Management of Acute Myocardial Infarction

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ST Elevation Acute Myocardial Infarction

Aims Of Management

• Emergency care (Pre-hospital)
• Early care (emergency department)
• Subsequent care (CCU)
• Risk assessment and measures to prevent progression of CAD, new infarction, CHF and death (Regular ward)
Emergency care (Pre-hospital)

50 % of mortality occur in this phase

- Call to ambulance time: 9 minutes
- Transportation time: 40 minutes
- Door to needle time: 24 minutes
- Door to balloon time: ≤ 90 minutes

Room for improvement

- Education for the Public, Patient and Doctors
- Treatment (Thrombolysis/Resuscitation) during transport
- Rapid action and decision making in hospital
Early care (emergency department)

- History of chest pain/discomfort
- ST-segment elevations or (presumed) new LBBB on admission ECG
  - Repeated ECG recordings often needed
- Elevated serum markers (CK-MB, Troponins)
  - Do not wait for the results to initiate reperfusion treatment
- 2D echo and perfusion scintigraphy
STEMI

• Long term prognosis depends on amount of myocardial loss

• Myocardial loss depends on time to reperfusion

Early reperfusion essential

• The golden hour (35 lives saved/1000 treated)

• The 6 hour limit

• The 12 hour limit (16 lives saved/1000 treated)

• The 36 hour limit in shock
STEMI: Early care (emergency department)

- ECG within 10 minutes
- Examination complete within 15 minutes

Typical chest pain + ST elevation in 2 contiguous leads, or new or presumed new LBBB

- Proceed to:
  - Initial Adjuvant measures
  - Reperfusion
**STEMI**: Early care (emergency department)

Initial Adjuvant Measures

- Blood Sample for cardiac enzymes
- Morphia 4 – 8 mg
- O₂ 2 L /min
- ASA 75 – 165 mg non-enteric coated crushed
- IV β blockers
- IV Nitroglycerine
STEMI: Role of Antiplatelet Drugs

- Significance of previous regular use of aspirin
- Initial aspirin is a must
  - 75 – 165 mg non-enteric coated, crushed
- Aspirin Resistance
  - Diagnose by platelet aggregometry or Urinary thromboxane metabolites excretion
  - Use clopidogrel (600 mg) instead
- Aspirin intolerance
  - Use clopidogrel (no data yet)
- Routine use of IIb/IIIa blockers not yet recommended
STEMI: Reperfusion Methods

Best done by Primary PTCA/Stenting:

- Immediate result
- Treats underlying disease (TVR)
- No contraindications
- Low danger of hemorrhagic complications
STEMI: Acute Triage in Hospital

Subsequent care (CCU)

When not to use primary PCI

- Door to balloon time > 90 minutes
- Facilities not available
- Low volume center / inexperienced staff

When is PCI a must

Cardiogenic shock

- within 36 hour of pain
- within 18 hour of shock
STEMI: Primary PCI

- Cover with IIb/IIIa blockers
- Treat culprit lesion only *(Except in Cardiogenic shock)*
- Surgical back-up not essential
- Distal protection device not important
STEMI: PCI

Facilitated PCI:

- PCI performed as a matter of policy immediately after fibrinolytic therapy.
  - POBA
  - Stenting

Rescue PCI:

- PCI performed on a coronary artery which remains occluded despite fibrinolytic therapy.
- Data suggest clinical benefit if infarct related artery can be recanalised by angioplasty, But:
  - No effective non-invasive method to assess patency
  - Transfer to tertiary center is safe
  - Concomitant use of IIb IIIa may lead to excessive bleeding complications
STEMI: Problems With Thrombolysis

- **Patency Rate**
  - TIMI III 55 – 60 %
  - Overall 70 - 85 %

- **Re-occlusion Rate**
  - 25 – 32 %

- **Hemorrhagic Complication**
  - Procedure Related
    - Intracerebral Hage 0.5-1 %
    - Stroke 2 %
    - Age>75 4%
# Fibrinolytic Regimens For Acute Myocardial Infarction

<table>
<thead>
<tr>
<th>Fibrinolytic Agent</th>
<th>Initial treatment</th>
<th>Antithrombin co-therapy</th>
<th>Specific contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptokinase (SK)</td>
<td>1.5 million units in 100 ml of 5% dextrose or 0.9% saline over 30-60 min</td>
<td>None or i.v. heparin for 24 to 48 h</td>
<td>Prior SK or anistreplase</td>
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<tr>
<td>Alteplase (tPA)</td>
<td>15 mg i.v. bolus 0.75 mg . Kg(^{-1}) over 30 min then 0.5 mg . Kg(^{-1}) over 60 min i.v. Total dosage not to exceed 100 mg</td>
<td>i.v. heparin for 34 to 48 h</td>
<td></td>
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<tr>
<td>Reteplase (r-PA)</td>
<td>10 U + 10 U i.v. bolus given 30 min apart</td>
<td>i.v. heparin for 24 to 48 h</td>
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<tr>
<td>Tenectaplaste (TNK-tPA)</td>
<td>Single i.v. bolus 30 mg if &lt;60 kg 35 mg if 60 to &lt;70 kg 40 mg if 70 to &lt;80 kg 45 mg if 80 to &lt;90 kg 50 mg if ≥ 90 kg</td>
<td>i.v. heparin for 24 to 48 h</td>
<td></td>
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**Contraindications to Fibrinolytic Therapy**

<table>
<thead>
<tr>
<th><strong>Absolute contraindications</strong></th>
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<tbody>
<tr>
<td>Hemorrhagic stroke or stroke of unknown origin at any time</td>
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<tr>
<td>Ischemic stroke in preceding 6 months</td>
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<tr>
<td>Central nervous system damage or neoplasm</td>
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<tr>
<td>Recent major trauma/ surgery/ head injury (within preceding 3 weeks)</td>
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<tr>
<td>Gastro-intestinal bleeding within the last month</td>
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<tr>
<td>Known bleeding disorder</td>
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<tr>
<td>Aortic dissection</td>
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ESC Guidelines 2003
## Contraindications to Fibrinolytic therapy

### Relative contraindications

- TIA in preceding 6 months
- Oral anticoagulant therapy
- Pregnancy or within 1 week post partum
- Non-compressible punctures
- Traumatic resuscitation
- Refractory hypertension (systolic blood pressure > 180 mm Hg)
- Advanced liver disease
- Infective endocarditis
- Active peptic ulcer
STEMI: Role of Heparin

- Low molecular weight preferred (1mg/Kg of Enoxaparin)
- Intracardiac thrombus in Echo
- After use of thrombolytics

**DOSE**

- IV bolus 60 U/Kg maximum 4000 U
- IV infusion 12 U/Kg for 24 – 48 h maximum 1000 U/h
- Target APTT 50 – 60 ms.
- APTT at 3, 6, 12, 24 h after start of treatment

Role of direct antithrombins (Hirudin, Bivalirudin, Argatroban) not settled
Right Ventricular Infarction

Maintain RV Preload

- Volume loading with normal saline
- Avoid use of nitrates or diuretics
- Maintain AV synchrony: if HB
  - atropine, if fails:
  - AV sequential pacing.
- Dobutamine if COP fails to rise with volume loading
STEMI: Regular ward Care

- Blood sample for lipids
- ACE inhibitors
- Early Statin therapy
- Oral β-blockers unless contraindicated
Post-infarction Cardiac Catheterization

Indications

- Chest pain or dynamic ST changes.
- Provocable ischemia diagnosed by predischarge exercise test.
  - Symptom limited at 5-7 days.
  - Submaximal at 10-14 days.

Routine cardiac cath and PCI predischarge following AMI does not salvage myocardium nor reduce the incidence of reinfarction or death.