Updates on ST-Elevation Myocardial Infarction

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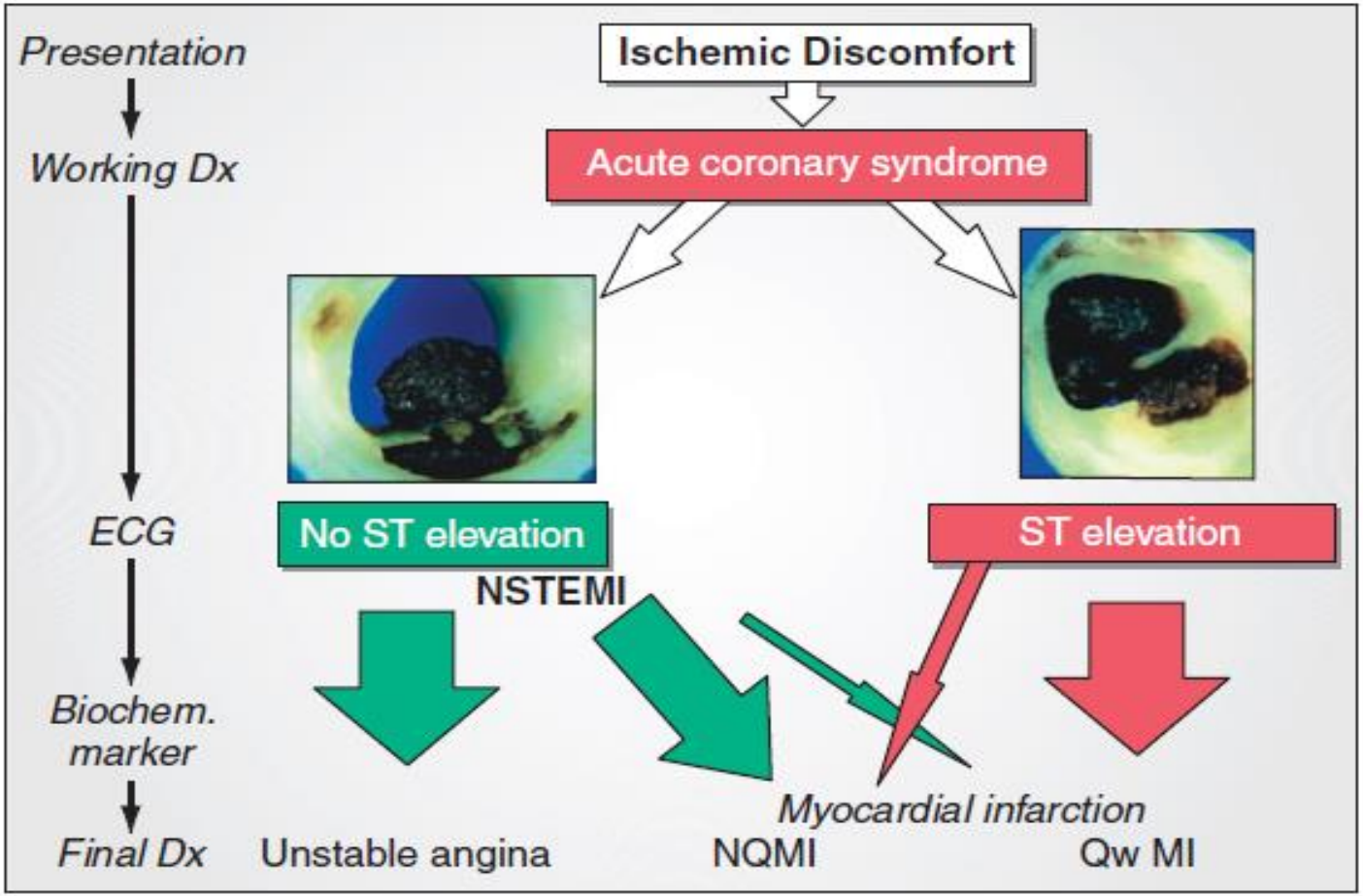

(Adapted from CW Hamm et al: Lancet 358:1533, 2001, an MJ Davies: Heart 83:361, 2000)

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

ESC European Society of Cardiology

The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology

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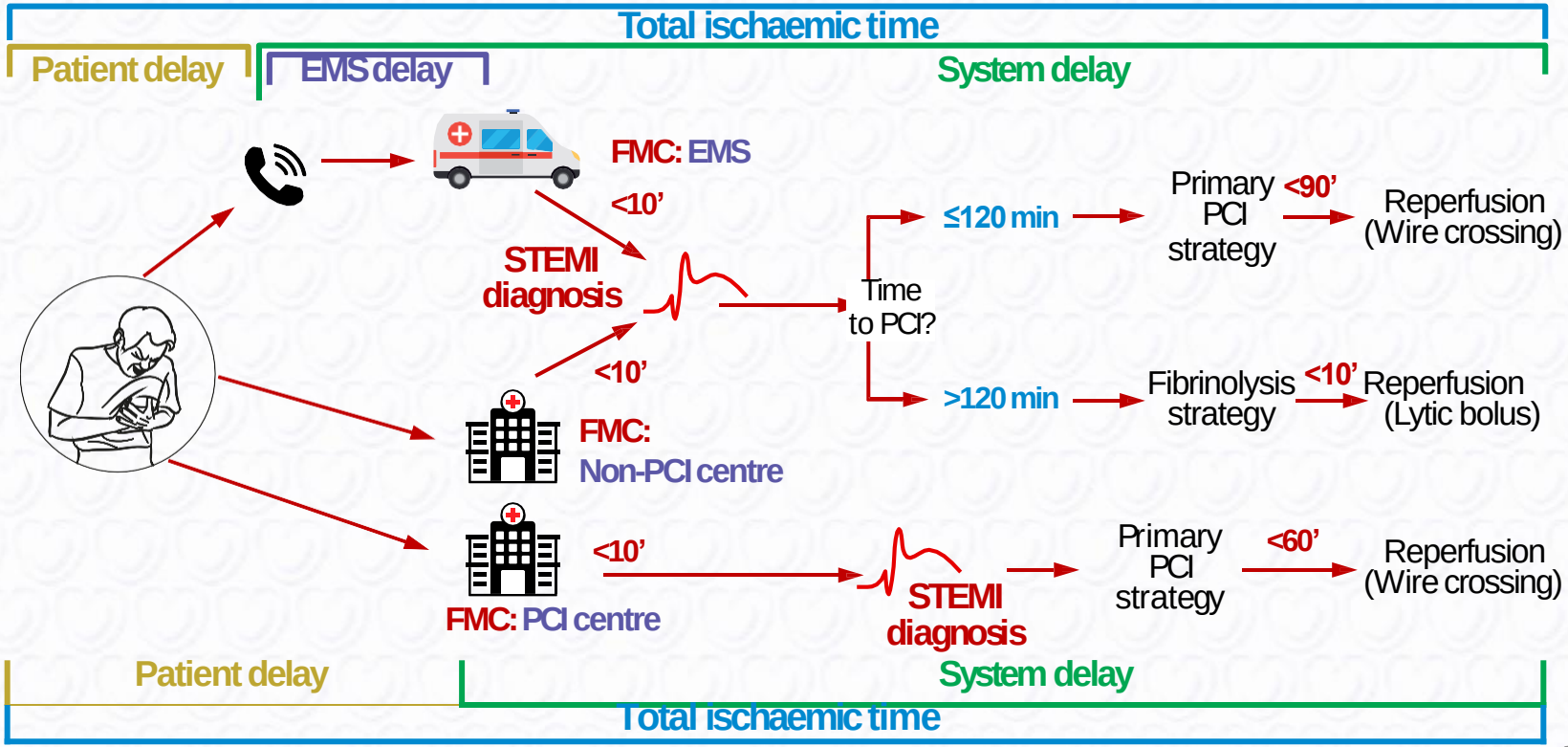
Modes of patient presentation, components of ischaemic time and flowchart for reperfusion strategy selection



2017 ESCGuidelines for the Management of AMI-STEMI (European Heart Journal 2017 - doi:10.1093/eurheartj/ehx095)

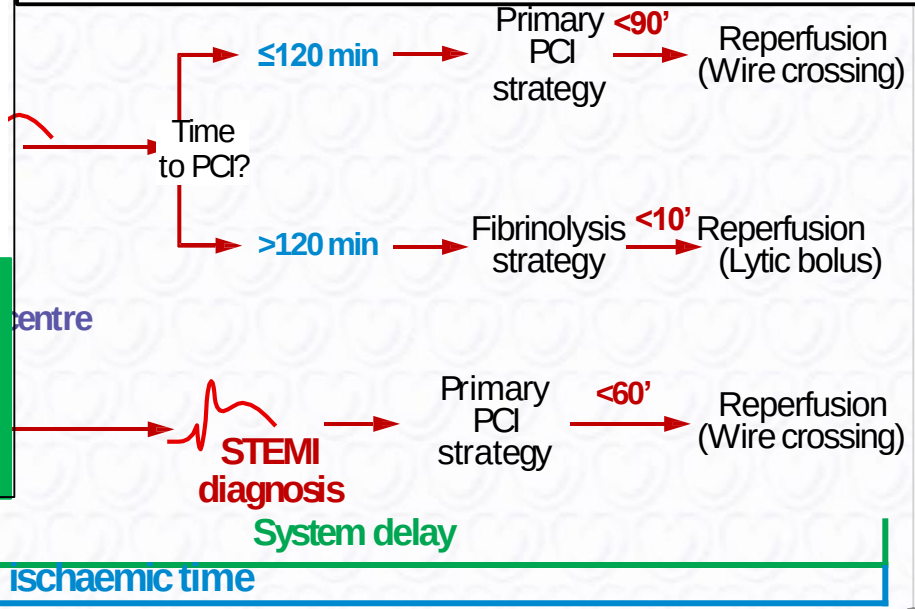
Modes of patient presentation, components of ischaemic time and flowchart for reperfusion strategy selection

Atypical ECG presentations

- Bundle branch block,
- Ventricular pacing,
- Hyper-acute T waves,
- Isolated depression in anterior leads,
- Universal ST depression with aVR elevation

In the presence of symptoms, a primary PCI strategy (urgent angiography and PCI if indicated) should be followed.

Left and right bundle branch block are considered equal for recommending urgent angiography if ischaemic symptoms.



Fibrinolytic therapy

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Recommendations	Class	Level
When fibrinolysis is the reperfusion strategy, it is recommended to initiate this treatment as soon as possible after STEMI diagnosis, preferably in the prehospital setting. TARGET TIME: STEMI DIAGNOSIS TO BOLUS 10 MIN	I	A
A fibrin-specific agent (i.e. tenecteplase, alteplase, reteplase) is recommended.	I	B
A half-dose of tenecteplase should be considered in patients ≥75 years of age.	IIa	B

New

Co-therapies

ACUTE

Aspirin (IB), Clopidogrel (IA), Enoxaparin (IA)

MAINTENANCE

DAPT 1 year (IC). After 48hr, switch to potent P2Y12 inh may be considered (IIbC)

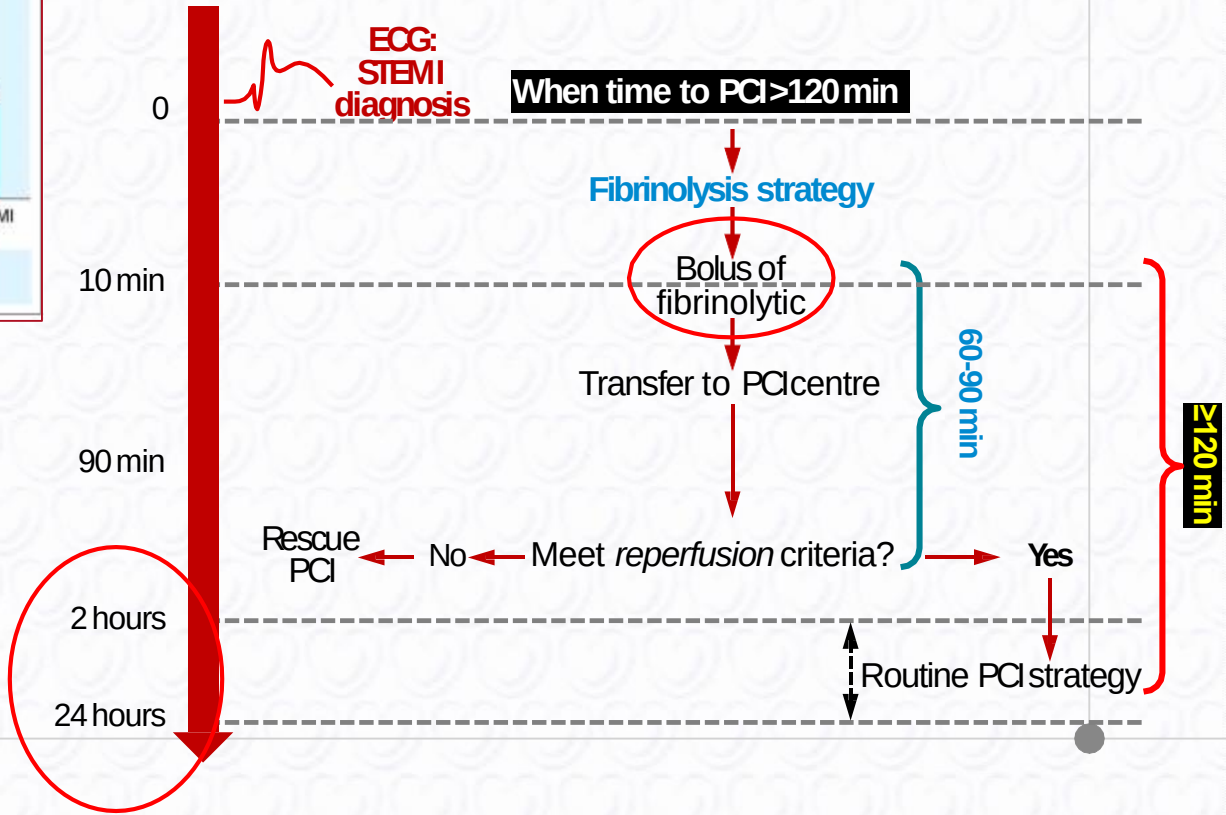
Fibrinolysis Strategy = Pharmacoinvasive

Routine angio ±PCI

2012 GL: IIaA

2017 GL: IA

Strategy clock



Doses of anti-thrombotic agents

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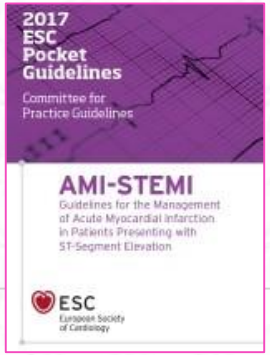
interactive tool

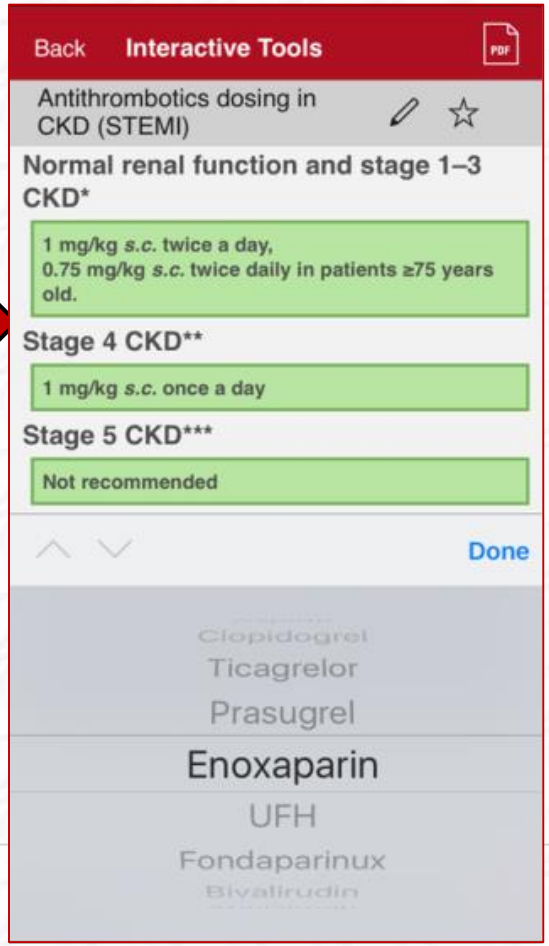
- -Calculators
- -Charts & scores

Summary Cards

Essential Messages

Online & Offline



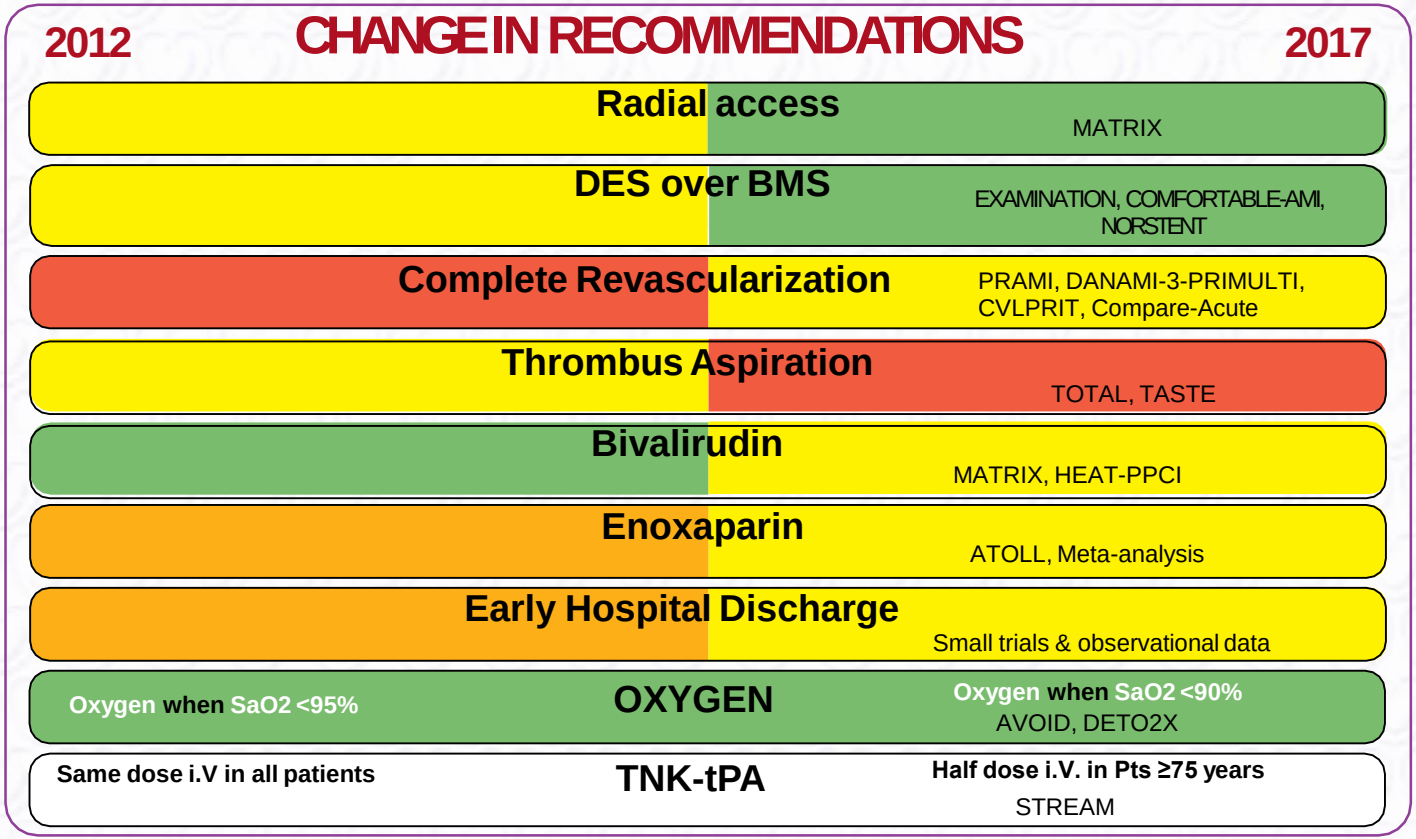


Logistical issues for hospital stay: MAKE LIFEEASIER

Recommendations	Class	Level
Transfer back to a referring non-PCI hospital		
Same-day transfer should be considered appropriate in selected patients after successful primary PCI, i.e. those without ongoing myocardial ischaemia, arrhythmia, or haemodynamic instability, not requiring vasoactive or mechanical support, and not needing further early revascularization.	IIa	C
Hospital discharge		
Early discharge (within 48-72 hours) should be considered appropriate in selected low-risk patients if early rehabilitation and adequate follow-up are arranged.	IIa	A

2012 GL IIbC

2012 GL >72h, IIbB


2012
CHANGE IN RECOMMENDATIONS
2017
Radial access
MATRIX
DES over BMS
EXAMINATION, COMFORTABLE-AMI, NORSTENT
Complete Revascularization
PRAMI, DANAMI-3-PRIMULTI, CVLPRIT, Compare-Acute
Thrombus Aspiration
TOTAL, TASTE
Bivalirudin
MATRIX, HEAT-PPCI
Enoxaparin
ATOLL, Meta-analysis
Early Hospital Discharge
Small trials & observational data
Oxygen when SaO2 <95%
OXYGEN
Oxygen when SaO2 <90%
AVOID, DETO2X
Same dose i.V in all patients
TNK-tPA
Half dose i.V. in Pts ≥75 years
STREAM

ROUTINE MAINTENANCE THERAPIES:

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Antiplatelet therapy

Lipid lowering therapy

Beta-blockers

ACE inhibitors/ARBs

MRA

Maintenance antithrombotic strategy after STEMI

Recommendations	Class	Level
Antiplatelet therapy with low-dose aspirin (75–100 mg) is indicated.	I	A
DAPT in the form of aspirin plus ticagrelor or prasugrel (or clopidogrel if ticagrelor or prasugrel is not available or is contra-indicated) is recommended for 12 months after PCI unless there are contra-indications such as excessive risk of bleeding.	I	A
A PPI in combination with DAPT is recommended in patients at high risk* of gastrointestinal bleeding.	I	B
In patients with an indication for oral anticoagulation, oral anti-coagulants are indicated in addition to antiplatelet therapy.	I	C
In patients who are at high risk of severe bleeding complications, discontinuation of $P2Y_{12}$ inhibitor therapy after 6 months should be considered.	IIa	B
In STEMI patients with stent implantation and an indication for oral anticoagulation, triple therapy should be considered for 1–6 months (according to a balance between the estimated risk of recurrent coronary events and bleeding).	IIa	C
DAPT for 12 months in patients who did not undergo PCI should be considered unless there are contra-indications such as excessive risk of bleeding.	IIa	C
In patients with LV thrombus, anticoagulation should be administered for up to 6 months guided by repeated imaging.	IIa	C
In high ischaemic risk patients who have tolerated DAPT without a bleeding complication, treatment with DAPT in the form of ticagrelor 60 mg twice a day on top of aspirin for longer than 12 months may be considered for up to 3 years.	IIb	B
In low bleeding risk patients who receive aspirin and clopidogrel, low-dose rivaroxaban (2.5 mg twice daily) may be considered.	IIb	B
The use of ticagrelor or prasugrel is not recommended as part of triple antithrombotic therapy with aspirin and oral anticoagulation.	III	C

2017 ESC Focused Update on Dual Anti-platelet Therapy in Coronary Artery Disease developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS)

STEMI & DAPT documents well aligned

Routine therapies: lipid lowering

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Recommendations	Class	Level
Lipid lowering therapies		
It is recommended to start high-intensity statin therapy as early as possible, unless contra-indicated, and maintain it long term.	I	A
An LDL-C goal of 70 mg/dL or a reduction of at least 50% if the baseline LDL-C is between 70 and 135 mg/dL is recommended.	I	B
It is recommended to obtain a lipid profile in all STEMI patients as soon as possible after presentation. (NO NEED A FASTING PROFILE)	I	C
In patients with LDL-C ≥70 mg/dL despite a maximally tolerated statin dose who remain at high risk, further therapy to reduce LDL-C should be considered.	IIa	A

New (IMPROVE-IT FOURIER)

Routine therapies: Beta-blockers

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Recommendations	Class	Level
EARLY INTRAVENOUS Beta-blockers		
Intravenous beta-blockers should be considered at the time of presentation in patients undergoing primary PCI without contra-indications, with no signs of acute heart failure, and with an SBP>120 mmHg.	IIa	A
Intravenous beta-blockers must be avoided in patients with hypotension, acute heart failure or AV block or severe bradycardia.	III	B

Recommendations	Class	Level
MAINTENANCE oral Beta-blockers		
Oral treatment with beta-blockers is indicated in patients with heart failure and/or LVEF≤40% unless contra-indicated.	I	A
Routine oral treatment with beta-blockers should be considered during hospital stay and continued thereafter in all patients without Contra-indications.	IIa	B

Routine therapies: ACEinhibitors / MRA

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Recommendations	Class	Level
ACEinhibitors/ARBs: LVEF≤ 40% and/or Heart Failure		
ACEinhibitors are recommended, starting within the first 24 hours of STEMI in patients with evidence of heart failure, LV systolic dysfunction, diabetes, or an anterior infarct.	I	A
An ARB, preferably valsartan, is an alternative to ACEinhibitors in patients with heart failure or LV systolic dysfunction, particularly those who are intolerant of ACEinhibitors.	I	B
ACEinhibitors should be considered in all patients in the absence of contra-indications.	IIa	A
MRAs: LVEF≤ 40% and Heart Failure		
MRAs are recommended in patients with an LVEF ≤40% and heart failure or diabetes, who are already receiving an ACE inhibitor and a beta-blocker, provided there is no renal failure or hyperkalaemia.	I	B

Acute Heart Failure and Cardiogenic shock: a "*LOECzone*"

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Recommendations for STEMI patients with Acute Heart Failure	Class	Level
Loop diuretics are recommended in patients with acute heart failure with symptoms/signs of fluid overload to improve symptoms.	I	C
Nitrates are recommended in patients with symptomatic heart failure with SBP >90 mmHg to improve symptoms and reduce congestion.	I	C
Oxygen is indicated in patients with pulmonary oedema with SaO2 <90% to maintain a saturation >95%.	I	C
Patient intubation is indicated in patients with respiratory failure or exhaustion, leading to hypoxaemia, hypercapnia, or acidosis, and if non-invasive ventilation is not tolerated.	I	C
Non-invasive positive pressure ventilation (continuous positive airway pressure, biphasic positive airway pressure) should be considered in patients with respiratory distress (respiratory rate >25 breaths/min, SaO2 <90%) without hypotension.	IIa	B

Recommendations for STEMI patients in Cardiogenic Shock	Class	Level
Immediate PCI is indicated for patients with cardiogenic shock if coronary anatomy is suitable. If coronary anatomy is not suitable for PCI, or PCI has failed, emergency CABG is recommended.	I	B
Invasive blood pressure monitoring with an arterial line is recommended.	I	C
Immediate Doppler echocardiography is indicated to assess ventricular and valvular functions, loading conditions, and to detect mechanical complications.	I	C
It is indicated that mechanical complications are treated as early as possible after discussion by the Heart Team.	I	C
Oxygen/mechanical respiratory support is indicated according to blood gases.	I	C

Routine complete revascularization

Recommendations	Class	Level
Complete revascularization during the index procedure should be considered in patients presenting with cardiogenic shock.	IIa	C

Reperfusion Strategy selection in Cardiogenic shock: a super "*LOEC zone*"

Recommendations	Class	Level
Fibrinolysis should be considered in patients presenting with cardiogenic shock if a primary PCI strategy is not available within 120 min from STEMI diagnosis and mechanical complications have been ruled out.	IIa	C

Strategy guided as in other STEMI patients (if time from STEMI diagnosis to wire crossing is >120min € Immediate fibrinolysis & transfer to PCI center)

Urgent angiography upon arrival regardless time from lytics

Acute Heart Failure and Cardiogenic shock

2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

STEMI & HF Guidelines well aligned

IC	Opiates to relief dyspnea and anxiety	IIbB
IIaC	Inotropic/vasopressor agents	IIbC
IIaB	Ultrafiltration	IIbB
IIbC	Mechanical support	IIbC
IIbB	IABP	routine IIIB Mechanical complications IIaC

Management of atrial fibrillation

Recommendations	Class	Level
Acute rate control of AF		
Intravenous beta-blockers are indicated for rate control if necessary and there are no clinical signs of acute heart failure or hypotension.	I	C
Intravenous amiodarone is indicated for rate control if necessary in the presence of concomitant acute heart failure and no hypotension.	I	C
Intravenous digitalis should be considered for rate control if necessary in the presence of concomitant acute heart failure and hypotension.	IIa	B
Cardioversion		
Immediate electrical cardioversion is indicated when adequate rate control cannot be achieved promptly with pharmacological agents in patients with AF and ongoing ischaemia, severe haemodynamic compromise or heart failure.	I	C

Management of atrial fibrillation

Recommendations	Class	Level
Intravenous amiodarone is indicated to promote electrical cardioversion and/or decrease risk for early recurrence of AF after electrical cardioversion in unstable patients with recent onset AF	I	C
In patients with documented de novo AF during the acute phase of STEMI, long-term oral anticoagulation should be considered depending on CHA_2DS_2-VASc score and taking concomitant antithrombotic therapy into account.	IIa	C

New

Transient, self-terminating AF during STEMI relates to a significantly higher stroke rate during long-term follow-up.

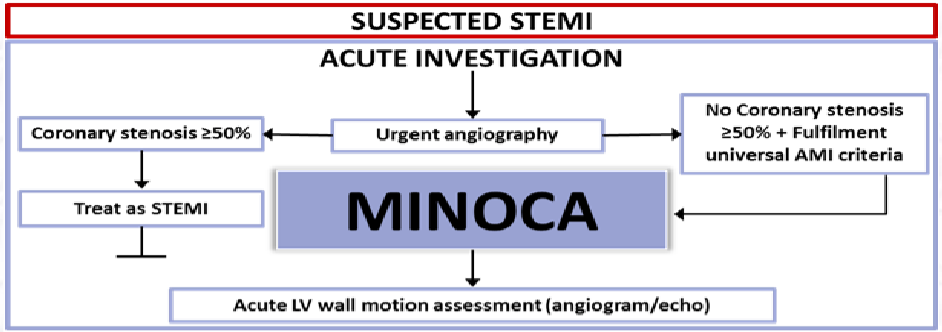
MINOCA: New Chapter!

Not focused into specific treatments, rather encouraging pursuing etiology!

Aligned with dedicated ESC position papers

ESC working group position paper on myocardial infarction with non-obstructive coronary arteries

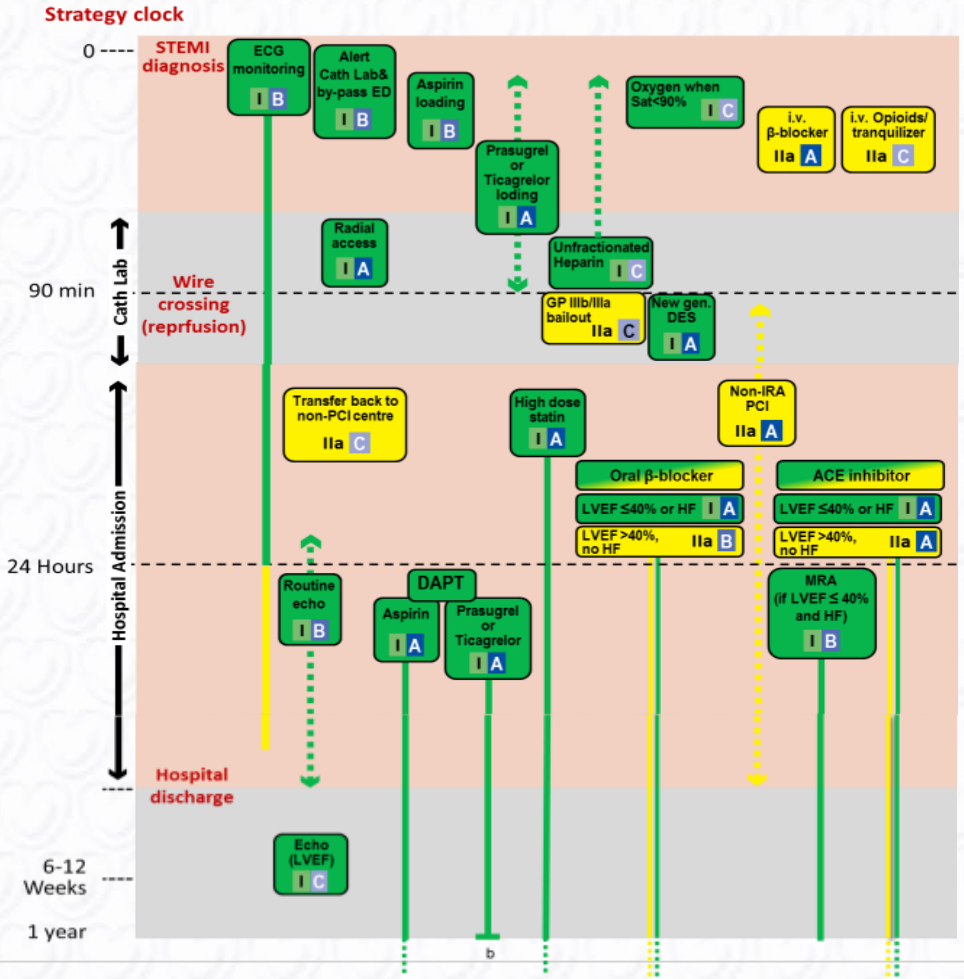
Stefan Agewall[1*], John F. Beltrame[2], Harmony R. Reynolds[3], Alexander Niessner[4], Giuseppe Rosano[5,6], Alida L. P. Caforio[7], Raffaele De Caterina[8], Marco Zimarino[8], Marco Roffi[9], Keld Kjeldsen[10], Dan Atar[1], Juan C. Kaski[6], Udo Sechtem[11], and Per Tornvall[12], on behalf of the WG on Cardiovascular Pharmacotherapy



SUSPECTED DIAGNOSIS AND FURTHER DIAGNOSTIC TESTS

	Non-invasive	Invasive
Myocarditis	**TTE Echo** (Pericardial effusion) **CMR** (Myocarditis, pericarditis)	**Endomyocardial biopsy** (myocarditis)
Coronary (epicardial/ microvascular)	**TTE Echo** (Regional wall motion abnormalities, embolic source) **CMR** (small infarction) **TOE/Bubble Contrast Echo** (Patent foramen ovale, atrial septal defect)	**IVUS/OCT** (Plaque disruption/dissection) **Ergonovine/Ach test** (Spasm) **Pressure/Doppler wire** (Microvascular dysfunction)
Myocardial disease	**TTE Echo** **CMR** (Takotsubo, others)	
Pulmonary Embolism	**D-dimer**(Pulmonary embolism) **CT scan** (Pulmonary embolism) **Thrombophilia screen**	
Oxygen supply/ demand imbalance- Type 2 MI	**Blood test,** **Extracardiac investigation**	

"Do not forget" interventions in STEMI patients undergoing a primary PCI strategy



www.escardio.org/guidelines 2017 ESCGuidelines for the Management of AMI-STEMI (European Heart Journal 2017 - doi:10.1093/eurheartj/ehx095)

Thank you!