Pre Hospital and Initial Management of Acute Coronary Syndrome

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3rd SymCARD 2013
Classification of ACS

ESC Guidelines for the management of Acute Coronary Syndrome in patients without persistent ST Elevation.2011
Atherosclerosis risk factors

Unmodified risk factors

- Aging
  - male > 45 yrs
  - female > 55 yrs

- Family history of ACS
  - male < 55 yrs
  - female < 65 yrs

Modified risk factors

- Smoking
- Hypertension
- Dyslipidemia
- Diabetes Miletus
Table 3  **Universal definition of myocardial infarction**

<table>
<thead>
<tr>
<th>Detection of rise and/or fall of cardiac biomarker values (preferably troponin) with at least one value above the 99th percentile of the upper reference limit and with at least one of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Symptoms of ischaemia;</td>
</tr>
<tr>
<td>♦ New or presumably new significant ST-T changes or new LBBB;</td>
</tr>
<tr>
<td>♦ Development of pathological Q waves in the ECG;</td>
</tr>
<tr>
<td>♦ Imaging evidence of new loss of viable myocardium, or new regional wall motion abnormality;</td>
</tr>
<tr>
<td>♦ Identification of an intracoronary thrombus by angiography or autopsy.</td>
</tr>
</tbody>
</table>

| Cardiac death with symptoms suggestive of myocardial ischaemia, and presumably new ECG changes or new LBBB, but death occurring before blood cardiac biomarkers values are released or before cardiac biomarker values would be increased. |

| Stent thrombosis associated with MI when detected by coronary angiography or autopsy in the setting of myocardial ischaemia and with a rise and/or fall of cardiac biomarker values with at least one value above the 99th percentile URL. |

ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. 2011.
Clinical Symptom

1. **Site** is ‘retrosternal chest discomfort (may radiate to neck, jaw, epigastrium, or arms)
2. **Characteristic quality** (squeezing, pressure-like, heavy)
3. **Duration** (usually 2–20 min)
4. **Worsened** by physical exertion or emotional stress
5. **Relieved** by rest or nitroglycerin

**Associated symptoms**
- Sweating
- Palpitation
- Syncope
  - Vasovagal syncope
  - Arrhythmia
Clinical signs

• Vital sign
  – Arrhythmia
  – Hypertension, hypotension
  – Tachypnea
  – Low grade fever

• Cardiovascular
  – Murmur
  – S3 or S4 gallop

• Lung congestion: Killip I-IV
Investigations

- Electrocardiography
- Cadiac enzyme
- Chest x-ray
- Echocardiography
- Coronary angiography, CAG
- Other risk factors: Lipid profiles
## Electrocardiography

### Recommendations

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 12-lead ECG must be obtained as soon as possible at the point of FMC, with a target delay of ≤10 min.</td>
<td>I</td>
<td>B</td>
<td>17,19</td>
</tr>
<tr>
<td>ECG monitoring must be initiated as soon as possible in all patients with suspected STEMI.</td>
<td>I</td>
<td>B</td>
<td>20,21</td>
</tr>
<tr>
<td>Blood sampling for serum markers is recommended routinely in the acute phase but one should not wait for the results before initiating reperfusion treatment.</td>
<td>I</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>The use of additional posterior chest wall leads (V₇-V₉ ≥0.05 mV) in patients with high suspicion of infero-basal myocardial infarction (circumflex occlusion) should be considered.</td>
<td>IIa</td>
<td>C</td>
<td>-</td>
</tr>
</tbody>
</table>
- ST-segment elevation at the J point in two contiguous leads
  - ≥0.25 mV in men below the age of 40 years,
  - ≥0.2 mV in men over the age of 40 years, or ≥0.15 mV in women in leads V2–V3 and/or ≥0.1 mV in other leads
- Advisable to record right precordial leads (V3R and V4R) seeking
- ST elevation identify concomitant right ventricular

New ST Horizontal/downsloping depression ≥ 0.1 mV in 2 contiguous lead
T Inverted ≥ 0.1 mV

ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. 2011.
Cardiac marker

- In patients with MI, an initial rise in troponins occurs within 4 hours after symptom onset.
- Troponins may remain elevated for up to 2 weeks.
- Serial every 6-12 hrs at least 2 times.
- CK-MB subform and Troponin are very helpful in diagnosis.

ESC Guidelines for the management of Acute Coronary Syndrome in patients without persistent ST Elevation.2011
Chest X-Ray

- Cardiac abnormality
- Determine acute heart failure
Echocardiography
Coronary angiogram
How to Manage?
*Patients with cardiogenic shock or severe heart failure initially seen at a non–PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset (Class I, LOE: B). †Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.

DIDO = door-in-door-out
Principle of ACS management

- Aspirin
- Nitrates
- Mo
- Clopidogrel
- Beta blockers
- ACEI
- Antithrombin
- GPII/IIIa

Hemodynamic stabilization
- Medical
- Ventilator
- IABP
- Pace maker

Early Invasive
- Primary PCI
- Facilitate PCI
- Rescue PCI
- CABG

Early Conservative
- Fibrinolytic drugs
- Risk stratification

Elective CAG +/- PCI or CABG

ACS

Adjuvant Rx

Initial Therapy

MoNACO
Acute Coronary Syndromes

1. Symptoms suggestive of ischemia or infarction

2. EMS assessment and care and hospital preparation:
   - Monitor, support ABCs. Be prepared to provide CPR and defibrillation
   - Administer aspirin and consider oxygen, nitroglycerin, and morphine if needed
   - Obtain 12-lead ECG; if ST elevation:
     - Notify receiving hospital with transmission or interpretation; note time of onset and first medical contact
   - Notified hospital should mobilize hospital resources to respond to STEMI
   - If considering prehospital fibrinolysis, use fibrinolytic checklist

3. Immediate ED general treatment
   - If O₂ sat <94%, start oxygen at 4 L/min, titrate
   - Aspirin 160 to 325 mg (if not given by EMS)
   - Nitroglycerin sublingual or spray
   - Morphine IV if discomfort not relieved by nitroglycerin

Concurrent ED assessment (<10 minutes):
- Check vital signs; evaluate oxygen saturation
- Establish IV access
- Perform brief, targeted history, physical exam
- Review/complete fibrinolytic checklist (Fig 5-4, Table 5-2), check contraindications (Table 5)
- Obtain initial cardiac marker levels, initial electrolyte and coagulation studies
- Obtain portable chest x-ray (<30 minutes)
## Table 6  Recommendations for relief of pain, breathlessness and anxiety

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Level&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titrated(i.v. opioids) are indicated to relieve pain.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Oxygen is indicated in patients with hypoxia (SaO₂ &lt;95%), breathlessness, or acute heart failure.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Tranquillizer may be considered in very anxious patients.</td>
<td>IIa</td>
<td>C</td>
</tr>
</tbody>
</table>

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Anti Ischemic

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### Recommendations for anti-ischaemic drugs

<table>
<thead>
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<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral or intravenous nitrate treatment is indicated to relieve angina; intravenous nitrate treatment is recommended in patients with recurrent angina and/or signs of heart failure.</td>
<td>I</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>Patients on chronic β-blocker therapy admitted with ACS should be continued on β-blocker therapy if not in Killip class ≥II.</td>
<td>I</td>
<td>B</td>
<td>91</td>
</tr>
<tr>
<td>Oral β-blocker treatment is indicated in all patients with LV dysfunction (see Section 5.5.5) without contraindications.</td>
<td>I</td>
<td>B</td>
<td>86,90,91</td>
</tr>
<tr>
<td>Calcium channel blockers are recommended for symptom relief in patients already receiving nitrates and β-blockers (dihydropyridines type), and in patients with contraindications to β-blockade (benzothiazepine or phenylethylamine type).</td>
<td>I</td>
<td>B</td>
<td>88</td>
</tr>
<tr>
<td>Calcium channel blockers are recommended in patients with vasospastic angina.</td>
<td>I</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>Intravenous β-blocker treatment at the time of admission should be considered for patients in a stable haemodynamic condition (Killip class &lt;III) with hypertension and/or tachycardia.</td>
<td>IIa</td>
<td>C</td>
<td>93</td>
</tr>
<tr>
<td>Nifedipine, or other dihydropyridines, are not recommended unless combined with β-blockers.</td>
<td>III</td>
<td>B</td>
<td>88</td>
</tr>
</tbody>
</table>

(Acute Heart Failure)
Anti platelet

Recommendations for oral antiplatelet agents

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin should be given to all patients without contraindications at an initial loading dose of 150–300 mg, and at a maintenance dose of 75–100 mg daily long-term regardless of treatment strategy.</td>
<td>I</td>
<td>A</td>
<td>107, 108</td>
</tr>
<tr>
<td>A P2Y₁₁ inhibitor should be added to aspirin as soon as possible and maintained over 12 months, unless there are contraindications such as excessive risk of bleeding.</td>
<td>I</td>
<td>A</td>
<td>110, 130, 132</td>
</tr>
<tr>
<td>A proton pump inhibitor (preferably not omeprazole) in combination with DAPT is recommended in patients with a history of gastrointestinal haemorrhage or peptic ulcer, and appropriate for patients with multiple other risk factors (H. pylori infection, age ≥65 years, concurrent use of anticoagulants or steroids).</td>
<td>I</td>
<td>A</td>
<td>125–127</td>
</tr>
<tr>
<td>Prolonged or permanent withdrawal of P2Y₁₁ Inhibitors within 12 months after the index event is discouraged unless clinically indicated.</td>
<td>I</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>Ticagrelor (180-mg loading dose, 90 mg twice daily) is recommended for all patients at moderate-to-high risk of ischaemic events (e.g. elevated troponins), regardless of initial treatment strategy and including those pre-treated with clopidogrel (which should be discontinued when ticagrelor is commenced).</td>
<td>I</td>
<td>B</td>
<td>132</td>
</tr>
<tr>
<td>Prasugrel (60-mg loading dose, 10-mg daily dose) is recommended for P2Y₁₁ inhibito-naive patients (especially diabetics) in whom coronary anatomy is known and who are proceeding to PCI unless there is a high risk of life-threatening bleeding or other contraindications.</td>
<td>I</td>
<td>B</td>
<td>130</td>
</tr>
<tr>
<td>Clopidogrel (300-mg loading dose, 75-mg daily dose) is recommended for patients who cannot receive ticagrelor or prasugrel.</td>
<td>I</td>
<td>A</td>
<td>108, 146, 147</td>
</tr>
<tr>
<td>A 600-mg loading dose of clopidogrel (or a supplementary 300-mg dose at PCI following an initial 300-mg loading dose) is recommended for patients scheduled for an invasive strategy when ticagrelor or prasugrel is not an option.</td>
<td>I</td>
<td>B</td>
<td>108, 114, 115</td>
</tr>
</tbody>
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**Table 8**  P2Y₁₂ inhibitors

<table>
<thead>
<tr>
<th></th>
<th>Clopidogrel</th>
<th>Prasugrel</th>
<th>Ticagrelor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class</strong></td>
<td>Thienopyridine</td>
<td>Thienopyridine</td>
<td>Triazolopyrimidine</td>
</tr>
<tr>
<td><strong>Reversibility</strong></td>
<td>Irreversible</td>
<td>Irreversible</td>
<td>Reversible</td>
</tr>
<tr>
<td><strong>Activation</strong></td>
<td>Prodrug, limited by metabolism</td>
<td>Prodrug, not limited by metabolism</td>
<td>Active drug</td>
</tr>
<tr>
<td><strong>Onset of effect</strong></td>
<td>2–4 h</td>
<td>30 min</td>
<td>30 min</td>
</tr>
<tr>
<td><strong>Duration of effect</strong></td>
<td>3–10 days</td>
<td>5–10 days</td>
<td>3–4 days</td>
</tr>
<tr>
<td><strong>Withdrawal before major surgery</strong></td>
<td>5 days</td>
<td>7 days</td>
<td>5 days</td>
</tr>
</tbody>
</table>

*50% inhibition of platelet aggregation.*

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Complication Following ST Elevation Myocardial Infarction
Acute Heart Failure

Acute pulmonary oedema/congestion

- Intravenous bolus of loop diuretic
  - Furosemid

- Hypoxaemia
  - Yes: Oxygen
  - No

- Severe anxiety/distress
  - Yes: Consider i.v. opiate
  - No

Measure systolic blood pressure

- SBP < 85 mmHg or shock
  - Add non-vasodilating inotrope

- SBP 85–110 mmHg
  - No additional therapy until response assessed

- SBP > 110 mmHg
  - Consider vasodilator (e.g. NTG)

SpO2 < 90%

Ex: Dobutamine,

Morphine 4-8 mg
Right Ventricular Infarct

- STEMI Inferior (II,III,aVF) → RV Infarction (ST elevation on lead V3R & V4R)
- ST Elevation ≥ 1 mV on V3R & V4R
Trias RV Infarct

1. Hypotension
2. Clear Lung
3. Raised Jugular Venous Pressure

Treatment

1. Fluid Loading (Up to 2 Lt)
2. Avoid Diuretic & Vasodilator (Nitrate, Ace Inhibitor)
Evolving anti-platelet treatment: Will the new agents change clinical practice for all ACS patients?
CLOPIDOGREL

300-mg or 600-mg loading dose?
Plavix 300 mg = Improve Compliance

Loading Dose 4 tabs 75 mg = 1 tab Plavix 300 mg

Loading Dose 8 tabs 75 mg = 2 tabs Plavix 300 mg
DIFFERENCE

APA BEDA CLOPIDOGREL YANG SATU DENGAN LAINNYA?
Clopidogrel ada 2 formula?
TERYATA
TIDAK SEMUA
CLOPIDOGREL ITU SAMA

Struktur Kimia Form 1
Struktur Kimia Form 2
Thank You