Acute Coronary Syndrome

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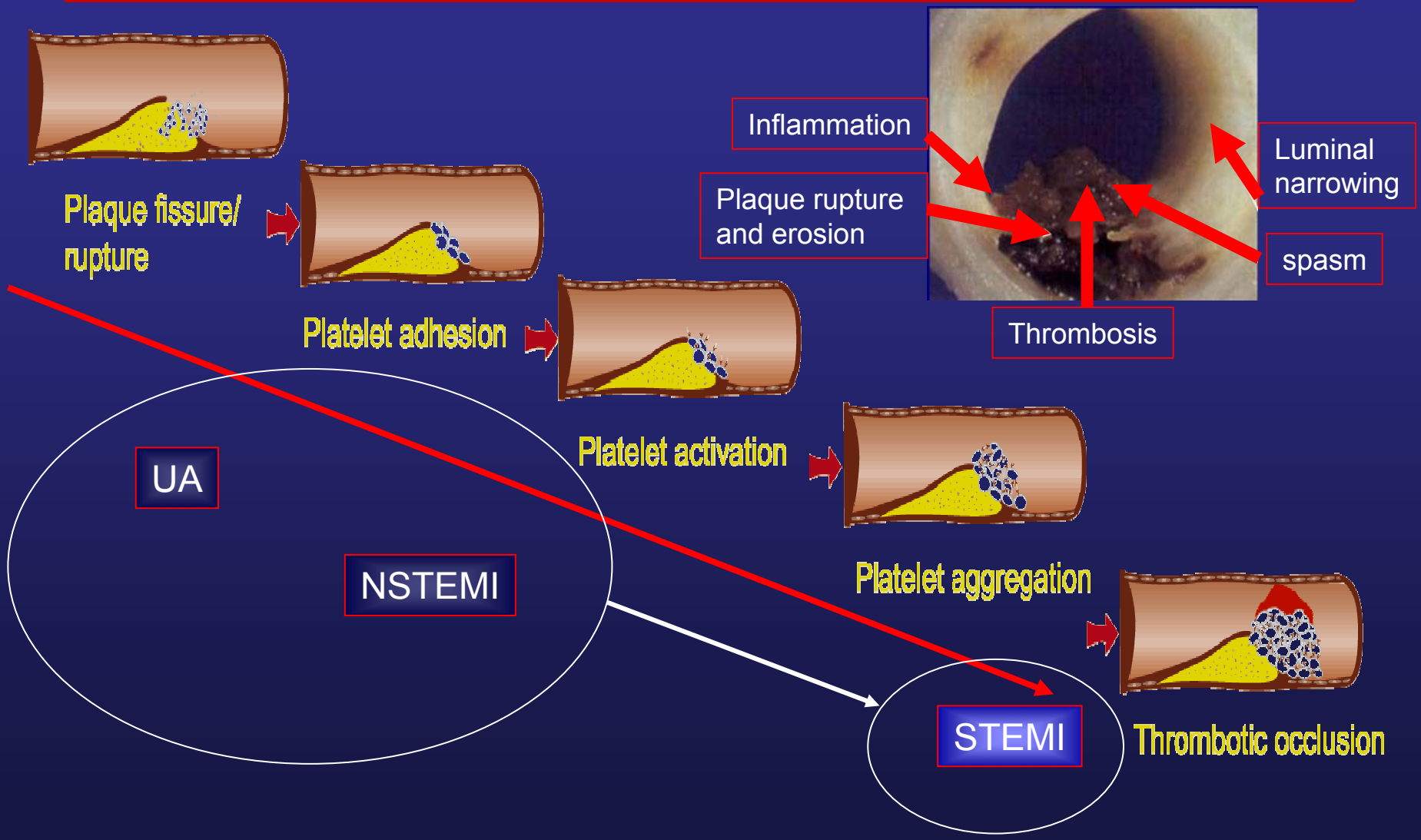
Service de soins intensifs

Acute Coronary Syndrome

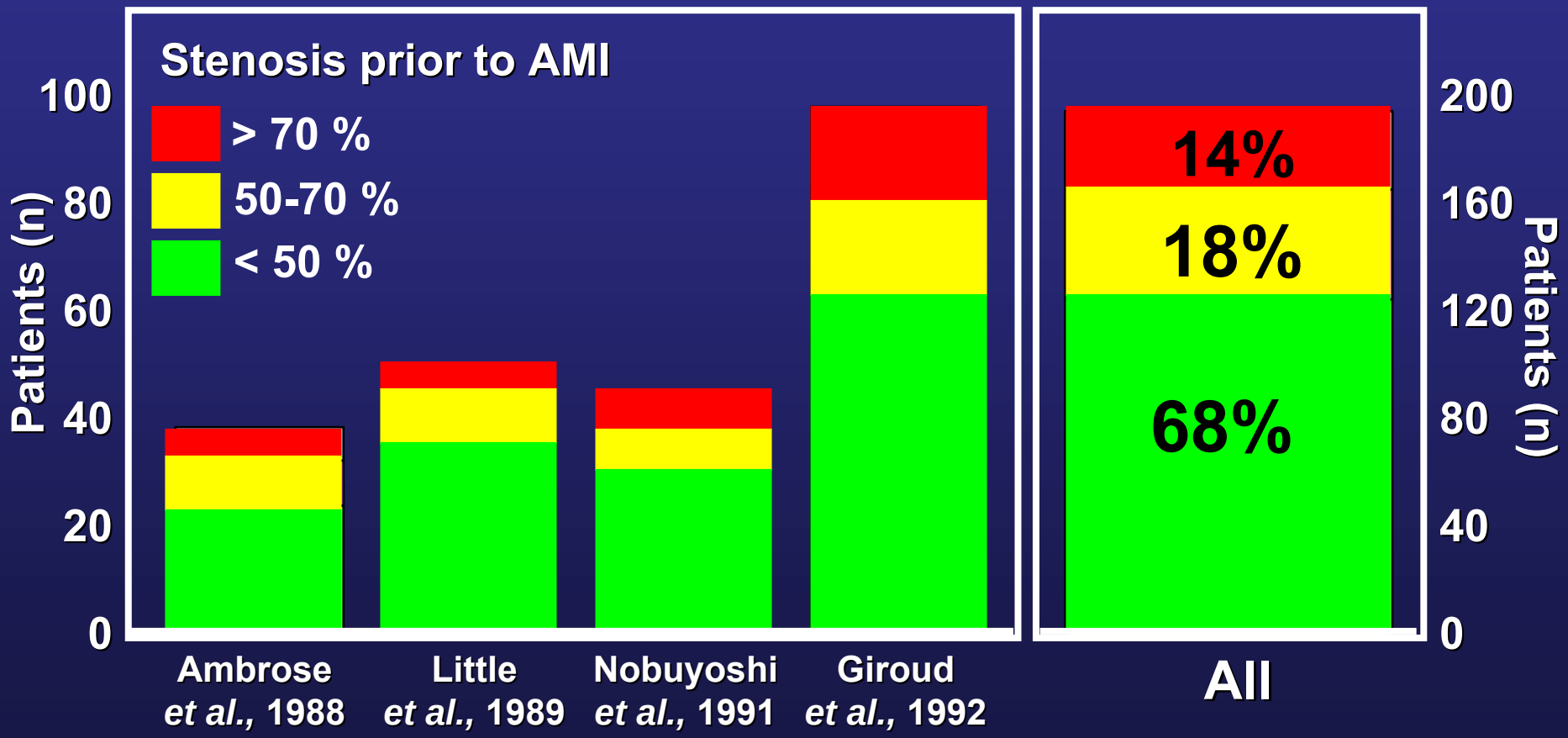
- Pathophysiology
- STEMI
- UA and NSTEMI
- Conclusions

Pathogenesis of ACS



White HD. *Am J Cardiol.* 1997; 80(4A):2B-10B.

Evolution to AMI does not depend on the degree of coronary stenosis



Falk, E. *Circulation* 1995;92:657

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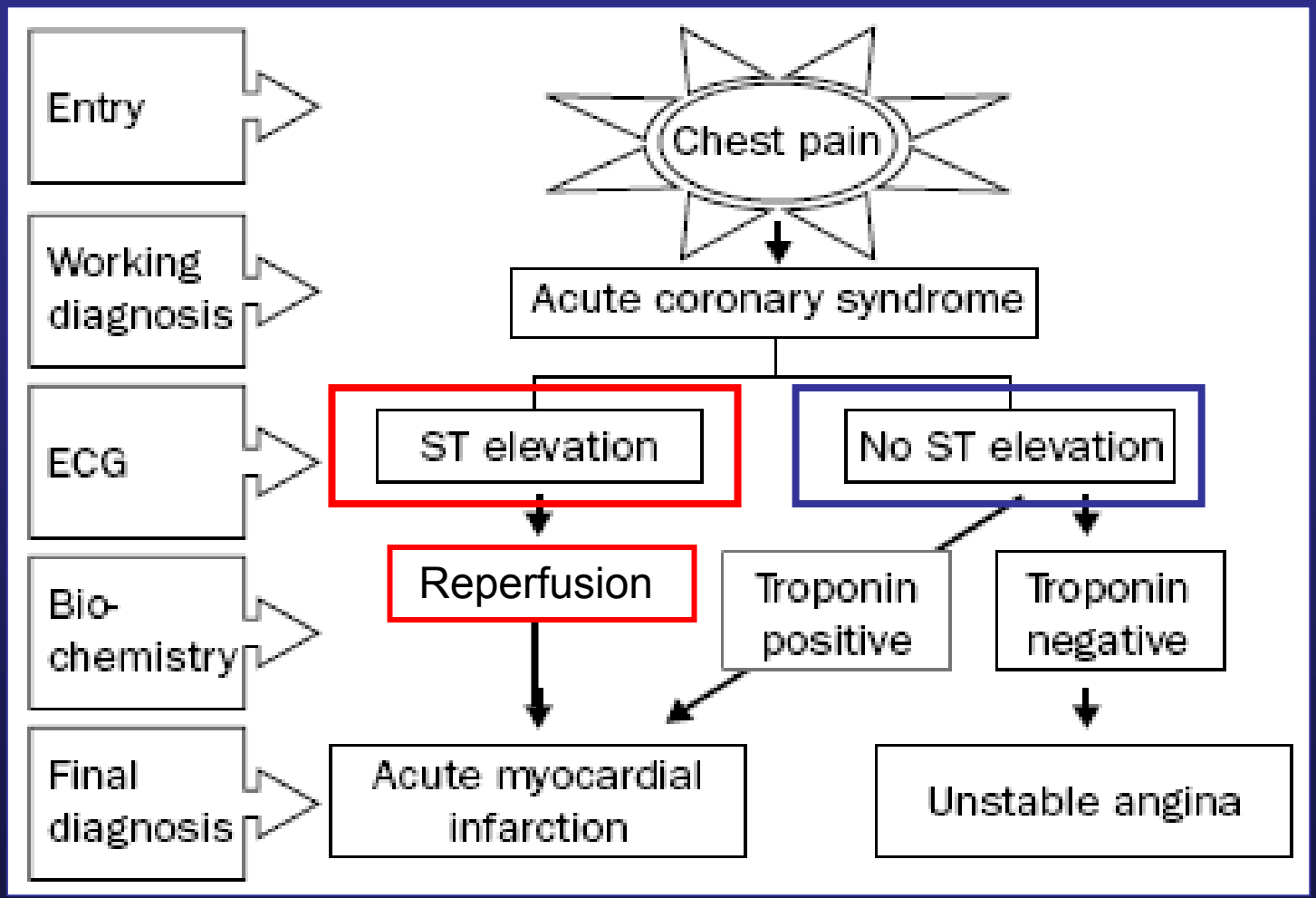
- Conclusions

Approach of Chest pain



Hamm CW.Lancet 2001; 358: 1533–38

STEMI
=
Urgent reperfusion

Milestones in the Evolution of Thrombolysis in Myocardial Infarction

			Mortality
1988	ISIS-2	SK	25% ↓
		ASA	23% ↓
1993	GUSTO-1	TPA	14% ↓

Clinical Impact of Reocclusion after Thrombolysis:

Data from the TAMI trials:

- 810 patients, cath 90 min & 7 days later:
- 12.4% reocclusion
- 58% symptomatic
- In-hospital mortality 11.0% vs 4.5% (*P*=0.01).

Ohman et al. *Circulation.* 1990;82:781-791.

Coronary angiography after fibrinolysis :

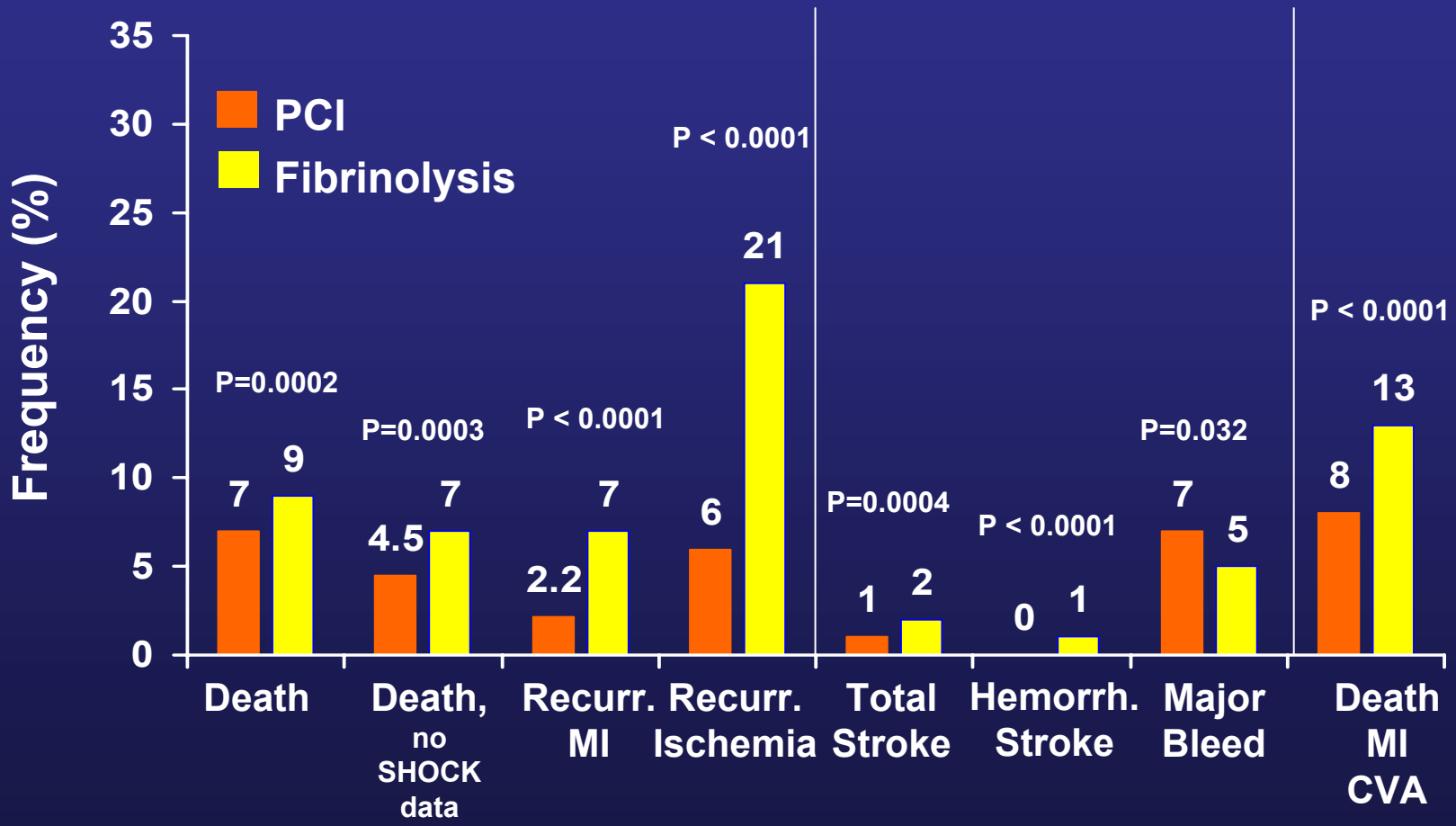
⇒ Rescue PCI

if Sx persistance and/or persistance of ST-elevation within 60 to 90 minutes

⇒ Elective angiography and PCI

for all patients after thrombolysis

PCI vs Fibrinolysis for STEMI: *Short Term Clinical Outcomes*



N = 7739

Keeley et al. The Lancet 2003;361:13.

DANAMI-2: Study Design

High-risk ST elevation MI patients (≥4 mm elevation), Sx < 12 hrs
5 PCI centers (n=443) and 22 referring hospitals (n=1,129), transfer in ≤ 3 hrs

Lytic therapy
Front-loaded tPA 100 mg
(n=782)

Primary PCI with transfer
(n=567)

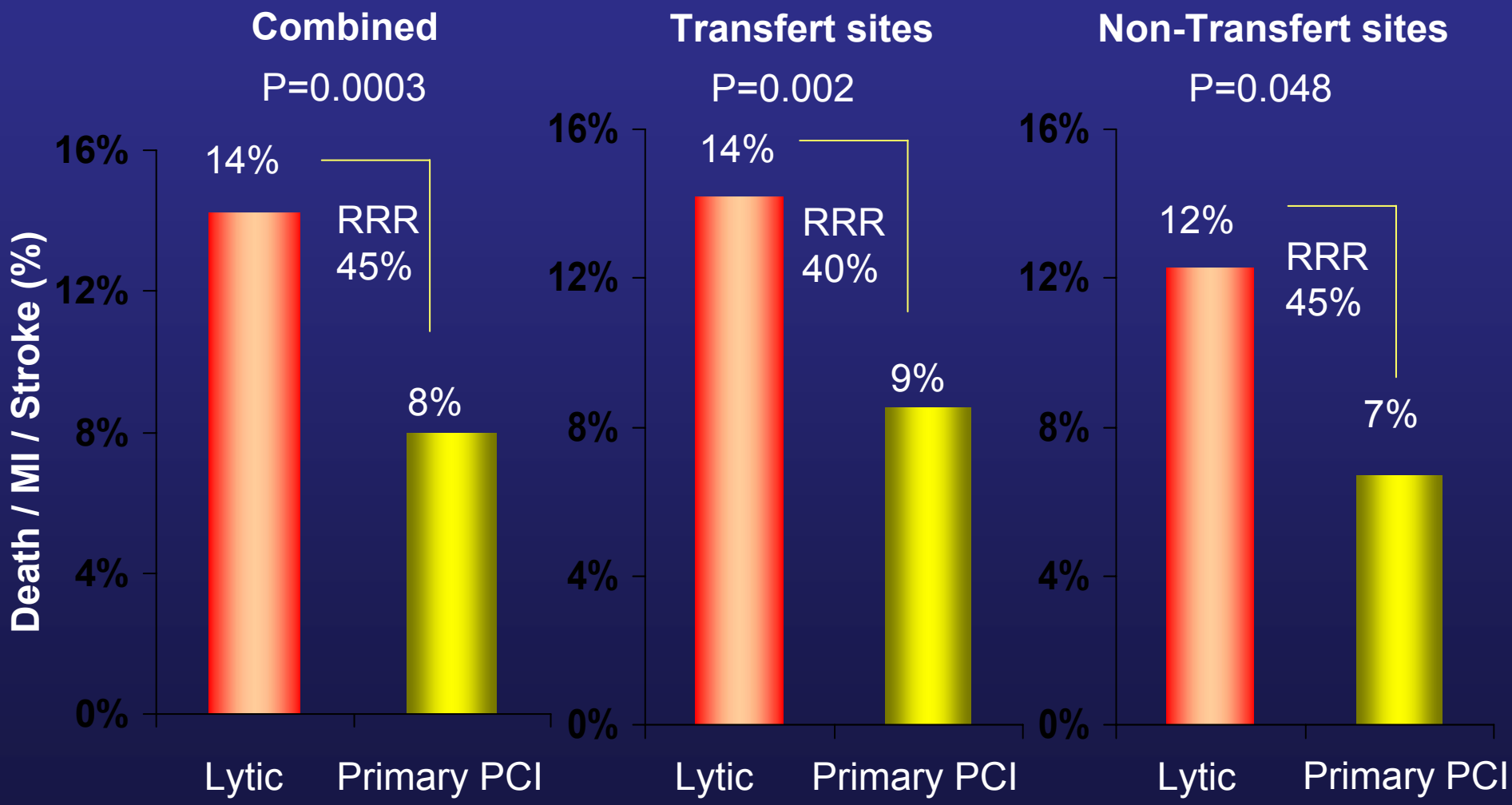
Primary PCI without transfer
(n=223)

Death / MI / Stroke at 30 Days

Stopped early by safety and efficacy committee

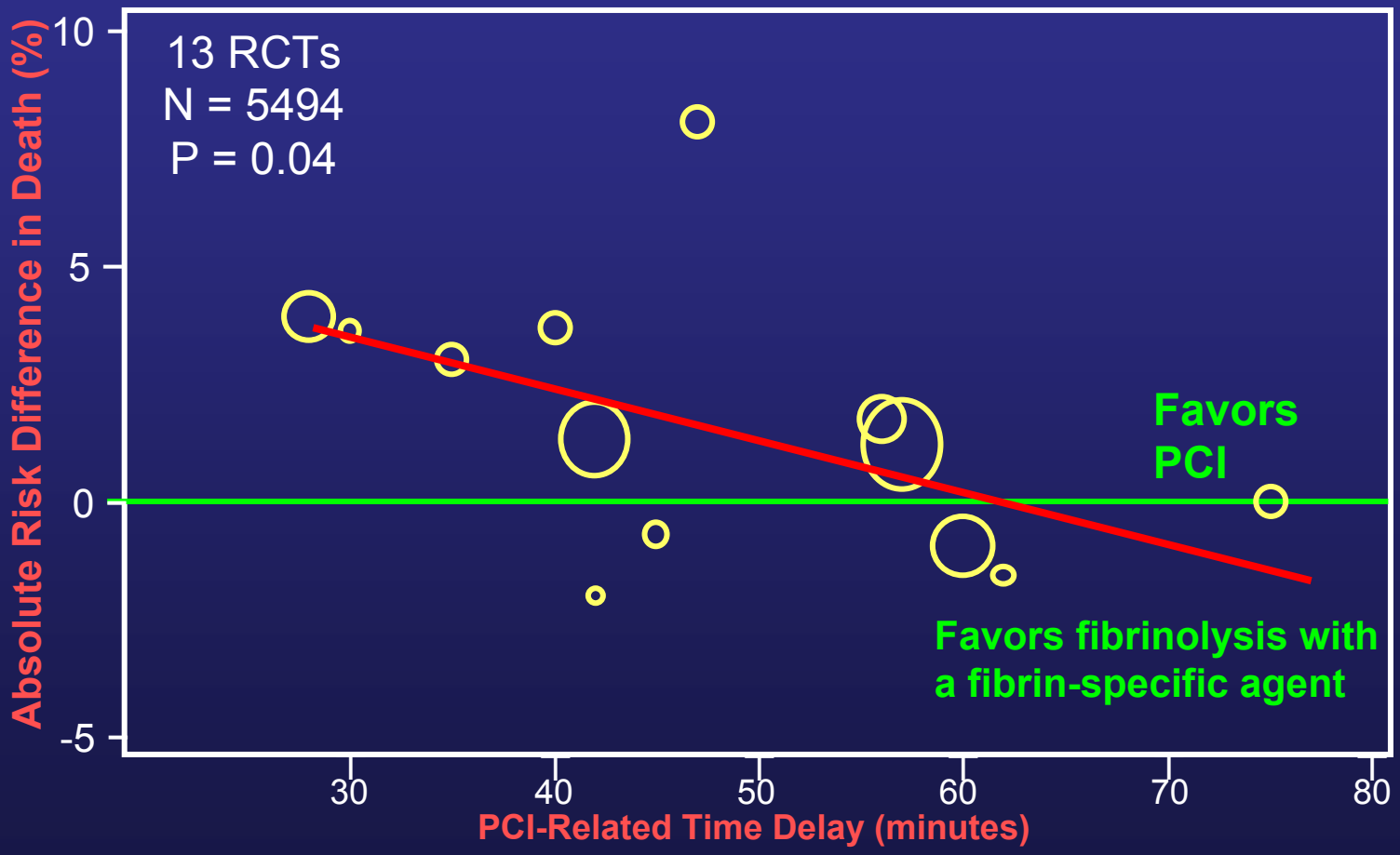
Andersen HR. N Engl J Med 2003;349:733-42.

DANAMI-2



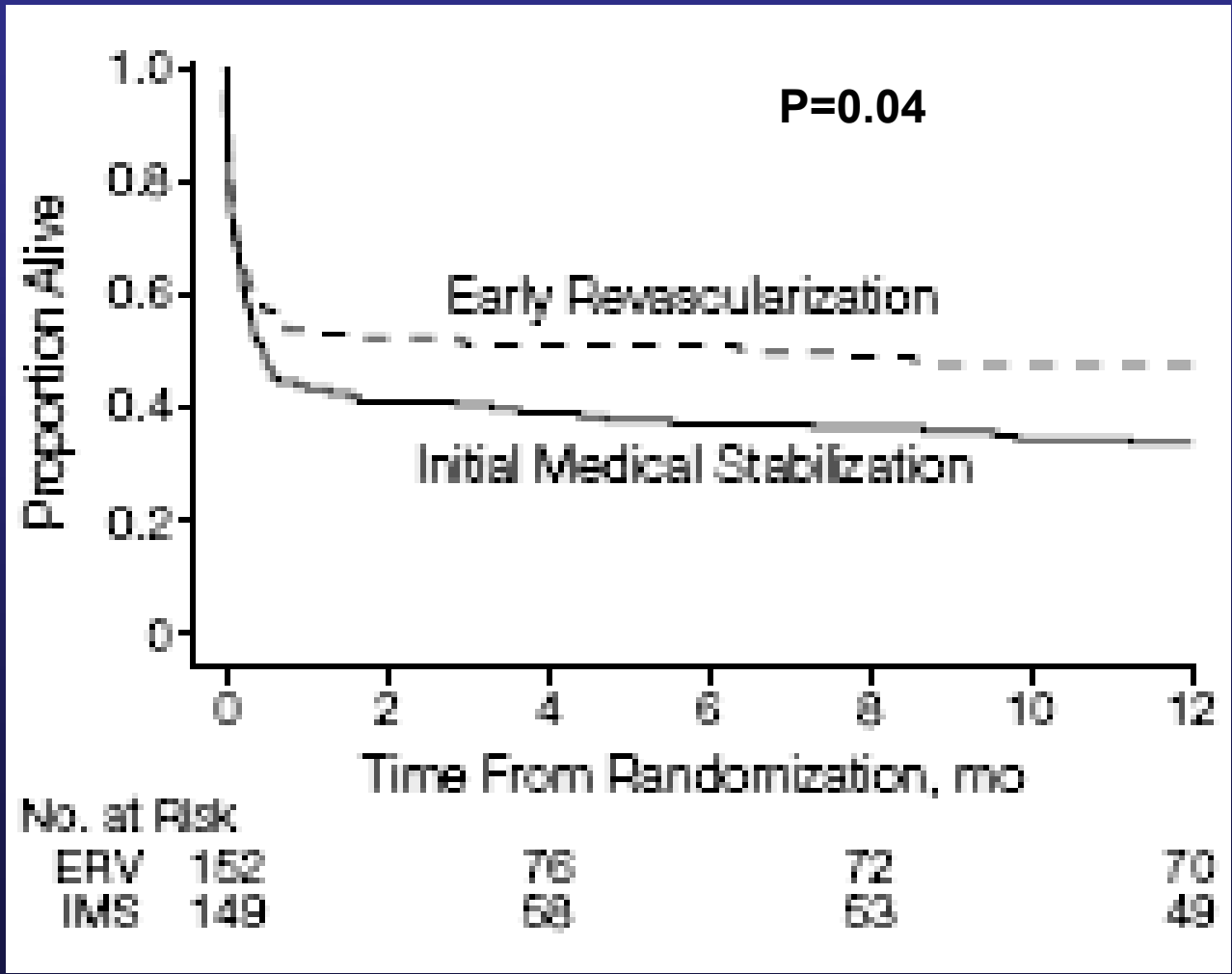
Andersen HR. N Engl J Med 2003;349:733-42.

PCI versus Fibrinolysis with Fibrin-Specific Agents: Is Timing (Almost) Everything?



Nallamothu and Bates. Am J Cardiol 2003;92:824.

Shock Trial : one year follow up

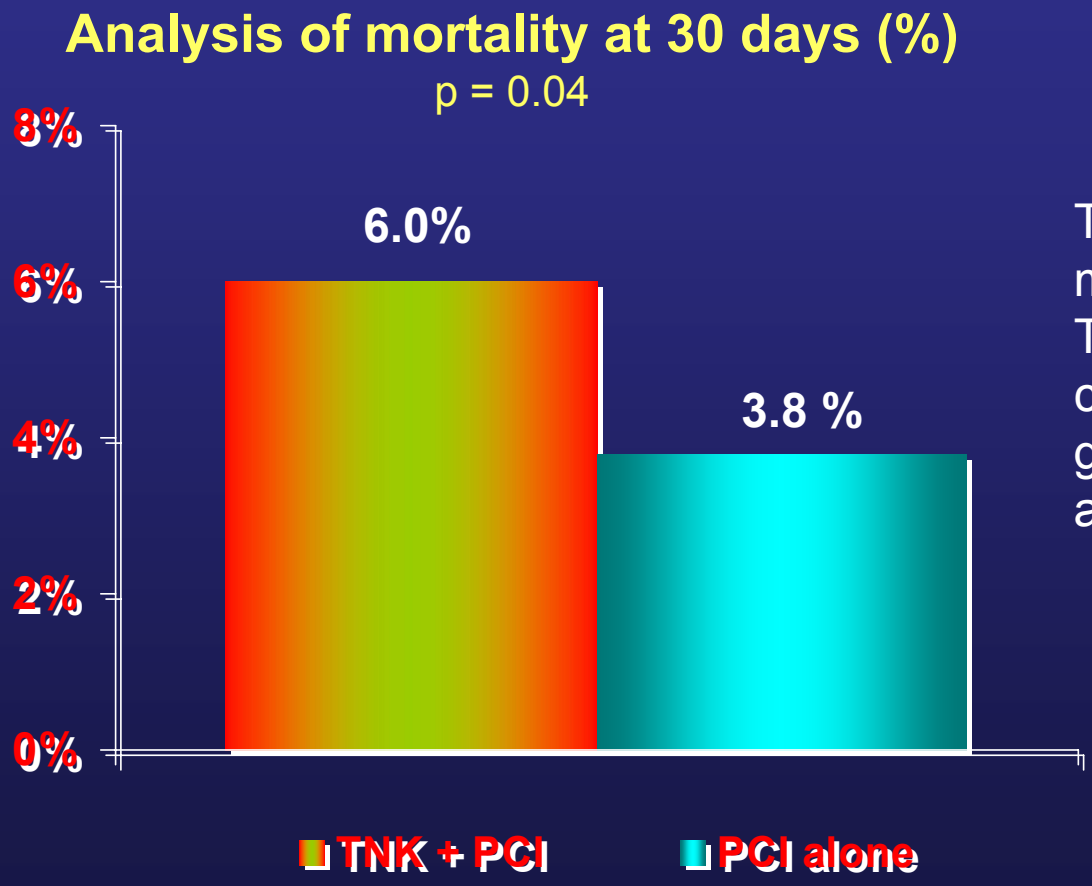


Hochman JS. JAMA. 2001;285:190-192

Facilitated angioplasty ?

No!

ASSENT – 4 PCI trial: Mortality at 30 days

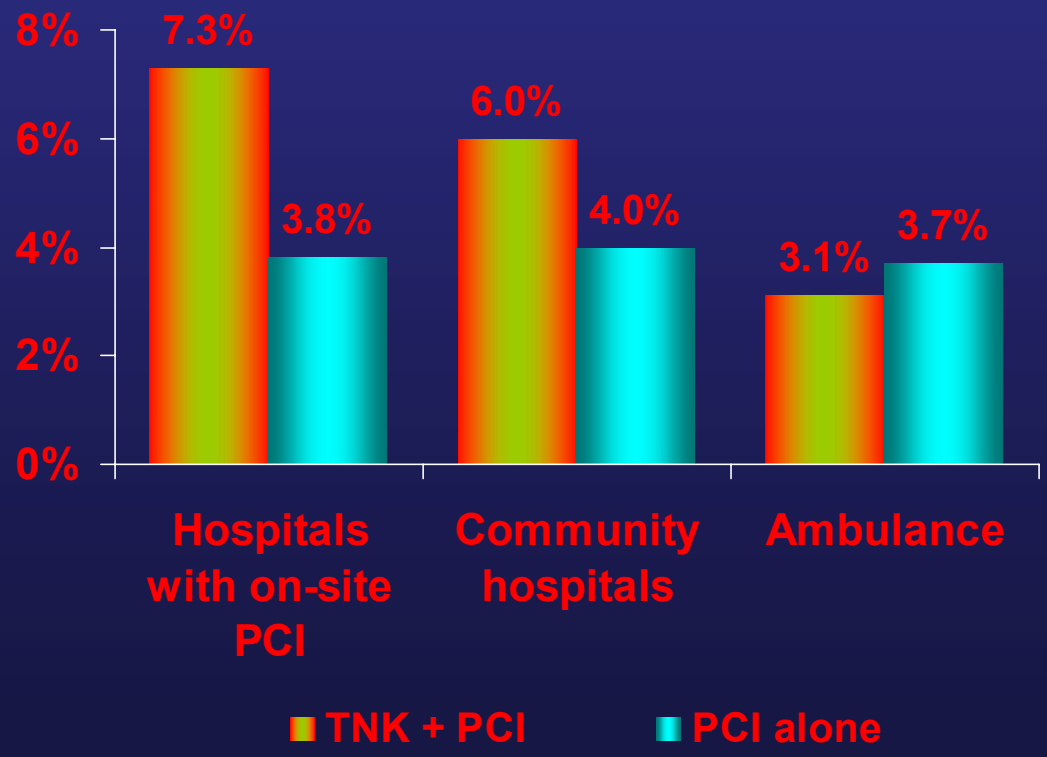


The primary endpoint of mortality was higher in the TNK + PCI treatment group compared with the PCI alone group (6.0% vs 3.8%, p=0.04) at 30 days

ASSENT-4. ESC 2005

ASSENT – 4 PCI trial: Mortality Subgroup Analysis

Subgroup analysis of mortality based on site of randomization (%)



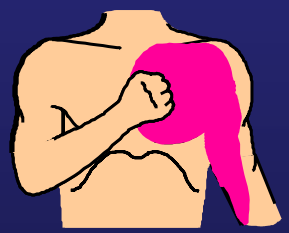
The greatest mortality difference by treatment group was seen in hospitals with on-site PCI (7.3% vs 3.8%), with less difference in community hospitals (6.0% vs 4.0%), and a shift in direction for patients enrolled in the ambulance (3.1% vs 3.7%)

ASSENT-4. ESC 2005

Reperfusion

Patient Transport

Goals



5 min

≤ 30 min

Triage Plan

Hospital PCI: Door-to-Balloon within 90 min.

PCI capable

Inter-Hospital Transfer

Not PCI capable

Hospital fibrinolysis: Door-to-Needle within 30 min.

Contraindications and Cautions for Fibrinolysis in STEMI

Absolute Contraindications

- Any prior intracranial hemorrhage
- Known structural cerebral vascular lesion (e.g., arteriovenous malformation)
- Known malignant intracranial neoplasm (primary or metastatic)
- Ischemic stroke within 3 months EXCEPT acute ischemic stroke within 3 hours

NOTE: Age restriction for fibrinolysis has been removed compared with prior guidelines.

Contraindications and Cautions for Fibrinolysis in STEMI

Absolute Contraindications

- Suspected aortic dissection
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed-head or facial trauma within 3 months

Contraindications and Cautions for Fibrinolysis in STEMI

Relative Contraindications

- History of chronic, severe, poorly controlled hypertension
- Severe uncontrolled hypertension on presentation (SBP > 180 mm Hg or DBP > 110 mm Hg)
- History of prior ischemic stroke greater than 3 months, dementia, or known intracranial pathology not covered in contraindications
- Traumatic or prolonged (> 10 minutes) CPR or major surgery (< 3 weeks)

Contraindications and Cautions for Fibrinolysis in STEMI

Relative Contraindications

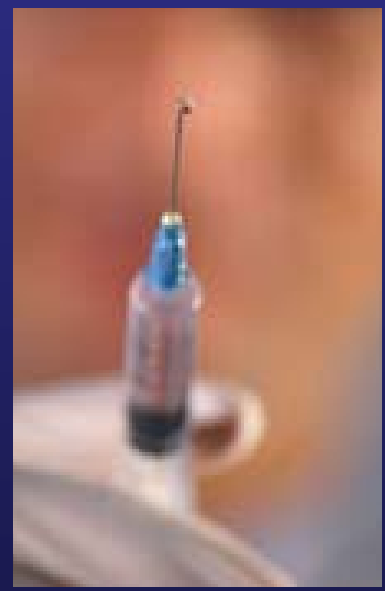
- Recent (< 2 to 4 weeks) internal bleeding
- Noncompressible vascular punctures
- For streptokinase/anistreplase: prior exposure (> 5 days ago) or prior allergic reaction to these agents
- Pregnancy
- Active peptic ulcer
- Current use of anticoagulants: the higher the INR, the higher the risk of bleeding

Reperfusion Options for STEMI Patients
Step 2: Select Reperfusion Treatment.

*If presentation is < 3 hours and there is no delay to an invasive strategy, there is a **preference for PCI**.*

Fibrinolysis generally preferred

- *Early presentation (≤ 3 hours from symptom onset and delay to invasive strategy)*
- *Invasive strategy not an option*
  - Cath lab occupied or not available
  - Vascular access difficulties
  - No access to skilled PCI lab
- *Delay to invasive strategy*
  - Prolonged transport
  - Door-to-balloon more than 90 minutes
  - > 1 hour vs fibrinolysis (fibrin-specific agent) now



Reperfusion Options for STEMI Patients
Step 2: Select Reperfusion Treatment.

If presentation is < 3 hours and there is no delay to an invasive strategy, there is a preference for PCI.

Invasive strategy generally preferred

- *Skilled PCI lab available with surgical backup*
  - Door-to-balloon < 90 minutes
- *High Risk from STEMI*
  - Cardiogenic shock, Killip class ≥ 3
- *Contraindications to fibrinolysis,* including increased risk of bleeding and ICH
- *Late presentation*
  - > 3 hours from symptom onset
- *Diagnosis of STEMI is in doubt*

Summary of Pharmacologic Rx: *Ischemia*

	1st 24 h	During Hosp	Hosp DC + Long Term
Aspirin	162-325 mg chewed	75-162 mg/d p.o.	75-162 mg/d p.o.
Fibrinolytic	tPA,TNK, rPA, SK		
IIbIIIa inhib	ABCX, Tirofiban, Eptifibatide		
UFH	60U/kg (4000) 12 U/kg/h (1000) aPTT 1.5 - 2 x C	aPTT 1.5 - 2 x C	
Beta-blocker	Oral daily	Oral daily	Oral daily

JACC 2004;44: 671 Circulation 2004;110: 588

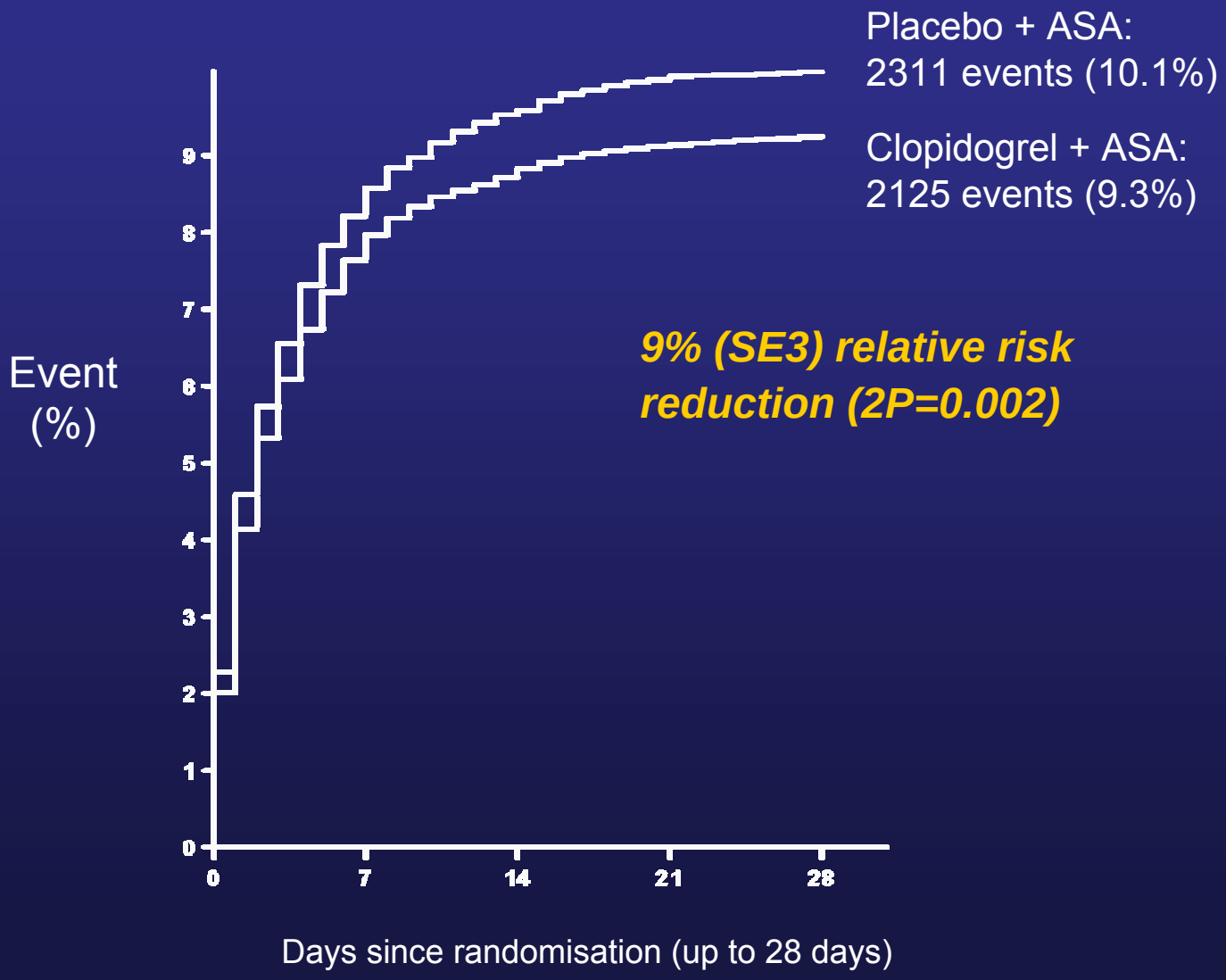
Summary of Pharmacologic Rx: *LVD, Sec. Prev.,*

	1st 24 h	During Hosp	Hosp DC + Long Term
ACEI	Anterior MI, Pulm Cong., EF < 40	Oral Daily	Oral Daily Indefinitely
ARB	ACEI intol., HF, EF < 40		
Aldo Blocker		No renal dysf, $K^+ \leq 5.0$ mEq/L On ACEI, HF or DM	Same as during Hosp.
Statin	Start early w/o lipid profile	Indefinitely, LDL << 2.6	Indefinitely, LDL << 2.6

JACC 2004;44:671
Circ 2004;110:588

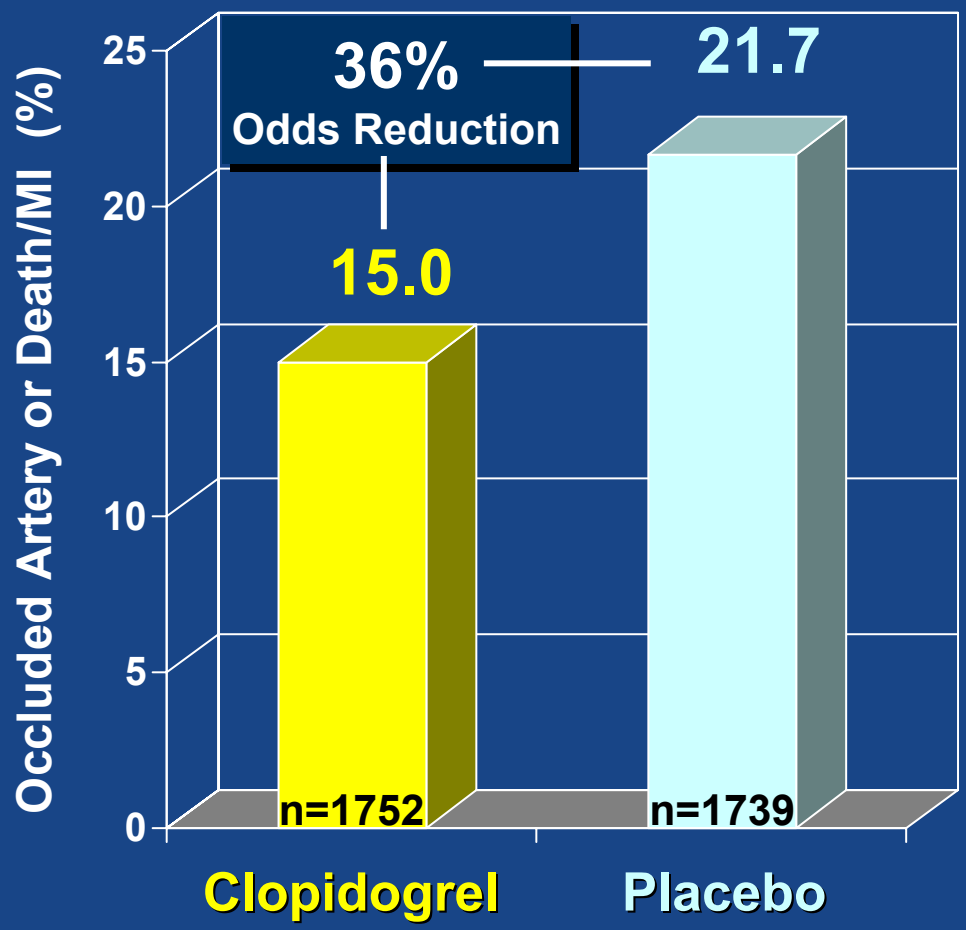
COMMIT: Effects of CLOPIDOGREL on Death, Re-MI or Stroke

n=45’851



CLARITY TIMI 28

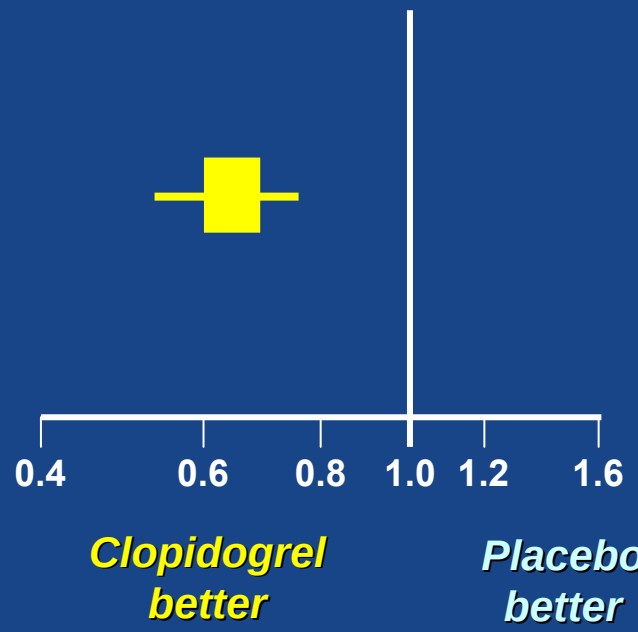
Primary Endpoint: Occluded Artery (or D/MI thru Angio/HD)



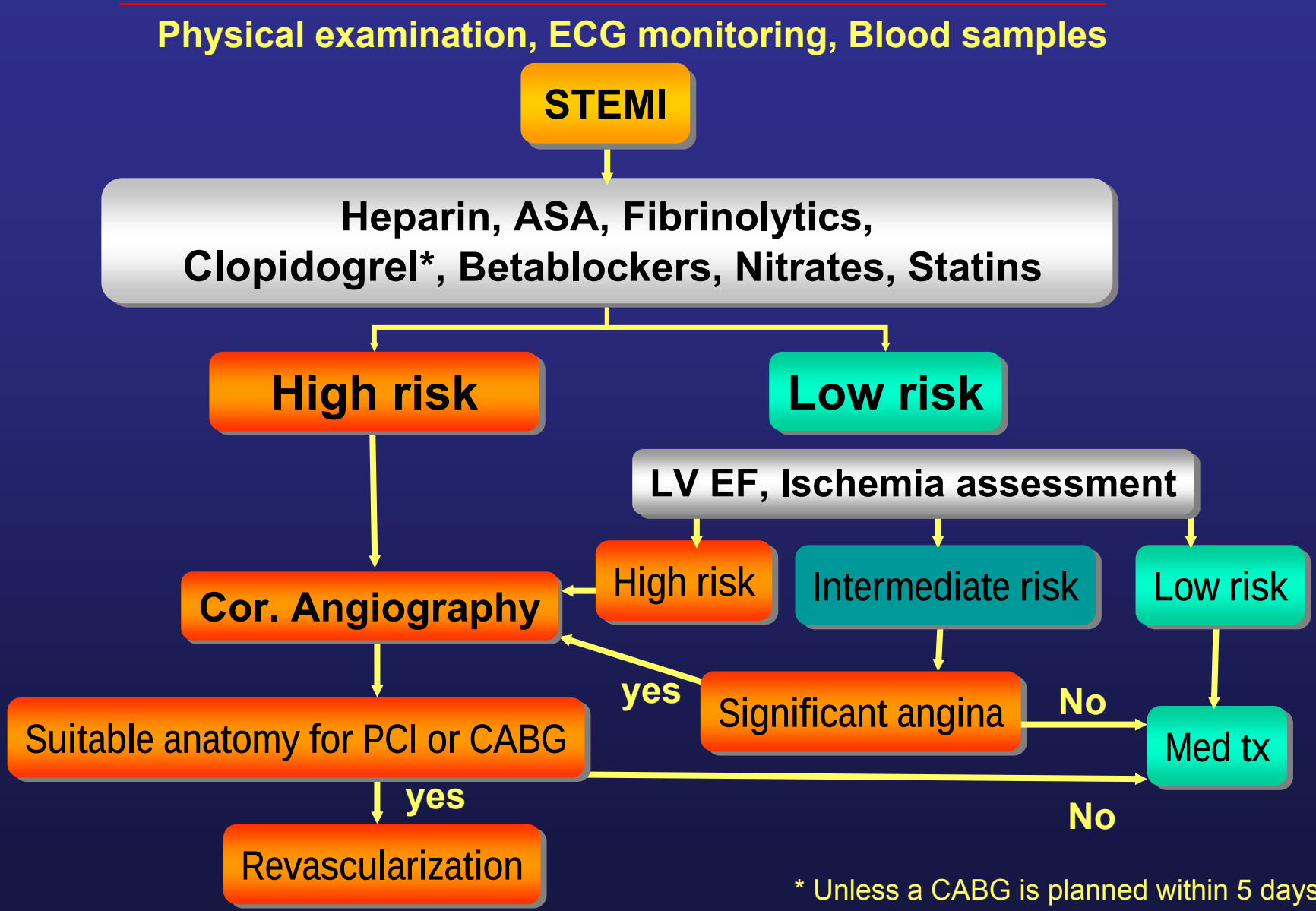
Odds Ratio 0.64

(95% CI 0.53-0.76)

P=0.00000036



Persistent ST-elevation MI **without PCI facility**



Acute Coronary Syndrome

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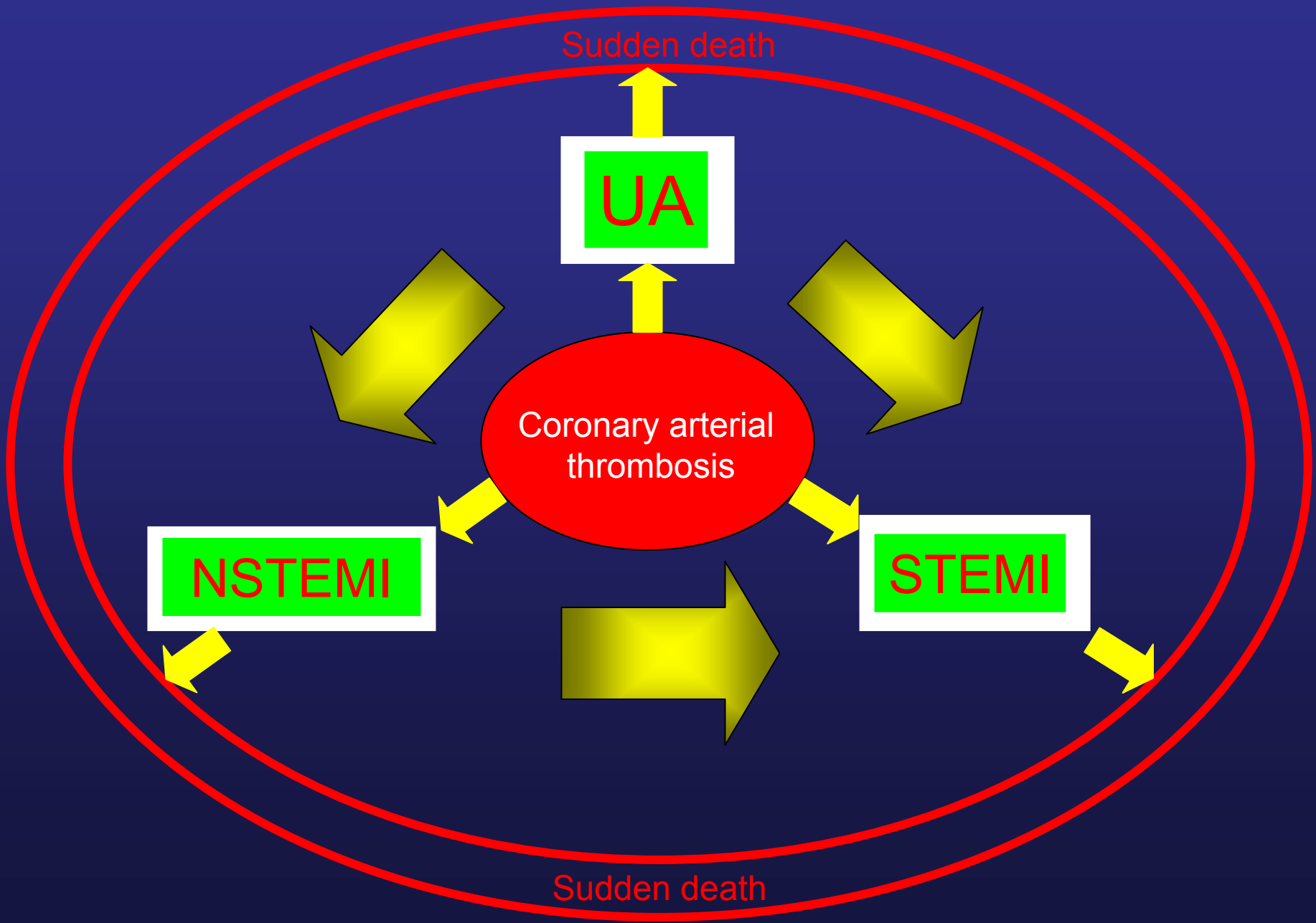
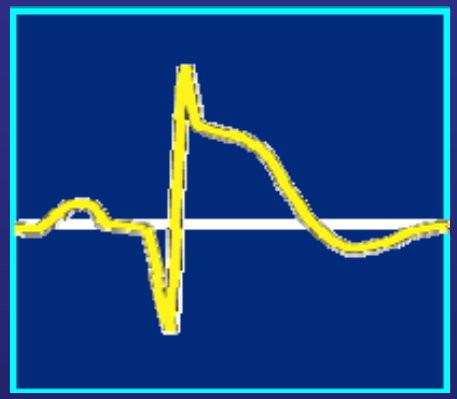
UA / NSTEMI

Risk stratification

Acute Coronary Syndromes

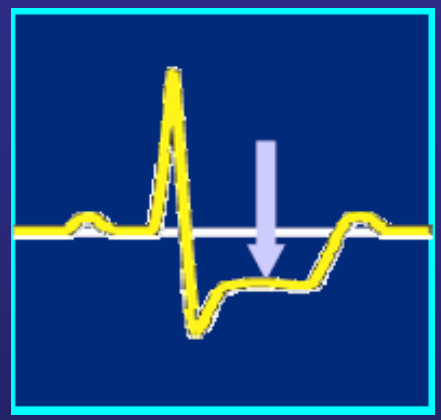


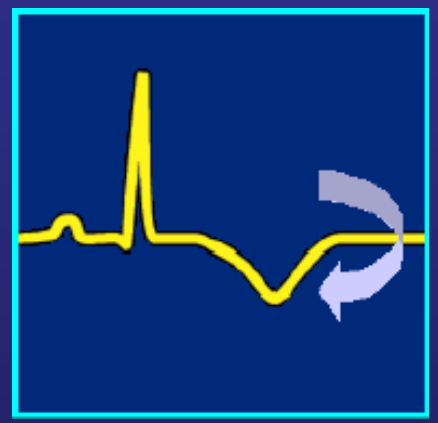
ACS **with** persistent ST-segment elevation



Troponin or CK-mb elevated

ACS **without** persistent ST-segment elevation



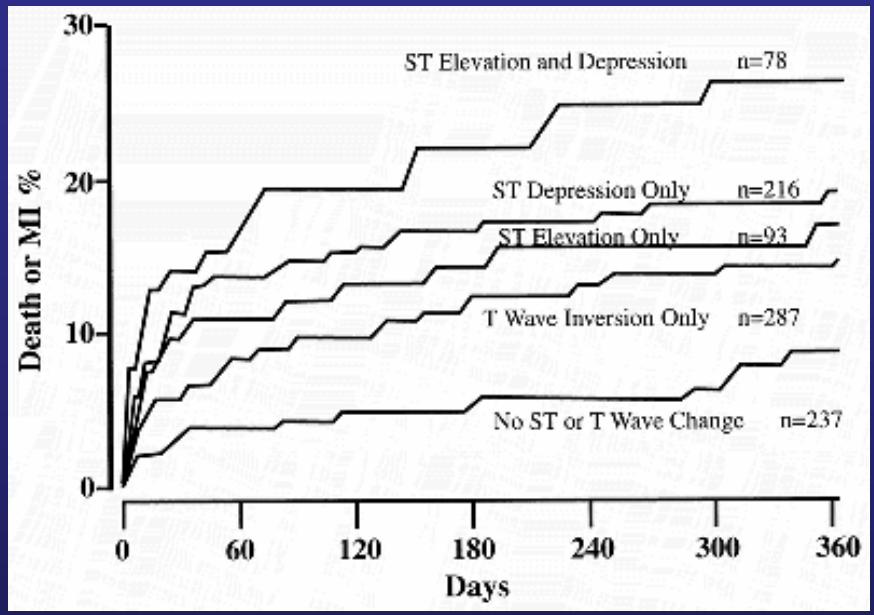


Troponin elevated or not

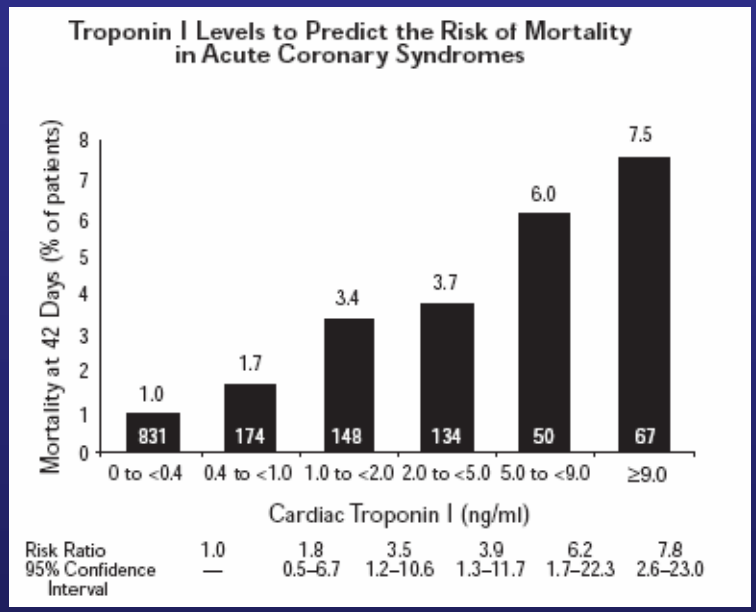
Myocardial infarction

Unstable angina

Risk stratification : ECG, Troponin



J Intern Med 1993; 234:293-301



N Engl J Med 1996;335:1342

Cardiac enzymes or troponins rise

=

myocardial infarction

Eur Heart J 2000; 21: 1502–13.

Criteria for acute, evolving or recent MI

Either one of the following criteria satisfies the diagnosis for an acute, evolving or recent MI:

(1) Typical rise and gradual fall (troponin) or more rapid rise and fall (CK-MB) of biochemical markersof myocardial necrosis with at least one of the following:

(a) ischemic symptoms;

(b) development of pathologic Q waves on the ECG;

(c) ECG changes indicative of ischemia (ST segment elevation or depression); or

(d) coronary artery intervention (e.g., coronary angioplasty).

(2) Pathologic findings of an acute MI.

European Heart Journal (2000) 21, 1502–1513

Criteria for established MI

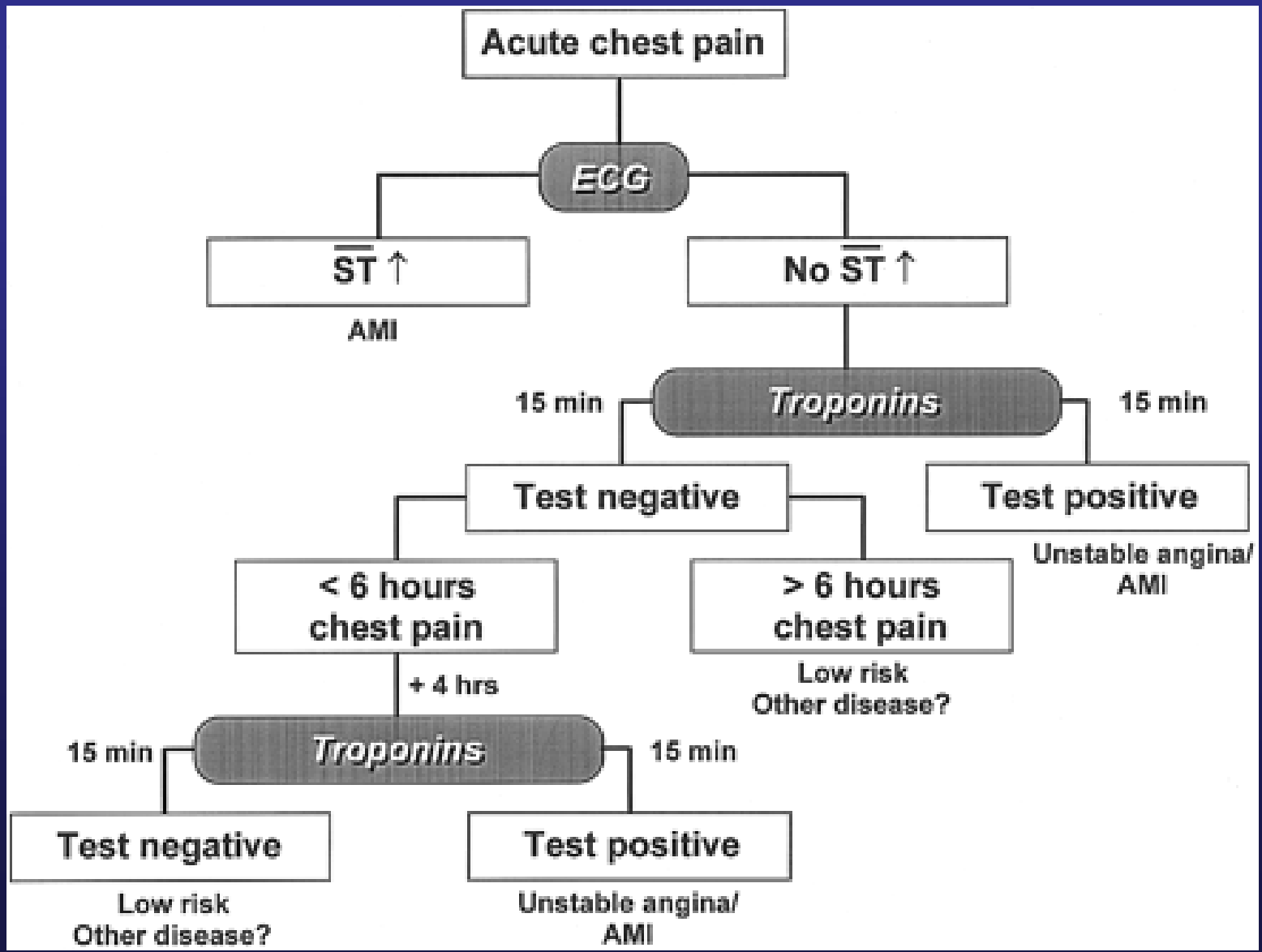
Any one of the following criteria satisfies the diagnosis

forestablished MI:

(1) Development of new pathologic Q waves on serial ECGs. The patient may or may not remember previous symptoms. Biochemical markers of myocardial necrosis may have normalized, depending on the length of time that has passed since the infarct developed.

(2) Pathologic findings of a healed or healing MI.

European Heart Journal (2000) 21, 1502–1513



Circulation. 2000;102:118

Braunwald classification UA

Classification	***A. Secondary*** *unstable angina*	***B. Primary*** *unstable angina*	***C. Postinfarction*** *(< 2 weeks) unstable angina*
I New onset of severe or accelerated angina No rest pain	**IA**	**IB**	**IC**
II Subacute rest angina (> 48 hours ago)	**IIA**	**IIB**	**IIC**
III Acute rest angina (within 48 hours)	**IIIA**	**IIIB**	**IIIC**

Circulation. 1989 Aug;80(2):410-4

Summary of the Risk Stratification : Risk of Progression to Death and MI

High-risk patients

Hemodynamic instability

Majors arrhythmias (VF, VT)

Pulmonary edema secondary to ischemia

New or worsening MR murmur

S3 or worsening rales

Dynamic ECG ST/T changes

Early post infarction UA

Prolonged or Reccurent chest pain

Elevated troponin levels

Diabetes

***history of revascularization**

Age>75 ans

Tachycardia / Bradycardia

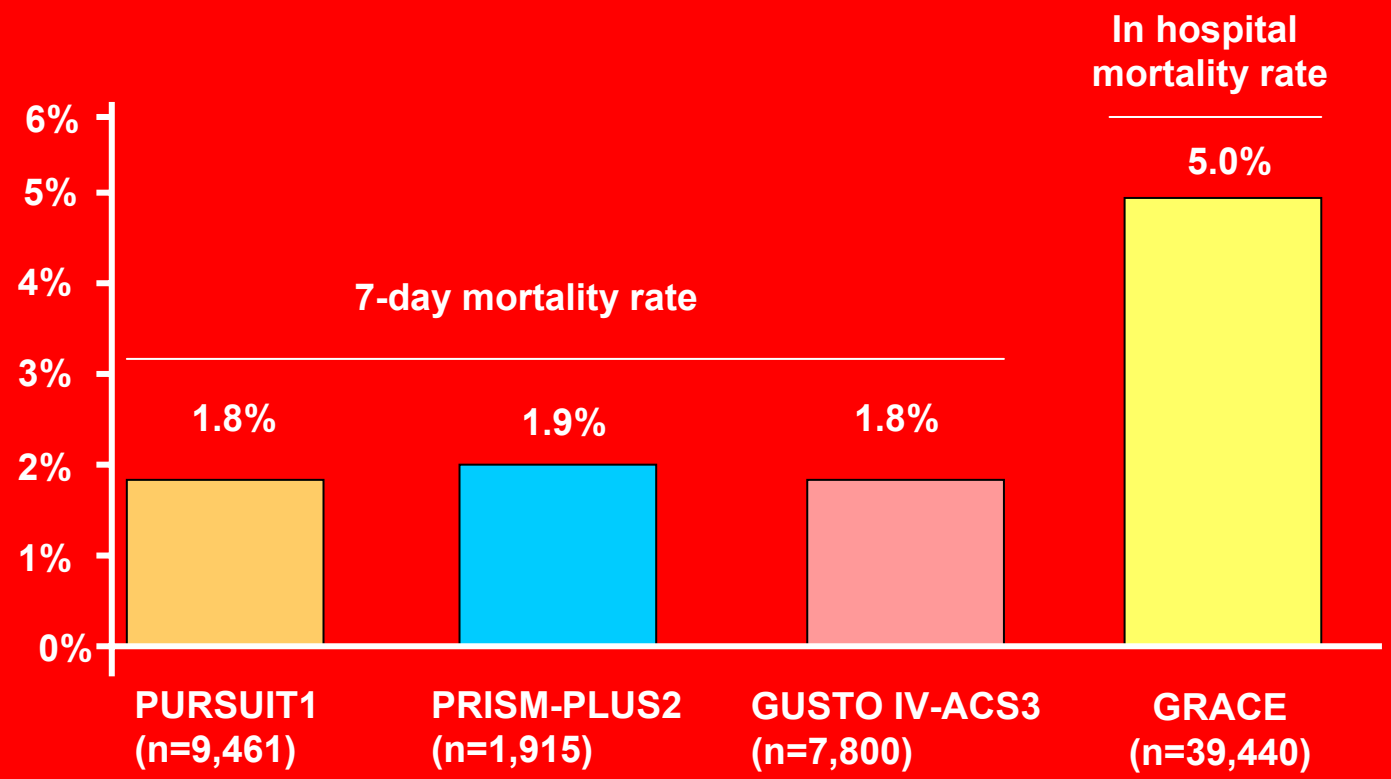
*American Heart Association®
Learn and Live℠

Summary of the Risk Stratification : Risk of Progression to Death and MI

Low-risk patients

- ✓ **No reccurence of chest pain within observational period**
- ✓ **No ST-segment depression**
  Negative T waves, Flat T waves, Normal ECG
- ✓ **No elevation of troponin or others biochemical markers**
- ✓ **Troponin twice negative**

Mortality rate in High Risk ACS: clinical trials and real life



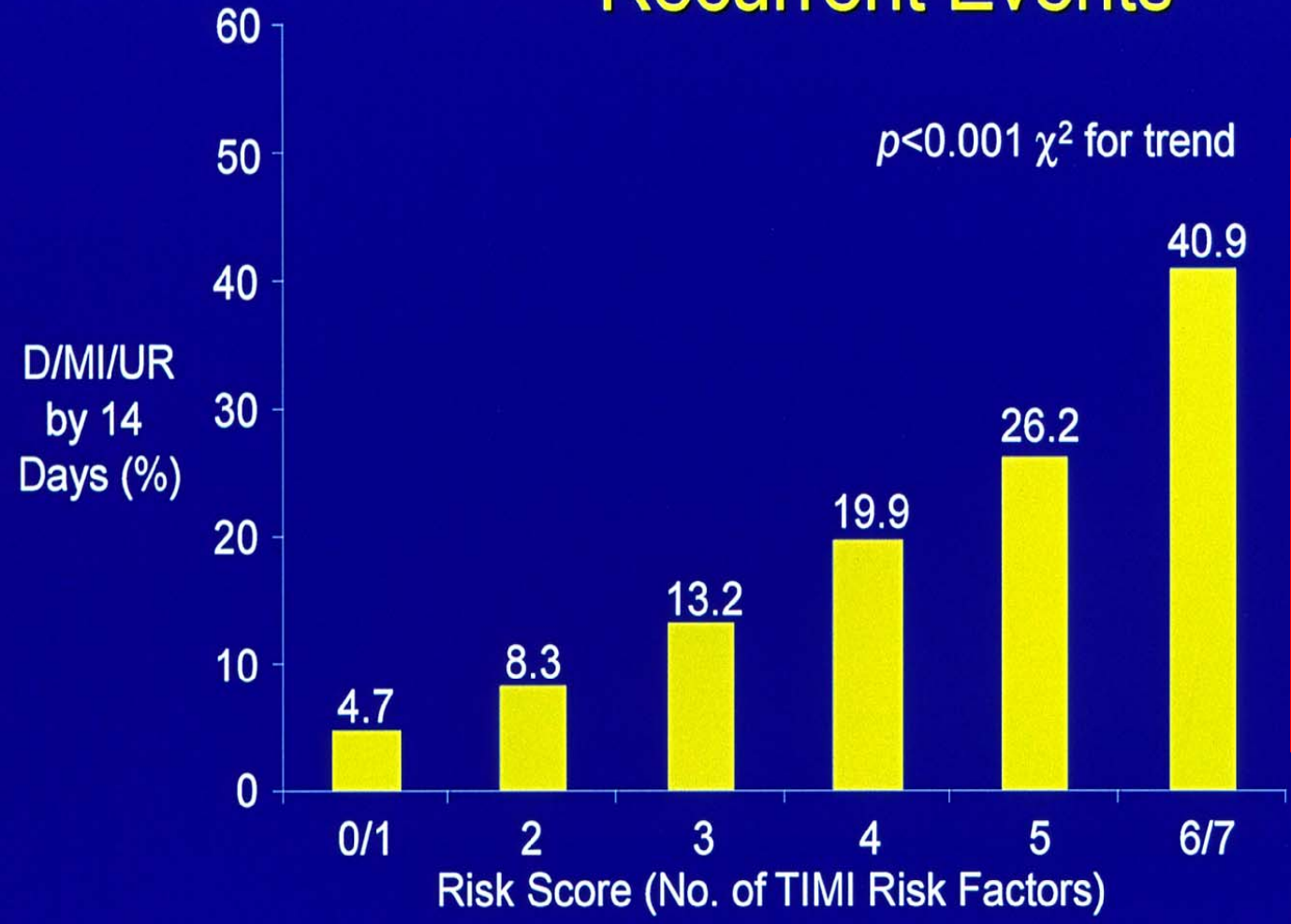
1. The pursuit Trial Investigators. *N Engl J Med 1998* 2. The PRISM-PLUS Study Investigators. *N Engl J Med 1998* 3. The GUSTO IV-ACS Investigators. *Lancet 2001*
4. GRACE. Am J Cardiol 2003;92(9):1031-6

Outcome of "Low-risk" Patients with ACS

- Presentation with UA in the absence of dynamic ECG changes, no troponin elevation, no arrhythmia nor hypotension
- Abnormal ECG in 38%,
- 27% stress test, 37% echo, 52% angio
- 6 month outcome:
  - 23% readmission
  - 12% revascularized
  - 3% deaths
- **"Low-risk" is not no risk**

Devlin et al. Eur Heart J 2001;22(Abstr Suppl):525

Number of TIMI Risk Factors Predicts Short-Term Recurrent Events



TIMI Risk Factors

- Age ≥65 yr
- ≥3 CAD risk factors
- Known CAD
- Aspirin in past 7 days
- Recent (<24 h) severe angina
- ST deviation ≥0.5 mm
- ↑ Cardiac markers

D=death, MI=myocardial infarction, UR=urgent revascularization.

Antman E et al. *JAMA*. 2000;284:835.

www.timi.org/files/riskscore/risk_home.htm

Tools to assess the risk stratification

GRACE™
GLOBAL REGISTRY OF ACUTE CORONARY EVENTS

www.outcomes.org/grace

A Validated Prediction Model for All Forms of Acute Coronary Syndrome

Estimating the Risk of 6-Month Postdischarge Death in an International Registry

Conclusions The GRACE 6-month postdischarge prediction model is a simple, robust tool for predicting mortality in patients with ACS. Clinicians may find it simple to use and applicable to clinical practice.

JAMA. 2004;291:2727-2733 www.jama.com

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Álvaro Avezum, MD, PhD
Marcus D. Flather, MBBS, FRCP
Keith A. A. Fox, MB, ChB, FRCP
for the GRACE Investigators

Figure 2. GRACE Prediction Score Card and Nomogram for All-Cause Mortality From Discharge to 6 Months

Risk Calculator for 6-Month Postdischarge Mortality After Hospitalization for Acute Coronary Syndrome

Record the points for each variable at the bottom left and sum the points to calculate the total risk score. Find the total score on the x-axis of the nomogram plot. The corresponding probability on the y-axis is the estimated probability of all-cause mortality from hospital discharge to 6 months.

Medical History

	Points
① Age in Years	
≤29	0
30–39	0
40–49	18
50–59	36
60–69	55
70–79	73
80–89	91
≥90	100
② History of Congestive Heart Failure	24
③ History of Myocardial Infarction	12

Findings at Initial Hospital Presentation

	Points
④ Resting Heart Rate, beats/min	
≤49.9	0
50–69.9	3
70–89.9	9
90–109.9	14
110–149.9	23
150–199.9	35
≥200	43
⑤ Systolic Blood Pressure, mm Hg	
≤79.9	24
80–99.9	22
100–119.9	18
120–139.9	14
140–159.9	10
160–199.9	4
≥200	0
	1
⑥ ST-Segment Depression	11

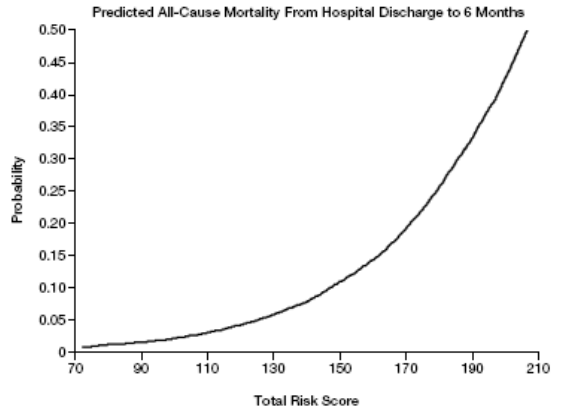
Findings During Hospitalization

	Points
⑦ Initial Serum Creatinine, mg/dL	
0–0.39	1
0.4–0.79	3
0.8–1.19	5
1.2–1.59	7
1.6–1.99	9
2–3.99	15
≥4	20
⑧ Elevated Cardiac Enzymes	15
⑨ No In-Hospital Percutaneous Coronary Invervention	14

Points
① _____
② _____
③ _____
④ _____
⑤ _____
⑥ _____
⑦ _____
⑧ _____
⑨ _____

Total Risk Score _____ (Sum of Points)

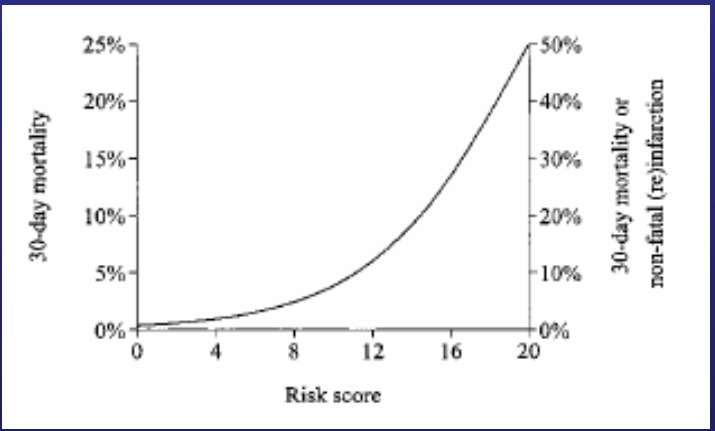
Mortality Risk _____ (From Plot)



Tools to assess the risk stratification

PURSUIT RISK SCORE

		Score	
		Mortality only	Mortality or infarction
Age (year)	50	0	8 (11)
	60	2 (3)	9 (12)
	70	4 (6)	11 (13)
	80	6 (9)	12 (14)
Gender	Female	0	0
	Male	1	1
Worst CCS-class in previous 6 weeks	No angina; I or II	0	0
	III or IV	2	2
Heart rate (bpm)	80	0	0
	100	1 (2)	0
	120	2 (5)	0
Systolic blood pressure (mmHg)	120	0	0
	100	1	0
	80	2	0
Signs of heart failure (rales)	No	0	0
	Yes	3	2
ST-depression on presenting ECG	No	0	0
	Yes	3	1



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***Circulation*. 2000;101:2557-2567**

Acute Coronary Syndrome W/O persistent ST-segment elevation

Treatment

ACS without persistent ST-segment elevation

Treatment options :

- Anti-ischemic
- Antithrombotic therapy
- Urgent PCI

Class I Recommandations for anti-ischemic therapy

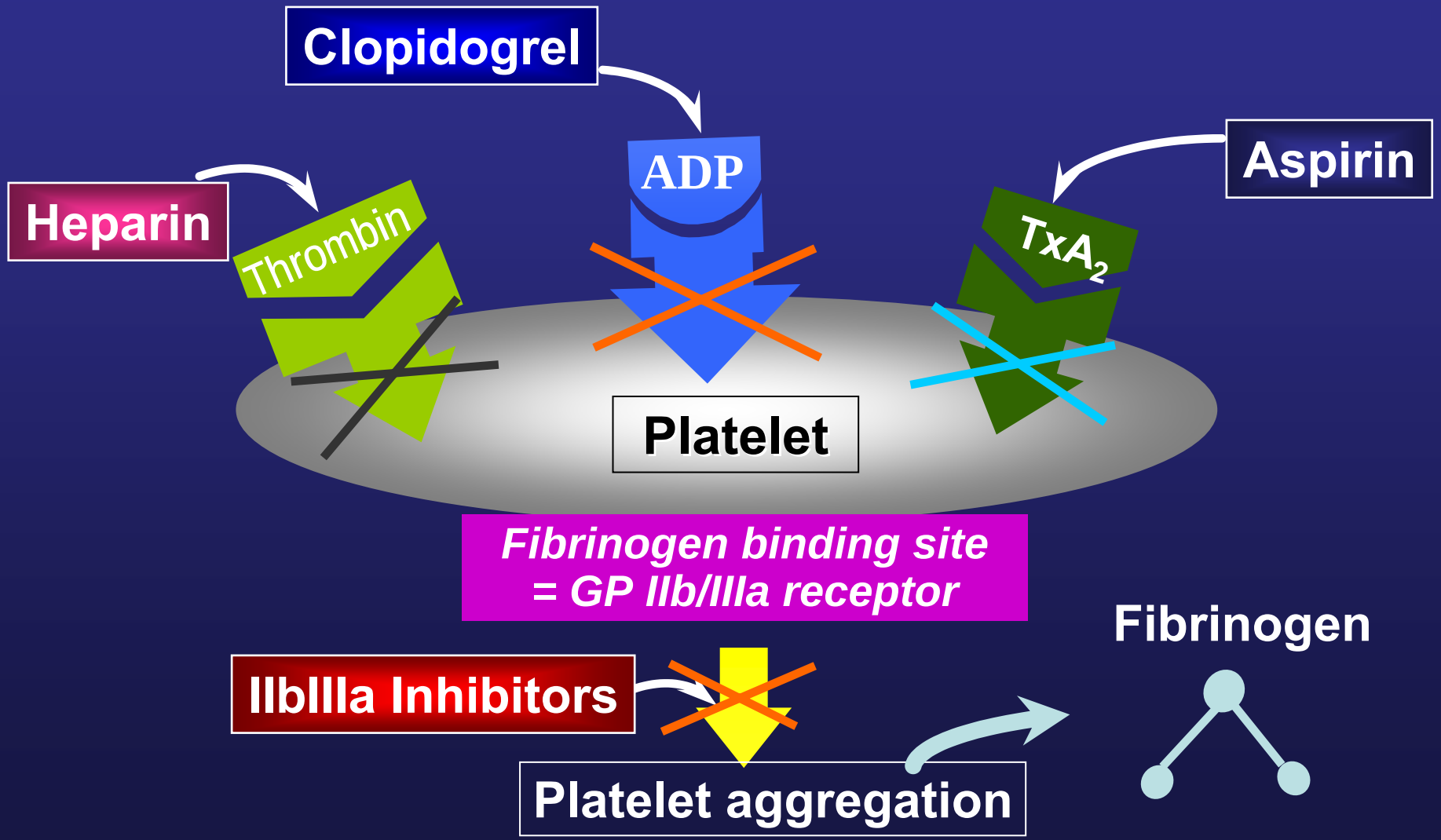
Continuing Ischemia/Other Clinical High-Risk Features*		Level of evidence
Present	**Absent**	
Bed rest with continuous ECG monitoring		C
Supplemental O_2 to maintain Sao_2 >90%		C
NTG IV		C
Beta-blockers, oral or IV	Beta-blockers, oral	B
Morphine IV for pain, anxiety, pulmonary congestion		C
IABP if ischemia or hemodynamic instability persists		B
ACEI for control of hypertension or LV dysfunction, after MI	ACEI for control of hypertension or LV dysfunction, after MI	B

ACS without persistent ST-segment elevation

Treatment options :

- Anti-ischemic
- Antithrombotic therapy
- Urgent PCI

Antiplatelet and Anticoagulation therapy



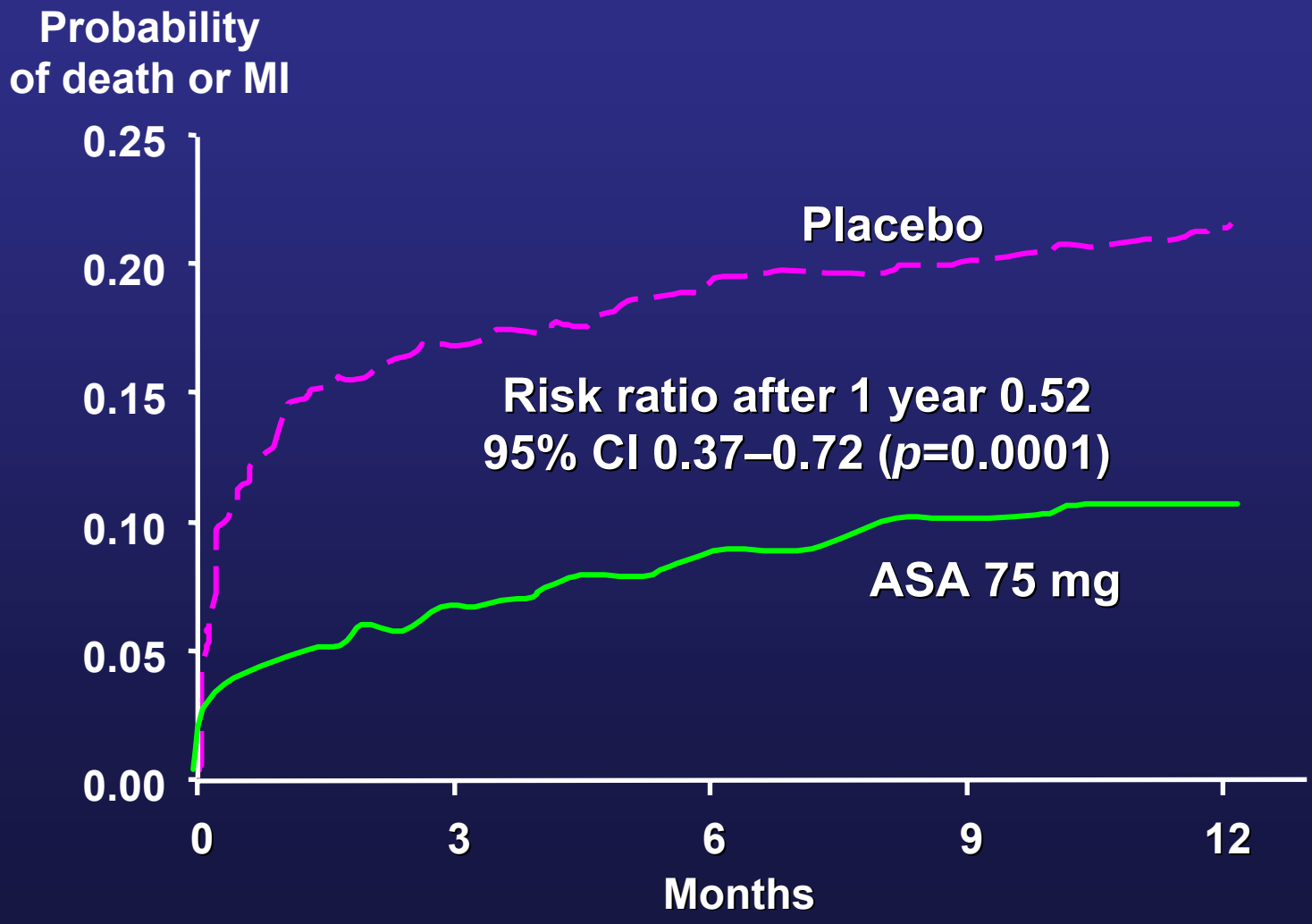
ACS without persistent ST-segment elevation

Treatment options :

Antithrombotic therapy

- ASA and Heparin
- Thienopyridines : Clopidogrel
- Anti IIbIIIa

Long-term Efficacy of ASA in Reducing Death or MI in Patients with Unstable Angina



Wallentin LC et al *JACC* 1991;18:1587–1593

Heparin trials

Heparin

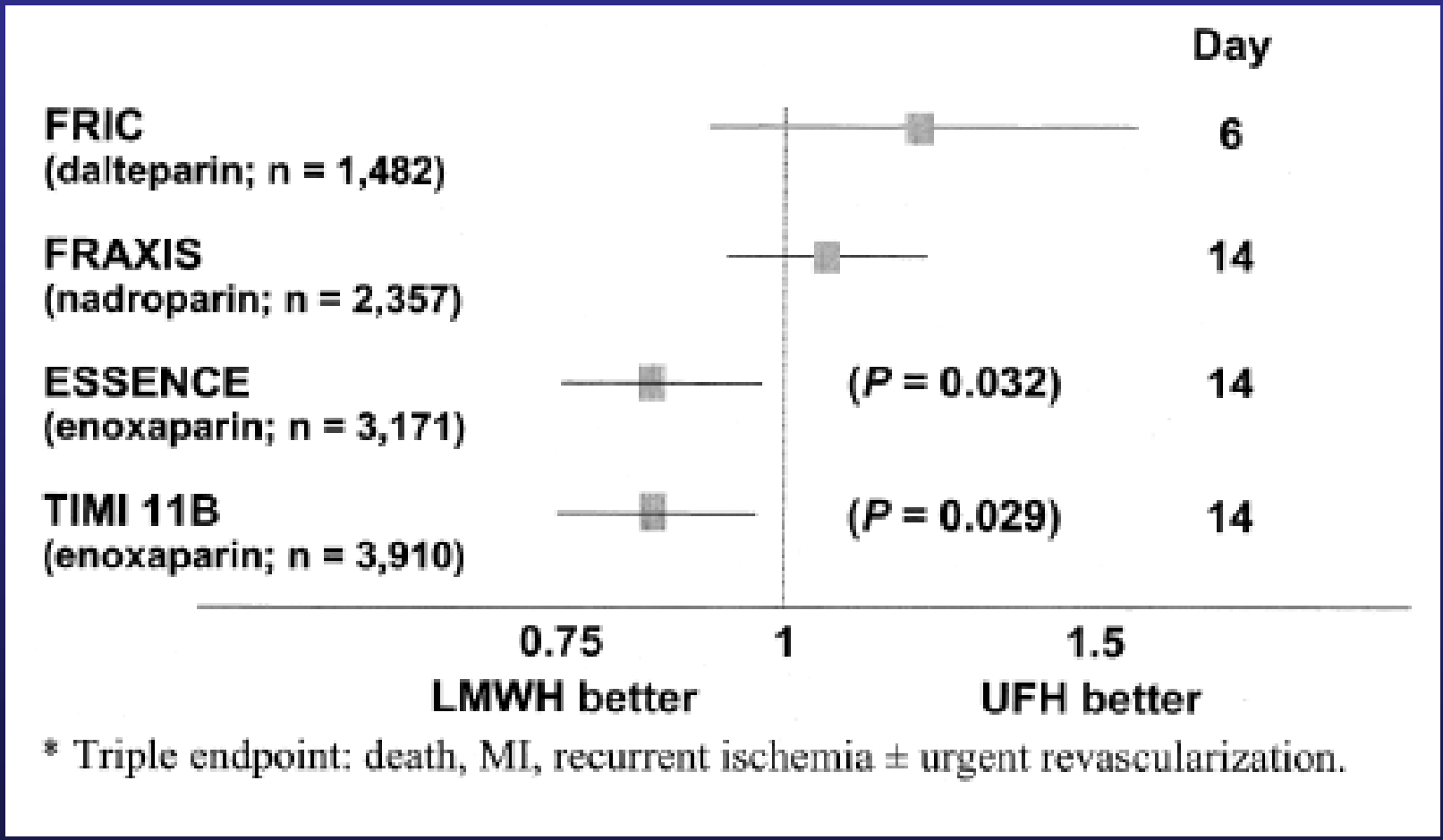
Study	Patients	ASA, mg/d	Heparin	Entry Window, h	Follow-up, d	Cardiac Death or Nonfatal MI: ASA, %	ASA/Heparin, %	RR Reduction, %	p	l
RISC[138]	796	75	Bolus q6h	72	5	3.7	1.4	62	NS	
					30	4.8	3.8	21	NS	
Théroux et al[136]	479	650	Bolus, infusion	24	6	3.3	1.6	52	NS	
ATACS[140]	214	162.5	Bolus, infusion	48	5	8.3	3.8	54	NS	
Overview[140]								56	<0.05	

Cairns JA. CHEST 1995

Low Molecular Weight Heparin

Unfractionated Heparin

LMWH versus UFH in ACS with conservative strategy



* Triple endpoint: death, MI, recurrent ischemia ± urgent revascularization.

Klein W. Circulation1997;96:61-68.
FRAXIS study group. Eur Heart J 1999;20: 1553-62.
Cohen M. N Engl J Med 1997;337:447-52.
Antman EM. Circulation 1999;100:1593-601.

UF versus LMWH Bleedings

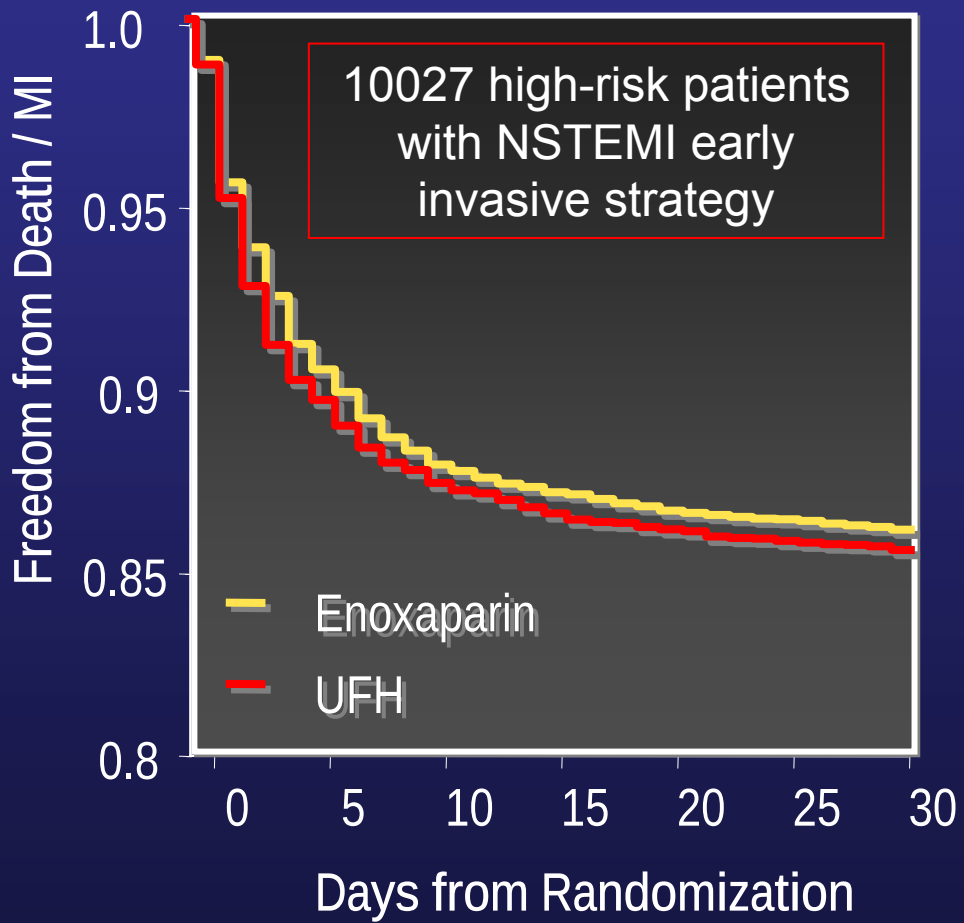
Time Point	Treatment Group: Unfractionated Heparin (n=1936)	Enoxaparin* (n=1938)	P
72 h			
Major hemorrhage	14 (0.7)	16 (0.8)	0.714
Minor hemorrhage	45 (2.3)	99 (5.1)	<0.001
End of initial hospitalization			
Major hemorrhage	19 (1.0)	29 (1.5)	0.143
Minor hemorrhage	48 (2.5)	176 (9.1)	<0.001

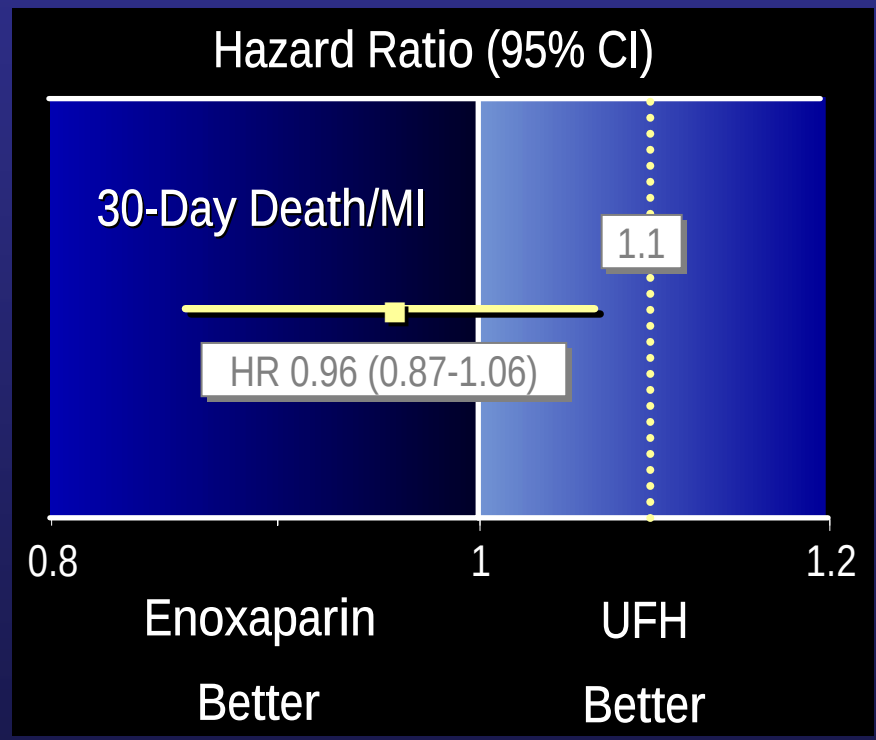
TIMI IIb. Antman, E. M. et al. Circulation 1999;100:1593-1601

ADVERSE EVENT	TREATMENT GROUP: UNFRACTIONATED HEPARIN	ENOXAPARIN	P VALUE
	number (percent)		
Hemorrhage			
Major	107 (7.0)	102 (6.5)	0.57
Minor	110 (7.2)	188 (11.9)	<0.001
Stroke	7 (0.5)	7 (0.4)	
Hemorrhagic	1 (0.1)	0	
Nonhemorrhagic	6 (0.4)	7 (0.4)	
Transient ischemic attack	8 (0.5)	1 (0.1)	
Drop in platelet count of >50% from base line	56 (3.7)	39 (2.5)	0.08

ESSENCE. Cohen M et al. N Engl J Med 1997;337:447-52.

Death and MI at 30 Days in the SYNERGY trial





JAMA. 2004;292:45-54

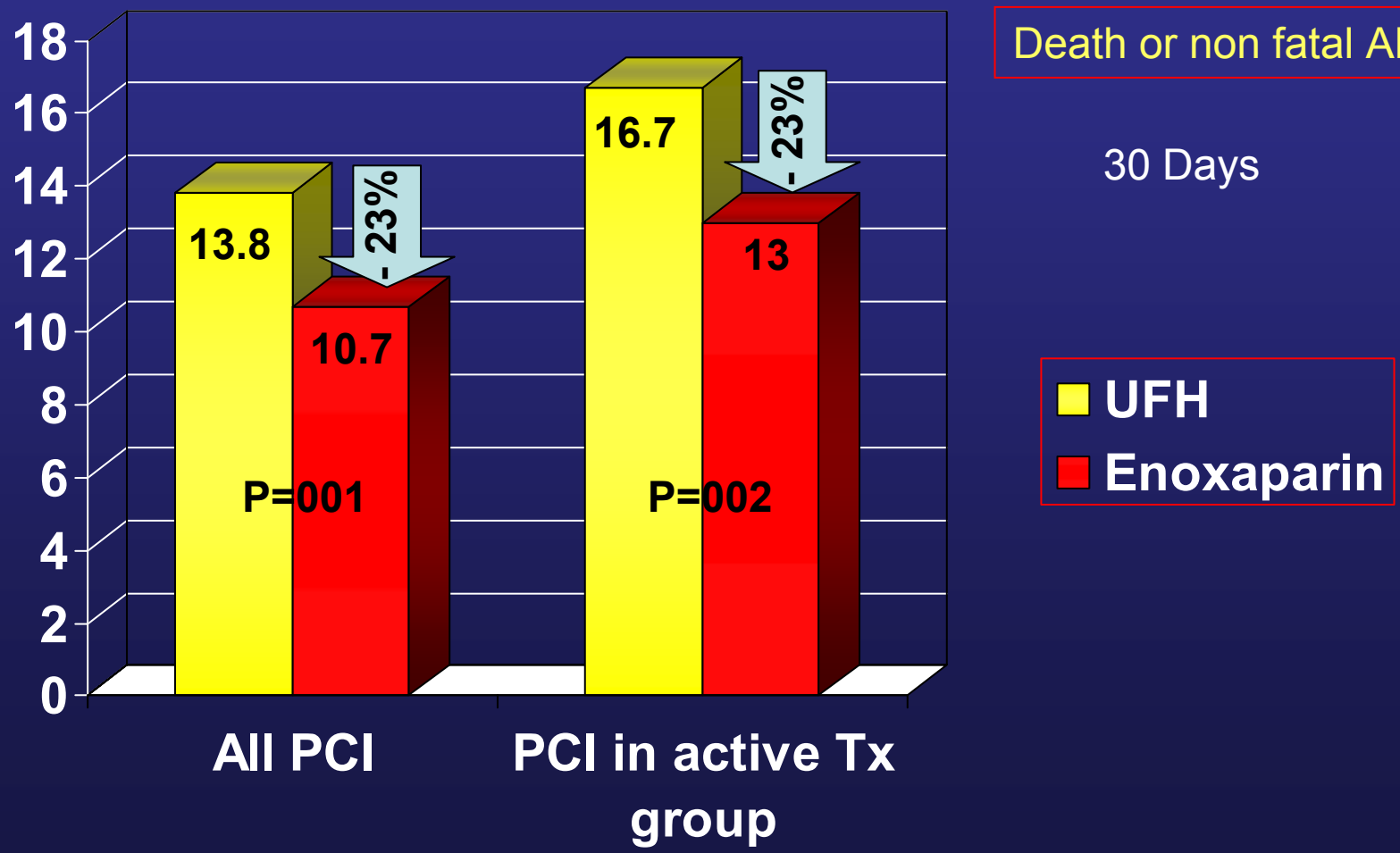
Bleedings at 30 Days in the SYNERGY trial

TIMI major bleeding (9.1% vs 7.6%, *P*=.008)

Resulted from CABG-related events

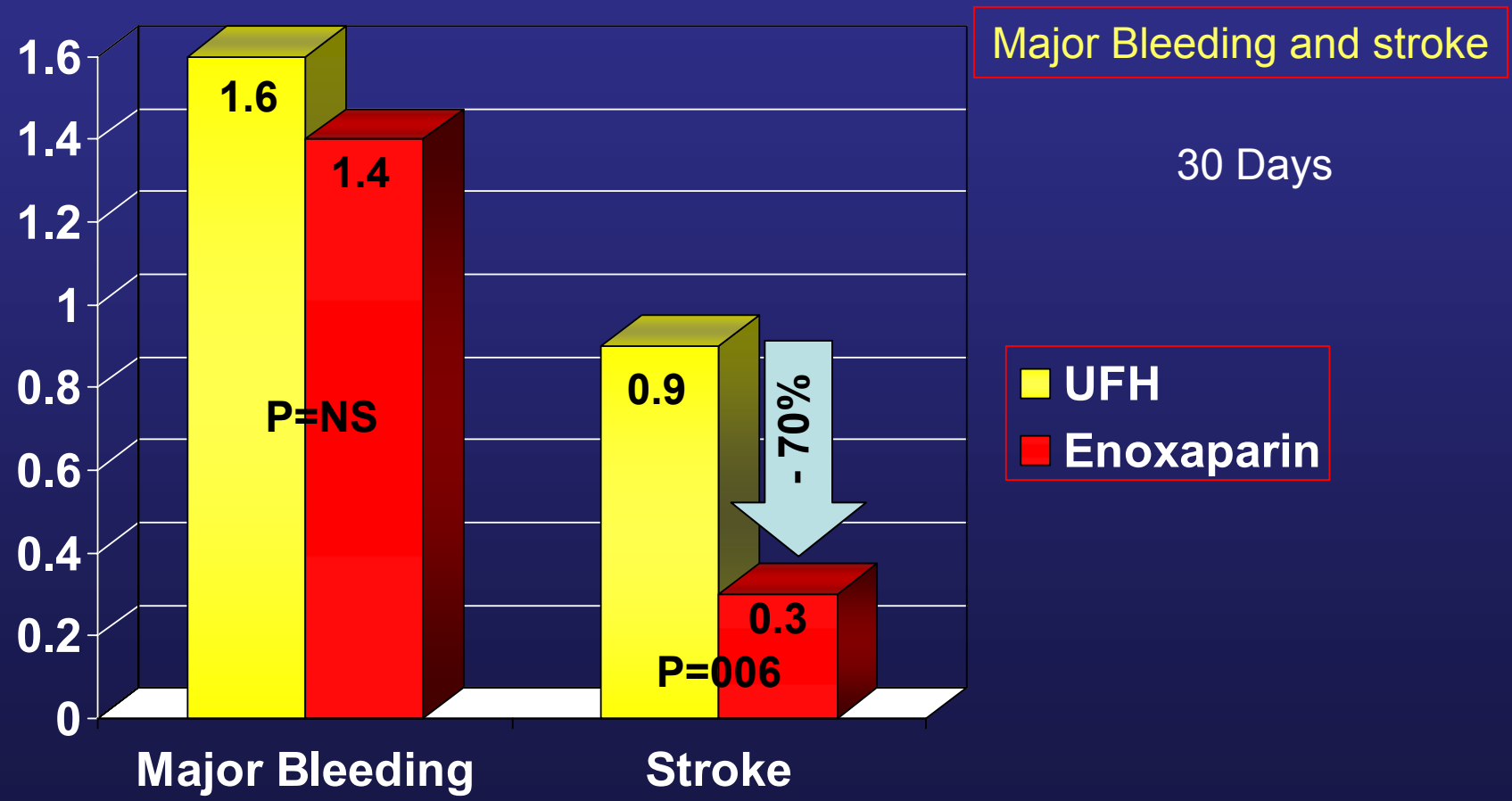
JAMA. 2004;292:45-54

PCI-Extract TIMI 25



Antman EM et al : N Engl J Med, 2006;354:1477-88

PCI-Extract TIMI 25



Antman EM et al : N Engl J Med, 2006;354:1477-88

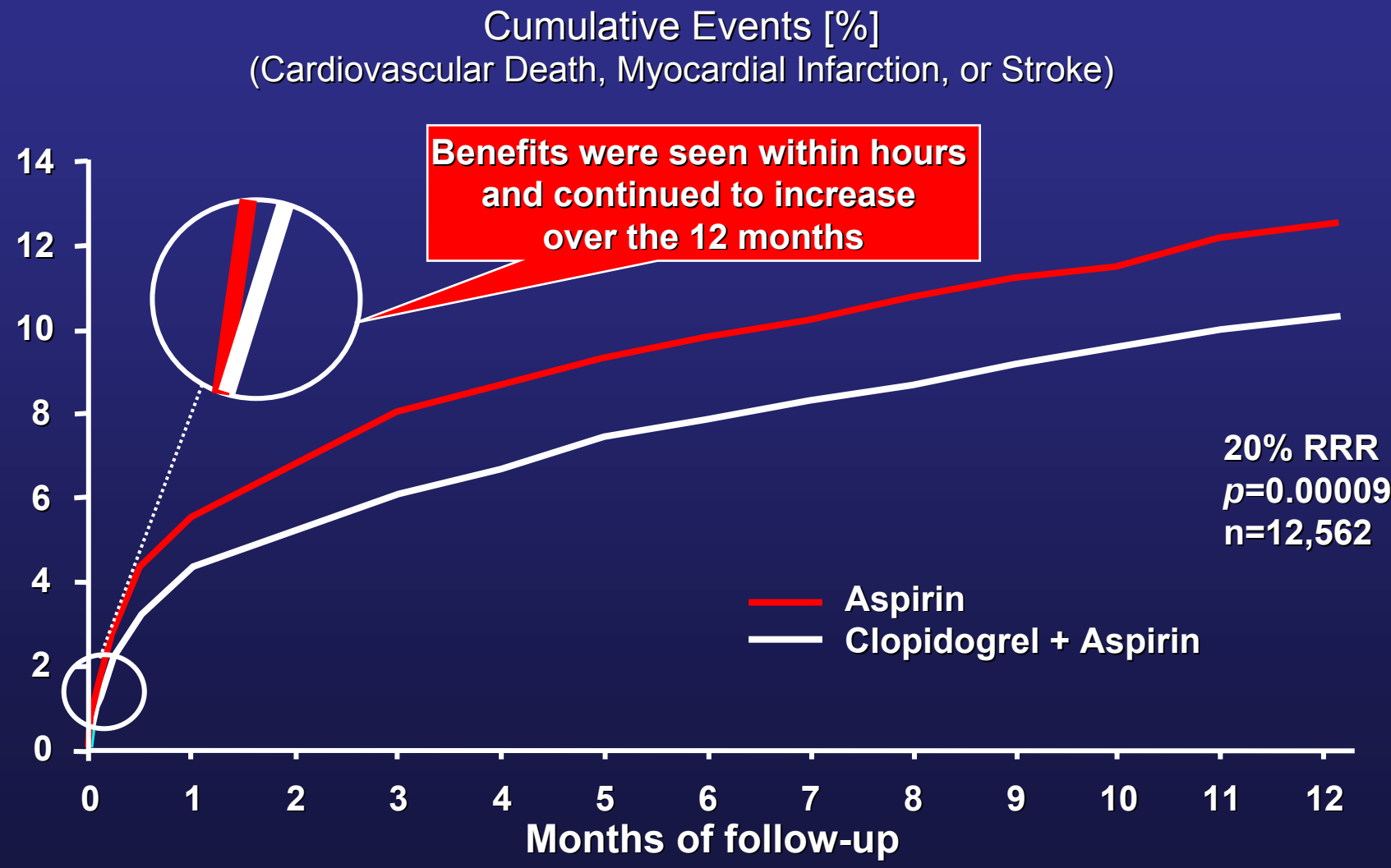
ACS without persistent ST-segment elevation

Treatment options :

Antithrombotic therapy

- ASA and Heparin
- Thienopyridines : Clopidogrel
- Anti IIbIIIa

CURE: Early & Long-Term Benefits of Clopidogrel



N Eng J Med 2001;345:494

CURE: Bleedings

Variable	Clopidogrel Group (N=6259)	Placebo Group (N=6303)	Relative Risk (95% CI)	P Value
	no. (%)			
Major bleeding	231 (3.7)	169 (2.7)	1.38 (1.13–1.67)	0.001
Necessitating transfusion of ≥2 units of blood	177 (2.8)	137 (2.2)	1.30 (1.04–1.62)	0.02
Life-threatening	135 (2.2)	112 (1.8)	1.21 (0.95–1.56)	0.13
Fatal	11 (0.2)	15 (0.2)		
Causing 5 g/dl drop in hemoglobin level	58 (0.9)	57 (0.9)		
Requiring surgical intervention	45 (0.7)	43 (0.7)		
Causing hemorrhagic stroke	7 (0.1)	5 (0.1)		
Requiring inotropic agents	34 (0.5)	34 (0.5)		
Necessitating transfusion of ≥4 units of blood	74 (1.2)	60 (1.0)		
Non–life-threatening	96 (1.5)	57 (0.9)	1.70 (1.22–2.35)	0.002
Site of major bleeding				
Gastrointestinal	83 (1.3)	47 (0.7)		
Retroperitoneal	8 (0.1)	5 (0.1)		
Urinary (hematuria)	4 (0.1)	5 (0.1)		
Arterial puncture site	36 (0.6)	22 (0.3)		
Surgical site	56 (0.9)	53 (0.8)		
Minor bleeding	322 (5.1)	153 (2.4)	2.12 (1.75–2.56)	<0.001
Total with bleeding complications	533 (8.5)	317 (5.0)	1.69 (1.48–1.94)	<0.001

N Eng J Med 2001;345:494

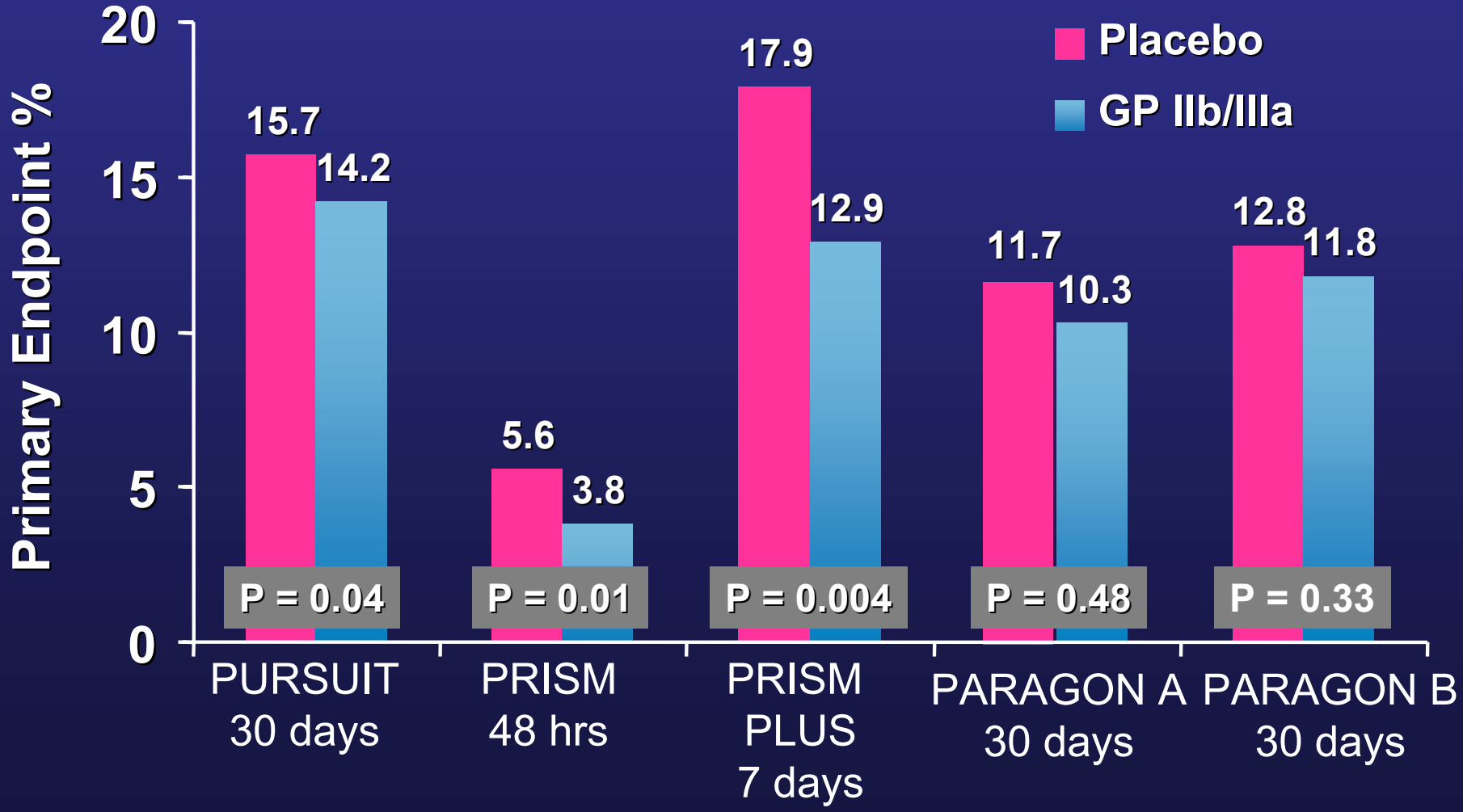
ACS without persistent ST-segment elevation

Treatment options :

Antithrombotic therapy

- ASA and Heparin
- Thienopyridines : Clopidogrel
- Anti IIbIIIa

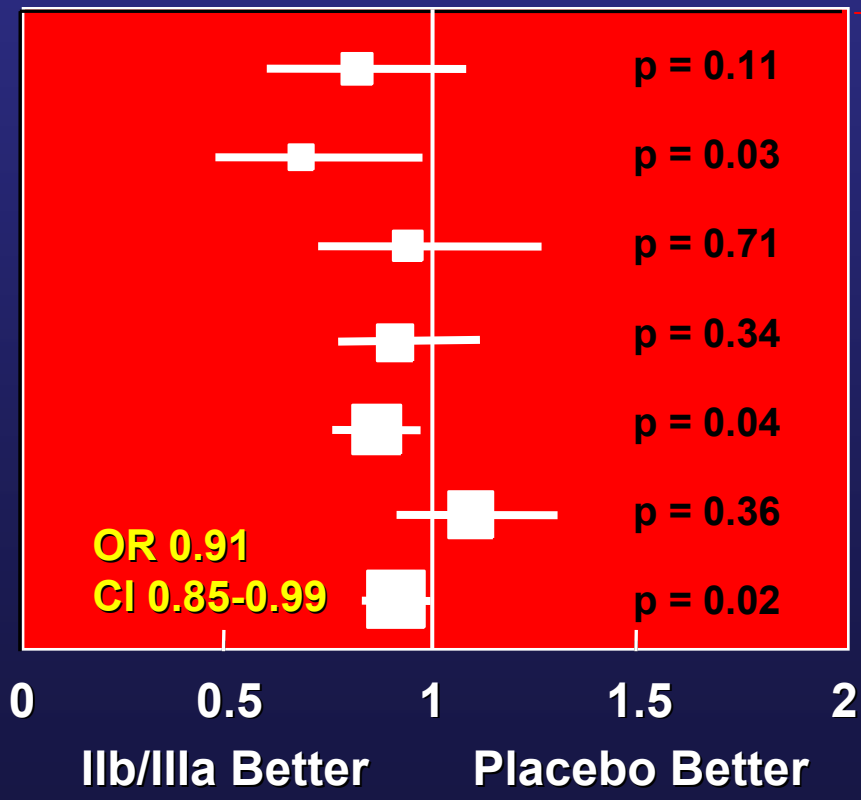
Platelet GP IIb/IIIa Inhibition for NSTEMI-ACS
Primary Endpoint Results from the 5 Major RCTs



GP IIb/IIIa and ACS:

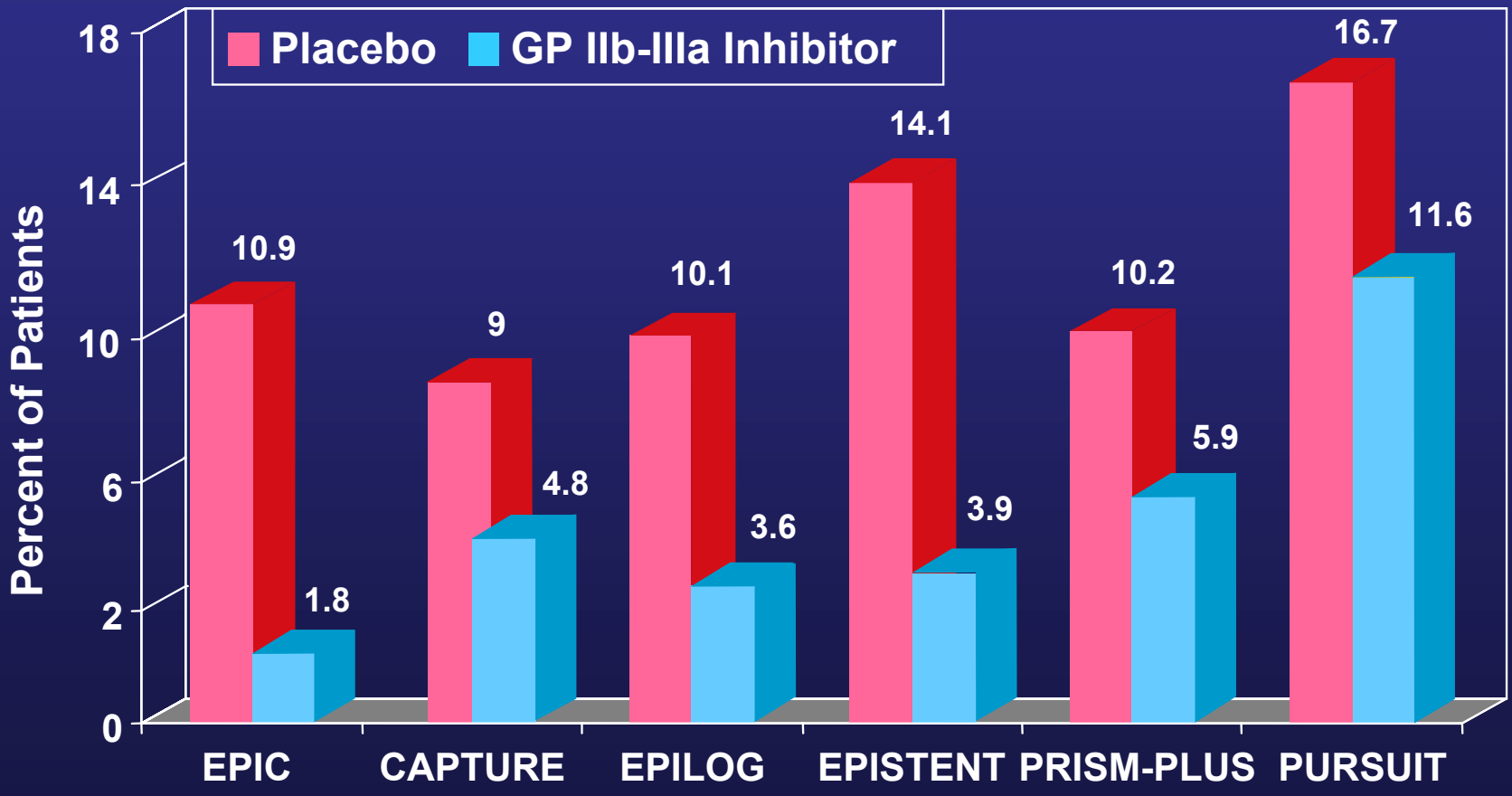
Death / MI at 30 Days

Trial	N	Odds Ratio & 95% CI	Placebo	IIb/IIIa
PRISM	3232	p = 0.11	7.1%	5.8%
PRISM-PLUS	1570	p = 0.03	11.9%	8.7%
PARAGON A	2282	p = 0.71	12.0%	11.5%
PARAGON B	5225	p = 0.34	11.4%	10.6%
PURSUIT	9461	p = 0.04	15.7%	14.2%
GUSTO IV	7800	p = 0.36	8.0%	8.7%
Pooled	29570	OR 0.91 CI 0.85-0.99 p = 0.02	11.5%	10.7%

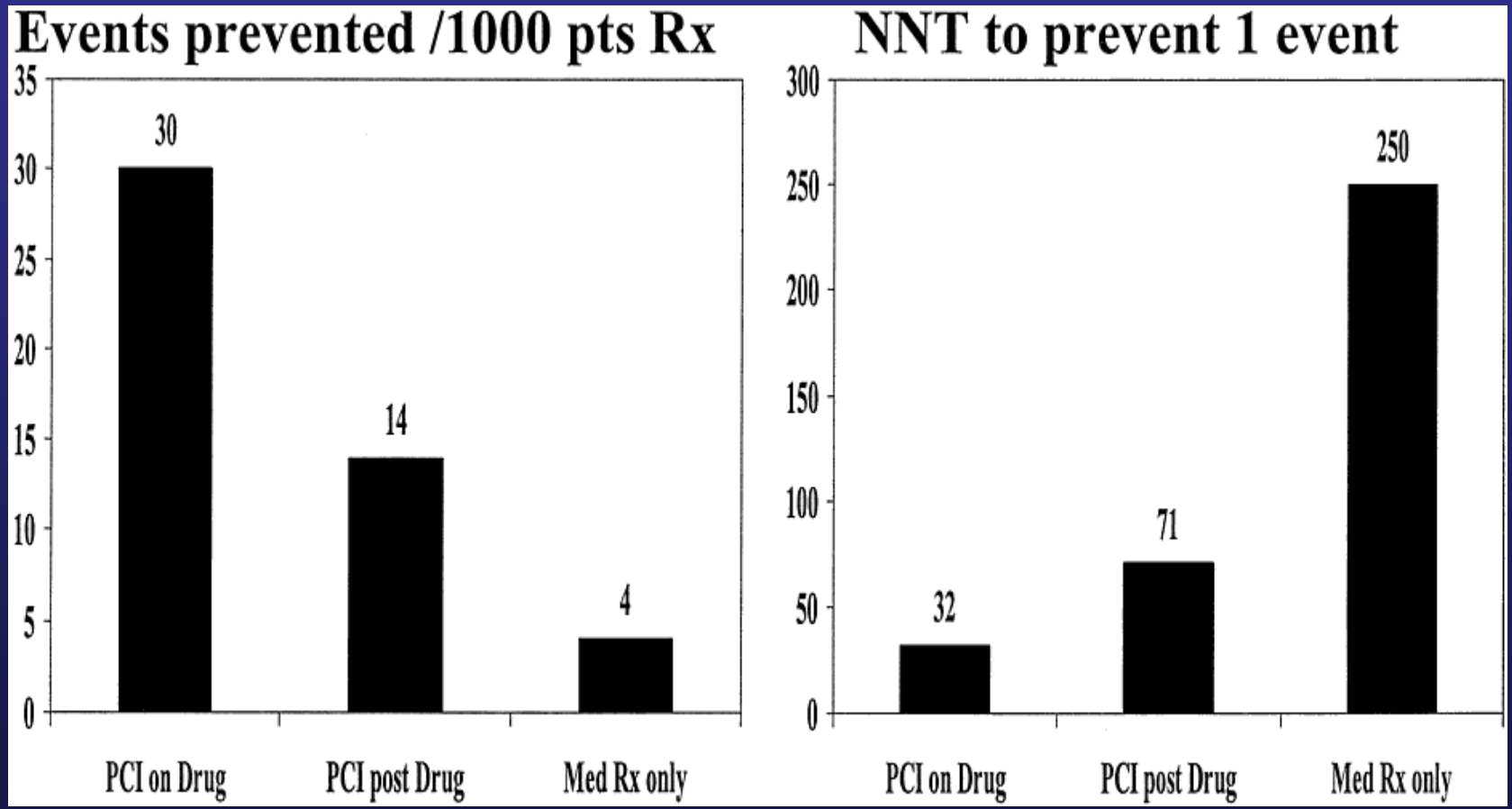


Roffi et al., Eur Heart J 2002; 23:1441-8

Benefit of Glycoprotein IIb/IIIa Inhibition Impact in PCI



Anti-IIbIIIa and PCI



Antman EM. Eur Heart J 2002; 23:1441-8

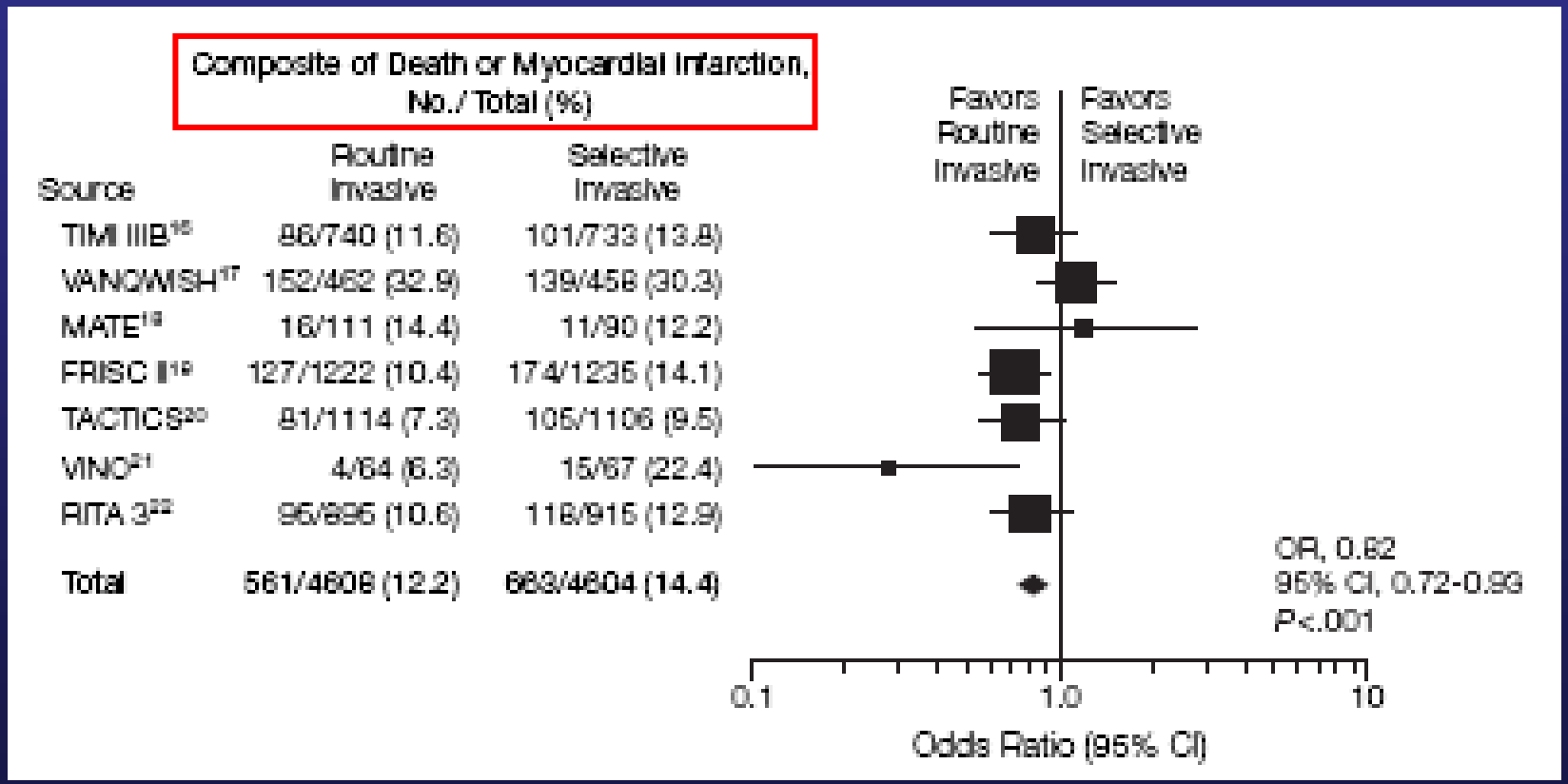
ACS without persistent ST-segment elevation

Treatment options :

- Anti-ischemic
- Antithrombotic therapy
- Urgent PCI

Early Invasive versus no early invasive

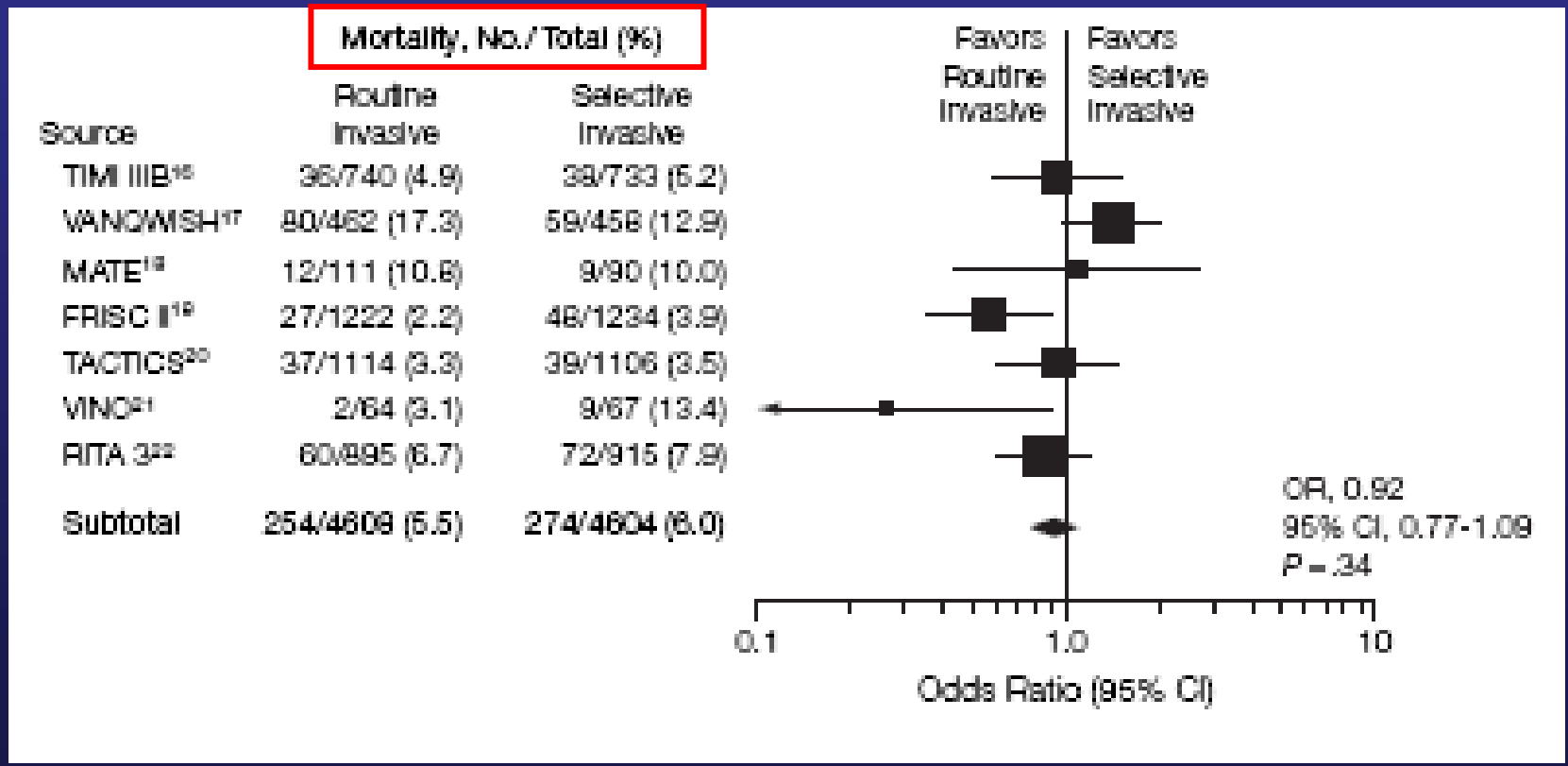
Mean follow-up 17.3 months (range 6-24 months)



Mehta, SR. JAMA. 2005;293:2908-2917

Early Invasive versus no early invasive

Mean follow-up 17.3 months (range 6-24 months)



Mehta, SR. JAMA. 2005;293:2908-2917

Early Invasive versus Selectively Invasive Management for high risk ACS

- Coronary angiography should be planned as soon as possible, but without undue urgency.
- In most cases coronary angiography is performed within the 48 h, or at least within hospitalization period.

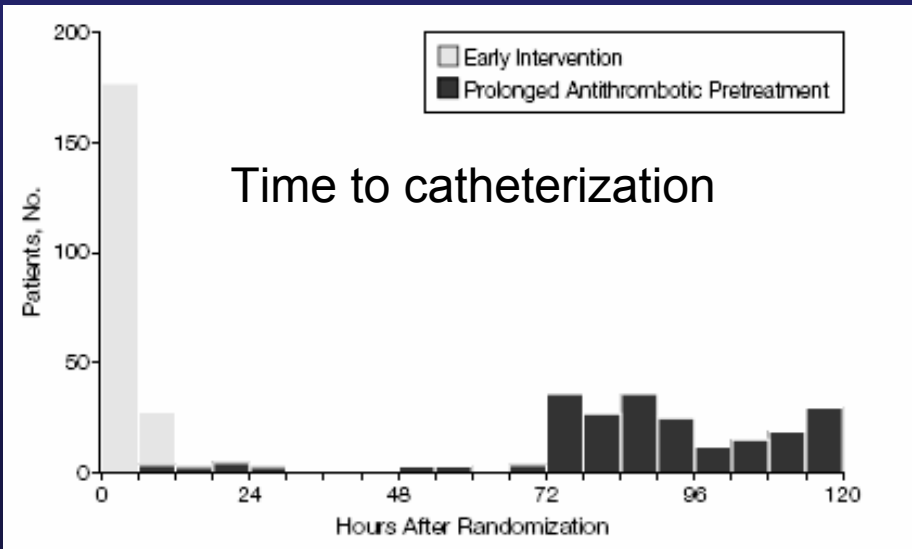
ESC 2002

Evaluation of Prolonged Antithrombotic Pretreatment ("Cooling-Off" Strategy) Before Intervention in Patients With Unstable Coronary Syndromes

A Randomized Controlled Trial

Franz-Josef Neumann, MD
Adnan Kastrati, MD
Gisela Pogatsa-Murray, MD
Julinda Mehilli, MD
Hildegard Bollwein, MD
Hans-Peter Bestehorn, MD
Claus Schmitt, MD
Melchior Seyfarth, MD
Josef Dirschinger, MD
Albert Schömig, MD

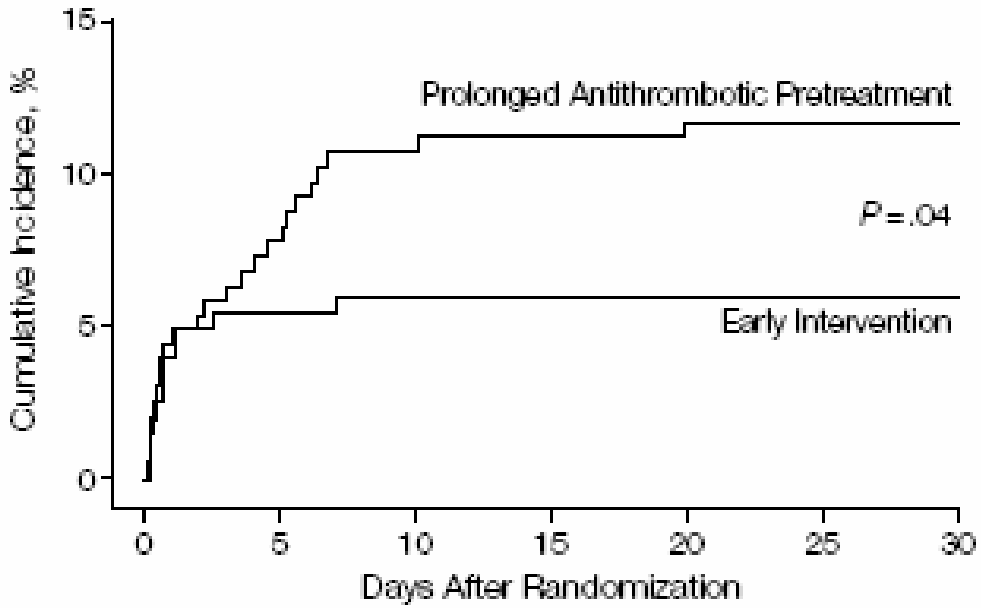
ISAR-COOL TRIAL



- **ASA**
- **Plavix 600mg bolus**
- **Tirofiban for all patients (n=410)**

Neumann FJ. JAMA 2003; 290:1593-1599

ISAR-COOL: Death/MI at 30 Days



No. at Risk							
Prolonged Antithrombotic Pretreatment	207	191	185	184	183	183	183
Early Intervention	203	192	191	191	191	191	191

Conclusion In patients with unstable coronary syndromes, deferral of intervention for prolonged antithrombotic pretreatment does not improve the outcome compared with immediate intervention accompanied by intense antiplatelet treatment.

JAMA. 2003;290:1593-1599 www.jama.com

Neumann FJ. JAMA 2003; 290:1593-1599

Clinical Suspicion of ACS

Physical examination, ECG monitoring, Blood samples

No persistent Segment elevation

Heparin (LMWH or UFH), ASA, Clopidogrel*, Betablockers, Nitrates, Statins

High risk

Low risk

Second troponin measurement

GpIIb/IIIa

Cor. Angiography

Positive

Twice negative

Stress test
Cor. angiography

* Unless a CABG is planned within 5 days.

GRACE: NSTEMI Treatment Strategies
Worldwide Results from July to December 2001