Non-ST Elevation MI / Acute Coronary Syndrome

S.Matetzky
Sheba Medical Center
Heart Institute,ICCU

Outline

- Early invasive vs. conservative therapy
- Oral anti-platelets
- UFH vs. LMWH
- New anti-coagulants
- GP IIB/IIIA

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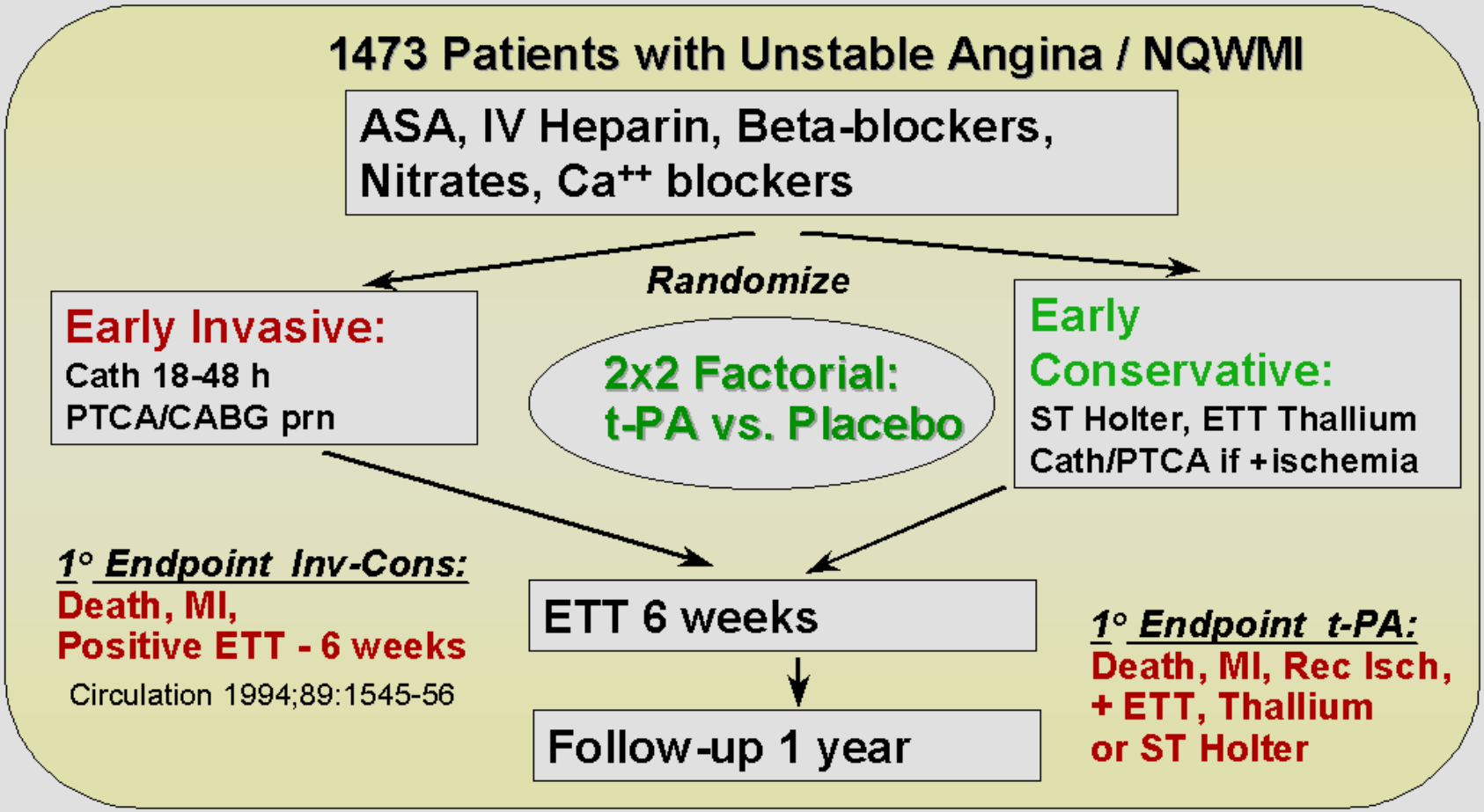
Early invasive Vs. Conservative Therapy

- TIMI IIIB (1994,1996)
- VANQWISH (1998)
- FRISC II (1999,2000)
- TACTICS TIMI 18 (2001)
- RITA 3 (2005)
- ICTUS (2007)

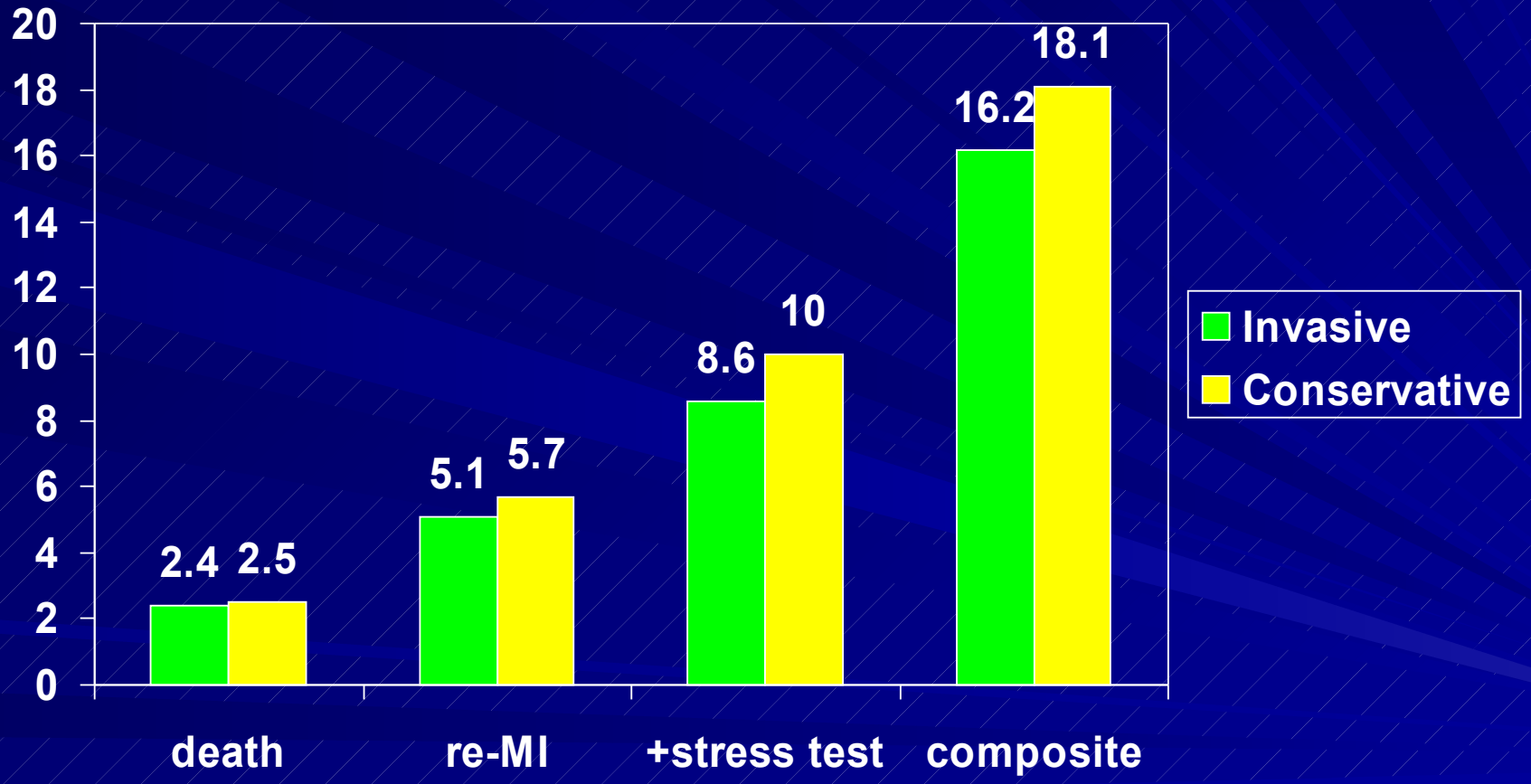
TIMI IIIB

Protocol Design



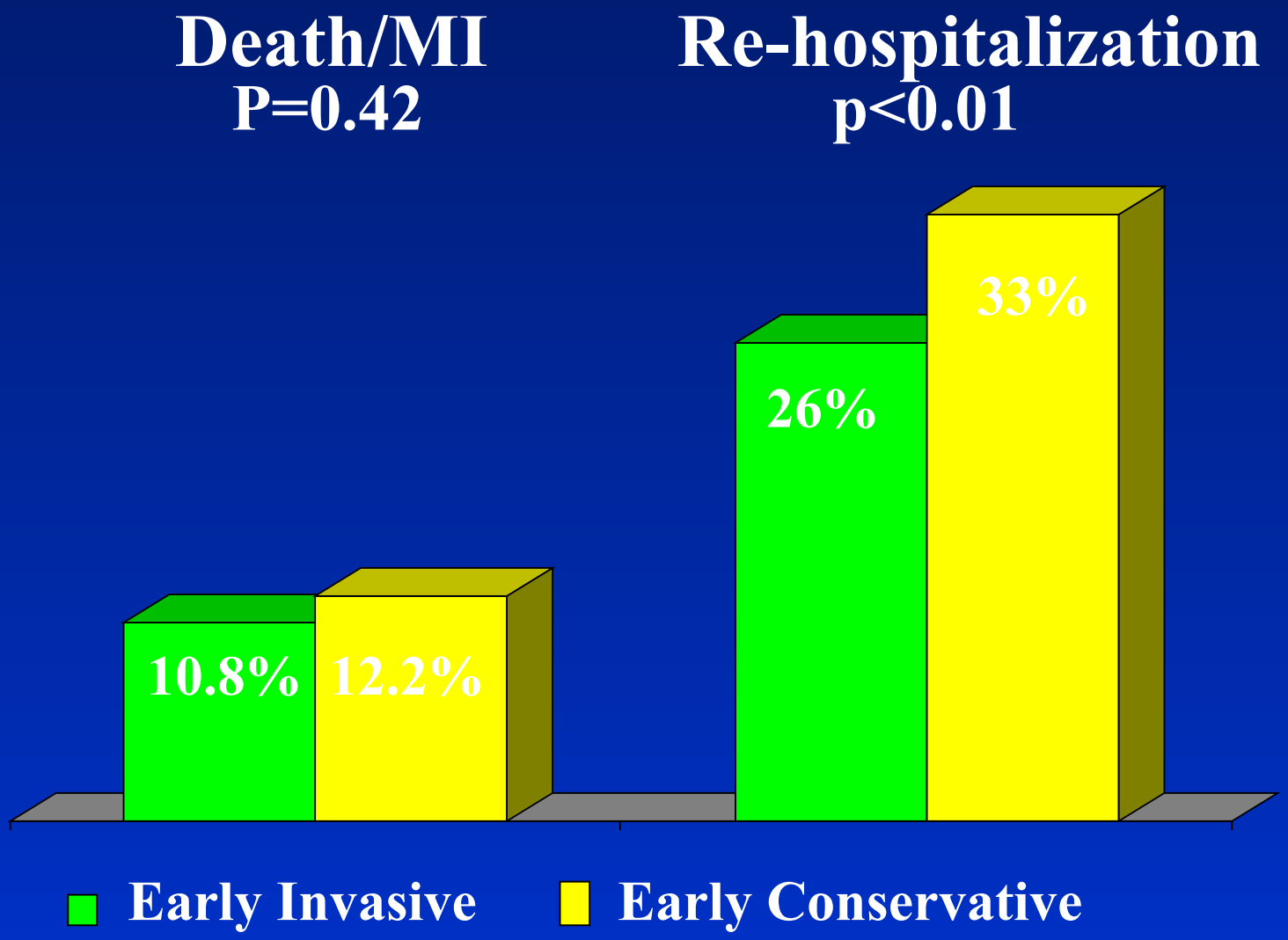
Circulation 1994

TIMI IIIB - 6-week results



Circulation 1994

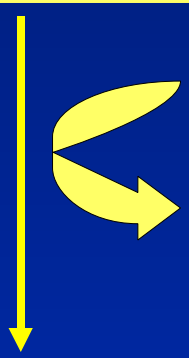
TIMI IIIB - 1 Year



JACC 1995; 26:1643-50

VANQWISH

2738 pts with NQMI
(CK- MB ≥ 1.5 UNL)



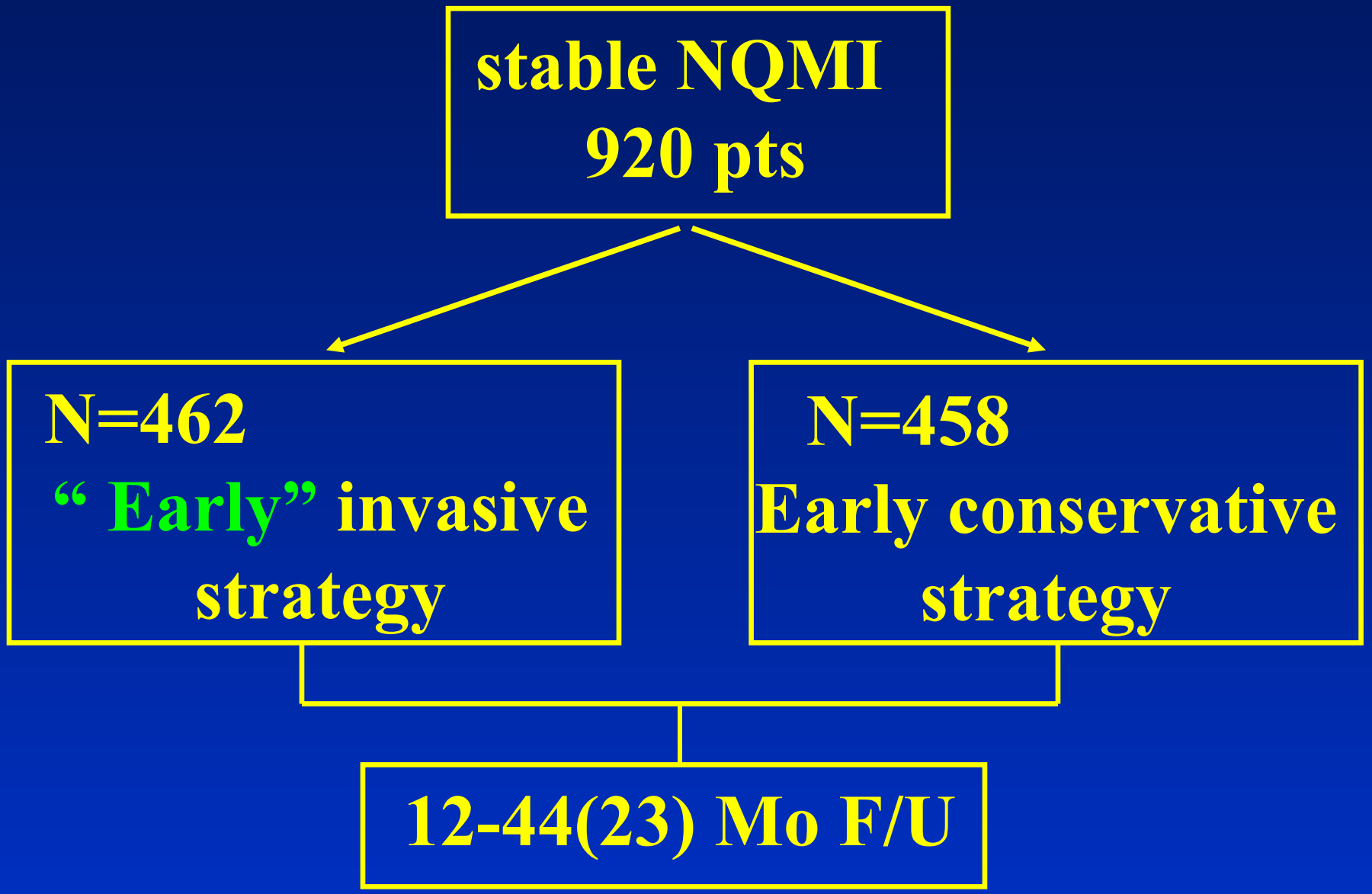
247 pts (9%)
Recurrent ischemia/ CHF during first 48 hr

clinically stable NQWMI

(at transfer from ICCU)

Randomization 48-72 hr after admission

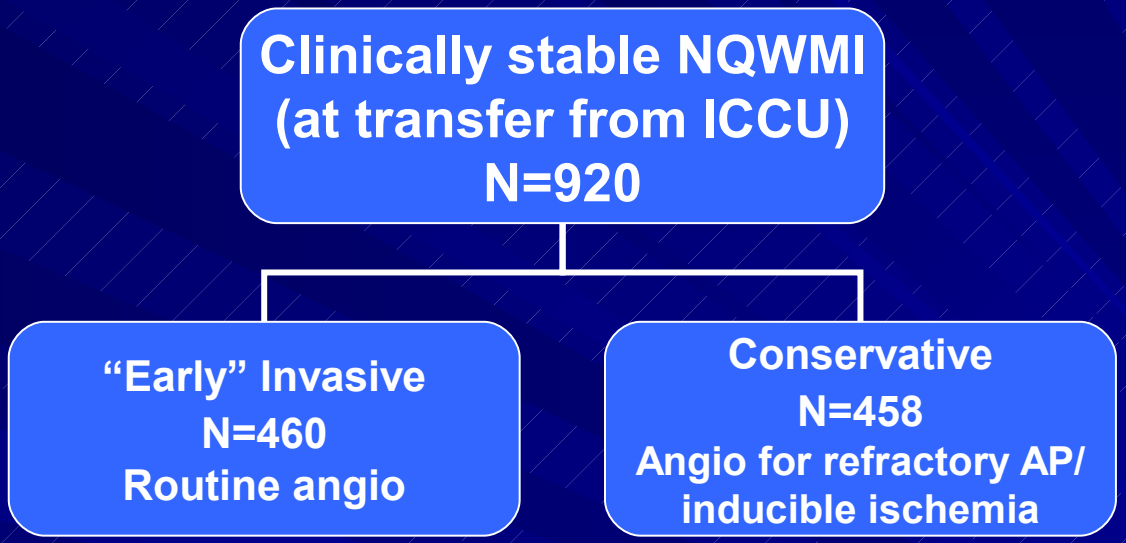
Boden et al. N Engl J Med, 1998



Boden et al. N Engl J Med, 1998

VANQWISH

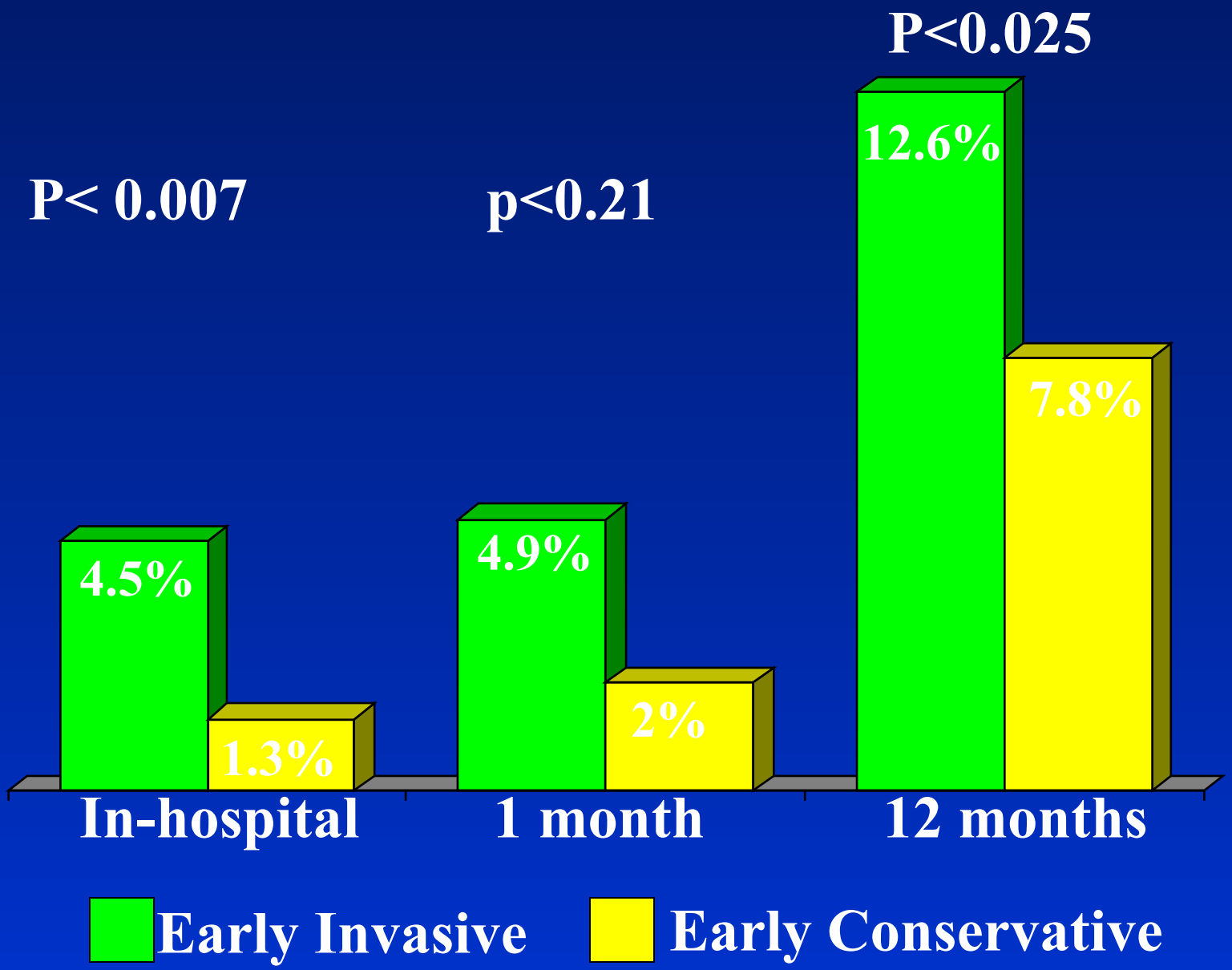
Randomization 48-72 hr)
(after admission



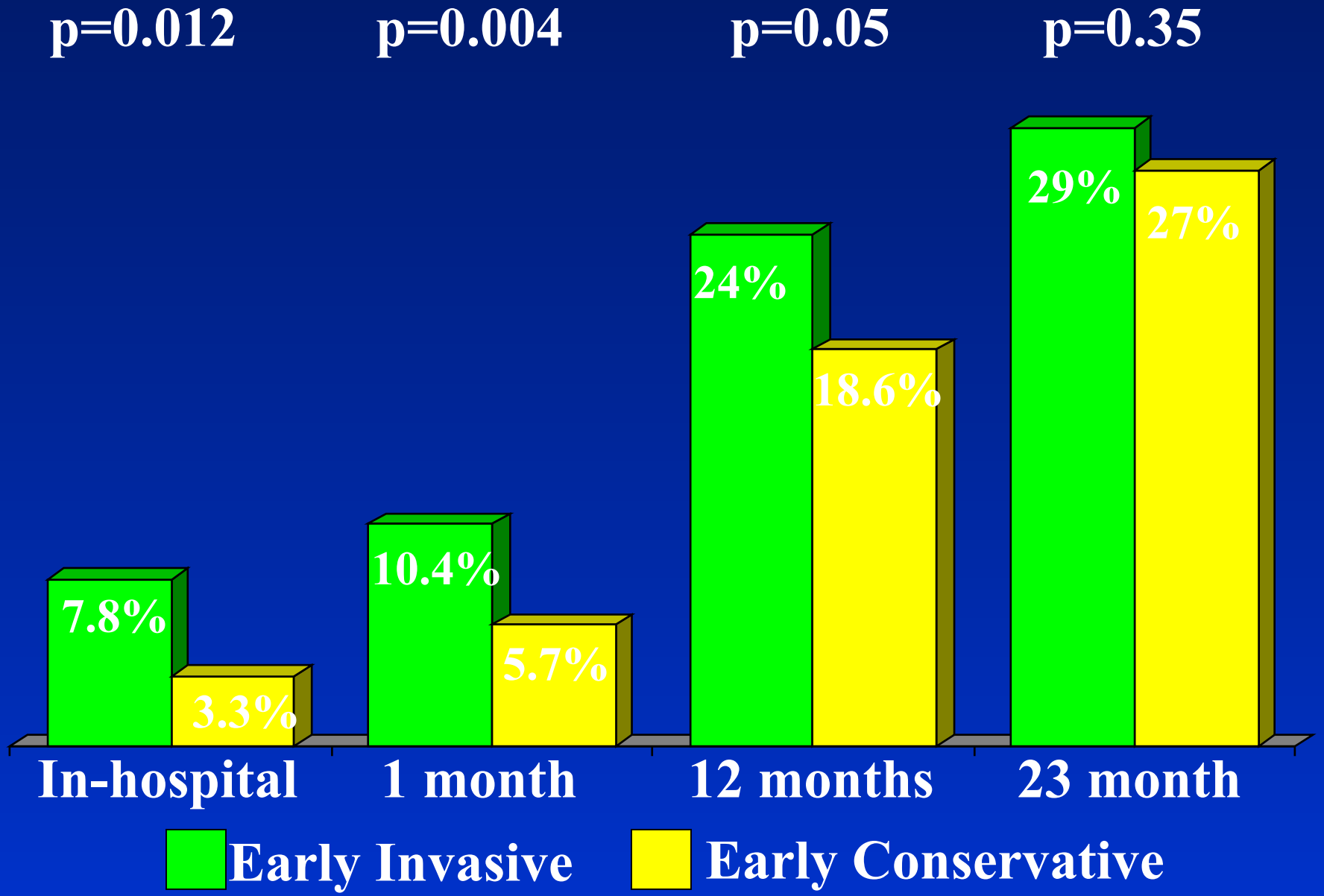
Angiography <72hr	96%	48%
Revascularization	44%	33%
Time to revas.	8d	25d

Boden et al. N Engl J Med, 1998

Mortality


P<0.025
P< 0.007
p<0.21
12.6%
7.8%
4.5%
4.9%
2%
1.3%
In-hospital
1 month
12 months
Early Invasive
Early Conservative

Death and non-fatal MI



FRISC II: UCAD Treatment Will Never Be the Same Again

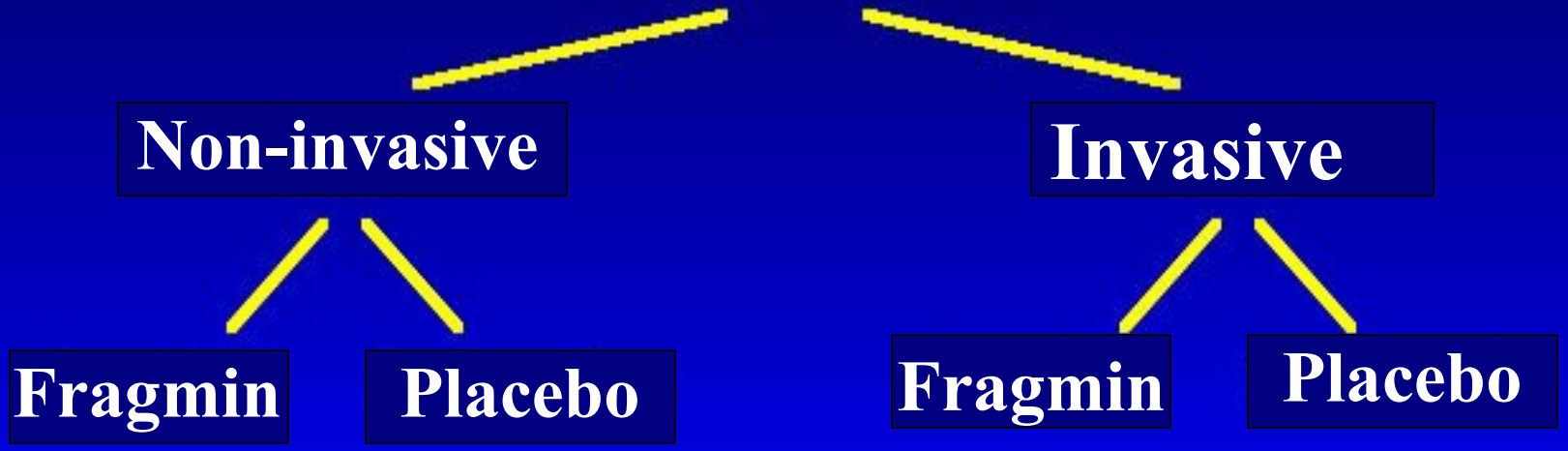
Fragmin®
(dalteparin sodium)

The Lancet 1999;354:708-715

Study design of FRISC-2

Medical management with
ASA, dalteparin, nitrates
and ß-blockers for a
minimum of 5 days

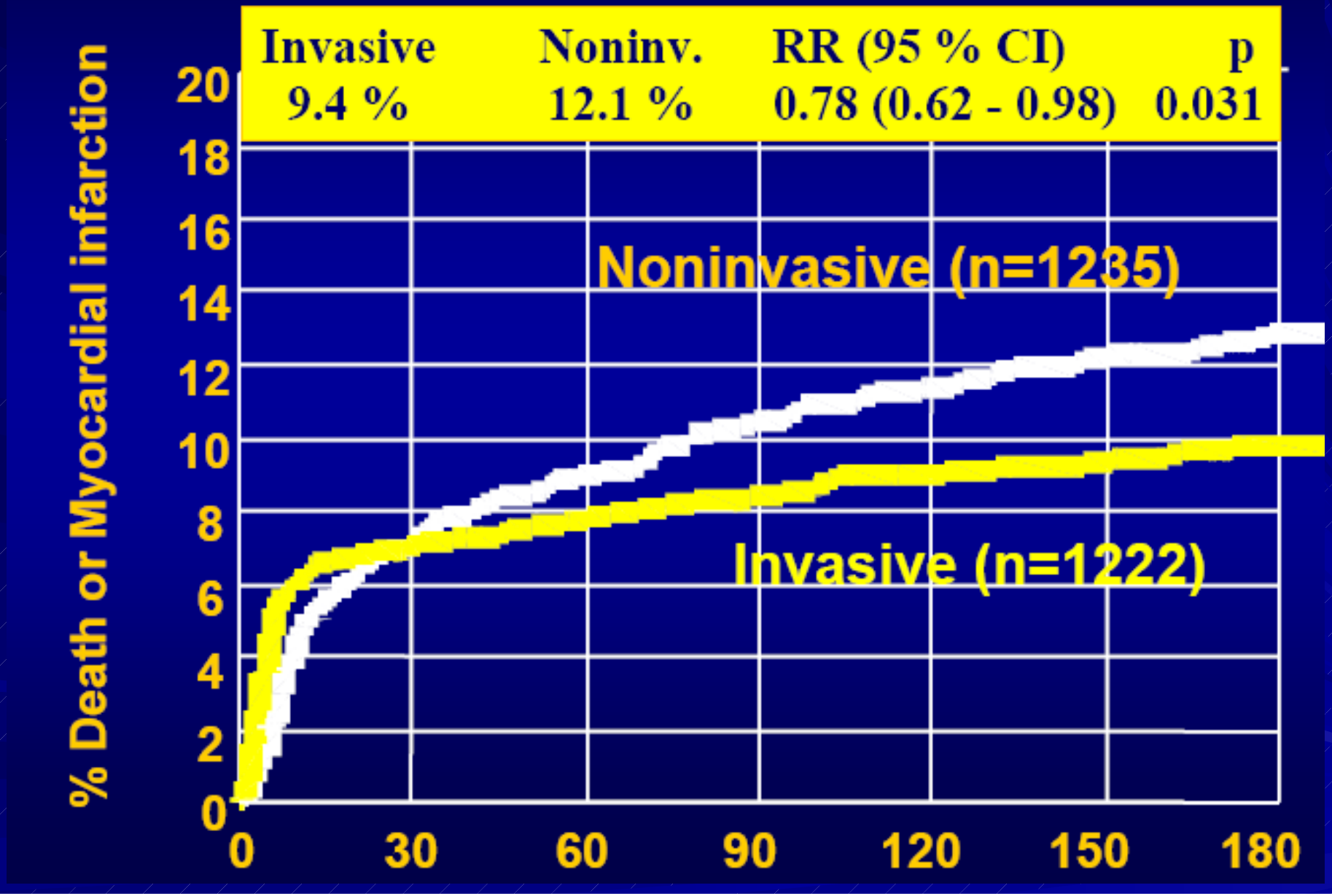
Randomization (2 x 2)
N = 2398



PT 1999

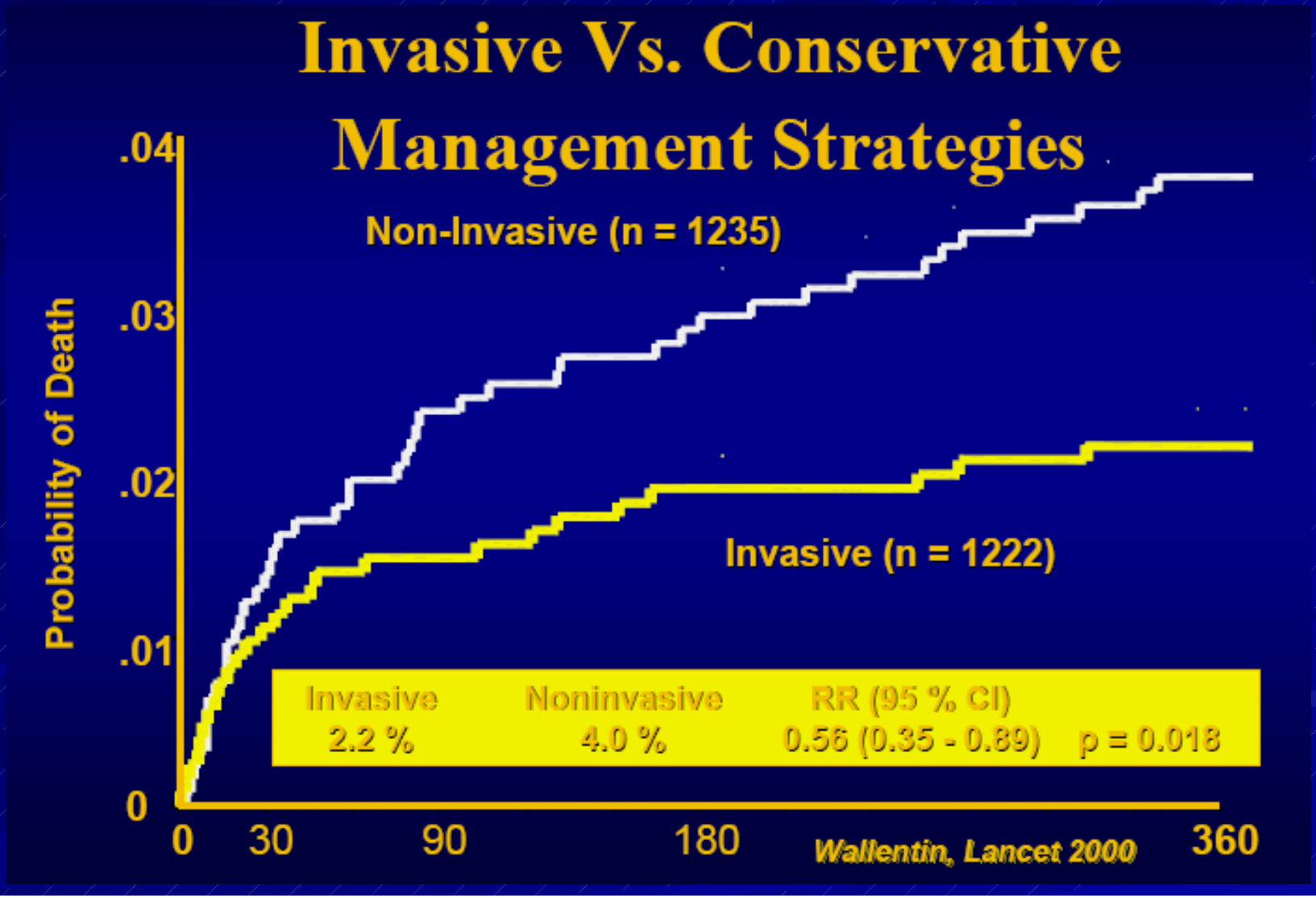
The Lancet 1999;354:708-715

FRISC II – death or MI



Lancet 1999

FRISC II – 1 year mortality

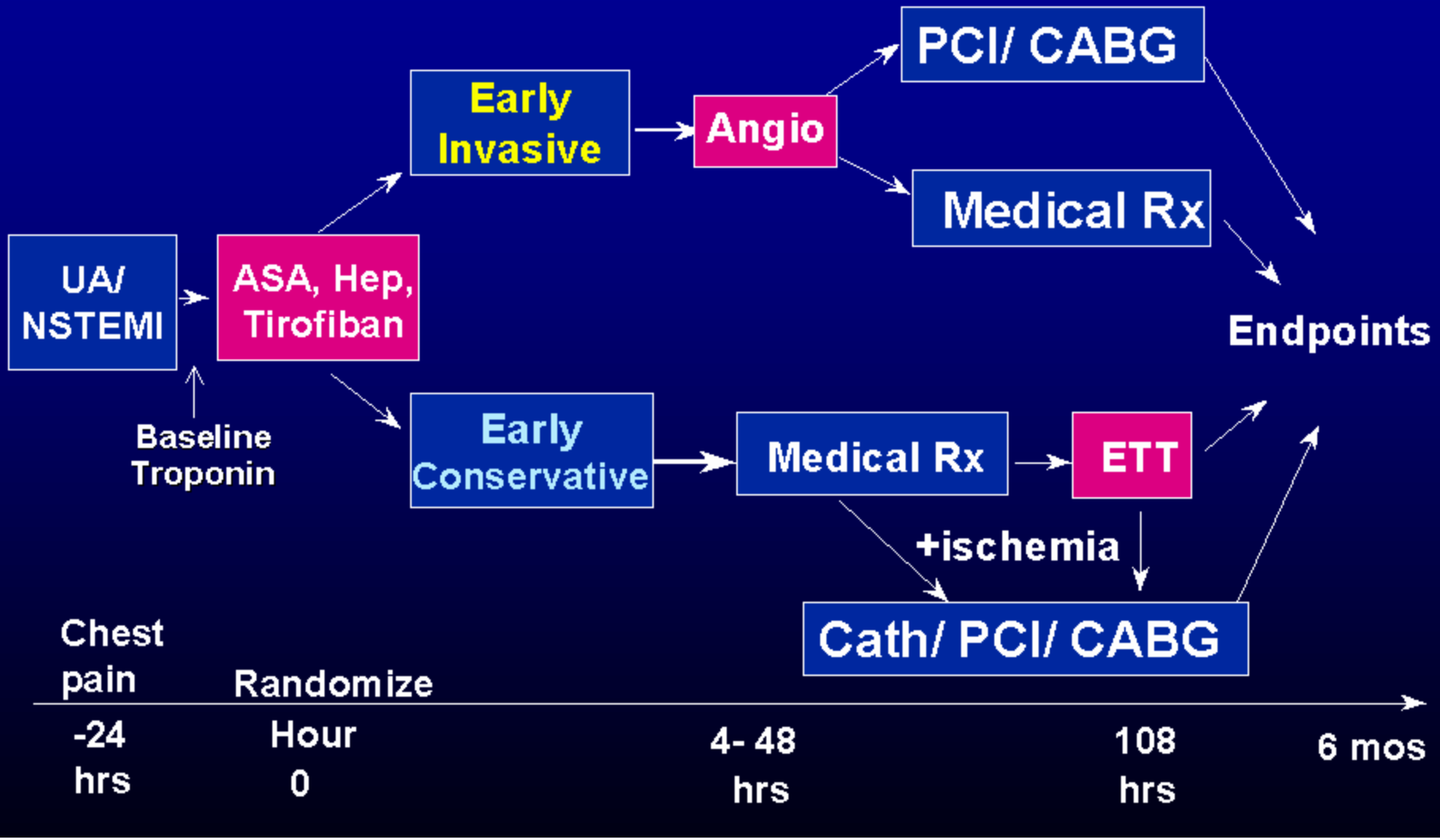


Lancet 2000

TACTICS-TIMI 18

Treat Angina with
Aggrastat + Determine
Cost of
Therapy with an
Invasive or
Conservative
Strategy
TIMI 18

TACTICS-TIMI 18 Study Design



N Engl J Med, 2001

Cardiac Events at 30 Days

	CONS (%)	INV (%)	OR	P value
No. Pts	1106	1114		
1° Endpoint	10.5	7.4	0.67	0.009
Death/MI	7.0	4.7	0.65	0.02
Death	1.6	2.2	1.40	0. 29
MI	5.8	3.1	0.51	0.002
Rehosp ACS	5.5	3.4	0.61	0.018

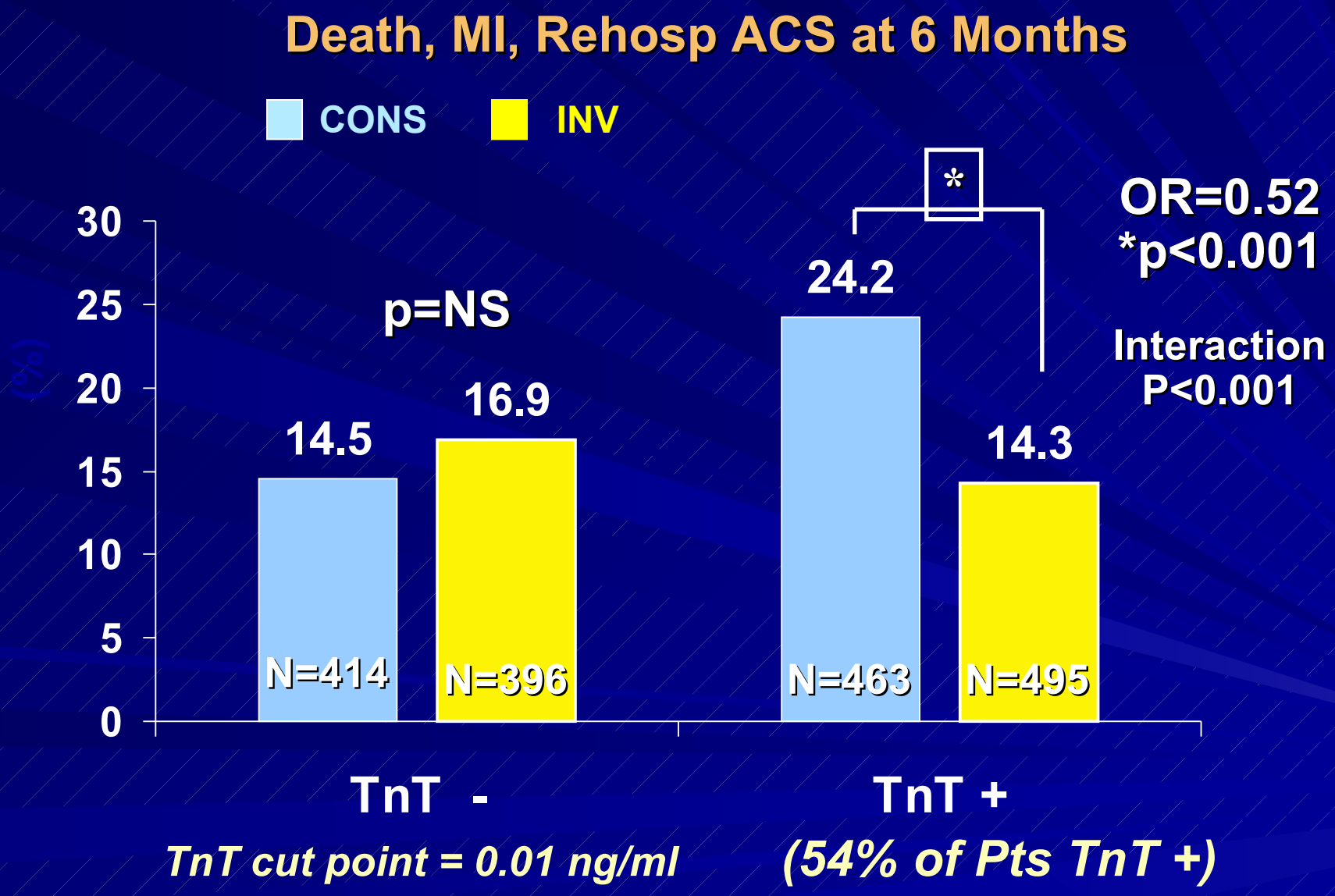
N Engl J Med, 2001

Cardiac Events at 6 Months

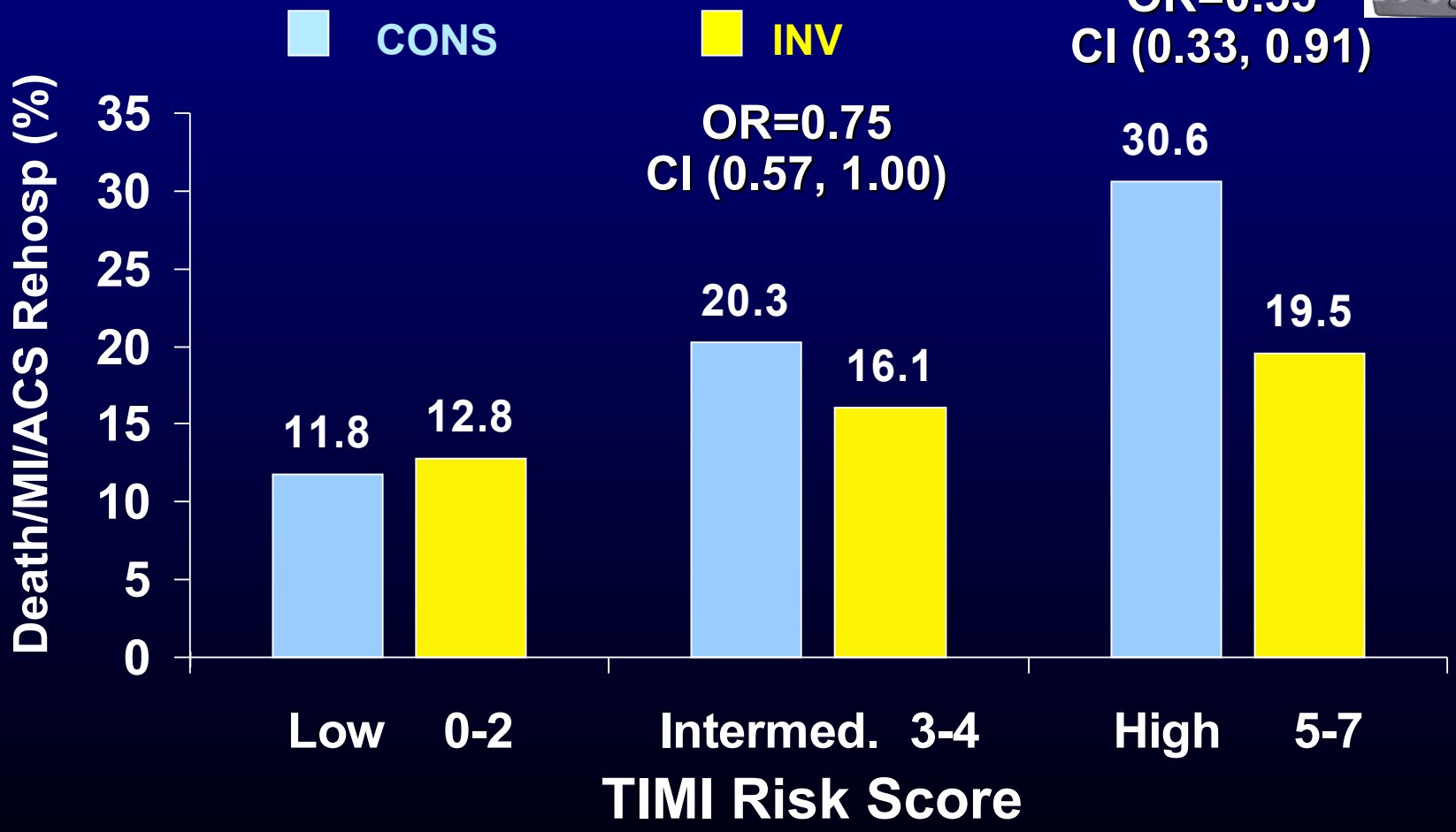
	CONS (%)	INV (%)	OR	P value
No. Pts	1106	1114		
1° Endpoint	19.4	15.9	0.78	0.025
Death/MI	9.5	7.3	0.74	<0.05
Death	3.5	3.3	0.93	0.74
MI	6.9	4.8	0.67	0.029
Rehosp ACS	13.7	11.0	0.78	0.054

N Engl J Med, 2001

Troponin T: 1°EP at 6 months

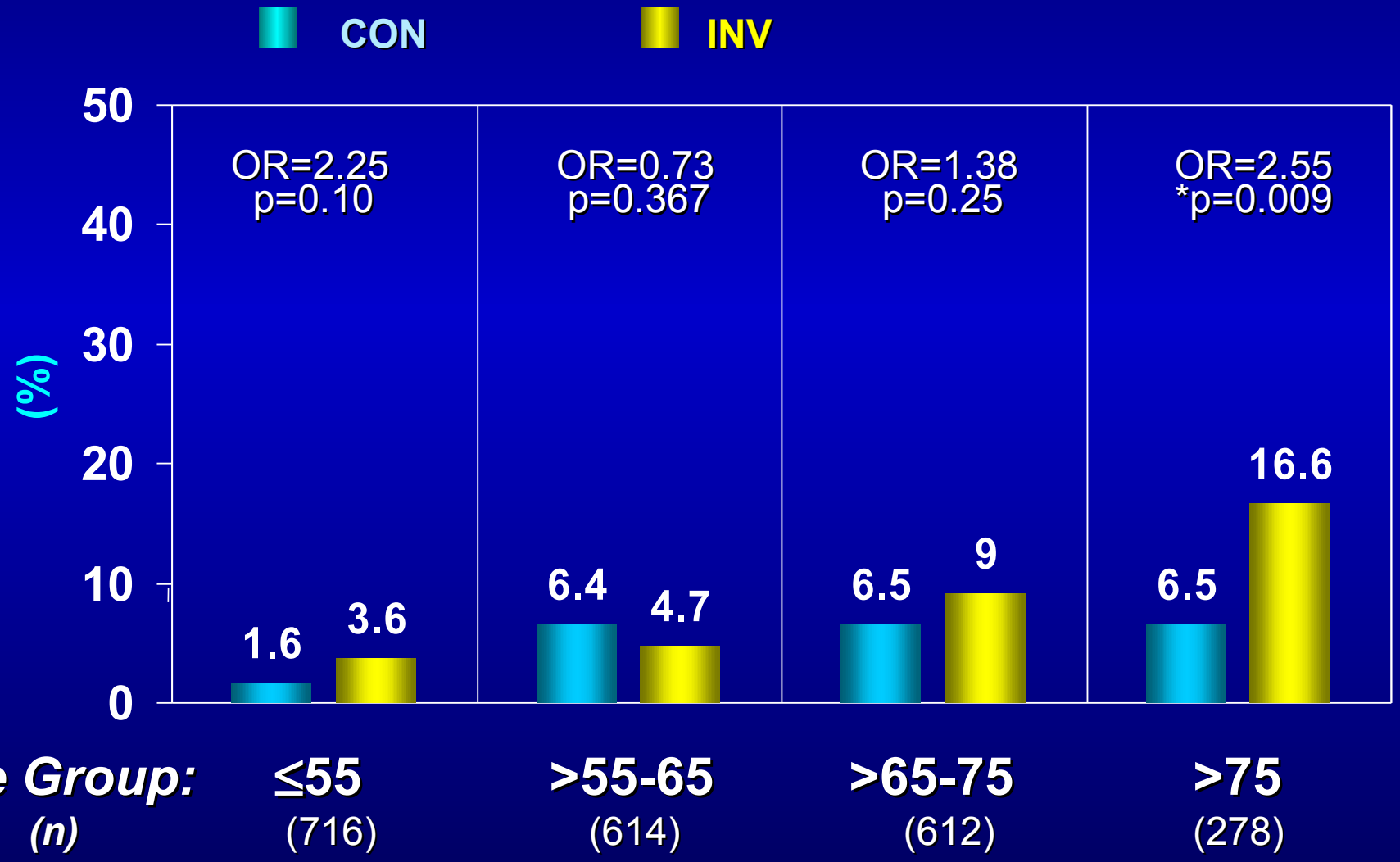


TIMI Risk Score: 1°EP at 6 mos

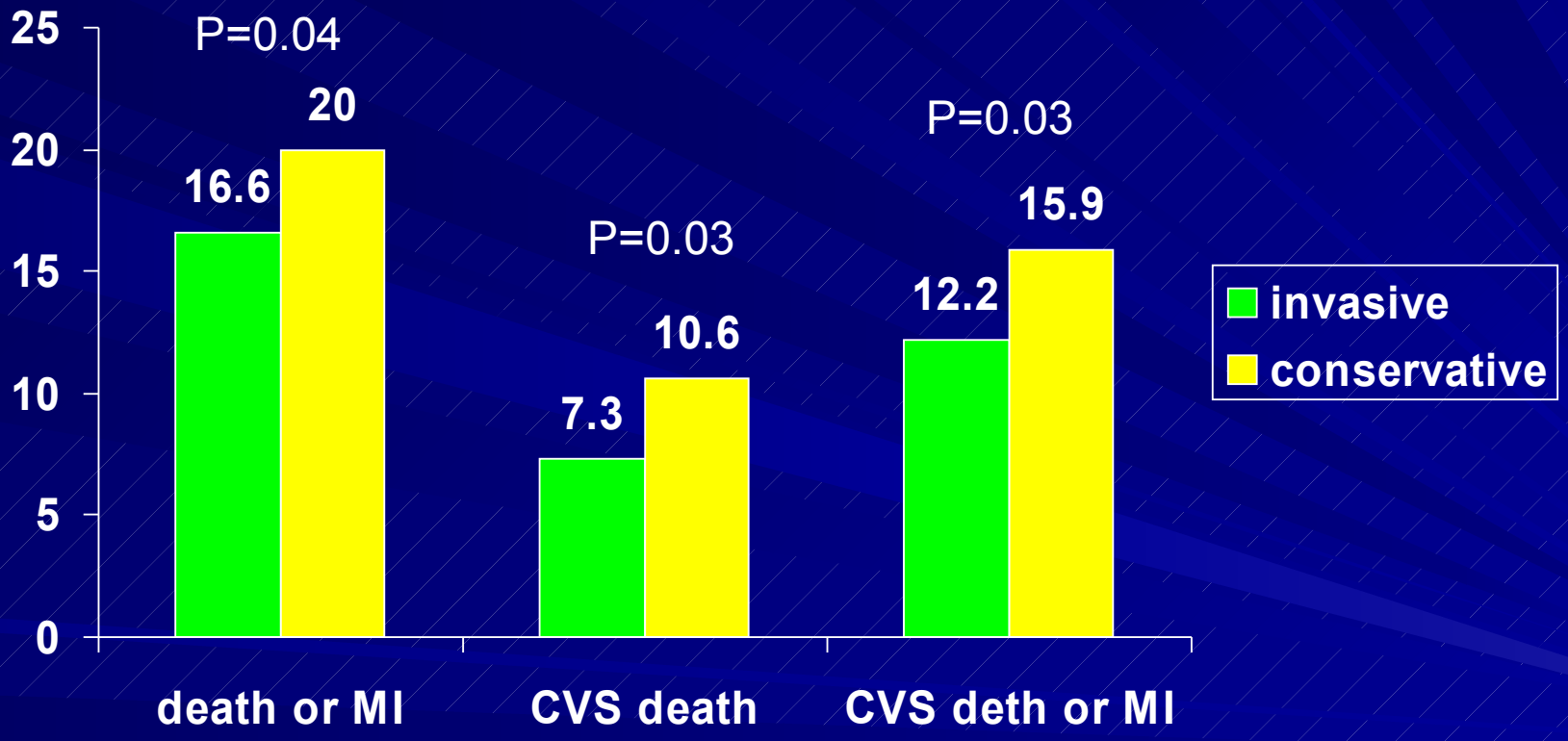


% of Pts: 25% 60% 15%

Major Bleeding According to Treatment Strategy Stratified by Age Group in TACTICS-TIMI 18



RITA 3 – 5 year results



Fox et al. Lancet 2005

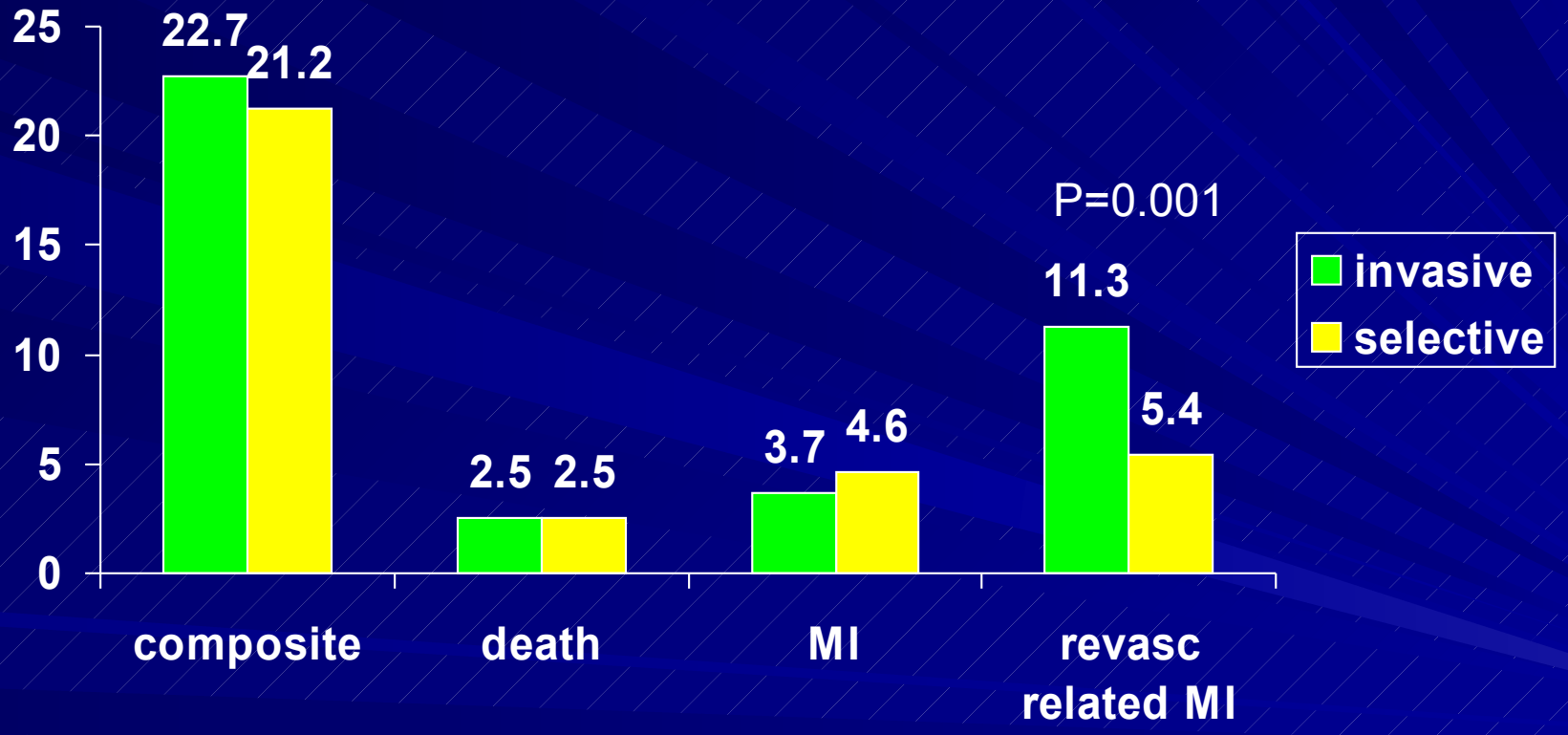
ICTUS

- N=1200 NSTE-ACS + elevated TnT
  - Early invasive n=604
  - Selective invasive for refractory angina or recurrent ischemia n=596

	Early invasive	Selective
	PCI / CABG	PCI / CABG
Within 2 days	53% / 2%	4% / <1%
In-hospital	60% / 16%	28% / 11%
1-year	61% / 18%	40% / 14%

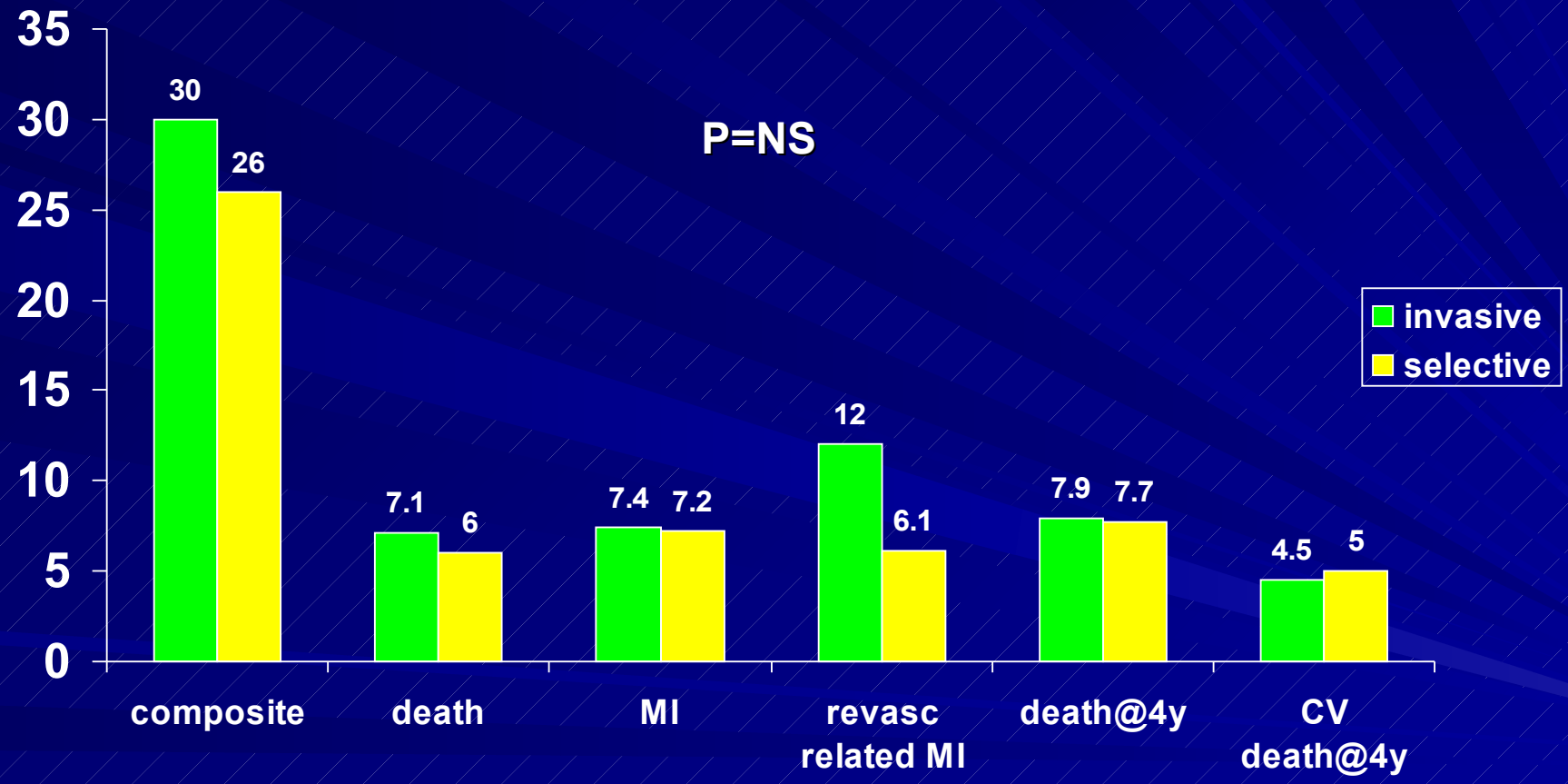
De Winter et al, NEJM 2005 and Hirsch et al, Lancet 2007

ICTUS – 1 year results



De Winter et al, NEJM 2005

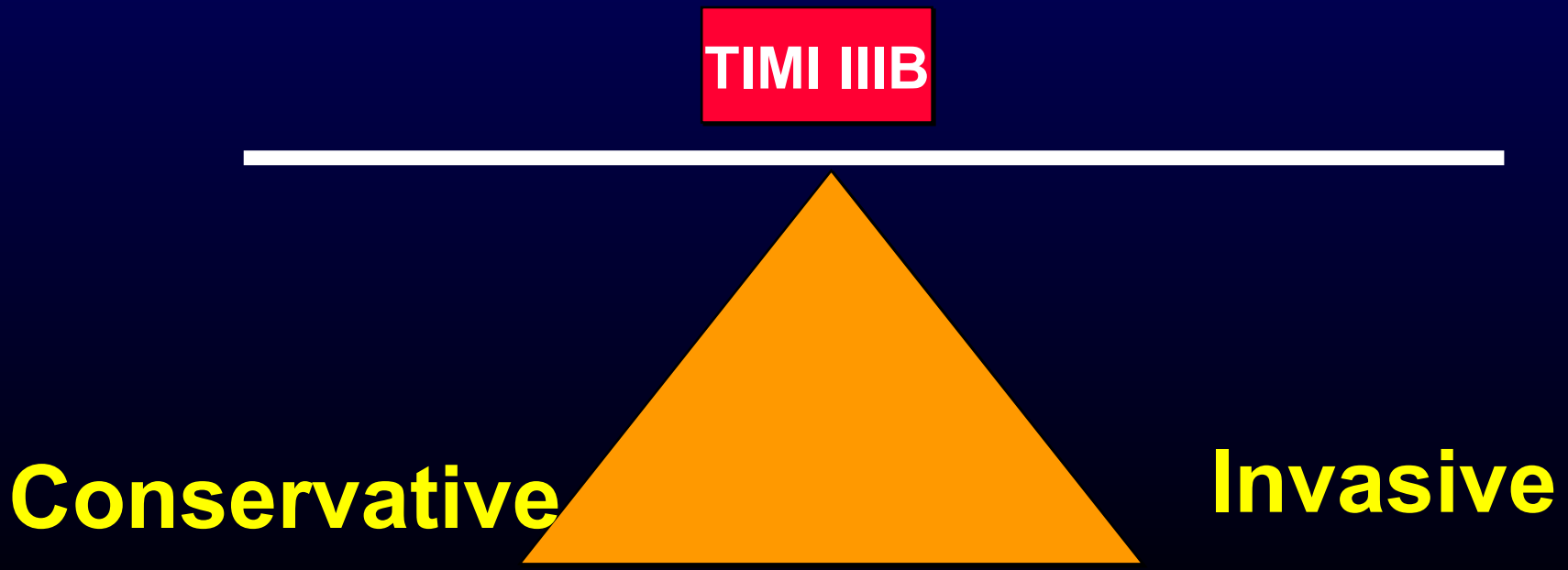
ICTUS – 3 year results



Hirsch et al, Lancet 2007

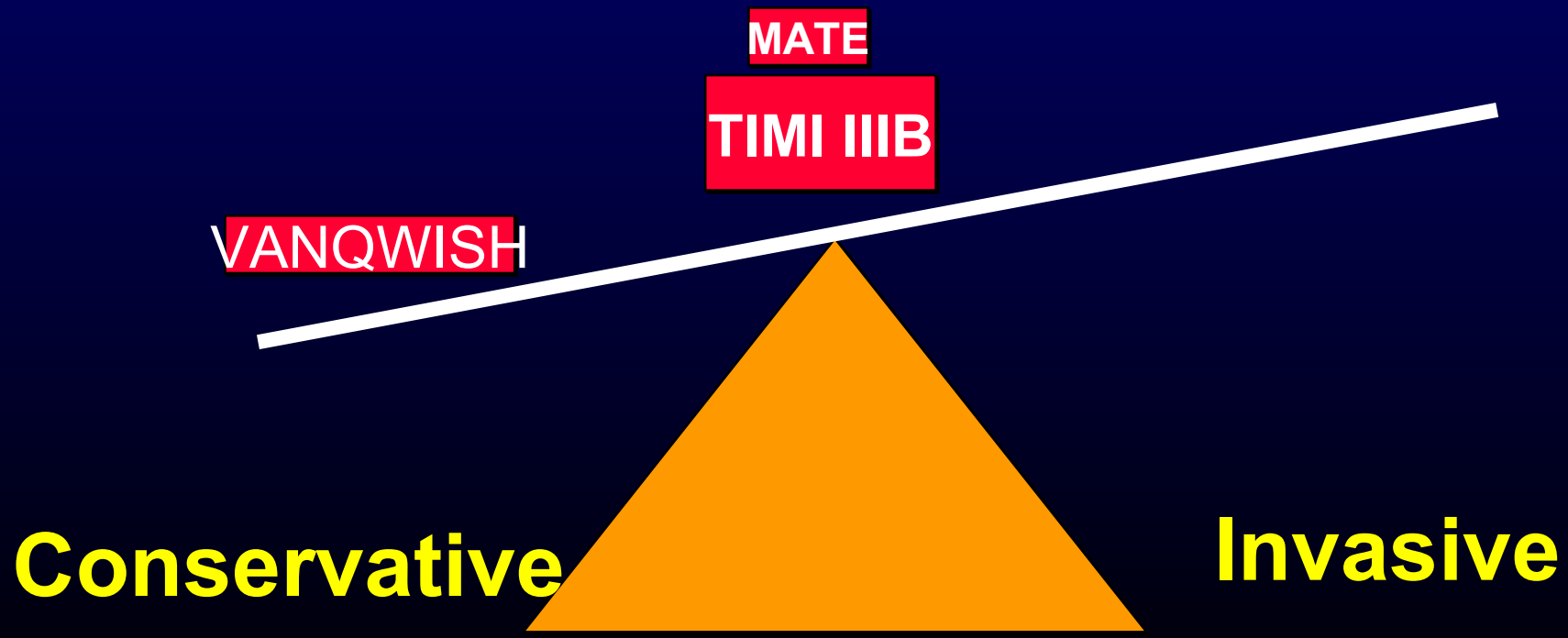
Optimal Strategy for UA/NSTEMI

1994



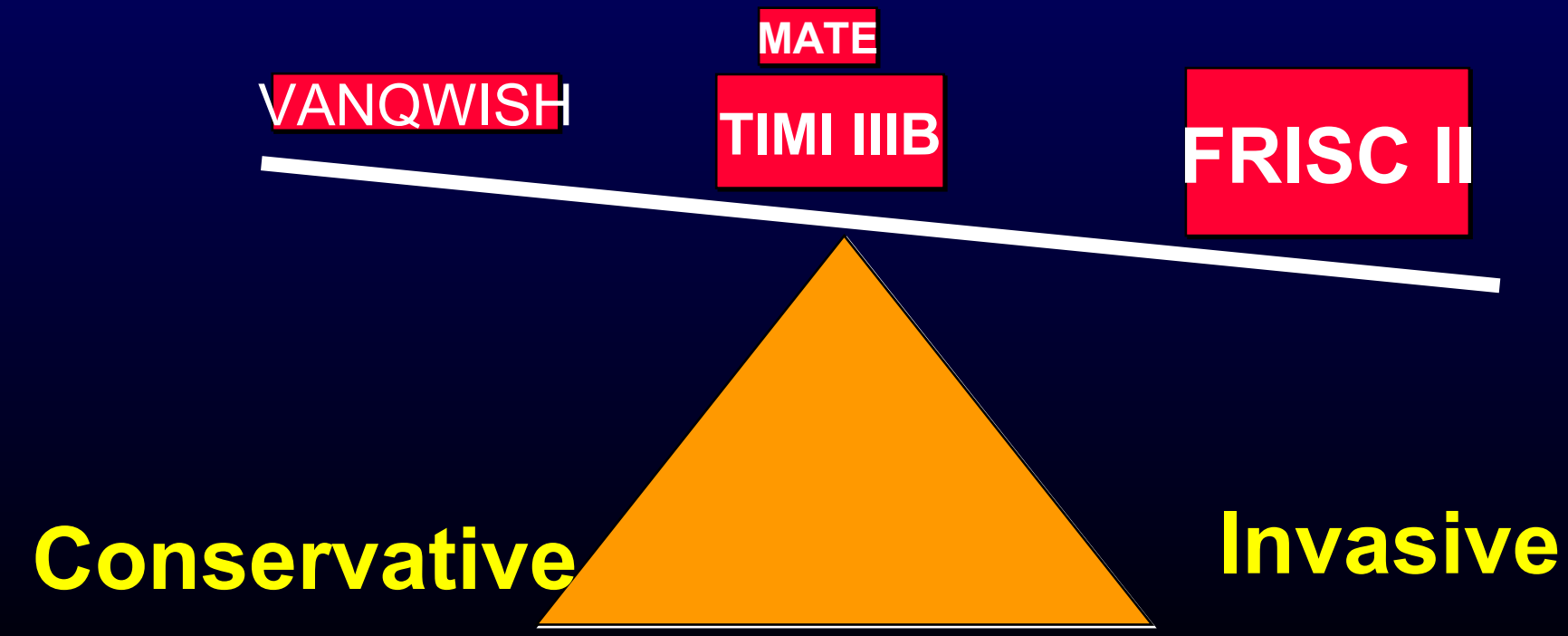
Optimal Strategy for UA/NSTEMI

1996



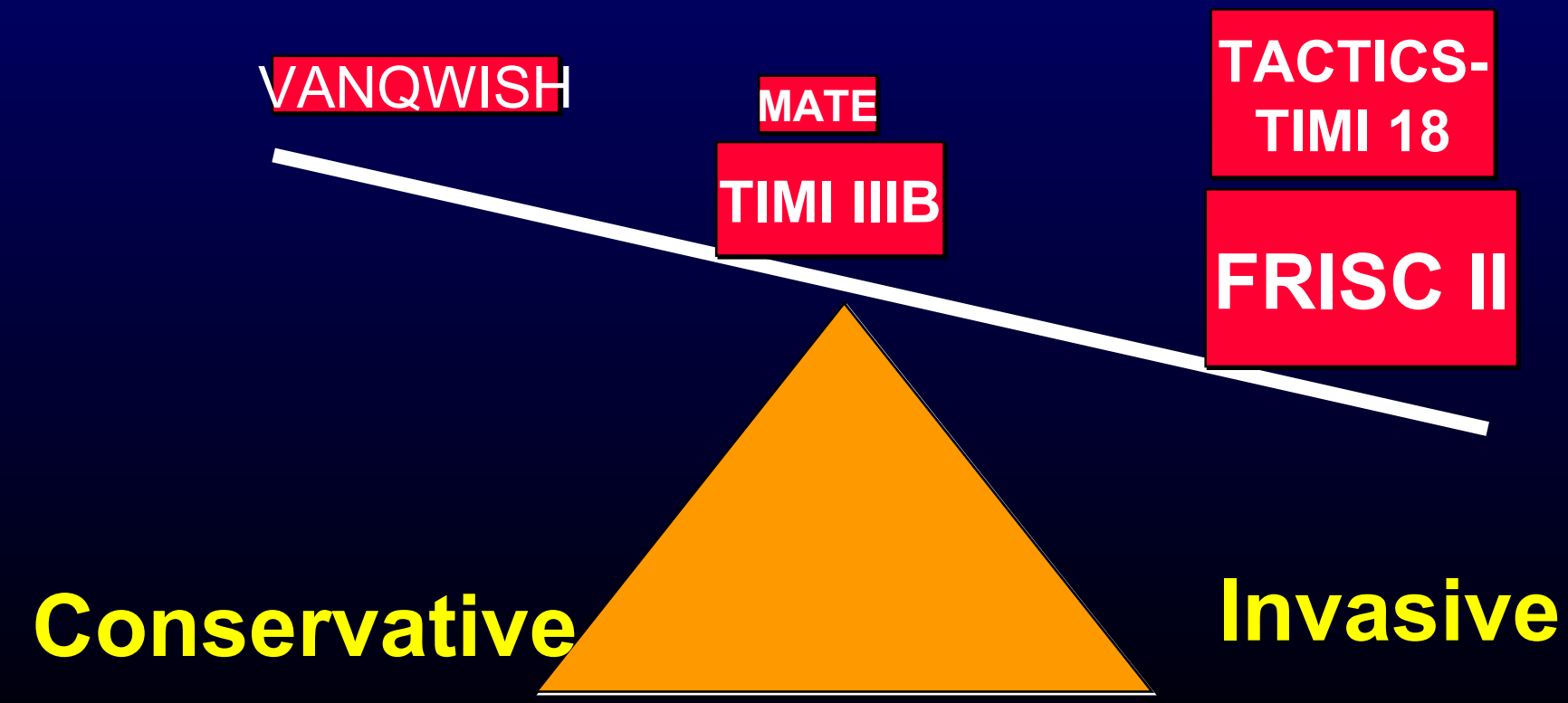
Optimal Strategy for UA/NSTEMI

1999

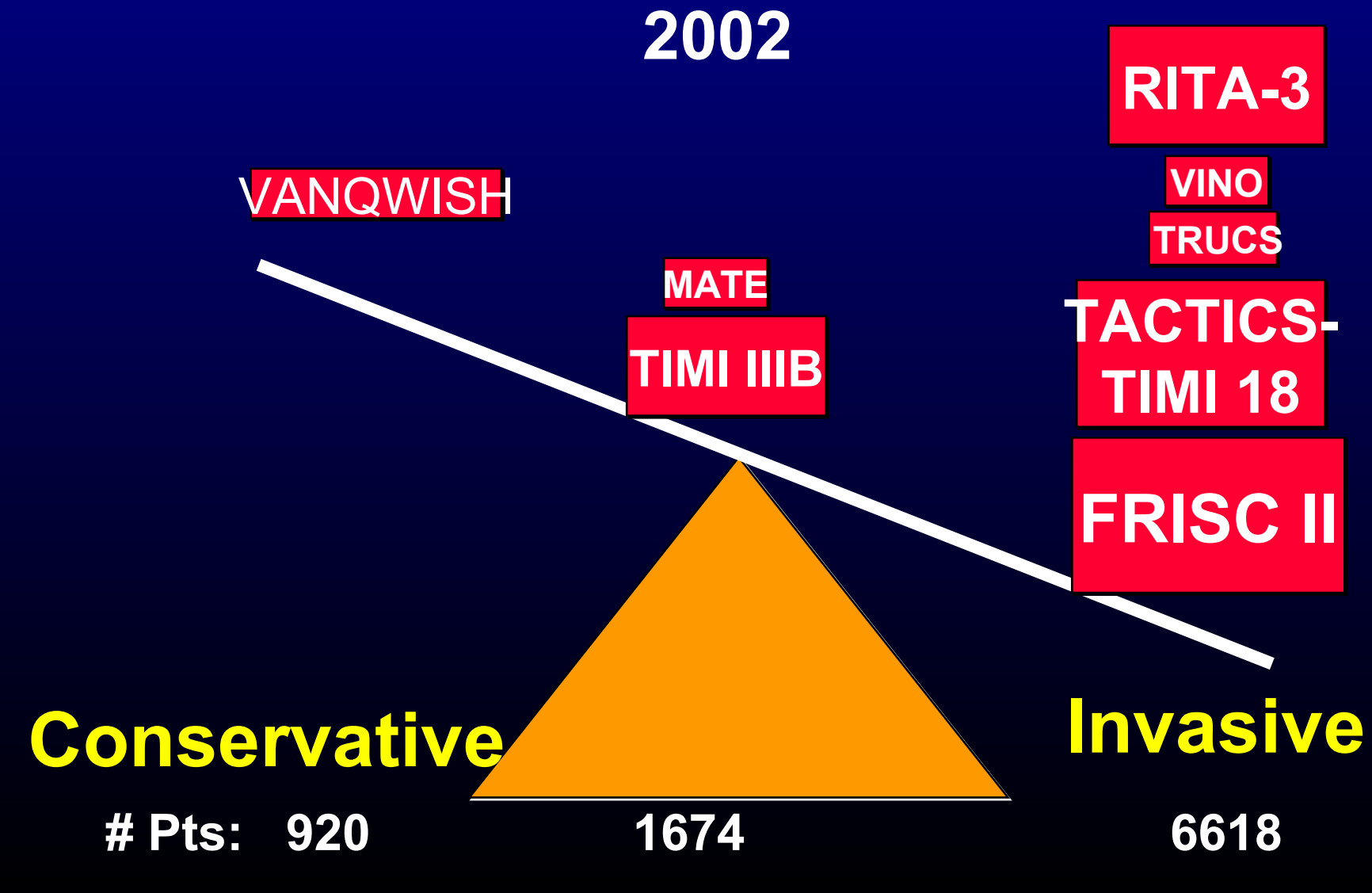


Optimal Strategy for UA/NSTEMI

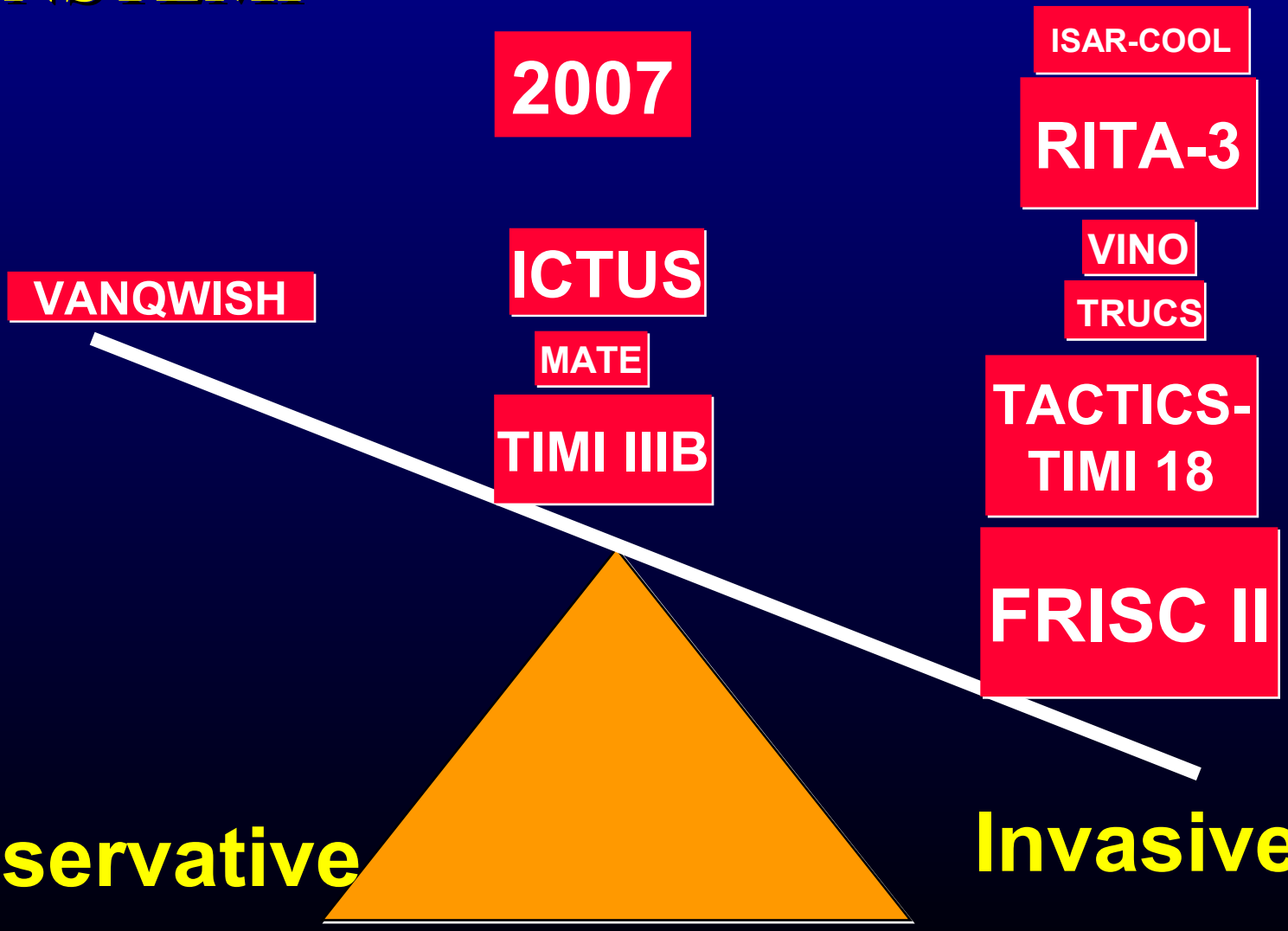
2001



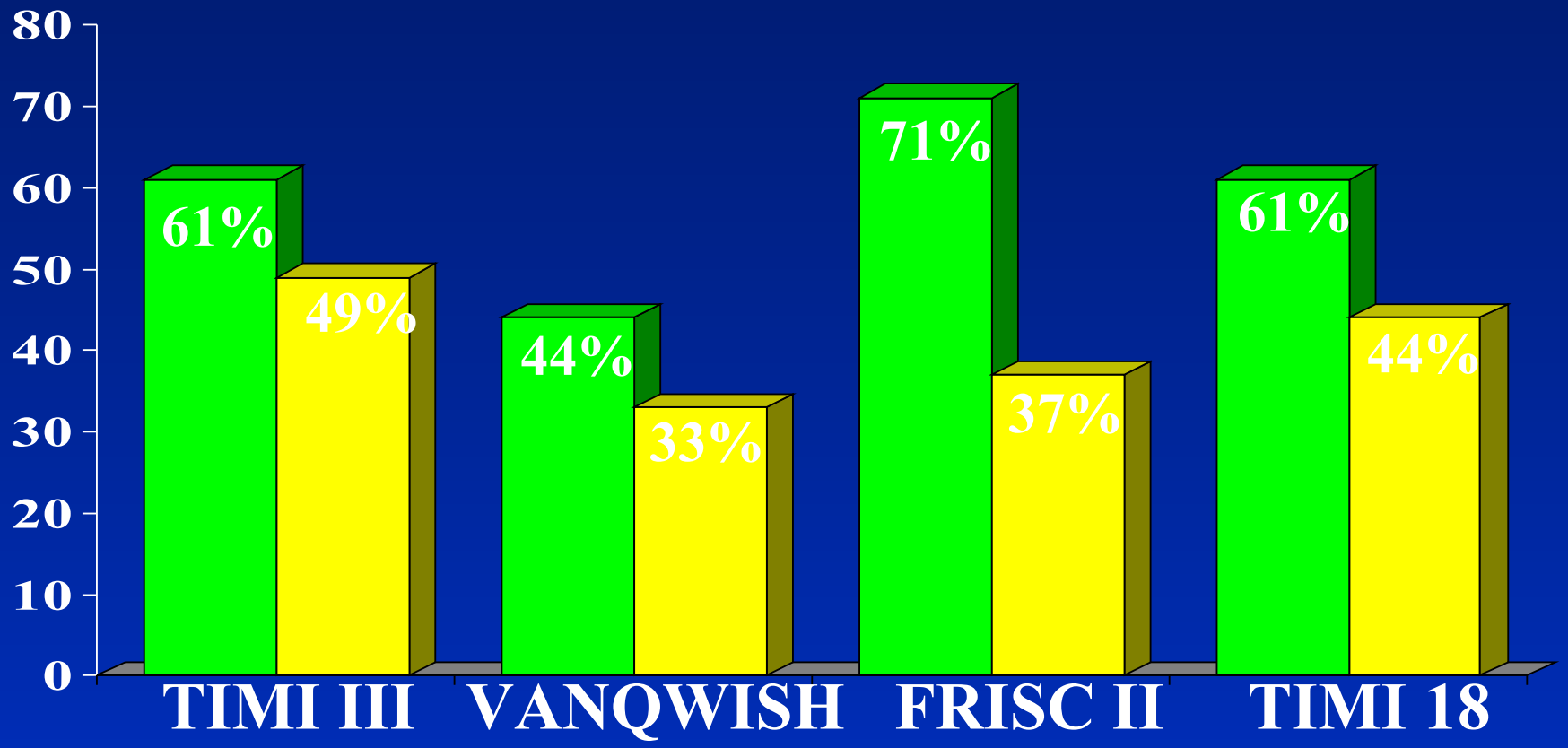
Optimal Strategy for UA/NSTEMI



Invasive vs. Conservative Strategy for UA/NSTEMI



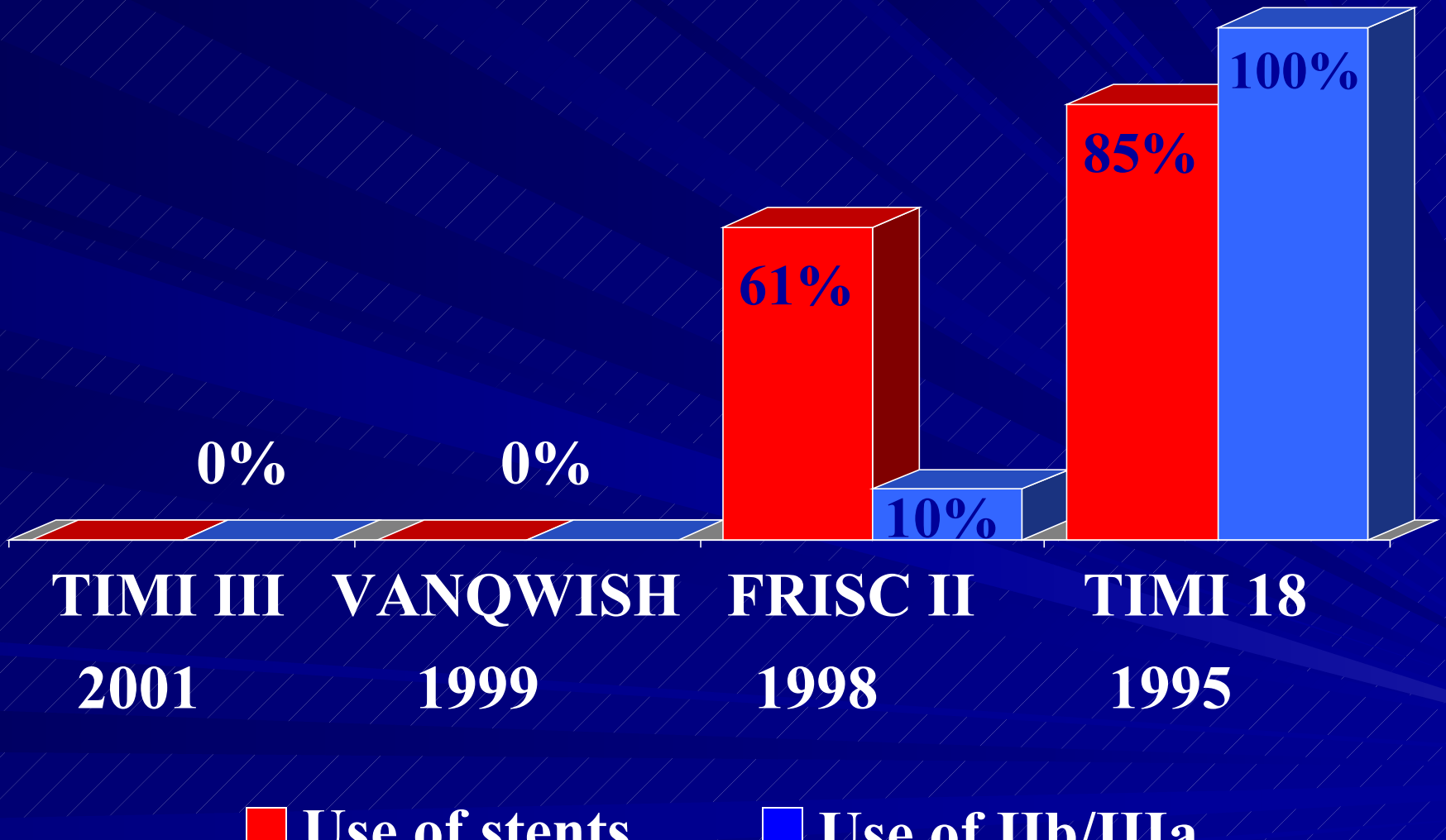
% Revascularization



? “How Early is “Early

	PCI	CABG	Revascula-rization
TIMI III	as soon as possible, **>48hr**	within 6 w	NA
VANQWISH	NA	NA	**8(5,18)d**
FRISC II	**4(2,7)d**	7(5,13)d	71% within 10d
TIMI 18	**25(19,46)hr**	89(10,139)hr	NA

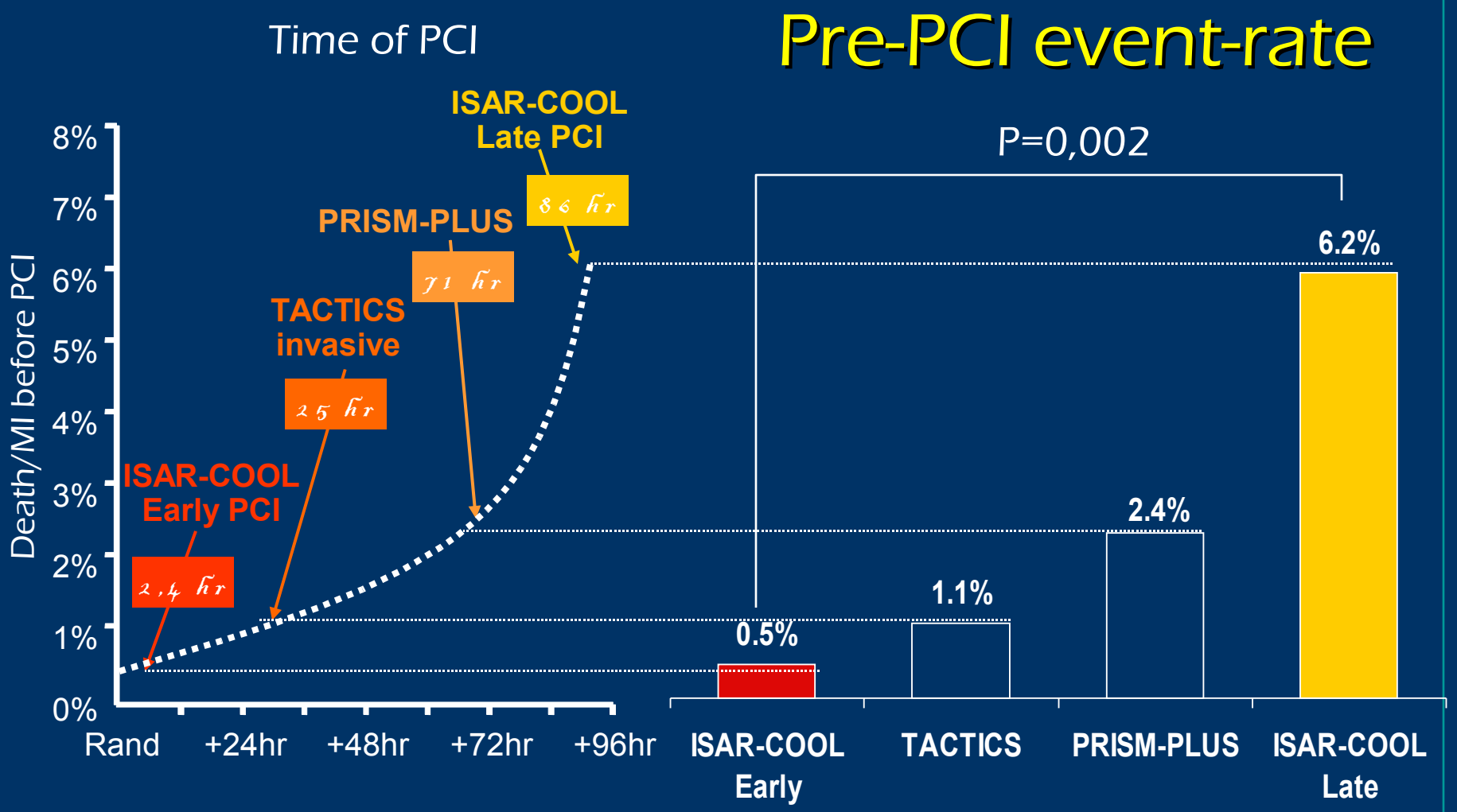
Use of Stents and IIb/IIIa Antagonists



If brute force isn’t working

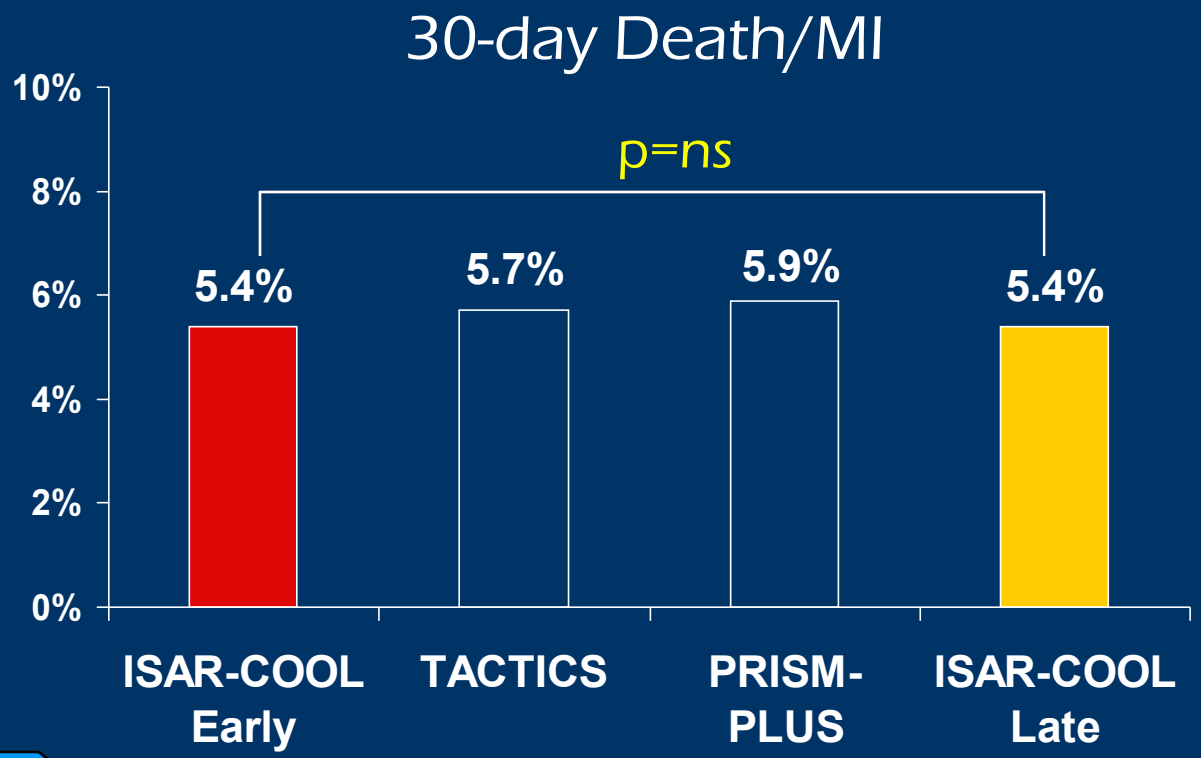
you’re not using enough of it ...

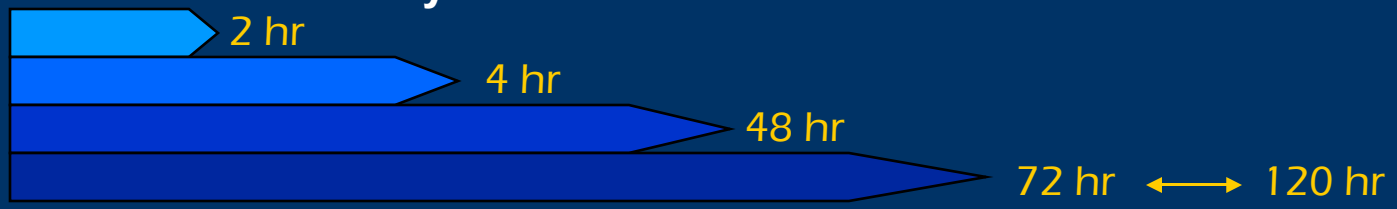
ISAR-COOL study - *Pre-procedural outcome*



Neumann, JAMA 2003

ISAR-COOL study - *Post-procedural outcome*





Pre-treatment time

Neumann, JAMA 2003

ISAR-COOL study – 30 days Outcome

	% Early Group	% Late Group	p
Death	0	1,4	0,25
Non Fatal MI	5,9	10,1	0,12
Composite	5,9	11,6	0,04

Major Bleedings	3	3,9	0,61

In High Risk Patients,Troponin+(67% of patients) and ST depression (65%)

NO SIGNIFICANT EFFECT ON PRIMARY END POINT WAS FOUND

Neumann, JAMA 2003

Selection of Initial Treatment Strategy: Invasive Versus Conservative Strategy

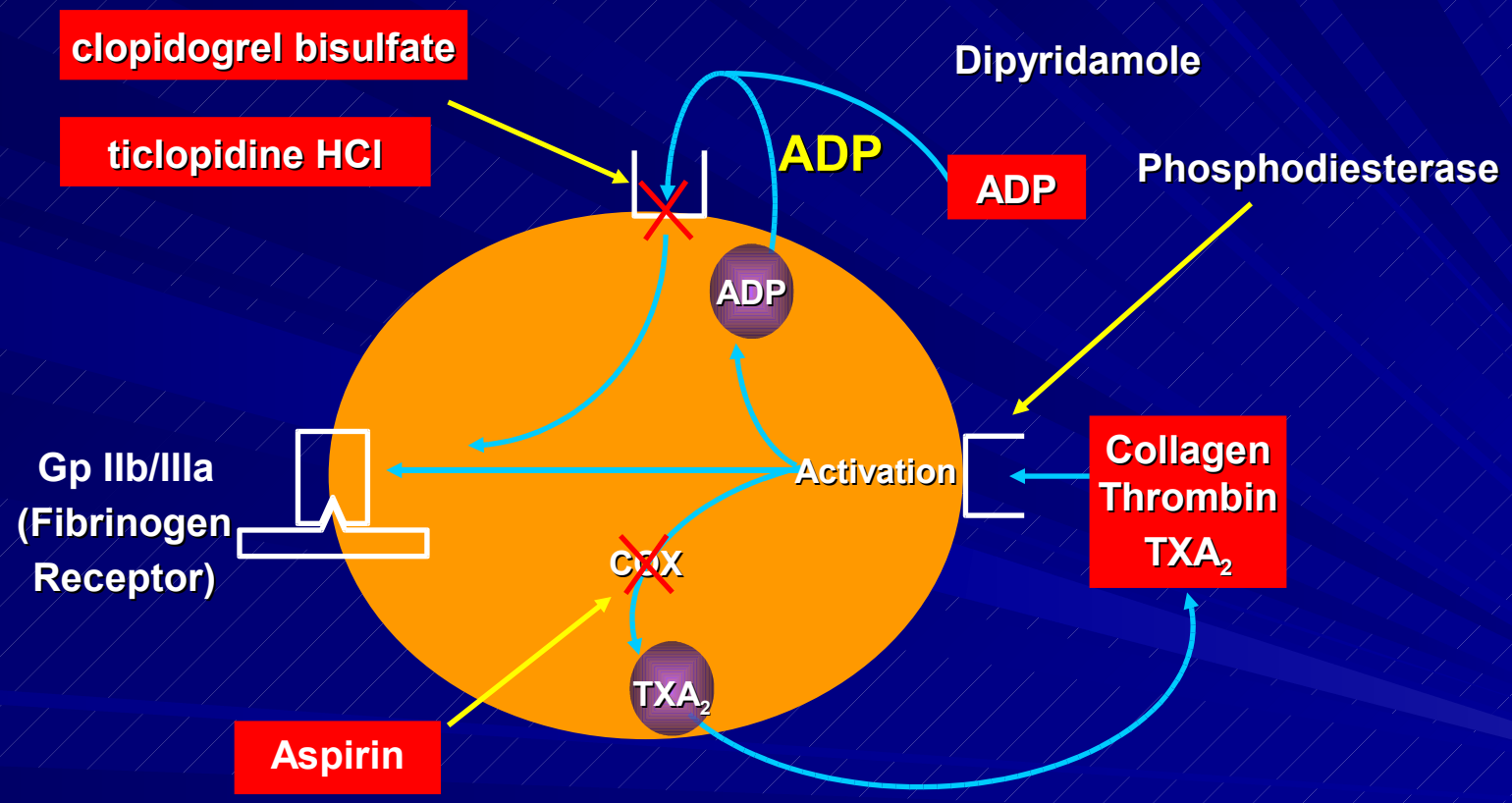
Preferred Strategy	Patient Characteristics
Invasive	Recurrent angina or ischemia at rest or with low-level activities despite intensive medical therapy
	Elevated cardiac biomarkers (TnT or TnI)
	New or presumably new ST-segment depression
	Signs or symptoms of HF or new or worsening mitral regurgitation
	High-risk findings from noninvasive testing
	Hemodynamic instability
	Sustained ventricular tachycardia
	PCI within 6 months
	Prior CABG
	High risk score (e.g., TIMI, GRACE)
	Reduced left ventricular function (LVEF less than 40%)
Conservative	Low risk score (e.g., TIMI, GRACE)
	Patient or physician preference in the absence of high-risk features

UA/NSTEMI ACC/AHA guidelines. Circulation 2007

Outline

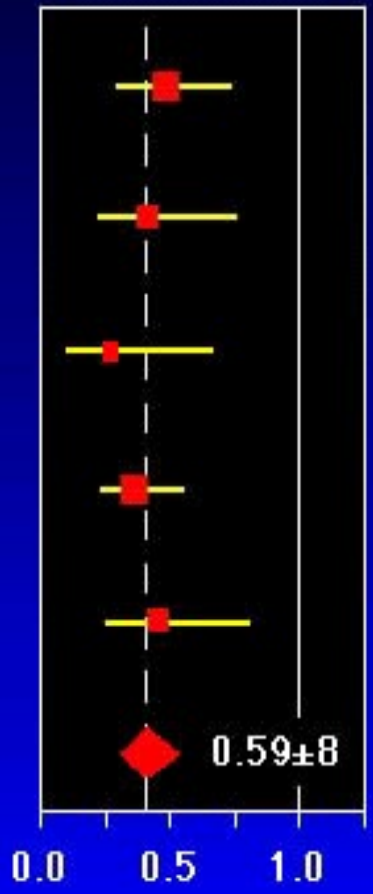
- Early invasive vs. conservative therapy
- Oral anti-platelets
- UFH vs. LMWH
- New anti-coagulants
- GP IIB/IIIA

Oral Antiplatelet Agents



Oral antiplatelet therapy in unstable angina

Trial	N	Timing of endpoint	Agent	Events		RR (95% CI)
				Study	Control	
Lewis et al.	1266	3 months	ASA, 324 mg	5.0%	10.1%	
Cairns et al.	278	24 months	ASA, 1200 mg	12.2%	25.9%	
Théroux et al.	239	6 days	ASA, 650 mg	3.3%	13.6%	
Wallentin et al.	796	3 months	ASA, 75 mg	6.5%	17.1%	
Balsano et al.	652	3 months	Ticlopidine, 500 mg	5.1%	10.9%	
Total	3231			5.9%	13.6%	0.59±8



Treatment effect, 2P<0.001

χ^2 test for heterogeneity, 8.0, 6df, p=0.3

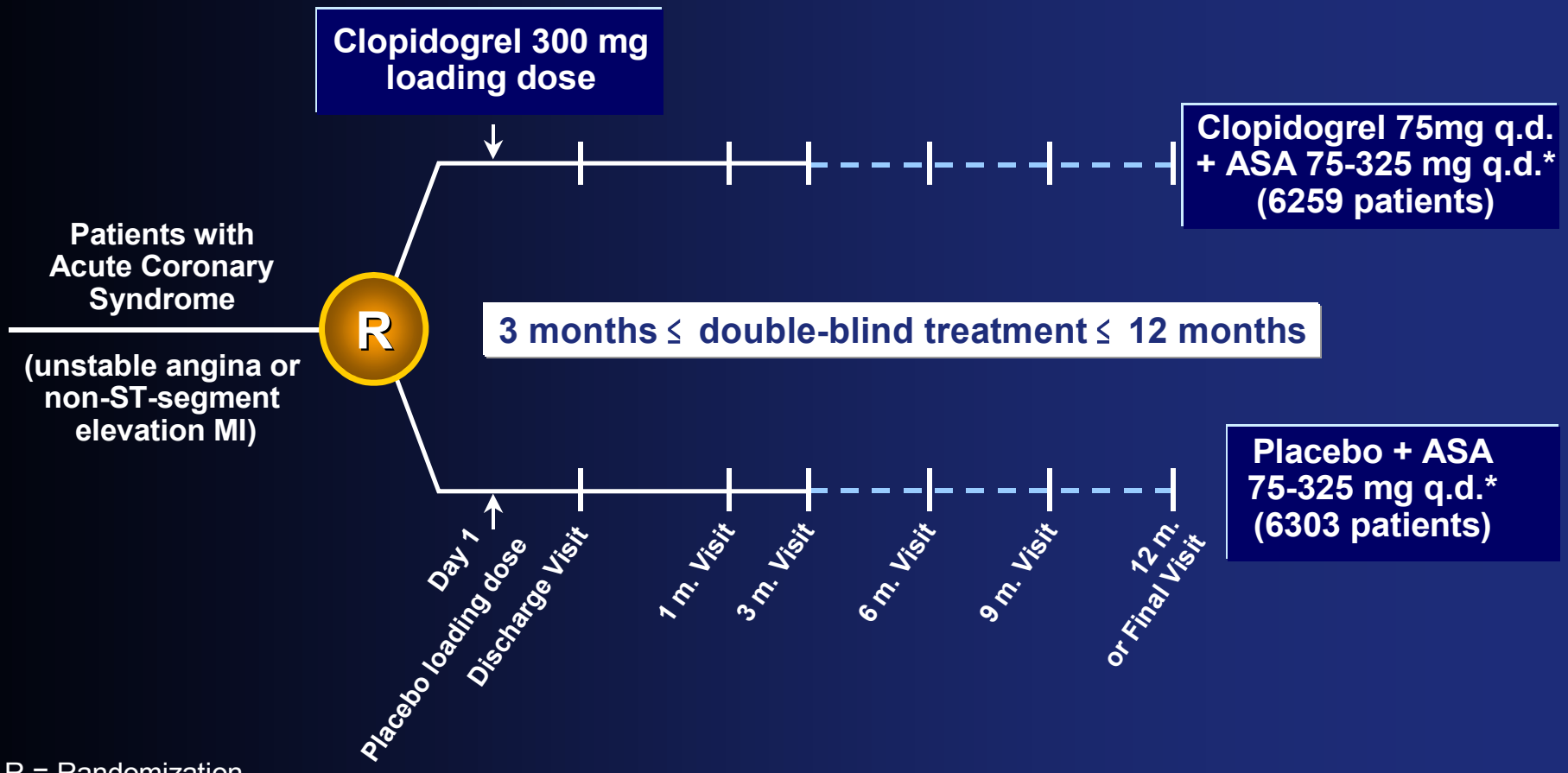
PT 1999

CURE

Clopidogrel in Unstable Angina to Prevent Recurrent Events

CURE

Study Design

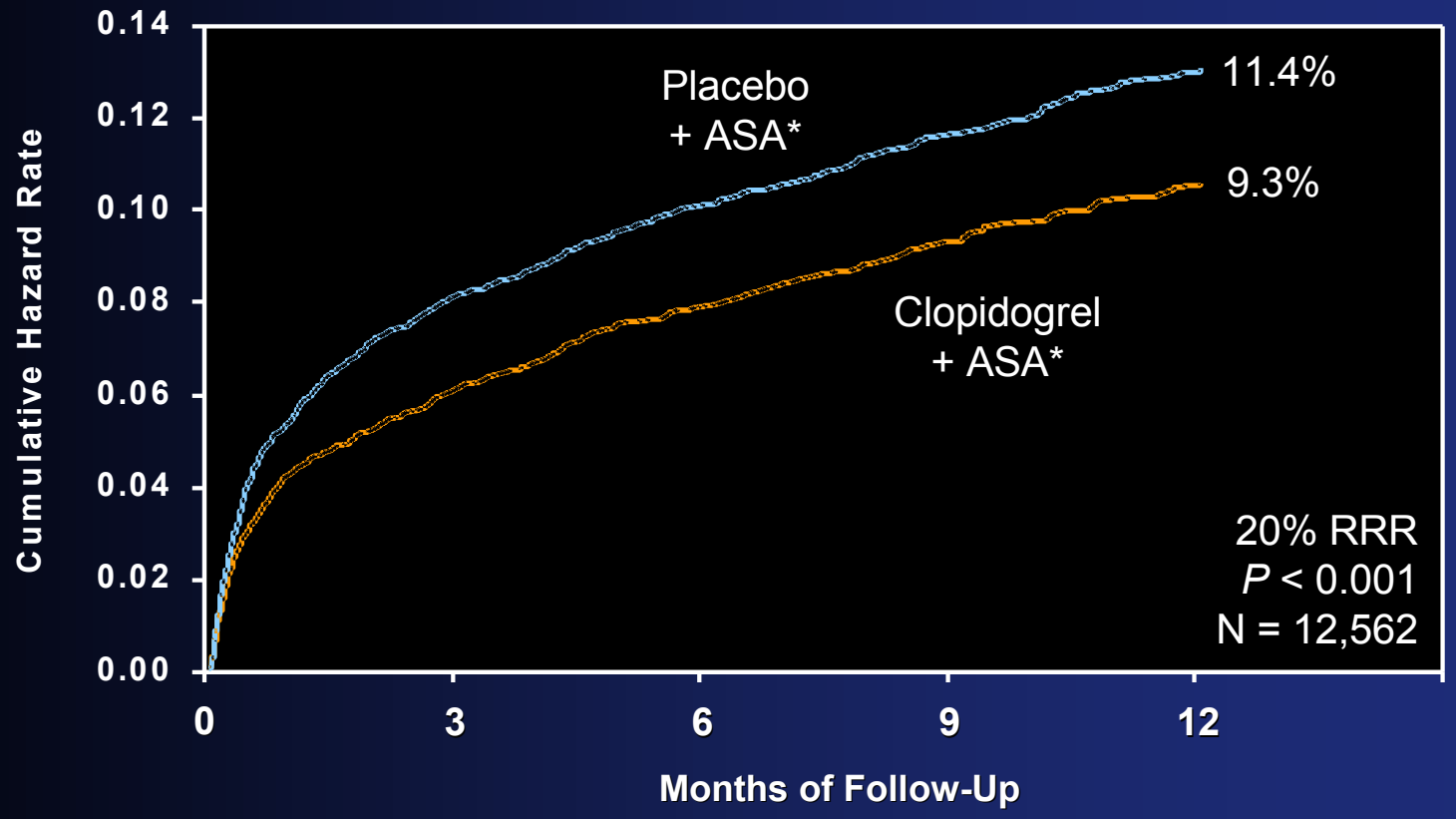


R = Randomization
* In combination with other standard therapy

The CURE Trial Investigators. *N Engl J Med.* 2001;345:494-502.

CURE

Primary End Point - MI/Stroke/CV Death

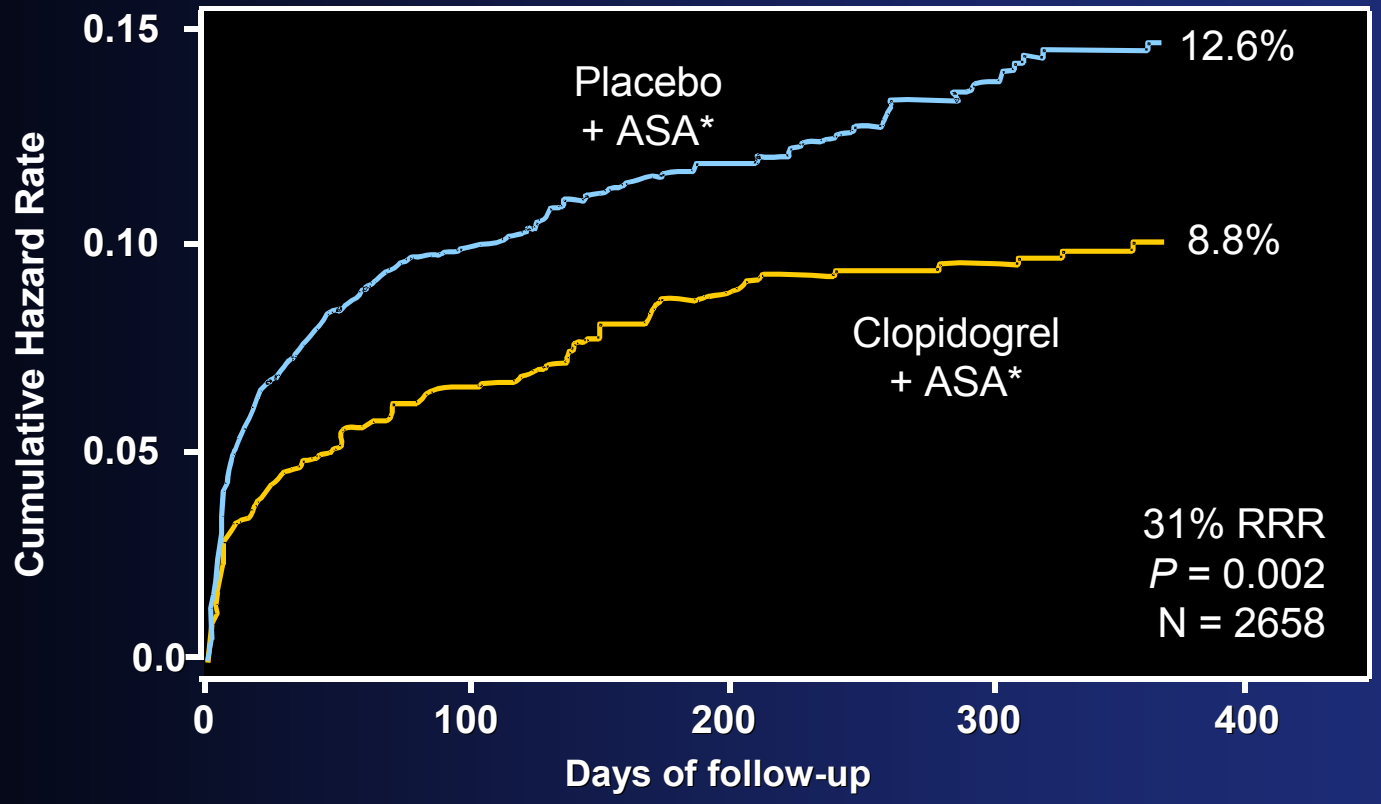


* In combination with standard therapy

The CURE Trial Investigators. *N Engl J Med.* 2001;345:494-502.

Overall Long-Term Results

Composite of cardiovascular death or MI from randomization to end of follow-up



* In combination with standard therapy

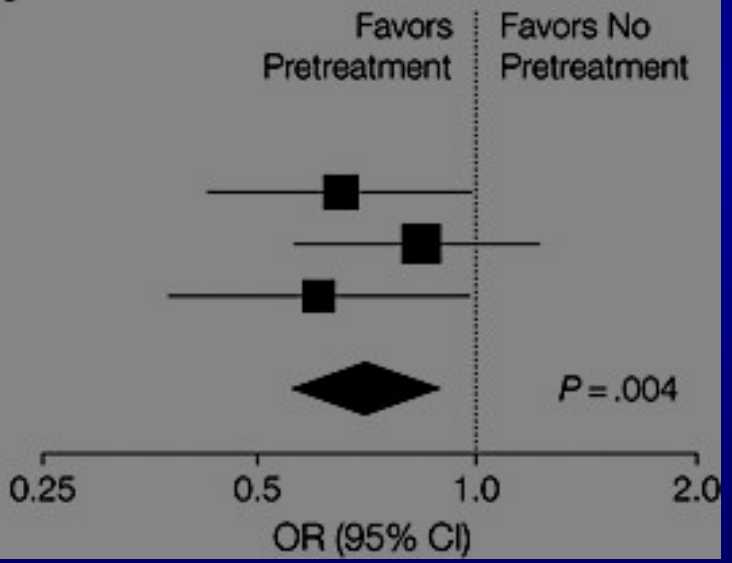
Mehta, SR. et al for the CURE Trial Investigators. *Lancet.* August 2001.

Effectiveness of Clopidogrel pre-treatment

PCI-Cure, Credo, PCI-Clarity **meta-analysis (7000 pts vast majority presented with ACS)**

B Cardiovascular Death or Myocardial Infarction After PCI to 30 Days

Source	Events, No./Total (%)		OR (95% CI)
	Clopidogrel	Placebo	
PCI-CURE,[13] 2001	38/1313 (2.9)	59/1345 (4.4)	0.65 (0.43-0.98)
CREDO,[14] 2002	54/9000 (6.0)	65/915 (7.1)	0.83 (0.57-1.21)
PCI-CLARITY	31/933 (3.3)	50/930 (5.4)	0.60 (0.38-0.96)
Overall	123/3146 (3.9)	174/3190 (5.5)	0.71 (0.56-0.89)



JAMA 2005;294:1224-1232

TRÎTON TIMI-38

Study Design

ACS (STEMI or UA/NSTEMI) & Planned PCI

ASA ↓ N= 13,600

Double-blind

CLOPIDOGREL
300 mg LD/ 75 mg MD

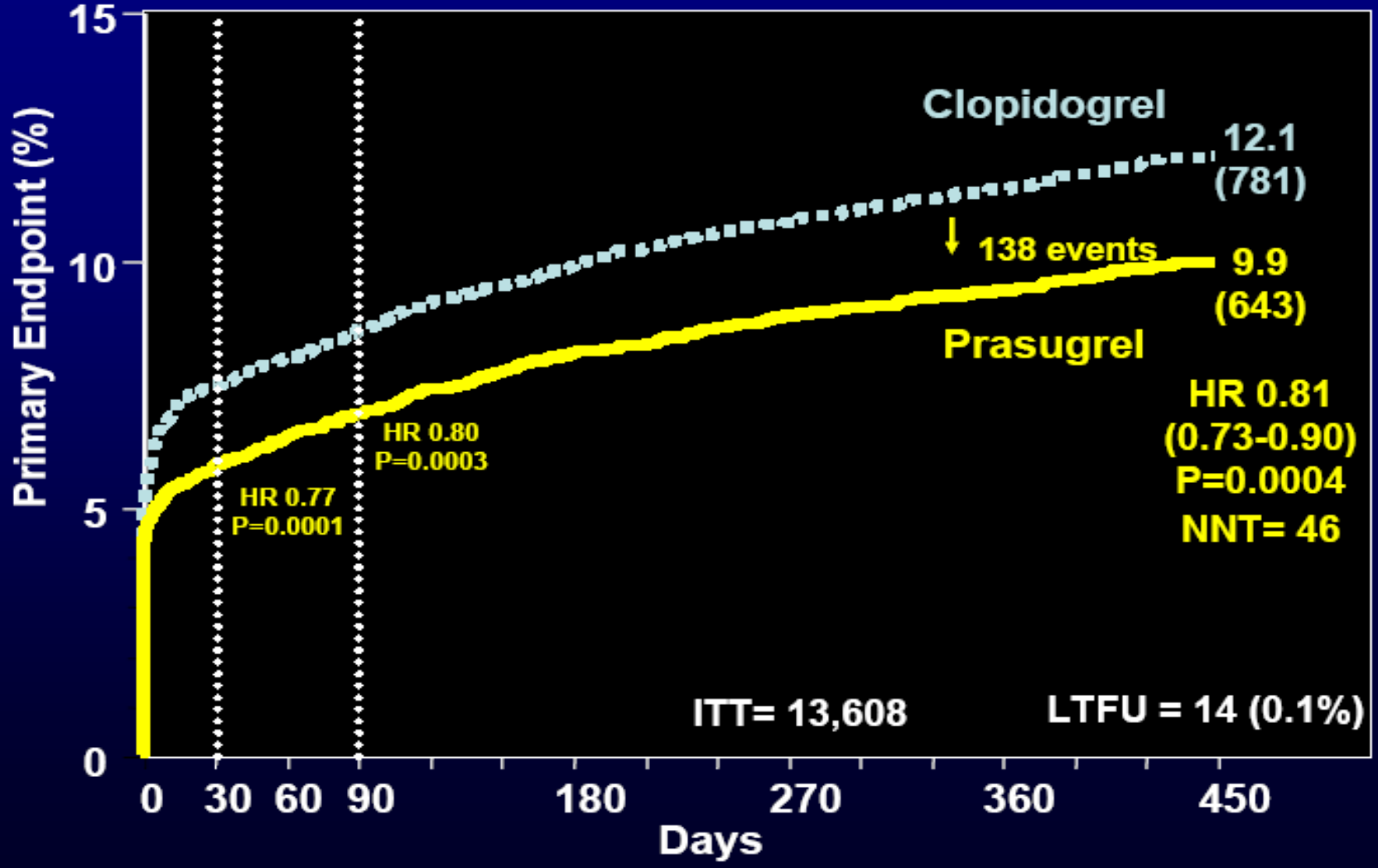
PRASUGREL
60 mg LD/ 10 mg MD

Median duration of therapy - 12 months

1° endpoint:	CV death, MI, Stroke
2° endpoints:	CV death, MI, Stroke, Rehosp-Rec Isch
	CV death, MI, UTVR
	Stent Thrombosis
Key Substudies:	Pharmacokinetic, Genomic

TRÎTON TIMI·38

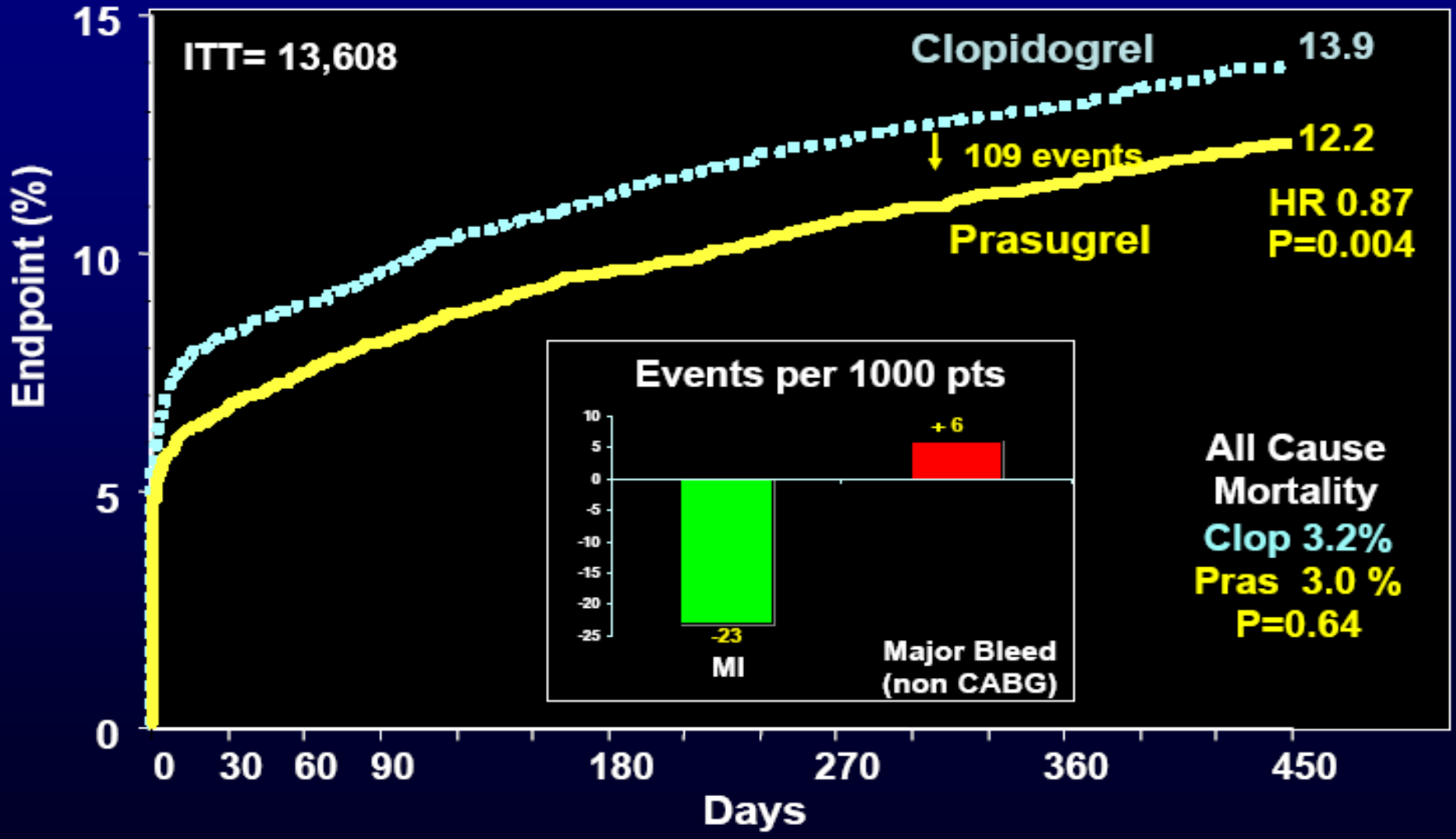
Primary Endpoint
CV Death,MI,Stroke



TRÎTON TIMI·38

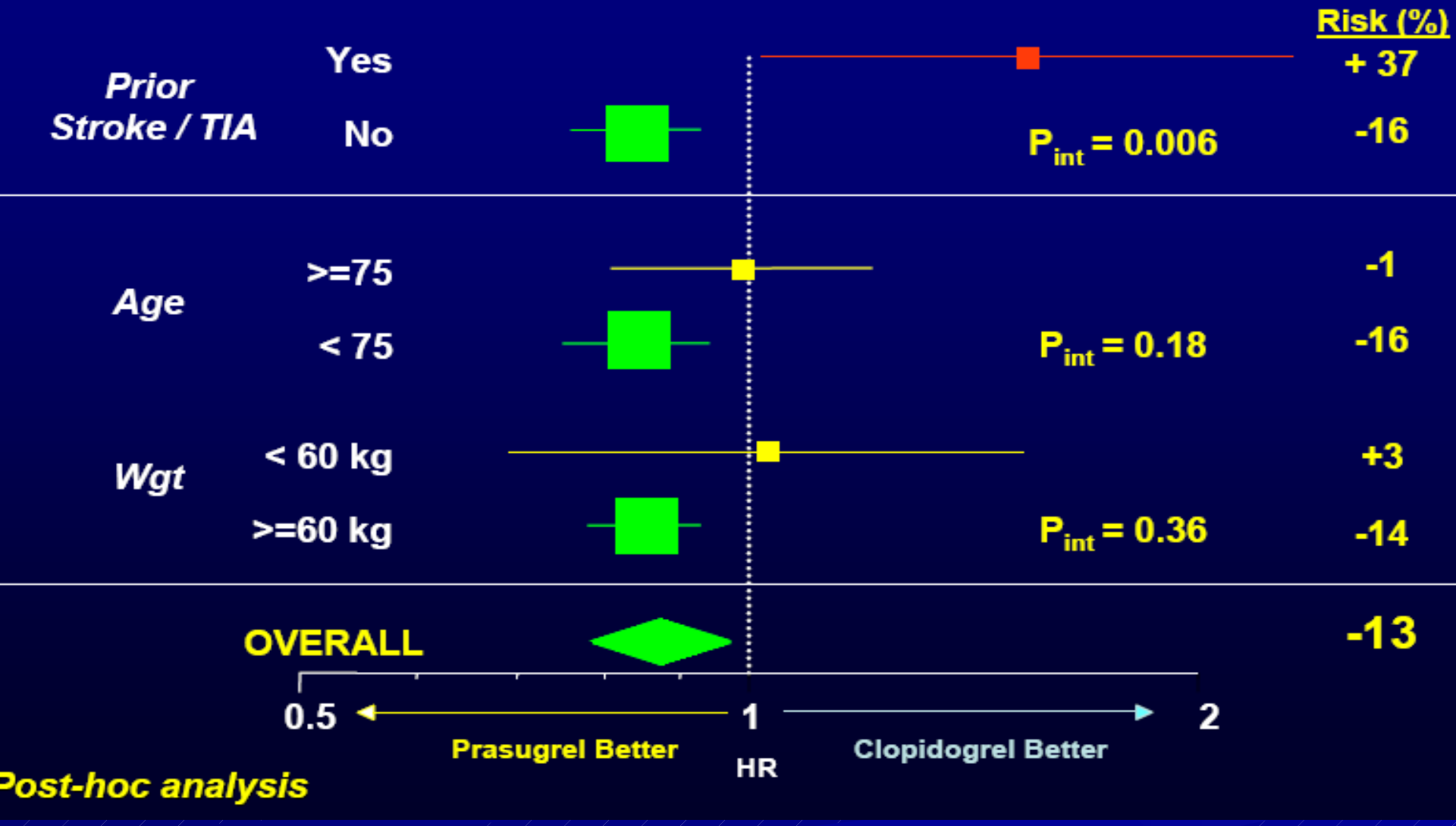
Net Clinical Benefit

Death, MI, Stroke, Major Bleed (non CABG)

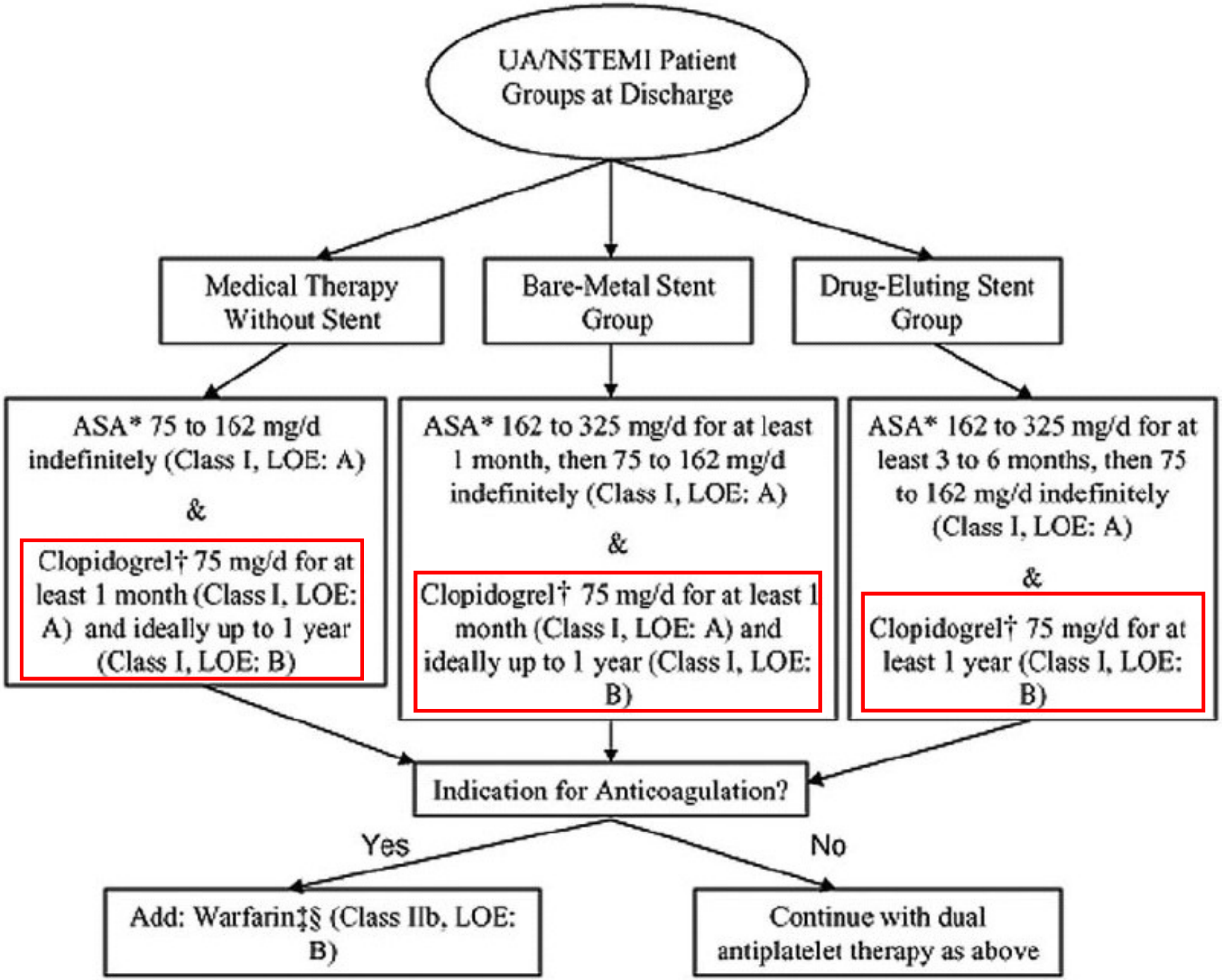


TRITON TIMI-38

Net Clinical Benefit
Bleeding Risk Subgroups



Post-hoc analysis


UA/NSTEMI Patient Groups at Discharge
Medical Therapy Without Stent
Bare-Metal Stent Group
Drug-Eluting Stent Group
ASA* 75 to 162 mg/d indefinitely (Class I, LOE: A)
&
Clopidogrel† 75 mg/d for at least 1 month (Class I, LOE: A) and ideally up to 1 year (Class I, LOE: B)
ASA* 162 to 325 mg/d for at least 1 month, then 75 to 162 mg/d indefinitely (Class I, LOE: A)
&
Clopidogrel† 75 mg/d for at least 1 month (Class I, LOE: A) and ideally up to 1 year (Class I, LOE: B)
ASA* 162 to 325 mg/d for at least 3 to 6 months, then 75 to 162 mg/d indefinitely (Class I, LOE: A)
&
Clopidogrel† 75 mg/d for at least 1 year (Class I, LOE: B)
Indication for Anticoagulation?
Yes
No
Add: Warfarin‡§ (Class IIb, LOE: B)
Continue with dual antiplatelet therapy as above

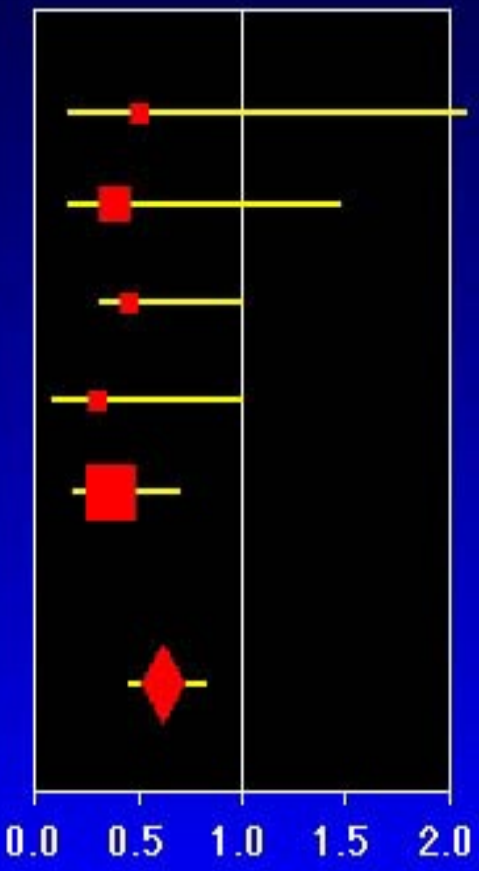
Outline

- Early invasive vs. conservative therapy
- Oral anti-platelets
- UFH vs. LMWH
- New anti-coagulants
- GP IIB/IIIA

Heparin (unfractionated or low-molecular weight) plus aspirin vs aspirin alone in unstable ACS

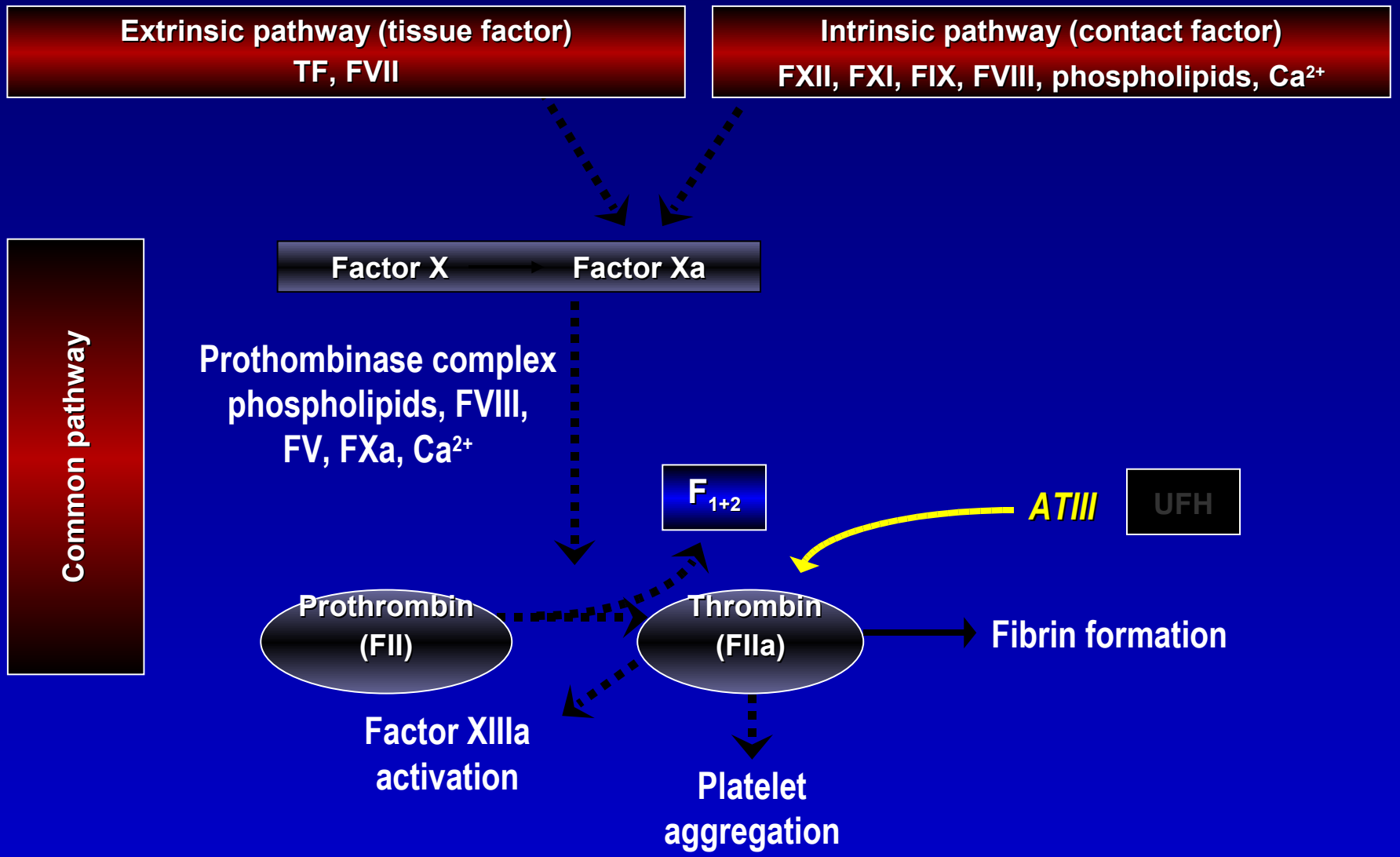
Endpoint of death / MI

Trial		N	Timing of endpoint	Heparin + ASA	Aspirin
Théroux	1988	243	5 days	1.6%	3.3%
RISK	1990	399	5 days	1.4%	3.7%
ATACS	1994	214	5 days	3.8%	8.3%
Gurfinkel	1995	284	5 days	2.9%	9.6%
FRISC	1996	1506	6 days	1.8%	4.8%
Total		2646		4.6%	7.5%

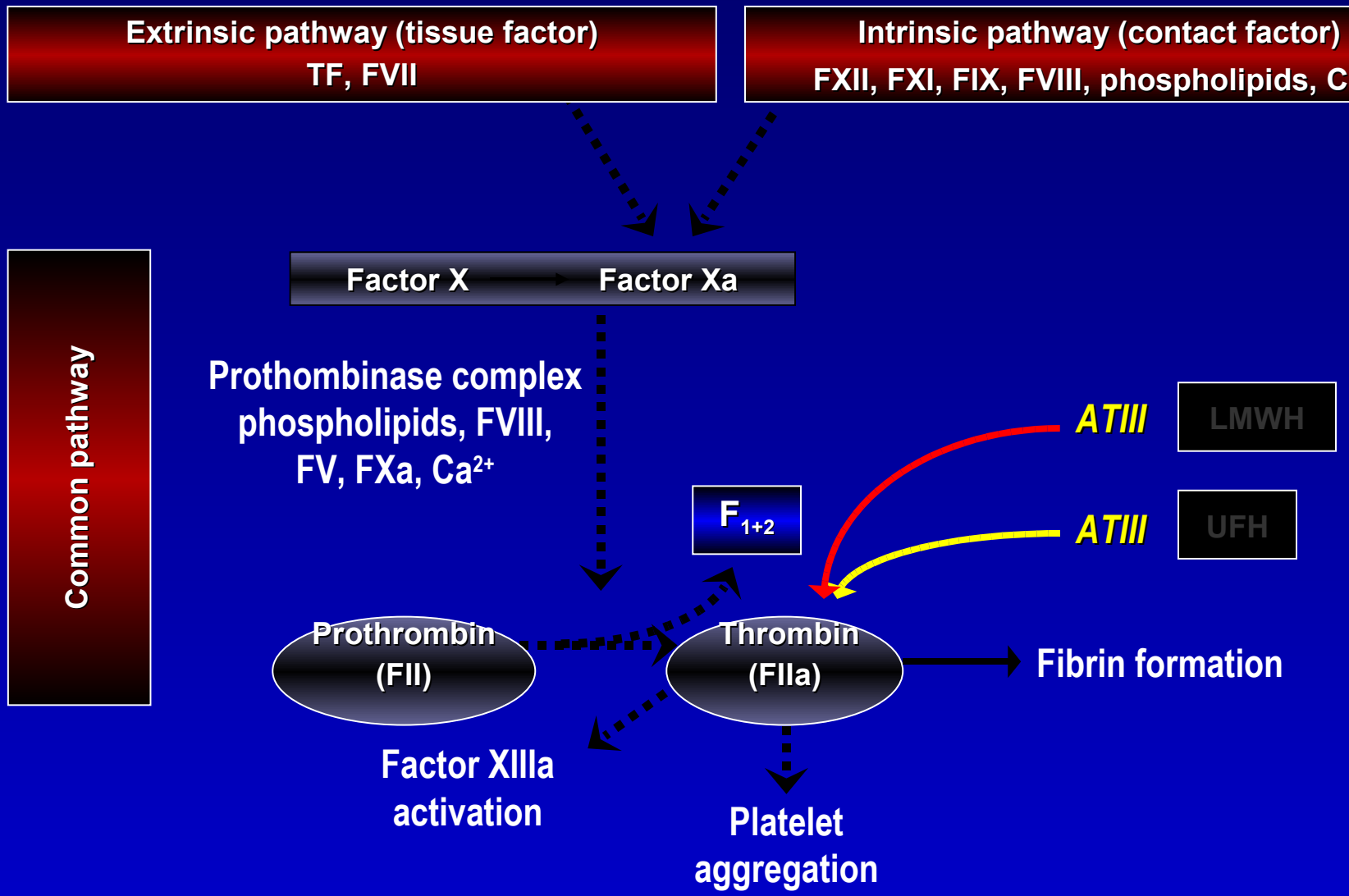


PT 1999

Coagulation Cascade and Antithrombins



Coagulation Cascade and Antithrombins



Study Design

High-Risk ACS Patients

At least 2 of 3 required:

- **Age ≥ 60**
- **ST ↑ (transient) or ↓**
- **(+) CK-MB or Troponin**

Randomize
(n = 10,000)

Enoxaparin

1 mg/kg SC Q12H

IV Heparin

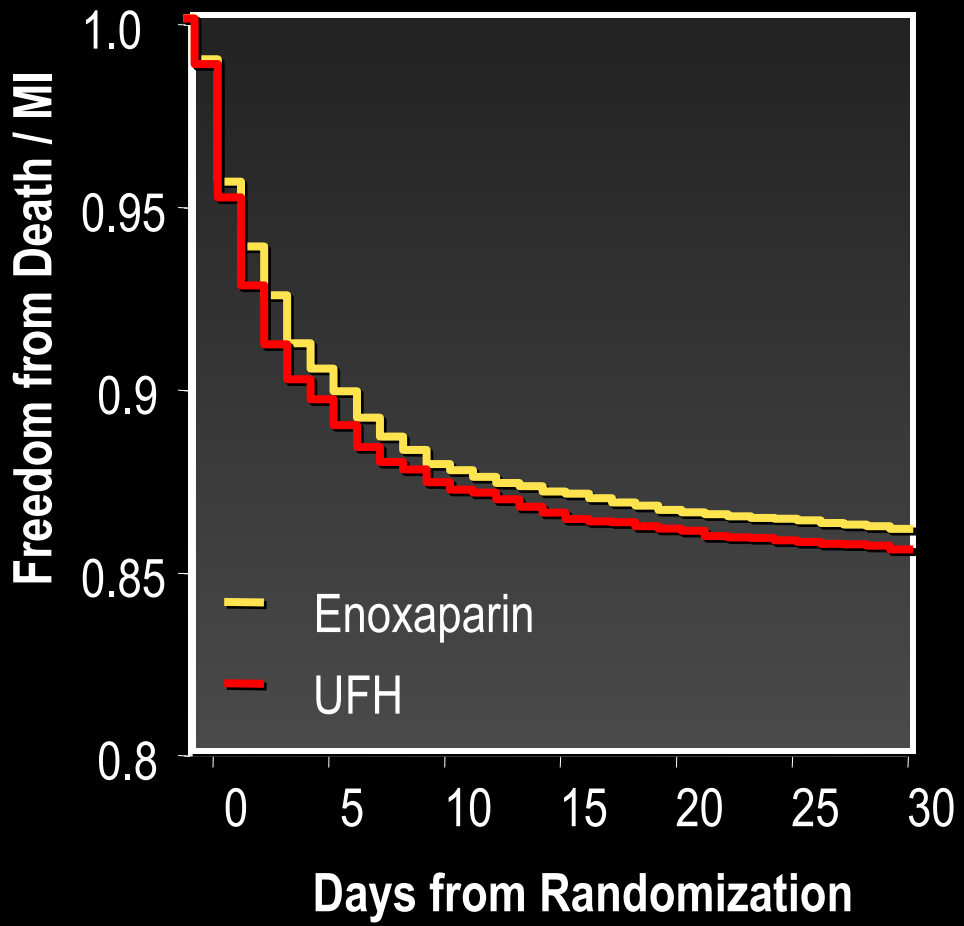
60 U/kg → 12 U/kg/hr (aPTT 50-70 sec)

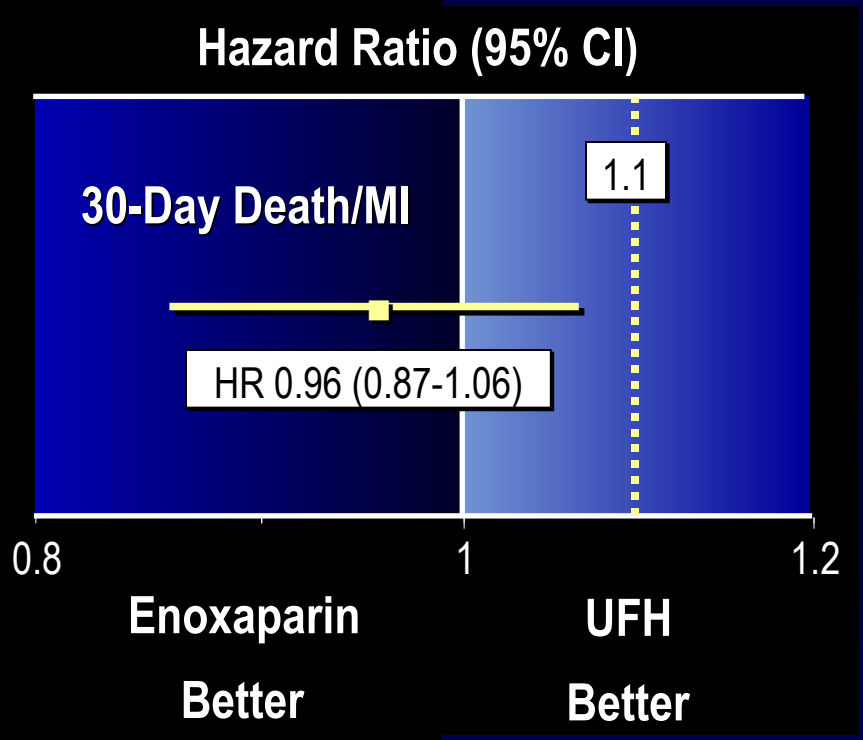
Early invasive strategy
Other therapy per AHA/ACC Guidelines
(ASA, β-blocker, ACE, clopidogrel, GP IIb/IIIa)

Primary endpoint: Death or MI at 30 days

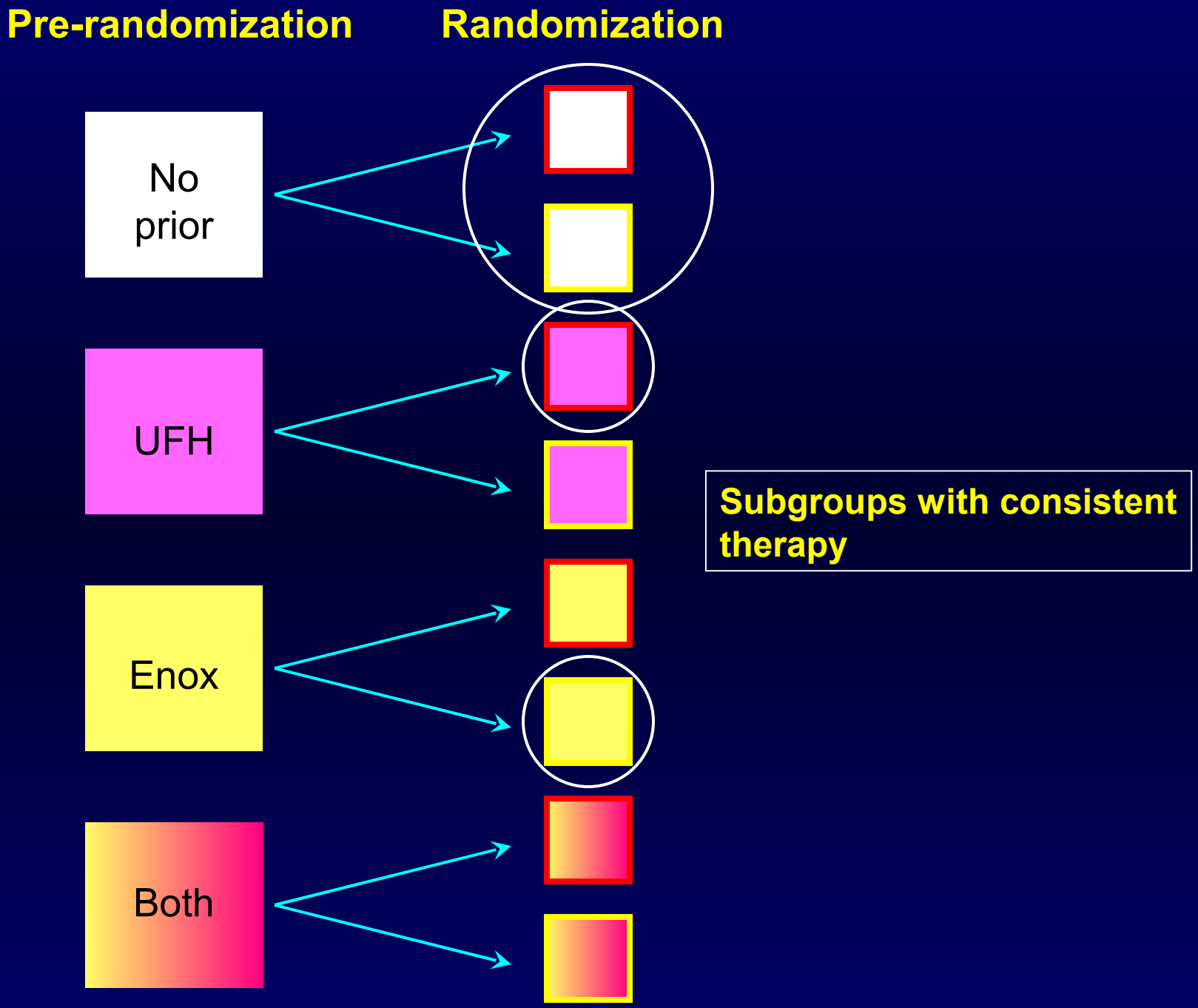
SYNERGY

Death and MI at 30 Days



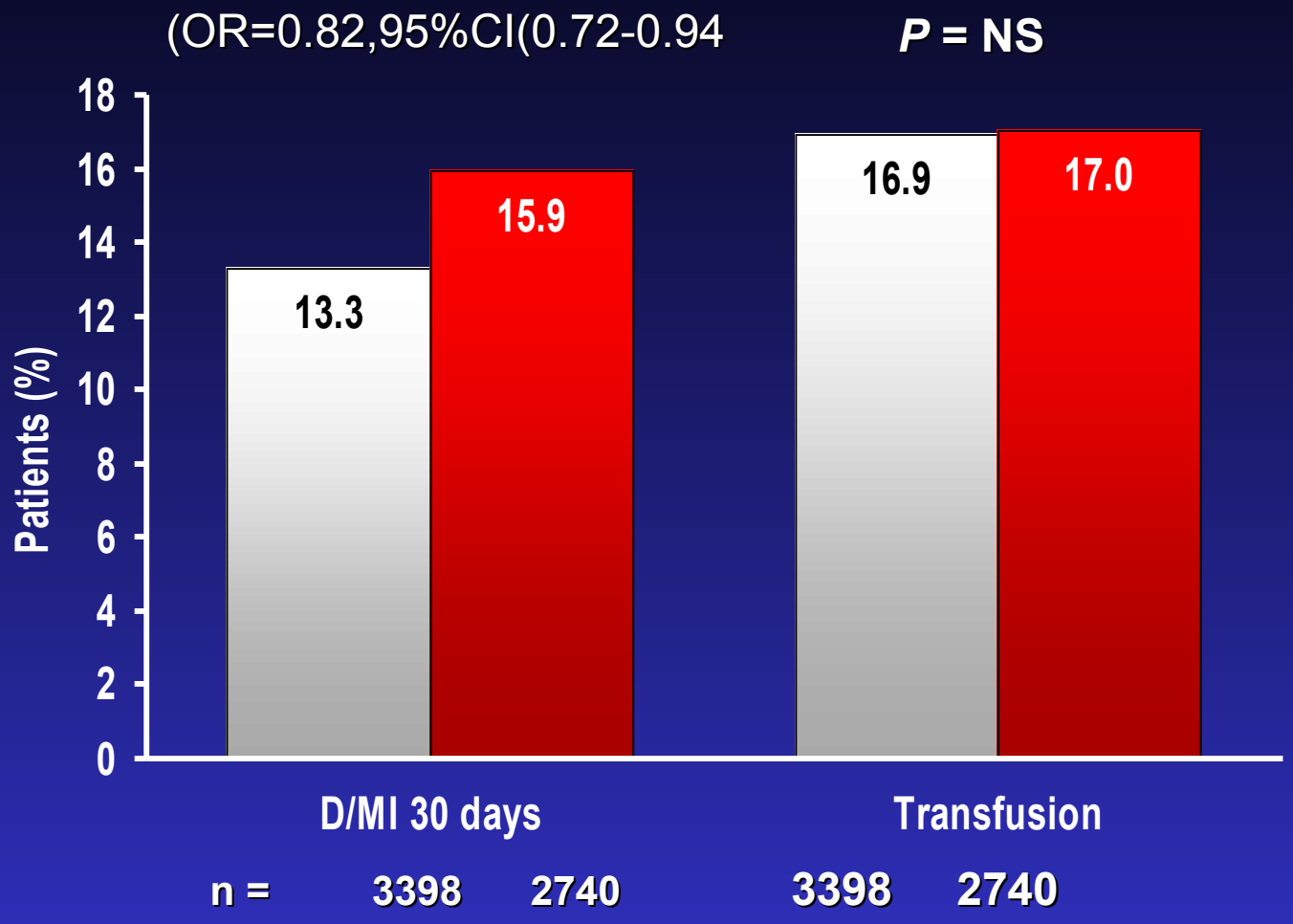


SYNERGY


Pre-randomization
Randomization
No prior
UFH
Enox
Both
Subgroups with consistent therapy

Efficacy and Safety Outcomes

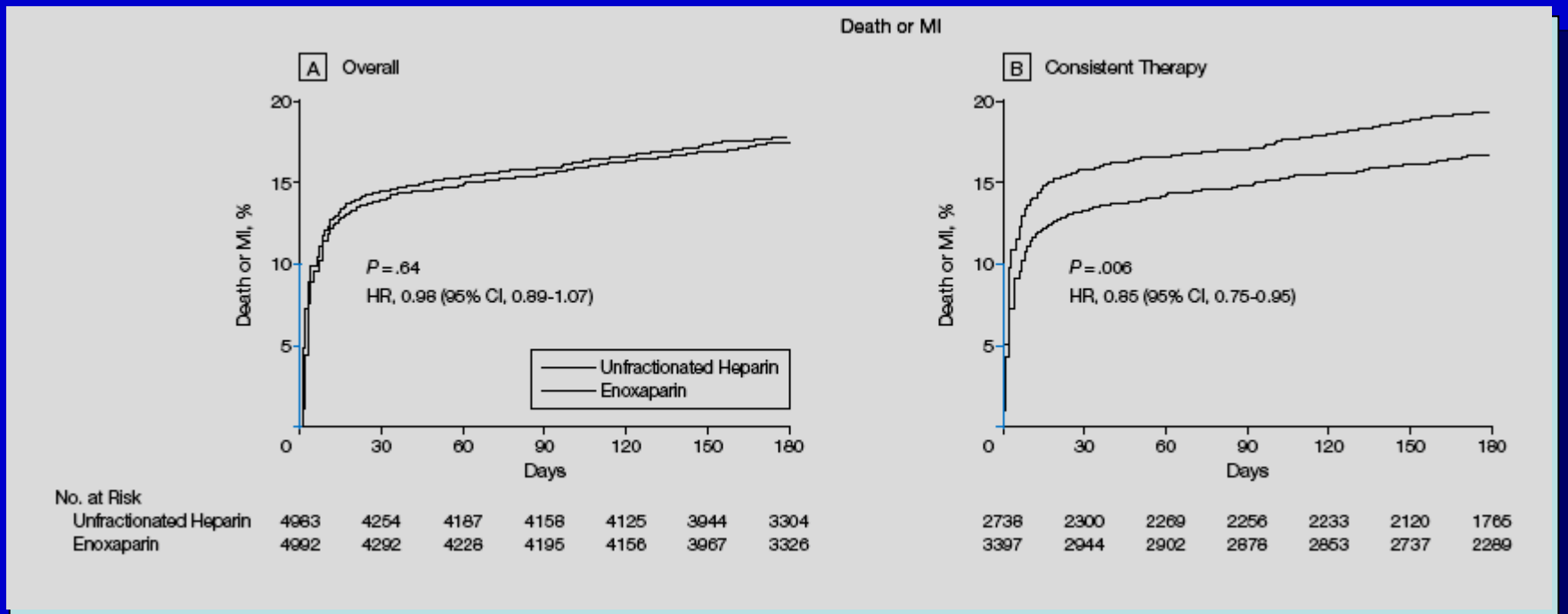
Consistent antithrombotic treatment



The SYNERGY Trial Investigators. *JAMA*. 2004;292:45-54.

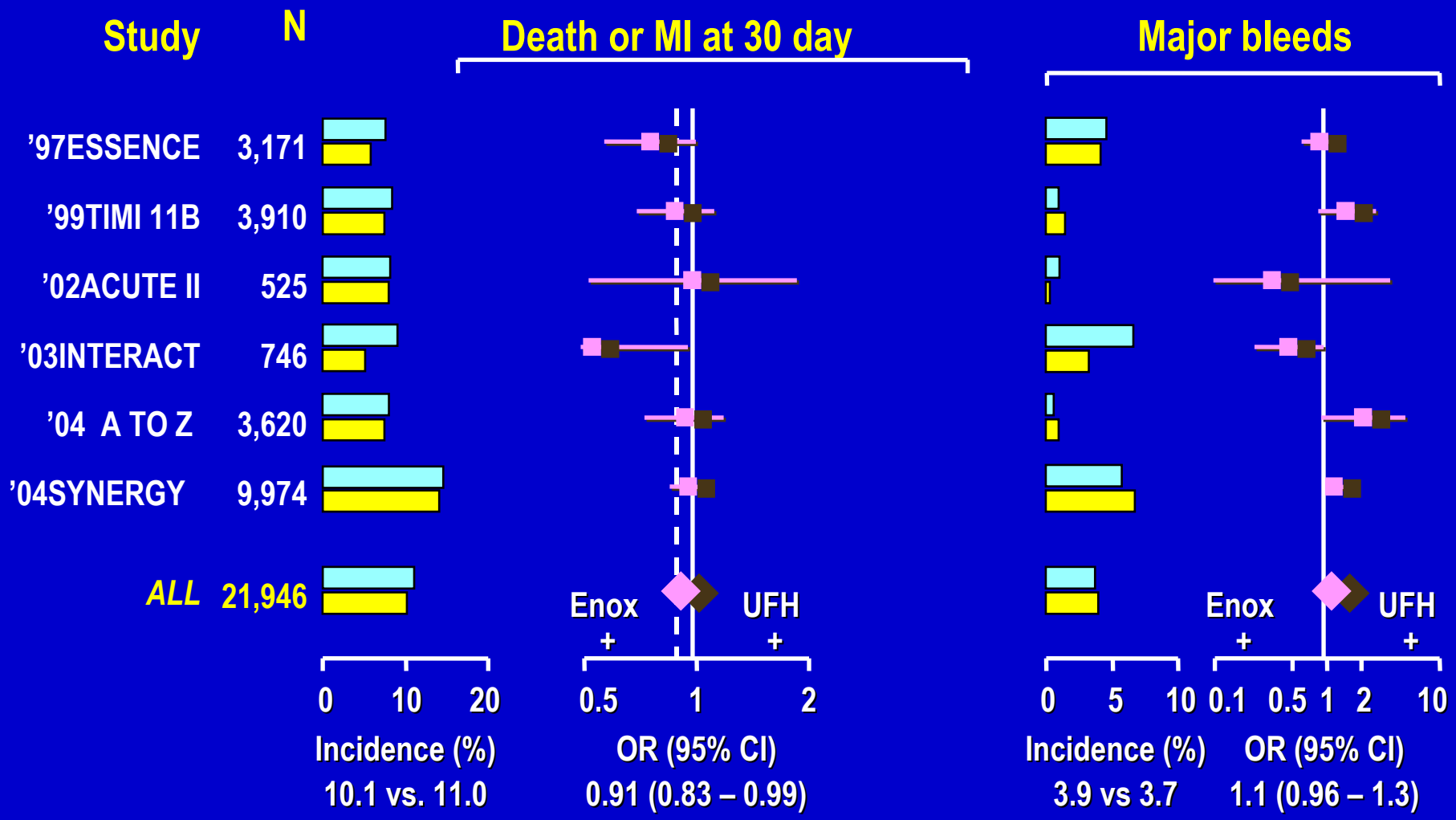
High-Risk Patients With Acute Coronary Syndromes Treated With Low-Molecular-Weight or Unfractionated Heparin

Outcomes at 6 Months and 1 Year in the SYNERGY Trial



Mahaffey et al JAMA 2005;294:2594-2600

Death, MI, Major Bleeds at 30 Days

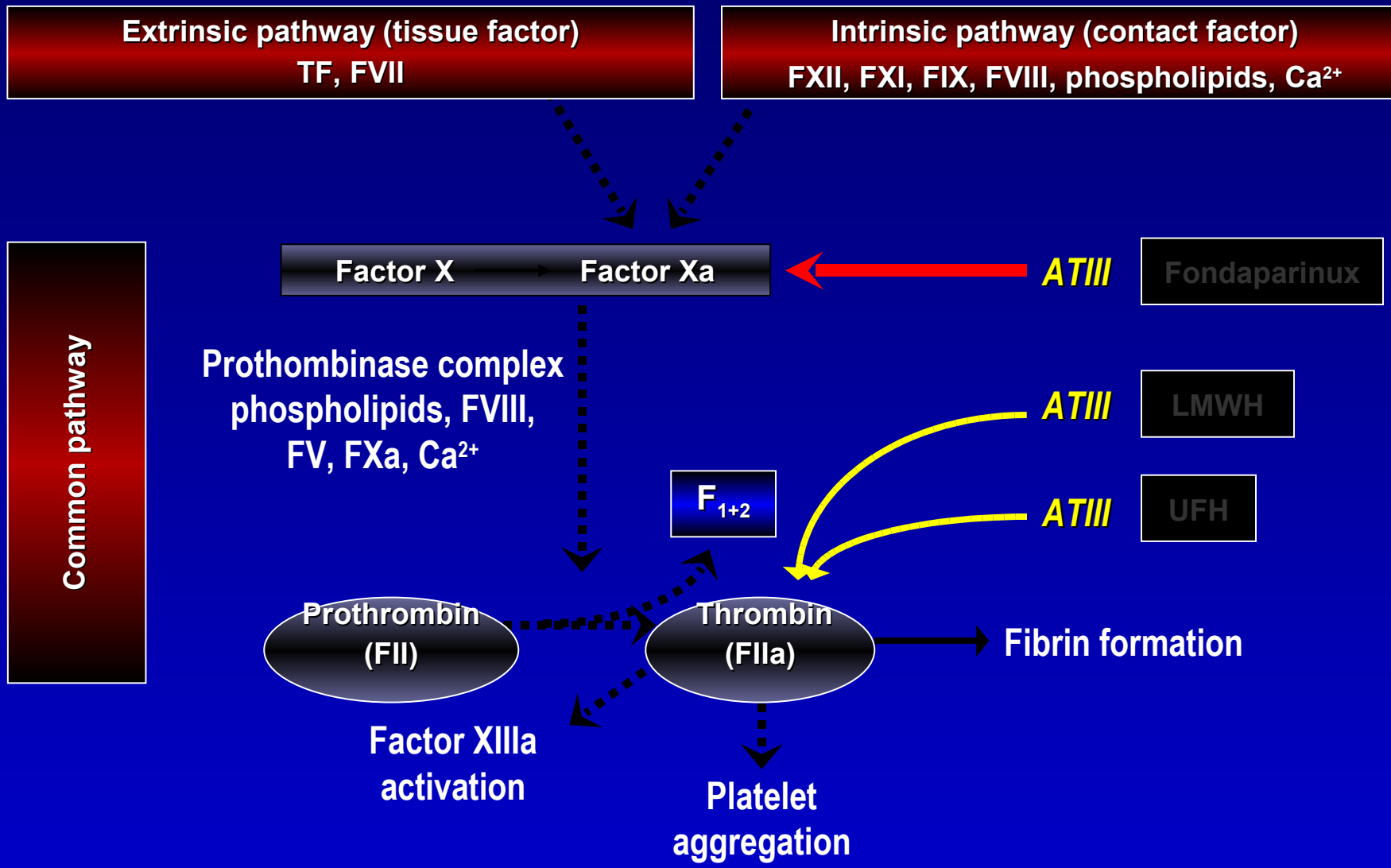


Peterson et al. *JAMA*. 2004;292:89-96.

Outline

- Early invasive vs. conservative therapy
- Oral anti-platelets
- UFH vs. LMWH
- New anti-coagulants
- GP IIB/IIIA

Coagulation Cascade and Antithrombins



Study Design: Randomized, Double Blind

Patients with NSTE ACS, Chest discomfort < 24 hours
2 of 3: Age>60, ST Segment Δ, ↑ cardiac markers

ASA, Clop, GP IIb/IIIa, planned Cath/PCI as per local practice

Exclude
Age < 21
Any contra-ind to Enox
Hem stroke< 12 mo.
Creat> 3 mg/dL/265 umol/L

Randomize

N=20,000

Fondaparinux
2.5 mg sc once daily

PCI <6 h: IV Fonda 2.5 mg without IIb/IIIa, 0 with IIb/IIIa
PCI> 6 h: IV Fonda 2.5 mg with and 5.0 mg without IIb/IIIa

Enoxaparin
1 mg/kg sc twice daily

PCI< 6 h, No additional UFH
PCI >6 h, IV UFH
With IIb/IIIa 65 U/kg
Without IIb/IIIa 100 U/kg

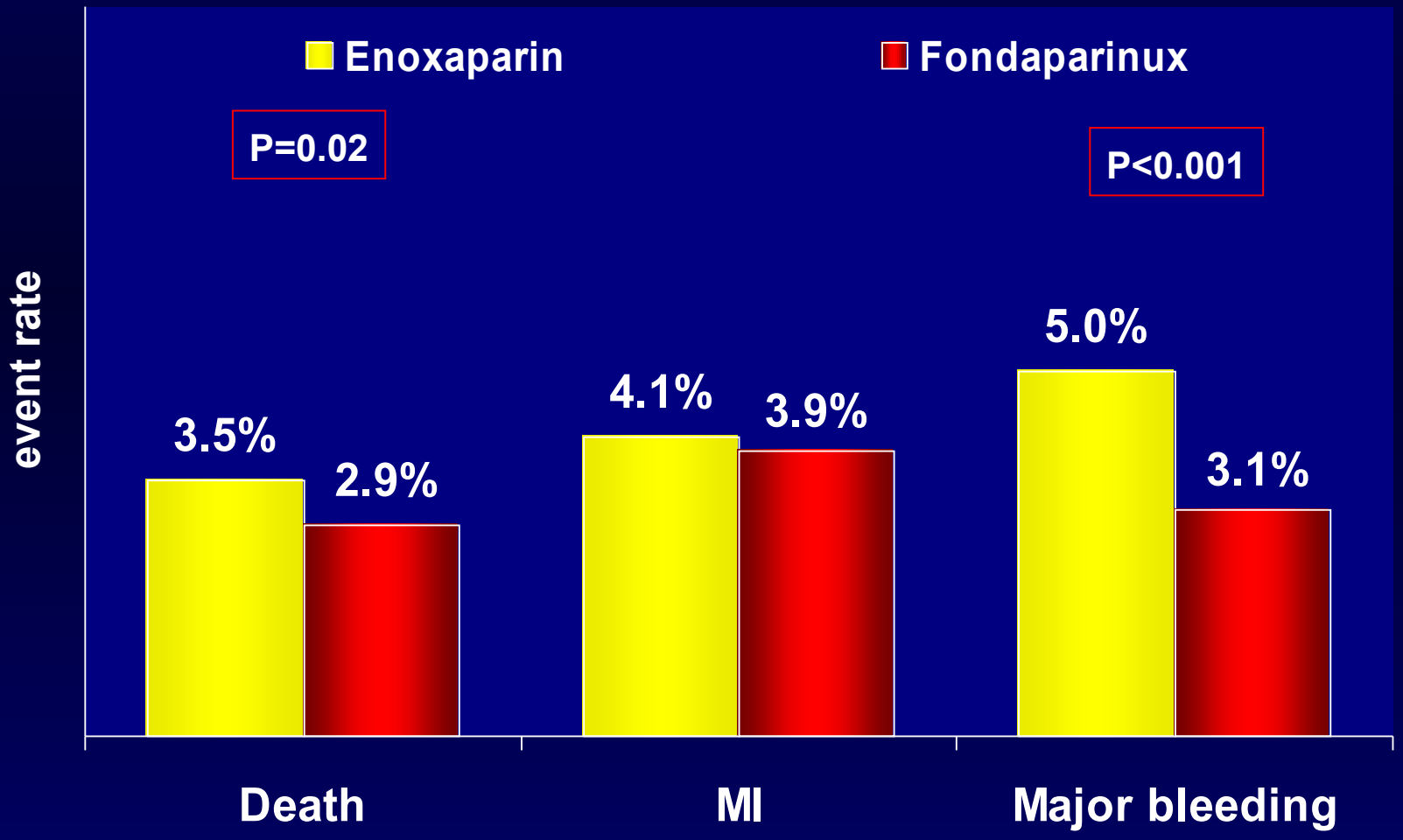
Outcomes

Primary: **Efficacy**: Death, MI, refractory ischemia at 9 days
Safety: Major bleeding at 9 days
Risk benefit: Death, MI, refractory ischemia, major bleeds 9 days

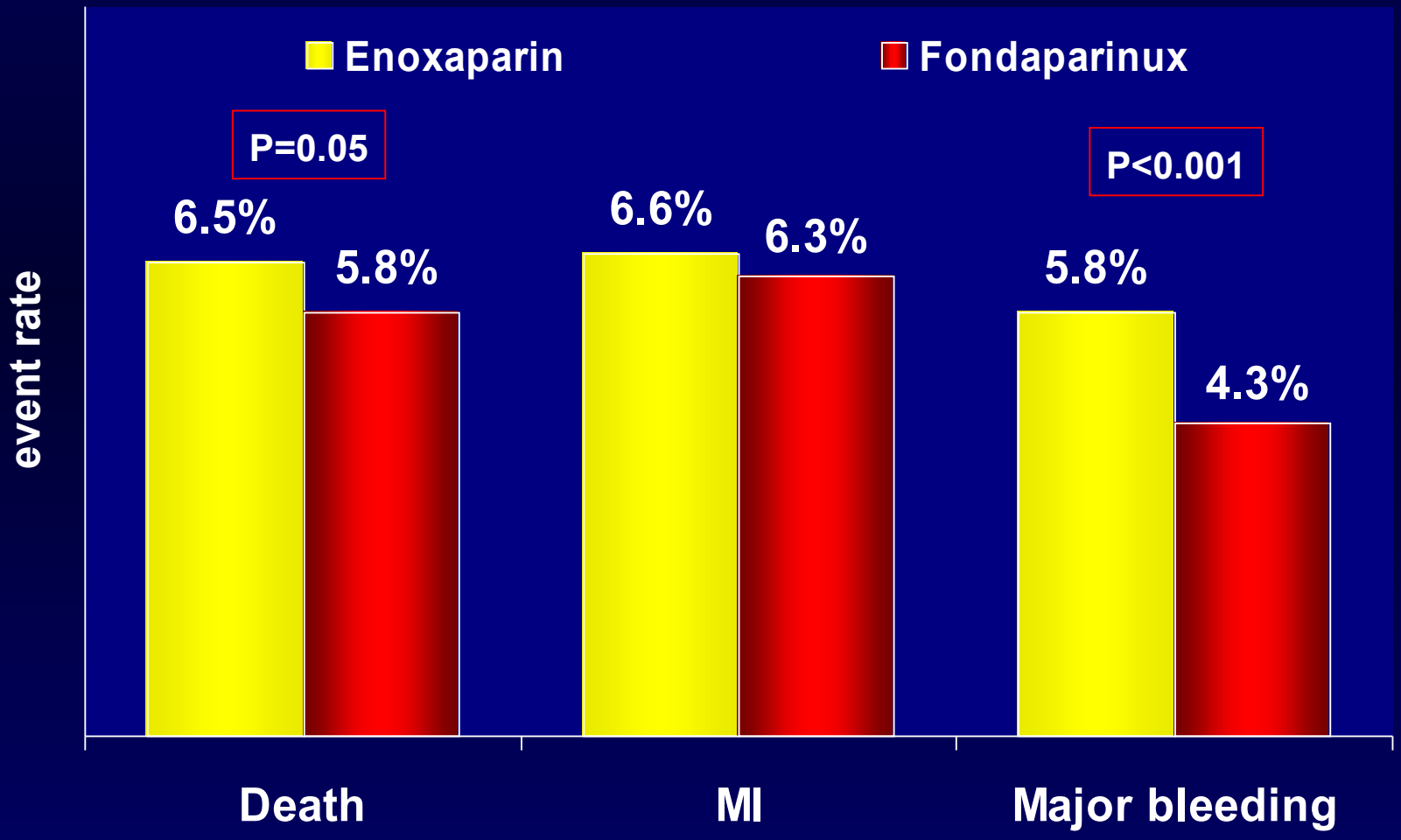
Secondary: Above & each component separately at day 30 & 6 months

Hypothesis: First test non-inferiority, then test superiority

OASIS-5
Event rate at 30 days



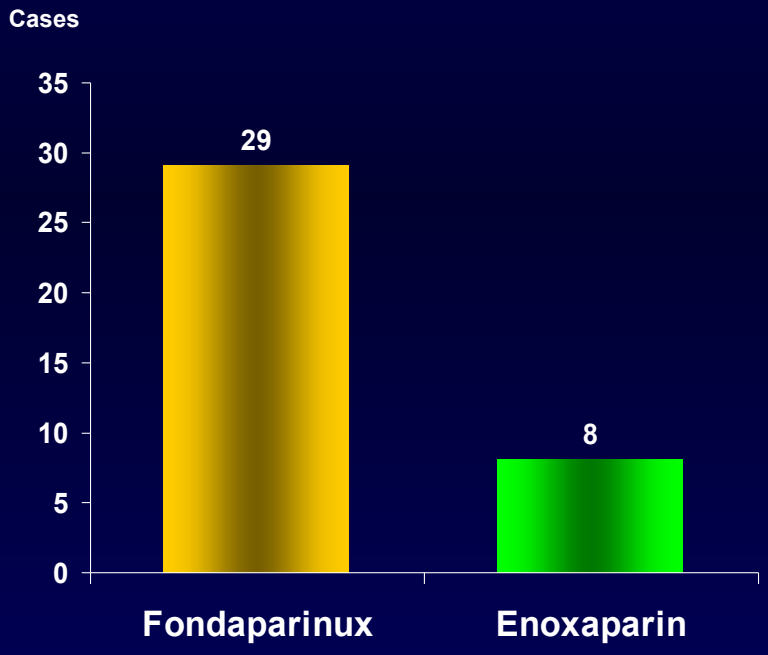
OASIS-5
Event rate at 6 months



Guiding Catheter Thrombosis

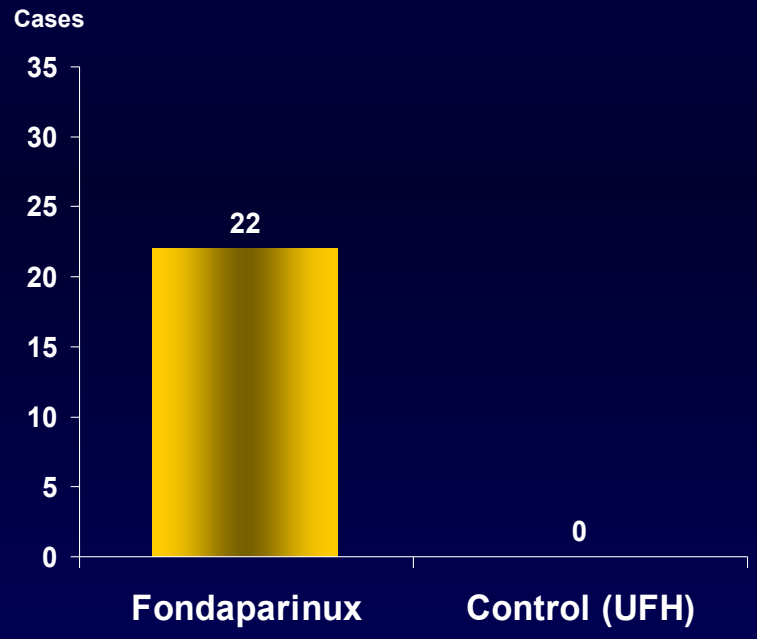
OASIS 5

P<0.001

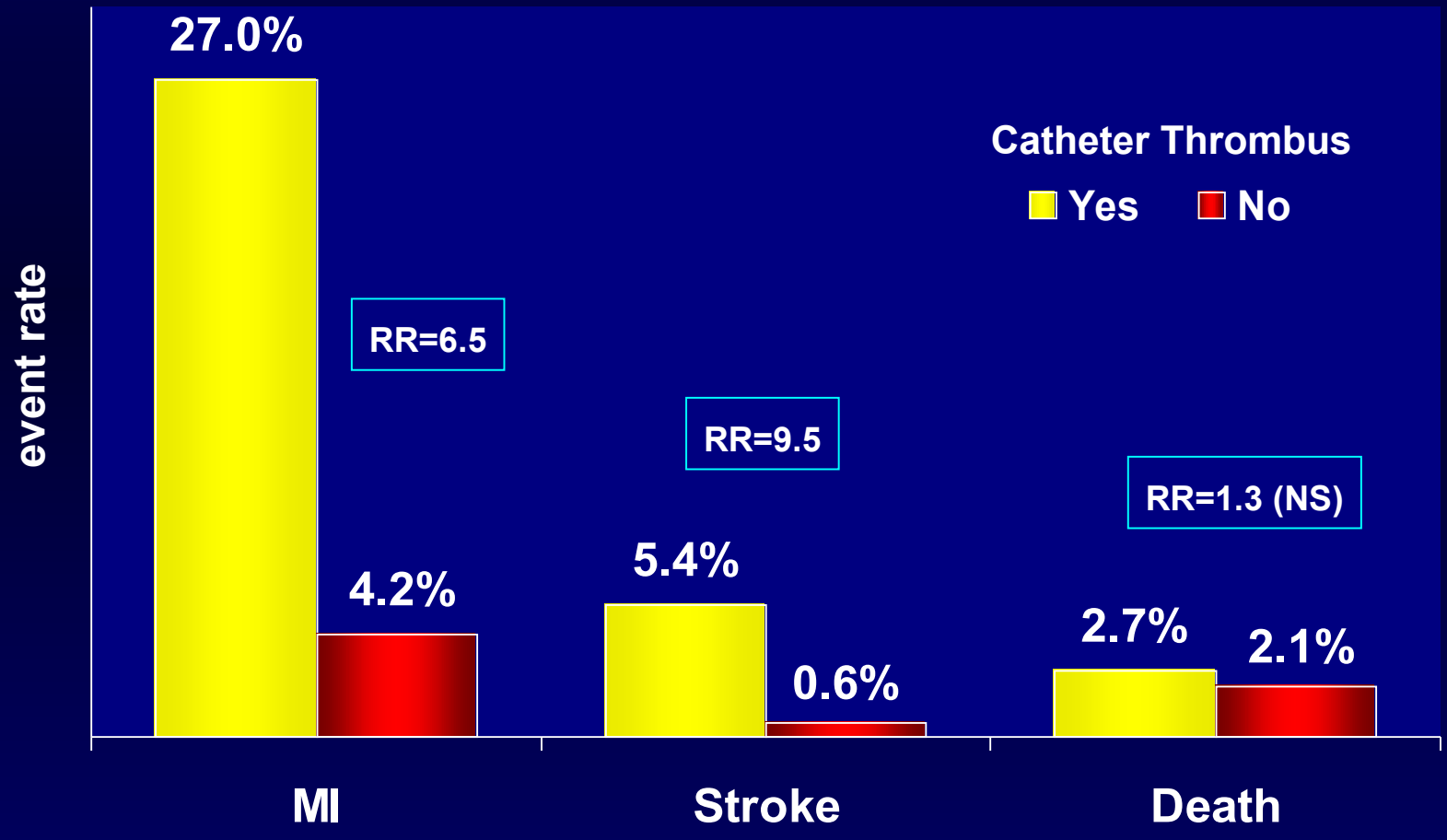


OASIS 6

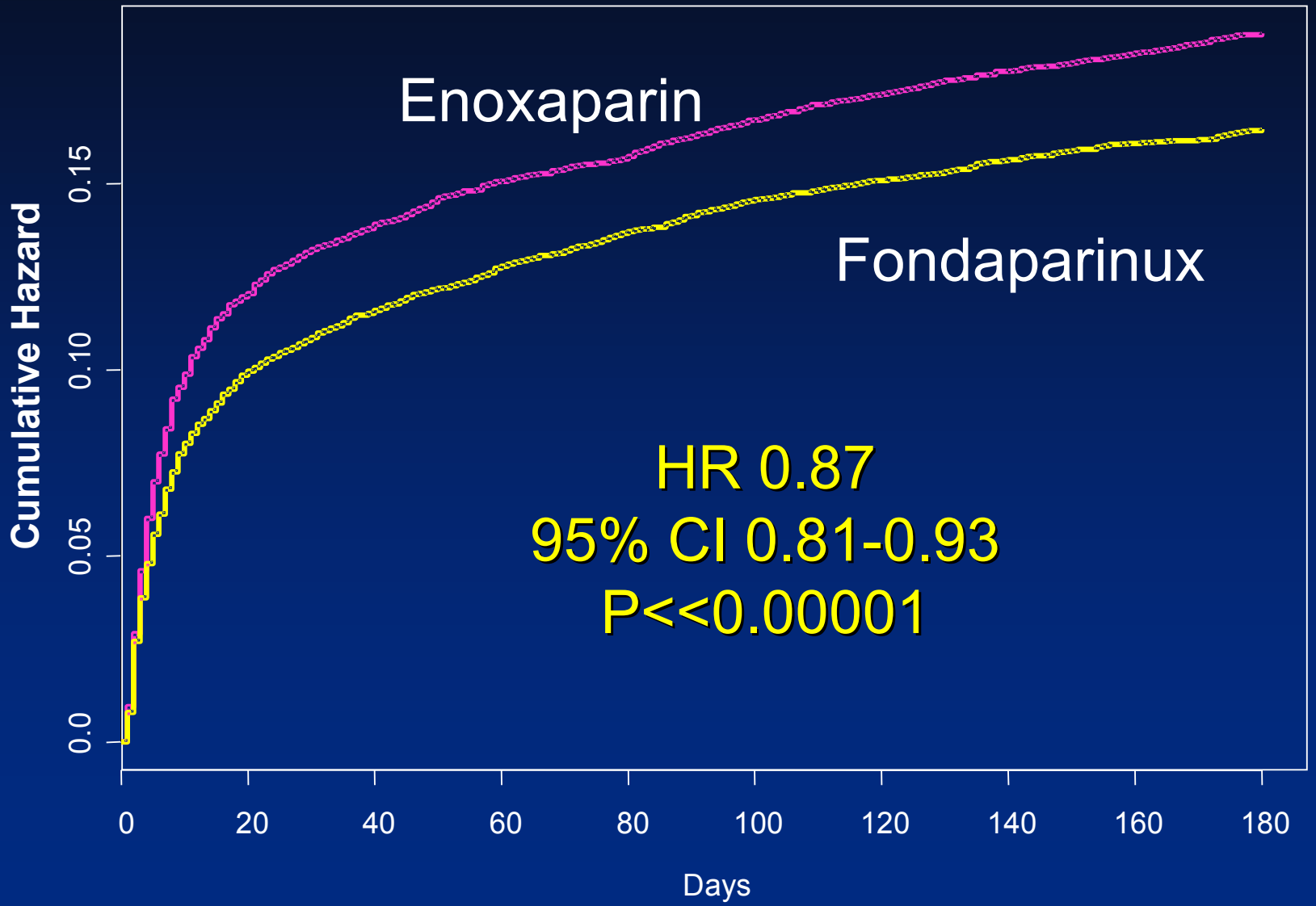
P<0.001



Consequences of Catheter Thrombosis OASIS-5



Death, MI, RI, Major Bleeding at 6 Months



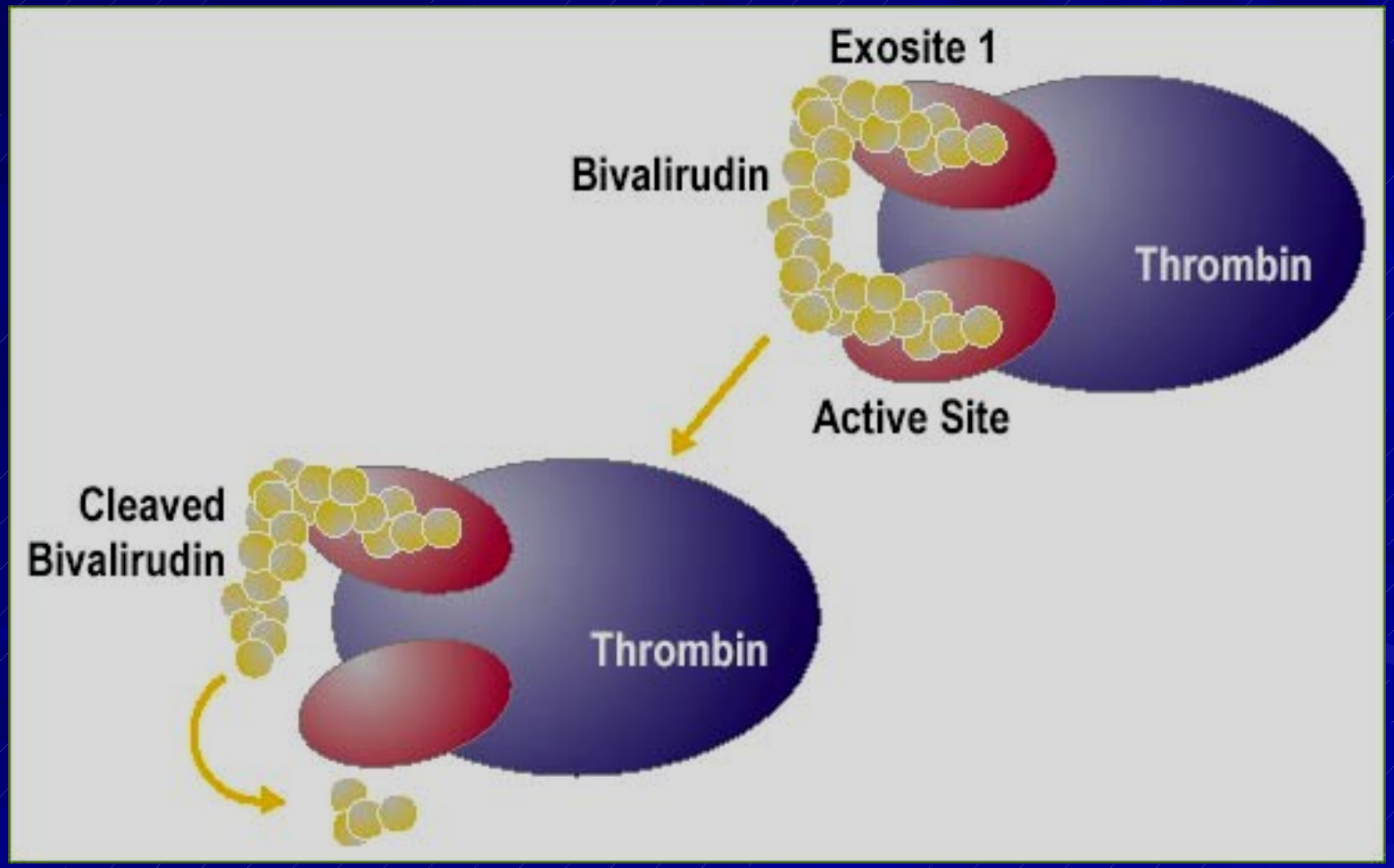
Clinical Implications

Treating 1000 NSTE ACS patients with fondaparinux instead of enoxaparin prevents:

- 10 deaths or MI
- 4 strokes
- 25 major bleeds

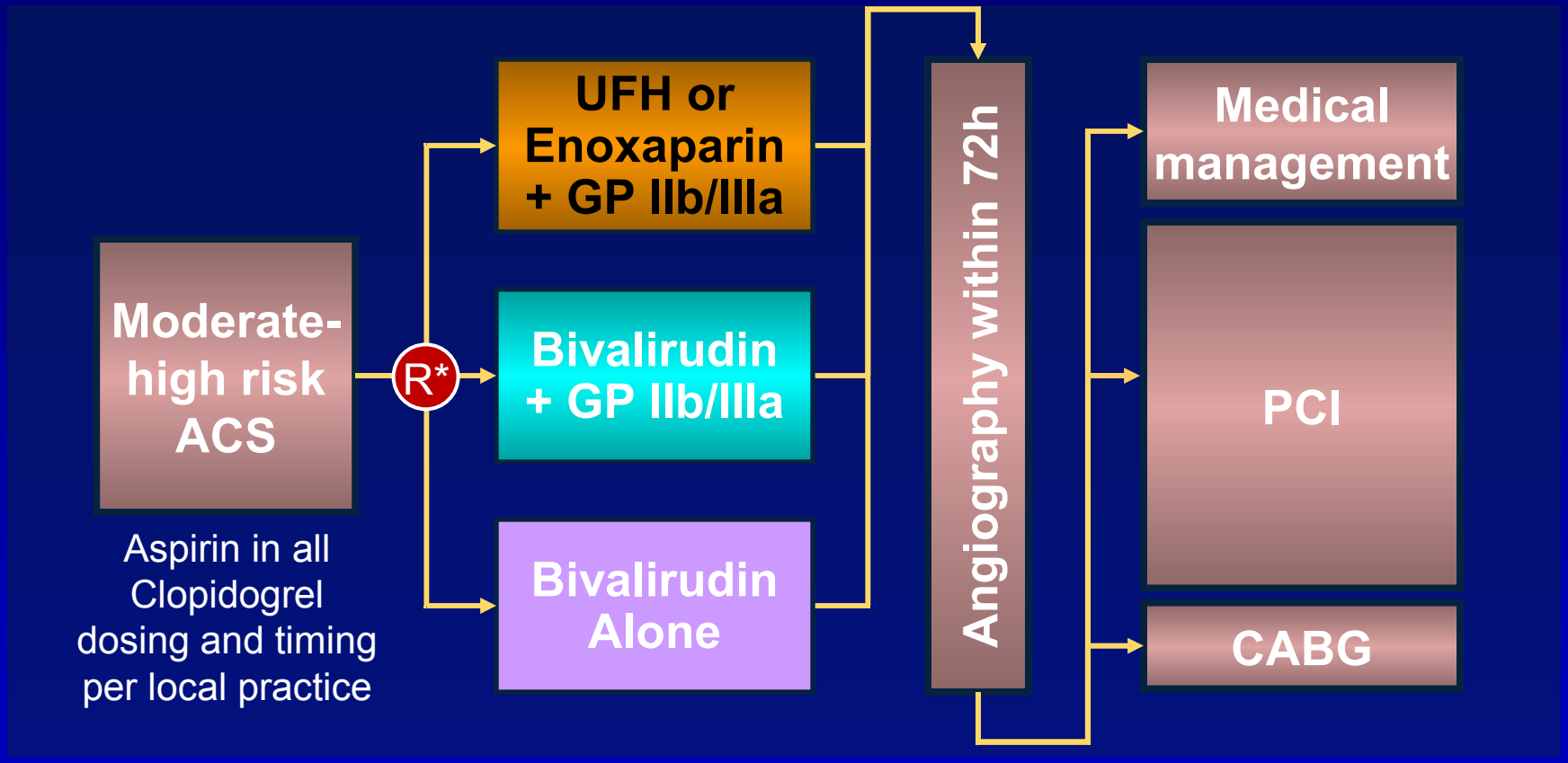
THE OASIS 5 TRIAL CLEARLY DEMONSTRATES THAT FONDAPARINUX IS THE PREFERRED ANTICOAGULANT FOR TREATMENT OF ACS

Bivalirudin



Study Design – First Randomization

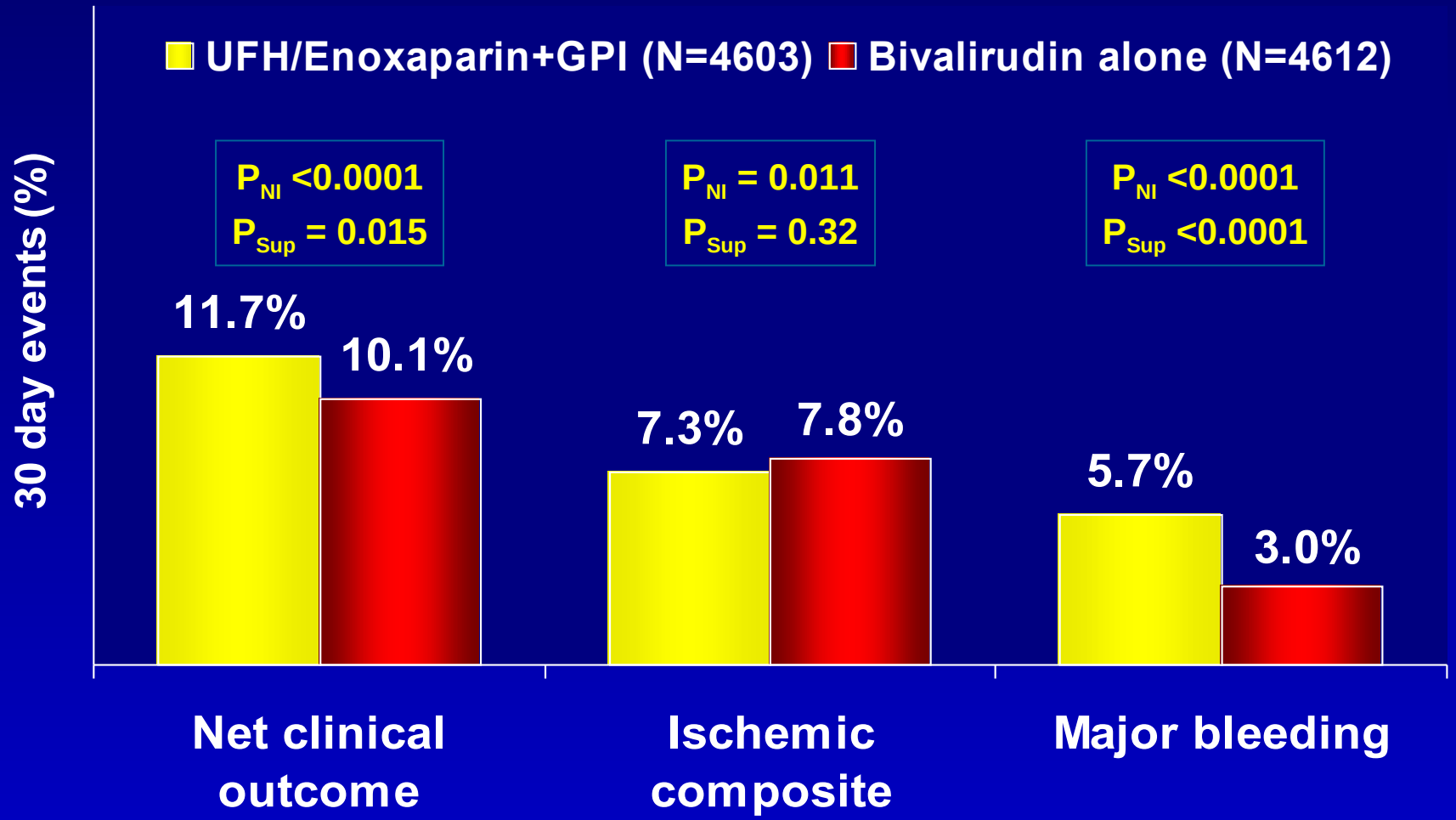
Moderate-high risk unstable angina or NSTEMI undergoing an invasive strategy (N = 13,800)



***Stratified by pre-angiography thienopyridine use or administration**

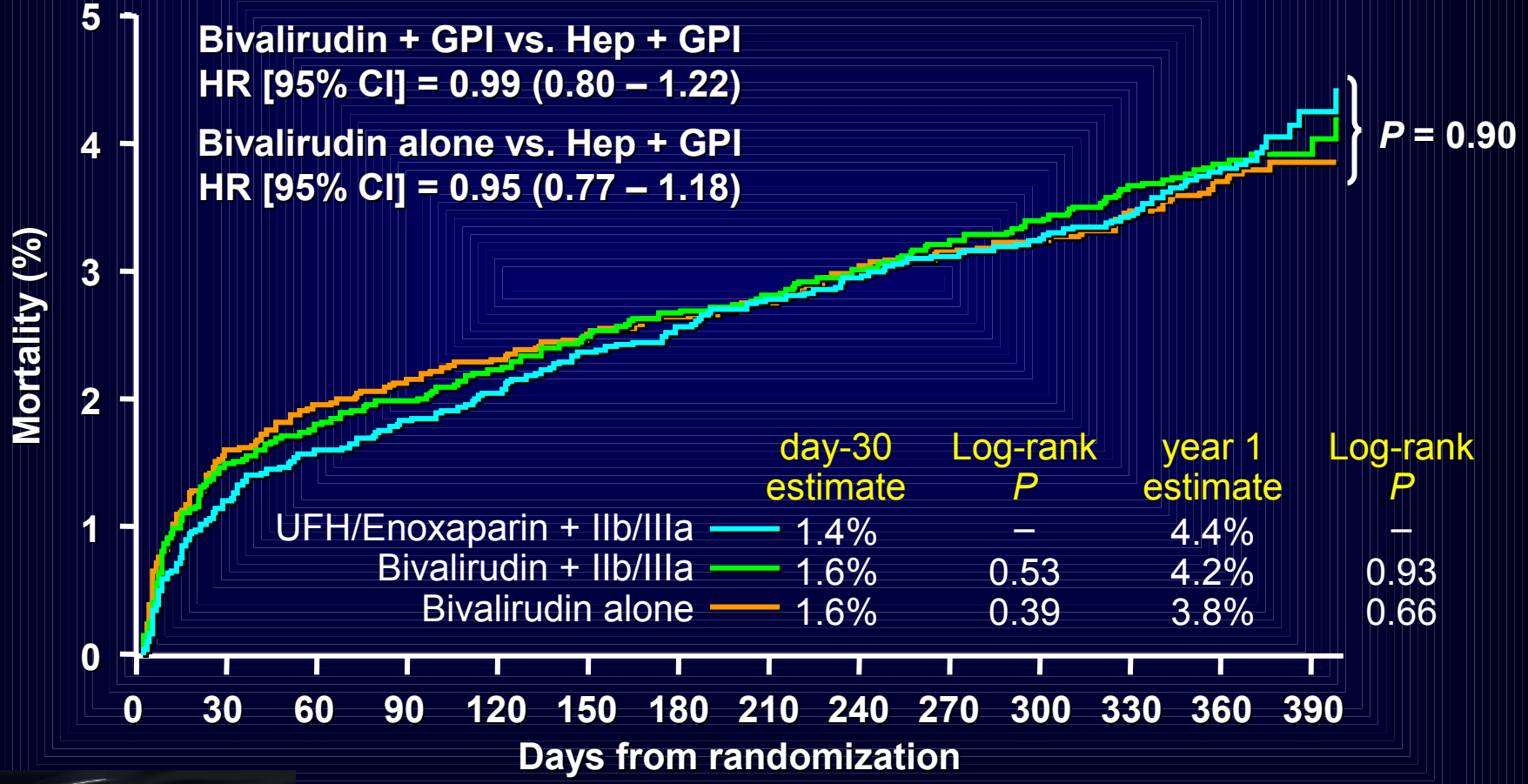
ACUITY Design. Stone GW et al. AHJ 2004;148:764–75

UFH/Enoxaparin + GPI vs. Bivalirudin Alone (Primary Endpoint Measures (ITT



Mortality: 524 Total Deaths at 1 Year

UFH/Enoxaparin + GPI vs. Bivalirudin + GPI vs. Bivalirudin Alone



ACUITY

ESC and ACC/AHA NSTE ACS Guidelines 2007

Anticoagulant Therapy for an Urgent Invasive Approach

	ESC	ACC/AHA
UFH	IC	IA
Enoxaparin	IIa-B	IA
Fondaparinux	Not recom-mended	IB
Bivalirudin	IB	IB

LMWH recommendation limited to enoxaparin.

Bassand JP, et al. *Eur Heart J.* 2007;28:1598-1660.

Anderson JL, et al. *Circulation.* 2007;116:e148-304.

ESC and ACC/AHA NSTE ACS Guidelines 2007

Anticoagulant Therapy for a Conservative Approach

	ESC	ACC/AHA
UFH	IC	IA
Enoxaparin	IIa-B	IA
Fondaparinux	IA	IB

LMWH recommendation limited to enoxaparin.

Bassand JP, et al. *Eur Heart J.* 2007;28:1598-1660.

Anderson JL, et al. *Circulation.* 2007;116:e148-304.

GP IIB/IIIA

ISAR-REACT II

pts 2022
an episode of angina ≤ 48 hrs
angiographic lesions requiring PCI
: at least one of the following

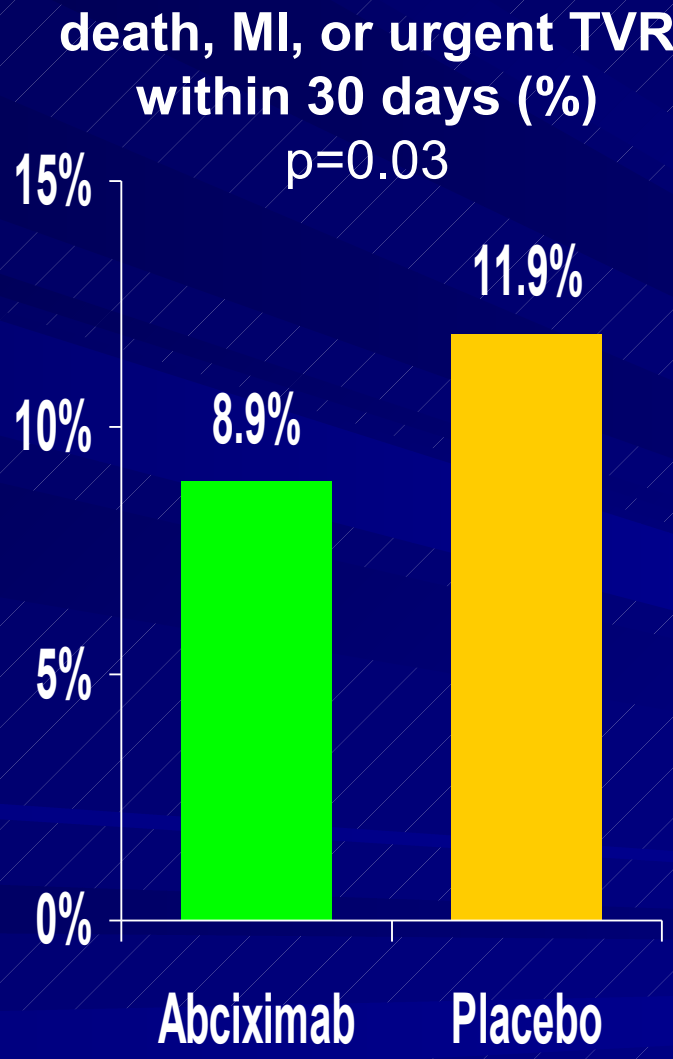
- elevated troponin T level
- new ST-segment depression of ≥0.1 mV
- transient (<20 minutes) ST-segment elevation of ≥0.1 m V

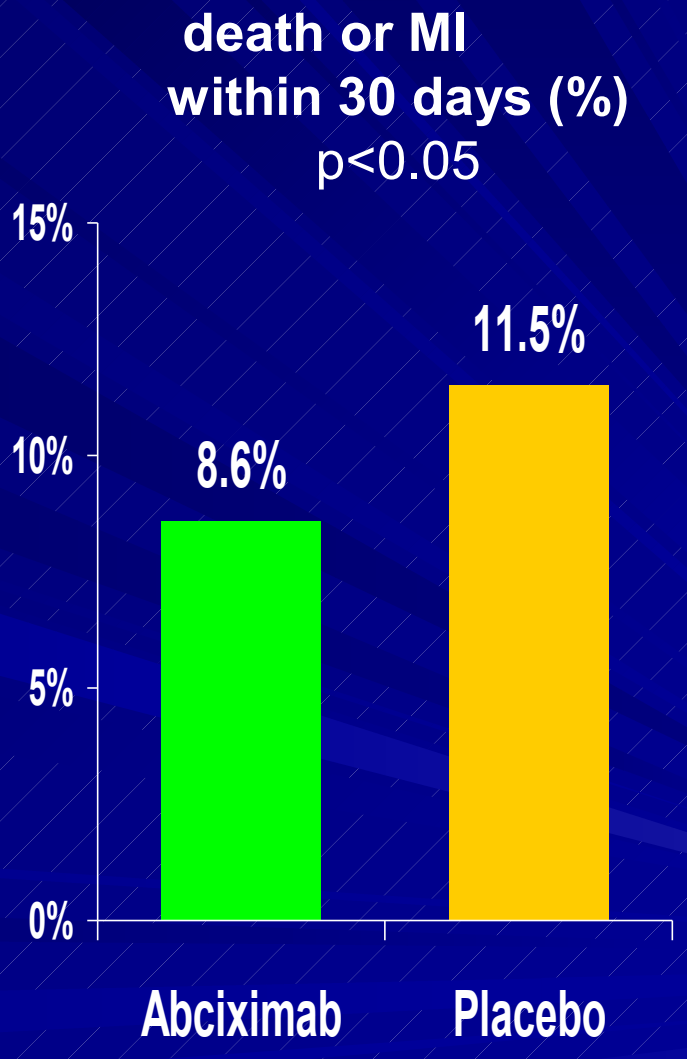
↓

Pre-treatment with high dose (600mg) clopidogrel at least 2 hours pre-procedure

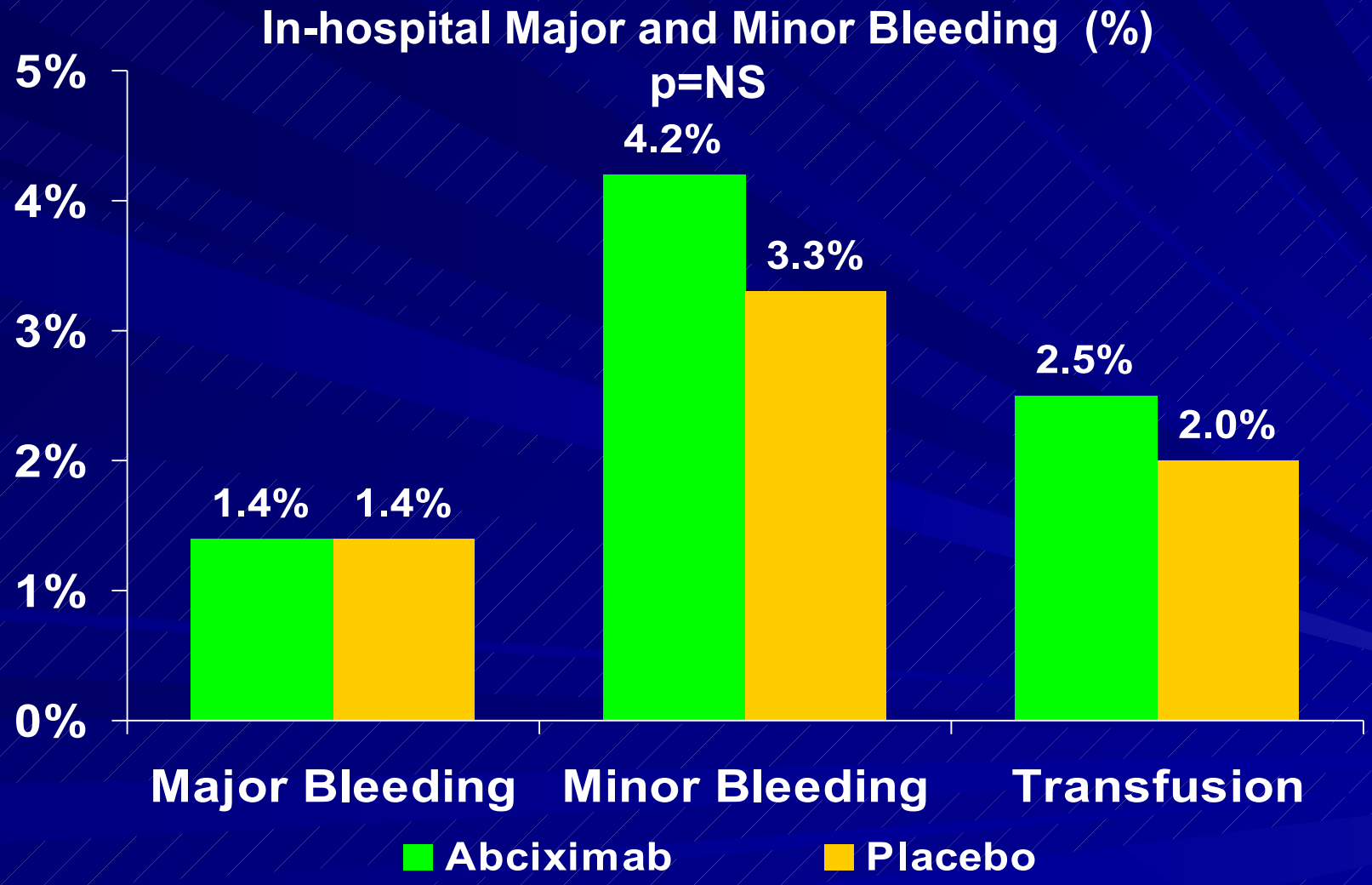
Abciximab (n=1012	Placebo n=1010

ISAR-REACT 2 Trial : Endpoints



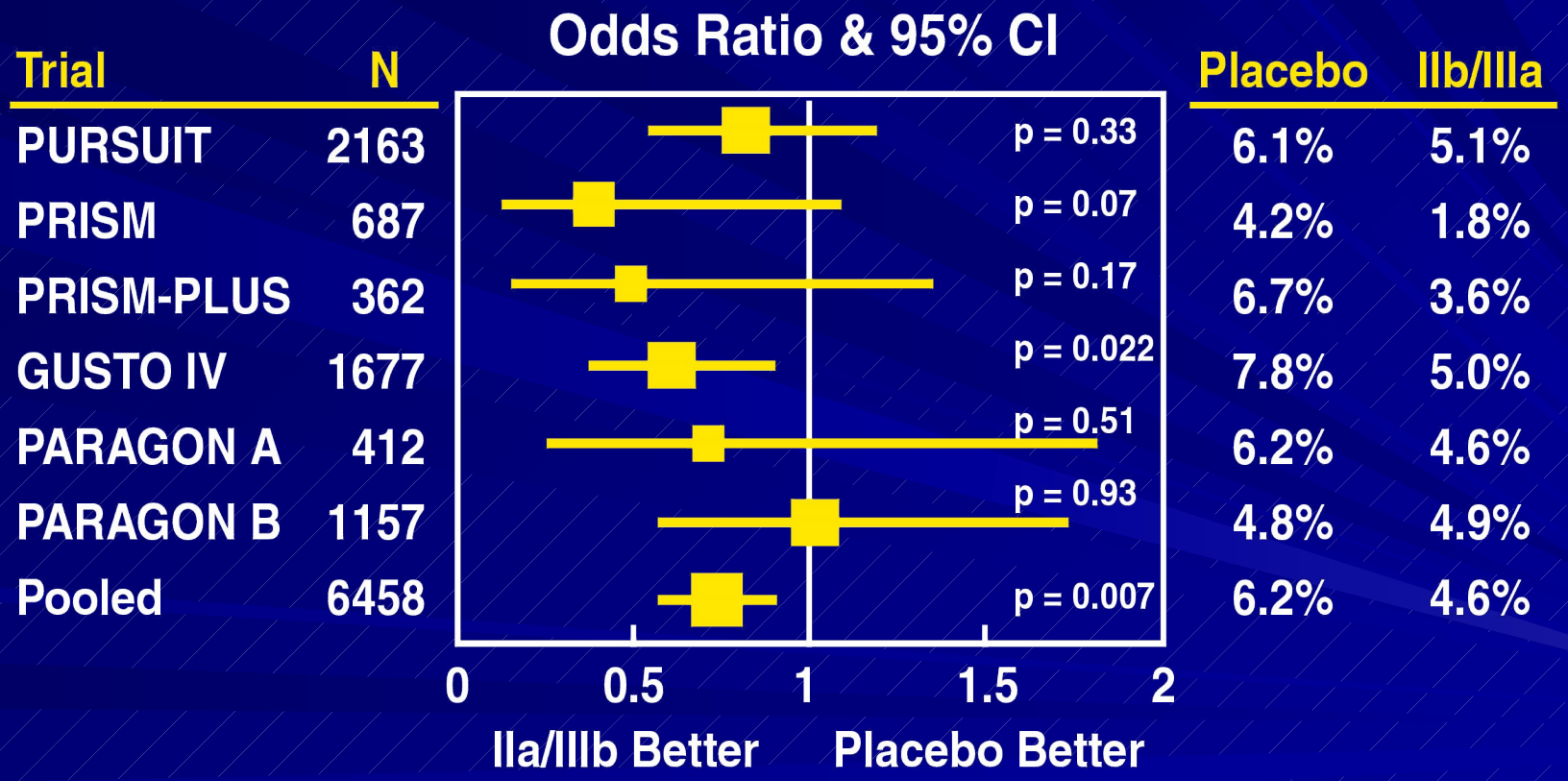


ISAR-REACT 2 Trial: In-hospital Major and Minor Bleeding



GP IIb/IIIa Inhibitors Reduce Mortality in Pts With Diabetes

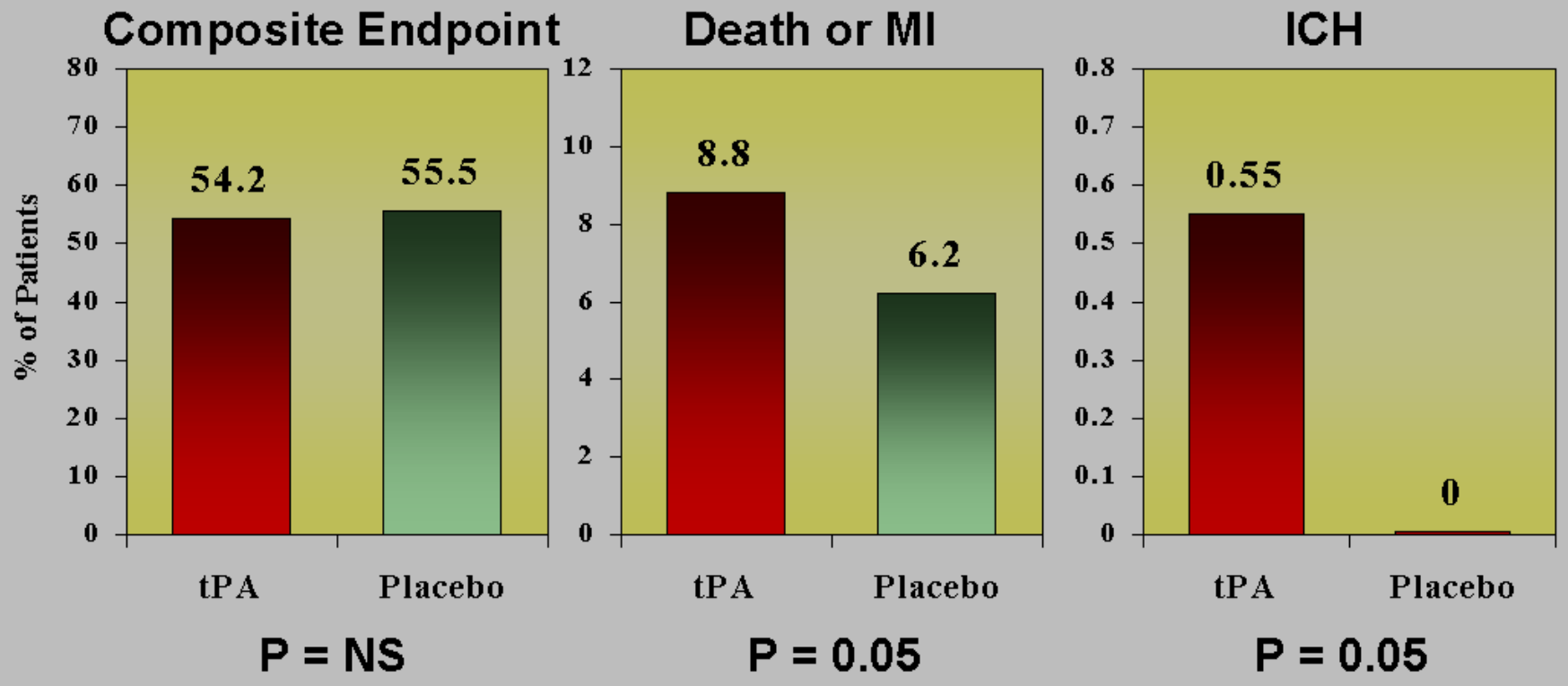
30-Day Mortality – Diabetic Patients



TIMI IIIB

Primary Results

tPA vs. Placebo in Non-ST Elevation ACS



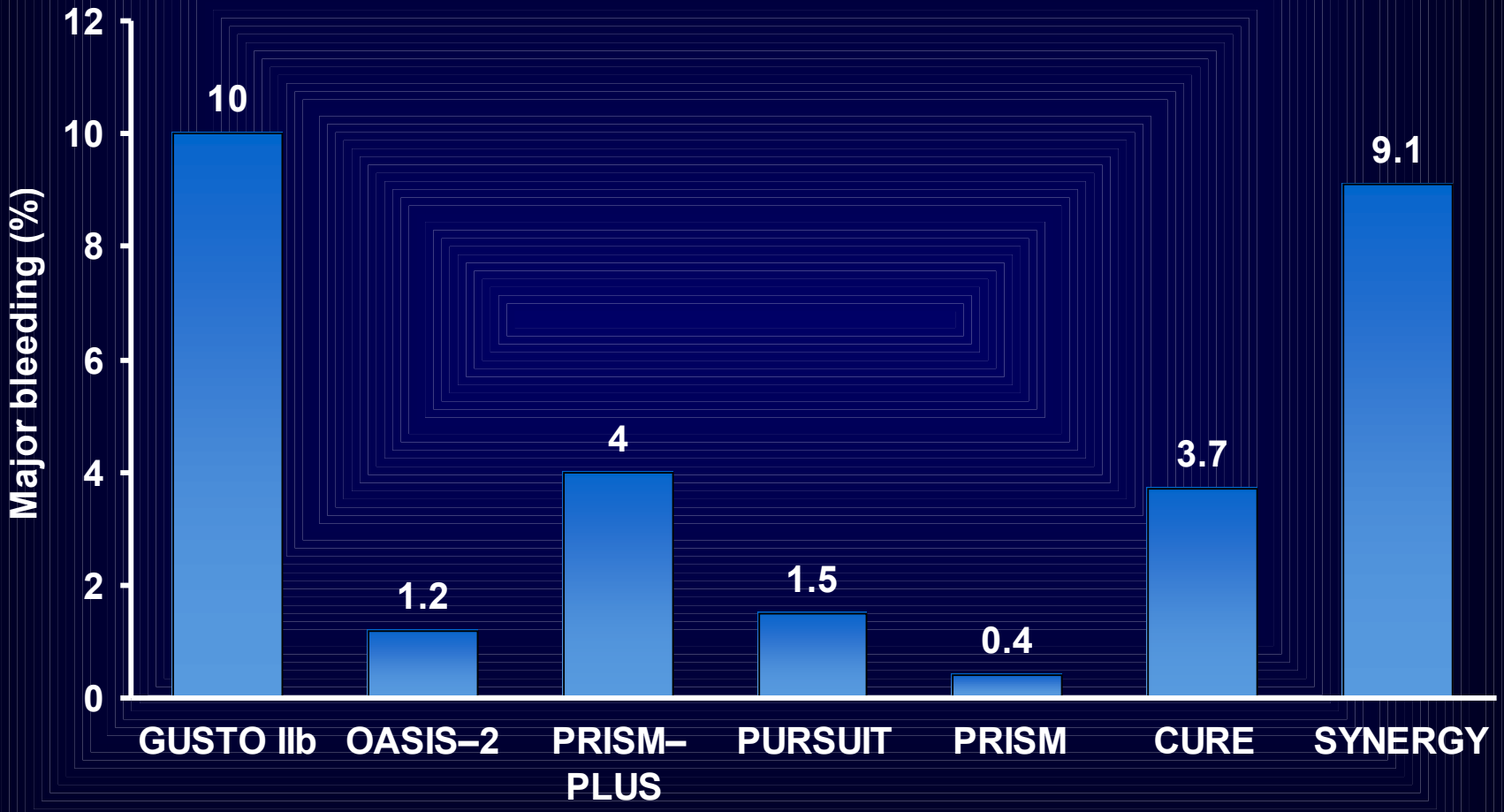
TIMI IIIB Investigators. Circulation 1994;89:1545-56

Summary
NSTE-ACS

- Risk stratification is of major importance
- Major role of clopidogrel
- LMWH ≥ UFH
- New antithrombotics are equivalent to UFH + GP IIB/IIIA with less bleeding
- GP IIb/IIIa inh for high risk pts (DEM) undergoing PCI

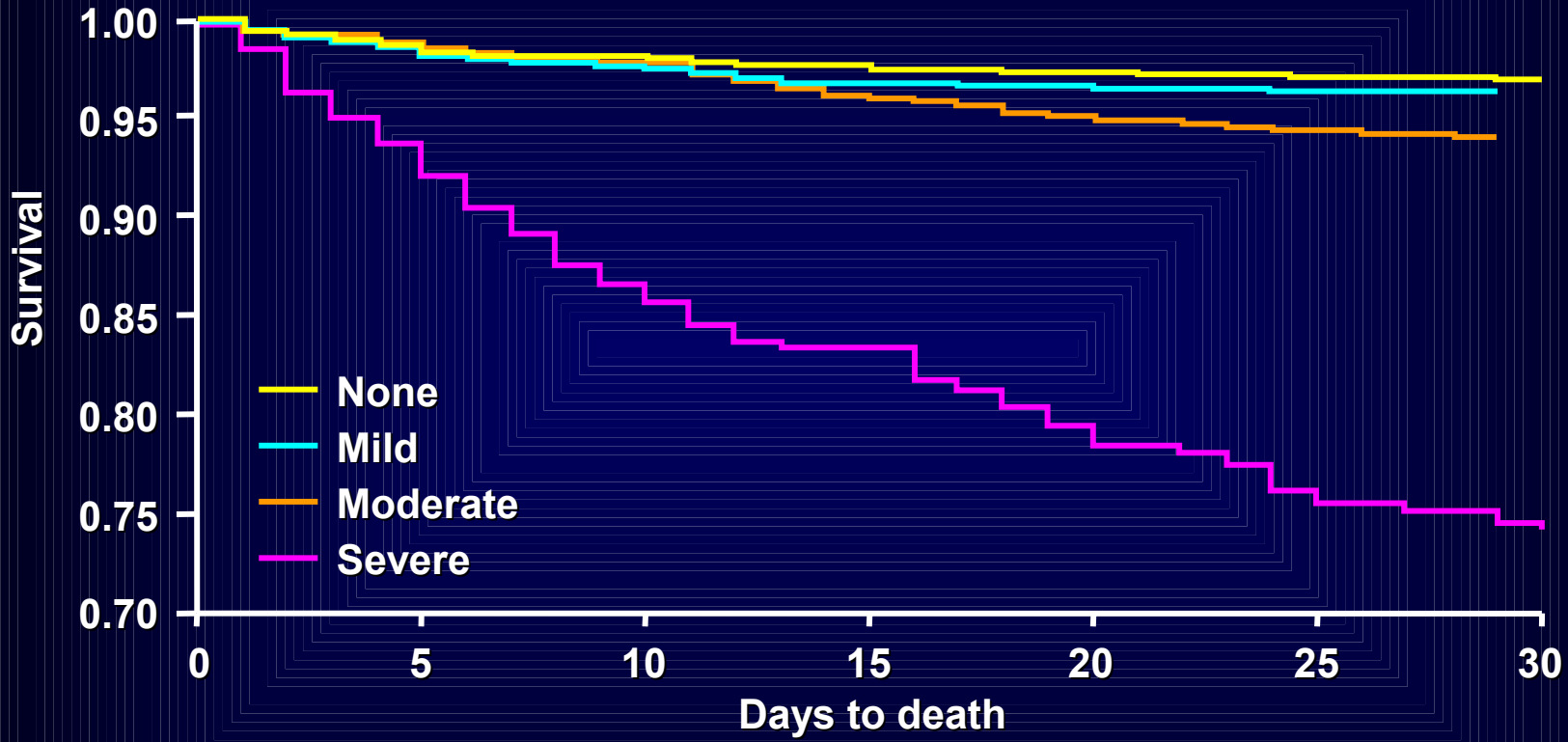
Balancing efficacy and safety

Major" Bleeding: Incidence in ACS" Clinical Trials



Bleeding & Outcomes

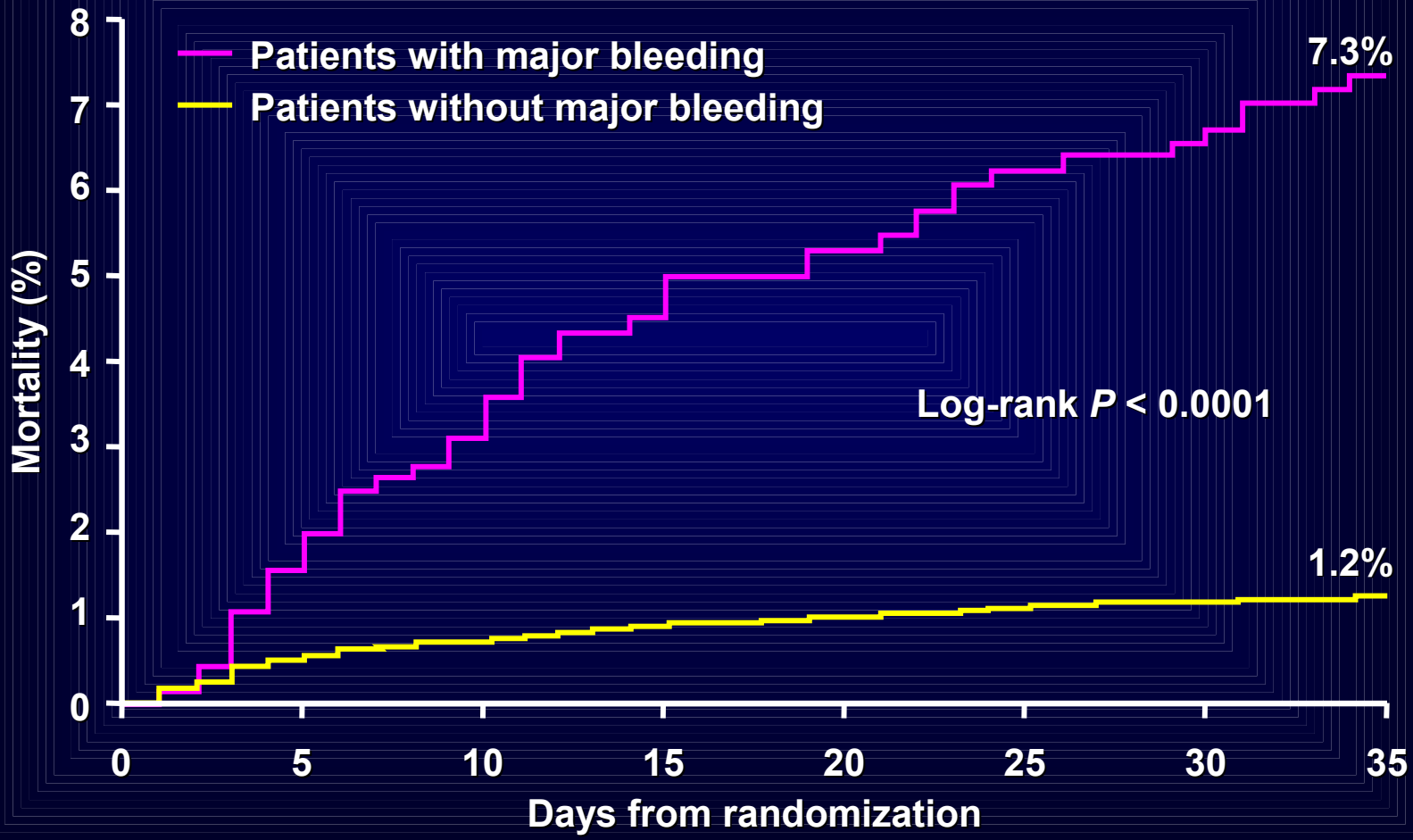
Kaplan–Meier Curves for 30-Day Death, (Stratified by Bleed Severity (GUSTO



Log rank *P* for all four categories < 0.0001
Log-rank *P* for no vs. mild bleeding = 0.02
Log-rank *P* for mild vs. moderate bleeding < 0.0001
Log-rank *P* for moderate vs. severe bleeding < 0.001

Rao SV, et al. *Am J Cardiol*. 2005;96:1200-1206.

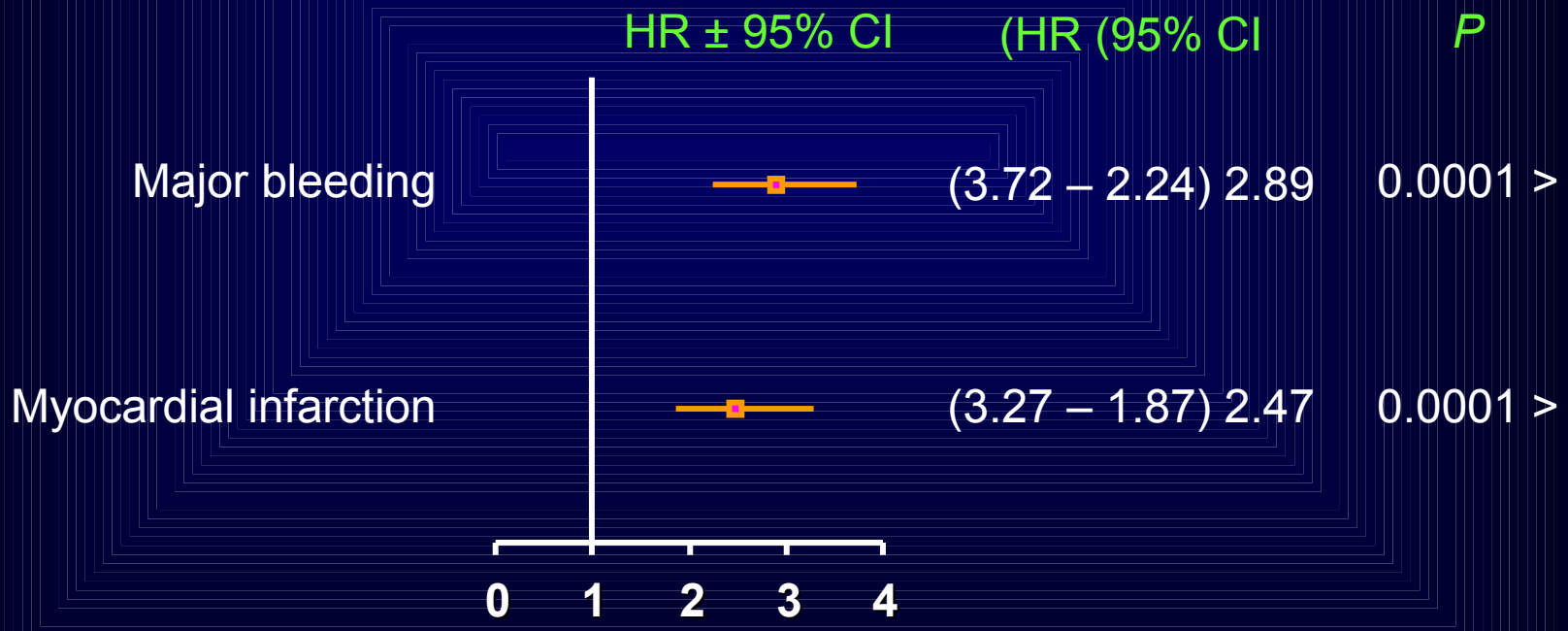
Major Bleeding (ACUITY) in ACS



Manoukian SV, et al. *J Am Coll Cardiol*. 2007;49:1362-1368.

Influence of Major Bleeding and MI in the First 30 Days, on Risk of Death Over 1 Year

- Cox model adjusted for baseline predictors, with non-CABG major bleeding and MI as time-updated covariates

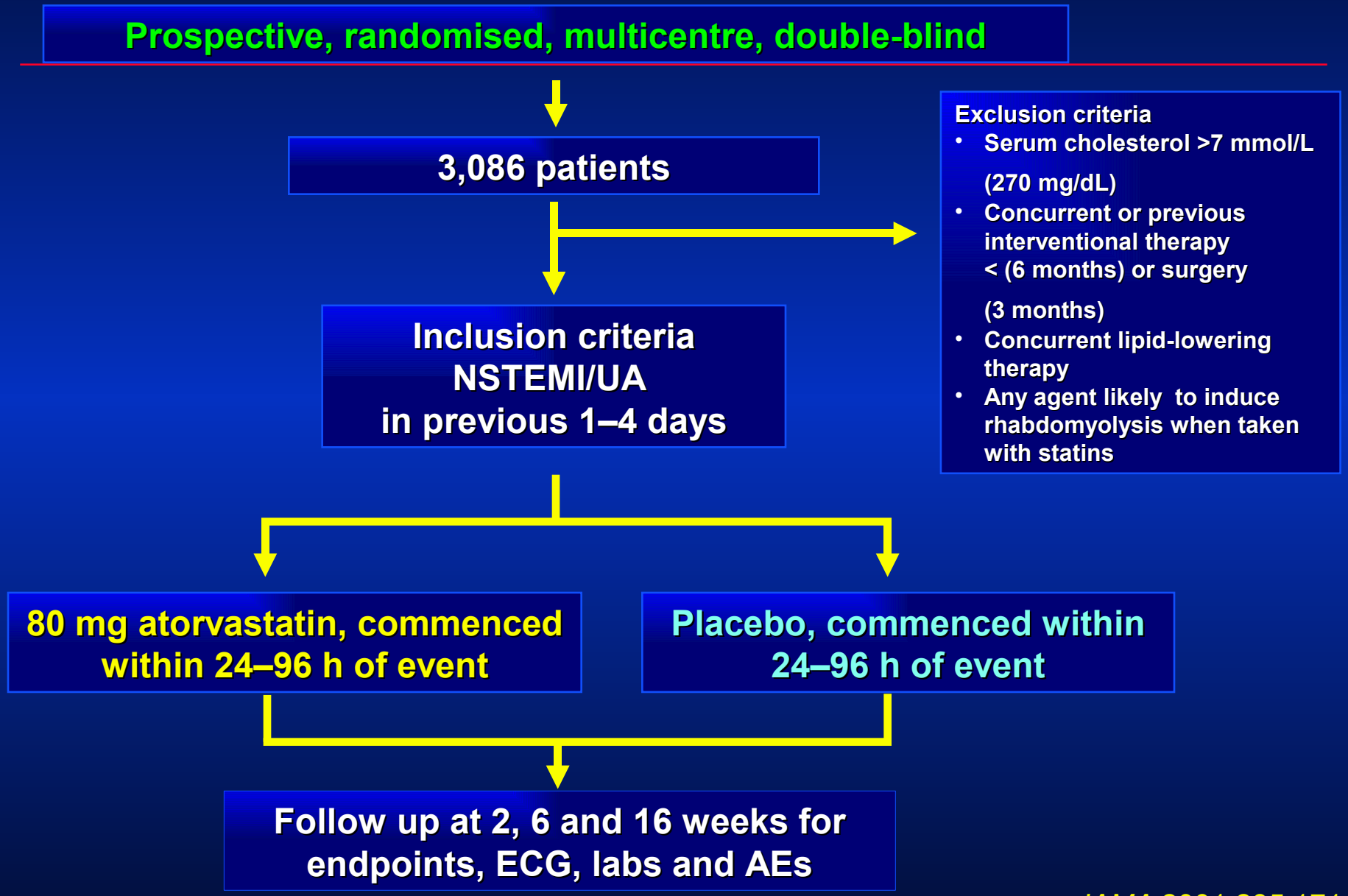


ACUITY

European Society of Cardiology, 2007.

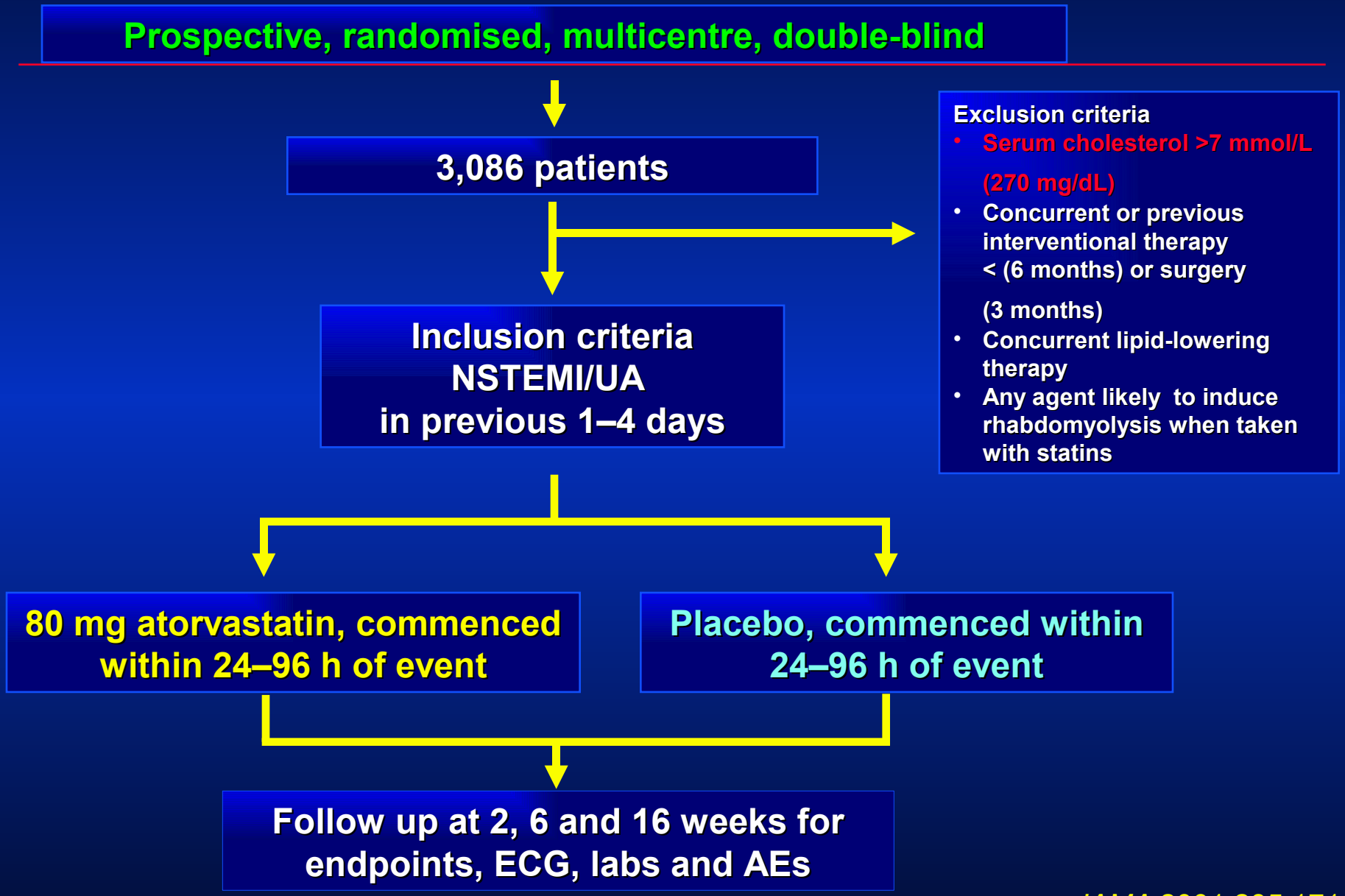
Bleeding confers significant, independent risk for both short- and long-term morbidity and mortality

MIRACL study design



JAMA 2001;285:1711-8

MIRACL study design

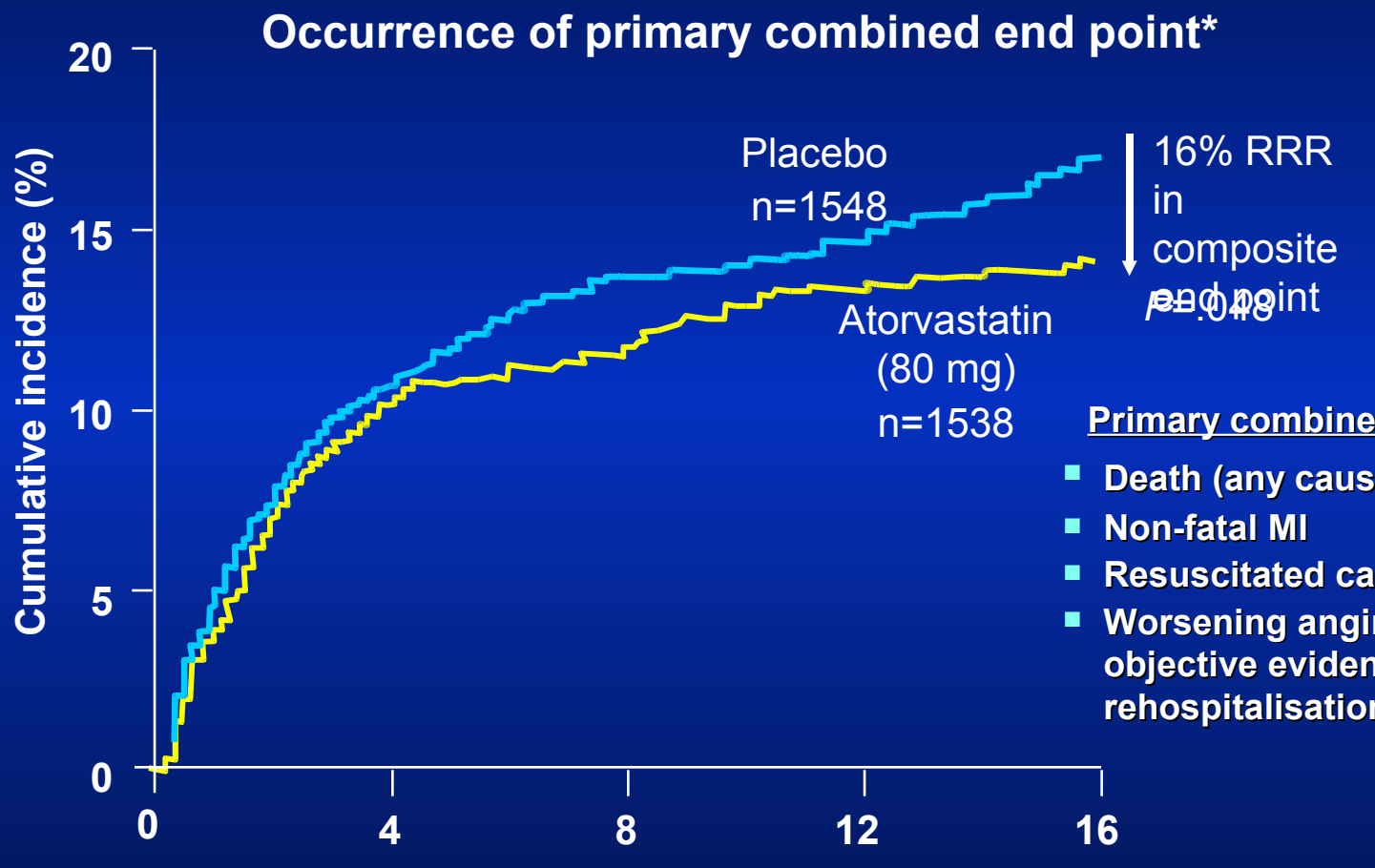


JAMA 2001;285:1711-8

Blood lipids

	Baseline Mean of both groups mg/dl	End of study	
		Placebo	Atorvastatin
		mg/dl (% change)	
Total cholesterol	206	217 (+7%)	147 (-27%)
LDL cholesterol	124	135 (+12%)	72 (-40%)
HDL cholesterol	46	46 (+4%)	48 (+5%)
Triglycerides	182	187 (+9%)	139 (-16%)

MIRACL: Atorvastatin Significantly Reduced Recurrence of Ischemic Events in Patients With ACS



Primary combined end point*

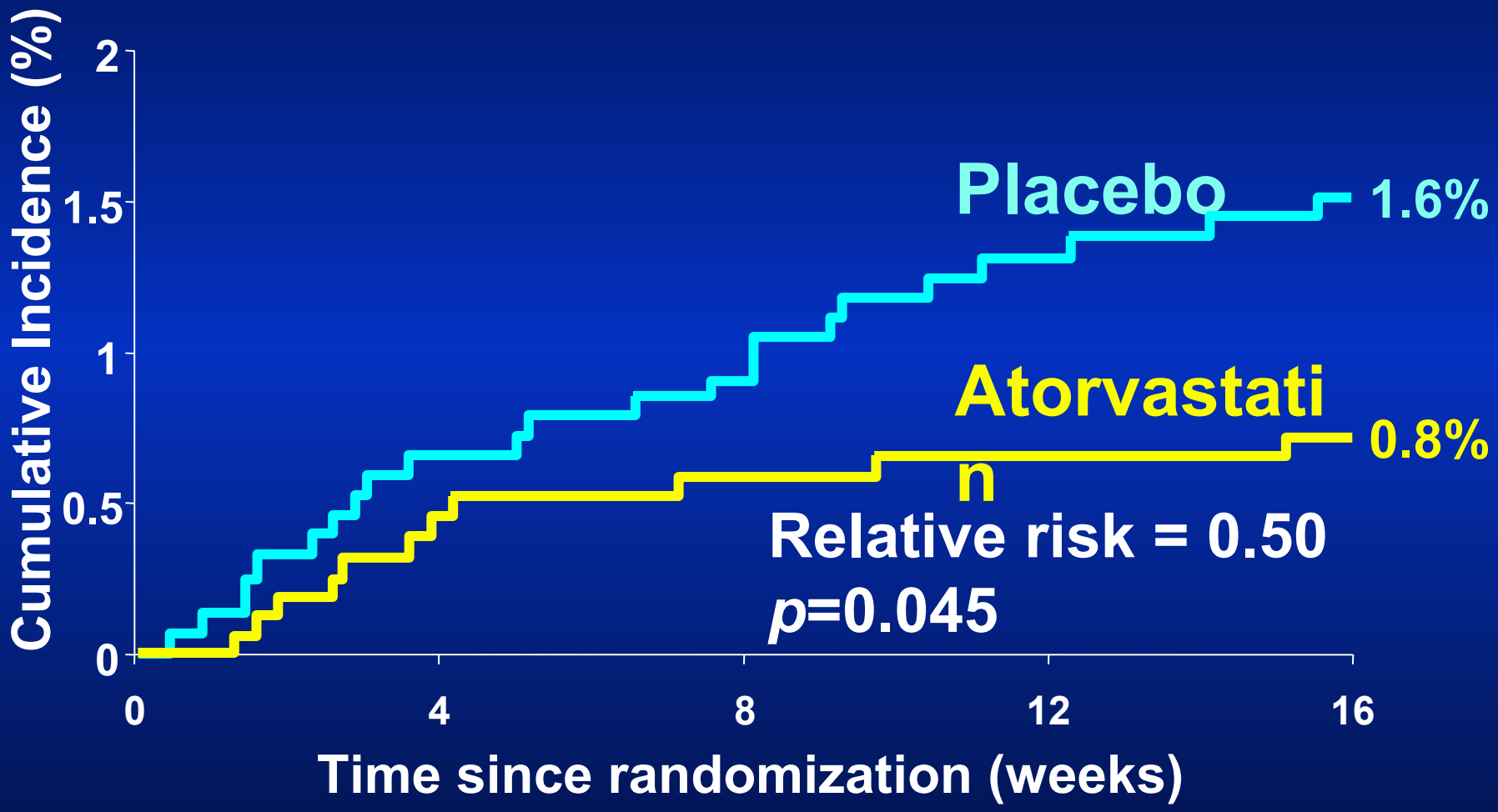
- **Death (any cause)**
- **Non-fatal MI**
- **Resuscitated cardiac arrest**
- **Worsening angina with new objective evidence and urgent rehospitalisation**

*Combined primary end point=death, non-fatal MI, cardiac arrest with resuscitation, or recurrent symptomatic myocardial ischemia requiring emergency rehospitalization.

RRR=relative risk reduction.

Adapted from Schwartz GG et al. *JAMA*. 2001;285:1711-1718.

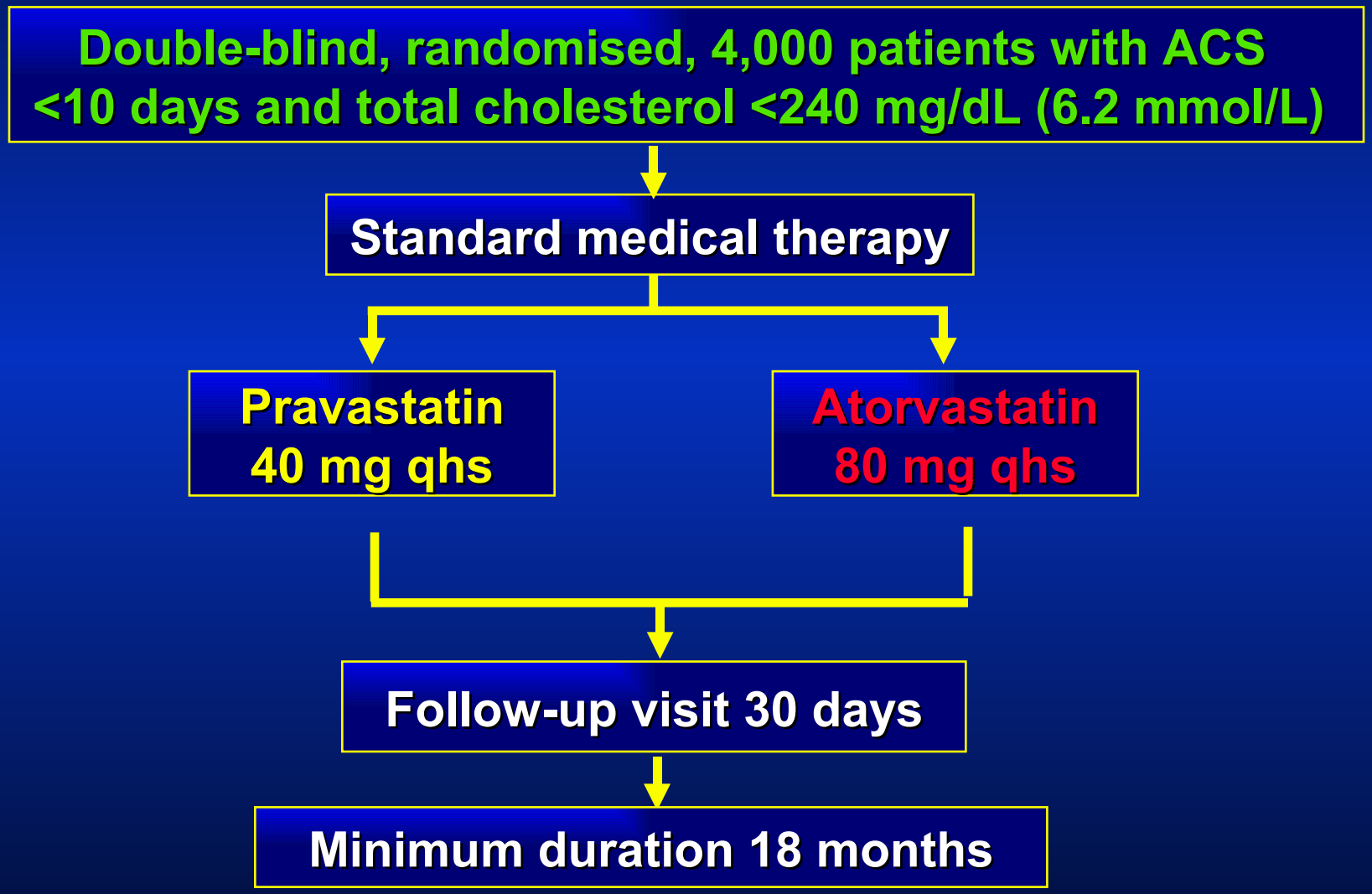
MIRACL: fatal or nonfatal stroke



Safety

	Placebo n=1548	Atorvastatin n=1538
Elevated liver transaminases (>3 times ULN on 2 occasions)	2.5%	0.6%
Myositis (with CK >10 times ULN on 2 occasions)	0%	0%

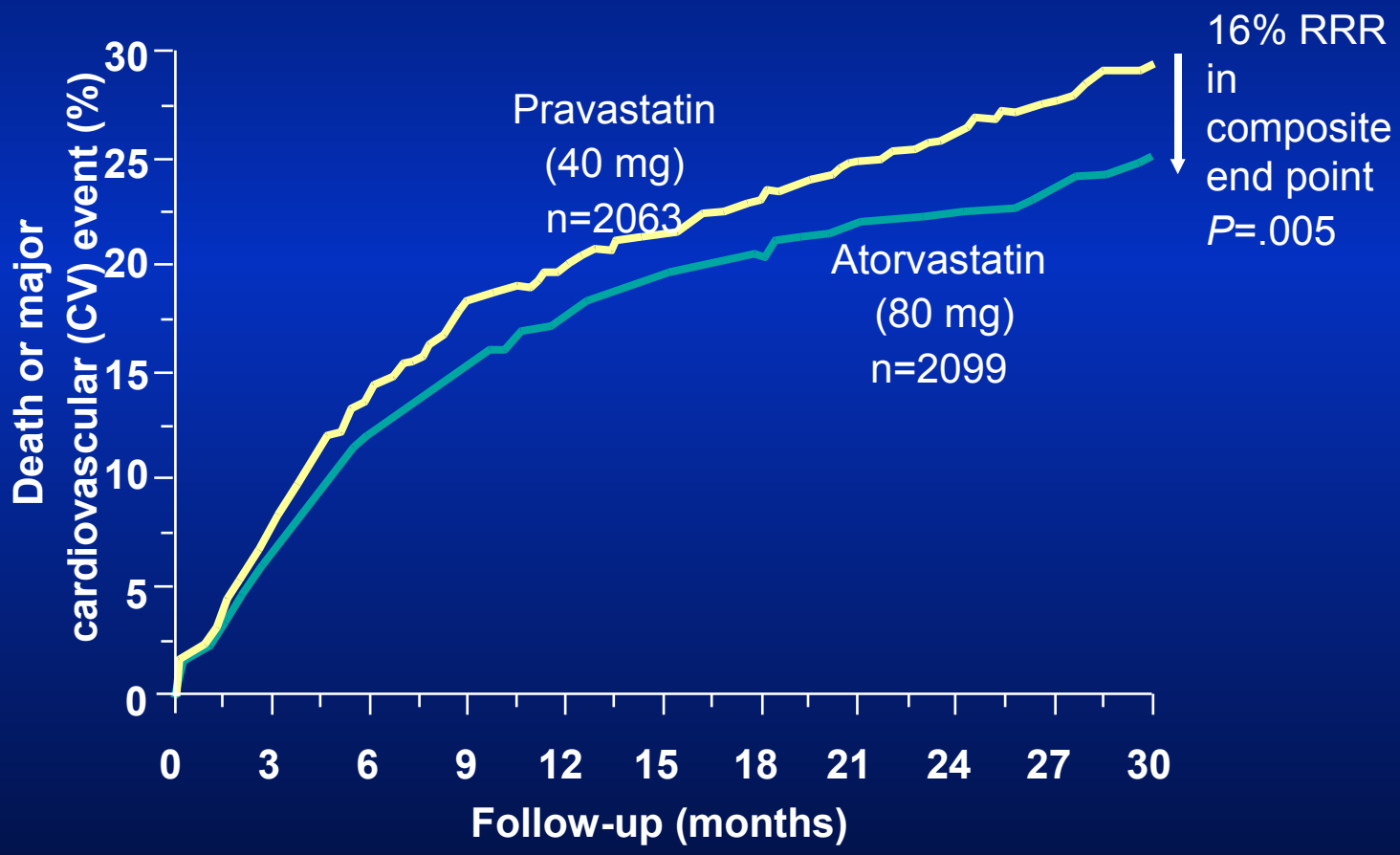
PROVE IT study design



Cannon CP et al. *N Engl J Med*. 2004;350:1495-150

PROVE IT: Early and Sustained Benefit With Atorvastatin Compared With Pravastatin

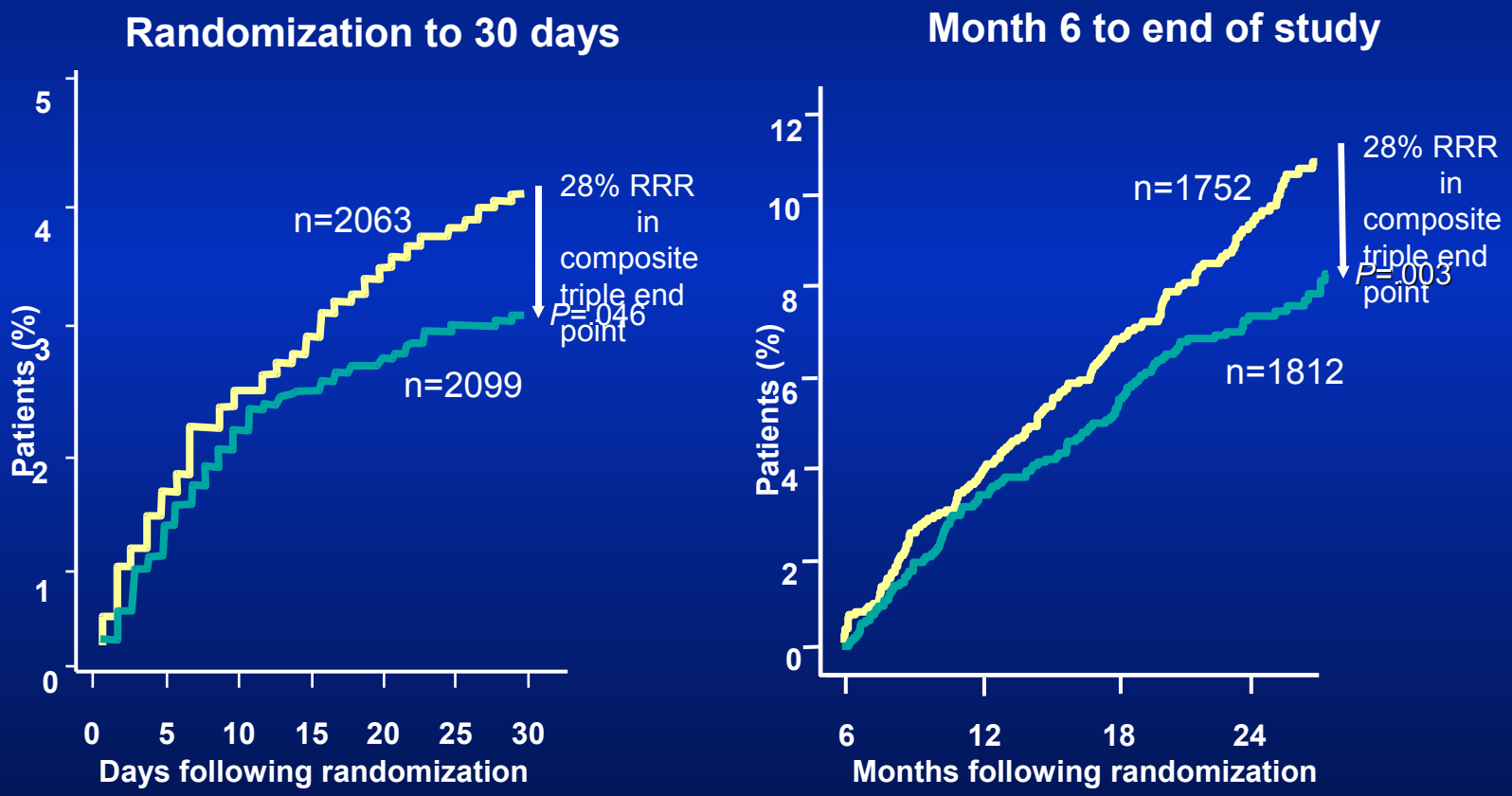
Occurrence of primary composite end point
(death, MI, UA requiring rehospitalization, revascularization, stroke)



Cannon CP et al. *N Engl J Med*. 2004;350:1495-150

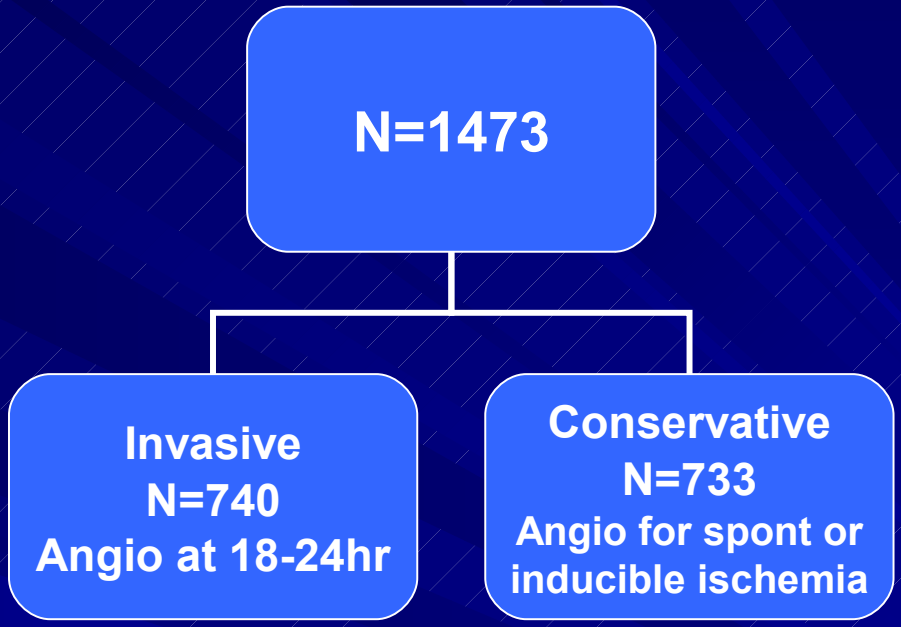
PROVE IT Subanalysis: Intensive Therapy With Atorvastatin Provides Early and Long-Term Benefits in Patients With ACS

Occurrence of composite triple end point
(death, MI, or rehospitalization with recurrent ACS)



Ray KK et al. *J Am Coll Cardiol*. 2005;46:1405-1410.

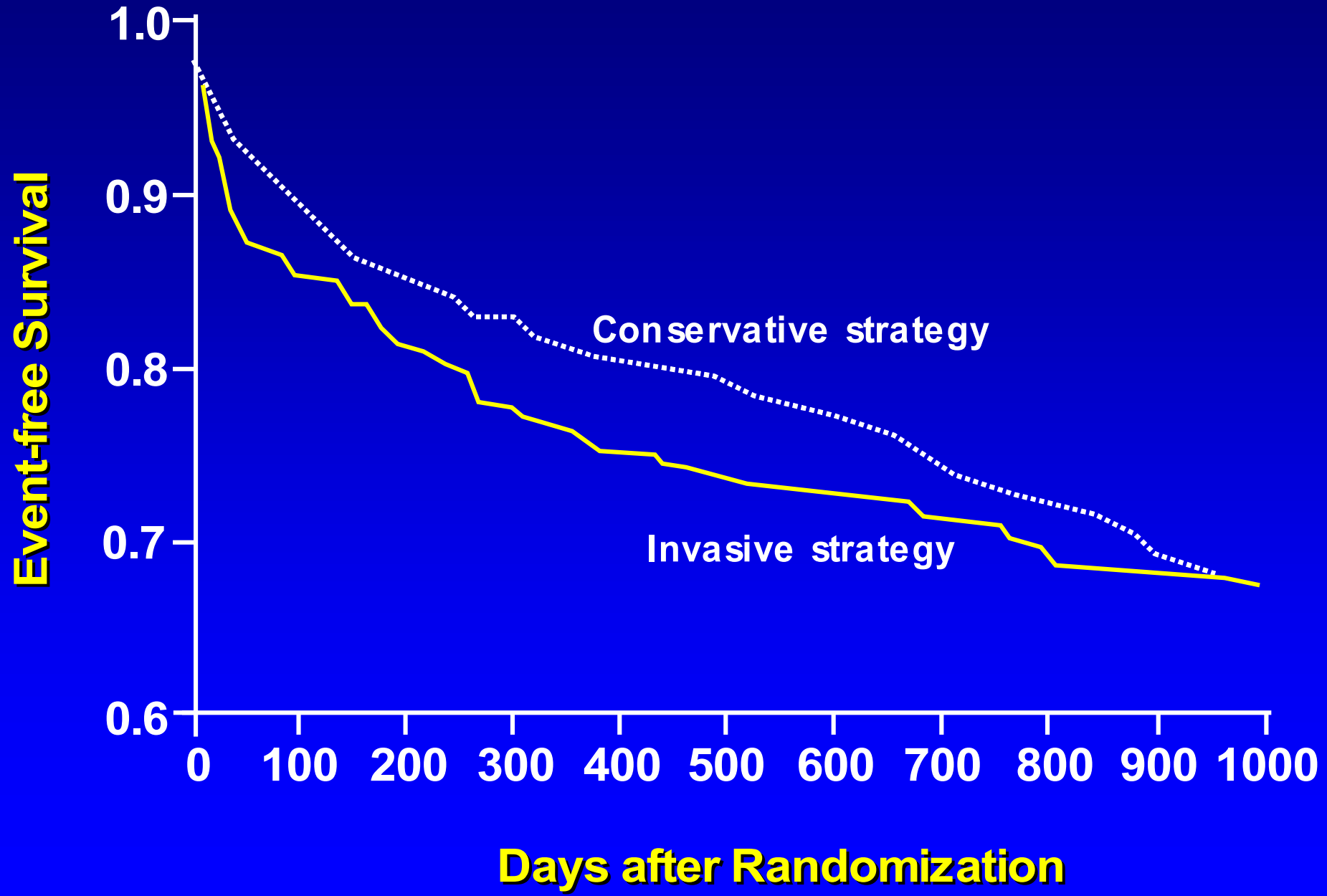
TIMI IIIB

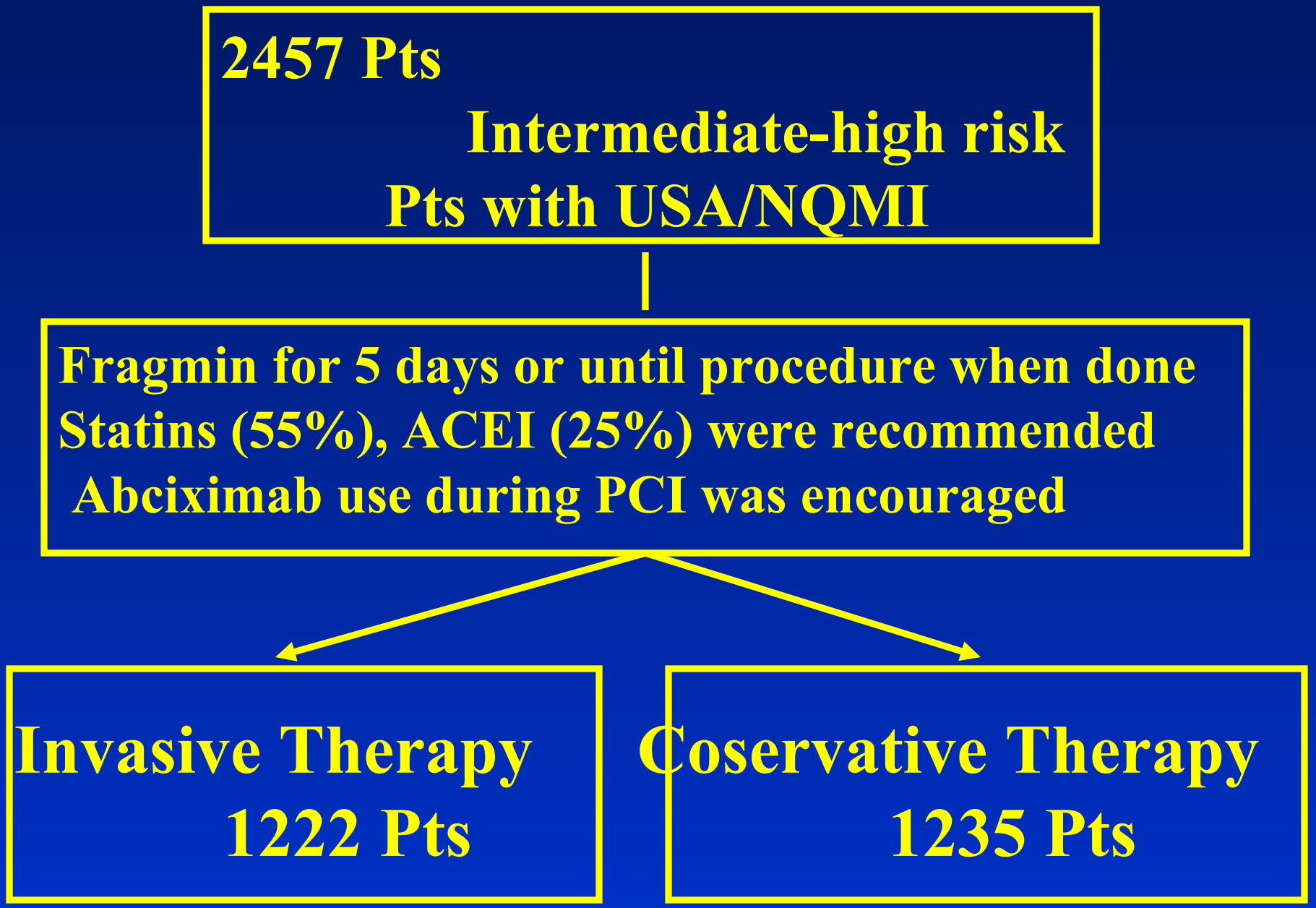


Angiography	98%	64%
Revascularization 6w	61%	49%
CABG	25%	24%
PTCA	41%	26%
Time to	1.5d	7.1d

Circulation 1994

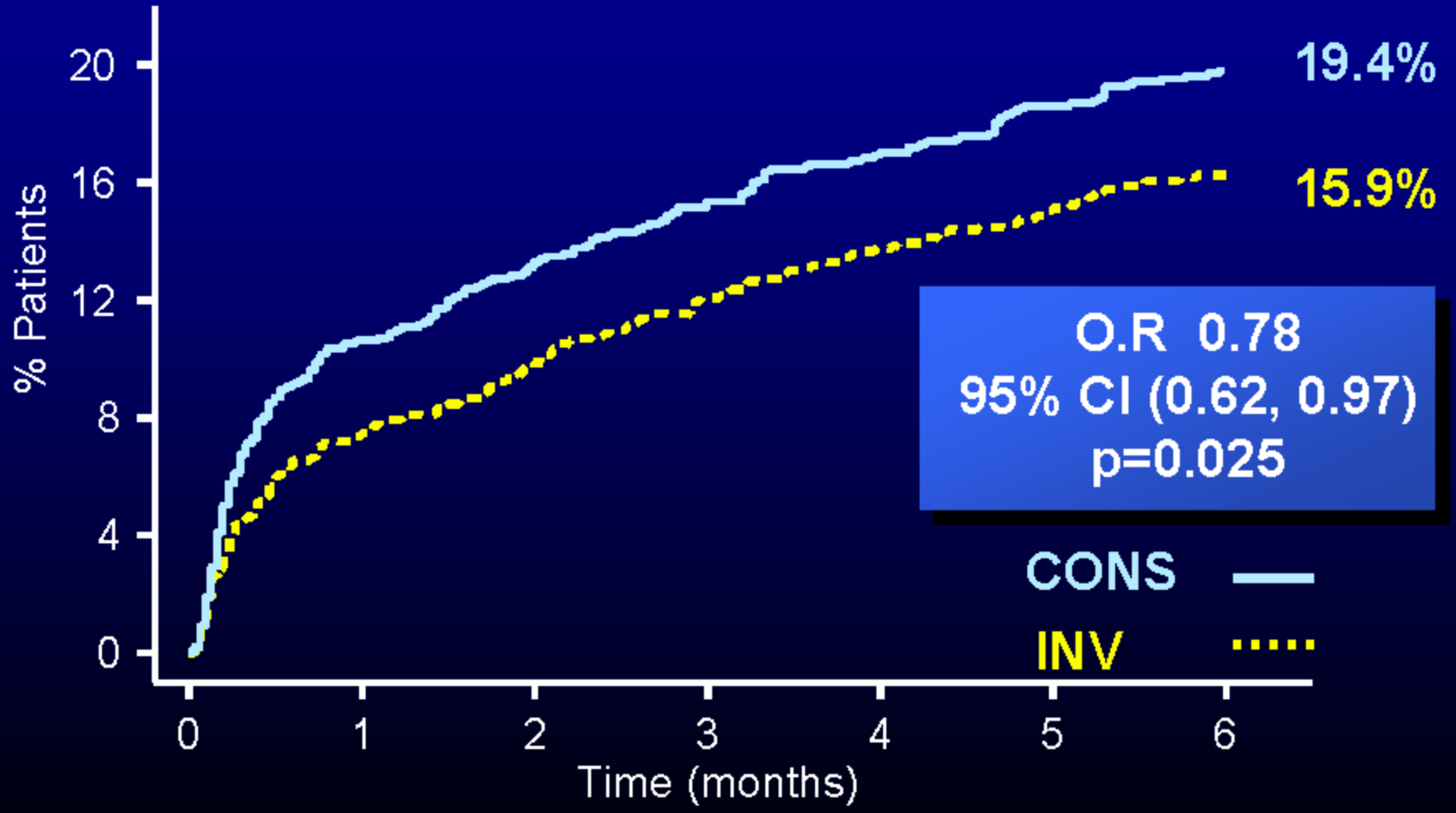
VAQWISH- Death and/or MI




2457 Pts
Intermediate-high risk
Pts with USA/NQMI
Fragmin for 5 days or until procedure when done
Statins (55%), ACEI (25%) were recommended
Abciximab use during PCI was encouraged
Invasive Therapy
1222 Pts
Coservative Therapy
1235 Pts

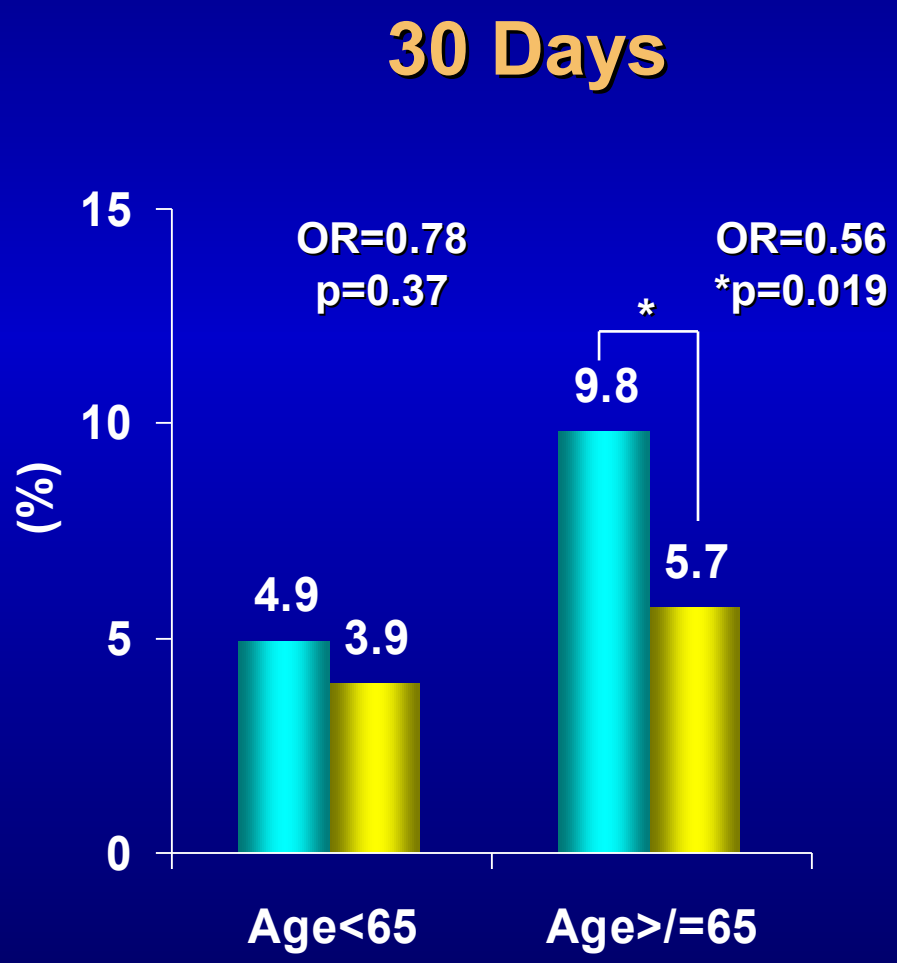
Primary Endpoint

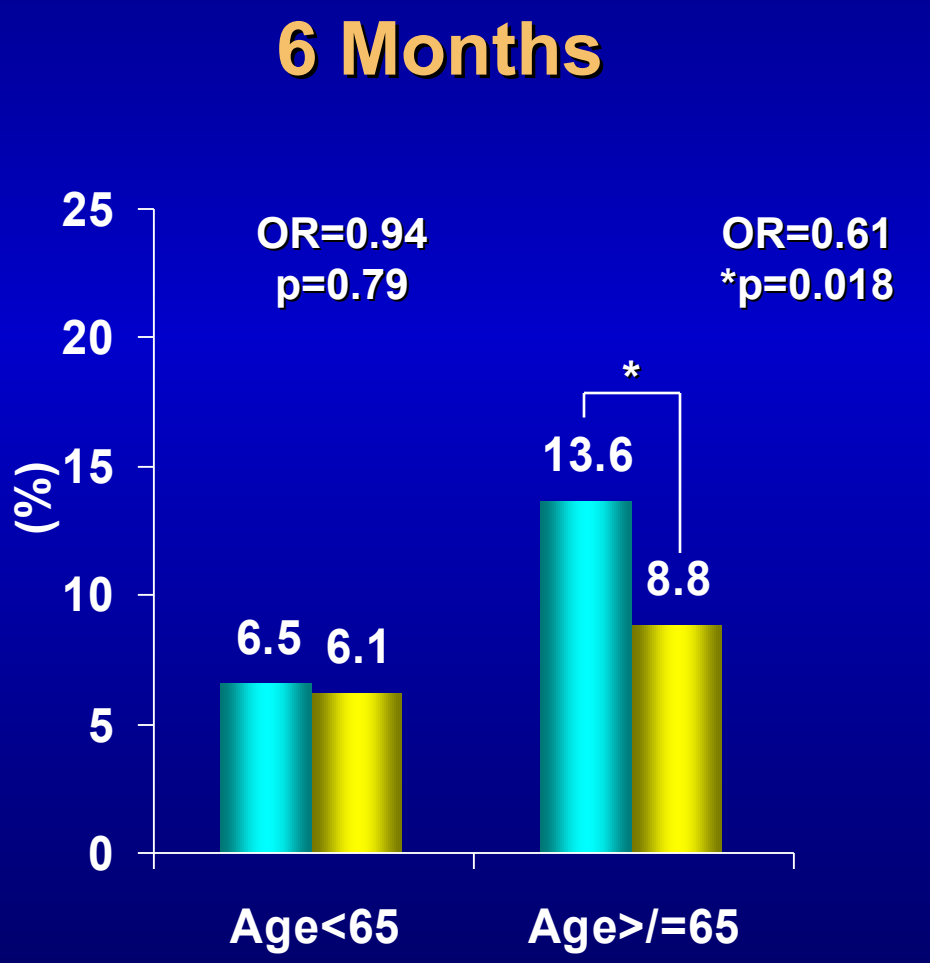
Death, MI, Rehosp for ACS at 6 Months



Invasive vs. Conservative Management of UA/NSTEMI in TACTICS-TIMI 18 Stratified by Age

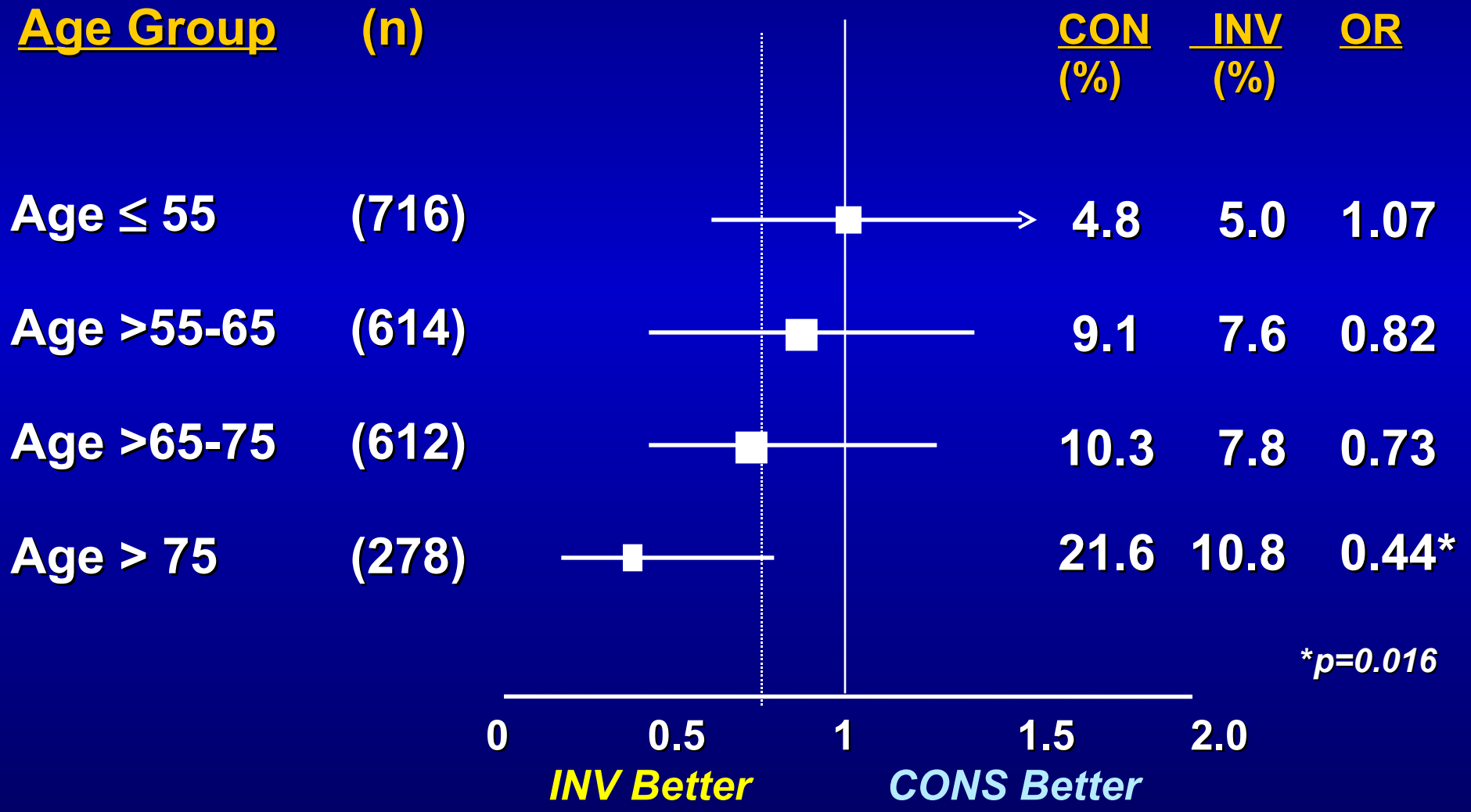
Death or Non-Fatal MI





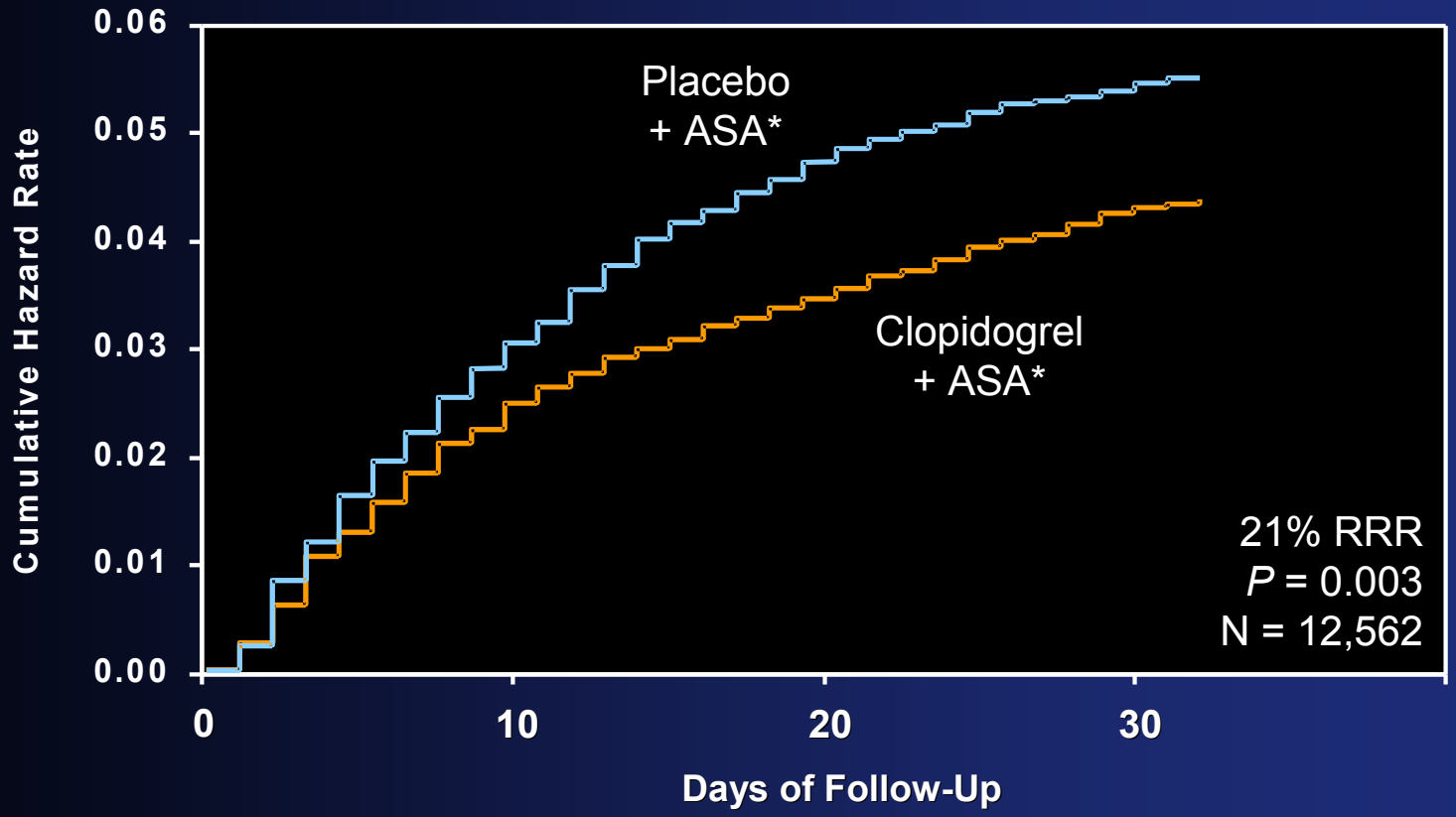
Efficacy of Invasive Strategy Across Age Subgroups in TACTICS-TIMI 18

Death, MI at 6 Months



CURE

MI/Stroke/CV Death within 30 Days



* In combination with standard therapy

The CURE Trial Investigators. *N Engl J Med.* 2001;345:494-502.

Anticoagulants Recommended by Both Guidelines

- ***UFH***
- ***Enoxaparin***
- ***Fondaparinux***
- ***Bivalirudin***

Bassand JP, et al. Eur Heart J. 2007;28:1598-1660.
Anderson JL, et al. Circulation. 2007;116:e148-304.

<u>תיאור מקרה</u>:

בן 62.

<u>ברקע</u>- סכרת מטופלת פומית.

<u>מעברו</u> – אירוע כלילי קל כשנה טרם קבלתו הנוכחית.

התקבל כעת בתמונה של אוטם חד (inferior STEMI),
כשלוש שעות לאחר תחילת התלונות.

טופל בנט"ן באספריו,הפרין ונטרטים.במהלך הפנוי
הידרדרות מהירה של ערכי ל"ד עד \80 ממ"כ ובמקביל
הזעה ניכרת,בחילות והקאות ובהמשך ירידה במצב
ההכרה.

בקבלה בח"מ החולה שקוע, ל"ד-70\40,קר מזיע,חוור עם
כחלון בקצוות,גודש צווארי.


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
RHYTHM STRIP: II
25 mm/sec; 1 cm/mV

R.V.I.

RV Systolic Dysfunction
RV Diastolic Dysfunction
RV Volume Overload

RV Stroke Volume ↓

↓

LV Stroke Volume ↓

||

Left Ventricular Preload ↓

Interventricular Septum Displacement to Left

↓

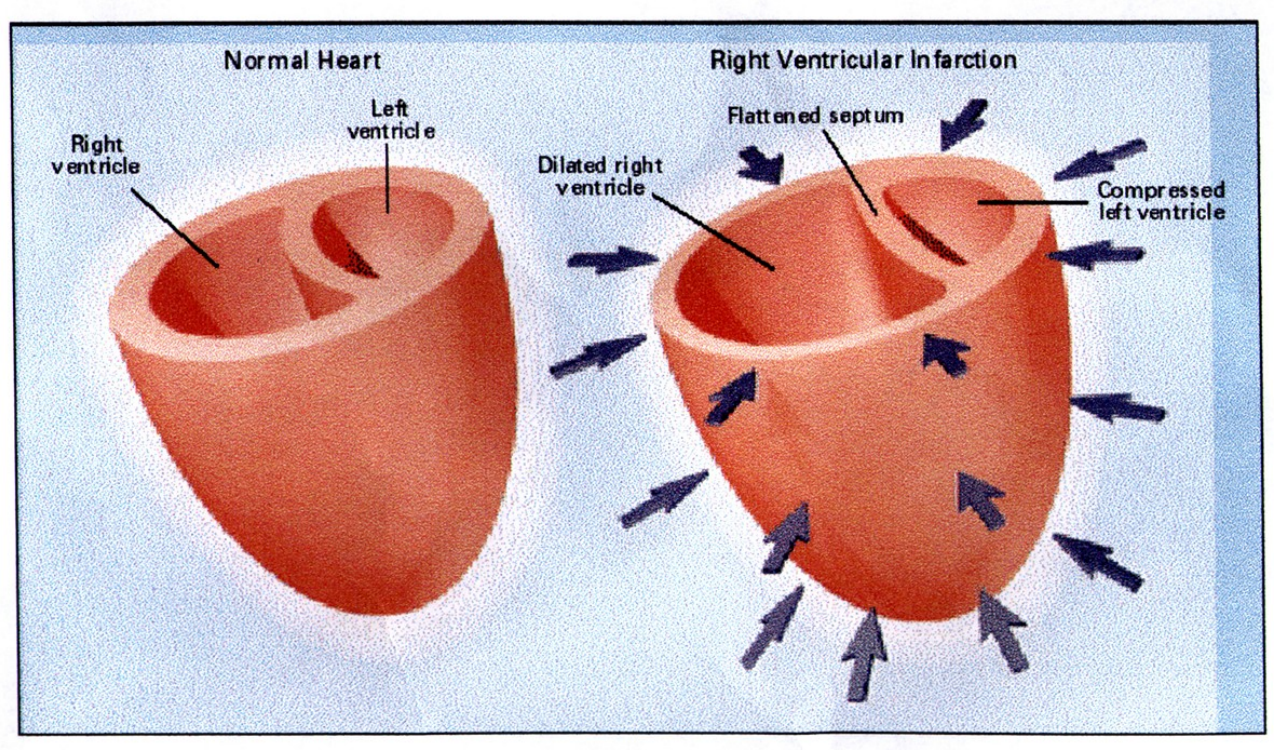
LV Diastolic Volume ↓

LV Stroke Volume ↓

||

Ventricular Interdependence

Pathophysiologic Mechanism Underlying the Low-Output State in RVI



R.V.I.

RV Systolic Dysfunction
RV Diastolic Dysfunction
RV Volume Overload

RV Stroke Volume ↓

↓

LV Stroke Volume ↓

||

Left Ventricular Preload ↓

Interventricular Septum Displacement to Left

↓

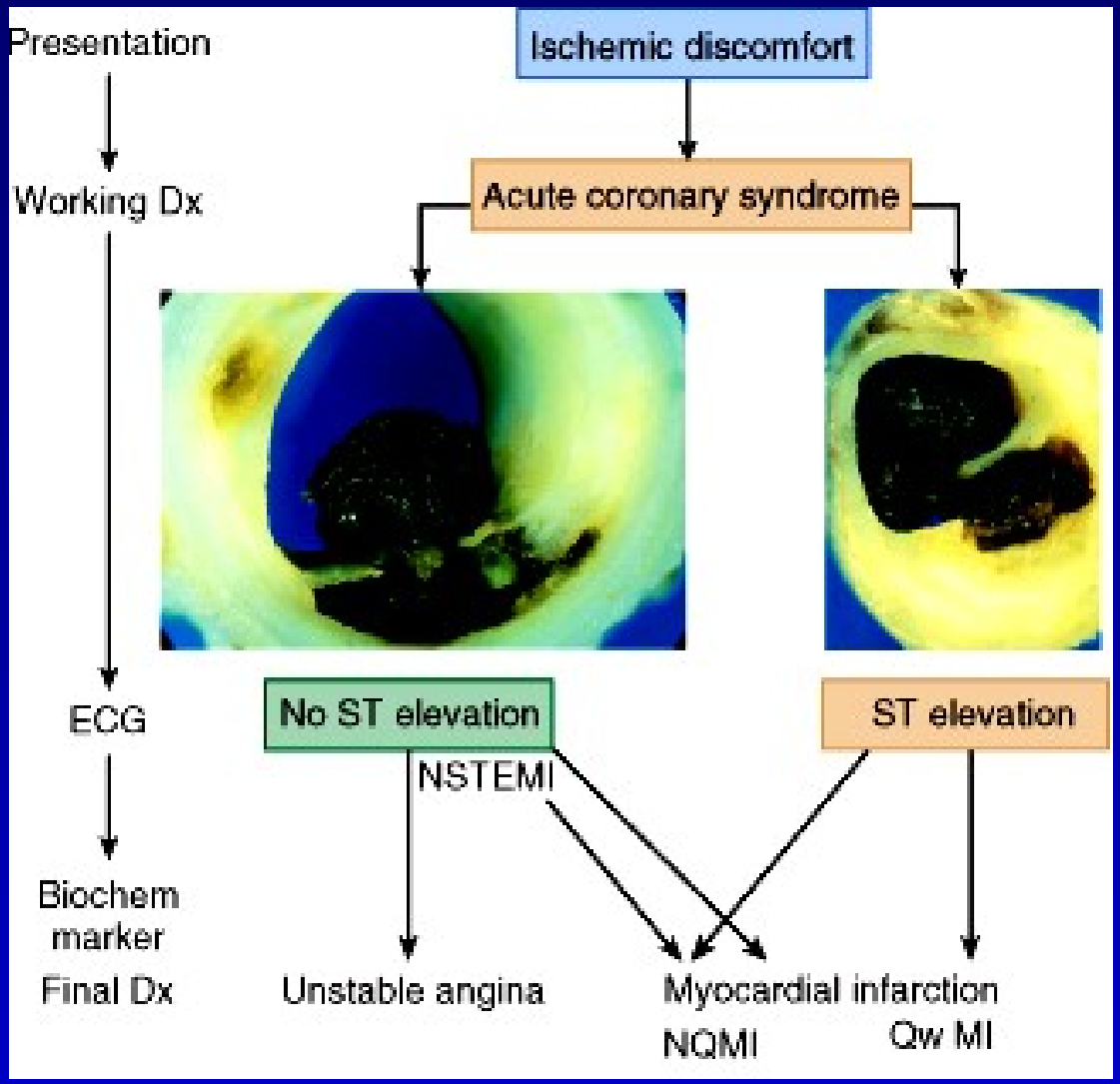
LV Diastolic Volume ↓

LV Stroke Volume ↓

||

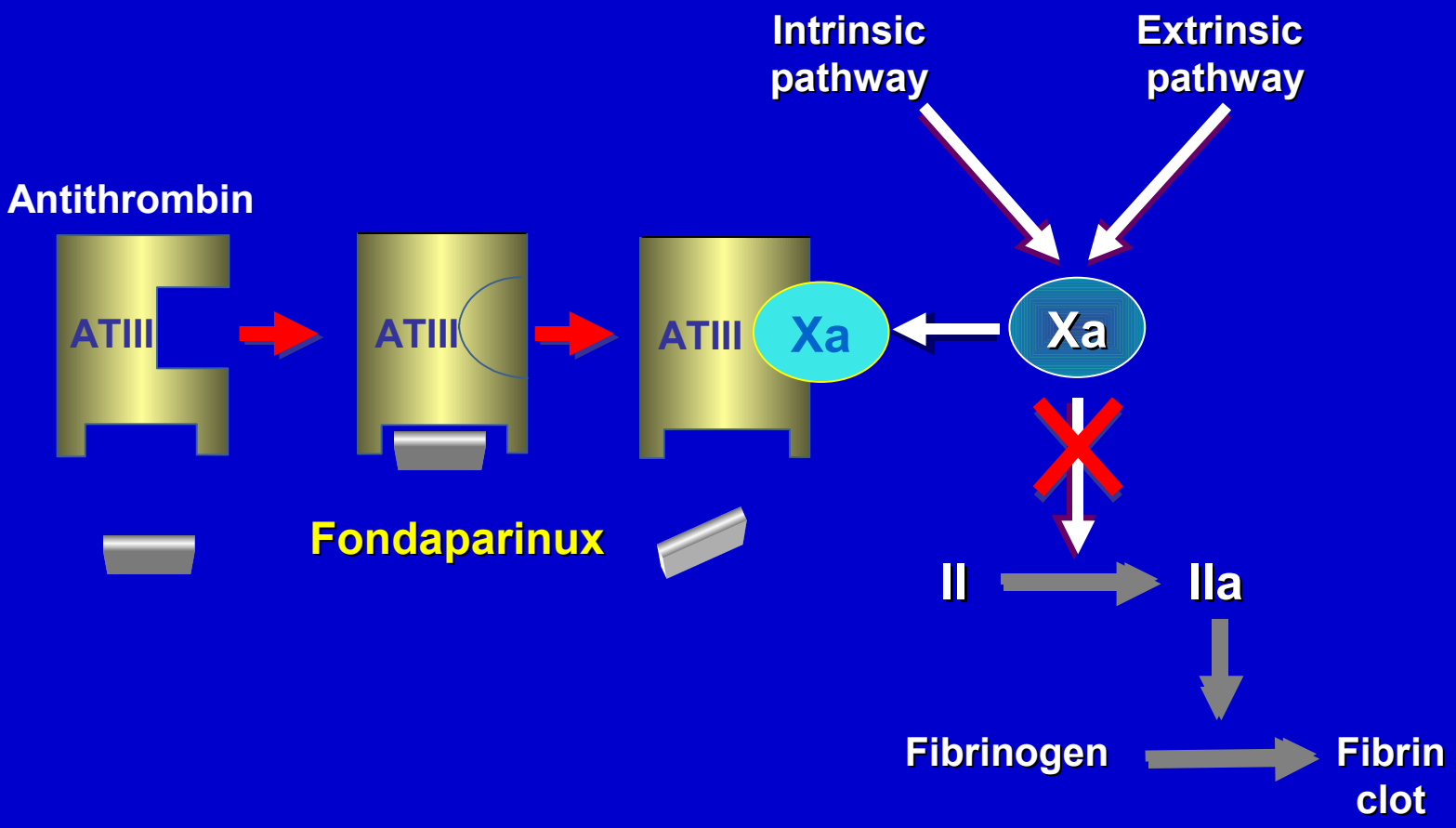
Ventricular Interdependence

Pathogenesis of ACS/NSTEMI



Fondaparinux

Fondaparinux selectively inhibits factor Xa by binding to antithrombin



Death/MI/RI/Major Bleeds: Day 30