Management of Angina

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Management of angina

- Symptoms of angina is produced by myocardial ischaemia

  – Imbalance between O2 demand and supply
    - reduction in supply; narrowing of coronary vessels
    - Increase in demand; AS, HT

    Narrowing of coronary vessels

    70-80% narrowing is required

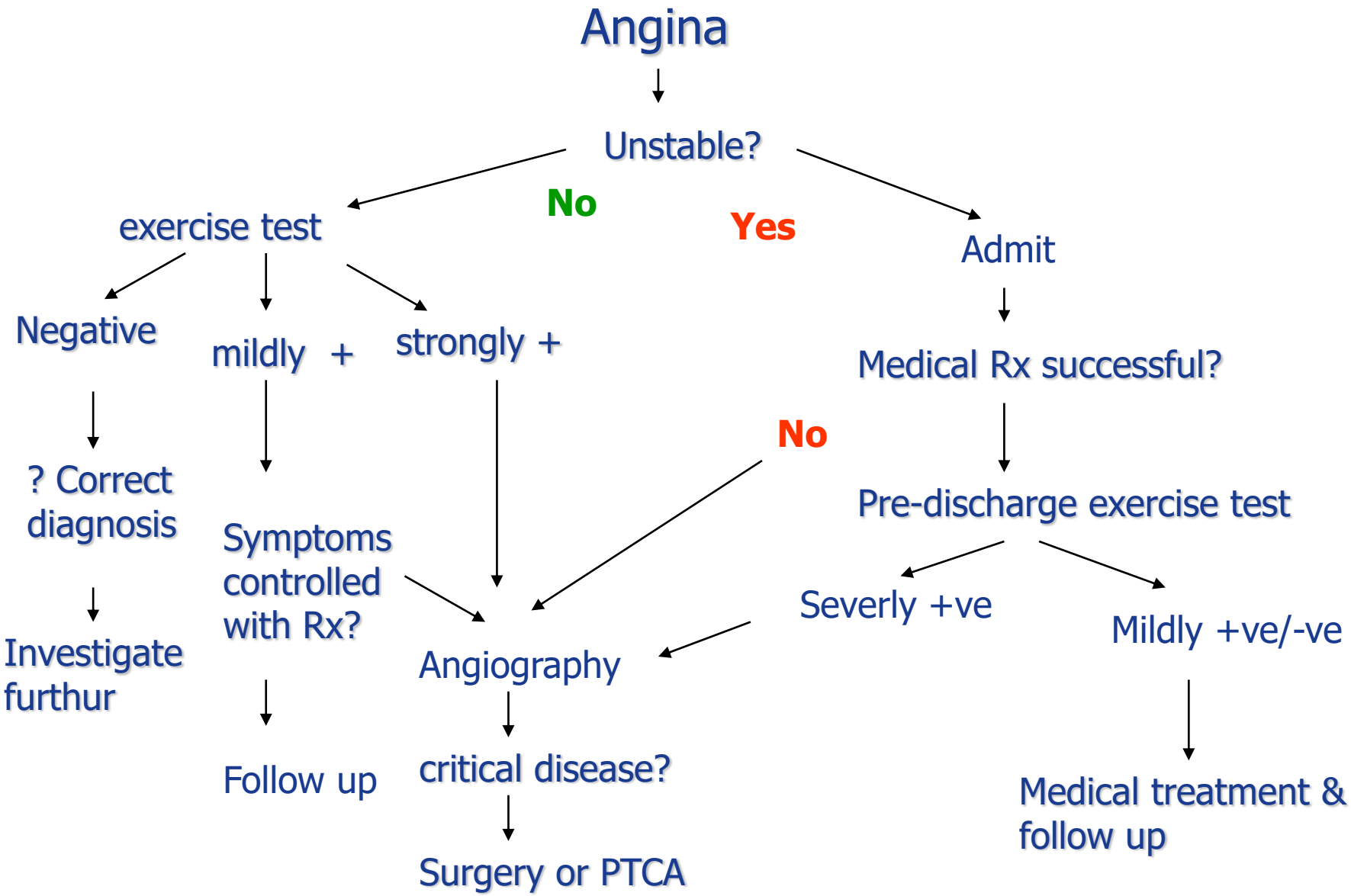
    >90% narrowing; symptoms at rest

Management of angina

- Educate the patient
  - Nature of illness
  - Good prognosis (annual mortality <2%)
- Manage co-existing conditions
  - Diabetes
  - Hypertension
  - Hypothyroidism, anaemia
- Evaluate risk factors
  - Smoking
  - Hypercheolesterolaemia
  - Regular exercises/ weight loss
- Decision between medical Rx/ surgical intervention

Management of angina

- Management
  - Medical management
  - Surgical management
  - Modification of risk factors


Angina
Unstable?
No
Yes
exercise test
Admit
Negative
mildly +
strongly +
Medical Rx successful?
No
? Correct diagnosis
Symptoms controlled with Rx?
Pre-discharge exercise test
Severly +ve
Mildly +ve/-ve
Investigate furthur
Angiography
Follow up
critical disease?
Medical treatment & follow up
Surgery or PTCA

Management of angina

Medical management

- Treatment decision should be tailored to the individual patient

- Selection of drugs from
  - Nitrates,
  - B blockers
  - Calcium channel blockers
  - K channel blockers

Management of angina

Nitrates

Reduce venous return: reduce intra-cardiac diastolic pressure
Vasodilatation: reduce left ventricular impedance to emptying

Short acting
- » Glyceryl trinitrate (GTN; SL/ Spray)

Long acting
- » Isosorbide dinitrate (twice / thrice daily)
- » Isosorbide mononitrate (once daily)

Management of angina

Beta blockers

Reduce heart rate
Reduce force of ventricular contraction
Reduce myocardial O2 demand esp. on exertion
Proven benefit in 2ry prevention

Beta blockers

- Selective (B1): Atenolol, Metoprolol, Bisaprolol

Management of angina

Calcium channel blockers

Relax coronary vessels
Peripheral vasodilatation
Reduce force of ventricular contraction
Reduce HR (non-dihydropiridine Ca B)

- Verapamil
- Diltiazem

Nicorandil

a potasium channel activator; both arterial and venous dilators
Not used as a first line drug.
When others are contraindicated / refractory angina

Management of angina

- General measures
    - Antiplatelets (Aspirin, Clopidogrel)
    - Lipids; dietary modifications, statins
    - Hypertension
    - Life-style changes; smoking, exercise

Management of angina

- Surgical management
    - Angioplasty and stenting
    - Coronary artery bypass grafting (Tripple vessel)

Management of acute coronary syndromes

Management of acute coronary syndromes- Principles

- Is a medical emergency
  - Immediate IV access
- Management:
  - Duel anti-platelet therapy
  - Lipid lowering
  - Pain relief
  - Specific treatment Other acute therapy
  - Complications

Management—including both diagnosis and treatment—of AMI

- Should start at the point of first medical contact (FMC)
  - Paramedic
  - GP, physician or other medical personnel in the pre-hospital setting
  - Hospital emergency department
- therefore often in the outpatient setting

High index of suspicion

- Duel antiplatelet therapy
  - Aspirin 300 mg
  - Clopidogrel 300 mg
- High dose lipid lowering
  - Atorvastatin 40-80mg
- Pain relief?
  - Opiates
  - Iv morphine 5-10mg + antiemetic

Recommendations	Class [a]
A 12-lead ECG must be obtained as soon as possible at the point of FMC, with a target delay of ≤10 min.	I
ECG monitoring must be initiated as soon as possible in all patients with suspected STEMI.	I
Blood sampling for serum markers is recommended routinely in the acute phase but one should not wait for the results before initiating reperfusion treatment.	I
The use of additional	

Components of delay

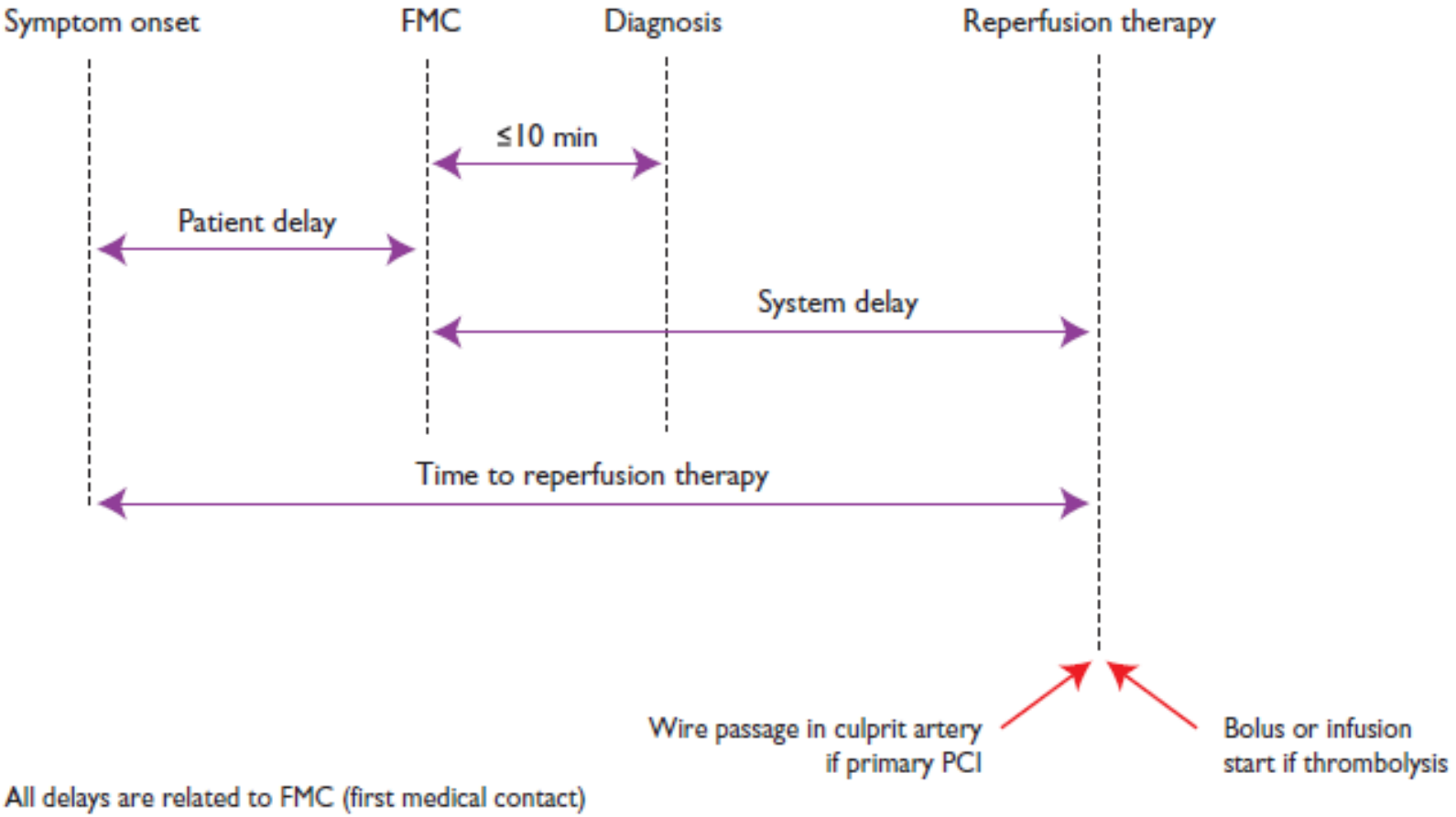


Figure 1 Components of delay in STEMI and ideal time intervals for intervention.

Table 10 A summary of important delays and treatment goals in the management of acute ST-segment elevation myocardial infarction

Delay	Target
Preferred for FMC to ECG and diagnosis	**≤10 min**
Preferred for FMC to fibrinolysis ('FMC to needle')	**≤30 min**
Preferred for FMC to primary PCI ('door to balloon') in primary PCI hospitals	**≤60 min**
Preferred for FMC to primary PCI	**≤90 min** (≤60 min if early presenter with large area at risk)
Acceptable for primary PCI rather than fibrinolysis	**≤120 min** (≤90 min if early presenter with large area at risk) if this target cannot be met, consider fibrinolysis.
Preferred for successful fibrinolysis to angiography	**3–24 h**

FMC = first medical contact; PCI = percutaneous coronary intervention.

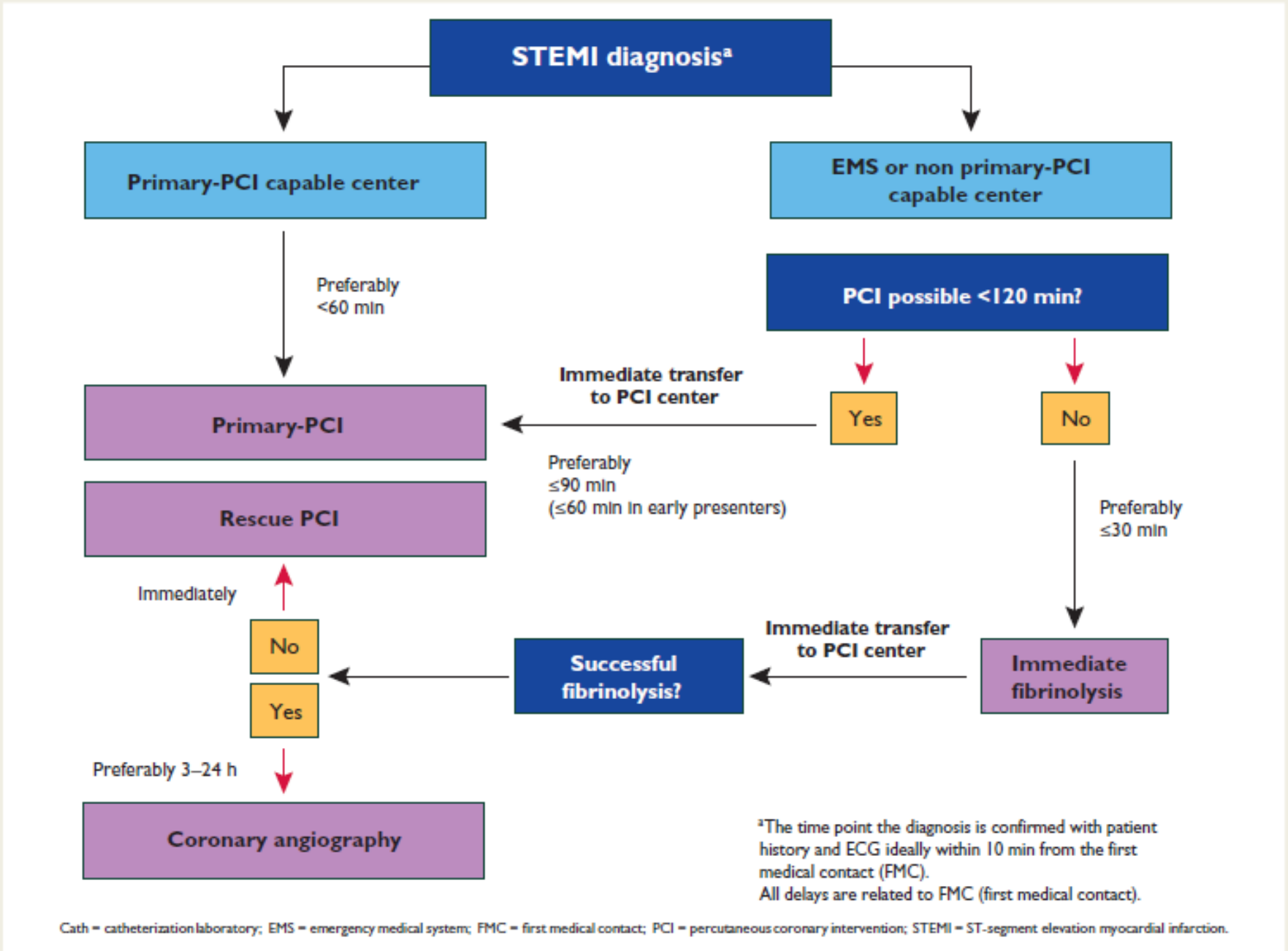
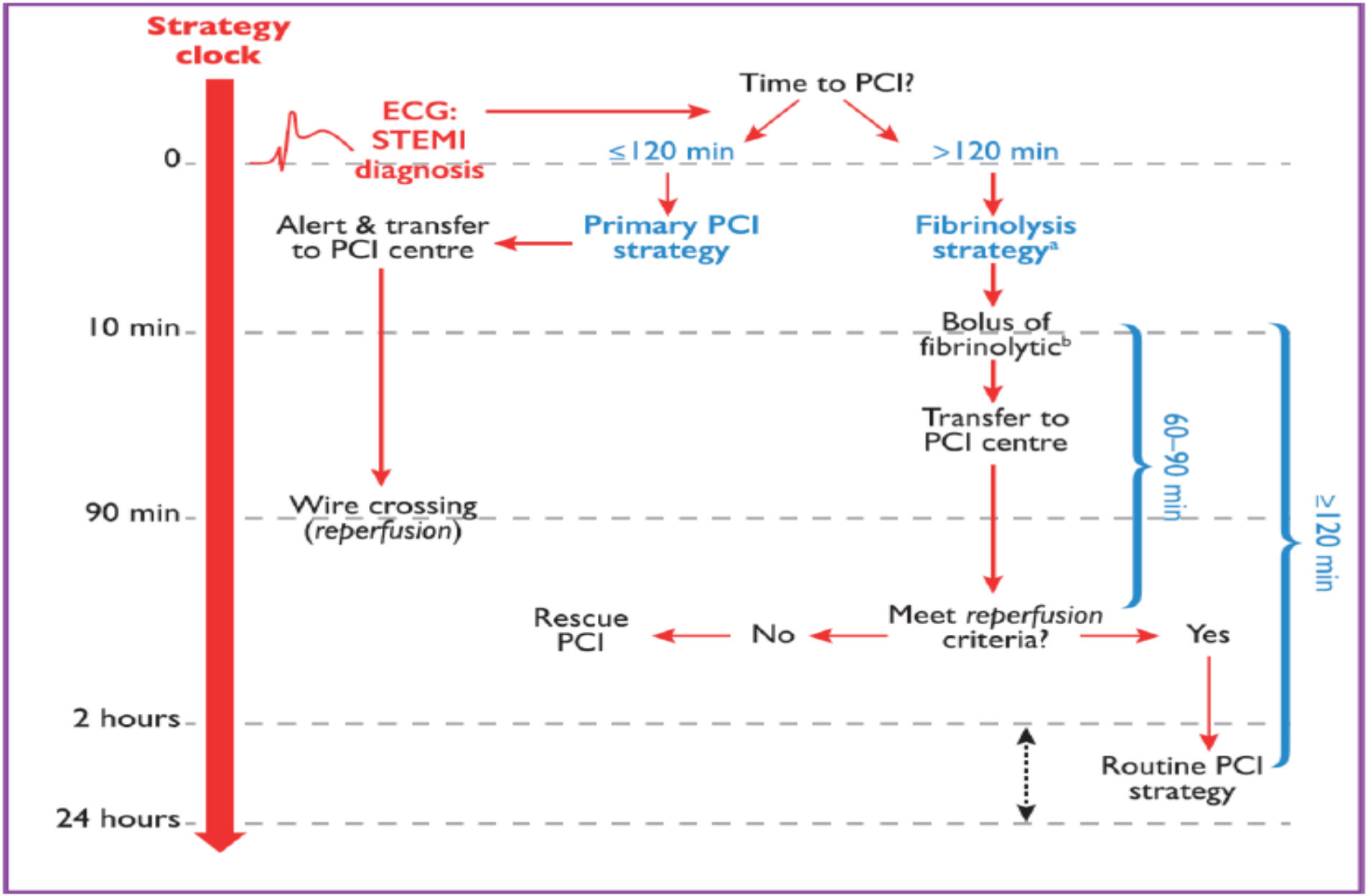


Figure 2 Prehospital and in-hospital management, and reperfusion strategies within 24 h of FMC (adapted from Wijns *et al.*).[4]

Sri Lanka


Strategy clock
0
10 min
90 min
2 hours
24 hours
ECG: STEMI diagnosis
Time to PCI?
≤120 min
>120 min
Primary PCI strategy
Alert & transfer to PCI centre
Fibrinolysis strategy[a]
Bolus of fibrinolytic[b]
Transfer to PCI centre
Wire crossing (reperfusion)
Meet reperfusion criteria?
No
Rescue PCI
Yes
Routine PCI strategy
60–90 min
≥120 min

able 9 Recommendations for reperfusion

Recommendations	Class [a]	Level [b]
Reperfusion therapy is indicated in all patients with symptoms of <12 h duration and persistent ST-segment elevation or (presumed) new LBBB.	I	A
Reperfusion therapy (preferably primary PCI) is indicated if there is evidence of ongoing ischaemia, even if symptoms may have started >12 h beforehand or if pain and ECG changes have been stuttering.	I	C

Re-perfusion cont..

Reperfusion therapy with primary PCI may be considered in stable patients presenting 12–24 h after symptom onset.	IIb	B
Routine PCI of a totally occluded artery >24 h after symptom onset in stable patients without signs of ischaemia (regardless of whether fibrinolysis was given or not) is not recommended.	III	A

ECG = electrocardiogram; i.v. = intravenous; LBBB = left bundl
PCI = percutaneous coronary intervention.
[a]Class of recommendation.
[b]Level of evidence.
[c]References.

Choice of thrombolytic agent

- Traditionally, streptokinase has been the most commonly used thrombolytic agent in Sri Lanka.

- However, streptokinase is not fibrin-specific, requires to be given as an infusion over one hour and may be associated with hypersensitivity reactions.

Choice of thrombolytic agent

- Tenecteplase has the advantage of being fibrin-specific, can be given as a bolus dose, and has a lower incidence of hypersensitivity reactions.

- TIMI 3 flow in the infarct related coronary artery may also occur more frequently with tenecteplase when compared to streptokinase.

- However due to the high cost of a tenecteplase, it may be reasonable to triage patients and administer

- Streptokinase for low risk patients and restrict use of tenecteplase for patients who would benefit more from it

Current recommendation of thrombolytic agent in SL

All STEMI < 60 yrs of age

All STEMI with complication

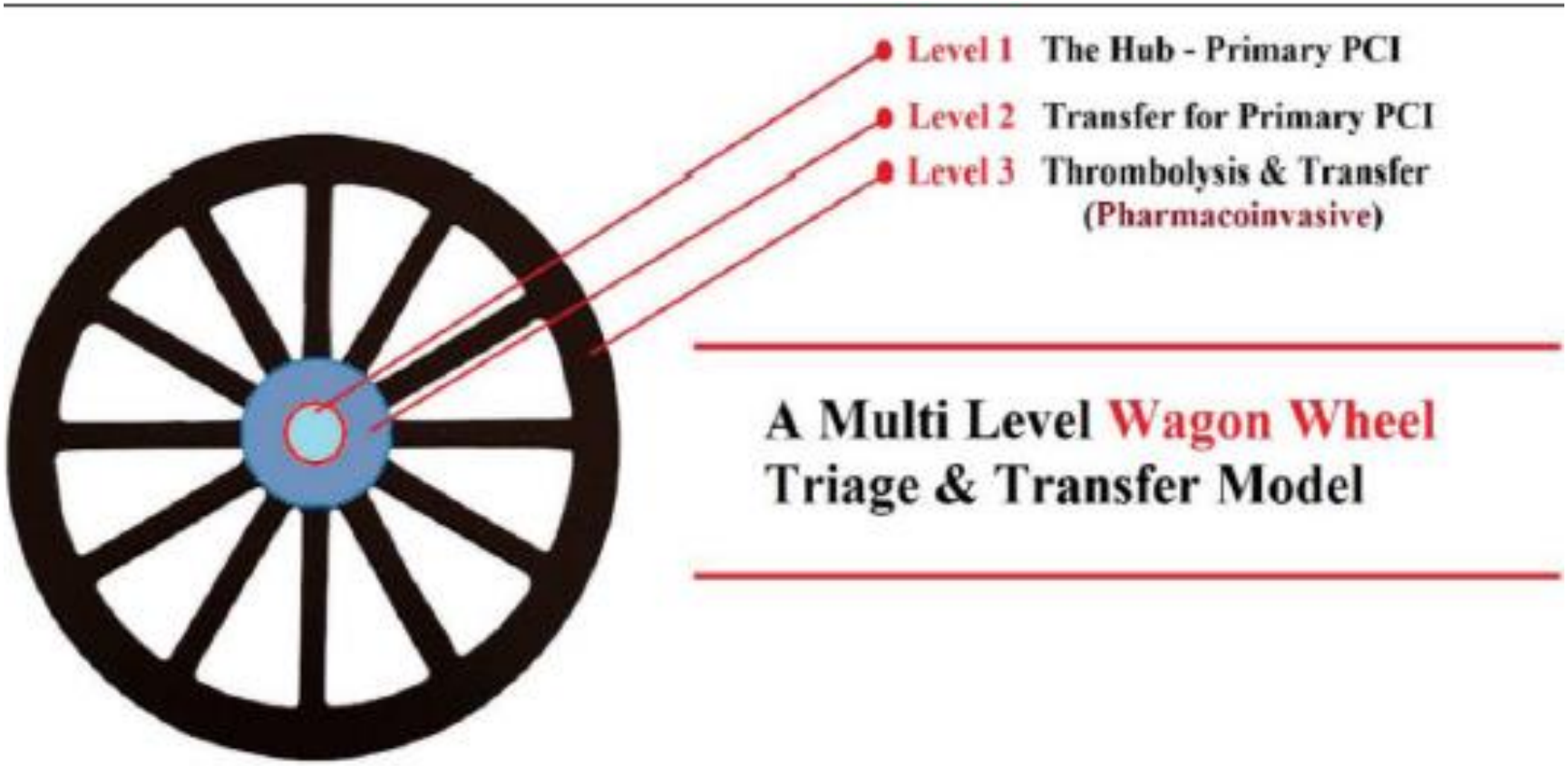
All anterior STEMI or STEMI with LBBB

- TNK

Other STEMI

- SK

Recommendations for SL



Level 1

- Is the hub where PCI enabled hospitals are located

- They are equipped with Catheterization laboratory facilities and could perform primary PCIs as early as two hours

Level 2

- Geographically closer to the hub, is to immediately transfer patients to the Hub for primary PCI within 30 minutes.

Level 3

- Further away from the Hub, taking more than two hours to transfer the patient to the hub

- Is to implement a pharmacoinvasive strategy

Level 2 & 3

- Hospitals where catheterization facilities are not available and the patients undergo thrombolytic therapy after diagnosis,

- it is recommended that these hospitals use Tenecteplase as the thrombolytic agent,

- However currently in Sri Lanka Streptokinase is the more commonly used thrombolytic agent.

Protocols to be followed in cohesion with the Wagon Wheel Model

1. In case of STEMI
   - Aspirin 300mg
   - Clopidogrel 300mg
   - Heparin 5000 bolus

2. Decide on reperfusion strategy

If transferable to a PCI capable hospital within 2h:

- Discuss with on call cardiologist/SR/MO regarding the possibility of primary PCI.
- Consider the availability of ambulance/ staff/ traffic.
- If pPCI is possible transfer immediately with MO + resuscitation facilities.
- When transferring patients, document the time, dosage of drugs given, especially Aspirin, Clopidogrel and Heparin.

If not transferable to PCI capable hospital within 2h:

- Thrombolyze

3. Which thrombolytic agent to use?

- All STEMI - TNK (Ideal)

All STEMI < 60 yrs of age

All STEMI with complication

All anterior STEMI or STEMI with LBBB

} - TNK

Other STEMI - SK

Assessing the success of thrombolysis

- If thrombolysis was successful;
  - Patient should be free of pain
  - ECG done in 90 minutes after initiation of the thrombolytic therapy should show resolution of the tallest ST segment in pre thrombolytic ECG by 50%
  - Reperfusion arrhythmia may appear.

If thrombolysis is successful

- Continue anticoagulants for 5 days especially with TNK as reinfarction rates are higher if anticoagulants are withdrawn earlier.

- Discuss and transfer to a PCI centre for coronary angiogram within 24 hours.

- Persistence of angina and non-resolution of ST elevation by 50% would indicate failed thrombolysis

If thrombolysis has failed

- Transfer to PCI centre for coronary angiogram immediately after discussing with the on-call team.

Indications for transfer of patients (after fibrinolytic therapy) to centers with CCUs and/or PCI capabilities
1. Patients in cardiogenic shock or those who are at high risk of developing cardiogenic shock†
2. Failed fibrinolytic therapy
3. High-risk patients‡*

† Age >70 years, systolic blood pressure <120 mmHg, heart rate >110/min or <60/min, and increased time since onset of symptoms.

‡ Patients with ST elevation ≥2 mm in anterior leads or 1 mm in inferior leads who have at least one of the following high-risk factors:

systolic blood pressure < 100 mm Hg,heart rate >100/min, Killip class IIor III, ST-segment depression of ≥2 mm inthe anterior leads, or ST-

** PCI may then be performed as and when needed or as part of a pharmacoinvasive strategy*

Table 15 Doses of fibrinolytic agents

	Initial treatment	Specific contraindications
Streptokinase (SK)	1.5 million units over 30–60 min i.v.	Prior SK or anistreplase
Alteplase (tPA)	15 mg i.v. bolus 0.75 mg/kg over 30 min (up to 50 mg) then 0.5 mg/kg over 60 min i.v. (up to 35 mg)	
Reteplase (r-PA)	10 units + 10 units i.v. bolus given 30 min apart	
Tenecteplase (TNK–tPA)	Single i.v. bolus: 30 mg if <60 kg 35 mg if 60 to <70 kg 40 mg if 70 to <80 kg 45 mg if 80 to <90 kg 50 mg if ≥90 kg	

i.v. = intravenous.

Table 13 Contraindications to fibrinolytic therapy

Absolute
Previous intracranial haemorrhage or stroke of unknown origin at any time
Ischaemic stroke in the preceding 6 months
Central nervous system damage or neoplasms or atrioventricular malformation
Recent major trauma/surgery/head injury (within the preceding 3 weeks)
Gastrointestinal bleeding within the past month
Known bleeding disorder (excluding menses)
Aortic dissection
Non-compressible punctures in the past 24 h (e.g. liver biopsy, lumbar puncture)
Relative
Transient ischaemic attack in the preceding 6 months
Oral anticoagulant therapy
Pregnancy or within 1 week postpartum
Refractory hypertension (systolic blood pressure >180 mmHg and/or diastolic blood pressure >110 mmHg)
Advanced liver disease
Infective endocarditis
Active peptic ulcer
Prolonged or traumatic resuscitation

Management of non-STMI and unstable angina: specific Rx

- Antithrombin
  - Low molecular weight heparins
  - (conventional heparin)
- Glycoprotein IIB/IIIA inhibitors
  - Abciximab
    - (if coronary intervention likely within 24 hrs)
  - Tirofiban
    - In high risk patients managed without intervention

Management of acute coronary syndromes

- Other measures
  - β blockers
  - ACE inhibitors
  - Lipid lowering agents
  - (nitrates)

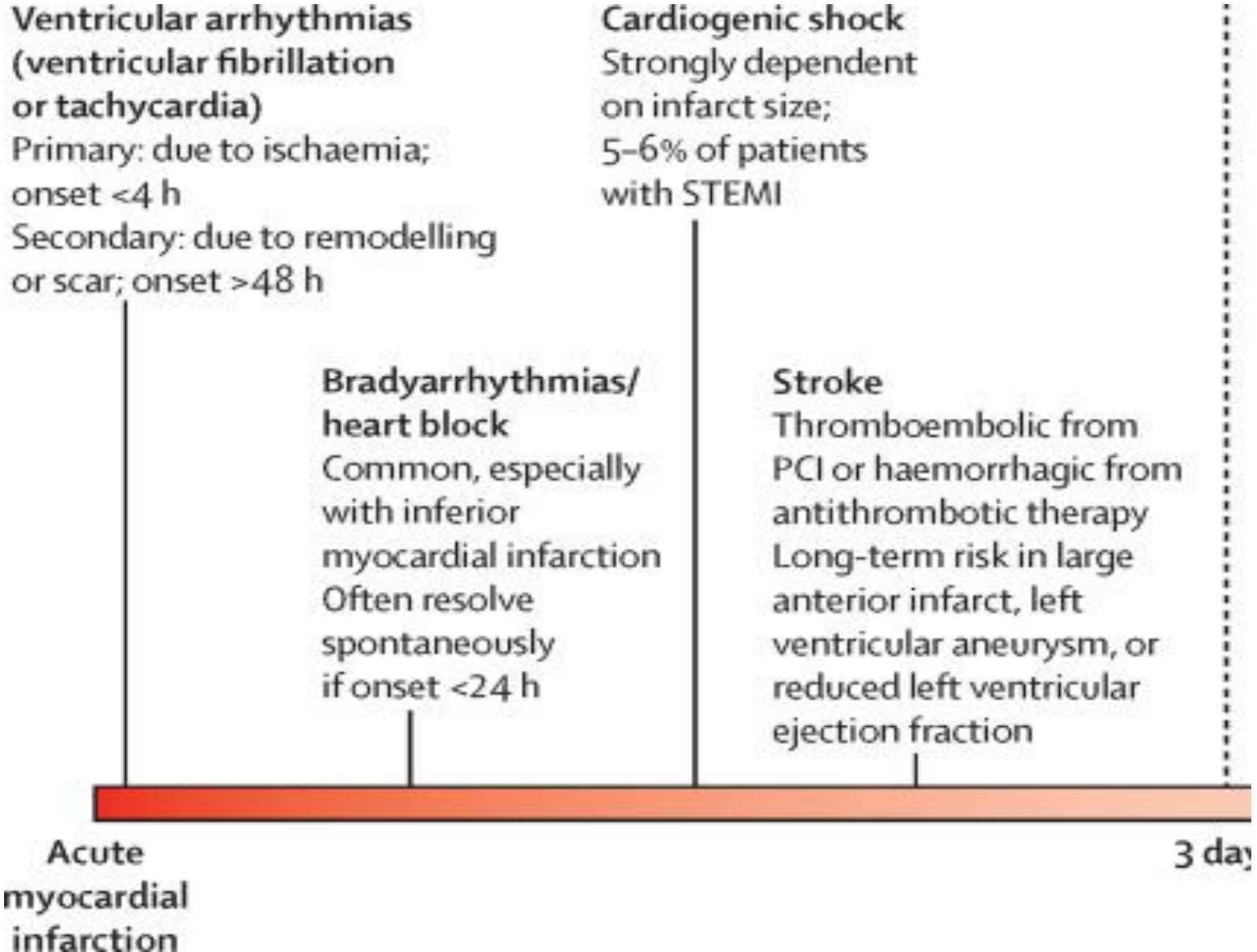
Post MI drug therapy

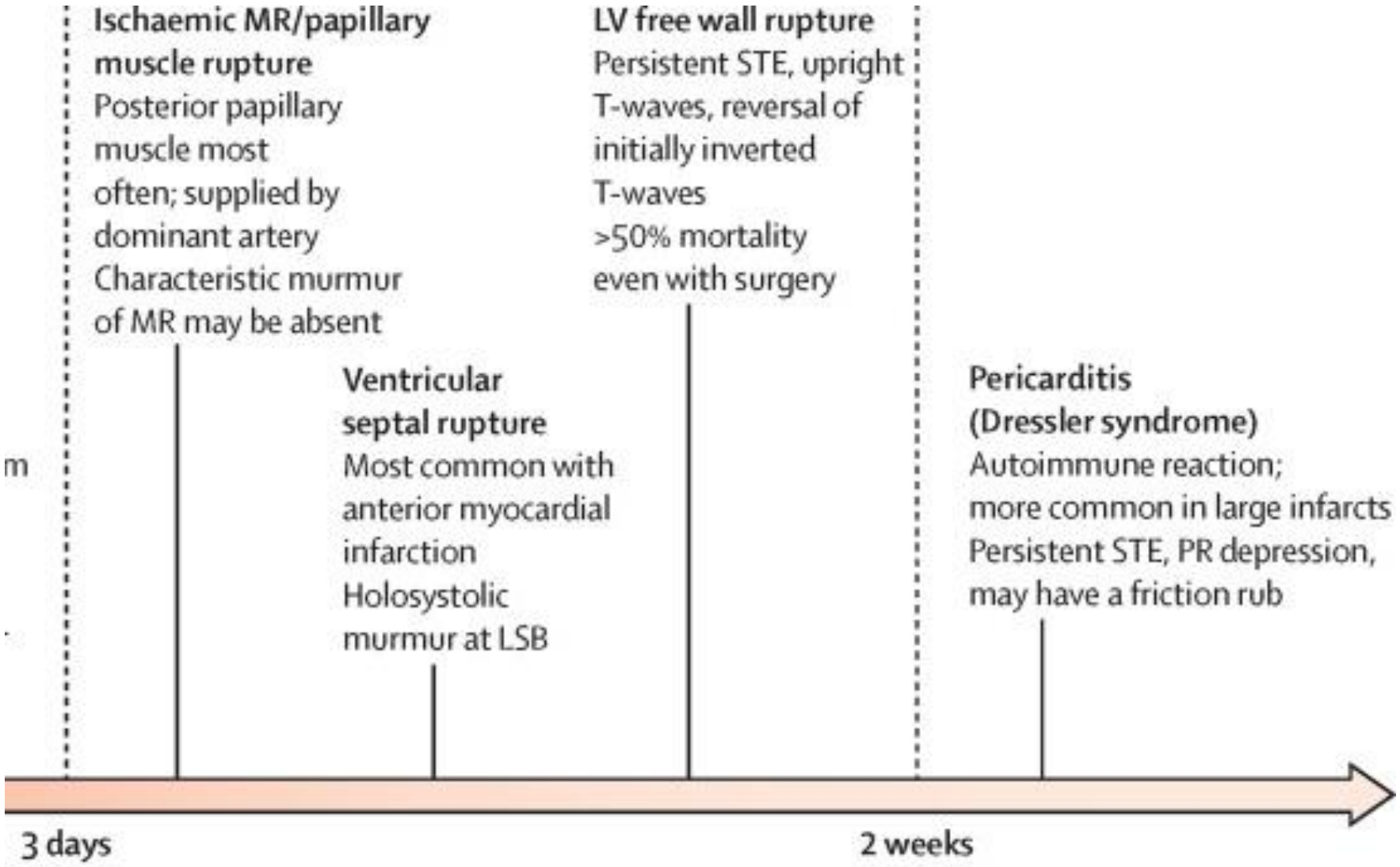
- Reduce mortality over the following years
  - Aspirin 75-100mg/day
  - β blockers to maintain HR <60 b.p.m.
  - ACE inhibitors
  - Lipid lowering agents
  - (long acting nitrates; if there is residual angina)

During the hospital stay

- Identify complications
- Form a preliminary assessment of risk
- Treat complications
- Assess risk for subsequent events (if primary angioplasty has not been done)
  - If uncomplicated with no angina during hospital stay: low level exercise test before discharge
  - Formal ETT 6 weeks later
- Initiate secondary prevention measures
- Initiate rehabilitation

Complications following acute MI


Ventricular arrhythmias (ventricular fibrillation or tachycardia)
Primary: due to ischaemia; onset <4 h
Secondary: due to remodelling or scar; onset >48 h
Bradyarrhythmias/ heart block
Common, especially with inferior myocardial infarction
Often resolve spontaneously if onset <24 h
Cardiogenic shock
Strongly dependent on infarct size;
5–6% of patients with STEMI
Stroke
Thromboembolic from PCI or haemorrhagic from antithrombotic therapy
Long-term risk in large anterior infarct, left ventricular aneurysm, or reduced left ventricular ejection fraction
Acute myocardial infarction
3 day


Ischaemic MR/papillary muscle rupture
Posterior papillary muscle most often; supplied by dominant artery
Characteristic murmur of MR may be absent
Ventricular septal rupture
Most common with anterior myocardial infarction
Holosystolic murmur at LSB
LV free wall rupture
Persistent STE, upright T-waves, reversal of initially inverted T-waves
>50% mortality even with surgery
Pericarditis (Dressler syndrome)
Autoimmune reaction; more common in large infarcts
Persistent STE, PR depression, may have a friction rub
3 days
2 weeks

Patients at risk for further cardiovascular events

- Persistent heart failure or shock
- Severely impaired ventricular function
- Acute mechanical complications
- Angina at rest / minimal exertion
- Recurrent arrhythmias
- Unable to perform exercise tolerance test
- General risk factors
  - Age > 65
  - Multiple risk factors
  - Previous MI

The mortality of STMI

- Affected by many factors such as
  - age,
  - Killip class,
  - time delay to treatment,
  - mode of treatment,
  - history of prior myocardial infarction,
  - diabetes mellitus, renal failure,
  - number of diseased coronary arteries,
  - ejection fraction, and treatment.

TIMI RISK SCORE for STEMI

HISTORICAL	POINTS
Age ≥ 75	3
65-74	2
DM or HTN or angina	1
EXAM	
SBP < 100 mmHg	3
HR >100 bpm	2
Killip II-IV	2
Weight < 67 kg (150 lb)	1
PRESENTATION	
Anterior STE or LBBB	1
Time to Rx > 4 hrs	1

RISK SCORE = Total points (0 -14)

RISK SCORE	30-DAY MORTALITY IN InTIME II(%)*
0	0.8
1	1.6
2	2.2
3	4.4
4	7.3
5	12
6	16
7	23
8	27
>8	36

*Entry criteria: CP > 30 min, ST ↑, sx onset < 6hrs, fibrinolytic-eligible

For more info go to www.timi.org

Morrow et al. *Circulation* 2000; 102:2031-7

Killip Classification of CHF after MI		30-day mortality
Class I	No clinical signs of heart failure	6%
Class II	Rales or crackles, gallop, elevated jugular venous pressure	17%
Class III	Frank acute pulmonary edema	38%
Class IV	Cardiogenic shock	81%

Several recent studies: fall in acute and long-term mortality following STEMI

- With greater use of reperfusion therapy, primary percutaneous coronary intervention (primary PCI) modern antithrombotic therapy and secondary prevention treatments.
- However, mortality remains substantial with approximately 12% of patients dead within 6 months, but with higher mortality rates in higher-risk patients

- Justifies continuous efforts to improve quality of
- care, adherence to guidelines and research.

Prevention

- Patients with established CAD, PVD and cerebrovascular atherosclerotic diseases

- Asymptomatic individuals who are at high risk of atherosclerotic disease due to multiple risk factors
  - Cholesterol > 8mmol/L
  - LDL > 6 mmol/L
  - BP >180/110mmHg

Prevention

- All patients with DM
- Close relatives of
  - patients with early onset atherosclerotic cardiovascular disease
  - Asymptomatic individuals who are at particular risk