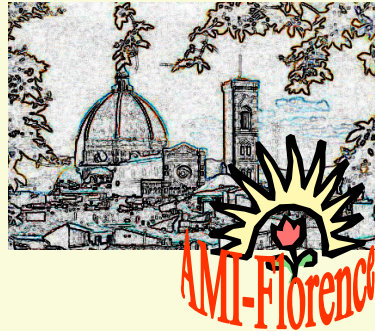


**Health Services Research in treatment of patients with
acute myocardial infarction
Berlin September 24, 2005**



A report from the AMI-Florence Italian Registry

Daniela Balzi, BSc

Epidemiology Unit, Local Health Unit 10, Via San Salvi 12, 50135 Florence, Italy

1999 Update: ACC/AHA Guidelines for the Management of Patients With Acute Myocardial Infarction: Executive Summary and Recommendations

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Acute Myocardial Infarction)

Thrombolysis

- **Class I**
- ST >0.1 mV in ≥ 2 contiguous leads), within 12 hours, age <75 years.
- New LBBB and history suggesting AMI.

- **Class II a**
- ST , age >75 years.

Primary PCI

- **Class I**
- ... in patients with ST AMI or new LBBB ... **within 12 hours** of onset of symptoms or beyond 12 hours if ischemic symptoms persist ...
- In patients who are within **36 hours** of an acute ST-elevation/Q-wave or new LBBB MI who develop cardiogenic shock, **are <75 years old** ...

THERAPEUTICAL APPROACH TO **STE-AMI**

**What does it happen in the
“real [clinical] world”?**

- How closely are guidelines applied?
- Which factors guide the therapeutic decision-making?

THE AMI-FLORENCE REGISTRY

Coordinating Centre

- Epidemiology Unit,
Tuscany Regional Health
Agency, Florence

1 Teaching Hospital with PCI facilities Careggi (Florence)

- Dept. Critical Care
Medicine Univ. Florence
 - Unit of Gerontology and
Geriatrics
 - Unit of Internal Medicine and
Cardiology
- Division of Cardiology 1

5 District Hospitals without PCI facilities

in the Florence metropolitan area

- Cardiology, Internal
Medicine and Emergency
Departments at:
 - S. Maria Nuova
 - S. Maria Annunziata
 - Nuovo S. Giovanni di Dio
 - Mugello
 - Figline Valdarno

THE AMI-FLORENCE REGISTRY

Inclusion criteria:

- All STE-AMIs (ST >0.1 mV in ≥ 2 contiguous leads or new LBBB) arriving alive to the Emergency Department at 1 of the 6 hospitals in Florence metropolitan area (800,000 inhabitants) from March, 2000 to February, 2001

Diagnostic confirmation criteria (1/2):

- Typical chest pain >30 minutes
- Increase in total CPK >2 times upper normal value within 72 hours

Systematic check of "cases" inclusion:

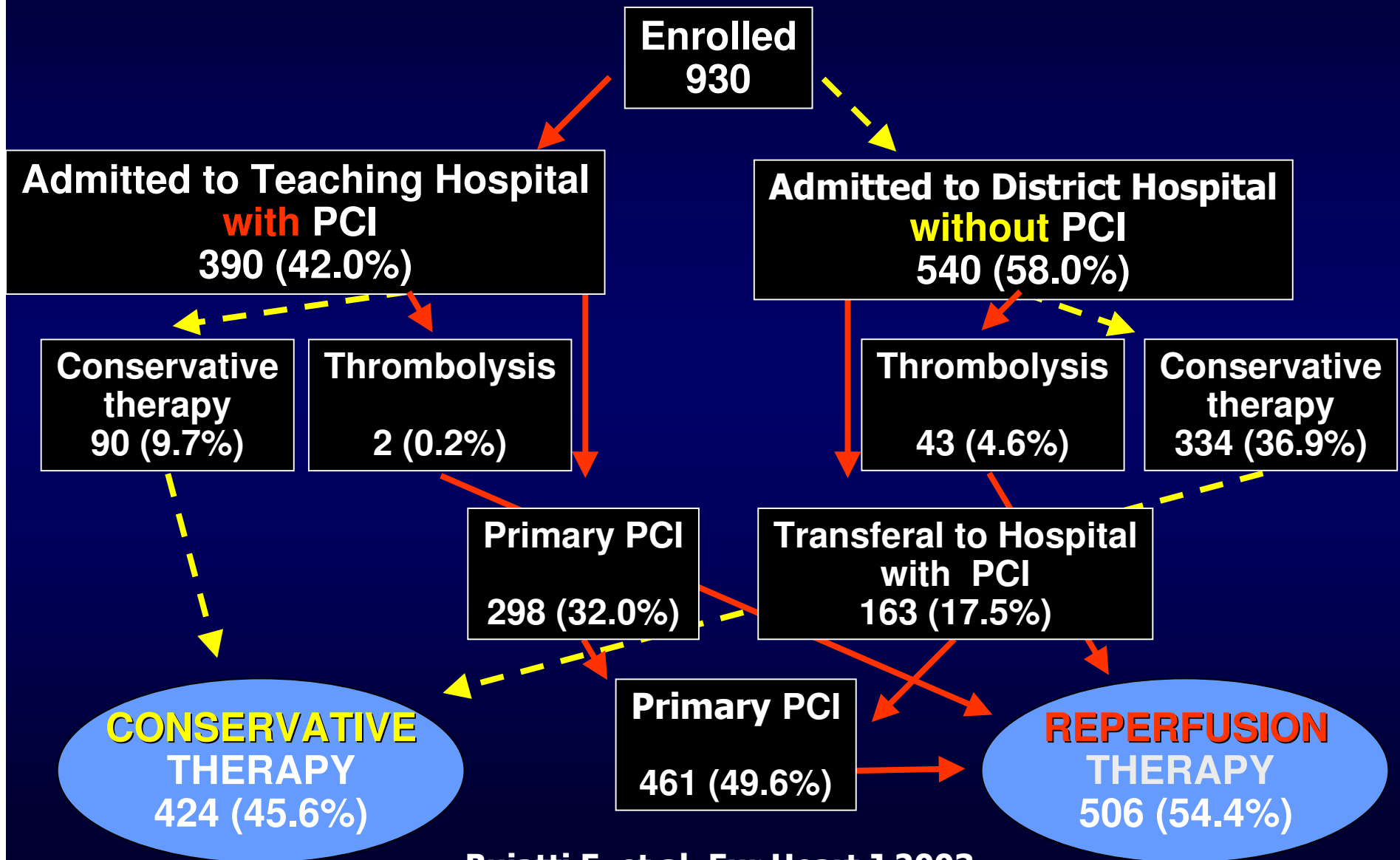
- The completeness of enrolment was checked through the regional hospital discharge system which records all hospital admissions (population-based study)

6-month, 1- and 3-year life status:

- From registry office of municipalities of residence

THE AMI-FLORENCE REGISTRY

STE-AMI: enrollment & treatment



THE AMI-FLORENCE REGISTRY (analysis #1)



ELSEVIER



EUROPEAN
SOCIETY OF
CARDIOLOGY

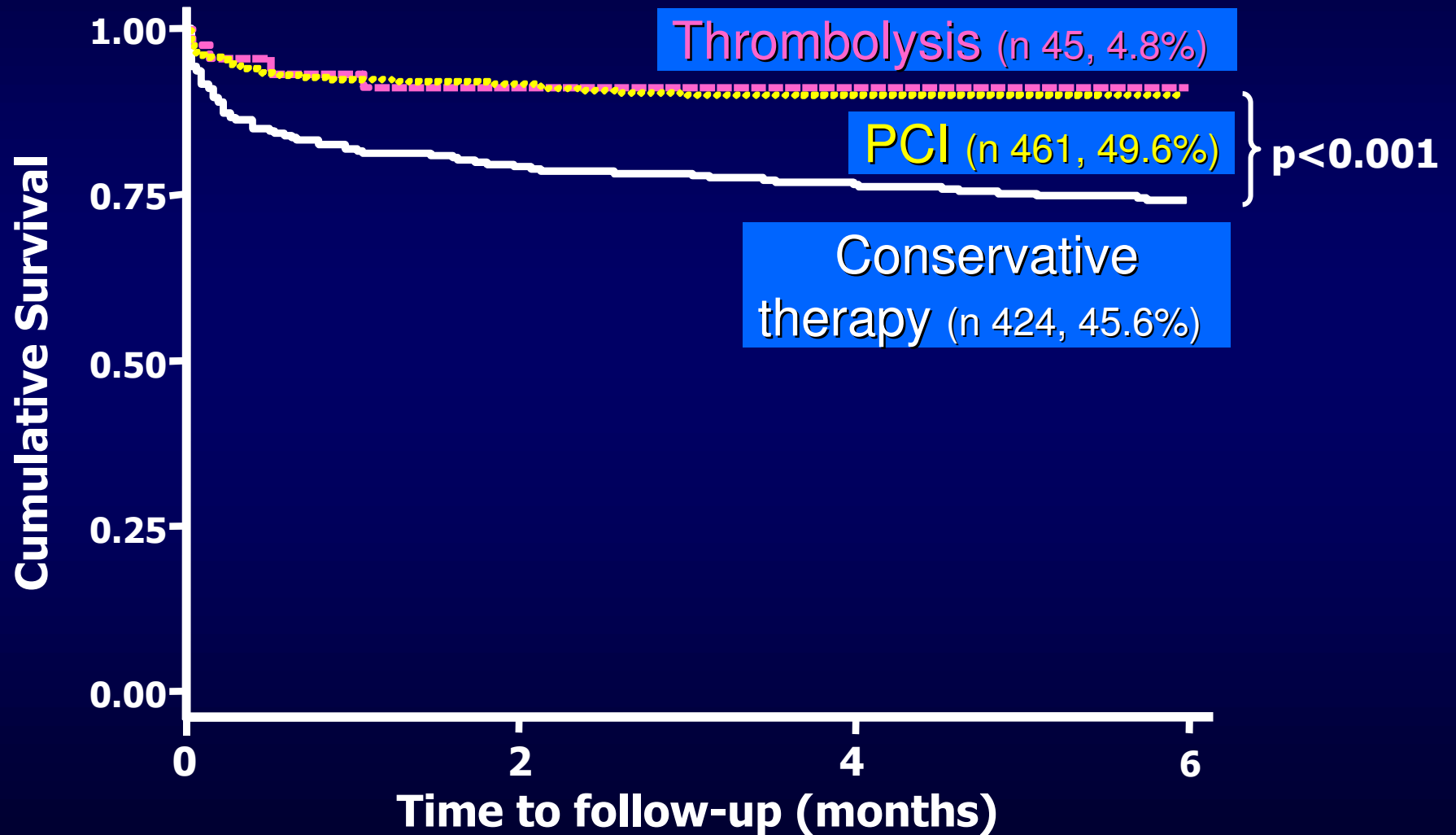
Determinants of **treatment strategies and survival**
in acute myocardial infarction: a population-based
study in the Florence district, Italy

Results of the acute myocardial infarction Florence
registry (AMI-Florence)^{1,2}

Eva Buiatti^a, Alessandro Barchielli^{b*}, Niccolò Marchionni^c, Daniela Balzi^b,
Nazario Carrabba^d, Serafina Valente^e, Iacopo Olivotto^f, Cristina Landini^g,
Maurizio Filice^h, Marco Torriⁱ, Giuseppe Regoli^j, Giovanni M Santoro^d

THE AMI-FLORENCE REGISTRY (analysis #1)

6-month survival, by treatment



THE AMI-FLORENCE REGISTRY (analysis #1)

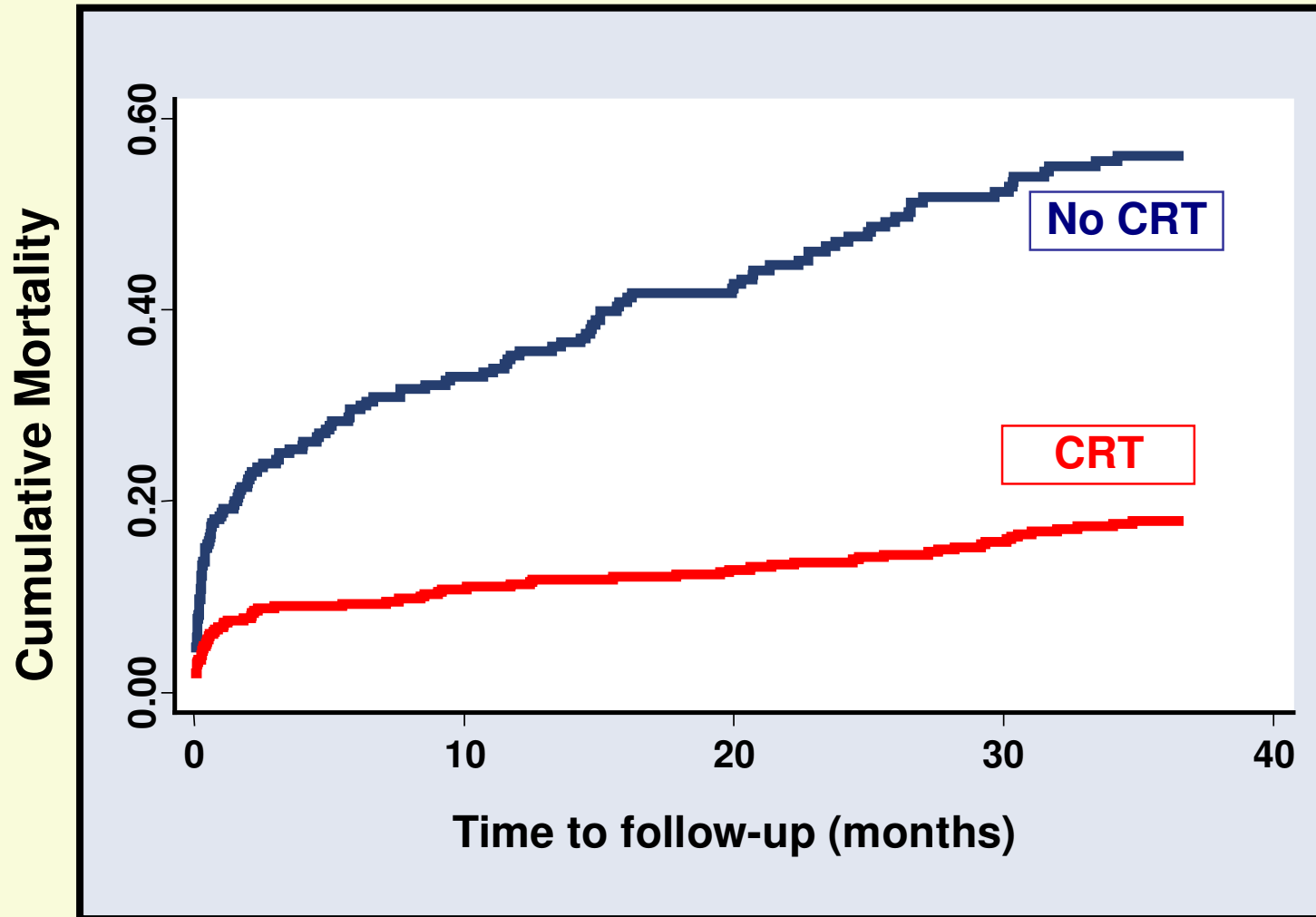
Predictors of 6-month mortality (Cox)

	HR	95% CI	p
Age (years, continuous)	1.06	1.04 – 1.07	<0.001
Unst. Angina >1 month (yes vs. no)	1.43	1.01 – 2.03	0.047
Previous Stroke (yes vs. no)	1.90	1.26 – 2.87	0.002
Cancer \leq 5 years (yes vs. no)	2.16	1.19 – 3.92	0.012
Non-Q waves AMI (vs. Q)	0.59	0.39 – 0.88	0.011
Killip Class (vs. class 1)			
2	2.54	1.66 – 3.91	<0.001
3	2.34	1.45 – 3.80	<0.001
4	6.66	4.13 – 10.72	<0.001
Reperfusion therapy (yes vs. no)	0.56	0.38 – 0.83	0.004

THE AMI-FLORENCE REGISTRY

(unpublished data)

3-year **mortality**, by coronary reperfusion therapy (CRT) status



THE AMI-FLORENCE REGISTRY

(unpublished data)

Multivariate predictors of long-term mortality (Cox)

Variable	HR (95%CI)
Age: <65 years (reference)	1 (-)
65-74	2.90 (1.54-5.47)
75-84	4.81 (2.62-8.84)
≥85	11.06 (6.01-20.35)
AMI location: anterior, Q waves (reference)	1 (-)
Other locations, Q waves	1.14 (0.71-1.84)
Non-Q waves	0.48 (0.24-0.97)
Killip class >1	2.26 (1.69-3.03)
History of diabetes (yes vs. no)	1.47 (1.09-1.98)
History of COPD (yes vs. no)	1.57 (1.11-2.22)
History of depression (yes vs. no)	1.84 (1.15-2.93)
Coronary reperfusion therapy (yes vs. no)	0.61 (0.45-0.82)

THE AMI-FLORENCE REGISTRY (analysis #1)

Multivariate predictors of reperfusion therapy utilization

	OR	95% CI	p
Age \geq 80 years ⁽¹⁾	0.37	0.23-0.57	<0.001
Comorbidity (clinical history)			
Chronic heart failure	0.36	0.16-0.82	0.014
Stroke	0.33	0.16-0.71	0.004
Depression	0.30	0.12-0.71	0.006
Renal insufficiency (creatinine $>$ 1.5 mg/dl)	0.23	0.10-0.55	0.001
Type of admission			
Directly to hospital with PCI	5.29	3.56-7.86	<0.001
Time delay \geq 13 hours ⁽²⁾	0.26	0.13-0.51	<0.001
Clinical characteristics			
AMI location ⁽³⁾			
- other locations, Q waves	0.52	0.34-0.78	0.002
- non-Q	0.05	0.03-0.09	<0.001
Killip class ⁽⁴⁾			
- class 2-4	0.18	0.08-0.38	<0.001

Reference: (1) Age $<$ 70 years; (2) Delay \leq 3 hours; (3) Anterior location, Q waves; (4) Killip class 1

THE AMI-FLORENCE REGISTRY (analysis #2)

In-Hospital Management and Outcome in Women With Acute Myocardial Infarction (Data from the AMI-Florence Registry)

Nazario Carrabba, MD, Giovanni M. Santoro, MD, Daniela Balzi, ScD, Alessandro Barchielli, MD, Niccolò Marchionni, MD, Plinio Fabiani, MD, Cristina Landini, MD, Luca Scarti, MD, Gennaro Santoro, MD, Serafina Valente, MD, Valerio Verdiani, MD, and Eva Buiatti, MD, for the AMI-Florence Working Group*

Background: guidelines indicate that coronary reperfusion therapy (CRT) is the first-choice treatment....., but whether the benefit is similar in women and in men remains unclear

Objectives: To identify the presence of gender-associated differences in hospital management and in early and late outcome

THE AMI-FLORENCE REGISTRY (analysis #2)

Results and Conclusions: The main finding of this paper was that in the general population, women with STE-AMI have a lower rate of coronary reperfusion therapy and a higher in-hospital and 1-year mortality.

However at multivariate analysis, female gender was not an independent predictor of either reperfusion use or outcome and the effect of reperfusion therapy on prognosis by gender is similar.

The higher crude mortality and the lower reperfusion rate observed in women are accounted for by older age and other age-related factors, such as higher prevalence of heart failure on admission.

THE AMI-FLORENCE REGISTRY (analysis #3)

Age-Related Changes in Treatment Strategies for Acute Myocardial Infarction: A Population-Based Study

Alessandro Barchielli, MD, Eva Buiatti, MD,† Daniela Balzi, BSc,* Giovanni M. Santoro, MD,‡ Nazario Carrabba, MD,§ Plinio Fabiani, MD,¶ Marcella Maci, MD,* Massimo Margheri, MD,# Irene Mangani, MD,** Matteo Monami, MD,** and Niccoló Marchionni, MD,**
for the AMI-Florence Working Group*

Background: guidelines indicate that coronary reperfusion therapy (CRT) is the first-choice treatment of STE-AMI ... primary PCI has been shown to reduce mortality and complications of STE-AMI more markedly than thrombolysis ... despite this, ... CRT is still underused in advanced age.

Objectives: To compare across four age groups (<65, 65–74, 75–84, 85) the determinants of CRT use in STE-AMI.

THE AMI-FLORENCE REGISTRY (analysis #3)

Demographic & clinical characteristics, by age group

	Age (years)				p
	<65 (n: 290)	65-74 (n: 246)	75-84 (n: 246)	≥85 (n: 148)	
Gender (males %)	85.9	71.5	58.1	43.9	<0.001
Comorbidities (mean)					
cardiovascular	0.37	0.58	0.88	0.93	<0.001
non-cardiovascular	0.60	1.04	1.35	1.33	<0.001
AMI Characteristics (%)					
Killip class 1	90.0	74.4	54.1	43.9	0.036
Killip class 2	4.5	14.2	18.7	30.4	
Killip class 3-4	5.6	11.4	27.3	25.8	
non anterior, Q waves	54.5	44.3	40.2	25.2	0.008
non-Q	14.8	19.9	25.2	25.0	
Hospital admission (%)					
Directly to hosp. with PCI	52.8	43.1	34.6	31.1	<0.001
Transf. to hosp. with PCI	56.2	47.9	33.5	17.7	<0.001

THE AMI-FLORENCE REGISTRY (analysis #3)

Probability of coronary reperfusion therapy (CRT) utilization

Age (years)	CRT (%)	Univariate		Multivariate †	
		OR (95%IC)	p	OR (95%IC)	p
< 65 (ref.)	71	1.00 (-)	-	1.00 (-)	-
65-74	60	0.60 (0.41-0.83)	0.005	0.97 (0.59-1.58)	0.90
75-84	43	0.30 (0.21-0.43)	<0.001	0.71 (0.43-1.17)	0.17
≥ 85	31	0.18 (0.12-0.28)	<0.001	0.37 (0.22-0.62)	<0.001

† Adjusted for comorbidity (n° of CV and non-CV associated diseases), Killip class, type of admission hospital, time delay, AMI location.

THE AMI-FLORENCE REGISTRY (analysis #3)

Multivariate predictors of coronary reperfusion therapy utilization, by age group

Variable	Age (years)							
	<65		65-74		75-84		≥85	
	OR	p	OR	p	OR	p	OR	p
Hospital with PCI *	5.10	<0.001	5.14	<0.001	3.18	0.001	3.23	0.009
Comorbidity ‡	0.76	0.21	0.67	0.02	0.63	0.004	0.46	<0.001
Killip class >1 #	0.19	0.10	0.03	<0.001	0.30	0.02	0.28	0.01
Non-anterior AMI °	0.59	0.17	0.30	0.004	0.84	0.61	1.15	0.78
Non-Q waves AMI °	0.06	<0.001	0.03	<0.001	0.08	<0.001	0.05	0.008

*: Yes vs. No; ‡ N° of chronic diseases; #: vs. Killip class 1; °: vs. anterior location

THE AMI-FLORENCE REGISTRY (analysis #4)


Effect of Comorbidity on Coronary Reperfusion Strategy and Long-Term Mortality after Acute Myocardial Infarction (the AMI-Florence Registry)

Daniela Balzi, Alessandro Barchielli, Eva Buiatti, Caterina Franceschini, Rinaldo Lavecchia, Matteo Monami, Giovanni Maria Santoro, Massimo Margheri, Iacopo Olivetto, Gian Franco Gensini, and Niccolò Marchionni, for the AMI-Florence Working Group

OBJECTIVES: ...Studies suggest that a substantial proportion of eligible patients with STE-AMI do not receive coronary reperfusion therapy (CRT), particularly when affected by **chronic comorbidity**... The present analysis is aimed at determining the impact of chronic comorbidity on CRT utilization and 1-year mortality in patients with STE-AMI.

THE AMI-FLORENCE REGISTRY (analysis #4)

Association of chronic conditions with 1-year mortality

Chronic condition	Prevalence n (%)	Cox regression# $\beta \pm SE$	Disease Score (B/SE)	
CHF	89 (9.7)	0.751 \pm 0.175	4.300	S e v e r i t y 
Stroke			3.731	
Cancer			2.547	
Periph			2.496	
Angina			2.301	
COPD			1.474	
Chronic			1.417	
Depres			1.184	
Cardia			1.179	
Angina			0.527	
Previo			0.307	
Cancer > 5 years	42 (4.6)	0.0064 \pm 0.312	0.205	

Chronic Comorbidity Score

❑ **CCS** is generated from the individual sum of disease-specific scores (e.g.: CHF 4.300 + stroke 3.731 = CCS 8.031)

❑ **3 CCS classes** (quartiles 1+2, 3, 4) identify patients with progressively increasing severity of comorbidity

adjusted for age & gender; CHF: chronic heart failure; COPD: chronic obstructive pulmonary disease

THE AMI-FLORENCE REGISTRY (analysis #4)

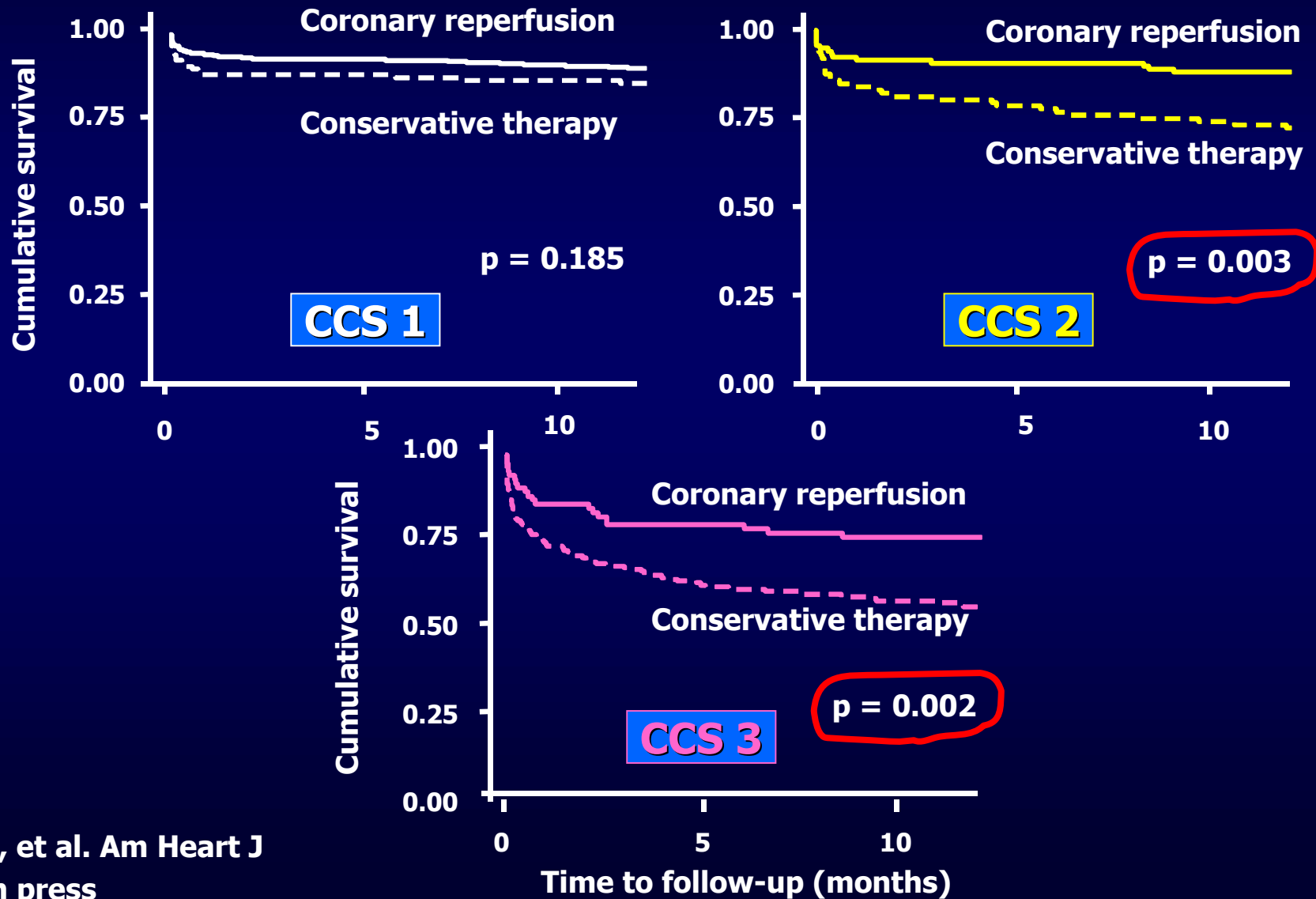
Clinical characteristics, by Chronic Comorbidity Score (CCS) category

	CCS 1 n: 423	CCS 2 n: 229	CCS 3 n: 268	p
Age (years)	65.9 ± 13.0	71.9 ± 12.6	76.5 ± 9.5	<0.001
Killip class, n (%)				
1	343 (81.1)	162 (70.7)	132 (49.3)	<0.001
2	62 (14.7)	57 (24.9)	111 (41.0)	
3-4	18 (4.3)	10 (4.4)	27 (9.3)	
AMI location, n (%)				
Anterior, Q waves	153 (36.2)	82 (35.8)	73 (27.2)	<0.001
Non-anterior, Q waves	209 (49.4)	95 (41.5)	119 (44.4)	
Non-Q waves	61 (14.4)	52 (22.7)	76 (28.4)	
Hosp. admission, n (%)				
Directly to hosp. with PCI	205 (48.5)	99 (43.2)	82 (30.6)	<0.001
Transf. to hosp. with PCI	188 (44.5)	49 (21.5)	55 (20.4)	<0.001
Therapy, n (%)				
Conservative	122 (28.8)	112 (48.9)	182 (67.9)	<0.001
Coronary reperfusion	301 (71.2)	117 (51.1)	86 (32.1)	

THE AMI-FLORENCE REGISTRY (analysis #4)

1-year survival, by Chronic Comorbidity Score (CCS) category &

treatment



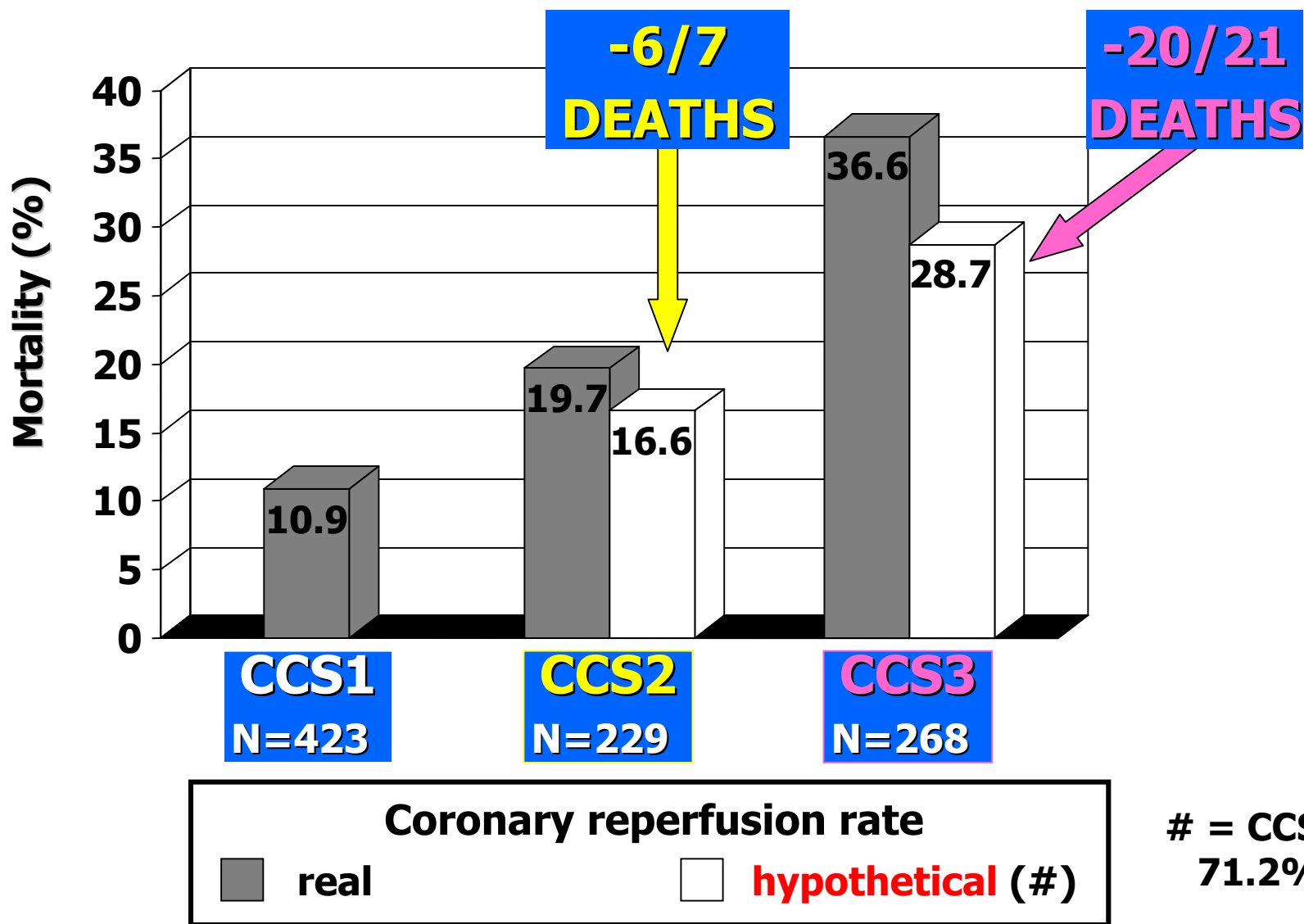
THE AMI-FLORENCE REGISTRY (analysis #4)

Multivariate predictors of 1-year mortality,
by Chronic Comorbidity Score

	CCS 1 (n: 423) HR (95% CI)	CCS 2 (n: 229) HR (95% CI)	CCS 3 (n: 268) HR (95% CI)
Age (years)	1.10 (1.07-1.14)	1.06 (1.03-1.09)	1.02 (1.00-1.05)
Killip class			
1	1	1	1
2	4.10(2.02-8.49)	2.20(1.12- 4.15)	2.10 (1.30-3.31)
3-4	15.30 (6.52-35.75)	5.40 (1.93-15.00)	3.10 (1.64-5.99)
AMI location			
anterior, Q waves	1	1	1
non-anterior, Q waves	1.39 (0.73-2.64)	0.87 (0.44-1.73)	1.20 (0.74-1.96)
non-Q waves	0.35 (0.11-1.15)	0.48 (0.21- 1.12)	0.83 (0.47- 1.44)
Therapy			
conservative	1	1	1
coronary reperfusion	0.64 (0.32-1.27)	0.50 (0.25- 1.01)	0.56 (0.33-0.94)

THE AMI-FLORENCE REGISTRY (analysis #4)

“Real” vs. “Hypothetical” mortality



CONCLUSIONS (1)

- **Older patients and those with greater comorbidity** are more frequently excluded from CRT in STE-AMI, also in areas where primary PCI is the prevailing CRT strategy.
- **CRT** achieves good results in terms of mortality (6-months, 1 yr, 3 yrs)

CONCLUSIONS (2)

- CRT is associated with **greater clinical benefits** in patients with **greater comorbidity**, who are more often excluded from such therapeutic option.
- Results suggest that the optimal therapeutical strategy for **older, frail individuals** with multiple comorbidities and STE-AMI, requiring an interdisciplinary approach, is still far from having been implemented in the real world.

**Thank you
for your attention!**