

Guidelines, how did change the practice of primary PCI

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The Real Benefit of Guidelines



- Decrease anecdotal medicine.
- Level playing field

Level of Evidence in STEMI

Purpose

- RCT: “Will the intervention work under ideal conditions” **EFFICACY**
- Registry: “Does the intervention work in the real world” **EFFECTIVENESS**

Does Quality of Care Matter?



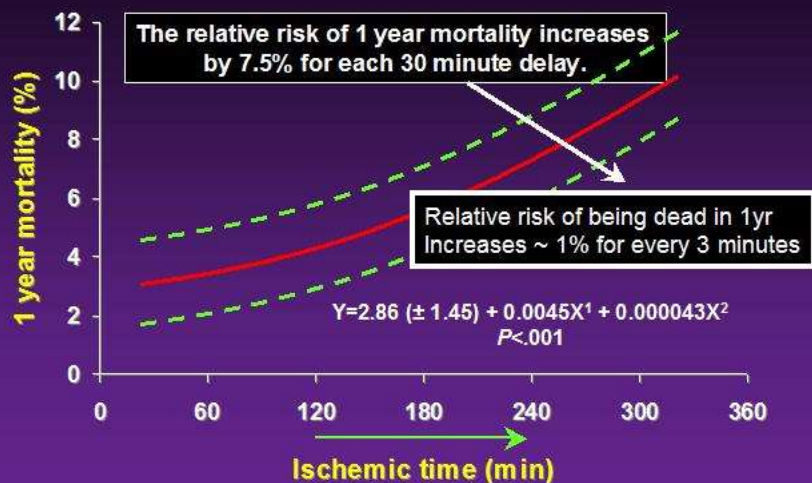
Peterson et al, JAMA 2006;295:1863-1912

PI-ACS

Basic Tenets of Reperfusion

- Not all time is created equal
 - The first few minutes are more important than the next few
- Patients present too late
 - Mean 3-4 hours after symptom onset
 - Onset is more important than “door” time
 - Therapy should be tailored based on onset
- It is estimated that only about 50% of all hospitals can do 24/7 PCI
 - Even these aren’t really 24/7
- Lots of patients will go to the wrong hospital and then need to be transferred
 - Transfers will always take longer than we think

Time from Symptom Onset to Treatment Predicts 1 Year Mortality—Primary PCI

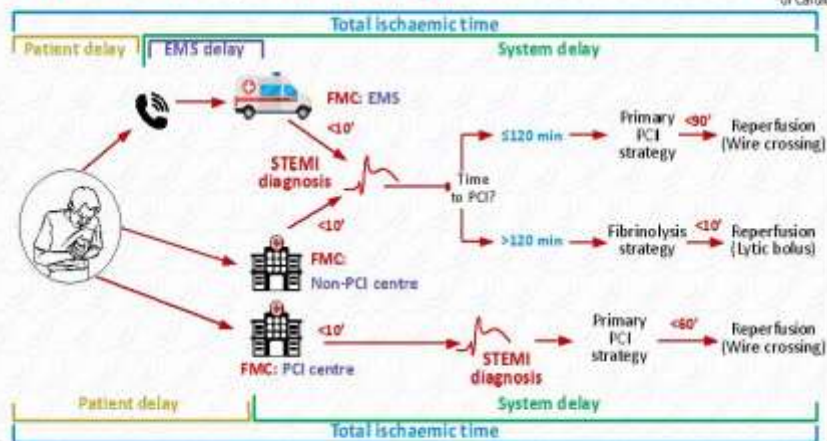


De Luca G, et al. *Circulation*. 2004;109:1223-1225.

2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation



Modes of patient presentation, components of ischaemic time and flowchart for reperfusion strategy selection



Cardiac arrest



Recommendations	Class	Level
A primary PCI strategy is recommended in patients with resuscitated cardiac arrest and an ECG consistent with STEMI.	I	B
Targeted temperature management is indicated early after resuscitation of cardiac arrest patients who remain unresponsive.	I	B
It is indicated that healthcare systems implement strategies to facilitate transfer of all patients in whom a myocardial infarction is suspected directly to the hospital offering 24/7 PCI-mediated reperfusion therapy via one specialized EMS.	I	C

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Cardiac arrest



Recommendations	Class	Level
It is indicated that all medical and paramedical personnel caring for suspected myocardial infarction have access to defibrillation equipment and are trained in basic cardiac life support.	I	C
Urgent angiography (and PCI if indicated) should be considered in patients with resuscitated cardiac arrest without diagnostic ST-segment elevation but with a high suspicion of ongoing myocardial ischaemia.	IIa	C
Prehospital cooling using a rapid infusion of large volumes of cold i.v. fluid immediately after return of spontaneous circulation is not recommended.	III	B

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Logistics of prehospital care



Recommendations	Class	Level
It is recommended that the prehospital management of STEMI patients is based on regional networks designed to deliver reperfusion therapy expeditiously and effectively, with efforts made to make primary PCI available to as many patients as possible.	I	B
It is recommended that primary PCI-capable centres deliver a 24/7 service and are able to perform primary PCI without delay.	I	B
It is recommended that patients transferred to a PCI-capable centre for primary PCI bypass the emergency department and CCU/ICCU and are transferred directly to the catheterization laboratory.	I	B
It is recommended that ambulance teams are trained and equipped to identify STEMI (with use of ECG recorders and telemetry as necessary) and administer initial therapy, including fibrinolysis when applicable.	I	C

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Logistics of prehospital care (continued)



Recommendations	Class	Level
It is recommended that all hospitals and EMS participating in the care of patients with STEMI record and audit delay times and work to achieve and maintain quality targets.	I	C
It is recommended that EMS transfer STEMI patients to a PCI-capable centre, by-passing non-PCI centres.	I	C
It is recommended that EMS, emergency departments, and CCU/ICCU have a written updated STEMI management protocol, preferably shared within geographic networks.	I	C
It is recommended that patients presenting to a non-PCI-capable hospital and awaiting transportation for primary or rescue PCI are attended in an appropriately monitored area (e.g. the emergency department, CCU/ICCU, intermediate care unit).	I	C

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Definitions of terms related to reperfusion therapy



Term	Definition
FMC	The time point when the patient is either initially assessed by a physician, paramedic, nurse or other trained EMS personnel who can obtain and interpret the ECG, and deliver initial interventions (e.g. defibrillation). FMC can be either in the prehospital setting or upon patient arrival at the hospital (e.g. emergency department).
STEMI diagnosis	The time at which the ECG of a patient with ischaemic symptoms is interpreted as presenting ST-segment elevation or equivalent.
Primary PCI	Emergent PCI with balloon, stent, or other approved device, performed on the IRA without previous fibrinolytic treatment.

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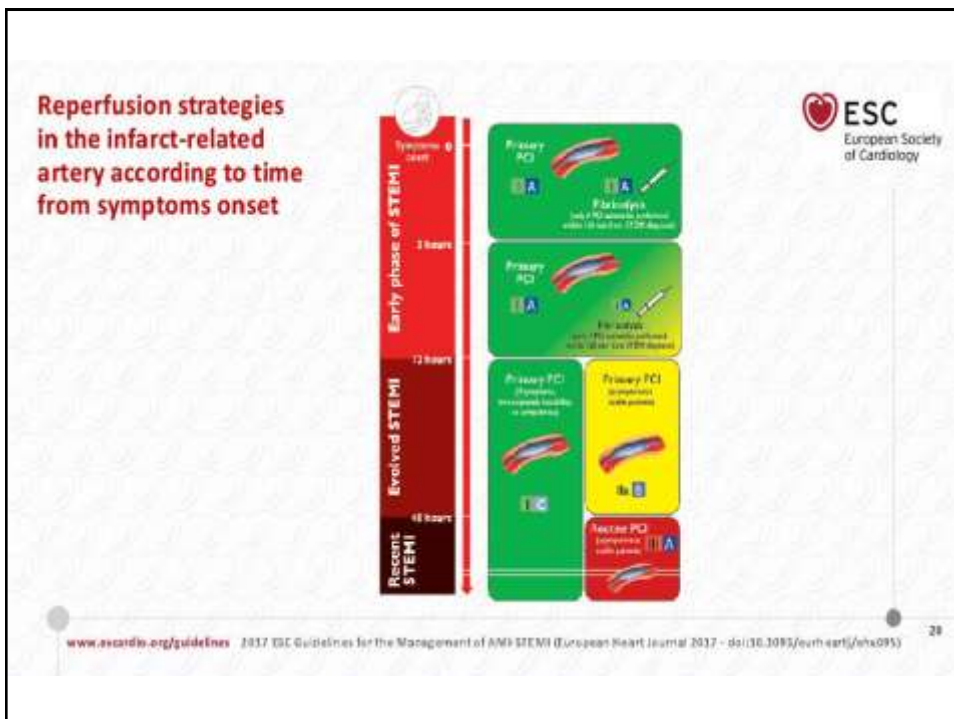
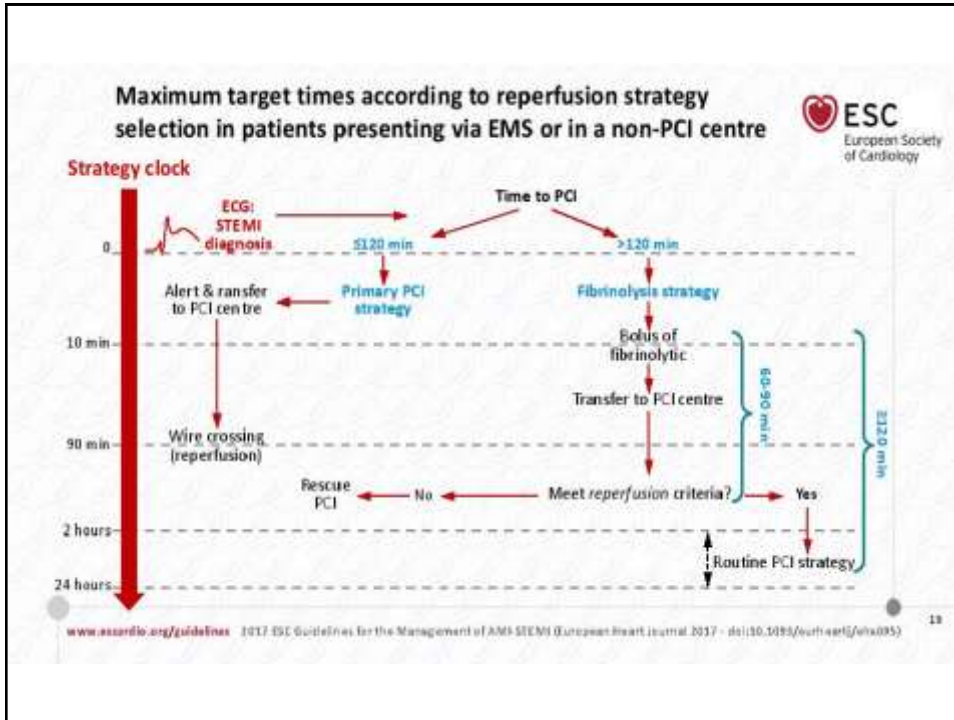
Definitions of terms related to reperfusion therapy (continued)

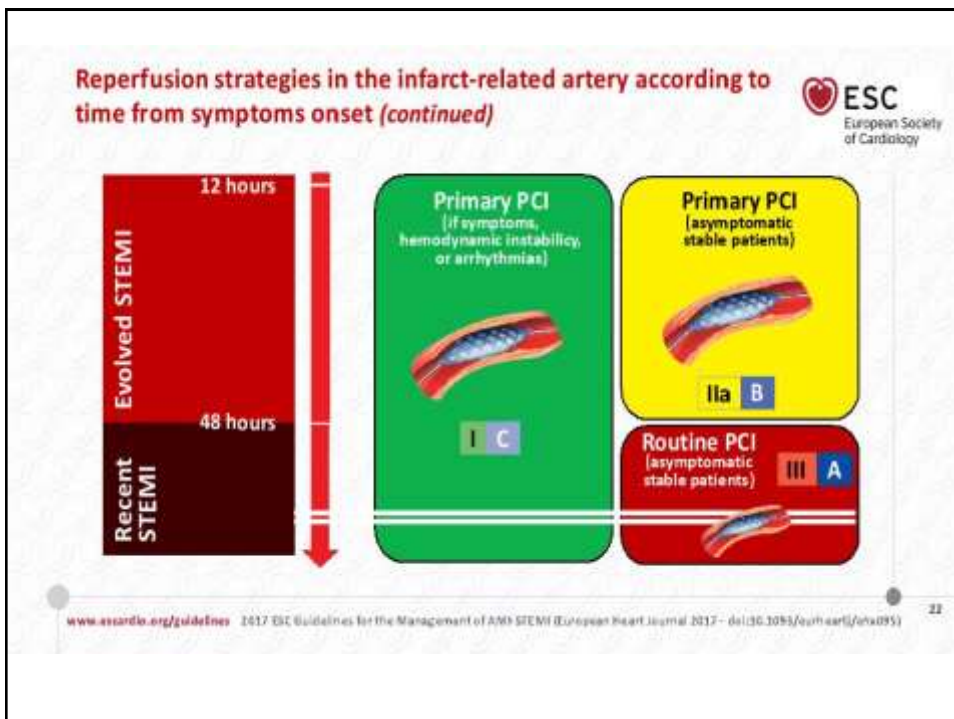
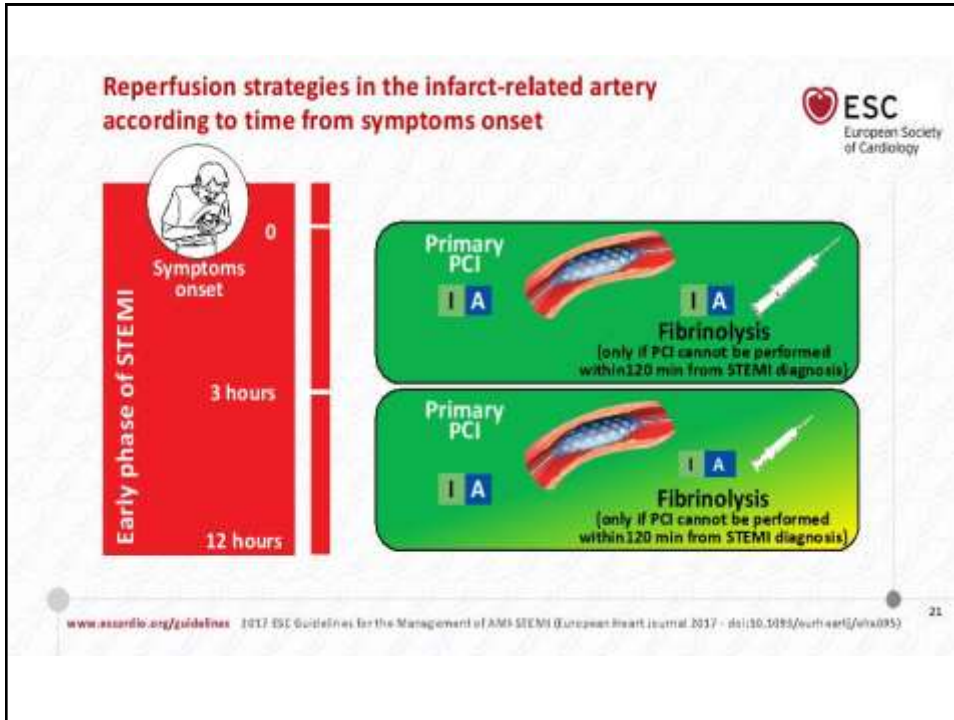


Term	Definition
Primary PCI strategy	Emergent coronary angiography and PCI of the IRA if indicated.
Rescue PCI	Emergent PCI performed as soon as possible in the case of failed fibrinolytic treatment.
Routine early PCI strategy after fibrinolysis	Coronary angiography, with PCI of the IRA if indicated, performed between 2 and 24 hours after successful fibrinolysis.
Pharmacoinvasive strategy	Fibrinolysis combined with rescue PCI (in case of failed fibrinolysis) or routine early PCI strategy (in case of successful fibrinolysis).

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Reperfusion therapy

Recommendations	Class	Level
Reperfusion therapy is indicated in all patients with symptoms of ischaemia of ≤ 12 hours duration and persistent ST-segment elevation.	I	A
A <i>primary PCI strategy</i> is recommended over fibrinolysis within indicated time frames.	I	A
If primary PCI cannot be performed timely after STEMI diagnosis, fibrinolytic therapy is recommended within 12 hours of symptom onset in patients without contra-indications.	I	A

Reperfusion therapy (*continued*)

Recommendations	Class	Level
In the absence of ST-segment elevation, a <i>primary PCI strategy</i> is indicated in patients with suspected ongoing ischaemic symptoms suggestive of myocardial infarction and at least one of the following criteria present: <ul style="list-style-type: none"> - haemodynamic instability or cardiogenic shock, - recurrent or ongoing chest pain refractory to medical treatment, - life-threatening arrhythmias or cardiac arrest, - mechanical complications of myocardial infarction, - acute heart failure, - recurrent dynamic ST-segment or T-wave changes, particularly with intermittent ST-segment elevation. 	I	C

Reperfusion therapy (continued)

Recommendations	Class	Level
Early angiography (within 24 hours) is recommended if symptoms are completely relieved and ST-segment elevation completely normalized spontaneously or after nitroglycerin administration (provided there are no recurrence of symptoms or ST-segment elevation).	I	C
In patients with time from symptom onset >12 hours, a <i>primary PCI strategy</i> is indicated in the presence of ongoing symptoms suggestive of ischaemia, haemodynamic instability, or life-threatening arrhythmias.	I	C
A routine <i>primary PCI strategy</i> should be considered in patients presenting late (12-48 hours) after symptom onset.	IIa	B
In asymptomatic patients, routine PCI of an occluded IRA >48 hours after onset of STEMI is not indicated.	III	A

Summary of important time targets

Intervals	Time targets
Maximum time from FMC to ECG and diagnosis.	≤10 min
Maximum expected delay from STEMI diagnosis to primary PCI (wire crossing) to choose primary PCI strategy over fibrinolysis (if this target time cannot be met, consider fibrinolysis).	≤120 min
Maximum time from STEMI diagnosis to wire crossing in patients presenting at primary PCI hospitals.	≤60 min
Maximum time from STEMI diagnosis to wire crossing in transferred patients.	≤90 min

Procedural aspects of the primary percutaneous coronary intervention strategy



Recommendations	Class	Level
IRA strategy		
Primary PCI of the IRA is indicated.	I	A
New coronary angiography with PCI if indicated is recommended in patients with symptoms or signs of recurrent or remaining ischaemia after primary PCI.	I	C
IRA technique		
Stenting is recommended (over balloon angioplasty) for primary PCI.	I	A
Stenting with new-generation DES is recommended over BMS for primary PCI.	I	A
Radial access is recommended over femoral access if performed by an experienced radial operator.	I	A

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Procedural aspects of the primary percutaneous coronary intervention strategy



Recommendations	Class	Level
IRA technique (continued)		
Routine use of thrombus aspiration is not recommended.	III	A
Routine use of deferred stenting is not recommended.	III	B
Non-IRA strategy		
Routine revascularization of non-IRA lesions should be considered in STEMI patients with multivessel disease before hospital discharge.	IIa	A
Non-IRA PCI during the index procedure should be considered in patients with cardiogenic shock.	IIa	C
CABG should be considered in patients with ongoing ischaemia and large areas of jeopardized myocardium if PCI of the IRA cannot be performed.	IIa	C

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Periprocedural and postprocedural antithrombotic therapy in patients undergoing primary percutaneous coronary intervention



Recommendations	Class	Level
Antiplatelet therapy		
A potent P2Y ₁₂ inhibitor (prasugrel or ticagrelor), or clopidogrel if these are not available or are contra-indicated, is recommended before (or at latest at the time of) PCI and maintained over 12 months unless there are contra-indications such as excessive risk of bleeding.	I	A
Aspirin (oral or i.v. if unable to swallow) is recommended as soon as possible for all patients without contra-indications.	I	B
GP IIb/IIIa inhibitors should be considered for bailout if there is evidence of no-reflow or a thrombotic complication.	IIa	C
Cangrelor may be considered in patients who have not received P2Y ₁₂ receptor inhibitors.	IIb	A

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Periprocedural and postprocedural antithrombotic therapy in patients undergoing primary percutaneous coronary intervention



Recommendations	Class	Level
Anticoagulant therapy		
Anticoagulation is recommended for all patients in addition to antiplatelet therapy during primary PCI.	I	C
Routine use of UFH is recommended.	I	C
In patients with heparin-induced thrombocytopenia, bivalirudin is recommended as the anticoagulant agent during primary PCI.	I	C
Routine use of enoxaparin i.v. should be considered.	IIa	A
Routine use of bivalirudin should be considered.	IIa	A
Fondaparinux is not recommended for primary PCI.	III	B

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Quality indicators



Type of indicator and process	Quality indicator
Structural measures (organization)	<p>1) The centre should be part of a network specifically developed for the rapid and efficient management of STEMI patients with written protocols covering the following points:</p> <ul style="list-style-type: none"> • <i>Single emergency telephone number</i> for patients to contact the emergency services, • <i>Prehospital interpretation of the ECG</i> for diagnosis and strategy decision, • <i>Prehospital activation</i> of the catheterization laboratory, • <i>Transportation</i> (ambulance-helicopter) equipped with ECG defibrillators. <p>2) Key times to reperfusion are systematically recorded and periodically reviewed for quality assessments by the centre or network participants.</p>

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Quality indicators (continued)



Type of indicator and process	Quality indicator
Performance measures for reperfusion therapy	<p>1) Proportion of STEMI patients arriving in the first 12 h receiving reperfusion therapy.</p> <p>2) Proportion of patients with timely reperfusion therapy, defined as:</p> <ul style="list-style-type: none"> • For patients attended to in the pre-hospital setting: <ul style="list-style-type: none"> – 90 min from STEMI diagnosis to IRA wire crossing for reperfusion with PCI, – <10 min from STEMI diagnosis to lytic bolus for reperfusion with fibrinolysis. • For patients admitted to PCI centres: <ul style="list-style-type: none"> – <60 min from STEMI diagnosis to IRA wire crossing for reperfusion with PCI, • For transferred patients: <ul style="list-style-type: none"> – <120 min from STEMI diagnosis to IRA wire crossing for reperfusion with PCI, – <30 min door-in-door-out for patients presenting in a non-PCI centre (en route to a PCI centre).

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What is new in 2017 Guidelines on AMI-STEMI


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2012	CHANGE IN RECOMMENDATIONS	2017
	Radial access	MATRIX
	DES over BMS	EXAMINATION, COMFORTABLE-AMI, ROBERT
	Complete Revascularisation	PRAMI, DANAMI 3-PRIMULTI, CYLPER, Omega-3 Acids
	Thrombus Aspiration	TOTAL, TASTE
	Bivalirudin	MATRIX, HEAT-PPD
	Enoxaparin	ATOLL, Meta-analysis
	Early Hospital Discharge	Small trials & observational data
Oxygen when SaO ₂ < 95%	OXYGEN	Oxygen when SpO ₂ < 90% AVOID, DETO2X
Some dose I.V. in all patients	TNK-tPA	Half dose I.V. in Pts > 75 years STREAM


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What is new in 2017 Guidelines on AMI-STEMI (continued)


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2017 NEW RECOMMENDATIONS

<ul style="list-style-type: none"> • Additional lipid lowering therapy if LDL > 1.8 mmol/L (70 mg/dL) despite on maximum tolerated statins. IMPROVE-IT, FOURIER 	<ul style="list-style-type: none"> • Complete revascularization during index primary PCI in STEMI patients in shock. Expert opinion
<ul style="list-style-type: none"> • Cangrelor if P2Y₁₂ inhibitors have not been given. CHAMPION • Switch to potent P2Y₁₂ inhibitors 48 hours after fibrinolysis. Expert opinion • Extend Ticagrelor up to 36 months in high-risk patients. PEGASUS-TIMI 54 • Use of polypill to increase adherence. FOCUS 	<ul style="list-style-type: none"> • Routine use of deferred stenting. DANAMI 3-DEFER



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