MMM

Preliminary Program

Madrid Microcirculation Meeting

-4rth Edition-

Treatment of microvascular obstruction in STEMI

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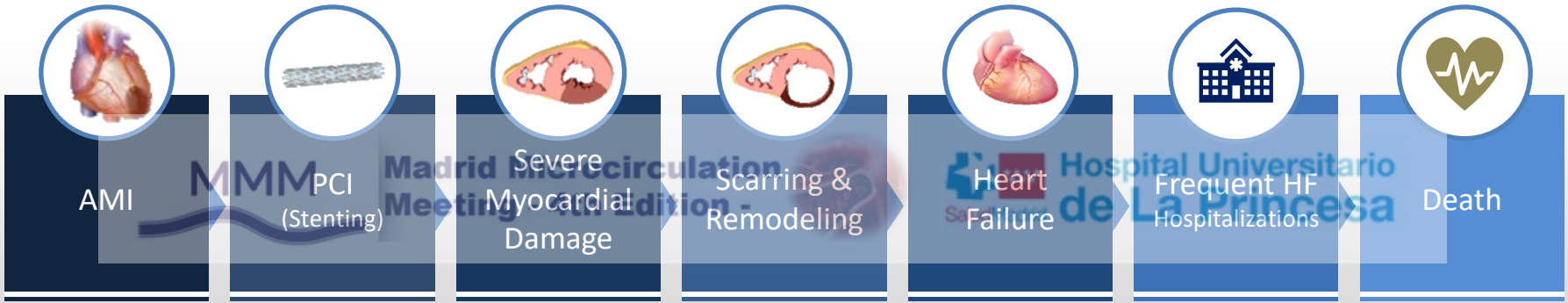
Disclosures/Conflicts of interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Consulting Fees/Honoraria	• Boston Scientific, Insight Lifetech, iVascular, Novonorddisk, Zoll,
• Speaker	• Abbott Vascular, General electric, Medis, Siemens
• Research grant to my institution	• Miracor

A need for treatment beyond reperfusion

Treatment success of Acute Myocardial Infarction (AMI) patients is at a **10-year plateau**

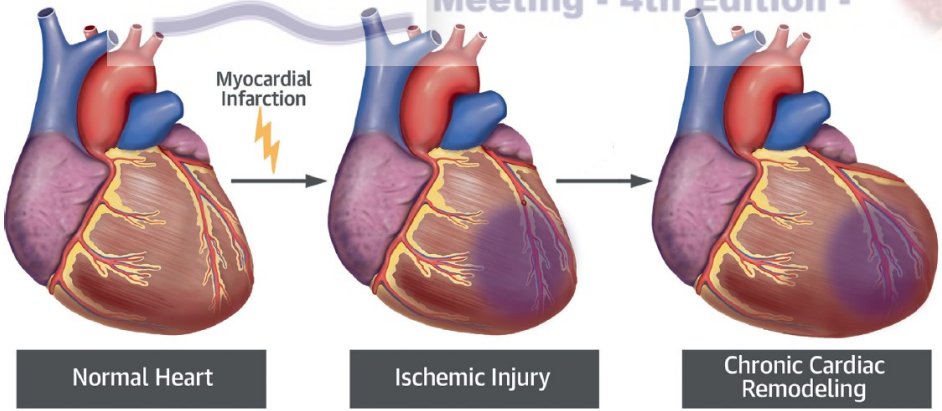


Up to 30% of patients develop HF within 1 year post-AMI, despite best practice PCI, due to **suboptimal myocardium salvage**

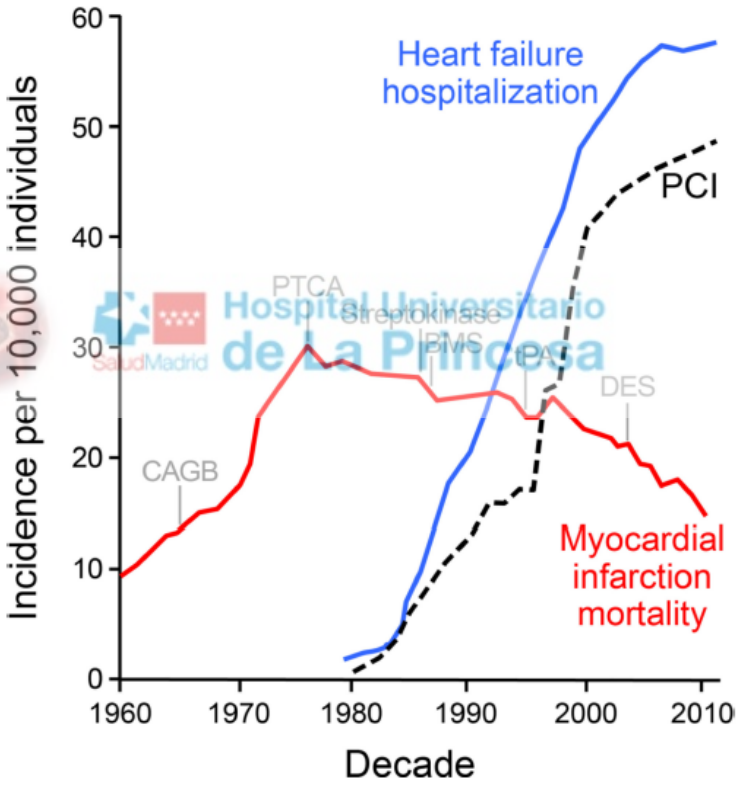
Jenča, D., et al., *Heart failure after myocardial infarction: incidence and predictors.* ESC Heart Failure, 2021. **8**(1): p. 222-237.

A paradox of medical success

Heart failure development is diagnosed in approximately 13% of patients at 30 days and 20–30% at 1 year after discharge for MI

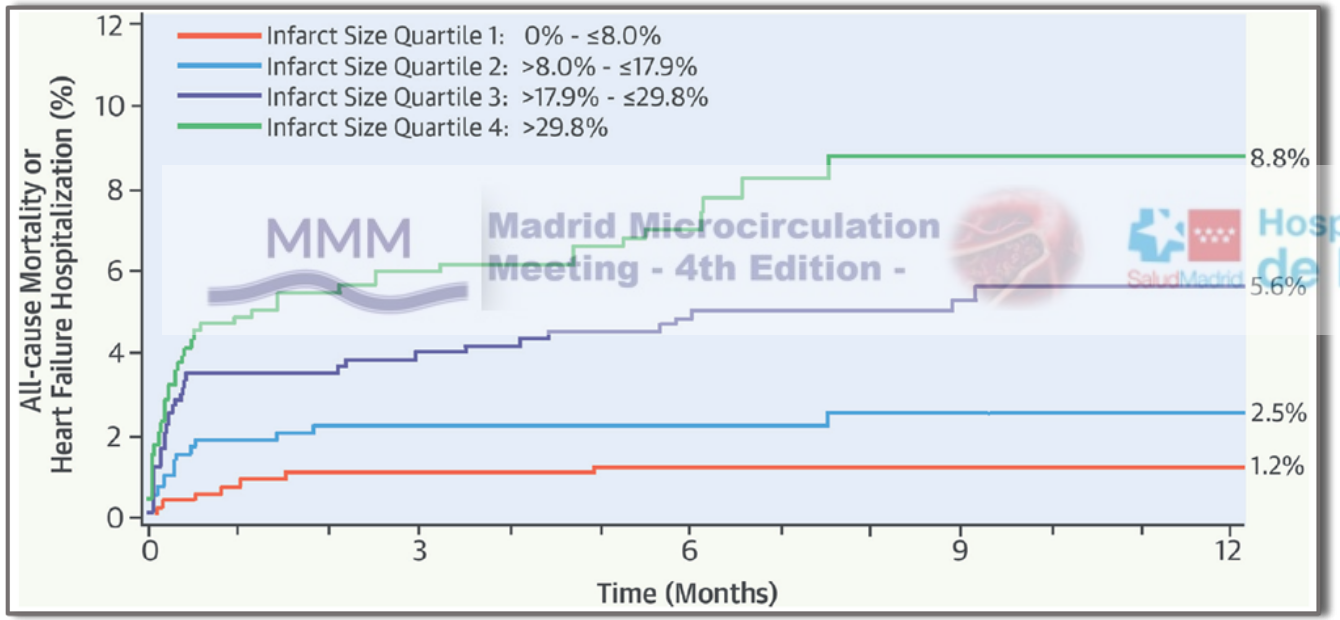


Sciarretta, S., et al. J Am Coll Cardiol, 2018. **71**(18): p. 1999-2010.



Terzic, A. and A. Behfar, Trends in Cardiovascular Medicine, 2016. **26**.

Infarct size is strongly associated with all-cause mortality & hospitalization for HF within 1 year

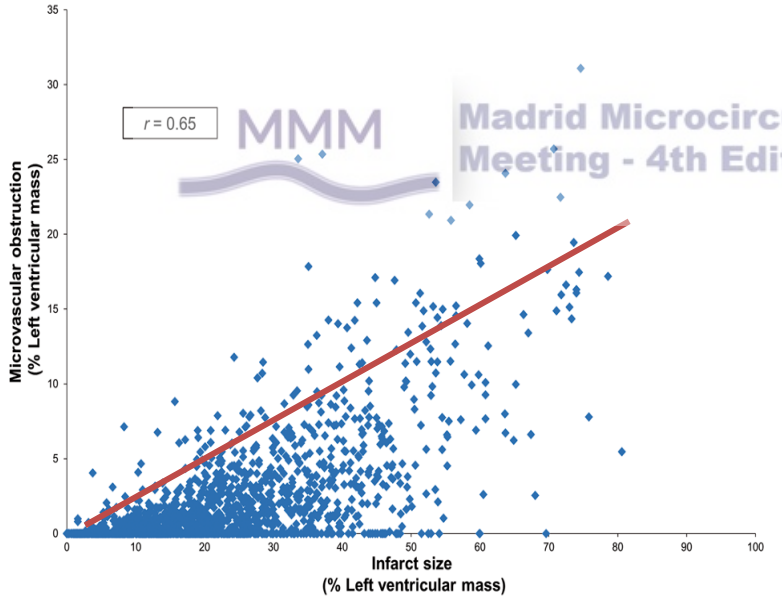


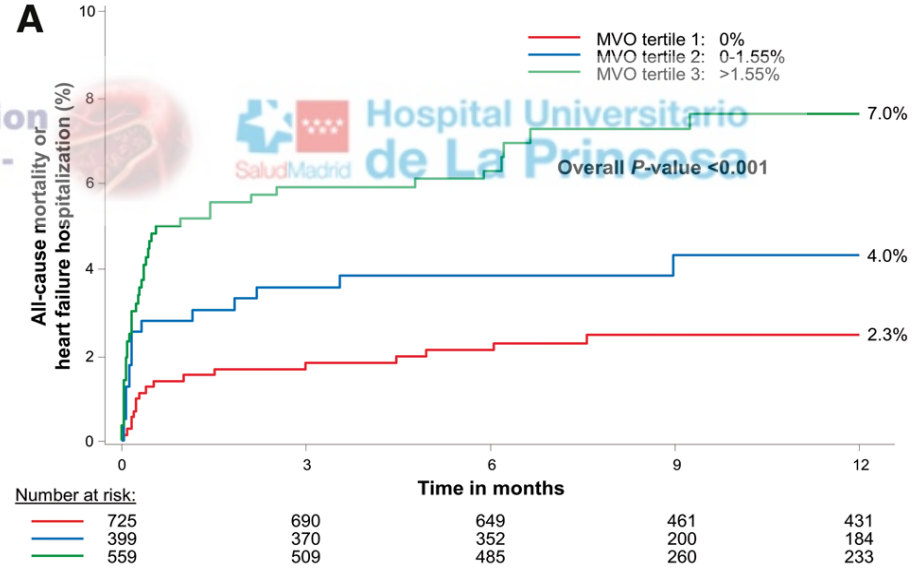
Every 5% increase in infarct size increases the risk of hospitalization for HF by 20%

Stone GW. *et al. J Am Coll Cardiol*. 2016;67:1674-83

Relationship between microvascular obstruction & clinical outcomes following primary PCI

- Patient level meta-analysis 7 RCTs PPCI, N = 1688, MVO assessed within 7 days by CMR.
- Every 1% increase in MVO increases the risk of 1-year all-cause mortality by 14% and 1-year HF hospitalization by 8%





de Waha, S., et al., Eur Heart J, 2017. **38**(47): p. 3502-3510.

Pharmacological strategies to reduce MVO

B-blockers	Adenosine	Statins	Atrial natriuretic peptide	IIb/IIIa Inhibitors
Inhibition of neutrophil-platelet coaggregation	↑ Coronary microvascular vasodilation ↓ Neutrophil adherence and neutrophil-mediated cellular damage ↓ Platelet aggregation ↓ Oxidative stress	↑ Microvascular dilation ↑ Endothelial function ↓ Platelet activation ↓ Inflammation ↓ Immune response	↓ Neutrophils-induced endothelial cytotoxity	Platelet inhibition

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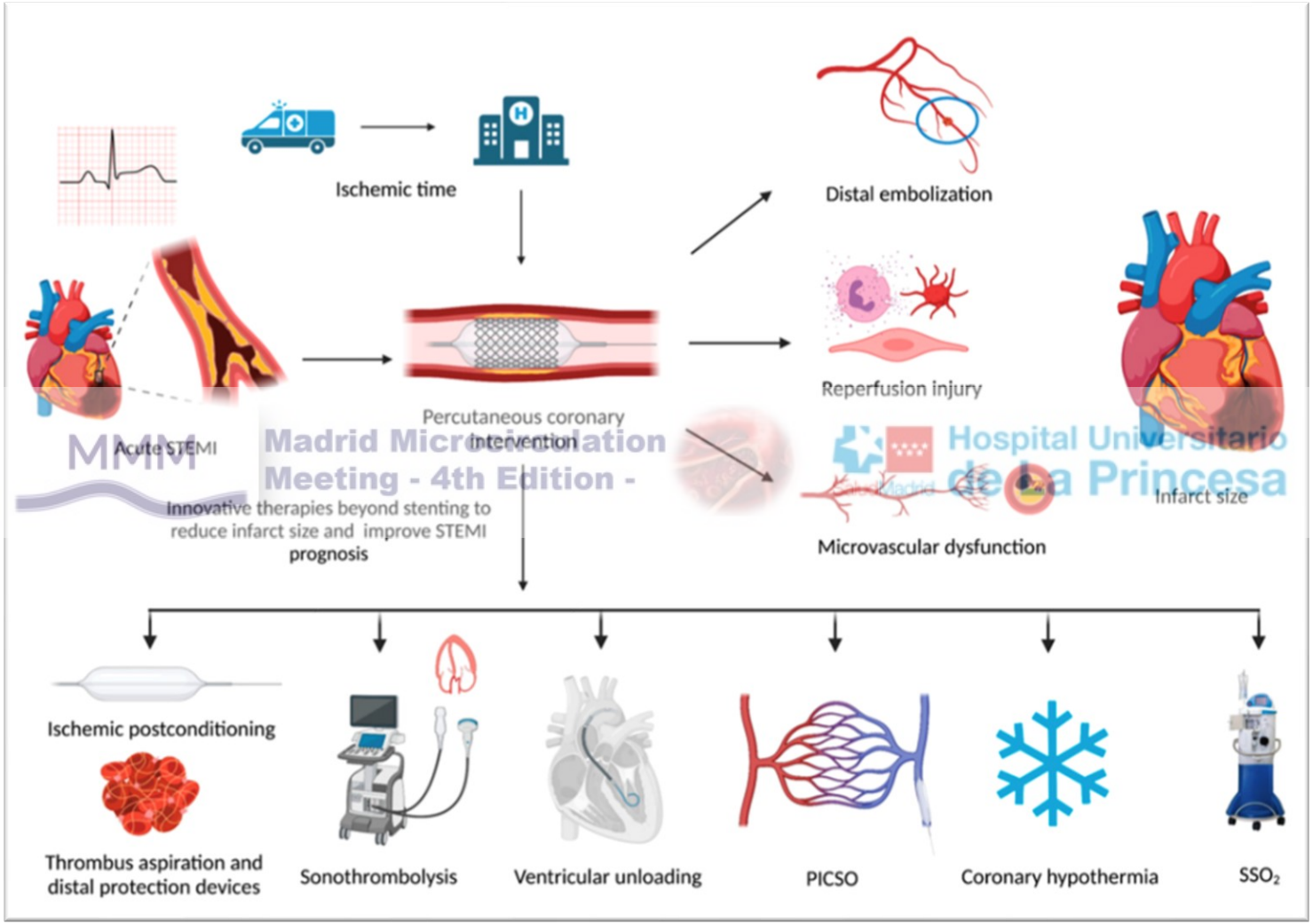
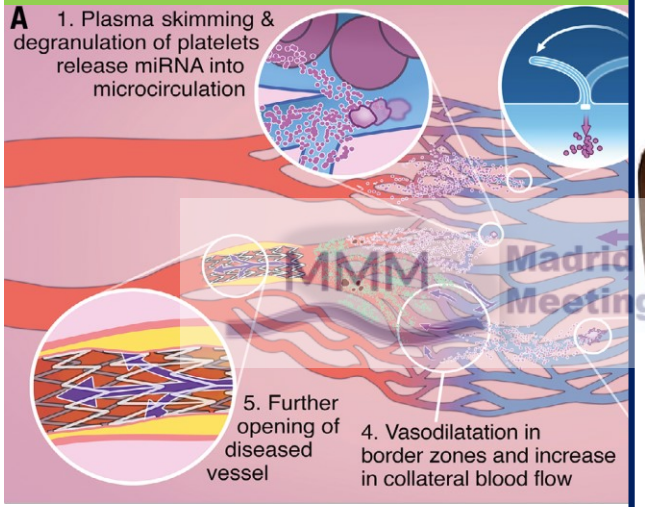
	↓ Platelet aggregation	↓ Platelet activation		
	↓ Oxidative stress	↓ Inflammation		
		↓ Immune response		

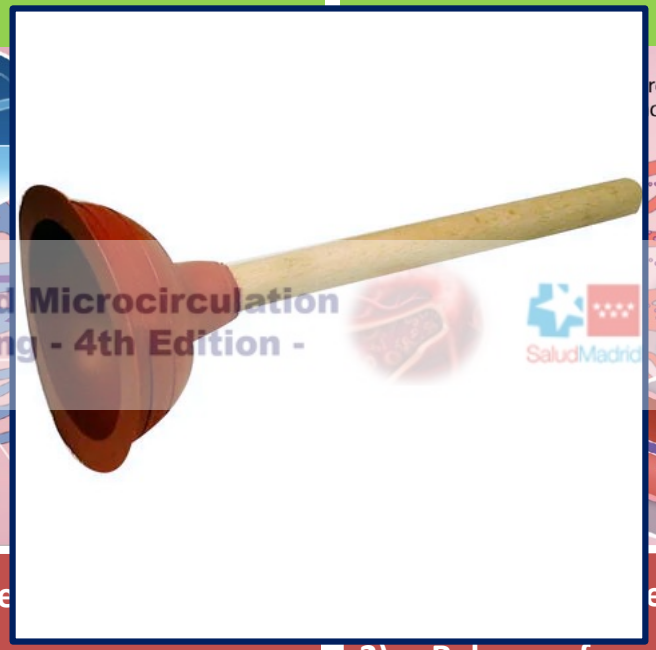


Percutaneous intermittent coronary sinus occlusion (PiCSO)

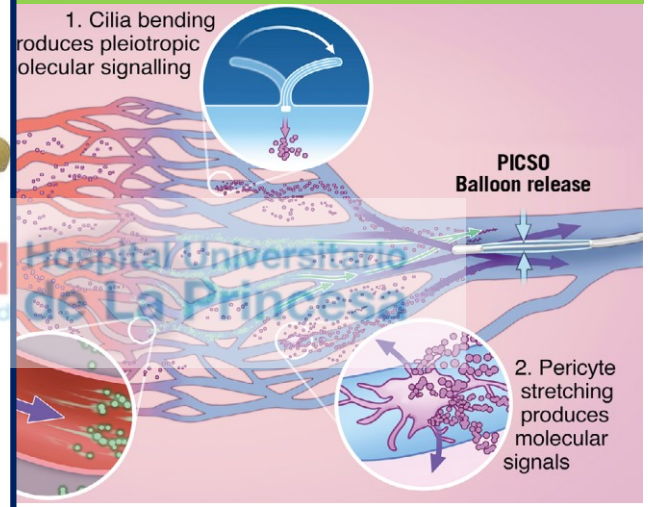
PiCSO

Diastole





Sistole

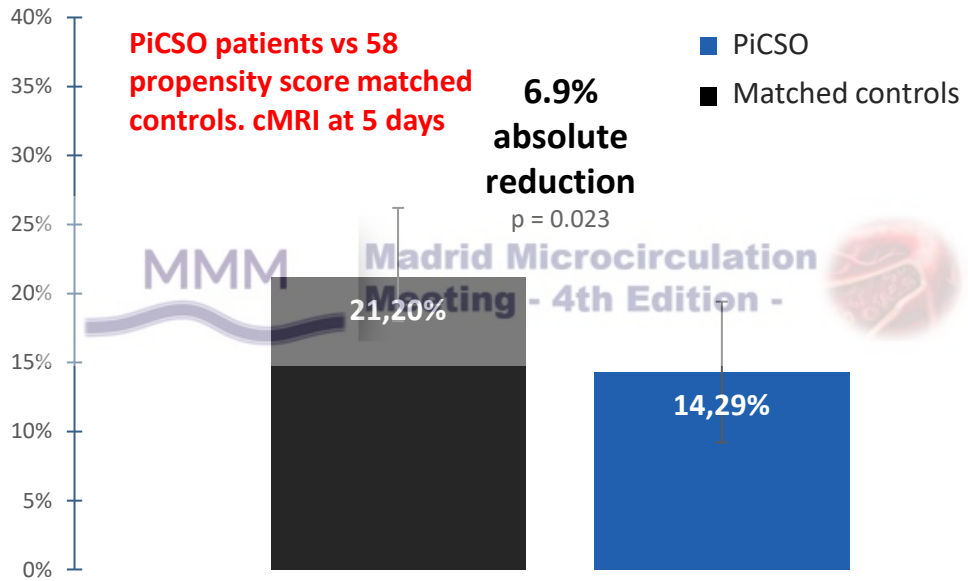


1) Flow redistribution through collate
2) Plasma Skimming phenomenon
3) Release of growth and vasodilatation factors

ema wash-out
2) Release of growth and vasodilators factors

PiCSO CE Mark study demonstrated clinical benefit

Infarct Size (% LV)



33% relative infarct size reduction in STEMI patients[1]

(7% absolute)

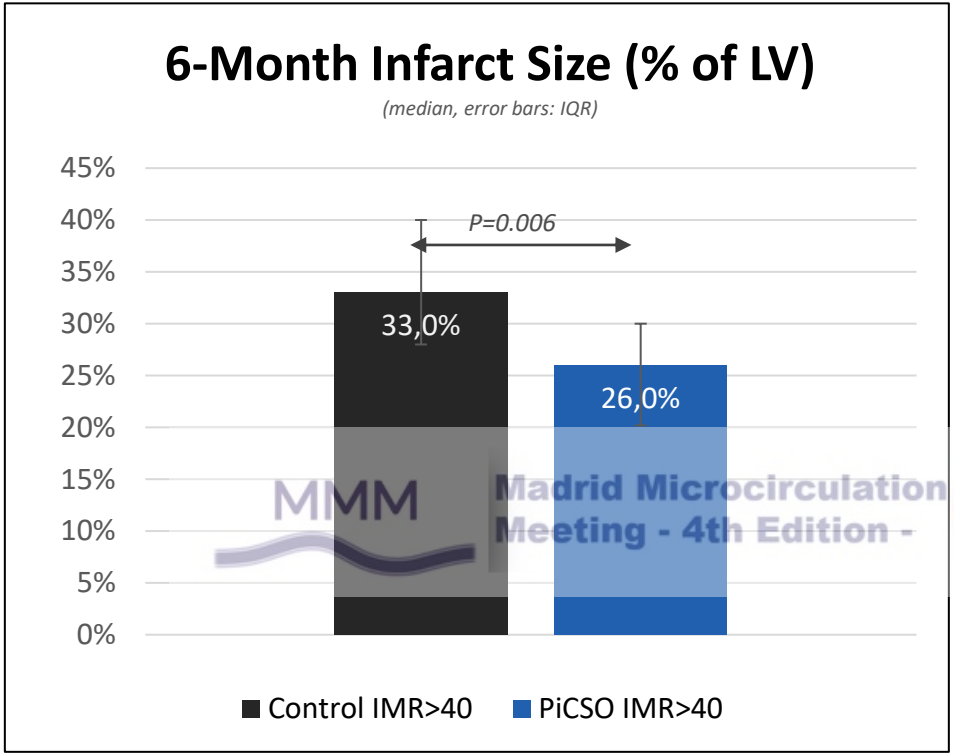
Modeled on PiCSO results[2] at 1-year, could result in:

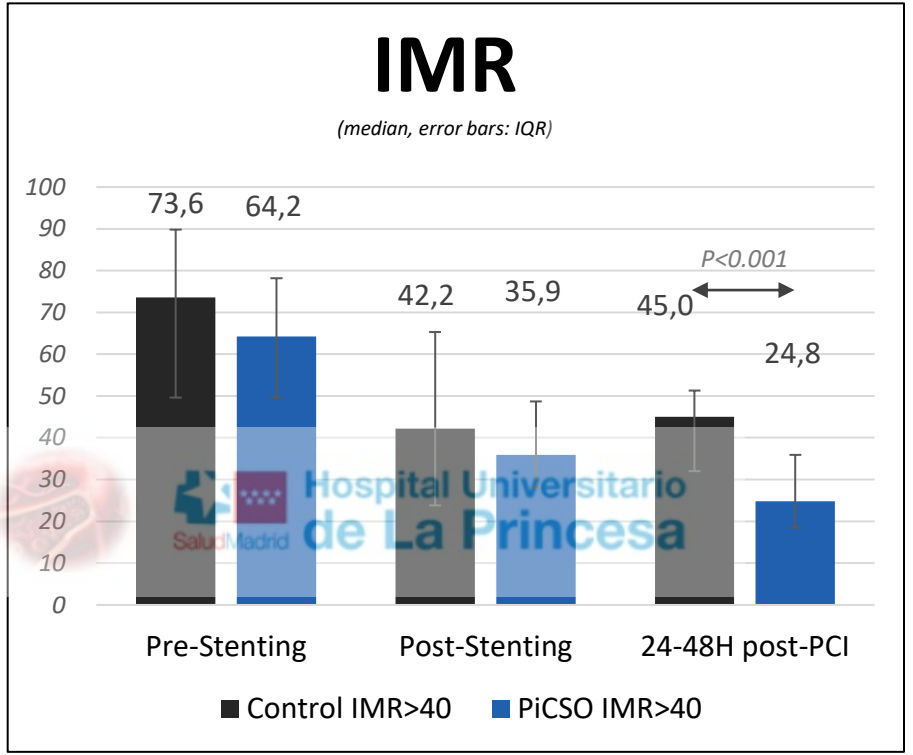
34% reduction in HF hospitalization

&

25% reduction in mortality

1. Egred, M., et al., *Effect of Pressure-controlled intermittent Coronary Sinus Occlusion (PiCSO) on infarct size in anterior STEMI: PiCSO in ACS study.* IJC Heart & Vasculature, 2020. **28**: p. 100526.
2. Stone et al: Polynomial regression analysis using PiCSO in ACS Study results based on Stone, et al. (2016). J Am Coll Cardiol 67(14): 1674-1683.

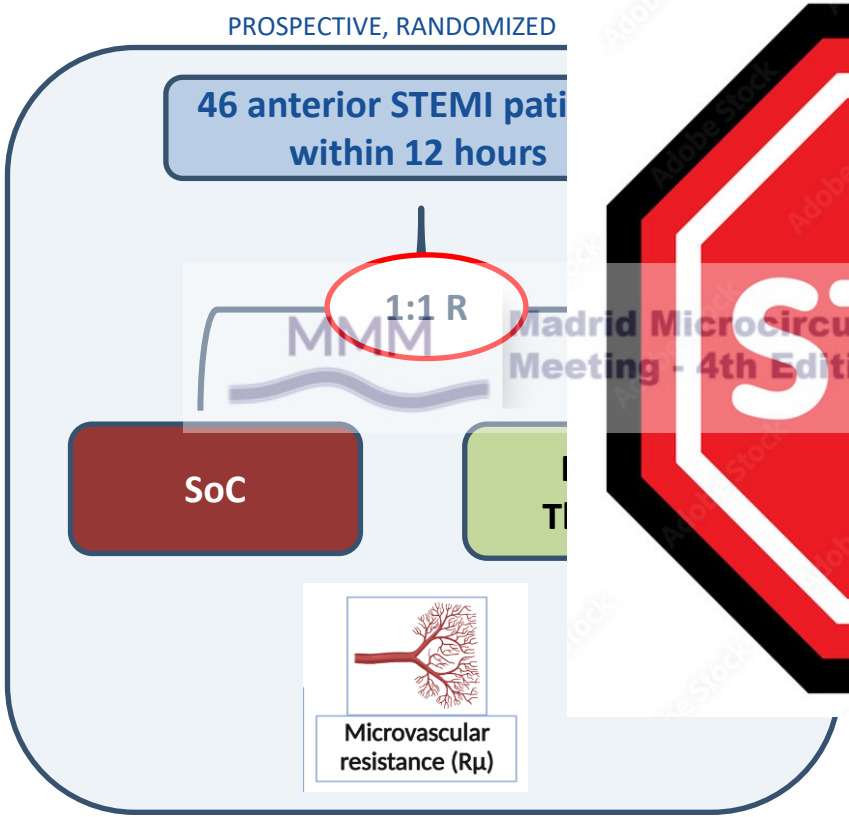




- **PiCSO-treated patients have better 6-months Infarct size (% of LV)**
- **PiCSO improved microcirculation - lower IMR @ 24-48h post-PCI**

EuroIntervention 2018;14(3):e352- e359

The PiCSO flow STEMI study



endpoint

y of PiCSO in
nicrovascular
immediately
its use

PiCSO-AMI-I trial

Design

International
Multicenter
Prospective
Randomized (1:1)
Controlled
Parallel-groups

PiCSO assisted pPCI

vs

Conventional pPCI

*144 sample size
80% power, alpha 0.05
To detect 25% reduction in IS
Assuming IS of 26% ± 12 in Control group and 20% drop-out rate

Primary Outcome

Infarct Size (%LV) at 5 ± 2 days CMR*

Secondary Outcome

MVO (%LV) at 5 ± 2 days CMR

IMH (%LV) at 5 ± 2 days CMR

Infarct Size (%LV) at 6 ± 1 months CMR

Myocardial Salvage 5 days CMR

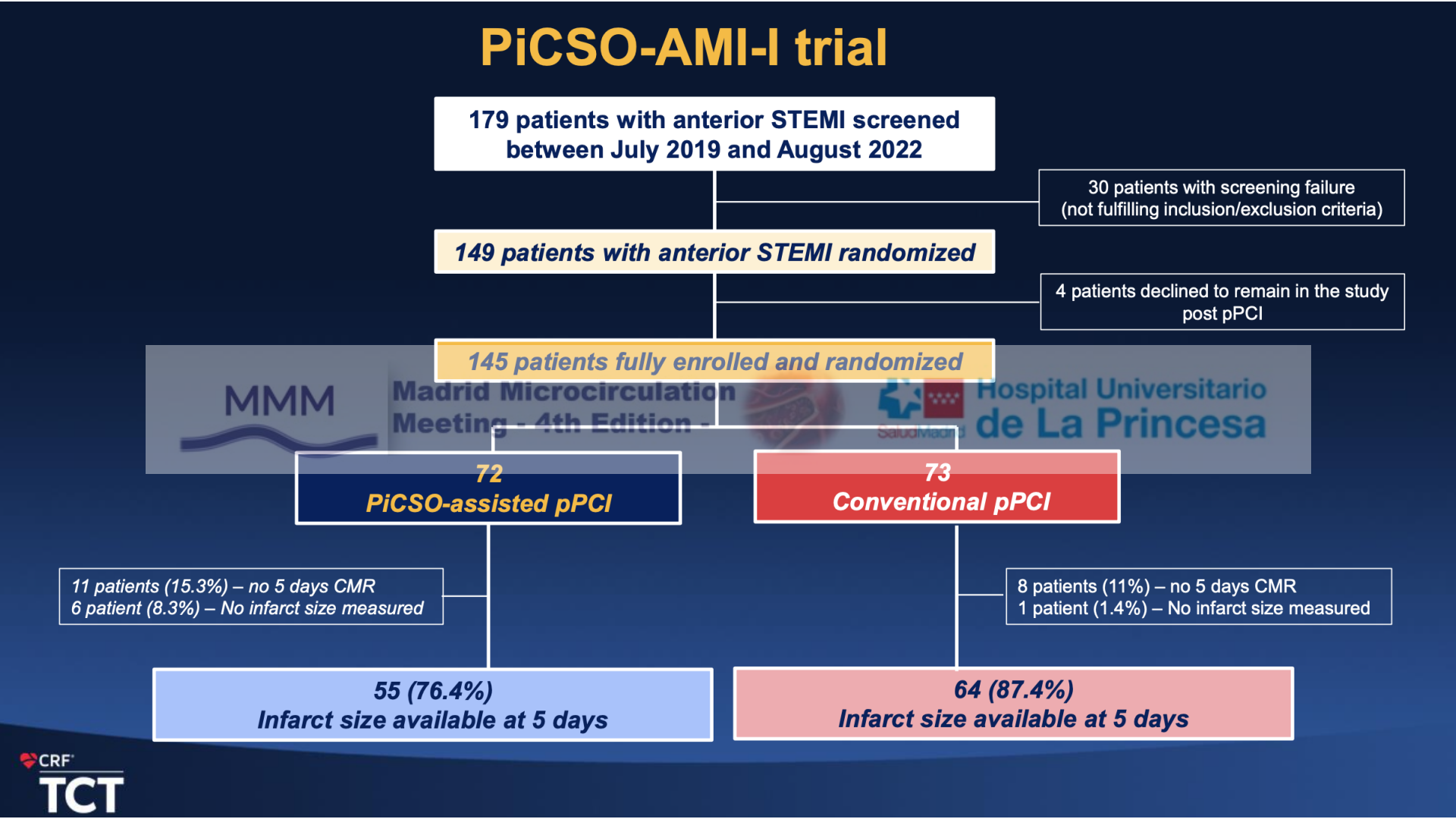
Ejection Fraction 5 days /6 months CMR

ST segment resolution 60 – 90 min post flow restored

PiCSO Procedural Success rate

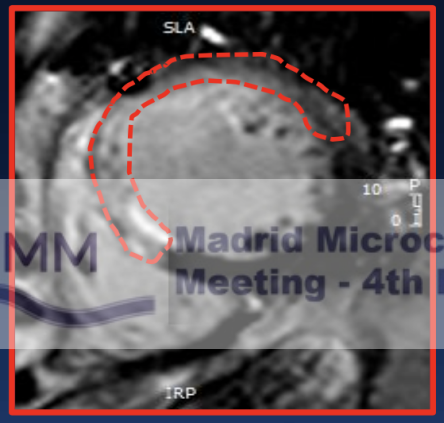
MACE at 6 months

PiCSO-AMI-I trial

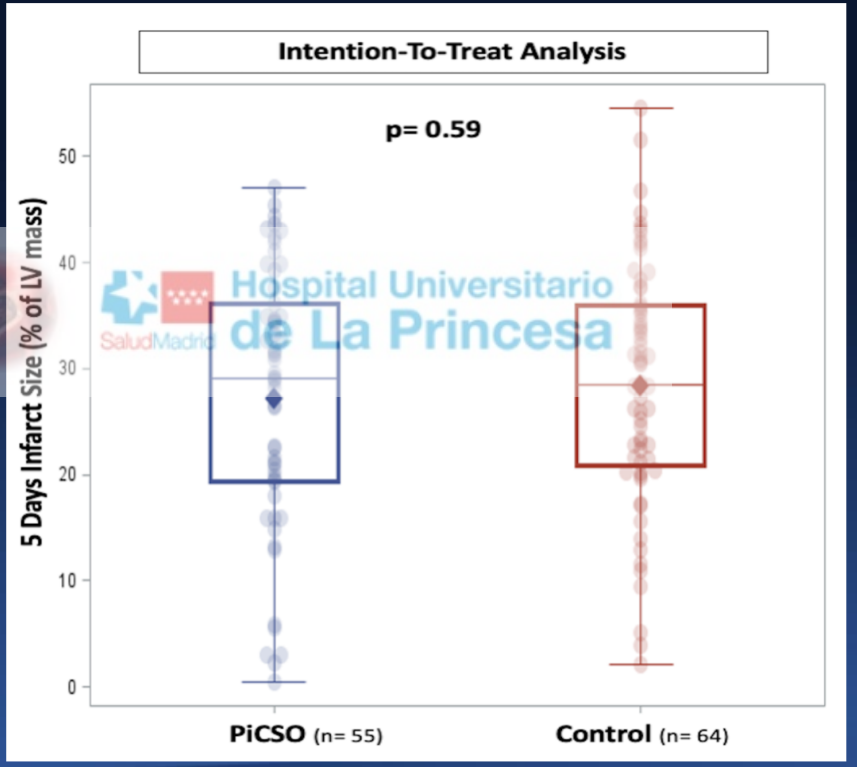


PiCSO-AMI-I trial

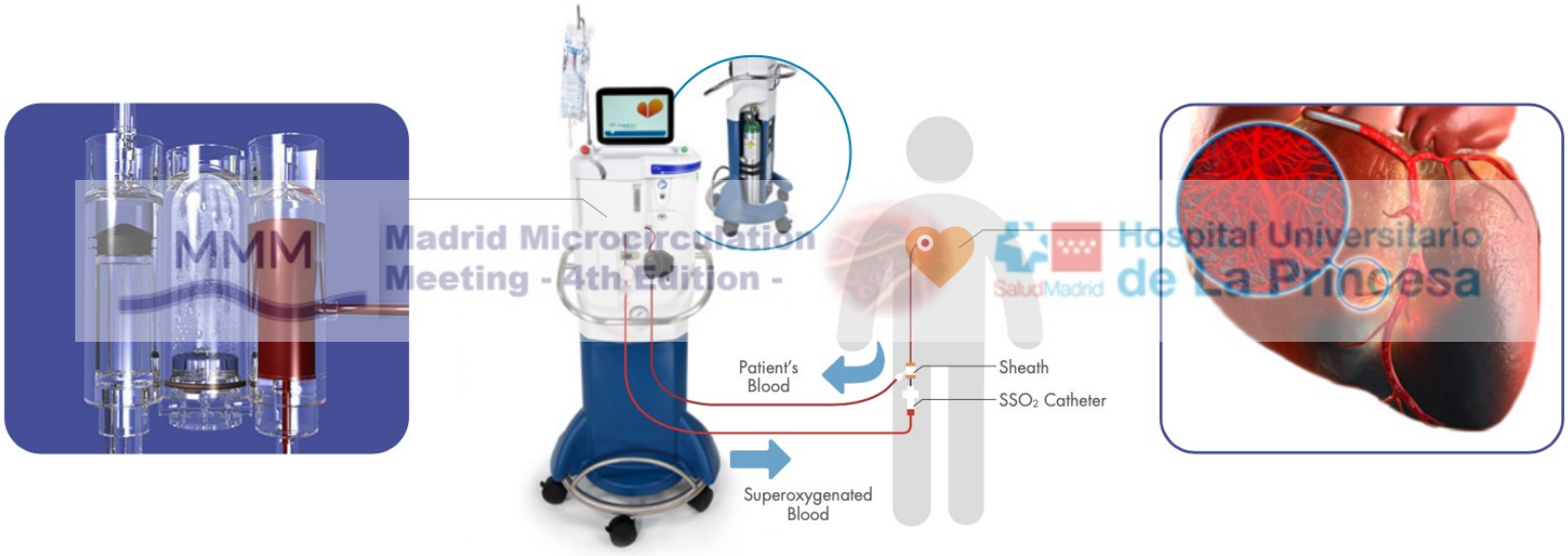
PRIMARY ENDPOINT: IS% @5days CMR – Intention to treat Analysis



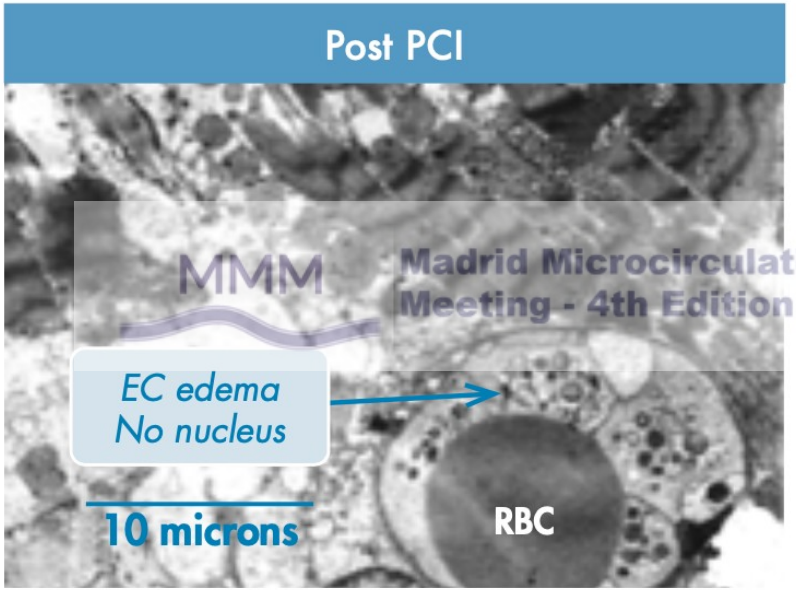
	PiCSO (n = 55)	Control (n= 64)	p
IS 5 days (LV%)	27.2% ± 12.4	28.3% ± 11.45	0.59



SSO_2 therapy



SSO_2 therapy



SSO_2 therapy

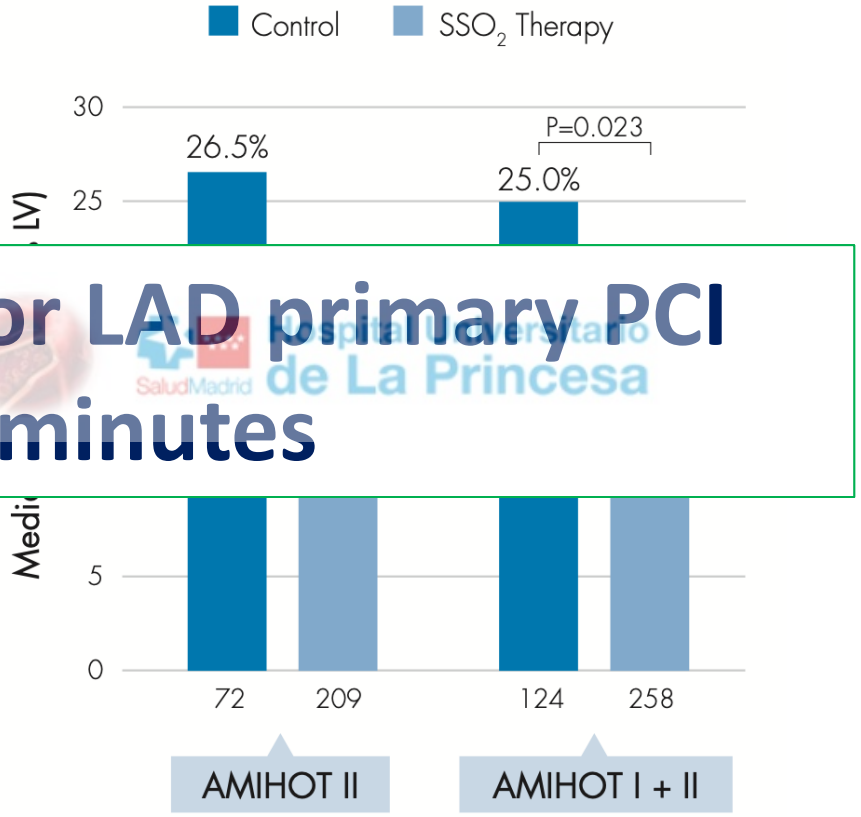
AMIHOT I

269 pts with acute or

60 minutes infusion for LAD primary PCI within 120 minutes

AMIHOT II

301 pts with anterior STEMI



Take home-messages

- **MVO** as a primary therapeutic target in STEMI
- **Drugs** & **devices** may be useful tools
- There is a growing in the field of devices **specifically focused on treating MVO in STEMI patients**

Thank you!

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