Complete Revascularization in STEMI in Thailand: How and When?

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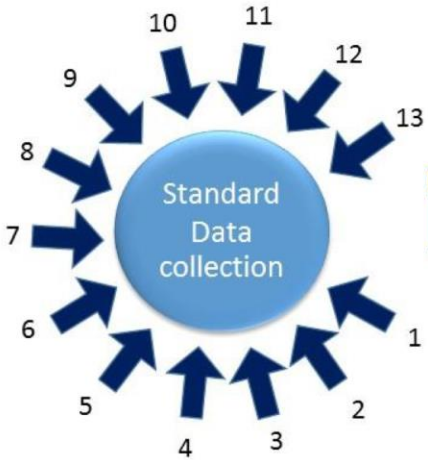
Disclosure

- Nothing to disclose

12 Area health + 1 Metropolitan (13)

Seamless ACS data management networking



ACS registry

Data back

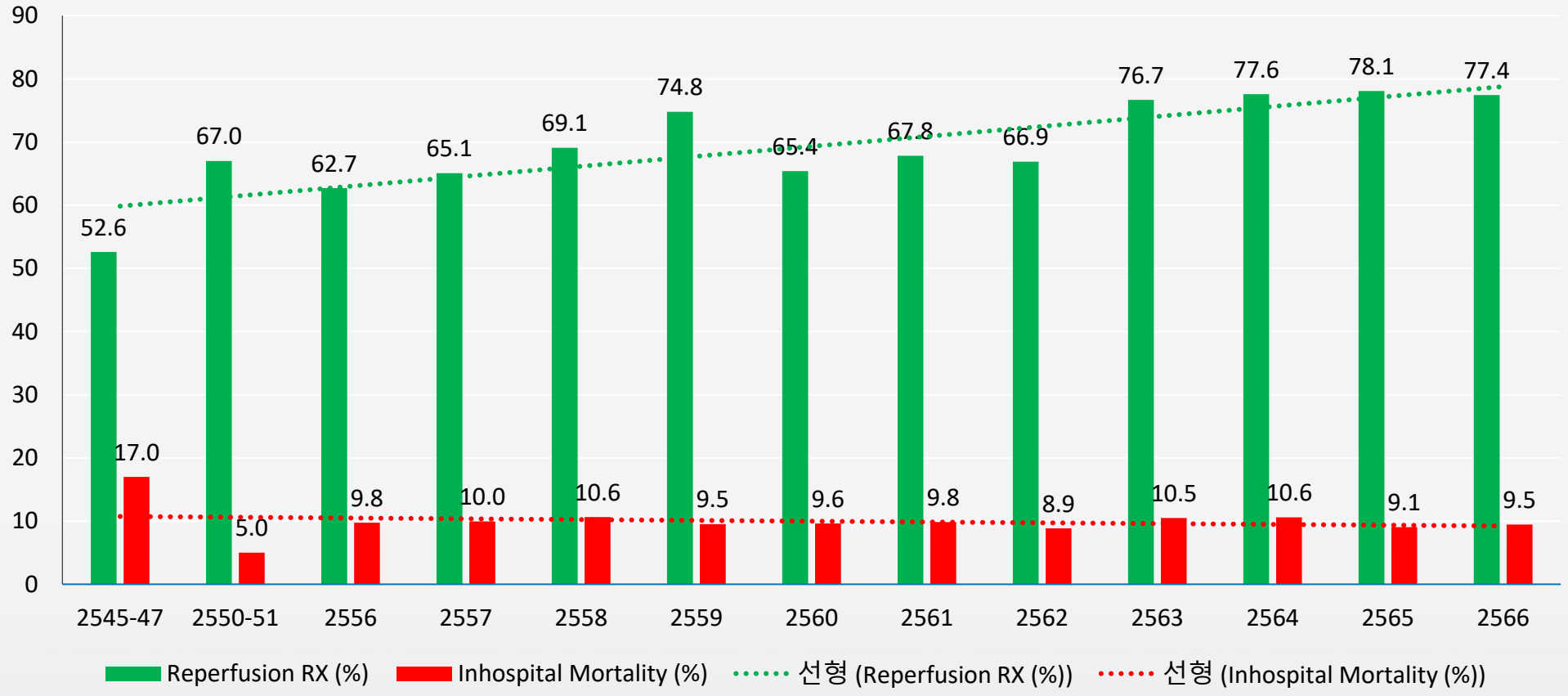
Analyze

Report and Benchmark

Quantity Data
- Number of ACS patients
- Reperfusion rate (Fibrinolysis, PCI)
- Mortality rate
- Complications
- etc.

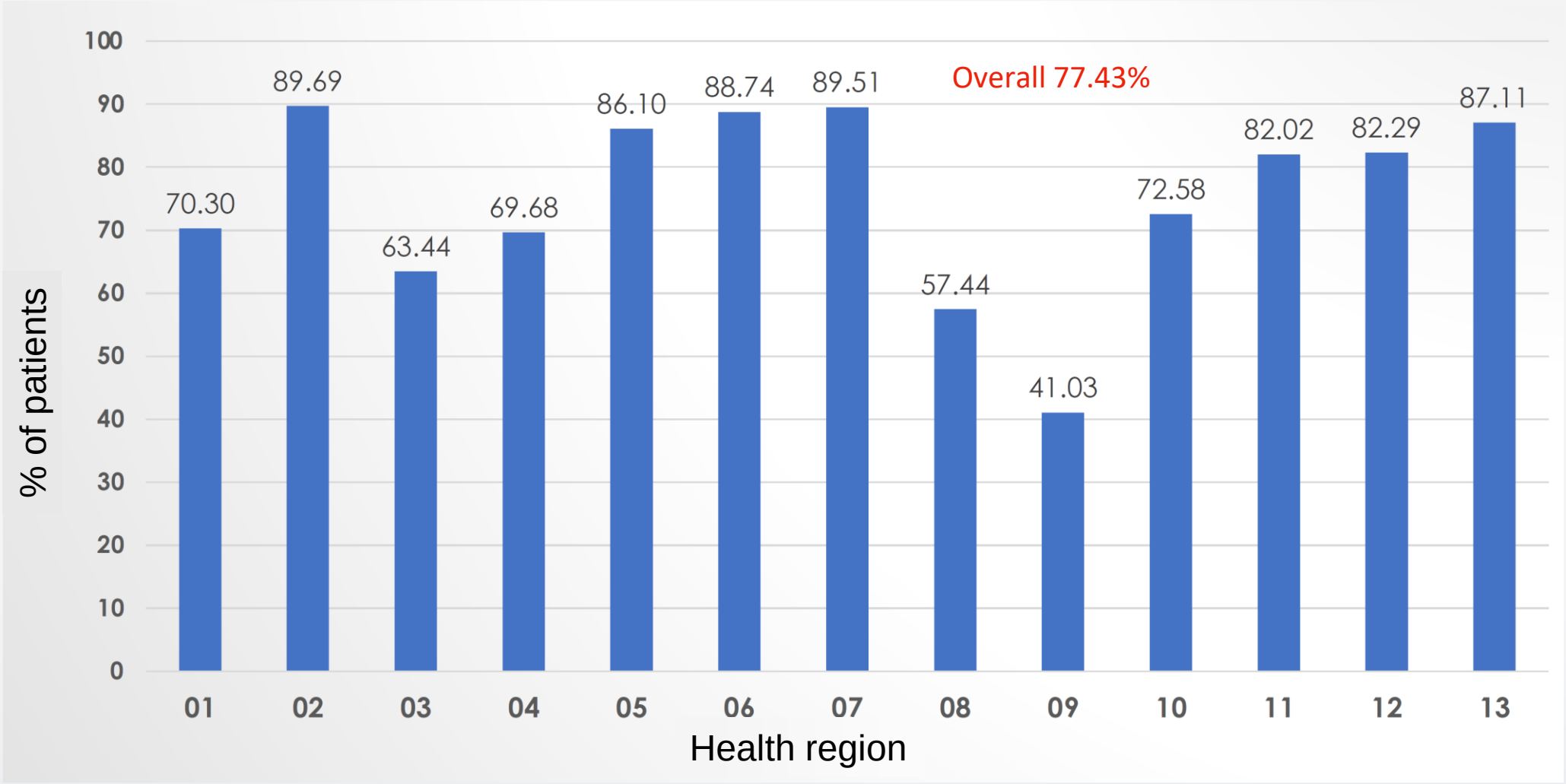
Quality of Care
- Patient Delay (Onset-FMC)
- System Delay
  - Total ischemic time
  - D-N time
  - D-Device time
  - DIDO
  - Refer time

Summary of STEMI in Thailand



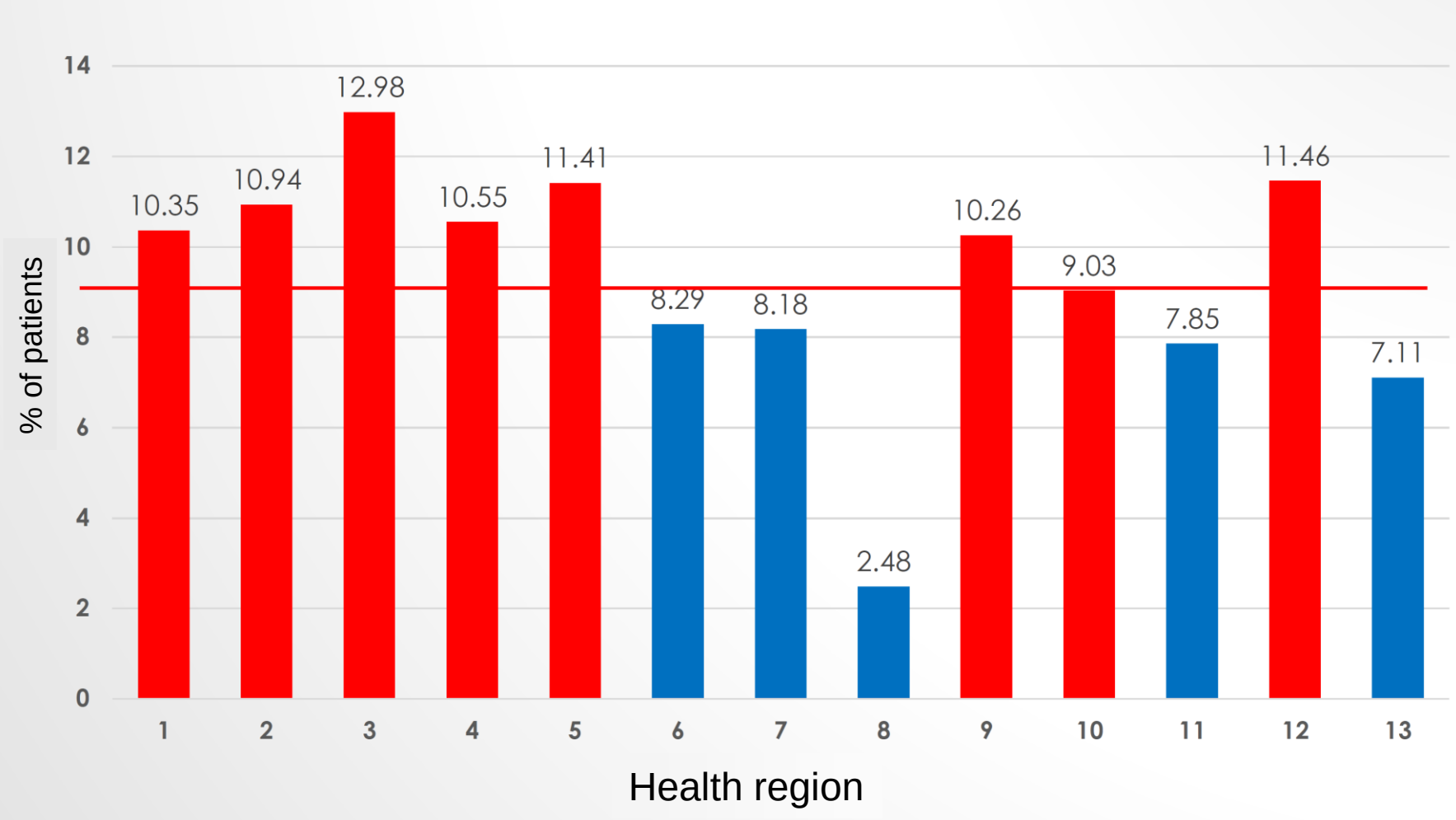
Source: Thai ACS registry, Service plan 2023

Reperfusion therapy in STEMI
October 2022 – September 2023



Source: Thai ACS Registry 1 October 2022 - 30 September 2023

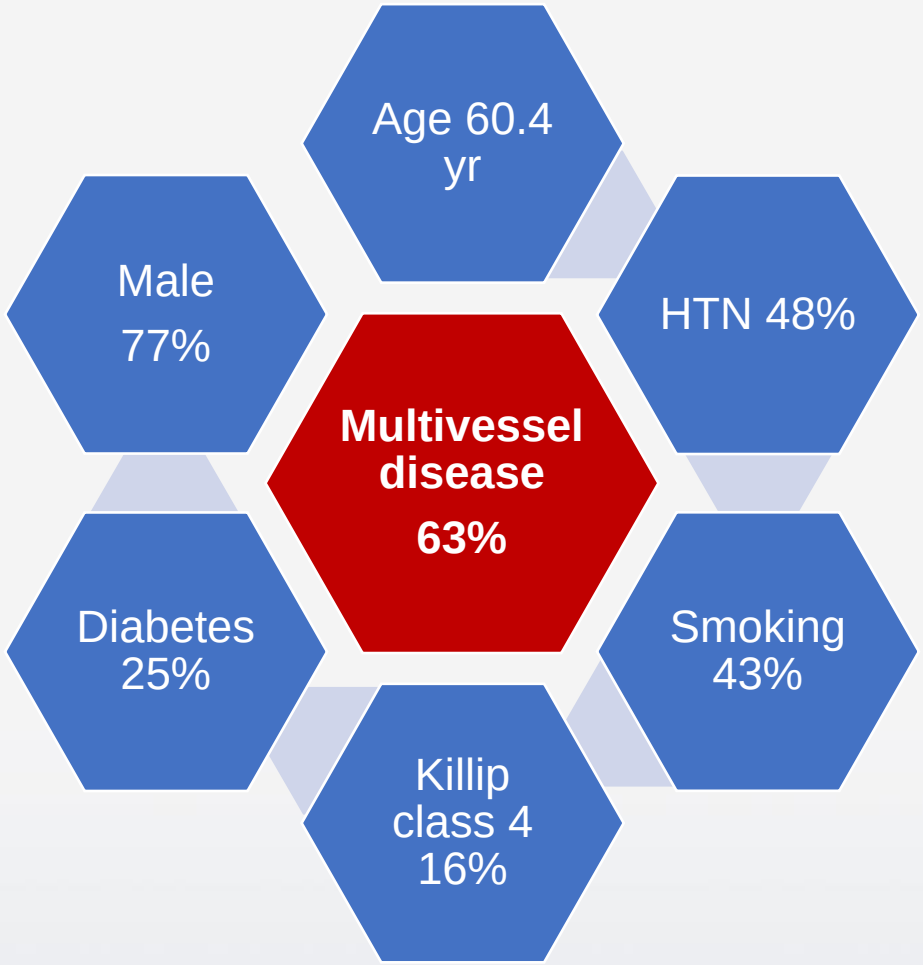
Mortality Rate of STEMI in Thailand October 2022 – September 2023



Source: Thai ACS Registry 1 October 2022 - 30 September 2023

Management of patients with MVD

STEMI characteristic: University hospital in Bangkok



Lertsanguansinchai P., *Biomedicines* 2022, 10, 2671.

Question

Culprit only vs. complete revascularization

Primary PCI RCTs in Pts with STEMI and MVD

	PRAMI (n=465) stopped early			CvLPRIT (n=296)			PRIMULTI (n=627)			COMPARE-ACUTE (n=885)		
Non-IRA lesion criteria	>50% DS			>70% DS or >50% DS in 2 views			>50% DS and FFR <0.80 or >90% DS			>50% DS and FFR <0.80 or >90% DS		
Randomization for non-IRA lesions	Immediate MV PCI (angio-guided) during index procedure vs. conservative care			Immediate or staged MV PCI (angio-guided) within index admission vs. conservative care			Staged MV PCI (FFR-guided) within index admission vs. conservative care			(1:2) Staged MV PCI (FFR-guided) within index admission vs. conservative care		
1° endpoint	CD, MI, RA at 1 year			D, MI, HF, IDR at 1 year			D, MI, IDR at 1 year			D, MI, Revas, stroke at 1 year		
Results	MV PCI	Cons	P	MV PCI	Cons	P	MV PCI	Cons	P	MV PCI	Cons	P
1° endpoint	9.0%	22.9%	<0.001	10.0%	21.2%	0.009	12.7%	21.7%	0.004	7.8%	20.5%	<0.001
D/CD or MI	4.7%	11.7%	0.004	4.0%	9.6%	0.06	6.4%	8.0%	0.47	3.7%	6.4%	0.10
Heart failure	-	-	-	6.2%	2.7%	0.14	-	-	-	-	-	-
Refr. angina	5.1%	13.0%	0.002	-	-	-	-	-	-	-	-	-
Revasc	6.8%	19.7%	<0.001	8.2%	4.7%	0.20	5.4%	16.6%	<0.001	6.4%	27.3%	0.002
	Wald DS et al. NEJM 2013			Gershlick A et al. JACC 2015			Engstrøm T et al. Lancet 2015			Smits PC et al. NEJM 2017		

COMPLETE Trial Design

STEMI WITH MULTIVESSEL CAD AND SUCCESSFUL PCI TO THE CULPRIT LESION
MVD defined as at least one additional non-culprit lesion ≥ 2.5 mm diameter
and ≥70% stenosis or 50-69% with FFR ≤0.80

→ Exclusion Criteria: Intent to revascularize NCL, planned surgical revascularization, prior CABG

RANDOMIZATION
Stratified for intended timing of NCL PCI:
During initial hospitalization or after discharge (max 45 d)

Actual Time to study NCL PCI in Complete Group (median)
During initial hospitalization: 1 day (IQR 1-3)
After hospital discharge: 23 days (IQR 12.5-33.5) Median 23 days

COMPLETE REVASCULARIZATION
Routine staged PCI* of all suitable non-culprit lesions
with the goal of complete revascularization
N=2016

CULPRIT-LESION-ONLY REVASCULARIZATION
No further revascularization of non-culprit lesions,
guideline-directed medical therapy alone
N=2025

*Everolimus-eluting stents strongly recommended

Guideline-Directed Medical Therapy
ASA, P2Y12 inhibitor (Ticagrelor strongly recommended), Statin, BB, ACE/ARB + Risk Factor Modification

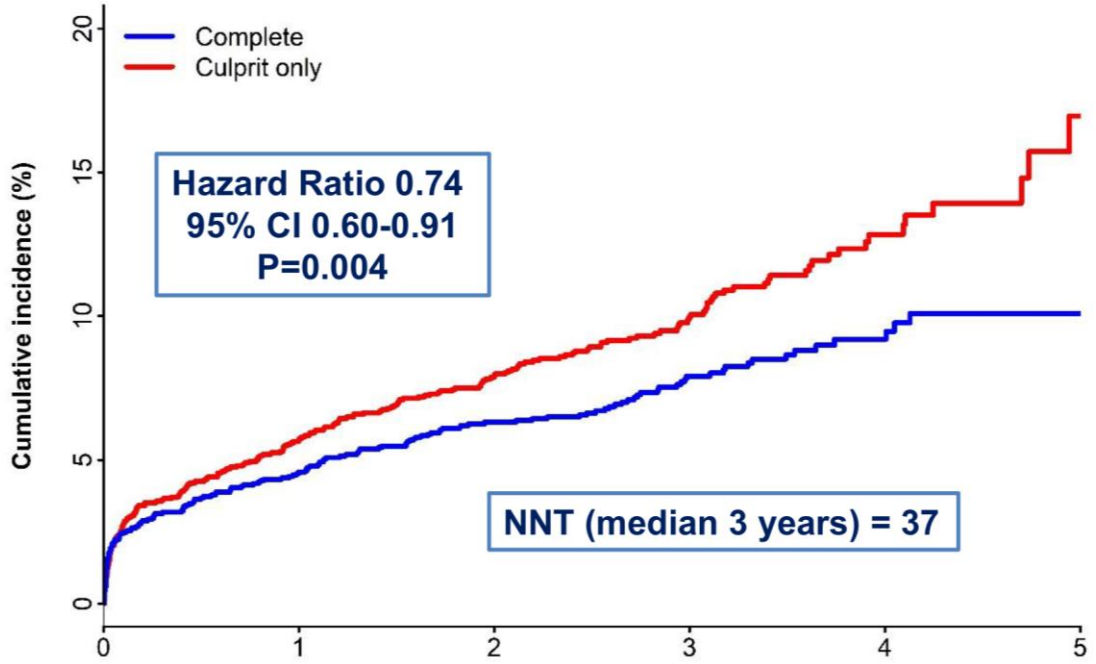
MEDIAN FOLLOW-UP: 3 YEARS

CO-PRIMARY OUTCOMES:
1. Composite of CV death or new MI
2. Composite of CV death, new MI or IDR

KEY SECONDARY OUTCOME: CV death, new MI, IDR, unstable angina, NYHA class IV heart failure

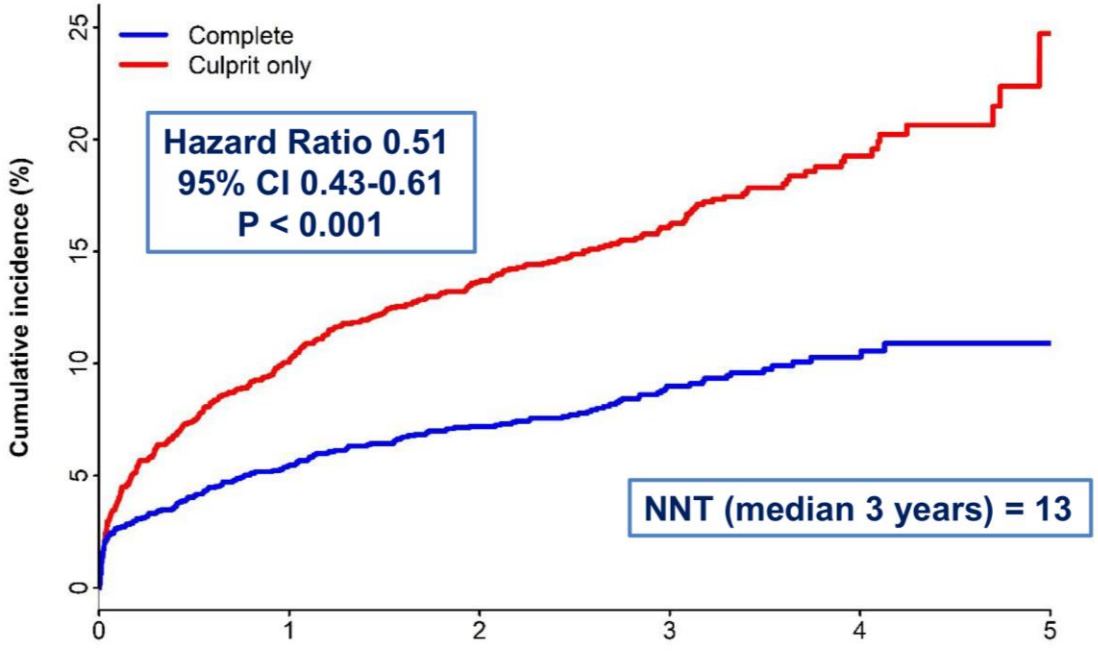
Mehta SR. et al. *N Engl J Med* 2019;381:1411-1421

First Co-Primary Outcome: CV Death or New MI



No. at Risk						
Complete	2016	1904	1677	938	337	70
Culprit only	2025	1897	1666	933	310	59

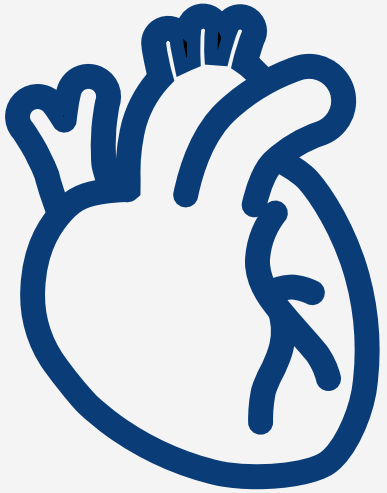
2nd Co-Primary Outcome: CV Death, New MI, or IDR



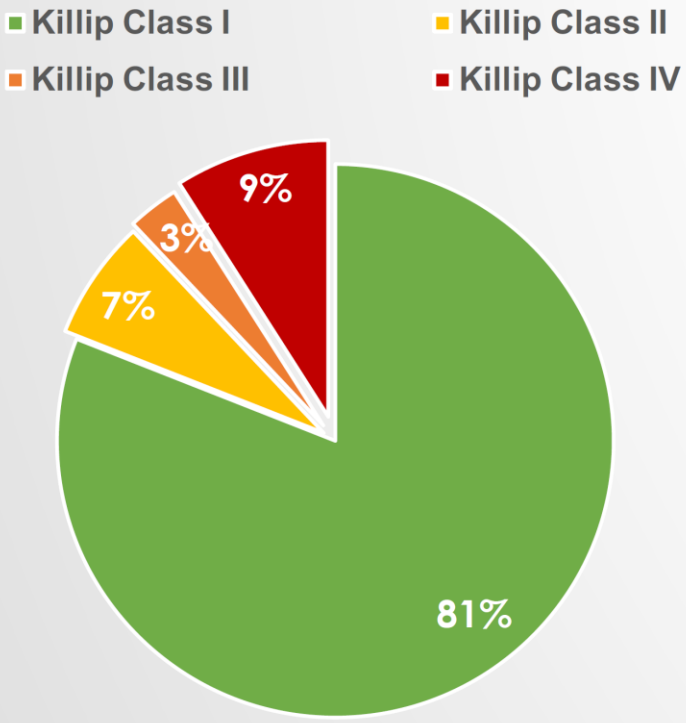
No. at Risk						
Complete	2016	1886	1659	925	329	66
Culprit only	2025	1808	1559	865	294	57

Mehta SR. et al. *N Engl J Med* 2019;381:1411-1421

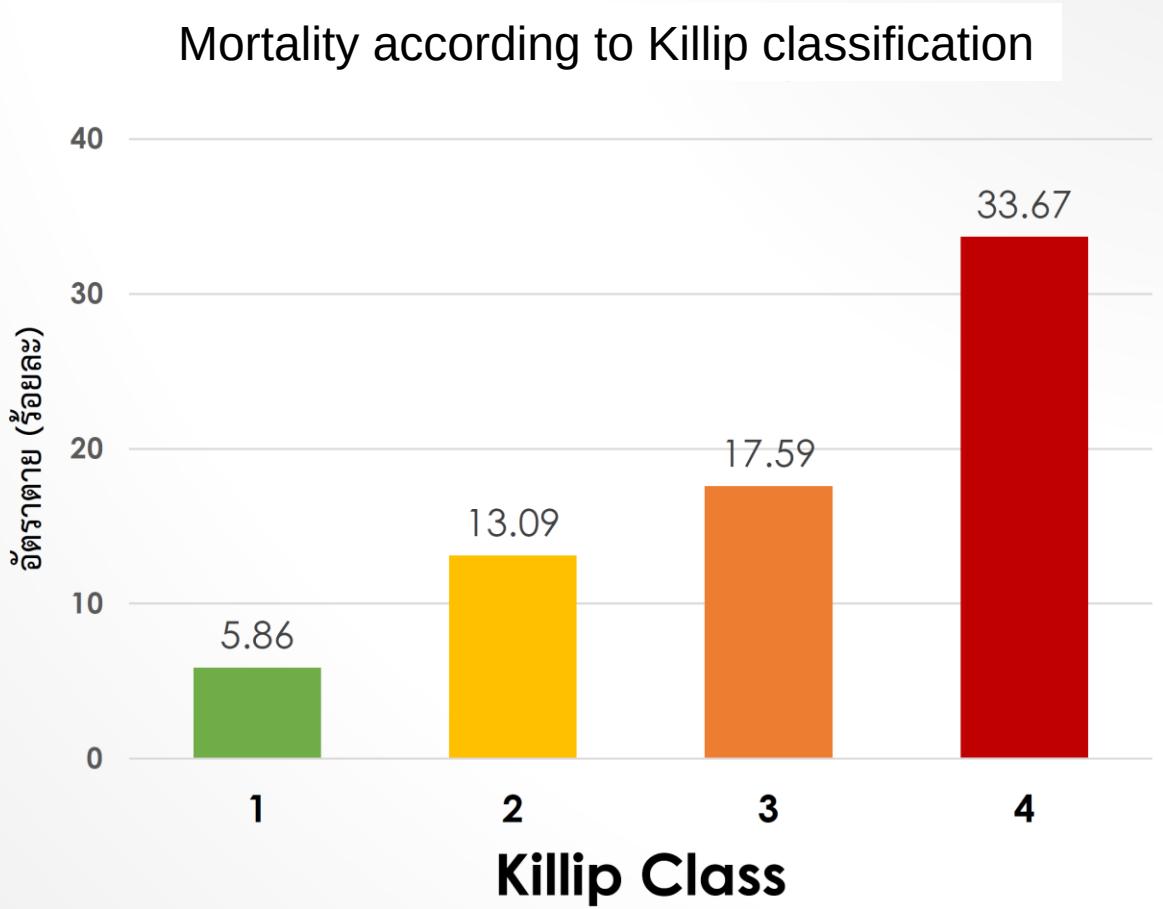
STEMI-MVD with shock



Clinical Presentation in Thailand

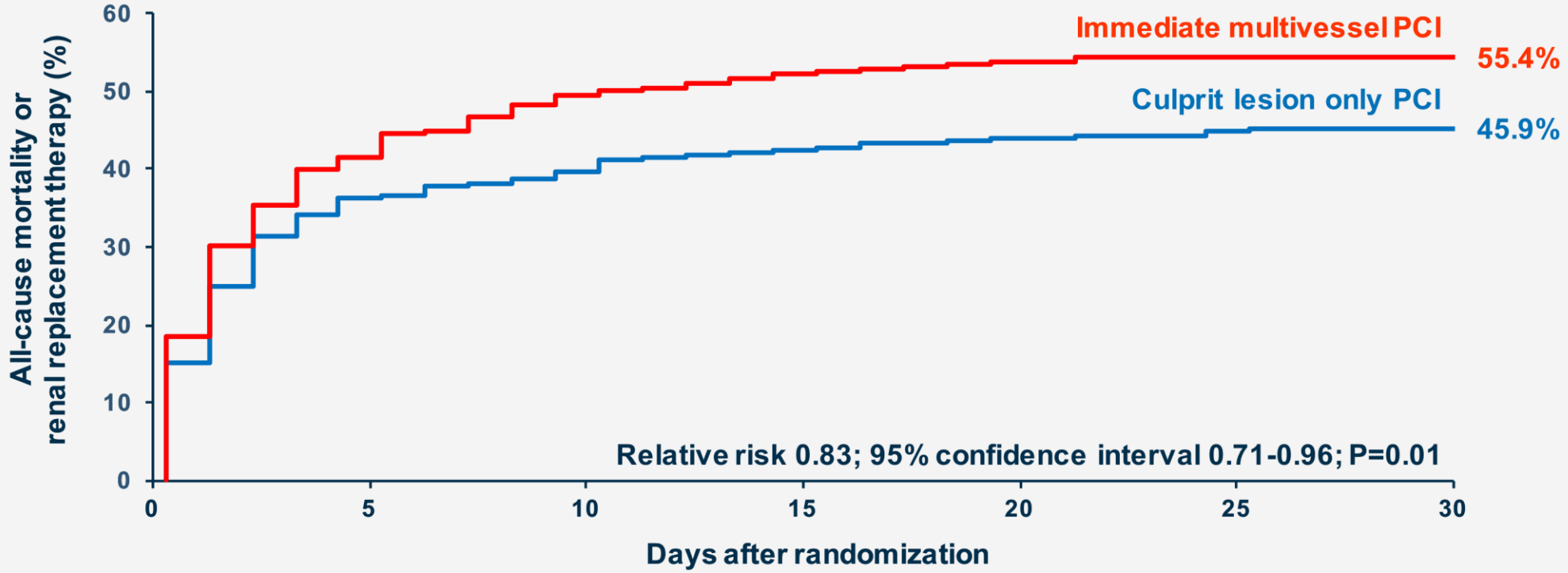


Killip Class	Clinical Signs
Class I	No clinical heart failure
Class II	Rales or crackles in lungs, S3 gallop, elevated JVP
Class III	Pulmonary edema
Class IV	Cardiogenic shock, SBP < 90 mmHg, low cardiac output



Source: Thai ACS Registry 1 October 2022 - 30 September 2023

CULPRIT-SHOCK trial: primary endpoint

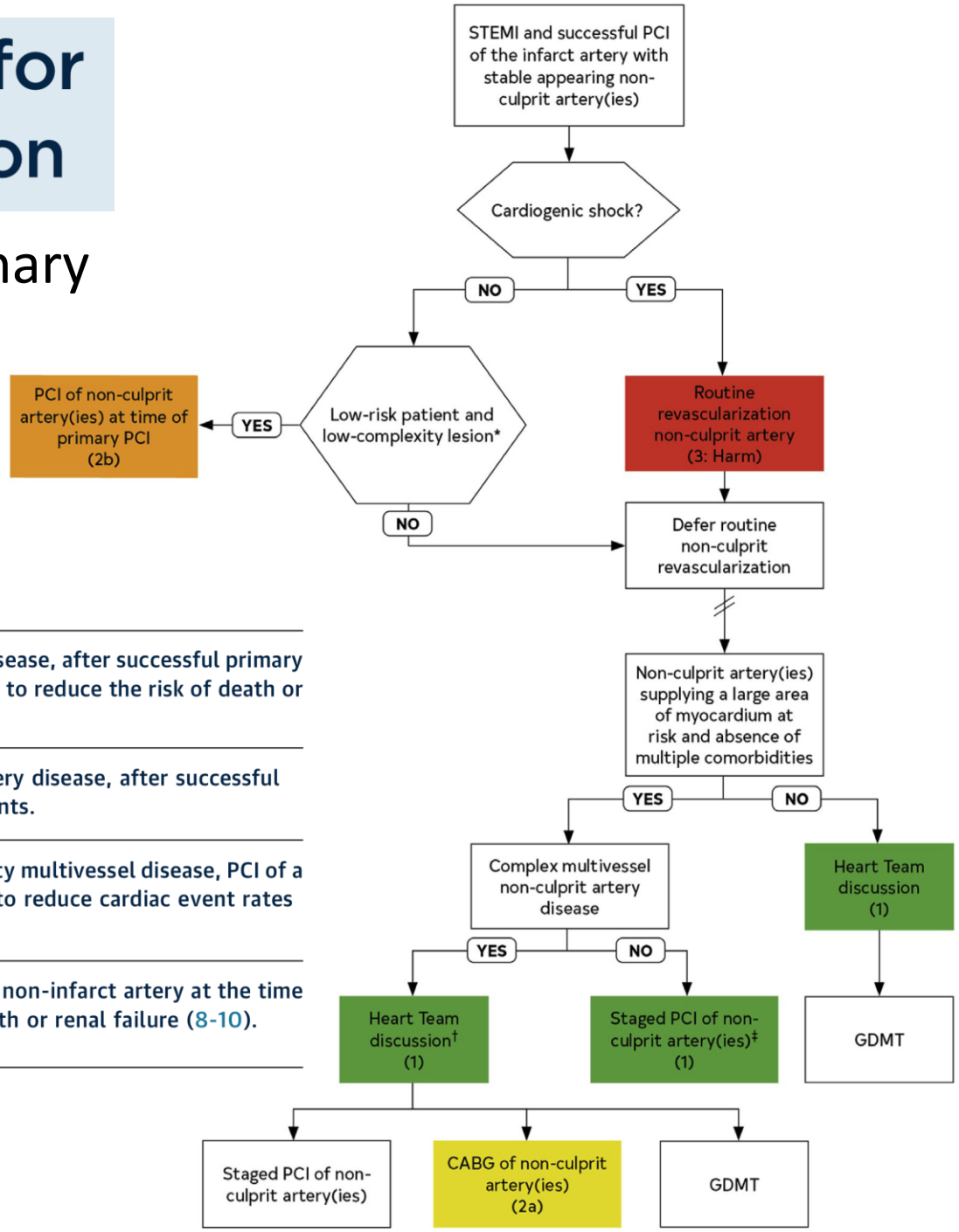


Holger Thiele, *N Engl J Med* 2017; 377:2419-2432

2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization

Revascularization of Noninfarct-Related Coronary Artery Lesions in Patients With STEMI

COR	LOE	RECOMMENDATIONS
1	A	1. In selected hemodynamically stable patients with STEMI and multivessel disease, after successful primary PCI, staged PCI of a significant non-infarct artery stenosis is recommended to reduce the risk of death or MI (1-4).
2a	C-EO	2. In selected patients with STEMI with complex multivessel non-infarct artery disease, after successful primary PCI, elective CABG is reasonable to reduce the risk of cardiac events.
2b	B-R	3. In selected hemodynamically stable patients with STEMI and low-complexity multivessel disease, PCI of a non-infarct artery stenosis may be considered at the time of primary PCI to reduce cardiac event rates (1,2,5-7).
3: Harm	B-R	4. In patients with STEMI complicated by cardiogenic shock, routine PCI of a non-infarct artery at the time of primary PCI should not be performed because of the higher risk of death or renal failure (8-10).



What the OPTIMAL timing of complete revascularization?

Immediate vs staged

PCI of non-culprit artery(ies) at time of primary PCI (2b)

Staged PCI of non-culprit artery(ies)‡ (1)

In 2023…

THE LANCET

Immediate versus staged complete revascularisation in patients presenting with acute coronary syndrome and multivessel coronary disease (BIOVASC): a prospective, open-label, non-inferiority, randomised trial

Roberto Diletti, Wijnand K den Dekker*, Johan Bennett, Carl E Schotborgh, Rene van der Schaaf, Manel Sabaté, Raúl Moreno, Koen Ameloot, Rutger van Bommel, Daniele Forlani, Bert van Reet, Giovanni Esposito, Maurits T Dirksen, Willem P T Ruifrok, Bert R C Everaert, Carlos Van Mieghem, Jacob J Elscot, Paul Cummins, Mattie Lenzen, Salvatore Brugaletta, Eric Boersma, Nicolas M Van Mieghem, for the BIOVASC Investigators†*

The NEW ENGLAND JOURNAL of MEDICINE

Timing of Complete Revascularization with Multivessel PCI for Myocardial Infarction

B.E. Stähli, F. Varbella, A. Linke, B. Schwarz, S.B. Felix, M. Seiffert, R. Kesterke, P. Nordbeck, B. Witzenbichler, I.M. Lang, M. Kessler, C. Valina, A. Dibra, M. Rohla, M. Moccetti, M. Vercellino, L. Gaede, L. Bott-Flügel, P. Jakob, J. Stehli, A. Candreva, C. Templin, M. Schindler, M. Wischnewsky, G. Zanda, G. Quadri, N. Mangner, A. Toma, G. Magnani, P. Clemmensen, T.F. Lüscher, T. Münzel, P.C. Schulze, K.-L. Laugwitz, W. Rottbauer, K. Huber, F.-J. Neumann, S. Schneider, F. Weidinger, S. Achenbach, G. Richardt, A. Kastrati, I. Ford, W. Maier,* and F. Ruschitzka, for the MULTISTARS AMI Investigators†

Study Design: MULTISTARS AMI

Patients with acute STEMI and MVD after successful PCI of the culprit artery

MVD was defined as at least one non-culprit coronary artery (≥2.25 mm and ≤5.75 mm) with ≥70% diameter stenosis on coronary angiography

1:1 randomization

Immediate PCI (during index procedure) of non-culprit lesions

N=418

**everolimus-eluting stent was recommended*

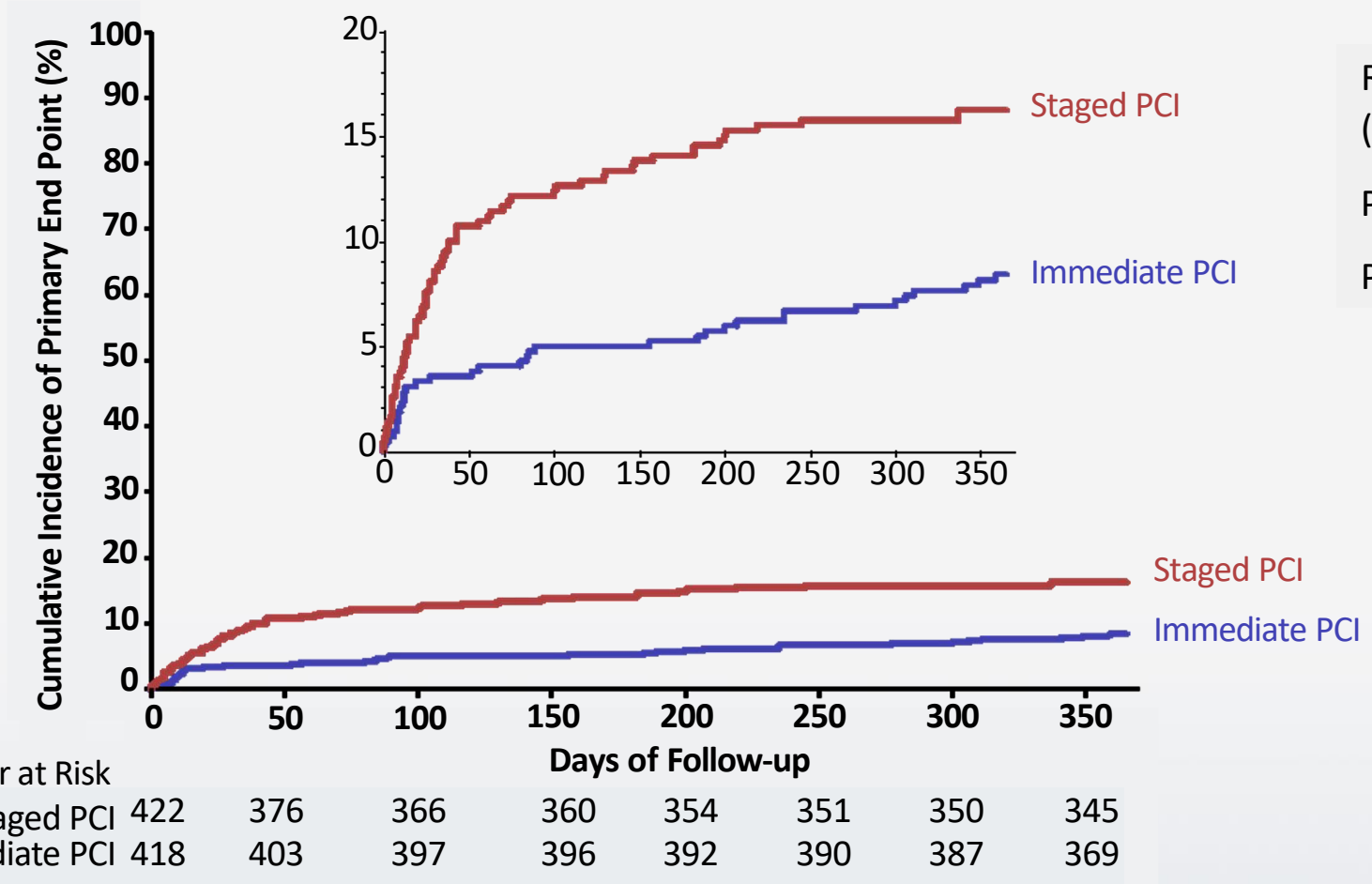
Staged PCI (within 19 to 45 days) of non-culprit lesions

N=422

Primary end point: all-cause death, non-fatal myocardial infarction, stroke, ischemia-driven revascularization, or hospitalization for heart failure at 1 year

Primary Outcome

Composite of all-cause death, non-fatal myocardial infarction, stroke, unplanned ischemia-driven revascularization, or hospitalization for heart failure at 1 year



Risk ratio 0.52
(95% CI 0.38 to 0.72)

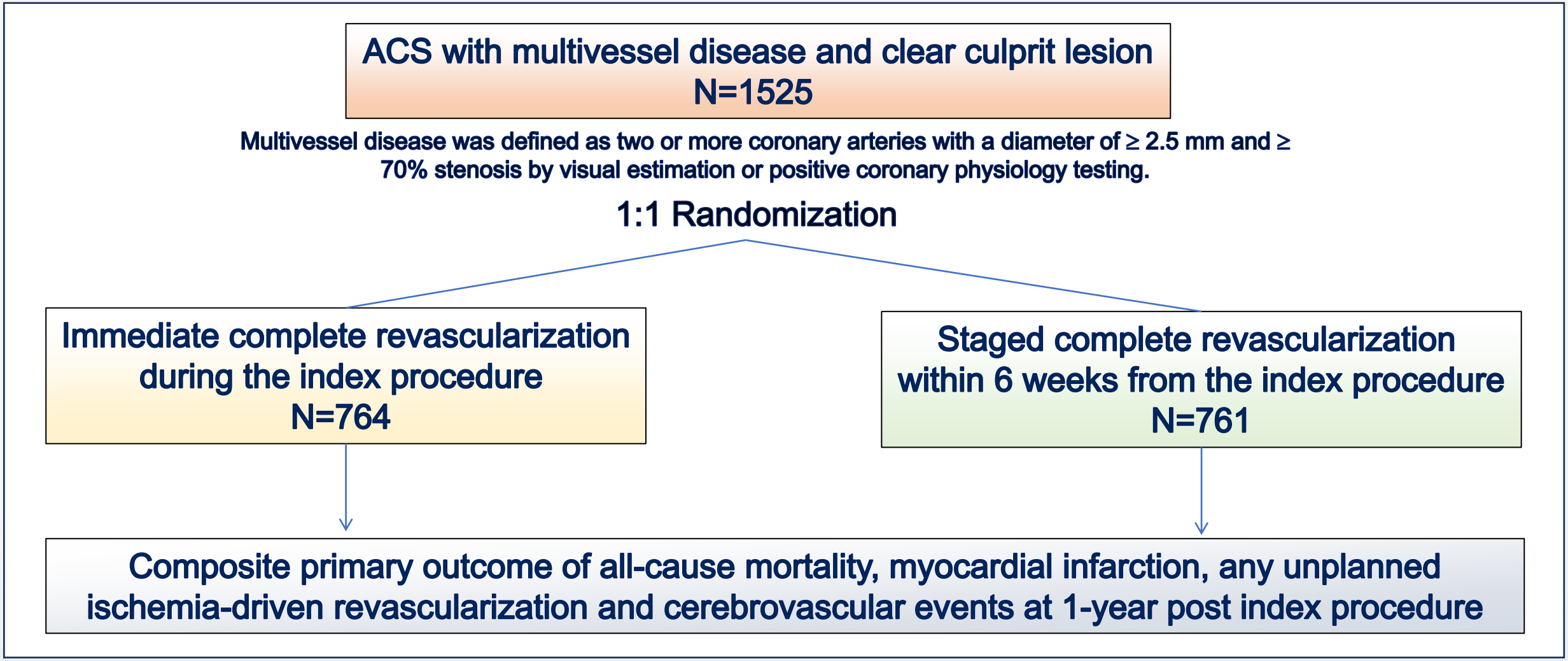
$P_{non\text{-}inferiority} < 0.0001$

$P_{superiority} = 0.0004$

Number at Risk

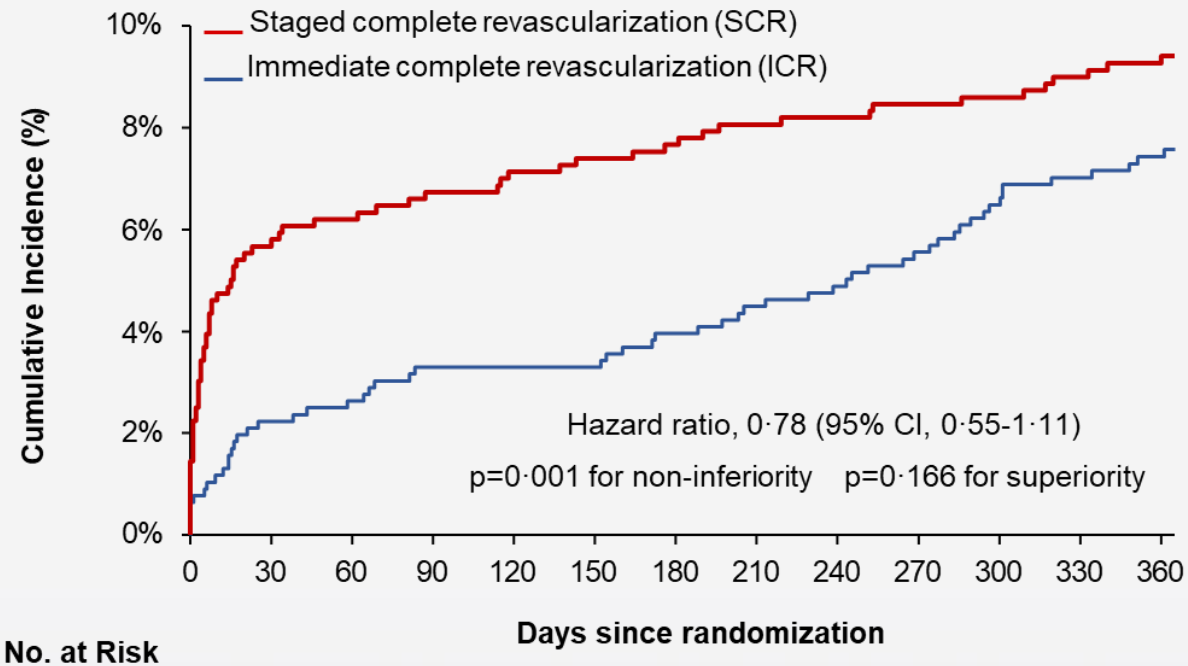
Staged PCI	422	376	366	360	354	351	350	345
Immediate PCI	418	403	397	396	392	390	387	369

BIOVASC Trial study design



Primary Outcome

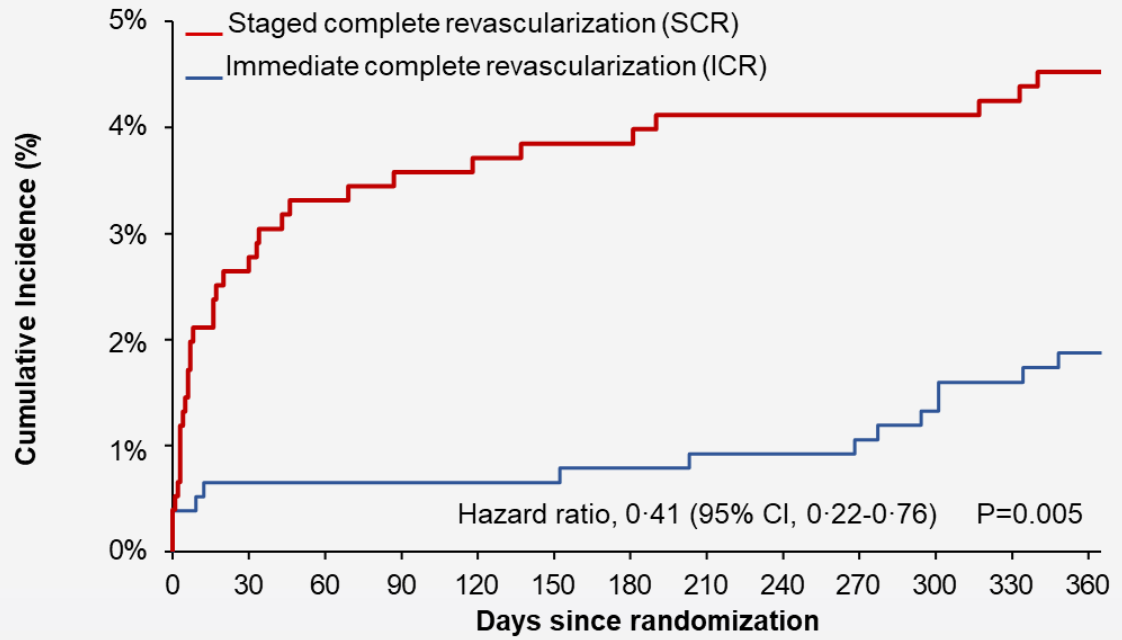
Composite of all-cause mortality, MI, any unplanned ischemia-driven revascularization and cerebrovascular events



No. at Risk

ICR	764	736	733	728	728	728	723	718	714	709	701	695	650
SCR	761	712	705	701	698	696	694	691	690	687	686	681	638

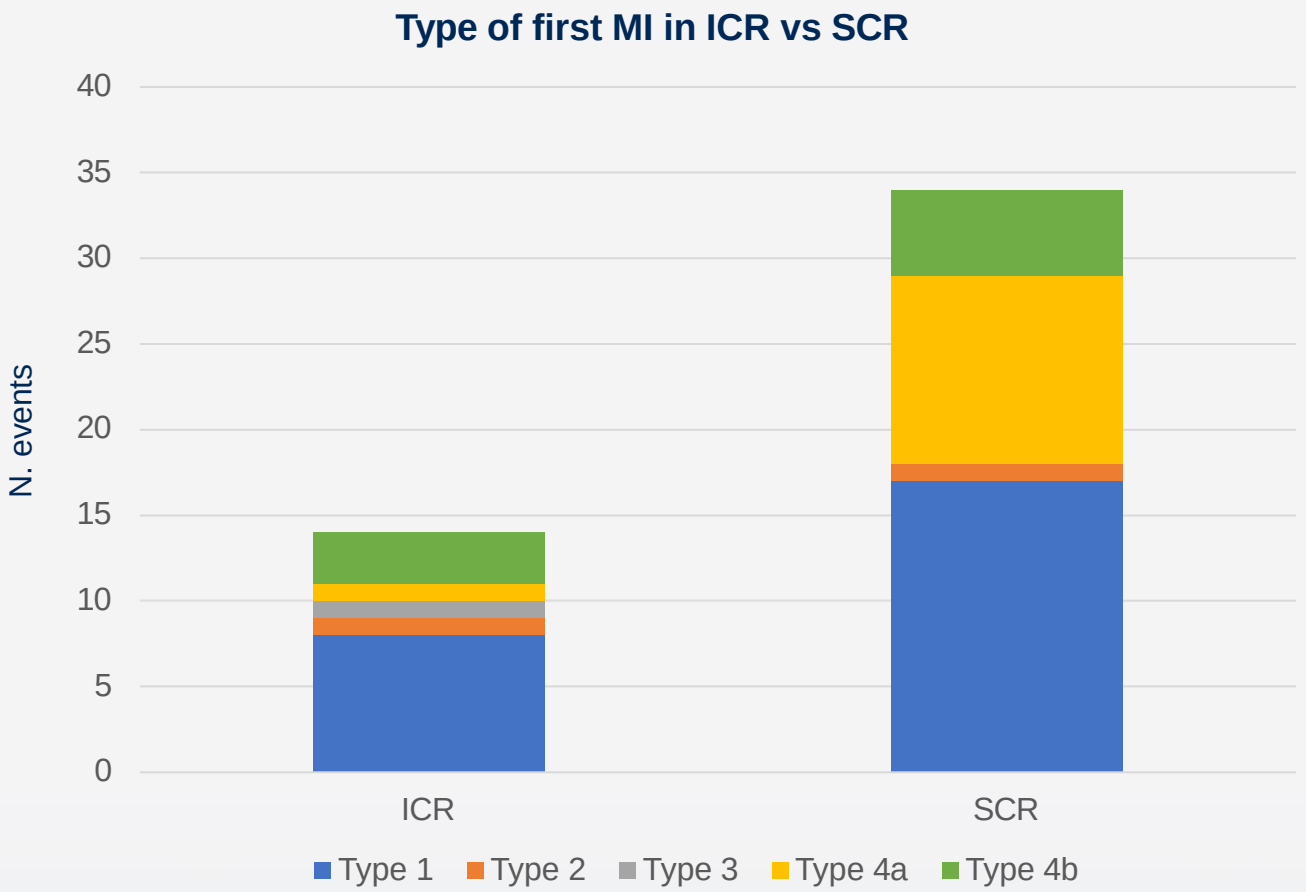
Myocardial Infarction

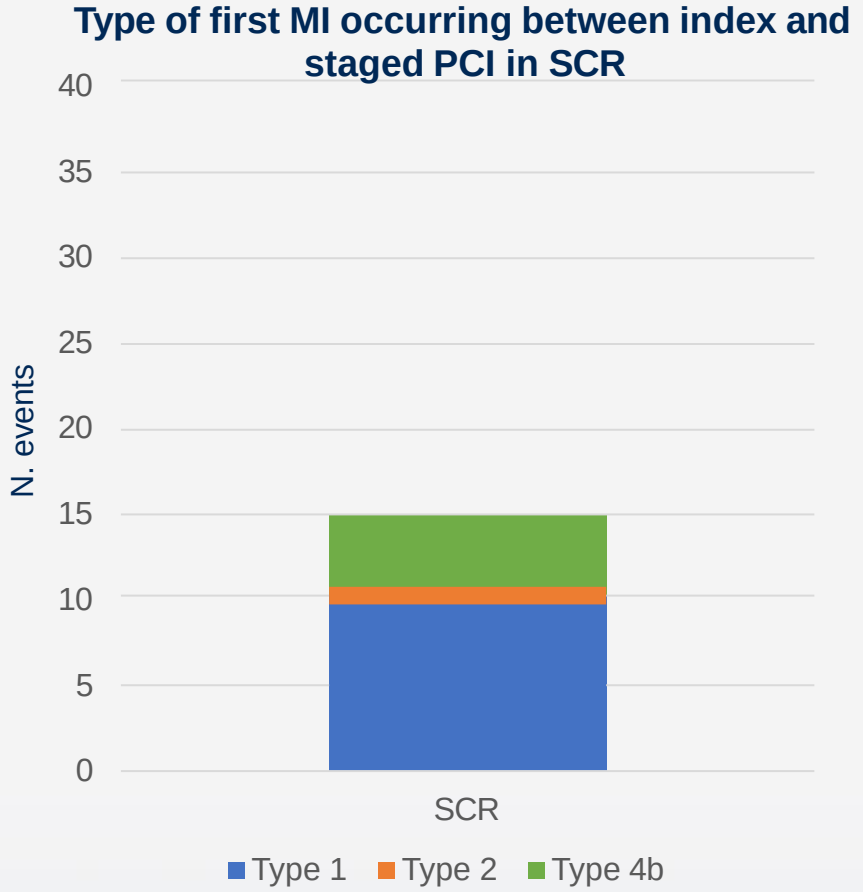


No. at Risk

ICR	764	744	743	742	742	742	738	736	735	734	729	624	680
SCR	761	732	724	721	719	718	718	716	716	714	714	710	666

Type of first occurring Myocardial Infarction





ICR= immediate complete revascularization. SCR=staged complete revascularization.

44% of all myocardial infarctions in the staged complete revascularization group occurred in the time window between the index and the staged PCI. No Type 5 MI occurred.

Physiologic guidance revascularization for non-infarct related artery

ACC.24

FULL REVASC

FFR-Guided Complete or Culprit-Only PCI in Patients with Myocardial Infarction

FELIX BÖHM, MD, PHD

Karolinska Institute and Danderyd Hospital, Stockholm, Sweden
On behalf of the FULL REVASC Trial Executive and Steering Committees and Investigators

AMERICAN COLLEGE of CARDIOLOGY

Trial design

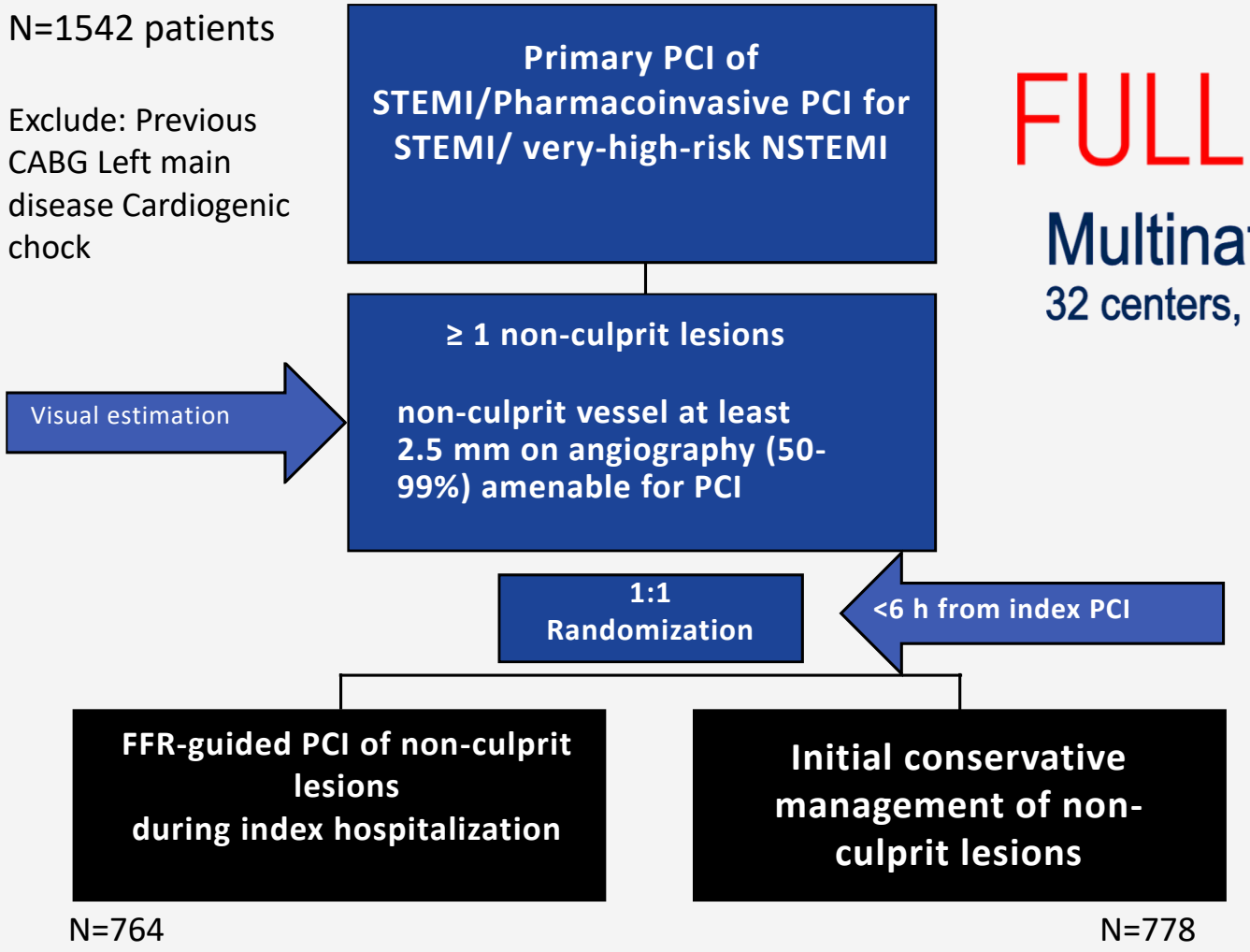
N=1542 patients

Exclude: Previous CABG Left main disease Cardiogenic chock

FULL REVASC

Multinational RRCT hybrid

32 centers, 7 countries

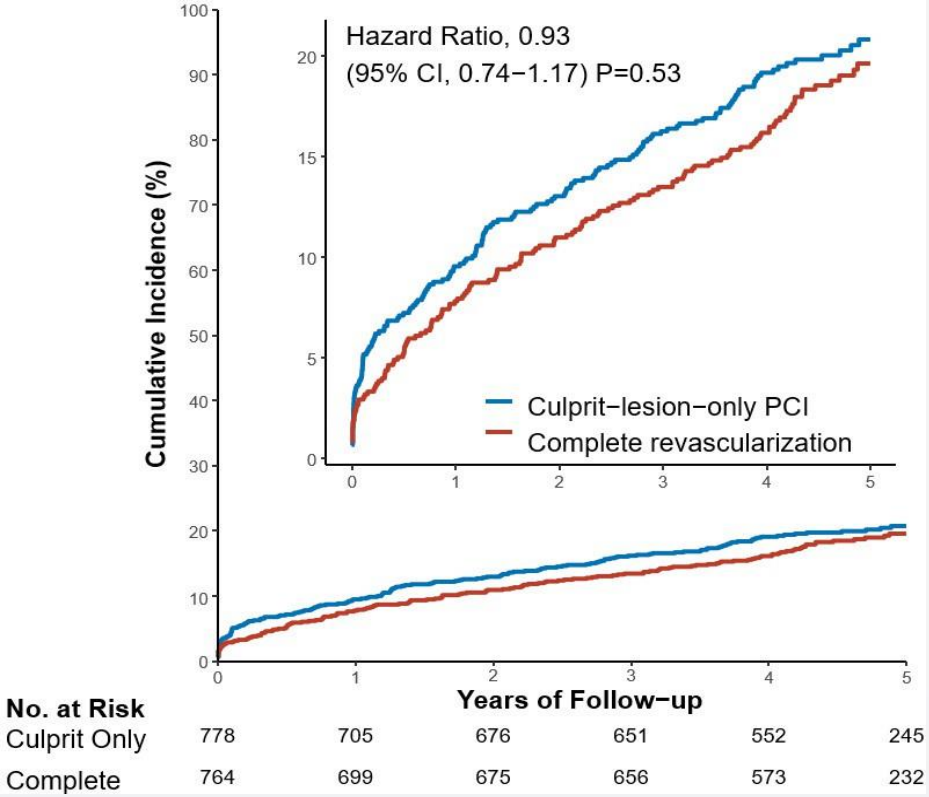


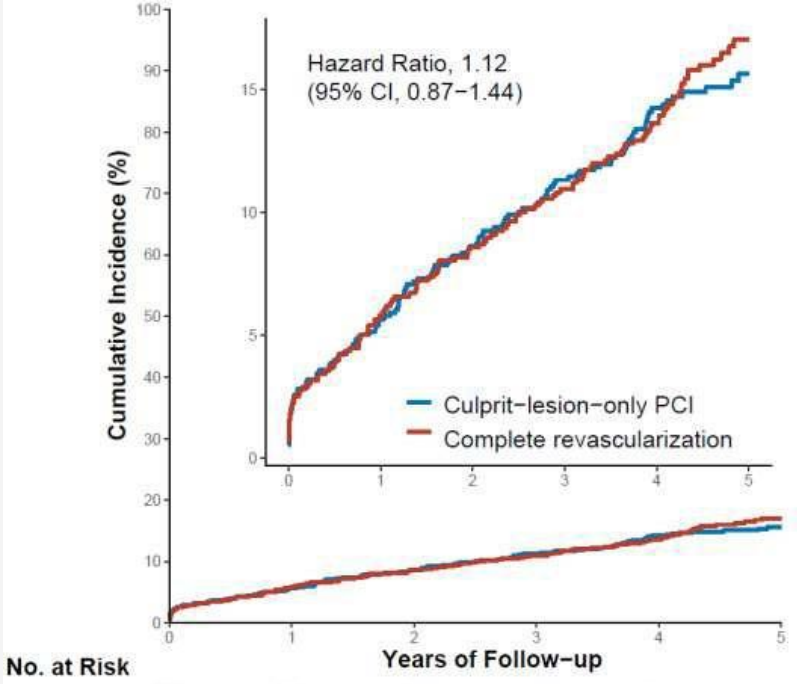
Median follow-up 4.8 years

304 primary endpoint events: Death, MI or unplanned revasc

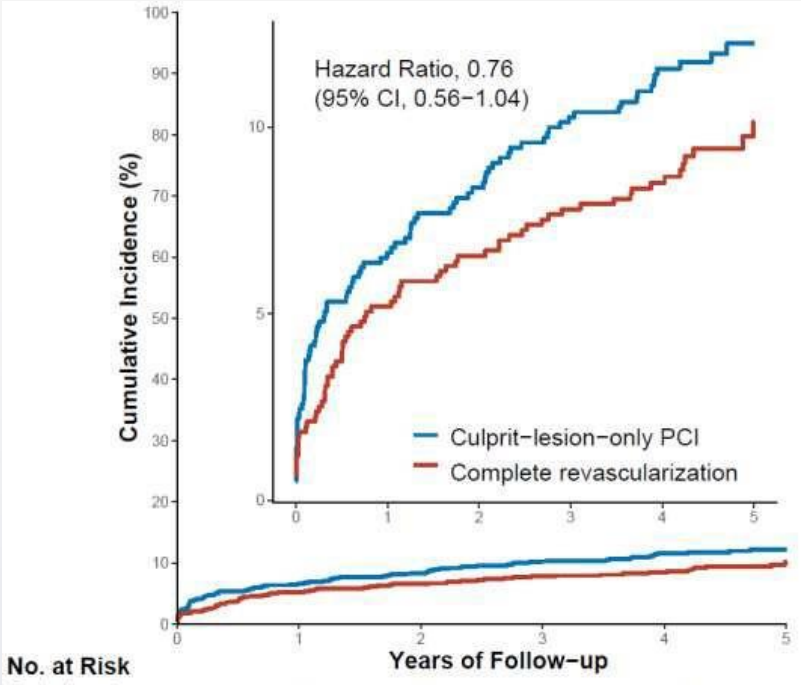
Primary Endpoint

Death, MI, Unplanned revasc.



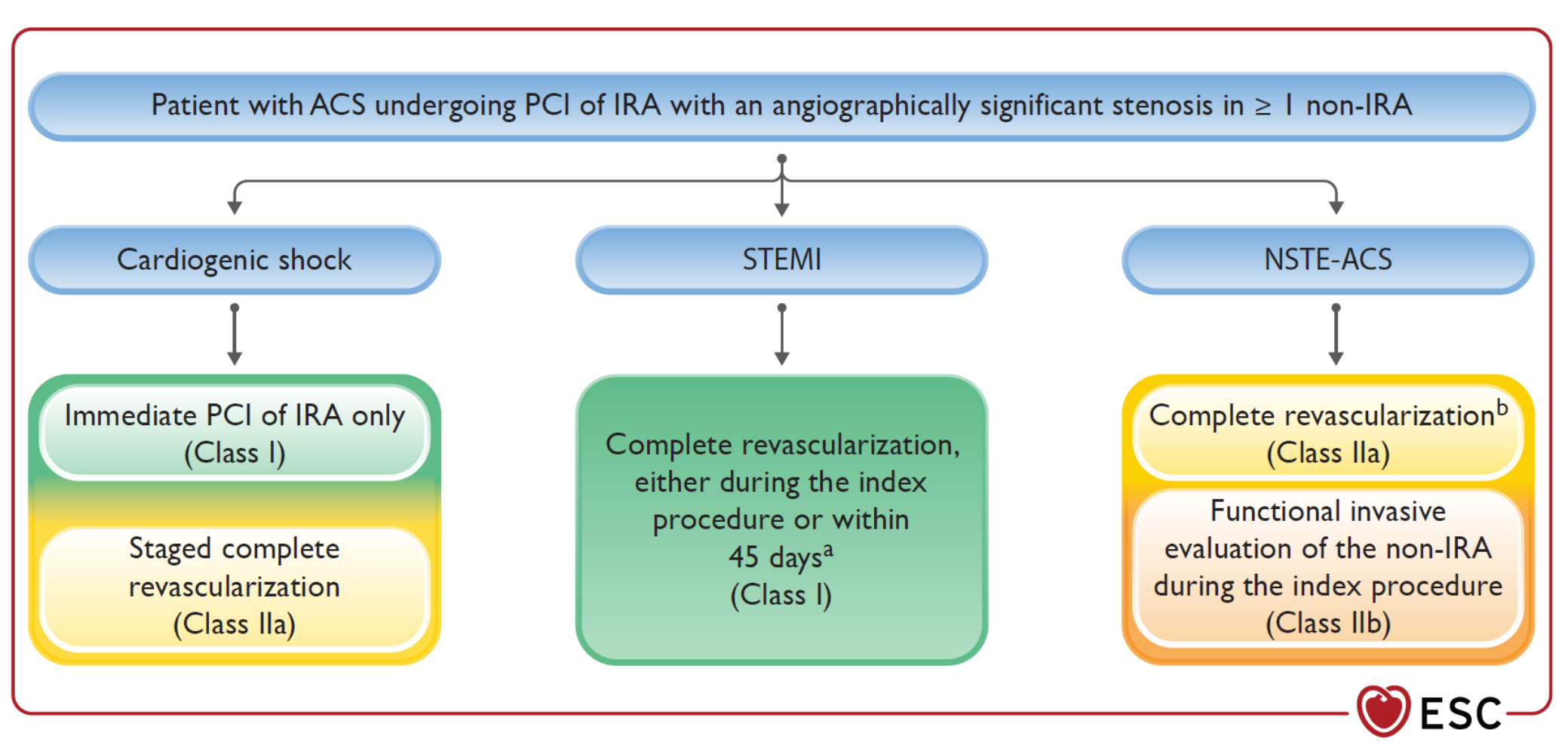


Death or MI



Unplanned revasc.

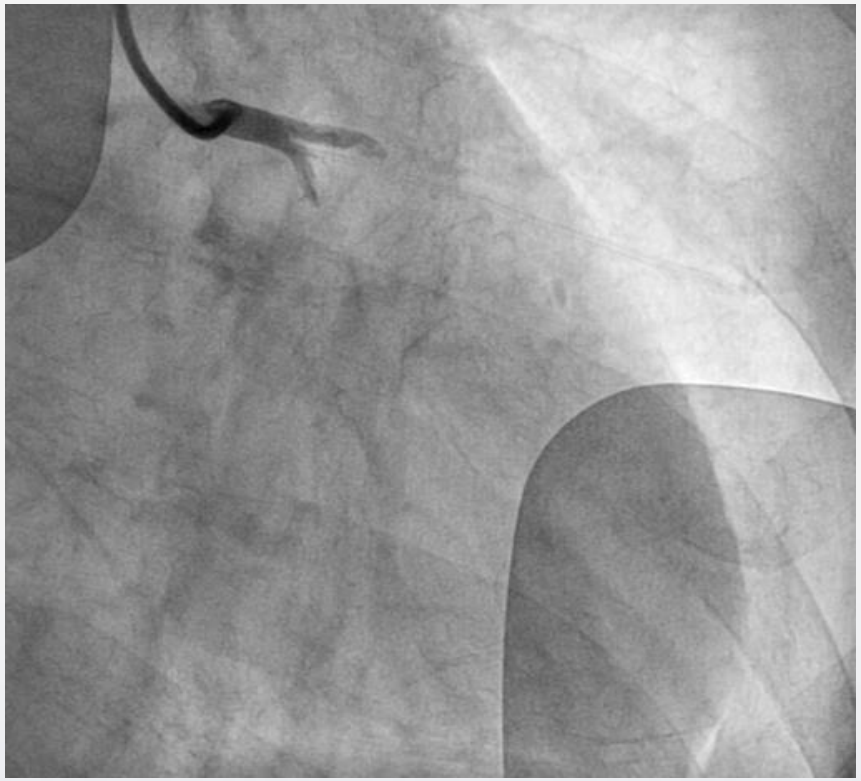
2023 ESC ACS guidelines

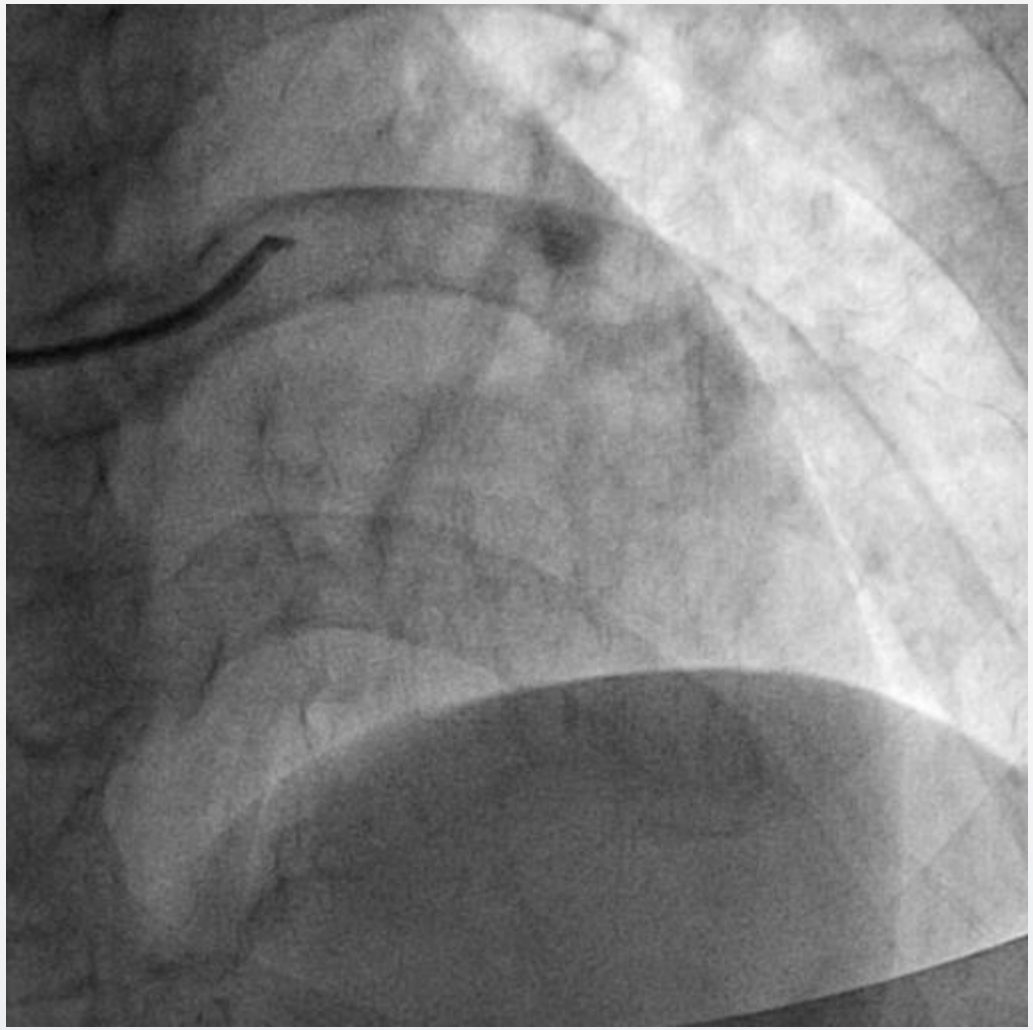


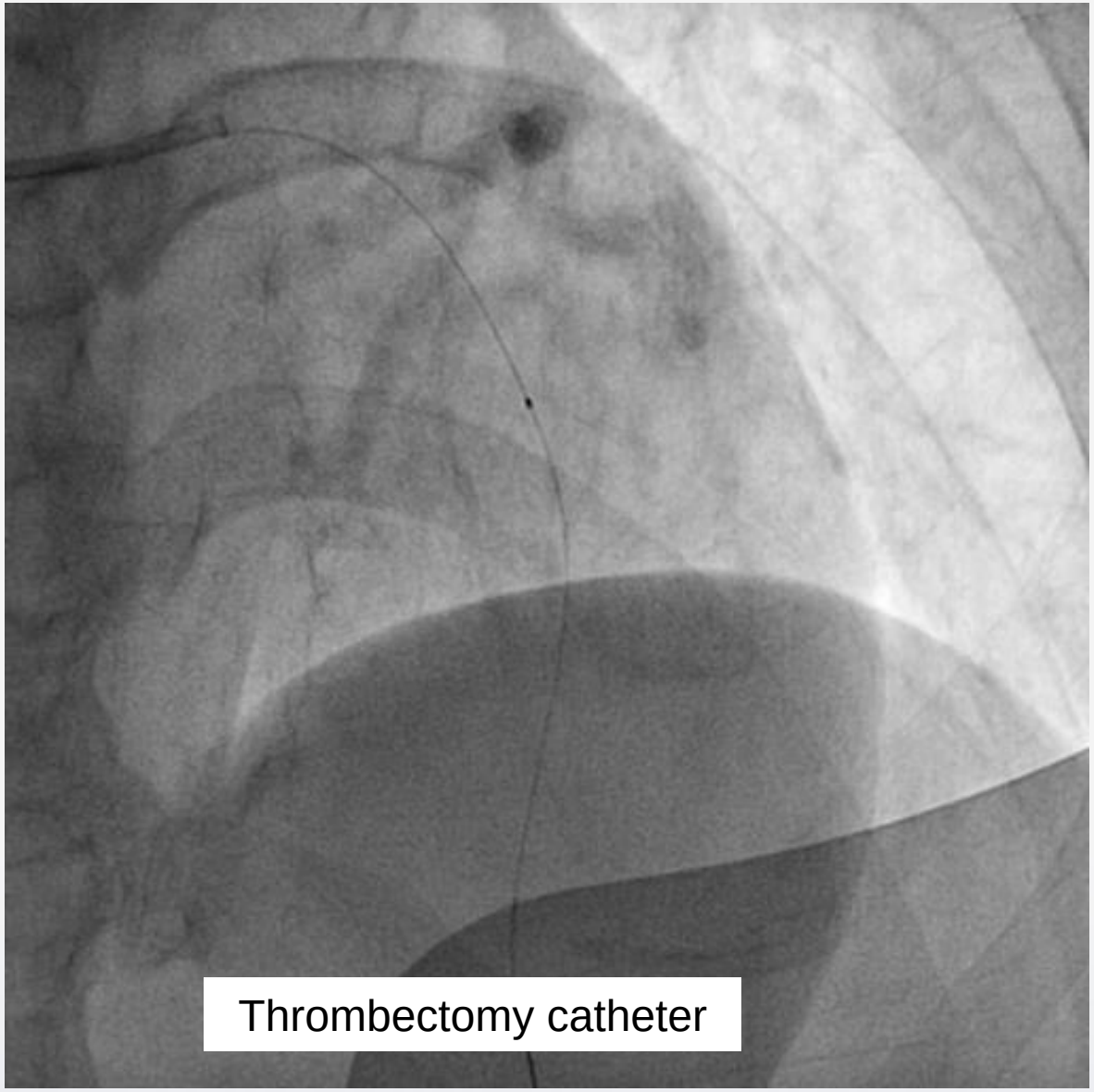
Case Primary PCI with aspiration thrombectomy and DES for multivessel disease using direct universal guide catheter via radial approach

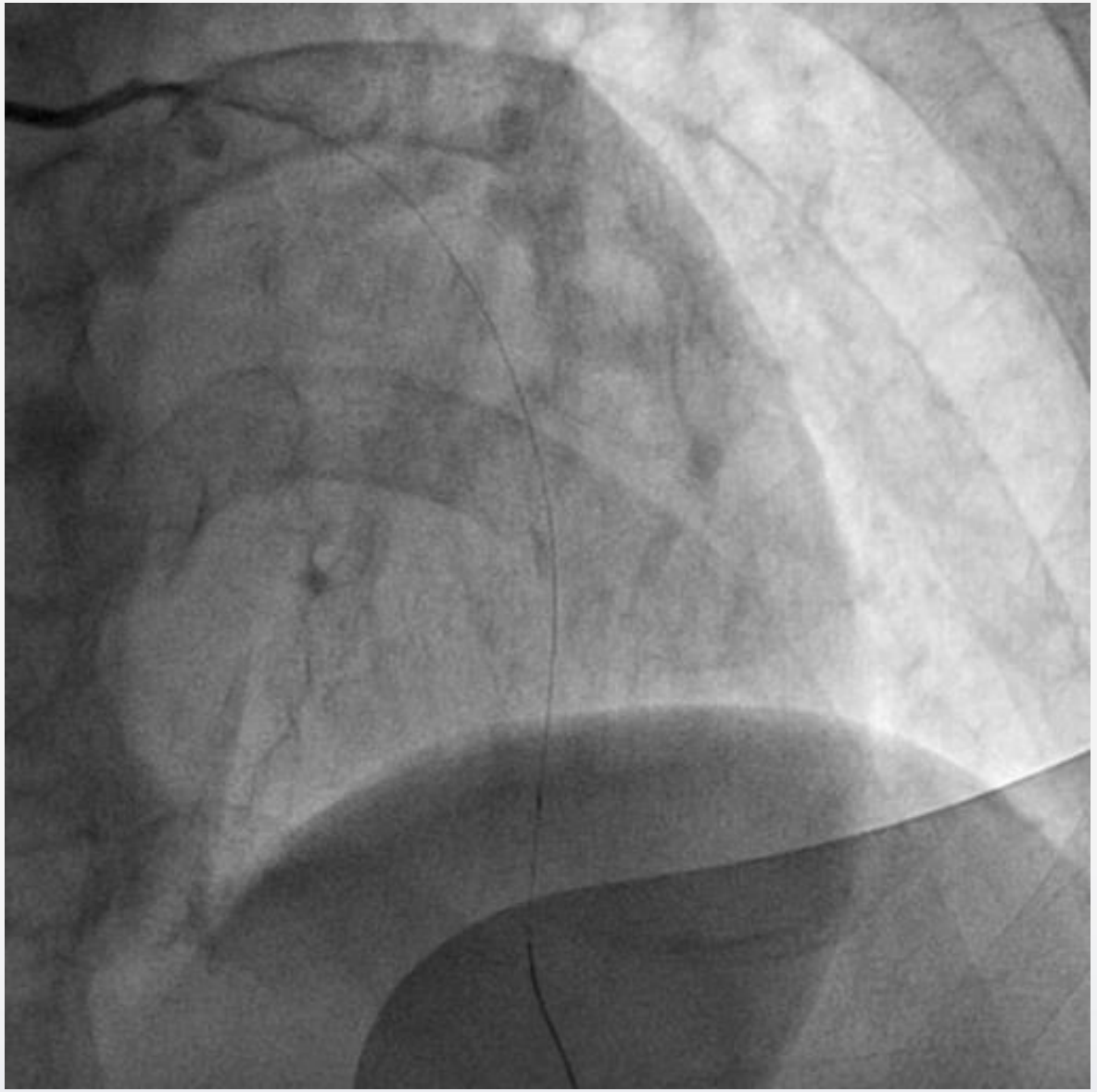
A 61-YO male, anterior STEMI for 3 hours

- Pretreatment with aspirin and ticagrelor
- Right radial approach
- IL 3.5 guide catheter

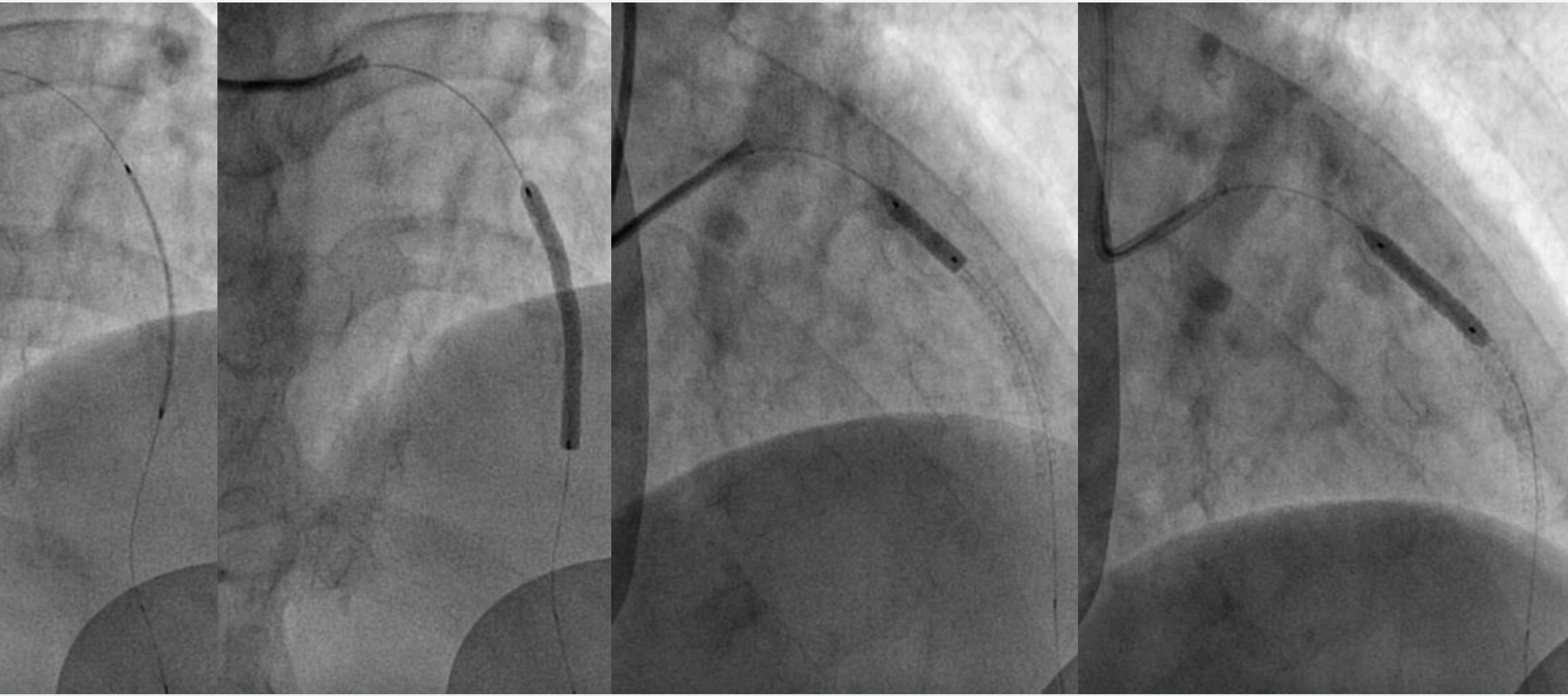




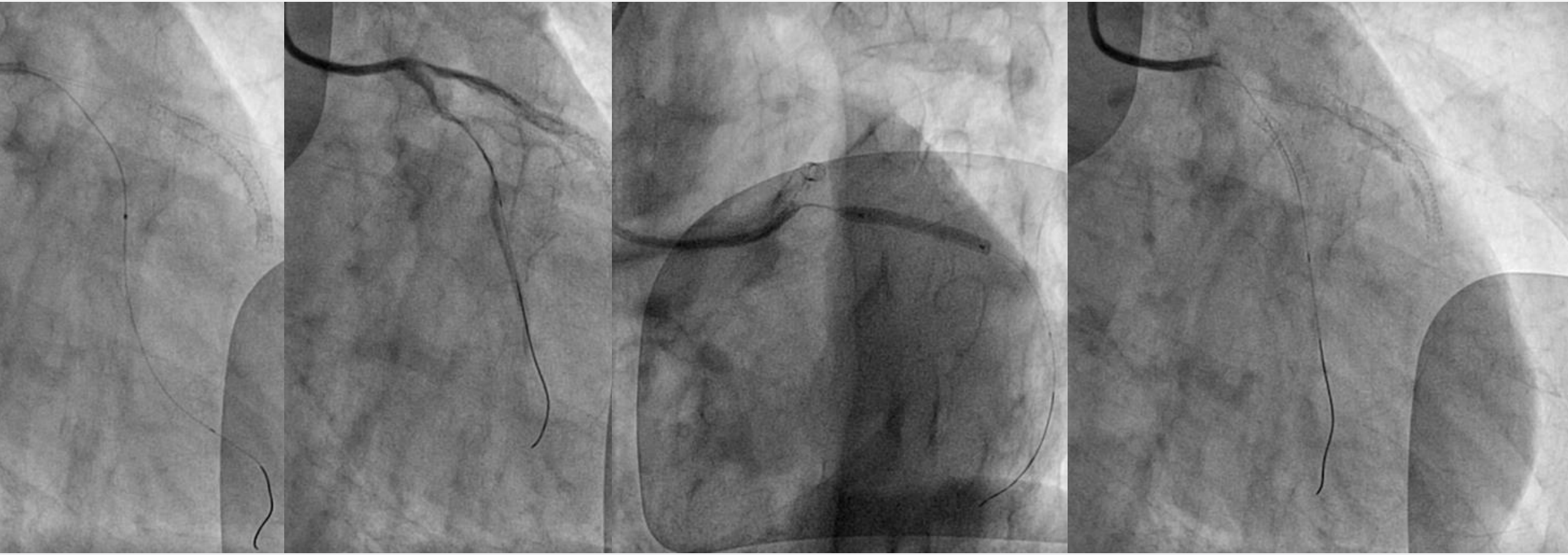

Thrombectomy catheter



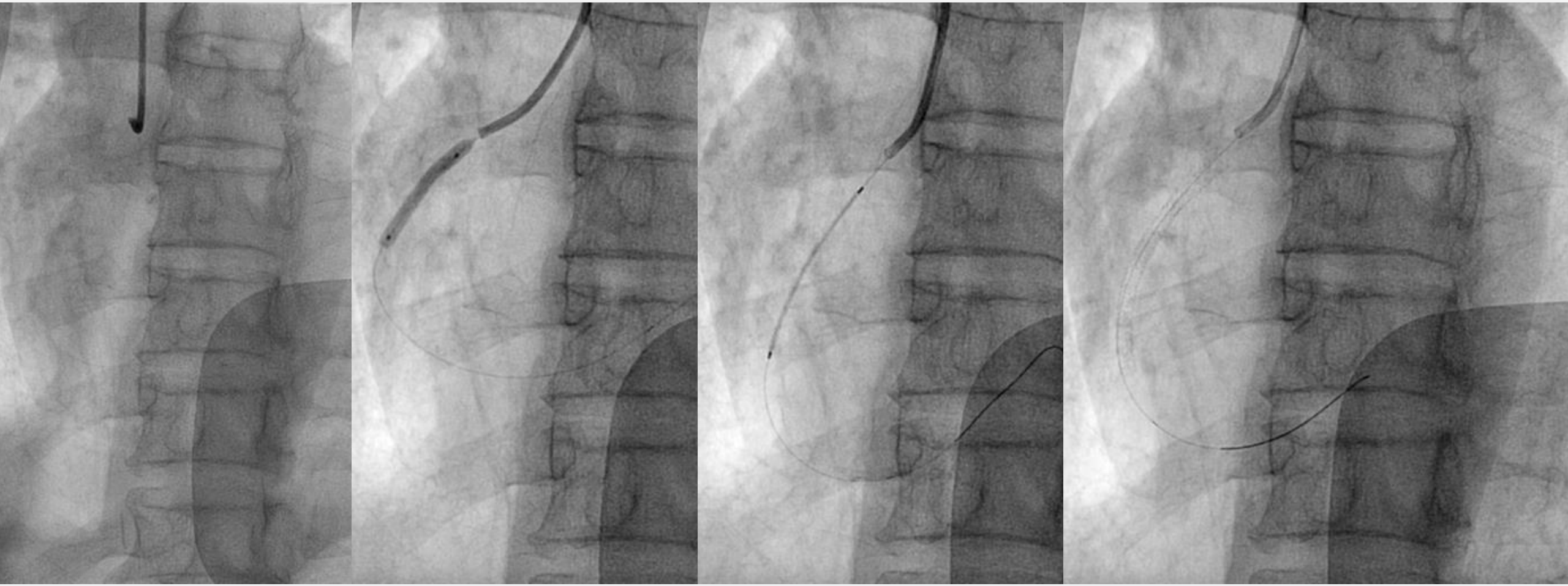
PCI 2DES placement in LAD



PCI of LCx, 1 DES placement

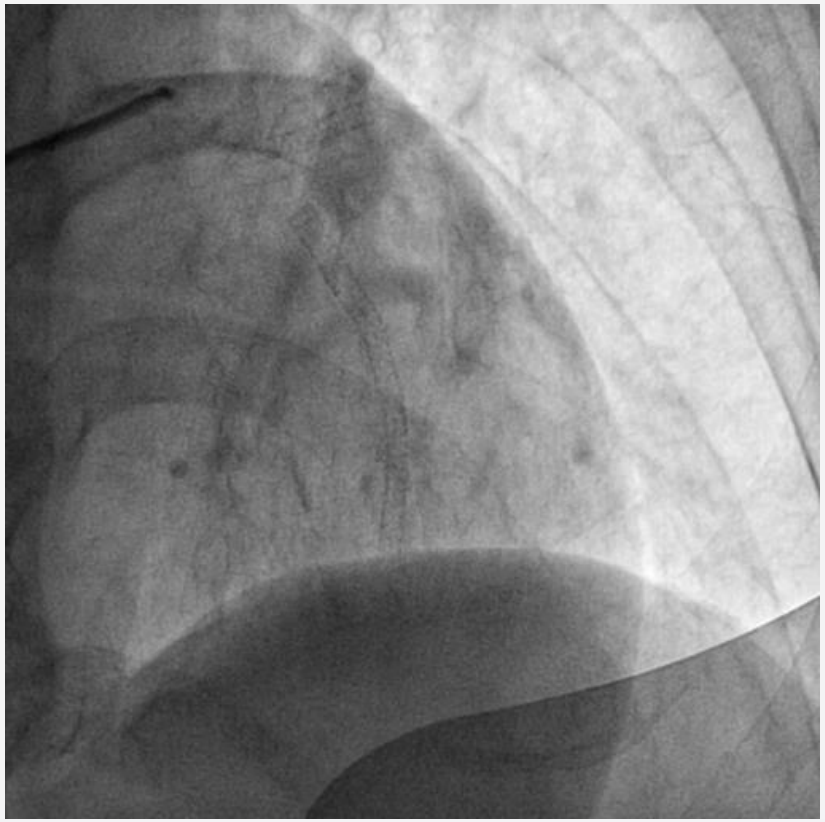


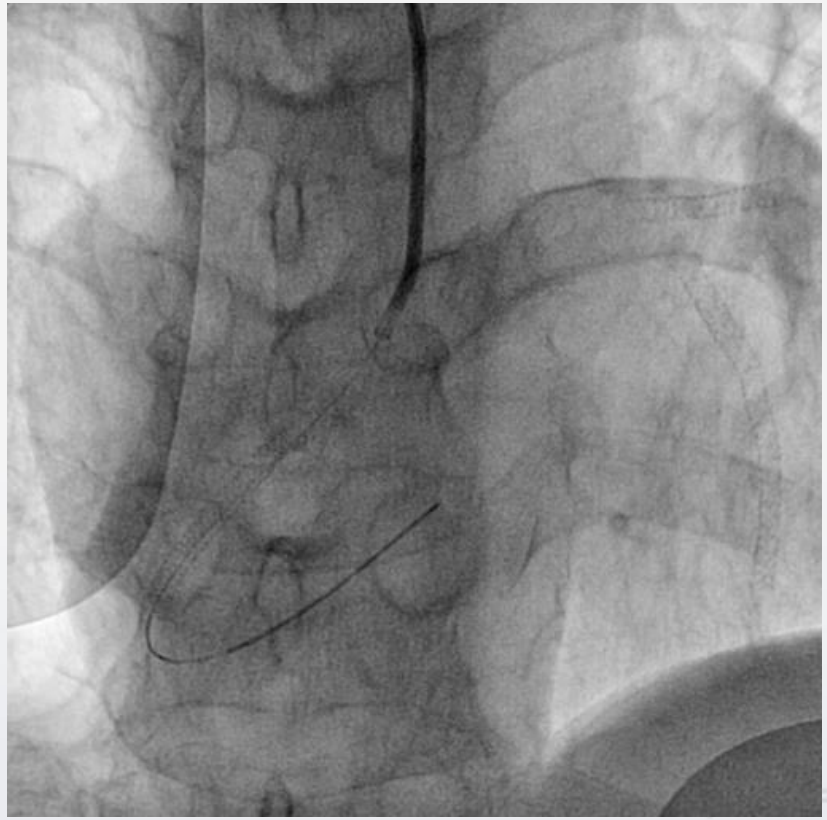
PCI of RCA



Summary

- Equipments
  - 0 Diag catheter
  - 1 Guide
  - 1 PTCA guidewire
  - 0 SC balloon
  - 5 Stents
  - 1 NC balloon
  - Contrast 120 ml
  - Flu time 18.23 min





Draft of new reimbursement act (on public hearing)

- PCI of infarct related artery in STEMI
  - Chest pain in 12 hours
  - Chest pain 12-48 hours with ongoing ischemic symptoms
  - Onset > 48 hours with evidence of ongoing ischemia or evidence of viable myocardium
- Staged PCI of non-infarct related artery
  - Supply the large area of myocardium
  - (if perform immediate non-infarct related PCI, may need to submit appeal documentations)

Conclusion

- Complete revascularization in stable MVD-STEMI has shown benefit to reduce death, MI and IDRV compared to culprit-only PCI
- In CS MVD-STEMI, PCI of culprit lesion only is recommended
- Still limited evidence of physiologic guidance of NIRA-PCI
- Timing of complete revascularization is depended on clinical setting, anatomical suitability, reimbursement system