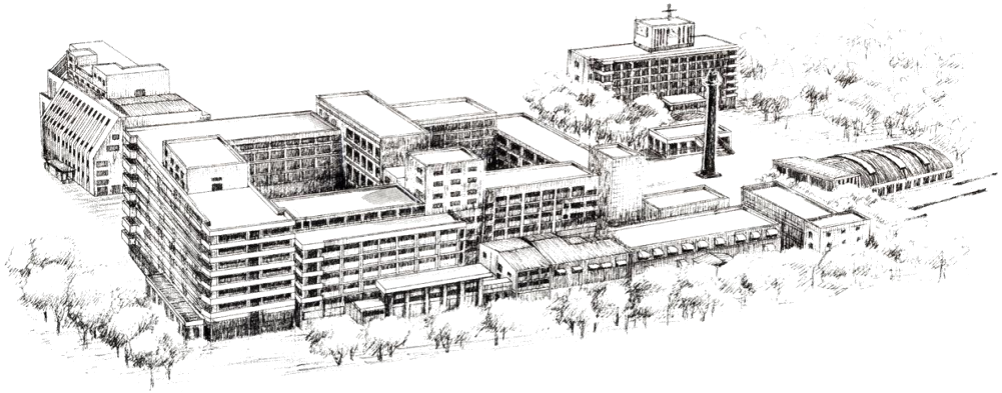
Essential Knowledge in Cardiology Practice - IHD

STEMI
'Treatment Issues'



계명의대 심장내과 허 승 호

Outline

- **Interventional Issues**
  - DES vs. BMS
  - Culprit only vs. Complete Revas.
  - IABP support
- **Pharmacological Issues**
  - Anticoagulant: Bivalirudin, UFH
  - Antiplatelet agents: Prasugrel, GPI
- **Triage and Transfer of Patients Issue**

American Guideline for STEMI

1990	1992	1994	1996	1998	2000	2002	2004	2007	2009

1990
ACC/AHA
AMI
R. Gunnar

1994
AHCPR/NHLBI
UA
E. Braunwald

1996 1999
Rev *Upd*
ACC/AHA AMI
T. Ryan

2000 2002 2007
Rev *Upd* *Rev*
ACC/AHA UA/NSTEMI
E. Braunwald; J. Anderson

2004 2007
Rev *Upd*
ACC/AHA STEMI
E. Antman

2009
Upd
ACC/AHA STEMI/PCI
F. Kushner

European Guideline for STEMI

» 35 ESC Clinical Practice Guidelines

Date	Title	Topic
2011	Acute Coronary Syndromes (ACS) in patients presenting without persistent ST-segment elevation (Management of)	Acute Coronary Syndromes (ACS)
2011	Cardiovascular Diseases during Pregnancy (Management of)	Pregnancy and Heart Disease
2011	Peripheral Artery Diseases (Diagnosis and Treatment of)	Peripheral Arterial Diseases
2011	Dyslipidaemias (Management of)	Cardiovascular Disease Prevention - Risk Assessment and Management
2010	Myocardial Revascularisation (Guidelines for)	Acute Coronary Syndromes (ACS)
2010	Atrial Fibrillation (Management of)	Atrial Fibrillation
2010	Grown-Up Congenital Heart Disease (Management of)	Congenital Heart Disease
2010	Device Therapy in Heart Failure (Focused Update)	Heart Failure (HF)
2009	Infective Endocarditis (Guidelines on Prevention, Diagnosis and Treatment of)	Infective Endocarditis
2009	Syncope (Guidelines on Diagnosis and Management of)	Syncope
2009	Pre-operative Cardiac Risk Assessment and Perioperative Cardiac Management in Non-Cardiac Surgery	The Cardiac Consult
2009	Pulmonary Hypertension (Guidelines on Diagnosis and Treatment of)	Pulmonary Hypertension
2008	Acute Myocardial Infarction in patients presenting with ST-segment elevation (Management of)	Acute Coronary Syndromes (ACS)
2008	Acute and Chronic Heart Failure	Heart Failure (HF)
2008	Acute Pulmonary Embolism (Diagnosis and Management of)	Thromboembolic Venous Disease

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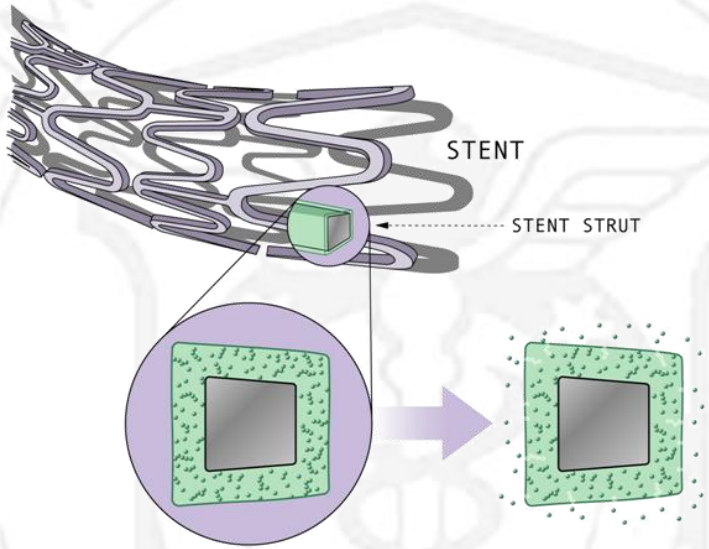
‘Off-Label’ Indications of DES

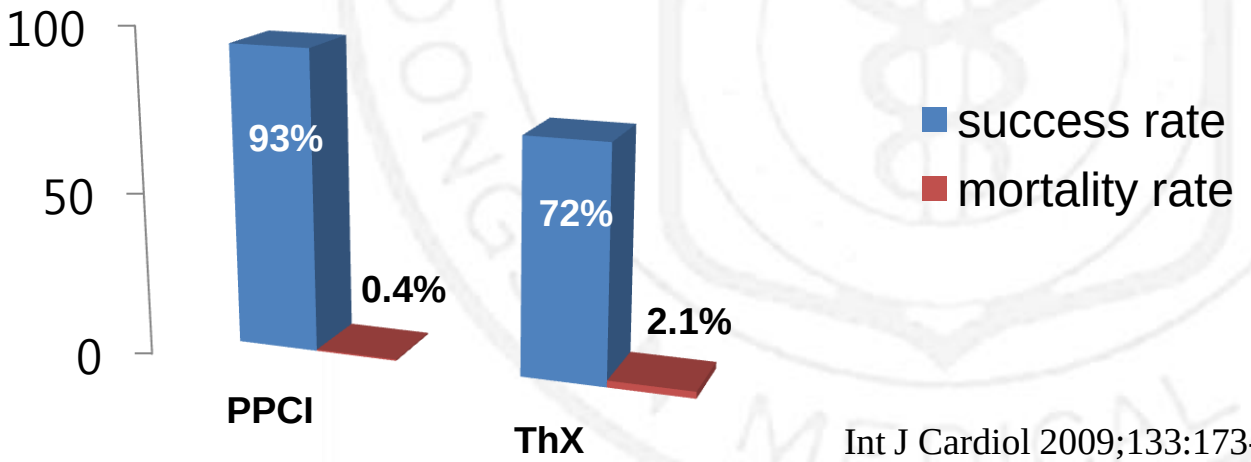
- Acute myocardial infarction
- Left main disease
- Chronic total occlusions
- Bifurcation lesions
- BMS or DES restenosis
- Bypass graft lesions
- Left ventricular dysfunction
- Chronic kidney disease
- Diffuse long disease (>28 mm in length)
- Ostial lesion (aorto-ostial, LAD os, LCX os)



Data from KAMIR

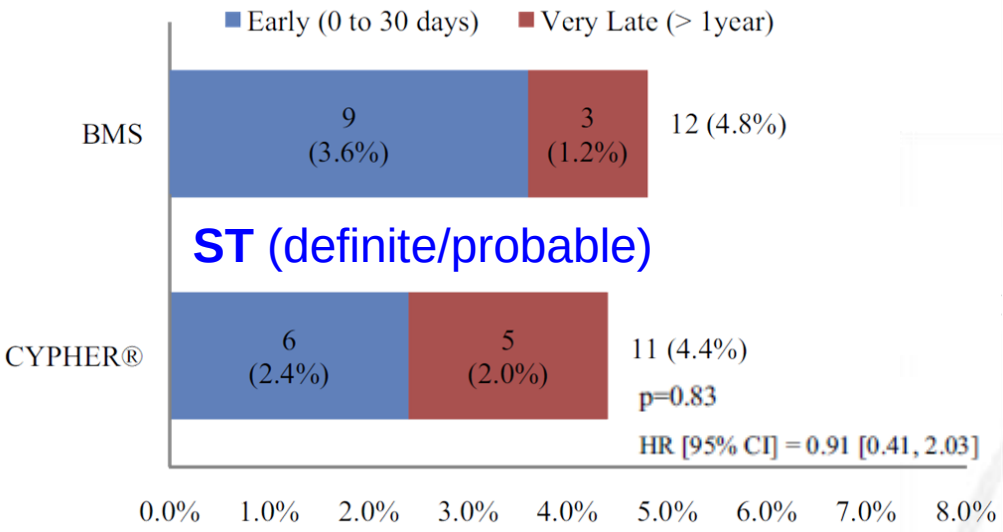
STEMI (n=4019)	P-PCI (n=2847)	ThX (n=501)	ConTx (n=625)	p-value
Methods of PCI, n (%)				<0.001
Balloon only	203 (7)	52 (13)	87 (19)	
Stent implantation	2526 (93)	365 (88)	372 (81)	
Type of deployed stent, n (%)				0.005
DES	2292 (92)	329 (91)	336 (91)	
BMS	202 (8)	33 (9)	34 (9)	

Results by therapeutic modality

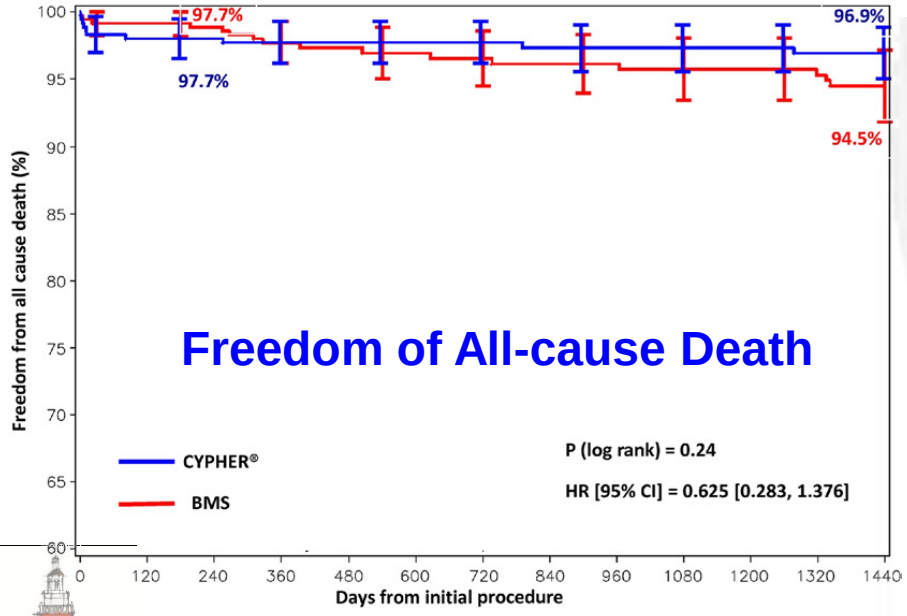


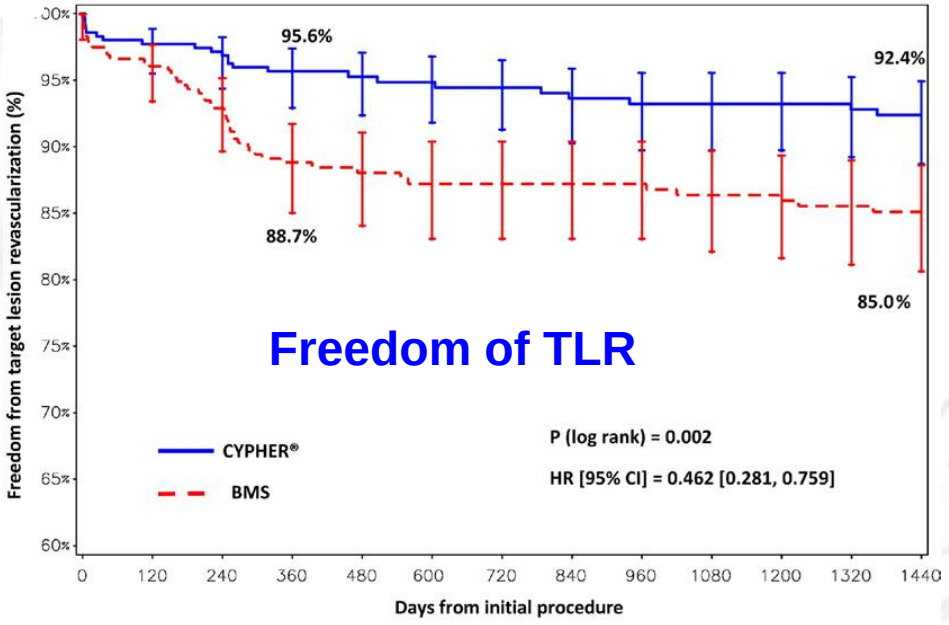
Int J Cardiol 2009;133:173-8

TYPHOON: 4Y FU



- 712 STEMI treated by primary PCI
- SES (n=355) or BMS (n=357)
- Complete data: 501 pts (70%)
- Survival status is known: 580 pts (81%)

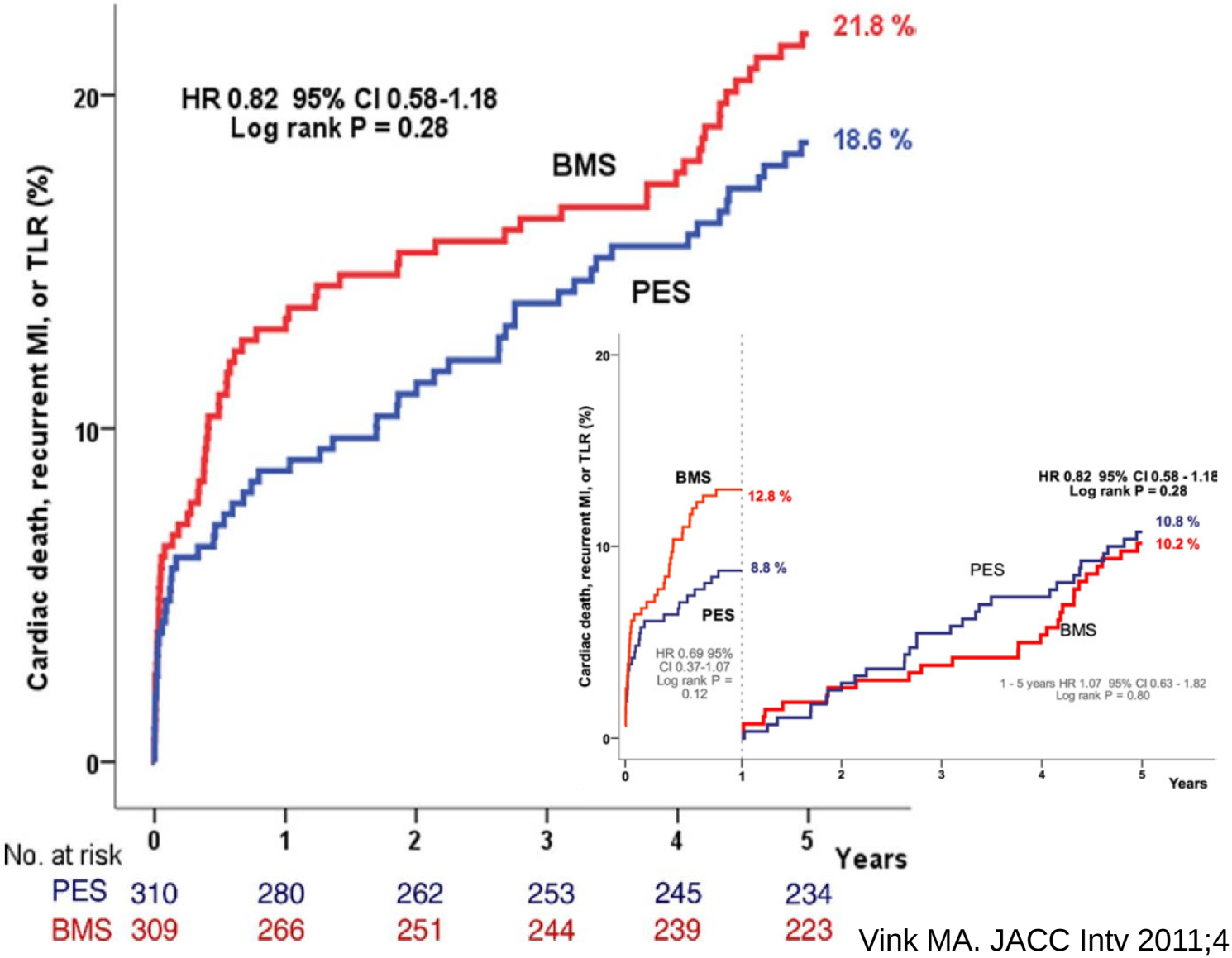




Spaulding C. JACC Intv 2011;4:14-23

PASSION: 5Y FU

- 619 STEMI treated by primary PCI / PES (n=310) or BMS (n=309)



Vink MA. JACC Intv 2011;4:24-9

Meta-Analysis

RCT of DES vs. BMS in Primary PCI w/ Long-term FU (≥3 years)

Study	Sample size (DES/BMS)	Type of DES	Angio-Follow-up	Follow-up (Months)	Complete-ness of Follow-up
DEDICATION	313/313	SES, PES and ZES	No	Median 42	100%
PASEO	180/90	SES and PES	No	Mean 41	100%
STRATEGY	87/88	SES	No	60	100%
SESAMI	160/160	SES	No	36	98%
MISSION	152/152	SES	Yes	36	91%
TYPHOON	355/357	SES	Yes	48	70%
PASSION	310/309	PES	No	60	98%

Ziada KM. JACC Intv. 2011;4:39-41

Meta-Analysis

RCT of DES vs. BMS in Primary PCI w/ Long-term FU (≥3 years)

Study	Death (%)				TVR (%)				ST (%)			
	DES	BMS	Estimated OR (95% CI)	p Value	DES	BMS	Estimated OR (95% CI)	p Value	DES	BMS	Estimated OR (95% CI)	p Value
DEDICATION	10.5	6.4	1.73 (0.97-3.08)	0.06	8.9	19.8	0.40 (0.25-0.64)	<0.01	2.9	3.2	0.90 (0.36-2.24)	0.82
PASEO	8.3	12.2	0.65 (0.29-1.49)	0.31	6.1	21.1	0.24 (0.11-0.54)	<0.01	1.1	2.2	0.49 (0.07-3.57)	0.48
STRATEGY	18.4	15.9	1.19 (0.54-2.62)	0.66	10.3	26.1	0.33 (0.14-0.75)	0.01	6.9	7.9	0.86 (0.28-2.66)	0.79
SESAMI	3.2	5.0	0.61 (0.20-1.92)	0.40	8.3	16.0	0.46 (0.23-0.92)	0.03	5.1	5.1	1.00 (0.37-2.73)	1.00
MISSION	4.4	6.6	0.69 (0.25-1.85)	0.46	8.9	15.8	0.54 (0.27-1.09)	0.09	3.1	2.0	1.69 (0.40-7.20)	0.48
TYPHOON	4.0	6.6	0.61 (0.27-1.36)	0.23	11.9	21.5	0.49 (0.30-0.80)	<0.01	5.3	5.5	0.92 (0.42-2.00)	0.83
PASSION	8.9	11.5	0.75 (0.45-1.27)	0.29	7.7	10.5	0.73 (0.42-1.26)	0.26	4.2	3.4	1.19 (0.52-2.69)	0.68
Total Estimated OR			**0.89 (0.64-1.24)**				**0.46 (0.36-0.58)**				**0.99 (0.68-1.45)**	

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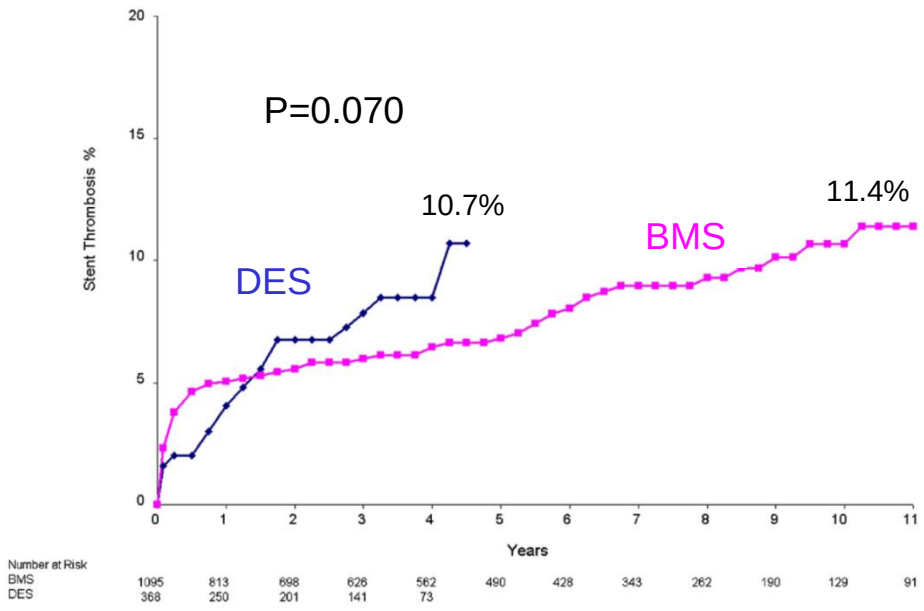
Ziada KM. JACC Intv. 2011;4:39-41

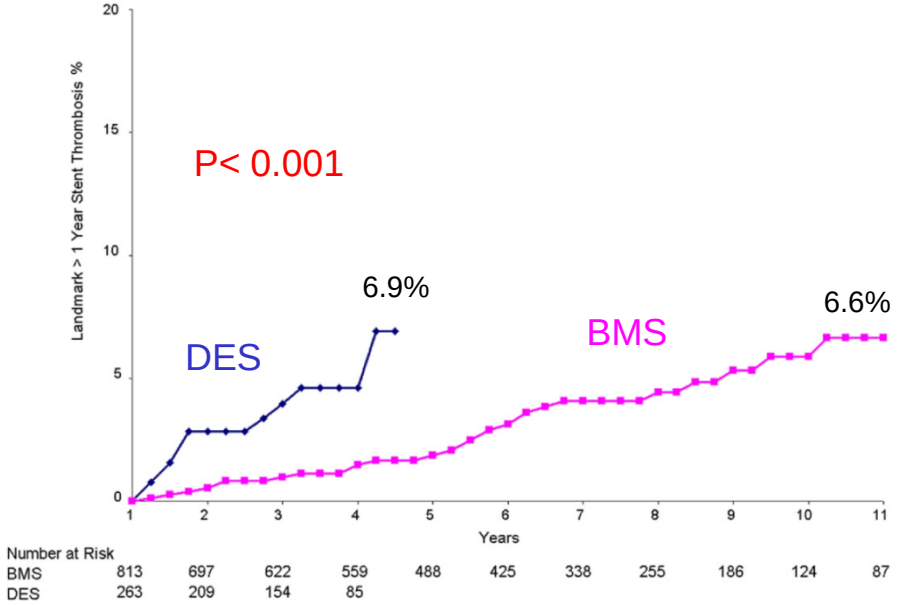
VLST after PPCI w/ DES vs. BMS

A 15-Year Single-Center Experience

- Consecutive patients (n=1,463) underwent primary PCI for STEMI
- BMS were implanted exclusively from 1995 to 2002
- DES and BMS were implanted from 2003 to 2009
  ⇨ DES (n=368) vs. BMS (n=1,095)
- Follow-up was obtained at 1 to 15 years



Kaplan-Meier Estimates of ST Rates



Landmark Analysis of Kaplan-Meier Estimates of VLST Rates (>1 year)

Brodie B. JACC Intv. 2011;4:30-8

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ACC/AHA 2009 Joint STEMI/PCI Focused Update Recommendations for Use of Stents in AMI

Class IIa

It is reasonable to use a DES as an alternative to a BMS for **primary PCI** in STEMI (considerations should include the ability of the patient to comply with prolonged dual-antiplatelet therapy, the bleeding risk in pts undergoing chronic oral anticoagulation, and possibility that pt may need surgery during the ensuing year) Level of Evidence: B

Class IIb

A DES may be considered for clinical and anatomic settings in which the efficacy/ safety profile appears favorable (small vessels, long lesions, or diabetes mellitus) Level of Evidence: B

Kushner FG et al. Circ 2009;120:2271-2306

ESC/ EACTS Guidelines 2010 on Myocardial Revascularization

- DES with proven efficacy should be considered by default in nearly all clinical conditons and lesion subsets, except if there are concerns or contraindi-cations for prolonged DAPT

- Relative Clinical Contraindications to Use of DES
  Clinical history difficult to obtain, especially in the setting of acute severe clinical conditions (STEMI or cardiogenic shock)

Task Force on Myocardial Revasc EHJ 2010; 31: 2501-2555

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1. Prognostic impact of staged versus "one-time" **multivessel** percutaneous intervention in acute myocardial infarction: analysis from the HORIZONS-AMI (harmonizing outcomes with revascularization and stents in acute myocardial infarction) trial.
   Kornowski R, Mehran R, Dangas G, Nikolsky E, Assali A, Claessen BE, Gersh BJ, Wong SC, Witzenbichler B, Guagliumi G, Dudek D, Fahy M, Lansky AJ, Stone GW; HORIZONS-AMI Trial Investigators.
   J Am Coll Cardiol. 2011 Aug 9;58(7):704-11.
   PMID: 21816305 [PubMed - in process]

Culprit Only Revascularization

vs.

Multivessel (Complete) Revascularization

in

STEMI with MVD

5. Di Mario C.
   Catheter Cardiovasc Interv. 2011 Feb 1;77(2):171-3. doi: 10.1002/ccd.22968. No abstract available.
   PMID: 21290552 [PubMed - indexed for MEDLINE]
   Related citations

8. Clinical impact of simultaneous complete revascularization vs. **culprit** only primary angioplasty in patients with st-elevation myocardial infarction and **multivessel** disease: a meta-analysis.
   Navarese EP, De Servi S, Buffon A, Suryapranata H, De Luca G.
   J Thromb Thrombolysis. 2011 Feb;31(2):217-25.
   PMID: 20853136 [PubMed - indexed for MEDLINE]
   Related citations

Culprit Vessel PCI vs. One-Setting and Staged Multivessel (MV) PCI

Culprit Vessel Percutaneous Coronary Intervention Versus Multivessel and Staged Percutaneous Coronary Intervention for ST-Segment Elevation Myocardial Infarction Patients With Multivessel Disease

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David R. Holmes, Jr, MD,‡ Alice K. Jacobs, MD,§ Nicholas J. Stamato, MD,‖
Ferdinand J. Venditti, MD,¶ Samin Sharma, MD,# Spencer B. King III, MD**

Albany, Syracuse, Binghamton, and New York, New York; Rochester, Minnesota; Boston, Massachusetts; and Atlanta, Georgia

Objectives The purpose of this study was to examine the differences in in-hospital and longer-term mortality for ST-segment elevation myocardial infarction (STEMI) patients with multivessel disease as a function of whether they underwent single-vessel (culprit vessel) percutaneous coronary interventions (PCIs) or multivessel PCI.

Background The optimal treatment of patients with STEMI and multivessel disease is of continuing interest in the era of drug-eluting stents.

Methods STEMI patients with multivessel disease undergoing PCIs in New York between January 1, 2003, and June 30, 2006, were subdivided into those who underwent culprit vessel PCI and those who underwent multivessel PCI during the index procedure, during the index admission, or staged within 60 days of the index admission. Patients were propensity-matched and mortality rates were calculated at 12, 24, and 42 months.

Results A total of 3,521 patients (87.5%) underwent culprit vessel PCI during the index procedure. A total of 259 of them underwent staged PCI during the index admission and 538 patients underwent staged PCI within 60 days of the index procedure. For patients without hemodynamic compromise, culprit vessel PCI during the index procedure was associated with lower in-hospital mortality than multivessel PCI during the index procedure (0.9% vs. 2.4%, p = 0.04). Patients undergoing staged multivessel PCI within 60 days after the index procedure had a significantly lower 12-month mortality rate than patients undergoing culprit vessel PCI only (1.3% vs. 3.3%, p = 0.04).

Conclusions Our findings support the American College of Cardiology/American Heart Association (ACC/AHA) recommendation that culprit vessel PCI be used for STEMI patients with multivessel disease

- Data from New York State's Percutaneous Coronary Interventions Reporting System (PCIRS)
- Culprit vessel PCI (n=3,521)
  One-Setting MV-PCI (n=503)
  Staged MV-PCI within admission (n=259)
  Staged MV-PCI within 60 days (n=538)
- Propensity-matched and mortality rates were calculated at 12, 24, and 42 months
- Pts without hemodynamic compromise
  - culprit vessel PCI was ass. w/ lower in-hospital mortality than one-setting MV-PCI (0.9% vs. 2.4%, p=0.04)
- Staged MV-PCI within 60 days was ass. w/ lower 12-month mortality than culprit

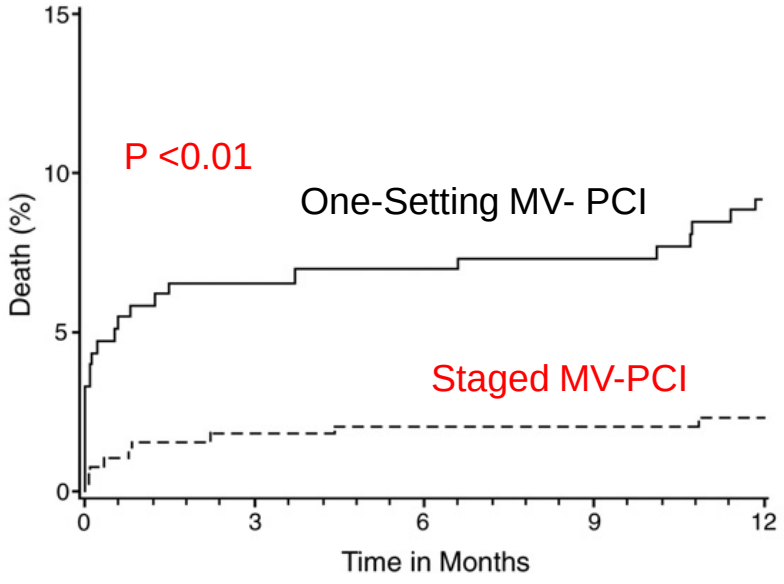
Staged MV-PCI within 60 days ≥ Culprit vessel PCI > One-Setting MV-PCI

One-Setting vs. Staged MV-PCI

Data from HORIZONS-AMI

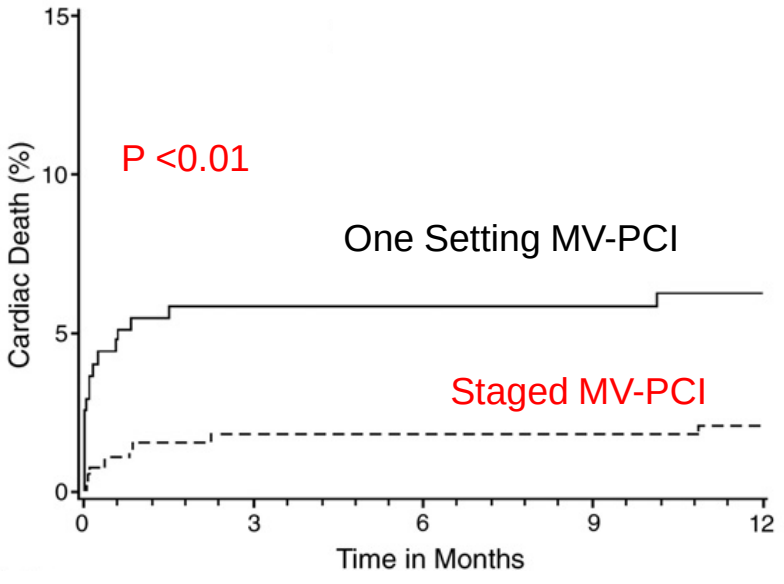
Multivessel PCI strategy (n=275) vs. Staged PCI (n=393)

All-cause Mortality



Number at risk					
Single	275	252	251	248	224
Staged	393	383	380	377	347

Cardiac Mortality



Number at risk					
Single	275	252	251	248	224
Staged	393	383	380	377	347

Staged MV-PCI > One-Setting MV-PCI

Meta-Analysis: Culprit Vessel PCI vs. One-Setting and Staged MV-PCI

Culprit Vessel Only Versus Multivessel and Staged Percutaneous Coronary Intervention for Multivessel Disease in Patients Presenting With ST-Segment Elevation Myocardial Infarction

A Pairwise and Network Meta-Analysis

Pieter J. Vlaar, MD, PhD,* Karim D. Mahmoud, BS,* David R. Holmes, Jr, MD, PhD,†
Gert van Valkenhoef, MS,‡ Hans L. Hillege, MD, PhD,*‡ Iwan C. C. van der Horst, MD, PhD,*
Felix Zijlstra, MD, PhD,§ Bart J. G. L. de Smet, MD, PhD*

Groningen and Rotterdam, the Netherlands; and Rochester, Minnesota

Objectives The purposes of this study were to investigate whether, in patients with ST-segment elevation myocardial infarction (STEMI) and multivessel disease (MVD), percutaneous coronary intervention (PCI) should be confined to the culprit or also nonculprit vessels and, when performing PCI for nonculprit vessels, whether it should take place during primary PCI or staged procedures.

Background A significant percentage of STEMI patients have MVD. However, the best PCI strategy for nonculprit vessel lesions is unknown.

Methods Pairwise and network meta-analyses were performed on 3 PCI strategies for MVD in STEMI patients: 1) culprit vessel only PCI strategy (culprit PCI), defined as PCI confined to culprit vessel lesions only; 2) multivessel PCI strategy (MV-PCI), defined as PCI of culprit vessel as well as ≥1 nonculprit vessel lesions; and 3) staged PCI strategy (staged PCI), defined as PCI confined to culprit vessel, after which ≥1 nonculprit vessel lesions are treated during staged procedures. Prospective and retrospective studies were included when research subjects were patients with STEMI and MVD undergoing PCI. The primary endpoint was short-term mortality.

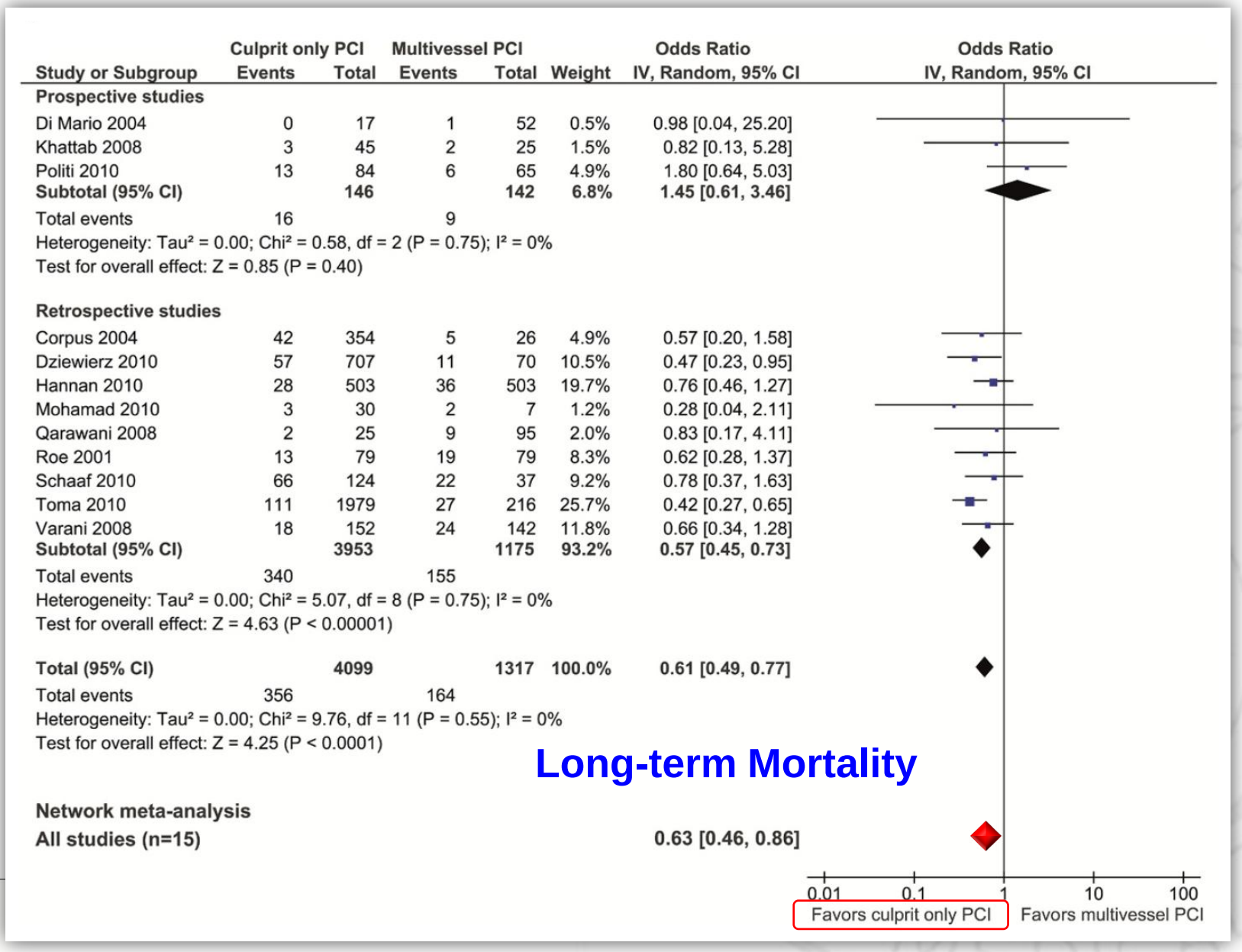
Results Four prospective and 14 retrospective studies involving 40,280 patients were included. Pairwise meta-analyses demonstrated that staged PCI was associated with lower short- and long-term mortality as compared with culprit PCI and MV-PCI and that MV-PCI was associated with highest mortality rates at both short- and long-term follow-up. In network analyses, staged PCI was also consistently associated with lower mortality.

Conclusions This meta-analysis supports current guidelines discouraging performance of multivessel primary PCI for STEMI. When significant nonculprit vessel lesions are suitable for PCI, they should only be treated during staged procedures. (J Am Coll Cardiol 2011;58:692–703)

- Pairwise and Network Meta-analysis
- 4 Prospective studies + 14 Retrospective studies
  ⇨ 40,280 patients

Vlaar PJ et al. JACC 2011;58:692-703

Meta-Analysis: Culprit PCI vs. One-Setting MV-PCI



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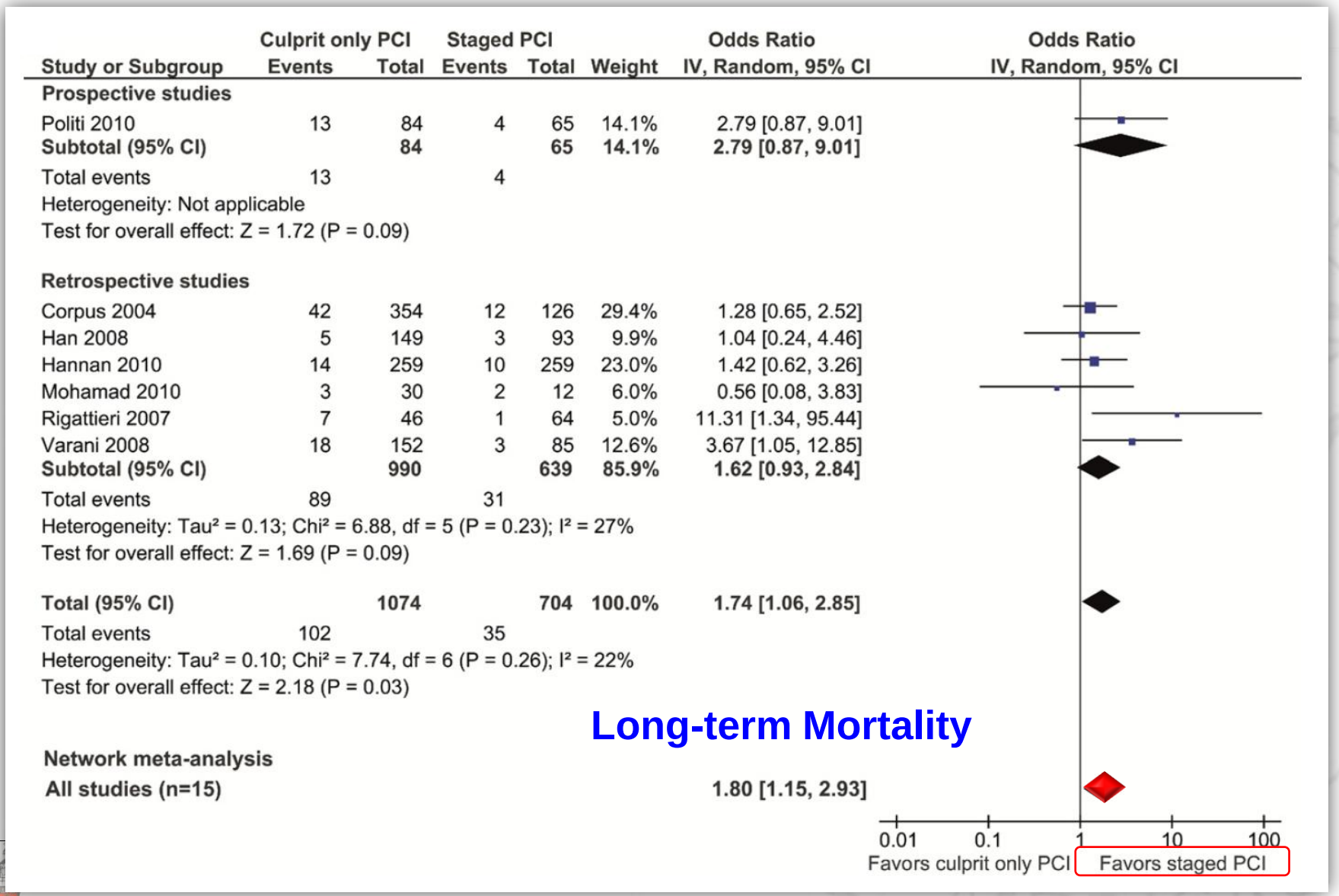
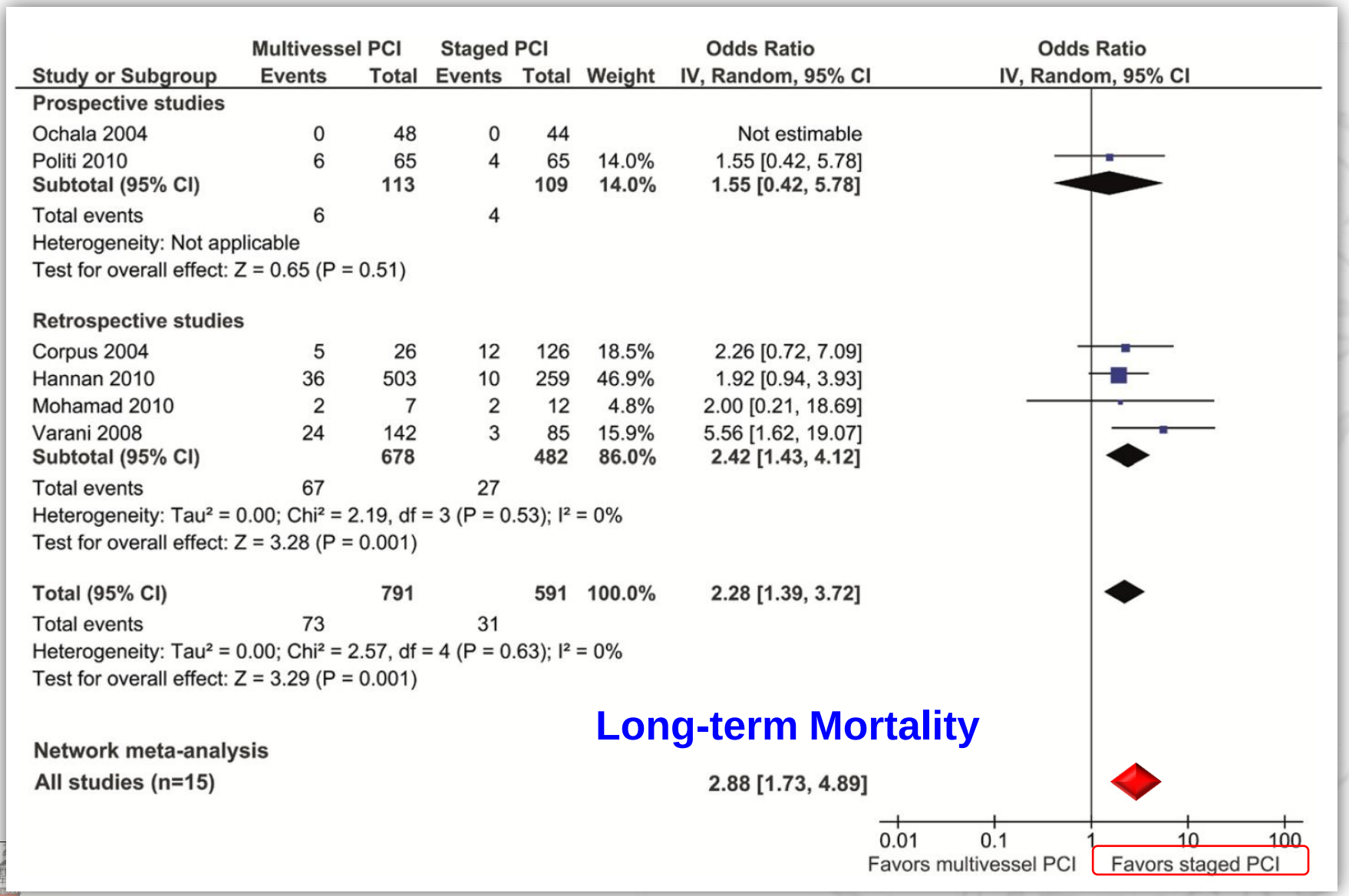
Meta-Analysis: Culprit PCI vs. Staged MV-PCI



Vlaar PJ et al. JACC 2011;58:692-703

Meta-Analysis: One-Setting vs. Staged MV-PCI



Vlaar PJ et al. JACC 2011;58:692-703

Benefits of One-Setting MV-PCI

- reduce ischemia (border zone)
- may improve survival
- presence of ≥1 culprit lesion
- more convenient for the patient
  (no secondary procedure)
- cost-saving

Thiele H et al. EHJ 2010;31:1828-35
Hochman JS et al. JAMA 2006;295:2511-5
Goldstein JA et al. NEJM 2000;343:915-22

Meta-Analysis of Multivessel Coronary Artery Revascularization Versus Culprit-Only Revascularization in Patients With ST-Segment Elevation Myocardial Infarction and Multivessel Disease

Sripal Bangalore, MD[a,*], Sunil Kumar, MD[b], Kanhaiya L. Poddar, MBBS[c], Sureshkumar Ramasamy, MD[c], Seung-Woon Rha, MD[c], and David P. Faxon, MD[d]

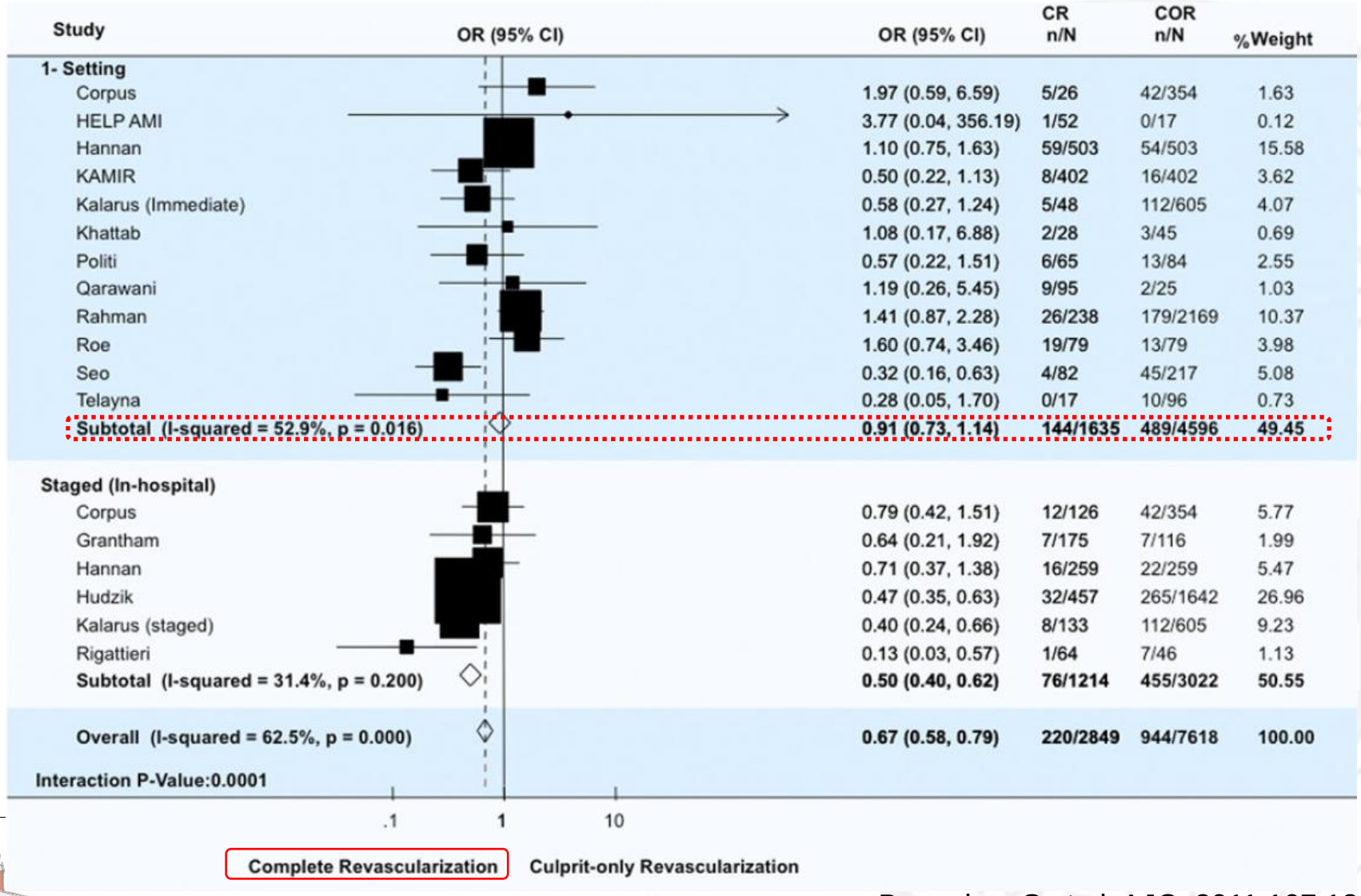
American College of Cardiology/American Heart Association guidelines for management of patients with ST-segment elevation myocardial infarction (STEMI) recommend culprit artery-only revascularization (CULPRIT) based on safety concerns during noninfarct-related artery intervention. However, the data to support this safety concern are scant. Searches were performed in PubMed/EMBASE/CENTRAL for studies evaluating multivessel revascularization versus CULPRIT in patients with STEMI and multivessel disease (MVD). A multivessel revascularization strategy had to be performed at the time of CULPRIT or during the same hospitalization. Early (≤30-day) and long-term outcomes were evaluated. Among 19 studies (23 arms) that evaluated 61,764 subjects with STEMI and MVD, multivessel revascularization was performed in a minority of patients (16%). For early outcomes, there was no significant difference for outcomes of mortality, MI, stroke, and target vessel revascularization, with a 44% decrease in risk of repeat percutaneous coronary intervention and major adverse cardiovascular events (odds ratio 0.68, 95% confidence interval 0.57 to 0.81) with multivessel revascularization compared to CULPRIT. Similarly, for long-term outcomes (follow-up 2.0 ± 1.1 years), there was no difference for outcomes of MI, target vessel revascularization, and stent thrombosis, with 33%, 43%, and 53% decreases in risk of mortality, repeat percutaneous coronary intervention, coronary artery bypass grafting, respectively, and major adverse cardiovascular events (odds ratio 0.60, 95% confidence interval 0.50 to 0.72) with multivessel revascularization compared to CULPRIT. In conclusion, in patients with STEMI and MVD, multivessel revascularization appears to be safe compared to culprit artery-only revascularization. These findings support the need for a large-scale randomized trial to evaluate revascularization strategies in patients with STEMI and MVD. (Am J Cardiol 2011;107:1300–1310)

- Among 19 studies (23 arms) that evaluated 61,764 subjects with STEMI and MVD, multivessel revascularization was performed in a minority of patients (16%).

Bangalore S et al. AJC 2011;107:1300-10

Meta-Analysis of Multivessel Coronary Artery Revascularization Versus Culprit-Only Revascularization in Patients With ST-Segment Elevation Myocardial Infarction and Multivessel Disease

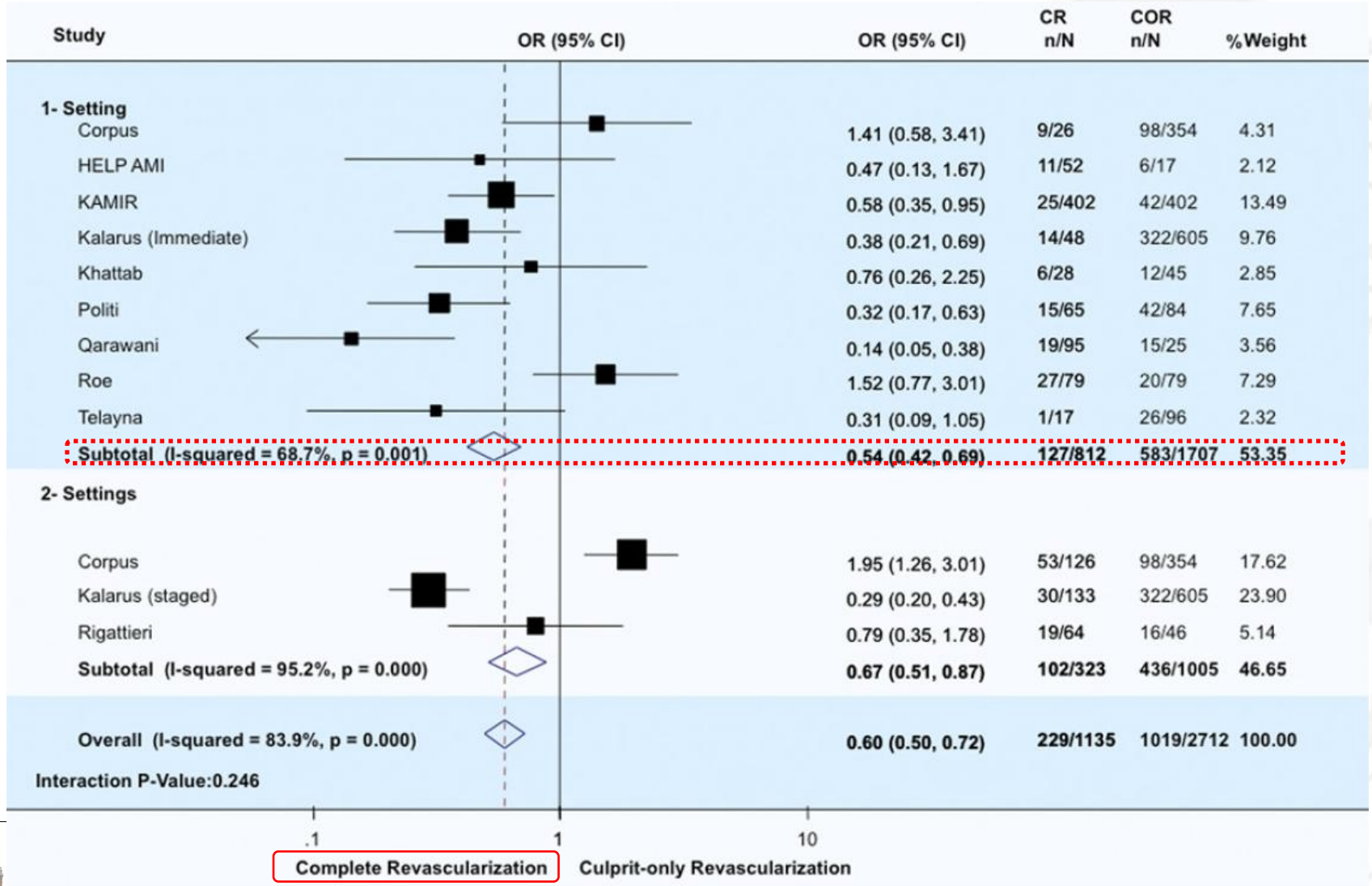
Long-term Mortality



Bangalore S et al. AJC 2011;107:1300-10

Meta-Analysis of Multivessel Coronary Artery Revascularization Versus Culprit-Only Revascularization in Patients With ST-Segment Elevation Myocardial Infarction and Multivessel Disease

Long-term MACE



Bangalore S et al. AJC 2011;107:1300-10

Guideline for Non-Infarct Related Artery PCI in STEMI with MVD

Class III

PCI should not be performed in a noninfarct artery at the time of primary PCI in patients without hemodynamic compromise. (Level of Evidence: C)

2004 ACC/AHA STEMI Guideline

Except for patients in cardiogenic shock, only the culprit lesion should be dilated in the acute setting. Complete revascularization of the non-culprit lesions may be performed at a later time point depending on the remaining ischemia

2008 ESC STEMI Guideline

IABP and Infarct Size in Patients with Acute Anterior MI without Shock

CRISP AMI: 337 pts randomized to primary PCI with or without intra-aortic balloon pump (IABP) pre-intervention.

	IABP Plus PCI (n = 161)	PCI Alone (n = 176)	*P* Value
Mean Infarct Size[a]	42.1%	37.5%	0.06
Mean LVEF	46.1%	48.2%	0.17
6-Month Mortality	1.9%	5.2%	0.12

IABP therapy fails to reduce infarct size or improve clinical outcomes when added prior to primary PCI in patients with high-risk STEMI but no cardiogenic shock.

• Infarct size expressed as a percentage of left ventricular (LV) mass and measured by cardiac magnetic resonance imaging performed 3 to 5 days after PCI

[a] Primary endpoint.

Patel MR, et al. JAMA 2011 Sep 28;306:1329-37.

Guideline for Use of IABP in STEMI

Cardiogenic Shock

Class I

1. Intra-aortic balloon counterpulsation is recommended for STEMI patients when cardiogenic shock is not quickly reversed with pharmacological therapy. The IABP is a stabilizing measure for angiography and prompt revascularization. (*Level of Evidence: B*)

2004 ACC/AHA STEMI Guideline

Treatment of shock (Killip class IV)

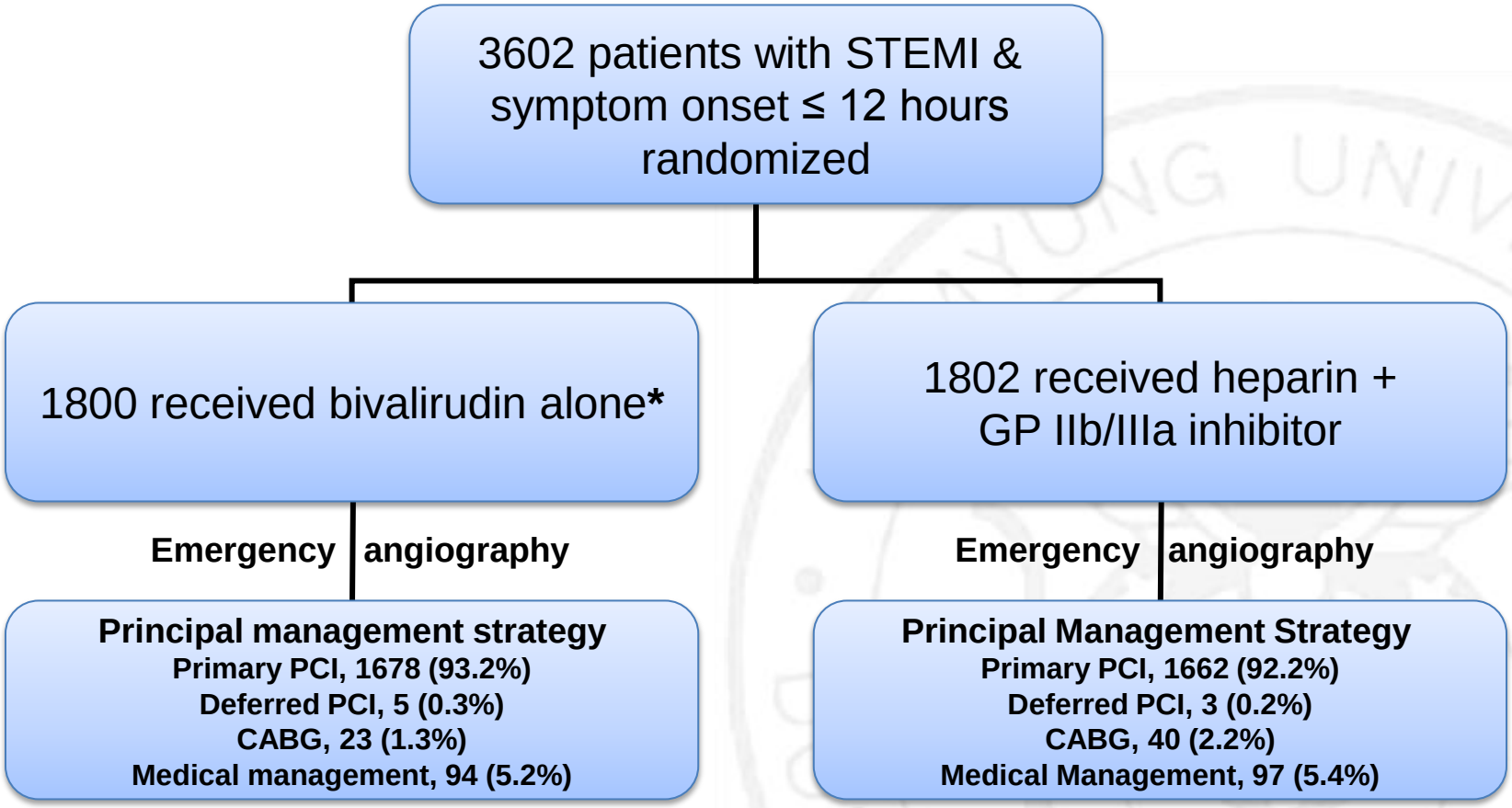
O_2	I	C
Mechanical ventilatory support according to blood gasses	I	C
Haemodynamic assessment with balloon floating catheter	IIb	C
Inotropic agents: dopamine	IIb	B
and dobutamine	IIa	C
Intra-aortic balloon pump	I	C
LV assist devices	IIa	C
Early revascularization	I	B

2008 ESC STEMI Guideline

Outline

- **Interventional Issues**
  - DES vs. BMS
  - Culprit only vs. Complete Revas.
  - IABP support
- **Pharmacological Issues**
  - Anticoagulant: UFH, Bivalirudin
  - Antiplatelet agents: Prasugrel, GPI
- **Triage and Transfer of Patients Issue**

HORIZONS-AMI



Endpoints: Composite of net adverse clinical events (NACE) included major bleeding plus MACE (a composite of CVD death, reinfarction, TVR for ischemia, and stroke within 30 days)

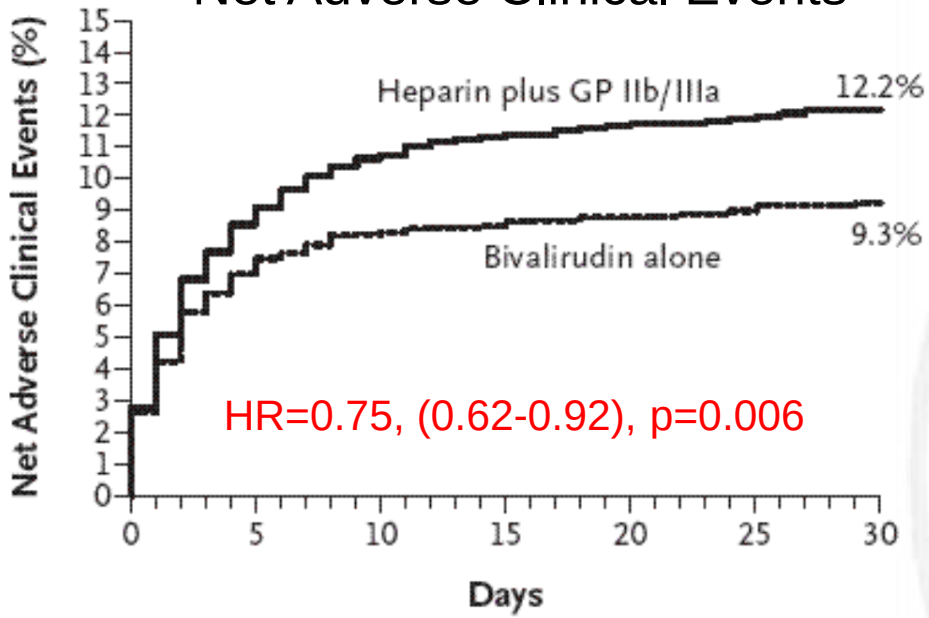
Stone et al. NEJM. 2008;358:2218-30

Bivalirudin in STEMI

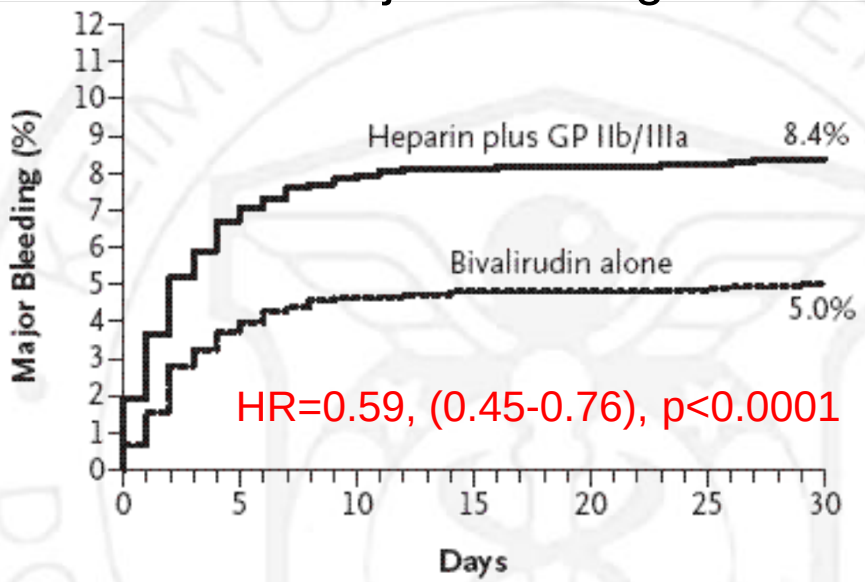
HORIZONS-AMI

Time-to-Event Curves through 30 days

Net Adverse Clinical Events



Major Bleeding

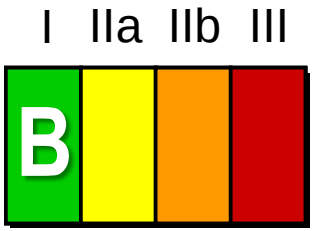


- Treatment with bivalirudin alone compared with UFH + GP IIb/IIIa Inhibitors resulted in reduced 30-day rates of NACE.
- At one year, MACE rates were identical, but there was a decrease in all-cause mortality with bivalirudin (3.4% versus 4.8%, p=0.03).

KEIMYUNG UNIVERSITY

Stone et al. NEJM. 2008;358:2218-30

Use of Parenteral Anticoagulants in STEMI (I)



For patients proceeding to primary PCI, who have been treated with ASA and a thienopyridine, recommended supportive anticoagulant regimens include:

b. Bivalirudin is useful as support for primary PCI with or without prior treatment with heparin.

TRITON-TIMI 38

ACS (STEMI or UA/NSTEMI) & Planned PCI

ASA

N= 13,600

Double-blind

CLOPIDOGREL	PRASUGREL
300 mg LD/ 75 mg MD	60 mg LD/ 10 mg MD

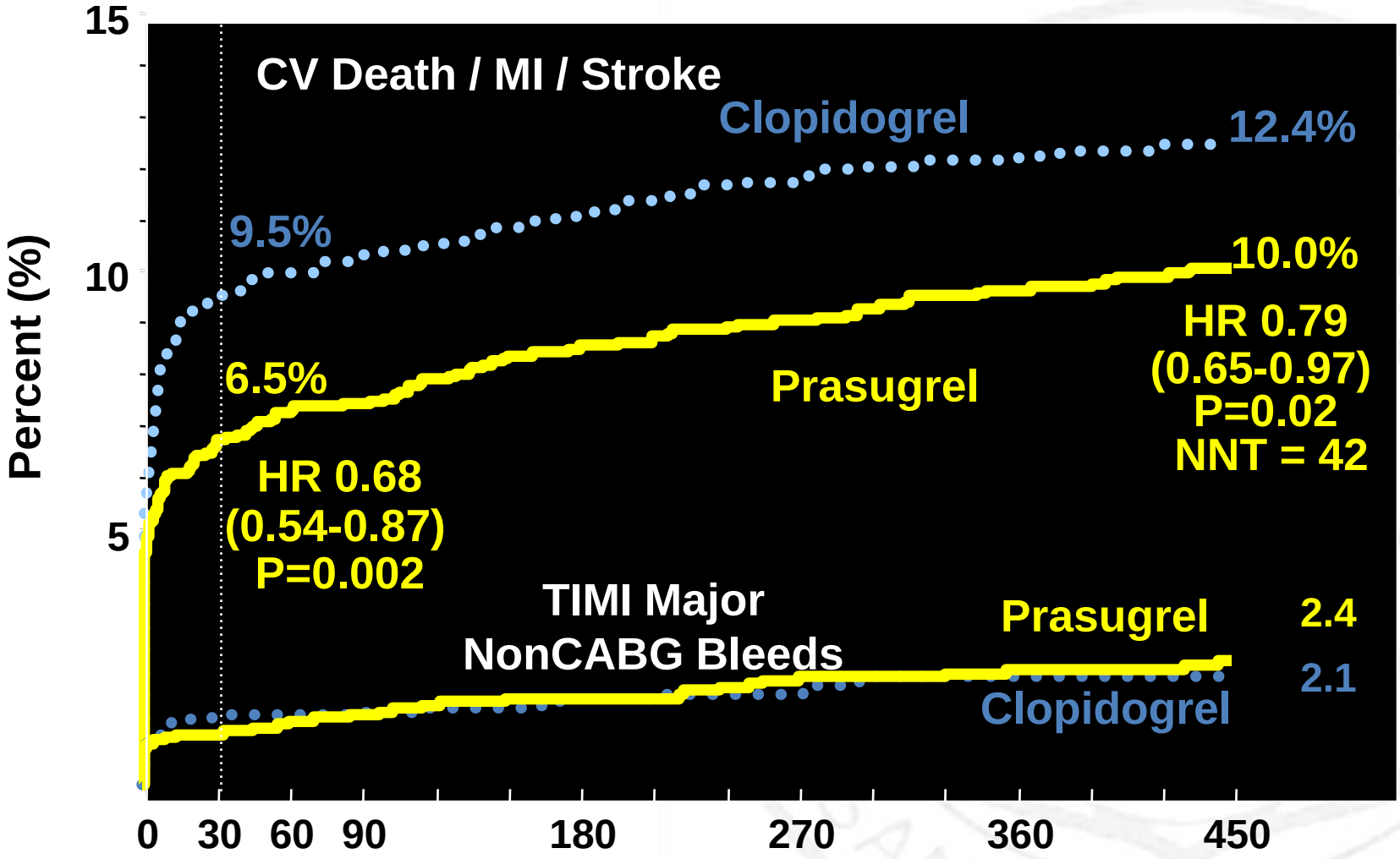
Median duration of therapy - 12 months

1º endpoint: CV death, MI, Stroke
2º endpoints: CV death, MI, Stroke, Rehosp-Rec Isch
CV death, MI, UTVR,
Stent Thrombosis (ARC definite/prob.)
Safety endpoints: TIMI major bleeds, Life-threatening bleeds
Key Substudies: Pharmacokinetic, Genomic

Wiviott SD et al. AHJ 2006;152:627

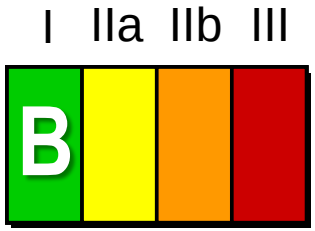
TRITON-TIMI 38

STEMI Cohort (N=3534)



Montalescot et al Lancet 2008

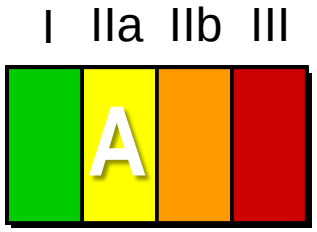
Recommendations for the use of Thienopyridines



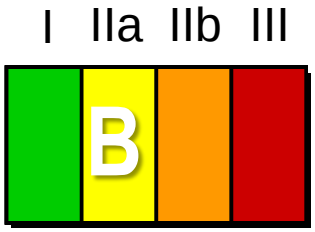
Prasugrel 60 mg should be given as soon as possible for primary PCI.

Use of Glycoprotein IIb/IIIa Receptor Antagonists in STEMI

It is reasonable to start treatment with glycoprotein IIb/IIIa receptor antagonists at the time of primary PCI (with or without stenting) in selected patients with STEMI:

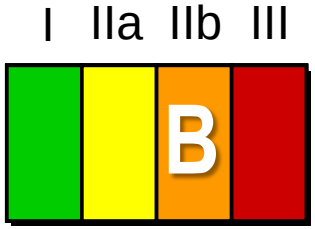


abciximab



tirofiban and eptifibatide

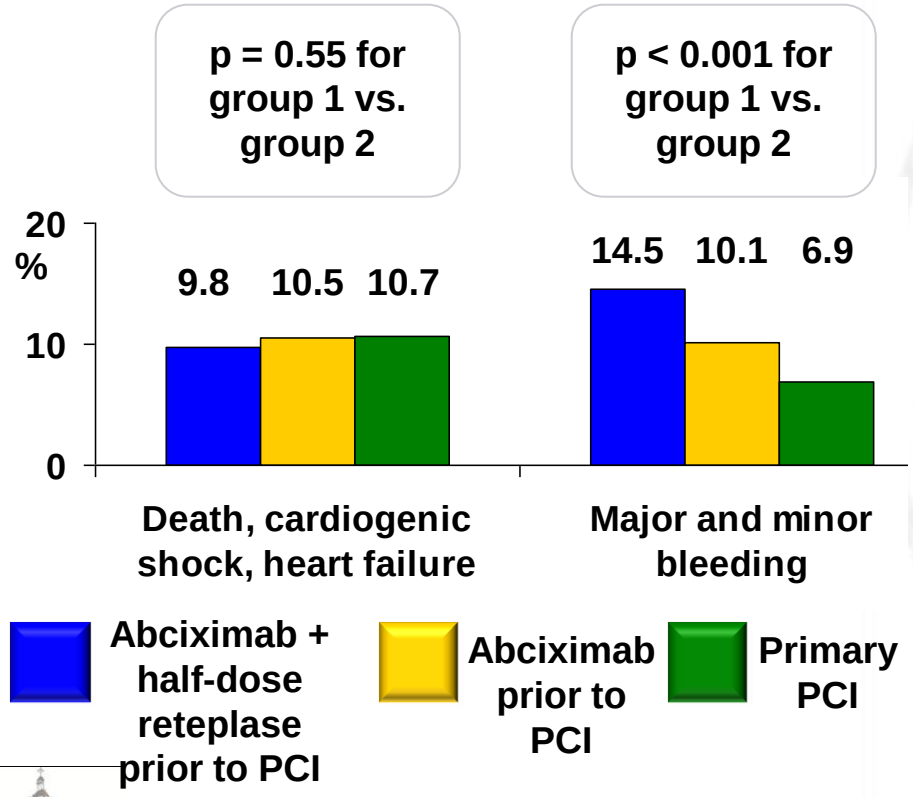
Use of Glycoprotein IIb/IIIa Receptor Antagonists in STEMI



The usefulness of glycoprotein IIb/IIIa receptor antagonists (as part of a preparatory pharmacologic strategy for patients with STEMI **prior to arrival in the cardiac catheterization laboratory** for angiography and PCI) is uncertain.

FINESSE

STEMI patients were randomized to abciximab and half-dose reteplase (n = 828), abciximab alone (n = 818), or placebo (n = 806) prior to PCI. All patients received abciximab in the catheterization laboratory, which was continued for 12 hours.



Conclusions

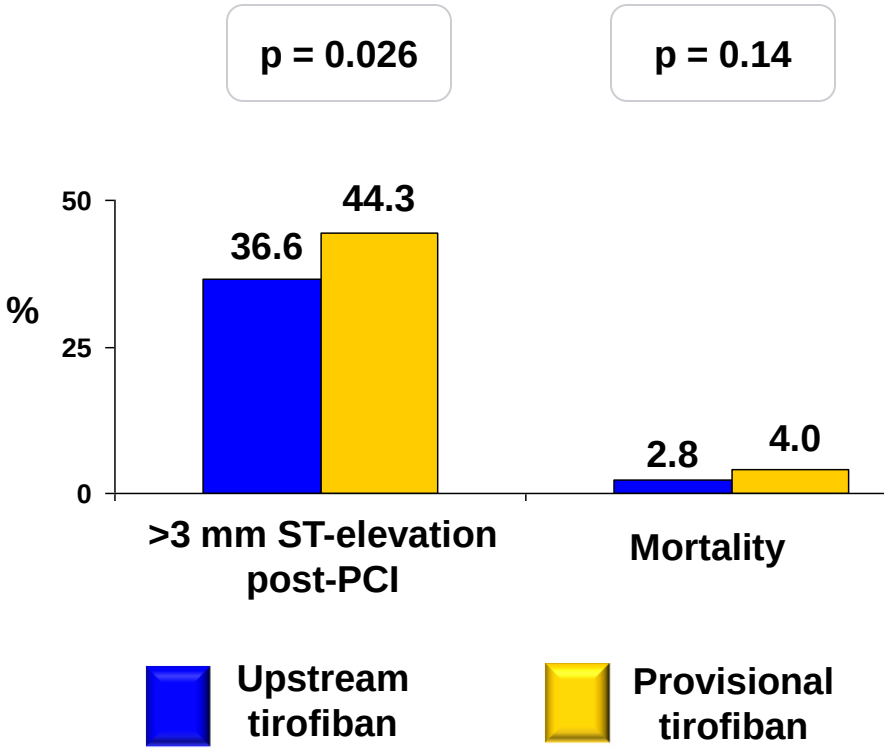
- PCI facilitated by abciximab and half-dose reteplase or abciximab alone is not superior to primary PCI with abciximab
- Facilitated PCI is associated with improved ST-segment resolution; however, this approach results in similar major adverse events and increased bleeding

Cardiosource

Ellis SG, et al. NEJM 2008;358:2205-17

ON-TIME 2

STEMI patients who presented to a non-PCI center were randomized to tirofiban prior to transfer for primary PCI (n = 491) or placebo with provisional tirofiban in the catheterization laboratory (n = 493) and followed for 30 days.



Conclusions

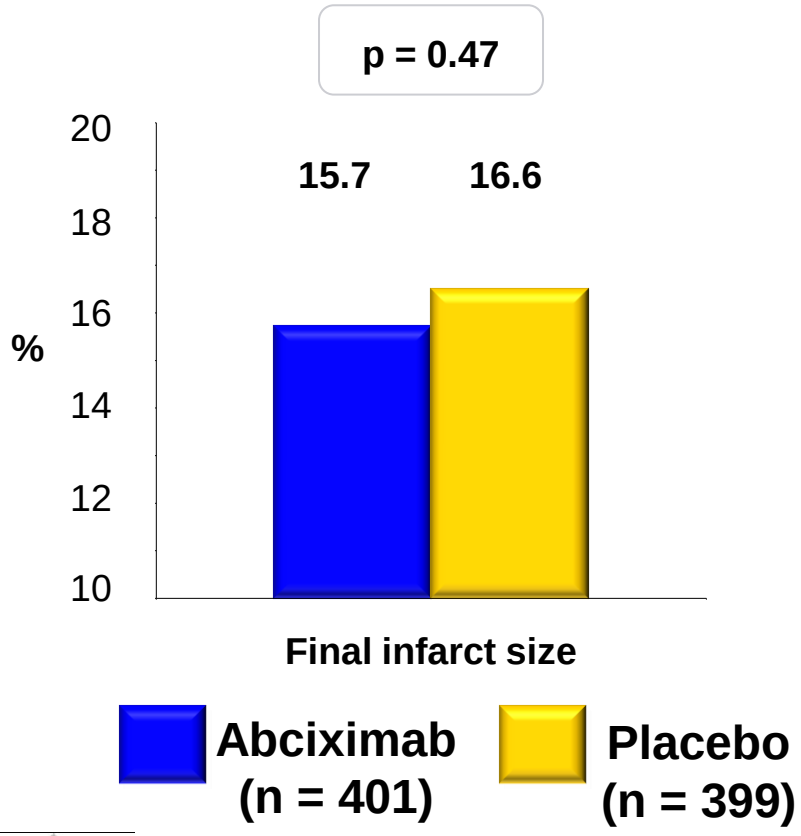
- In STEMI patients, tirofiban prior to transfer for PCI is beneficial
- Upstream tirofiban reduces ST-elevation post-PCI and nonsignificantly decreases mortality
- Potential for increased bleeding with upstream tirofiban

Cardiosource

Van't Hof AW, et al. Lancet 2008;372:537-46

BRAVE-3

Patients with STEMI undergoing PCI were randomized to either abciximab or unfractionated heparin (UFH), after pretreatment with 600 mg of clopidogrel. LV infarct size was evaluated at 5-7 days.



Results

- Mean final infarct size: 15.7% vs. 16.6% in the abciximab and control groups (p = 0.47)
- Death, MI, stroke or urgent revasc. : 5.0% vs. 3.8% in the abciximab and control groups (p = 0.39)

Conclusions

- No difference in infarct size or clinical outcomes with abciximab in patients with STEMI undergoing PCI following pretreatment with 600 mg of clopidogrel

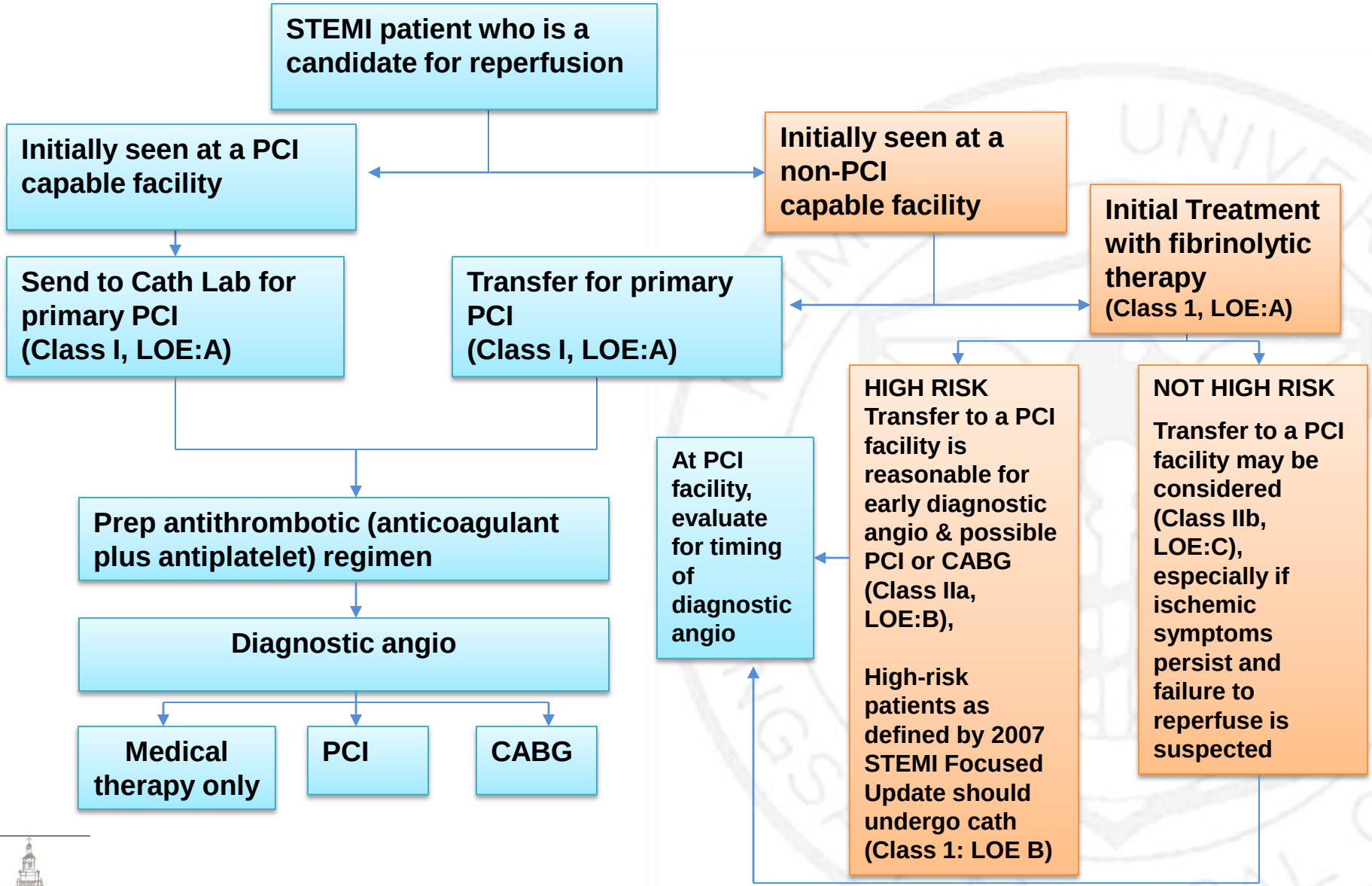
Cardiosource

Mehilli J, et al. Circulation 2009

Outline

- **Interventional Issues**
  - DES vs. BMS
  - Culprit only vs. Complete Revas.
  - IABP support
- **Pharmacological Issues**
  - Anticoagulant: UFH, Bivalirudin
  - Antiplatelet agents: Prasugrel, GPI
- **Triage and Transfer of Patients Issue**

Pathway: Triage and Transfer for PCI (in STEMI)



ACC/AHA 2009 Joint STEMI/PCI Guideline

Recommendations for Triage and Transfer for PCI: *High Risk Definition

CARESS -in -AMI

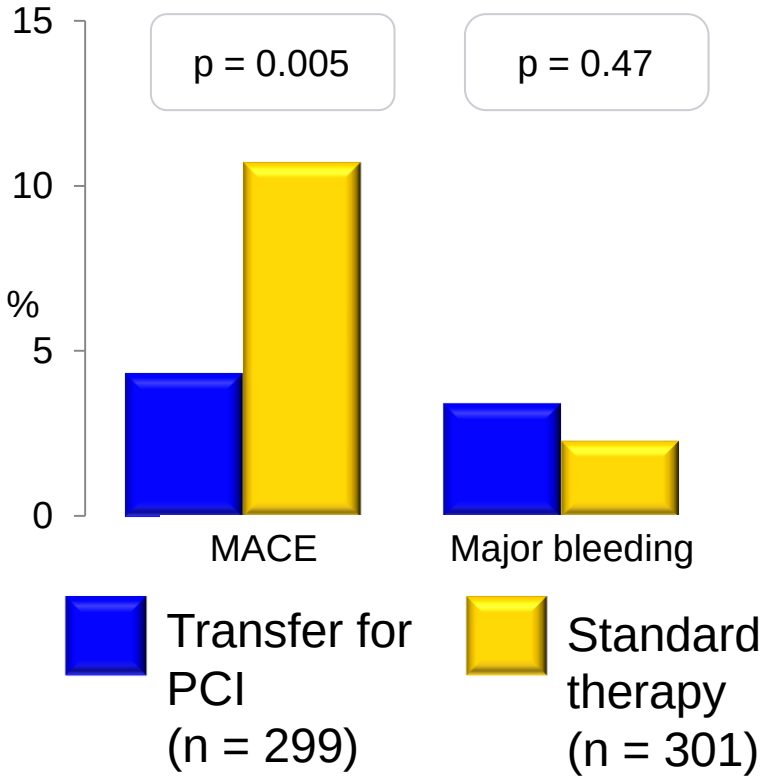
- STEMI patients with one or more high-risk features:
  - extensive ST-segment ↑
  - new-onset left bundle branch block
  - previous MI
  - Killip class >2, or
  - LVEF<35% for inferior MIs;
- Anterior MI alone with 2 mm or more ST-segment ↑ in 2 or more leads qualifies

TRANS -FER -AMI

- >2 mm ST-segment ↑ in 2 anterior leads or ST ↑ at least 1 mm in inferior leads with at least one of the following:
  - systolic blood pressure <100 mm Hg
  - heart rate >100 beats per minute
  - Killip Class II-III
  - >2 mm of ST-segment ↓ in the anterior leads
  - >1mm of ST ↑ in right-sided lead V4 indicative of right ventricular involvement

CARESS-in-AMI

STEMI patients admitted to non-PCI hospitals and initially treated with heparin, half-dose reteplase, and abciximab were randomized to immediate transfer for urgent PCI (n = 299) or standard therapy with rescue PCI if needed (n = 301).



Conclusions

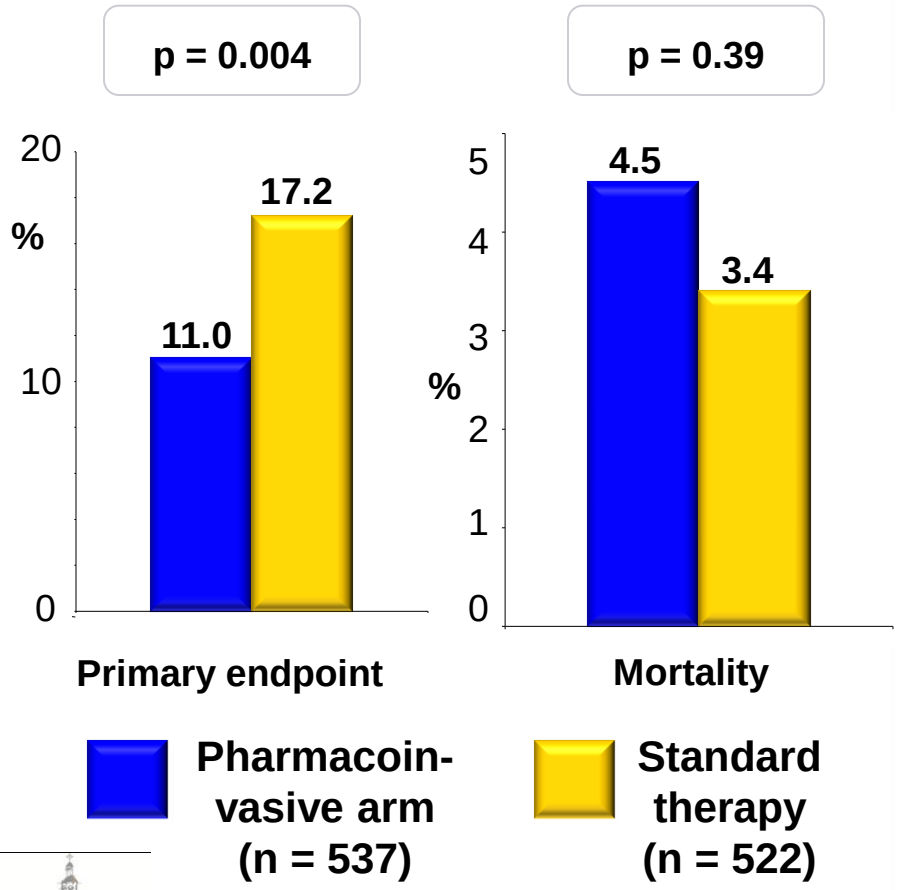
- STEMI patients treated with half-dose lytics and abciximab did better with immediate transfer for PCI
- This approach reduced death, MI, or refractory ischemia at 30 days
- Benefit driven by reduction in refractory ischemia

Cardiosource

Di Mario C, et al. Lancet 2008;371:559-68

TRANSFER-AMI

Patients with STEMI who presented to centers where timely primary PCI was not feasible were randomized to a pharmacoinvasive strategy (emergent transfer for PCI within 6 hours of fibrinolysis) or to standard treatment after fibrinolysis.



* Primary endpoint: death, MI, HF, severe recurrent ischemia, or shock

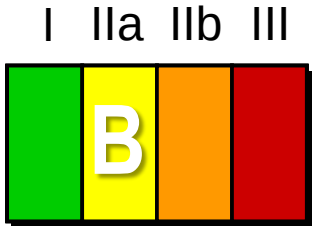
Conclusions

- Pharmacoinvasive was approach safe and efficacious compared with treatment with thrombolytics and transfer for rescue PCI only
- Needs to be distinguished from facilitated PCI
- Optimal window based on this and other trials: 2-17 hours

Cardiosource

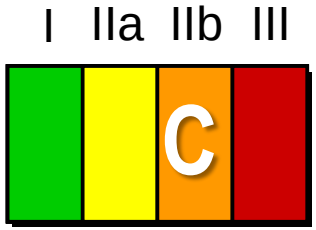
Cantor WJ, et al. NEJM 2009;360:2705-18

Recommendations for Triage and Transfer for PCI (for STEMI)



It is reasonable to transfer high risk patients who receive fibrinolytic therapy as primary reperfusion therapy at a non-PCI capable facility to a PCI-capable facility as soon as possible where either PCI can be performed when needed or as a pharmacoinvasive strategy.

Recommendations for Triage and Transfer for PCI (for STEMI)



Patients who are not high risk who receive fibrinolytic therapy as primary reperfusion therapy at a non-PCI capable facility may be considered for transfer to a PCI-capable facility as soon as possible where either PCI can be performed when needed or as a pharmacoinvasive strategy.

SUMMARY

Treatment Issues of STEMI in 2011 (I)

1. The efficacy of DES has been proved but its safety is still a great controversy in patients with STEMI. Although there was no evidence of a higher incidence of stent thrombosis in DES after 3 to 5 years, the longer-term follow-up is needed as ever.

2. Culprit vessel PCI may be the initial strategy during primary PCI for STEMI with MVD. When significant nonculprit lesions are eligible for PCI, staged MV-PCI should be considered.

Treatment Issues of STEMI in 2011 (II)

3. The routine usage of IABP is not recommended in STEMI patients with high-risk unless combined with cardiogenic shock.

4. Bivalirudin and prasugrel should be considered as an acceptable antithrombotic agent during primary PCI.

5. Triage and transfer to a PCI facility in patient with STEMI is reasonable strategy for early possible PCI or CABG.

Thank you for attention