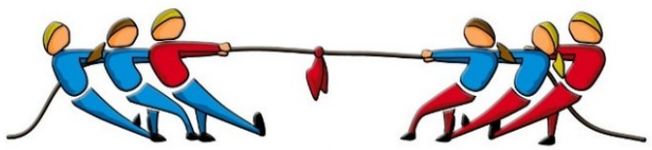
IAM EN MALALTIA MULTIVÀS
TRACTAR-HO TOT O NO
AGUT O DIFERIT

TRACTAR ALTRES LESIONS QUE LA RESPONSABLE EN LA FASE AGUDA APORTA AVANTATGES

- PART I -



Oriol Rodríguez Leor
Institut del Cor Germans Trias i Pujol
Badalona

iCor INSTITUT DEL COR DEL GERMANS TRIAS I PUJOL

germanstrias hospital

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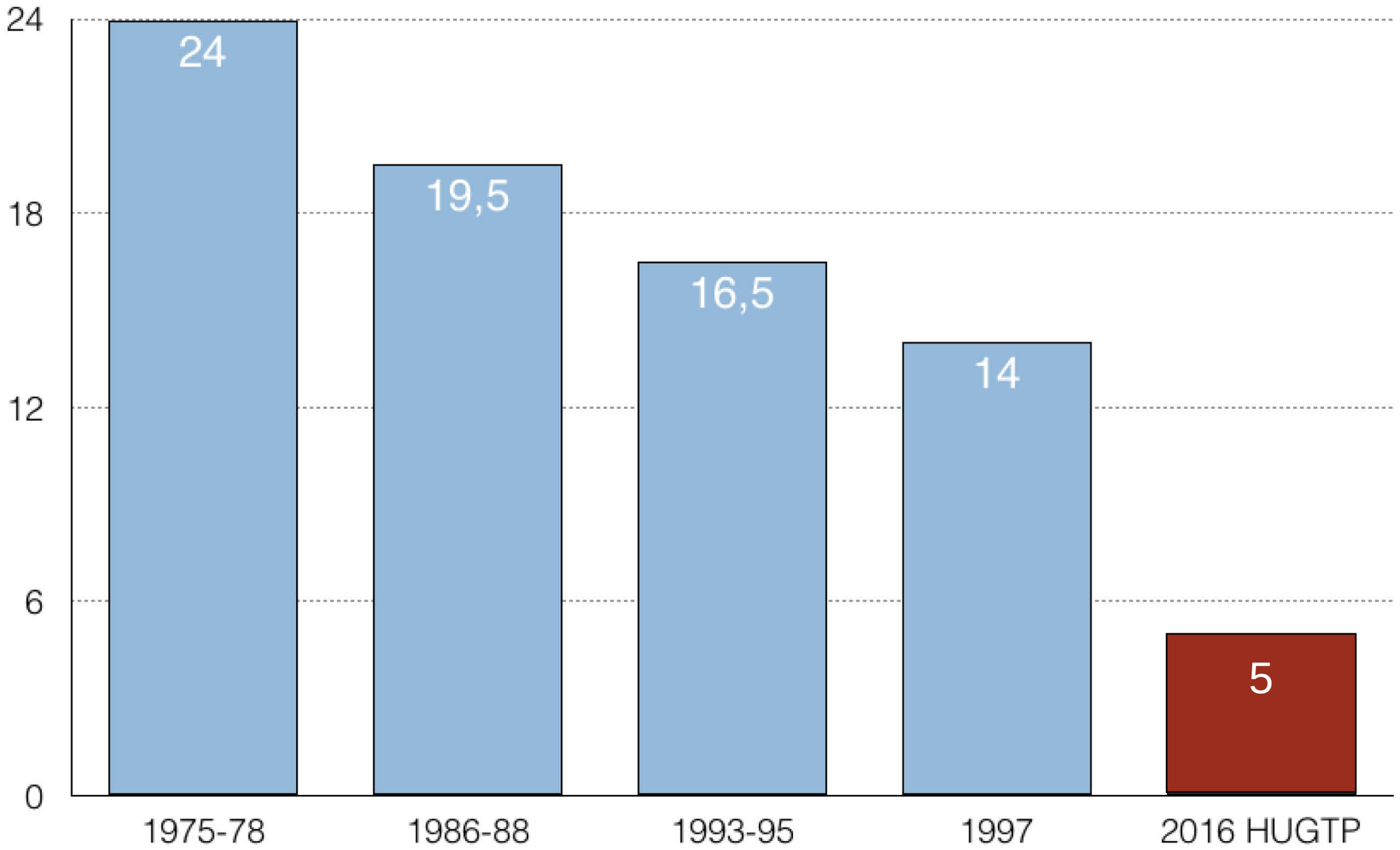
In-Hospital Mortality Evolution in STEMI

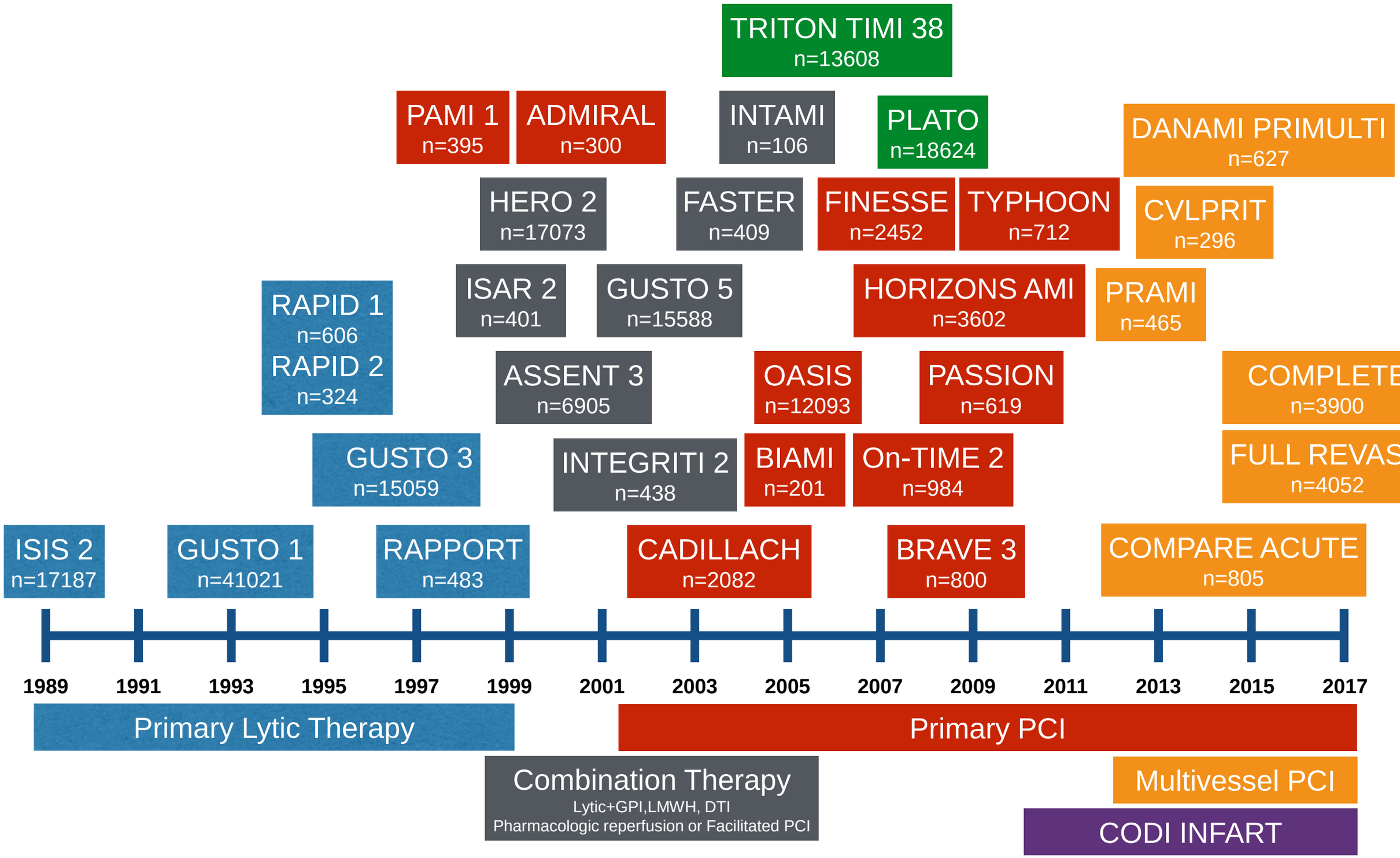
70s → **2017**



Dauerman HL et al. **The Worcester Heart Attack Study.** Am J Cardiol 2002;143:1033

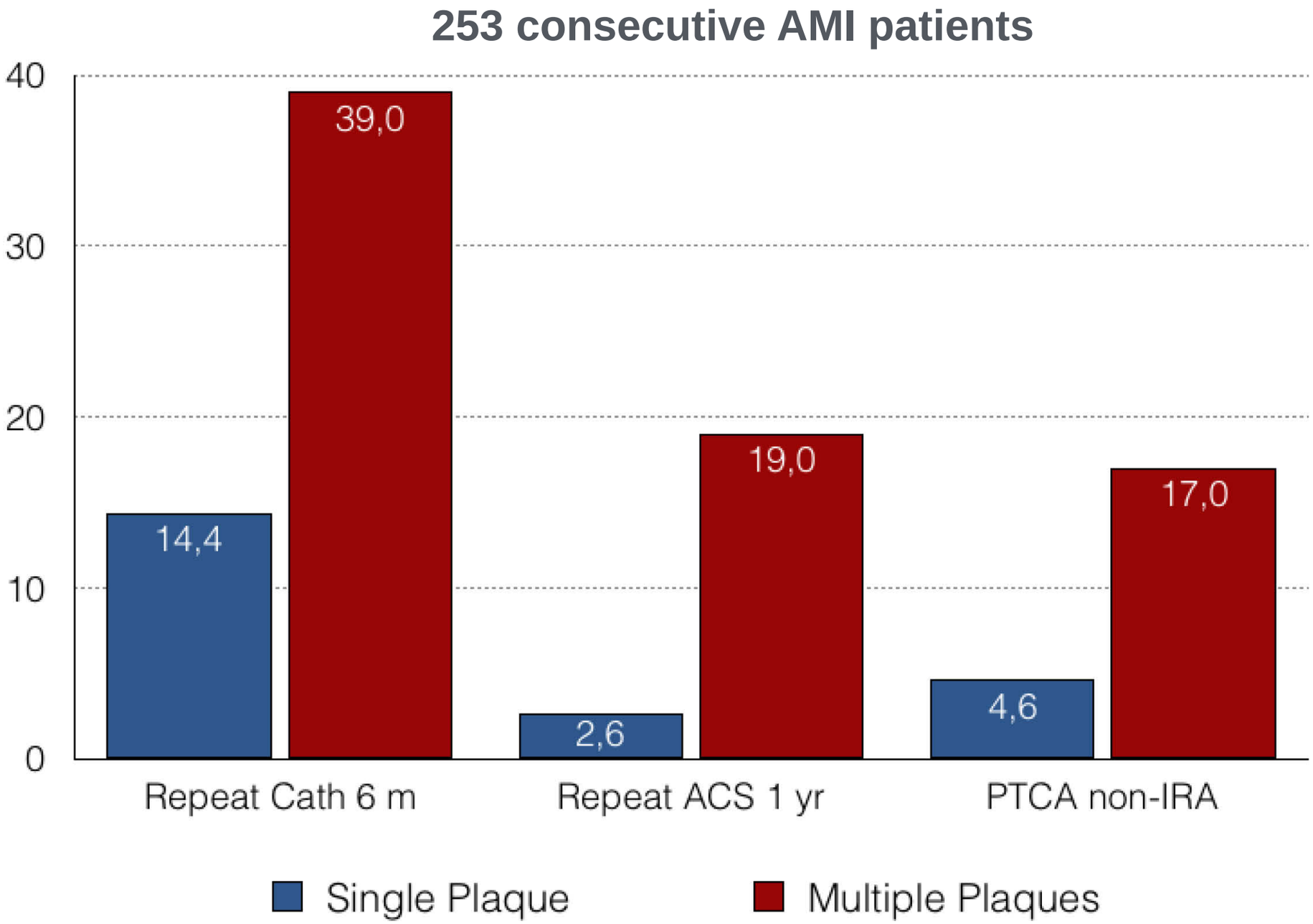
Evolution of STEMI Patient Management

STEMI management has evolved over the past 3 decades based on new clinical data involving technologic and pharmacologic advances



Multiple Coronary Plaques in Patients with STEMI

Clinical Outcomes of Patients with Acute Myocardial Infarction and Single or Multiple Complex Coronary Plaques

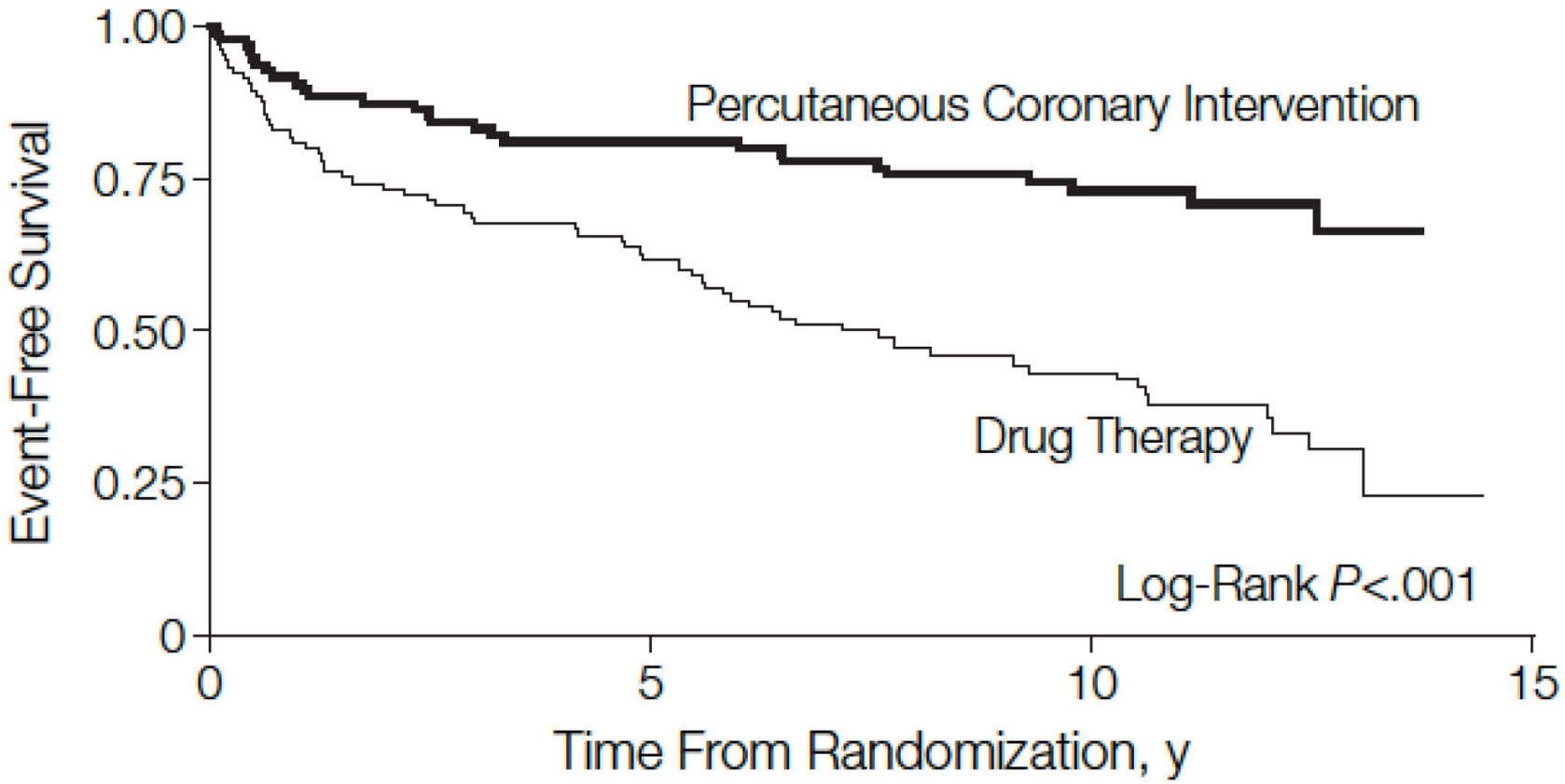


Complex Coronary Plaques (Thrombus, Ulceration, Plaque Irregularity, Impaired Flow)

Goldstein JA et al. **Multiple complex coronary plaques in patients with acute myocardial infarction**. N Engl J Med 2000;343:915-22

Effect of PCI in Silent Ischemia After Myocardial Infarction

Among patients with recent MI and silent myocardial ischemia verified by stress imaging, PCI compared with anti-ischemic drug therapy reduced the long-term risk of MACE



Cardiac death 0,3% vs 2,1% (HR 0,19 [0,05-0,67] p=0,01)
Non-Fatal Recurrent MI 1,2% vs 4,7% (HR 0,31 [0,15-0,65] p=0,002)

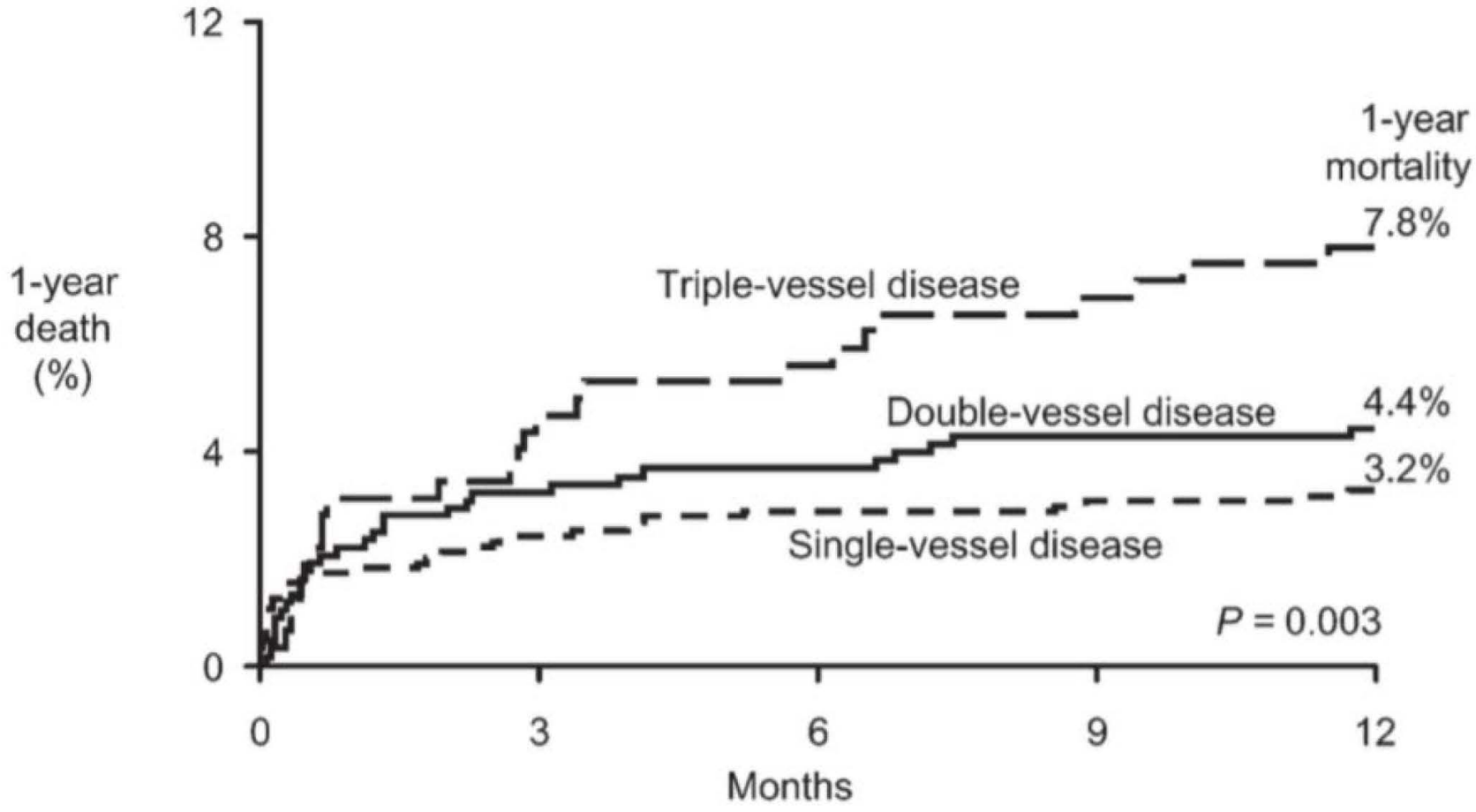
Smits PC et al. **Effects of PCI in silent ischemia after myocardial infarction. The SWISSI II randomized controlled trial**. JAMA 2007;297:1985-1991

Cumulative Incidence of Death According to Number of Vessels

CADILLAC Trial

Cumulative incidence of death according to the presence of single-, double-, or triple-vessel disease

2802 patients enrolled in CADILLAC Trial



The presence of significant concomitant CAD in vessels remote from the IRA should be recognized as a major adverse prognostic factor in patients with STEMI

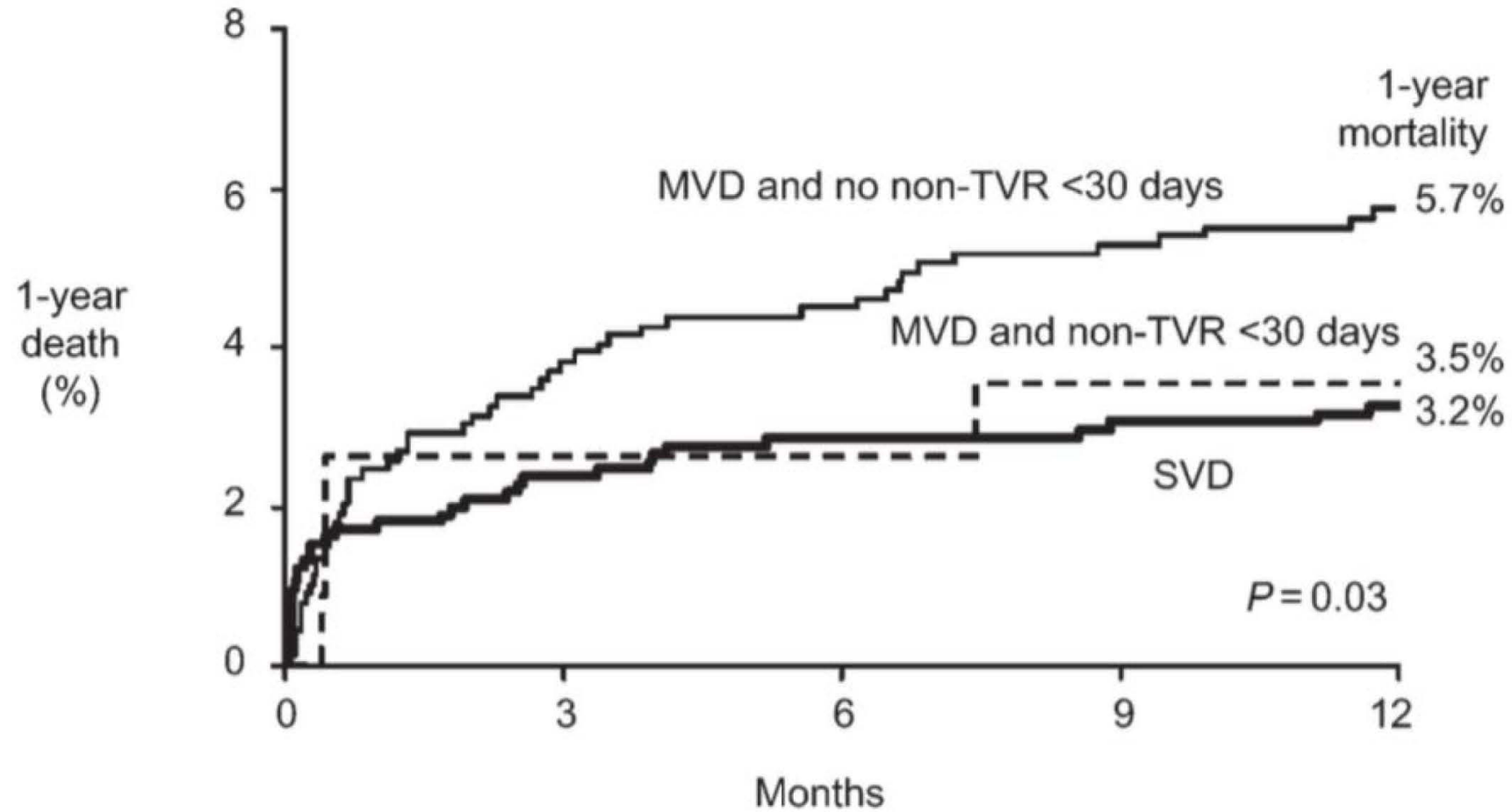
Sorajja P et al. **Impact of multivessel disease on reperfusion success and clinical outcomes in patients undergoing primary PCI for AMI**. Eur Heart J 2007;28:1709-1716

Cumulative Incidence of Death According to Number of Vessels

CADILLAC Trial

Cumulative incidence of death in patients with MVD stratified according to whether or not subsequent revascularization was performed within 30 days

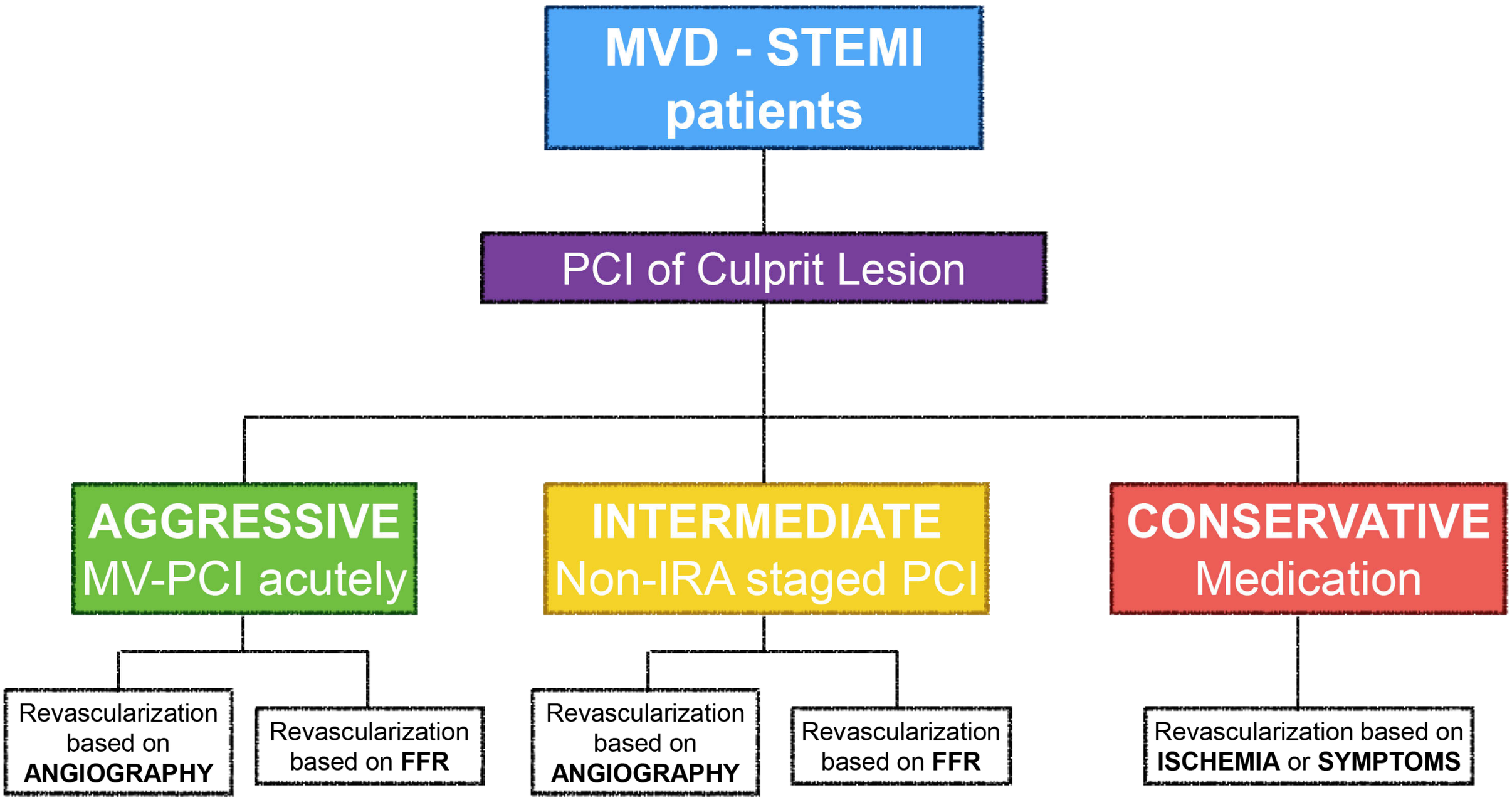
2802 patients enrolled in CADILLAC Trial



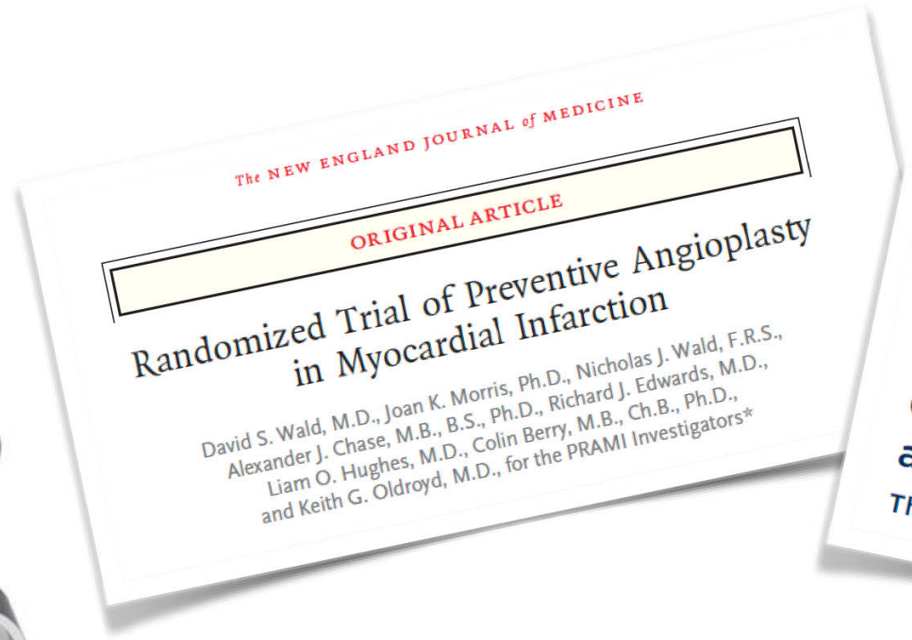
Greater survival was evident in patients with multivessel disease in whom revascularization of remote non-infarct-artery-related disease was subsequently performed probably related to deleterious effects of plaque burden and diffuse ischaemia

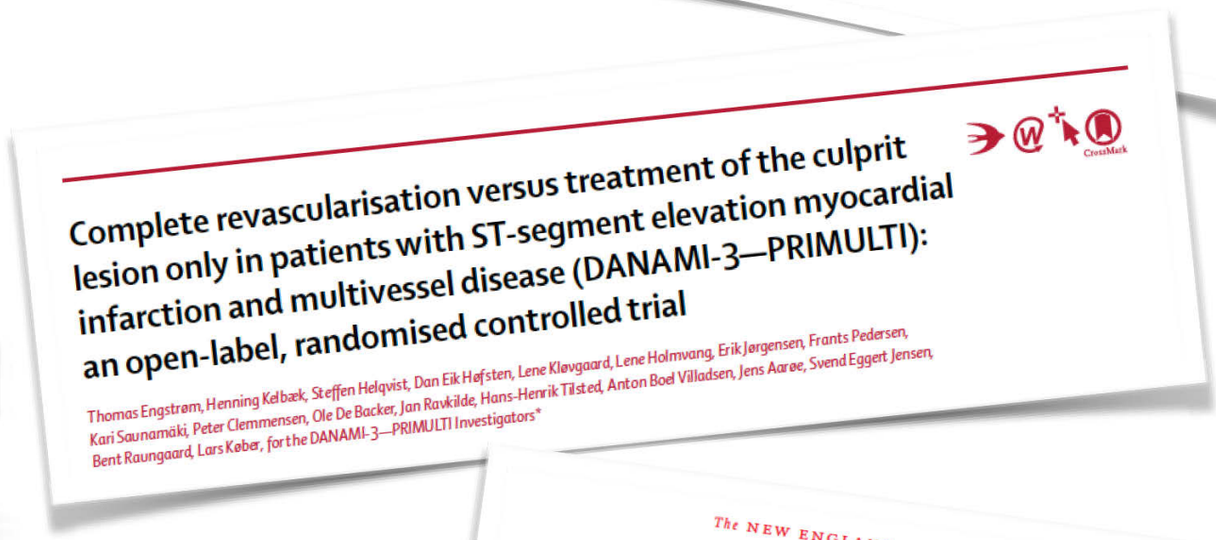
Sorajja P et al. **Impact of multivessel disease on reperfusion success and clinical outcomes in patients undergoing primary PCI for AMI**. Eur Heart J 2007;28:1709-1716

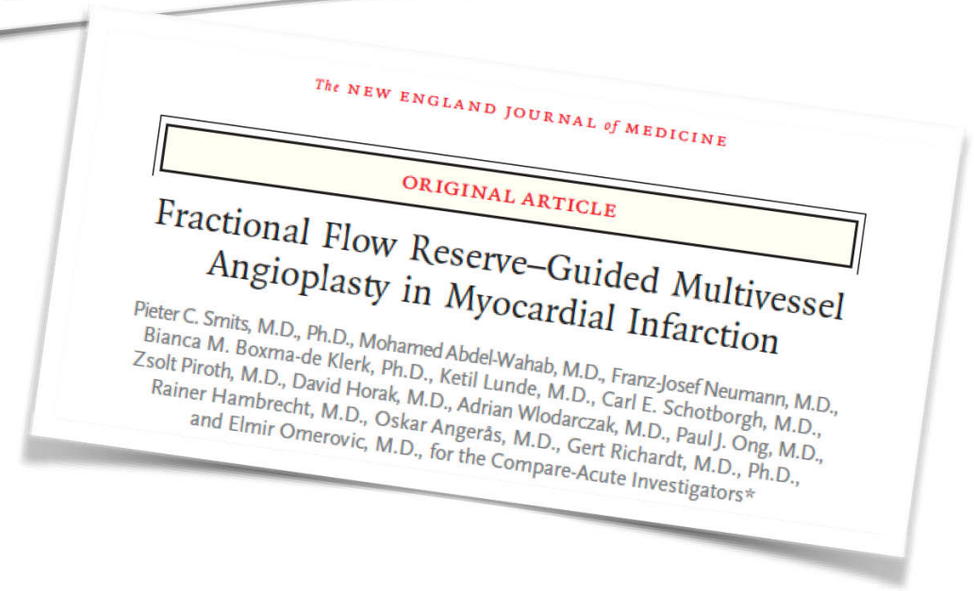
Treatment Strategies in Patients with STEMI and Multivessel Disease



Randomized Trials of Multivessel PCI in STEMI







2013 → **2017**

Randomized Trials of Multivessel PCI in STEMI

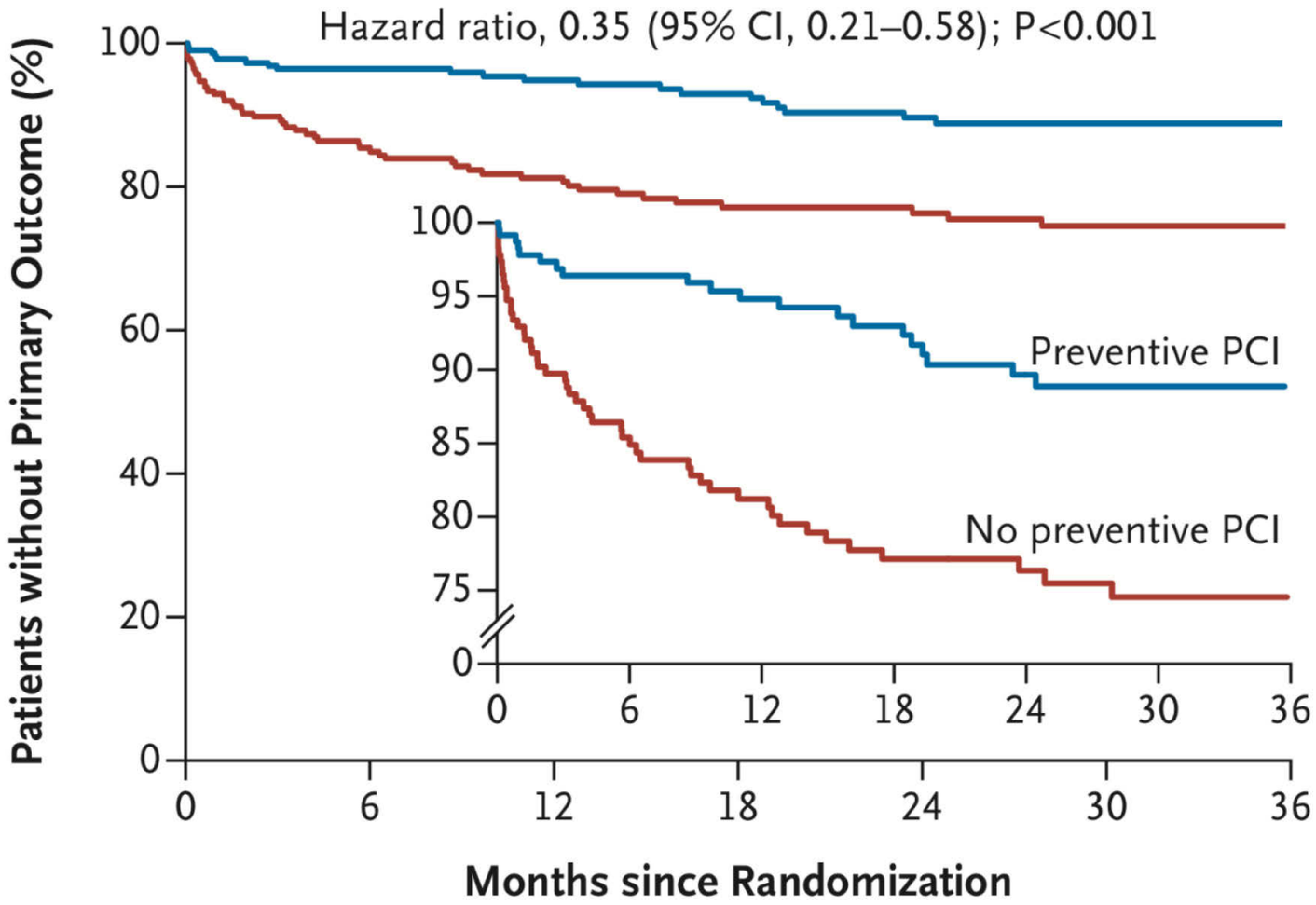
PRAMI Trial

465 patients with STEMI and MVD*, after successful IRA PCI

Preventive Multivessel PCI (n=234)

No preventive PCI (n=231)
(subsequent PCI only recommended for refractory angina with objective evidence of ischemia)

*Angio stenosis >50%



Primary Outcome: death from cardiac causes, non-fatal MI, refractory angina

Wald DS et al. **Randomized Trial of Preventive Angioplasty in Myocardial Infarction.** N Engl J Med 2013;369:1115-23

Randomized Trials of Multivessel PCI in STEMI

PRAMI Trial

The results were considered conclusive by the data and safety monitoring committee, which recommended that the trial be stopped early

Table 3. Prespecified Clinical Outcomes.*

Outcome	Preventive PCI (N=234)	No Preventive PCI (N=231)	Hazard Ratio (95% CI)	P Value
	no. of events			
Primary outcome				
Death from cardiac causes, nonfatal myocardial infarction, or refractory angina†	21	53	0.35 (0.21–0.58)	<0.001
Death from cardiac causes or nonfatal myocardial infarction†	11	27	0.36 (0.18–0.73)	0.004
Death from cardiac causes	4	10	0.34 (0.11–1.08)	0.07
Nonfatal myocardial infarction	7	20	0.32 (0.13–0.75)	0.009
Refractory angina	12	30	0.35 (0.18–0.69)	0.002
Secondary outcomes				
Death from noncardiac causes	8	6	1.10 (0.38–3.18)	0.86
Repeat revascularization	16	46	0.30 (0.17–0.56)	<0.001

Preventive PCI in noninfarct coronary arteries with major stenoses significantly reduced the risk of adverse CV events, as compared with PCI limited to the infarct artery

Wald DS et al. **Randomized Trial of Preventive Angioplasty in Myocardial Infarction.** N Engl J Med 2013;369:1115-23

Randomized Trials of Multivessel PCI in STEMI

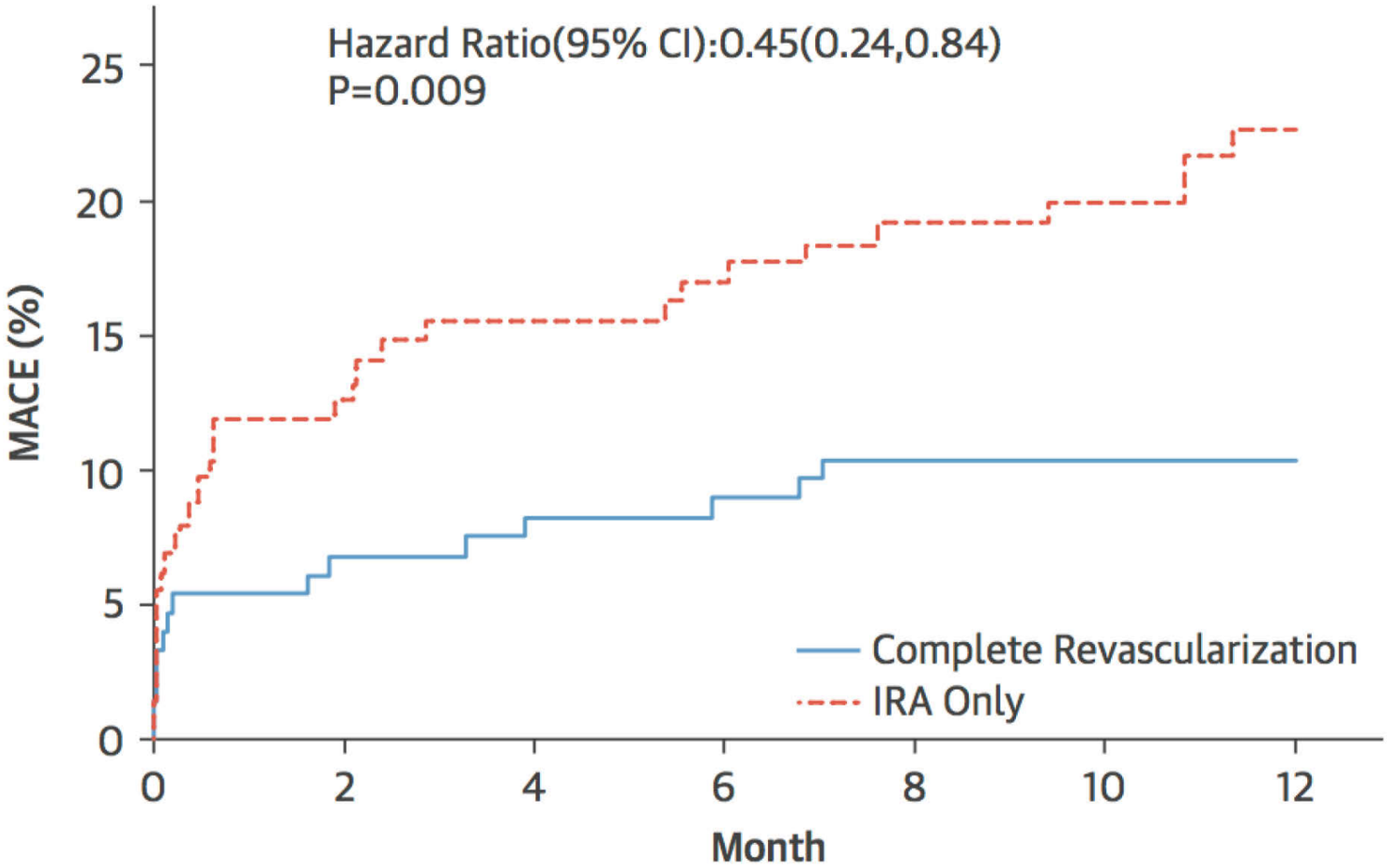
CvLPRIT Trial

296 patients with STEMI and MVD*, after successful IRA PCI

Preventive Multivessel PCI (n=150)

No preventive PCI (n=146)
(subsequent PCI only recommended for refractory angina with objective evidence of ischemia)

*Angio stenosis >70% in 1 view or >50% in 2 views



Primary Outcome: all-cause death, recurrent MI, HF, ischemia-driven revascularization

Gershlick AH et al. **Randomized trial of complete vs lesion-only revascularization in patients undergoing primary PCI for STEMI and multivessel disease.** J Am Coll Cardiol 2015;65:963-72

Randomized Trials of Multivessel PCI in STEMI

CvLPRIT Trial

Clinical Outcomes at 12 months

Event	Preventive PCI N = 150 (%)	NO Preventive PCI N = 146 (%)	HR (95%)	P
Total MACE	15 (10.0)	31 (21.2)	0.45 (0.24, 0.84)	0.009
Mortality	2 (1.3)	6 (4.1)	0.32 (0.06, 1.60)	0.14
Recurrent MI	2 (1.3)	4 (2.7)	0.48 (0.09, 2.62)	0.39
Heart Failure	4 (2.7)	9 (6.2)	0.43 (0.13, 1.39)	0.14
Repeat Revascularization	7 (4.7)	12 (8.2)	0.55 (0.22, 1.39)	0.2

Index admission complete revascularization significantly lowered the rate of the composite primary endpoint at 12 months compared with treating only the IRA

Gershlick AH et al. **Randomized trial of complete vs lesion-only revascularization in patients undergoing primary PCI for STEMI and multivessel disease.** J Am Coll Cardiol 2015;65:963-72

Randomized Trials of Multivessel PCI in STEMI

DANAMI 3 - PRIMULTI

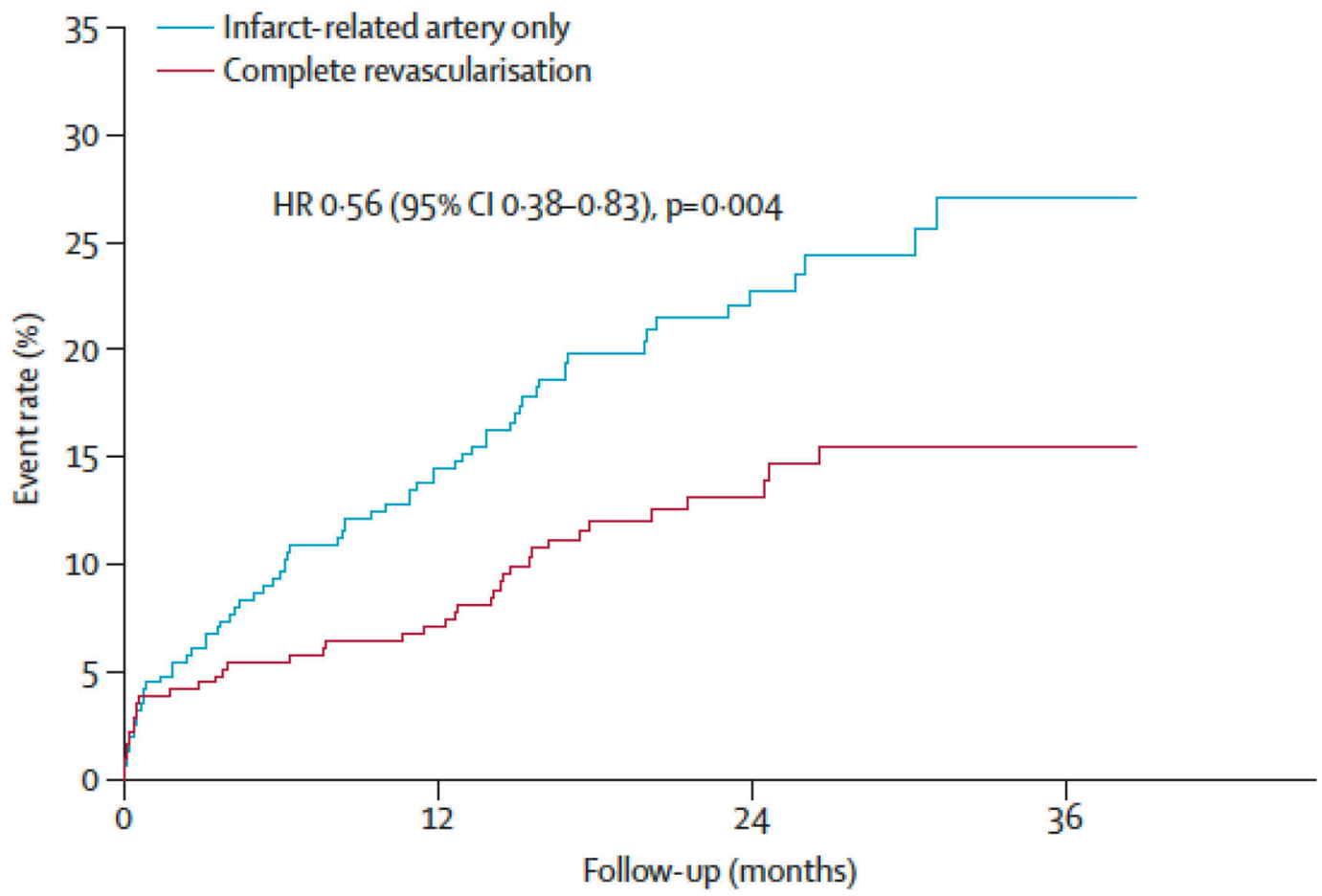
627 patients with STEMI and MVD*, after successful IRA PCI

Staged FFR-guided** Multivessel PCI (n=314)

No further PCI (n=313)
(subsequent PCI only recommended for angina with objective evidence of ischemia)

*Angio stenosis >50%

**FFR>0,80 in 31% of patients



Primary Outcome: all-cause death, ischemia-driven non-target vessel revascularization

Engstrom T et al. **Complete revascularization vs treatment of the culprit lesion only in patients with STEMI and multivessel disease (DANAMI-3 PRIMULTI): an open-label randomised trial.** Lancet 2015;386:665-71

DANAMI 3 - PRIMULTI

Clinical Outcomes at 12 months

	Infarct-related artery only (n=313)	Complete revascularisation (n=314)	Hazard ratio (95% CI)	p
Primary endpoint*	68 (22%)	40 (13%)	0·56 (0·38–0·83)	0·004
All-cause mortality	11 (4%)	15 (5%)	1·40 (0·63–3·00)	0·43
Non-fatal reinfarction	16 (5%)	15 (5%)	0·94 (0·47–1·90)	0·87
Ischaemia-driven revascularisation	52 (17%)	17 (5%)	0·31 (0·18–0·53)	<0·0001
Secondary endpoints				
Cardiac death	9 (3%)	5 (2%)	0·56 (0·19–1·70)	0·29
Cardiac death or non-fatal myocardial infarction	25 (8%)	20 (6%)	0·80 (0·45–1·45)	0·47
Urgent percutaneous coronary intervention	18 (6%)	7 (2%)†	0·38 (0·16–0·92)	0·03
Non-urgent percutaneous coronary intervention	27 (9%)	8 (3%)	0·29 (0·13–0·63)	0·002
Unplanned coronary-artery bypass graft surgery	7 (2%)	3 (1%)	0·43 (0·11–1·70)	0·22

	Infarct-related artery only (n=313)	Complete revascularisation (n=314)	p
Periprocedural myocardial infarction	0	2 (1%)	0·2
Bleeding requiring transfusion or surgery	4 (1%)	1 (<1%)	0·2
Contrast-induced nephropathy (>50% rise in plasma creatinine)	7 (2%)	6 (2%)	0·8
Stroke	1 (<1%)	4 (1%)	0·2

Complete revascularisation guided by FFR measurements significantly reduces the risk of future events driven by significantly fewer repeat revascularisations, because all-cause mortality and non-fatal reinfarction did not differ between groups

Engstrom T et al. **Complete revascularization vs treatment of the culprit lesion only in patients with STEMI and multivessel disease (DANAMI-3 PRIMULTI): an open-label randomised trial.** Lancet 2015;386:665-71

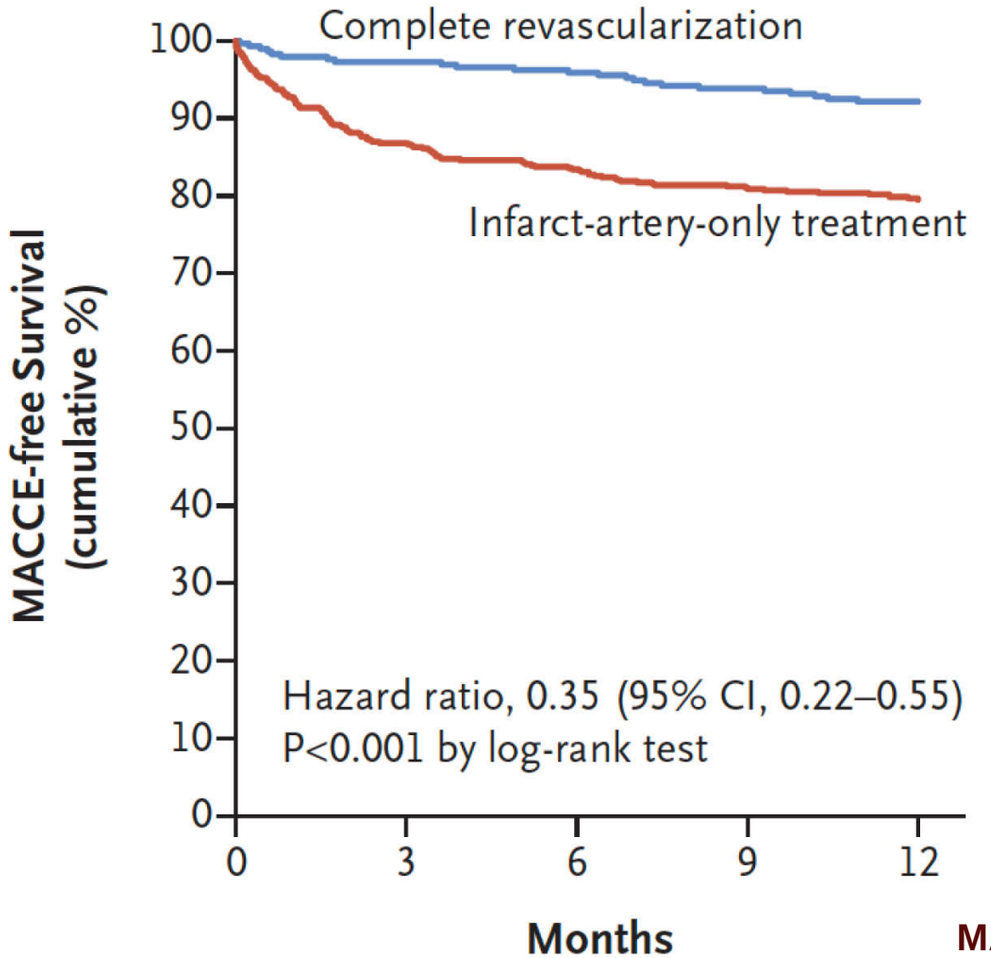
Randomized Trials of Multivessel PCI in STEMI

COMPARE ACUTE Trial

885 patients with STEMI and MVD*, after successful IRA PCI

- FFR-guided Preventive Multivessel PCI (n=295)
- No preventive PCI (n=590)
  (subsequent PCI according to ischemia, symptoms or clinical judgement)

*Angio stenosis >50% **FFR performed in both groups of treatment**



- FFR<0,80 in around 50% of lesions
- In the IRA-PCI, **clinically indicated elective PCI of the N-IRA** (according to ischemia, symptoms or clinical judgement) **within 45 days was not counted as event**
- MV-PCI had N-IRA PCI during index PCI in 83,4%
- DES (EES) in 98,9%

MACCE: all-cause death, recurrent MI, revascularization, cerebrovascular events

59 IRA only PCI patients had N-IRA revascularization within 45 days and were not counted as events

Smits PC et al. **FFR-guided multivessel angioplasty in myocardial infarction. COMPARE ACUTE Trial**. N Engl J Med 2017;376:1234-44

Randomized Trials of Multivessel PCI in STEMI

COMPARE ACUTE Trial

12 months Clinical Outcomes

End Point	Complete Revascularization (N=295)	Infarct-Artery-Only Treatment (N=590)	Hazard Ratio (95% CI)	P Value
	number (percent)			
Primary				
MACCE*	23 (7.8)	121 (20.5)	0.35 (0.22–0.55)	<0.001
Death from any cause	4 (1.4)	10 (1.7)	0.80 (0.25–2.56)	0.70
Cardiac event	3 (1.0)	6 (1.0)	1.00 (0.25–4.01)	1.00
Myocardial infarction	7 (2.4)	28 (4.7)	0.50 (0.22–1.13)	0.10
Spontaneous event	5 (1.7)	17 (2.9)	0.59 (0.22–1.59)	0.29
Periprocedural event	2 (0.7)	11 (1.9)	0.36 (0.08–1.64)	0.19
Revascularization	18 (6.1)	103 (17.5)	0.32 (0.20–0.54)	<0.001
PCI	15 (5.1)	98 (16.6)	0.37 (0.24–0.57)	<0.001
Coronary-artery bypass graft	3 (1.0)	5 (0.8)	1.20 (0.29–5.02)	0.80
Cerebrovascular event	0	4 (0.7)	NA	NA

59 patients in the IRA PCI group had elective non-IRA revascularization within 45 days and did not count as event

MACCE: death from any cause, non-fatal AMI, revascularization, cerebrovascular events at 12 months

Smits PC et al. **FFR-guided multivessel angioplasty in myocardial infarction. COMPARE ACUTE Trial**. N Engl J Med 2017;376:1234-44

Randomized Trials of Multivessel PCI in STEMI

Ongoing Big Randomized Trials

COMPLETE TRIAL

Complete vs culprit-only revascularization to treat multivessel disease after primary PCI for STEMI

STEMI with MVD

Staged non-culprit PCI + OMT vs OMT

3900 patients

Enrollment finished
Results in march 2018

Primary outcome: CV death or new MI 1-4 yr

FULL REVASC TRIAL

FFR-guidance for complete non-culprit revascularizatioin

STEMI or high-risk NSTEMI with MVD

FFR-guided PCI of all non-culprit lesions during index hospitalization vs conservative management

4052 patients

44 patients enrolled on april 28th
Results in october 2019

Primary outcome: all-cause mortality and MI 1 yr

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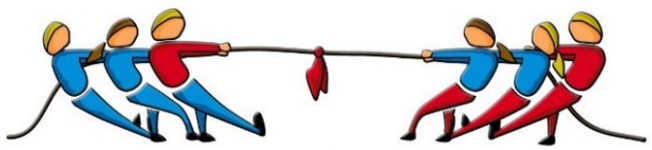
TRACTAR ALTRES LESIONS QUE LA RESPONSABLE EN LA FASE AGUDA APORTA AVANTATGES

- PART II -



Oriol Rodríguez Leor
Institut del Cor Germans Trias i Pujol
Badalona

iCor INSTITUT DEL COR DEL GERMANS TRIAS I PUJOL

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2014 ESC Myocardial Revascularization Guidelines

Recommendations	Class[a]	Level[b]	Ref[c]
Strategy			
Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIa	B	234,264–266
Staged revascularization of non-culprit lesions should be considered in STEMI patients with multivessel disease in case of symptoms or ischaemia within days to weeks after primary PCI.	IIa	B	235
Immediate revascularization of significant non-culprit lesions during the same procedure as primary PCI of the culprit vessel may be considered in selected patients.	IIb	B	267
In patients with continuing ischaemia and in whom PCI of the infarct-related artery cannot be performed, CABG should be considered.	IIa	C	

234. Kornowski (HORIZONS AMI)_JACC 2011
264. Hannan (New York Registry)_JACC Interv 2010
265. Toma (APEX AMI)_ Eur Heart J 2010
266. Vlaar (Meta-Analysis)_J Am Coll Cardiol 2011

235. Politi. Heart 2010

267. Wald. N Engl J Med 2013

Windecker S et al. **2014 ESC/EACTS Guidelines on myocardial revascularization**. Eur Heart J 2014;35:2541-2619

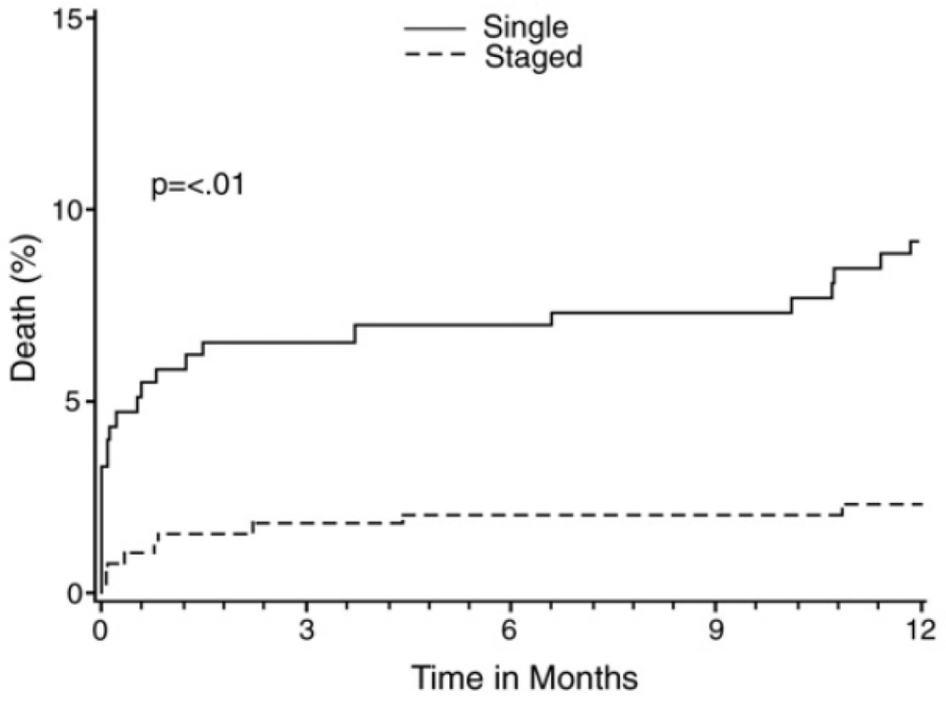
2014 EHJ Revascularization Guidelines

HORIZONS AMI Trial

668 of the 3602 STEMI patients enrolled (18.5%) underwent PCI of culprit and nonculprit lesions for multivessel disease

Patients were categorized into a single PCI strategy (n=275) versus staged PCI (n=393)

CONCLUSION: a deferred angioplasty strategy of nonculprit lesions should remain the standard approach in patients with STEMI undergoing primary PCI, as multivessel PCI may be associated with a greater hazard for mortality and stent thrombosis



- **Retrospective nonrandomized subanalysis**
- **Specific reason why operator chose a single procedure vs a staged approach was not prospectively collected**
- **Low number of events (31 deaths / 25 cardiac deaths/19 stent thrombosis) -> Multivariate Model Underpowered**
- **BMS vs Taxus Express**

Kornowski R et al. **Prognostic impact of staged vs "ontime" multivessel PCI in acute myocardial infarction. Analysis from the HORIZONS-AMI Trial.** J Am Coll Cardiol 2011; 58:704-711

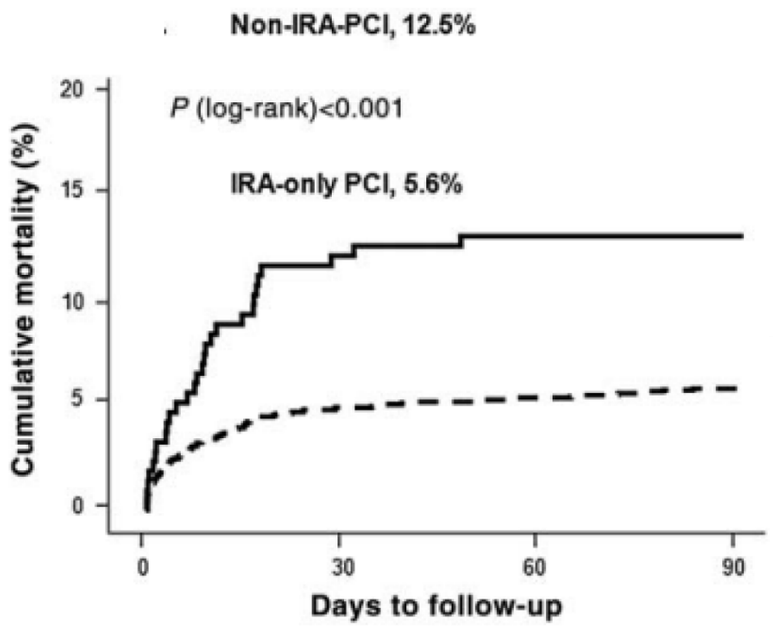
2014 EHJ Revascularization Guidelines

APEX AMI Trial

2201 of the 5373 STEMI patients enrolled (18.5%) underwent PCI of culprit and nonculprit lesions for multivessel disease

Patients were categorized into a single PCI strategy (n =217) versus no PCI (n =1984)

CONCLUSION: Non-culprit coronary interventions were performed at the time of primary PCI in 10% of MVD patients and were significantly associated with increased mortality. Our data support current guideline recommendations discouraging the performance of such procedures in stable primary PCI patients.



- **Retrospective nonrandomized subanalysis**
- **Specific reason why operator chose a single procedure vs a staged approach was not prospectively collected**
- **Low number of events (135 deaths)-> Multivariate Model Underpowered**
- **Only 38% DES (1st generation)**
- **Lack of information on outcomes in patients not treated at the index procedure**

Toma M et al. **Non-culprit coronary artery percutaneous coronary intervention during acute ST-segment elevation myocardial infarction: insights from the APEX-AMI trial.** Eur Heart J. 2010;31:1701-7

2014 EHJ Revascularization Guidelines

Hannan et al, JACC Intv

New York State Registry (3521 patients) 2003-2006

CONCLUSION: Our findings support the ACC/AHA recommendation that culprit vessel PCI be used for STEMI patients with multivessel disease at the time of the index PCI when patients are not hemodynamically compromised. However, staged PCI within 60 days after the index procedure, including during the index admission, is associated with risk-adjusted mortality rates that are comparable with the rate for culprit vessel PCI alone.

Table 5. Mortality Rates (%) for Propensity Matched Multivessel Disease STEMI Patients by Revascularization Strategy During the Index Procedure

Outcome by Subgroup	Culprit Vessel Revascularization at the Time of PPCI	Multivessel Revascularization at the Time of PPCI	Percentage Difference	p Value
All patients	n = 503	n = 503		
Death, %				
In-hospital	2.0	3.4	1.4	0.14
12 months	5.5	7.1	1.6	0.23
24 months	6.6	8.6	2.0	0.17
42 months	10.8	11.8	1.0	0.23
Patients without hemodynamic instability, LVEF <20%, malignant ventricular arrhythmia	n = 458	n = 458		
Death, %				
In-hospital	0.9	2.4	1.5	0.04
12 months	4.2	5.8	1.6	0.13
24 months	4.9	7.2	2.3	0.07
42 months	6.7	10.4	3.7	0.08

Median follow-up = 22.54 months.
LVEF = left ventricular ejection fraction; PPCI = primary percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.

- **Observational study (selection bias)**
- **No information about medical treatment**
- **No information about DES use, but 1st generation**
- **Very low In-hospital mortality in the culprit-only group (0,9%!!)**

Hannan EL et al. **Culprit vessel PCI vs multivessel and staged PCI for STEMI in patients with multivessel disease .** J Am Coll Cardiol Intv 2010;3:22-31

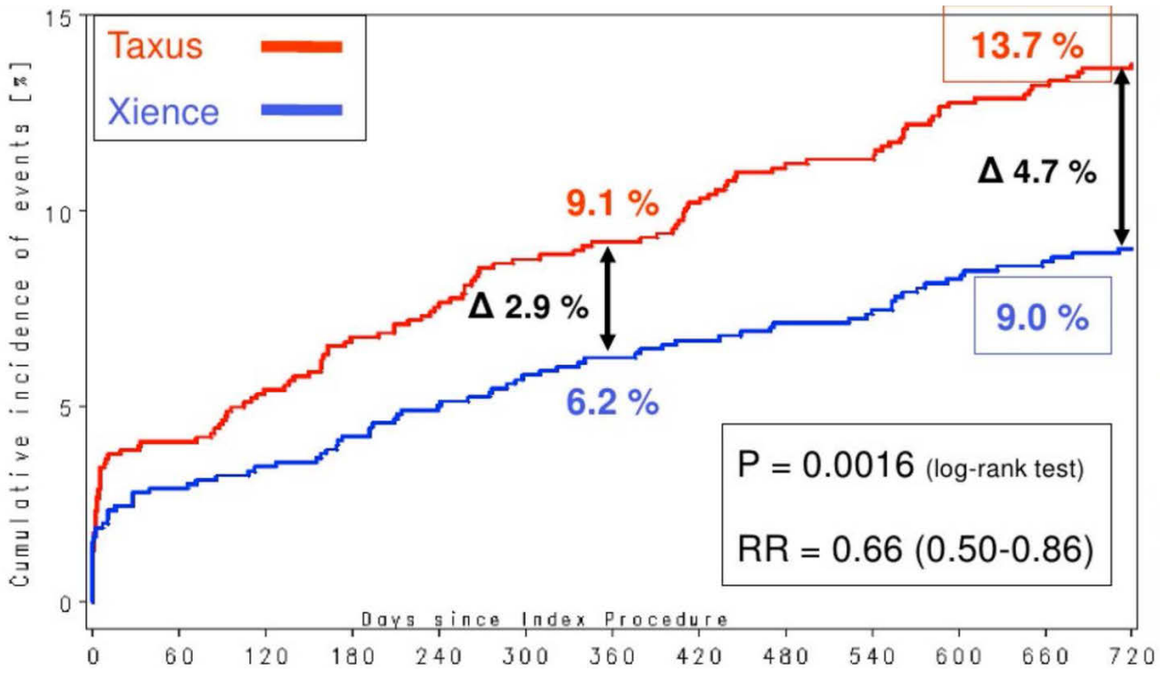
Randomized Trials of Multivessel PCI in STEMI

First Generation vs Contemporary DES

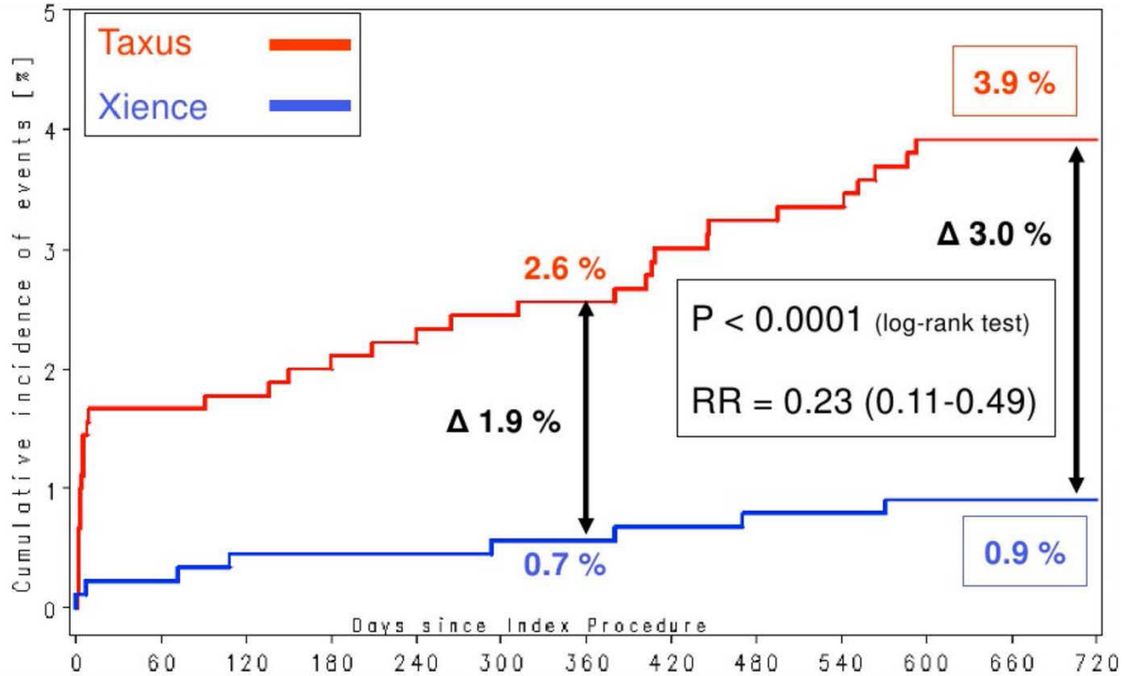
COMPARE Trial

2-Year Follow-Up of a Randomized Controlled Trial of Everolimus- and Paclitaxel-Eluting Stents for Coronary Revascularization in Daily Practice

MACE (all death, non-fatal MI, TVR)



STENT THROMBOSIS



The substantial clinical benefit of the EES over the PES with regard to measures of both safety and efficacy is maintained at 2 years in real-life practice with an increasing benefit in terms of safety and efficacy between 1 year and 2 years

Smits PC et al. **2-Year Follow-Up of a Randomized Controlled Trial of Everolimus- and Paclitaxel-Eluting Stents for Coronary Revascularization in Daily Practice.** J Am Coll Cardiol 2011; 58:11–8

Treatment Strategies in Patients with STEMI and Multivessel Disease

MVD - STEMI patients

AGGRESSIVE
MV-PCI acutely

- Revascularization based on **ANGIOGRAPHY**
- Revascularization based on **FFR**

INTERMEDIATE
Non-IRA staged PCI

- Revascularization based on **ANGIOGRAPHY**
- Revascularization based on **FFR**

CONSERVATIVE
Medication

- Revascularization based on **ISCHEMIA** or **SYMPTOMS**

DANAMI PRIMULTI
FULL REVASC

COMPLETE

COMPARE ACUTE

PRAMI

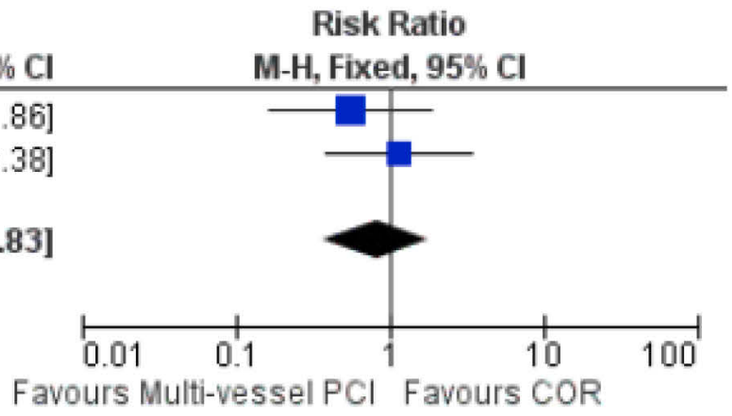
CvLPRIT

Meta-Analysis of RCT Comparing Multivessel vs Culprit Only PCI

Risk of Major Bleeding in Follow-up

Study or Subgroup	Multi-vessel PCI Events	Total	COR Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Culprit	4	150	7	146	54.0%	0.56 [0.17, 1.86]
PRAMI	7	234	6	231	46.0%	1.15 [0.39, 3.38]
Total (95% CI)		**384**		**377**	**100.0%**	**0.83 [0.38, 1.83]**
Total events	11		13			

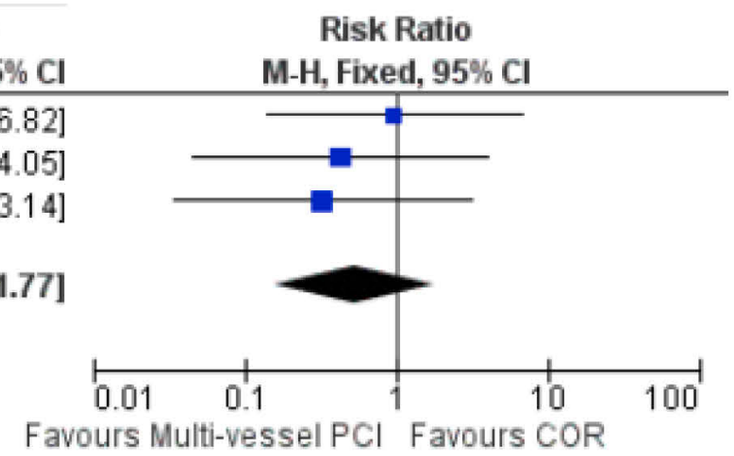
Heterogeneity: Chi² = 0.78, df = 1 (P = 0.38); I² = 0%
Test for overall effect: Z = 0.46 (P = 0.64)



Risk of Contrast-Induced Nephropaty in Follow-up

Study or Subgroup	Multi-vessel PCI Events	Total	COR Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Culprit	2	150	2	146	26.4%	0.97 [0.14, 6.82]
Politi	1	65	3	84	34.2%	0.43 [0.05, 4.05]
PRAMI	1	234	3	231	39.4%	0.33 [0.03, 3.14]
Total (95% CI)		**449**		**461**	**100.0%**	**0.53 [0.16, 1.77]**
Total events	4		8			

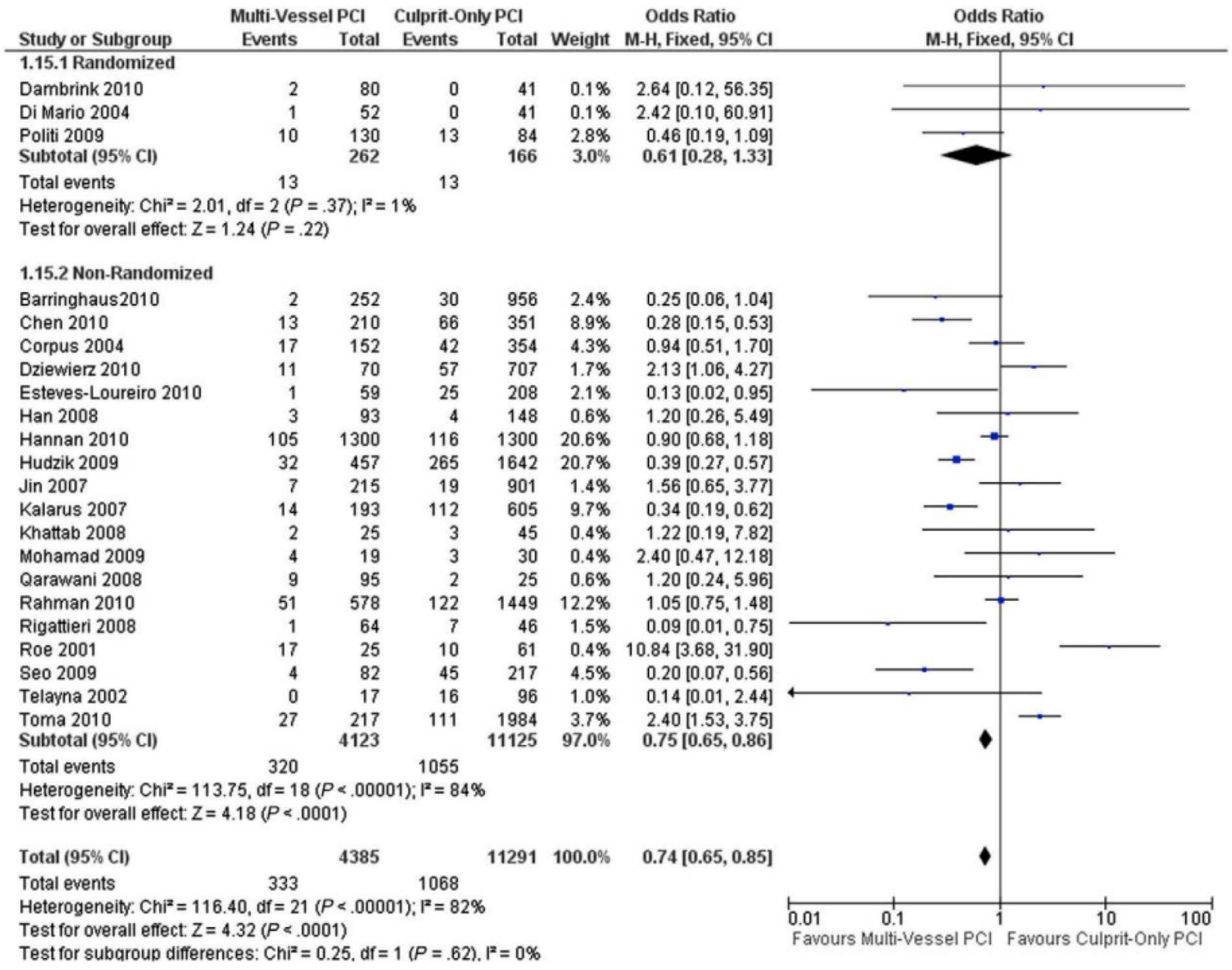
Heterogeneity: Chi² = 0.58, df = 2 (P = 0.75); I² = 0%
Test for overall effect: Z = 1.02 (P = 0.31)



El-Hayek GE et al. **Meta-analysis of randomized controlled trials comparing multi-vessel vs culprit only revascularization for patients with STEMI and multivessel disease**. Am J Cardiol;2015;115:1481

Meta-Analysis of RCT and nonRCT Comparing Multivessel vs Culprit Only PCI

Long Term Mortality Stratified by Study Method



Multivessel PCI asociated with lower long term mortality
OR 0,74 (0,65-0,85) p<0,001

Bainey KR et al. **Complete vs culprit-only revascularization for patients with MVD undergoing primary PCI for STEMI: a systematic review and meta-analysis**. Am Heart J;2014;167:1-14

2014 ESC Myocardial Revascularization Guidelines

Recommendations	Class[a]	Level[b]	Ref[c]
Strategy			
Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIa	B	234,264–266
Staged revascularization of non-culprit lesions should be considered in STEMI patients with multivessel disease in case of symptoms or ischaemia within days to weeks after primary PCI.	IIa	B	235
Immediate revascularization of significant non-culprit lesions during the same procedure as primary PCI of the culprit vessel may be considered in selected patients.	IIb	B	267
In patients with continuing ischaemia and in whom PCI of the infarct-related artery cannot be performed, CABG should be considered.	IIa	C	

234. Kornowski (HORIZONS AMI)_JACC 2011
264. Hannan (New York Registry)_JACC Interv 2010
265. Toma (APEX AMI)_ Eur Heart J 2010
266. Vlaar (Meta-Analysis)_J Am Coll Cardiol 2011

235. Politi. Heart 2010

267. Wald. N Engl J Med 2013

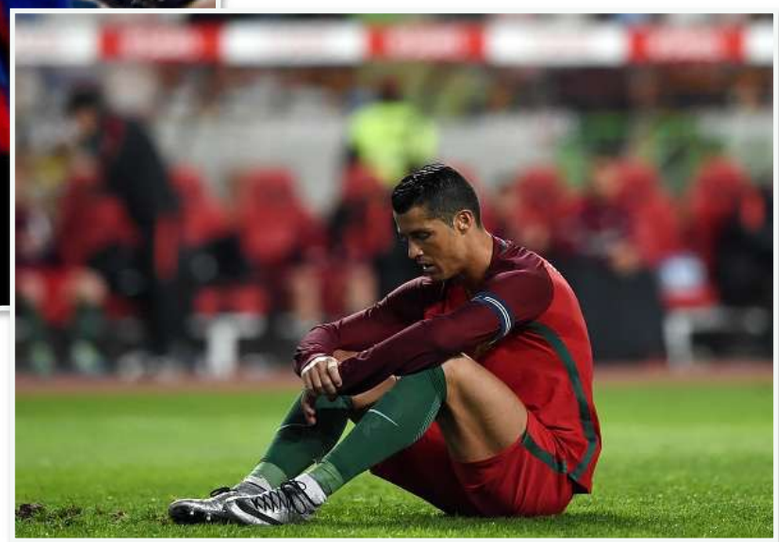
Windecker S et al. **2014 ESC/EACTS Guidelines on myocardial revascularization**. Eur Heart J 2014;35:2541-2619

2017 SCC Myocardial Revascularization Guidelines?

Recommendations	Class[a]	Level[b]	Ref[c]
Strategy			
Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIb	B	234,264–266
Staged revascularization of non-culprit lesions should be considered in STEMI patients with multivessel disease in case of symptoms or ischaemia within days to weeks after primary PCI.	I	A	235
Immediate revascularization of significant non-culprit lesions during the same procedure as primary PCI of the culprit vessel may be considered in selected patients.	IIa	A	267
In patients with continuing ischaemia and in whom PCI of the infarct-related artery cannot be performed, CABG should be considered.	IIa	C	

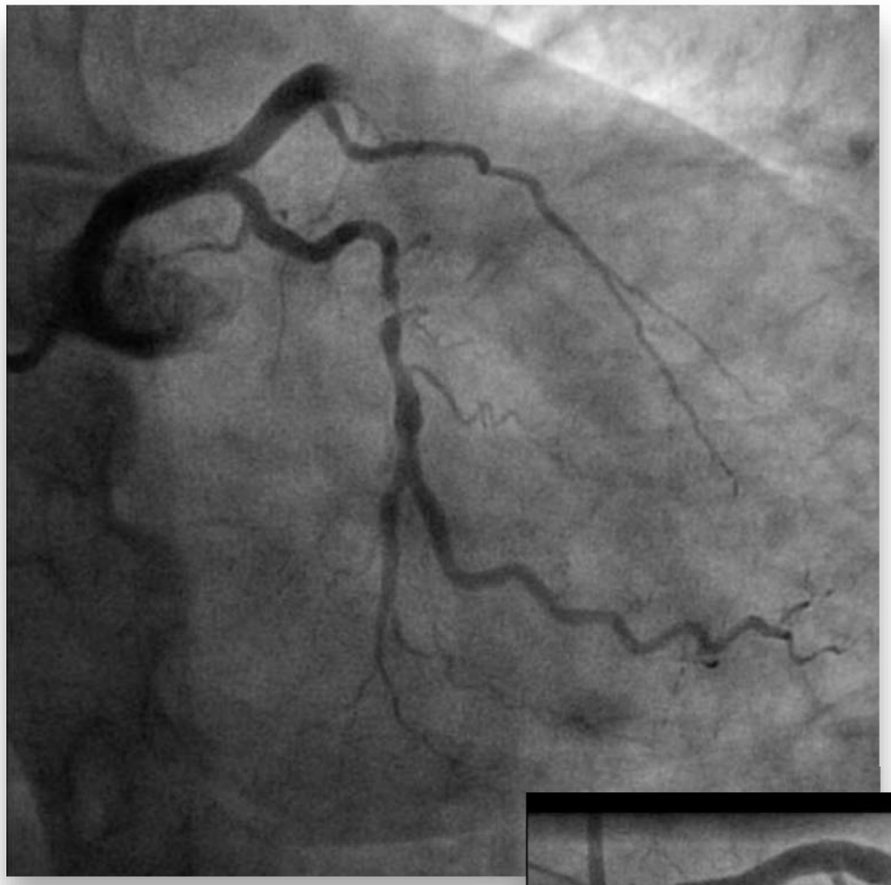
PRAMI Trial. N Engl J Med 2013
CvLPRIT Trial. J Am Coll Cardio 2014
DANAMI PRIMULTI. Lancet 2015
COMPARE ACUTE. N Engl J Med 2017

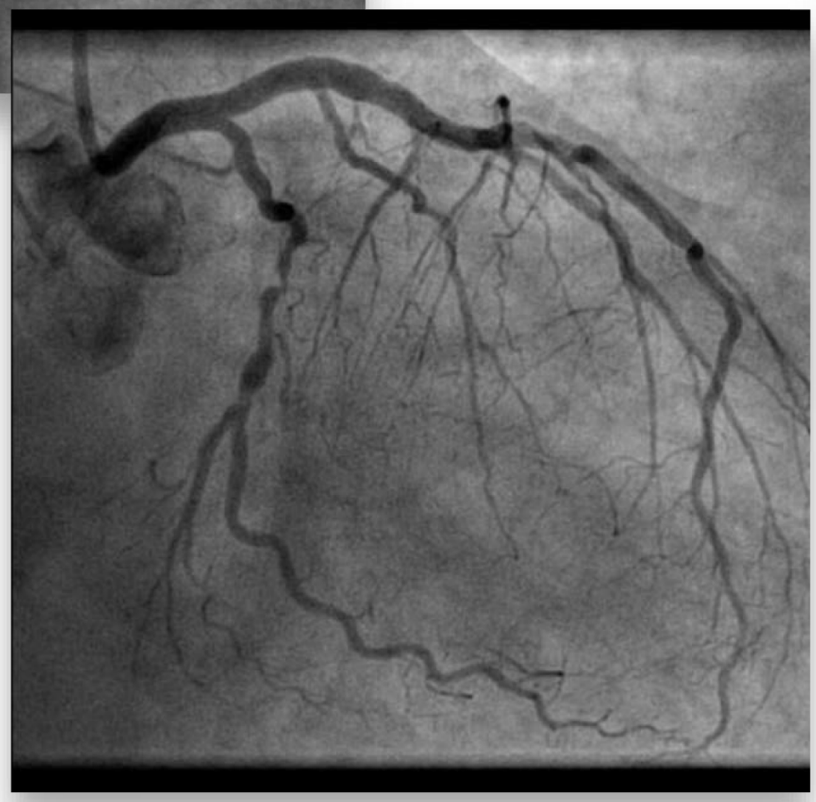
Multivessel revascularization seems the best option in patients with STEMI…



…but should we do it during the index procedure? (acute multivessel PCI)

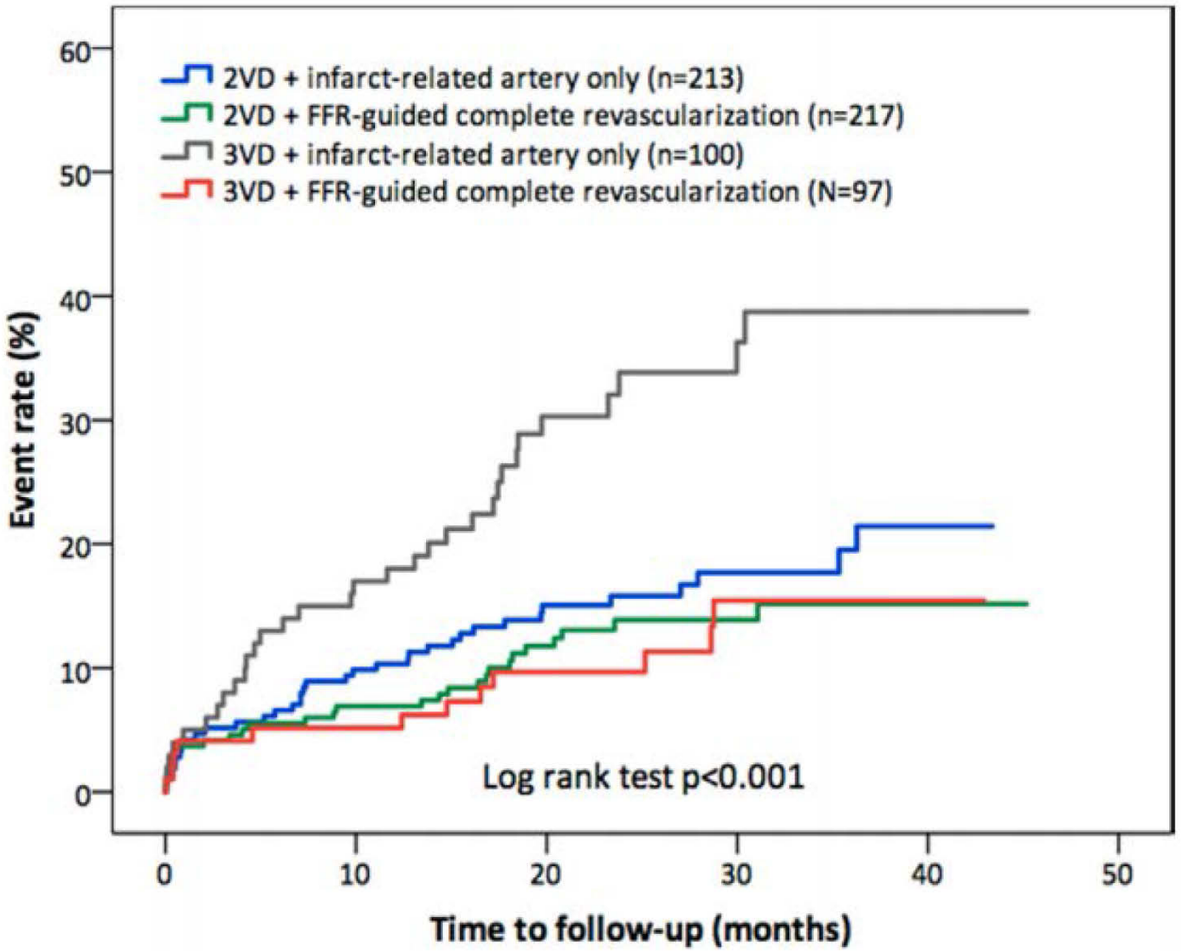
Multivessel PCI during the Index Procedure

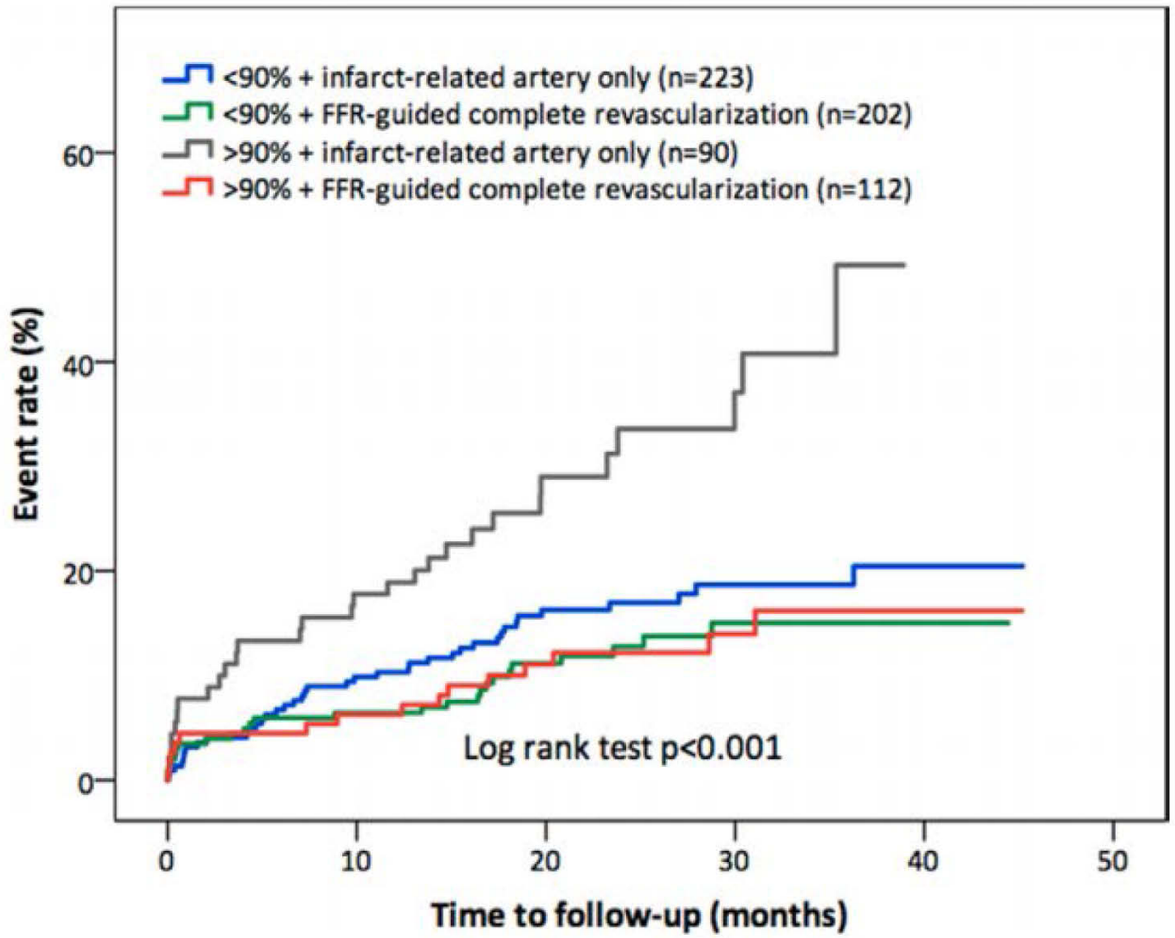




Impact of the Disease Severity on Outcome

The benefit from FFR-guided complete revascularization was dependent in the presence of 3-vessel disease and noninfarct diameter stenosis >90% (particularly pronounced in patients with both these angiographic characteristics)

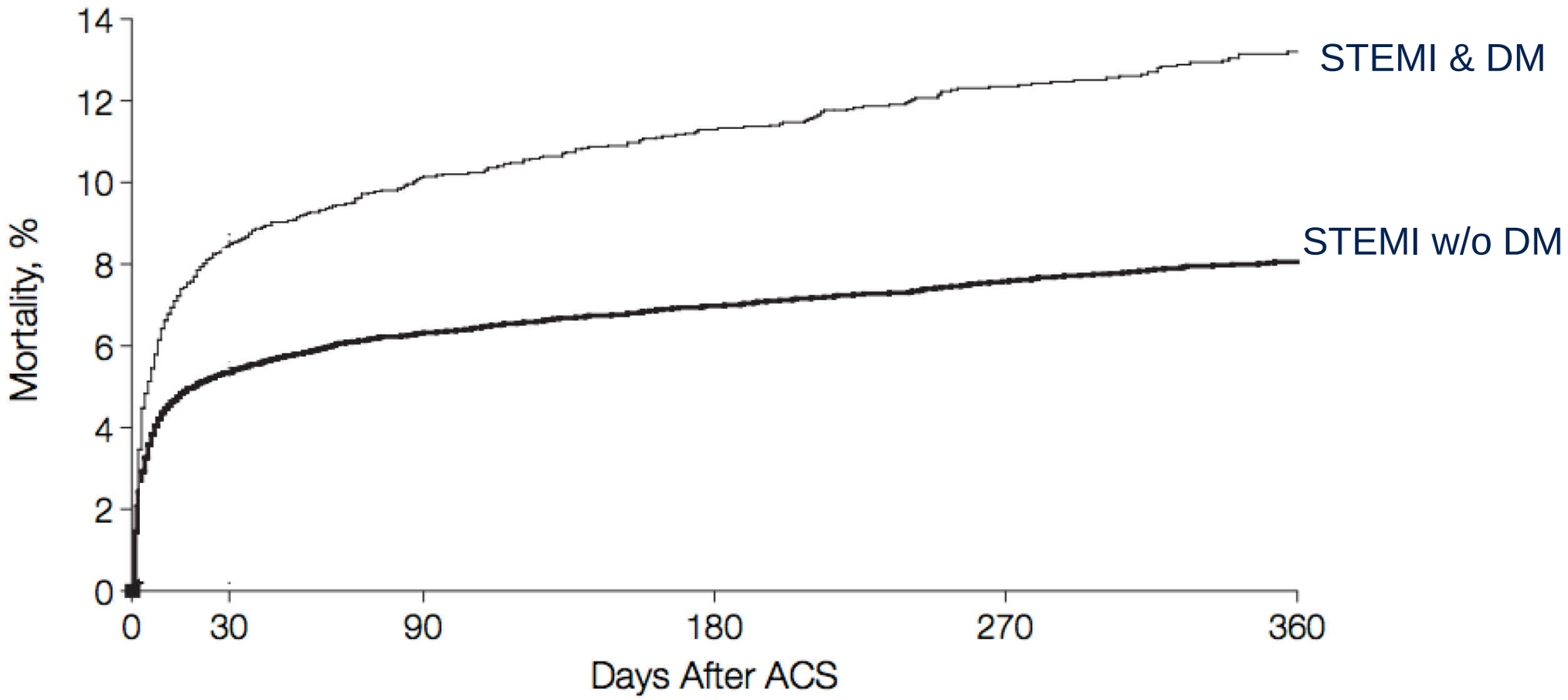




Lønborg J et al. **FFR-guided complete revascularization improves the prognosis of patients with STEMI and severe nonculprit disease. A DANAMI 3 PRIMULTI substudy.** Circ Cardiovasc Interv 201710:e004460

Impact of the Diabetes on Outcome in STEMI

Diabetes confers a significant adverse prognosis, which highlights the importance of aggressive strategies to manage this high-risk population



Diabetes at presentation was associated with significantly higher mortality 1 year after STEMI (HR, 1.22; 95% CI, 1.08- 1.38)

Donahoe SM et al. **Diabetes and Mortality Following Acute Coronary Syndromes.** JAMA 2007;298:765-775

Current Evidence of Multivessel vs Culprit Lesion PCI in STEMI complicated with Cardiogenic Shock

Registry trial	n	Mortality Complete Revascularization	Mortality Incomplete Revascularization	Adjusted OR (95%CI)
Webb[8]	74	55%*	20%*	2.75 (1.05-7.25)
Van der Schaaf[19]	161	60%*	53%*	Not reported (p=0.05)
Cavender[18]	3087	36.5%	27.8%	1.5 (1.22–1.95)
Bauer[17]	336	48.8%	37.4%	1.28 (0.72–2.28)
Zeymer[20]	735	46.8%	35.6%	1.5 (1.1-2.3)
Mylotte[28]	169	56.1%†	79.6%†	Not reported (p=0.002)
Cavender[31]	199	46%	27%	Not reported (p=0.04)
Hussain[27]	101	Not reported	Not reported	2.47 (1.14-6.21)
Park[29]	510	13.9%	17.9%	Not reported (p=0.18)
Yang[30]	338	35.0%	30.6%	1.16 (0.72-1.87)

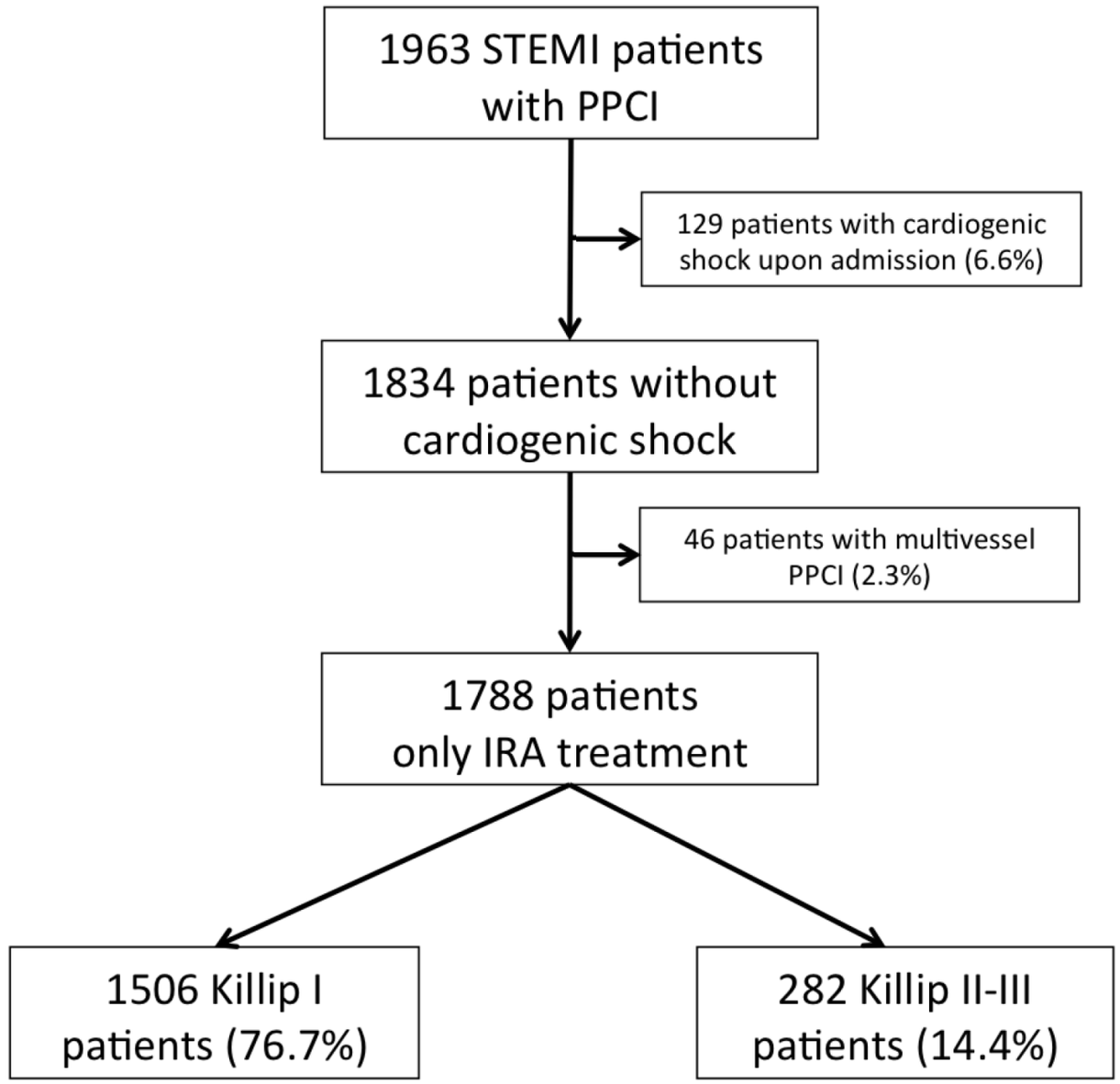
The CULPRIT-SHOCK trial will address the question of optimal revascularization strategy in patients with multivessel disease and acute myocardial infarction complicated by cardiogenic shock

Thiele H et al. **Multivessel versus culprit lesion only PCI plus potential staged revascularization in patients with STEMI complicated by cardiogenic shock: Design and rationale of CULPRIT-SHOCK trial**. Am Heart J;2016;172:160-169

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

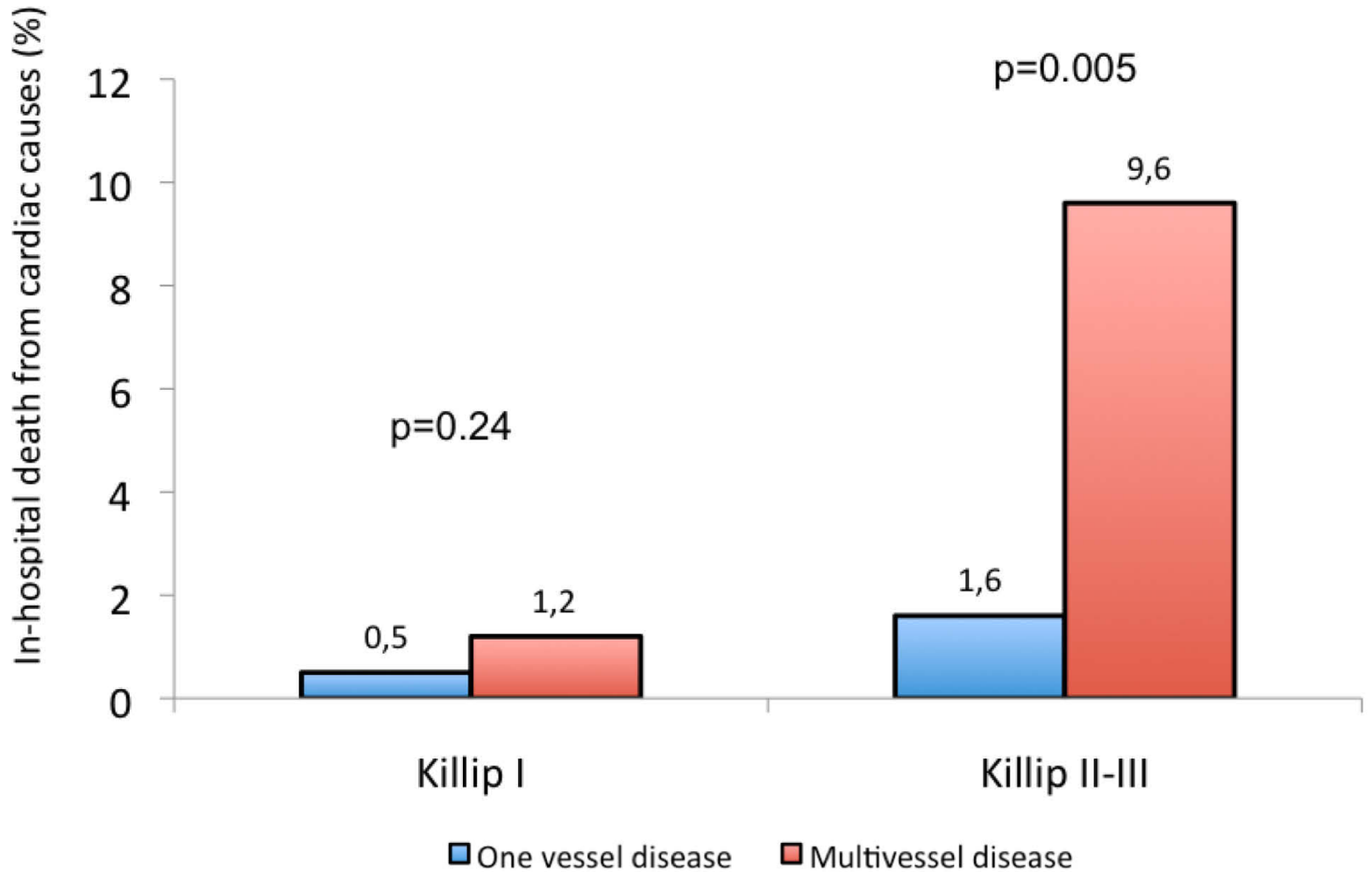


	Killip 1 N=1 506	Killip 2-3 N=282	P
Age, years	**63±13**	**66±14**	**<0,0001**
Females, n(%)	**299(19.9)**	**78(27.7)**	**0,003**
Hypertension, n(%)	751(49.9)	169(59.9)	0,001
Dyslipidemia, n(%)	771(51.2)	134(47.5)	0,14
Diabetes, n(%)	**332(22.0)**	**92(32.6)**	**<0,0001**
Smoking, n(%)	676(44.9)	112(39.7)	0,06
Kidney failure, n(%)	**124(8.2)**	**61(21.6)**	**<0,0001**
Peripheral vascular disease, n(%)	**127(8.4)**	**49(17.4)**	**<0,0001**
Previous infarction, n(%)	**122(8.1)**	**43(15.2)**	**<0,0001**
Previous PCI, n(%)	115(7.6)	36(12.8)	0,005
Multivessel disease, n(%)	**694(46.1)**	**156(55.3)**	**0,003**
Radial access, n(%)	1442(95.8)	269(95.4)	0,44
Thrombectomy, n(%)	1170(77.7)	213(75.5)	0,23
Anti IIb/IIIa, n(%)	1122(74.5)	193(68.4)	0,02
DTDT<120 min, n(%)	1010(67.1)	177(62.8)	0,17
Symptoms to reperfusion <120 min, n(%)	979(65.0)	171(60.6)	0,17

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease



Multivessel disease was associated with a 6-fold higher in-hospital cardiac mortality (1.6% vs. 9.6%; p=0.005)

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

Multivariate Analysis of Cardiac Death During Admission in Patients with Multivessel Disease

	RR	P
Age	1.11 (1.05-1.17)	<0.0001
Renal failure	2.04 (0.88-4.70)	0.09
Use of anti-glycoprotein IIb/IIIa agents	0.32 (0.12-0.86)	0.024
Heart failure at admission (killip>1)	5.19 (2.35-11.41)	<0.0001

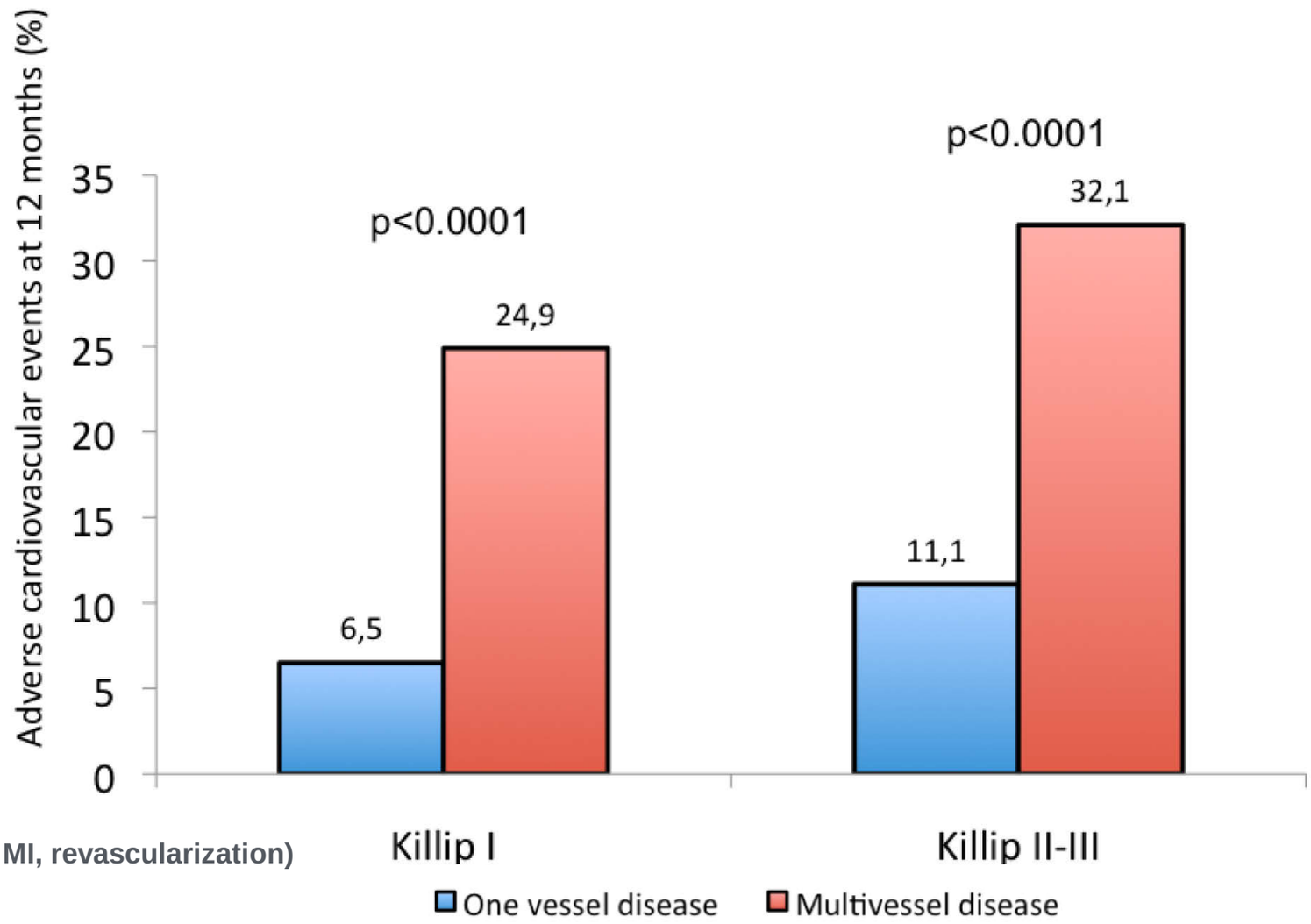
In patients with multivessel disease, Killip II-III at admission was the strongest predictor of in-hospital cardiac mortality

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

Adverse Cardiovascular Events at 12 months



(cardiac death, MI, revascularization)

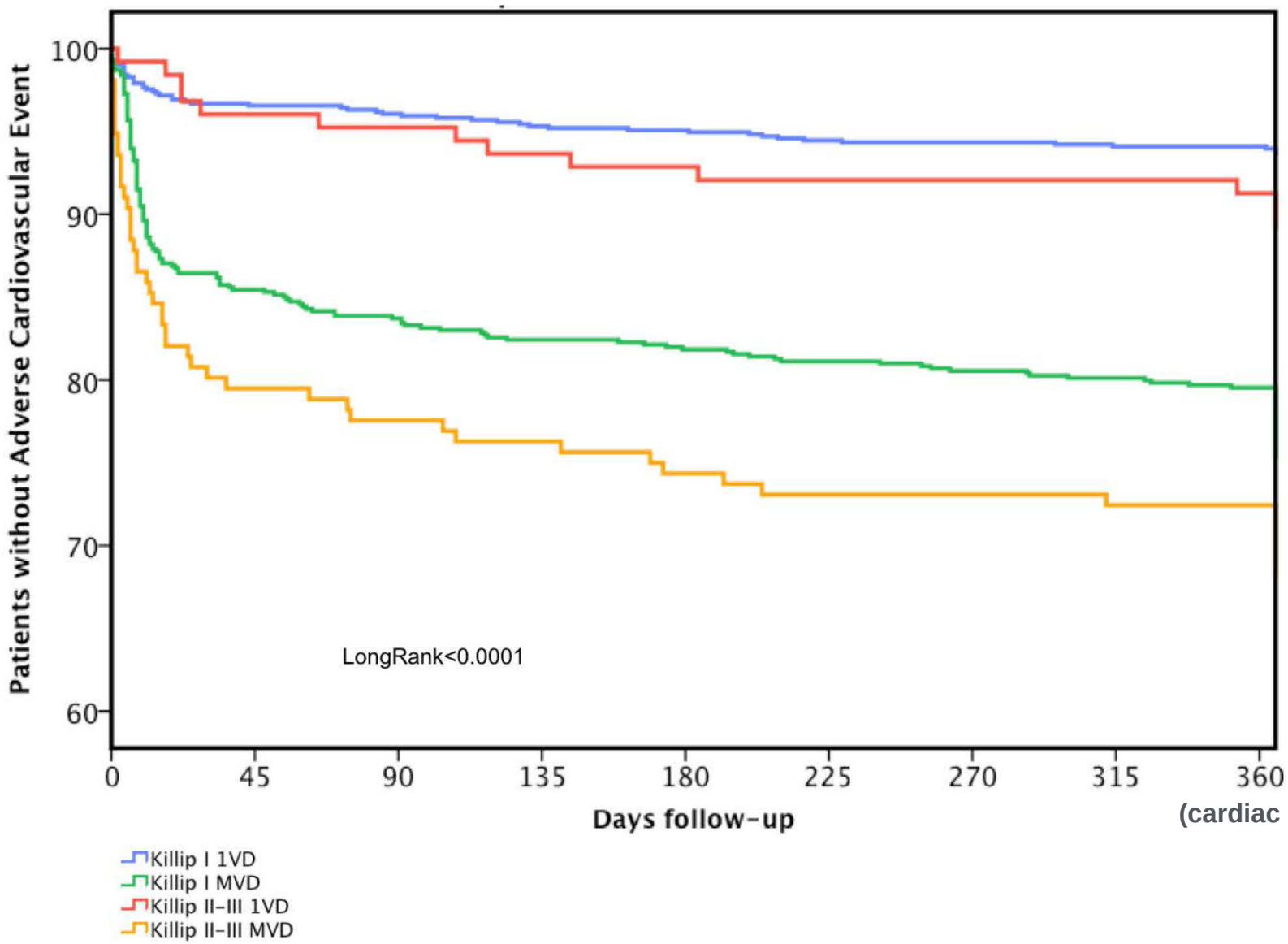
Multivessel disease was associated with a higher incidence of ACE in both groups

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

Kaplan-Meier Curves for Adverse Cardiovascular Events

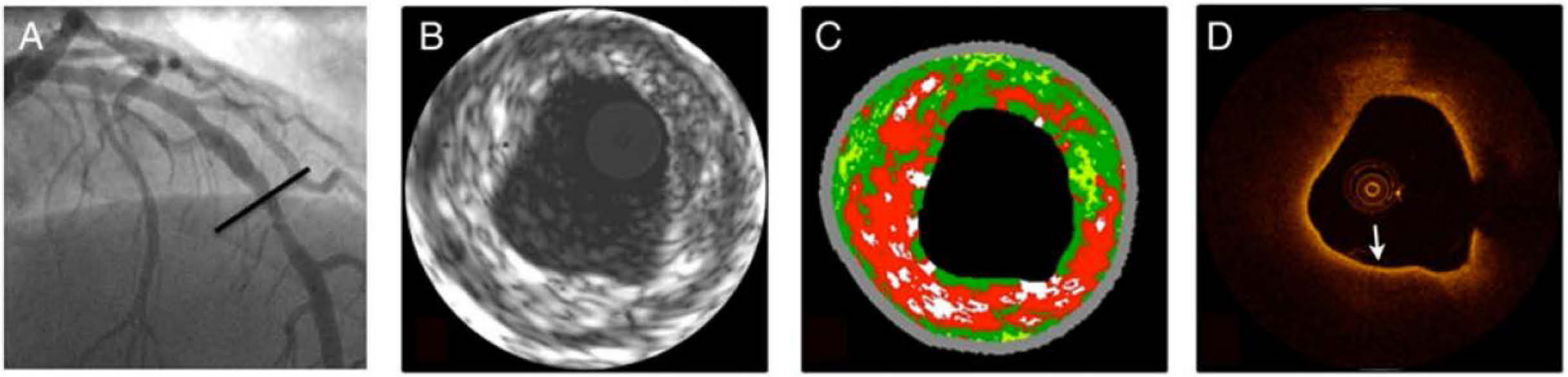


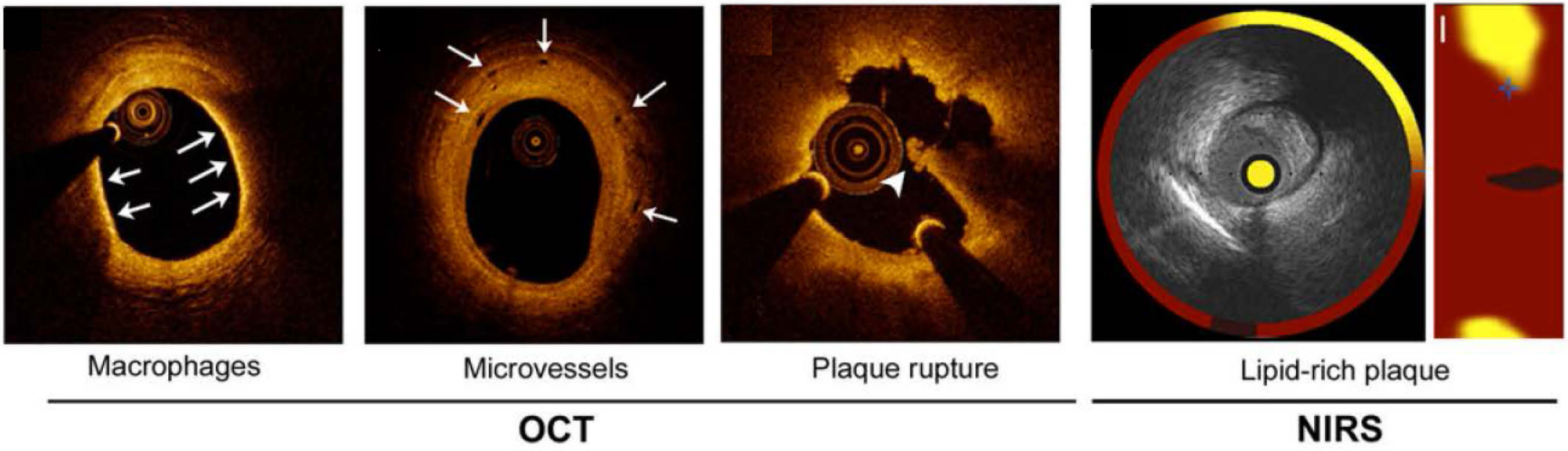
(cardiac death, MI, revascularization)

Remarkably, single-vessel disease curves were associated with favorable outcomes and could be superimposed for Killip I and Killip II-III patients

Meta-Analysis of RCT Comparing Multivessel vs Culprit Only PCI

Multimodality imaging of a distal left anterior descending artery lesion by angiography

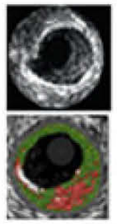
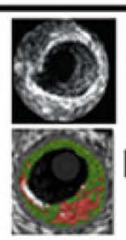
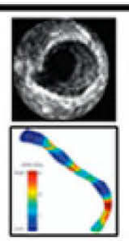




Koskinas KC et al. **Intracoronary imaging of coronary atherosclerosis: validation for diagnosis, prognosis and treatment.** Eur Heart J;2016;37:524-535

Meta-Analysis of RCT Comparing Multivessel vs Culprit Only PCI

Summary of the positive and negative predictive values of intracoronary imaging–derived variables for prediction of clinical outcomes

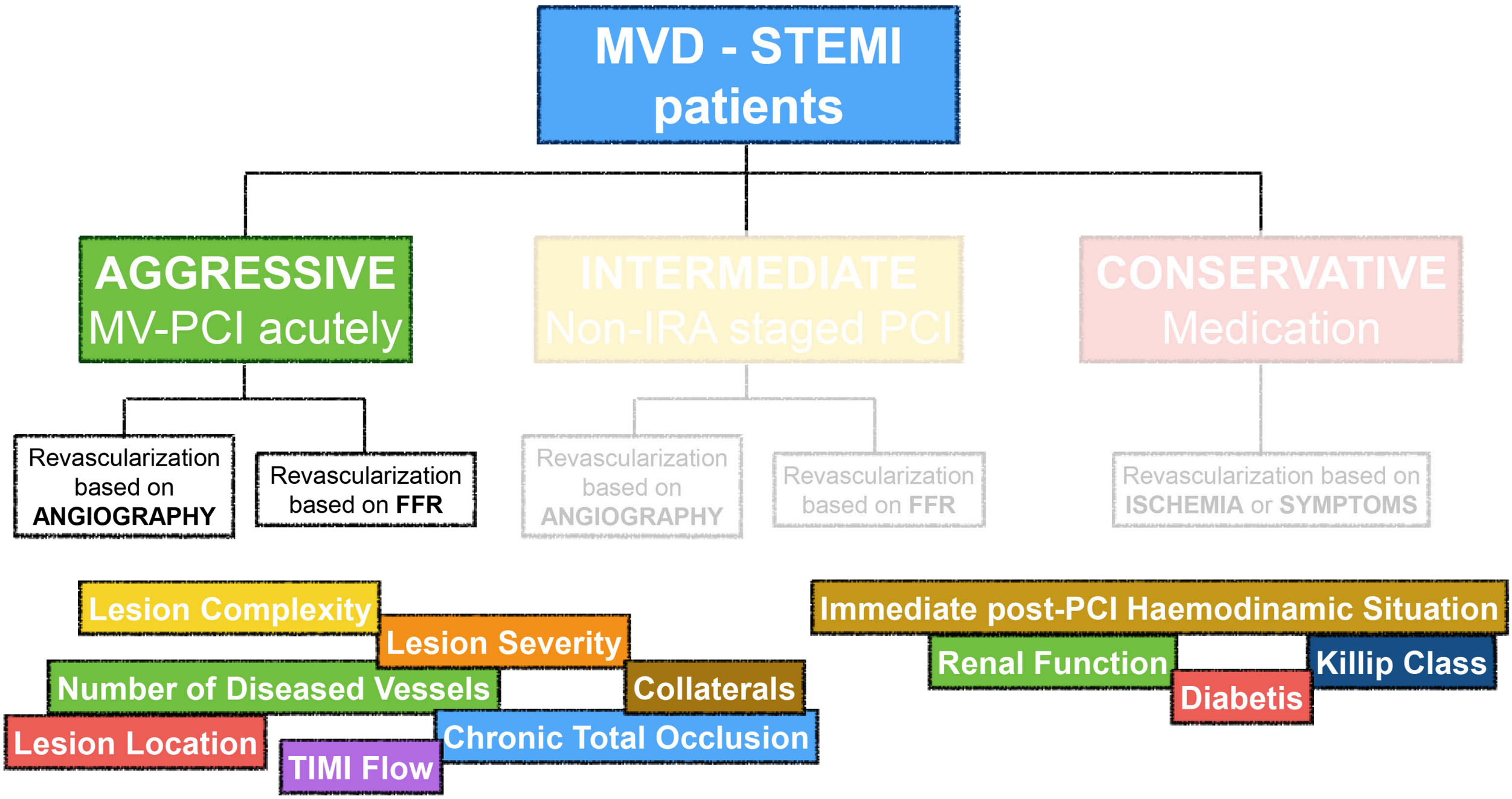
Study	Modality	Lesion characteristic(s)	Clinical endpoint	Positive predictive value	Negative predictive value
PROSPECT *n*=697	 IVUS & IVUS-VH	PB ≥70% & MLA <4mm² & IVUS-VH TCHA	MACE	18%	98%
ATHEROREMO IVUS *n*=581	 IVUS & IVUS-VH	PB ≥70% & MLA <4mm² & IVUS-VH TCHA	MACE	23%	93%
PREDICTION *n*=506	 IVUS & ESS	PB ≥58% & Low ESS <1.0 Pa	PCI	41%	92%
ATHEROREMO NIRS *n*=203	 NIRS	$LCBI_{4mm}$ >43	MACE	12%	99%

These methodologies have established a **link between in vivo plaque characteristics and subsequent coronary events**, thereby **improving individual risk stratification**, paving the way for risk-tailored systemic therapies and **raising the option for pre-emptive interventions**

Koskinas KC et al. **Intracoronary imaging of coronary atherosclerosis: validation for diagnosis, prognosis and treatment.** Eur Heart J;2016;37:524-535

Treatment Strategies in Patients with STEMI and Multivessel Disease

There are about 60 possible scenarios based on combinations of angiographic and clinical findings in individual patients



Conclussions

Multivessel disease should be recognized as a major adverse prognostic factor in patients with STEMI

Multivessel disease in STEMI is not a single entity and thus the treatment approach should be individualized

Randomized controlled trials (PRAMI, CvLPRIT, DANAMI-3 PRIMULTI, COMPARE ACUTE) showed that preventive PCI is safe and improves outcomes mainly driven by the need of repeat revascularization

Patients who are asymptomatic and have negative functional tests and no evidence for silent ischaemia after their first STEMI should currently be treated conservatively

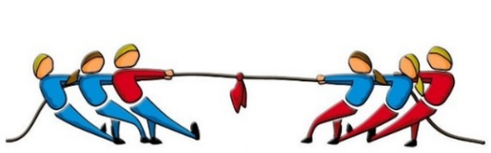
Future studies should clarify whether complete revascularization should be done acutely during the index procedure or at later time and whether it has an effect on hard endpoints

The every day real-life clinical practice brings much more different clinical scenarios. It is unlikely that any randomized clinical trial in the future can be able to fully address this complexity and thus, **experienced, wise clinical judgement will probably remain the most important factor in this difficult situation**

IAM EN MALALTIA MULTIVÀS
TRACTAR-HO TOT O NO
AGUT O DIFERIT

TRACTAR ALTRES LESIONS QUE LA RESPONSABLE EN LA FASE AGUDA APORTA AVANTATGES

- PART II -



Oriol Rodríguez Leor
Institut del Cor Germans Trias i Pujol
Badalona

iCor INSTITUT DEL COR DEL GERMANS TRIAS I PUJOL

germanstrias hospital

2014 ESC Myocardial Revascularization Guidelines

Recommendations	Class[a]	Level[b]	Ref[c]
Strategy			
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234. Kornowski (HORIZONS AMI)_JACC 2011
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235. Politi. Heart 2010

267. Wald. N Engl J Med 2013

Windecker S et al. **2014 ESC/EACTS Guidelines on myocardial revascularization**. Eur Heart J 2014;35:2541-2619

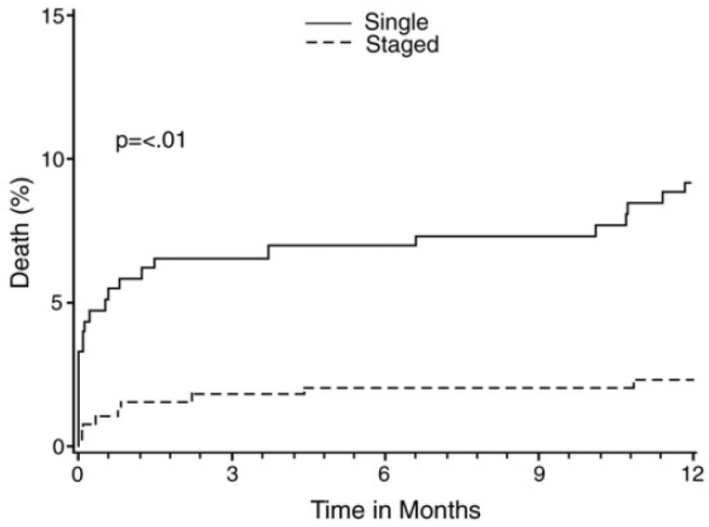
2014 EHJ Revascularization Guidelines

HORIZONS AMI Trial

668 of the 3602 STEMI patients enrolled (18.5%) underwent PCI of culprit and nonculprit lesions for multivessel disease

Patients were categorized into a single PCI strategy (n=275) versus staged PCI (n=393)

CONCLUSION: a deferred angioplasty strategy of nonculprit lesions should remain the standard approach in patients with STEMI undergoing primary PCI, as multivessel PCI may be associated with a greater hazard for mortality and stent thrombosis



- **Retrospective nonrandomized subanalysis**
- **Specific reason why operator chose a single procedure vs a staged approach was not prospectively collected**
- **Low number of events (31 deaths / 25 cardiac deaths/19 stent thrombosis) -> Multivariate Model Underpowered**
- **BMS vs Taxus Express**

Kornowski R et al. **Prognostic impact of staged vs "ontime" multivessel PCI in acute myocardial infarction. Analysis from the HORIZONS-AMI Trial.** J Am Coll Cardiol 2011; 58:704-711

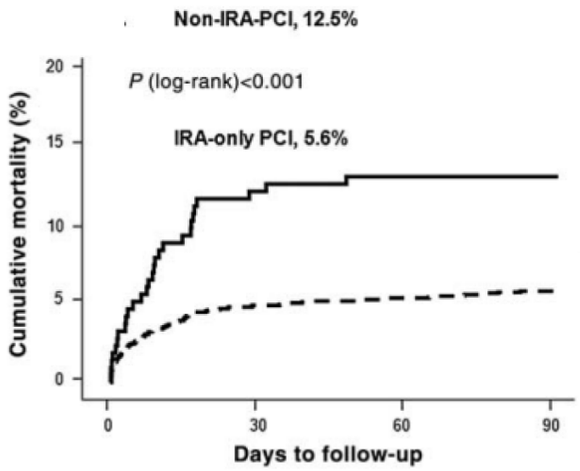
2014 EHJ Revascularization Guidelines

APEX AMI Trial

2201 of the 5373 STEMI patients enrolled (18.5%) underwent PCI of culprit and nonculprit lesions for multivessel disease

Patients were categorized into a single PCI strategy (n =217) versus no PCI (n =1984)

CONCLUSION: Non-culprit coronary interventions were performed at the time of primary PCI in 10% of MVD patients and were significantly associated with increased mortality. Our data support current guideline recommendations discouraging the performance of such procedures in stable primary PCI patients.



- **Retrospective nonrandomized subanalysis**
- **Specific reason why operator chose a single procedure vs a staged approach was not prospectively collected**
- **Low number of events (135 deaths)-> Multivariate Model Underpowered**
- **Only 38% DES (1st generation)**
- **Lack of information on outcomes in patients not treated at the index procedure**

Toma M et al. **Non-culprit coronary artery percutaneous coronary intervention during acute ST-segment elevation myocardial infarction: insights from the APEX-AMI trial.** Eur Heart J. 2010;31:1701-7

2014 EHJ Revascularization Guidelines

Hannan et al, JACC Intv

New York State Registry (3521 patients) 2003-2006

CONCLUSION: Our findings support the ACC/AHA recommendation that culprit vessel PCI be used for STEMI patients with multivessel disease at the time of the index PCI when patients are not hemodynamically compromised. However, staged PCI within 60 days after the index procedure, including during the index admission, is associated with risk-adjusted mortality rates that are comparable with the rate for culprit vessel PCI alone.

Table 5. Mortality Rates (%) for Propensity Matched Multivessel Disease STEMI Patients by Revascularization Strategy During the Index Procedure

Outcome by Subgroup	Culprit Vessel Revascularization at the Time of PPCI	Multivessel Revascularization at the Time of PPCI	Percentage Difference	p Value
All patients	n = 503	n = 503		
Death, %				
In-hospital	2.0	3.4	1.4	0.14
12 months	5.5	7.1	1.6	0.23
24 months	6.6	8.6	2.0	0.17
42 months	10.8	11.8	1.0	0.23
Patients without hemodynamic instability, LVEF <20%, malignant ventricular arrhythmia	n = 458	n = 458		
Death, %				
In-hospital	0.9	2.4	1.5	0.04
12 months	4.2	5.8	1.6	0.13
24 months	4.9	7.2	2.3	0.07
42 months	6.7	10.4	3.7	0.08

Median follow-up = 22.54 months.
LVEF = left ventricular ejection fraction; PPCI = primary percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.

- **Observational study (selection bias)**
- **No information about medical treatment**
- **No information about DES use, but 1st generation**
- **Very low In-hospital mortality in the culprit-only group (0,9%!!)**

Hannan EL et al. **Culprit vessel PCI vs multivessel and staged PCI for STEMI in patients with multivessel disease .** J Am Coll Cardiol Intv 2010;3:22-31

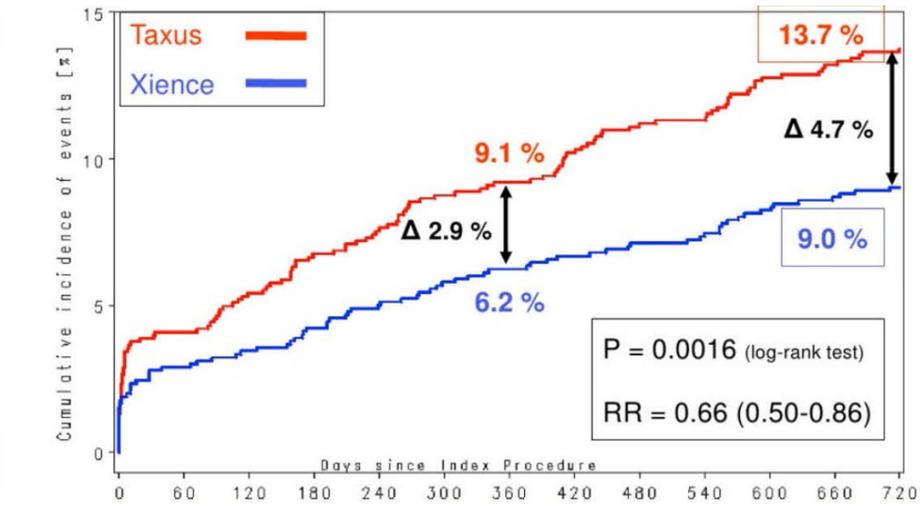
Randomized Trials of Multivessel PCI in STEMI

First Generation vs Contemporary DES

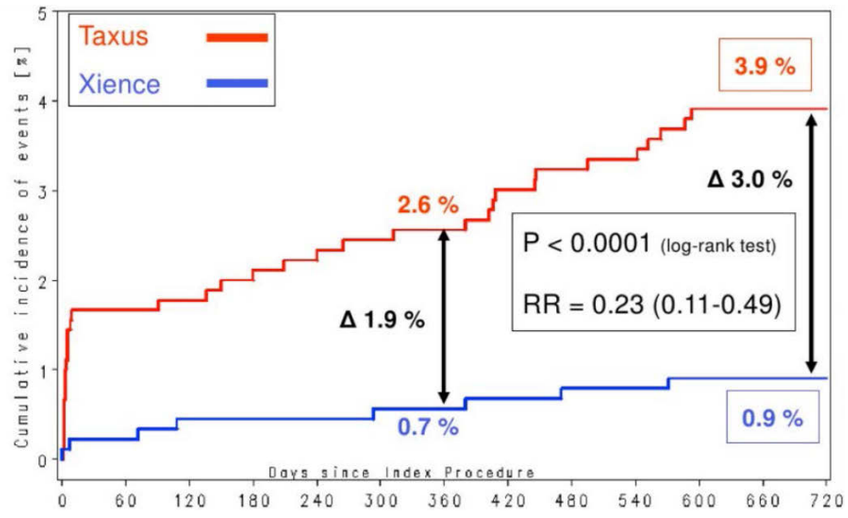
COMPARE Trial

2-Year Follow-Up of a Randomized Controlled Trial of Everolimus- and Paclitaxel-Eluting Stents for Coronary Revascularization in Daily Practice

MACE (all death, non-fatal MI, TVR)



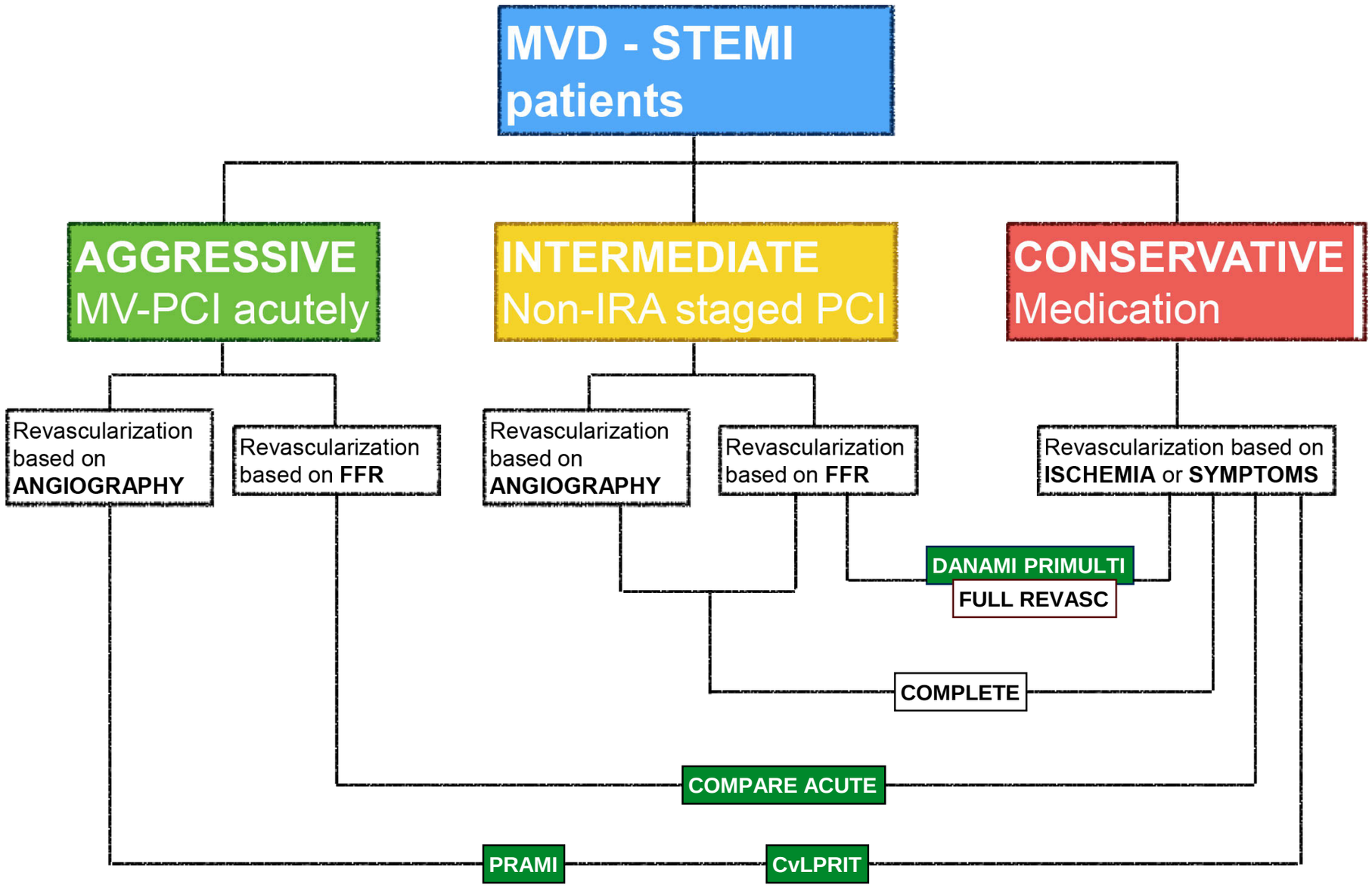
STENT THROMBOSIS



The substantial clinical benefit of the EES over the PES with regard to measures of both safety and efficacy is maintained at 2 years in real-life practice with an increasing benefit in terms of safety and efficacy between 1 year and 2 years

Smits PC et al. **2-Year Follow-Up of a Randomized Controlled Trial of Everolimus- and Paclitaxel-Eluting Stents for Coronary Revascularization in Daily Practice.** J Am Coll Cardiol 2011; 58:11–8

Treatment Strategies in Patients with STEMI and Multivessel Disease

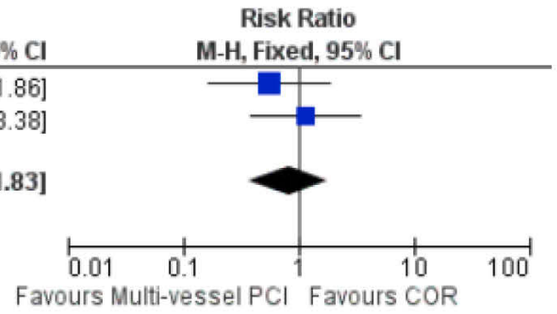


Meta-Analysis of RCT Comparing Multivessel vs Culprit Only PCI

Risk of Major Bleeding in Follow-up

Study or Subgroup	Multi-vessel PCI Events	Total	COR Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Culprit	4	150	7	146	54.0%	0.56 [0.17, 1.86]
PRAMI	7	234	6	231	46.0%	1.15 [0.39, 3.38]
Total (95% CI)		**384**		**377**	**100.0%**	**0.83 [0.38, 1.83]**
Total events	11		13			

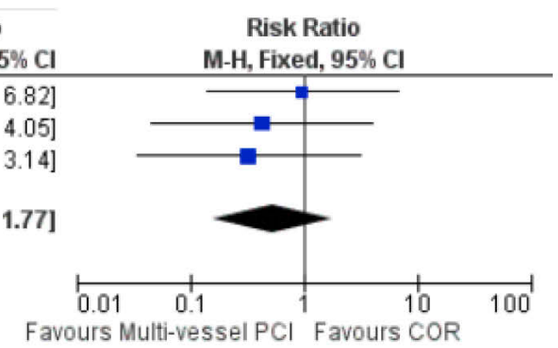
Heterogeneity: Chi² = 0.78, df = 1 (P = 0.38); I² = 0%
Test for overall effect: Z = 0.46 (P = 0.64)



Risk of Contrast-Induced Nephropaty in Follow-up

Study or Subgroup	Multi-vessel PCI Events	Total	COR Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Culprit	2	150	2	146	26.4%	0.97 [0.14, 6.82]
Politi	1	65	3	84	34.2%	0.43 [0.05, 4.05]
PRAMI	1	234	3	231	39.4%	0.33 [0.03, 3.14]
Total (95% CI)		**449**		**461**	**100.0%**	**0.53 [0.16, 1.77]**
Total events	4		8			

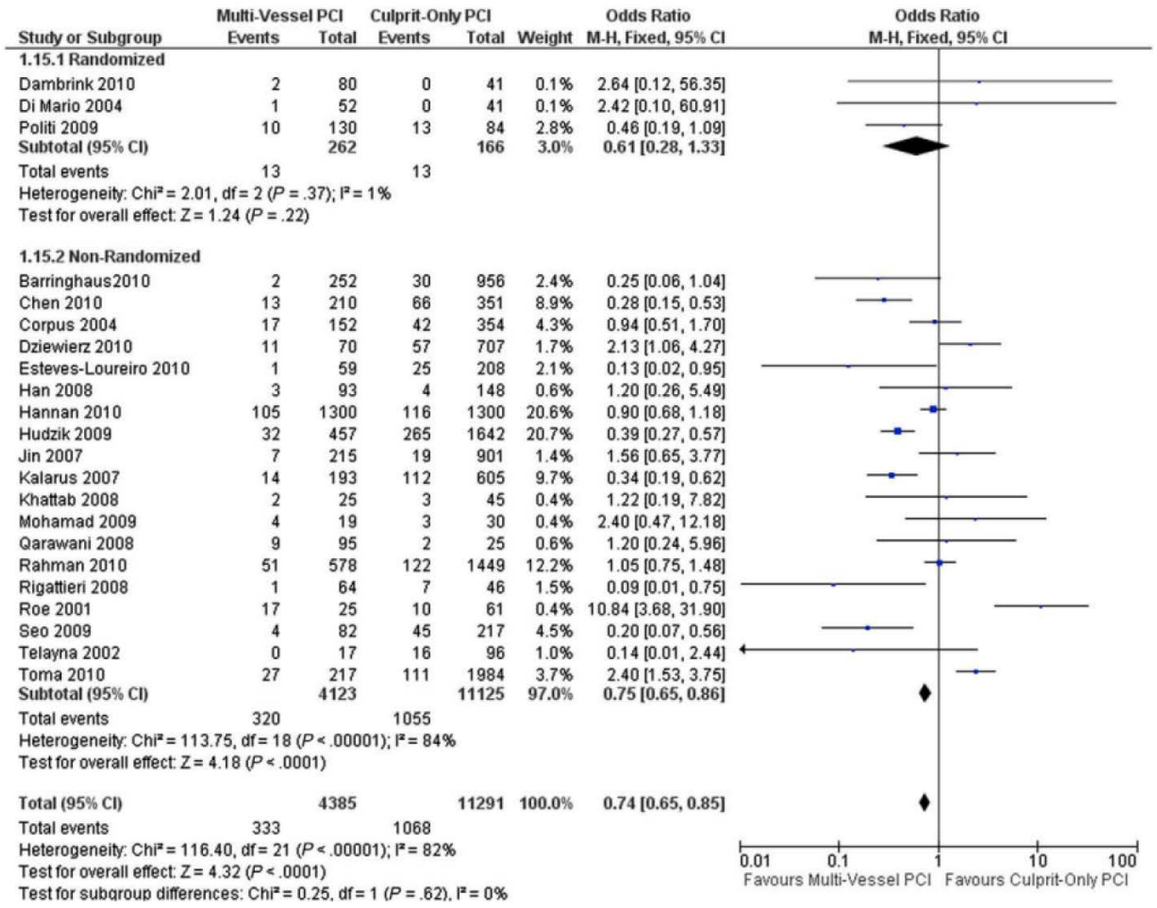
Heterogeneity: Chi² = 0.58, df = 2 (P = 0.75); I² = 0%
Test for overall effect: Z = 1.02 (P = 0.31)



El-Hayek GE et al. **Meta-analysis of randomized controlled trials comparing multi-vessel vs culprit only revascularization for patients with STEMI and multivessel disease**. Am J Cardiol;2015;115:1481

Meta-Analysis of RCT and nonRCT Comparing Multivessel vs Culprit Only PCI

Long Term Mortality Stratified by Study Method



Multivessel PCI asociated with lower long term mortality
OR 0,74 (0,65-0,85) p<0,001

Bainey KR et al. **Complete vs culprit-only revascularization for patients with MVD undergoing primary PCI for STEMI: a systematic review and meta-analysis**. Am Heart J;2014;167:1-14

2014 ESC Myocardial Revascularization Guidelines

Recommendations	Class[a]	Level[b]	Ref[c]
Strategy			
Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIa	B	234,264–266
Staged revascularization of non-culprit lesions should be considered in STEMI patients with multivessel disease in case of symptoms or ischaemia within days to weeks after primary PCI.	IIa	B	235
Immediate revascularization of significant non-culprit lesions during the same procedure as primary PCI of the culprit vessel may be considered in selected patients.	IIb	B	267
In patients with continuing ischaemia and in whom PCI of the infarct-related artery cannot be performed, CABG should be considered.	IIa	C	

234. Kornowski (HORIZONS AMI)_JACC 2011
264. Hannan (New York Registry)_JACC Interv 2010
265. Toma (APEX AMI)_ Eur Heart J 2010
266. Vlaar (Meta-Analysis)_J Am Coll Cardiol 2011

235. Politi. Heart 2010

267. Wald. N Engl J Med 2013

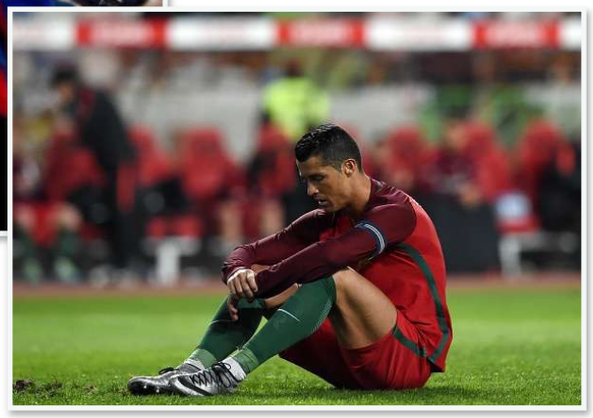
Windecker S et al. **2014 ESC/EACTS Guidelines on myocardial revascularization**. Eur Heart J 2014;35:2541-2619

2017 SCC Myocardial Revascularization Guidelines?

Recommendations	Class[a]	Level[b]	Ref[c]
Strategy			
Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIb	B	234,264–266
Staged revascularization of non-culprit lesions should be considered in STEMI patients with multivessel disease in case of symptoms or ischaemia within days to weeks after primary PCI.	I	A	235
Immediate revascularization of significant non-culprit lesions during the same procedure as primary PCI of the culprit vessel may be considered in selected patients.	IIa	A	267
In patients with continuing ischaemia and in whom PCI of the infarct-related artery cannot be performed, CABG should be considered.	IIa	C	

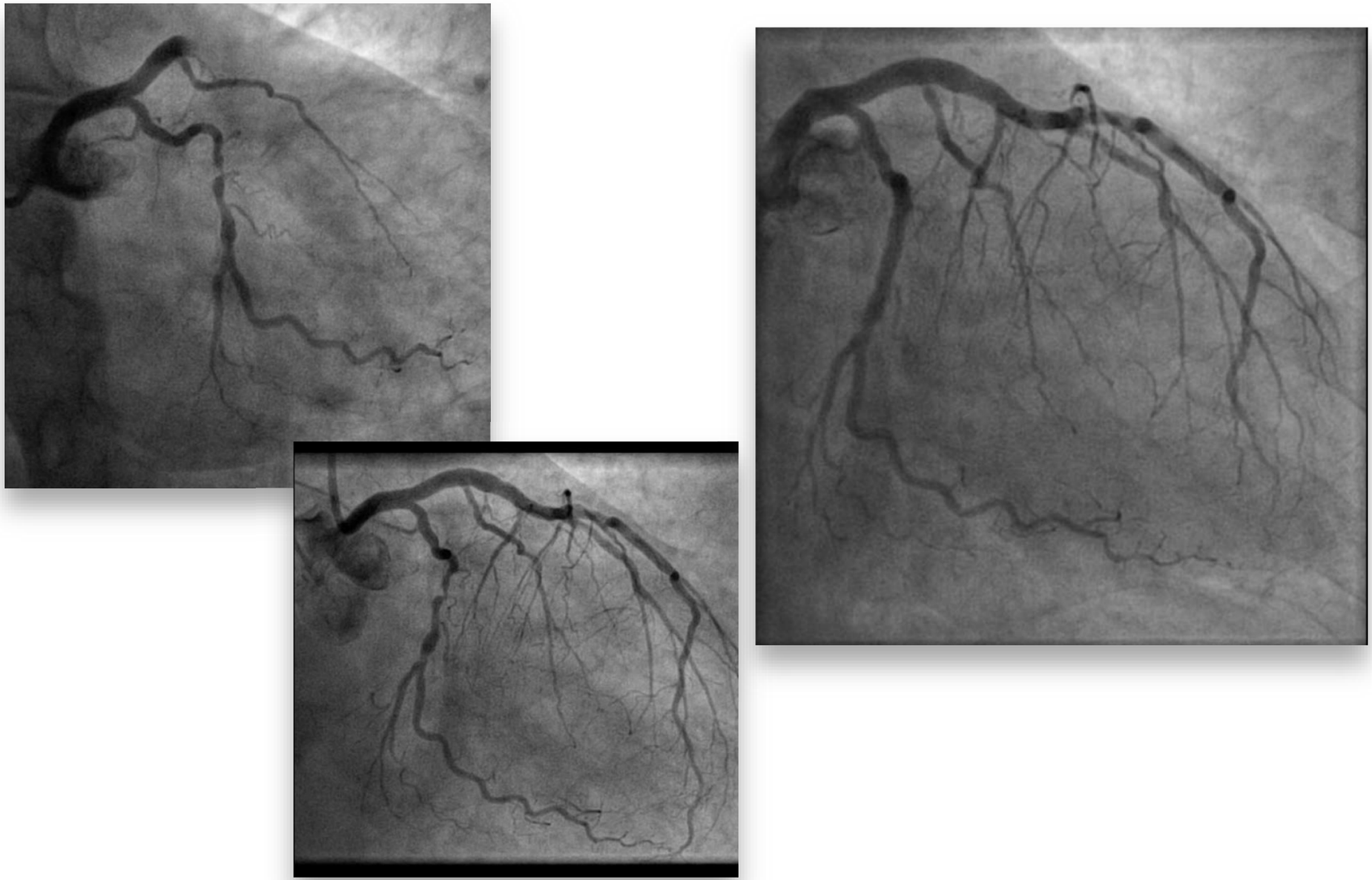
PRAMI Trial. N Engl J Med 2013
CvLPRIT Trial. J Am Coll Cardio 2014
DANAMI PRIMULTI. Lancet 2015
COMPARE ACUTE. N Engl J Med 2017

Multivessel revascularization seems the best option in patients with STEMI…



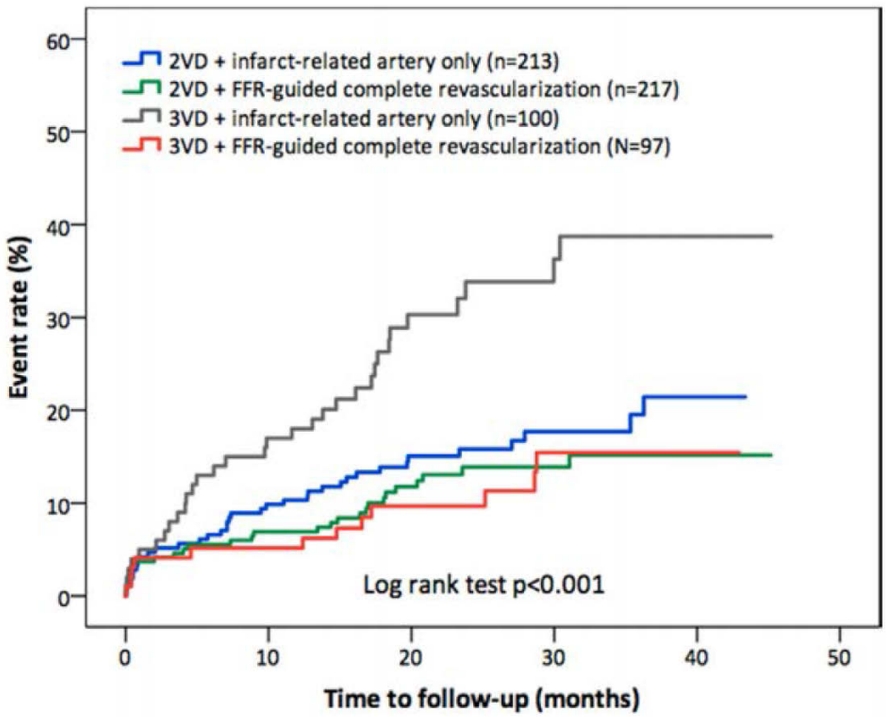
…but should we do it during the index procedure? (acute multivessel PCI)

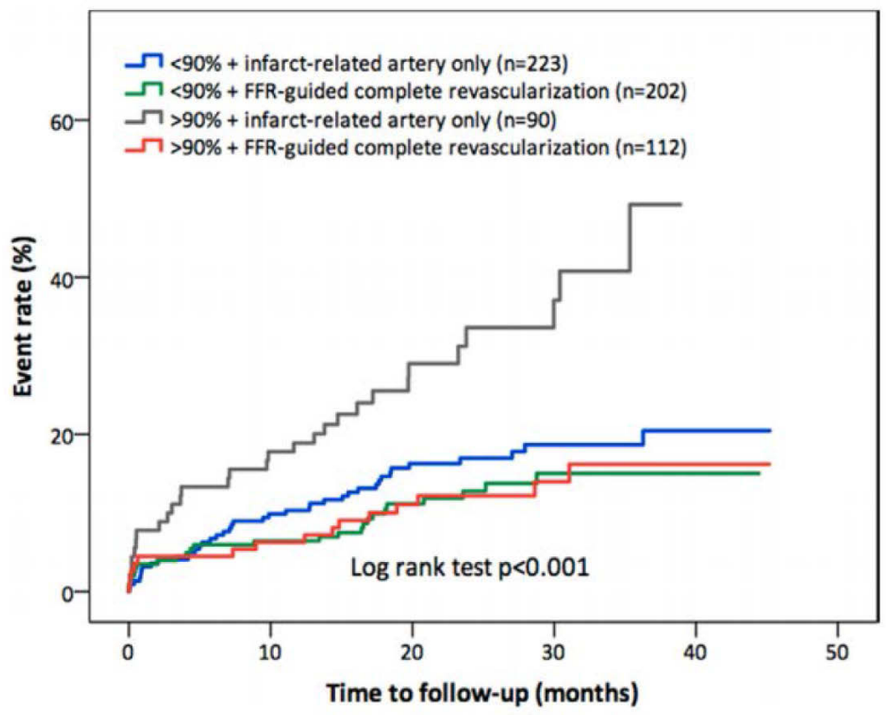
Multivessel PCI during the Index Procedure



Impact of the Disease Severity on Outcome

The benefit from FFR-guided complete revascularization was dependent in the presence of 3-vessel disease and noninfarct diameter stenosis >90% (particularly pronounced in patients with both these angiographic characteristics)

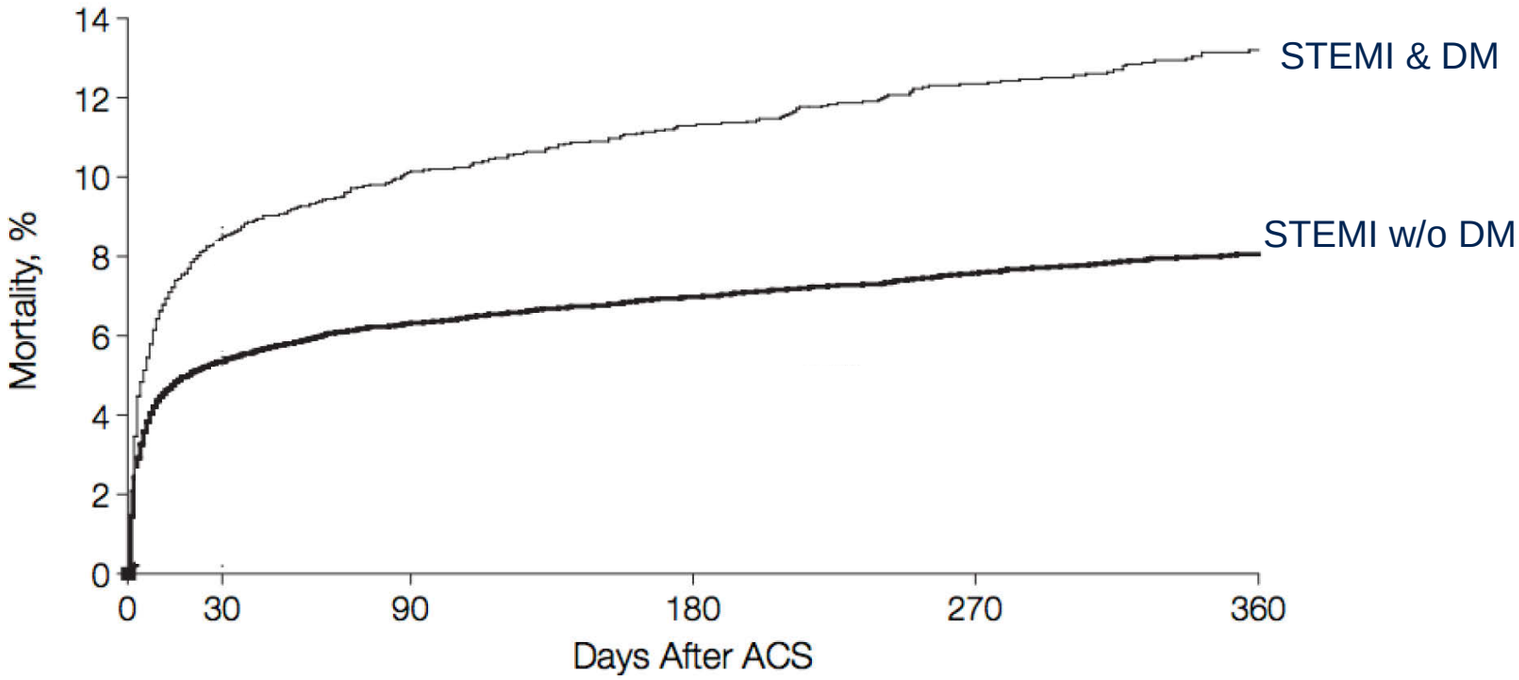




Lønborg J et al. **FFR-guided complete revascularization improves the prognosis of patients with STEMI and severe nonculprit disease. A DANAMI 3 PRIMULTI substudy.** Circ Cardiovasc Interv 201710:e004460

Impact of the Diabetes on Outcome in STEMI

Diabetes confers a significant adverse prognosis, which highlights the importance of aggressive strategies to manage this high-risk population



Diabetes at presentation was associated with significantly higher mortality 1 year after STEMI (HR, 1.22; 95% CI, 1.08- 1.38)

Donahoe SM et al. **Diabetes and Mortality Following Acute Coronary Syndromes.** JAMA 2007;298:765-775

Current Evidence of Multivessel vs Culprit Lesion PCI in STEMI complicated with Cardiogenic Shock

Registry trial	n	Mortality Complete Revascularization	Mortality Incomplete Revascularization	Adjusted OR (95%CI)
Webb[8]	74	55%*	20%*	2.75 (1.05-7.25)
Van der Schaaf[19]	161	60%*	53%*	Not reported (p=0.05)
Cavender[18]	3087	36.5%	27.8%	1.5 (1.22–1.95)
Bauer[17]	336	48.8%	37.4%	1.28 (0.72–2.28)
Zeymer[20]	735	46.8%	35.6%	1.5 (1.1-2.3)
Mylotte[28]	169	56.1%†	79.6%†	Not reported (p=0.002)
Cavender[31]	199	46%	27%	Not reported (p=0.04)
Hussain[27]	101	Not reported	Not reported	2.47 (1.14-6.21)
Park[29]	510	13.9%	17.9%	Not reported (p=0.18)
Yang[30]	338	35.0%	30.6%	1.16 (0.72-1.87)

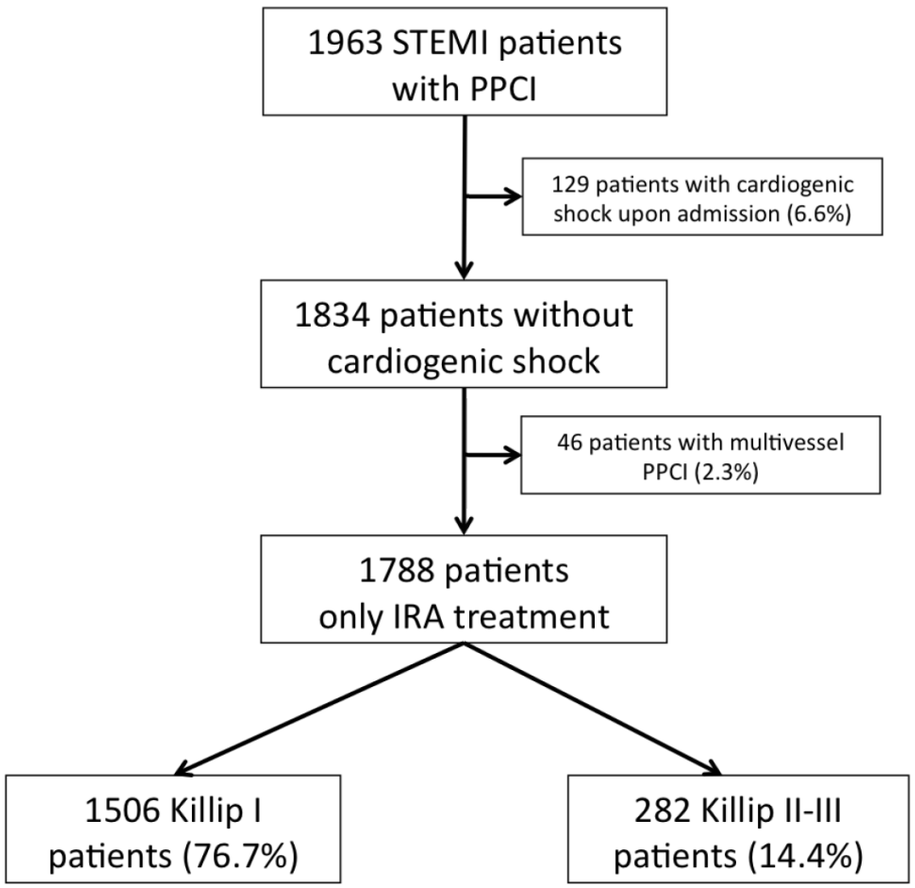
The CULPRIT-SHOCK trial will address the question of optimal revascularization strategy in patients with multivessel disease and acute myocardial infarction complicated by cardiogenic shock

Thiele H et al. **Multivessel versus culprit lesion only PCI plus potential staged revascularization in patients with STEMI complicated by cardiogenic shock: Design and rationale of CULPRIT-SHOCK trial**. Am Heart J;2016;172:160-169

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

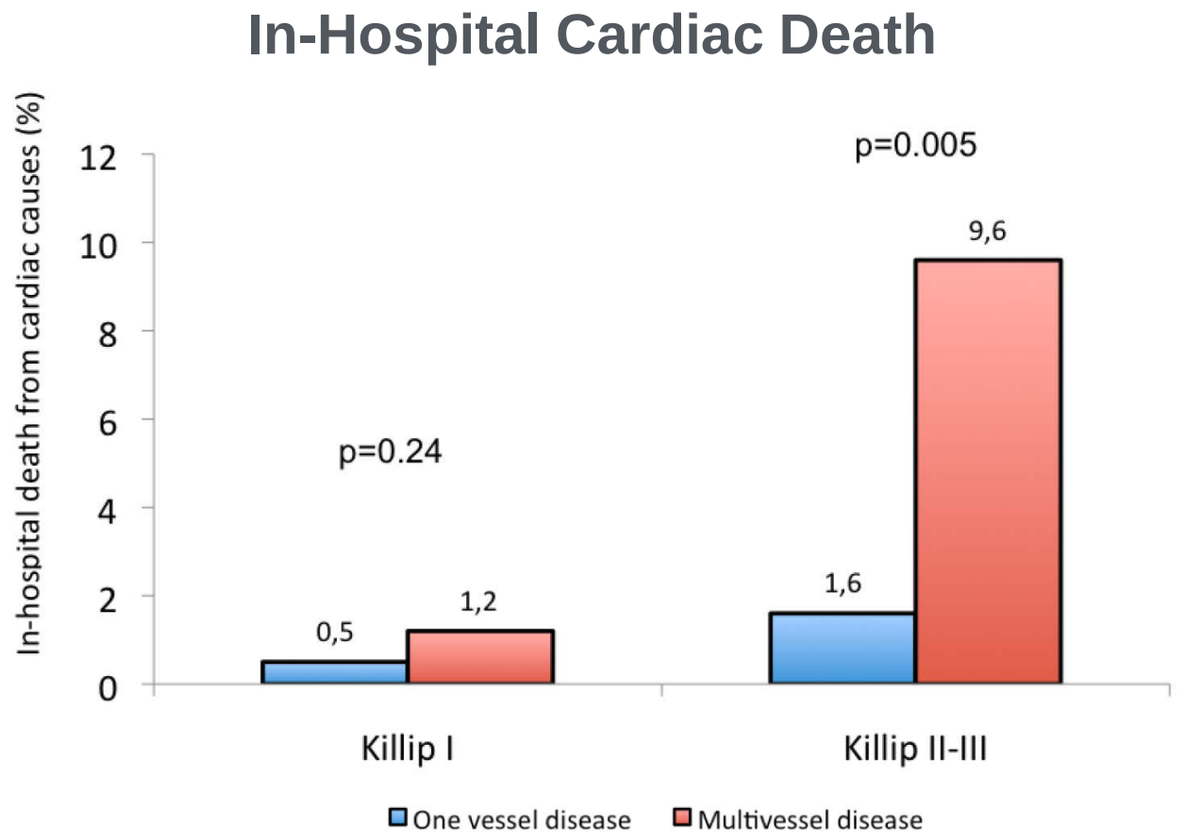


	Killip 1 N=1 506	Killip 2-3 N=282	P
Age, years	**63±13**	**66±14**	**<0,0001**
Females, n(%)	**299(19.9)**	**78(27.7)**	**0,003**
Hypertension, n(%)	751(49.9)	169(59.9)	0,001
Dyslipidemia, n(%)	771(51.2)	134(47.5)	0,14
Diabetes, n(%)	**332(22.0)**	**92(32.6)**	**<0,0001**
Smoking, n(%)	676(44.9)	112(39.7)	0,06
Kidney failure, n(%)	**124(8.2)**	**61(21.6)**	**<0,0001**
Peripheral vascular disease, n(%)	**127(8.4)**	**49(17.4)**	**<0,0001**
Previous infarction, n(%)	**122(8.1)**	**43(15.2)**	**<0,0001**
Previous PCI, n(%)	115(7.6)	36(12.8)	0,005
Multivessel disease, n(%)	**694(46.1)**	**156(55.3)**	**0,003**
Radial access, n(%)	1442(95.8)	269(95.4)	0,44
Thrombectomy, n(%)	1170(77.7)	213(75.5)	0,23
Anti IIb/IIIa, n(%)	1122(74.5)	193(68.4)	0,02
DTDT<120 min, n(%)	1010(67.1)	177(62.8)	0,17
Symptoms to reperfusion <120 min, n(%)	979(65.0)	171(60.6)	0,17

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease



Multivessel disease was associated with a 6-fold higher in-hospital cardiac mortality (1.6% vs. 9.6%; p=0.005)

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

Multivariate Analysis of Cardiac Death During Admission in Patients with Multivessel Disease

	RR	P
Age	1.11 (1.05-1.17)	<0.0001
Renal failure	2.04 (0.88-4.70)	0.09
Use of anti-glycoprotein IIb/IIIa agents	0.32 (0.12-0.86)	0.024
Heart failure at admission (killip>1)	5.19 (2.35-11.41)	<0.0001

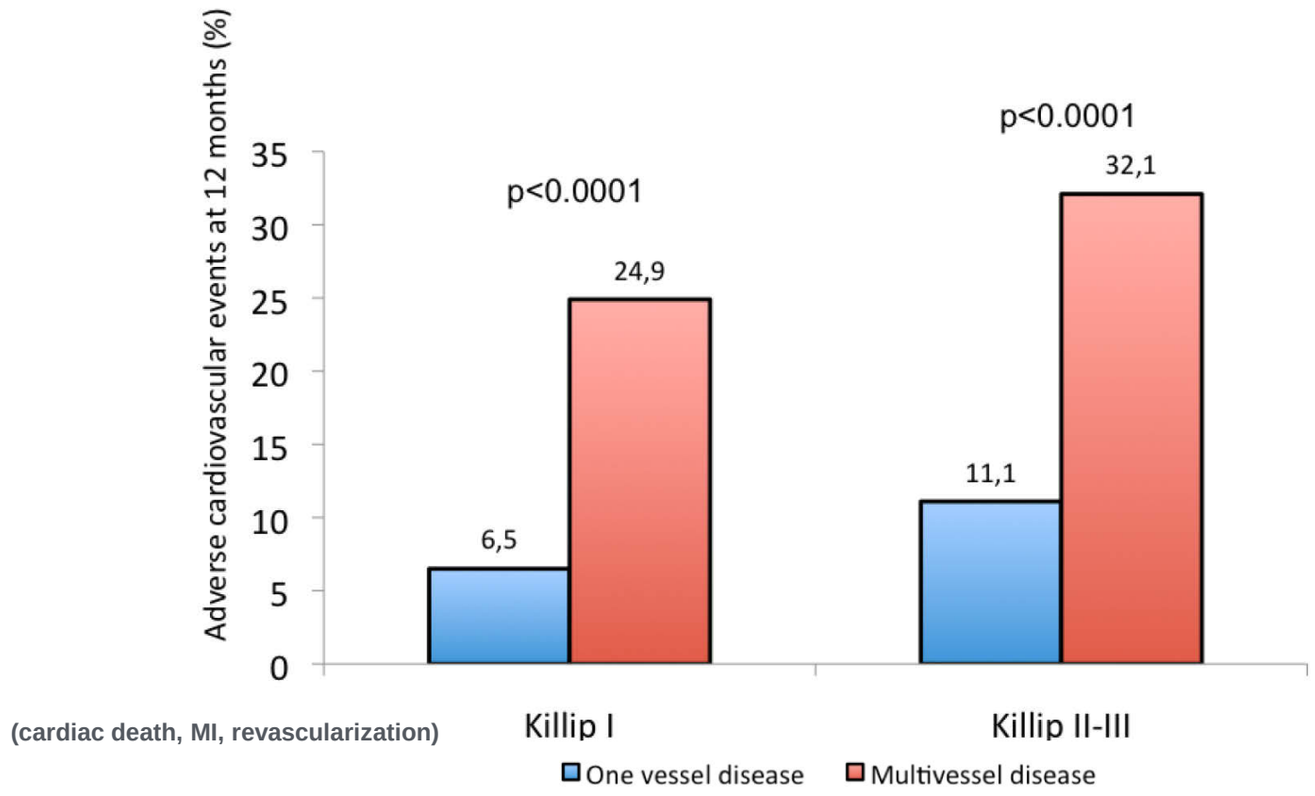
In patients with multivessel disease, Killip II-III at admission was the strongest predictor of in-hospital cardiac mortality

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

Adverse Cardiovascular Events at 12 months



(cardiac death, MI, revascularization)

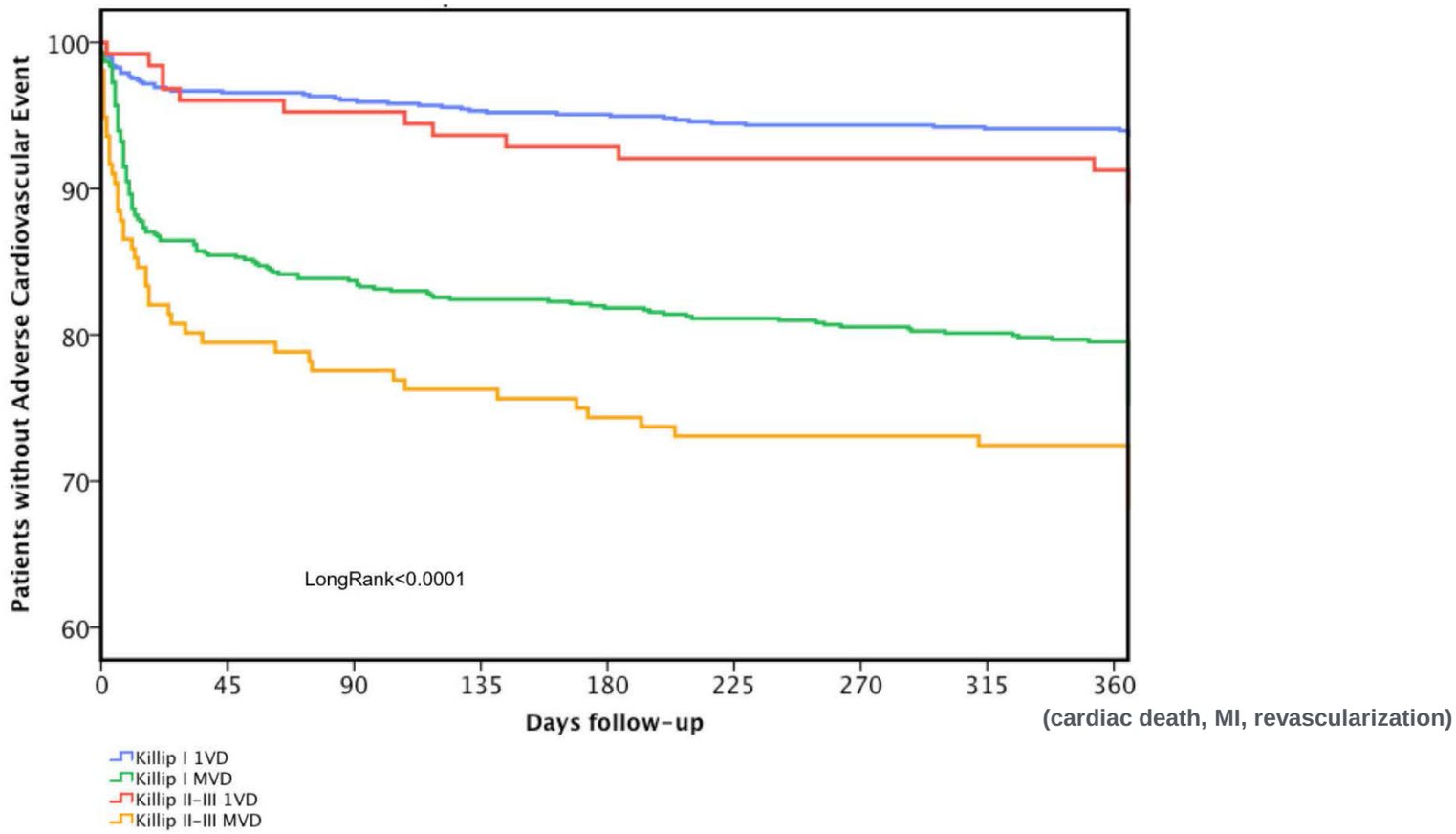
Multivessel disease was associated with a higher incidence of ACE in both groups

Impact of Heart Failure on Outcome in STEMI

HUGTP Experience (2007-2013)

Patients with STEMI treated with Primary PCI and Multivessel Disease

Kaplan-Meier Curves for Adverse Cardiovascular Events

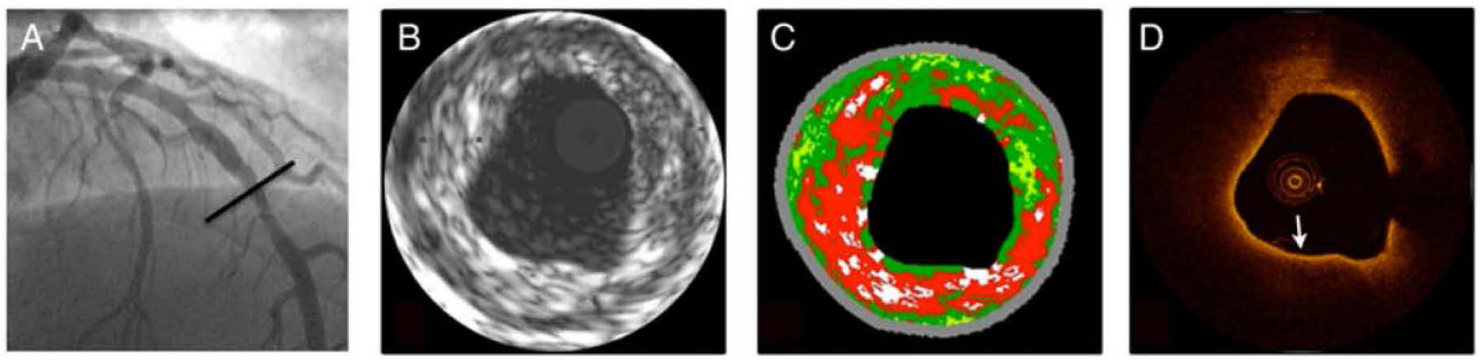


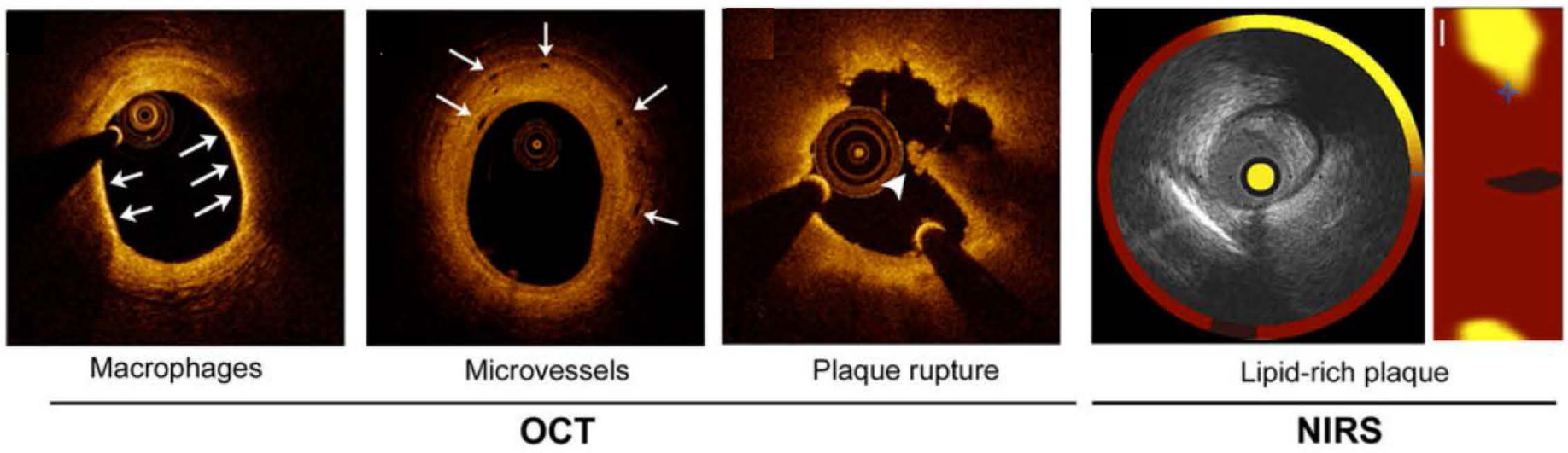
(cardiac death, MI, revascularization)

Remarkably, single-vessel disease curves were associated with favorable outcomes and could be superimposed for Killip I and Killip II-III patients

Meta-Analysis of RCT Comparing Multivessel vs Culprit Only PCI

Multimodality imaging of a distal left anterior descending artery lesion by angiography

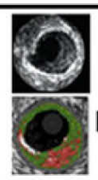
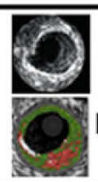
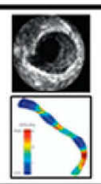




Koskinas KC et al. **Intracoronary imaging of coronary atherosclerosis: validation for diagnosis, prognosis and treatment.** Eur Heart J;2016;37:524-535

Meta-Analysis of RCT Comparing Multivessel vs Culprit Only PCI

Summary of the positive and negative predictive values of intracoronary imaging–derived variables for prediction of clinical outcomes

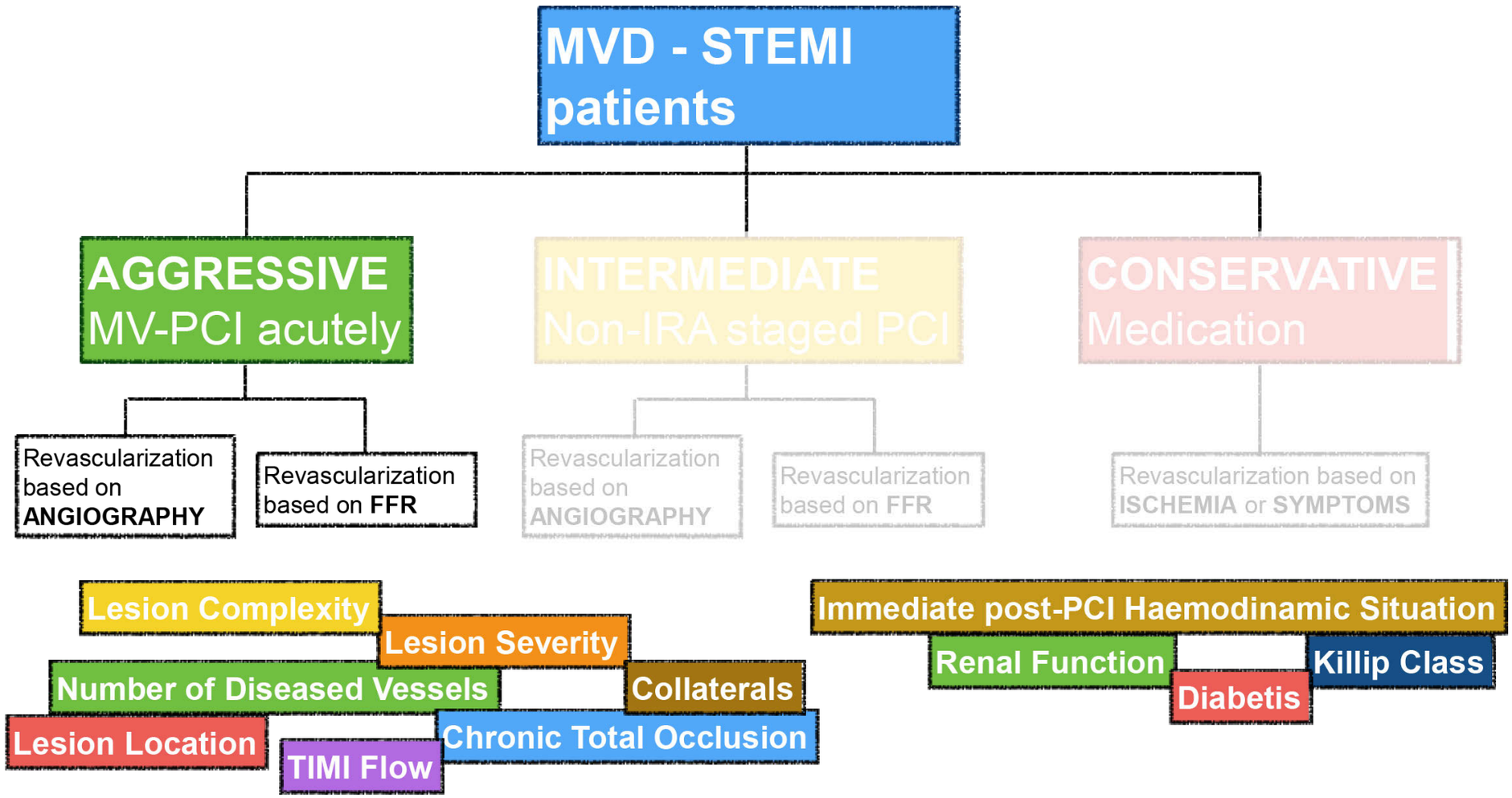
Study	Modality	Lesion characteristic(s)	Clinical endpoint	Positive predictive value	Negative predictive value
PROSPECT *n*=697	 IVUS & IVUS-VH	PB ≥70% & MLA <4mm² & IVUS-VH TCHA	MACE	18%	98%
ATHEROREMO IVUS *n*=581	 IVUS & IVUS-VH	PB ≥70% & MLA <4mm² & IVUS-VH TCHA	MACE	23%	93%
PREDICTION *n*=506	 IVUS & ESS	PB ≥58% & Low ESS <1.0 Pa	PCI	41%	92%
ATHEROREMO NIRS *n*=203	 NIRS	$LCBI_{4mm}$ >43	MACE	12%	99%

These methodologies have established a **link between in vivo plaque characteristics and subsequent coronary events**, thereby **improving individual risk stratification**, paving the way for risk-tailored systemic therapies and **raising the option for pre-emptive interventions**

Koskinas KC et al. **Intracoronary imaging of coronary atherosclerosis: validation for diagnosis, prognosis and treatment.** Eur Heart J;2016;37:524-535

Treatment Strategies in Patients with STEMI and Multivessel Disease

There are about 60 possible scenarios based on combinations of angiographic and clinical findings in individual patients



Conclussions

Multivessel disease should be recognized as a major adverse prognostic factor in patients with STEMI

Multivessel disease in STEMI is not a single entity and thus the treatment approach should be individualized

Randomized controlled trials (PRAMI, CvLPRIT, DANAMI-3 PRIMULTI, COMPARE ACUTE) showed that preventive PCI is safe and improves outcomes mainly driven by the need of repeat revascularization

Patients who are asymptomatic and have negative functional tests and no evidence for silent ischaemia after their first STEMI should currently be treated conservatively

Future studies should clarify whether complete revascularization should be done acutely during the index procedure or at later time and whether it has an effect on hard endpoints

The every day real-life clinical practice brings much more different clinical scenarios. It is unlikely that any randomized clinical trial in the future can be able to fully address this complexity and thus, **experienced, wise clinical judgement will probably remain the most important factor in this difficult situation**

thank you!