PCI post Thrombolysis, How to apply?

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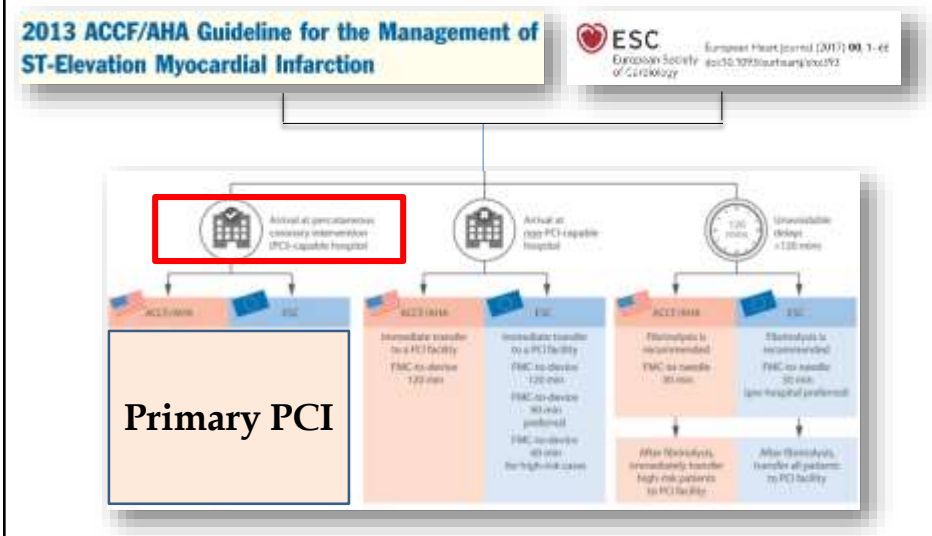
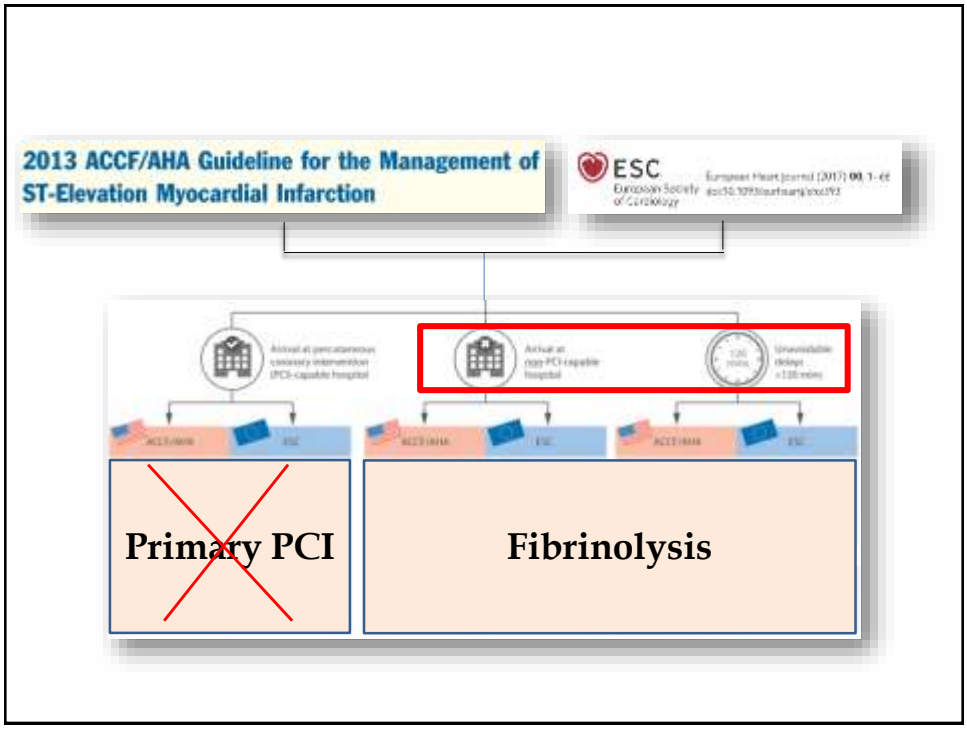




Fibrinolytic therapy

Non- PCI center

ESC European Society of Cardiology

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.	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

Dose of fibrinolytic agents

Drug	Initial treatment	Specific contra-indications
Doses of fibrinolytic therapy		
Streptokinase	1.5 million units over 30–60 min i.v.	Previous treatment with streptokinase or anistreplase
Alteplase (tPA)	15 mg i.v. bolus 0.75 mg/kg i.v. over 30 min (up to 50 mg) then 0.5 mg/kg i.v. over 60 min (up to 35 mg)	
Reteplase (rPA)	10 units + 10 units i.v. bolus given 30 min apart	
Tenecteplase (TNK-tPA)	Single i.v. bolus: 30 mg (6000 IU) if <60 kg 35 mg (7000 IU) if 60 to <70 kg 40 mg (8000 IU) if 70 to <80 kg 45 mg (9000 IU) if 80 to <90 kg 50 mg (10000 IU) if ≥90 kg It is recommended to reduce to half-dose in patients ≥75 years of age.	

www.escardio.org/guidelines

Indications for fibrinolytic therapy in suspected acute myocardial infarction: collaborative overview of early mortality and major morbidity results from all randomised trials of more than 1000 patients

*Fibrinolytic Therapy Trialists' (FTT) Collaborative Group**

Randomized 1000 patients presenting with STE or BBB
fibrinolytic therapy and control

⇩

significant absolute **mortality** reduction
30 per 1000 for those presenting within 0-6 h and
20 per 1000 for those presenting 7-12 h from symptom onset

Lancet 1994; 343: 311-22

Max. Benefit of Fibrinolysis

Thrombolytic therapy in the elderly

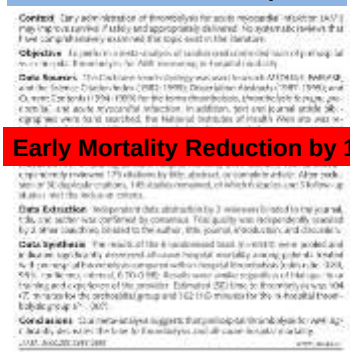
With the new FTT data, there is now clear clinical trial evidence that thrombolytic therapy is beneficial in elderly patients who present within 12 h of symptom onset and fulfil the electrocardiographic eligibility criteria. Their event rates remain high even with the best new thrombolytic regimens available and irrespective of the reperfusion strategy used. But rather than being excluded from treatment, the elderly should be the focus of more intensive research so that better treatments can be developed. Considering all of the information currently

THE LANCET • Vol 356 • December 16, 2000

Mortality and Prehospital Thrombolysis for Acute Myocardial Infarction
A Meta-analysis

(<2 h after symptom onset)

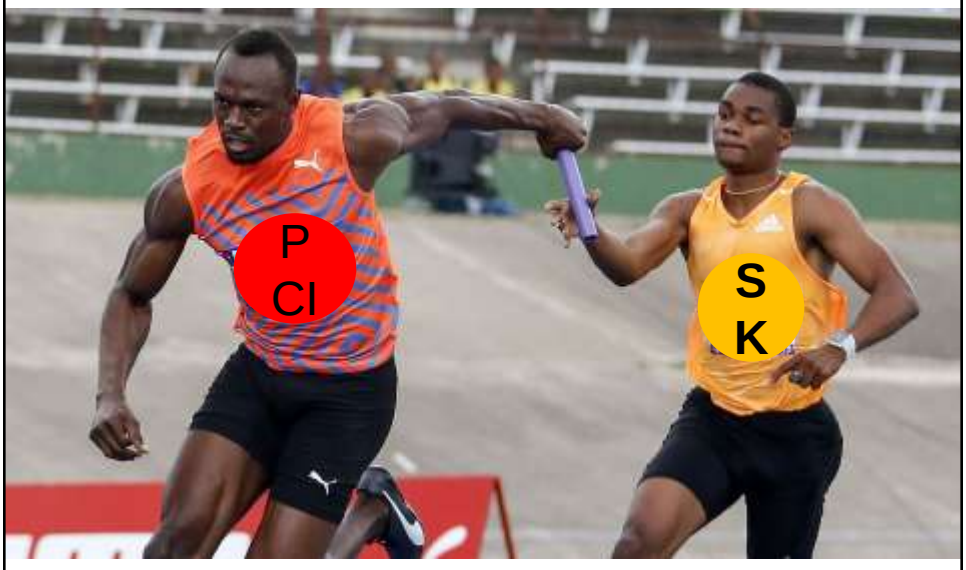
Six randomized trials (n = 6434)



Early Mortality Reduction by 17%

JAMA, 2000;283:2686-92

PCI after fibrinolytic therapy:
How, When, and Why?



How……

ESC Guidelines 2017 - AMI-STEMI

Primary PCI and fibrinolysis procedures

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Recommendations	Class	Level
Interventions following fibrinolysis		
Transfer after fibrinolysis		
Transfer to a PCI-capable centre following fibrinolysis is indicated in all patients immediately after fibrinolysis.	I	A
Interventions following fibrinolysis		
Emergency angiography and PCI if indicated is recommended in patients with heart failure/shock.	I	A
Rescue PCI is indicated immediately when fibrinolysis has failed (< 50% ST-segment resolution at 60-90 min) or at any time in the presence of haemodynamic or electrical instability, or worsening ischaemia.	I	A
Angiography and PCI of the IRA, if indicated, is recommended between2 and 24 hours after successful fibrinolysis.	I	A
Emergency angiography and PCI if needed is indicated in the case of recurrent ischaemia or evidence of reocclusion after initial successful fibrinolysis.	I	B

When……

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

Indications for Transfer for Angiography After Fibrinolytic Therapy

	COR	LOE
Immediate transfer for cardiogenic shock or severe acute HF irrespective of time delay from MI onset	I	B
Urgent transfer for failed reperfusion or reocclusion	IIa	B
As part of an invasive strategy in stable* patients with PCI between 3 and 24 h after successful fibrinolysis	IIa	B

*Although individual circumstances will vary, clinical stability is defined by the absence of low output, hypotension, persistent tachycardia, apparent shock, high-grade ventricular or symptomatic supraventricular tachyarrhythmias, and spontaneous recurrent ischemia.

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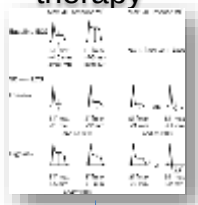
When……

Reperfusion (fibrinolytic) therapy

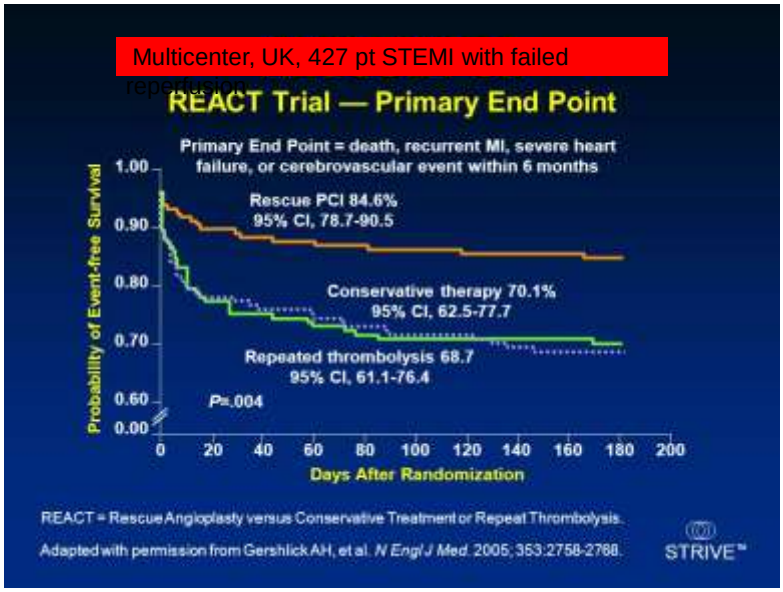


YES

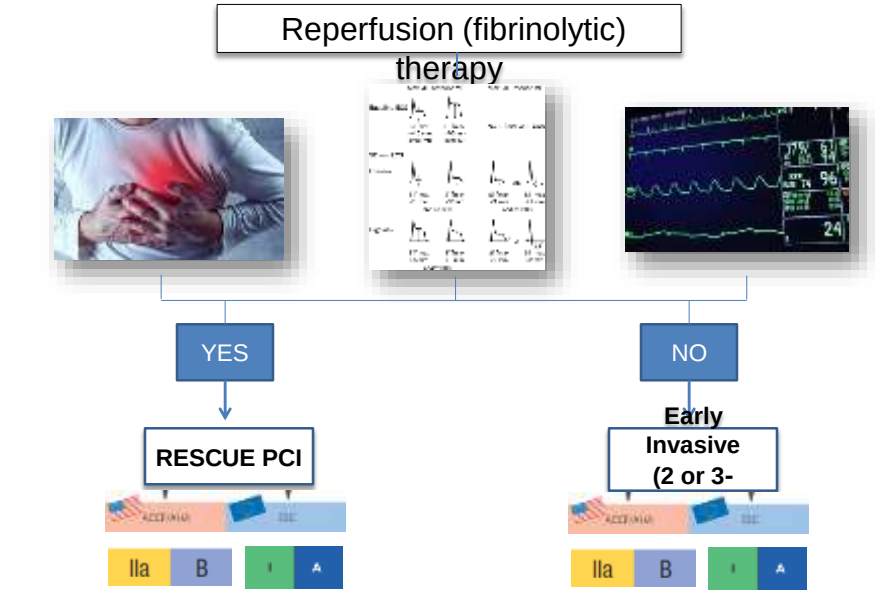
RESCUE PCI

IIa B I A

Why……


Multicenter, UK, 427 pt STEMI with failed reperfusion
REACT Trial — Primary End Point
Primary End Point = death, recurrent MI, severe heart failure, or cerebrovascular event within 6 months
Probability of Event-free Survival
1.00
0.90
0.80
0.70
0.60
0.00
Rescue PCI 84.6%
95% CI, 78.7-90.5
Conservative therapy 70.1%
95% CI, 62.5-77.7
Repeated thrombolysis 68.7
95% CI, 61.1-76.4
P=.004
0
20
40
60
80
100
120
140
160
180
200
Days After Randomization
REACT = Rescue Angioplasty versus Conservative Treatment or Repeat Thrombolysis.
Adapted with permission from Gershlick AH, et al. N Engl J Med. 2005;353:2758-2768.
STRIVE™

When……

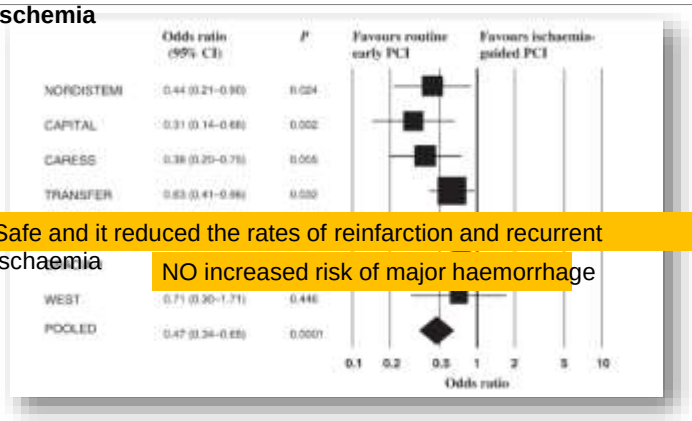

Reperfusion (fibrinolytic) therapy
YES
NO
RESCUE PCI
Early Invasive (2 or 3-
IIa
B
IIa
B

Why……

Routine early coronary angioplasty versus ischaemia-guided angioplasty after thrombolysis in acute STEMI: a meta-analysis (3195 patient)

Savio P. D'Souza, Mamas A. Mamas, Douglas G. Fraser, & Farzin Fath-Ordoubadi

Thirty-day combined endpoint of mortality, re-infarction, and ischemia



Safe and it reduced the rates of reinfarction and recurrent ischaemia

NO increased risk of major haemorrhage

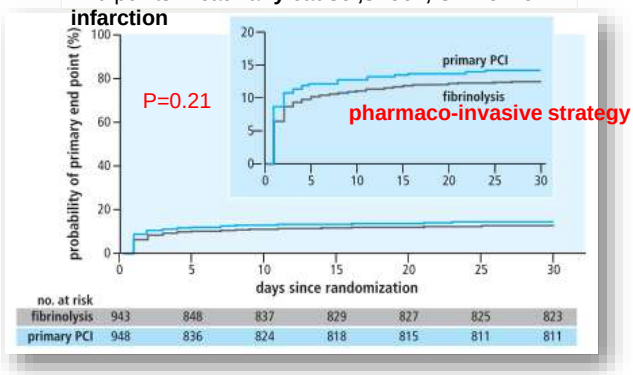
European Heart Journal (2011) 32, 972–982

Why……

Strategic Reperfusion Early after Myocardial Infarction **(STREAM)** study

Randomized, multicenter, international study (15 countries) , **1892** patients comparing pre-hospital fibrinolysis with PPCI in **early presenting STEMI** patients

End points: **Death any cause ,shock, CHF or re-infarction**

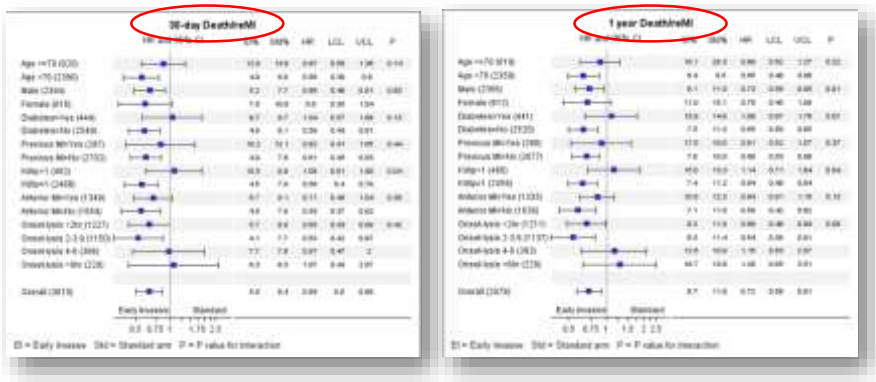


Armstrong et al. N Engl J Med 2013;368:1379-87.

Why……

Consistency of benefit from an early invasive strategy after fibrinolysis: a patient-level meta-analysis

(Seven randomized controlled trials)



Benefit across patient sub-groups

Heart 2015;101(19):1554–1561

Why……

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 8, NO. 1, 2015
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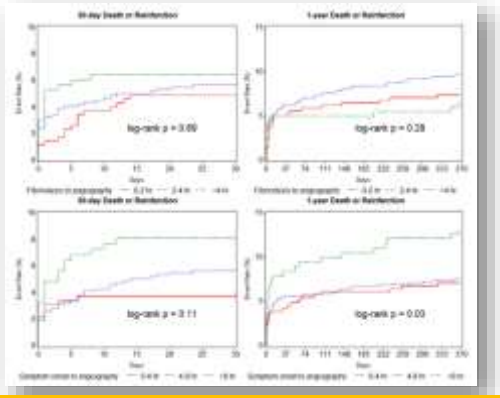
Relationship Between Time to Invasive Assessment and Clinical Outcomes of Patients Undergoing an Early Invasive Strategy After Fibrinolysis for ST Segment Elevation Myocardial Infarction

A Patient-Level Analysis of the Randomized Early Routine Invasive Clinical Trials



Very early angiography (<2 h) after fibrinolysis was not associated with an increased risk of 30-day death/reinfarction or in-hospital major bleeding, and angiography within 4 h after fibrinolysis was associated with reduced 30-day recurrent ischemia

Fibrinolytic therapy *(continued)*

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Recommendations	Class	Level
Interventions following fibrinolysis		
Transfer after fibrinolysis		
Transfer to a PCI-capable centre following fibrinolysis is indicated in all patients immediately after fibrinolysis.	I	A
Interventions following fibrinolysis		
Emergency angiography and PCI if indicated is recommended in patients with heart failure/shock.	I	A
Rescue PCI is indicated immediately when fibrinolysis has failed (< 50% ST-segment resolution at 60-90 min) or at any time in the presence of haemodynamic or electrical instability, or worsening ischaemia.	I	A
Angiography and PCI of the IRA, if indicated, is recommended between2 and 24 hours after successful fibrinolysis.	I	A
Emergency angiography and PCI if needed is indicated in the case of recurrent ischaemia or evidence of reocclusion after initial successful fibrinolysis.	I	B

NEW

Antithrombotic in Patients With STEMI Treated With Fibrinolytic Therapy

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

Adjunctive Antithrombotic Therapy to Support Reperfusion With Fibrinolytic Therapy

	COR	LOE
Antiplatelet therapy		
Aspirin		
• 162- to 325-mg loading dose	I	A
• 81- to 325-mg daily maintenance dose (indefinite)	I	A
• 81 mg daily is the preferred maintenance dose	IIa	B
$P2Y_{12}$ receptor inhibitors		
• Clopidogrel	I	A
• Age ≤75 y: 300-mg loading dose		
• Followed by 75 mg daily for at least 14 d and up to 1 y in absence of bleeding	I	A (14 d) C (up to 1 y)
• Age >75 y: no loading dose, give 75 mg	I	A
• Followed by 75 mg daily for at least 14 d and up to 1 y in absence of bleeding	I	A (14 d) C (up to 1 y)

ASA + Clopidogrel

Reduces the risk of cardiovascular events &overall mortality

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

Adjunctive Antithrombotic Therapy to Support Reperfusion With Fibrinolytic Therapy (cont.)

	COR	LOE
Anticoagulant therapy		
• UFH:	I	C
• Weight-based IV bolus and infusion adjusted to obtain aPTT of 1.5 to 2.0 times control for 48 h or until revascularization. IV bolus of 60 U/kg (maximum 4000 U) followed by an infusion of 12 U/kg/h (maximum 1000 U) initially, adjusted to maintain aPTT at 1.5 to 2.0 times control (approximately 50 to 70 s) for 48 h or until revascularization		
• Enoxaparin:	I	A
• If age <75 y: 30-mg IV bolus, followed in 15 min by 1 mg/kg subcutaneously every 12 h (maximum 100 mg for the first 2 doses)		
• If age ≥75 y: no bolus, 0.75 mg/kg subcutaneously every 12 h (maximum 75 mg for the first 2 doses)		
• Regardless of age, if CrCl <30 mL/min: 1 mg/kg subcutaneously every 24 h		
• Duration: For the index hospitalization, up to 8 d or until revascularization		
• Fondaparinux:	I	B
• Initial dose 2.5 mg IV, then 2.5 mg subcutaneously daily starting the following day, for the index hospitalization up to 8 d or until revascularization		
• Contraindicated if CrCl <30 mL/min		

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ESC Guidelines 2017 - AMI-STEMI

Primary PCI and fibrinolysis procedures

ESC European Society of Cardiology

Recommendations	Class	Level
Anticoagulation co-therapy with fibrinolysis		
Anticoagulation is recommended in patients treated with lytics until revascularization (if performed) or for the duration of hospital stay up to 8 days. The anticoagulant can be:	I	A
• Enoxaparin i.v. followed by s.c. (preferred over UFH).	I	A
• UFH given as a weight-adjusted i.v. bolus followed by infusion.	I	B
• In patients treated with streptokinase: fondaparinux i.v. bolus followed by an s.c. dose 24 hours later. only with SK	IIa	B
Antiplatelet co-therapy with fibrinolysis		
Oral or i.v. aspirin is indicated.	I	B
Clopidogrel is indicated in addition to aspirin.	I	A
DAPT (in the form of aspirin plus a $P2Y_{12}$ inhibitor) is indicated for up to 1 year in patients undergoing fibrinolysis and subsequent PCI.	I	C

NEW IIb C: 48 hrs after fibrinolysis, switch to potent $P2Y_{12}$ inhibitors may be considered

Prasugrel and ticagrelor have not been studied as adjuncts to fibrinolysis.

Conclusion

- Primary PCI remains the standard reperfusion therapy in acute STEMI
- FT should be considered in STEMI patients presenting early after symptom onset, when the expected time delay to PCI is prolonged
- All patients treated with FT (pre-hospital or in a non-PCI capable hospital) should be transferred to a PCI centre for Pharmaco-invasive strategy :
  - Rescue PCI is considered in failed fibrinolysis
  - Routine early PCI if indicated is performed between 2-24 hrs after successful fibrinolysis