PCI Strategy in AMI with MVD

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Disclosure

- Grants / Research Support

  Boston Scientific

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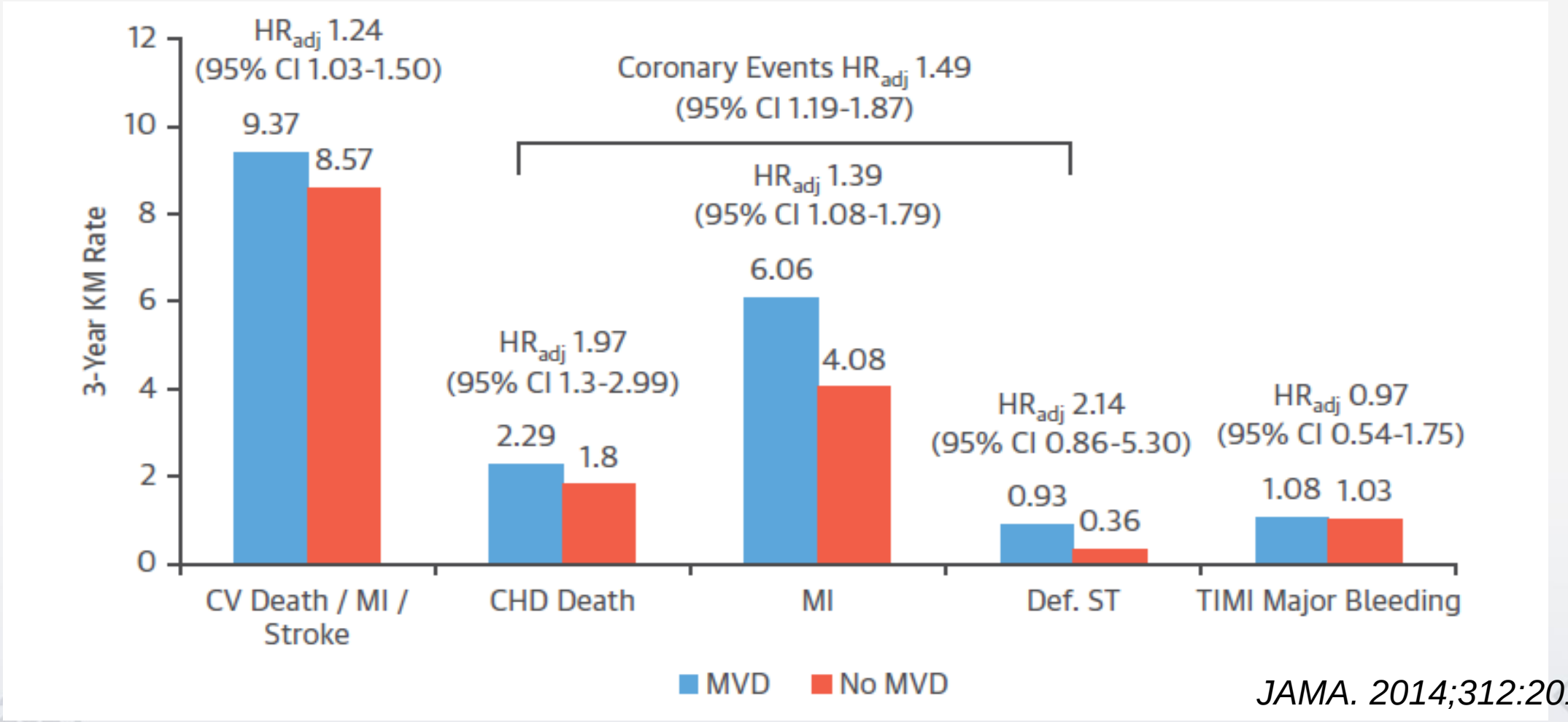
Prognosis of AMI Patients with MVD

Approximately 50% of AMI patients, Poor Clinical Outcomes



JAMA. 2014;312:2019-2027

J Am Coll Cardiol. 2018;71:489-496

STEMI with MVD: Major RCTS

Culprit Only vs. Complete Revascularization Trials in STEMI

TABLE 1 Is Complete/NCL Revascularization Beneficial?

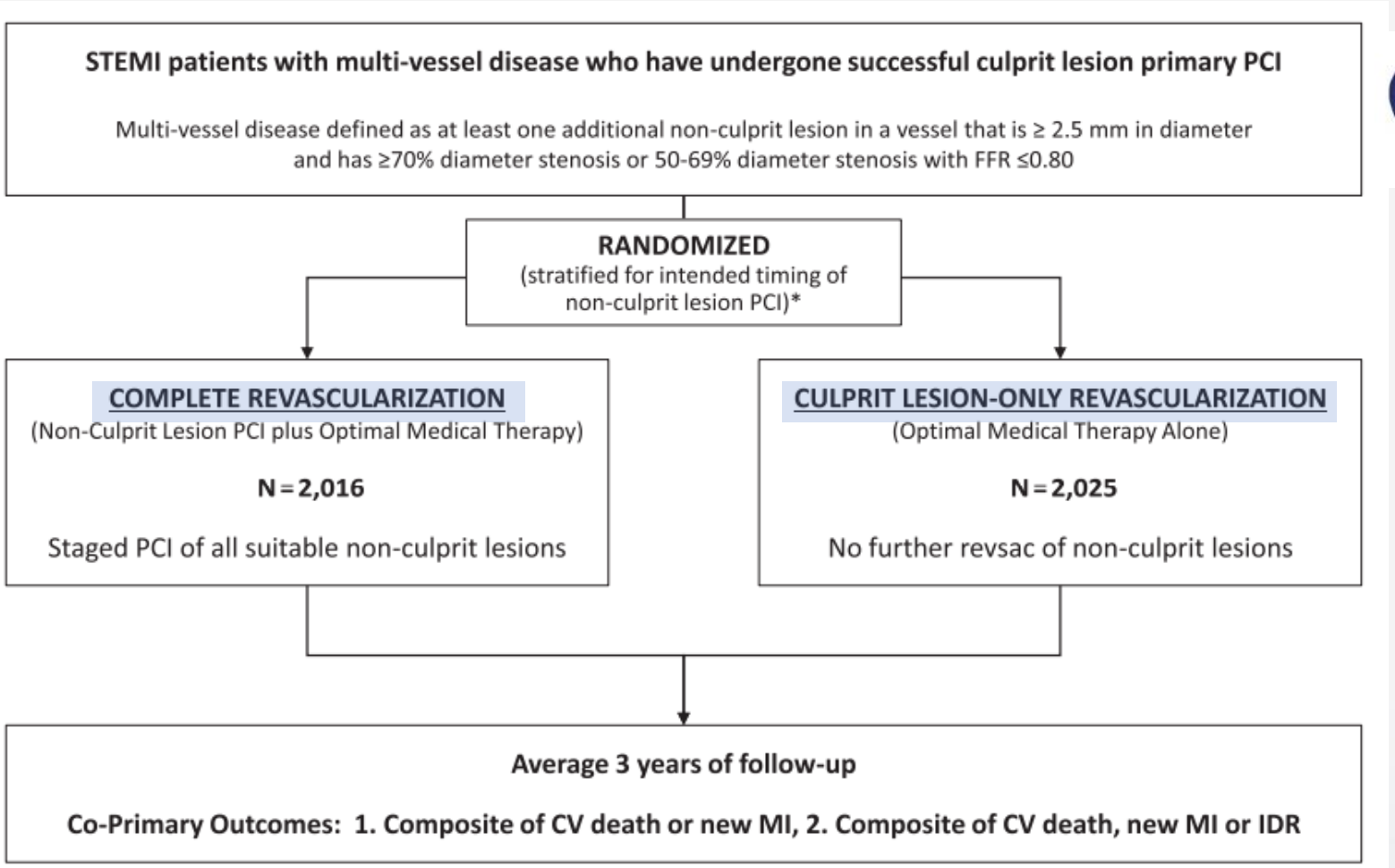
Study (Ref. #)	Inclusion Period	Intervention	Control	Primary Outcome	Results
PRAMI (3)	2008–2013	Index procedure PCI of NCLs with angiographic diameter stenosis >50% (n = 234)	No further PCI (n = 231)	Composite of death from cardiac causes, nonfatal MI, or refractory angina	Mean follow-up 23 months. Outcome 9% with complete revascularization and 23% without NCL revascularization (HR: 0.35; 95% CI: 0.21–0.58).
CvLPRIT (4)	2011–2013	Index procedure or index admission PCI of NCLs with angiographic diameter stenosis >70% in one view or >50% in 2 views (n = 138)	No further PCI (n = 139)	Composite of all-cause mortality, recurrent MI, heart failure, and ischemia-driven revascularization by PCI or CABG	Median follow-up 364 days. Outcome 10.0% with complete revascularization and 21.2% without NCL revascularization (HR: 0.45; 95% CI: 0.24–0.84).
DANAMI-3-PRIMULTI (5)	2011–2014	Index admission (not index pr[illegible]re) PCI of [illegible]CLs with an[illegible] angiographic diameter stenosis >90% (n = 314)	No further PCI (n = 313)	Composite of all-cause mortality, reinfarction, or ischemia-driven [illegible]	Median follow-up 27 months. Outcome 13% with complete revascularization and 22% without NCL revascularization (HR: 0.56; 95% CI: 0.38–0.83).
COMPARE-ACUTE (6)	2011–2015	Index [illegible] PCI [illegible] diameter stenosis >50% and FFR ≤0.80 (n = 295)	[illegible]	[illegible] any revascularization, and cerebrovascular events	1-year follow-up. Outcome 7.8% with complete revascularization and 20.5% without NCL revascularization (HR: 0.35; 95% CI: 0.22–0.55).
COMPLETE (7)	2013–2017	Index admission (not index procedure) or staged PCI of NCLs with angiographic diameter ste[illegible] >70% or angiographic dia[illegible] FF[illegible]	No further PCI (n = 2,025)	1. Composite of cardiovascular death and myocardial infarction 2. Composite of cardiovascular death, m[illegible]ardial infarction, [illegible] revascularization	Median follow-up 3 yrs. Outcome 1: 7.8% with complete revascularization and 10.5% without [illegible] [illegible] revascularization and 16.7% without NCL revascularization (HR: 0.51; 95% CI: 0.43–0.61).

Reduced Repeated Revascularization

Reduced Cardiac Death/MI

JACC Cardiovasc Interv. 2020;13:1145-1154

COMPLETE Trial



COMPLETE TRIAL

Angiography Guided (DS≥70%)

+

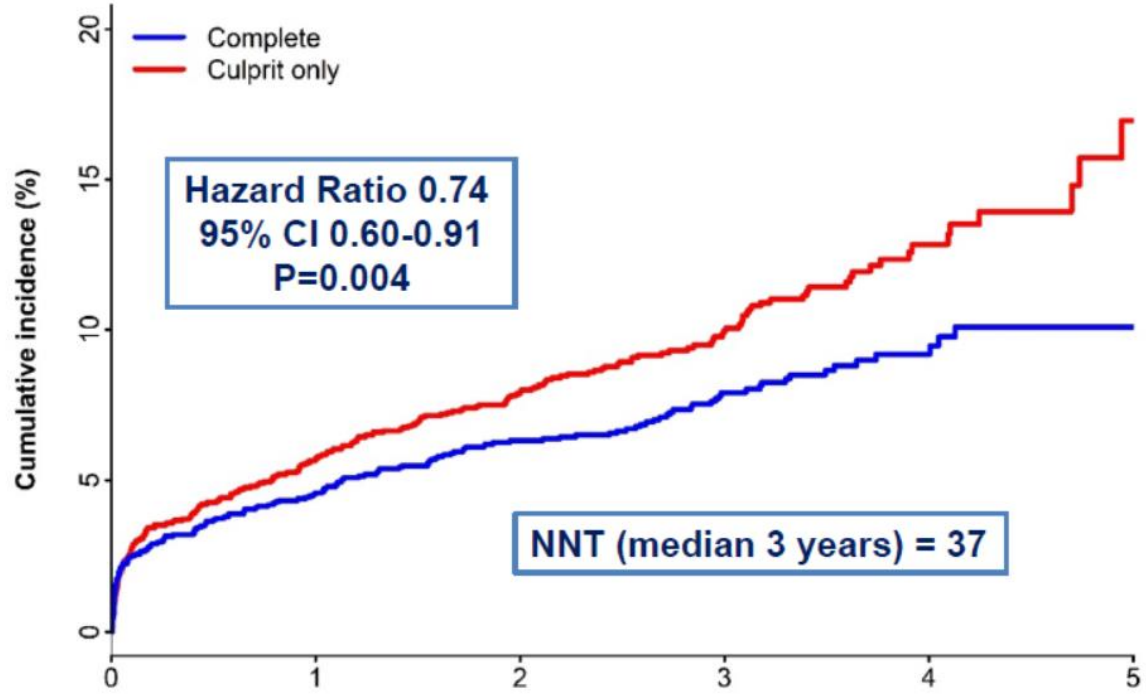
Physiology Guided (DS 50-69%)

Complete Revasc

Am Heart J. 2019;215:157-166

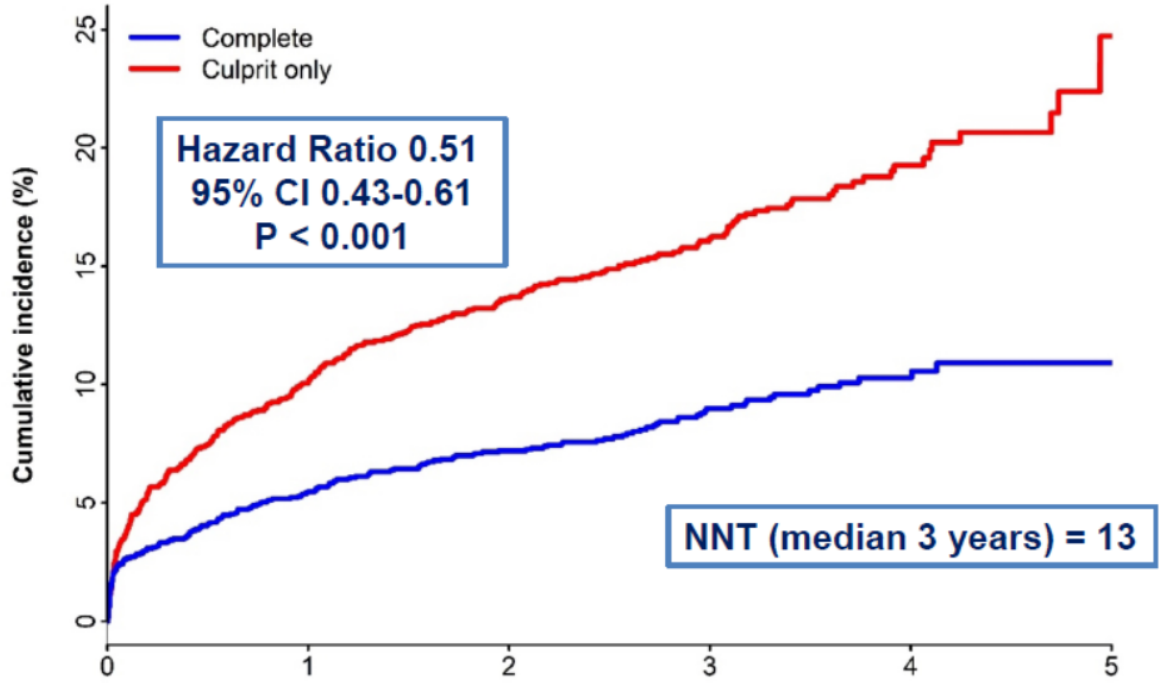
COMPLETE Trial: Main Result

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

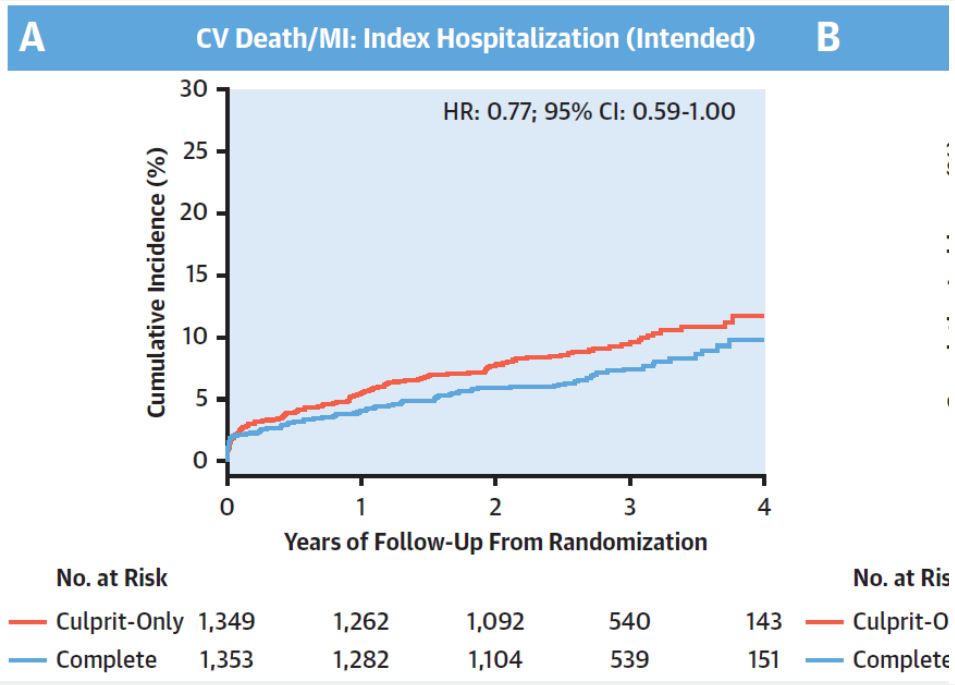


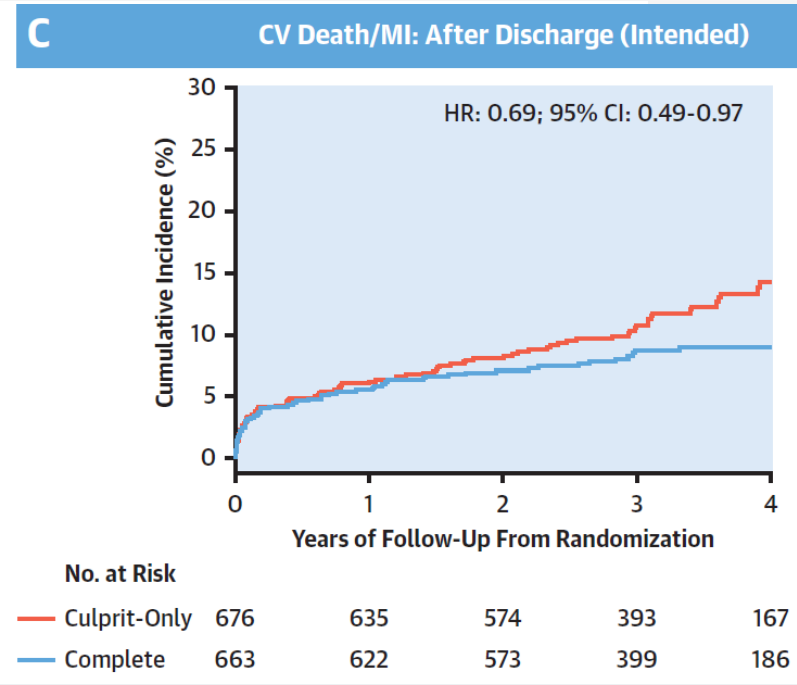
No. at Risk						
Complete	2016	1886	1659	925	329	66
Culprit only	2025	1808	1559	865	294	57

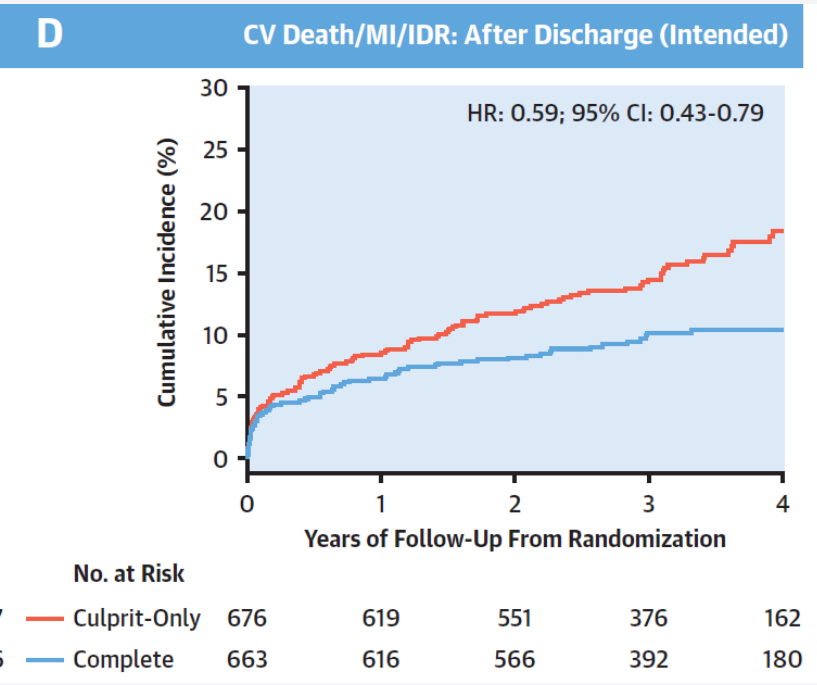
N Engl J Med. 2019;381:1411-1421

COMPLETE Trial: Time to Treat NCL

Benefit of Complete Revascularization over Culprit-Lesion only PCI was Consistent among Timing of Nonculprit-Lesion Intervention.



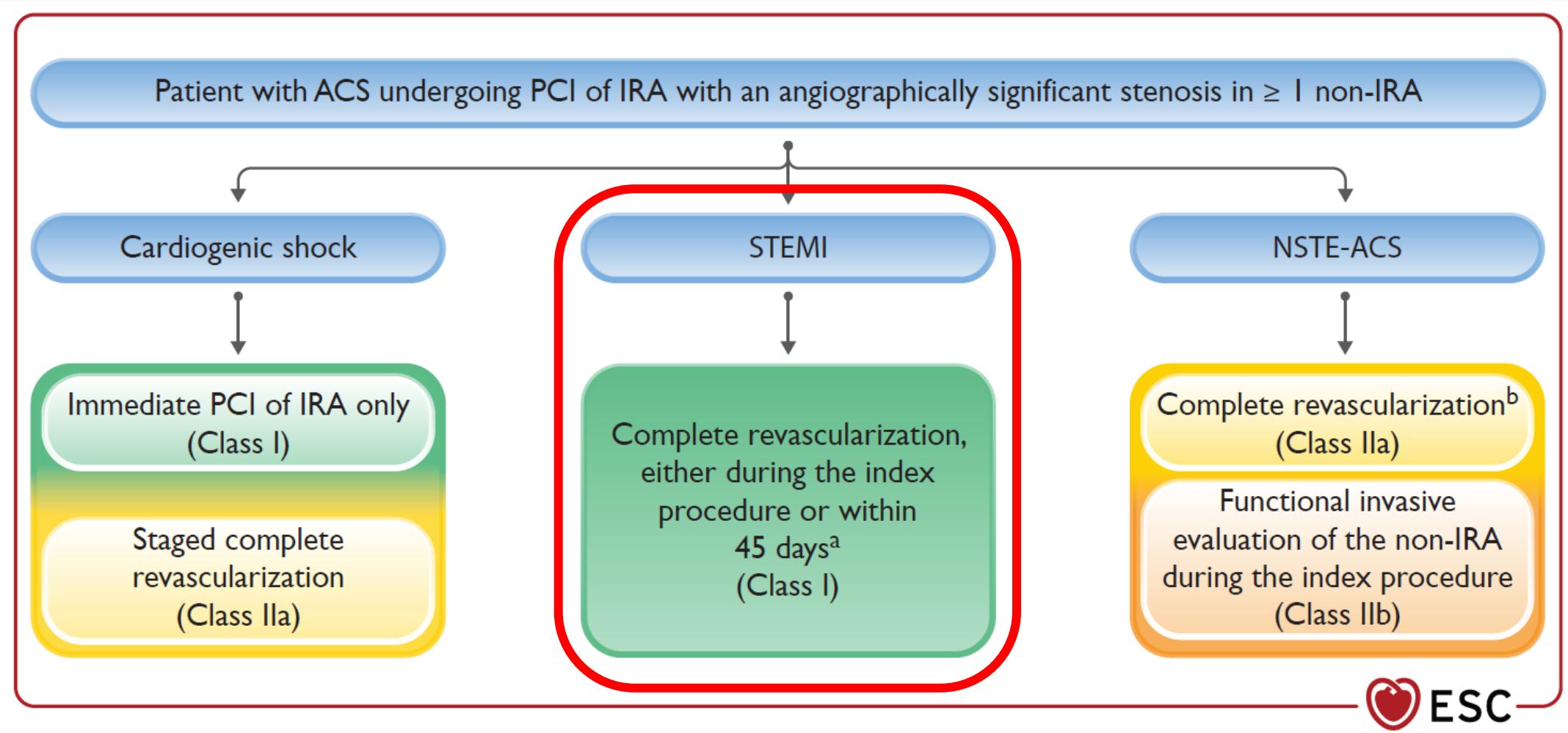




J Am Coll Cardiol. 2019;74:2713–2723

STEMI with MVD: Current Guidelines

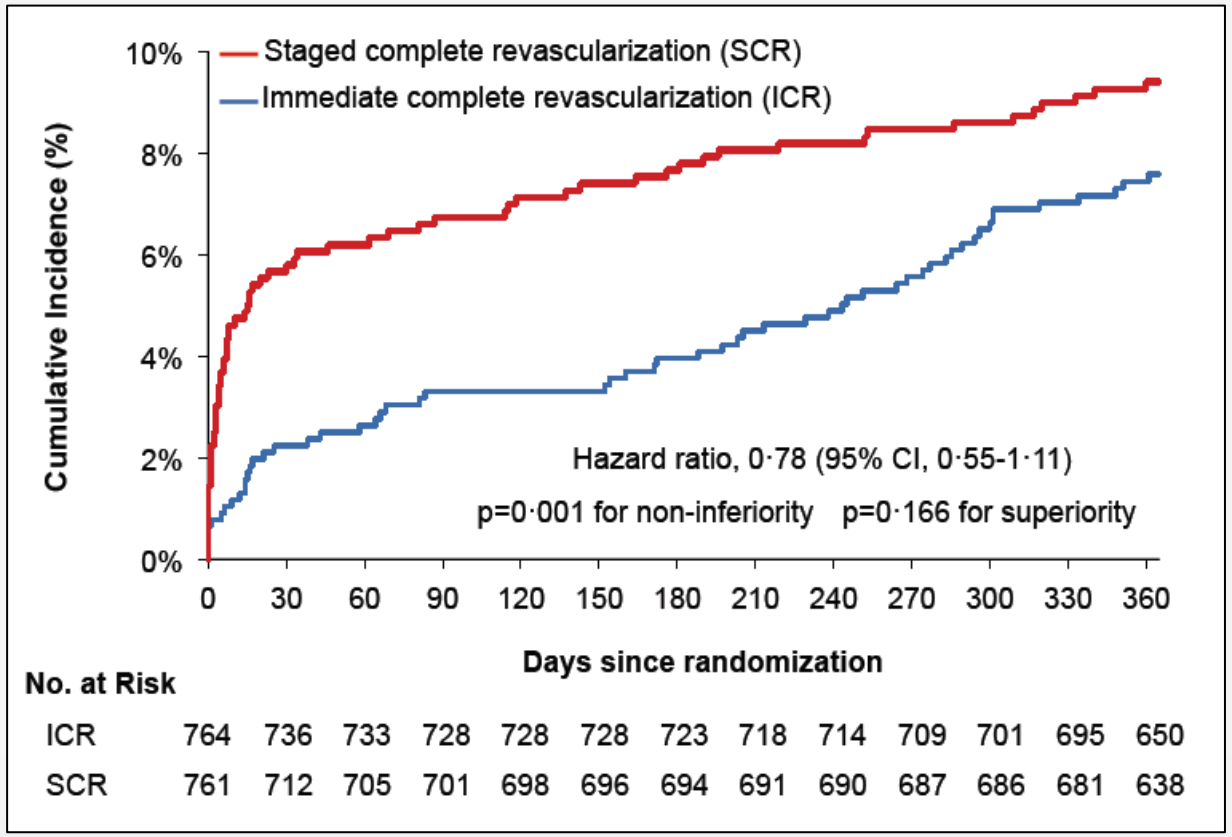
Recent Revascularization Guideline



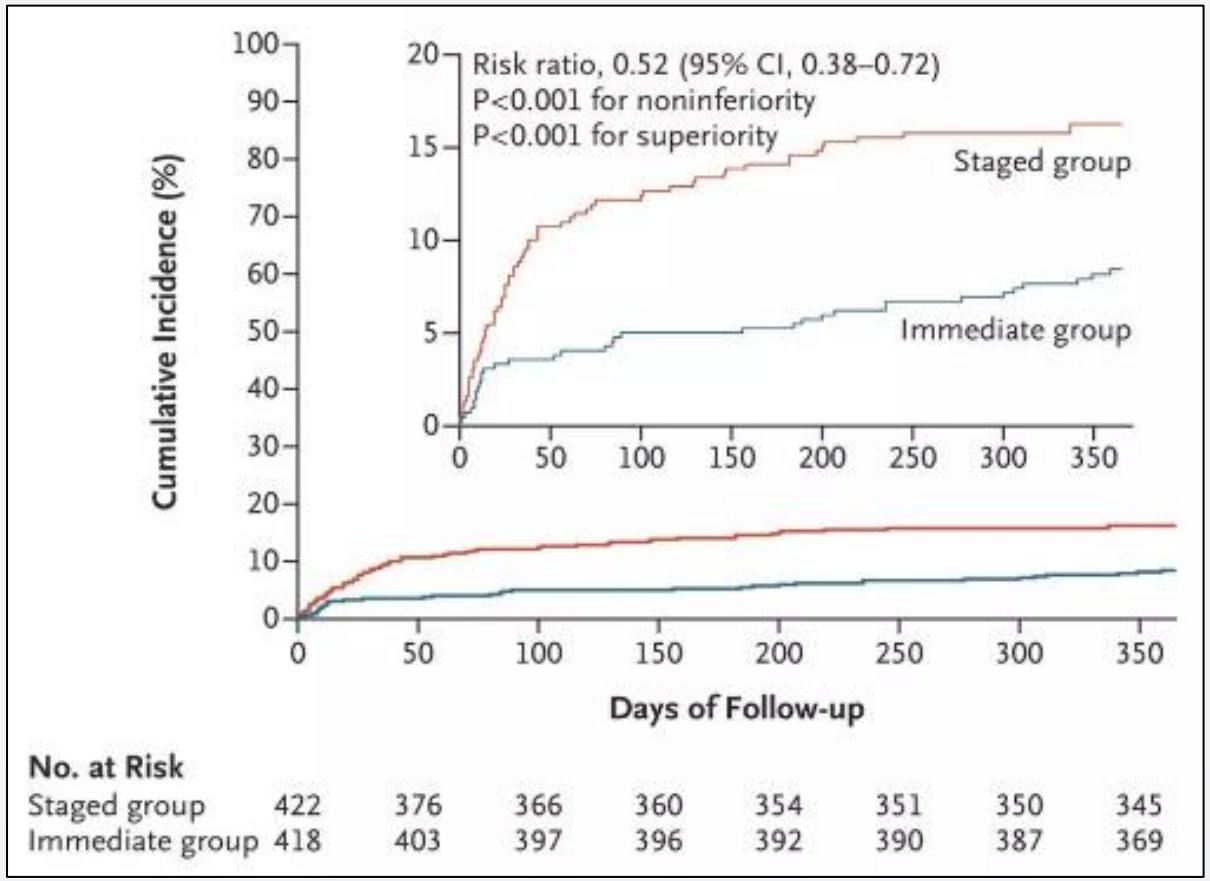
2023 ESC/EACTS Guideline

Recent Major RCTs

Non-inferior results with Immediate CR compared with Staged CR



All-cause mortality, MI, any unplanned IDR, or CVEs



Death from any cause, nonfatal MI, stroke, unplanned IDR, or hospitalization for HF

Lancet. 2023;401:1172-1182 (BIOVASC)
N Engl J Med. 2023;389:1368-1379 (MULTISTARS)

Impact of Incomplete Revascularization

ICR was strongly associated with Poor Clinical Outcomes

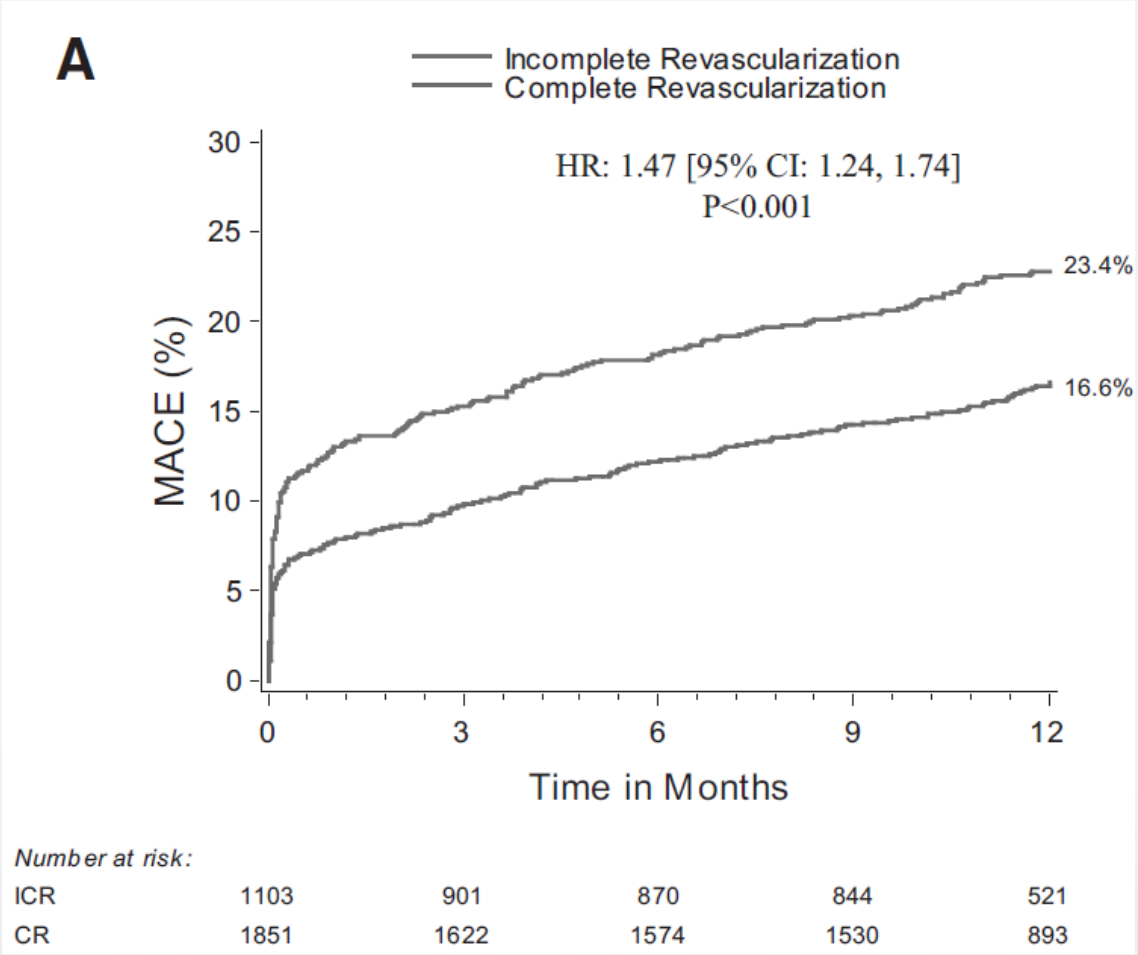


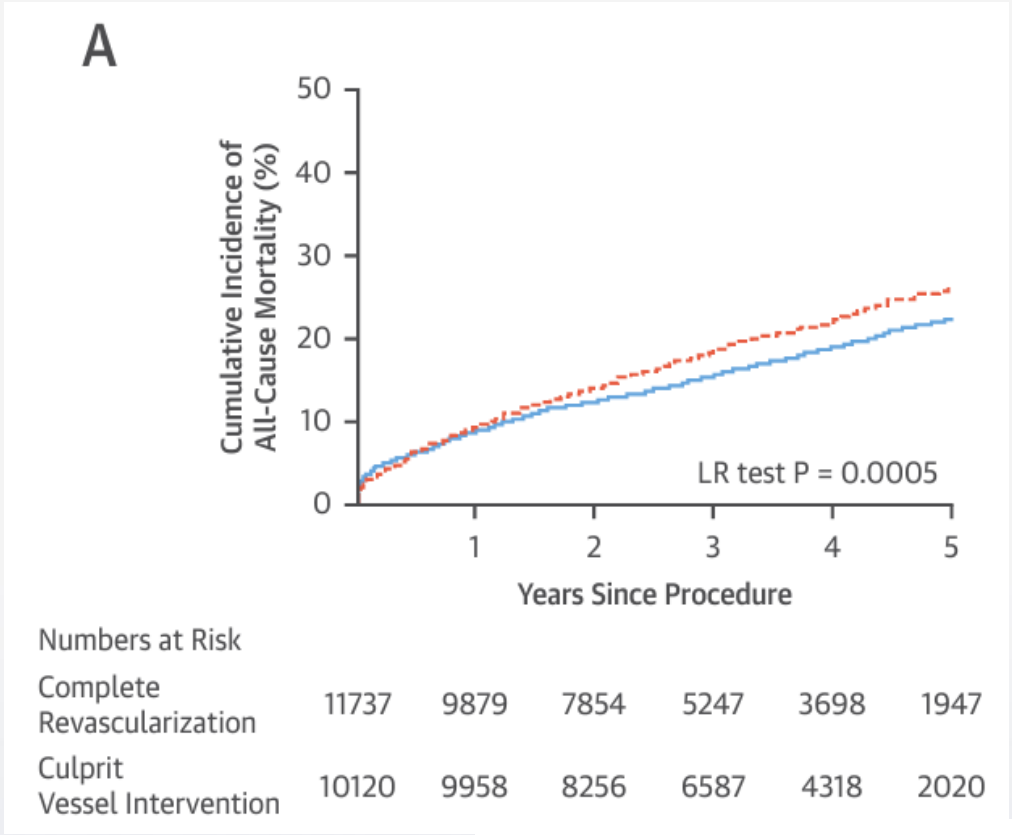
Table 4. Independent Predictors of 1-Year Major Adverse Cardiovascular Events

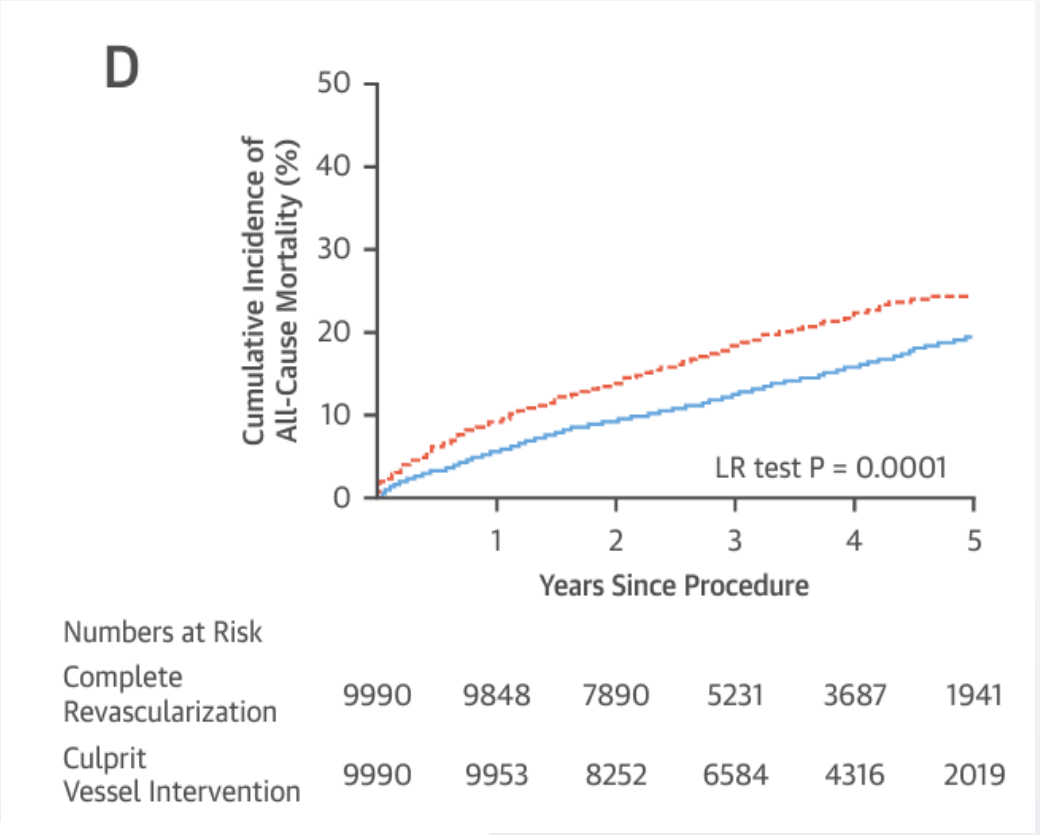
Variable	HR (95% CI)	*P*
ICR (DS ≥50%)	1.36 (1.12–.64)	0.002
Insulin-treated diabetes mellitus	1.34 (1.01–1.79)	0.046
Hyperlipidemia	1.23 (1.00–1.51)	0.049
Previous PCI	1.31 (1.08–1.60)	0.007
Renal insufficiency	1.61 (1.29–2.01)	<0.0001
No. of lesions treated by PCI	1.21 (1.11–1.32)	<0.0001
Triple-vessel CAD	1.21 (1.00–1.46)	0.053
Baseline WBC count	1.03 (1.00–1.06)	0.04

Circulation. 2012;125:2613-2620. Acuity trial in ACS

NSTEMI with MVD: Observational Study

Complete Revascularization showed better Long Term Clinical Outcomes compared with Culprit-Lesion only PCI





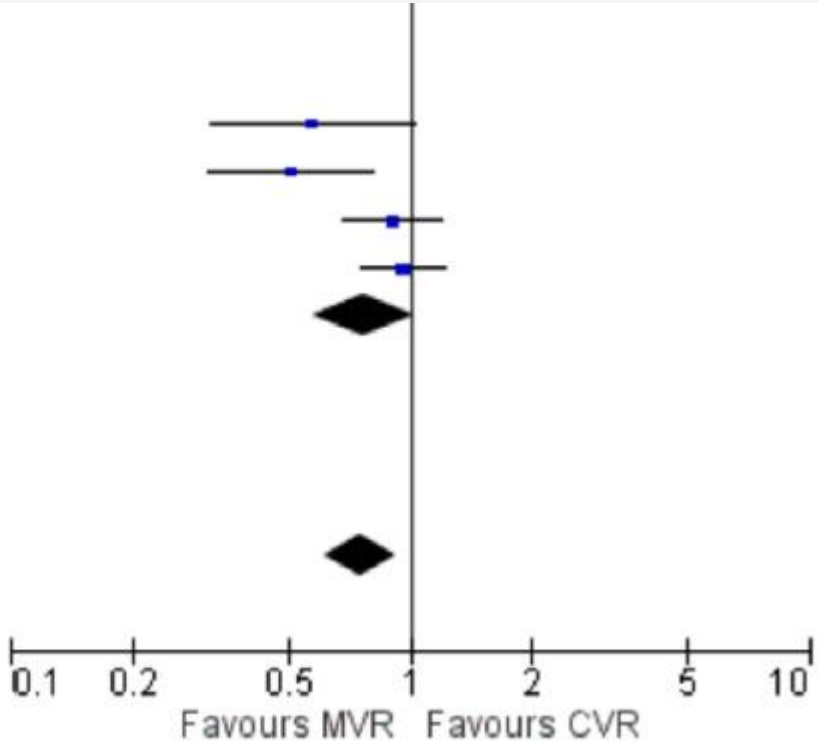
Complete Revascularization ------ Culprit Vessel Intervention

J Am Coll Cardiol. 2018;72:1989-1999 (Large scale observational cohort study in London)

NSTEMI with MVD: Meta-Analysis

Complete Revascularization showed better Long Term Clinical Outcomes compared with Culprit-Lesion only PCI

MACE

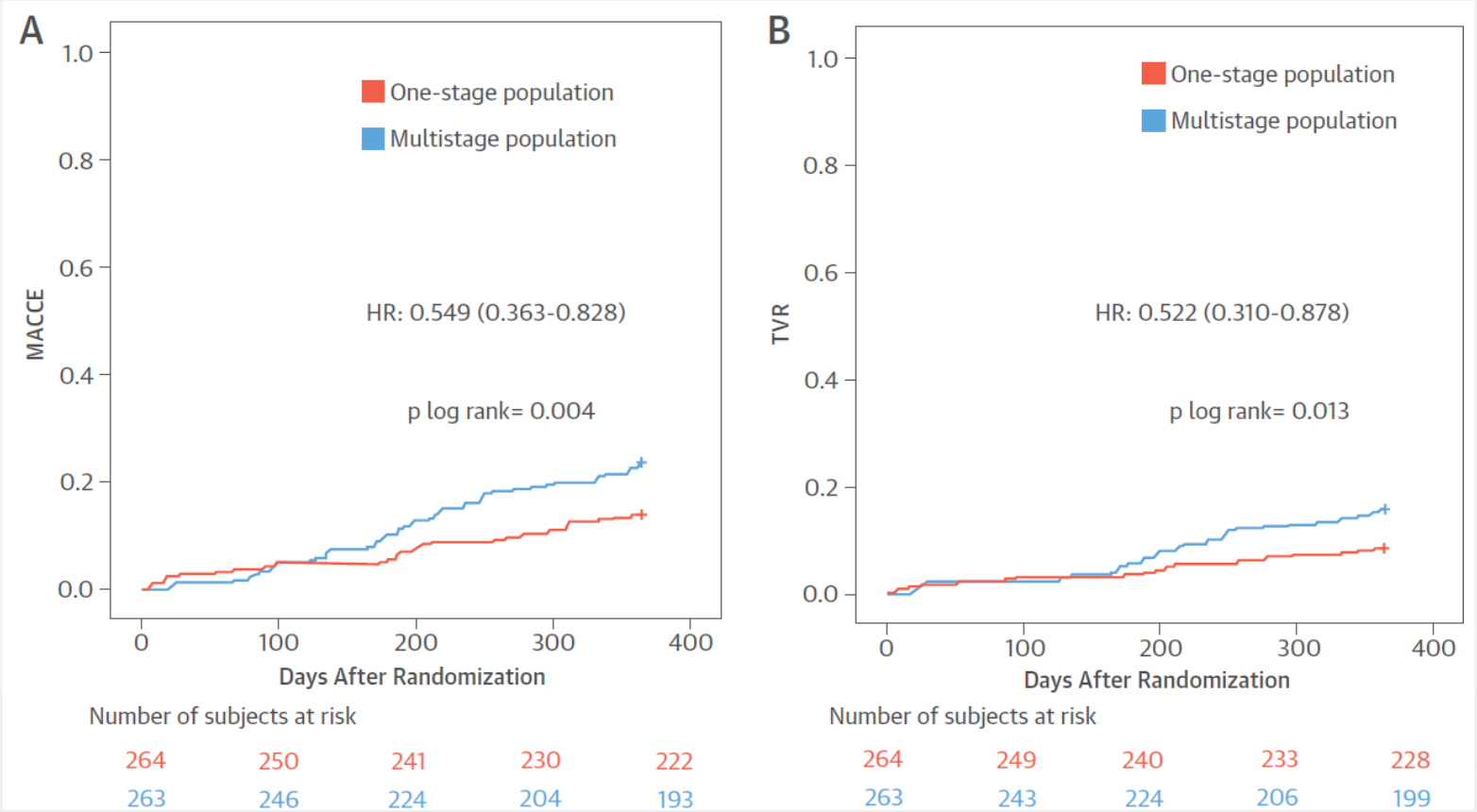


2.1.2 >2 years						
Correia 2018	28	71	70	131	7.3%	0.57 [0.32, 1.02]
Lee 2011	35	179	61	187	9.0%	0.50 [0.31, 0.81]
Onuma 2013	159	611	106	379	12.9%	0.91 [0.68, 1.21]
Shishehbor 2007	168	479	274	761	14.0%	0.96 [0.76, 1.22]
Subtotal (95% CI)		**1340**		**1458**	**43.2%**	**0.76 [0.57, 1.02]**
Total events	390		511			
Heterogeneity: Tau² = 0.05; Chi² = 7.61, df = 3 (P = 0.05); I² = 61%						
Test for overall effect: Z = 1.82 (P = 0.07)						
Total (95% CI)		**3890**		**6236**	**100.0%**	**0.76 [0.61, 0.93]**
Total events	728		1367			
Heterogeneity: Tau² = 0.07; Chi² = 27.68, df = 9 (P = 0.001); I² = 67%						
Test for overall effect: Z = 2.61 (P = 0.009)						
Test for subgroup differences: Chi² = 0.00, df = 1 (P = 0.96), I² = 0%						

Am J Cardiol. 2019;124:1501−1511

SMILE Trial (NSTEMI with MVD)

Complete One-stage Coronary Revascularization showed better Clinical Outcomes

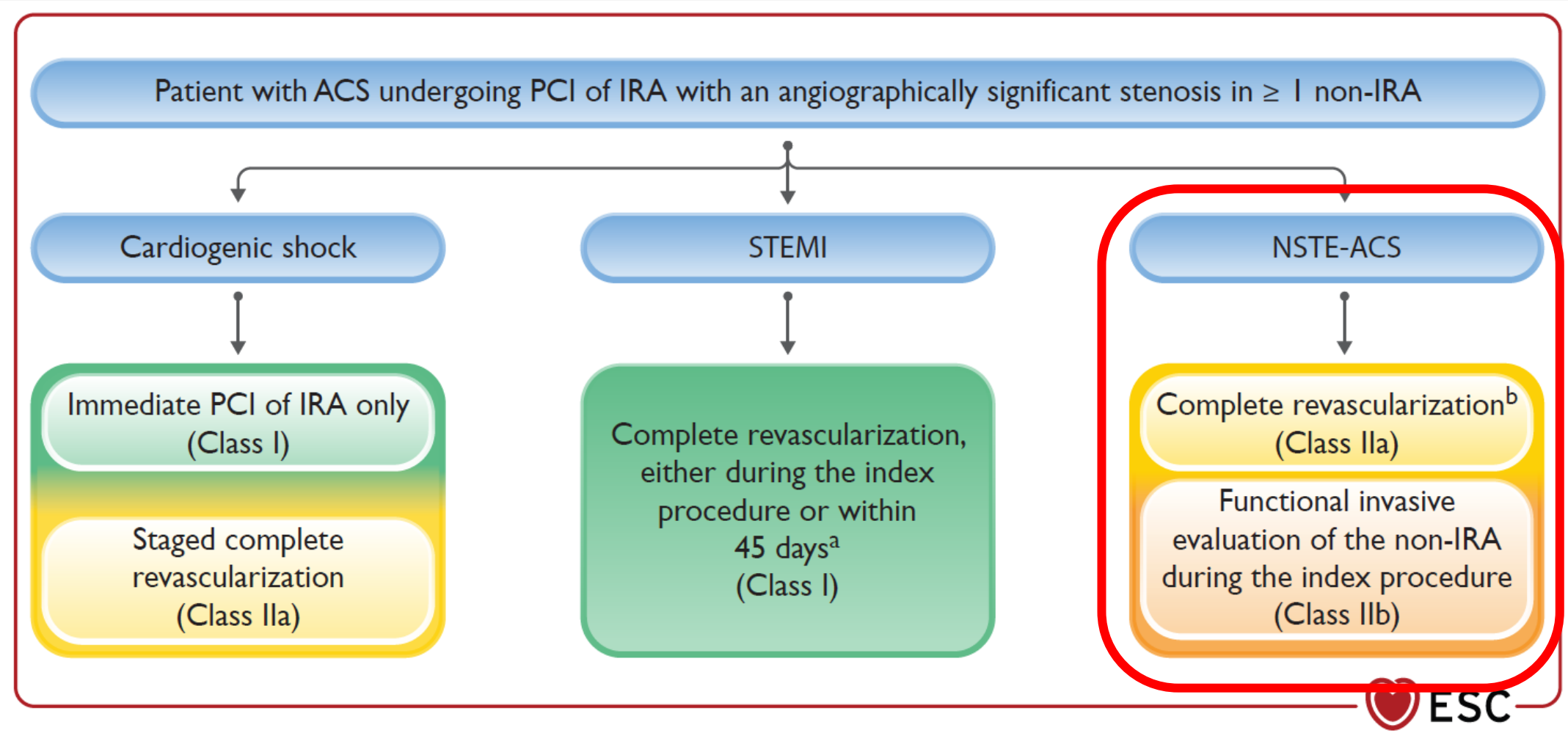


MACCE: cardiac death, death, reinfarction, rehospitalization for UA, repeat coronary revascularization (target vessel revascularization), and stroke at 1 year

J Am Coll Cardiol. 2016;67:264–272

NSTEMI with MVD: Current Guidelines

Recent Revascularization Guideline



2023 ESC/EACTS Guideline

Treatment of MVD in AMI (STEMI)

How to Plan Revascularization Strategies

- **Timing: Immediate vs. Staged PCI for NIRA**
- **Evaluation of NIRA**

Treatment of MVD in STEMI

Evaluation of NIRA

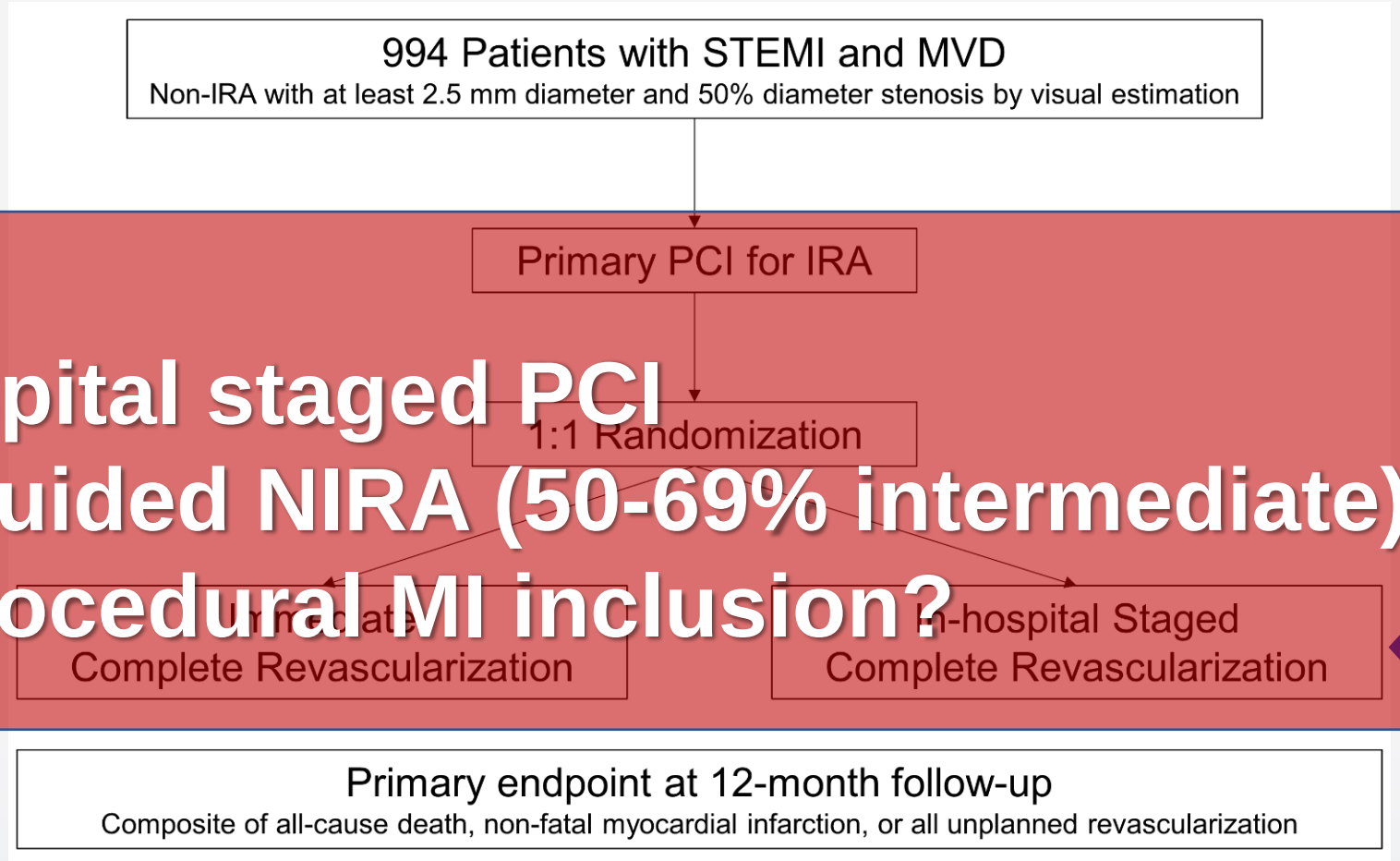
- Angiography Guided
- Physiology Guided
- Imaging Guided
- Patient Risk Guided

OPTION-STEMI study

OPtimal TIming of Fractional Flow Reserve-Guided Complete RevascularizatiON for Non-infarct Related Artery in ST-Segment Elevation Myocardial Infarction with Multivessel Disease

Am Heart J 2024 in press

Protocol Overview (NCT04626882)

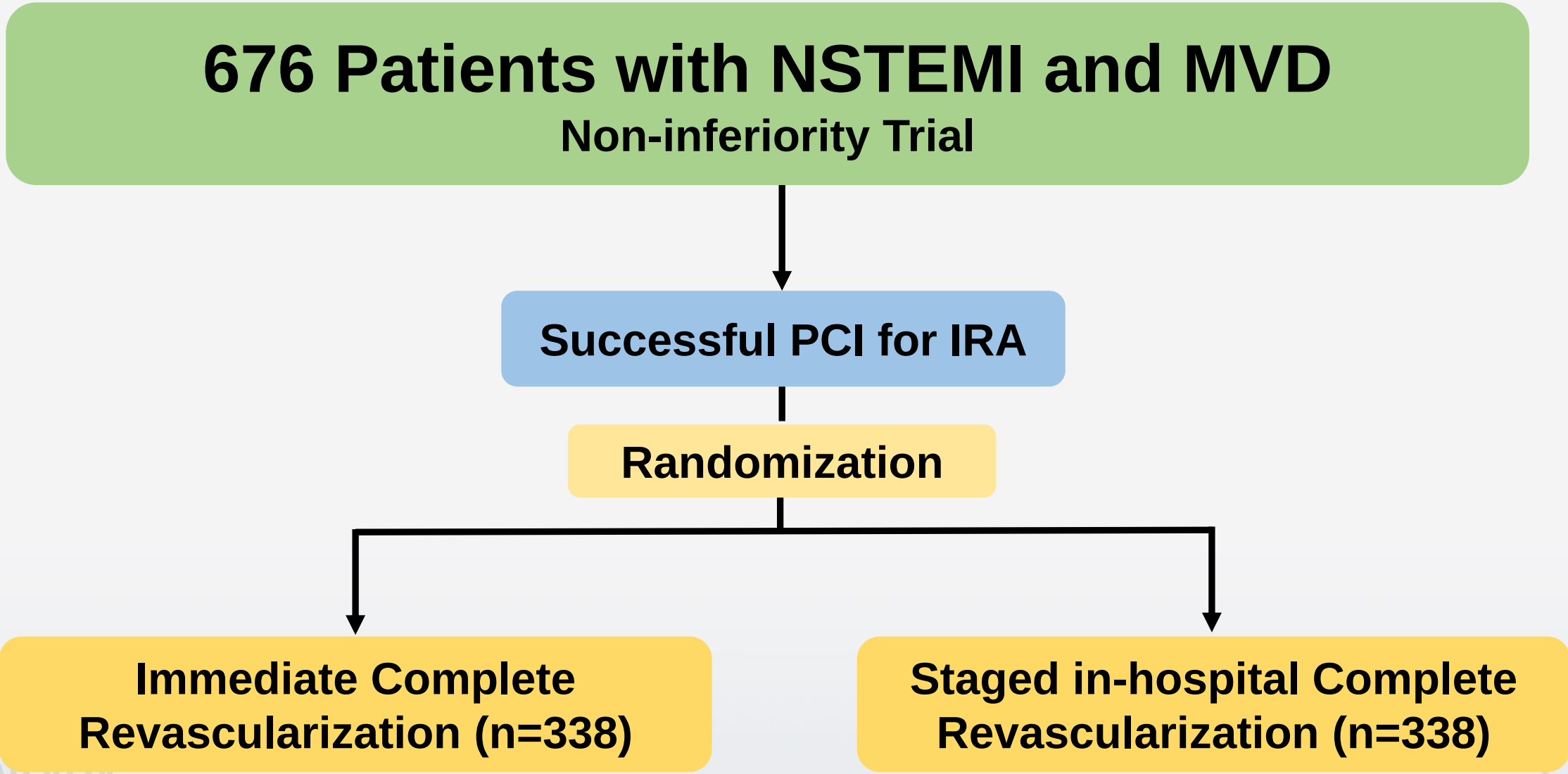


- In hospital staged PCI
- FFR-guided NIRA (50-69% intermediate) PCI
- Periprocedural MI inclusion?

Secondary Endpoint: all-cause death, cardiac death, non-cardiac death, non-fatal MI, hospitalization for UA, HF, major bleeding, stroke, CIN, ST during 1-year

Am Heart J 2024 in press

OPTION-NSTEMI (NCT04968808)



Cons of an immediate MV PCI in STEMI

Vasoconstriction in the acute phase

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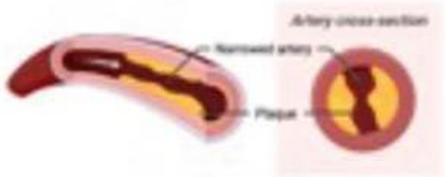
Unnecessary implantation of stents that are smaller than needed?

Significance of non-culprit lesions



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No role for physiological indices (e.g., FFR) during the acute phase

Suboptimal antiplatelet inhibition

↓

↑ risk of stent thrombosis, especially in high-risk lesions and multiple stents

Early revascularisation or early intensive care treatment?

↓

Is delayed intensive care counterbalanced by the benefits of early complete revascularisation?

EuroIntervention. 2024;20:e171-e173

Conclusion

- **Complete revascularization** (CR) is recommended.
- **Timing**: Immediate CR is not inferior or comparable to staged CR.
- Evaluation of NIRA is to be determined.
- **OPTION-STEMI** will find the outcome of in-hospital staged PCI and FFR-guided NIRA PCI.
- Complex lesions in NIRA could be recanalized in the staged PCI.