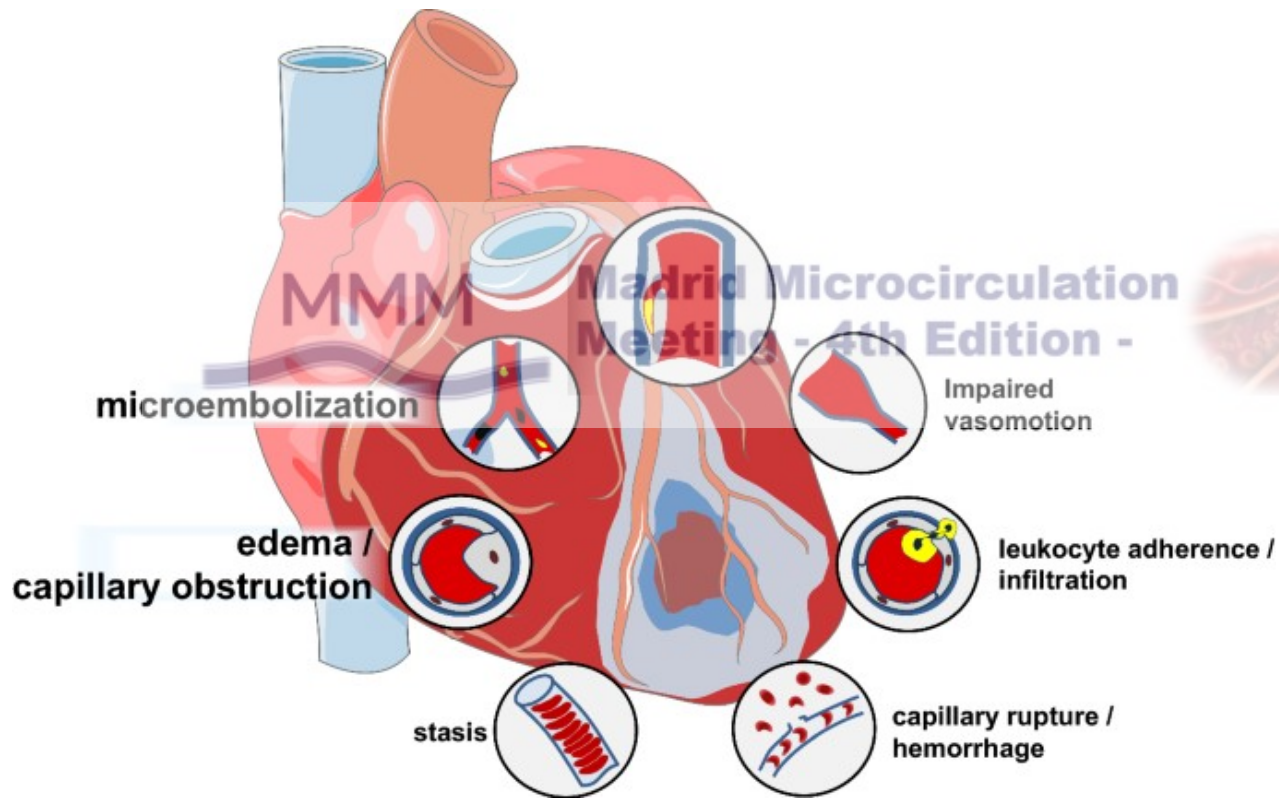


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DFI 109 cm  
FD 22 cm  
OAI 37°  
CAUD 2°

DFI 118 cm  
FD 22 cm  
OAI 3°  
CRAN 33°

# WHY DO PEOPLE MISTRUST FFR IN ACS?



# IMR IN THE CULPRIT

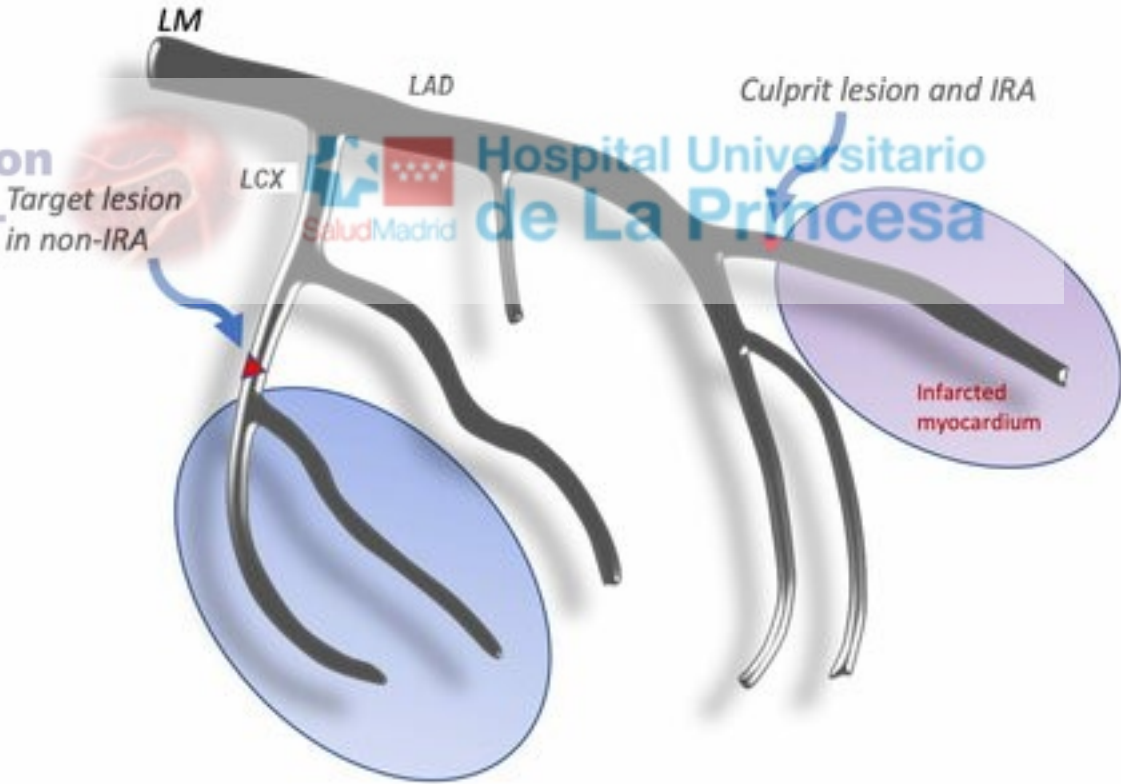
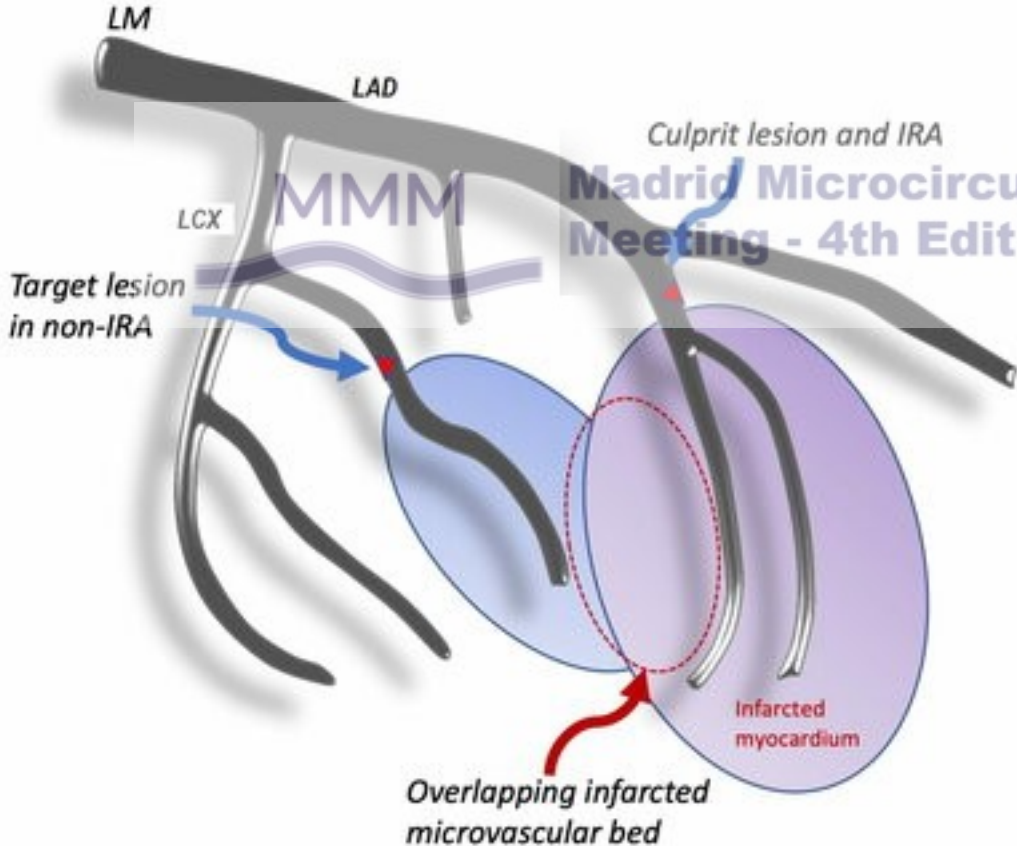
	Univariable		Multivariable		
	HR (95% CI)	P Value	HR (95% CI)	P Value	
Age (per 1 year increase)	1.05 (1.01-1.08)	0.009	1.03 (0.97-1.09)	0.32	
Male	0.65 (0.29-1.47)	0.30			
Diabetes	4.25 (2.03-8.91)	<0.001	5.99 (1.84-19.49)	0.003	
Hypertension	2.52 (1.19-5.34)	0.016	1.43 (0.40-5.07)	0.58	
Current smoker	0.74 (0.35-1.54)	0.42			
Previous MI	5.66 (2.04-15.74)	0.001	2.75 (0.40-19.08)	0.31	
Previous PCI	6.26 (2.25-17.37)	<0.001	2.30 (0.29-18.35)	0.43	
Previous stroke	4.88 (1.13-21.14)	0.034	1.93 (0.21-18.01)	0.56	
Culprit occlusion: LMCA or proximal LAD	1.58 (0.72-3.45)	0.25			4.9%
TIMI flow grade (post-PCI)	0.67 (0.28-1.62)	0.37			
IMR (per 10 increase)	1.12 (1.06-1.18)	<0.001	1.13 (1.03-1.25)	0.012	2.2%
CFR (per 0.1 increase)	0.81 (0.73-0.90)	<0.001	0.93 (0.80-1.07)	0.31	
FFR (per 0.05 increase)	0.81 (0.67-0.98)	0.03	0.93 (0.64-1.35)	0.70	
LVEF (per 5% increase)	0.79 (0.59-1.05)	0.10			
Infarct size (per 5% LVM increase)	1.20 (0.97-1.49)	0.09			

Years since index procedure

# BUT WHAT ABOUT THE NON-CULPRIT

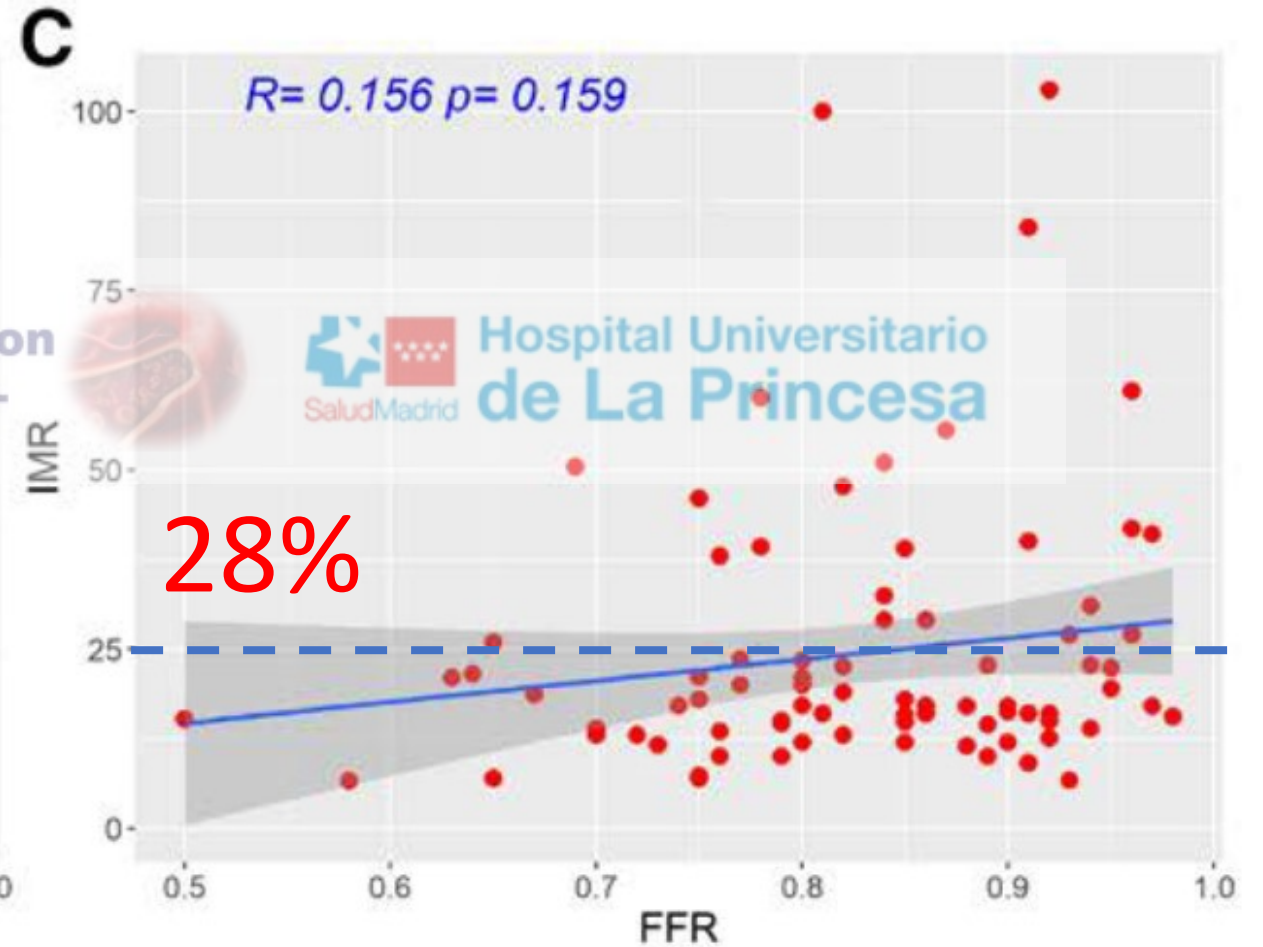
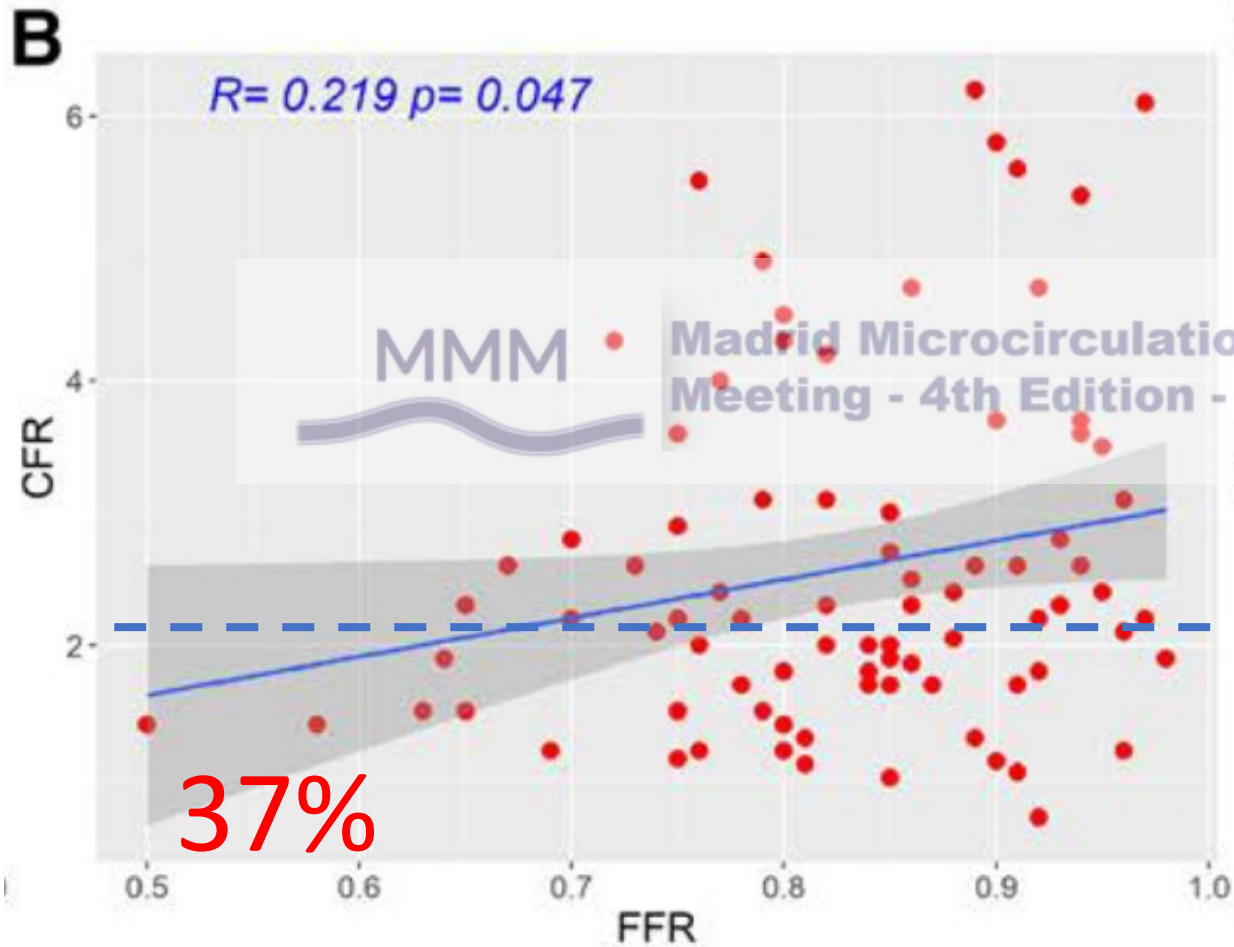
Non-IRA assessment with FFR is unreliable

Non-IRA assessment with FFR likely reliable

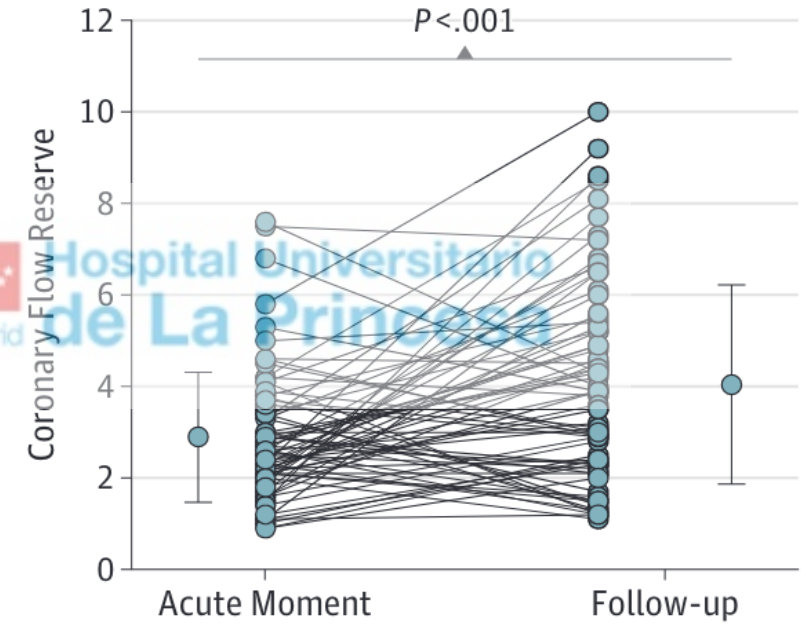
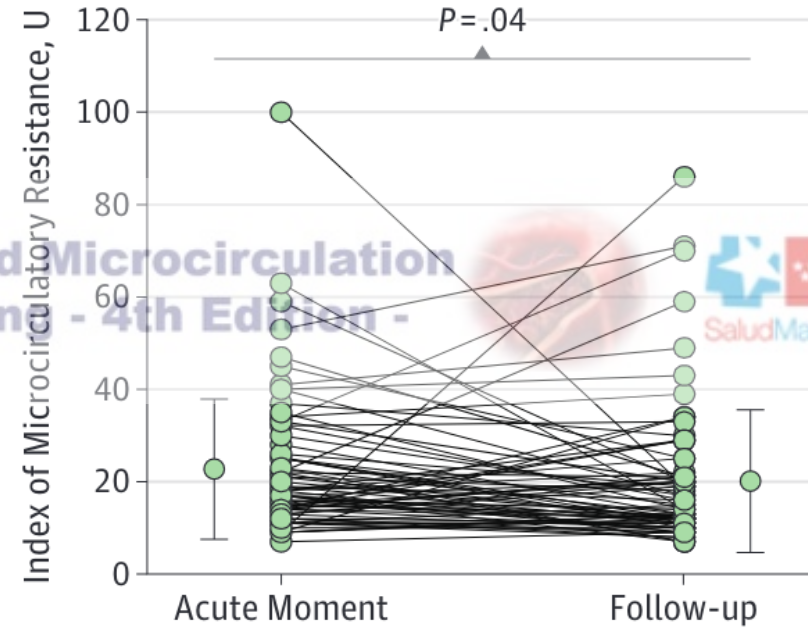
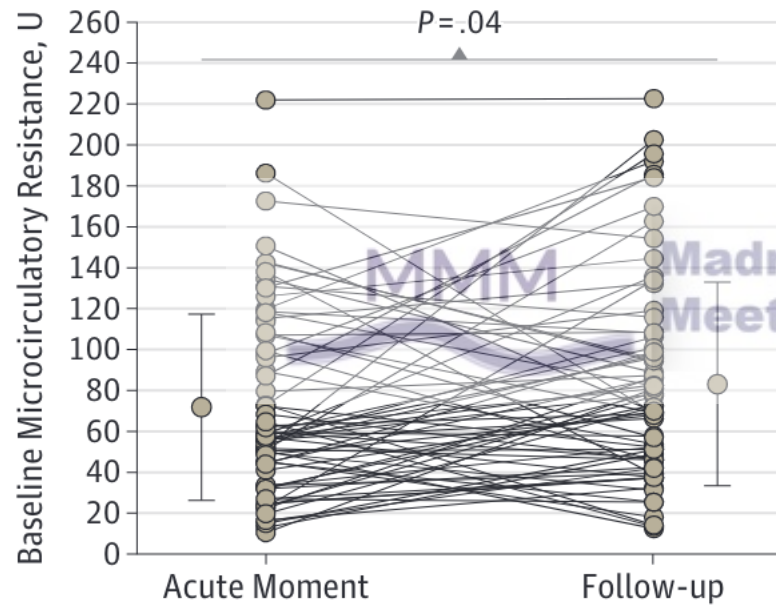


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# INDEED, THERE IS CMD IN THE NCA

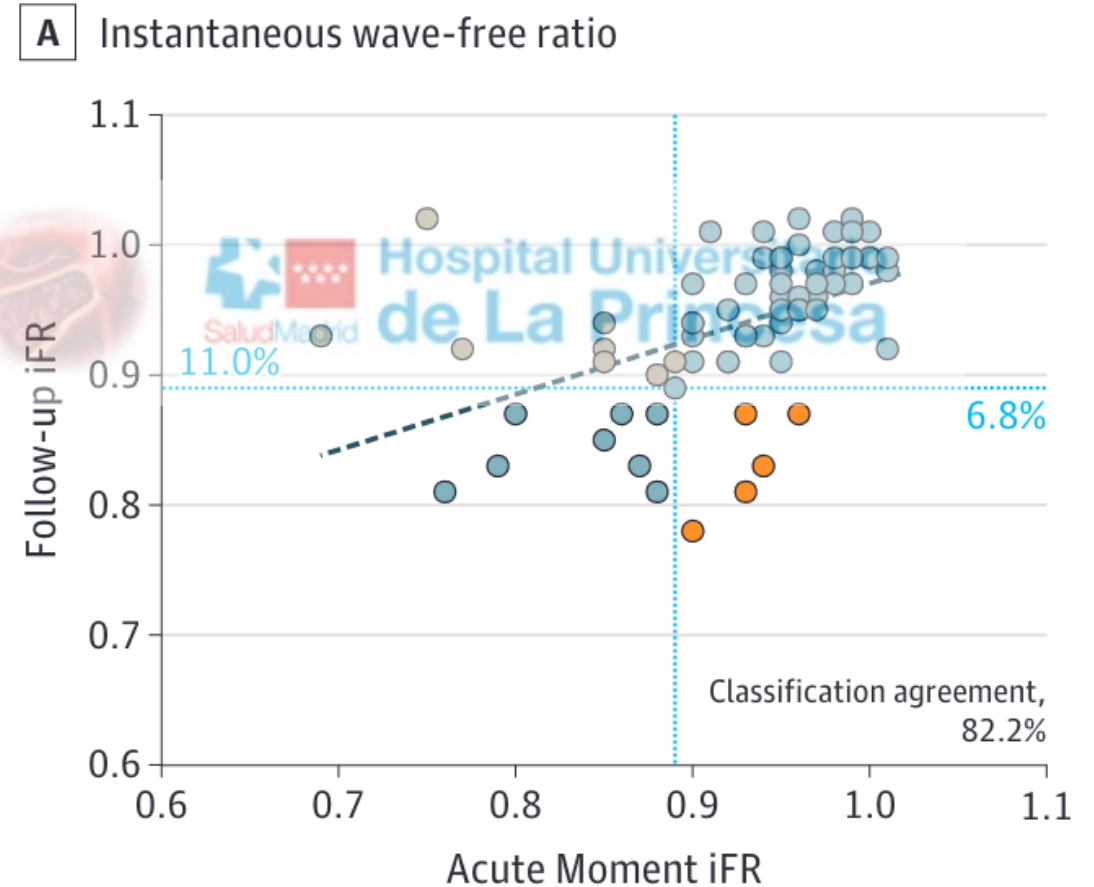
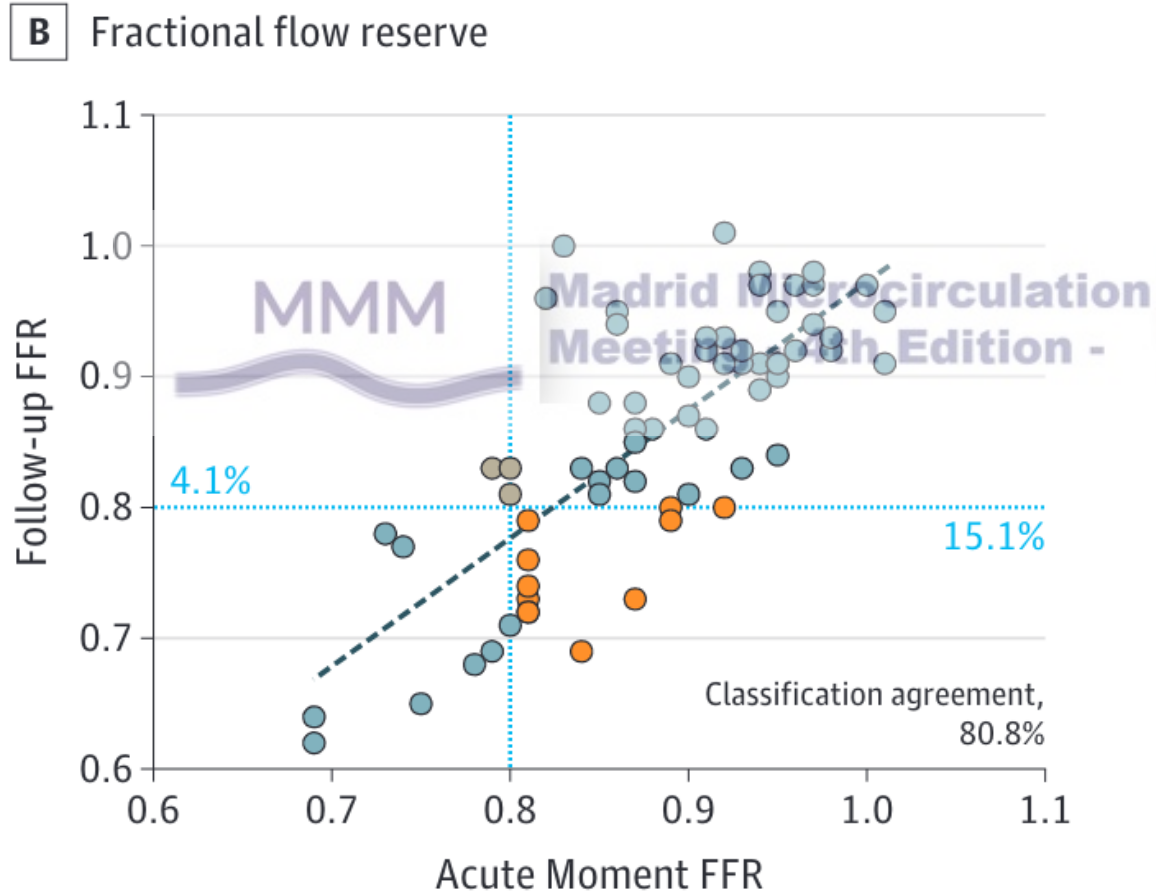


# IN SOME CASES, DYSFUNCTION IS TRANSIENT



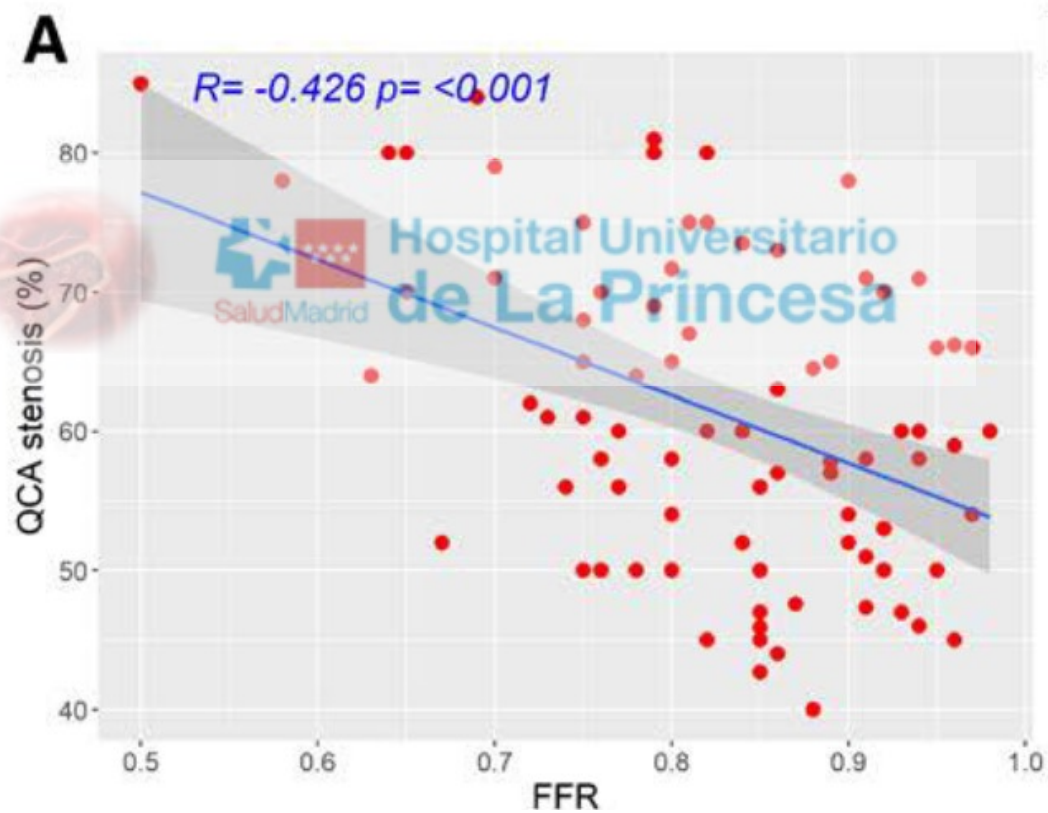
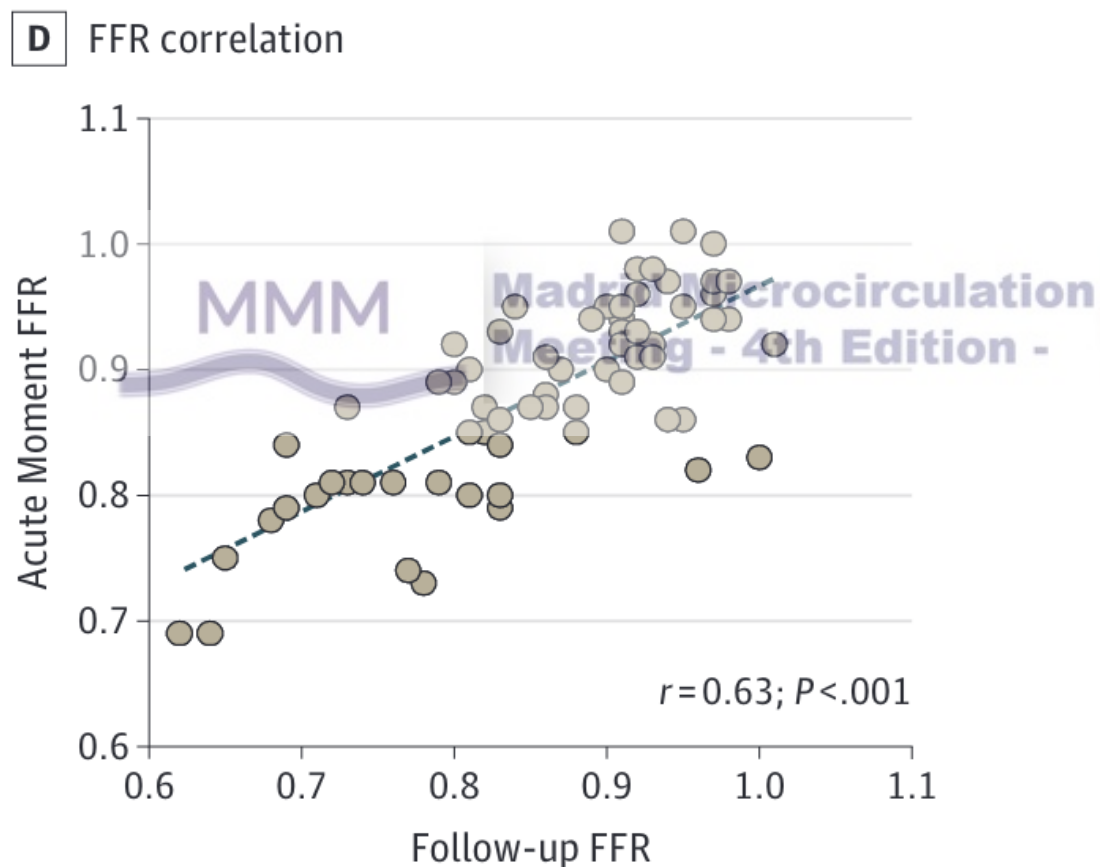
# FFR HAS A SLIGHT IMPRECISION

# AND SO DOES IFR





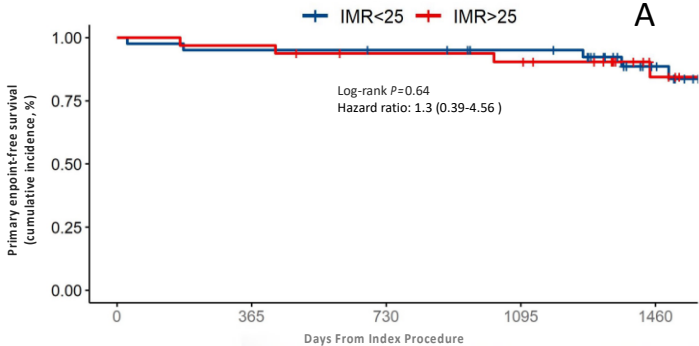
# Does imperfection of FFR make angio good?



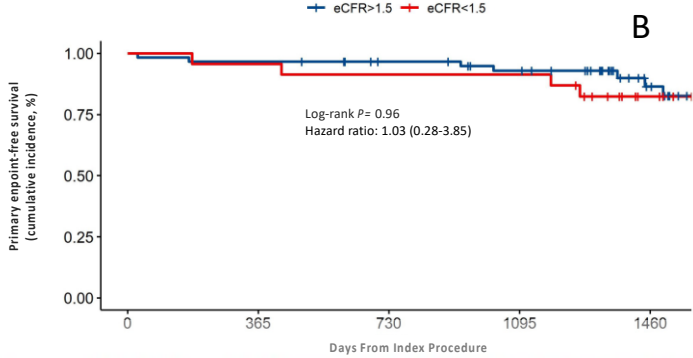
van der Hoeven NW et al. *JAMA Cardiology*. 2019

Díez-Delhoyo Felipe et al. *Circulation: Cardiovascular Interventions*. 2019;12:e007257.

# PROGNOSIS AND CMD IN THE NCA

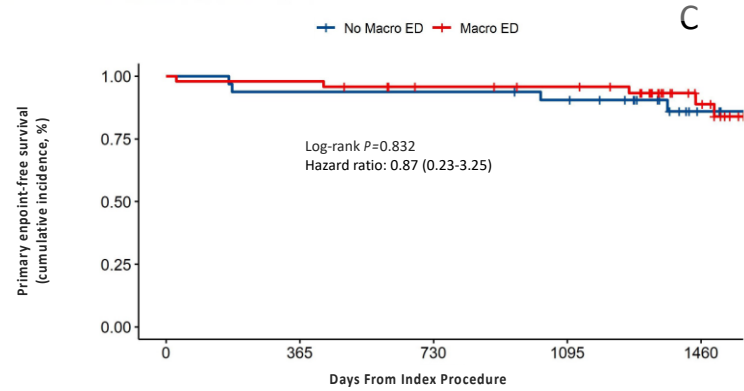


	0	365	730	1095	1460
IMR < 25	41	39	38	35	19
IMR > 25	32	31	28	27	14
	0	365	730	1095	1460

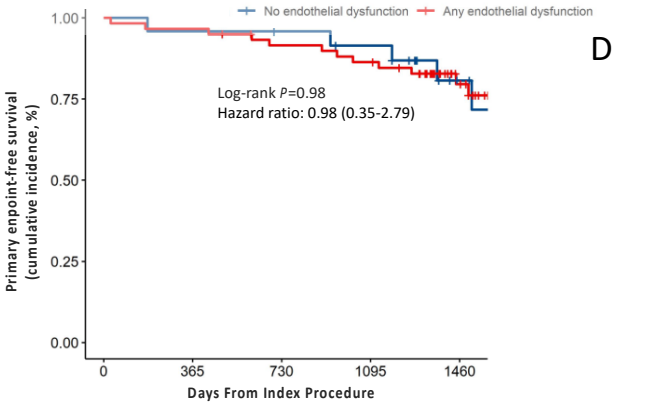


	0	365	730	1095	1460
eCFR > 1.5	60	58	53	48	24
eCFR < 1.5	23	22	21	21	11
	0	365	730	1095	1460

Primary endpoint-free survival (cumulative incidence, %)



	0	365	730	1095	1460
No Macro ED	32	30	30	28	14
Macro ED	48	47	42	40	20
	0	365	730	1095	1460



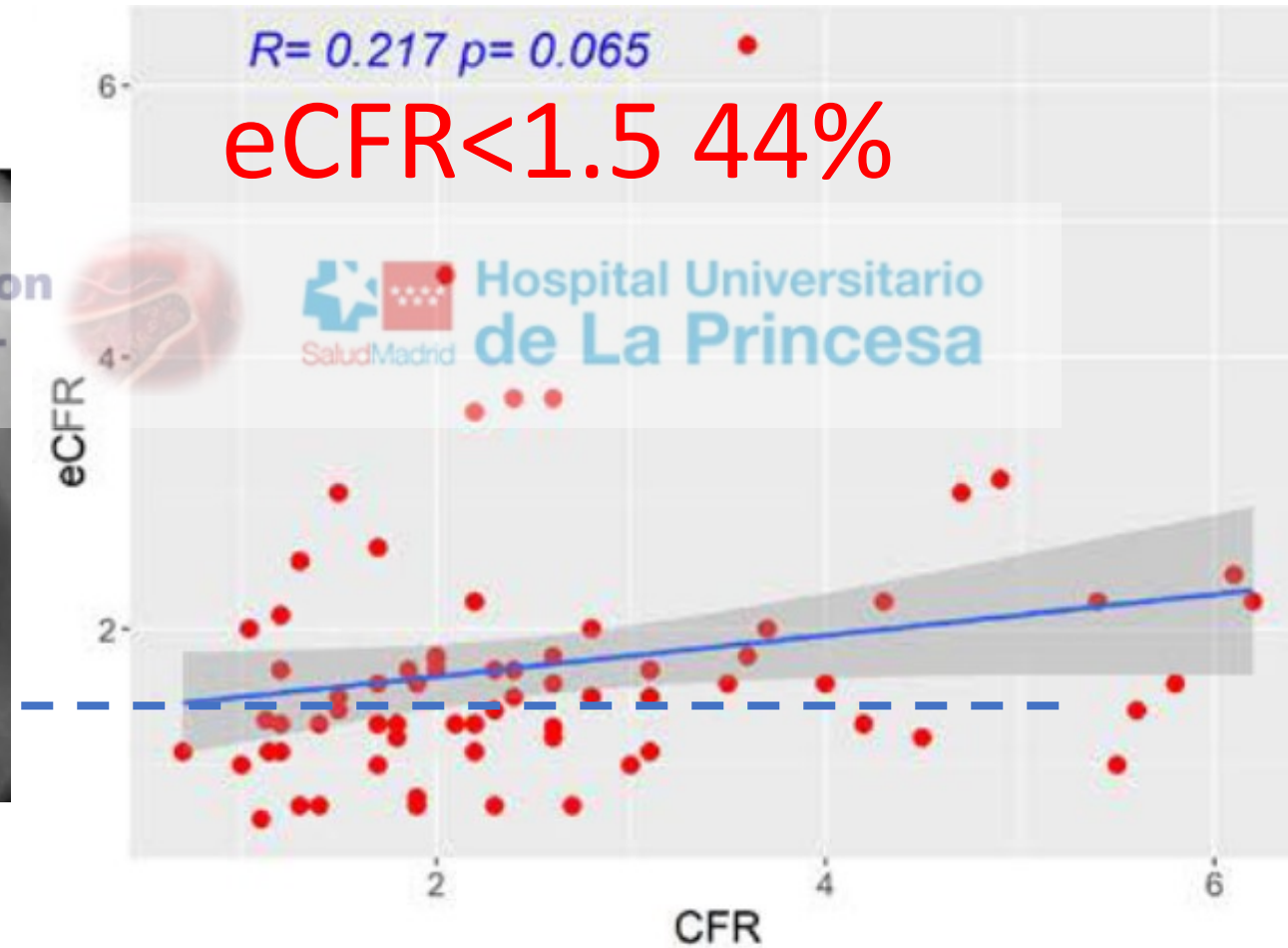
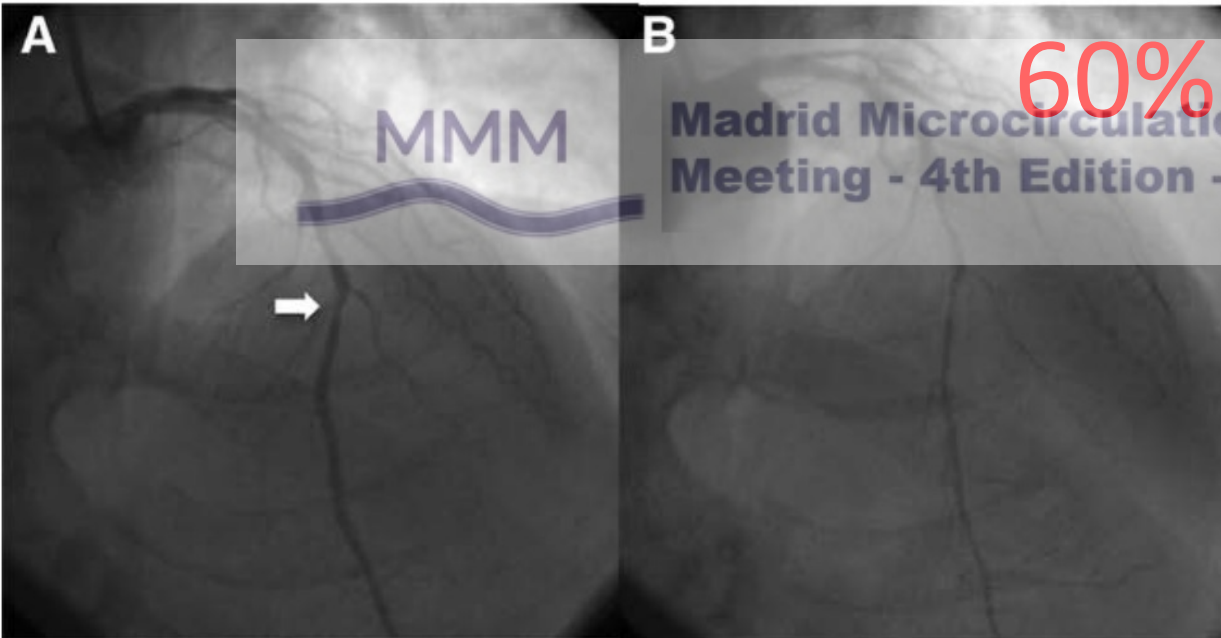
	0	365	730	1095	1460
No endothelial dysfunction	24	23	22	20	10
Any endothelial dysfunction	60	58	53	50	25
	0	365	730	1095	1460

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# ALSO, A LOT OF ENDOTHELIAL DYSFUNCTION

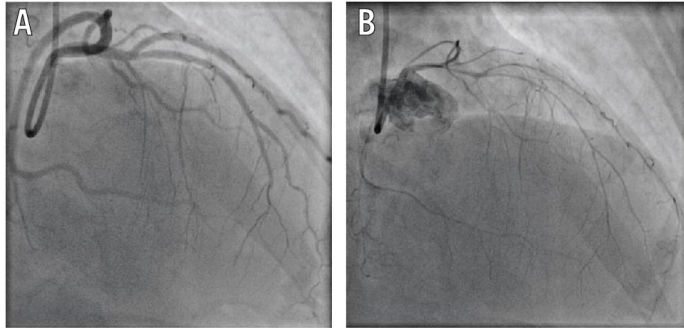


# MICROVASCULAR AND ENDOTHELIAL DYSFUNCTION CORRELATE WITH VULNERABILITY

75 ANOCA patients

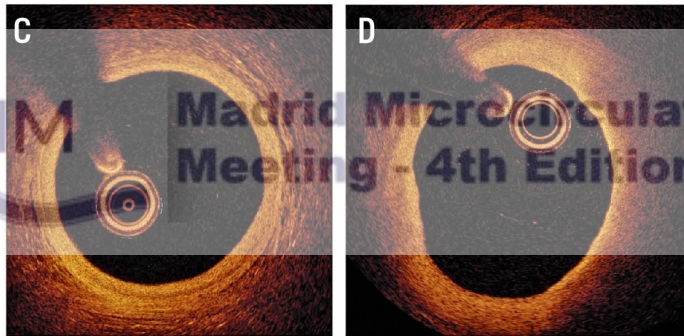
## Acetylcholine test

79%: vasospasm (ACH+)  
21%: negative test (ACH-)



## Optical coherence tomography

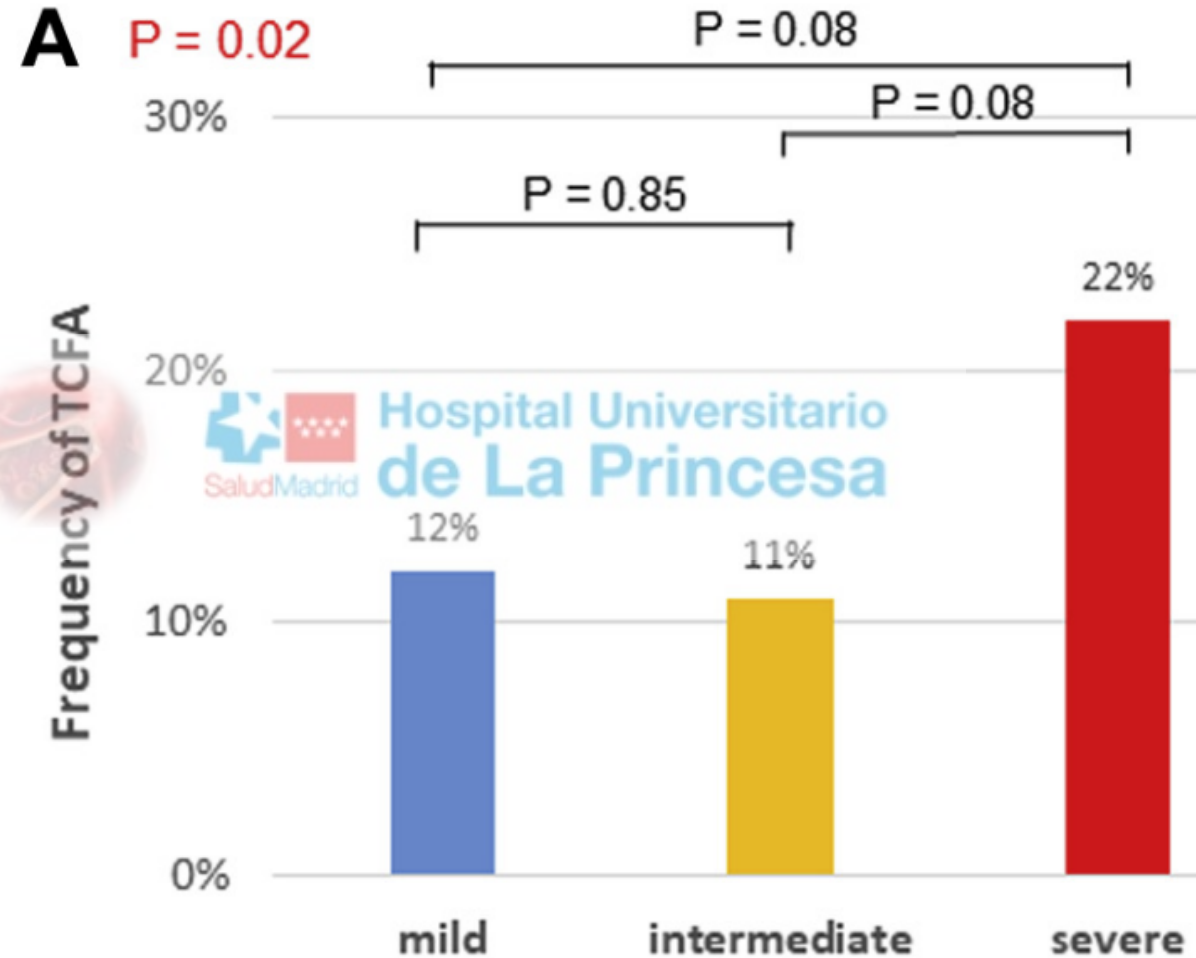
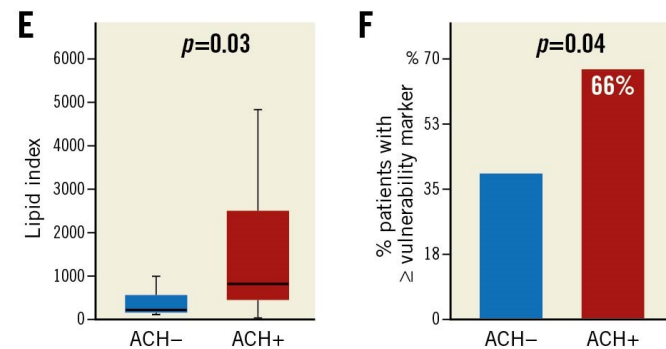
Lipid index  
Plaque vulnerability markers\*



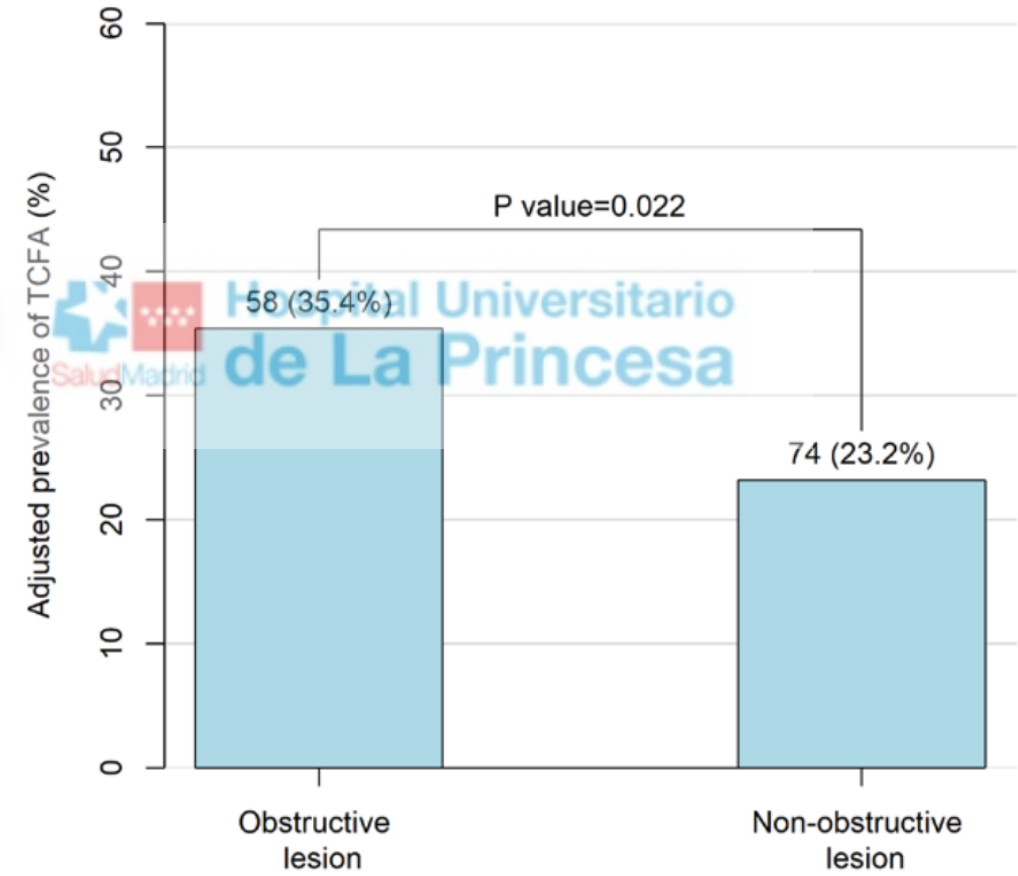
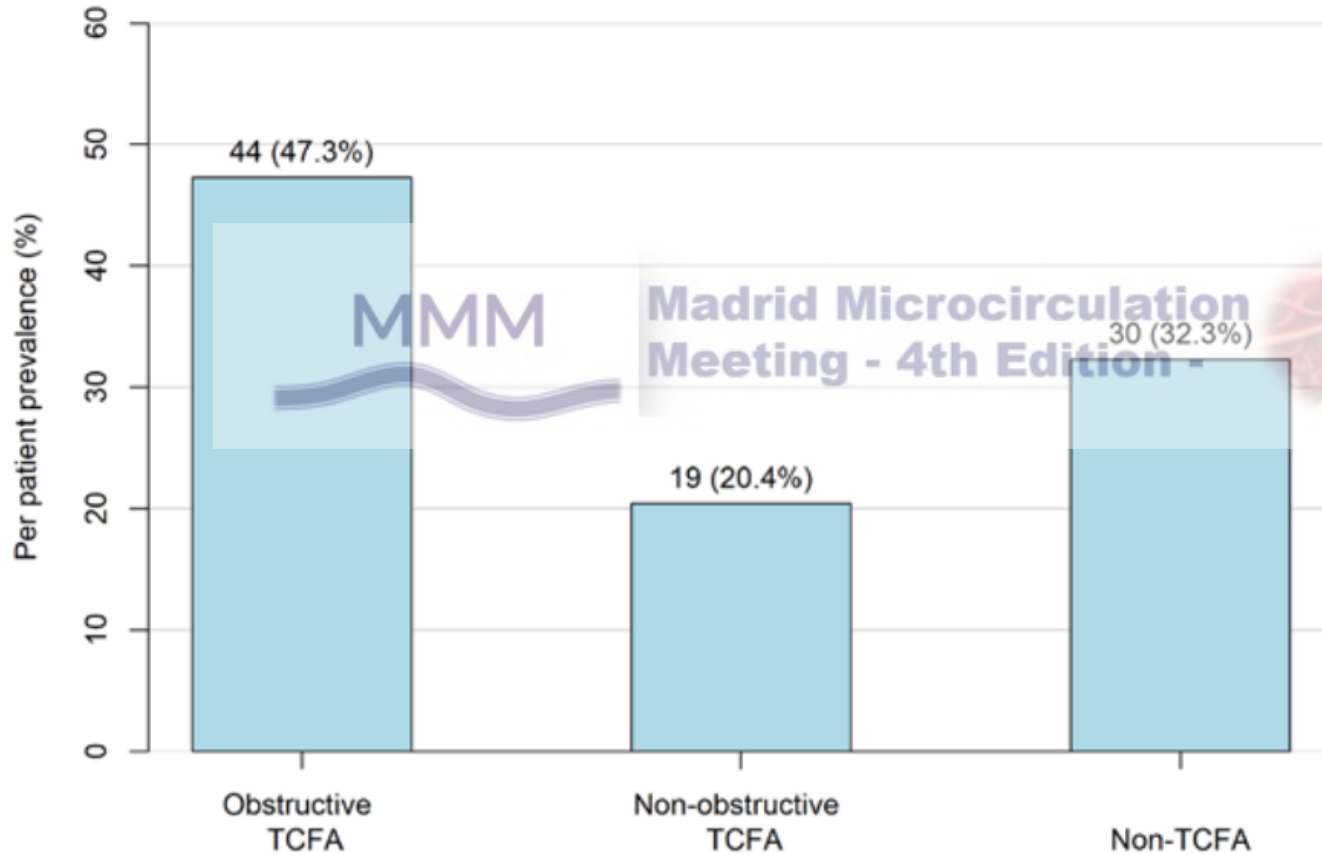
\*Vulnerability markers: thin-cap fibroatheroma, macrophage infiltration, neovascularisation, plaque erosion

## OCT findings in vasospasm

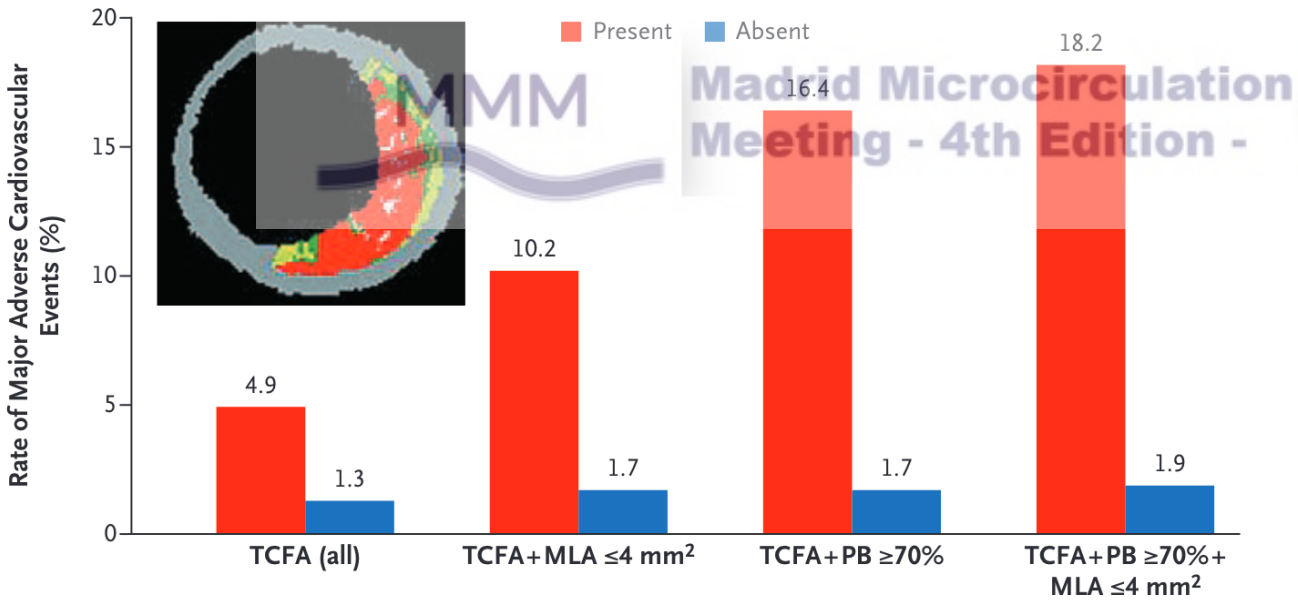
Higher lipid index  
Higher plaque vulnerability



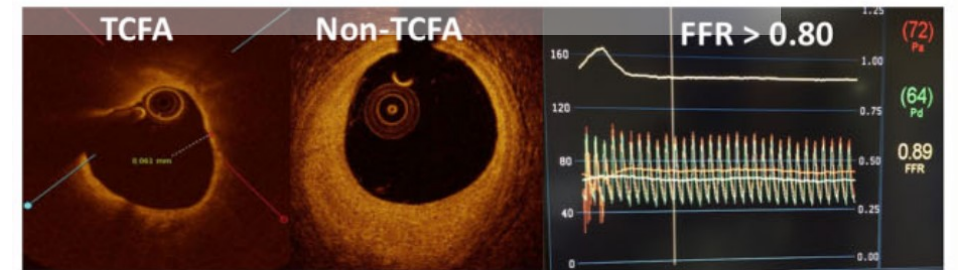
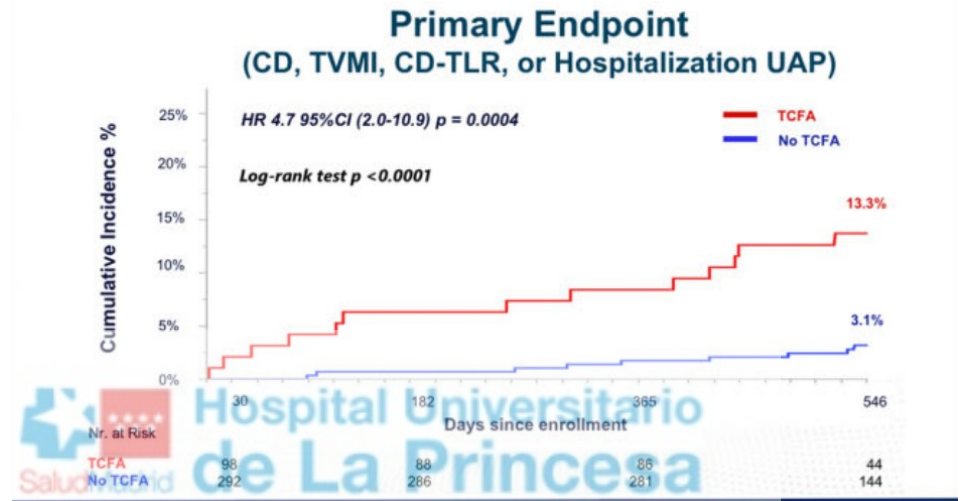
# AND VULNERABLE PLAQUE IS FREQUENT IN NCA



# PROSPECT

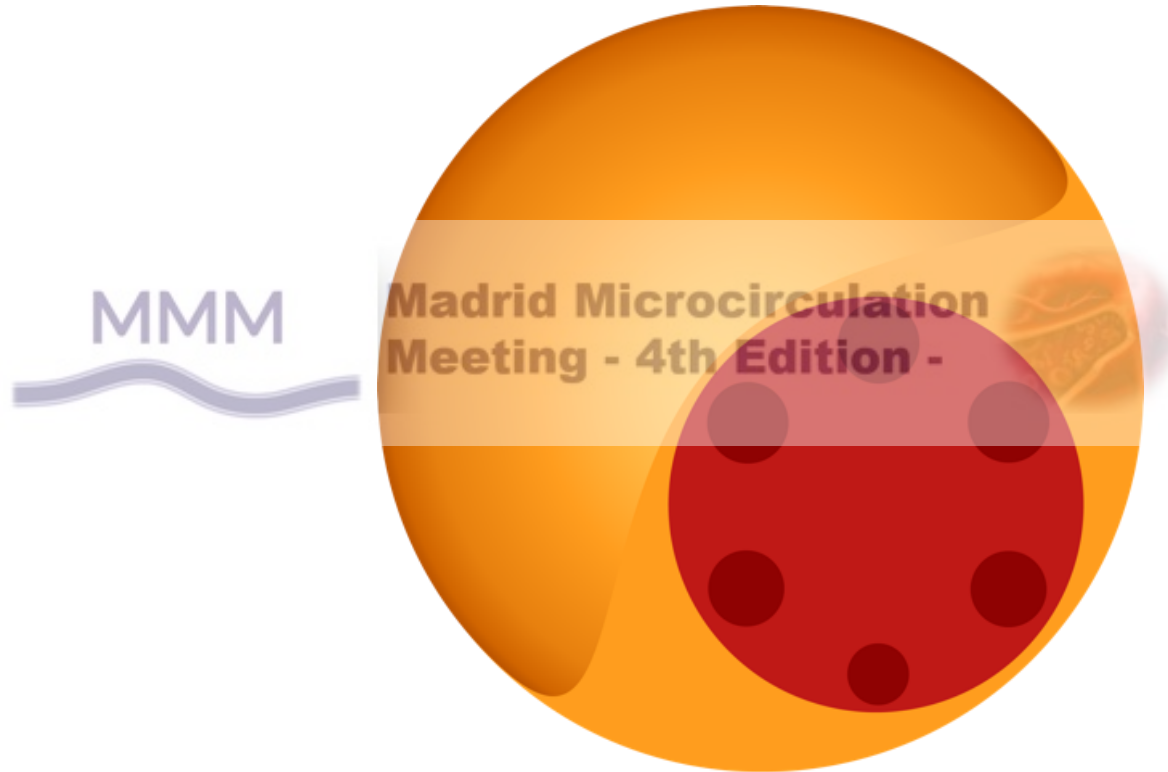


# COMBINE

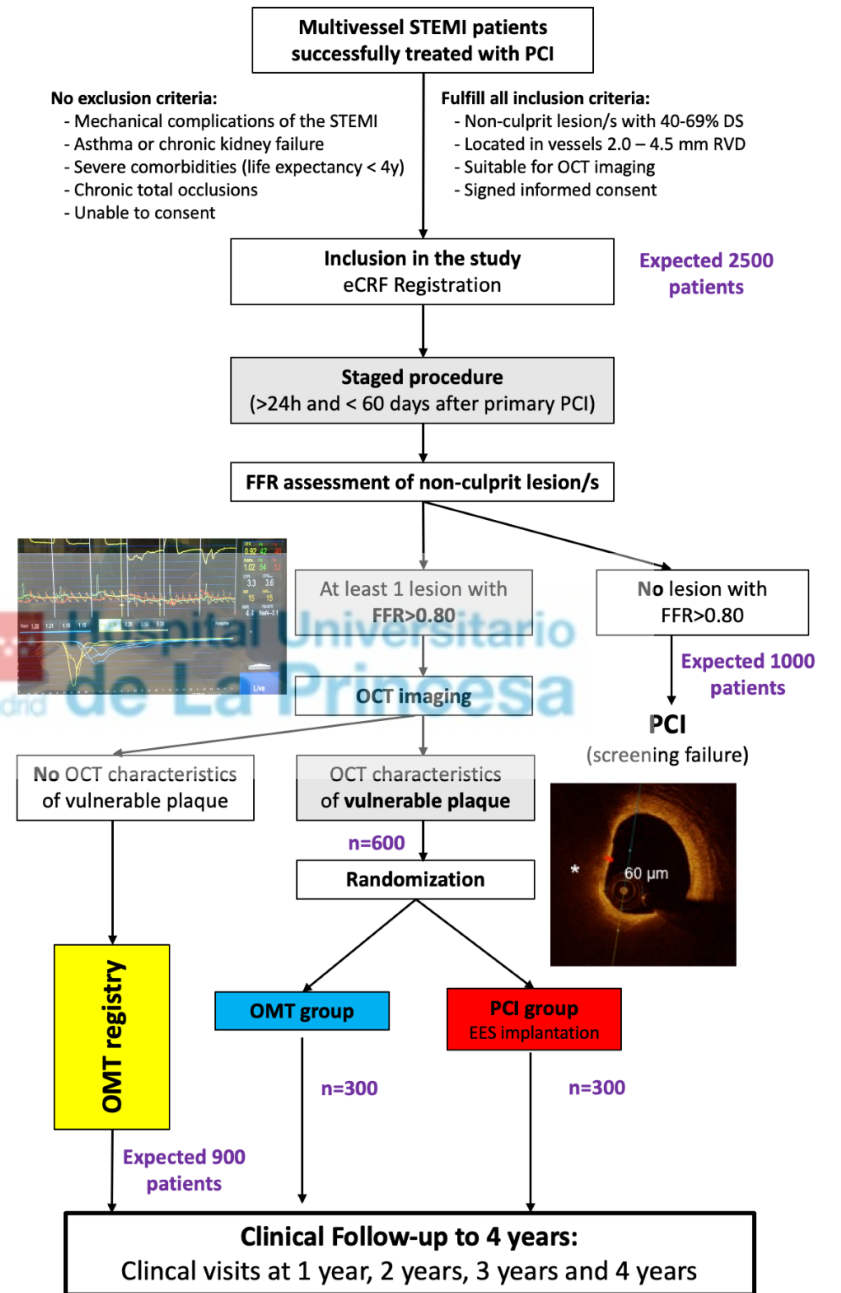


**Conclusions:** In DM patients, TCFA represents 25% of FFR-negative lesions and OCT-detected TCFA is associated with a 5-fold higher rate of adverse events despite the absence of ischemia

# So, is the vulnerable NCA THE REAL PROBLEM?



**Vulnerable Trial**  
Epic 28









MMM

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