NSTEMI: No rush, No delay!

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NO CONFLICTS OF INTEREST

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association

2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Ezra A. Amsterdam, Nanette K. Wenger, Ralph G. Brindis, Donald E. Casey, Jr., Theodore G. Ganiats, David R. Holmes, Jr., Allan S. Jaffe, Hani Jneid, Rosemary F. Kelly, Michael C. Kontos, Glenn N. Levine, Philip R. Liebson, Debabrata Mukherjee, Eric D. Peterson, Marc S. Sabatine, Richard W. Smalling and Susan J. Zieman

Circulation. published online September 23, 2014;

EUROPEAN SOCIETY OF CARDIOLOGY®

European Heart Journal (2011) **32**, 2999–3054
doi:10.1093/eurheartj/ehr236

ESC GUIDELINES

ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC)

Recommendations	COR	LOE
Perform rapid determination of likelihood of ACS, including a 12-lead ECG within 10 min of arrival at an emergency facility, in patients whose symptoms suggest ACS	I	C
Perform serial ECGs at 15- to 30-min intervals during the first hour in symptomatic patients with initial nondiagnostic ECG	I	C
Measure cardiac troponin (cTnI or cTnT) in all patients with symptoms consistent with ACS*	I	A
Measure serial cardiac troponin I or T at presentation and 3–6 h after symptom onset* in all patients with symptoms consistent with ACS	I	A
Use risk scores to assess prognosis in patients with NSTE-ACS	I	A

AHA

Recommendations	Class [a]	Level [b]
In patients with a suspected NSTE-ACS, diagnosis and short-term ischaemic/bleeding risk stratification should be based on a combination of clinical history, symptoms, physical findings, ECG (repeated or continuous ST monitoring), and biomarkers.	I	A
ACS patients should be admitted preferably to dedicated chest pain units or coronary care units.	I	C
It is recommended to use established risk scores for prognosis and bleeding (e.g. GRACE, CRUSADE).	I	B
A 12-lead ECG should be obtained within 10 min after first medical contact and immediately read by an experienced physician. This should be repeated in the case of recurrence of symptoms, and after 6–9 and 24 h, and before hospital discharge.	I	B
Additional ECG leads (V_{3R}, V_{4R}, V_7–V_9) are recommended when routine leads are inconclusive.	I	C
Blood has to be drawn promptly for troponin (cardiac troponin T or I) measurement. The result should be available within 60 min. The test should be repeated 6–9 h after initial assessment if the first measurement is not conclusive. Repeat testing after 12–24 h is advised if the clinical condition is still suggestive of ACS.	I	A
A rapid rule-out protocol (0 and 3 h) is recommended when highly sensitive troponin tests are available (see *Figure 5*).	I	B

ESC

Usefulness of the Admission Electrocardiogram to Predict Long-Term Outcomes After Non-ST-Elevation Acute Coronary Syndrome (from the FRISC II, ICTUS, and RITA-3 [FIR] Trials)

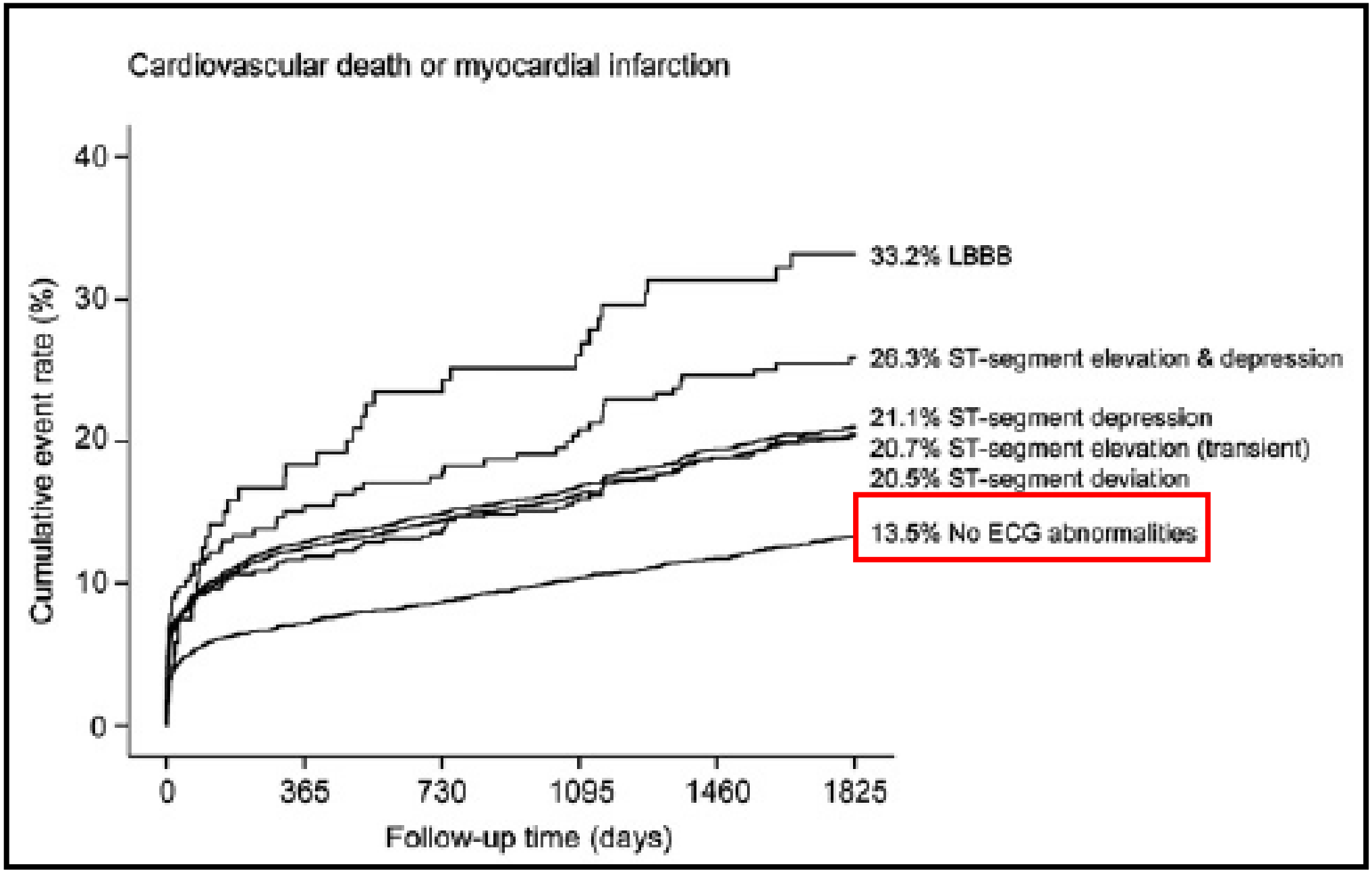
Peter Damman, MD[a], Lene Holmvang, MD, PhD[b], Jan G.P. Tijssen, PhD[a], Bo Lagerqvist, MD, PhD[c], Tim C. Clayton, BSc, MSc[d], Stuart J. Pocock, BSc, MSc, PhD[d], Fons Windhausen, MD, PhD[a], Alexander Hirsch, MD, PhD[a], Keith A.A. Fox, BSc, MB, ChB[e], Lars Wallentin, MD, PhD[c], and Robbert J. de Winter, MD, PhD[a,*]

5420 pts

ST-segment depression and left bundle branch block were independently associated with 5-year CV death or MI in multivariate analyses.

T wave: quantitative analysis has been shown to predict 1-year prognosis in a substudy of the FRISC II trial--> a total number of leads with abnormal T-waves 6-->worse outcomes.

Am J Cardiol 2012;109:6–12



Am J Cardiol 2012;109:6–12

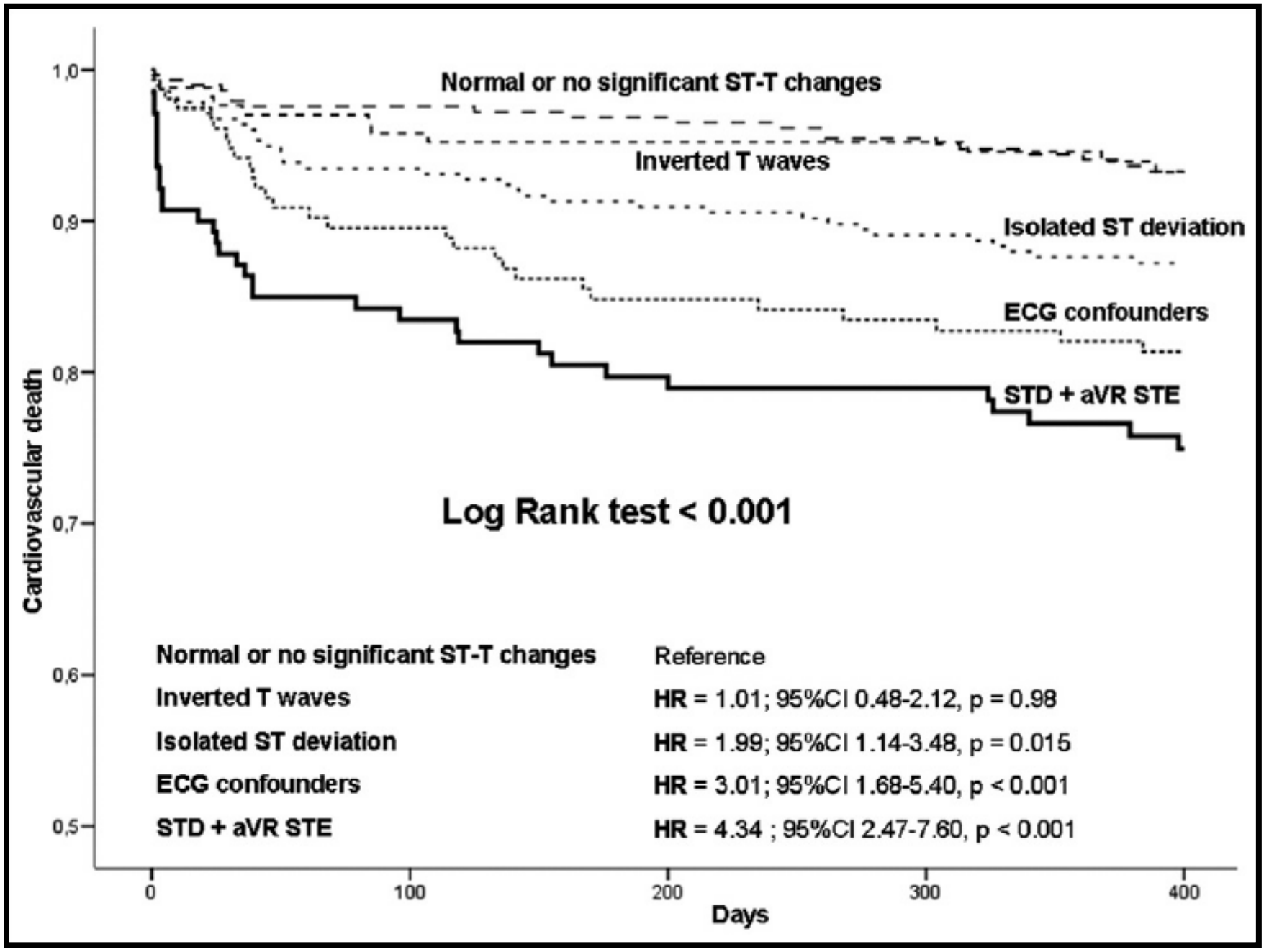
Short- and Long-Term Prognostic Significance of ST-Segment Elevation in Lead aVR in Patients With Non–ST-Segment Elevation Acute Coronary Syndrome

Nevio Taglieri, MD*, Antonio Marzocchi, MD, Francesco Saia, MD, PhD, Cinzia Marrozzini, MD, Tullio Palmerini, MD, Paolo Ortolani, MD, Laura Cinti, MD, Stefania Rosmini, MD, Fabio Vagnarelli, MD, Laura Alessi, MD, Caterina Villani, MD, Giuseppe Scaramuzzino, MD, Ilaria Gallelli, MD, Giovanni Melandri, MD, Angelo Branzi, MD, and Claudio Rapezzi, MD

Am J Cardiol 2011;108:21–28

1.042 consecutive patients with NSTE-ACS, divided into 5 groups:
1-normal electrocardiogram or no significant ST-T changes,
2- inverted T waves,
3- isolated ST deviation (ST depression without STE in lead aVR or transient STE),
4- STD+ STE in lead aVR
5-ECG confounders (pacing, right or left bundle branch block).

RESULTS:
Prevalence of 4) was 13.4%.
Rates of culprit LM disease and in-hospital cardiovascular death were 8.1% and 3.8%.
On multivariable analysis, patients with 4) showed an increased risk
of culprit LM disease



Am J Cardiol 2011;108:21–28

BIOMARKERS

AHA

Measure cardiac troponin (cTnI or cTnT) in all patients with symptoms consistent with ACS*	I	A
Measure serial cardiac troponin I or T at presentation and 3–6 h after symptom onset* in all patients with symptoms consistent with ACS	I	A
Use risk scores to assess prognosis in patients with NSTE-ACS	I	A

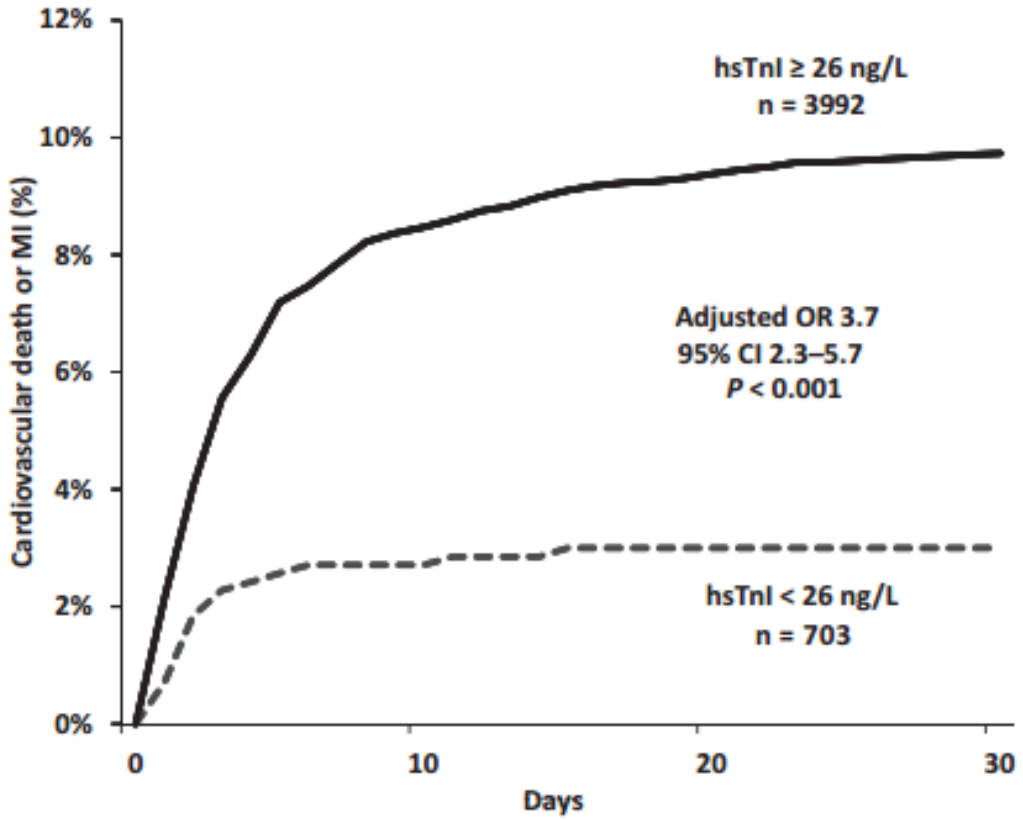
Additional ECG leads (V_{3R}, V_{4R}, V_7–V_9) are recommended when routine leads are inconclusive.	I	C
Blood has to be drawn promptly for troponin (cardiac troponin T or I) measurement. The result should be available within 60 min. The test should be repeated 6–9 h after initial assessment if the first measurement is not conclusive. Repeat testing after 12–24 h is advised if the clinical condition is still suggestive of ACS.	I	A
A rapid rule-out protocol (0 and 3 h) is recommended when highly sensitive troponin tests are available (see *Figure 5*).	I	B

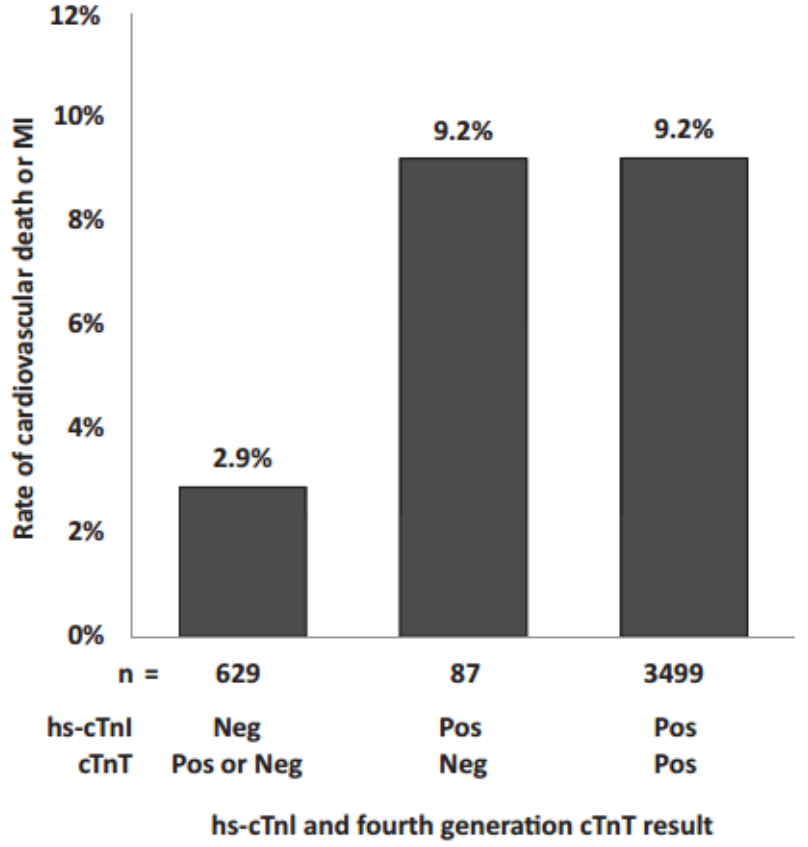
ESC

Clinical Chemistry 60:1
158–164 (2014)

Prognostic Performance of a High-Sensitivity Cardiac Troponin I Assay in Patients with Non–ST-Elevation Acute Coronary Syndrome

Erin A. Bohula May,[1*†] Marc P. Bonaca,[1†] Petr Jarolim,[2] Elliott M. Antman,[1] Eugene Braunwald,[1] Robert P. Giugliano,[1] L. Kristin Newby,[3] Marc S. Sabatine,[1‡] and David A. Morrow[1‡]





HIGH SENSITIVITY OR STANDARD TROPONIN T ?

Journal of the American Heart Association
OPEN ACCESS
American Heart Association | American Stroke Association

High–Sensitivity Cardiac Troponin T Compared With Standard Troponin T Testing on Emergency Department Admission: How Much Does It Add in Everyday Clinical Practice?

Angelika Hammerer-Lercher, Thomas Ploner, Sabrina Neururer, Peter Schratzberger, Andrea Griesmacher, Otmar Pachinger and Johannes Mair

2384 consecutive **(unselected)** pts→ Emergency Department

1)The diagnostic performances of hs-cTnT and standard cTnT for AMI diagnosis did not differ significantly.
2)HS-cTnT detected significantly more cardiac diseases.
3)HS-cTnT and standard cTnT were not independent predictors of ED readmissions and mortality from all causes.

J Am Heart Assoc. 2013

OTHER BIOMARKERS?

Dickkopf-1 as a Novel Predictor Is Associated with Risk Stratification by GRACE Risk Scores for Predictive Value in Patients with Acute Coronary Syndrome: A Retrospective Research

January 2013 | Volume 8 | Issue 1

Lin Wang[1], Xiao Bo Hu[1,2], Wei Zhang[1], Lin Di Wu[1], Yu Sheng Liu[1,3], Bo Hu[1,2], Cheng Long Bi[1], Yi Fei Chen[1], Xin Xin Liu[1], Cheng Ge[1], Yun Zhang[1], Mei Zhang[1]*

1 The Key Laboratory of Cardiovascular Remodeling and Function Research, Chinese Ministry of Education and Chinese Ministry of Public Health, Shandong University Qilu Hospital, Jinan, Shandong, People's Republic of China, 2 Shandong Provincial Hospital Affiliated to Shandong University, Jinan, Shandong, People's Republic of China, 3 The Second Hospital of Shandong University, Jinan, Shandong, People's Republic of China

Dickkopf→ major regulator of the WnT pathway plays an important role in CAD.
291 pts with STEMI and 245 with NSTEMI.

1)Plasma DKK-1 levels was greater in High/Intermediate Grace risk score
2) The rate of MACE increased with increasing DKK-1 level (P 0.001)

RISK STRATIFICATION SCORE

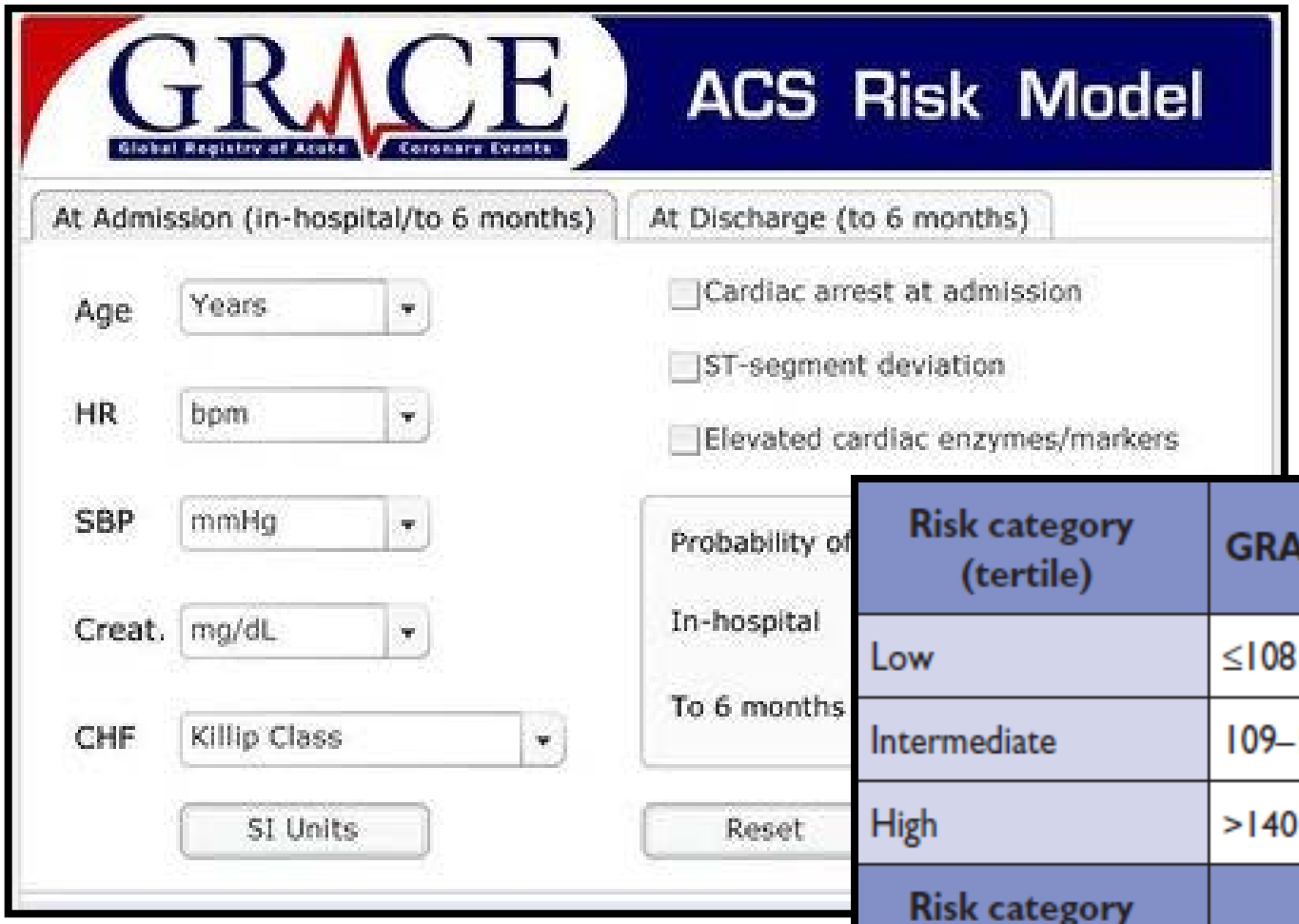
AHA

Perform serial ECGs at 15- to 30-min intervals during the first hour in symptomatic patients with initial nondiagnostic ECG	I	C
Measure cardiac troponin (cTnI or cTnT) in all patients with symptoms consistent with ACS*	I	A
Measure serial cardiac troponin I or T at presentation and 3–6 h after symptom onset* in all patients with symptoms consistent with ACS	I	A
Use risk scores to assess prognosis in patients with NSTE-ACS	I	A
Risk-stratification models can be useful in management	IIa	B
Obtain supplemental electrocardiographic leads V_7 to V_9 in patients with initial nondiagnostic ECG at intermediate/high risk for ACS	IIa	B

In patients with a suspected NSTE-ACS, diagnosis and short-term ischaemic/bleeding risk stratification should be based on a combination of clinical history, symptoms, physical findings, ECG (repeated or continuous ST monitoring), and biomarkers.	I	A
ACS patients should be admitted preferably to dedicated chest pain units or coronary care units.	I	C
It is recommended to use established risk scores for prognosis and bleeding (e.g. GRACE, CRUSADE).	I	B
A 12-lead ECG should be obtained within 10 min after first medical contact and immediately read by an experienced physician. This should be repeated in the case of recurrence of symptoms, and after 6–9 and 24 h, and before hospital discharge.	I	B
Additional ECG leads (V_{3R}, V_{4R}, V_7–V_9) are recommended when routine leads are inconclusive.	I	C
Blood has to be drawn promptly for troponin (cardiac troponin T or I) measurement. The result should be available within 60 min. The test should be repeated 6–9 h after initial assessment if the first measurement is not conclusive. Repeat testing after 12–24 h is advised if the clinical condition is still suggestive of ACS.	I	A

ESC

GRACE RISK SCORE



Risk category (tertile)	GRACE risk score	In-hospital death (%)
Low	≤108	<1
Intermediate	109–140	1–3
High	>140	>3
Risk category (tertile)	**GRACE risk score**	**Post-discharge to 6-month death (%)**
Low	≤88	<3
Intermediate	89–118	3-8
High	>118	>8

OTHERS SCORE ? THE ACUITY-PCI RISK SCORE

CME

A New Score for Risk Stratification of Patients With Acute Coronary Syndromes Undergoing Percutaneous Coronary Intervention

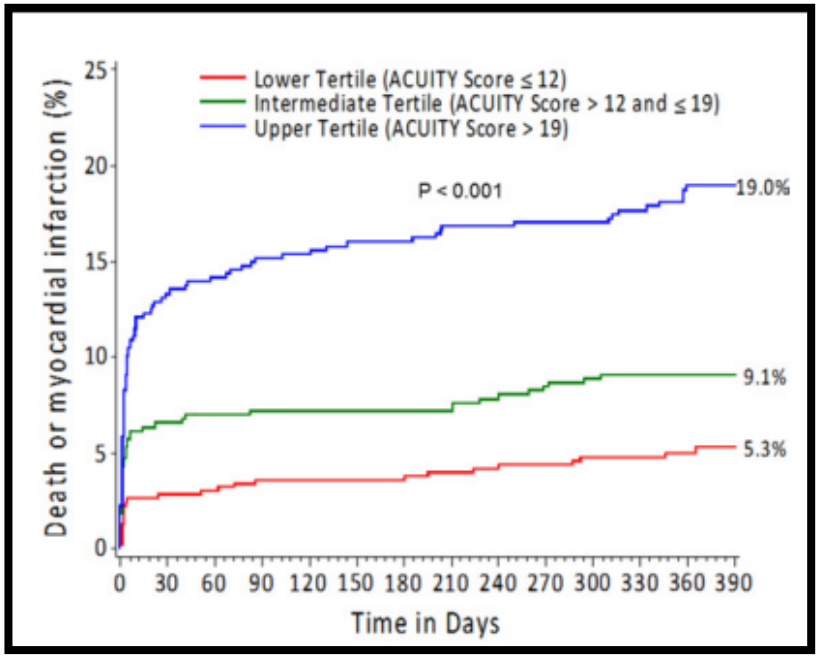
The ACUITY-PCI (Acute Catheterization and Urgent Intervention Triage Strategy–Percutaneous Coronary Intervention) Risk Score

Tullio Palmerini, MD,*† Philippe Genereux, MD,† Adriano Caixeta, MD,†
Ecaterina Cristea, MD,† Alexandra Lansky, MD,‡ Roxana Mehran, MD,§
Diego Della Riva, MD,* Martin Fahy, MSc,† Ke Xu, PhD,† Gregg W. Stone, MD†

Bologna, Italy; New York, New York; and New Haven, Connecticut

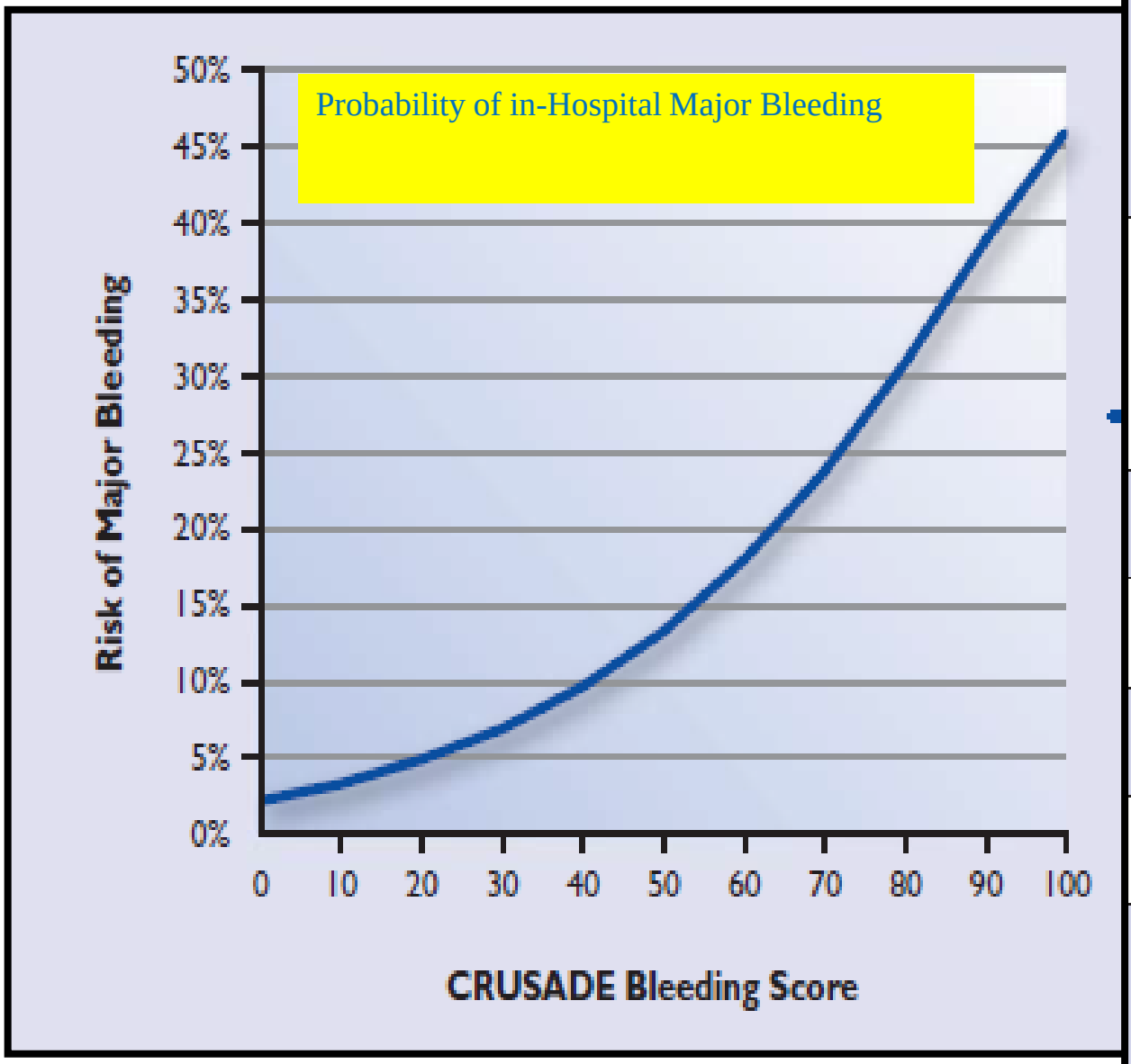
1) SIX VARIABLE: DIABETES, IRC, CARDIAC BIOMARKERS AND ST-DEVIATION+3 ANGIOGRAPHIC VARIABLES (bifurcation lesion, small vessel/diffuse coronary artery disease, and the extent of coronary artery disease).

2) COMPARED TO TIMI and GRACE scores, and the SYNTAX and Clinical SYNTAX scores, the **ACUITY-PCI score displayed the best accuracy in terms of discrimination, calibration**



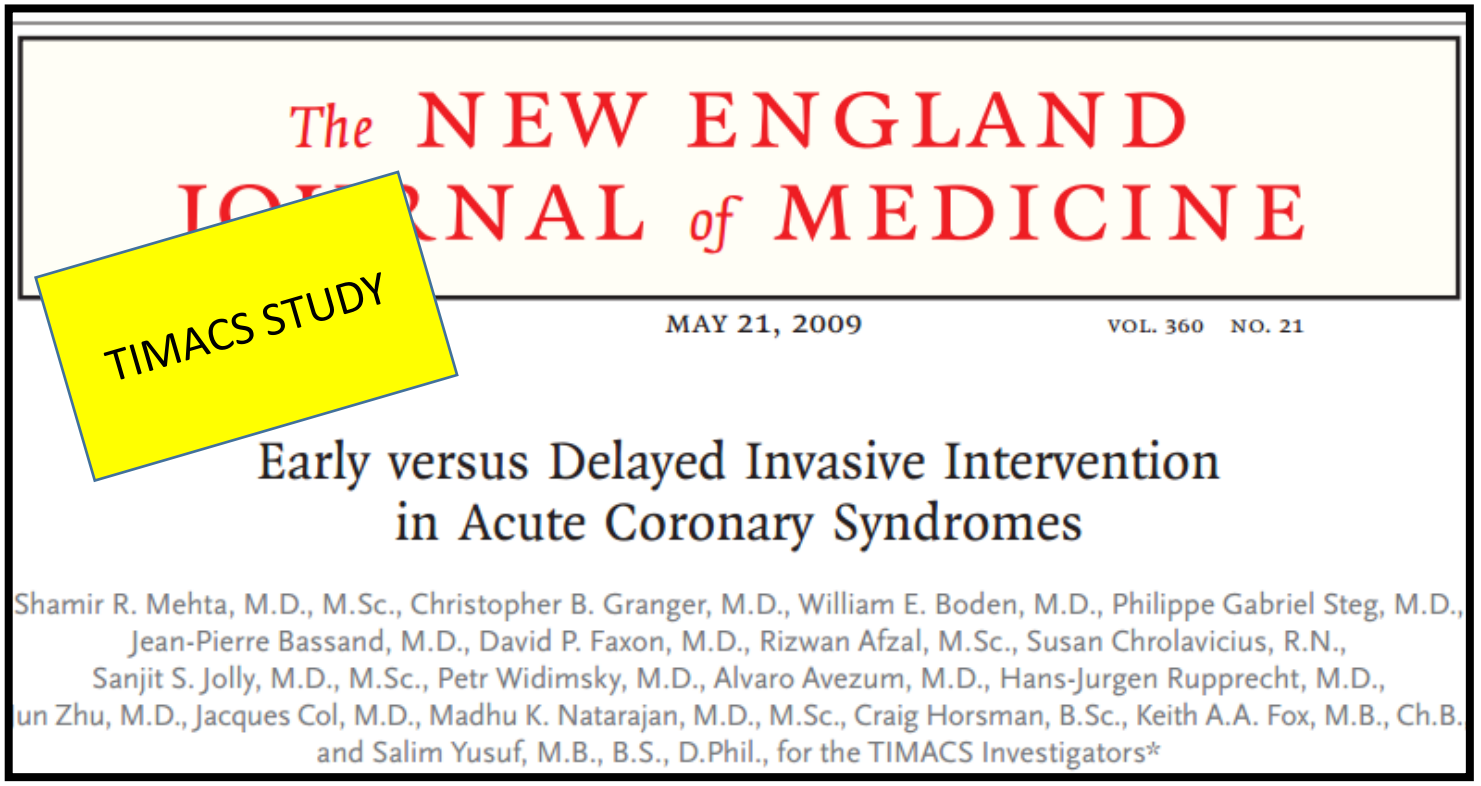
J Am Coll Cardiol Intv 2012;5:1108 –16

CRUSADE BLEEDING SCORE



Predictor	Score
Baseline haematocrit, %	
<31	9
31–33.9	7
34–36.9	3
37–39.9	2
≥40	0
Creatinine clearance,[a] mL/min	
≤15	39
>15–30	35
>30–60	28
>60–90	17
>90–120	7
>120	0
Heart rate (b.p.m.)	
≤70	0
71–80	1
81–90	3
91–100	6
101–110	8
111–120	10
≥121	11
Sex	
Male	0
Female	8
Signs of CHF at presentation	
No	0
Yes	7
Prior vascular disease[b]	
No	0
Yes	6
Diabetes mellitus	
No	0
Yes	6
Systolic blood pressure, mmHg	
≤90	10
91–100	8
101–120	5
121–180	1
181–200	3
≥201	5

EARLY OR DELAYED ANGIOGRAPHY?



The NEW ENGLAND JOURNAL of MEDICINE

MAY 21, 2009 VOL. 360 NO. 21

TIMACS STUDY

Early versus Delayed Invasive Intervention in Acute Coronary Syndromes

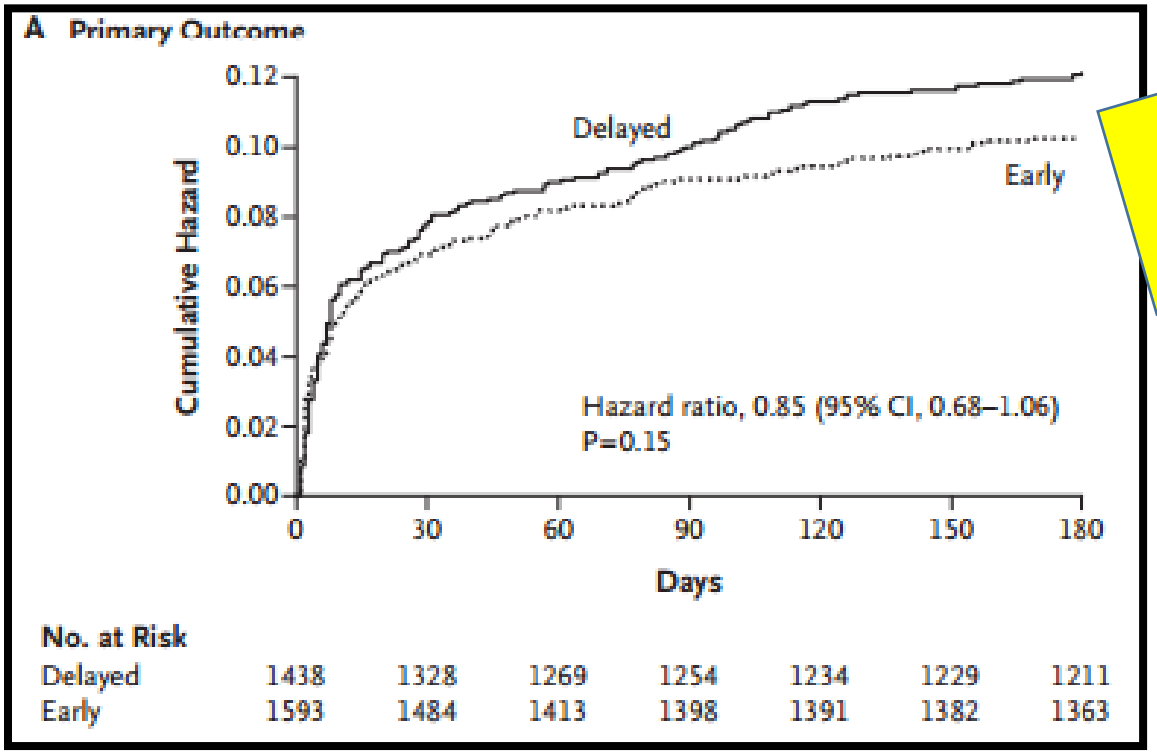
Shamir R. Mehta, M.D., M.Sc., Christopher B. Granger, M.D., William E. Boden, M.D., Philippe Gabriel Steg, M.D., Jean-Pierre Bassand, M.D., David P. Faxon, M.D., Rizwan Afzal, M.Sc., Susan Chrolavicius, R.N., Sanjit S. Jolly, M.D., M.Sc., Petr Widimsky, M.D., Alvaro Avezum, M.D., Hans-Jurgen Rupprecht, M.D., un Zhu, M.D., Jacques Col, M.D., Madhu K. Natarajan, M.D., M.Sc., Craig Horsman, B.Sc., Keith A.A. Fox, M.B., Ch.B. and Salim Yusuf, M.B., B.S., D.Phil., for the TIMACS Investigators*

April 2003→June 2008; Data from OASIS-5 (Fondaparinux)
3031 pts, randomly assigned to undergo **Early Intervention (<24 h: 1593 pts), or Delayed Intervention (>= 36 h: 1438 pts).**
Eligible pts with two of these increased risk criteria: Age (>=60; cardiac biomarkers positive or Ischeamic ECG.
Primary outcome: composite of death, myocardial infarction, or stroke
Secondary outcome: death, myocardial infarction, or refractory ischemia
FU 6 month

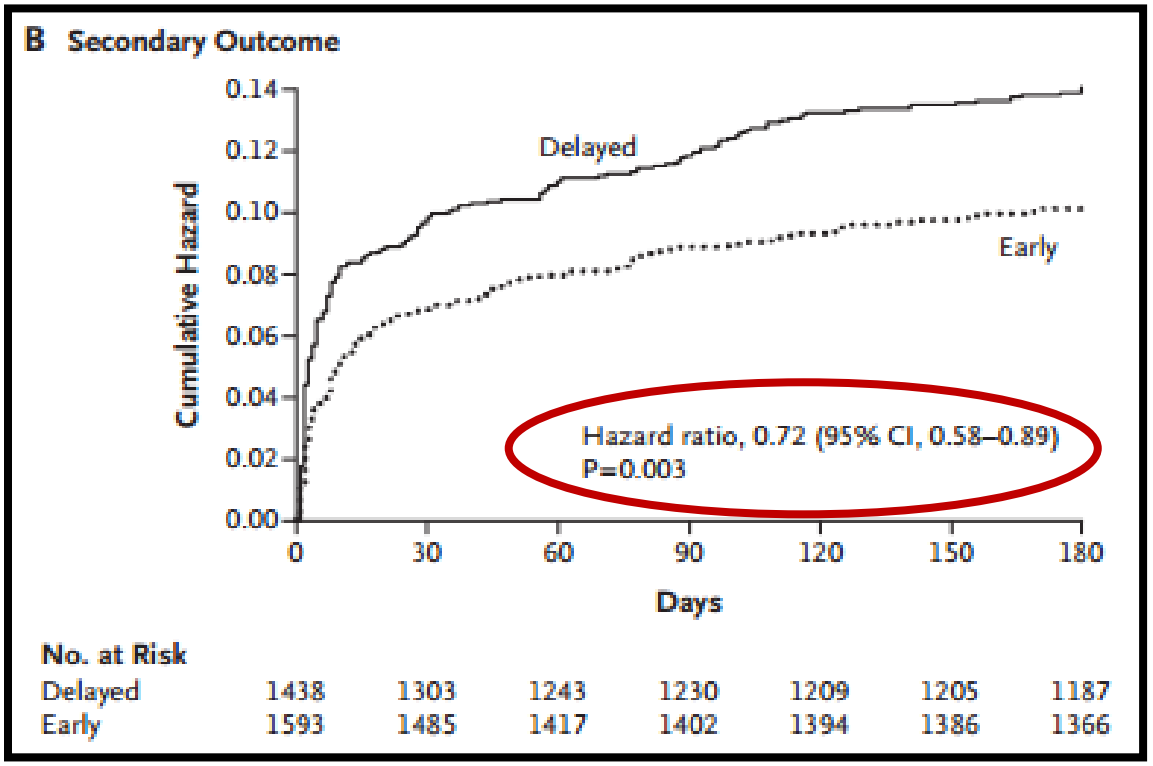
TIMACS STUDY

PRIMARY AND SECONDARY OUTCOMES

Variable	Early Intervention (N=1593)	Delayed Intervention (N=1438)	Hazard Ratio (95% CI)	P Value
	percent			
At 6 mo				
Death, myocardial infarction, or stroke	9.6	11.3	0.85 (0.68–1.06)	0.15
Death, myocardial infarction, or refractory ischemia	9.5	12.9	0.72 (0.58–0.89)	0.003
Death, myocardial infarction, stroke, refractory ischemia, or repeat intervention	16.6	19.5	0.84 (0.71–0.99)	0.04
Death	4.8	5.9	0.81 (0.60–1.11)	0.19
Myocardial infarction	4.8	5.7	0.83 (0.61–1.14)	0.25
Stroke	1.3	1.4	0.90 (0.49–1.68)	0.74
Refractory ischemia	1.0	3.3	0.30 (0.17–0.54)	<0.001
Repeat intervention	8.7	8.5	1.04 (0.82–1.34)	0.73
At 30 days				
Death, myocardial infarction, or stroke	6.7	7.6	0.88 (0.67–1.15)	0.34
Death, myocardial infarction, or refractory ischemia	6.6	9.3	0.70 (0.54–0.90)	0.006
Death, myocardial infarction, stroke, refractory ischemia, or repeat intervention	12.0	13.0	0.91 (0.75–1.12)	0.37
Death	2.9	3.3	0.86 (0.58–1.29)	0.48
Myocardial infarction	3.6	4.1	0.87 (0.61–1.25)	0.46
Stroke	0.9	0.9	1.04 (0.50–2.19)	0.91
Refractory ischemia	1.0	3.1	0.30 (0.17–0.55)	<0.001
Repeat intervention	5.9	4.2	1.39 (1.01–1.93)	0.05



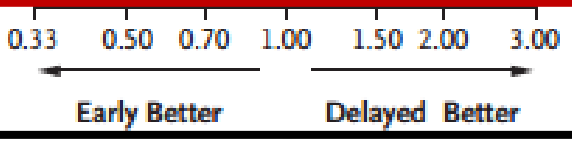
TIMACS STUDY



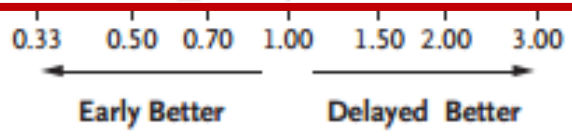
Refractory ischemia 1 vs 3.3 ($p < 0.01$)

B Secondary Outcome

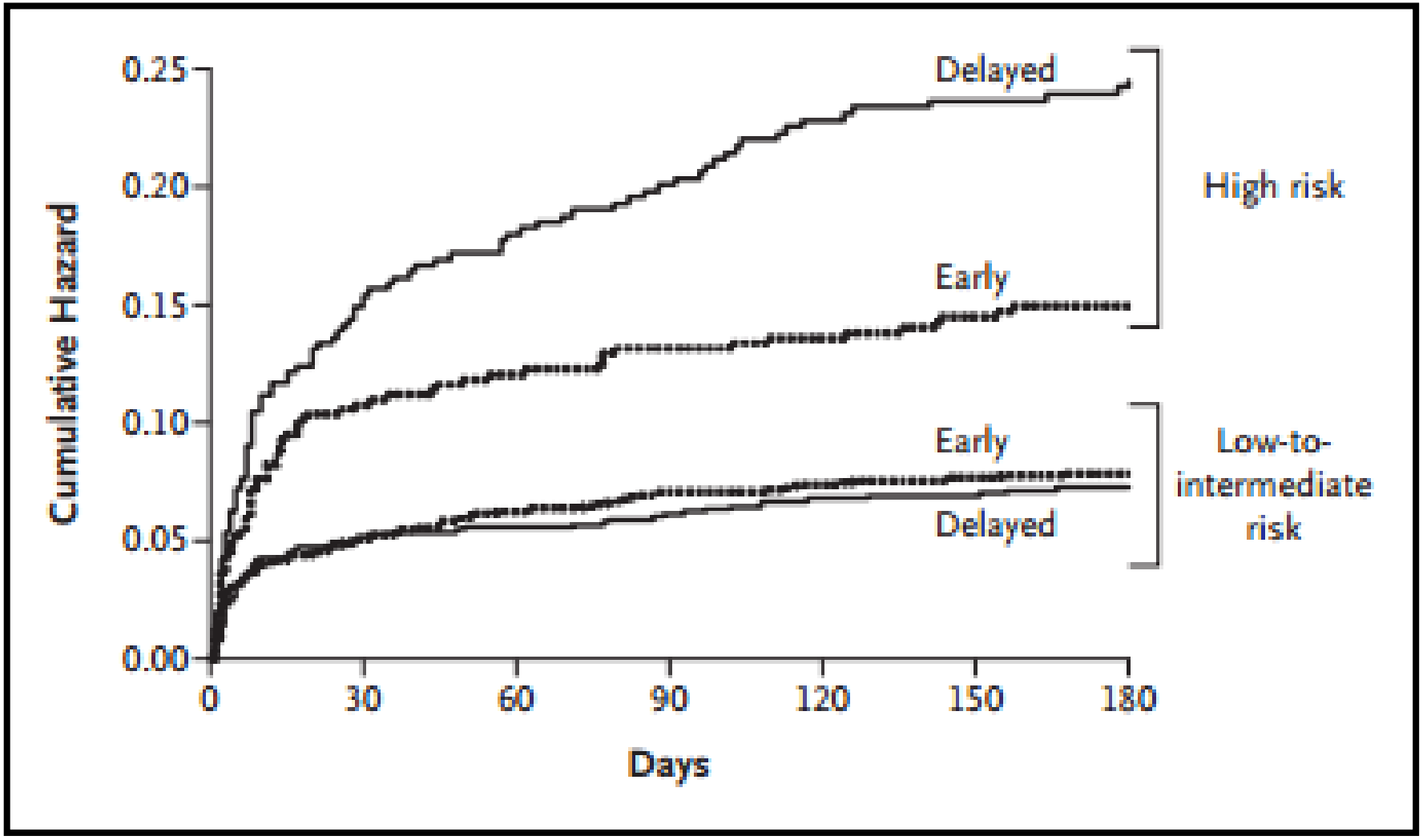
Characteristic	No. of Patients	Early %	Delayed %	Hazard Ratio for Event (95% CI)	P Value for Interaction
Overall	3031	9.5	12.9	0.72 (0.58–0.89)	
Age					0.86
<65 yr	1295	6.0	8.3	0.70 (0.46–1.06)	
≥65 yr	1736	12.3	16.2	0.74 (0.58–0.95)	
Sex					0.69
Female	1052	9.9	14.3	0.68 (0.48–0.97)	
Male	1978	9.2	12.2	0.74 (0.56–0.97)	
ST-segment deviation					0.86
No	1523	7.0	10.0	0.69 (0.49–0.98)	
Yes	1508	11.9	16.0	0.72 (0.55–0.94)	
Elevated cardiac marker					0.22
No	666	11.8	12.9	0.92 (0.59–1.41)	
Yes	2365	8.8	13.0	0.67 (0.52–0.85)	
GRACE score					0.15
0–140	2049	7.5	8.8	0.83 (0.61–1.12)	
≥141	982	13.7	21.6	0.62 (0.45–0.83)	



GRACE score					0.01
0–140	2070	7.6	6.7	1.12 (0.81–1.56)	
≥141	961	13.9	21.0	0.65 (0.48–0.89)	



TIMACS STUDY



TIMACS STUDY

ABOARD STUDY

Immediate vs Delayed Intervention for Acute Coronary Syndromes

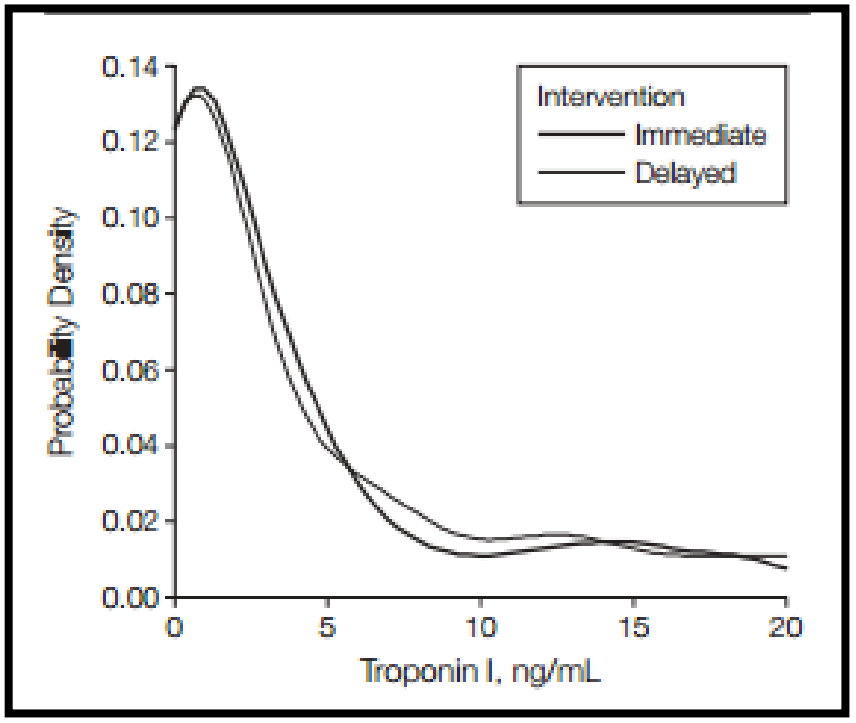
A Randomized Clinical Trial

Gilles Montalescot, MD, PhD
Guillaume Cayla, MD
Jean-Philippe Collet, MD, PhD
Simon Elhadad, MD
Farzin Beygui, MD, PhD
Hervé Le Breton, MD

August 2006→ September 2008 at 13 centers in France.
352 patients with NSTEMI
Early - Immediate , Delayed: next working day (from 8 to 60 hours from enrollemnt).
Primary end point: peak Troponin value during Hospitalization
Secondary end point: composite death, myocardial infarction, urgent revascularisation .
FU: 1 month, clinical.

JAMA. 2009;302(9):947-954

PRIMARY AND SECONDARY END POINT:



ABOARD STUDY

AT 1 MONTH FU: NOT STATISTICAL SIGNIFICANCE!

End Point	Intervention Strategy, No. (%)		*P* Value
	Immediate (n = 175)	Delayed (n = 177)	
Peak troponin I during index hospitalization, median (IQR), ng/mL (primary end point)	2.1 (0.3-7.1)	1.7 (0.3-7.2)	.70
Death, MI, or urgent revascularization at 1 mo, (key secondary end point)	24 (13.7)	18 (10.2)	.31
Death (all-cause)	5 (2.9)	2 (1.1)	.28
MI	16 (9.1)	8 (4.5)	.09
Non–CABG-related	15 (8.6)	8 (4.5)	.12
Post-CABG	1 (0.6)	0 (0)	.50
Urgent revascularization	6 (3.4)	10 (5.6)	.32
PCI	5 (2.9)	7 (4.0)	.57
CABG	1 (0.6)	3 (1.7)	.62
Death, MI, urgent revascularization, or recurrent ischemia at 1 mo	37 (21.1)	38 (21.5)	.94
Recurrent ischemia with or without urgent revascularization at 1 mo	21 (12.0)	33 (18.6)	.08
Major bleeding at 1 mo	7 (4.0)	12 (6.8)	.25
Non–CABG-related	4 (2.3)	9 (5.1)	.26
CABG-related	3 (1.7)	3 (1.7)	>.99
Transfusion ≥2 units	6 (3.4)	10 (5.6)	.32
Transfusion ≥5 units	2 (1.1)	2 (1.1)	>.99
Thrombocytopenia	5 (2.9)	8 (4.5)	.41
Non-CABG	4 (2.3)	7 (4)	.54
Post-CABG	1 (0.6)	1 (0.6)	>.99

Timing of Angiography With a Routine Invasive Strategy and Long-Term Outcomes in Non–ST-Segment Elevation Acute Coronary Syndrome

A Collaborative Analysis of Individual Patient Data From the FRISC II (Fragmin and Fast Revascularization During Instability in Coronary Artery Disease), ICTUS (Invasive Versus Conservative Treatment in Unstable Coronary Syndromes), and RITA-3 (Intervention Versus Conservative Treatment Strategy in Patients With Unstable Angina or Non-ST Elevation Myocardial Infarction) Trials

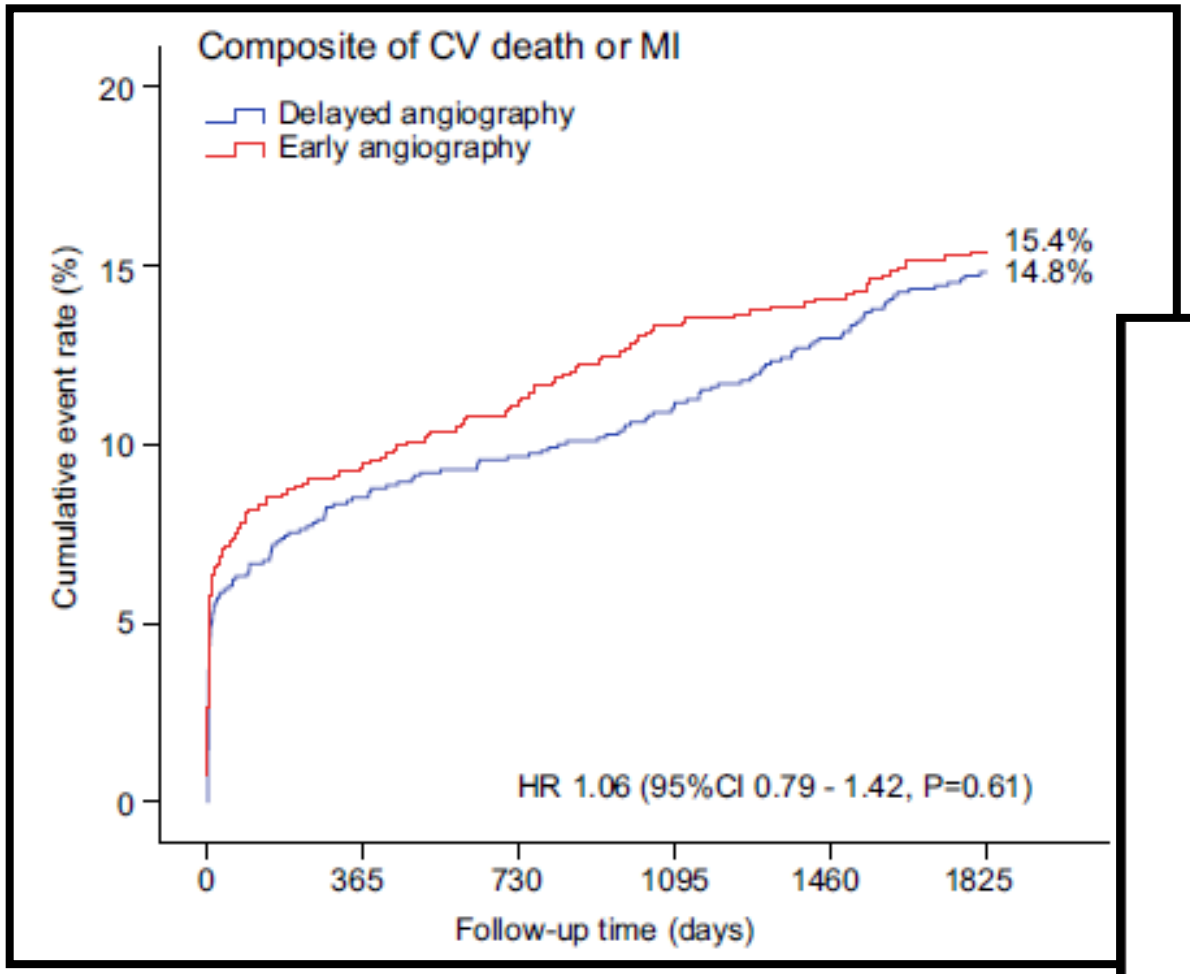
Peter Damman, MD,* Nan van Geloven, MSc,* Lars Wallentin, MD, PhD,†

2721 pts with NSTEMI→ 1141 Delayed; 975 Early.
Early: within 24-48 h; Delayed: within 3 to 5 days
Primary end point: cardiovascular death or myocardial infarction
FU 5 years

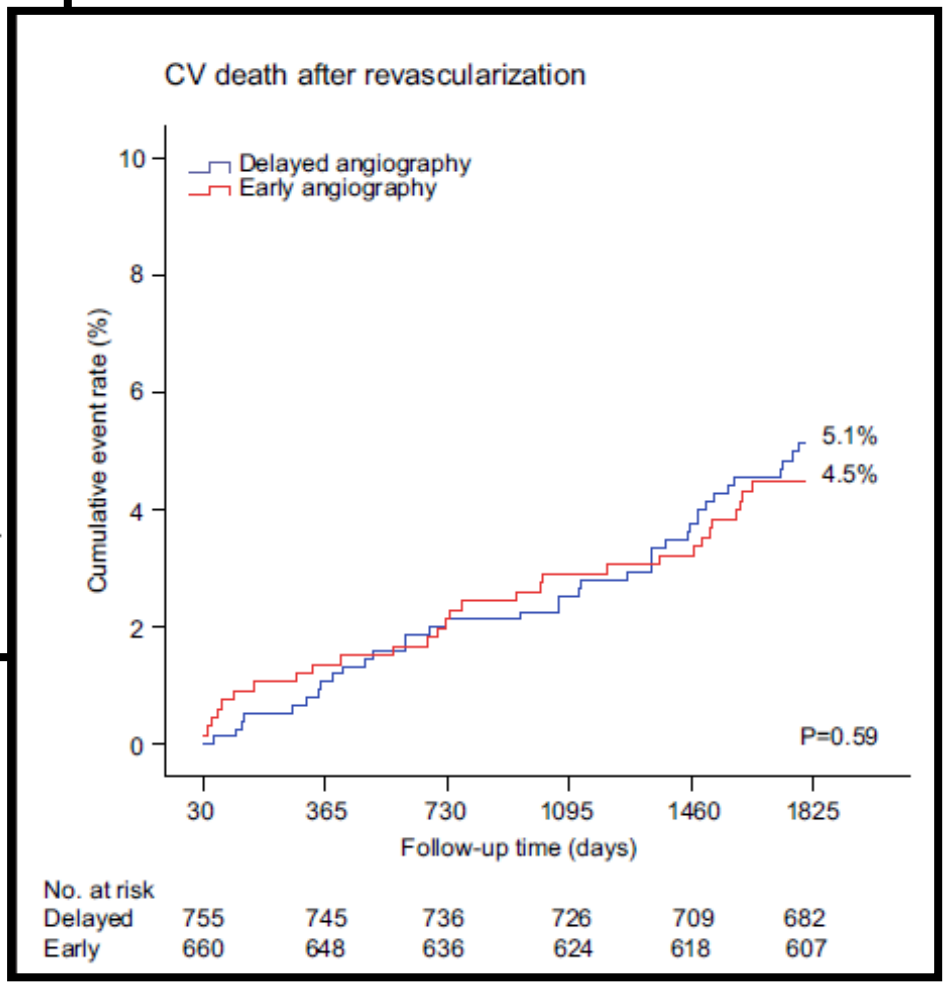
J Am Coll Cardiol Intv 2012;5:191–9

Outcome	Time to Angiography: Early Within 2 Days (n = 975)	Time to Angiography: Delayed 3–5 Days (n = 1,141)	p Value
CV death or MI	148 (15.4)	167 (14.8)	0.61
CV death	61 (6.4)	71 (6.3)	0.94
MI	105 (11.0)	111 (10.0)	0.37

Time to Angiography: Day 1 (n = 281)	Day 2 (n = 694)	Day 3 (n = 479)	Day 4 (n = 396)	Day 5 (n = 266)	>5 Days (n = 361)	p Value
39 (14.0)	109 (15.9)	70 (14.8)	60 (15.3)	37 (14.2)	66 (18.5)	0.61
15 (5.4)	46 (6.8)	28 (5.9)	26 (6.6)	17 (6.6)	26 (7.3)	0.95
29 (10.5)	76 (11.2)	46 (8.9)	43 (11.0)	22 (8.6)	52 (14.8)	0.21



J Am Coll Cardiol Intv 2012;5:191–9



Early angiography **within 48 h** does not reduce the incidence of 5-year death or MI, compared with delayed angiography **within 48 to 120 h**.

Annals of Internal Medicine | Review

Optimal Timing of Coronary Invasive Strategy in Non–ST-Segment Elevation Acute Coronary Syndromes

A Systematic Review and Meta-analysis

Eliano P. Navarese, MD, PhD; Paul A. Gurbel, MD; Felicita Andreotti, MD, PhD; Udaya Tantry, PhD; Young-Hoon Jeong, MD, PhD; Marek Kozinski, MD, PhD; Thomas Engstrøm, MD; Giuseppe Di Pasquale, MD; Waclaw Kochman, MD; Diego Ardissino, MD; Elvin Kedhi, MD; Gregg W. Stone, MD; and Jacek Kubica, MD, PhD

Study, Year (Reference)	Trial Name	Median Time of Catheterization, *h*		Patients, *n*		Definitive Treatment, *n* (%)		Clinical Outcomes at Follow-up
		Early Strategy	Delayed Strategy	Early Strategy	Delayed Strategy	Early Strategy	Delayed Strategy	
Mehta et al, 2009 (8)	TIMACS	14	50	1593	1438	PCI: 954 (59.9) CABG: 255 (16.0) Medical: 384 (24.1)	PCI: 796 (55.4) CABG: 219 (15.2) Medical: 423 (29.4)	Death, MI, major bleeding, re-PCI, refractory ischemia at 6 mo
Montalescot et al, 2009 (11)	ABOARD	1.1	20.5	175	177	PCI: 117 (66.9) CABG: 16 (9.1) Medical: 42 (24.0)	PCI: 105 (59.3) CABG: 17 (9.6) Medical: 55 (31.1)	Death, MI, major bleeding, re-PCI, refractory ischemia at 1 mo
Neumann et al, 2003 (12)	ISAR-COOL	2.4	86	203	207	PCI: 143 (70.4) CABG: 16 (7.9) Medical: 44 (21.7)	PCI: 133 (64.3) CABG: 16 (7.7) Medical: 58 (28.0)	Death, MI, major bleeding, refractory ischemia at 1 mo
Riezebos et al, 2009 (13)	OPTIMA	0.5	25	73	69	PCI: 73 (100)	PCI: 69 (100)	Death, MI, major bleeding, re-PCI at 6 mo
Thiele et al, 2012 (14)	LIPSIA-NSTEMI	<2	>48	200	200	PCI: 151 (75.5) CABG: 16 (8.0) Medical: 33 (16.5)	PCI: 114 (57.0) CABG: 25 (12.5) Medical: 61 (30.5)	Death, MI, refractory ischemia at 6 mo, in-hospital major bleeding
van 't Hof et al, 2003 (15)	ELISA	6	50	109	111	PCI: 66 (60.5) CABG: 15 (13.8) Medical: 27 (24.7)	PCI: 64 (57.7) CABG: 21 (18.9) Medical: 25 (23.4)	Death, MI, major bleeding, refractory ischemia at 6 mo
Zhang et al, 2010 (16)	NA	9.3	49.9	446	369	PCI: 314 (70.4) CABG: 41 (9.2) Medical: 91 (20.4)	PCI: 252 (68.3) CABG: 37 (10.1) Medical: 80 (21.6)	Death, MI, major bleeding, re-PCI, refractory ischemia at 6 mo

Ann Intern Med. 2013;158:261-270

Study, Year (Reference)	Trial Name	Time of Catheterization, *h*		Patients, *n*		Definitive Treatment, *n* (%)		Clinical Outcomes at Follow-up
		Early Strategy	Delayed Strategy	Early Strategy	Delayed Strategy	Early Strategy	Delayed Strategy	
Sorajja et al, 2010 (17)	ACUITY	≤24	>24	4937	2812	PCI: 4937 (100)	PCI: 2812 (100)	Death, MI, major bleeding at 12 mo
Ryan et al, 2005 (20)	CRUSADE	23.4	46.3	45 548	10 804	PCI: 19 130 (42.0) CABG: 6103 (13.4) Medical: 20 315 (44.6)	PCI: 4354 (40.3) CABG: 1394 (12.9) Medical: 5056 (46.8)	Death and MI at hospital discharge
Montalescot et al, 2005 (19)	GRACE	<24	>48	2407	4639	PCI: 1539 (63.9) CABG: 269 (11.2) Medical: 599 (24.9)	PCI: 2073 (44.7) CABG: 394 (8.5) Medical: 2172 (46.8)	Death at 6 mo, major bleeding at hospital discharge
Tricoci et al, 2007 (18)	SYNERGY	≤24	>24	3326	3026	PCI: 1924 (57.8) CABG: 723 (21.7) Medical: 679 (20.4)	PCI: 1586 (52.4) CABG: 591 (19.5) Medical: 849 (28.1)	Death, MI, major bleeding at 30 d

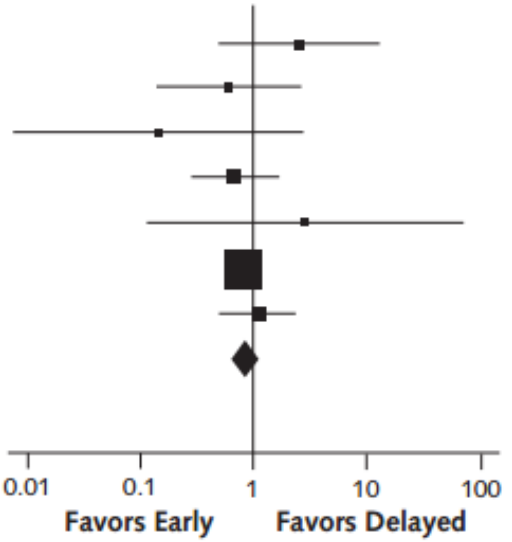
Randomized Trials

Study or Subgroup	Early Strategy		Delayed Strategy		Weight, %	OR D-L, Random (95% CI)
	Events, *n*	Total Patients, *n*	Events, *n*	Total Patients, *n*		
ABOARD	5	175	2	177	2.6	2.57 (0.49–13.45)
ELISA	3	109	5	111	3.4	0.60 (0.14–2.57)
ISAR-COOL	0	203	3	207	0.8	0.14 (0.01–2.80)
LIPSIA-NSTEMI	9	200	13	200	9.4	0.68 (0.28–1.62)
OPTIMA	1	73	0	69	0.7	2.88 (0.12–71.80)
TIMACS	76	1593	85	1438	70.8	0.80 (0.58–1.10)
Zhang et al, 2010 (16)	16	446	12	369	12.3	1.11 (0.52–2.37)
Total	110	2799	120	2571	100	0.83 (0.64–1.09)

Heterogeneity: $\tau^2 = 0.00$; chi-square = 4.72; $P = 0.58$; $I^2 = 0\%$

Test for overall effect: $Z = 1.36$ ($P = 0.180$)

Mortality



Ann Intern Med. 2013;158:261-270

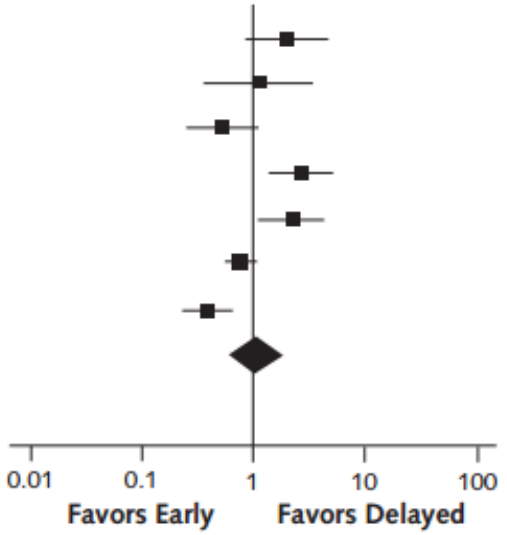
Randomized Trials

Study or Subgroup	Early Strategy Events, *n*	Early Strategy Total Patients, *n*	Delayed Strategy Events, *n*	Delayed Strategy Total Patients, *n*	Weight, %	OR D-L, Random (95% CI)
ABOARD	16	175	8	177	12.8	2.13 (0.89–5.10)
ELISA	7	109	6	111	10.6	1.20 (0.39–3.70)
ISAR-COOL	12	203	21	207	14.0	0.56 (0.27–1.16)
LIPSIA-NSTEMI	33	200	13	200	14.6	2.84 (1.45–5.58)
OPTIMA	44	73	27	69	14.6	2.36 (1.20–4.63)
TIMACS	76	1593	82	1438	17.5	0.83 (0.60–1.14)
Zhang et al, 2010 (16)	23	446	40	369	15.9	0.41 (0.24–0.69)
Total	211	2799	197	2541	100	1.15 (0.65–2.01)

Heterogeneity: $\tau^2 = 0.44$; chi-square = 32.98; $P < 0.001$; $I^2 = 82\%$

Test for overall effect: $Z = 0.48$ ($P = 0.63$)

Myocardial Infarction



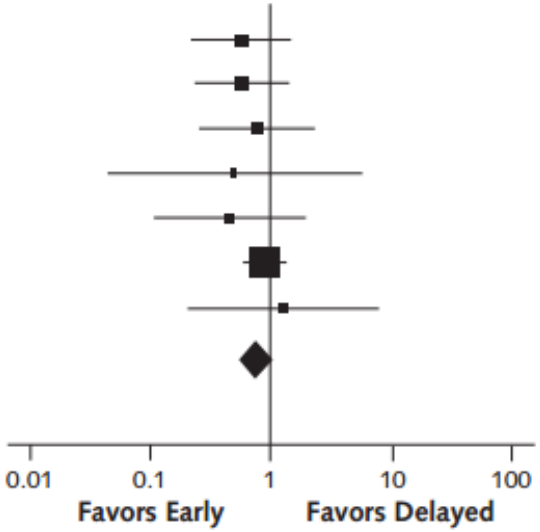
Randomized Trials

Study or Subgroup	Early Strategy Events, *n*	Early Strategy Total Patients, *n*	Delayed Strategy Events, *n*	Delayed Strategy Total Patients, *n*	Weight, %	OR D-L, Random (95% CI)
ABOARD	7	175	12	177	10.4	0.57 (0.22–1.49)
ELISA	9	109	15	111	12.5	0.58 (0.24–1.38)
ISAR-COOL	6	203	8	207	8.2	0.76 (0.26–2.22)
LIPSIA-NSTEMI	1	200	2	200	1.6	0.50 (0.04–5.53)
OPTIMA	3	73	6	69	4.7	0.45 (0.11–1.87)
TIMACS	49	1593	50	1438	59.5	0.88 (0.59–1.32)
Zhang et al, 2010 (16)	3	446	2	369	3.0	1.24 (0.21–7.48)
Total	78	2799	95	2571	100	0.76 (0.56–1.04)

Heterogeneity: $\tau^2 = 0.00$; chi-square = 2.17; $P = 0.90$; $I^2 = 0\%$

Test for overall effect: $Z = 1.70$ ($P = 0.090$)

Bleeding complications



Early Versus Delayed Percutaneous Coronary Intervention for Patients With Non-ST Segment Elevation Acute Coronary Syndrome: A Meta-Analysis of Randomized Controlled Clinical Trials

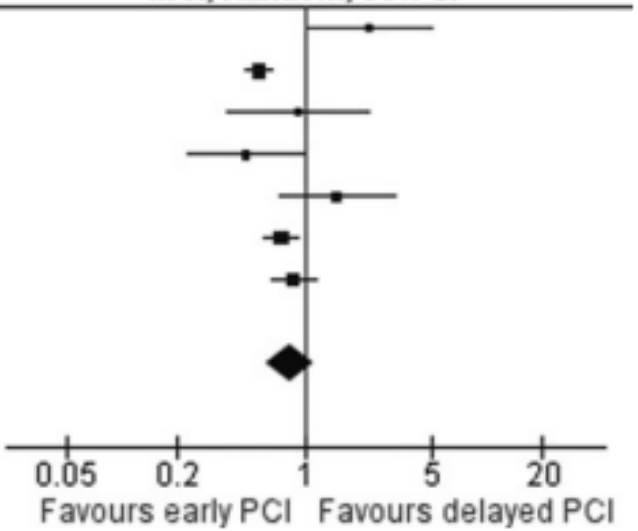
Naveen Rajpurohit,[1*] MD, Nadish Garg,[2] MD, Rajeev Garg,[2] MD,

PRIMARY COMPOSITE END POINT (DEATH, MI, AT 30 DAYS)

Study or Subgroup	Early PCI Events	Total	Delayed PCI Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
ABOARD (10)	21	175	10	177	8.8%	2.28 [1.04, 4.99]
ACUITY (6)	282	4937	273	2812	22.8%	0.56 [0.47, 0.67]
ELISA (11)	10	109	11	111	7.3%	0.92 [0.37, 2.26]
ISARCOOL (9)	12	203	24	207	9.7%	0.48 [0.23, 0.99]
OPTIMA (8)	24	73	17	69	9.5%	1.50 [0.72, 3.12]
PURSUIT (7)	155	620	382	1238	21.8%	0.75 [0.60, 0.93]
TIMACS (5)	103	1593	106	1438	20.1%	0.87 [0.66, 1.15]
Total (95% CI)		**7710**		**6052**	**100.0%**	**0.83 [0.62, 1.10]**
Total events	607		823			

Heterogeneity: Tau² = 0.09; Chi² = 22.88, df = 6 (P = 0.0008); I² = 74%

Test for overall effect: Z = 1.29 (P = 0.20)

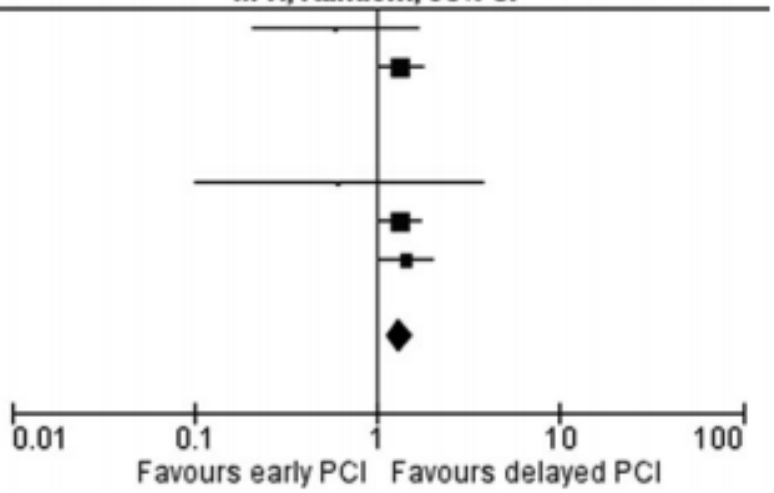


Catheterization and Cardiovascular Interventions 81:223–231 (2013)

REPEAT REVASCULARIZATION AT 30 DAYS→BETTER DELAYED!

Study or Subgroup	Early PCI Events	Early PCI Total	Delayed PCI Events	Delayed PCI Total	Weight	Odds Ratio M-H, Random, 95% CI
ABOARD (10)	6	175	10	177	2.4%	0.59 [0.21, 1.67]
ACUITY (6)	185	4937	79	2812	35.1%	1.35 [1.03, 1.76]
ELISA (11)	0	0	0	0		Not estimable
ISARCOOL (9)	0	0	0	0		Not estimable
OPTIMA (8)	2	73	3	69	0.8%	0.62 [0.10, 3.83]
PURSUIT (7)	118	620	185	1238	38.9%	1.34 [1.04, 1.73]
TIMACS (5)	94	1593	60	1438	22.8%	1.44 [1.03, 2.01]
Total (95% CI)		**7398**		**5734**	**100.0%**	**1.33 [1.14, 1.56]**
Total events	405		337			

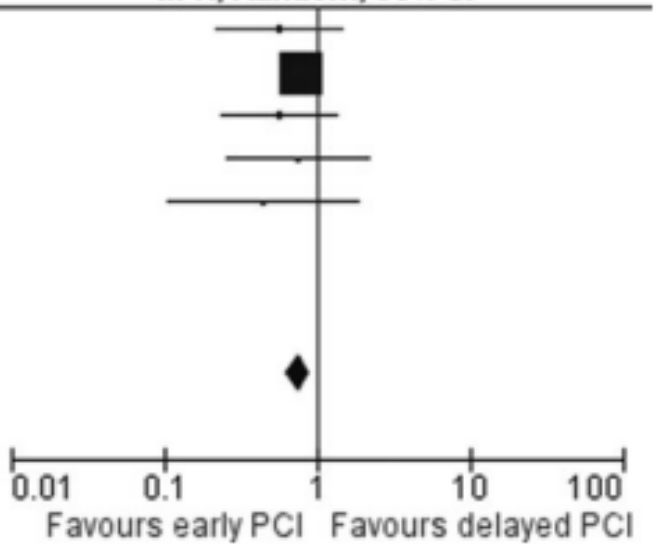
Heterogeneity: Tau² = 0.00; Chi² = 3.25, df = 4 (P = 0.52); I² = 0%
Test for overall effect: Z = 3.53 (P = 0.0004)



BLEEDING AT 30 DAYS→BETTER EARLY!

Study or Subgroup	Early PCI Events	Early PCI Total	Delayed PCI Events	Delayed PCI Total	Weight	Odds Ratio M-H, Random, 95% CI
ABOARD (10)	7	175	12	177	3.5%	0.57 [0.22, 1.49]
ACUITY (6)	267	4937	191	2812	87.8%	0.78 [0.65, 0.95]
ELISA (11)	9	109	15	111	4.2%	0.58 [0.24, 1.38]
ISARCOOL (9)	6	203	8	207	2.8%	0.76 [0.26, 2.22]
OPTIMA (8)	3	73	6	69	1.6%	0.45 [0.11, 1.87]
PURSUIT (7)	0	0	0	0		Not estimable
TIMACS (5)	0	0	0	0		Not estimable
Total (95% CI)		**5497**		**3376**	**100.0%**	**0.76 [0.63, 0.91]**
Total events	292		232			

Heterogeneity: Tau² = 0.00; Chi² = 1.35, df = 4 (P = 0.85); I² = 0%
Test for overall effect: Z = 3.02 (P = 0.003)



Catheterization and Cardiovascular Interventions 81:223–231 (2013)

Canadian Journal of Cardiology 29 (2013) 1429–1435

Clinical Research

Use and Timing of Coronary Angiography and Associated In-hospital Outcomes in Canadian Non–ST-Segment Elevation Myocardial Infarction Patients: Insights from the Canadian Global Registry of Acute Coronary Events

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[a] *Mazankowski Alberta Heart Institute, University of Alberta, Edmonton, Alberta, Canada*

Additional enrollement → GRACE 1999; GRACE (2)2003- 2007; CANRACE 2008

17.241 Pts, from June 1999 to December 2008, with ACS.
4755 NSTEMI patients were admitted on a weekday.
1956 NSTEMI (29.1%) were admitted on the weekend.

Invasive Procedure	Weekdays (n = 4755)	Weekends (n = 1956)	P
Coronary angiography, % (n)	60.2 (2851)	60.7 (1181)	0.73
Time to angiography, h*,†	58 (32-106)	70 (50-112)	0.32‡
For those with GRACE risk score ≥ 141	n = 1695	n = 683	
Coronary angiography, % (n)	44.7 (753)	45.2 (307)	0.84
Time to angiography, h*	70 (37-130)	72 (51-108)	0.27‡
PCI, % (n)	31.4 (1436)	30.9 (576)	0.74
Time to PCI, h*	56 (30-112)	71 (47-112)	0.20‡
CABG, % (n)	3.8 (175)	3.8 (69)	0.85
Time to CABG, days*	8 (6-13)	9 (6-12)	0.84‡
Any revascularization, % (n)	34.7 (1589)	34.4 (640)	0.82

NOT STATISTICAL DIFFERENCE!!

BUT…

In-Hospital Events, % (n)	Weekdays (n = 4755)	Weekends (n = 1956)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)*	High-risk group adjusted OR (95% CI)†
Death	2.9 (140)	3.2 (63)	1.10 (0.89-1.35) $P = 0.38$	1.52 (1.15-2.01) $P = 0.004$	1.34 (1.02-1.77) $P = 0.04$
Reinfarction	6.2 (275)	7.1 (131)	1.16 (0.97-1.38) $P = 0.10$	1.21 (0.95-1.52) $P = 0.12$	1.43 (1.00-2.06) $P = 0.05$
Recurrent ischemic symptoms	23.8 (1125)	26.3 (511)	1.14 (1.01-1.28) $P = 0.03$	1.16 (1.01-1.32) $P = 0.03$	1.26 (1.03-1.53) $P = 0.02$
CHF/pulmonary edema	9.9 (467)	11.7 (227)	1.21 (1.02-1.44) $P = 0.03$	1.28 (1.00-1.63) $P = 0.048$	1.26 (1.02-1.55) $P = 0.03$
Cardiogenic shock	1.3 (63)	1.6 (31)	1.20 (0.92-1.57) $P = 0.17$	1.36 (1.01-1.84) $P = 0.045$	1.38 (0.94-2.03) $P = 0.10$
Stroke	0.7 (34)	0.4 (8)	0.57 (0.30-1.09) $P = 0.09$	0.68 (0.34-1.34) $P = 0.27$	0.66 (0.28-1.59) $P = 0.36$
Major bleeding	2.4 (112)	1.8 (35)	0.76 (0.52-1.09) $P = 0.13$	0.75 (0.50-1.12) $P = 0.16$	0.56 (0.29-1.06) $P = 0.08$
Death/re-MI	8.9 (399)	9.7 (180)	1.10 (0.97-1.24) $P = 0.14$	1.30 (1.04-1.62) $P = 0.02$	1.33 (1.08-1.65) $P = 0.008$
Death/re-MI/recurrent ischemia	30.5 (1393)	32.6 (617)	1.10 (0.99-1.23) $P = 0.09$	1.14 (1.01-1.29) $P = 0.04$	1.29 (1.08-1.53) $P = 0.004$
Death/re-MI/recurrent ischemia/CHF/shock	35.1 (1609)	38.0 (721)	1.13 (1.02-1.26) $P = 0.02$	1.16 (1.03-1.31) $P = 0.02$	1.32 (1.12-1.56) $P = 0.001$

Patients admitted on weekends had higher adjusted mortality and cardiovascular event rates compared with those admitted on weekdays.

Canadian Journal of Cardiology 29 (2013) 1429-1435

CONCLUSIONS FOLLOWING the GUIDELINES

AHA

Immediate invasive (within 2 h)	Refractory angina
	Signs or symptoms of HF or new or worsening mitral regurgitation
	Hemodynamic instability
	Recurrent angina or ischemia at rest or with low-level activities despite intensive medical therapy
	Sustained VT or VF
Early invasive (within 24 h)	None of the above, but GRACE risk score >140
	Temporal change in Tn (Section 3.4)
	New or presumably new ST depression
Delayed invasive (within 25–72 h)	None of the above but diabetes mellitus
	Renal insufficiency (GFR <60 mL/min/1.73 m^2)
	Reduced LV systolic function (EF <0.40)
	Early postinfarction angina
	PCI within 6 mo
	Prior CABG
	GRACE risk score 109–140; TIMI score >2

Ischemia-guided strategy	Low-risk score (e.g., TIMI [0 or 1], GRACE [<109])
	Low-risk Tn-negative female patients
	Patient or clinician preference in the absence of high-risk features


Thanks for Your Attention!