

Clinique, Diagnostic, classification et traitement des Syndromes Coronariens aigus

21.03.07

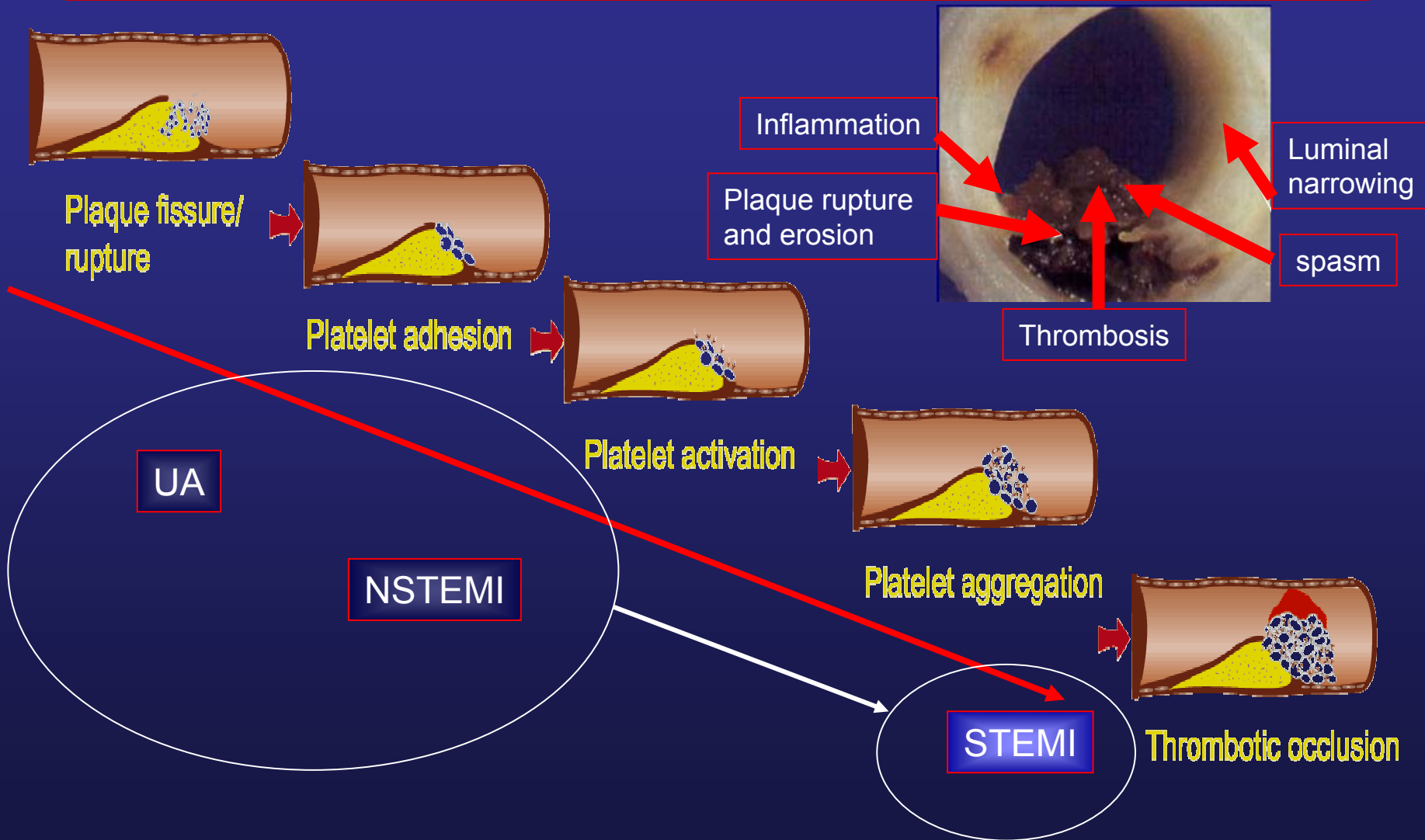
**Dr Pierre-Frédéric Keller
Service de cardiologie
Service des soins intensifs**



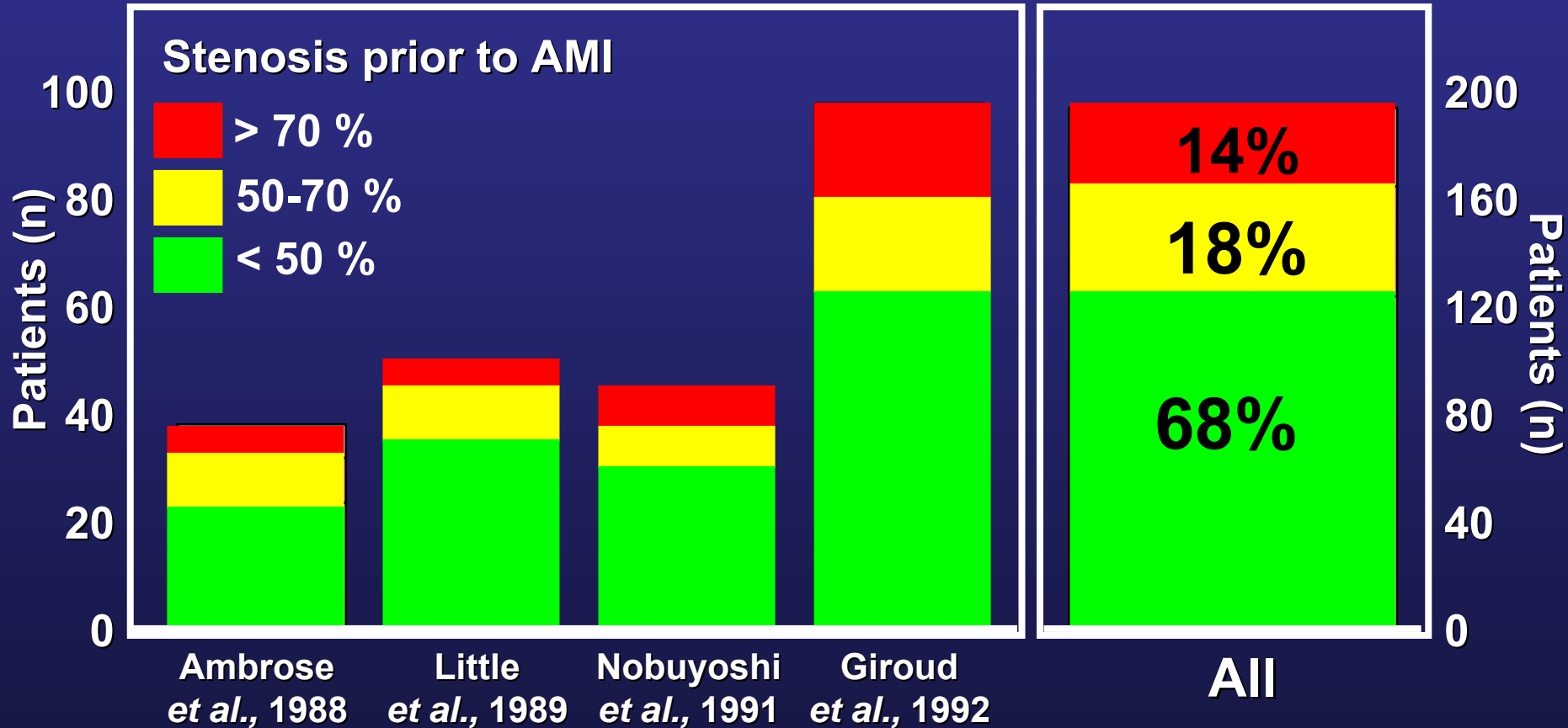
Acute Coronary Syndrome

- Pathophysiology and clinical presentation
- STEMI
- UA and NSTEMI

Pathogenesis of ACS



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



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 markers of 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.

Criteria for established MI

Any one of the following criteria satisfies the diagnosis for established 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.

Clinical presentation

- Chest pain +/- Dyspnea
- Dyspnea +/- Hypotension, ventricular arrhythmia
 - Silent myocardial ischemia (↑ Diabetics)
- Resuscitated sudden death with abnormal ECG (BBB, ST/T wave anomaly, Q wave, ventricular arrhythmia) (65-70% of ischemic origin)

Causes of chest pain in primary care practice

Cause	Prevalence, %
– Musculoskeletal	36
– Gastrointestinal	19
– Cardiac	16
• Stable angina	10.5
• UA/MI	1.5
• Other cardiac	3.8
– Psychiatric	8
– Pulmonary	5
– Other/Unknown	16

Clinical presentation

- Initial management of patients with suspected ACS should include early and simultaneous achievement of four goals :
 - Confirmation of the diagnosis by ECG and laboratory tests,
 - Relief of ischemic pain,
 - Assessment of the hemodynamic state and correction of abnormalities that may be present,
 - Initiation of antiplatelet, antithrombin, and reperfusion therapy.

Alternative diagnoses to cardiac ischemia for patients with chest pain

Non-ischemic cardiovascular	Pulmonary	Gastrointestinal
Aortic dissection*	Pleuritis	Biliary
Myocarditis	Pneumonia	Cholangitis
Pericarditis	Pulmonary embolus*	Cholecystitis
Chest wall	Tension pneumothorax*	Choledocholithiasis
Cervical disc disease	Psychiatric	Colic
Costochondritis	Affective disorders (eg, depression)	Esophageal
Fibrositis	Anxiety disorders	Esophagitis
Herpes zoster (before the rash)	Hyperventilation	Spasm
Neuropathic pain	Panic disorder	Reflux
Rib fracture	Primary anxiety	Rupture*
Sternoclavicular arthritis	Somatiform disorders	Pancreatitis
	Thought disorders (eg, fixed delusions)	Peptic ulcer disease
		Nonperforating
		Perforating*

Clinical Approach

- ECG within 10 minutes
- Brief history
 - Pain duration, character, similarity to possible previous episodes, provoking factors,
 - Past history of coronary disease,
 - CV risk factors
 - Bleeding risks
 - Allergies
- Physical examination
 - Auscultation of the heart and lungs,
 - Measurement of blood pressure in both arms,
 - Assessment for CHF or circulatory compromise (BP, HR, SatO₂).

ECG

- Early assessment of STEMI or not :
 - ST-elevation ≥ 1 mm (0.1 mV) in at least two anatomically contiguous leads or ≥ 2 mm (0.2 mV) in two contiguous precordial leads.
 - Isolated ST depression in anterior precordial leads: posterior STEMI (see posterior leads).
 - Early assessment of AMI of the right ventricle.

ECG

- ECG leads are more helpful in localizing regions of transmural than subendocardial ischemia.
 - Anterior wall ischemia - one or more of the precordial leads (V1-V6)
 - Anteroseptal ischemia - leads V1 to V3
 - Apical or lateral ischemia - leads aVL and I, and leads V4 to V6
 - Inferior wall ischemia - leads II, III, and aVF
 - Right ventricular ischemia - right-sided precordial leads

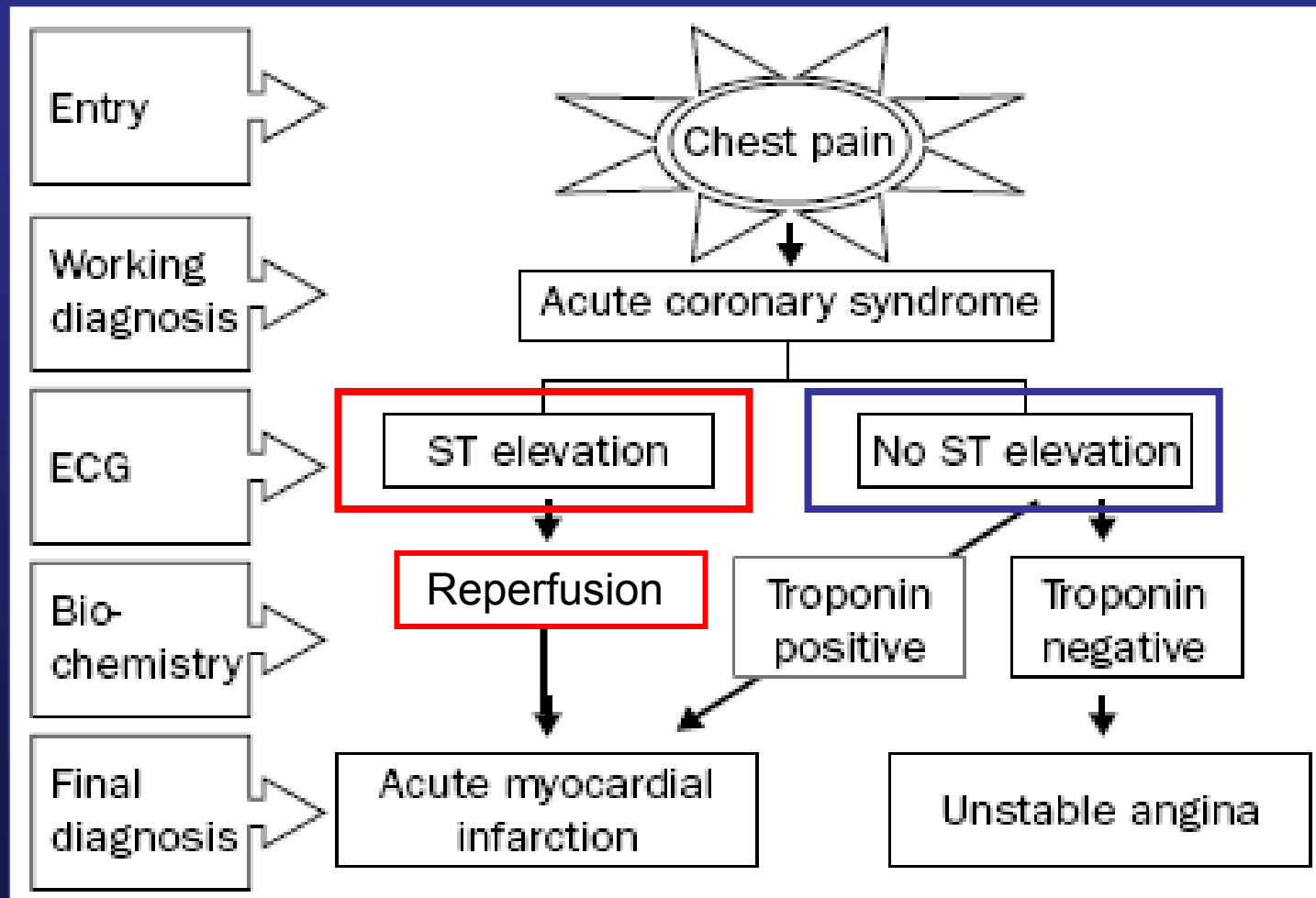
Peaked, hyperacute T waves may be the only abnormality

ECG and LBBB

26'003 pts with AMI, 131 LBBB

- **Sgarbossa criteria:** $\geq 3 = 90\%$ specificity for AMI
 - ST segment elevation of 1 mm or more that was in the same direction (concordant) as the QRS complex in any lead — score 5.
 - ST segment depression of 1 mm or more in any lead from V1 to V3 — score 3.
 - ST segment elevation of 5 mm or more that was discordant with the QRS complex (ie, associated with a QS or rS complex) — score 2.

Approach of Chest pain



Acute Coronary Syndrome

- Pathophysiology and clinical presentation
- STEMI
- UA and NSTEMI

STEMI

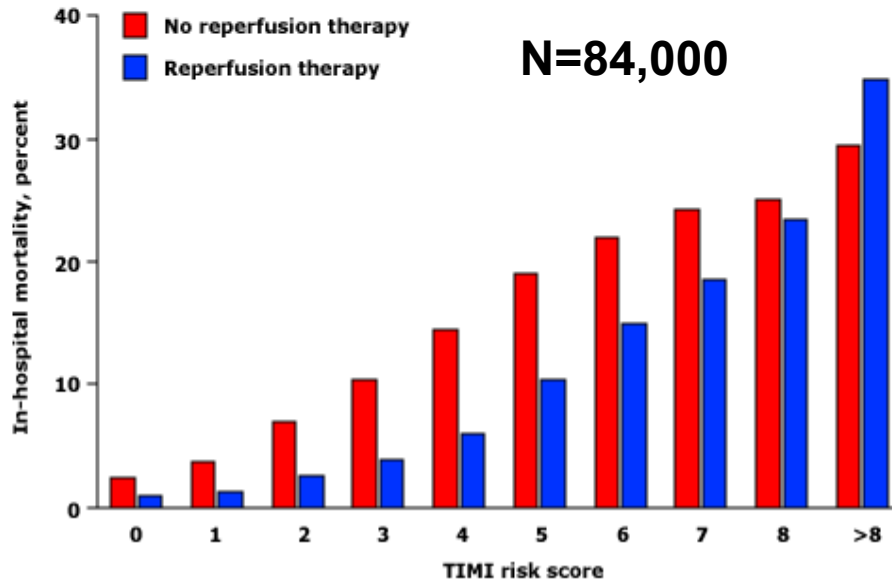
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**Urgent
reperfusion**

Risk stratification: STEMI-TIMI score

Elements of the TIMI risk score*	Points
Age ≥ 75 years	3
Age 65-74 years	2
History of diabetes, hypertension, or angina	1
Systolic blood pressure < 100 mm Hg	3
Heart rate > 100 /min	2
Killip class II to IV	2
Weight < 67 kg	1
Anterior ST elevation or left bundle-branch block	1
Time to reperfusion therapy > 4 h	1
Total possible points	14

Prediction of in-hospital mortality with TIMI risk score for ST elevation MI



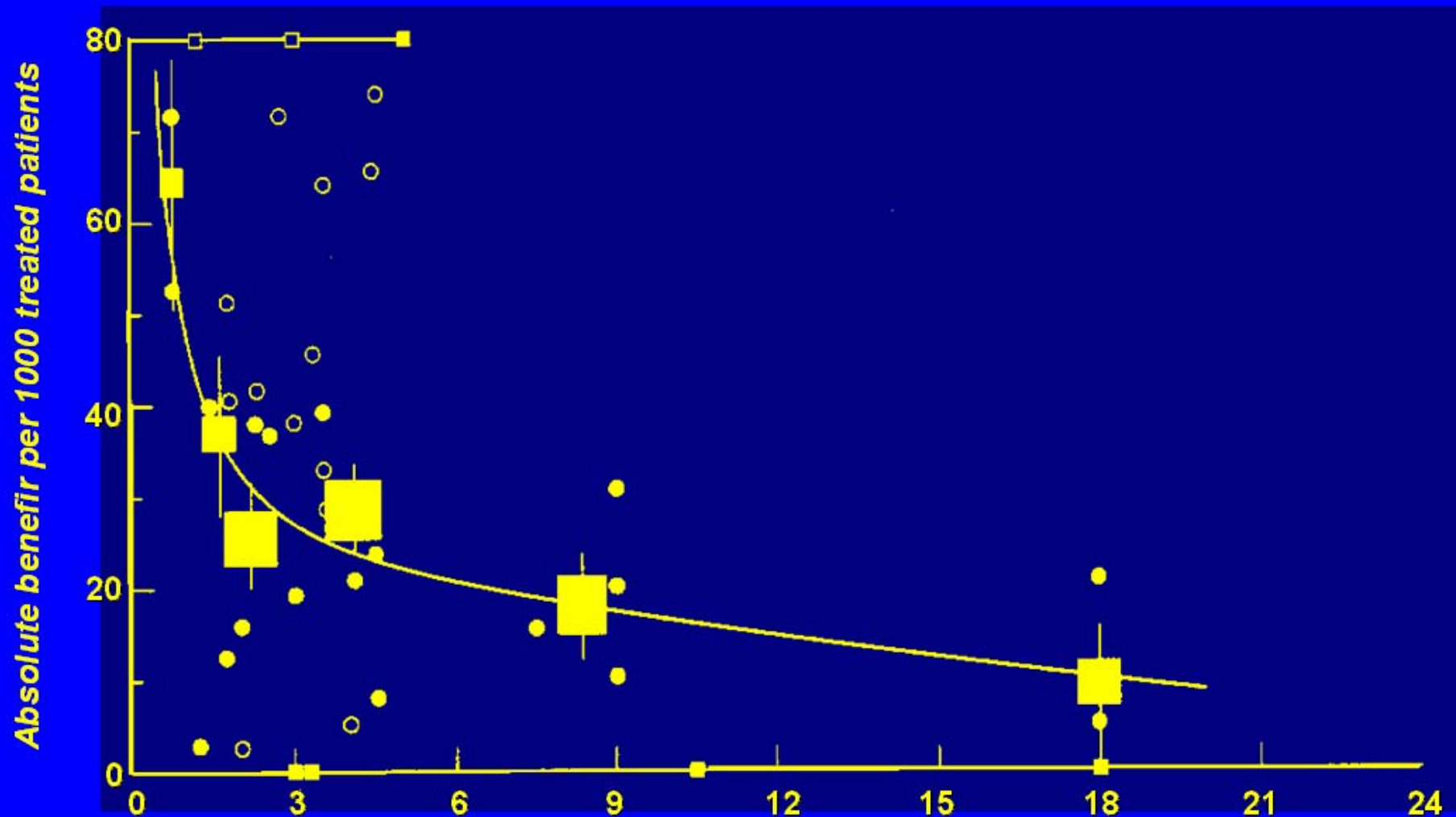
Killip Class:

- Killip I : 0 rales, 0 S3
- Killip II : rales $\leq 1/3$ or S3
- Killip III : rales $> 1/3$
- Killip IV : Cardiogenic shock

Milestones in the Evolution of Thrombolysis in Myocardial Infarction

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

Benefit of Thrombolysis According to Administration Delay



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% ($P=0.01$).

Coronary angiography after fibrinolysis :

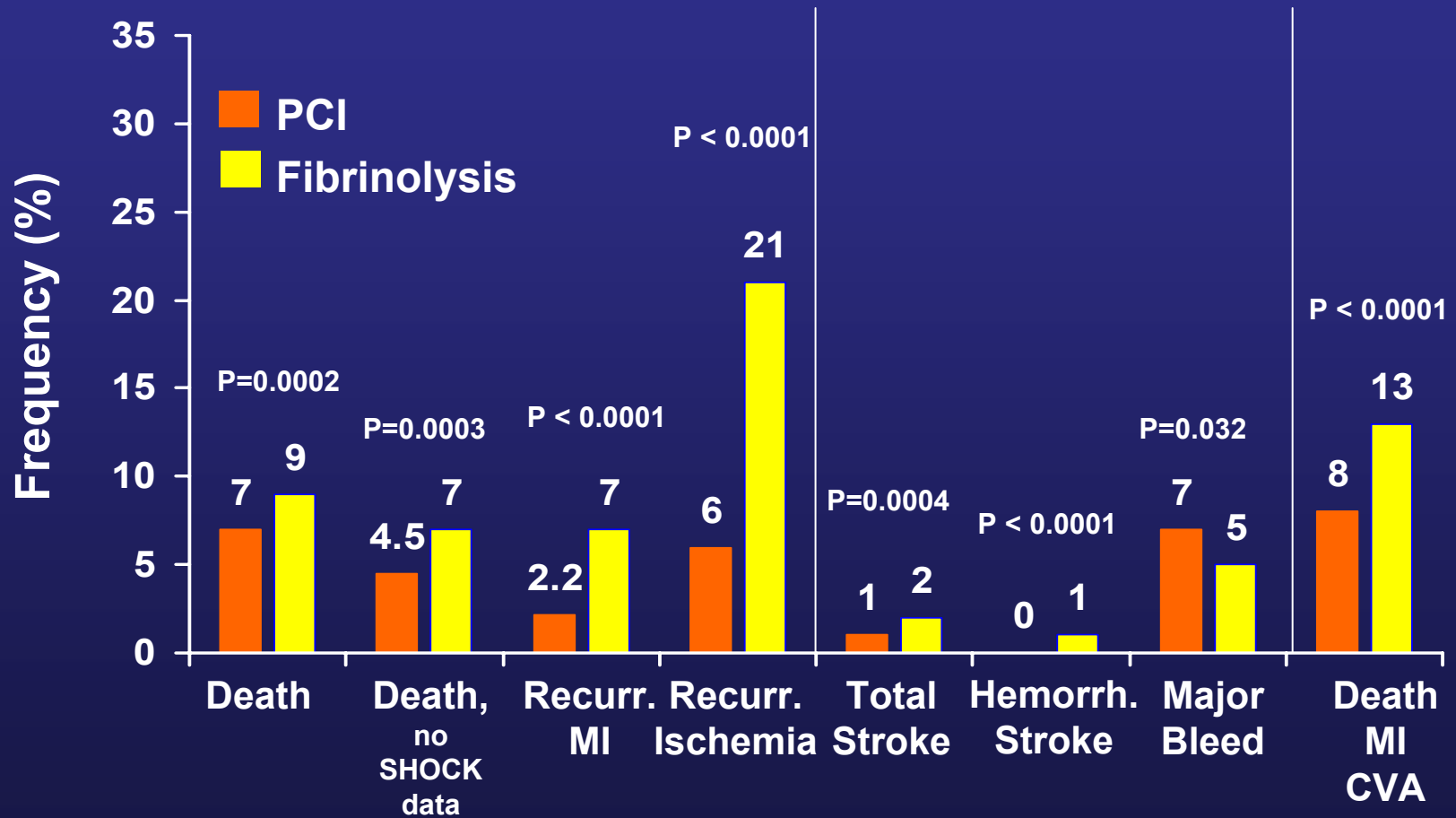
⇒ Rescue PCI

if Sx persistence and/or persistence 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

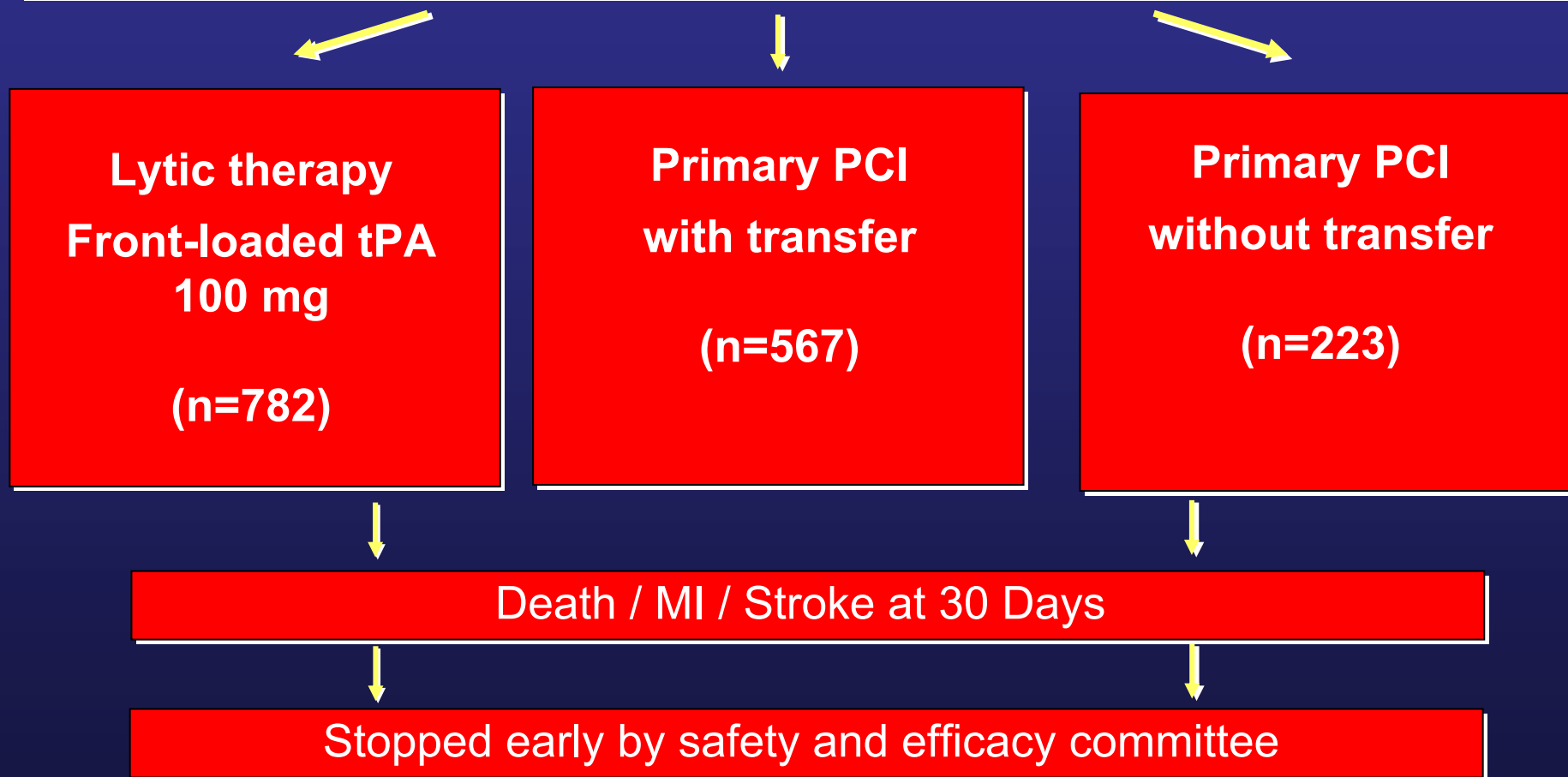


N = 7739



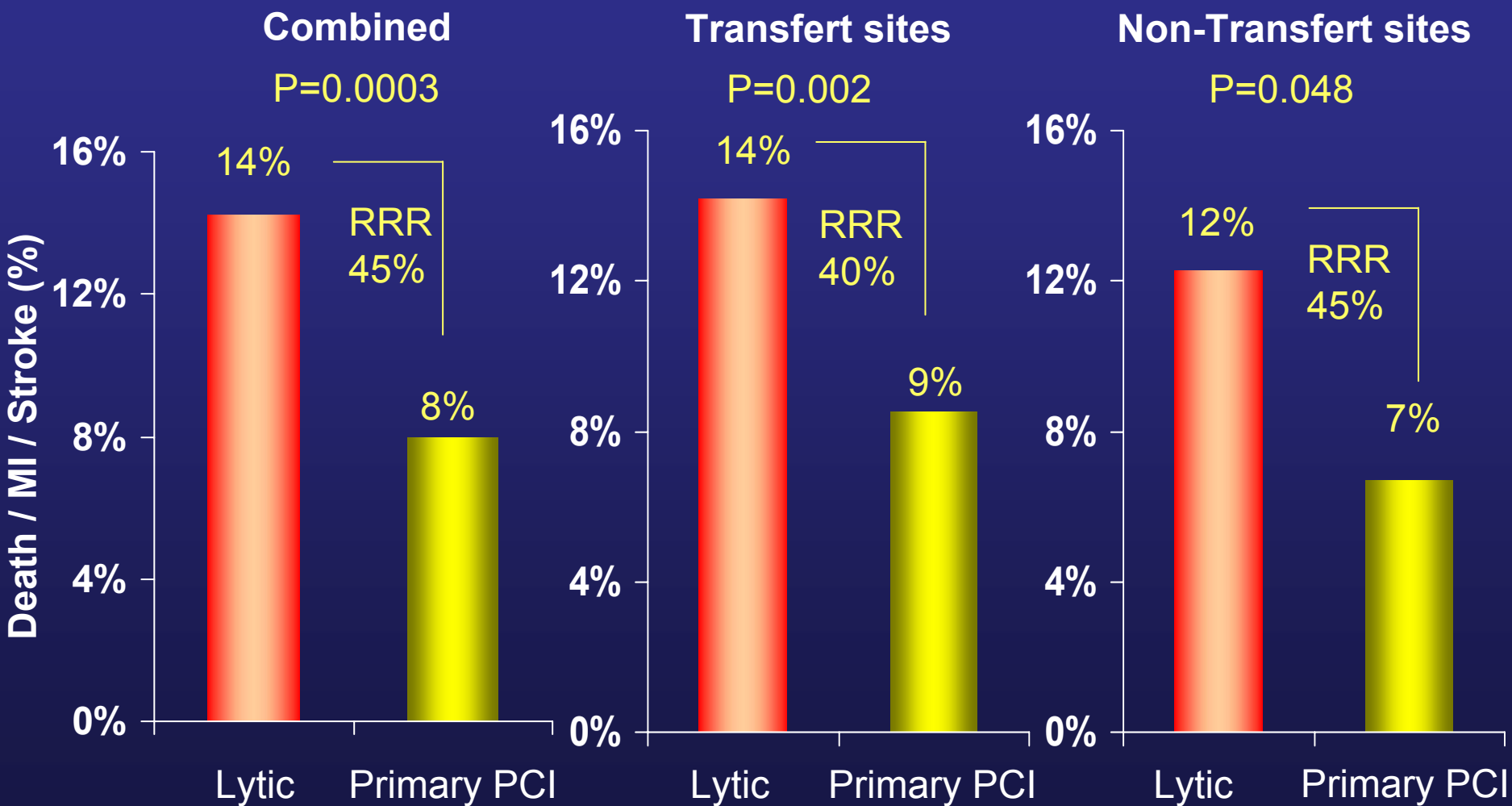
DANAMI-2: Study Design

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

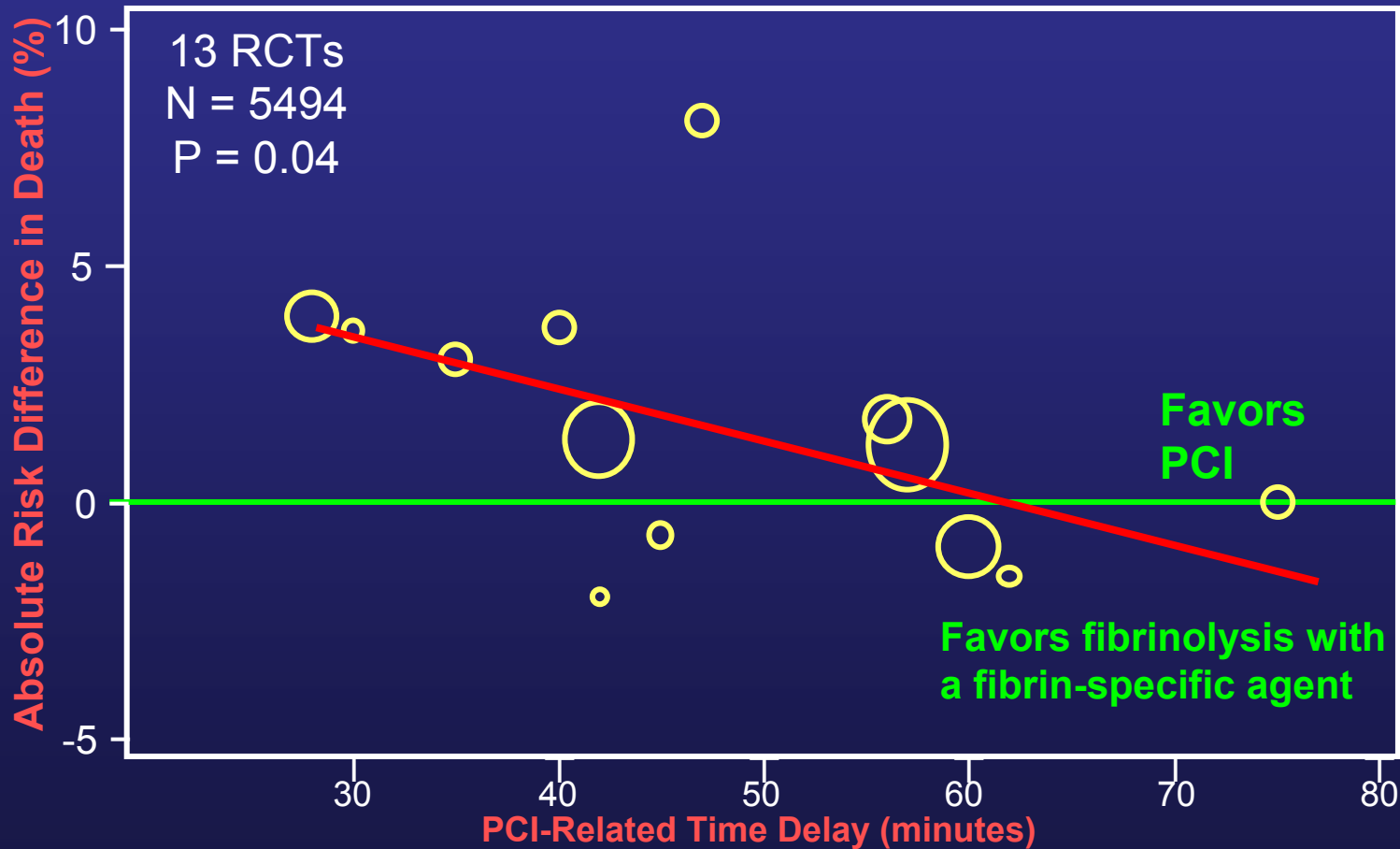




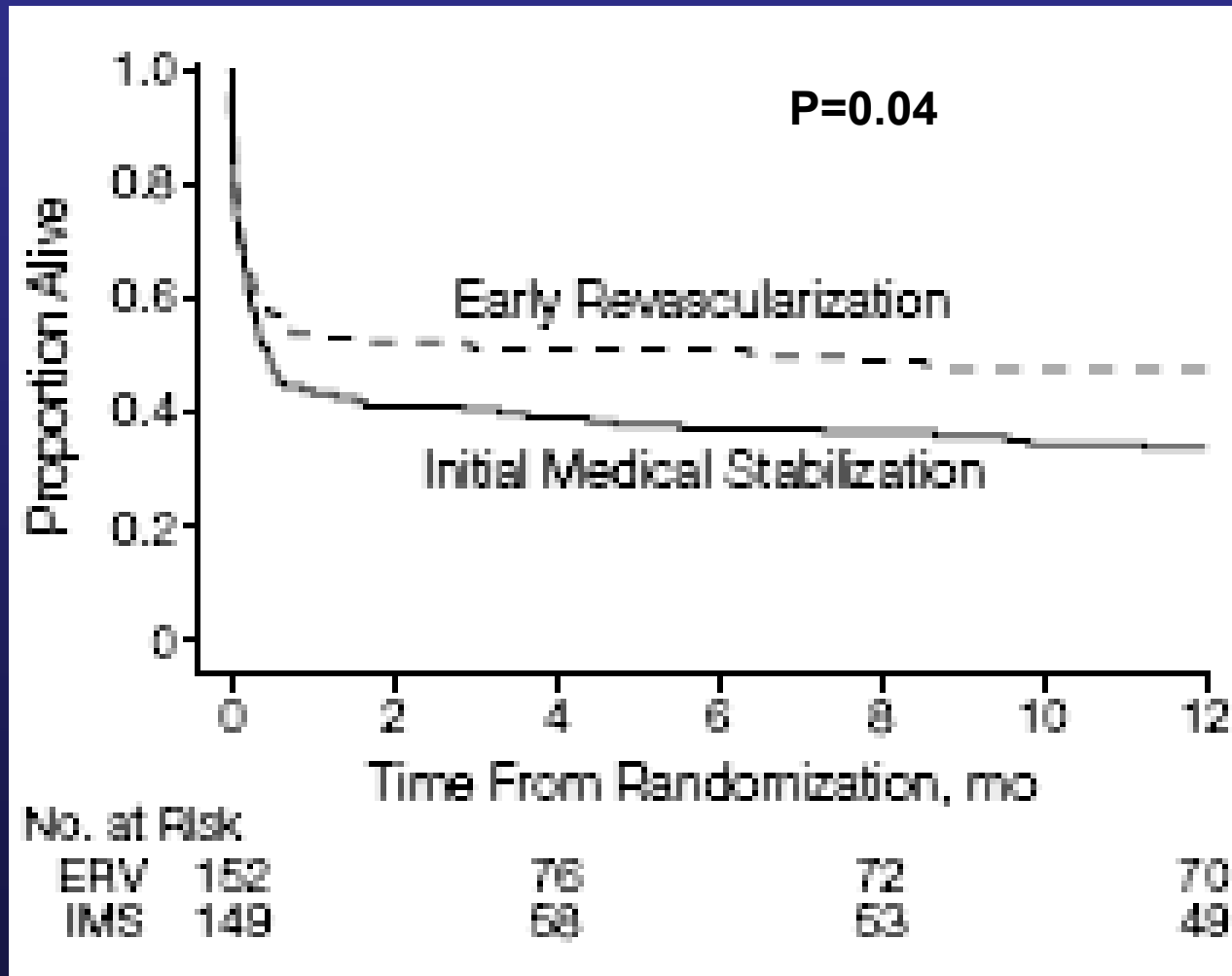
DANAMI-2



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



Shock Trial : one year follow up



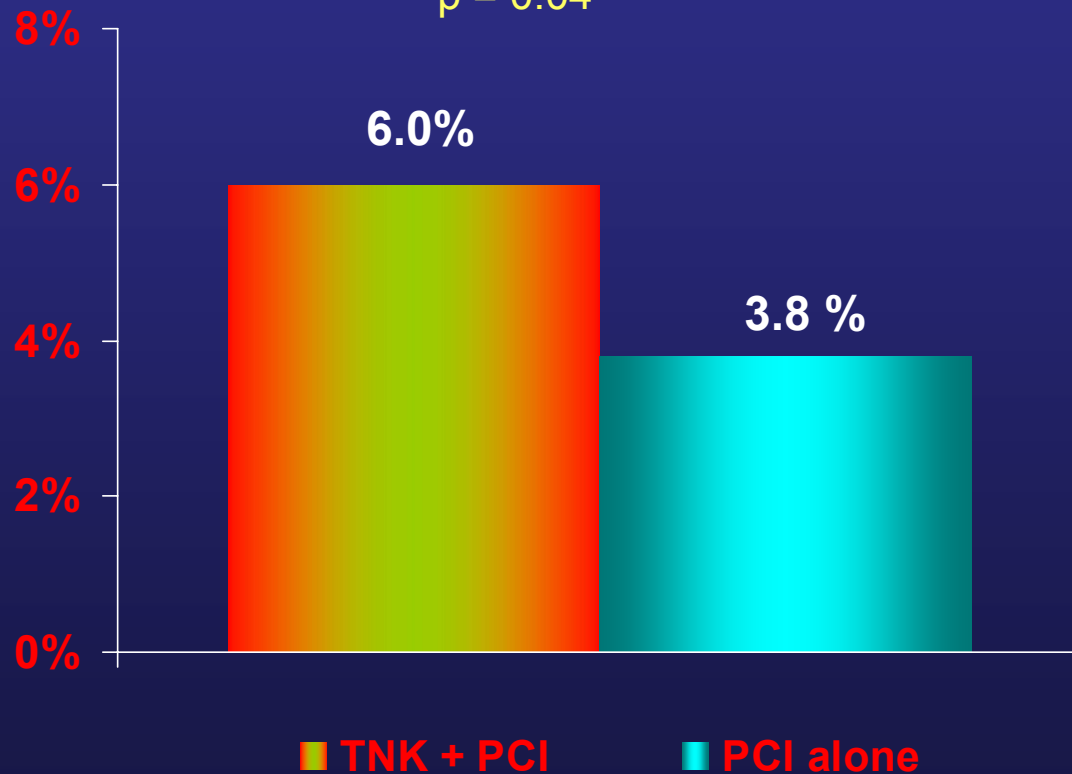
Facilitated angioplasty ?

No!

ASSENT – 4 PCI trial: Mortality at 30 days

Analysis of mortality at 30 days (%)

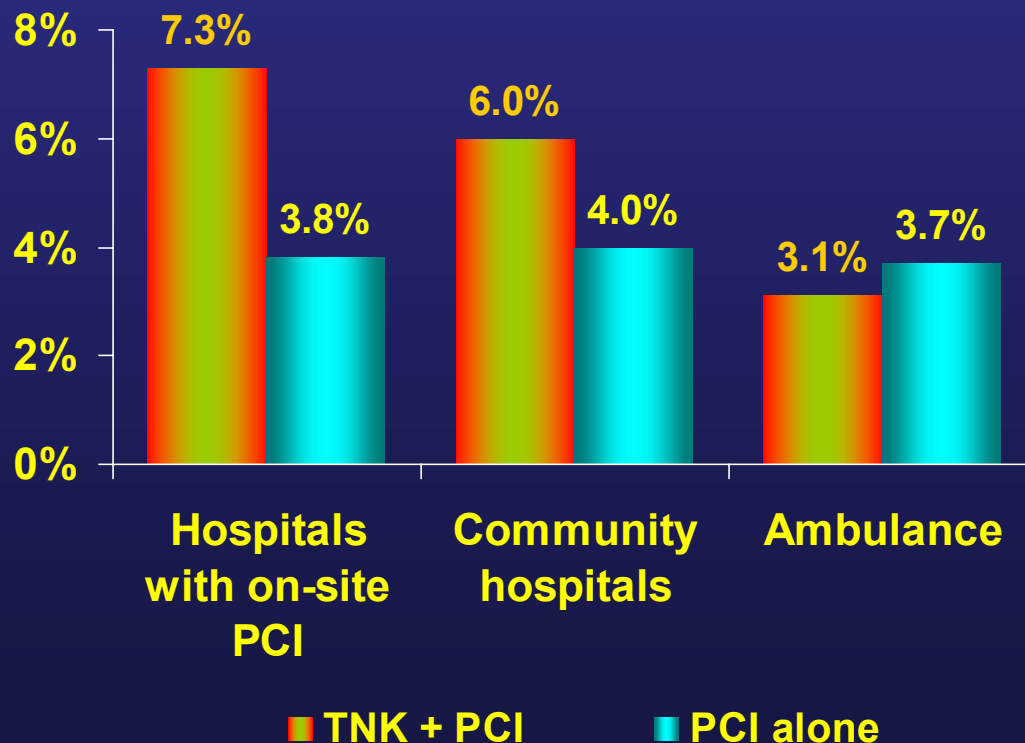
$p = 0.04$



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 PCI trial: Mortality Subgroup Analysis

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



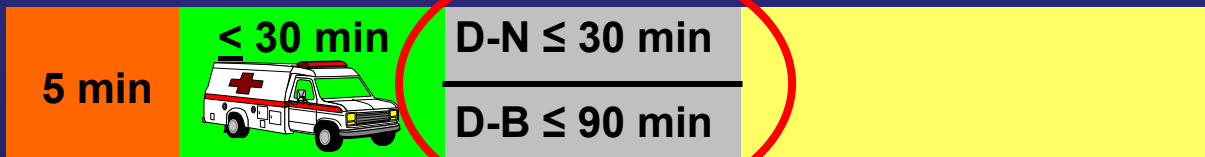
The greatest mortality difference by treatment group was seen in hospitals with on-site PCI (7.3% vs 3.8%), with less difference in community hospitals (6.0% vs 4.0%), and a shift in direction for patients enrolled in the ambulance (3.1% vs 3.7%)

Options for Transport of Patients With STEMI and Initial Reperfusion Treatment

If ≤ 3 hours from symptom onset

■ Patient ■ Transport ■ Inhospital ■ Reperfusion

Goals



Media campaign
Patient education

Greater use of
144
Prehospital Rx

Prehospital
ECG

MI protocol
Critical pathway
Quality
improvement
program

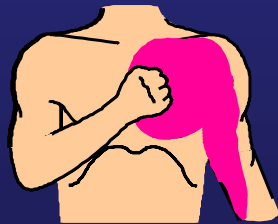
PCI team
Or
Lytics

Methods of
Speeding
Time to
Reperfusion

Reperfusion

■ Patient ■ Transport

Goals



5 min

< 30 min



Triage
Plan

PCI
capable

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

Not PCI
capable

Inter-
Hospital
Transfer

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

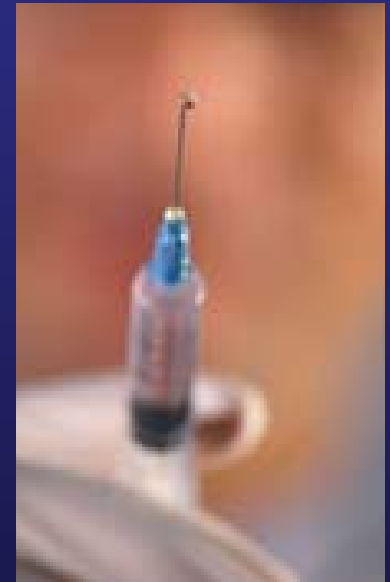
Reperfusion Options for STEMI Patients

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

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*

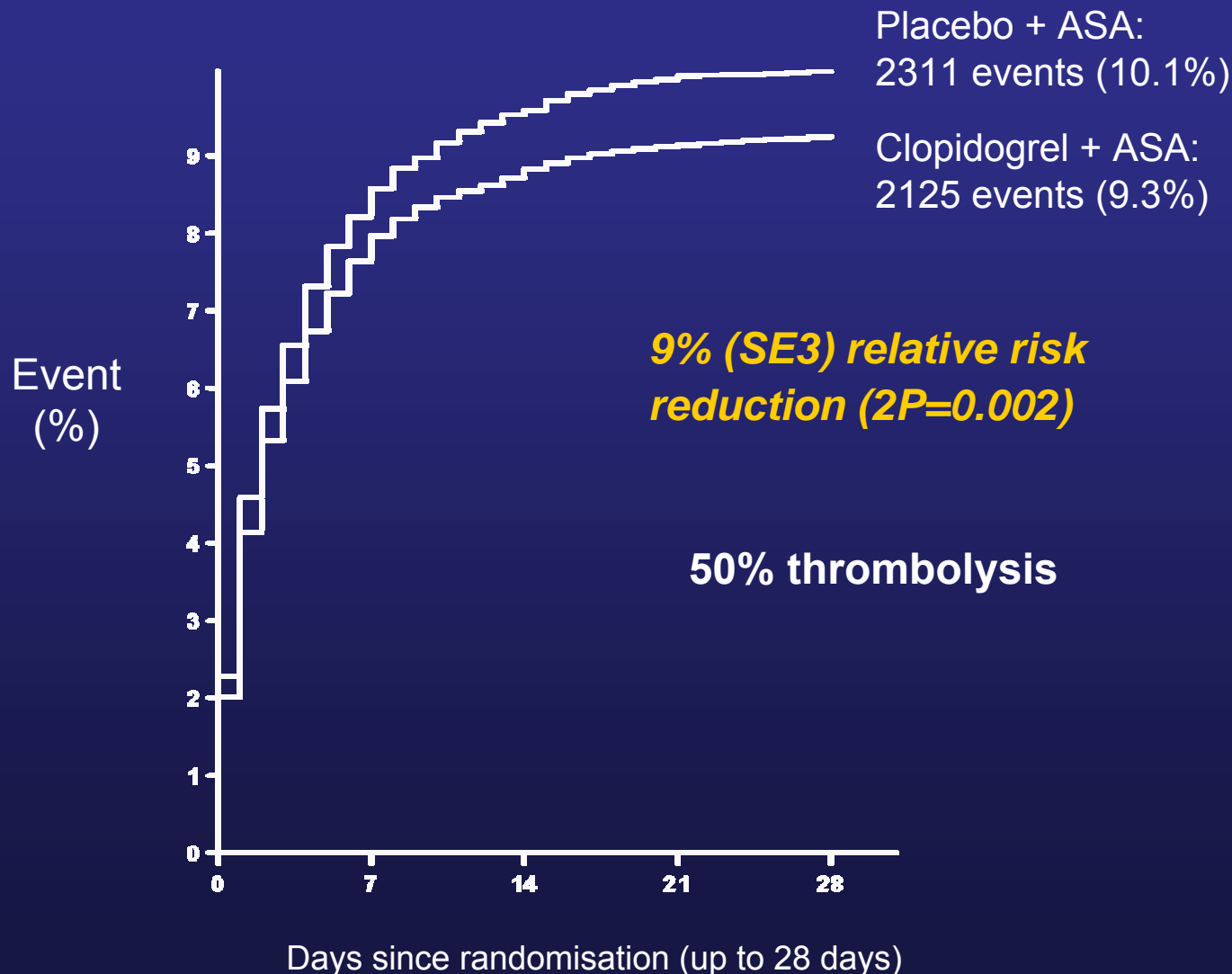
	1st 24 h	During Hosp	Hosp DC + Long Term
<i>Aspirin</i>	162-325 mg chewed or iv	75-162 mg/d p.o.	75-162 mg/d p.o.
Clopidogrel	600 mg p.o.	75mg/d p.o.	75mg/d p.o. 9-12 months
<i>Beta-blocker</i>	Oral daily	Oral daily	Oral daily
<i>Fibrinolytic</i>	tPA, TNK, rPA, SK		
UFH / HBPM*	Full dose	To PCI or 48h post Thrombolysis	
IIb/IIIa inhib	ABCX, Tirofiban, Eptifibatide		

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 ⁺ ≤ 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

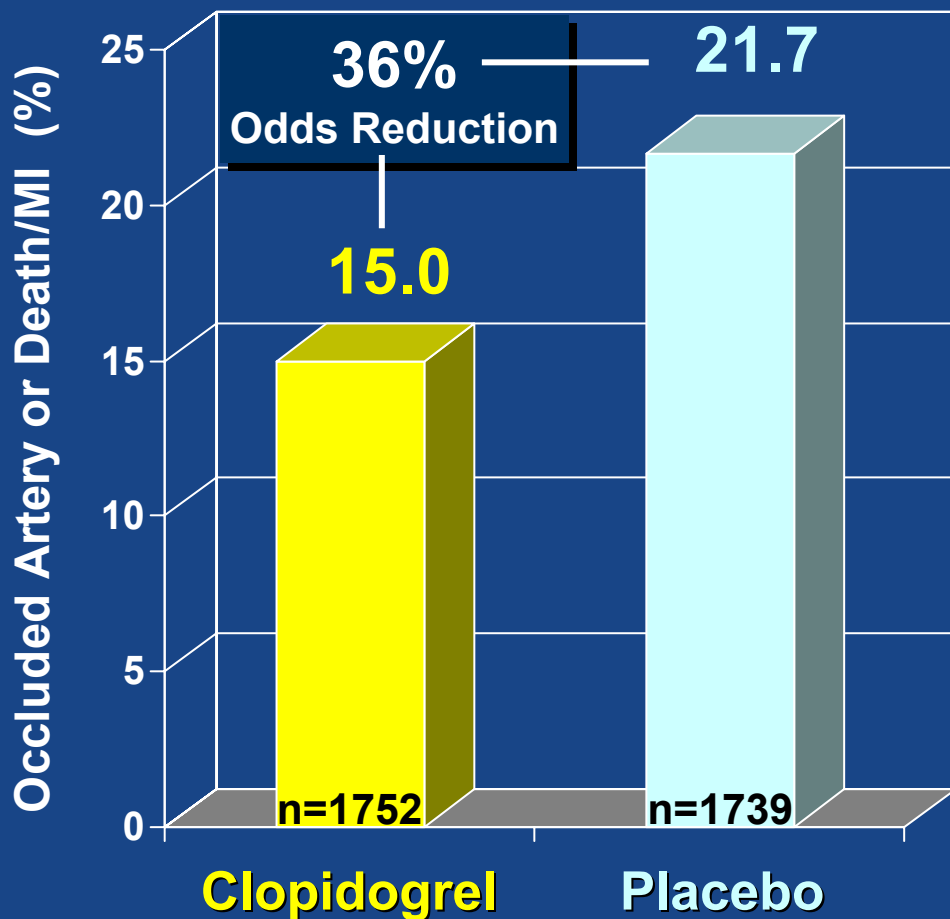
COMMIT: Effects of CLOPIDOGREL on Death, Re-MI or Stroke

n=45'851



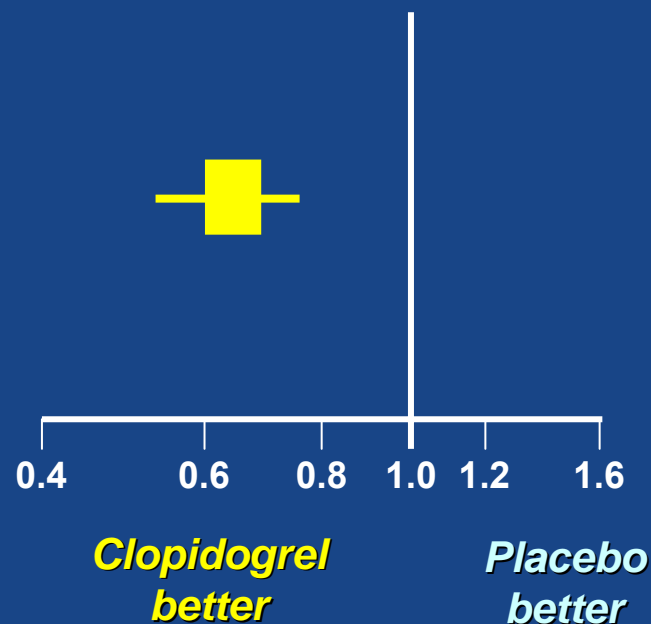
Primary Endpoint: Occluded Artery (or D/MI thru Angio/HD)

STEMI Fibrinolysis

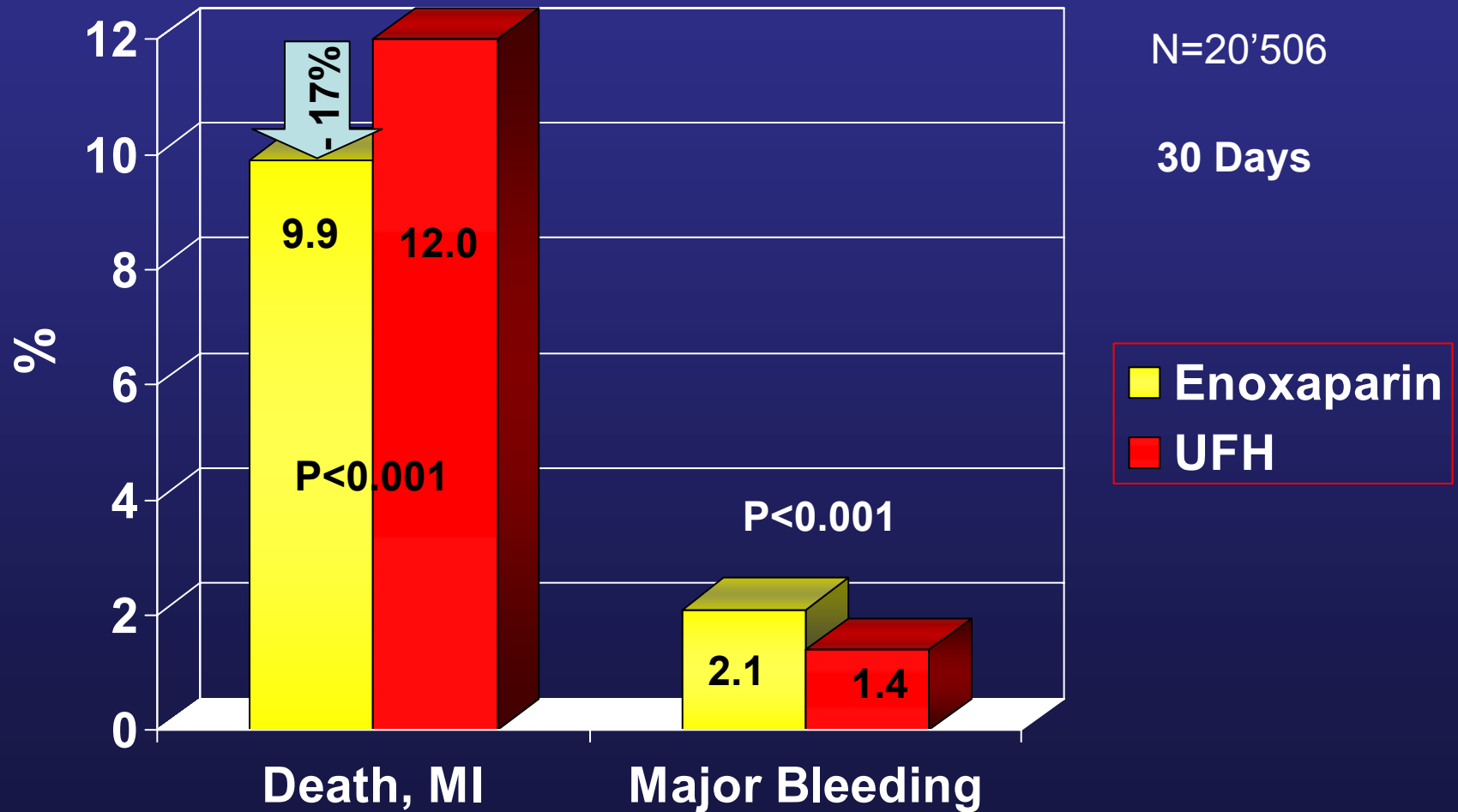


Odds Ratio 0.64
(95% CI 0.53-0.76)

$P=0.00000036$

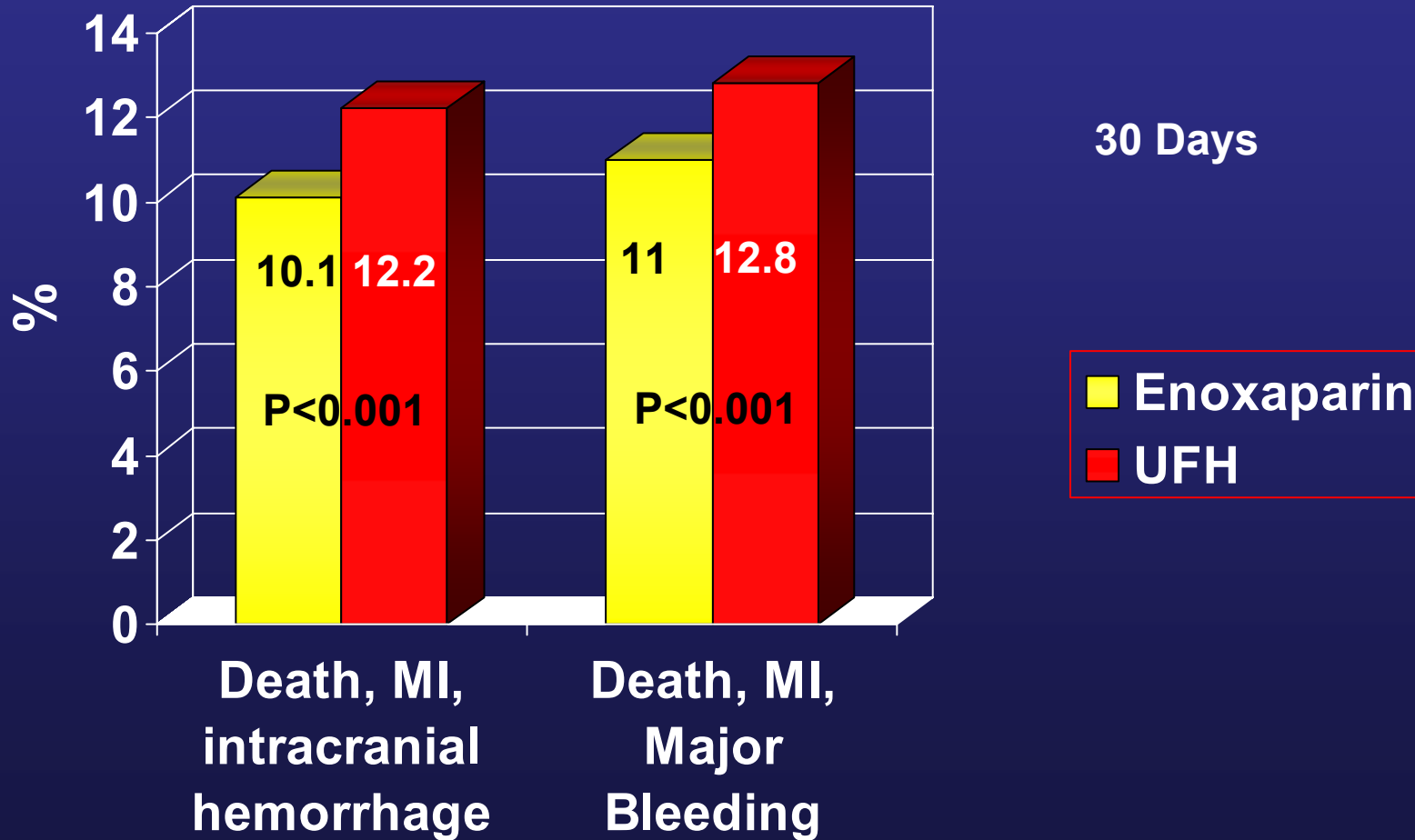


PCI-Extract TIMI 25: STEMI Fibrinolysis



PCI-Extract TIMI 25

Net clinical benefit



Persistent ST-elevation MI with PCI facility

Physical examination, ECG monitoring, Blood samples

**Chest pain \leq 12 h
ST-elevation or New LBBB**



**ST-elevation \geq 1 mm (0.1 mV) in at least two anatomically contiguous leads or \geq 2 mm (0.2 mV) in two contiguous precordial leads
=
STEMI**



**Urgent
reperfusion**

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

Physical examination, ECG monitoring, Blood samples

STEMI

Heparin, ASA, **Fibrinolytics**
Clopidogrel*, ACEI, Betablockers, Nitrates, Statins

High risk

Low risk

LV EF, Ischemia assessment

Cor. Angiography

High risk

Intermediate risk

Low risk

Suitable anatomy for PCI or CABG

Significant angina

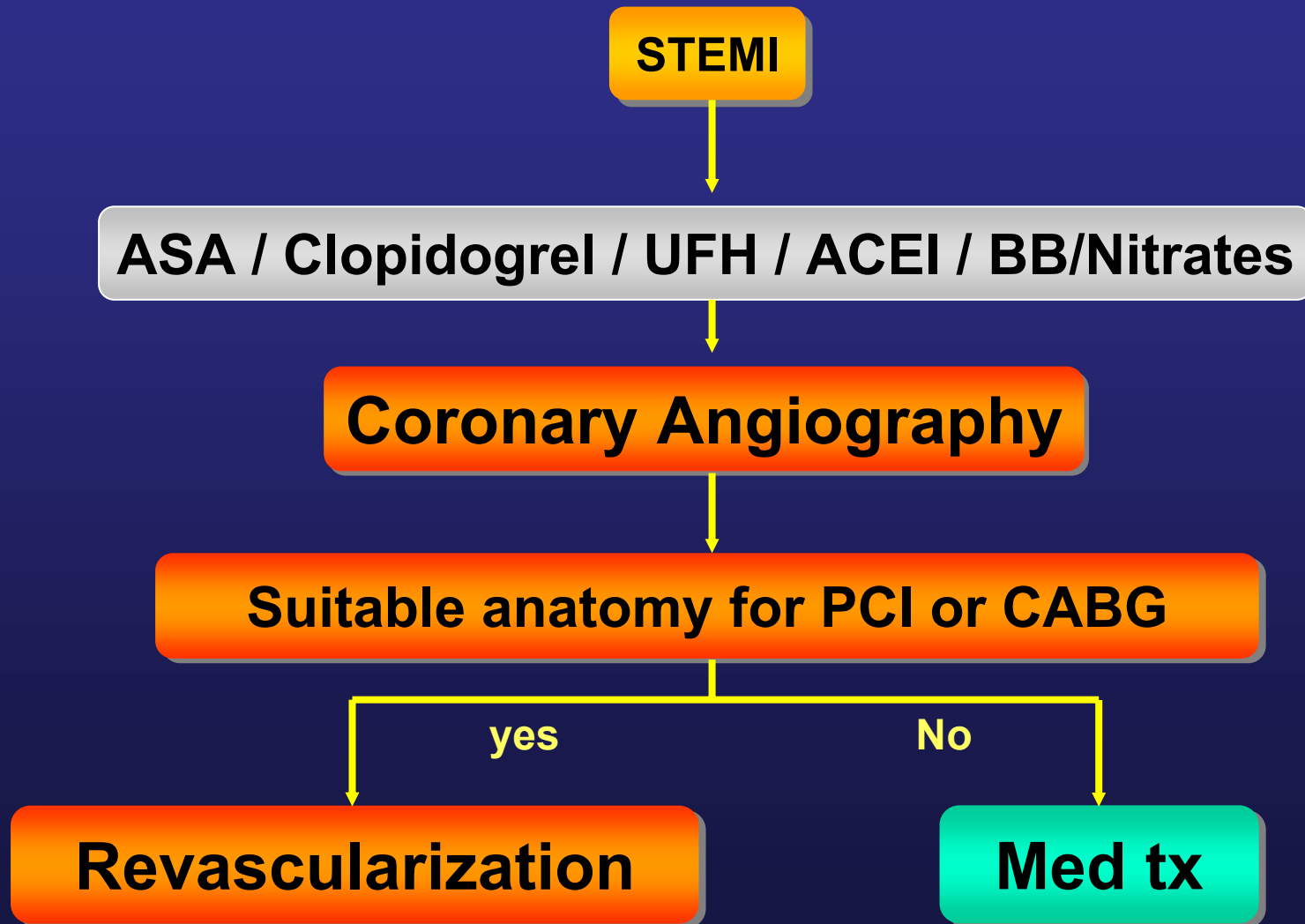
Med tx

Revascularization

* Unless a CABG is planned within 5 days.

Persistent ST-elevation MI with PCI facility

Physical examination, ECG monitoring, Blood samples



Acute Coronary Syndrome

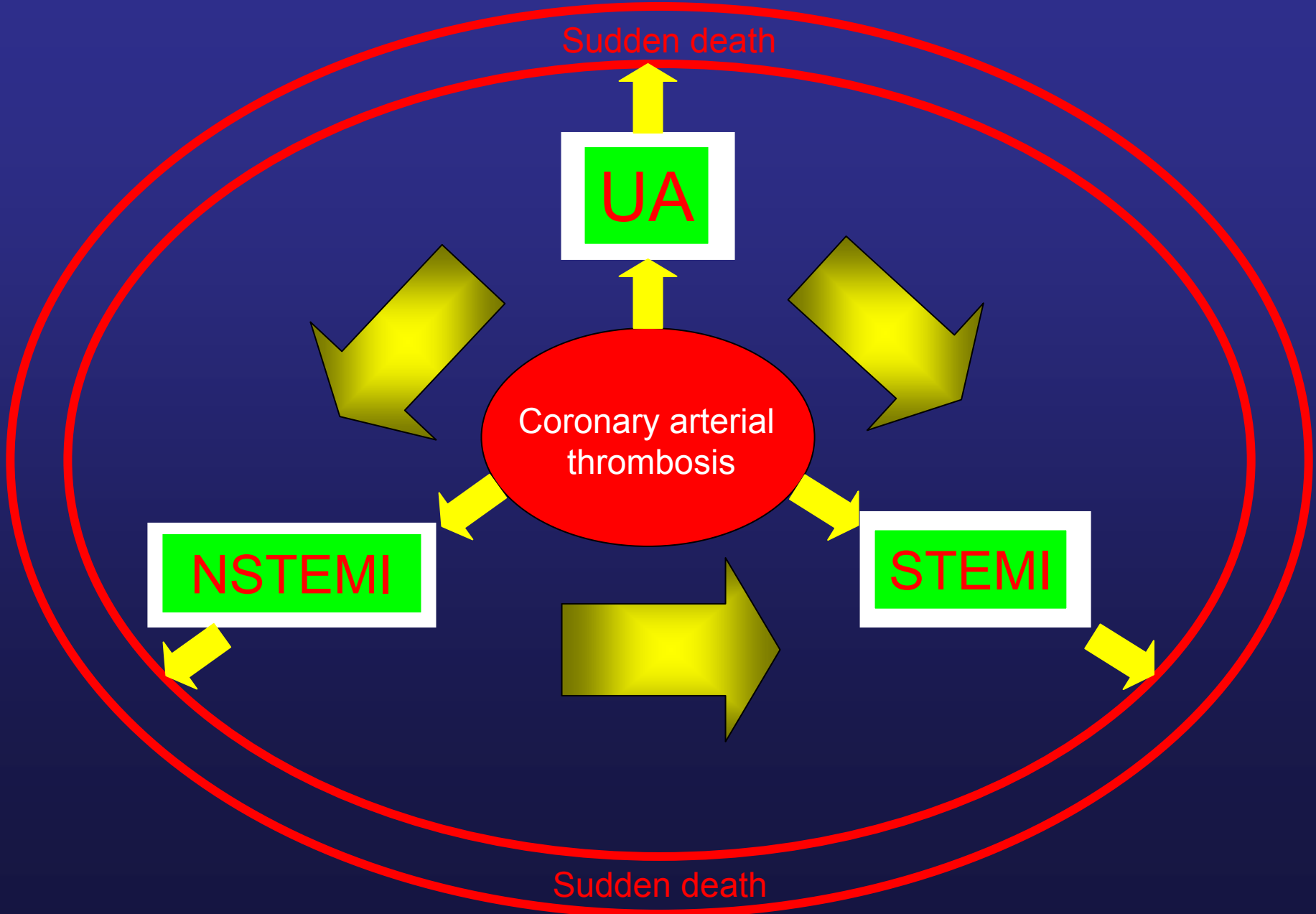
- Pathophysiology and clinical presentation
- STEMI
- UA and NSTEMI

UA / NSTEMI

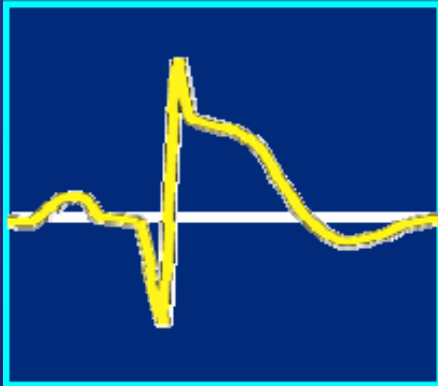


**Risk
stratification**

Acute Coronary Syndromes

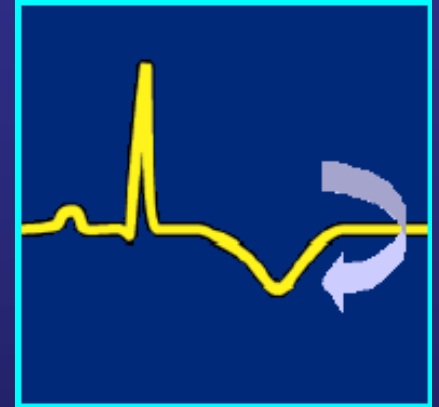
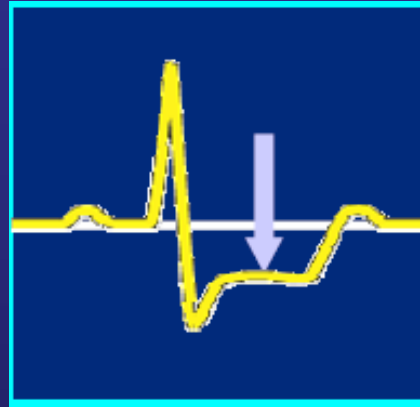


ACS with persistent ST-segment elevation



Troponin or CK-mb elevated

ACS without persistent ST-segment elevation

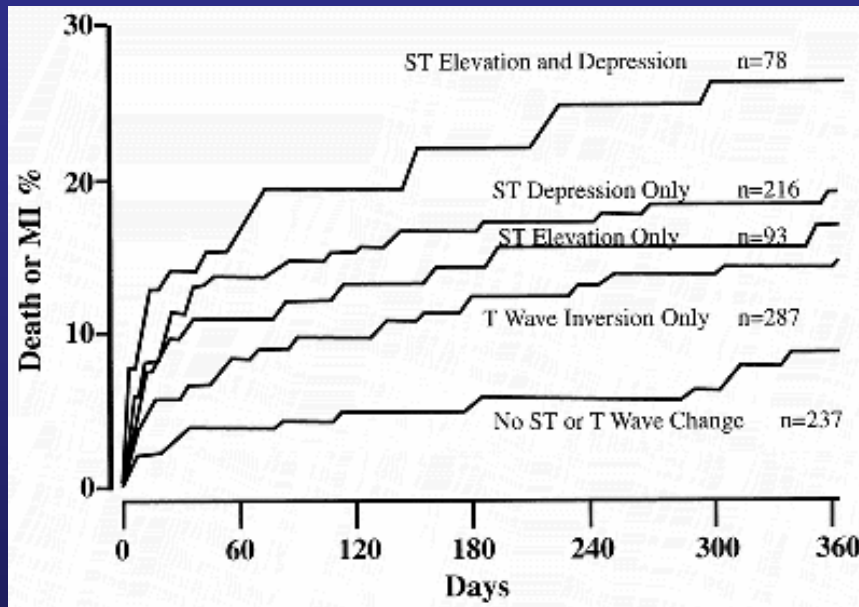


Troponin elevated or not

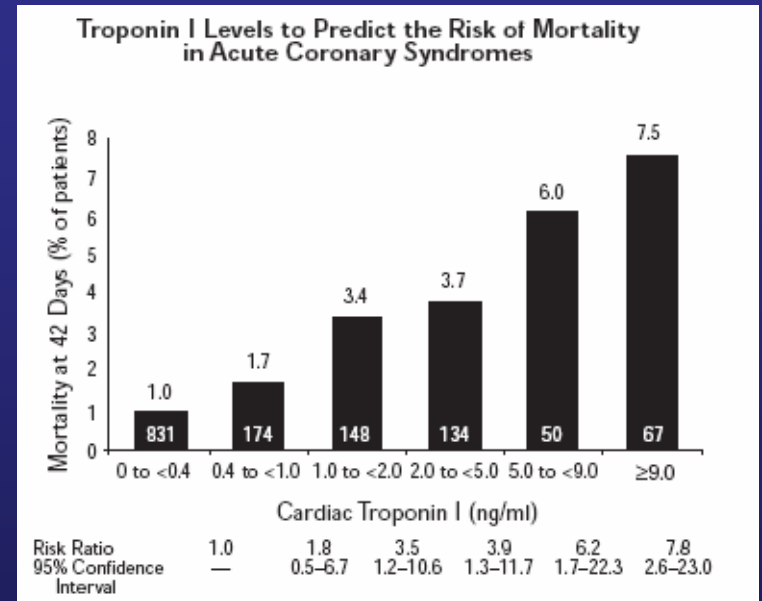
Myocardial infarction

Unstable angina

Risk stratification : ECG, Troponin



J Intern Med 1993; 234:293-301

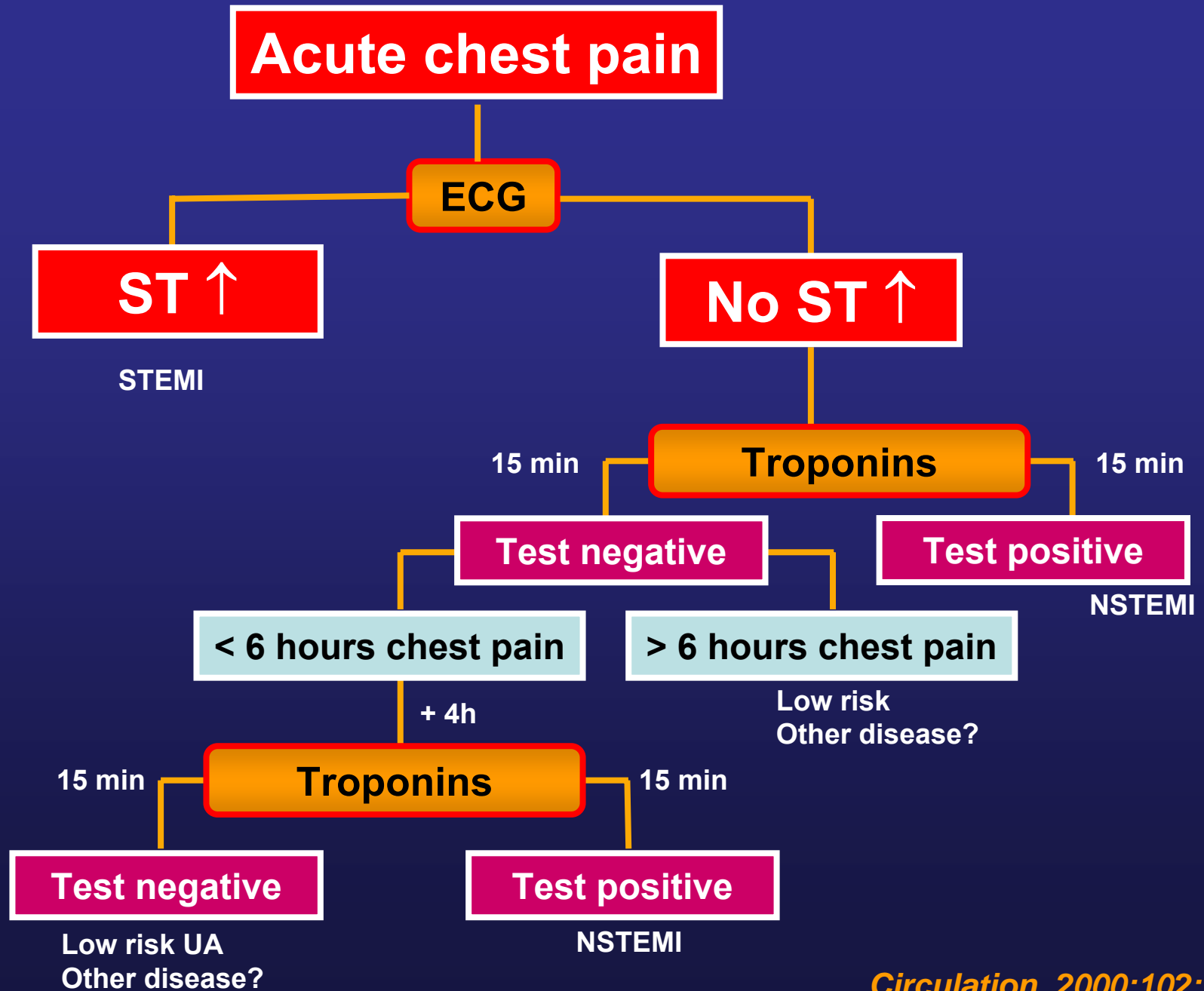


N Engl J Med 1996;335:1342

↑ Troponin
=
myocardial injury
⇒ ↑ mortality

↑ CKmb w/o
↑ Troponin
⇒ **no** ↑ mortality

Newby, L.K. J Am Coll Cardiol 2006; 47:312



Braunwald classification UA

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

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



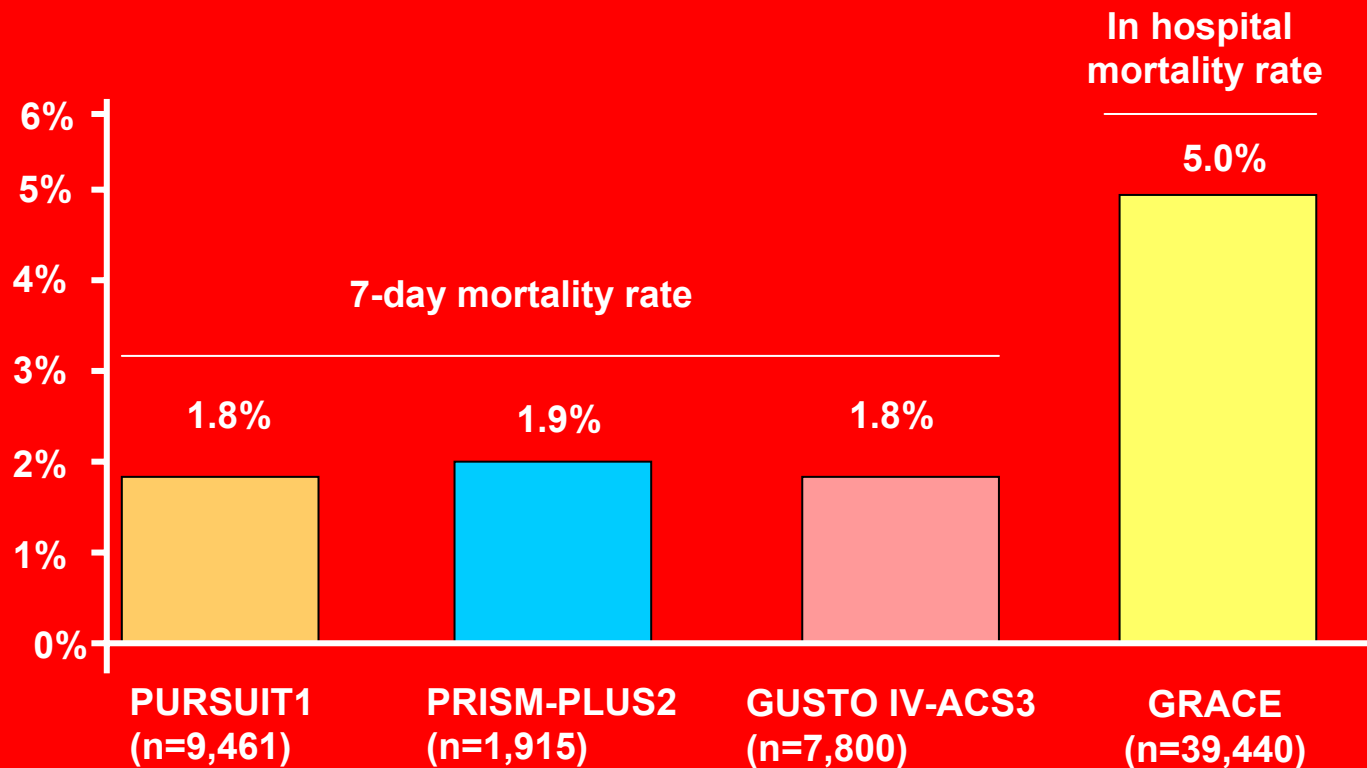
Summary of the Risk Stratification : Risk of Progression to Death and MI

Low-risk patients

- ✓ No recurrence 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**

Tools to assess the risk stratification



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

The TIMI Risk Score for Unstable Angina/Non-ST Elevation MI

A Method for Prognostication and Therapeutic Decision Making

ORIGINAL CONTRIBUTION

Conclusions In patients with UA/NSTEMI, the TIMI risk score is a simple prognostication scheme that categorizes a patient's risk of death and ischemic events and provides a basis for therapeutic decision making.

JAMA. 2000;284:835-842

www.jama.com



Elliott M. Antman, MD

Marc Cohen, MD

Peter J. L. M. Bernink, MD

Carolyn H. McCabe, BS

Thomas Horacek, MD

Gary Papuchis, MD

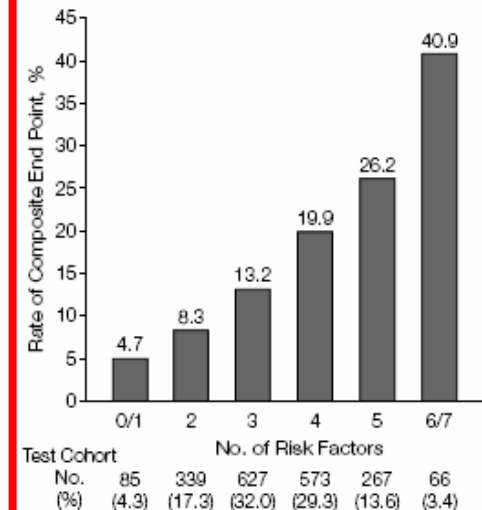
Branco Mautner, MD

Ramon Corbalan, MD

David Radley, MS

Eugene Braunwald, MD

- Age > 65 ans
- At least 3 RF for CAD
- Significant coronary stenosis
- ST deviation
- 2 anginal events in last 24 hours
- Use of Aspirin in last 7 days
- Elevated serum cardiac markers



Tools to assess the risk stratification



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.

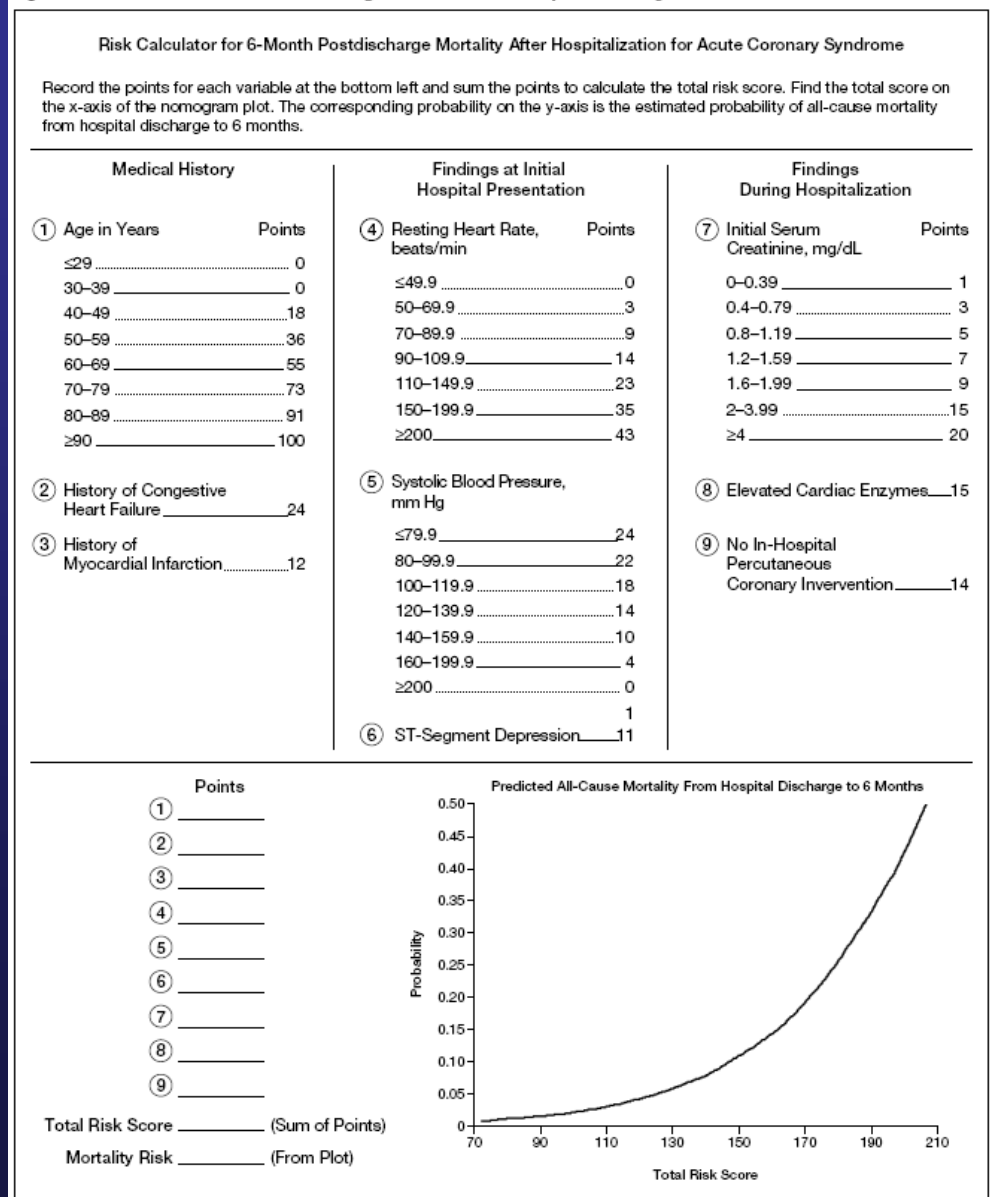
JAMA. 2004;291:2727-2733

www.jama.com

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Kim A. Eagle, MD
- _____
Michael J. Lim, MD
- _____
Omar H. Dabbous, MD, MPH
- _____
Karen S. Pieper, MS
- _____
Robert J. Goldberg, PhD
- _____
Frans Van de Werf, MD, PhD
- _____
Shaun G. Goodman, MD, MSc
- _____
Christopher B. Granger, MD
- _____
P. Gabriel Steg, MD
- _____
Joel M. Gore, MD
- _____
Andrzej Budaj, MD, PhD
- _____
Álvaro Avezum, MD, PhD
- _____
Marcus D. Flather, MBBS, FRCP
- _____
Keith A. A. Fox, MB, ChB, FRCP
- _____
for the GRACE Investigators



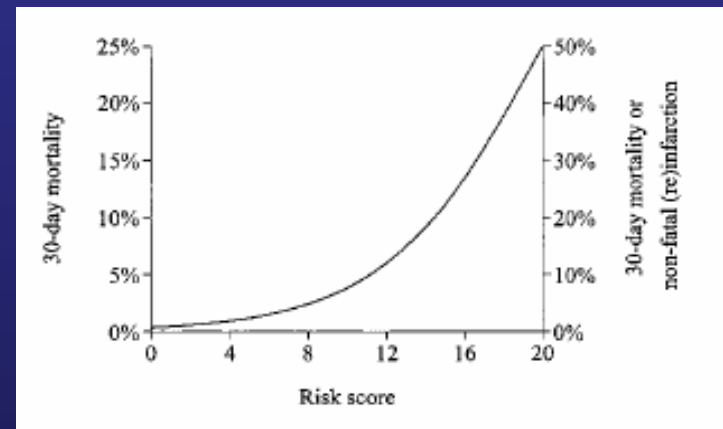
Figure 2. GRACE Prediction Score Card and Nomogram for All-Cause Mortality From Discharge to 6 Months



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



American Heart Association® 

Learn and Live SM

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 Recommendations for anti-ischemic therapy



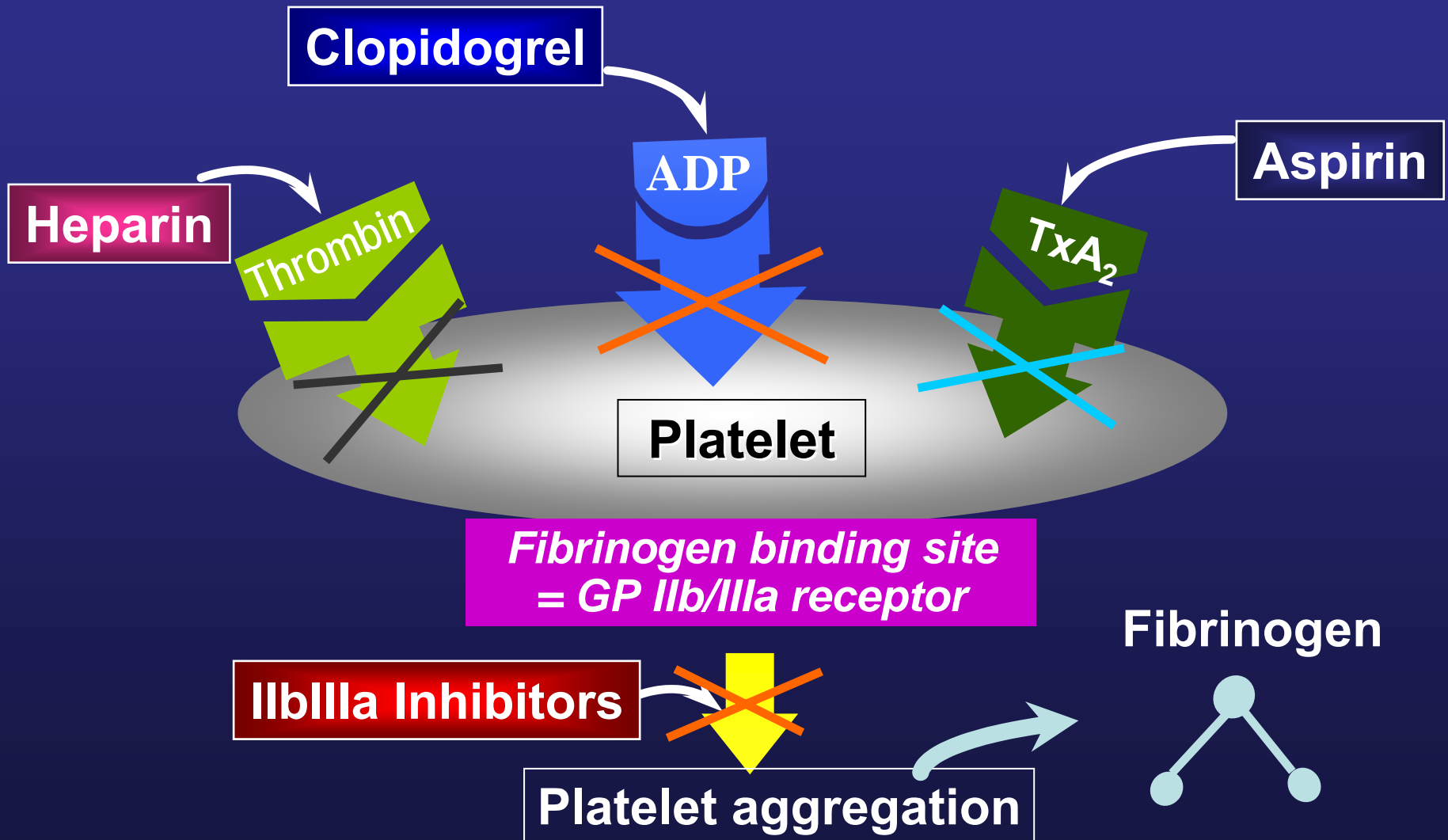
Continuing Ischemia/Other Clinical High-Risk Features [‡]		Level of evidence
Present	Absent	
Bed rest with continuous ECG monitoring		C
Supplemental O ₂ to maintain Sao ₂ >90%		C
NTG IV		C
Beta-blockers, oral or IV	Beta-blockers, oral	B
Morphine IV for pain, anxiety, pulmonary congestion		C
IABP if ischemia 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

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Antiplatelet and Anticoagulation therapy



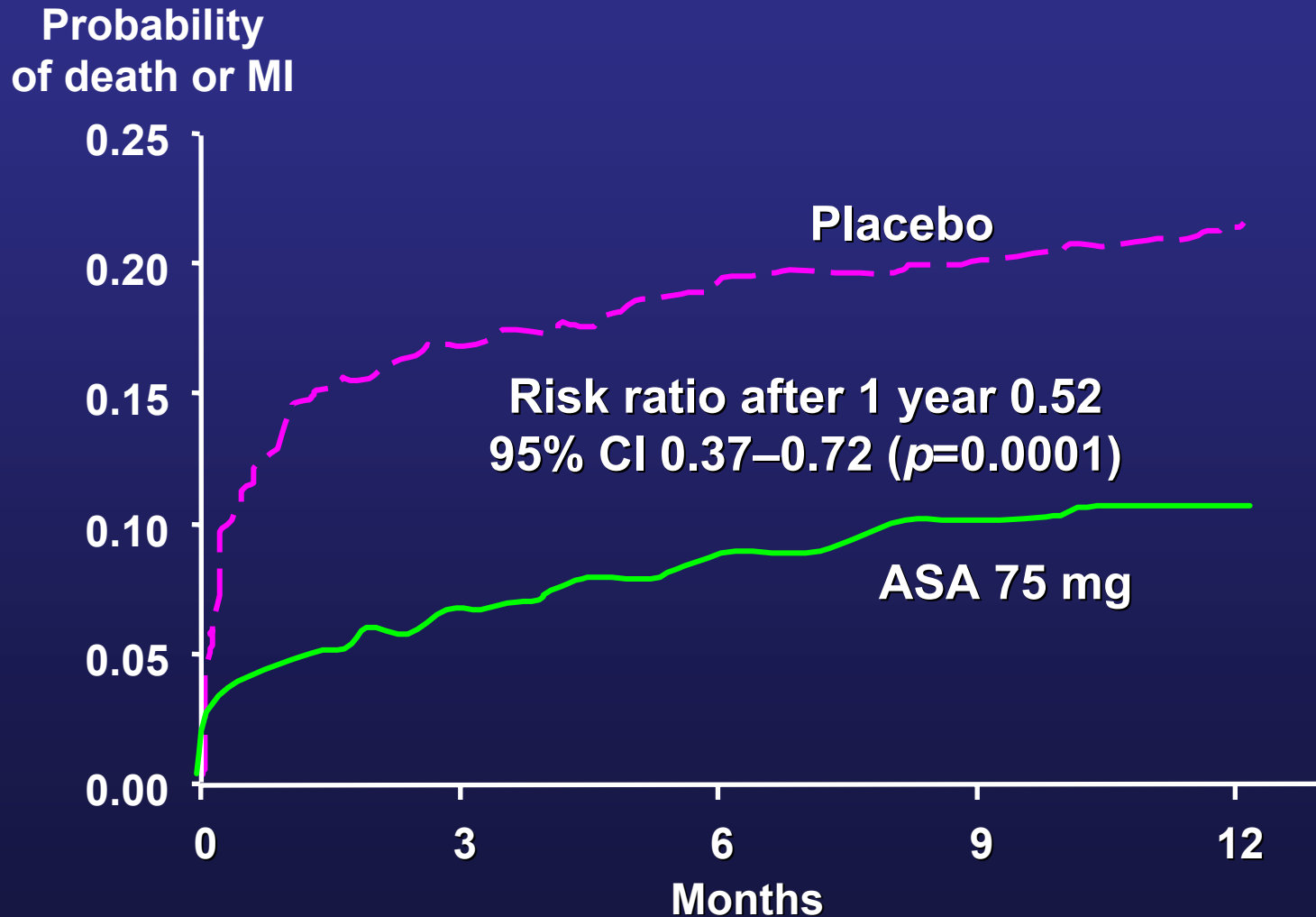
ACS without persistent ST-segment elevation

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



Heparin trials

Study	Patients	ASA, mg/d	Heparin	Entry Window, h	Follow-up, d	ASA, %	Cardiac Death or Nonfatal MI		
							ASA/Heparin, %	RR Reduction, %	p
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

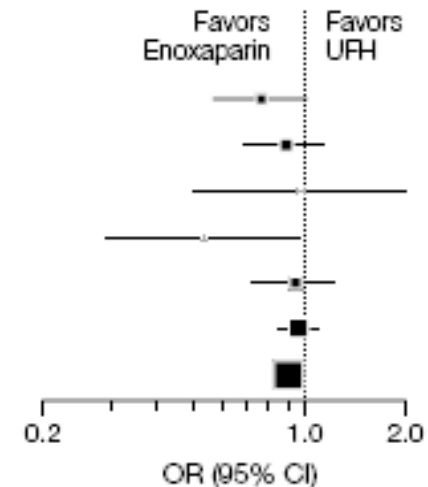
Low Molecular Weight Heparin

Unfractionated Heparin

LMWH vs UFH: 30 days Death, MI

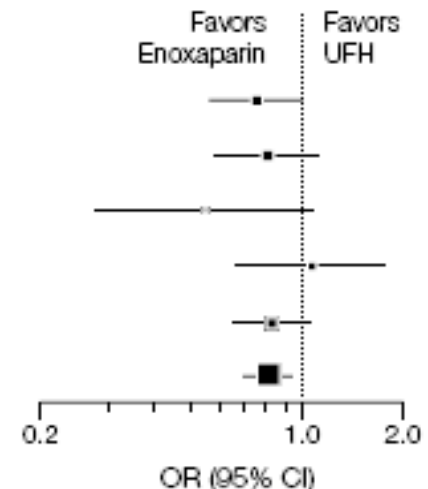
Overall population n=21'946

Trial	Events, No./Total (%)		OR (95% CI)
	Enoxaparin	UFH	
ESSENCE ⁷	94/1607 (5.8)	118/1564 (7.5)	0.76 (0.58-1.01)
TIMI 11B ⁸	145/1953 (7.4)	163/1957 (8.3)	0.88 (0.70-1.11)
ACUTE II ¹⁶	25/315 (7.9)	17/210 (8.1)	0.97 (0.51-1.83)
INTERACT ¹⁷	19/380 (5.0)	33/366 (9.0)	0.54 (0.30-0.96)
A to Z ¹⁵	137/1852 (7.4)	139/1768 (7.9)	0.94 (0.73-1.20)
SYNERGY ¹⁶	696/4992 (14.0)	722/4982 (14.5)	0.96 (0.86-1.07)
Overall	1116/11099 (10.1)	1192/10847 (11.0)	0.91 (0.83-0.99)



No prerandomization antothrombin therapy n=9'835

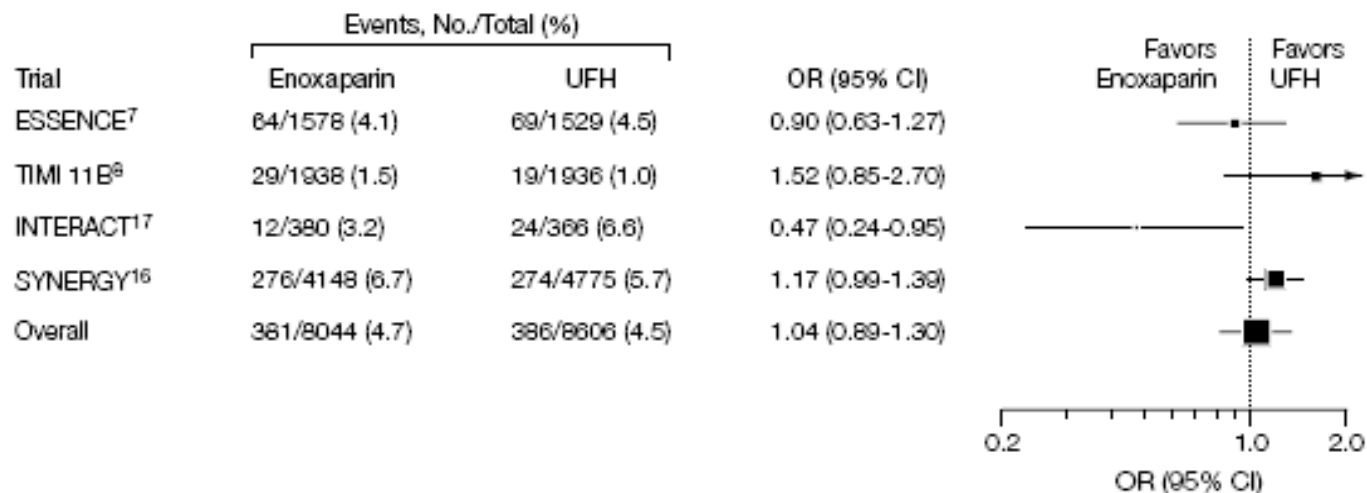
Trial	Events, No./Total (%)		OR (95% CI)
	Enoxaparin	UFH	
ESSENCE ⁷	94/1607 (5.8)	118/1564 (7.5)	0.76 (0.58-1.01)
TIMI 11B ⁸	81/1257 (6.4)	97/1242 (7.8)	0.81 (0.60-1.10)
INTERACT ¹⁷	14/304 (4.6)	24/295 (8.1)	0.55 (0.28-1.08)
A to Z ¹⁵	43/589 (7.3)	37/537 (6.9)	1.06 (0.68-1.67)
SYNERGY ¹⁶	165/1212 (12.6)	44/1228 (14.8)	0.84 (0.68-1.05)
Overall	397/4969 (8.0)	458/4866 (9.4)	0.81 (0.70-0.94)



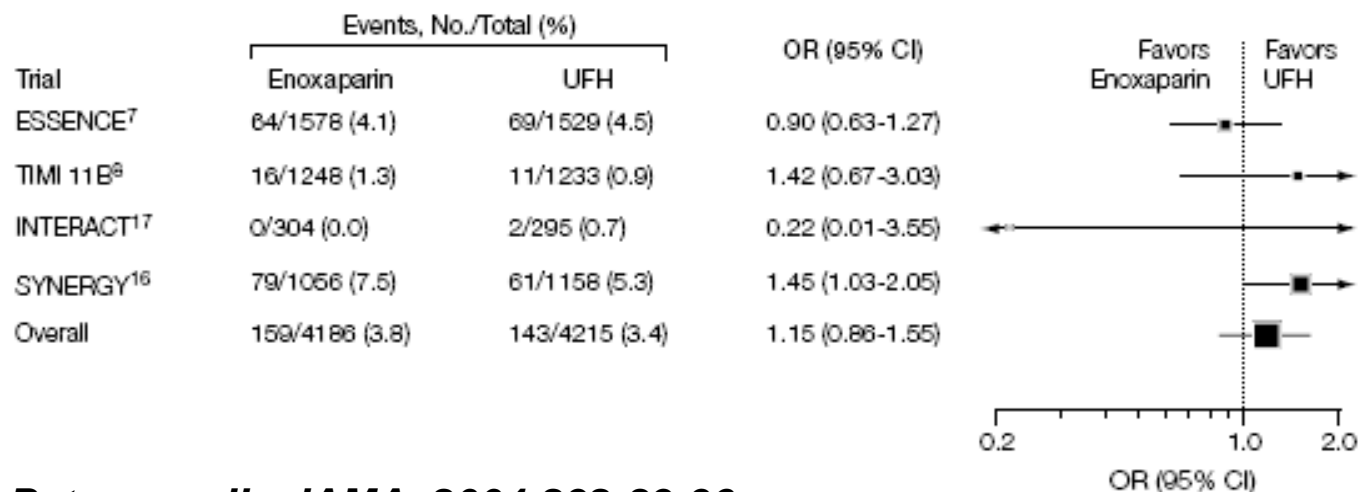
Petersen, JL. JAMA. 2004;292:89-96

LMWH vs UFH: 7 days Major Bleeding

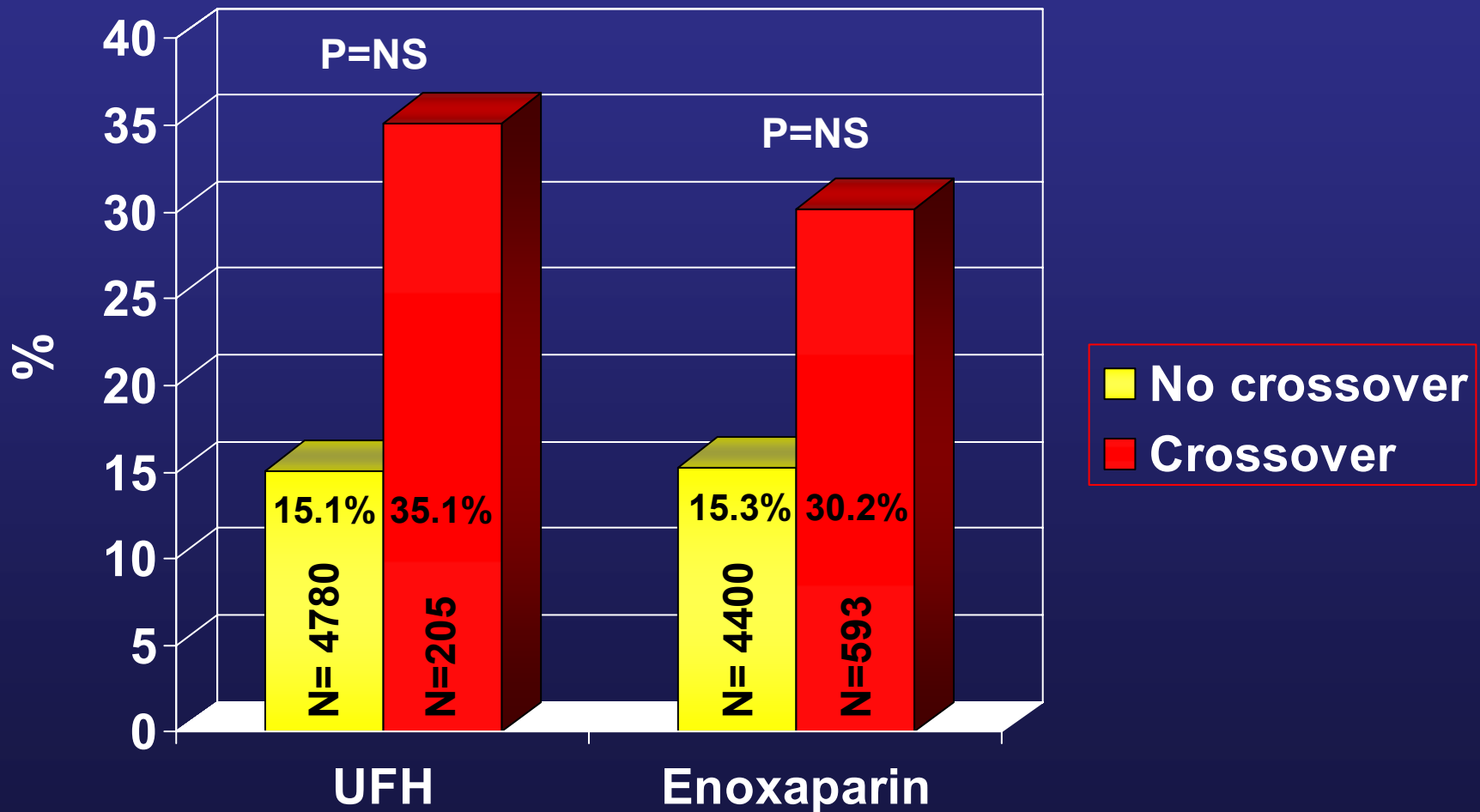
Overall population n=16'650



No prerandomization antothrombin therapy n=8'401



Bleeding: any transfusion – SYNERGY trial



N= number of No crossover/Crossover in each group

JAMA. 2004;292:45-54

ACS without persistent ST-segment elevation

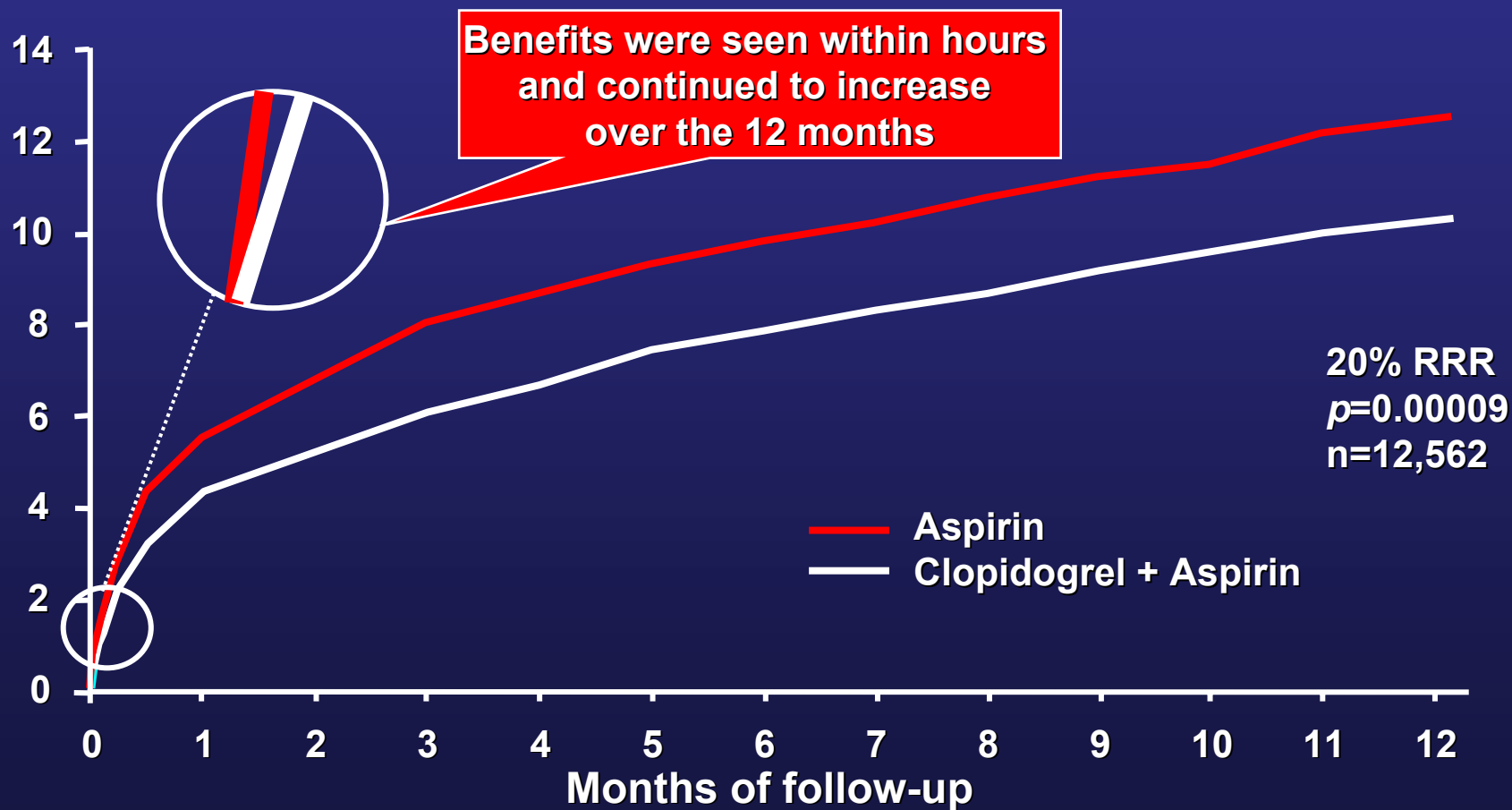
Treatment options :

Antithrombotic therapy

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- Thienopyridines : Clopidogrel
- Anti IIbIIIa

CURE: Early & Long-Term Benefits of Clopidogrel

Cumulative Events [%]
(Cardiovascular Death, Myocardial Infarction, or Stroke)



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

ACS without persistent ST-segment elevation

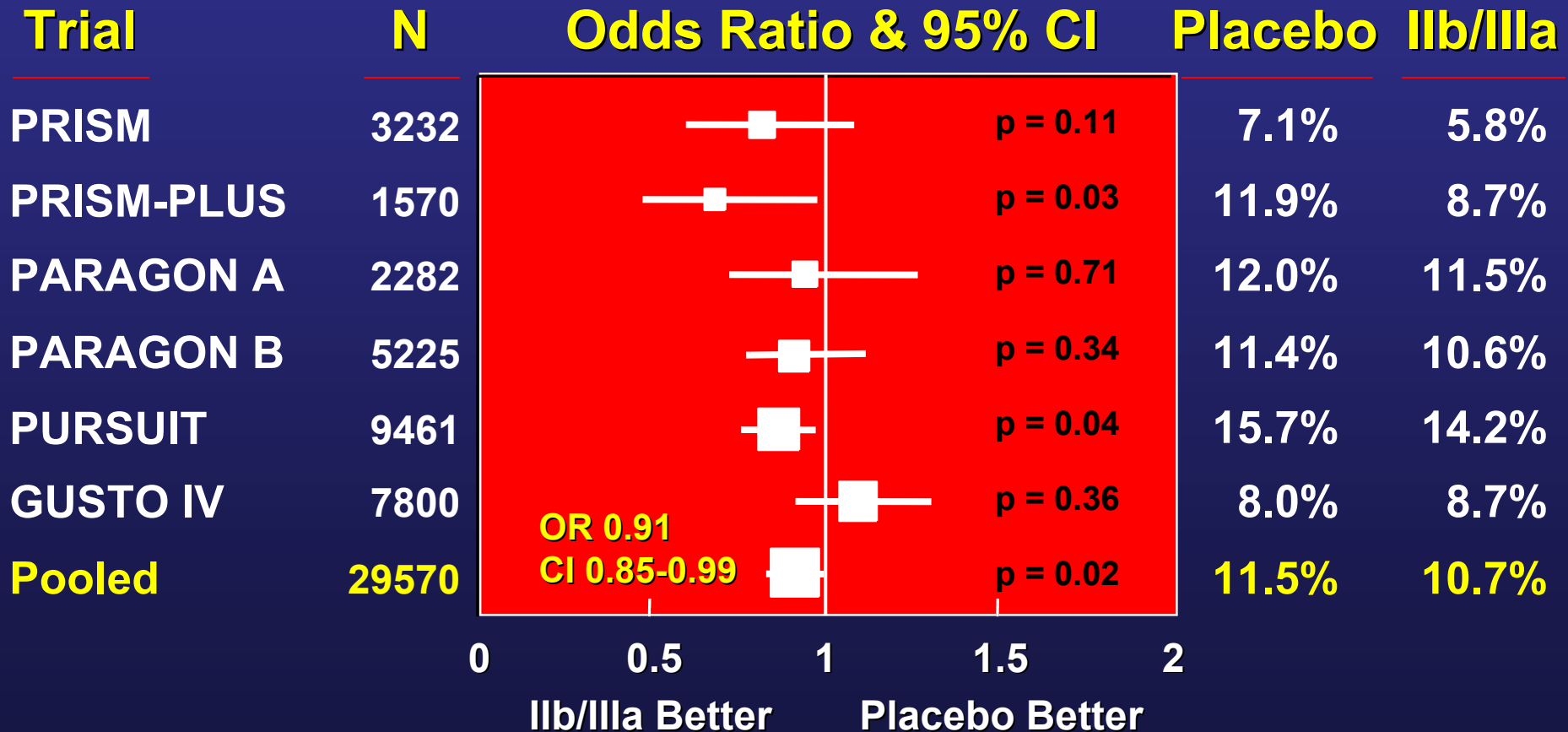
Treatment options :

Antithrombotic therapy

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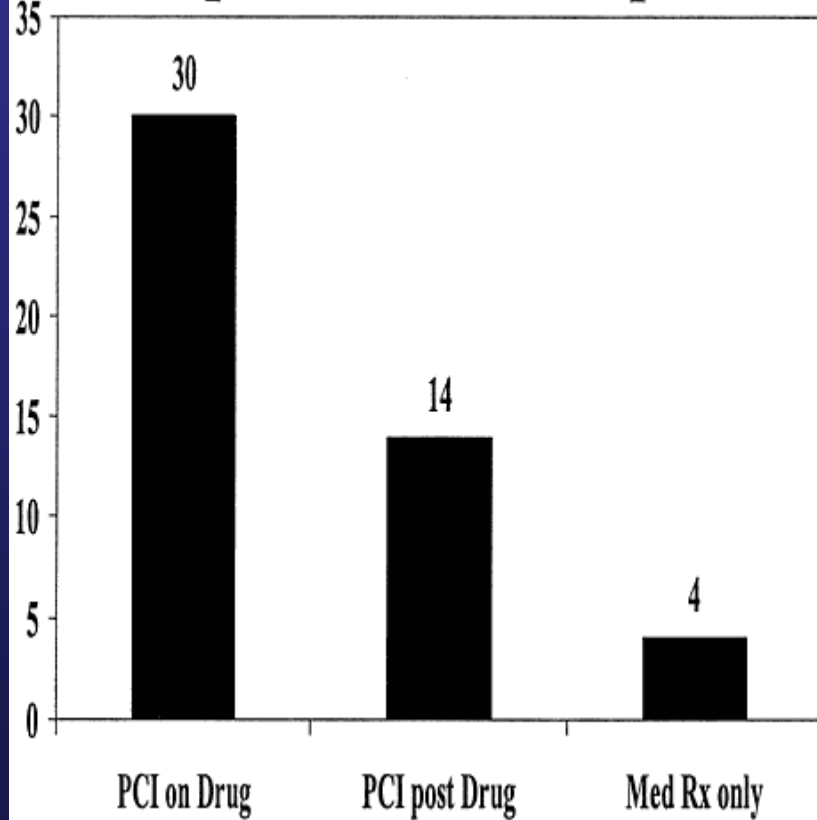
GP IIb/IIIa and ACS:

Death / MI at 30 Days

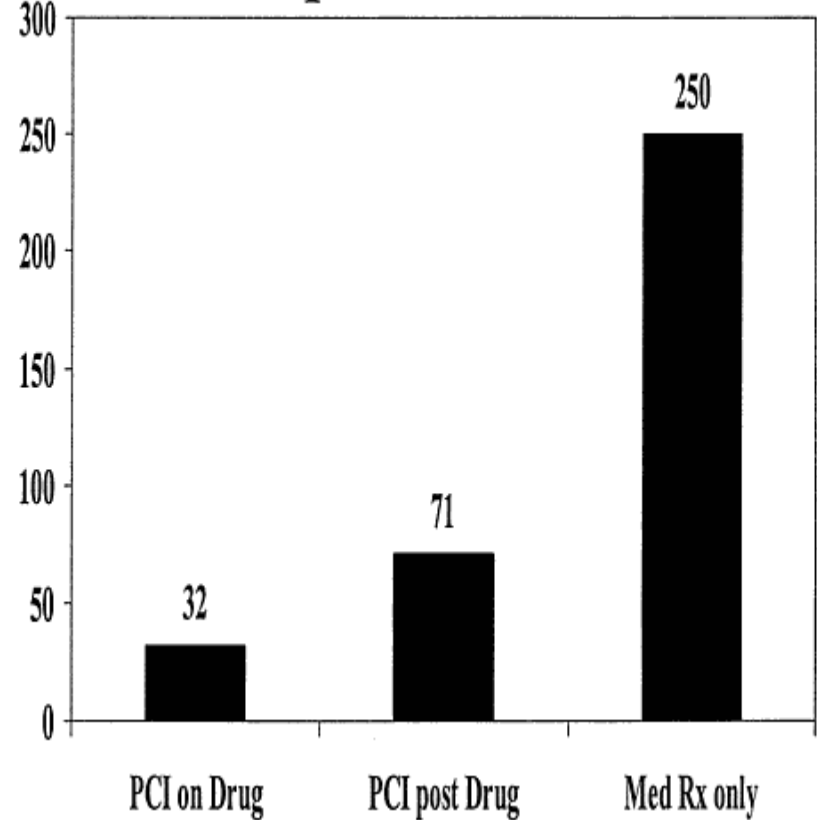


Anti-IIb/IIIa and PCI

Events prevented /1000 pts Rx



NNT to prevent 1 event



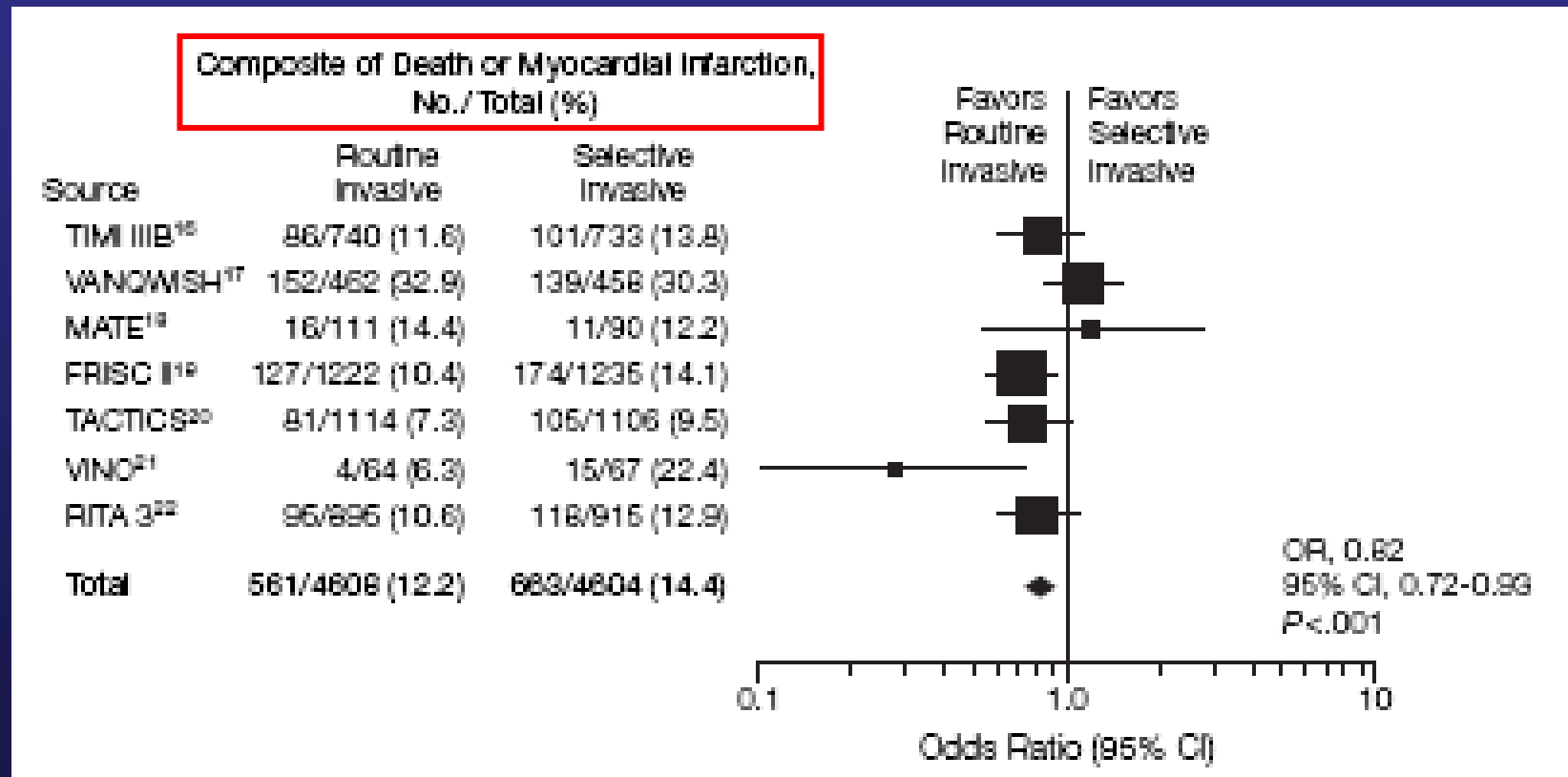
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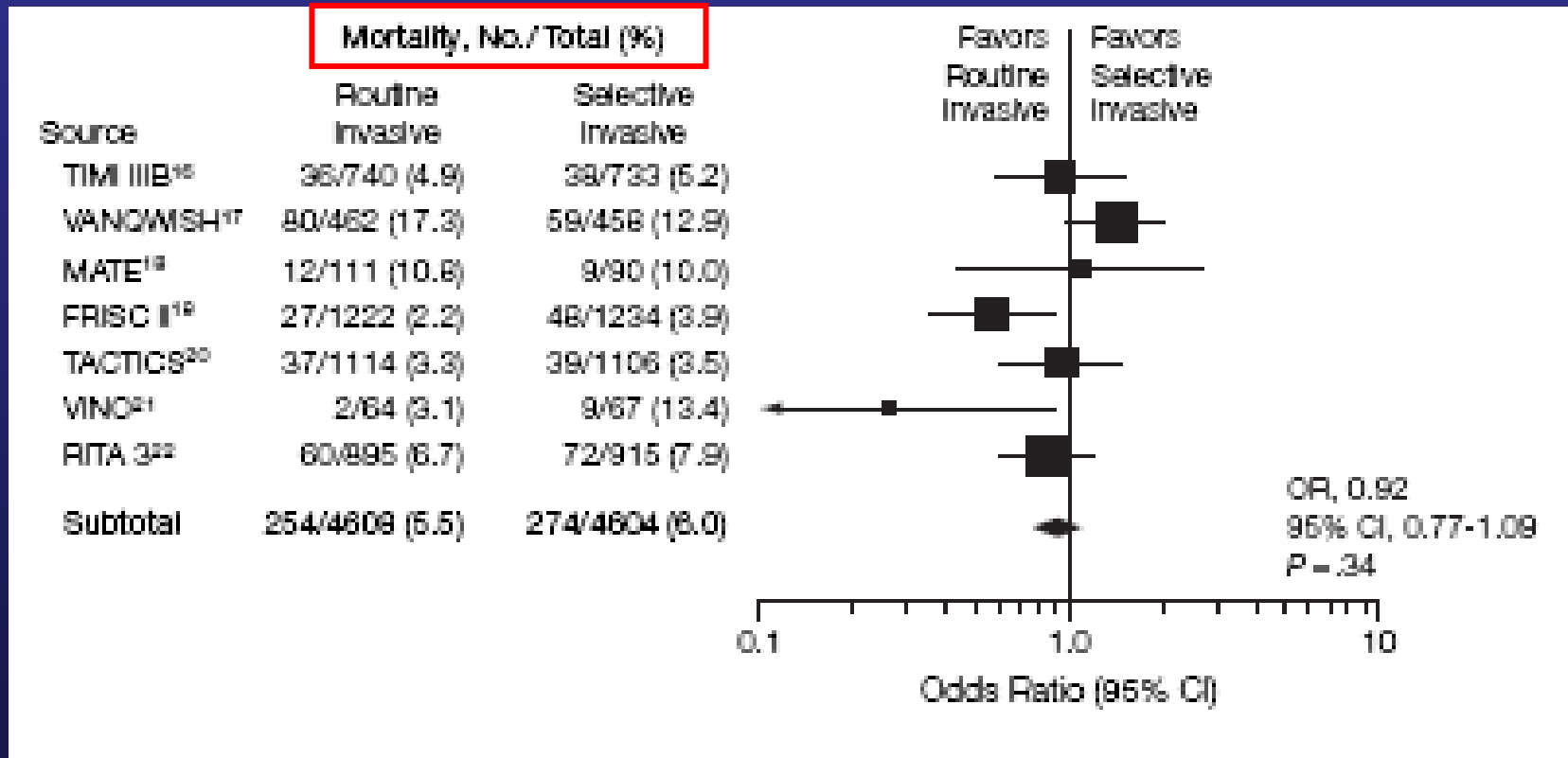
Early Invasive versus no early invasive

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



Early Invasive versus no early invasive

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





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.

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

A Randomized Controlled Trial

ISAR-COOL TRIAL

Franz-Josef Neumann, MD

Adnan Kastrati, MD

Gisela Pogatsa-Murray, MD

Julinda Mehilli, MD

Hildegard Bollwein, MD

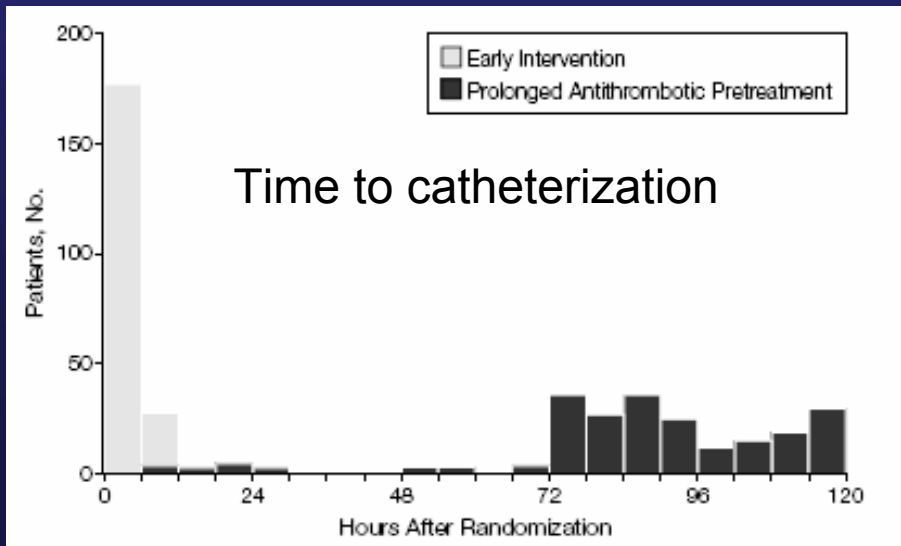
Hans-Peter Bestehorn, MD

Claus Schmitt, MD

Melchior Seyfarth, MD

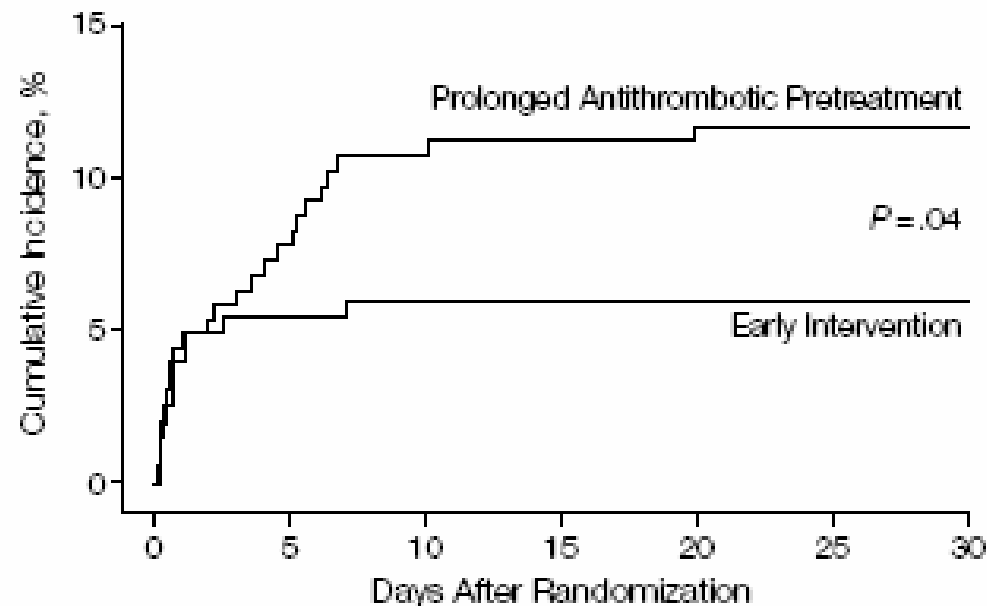
Josef Dirschinger, MD

Albert Schömig, MD



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

ISAR-COOL: Death/MI at 30 Days



	No. at Risk	0	5	10	15	20	25	30
Prolonged Antithrombotic Pretreatment	207	191	185	184	183	183	183	183
Early Intervention	203	192	191	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.

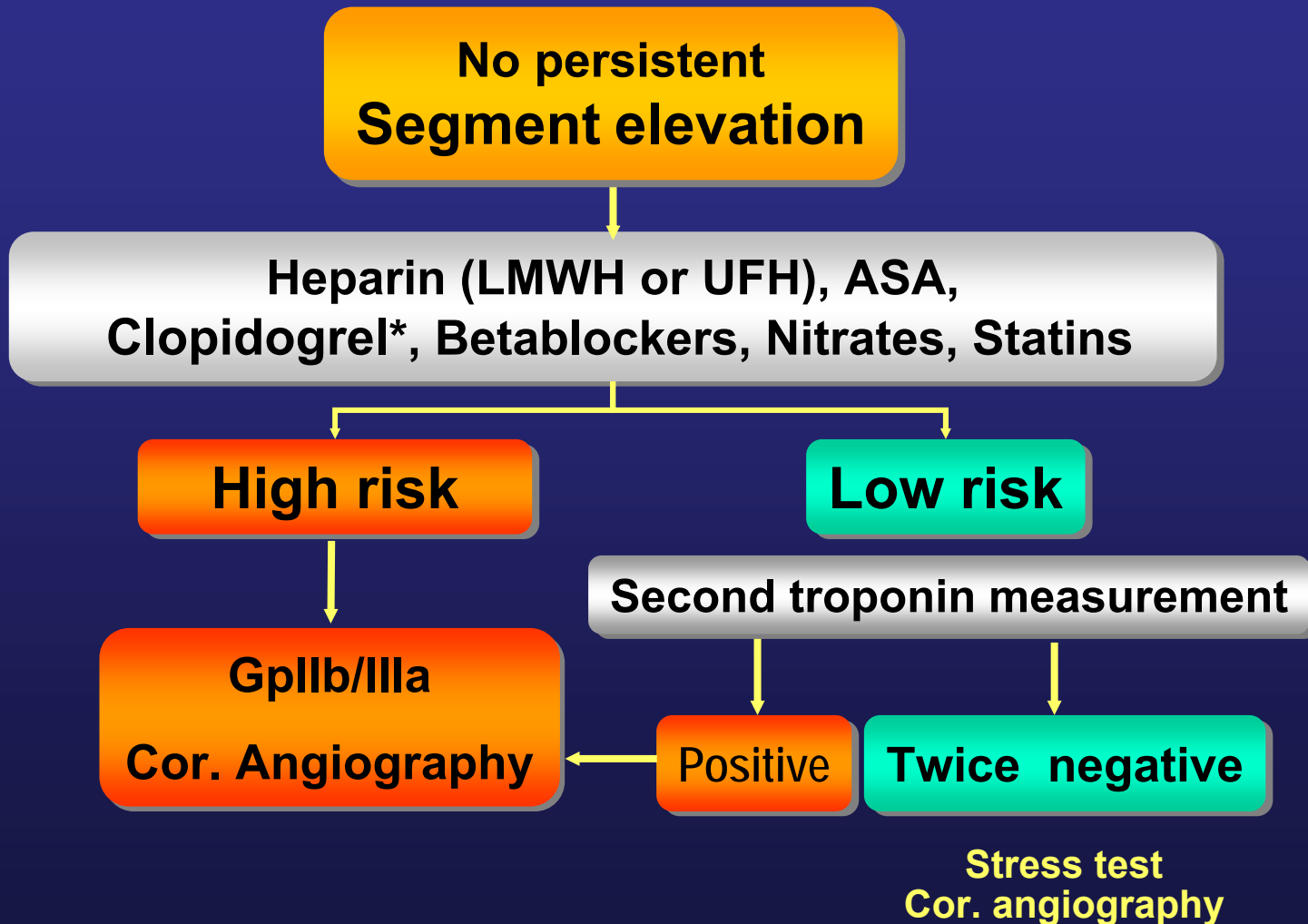
JAMA. 2003;290:1593-1599

www.jama.com

Clinical Suspicion of ACS



Physical examination, ECG monitoring, Blood samples



* Unless a CABG is planned within 5 days.

Merci

