Current Guideline for Primary PCI

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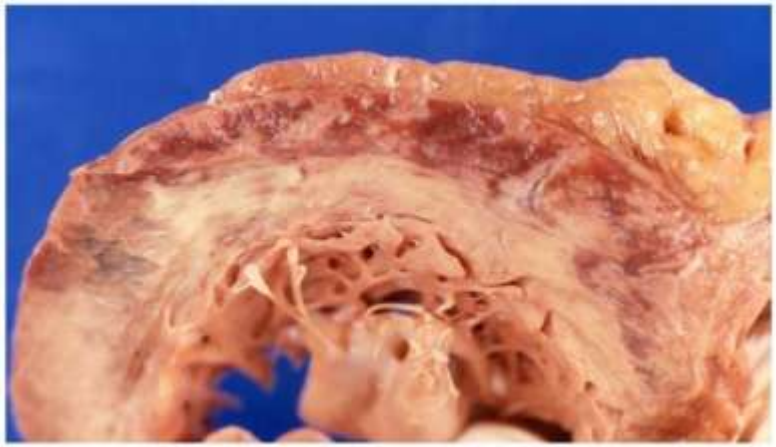
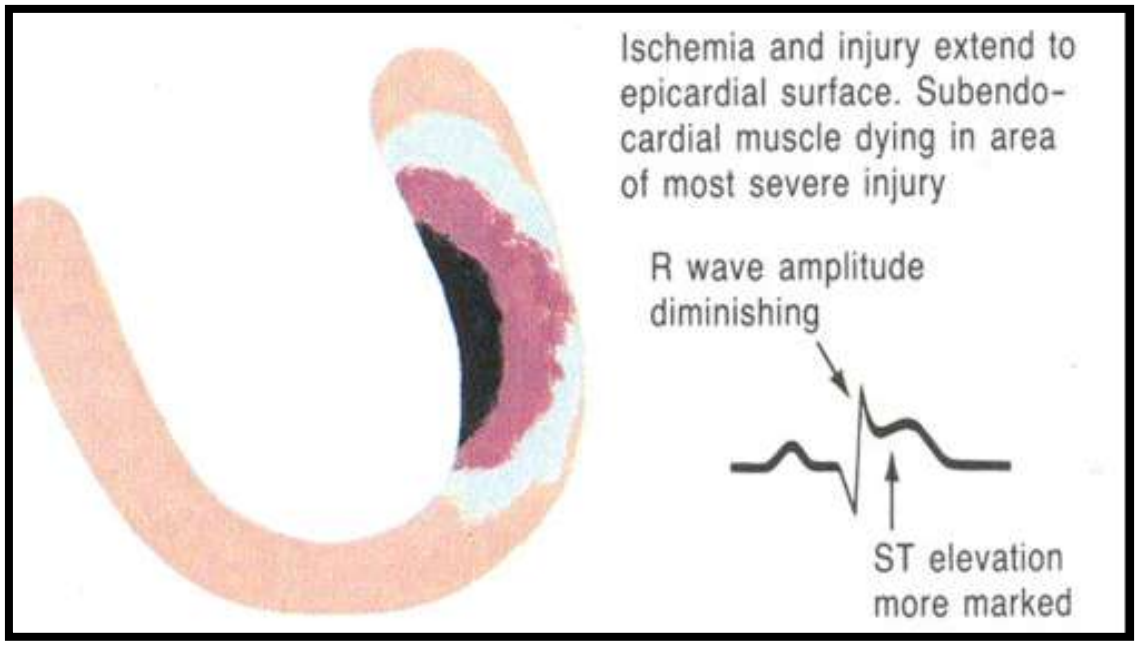
2014. 04. 25

Transmural Infarct



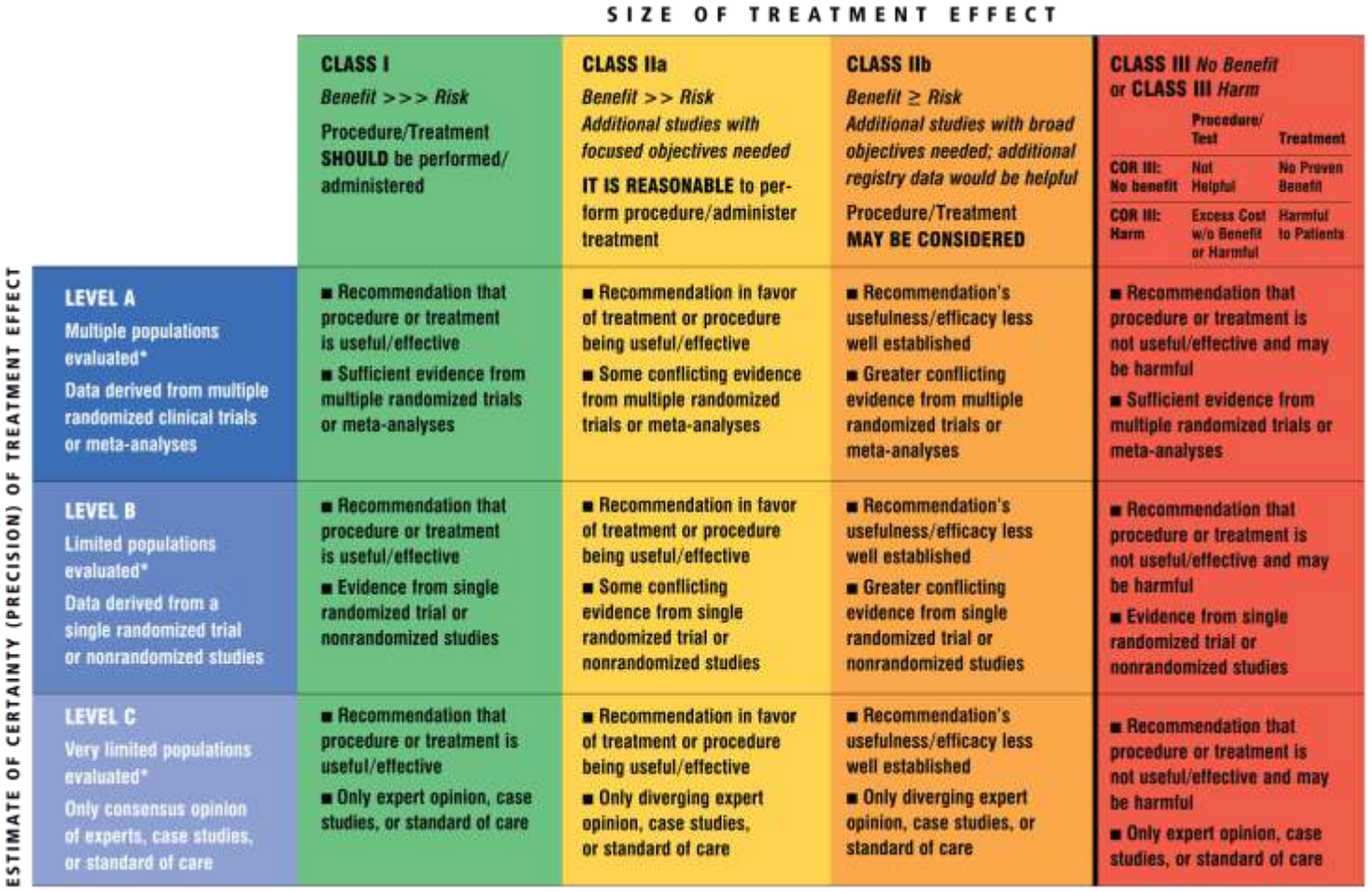


2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction

Developed in Collaboration with American College of Emergency Physicians and Society for Cardiovascular Angiography and Interventions

American Heart Association

Classification of Recommendations and Levels of Evidence

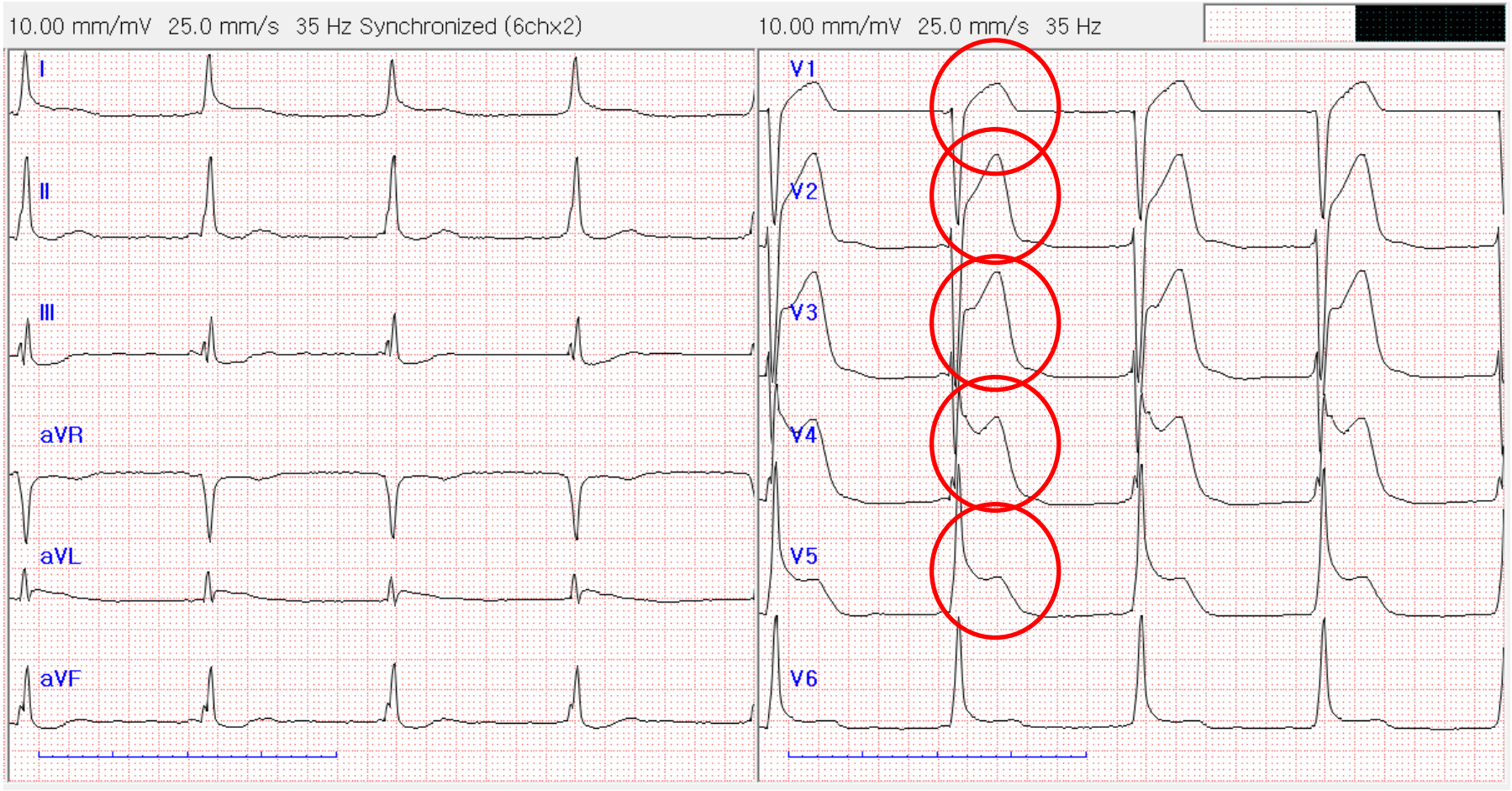


American Heart Association

Case #1

- ✓ F/72
- ✓ C.C : Squeezing chest pain, 40 minutes ago
- ✓ Occasionally chest discomfort (1-2 min)
  1day ago : effort chest pain 5min
  40min ago : squeezing chest pain → ER
- ✓ DM/HTN/Dyslipidemia(-/+ 5ya/-)
- ✓ Nonsmoker

EKG


10.00 mm/mV 25.0 mm/s 35 Hz Synchronized (6chx2)
10.00 mm/mV 25.0 mm/s 35 Hz
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

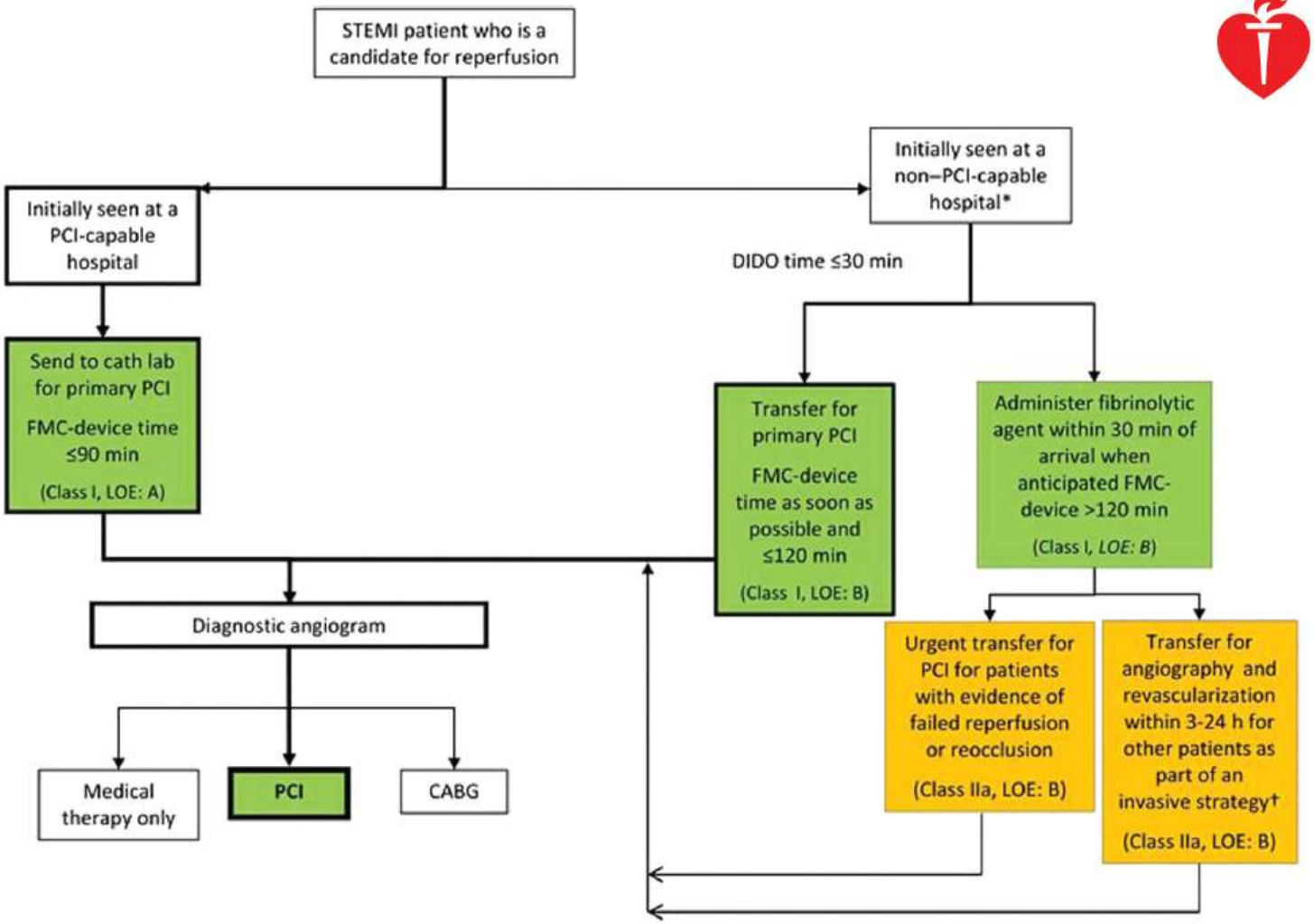
Regional Systems of STEMI Care, Reperfusion Therapy, and Time-to-Treatment Goals

Reperfusion therapy should be administered to all eligible patients with STEMI with symptom onset within the prior 12 hours.

Reperfusion therapy is reasonable for patients with STEMI and symptom onset within the prior 12 to 24 hours who have clinical and/or ECG evidence of ongoing ischemia. Primary PCI is the preferred strategy in this population.

American Heart Association.

Reperfusion Therapy for Patients with STEMI



*Patients with cardiogenic shock or severe heart failure initially seen at a non–PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset (*Class I, LOE: B*). †Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.

Case#1 : STEMI on V1-5

- ✓ BP 85/60mmHg, HR 90

→Start Dopamine 10ug/kg/mins, IV

Hemodynamically Unstable !!

Reperfusion at a PCI-Capable Hospital

Primary PCI in STEMI

Primary PCI in STEMI

	COR	LOE
Ischemic symptoms <12 h	I	A
Ischemic symptoms <12 h and contraindications to fibrinolytic therapy irrespective of time delay from FMC	I	B
Cardiogenic shock or acute severe HF irrespective of time delay from MI onset	I	B
Evidence of ongoing ischemia 12 to 24 h after symptom onset	IIa	B
PCI of a noninfarct artery at the time of primary PCI in patients without hemodynamic compromise	III: Harm	B

American Heart Association

Medication at ER

- ✓ Aspirin 200mg
- ✓ Prasugrel 60mg
- ✓ Dopamine 10ug/kg/mins

Reperfusion at a PCI-Capable Hospital

Antiplatelet Therapy to Support Primary PCI for STEMI

American Heart Association.

Antiplatelet Therapy to Support Primary PCI for STEMI

Aspirin 162 to 325 mg should be given before primary PCI.

A loading dose of a $P2Y_{12}$ receptor inhibitor should be given as early as possible or at time of primary PCI to patients with STEMI. Options include:

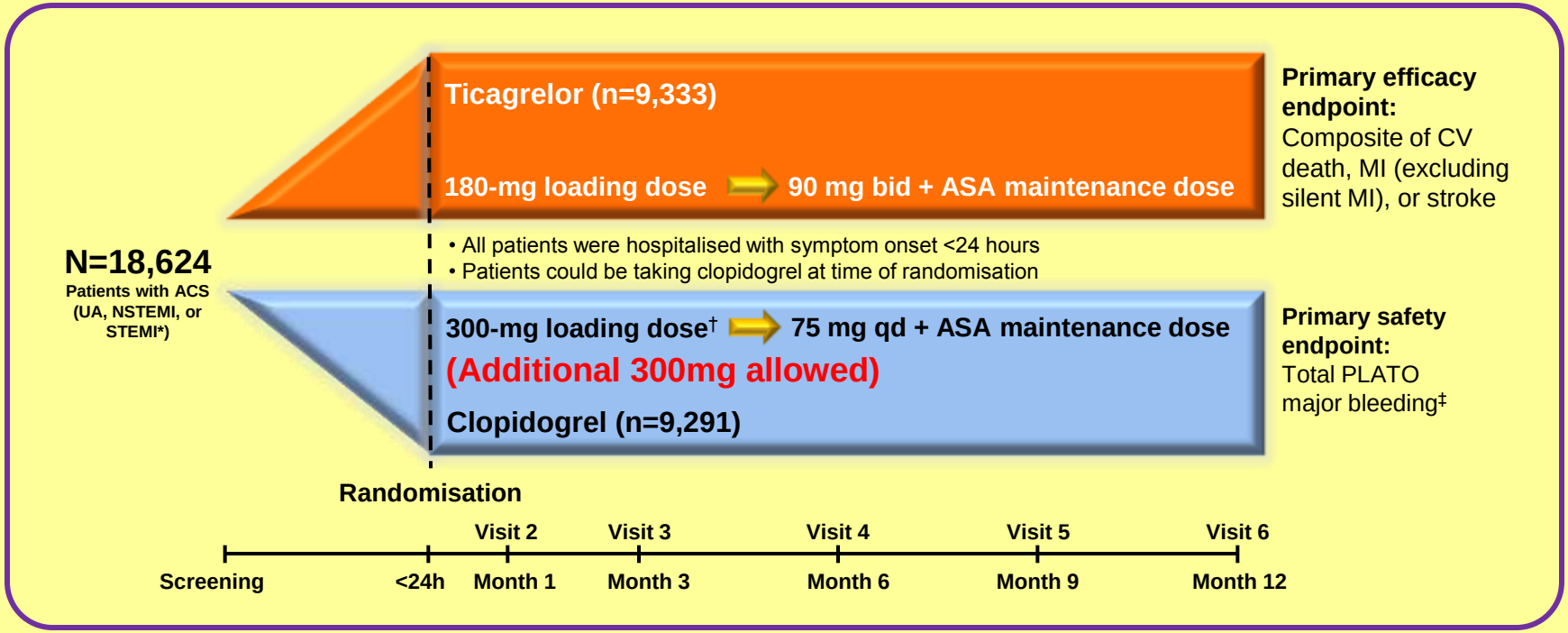
- Clopidogrel 600 mg; or
- Prasugrel 60 mg; or
- Ticagrelor 180 mg

American Heart Association.


60 tablets
BRILINTA
90 mg
ticagrelor


Effient 10 mg
film-coated tablets
prasugrel
Oral use
Lilly
Effient 10 mg
28 film-coated tablets
Effient 5 mg
film-coated tablets
prasugrel
Oral use
Lilly

PLATO: Study Design



Initial Treatment approaches

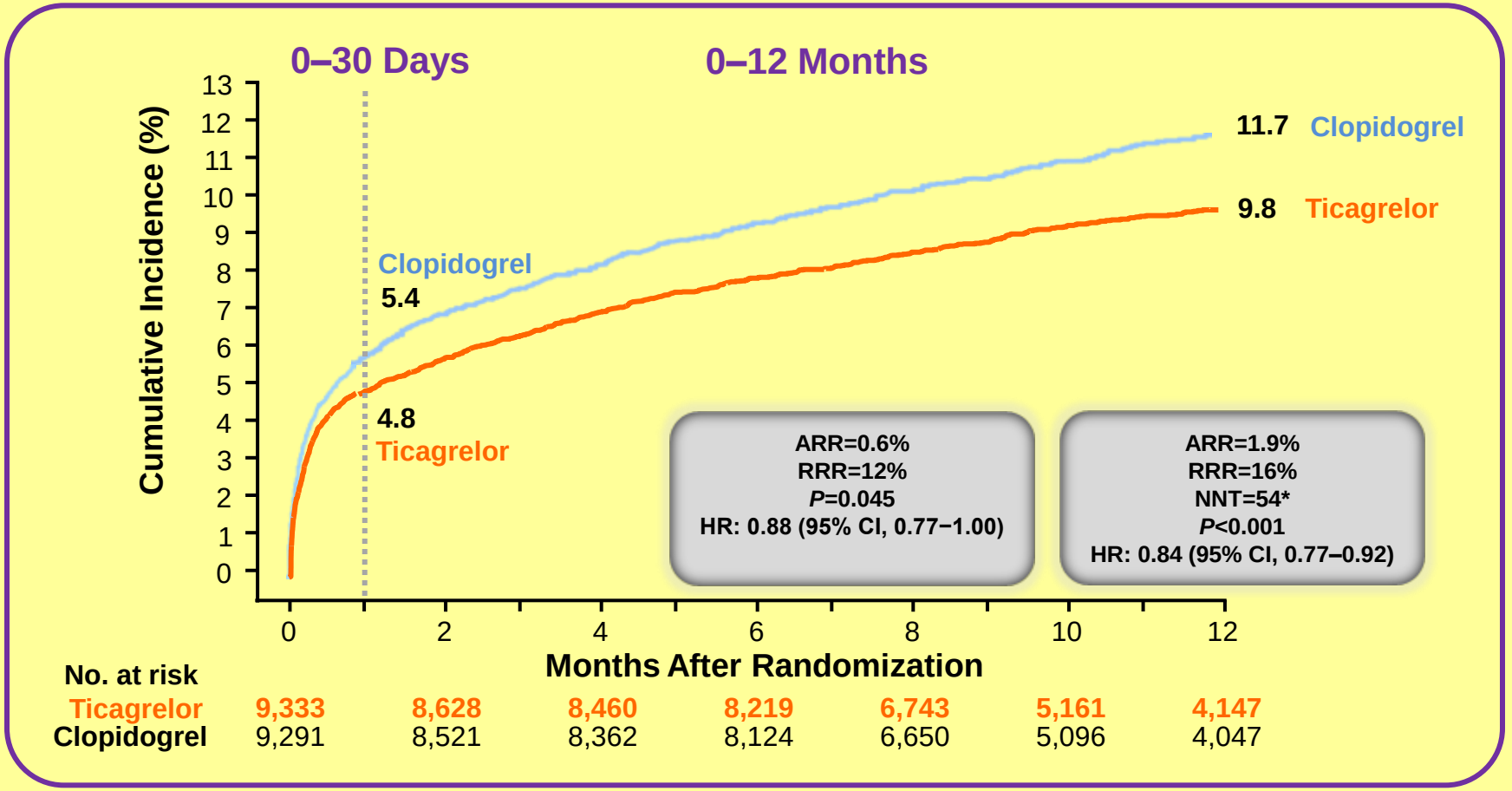
- **Medically managed (n=5,216 — 28.0%)**
- **Invasively managed (n=13,408 — 72.0%)**

*STEMI patients scheduled for primary PCI were randomised; however, they may not have received PCI.
†A loading dose of 300-mg clopidogrel was permitted in patients not previously treated with clopidogrel, with an additional 300 mg allowed at the discretion of the investigator.
‡The PLATO study expanded the definition of major bleeding to be more inclusive compared with previous studies in ACS patients. The primary safety endpoint was the first occurrence of any major bleeding event.

Wallentin L, et al. *N Engl J Med*. 2009;361:1045–1057.
James S, et al. *Am Heart J*. 2009;157:599–605.

Ticagrelor reduced the combined risk of CV death, MI, or stroke by 16% vs. Clopidogrel

- **Primary Efficacy Endpoint : Composite of CV Death, MI, or Stroke**



Wallentin L, et al. *N Engl J Med*. 2009;361:1045–1057.

TRITON-TIMI 38

ACS (STEMI or UA/NSTEMI) and Planned PCI (n=13,608)

Aspirin

Double-blind

Prasugrel
60 mg LD, 10 mg/day

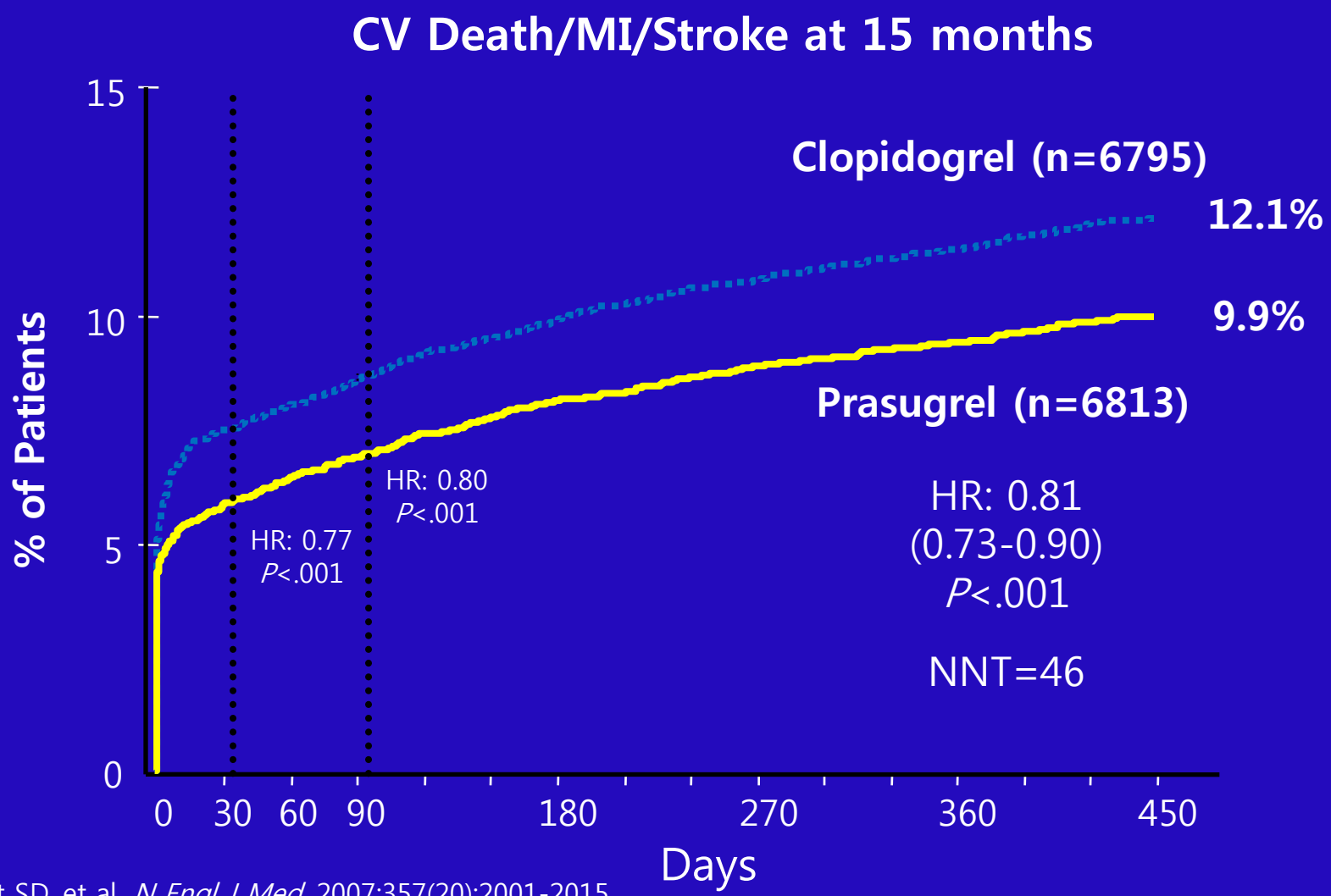
Clopidogrel
300 mg LD, 75 mg/day

Median duration of therapy 12 months

1° end point:	CV death, MI, stroke
2° end points:	CV death, MI, stroke, rehospitalization
	CV death, MI, UTVR
	Stent Thrombosis

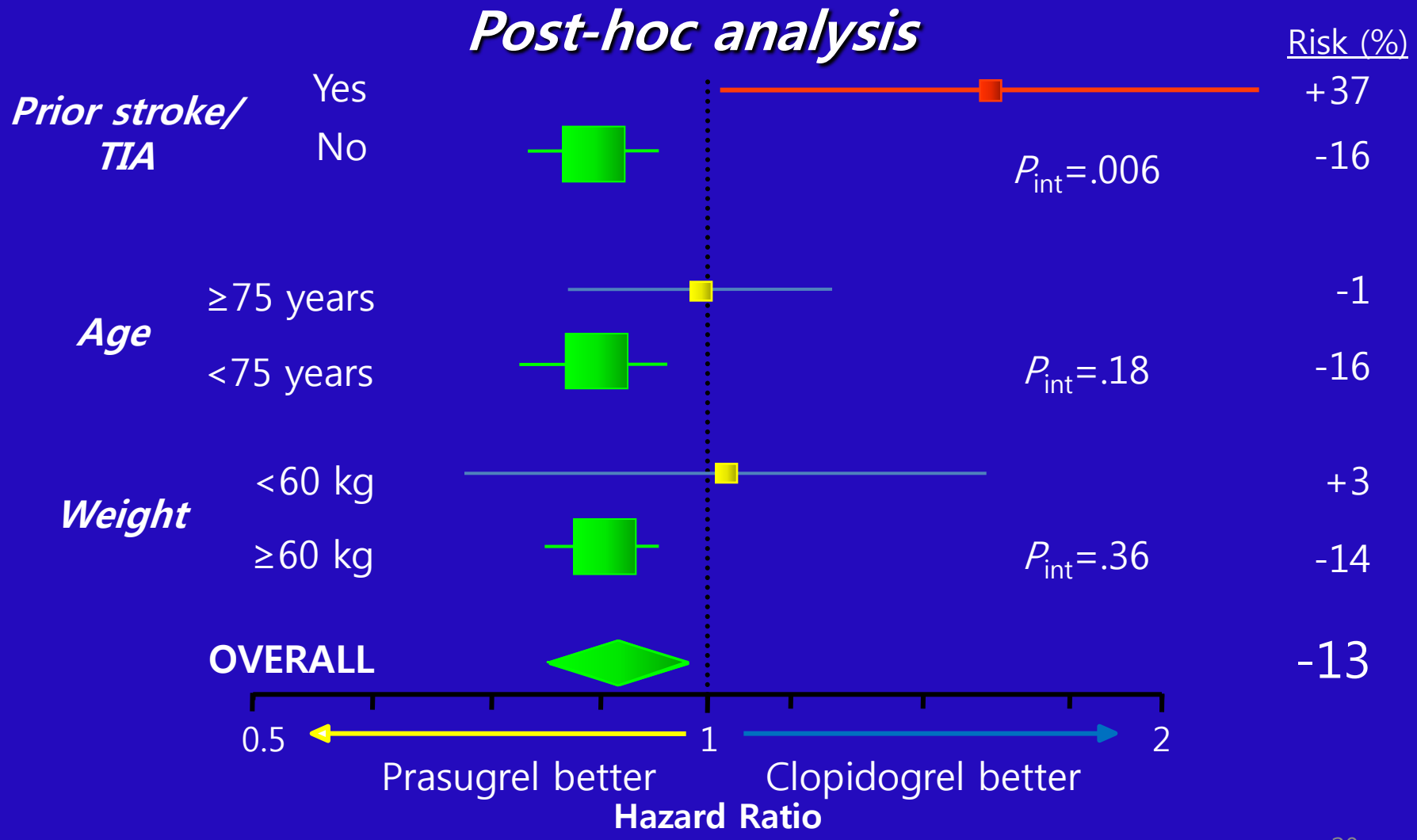
Wiviott, SD, et al. *N Engl J Med* 2007;357:2001-15.

TRITON-TIMI 38: Primary Endpoint



Wiviott SD, et al. *N Engl J Med.* 2007;357(20):2001-2015.

TRITON-TIMI 38: Net Clinical Benefit in Subgroups at Risk for Bleeding



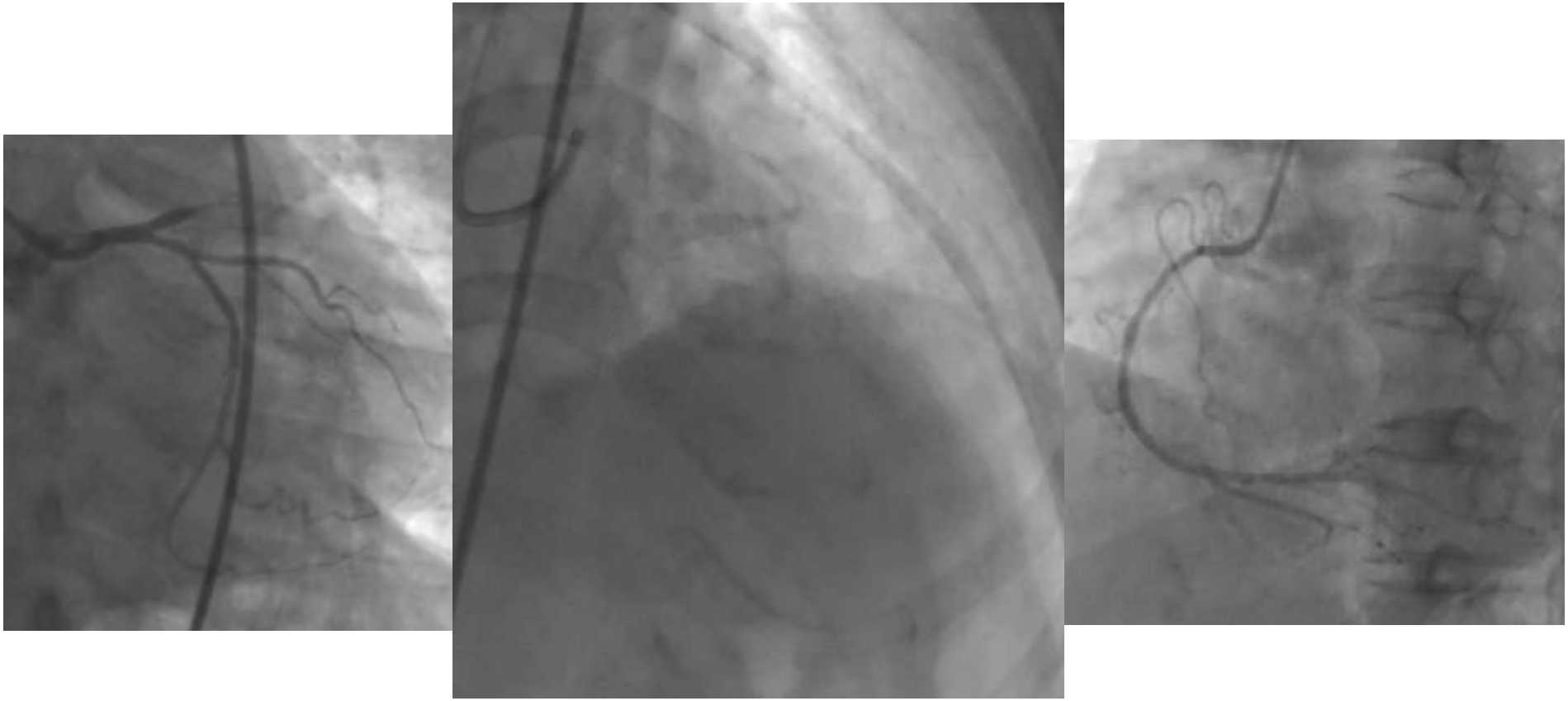
Wiviott SD, et al. *N Engl J Med.* 2007;357(20):2001-2015.

Antiplatelet Therapy to Support Primary PCI for STEMI

Harm

Prasugrel should not be administered to patients with a history of prior stroke or transient ischemic attack.

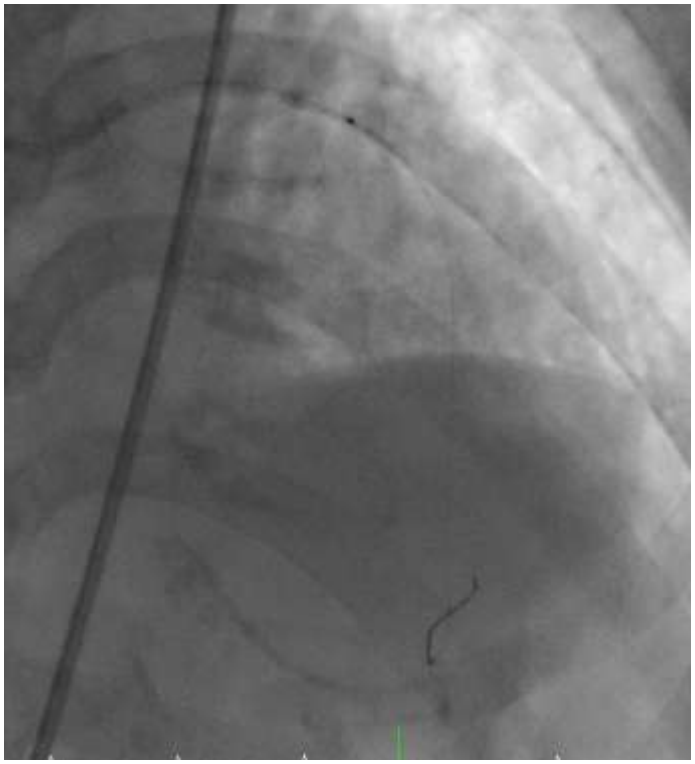
Case#1-CAG



LCX **LAD** **RCA**

total occlusion

Case#1-LAD



Thrombus aspiration

- VT

Cardioversion 100J

- Sinus rhythm

B 박사	LAD aspiration was done CR; white thrombi, small amount	NTG 200mcg IC
B 박사	VT wave seen. DC shock 100J 시행함	DOP @4 20mcg/kg/min 증량함
	EKG NSR 돌아옴. HR; 50bpm대, SBP 70mmHg선 checked	SIGM 2mg IC

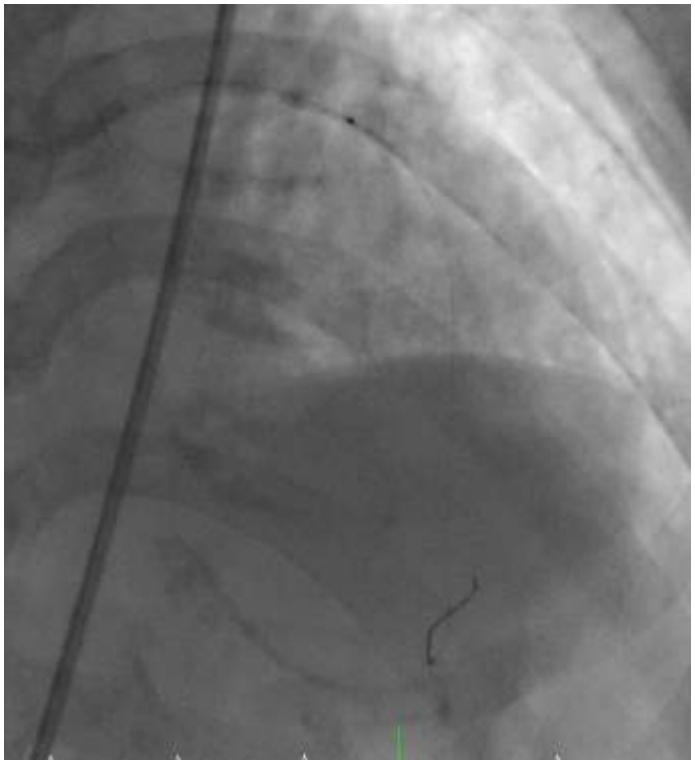
Reperfusion at a PCI-Capable Hospital

Aspiration Thrombectomy

Manual aspiration thrombectomy is reasonable for patients undergoing primary PCI.

American Heart Association.

LAD



- ✓Thrombus aspiration
  - VT

  Cardioversion 100J
  - Sinus rhythm

B 4/5 Am	LAD aspiration was done (R; white thrombi, small amount)
B 4/1 Am	VT wave seen. DC shock 100J 시행함
	EKG NSR 돌아옴. HR; 50bpm대, SBP 70mmHg선 checked

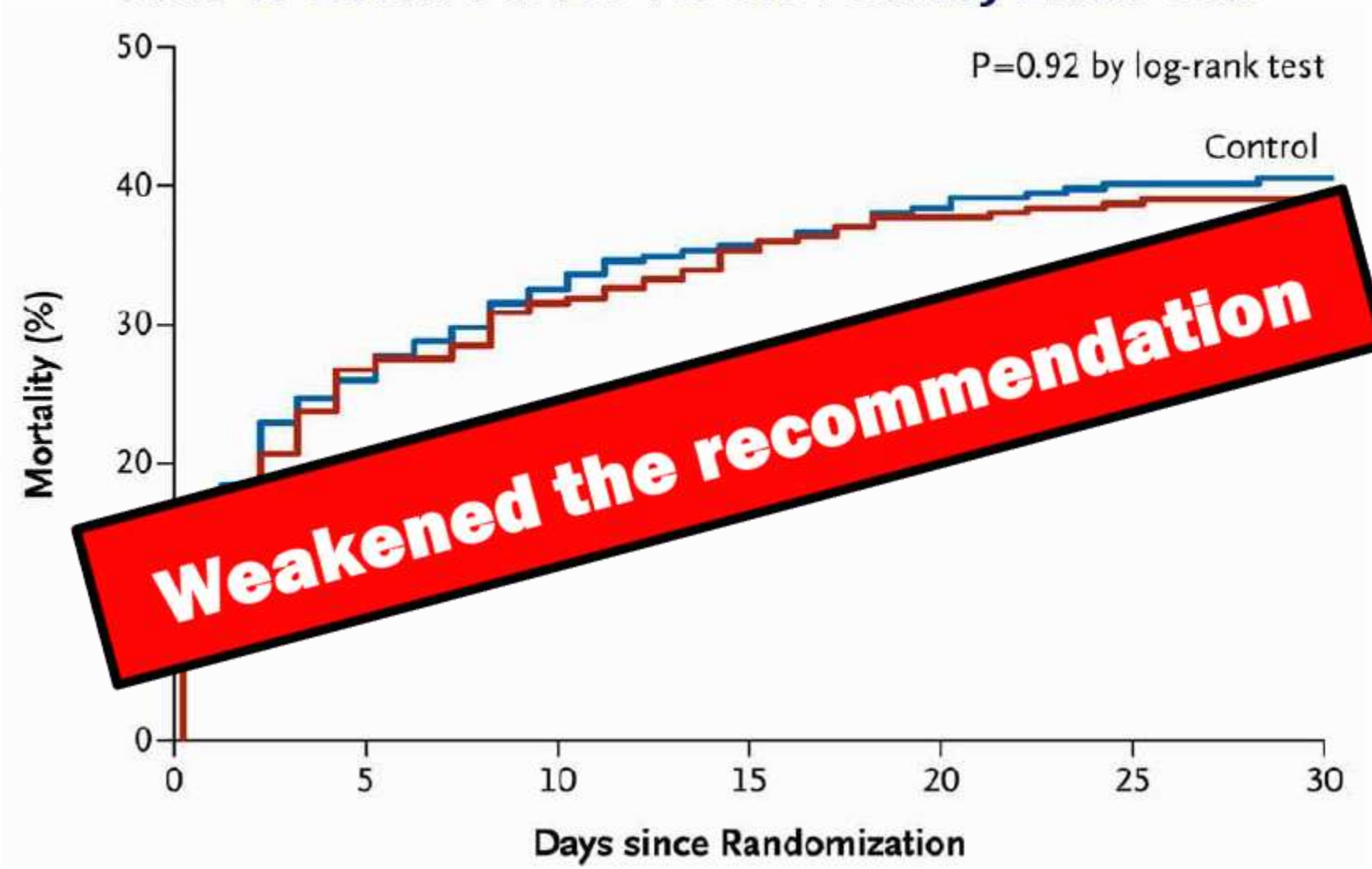
Treatment of Cardiogenic Shock

The use of intra-aortic balloon pump counterpulsation can be useful for patients with cardiogenic shock after STEMI who do not quickly stabilize with pharmacological.

Alternative LV assist devices for circulatory support may be considered in patients with refractory cardiogenic shock.

American Heart Association.

IABP-SHOCK II Trial
Time-to-Event Curves for the Primary End Point



N Engl J Med 2012; 367:1287–1296

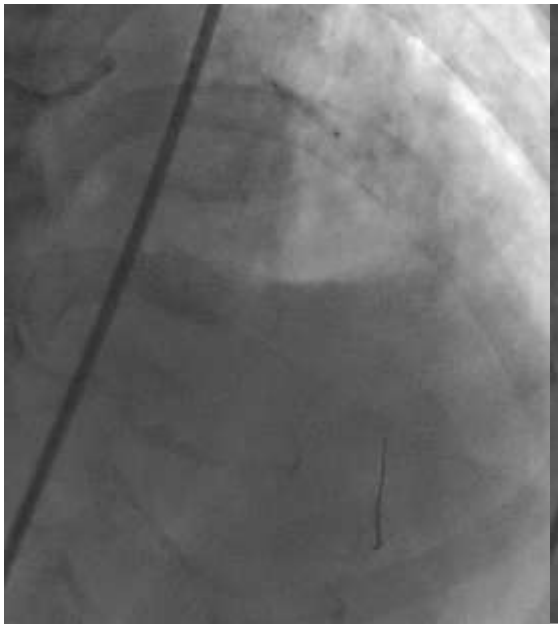
LV assist devices

Compared with IABP, LV assist devices may provide superior hemodynamic support and serve as more effective bridges to recovery or transplantation, though experience with their use in this setting is limited.[463,464] Medical support with inotropes and vasopressor agents should be individualized and guided by invasive hemodynamic monitoring. Use of dopamine in this setting may be associated with excess hazard.[465]

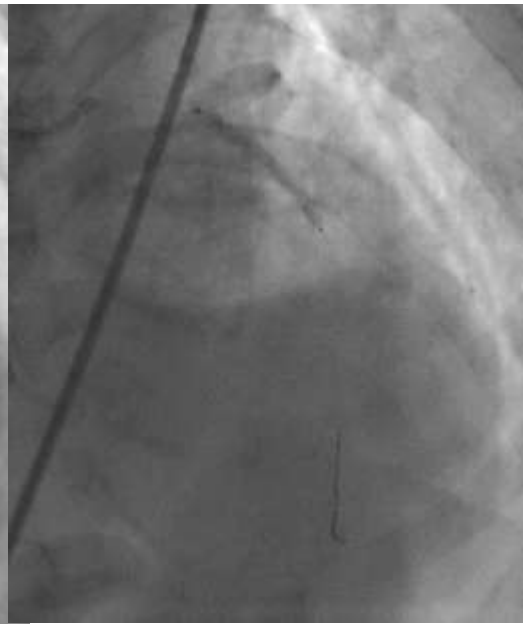
J Am Coll Cardiol. 2011;57:688–96
Eur Heart J. 2007;28:2057–63.

American Heart Association.

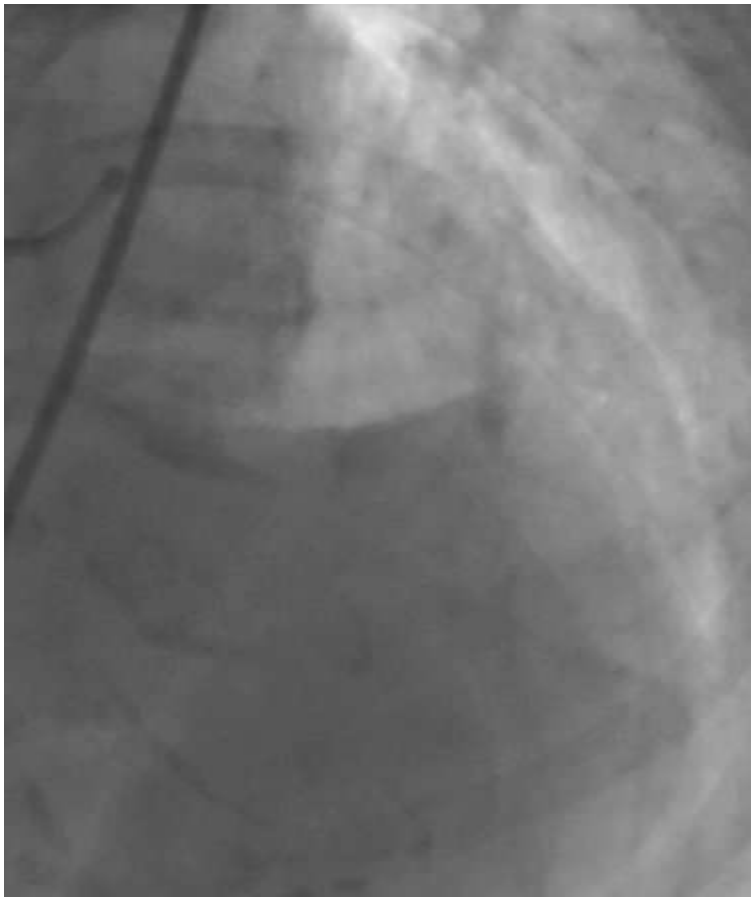
Case#2-LAD



Splinter 2.5*15



Resolute I 2.75*30



Post PCI medication

- ✓ Aspirin 100mg qd
- ✓ Prasugrel 10mg qd
- ✓ Atrovastatin 20mg qd
- ✓ Caverdilol 3.125mg qd
- ✓ Furosemide 20mg qd

Antiplatelet Therapy to Support Primary PCI for STEMI

After PCI, aspirin should be continued indefinitely.

American Heart Association.

Antiplatelet Therapy to Support Primary PCI for STEMI

$P2Y_{12}$ inhibitor therapy should be given for 1 year to patients with STEMI who receive a stent (BMS or DES) during primary PCI using the following maintenance doses:

- Clopidogrel 75 mg daily; or
- Prasugrel 10 mg daily; or
- Ticagrelor 90 mg twice a day*

*The recommended maintenance dose of aspirin to be used with ticagrelor is 81 mg daily.

American Heart Association.

Adjunctive Antithrombotic Therapy to Support Reperfusion With Primary PCI (cont.)

	COR	LOE
$P2Y_{12}$ inhibitors		
Maintenance doses and duration of therapy		
DES placed: Continue therapy for 1 y with:		
• Clopidogrel: 75 mg daily	I	B
• Prasugrel: 10 mg daily	I	B
• Ticagrelor: 90 mg twice a day*	I	B
BMS† placed: Continue therapy for 1 y with:		
• Clopidogrel: 75 mg daily	I	B
• Prasugrel: 10 mg daily	I	B
• Ticagrelor: 90 mg twice a day*	I	B
DES placed:		
• Clopidogrel, prasugrel, or ticagrelor* continued beyond 1 y	IIb	C
• Patients with STEMI with prior stroke or TIA: prasugrel	III: Harm	B

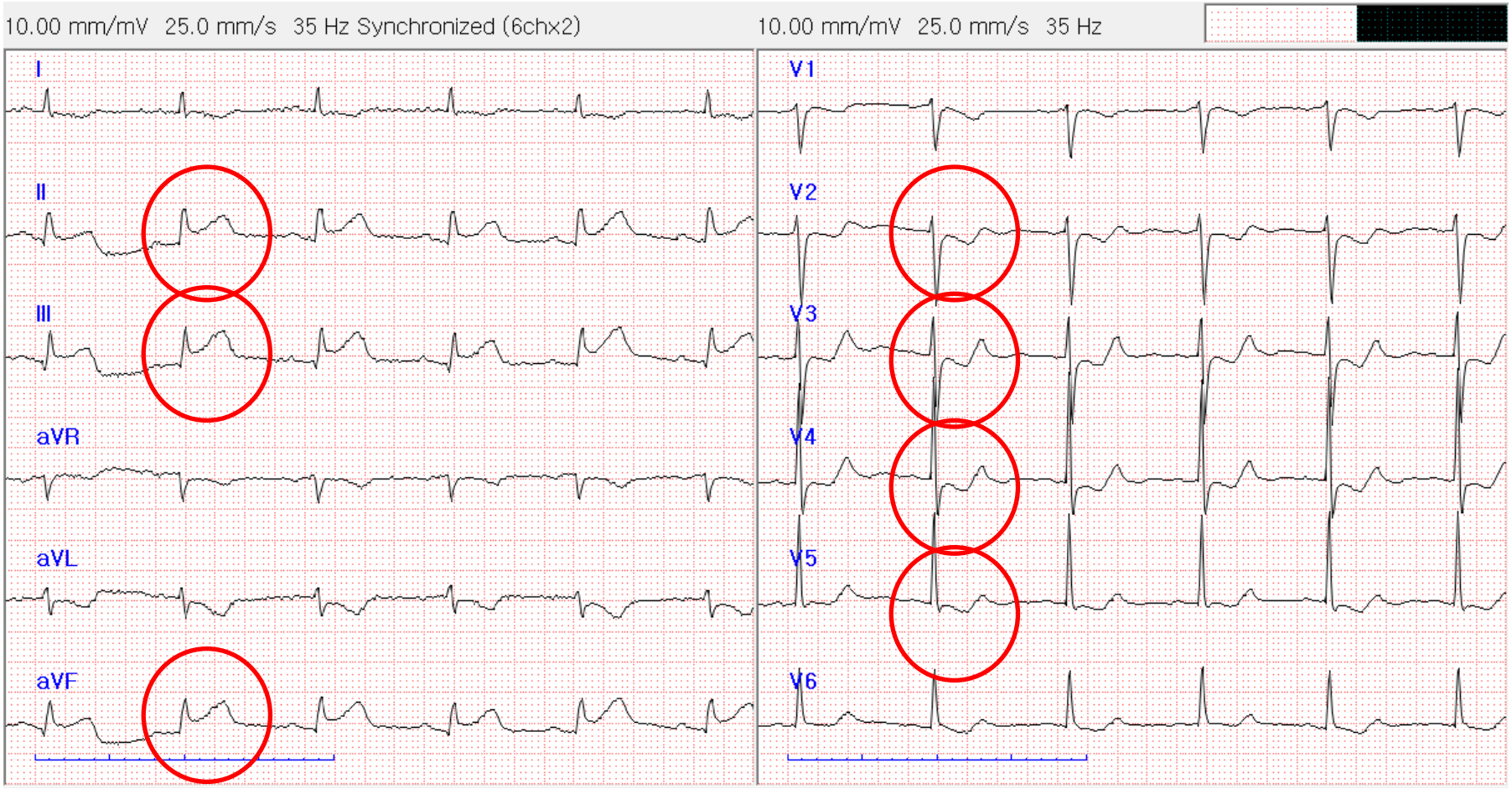
*The recommended maintenance dose of aspirin to be used with ticagrelor is 81 mg daily.
†Balloon angioplasty without stent placement may be used in selected patients. It might be reasonable to provide $P2Y_{12}$ inhibitor therapy to patients with STEMI undergoing balloon angioplasty alone according to the recommendations listed for BMS. (*LOE: C*).

American Heart Association.

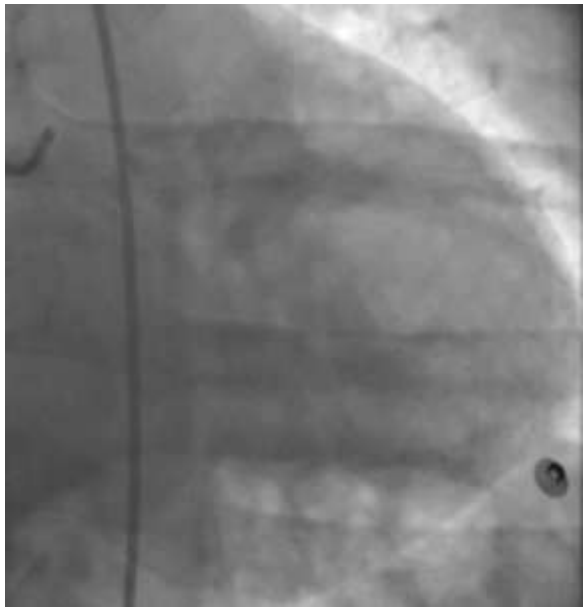
Case #2

- ✓ M/61
- ✓ CC : Chest pain, 3 hours ago
- ✓ 자던 중 새벽 3시경 C.C 발생, 이후 증상 지속 되어 ER내원
- ✓ DM/HTN/Dyslipidemia(-/+ 5ya/-)
- ✓ Ex-smoker : 5YA

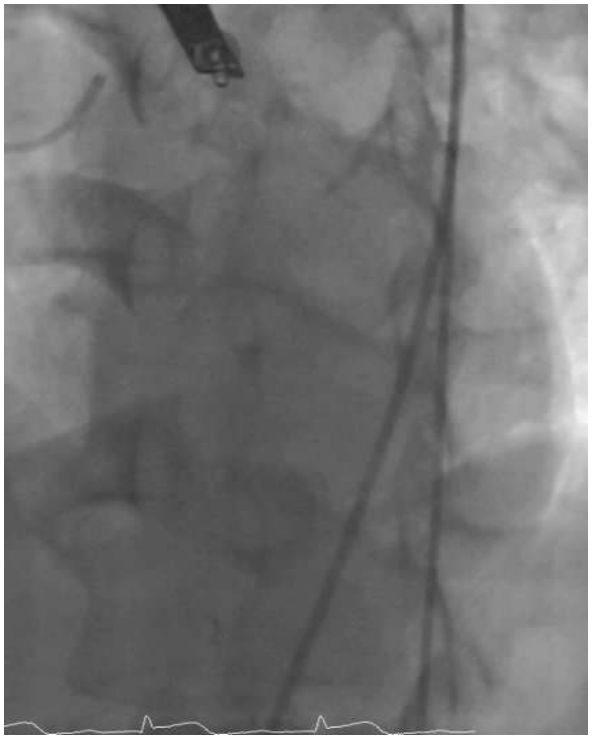
Case#2-EKG


10.00 mm/mV 25.0 mm/s 35 Hz Synchronized (6chx2)
10.00 mm/mV 25.0 mm/s 35 Hz
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

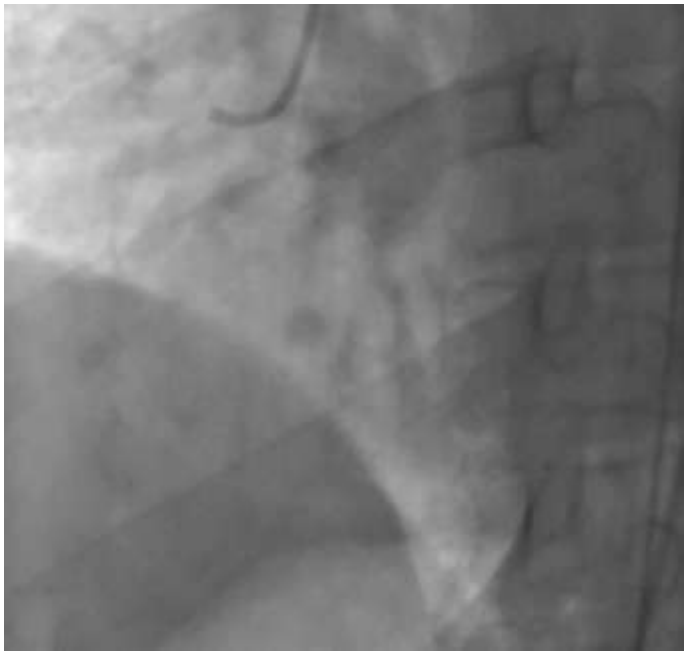
Case#2-CAG



LCX

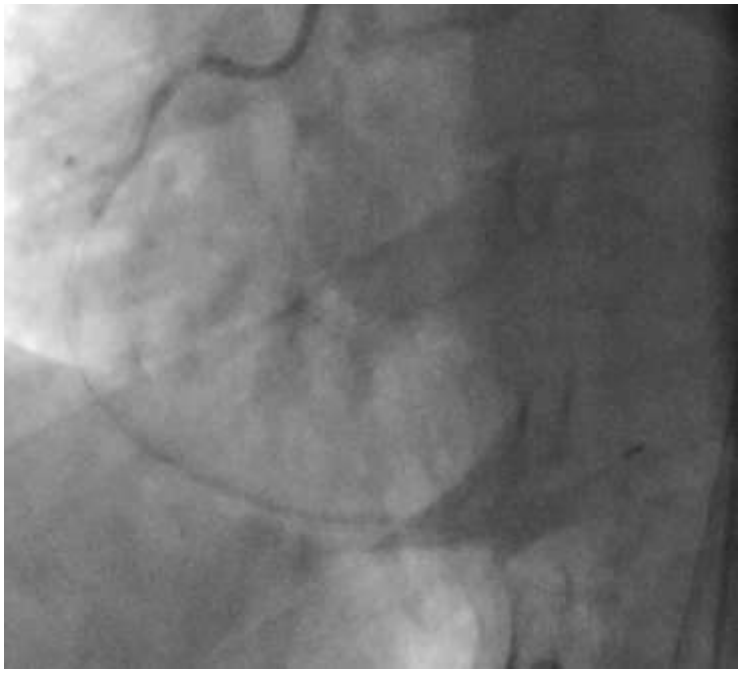


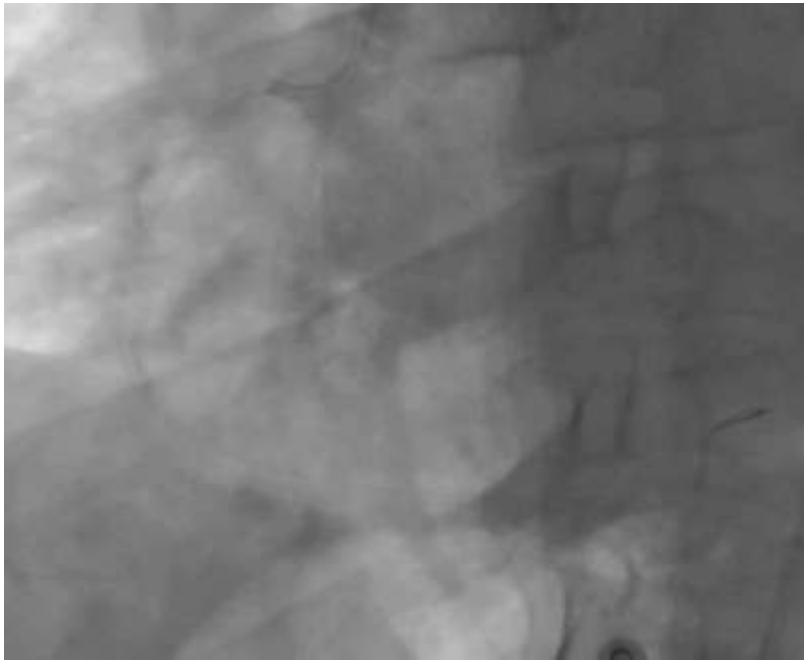
LAD



RCA

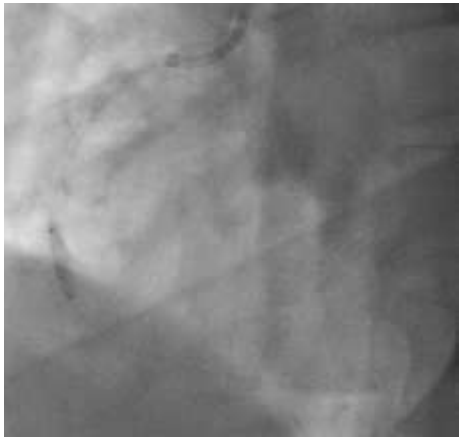
Case#2-RCA

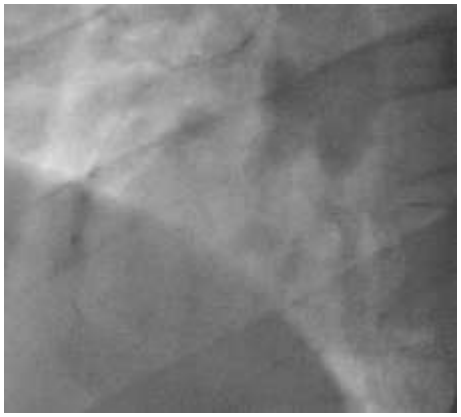




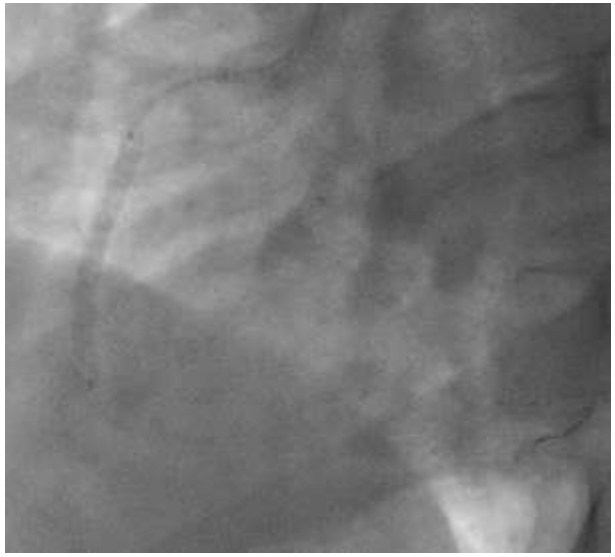
Thrombus aspiration - white thrombi, moderate

Case#2-RCA

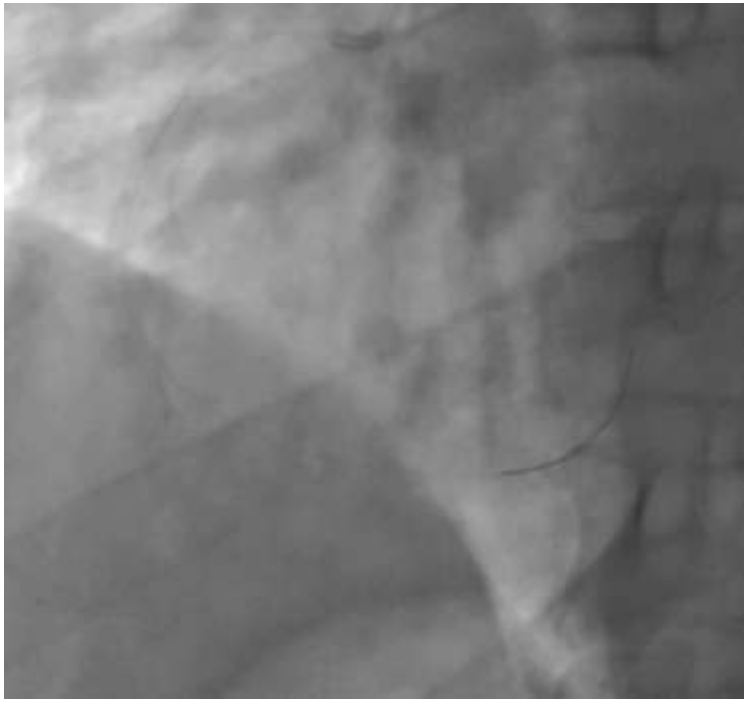




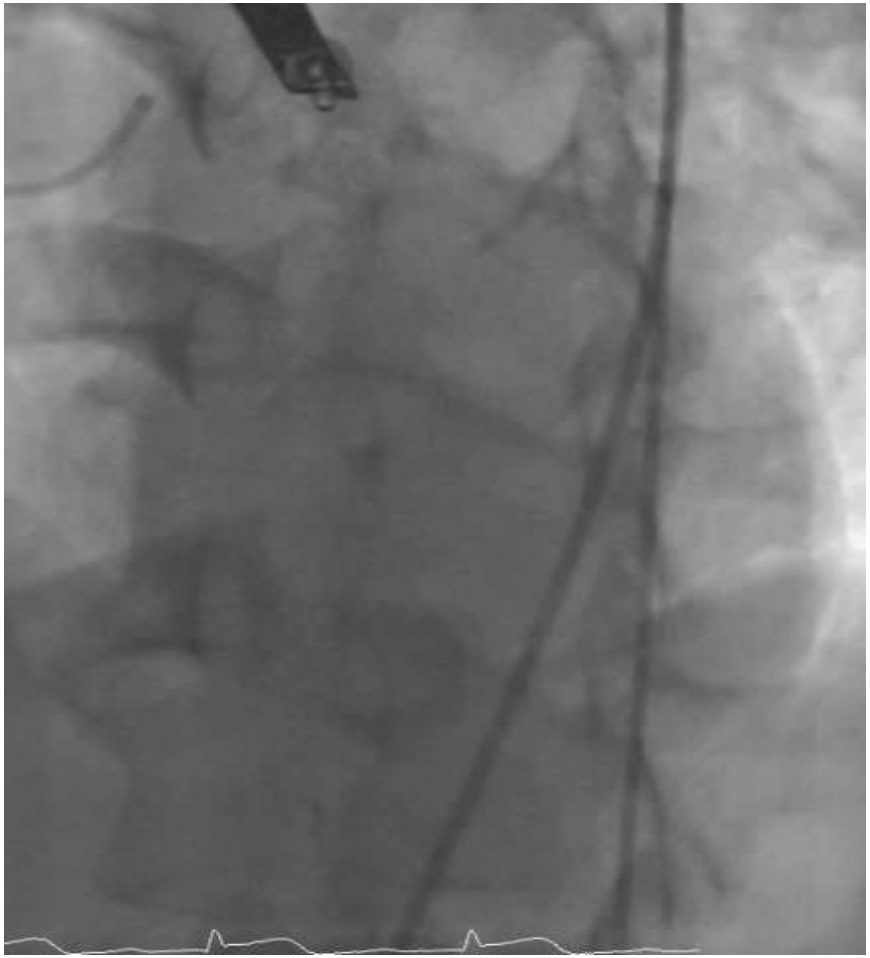
Preballoon



Stent implatation



LAD ?



Delayed Invasive Management

PCI of a Noninfarct Artery Before Hospital Discharge

PCI of a Noninfarct Artery Before Hospital Discharge

PCI is indicated in a noninfarct artery at a time separate from primary PCI in patients who have spontaneous symptoms of myocardial ischemia.

PCI is reasonable in a noninfarct artery at a time separate from primary PCI in patients with intermediate- or high-risk findings on noninvasive testing.

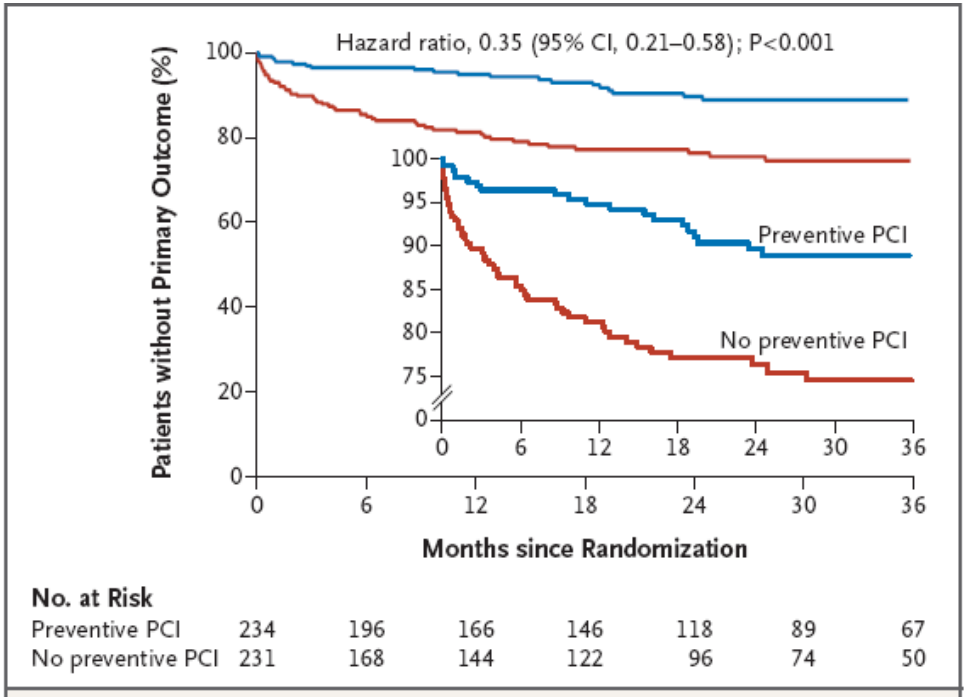
American Heart Association.

The NEW ENGLAND JOURNAL of MEDICINE N Engl J Med 2013;369:1115-23.

ORIGINAL ARTICLE

Randomized Trial of Preventive Angioplasty in Myocardial Infarction

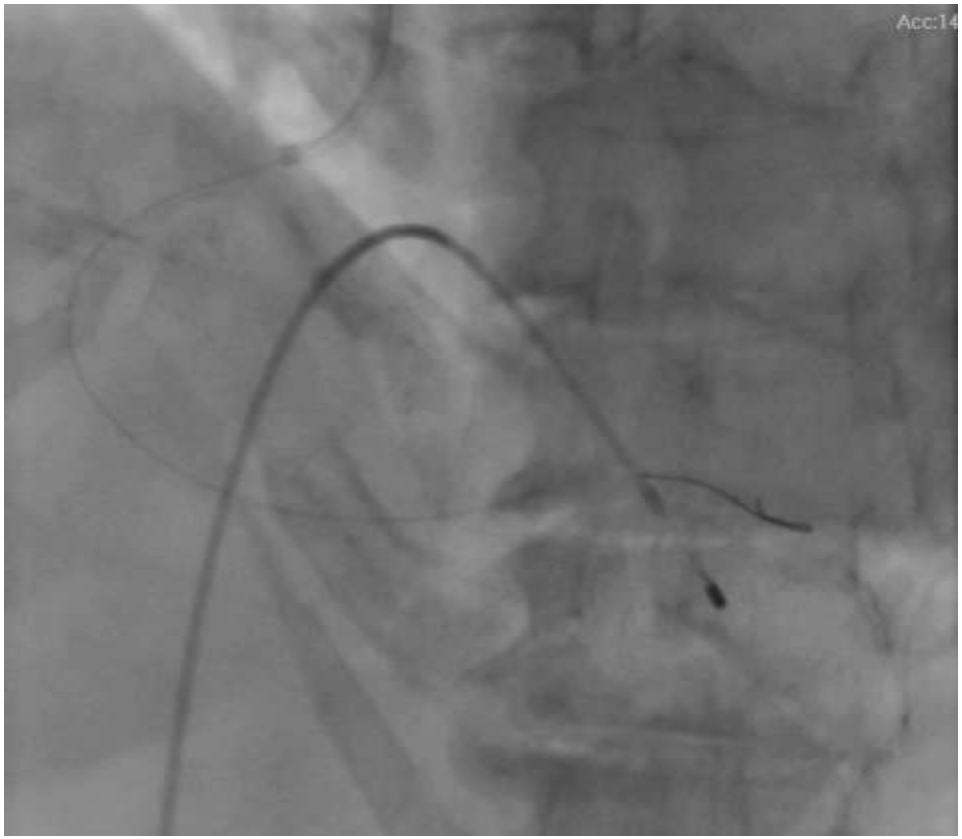
David S. Wald, M.D., Joan K. Morris, Ph.D., Nicholas J. Wald, F.R.S., Alexander J. Chase, M.B., B.S., Ph.D., Richard J. Edwards, M.D., Liam O. Hughes, M.D., Colin Berry, M.B., Ch.B., Ph.D., and Keith G. Oldroyd, M.D., for the PRAMI Investigators*



The primary outcome : composite of death from cardiac causes, nonfatal myocardial infarction,or refractory angina

- ✓ **Exclusion**
  - Cardiogenic shock
  - s/p CABG
  - LM
  - LAD, LCX OS
  - CTO

Case#3-STEMI, RCA



Complete AV block in Cath room

→ Pacemaker

Complications After STEMI

Pacing in STEMI

Pacing in STEMI

Temporary pacing is indicated for symptomatic bradyarrhythmias unresponsive to medical treatment.

First-degree AV block does not require treatment.

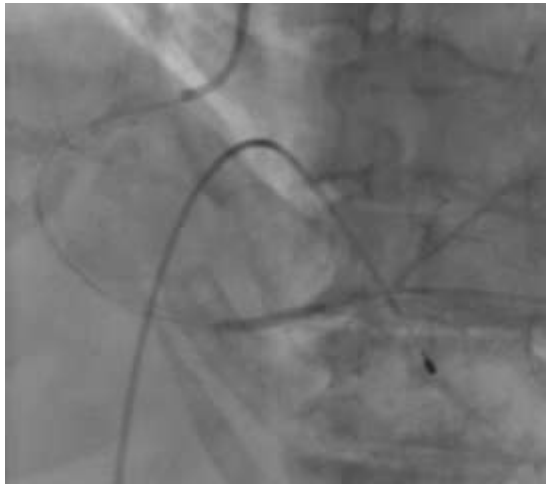
Prophylactic placement of a temporary pacing system is recommended for

- High-grade AV block
- New bundle-branch (especially LBBB)
- Bifascicular block in patients with anterior/lateral MI.

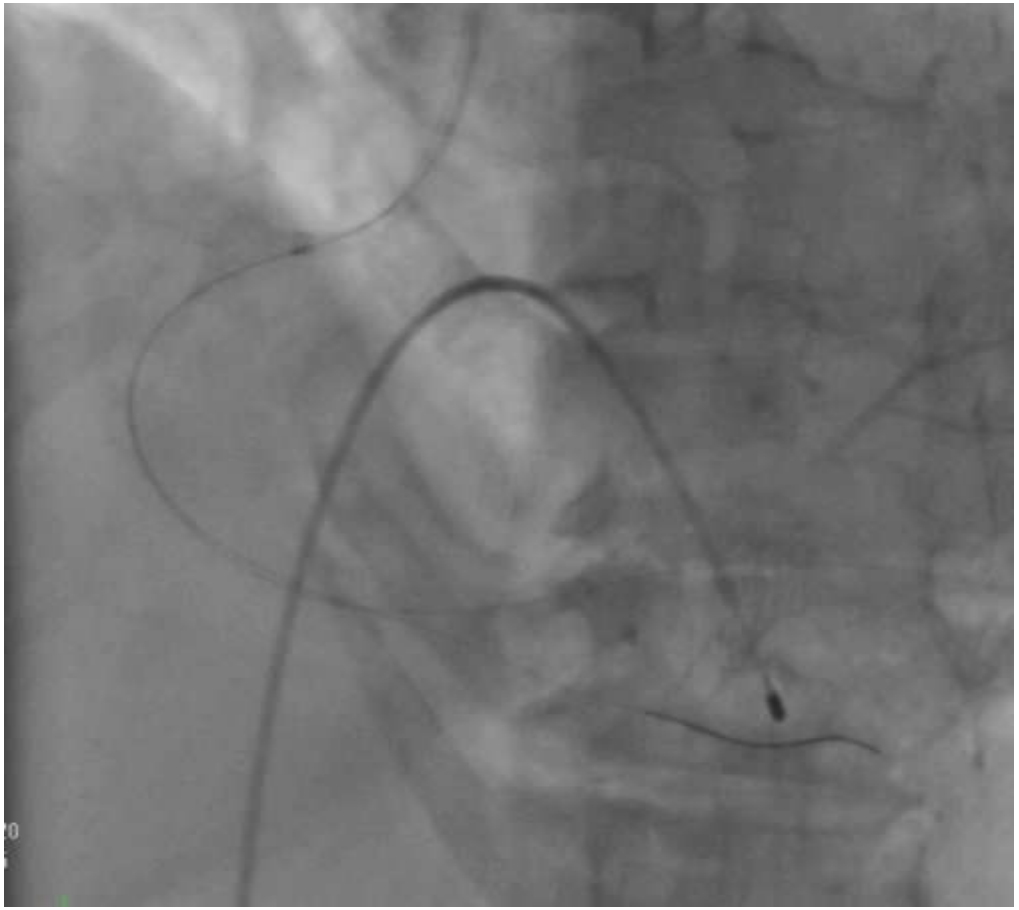
American Heart Association.

Case#3-STEMI, RCA

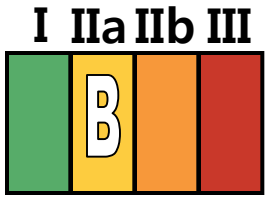
Thrombus aspiration



POBA



Antiplatelet Therapy to Support Primary PCI for STEMI



It is reasonable to start treatment with an intravenous GP IIb/IIIa receptor antagonist at the time of primary PCI (with or without stenting or clopidogrel pretreatment) in selected patients with STEMI who are receiving UFH.

- Abciximab: 0.25 mg/kg IV bolus, then 0.125 mcg/kg/min (maximum 10 mcg/min); or
- High-bolus-dose tirofiban: 25 mcg/kg IV bolus, then 0.15 mcg/kg/min; or
- Double-bolus eptifibatide: 180 mcg/kg IV bolus, then 2 mcg/kg/min; a 2nd 180-mcg/kg bolus is administered 10 min after the 1st bolus.

for large thrombus burden or inadequate P2Y12 receptor antagonist loading

American Heart Association.


1 VIAL
ABCIXIMAB
REOPRO
10 mg/5 mL vial
Sterile Solution
No Preservatives
Centocor
Lilly


AGGRASTAT
(tirofiban)
0.25 mg/mL Concentrate for Infusion
50 mL Vial
FOR INTRAVENOUS USE ONLY AFTER DILUTION
IROKO


(eptifibatide) Injection
INTEGRILIN
0.75 mg/mL
SINGLE USE VIAL
FOR INTRAVENOUS USE ONLY
Schering

Take home message

- ✓ Primary PCI is the recommended reperfusion therapy over fibrinolysis if performed by an experienced team within 90(120) minutes of FMC.
- ✓ Dual antiplatelet therapy with aspirin is recommended with
  - Prasugrel (if no history of prior stroke/TIA)
  - Ticagrelor
  - Clopidogrel
- ✓ Expected Change on next guideline
  - IABP
  - Preventive PCI

Thank you for your attention !