THE OPTIMAL TIME OF PERCUTANEOUS CORONARY INTERVENTION FOR NON-CULPRIT VESSEL IN ACUTE MYOCARDIAL INFARCTION PATIENTS WITH MULTIVESSEL DISEASE

Chonnam National University Hospital,
South Korea, Gwangju.

Multiple complex coronary plaques in patients with AMI

ABSTRACT

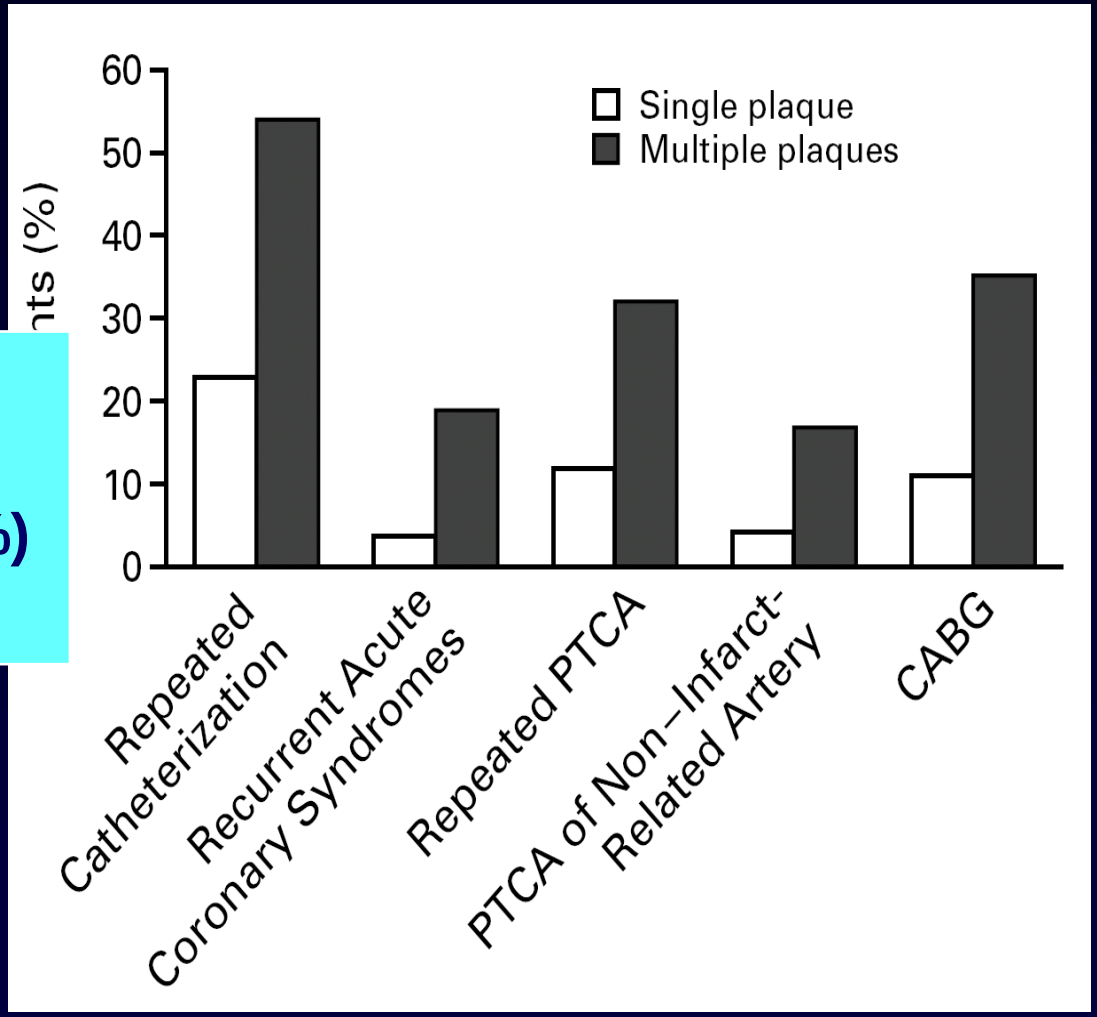
Background Acute myocardial infarction is believed to be caused by rupture of an unstable coronary-artery plaque that appears as a single lesion on angiography. However, plaque instability might be caused by pathophysiologic processes, such as inflammation, that exert adverse effects throughout the coronary vasculature and that therefore result in multiple unstable lesions.

Methods To document the presence of multiple unstable plaques in patients with acute myocardial in-

infarction, the presence of multiple complex plaques was associated with an increased incidence of recurrent acute coronary syndromes (19.0 percent vs. 2.6 percent, P≤0.001); repeated angioplasty (32.0 percent vs. 12.4 percent, P≤0.001), particularly of non–infarct-related lesions (17.0 percent vs. 4.6 percent, P≤0.001); and coronary-artery bypass graft surgery (35.0 percent vs. 11.1 percent, P≤0.001).

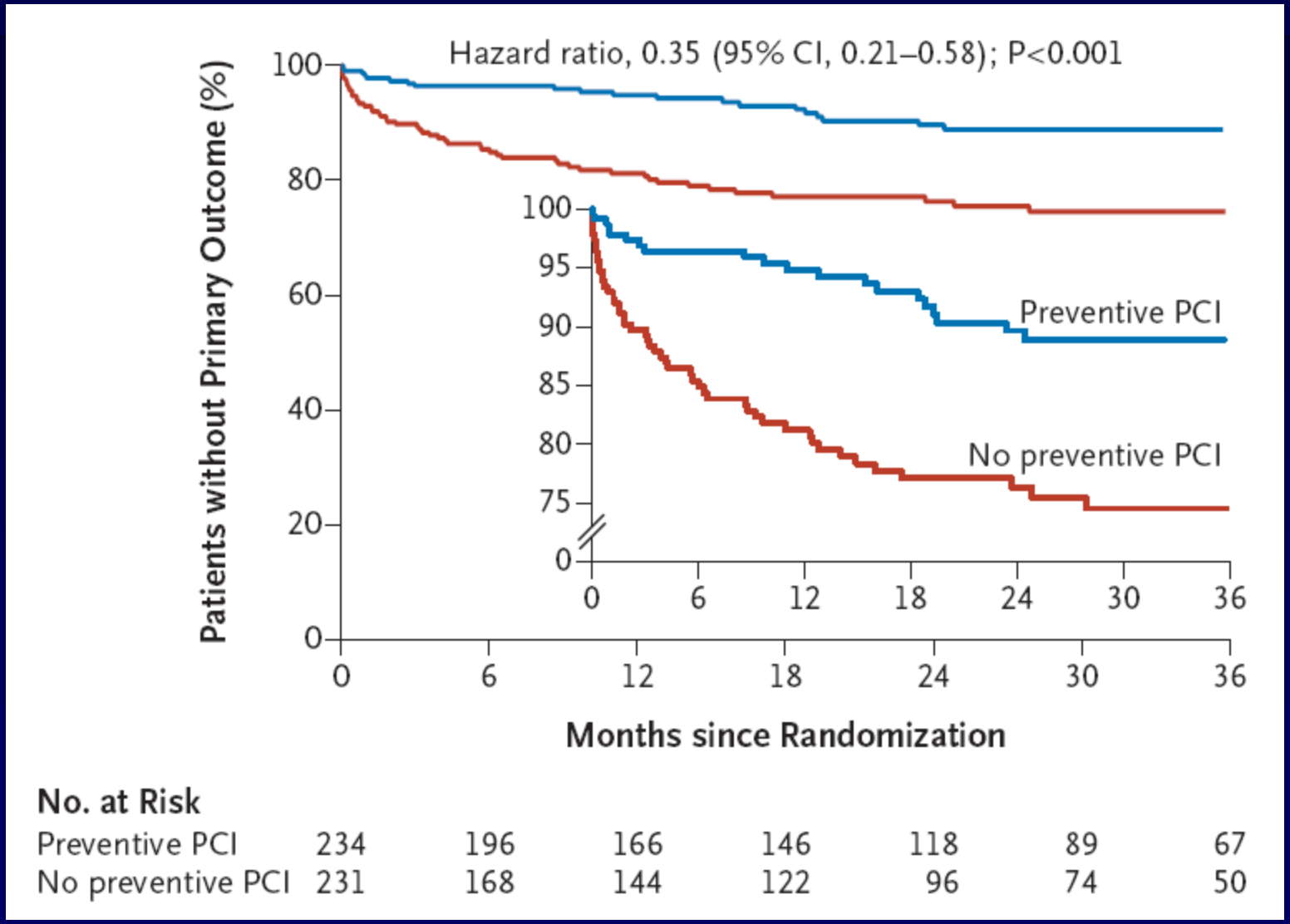
Conclusions Patients with acute myocardial infarction may harbor multiple complex coronary plaques that are associated with adverse clinical outcomes. Plaque instability may be due to a widespread process throughout the coronary vessels, which may have implications for the management of acute ischemic heart disease. (N Engl J Med 2000;343:915-22.)

Total 253 patients
Single plaque 153 (60.5%)
Multiple plaque 100 (39.5%)



NEJM 2000;343:915

Culprit only PCI vs Preventive PCI in STEMI

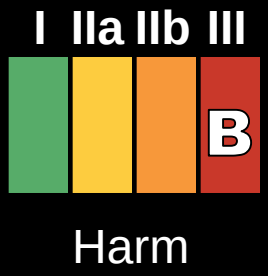


No. at Risk

Preventive PCI	234	196	166	146	118	89	67
No preventive PCI	231	168	144	122	96	74	50

N Engl J Med 2013;369:1115-23.

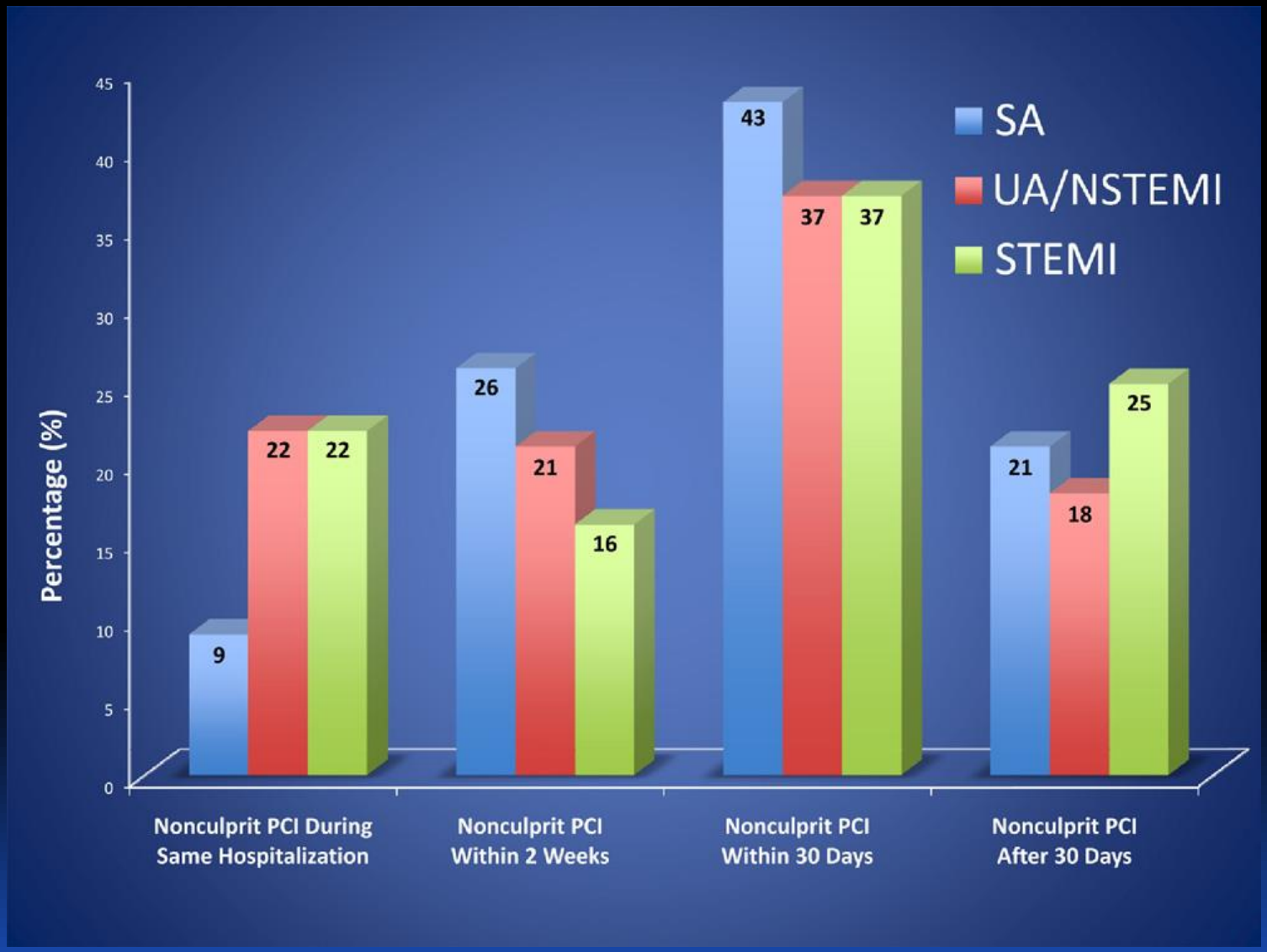
2013 ACCF/AHA guideline for the management of STEMI



PCI should not be performed in a noninfarct artery at the time of primary PCI in patients with STEMI without hemodynamic compromise.

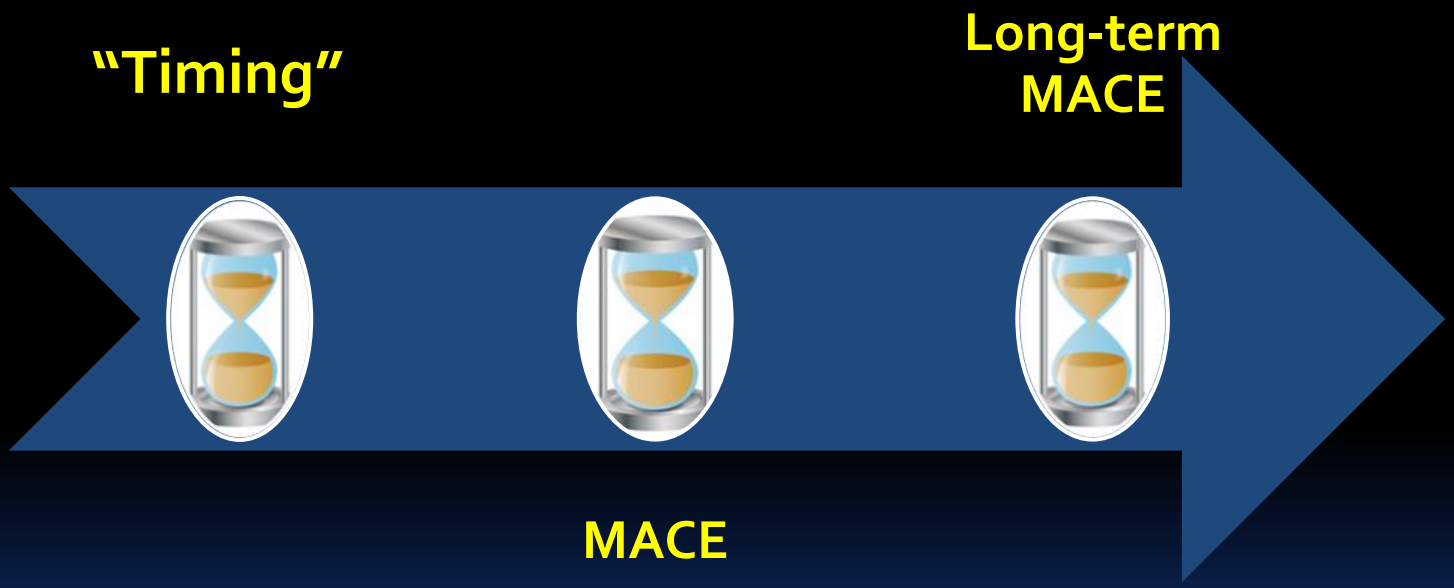
The timing of a staged PCI in MVD

Timing of Staging in Patient Subsets

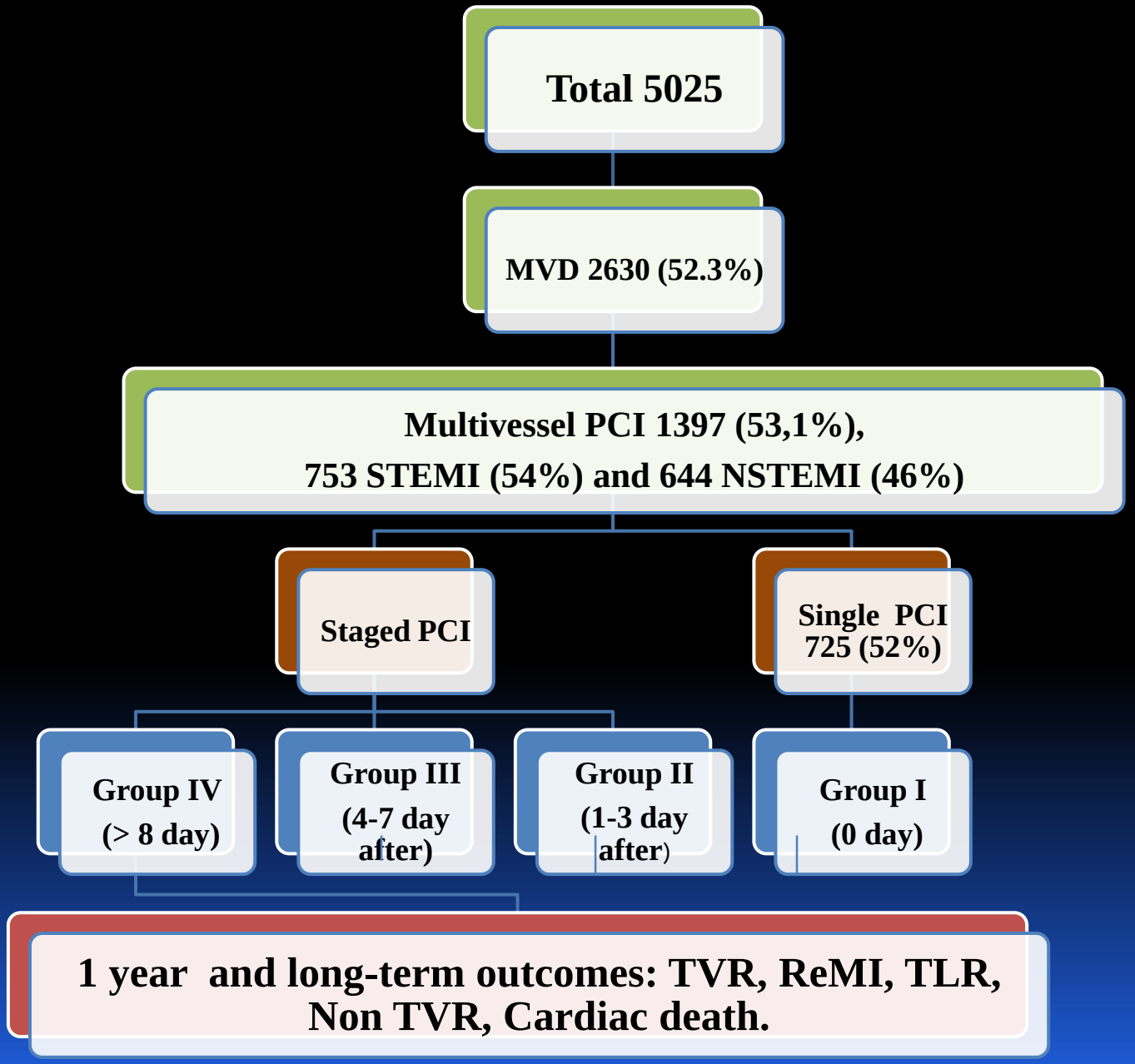


J Am Coll Cardiol Intv. 2010; 3(10):1096-1099.

The aim of study



Study design



Baseline clinical characteristics

	Group I (0 day) (n=725)	Group II (1-3 days) (n=105)	Group III (4-7 days) (n=442)	Group IV (>8 days) (n=125)	P value
Age, year	64±11.65	61±13.2	63.8± 11.3	65.9±10.6	0.012
Male, n (%)	500(69)	81(77)	314(71)	87(69.6)	0.374
Body mass index	23.93±3	24.20±3.1	24.37±3.27	24.36±2.98	0.096
Killip class III-IV	76(10.5)	15(14.3)	36(8.2)	23(18.4)	0.002
Medical history					
Hypertension	419(57.8)	54(51.4)	234(52.9)	66(52.8)	0.287
Diabetes	292(40.3)	36(34.3)	145(32.8)	37(29.6)	0.020
Smoking	403(55.6)	59(56.2)	272(61.5)	74(59.2)	0.241
Hyperlipidemia	200(27.6)	29(27.6)	142(32.1)	45(36.0)	0.074

Baseline clinical characteristics

	Group I (0 day) (n=725)	Group II (1-3 days) (n=105)	Group III (4-7 days) (n=442)	Group IV (>8 days) (n=125)	P valu e
STEMI	316(43.6)	67(63.8)	294(66.5)	76(60.8)	<0.001
NSTEMI	409(56.4)	38(36.2)	148(33.5)	49(49.2)	<0.001
Echo findings					
LVEF,%	53.6±12.3	51.2±12.6	54.7±11.5	50.4±11.4	0.001
Lab findings					
Peak Tn I (ng/ml)	60.2±57.7	47±11.86	60.7±63.2	112.4±93.5	0.019
Total cholesterol	180.5±42.3	185.9±53.5	185.3±40.2	183.1±45.7	0.250
Triglyceride, mg/dl	125.6±83.3	121.7±69	119.4±89.8	122.3±105	0.700
LDL, mg/dl	115±36.9	122.8±48.4	122.96±36	118.8±40.7	0.018

Medical treatment

	Group I (0 day) (n=725)	Group II (1-3 days) (n=105)	Group III (4-7 days) (n=442)	Group IV (>8 days) (n=125)	P value
Cilostazol	389(53.7)	61(58.1)	279(63.1)	75(60)	0.015
ß- blocker	527(72.1)	78(74.3)	373(84.4)	98(78.4)	0.003
ACEi	347(47.9)	49(46.7)	266(60.2)	58(46.4)	0.003
Statin	636(87.7)	89(84.8)	383(86.7)	106(84.8)	0.714
ARB	230(31.7)	31(29.5)	127(28.7)	44(35.2)	0.144

Angiographic findings

	Group I (0 day) (n=725)	Group II (1-3 days) (n=105)	Group III (4-7 days) (n=442)	Group IV (>8 days) (n=125)	P value
MVD, n(%)	289(39.9)	38(36.2)	194(43.9)	52(41.6)	0.401
Lesion type B2/C	136(18.5)	14(13.4)	105(23.7)	21(16.8)	<0.001
Initial TIMI 0 flow	151(20.8)	27(25.7)	61(13.8)	18(14.4)	<0.001
Bare metal stent	679(94.2)	100(95.2)	390(88.8)	106(84.8)	<0.001
Drug eluting stent	42(5.8)	5(4.8)	49(11.2)	19(15.2)	<0.001
Stent size, mm	31.5±17	28.54±16.4	28.81±14	24.26±12.7	0.221
Stent diameter, mm	3.17±0.38	3.5±0.57	3.1±0.31	3.16±0.37	0.150
Stent number, n	2.49±0.98	2.5±1.1	2.66±0.95	2.43±0.79	0.018
GP IIb/IIIa inhibitor use	78(10.8)	17(16.2)	154(34.8)	39(31.2)	<0.001

1 year clinical outcome

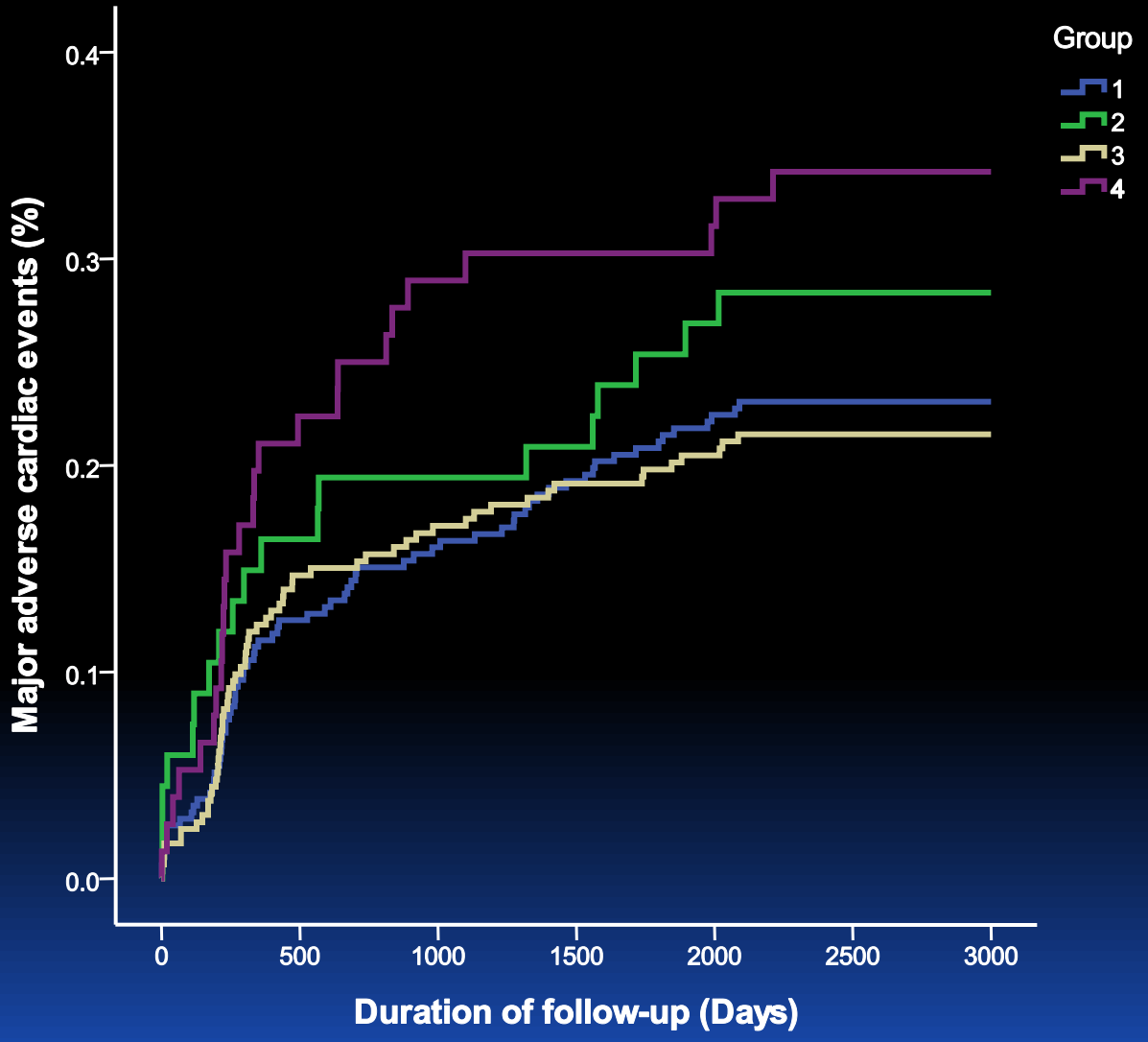
	Group I (0 day) (n=725)	Group II (1-3 days) (n=105)	Group III (4-7 days) (n=442)	Group IV (>8 days) (n=125)	P value
Composite of MACEs	176(24.3)	28(26.7)	90(20.4)	47(37.6)	0.001
Cardiac death	52(7.2)	11(10.5)	24(5.4)	16(12.8)	0.025
Myocardial infarction	20(2.8)	3(2.9)	12(2.7)	3(2.4)	0.099
TVR	29(4.0)	3(2.9)	17(3.8)	6(4.8)	0.899
Non-TVR	40(5.5)	7(6.7)	16(3.6)	10(8)	0.186
TLR	91(12.6)	12(11.4)	49(11.1)	19(15.2)	0.638
CABG	1(0.1)	0	1(0.2)	0	0.909

TVR, Target vessel revascularization; TLR, Target lesion revascularization

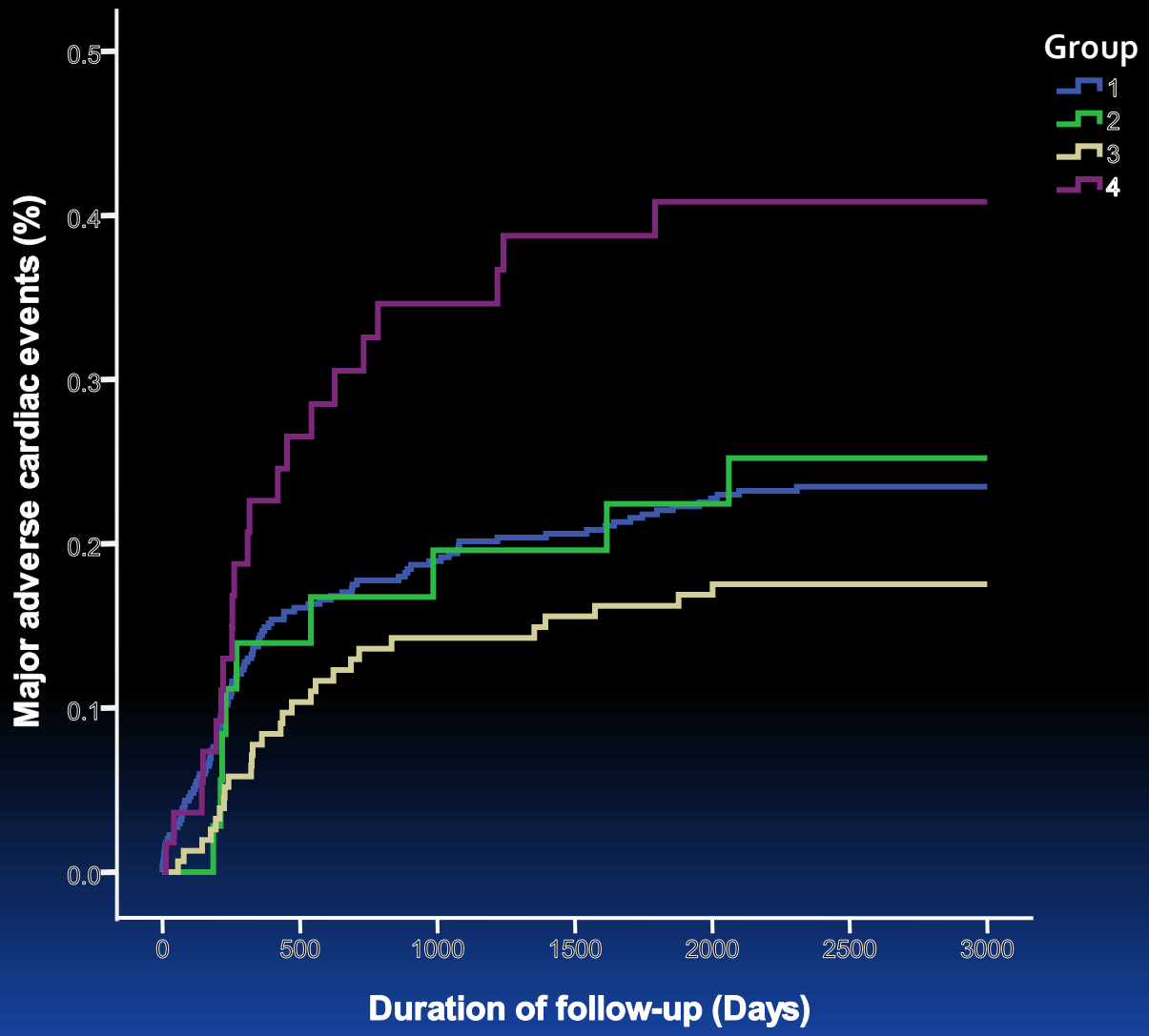
Multivariate logistic regression analysis for predicting 1Y MACE

Variable	Unadjusted Model		Adjusted Model	
	OR (95% CI)	p	OR (95% CI)	p
Group I	0.985 (0.772-1.258)	0.904		0.001
Group II	1.137 (0.731-1.785)	0.576	1.122 (0.692-1.821)	0.641
Group III	0.717 (0.546-0.942)	0.017	0.882 (0.752-0.944)	0.041
Group IV	2.004 (1.364-2.945)	<0.001	1.943 (1.268-2.978)	**0.002**
Killip class ≥ III	3.180 (1.874-5.393)	<0.001	2.733 (1.382-5.402)	**0.004**
LVEF ≤ 45%	1.471 (1.121-1.932)	0.005	1.370 (1.021-1.840)	**0.036**
No statin	1.572 (1.122-2.206)	0.009	1.452 (1.014-2.078)	**0.042**
Age ≥ 65 years	1.306 (1.021-1.670)	0.034	1.177 (0.880-1.576)	0.272
Diabetes mellitus	1.271 (0.989-1.632)	0.061	1.199 (0.917-1.567)	0.184
Left main disease	1.505 (0.970-2.334)	0.068	1.313 (0.750-1.950)	0.423

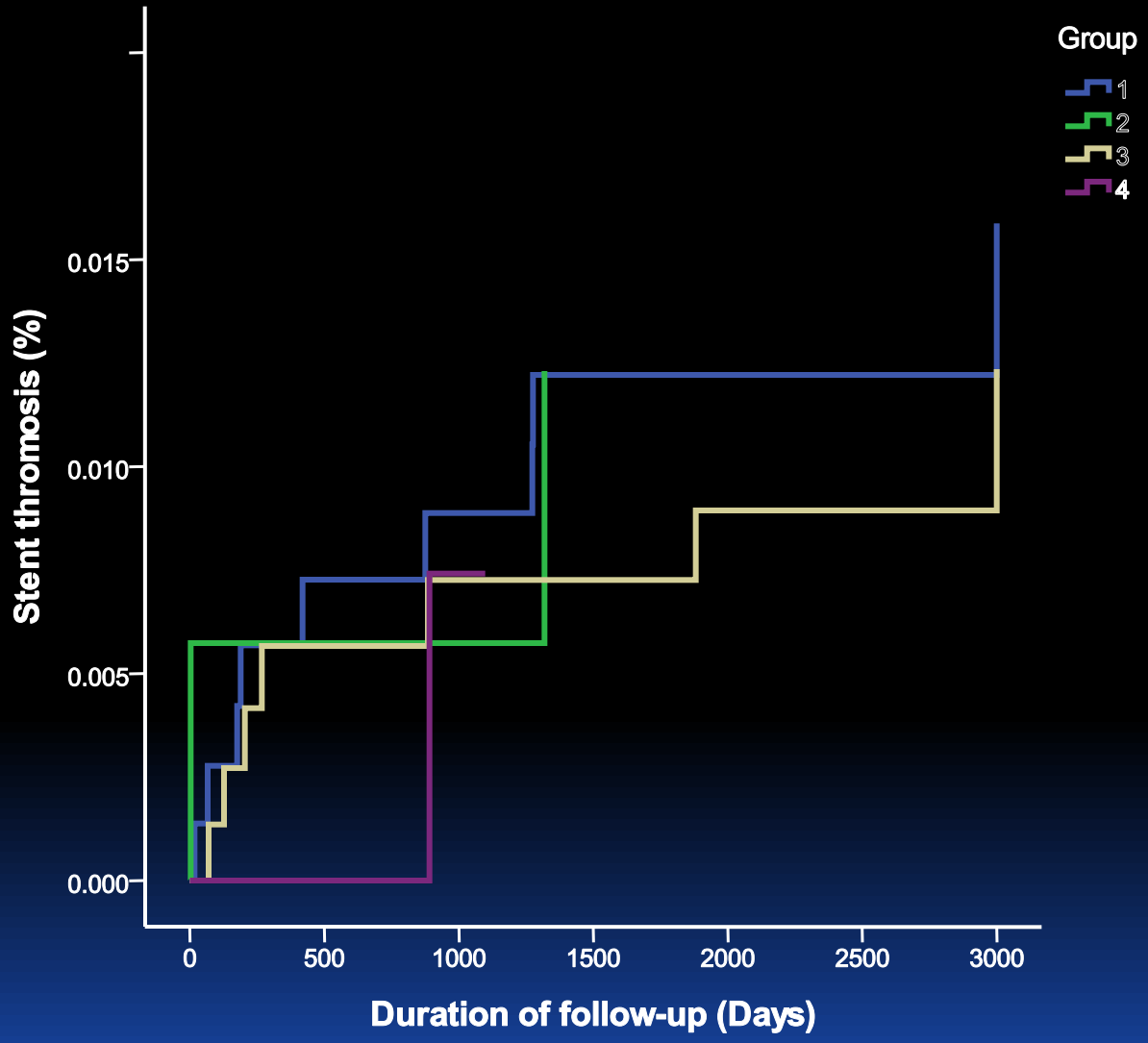
STEMI


Group
1
2
3
4
Major adverse cardiac events (%)
0.4
0.3
0.2
0.1
0.0
0
500
1000
1500
2000
2500
3000
Duration of follow-up (Days)

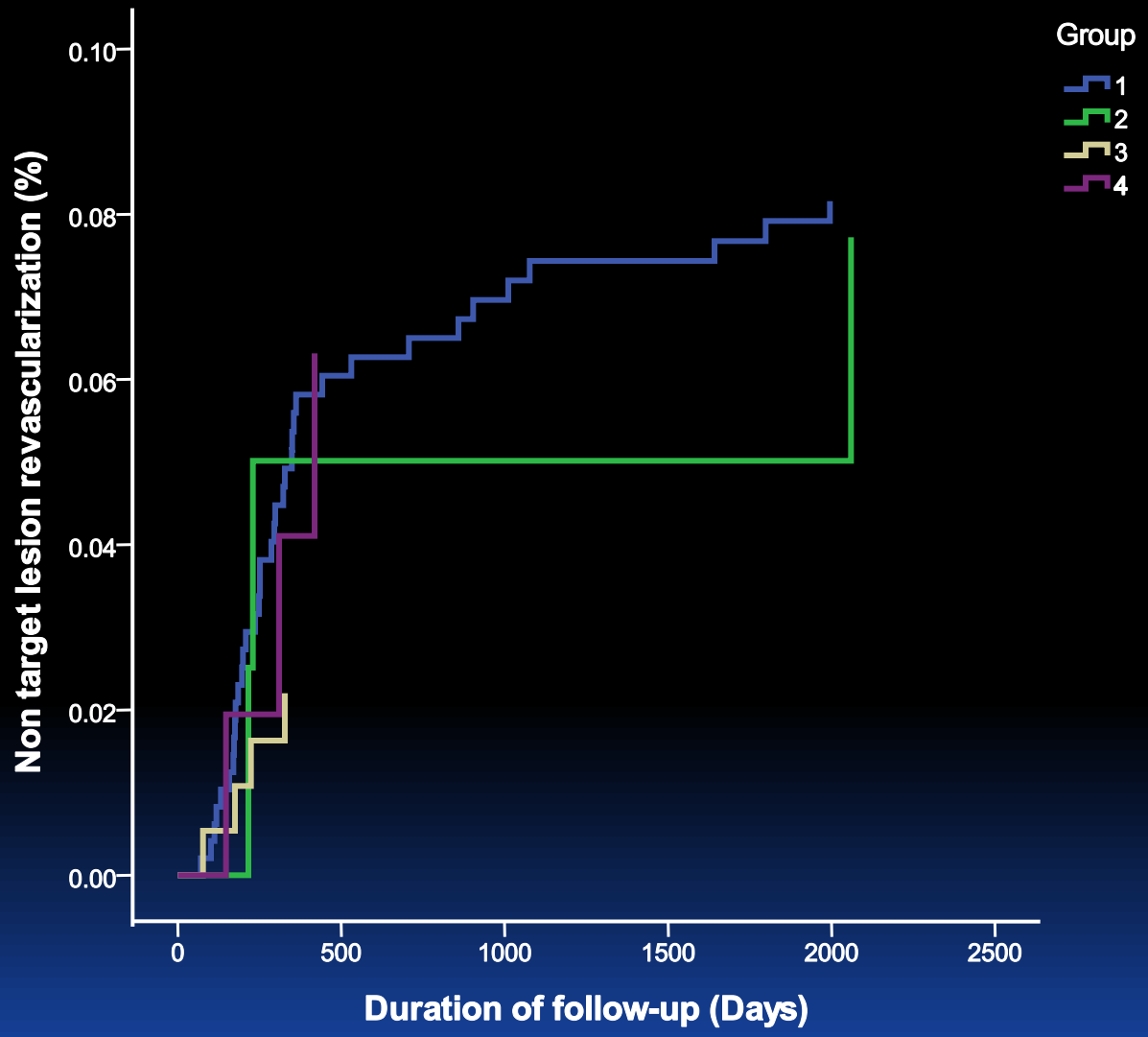
NSTEMI


Group
1
2
3
4
Major adverse cardiac events (%)
0.5
0.4
0.3
0.2
0.1
0.0
0
500
1000
1500
2000
2500
3000
Duration of follow-up (Days)

STEMI


Group
1
2
3
4
Stent thromosis (%)
0.015
0.010
0.005
0.000
0
500
1000
1500
2000
2500
3000
Duration of follow-up (Days)

NSTEMI


Group
1
2
3
4
Non target lesion revascularization (%)
0.10
0.08
0.06
0.04
0.02
0.00
0
500
1000
1500
2000
2500
Duration of follow-up (Days)

Conclusion

- Multivessel PCI at index admission did not associated with highest rate of MACE at 1 year follow up, but associated with high incidence *of stent thrombosis* in STEMI patients and *non target lesion revascularization* in NSTEMI patient in the long term follow up period.
- Performing of second stage PCI of nonculprit vessel in time frame of 4-7 days (Group III) was associated with lowest rate of MACE in STEMI and NSTEMI patients, respectively.
- PCI of nonculprit vessel at time frame of 4 to 7 days may be the optimal time after primary PCI.