# Acute coronary syndrome

## Definition
A group of clinical presentations that share a common pathology of disturbance of an atherosclerotic plaque leading to acute coronary ischemia.

## Classification

### Unstable angina
- Change in stable angina (duration, severity, pattern, etc)
- Recent onset angina
- Post MI

### Non ST elevation myocardial infarction (NSTEMI)

### ST elevation myocardial infarction (STEMI)

## Classification

<table>
<thead>
<tr>
<th>Chief symptom</th>
<th>Chest pain or Left arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal presentations of unstable angina</td>
<td>Rest angina that occurs at rest, lasts &gt;20 minutes</td>
</tr>
<tr>
<td></td>
<td>New-onset angina</td>
</tr>
<tr>
<td></td>
<td>Increasing (crescendo) angina: has become distinctly more frequent, longer in duration, or lower in severity</td>
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<tr>
<td></td>
<td>Shortness of breath, anginal equivalent or a symptom of heart failure</td>
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</tbody>
</table>

## Clinical Presentation

### Anginal Equivalents
- Atypical symptoms, such as arm, jaw, neck, ear, or epigastric discomfort.
- When the symptoms are clearly related to exertion or stress or when they are promptly relieved with nitroglycerin.

## Physical Examination

| 1. Hypotension or hypertension |
| 2. Diaphoresis |
| 3. Pulmonary edema and other signs of LHF |
| 4. Extracardiac vascular disease |

## Investigations

### ECG
Normal / transient ST-T wave changes

### Laboratory investigation
Mild increase in cardiac enzymes and troponin

### Echocardiography
Transient wall motion abnormality of LV

### Coronary angiography
(Gold standard) for diagnosis of ACS and consideration of the management strategy

## Risk Assessment

| 1. Clinical instability |
| 2. Accelerating chest pain in the 48 hours before presentation |
| 3. Prolonged ischemic chest pain |
| 4. Clinical evidence of heart failure |

## Differential Diagnosis

| 1. Aortic dissection |
| 2. Aortic stenosis |
| 3. Hypertensive emergency |
| 4. Cardiac neurosis |
| 5. Myocarditis |
| 6. Pericarditis |

## Treatment

### Conservative medical treatment

#### Anti-ischemic
- Analgesics
- O2 therapy

#### Antiplatelet
- Aspirin: 160-325mg initial dose followed by 80-150/day
- Clopidogrel 300-600mg followed by 75mg/day
- Other new antiplatelets

#### Anticoagulant
- Heparin infusion
- Low molecular weight heparin
- Other anti-thrombotics

### Revascularization invasive
Indicated after failure of medical treatment or early in high risk patients
Early coronary angiography and angioplasty and stenting to restore the blood flow
**Acute Myocardial Infarction (AMI)**

<table>
<thead>
<tr>
<th>Definition</th>
<th>Death of part of the heart muscle due to its sudden loss of blood supply usually caused by thrombus formation on coronary atheroma.</th>
</tr>
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</table>

### Etiology

1. Coronary atherosclerosis with formation of a thrombus on a plaque
2. Other causes:
   - Coronary spasm
   - Coronary embolism
   - Congenital CA anomalies
   - Coronary vasculitis
   - Coronary dissection and trauma

### Pathology

**Gross pathology**
- No changes for 8-12 h
- Then area become dark
- After 24 h pale centre normal edges
- 6-8 w it become a scar tissue

**Microscopic appearance**
- Coagulative necrosis of myocardial tissue with swelling of MF followed by loss of structure and necrosis.
- Cellular infiltration and inflammatory response
- Fibroblast appear and replacement with fibrous tissue

### Clinical Picture

#### Symptoms

- Premonitory symptoms stable or unstable angina
- Chest pain very severe central chest pain like that of angina but more severe and **prolonged > 30 min** and not responding to sublingual nitroglycerine
- Autonomic dysfunction:
  - Nausea vomiting
  - Syncope
  - Cold sweating
  - Palpitations
- Fever 2-5 day
- Painless or silent in 25% of cases

#### Signs

- Non-complicated Ml:
  - Minimal signs weak HS, S3
  - Tachycardia
  - Mild HTN
  - Cold sweating
  - Fever
  - Signs of risk factors e.g. DM, HTN, and dyslipidemia

#### Complications

- Non-complicated
- Complicated

### Investigations

#### ECG

- Site, type, duration of infarctions
- Arrhythmias and conduction defects

#### CXR

- Heart size
- Lung congestion or pulmonary edema
- Exclude other causes of chest pain

#### Biomarkers

- Troponin T or CK and CK-MB
- LDH
- SGOT
- CRP
- ESR
- Leucocytic count

#### Other special diagnostic procedures

- Echocardiography scan
- Radio-isotope:
  - Thalium 201–ve scan
  - Technetium 99m pyrophosphate +ve scan
- Coronary angiography for diagnosis and early intervention

### Classifications

According to

**Site and artery affected**
- Anterior (left anterior descending)
- Lateral (circumflex CA)
- Inferior (Right CA)

**Duration**
- Recent
- Late pattern
- Old

**Extent of wall affection**
- Transmural
- Subendocardial

**Complications**

- Non-complicated
- Complicated

### Table 1.3 Plasma markers of myocardial necrosis

<table>
<thead>
<tr>
<th>Marker</th>
<th>Rise Time</th>
<th>Peak</th>
<th>Return to baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myoglobin</td>
<td>1–4 hours</td>
<td>6–7 hours</td>
<td>24 hours</td>
</tr>
<tr>
<td>Troponin I</td>
<td>3–12 hours</td>
<td>24 hours</td>
<td>5–10 days</td>
</tr>
<tr>
<td>Troponin T</td>
<td>3–12 hours</td>
<td>12–48 hours</td>
<td>3–4 days</td>
</tr>
<tr>
<td>CK</td>
<td>4–8 hours</td>
<td>12–24 hours</td>
<td>3–4 days</td>
</tr>
<tr>
<td>CK-MB</td>
<td>4–8 hours</td>
<td>18–36 hours</td>
<td>2–3 days</td>
</tr>
<tr>
<td>AST</td>
<td>8–12 hours</td>
<td>18–36 hours</td>
<td>3–4 days</td>
</tr>
<tr>
<td>LDH</td>
<td>8–12 hours</td>
<td>3–6 days</td>
<td>8–14 days</td>
</tr>
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</table>
## Diagnosis
At least 2 of the following 3 criteria:
1. **Classic chest pain**
2. **ECG changes**
3. **Positive biomarkers**

## Differential Diagnosis
| 1. Acute pericarditis | 7. Chest wall causes |
| 2. Acute pulmonary embolism | 8. Esophageal causes |
| 4. Pneumonia | 10. Pancreatitis |
| 5. Pleurisy | 11. Acute Cholecystitis |
| 6. Pneumothorax | 12. Cardiac neurosis |

## Complication
<table>
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<th>Early</th>
<th>Late</th>
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<tr>
<td>1. Arrhythmias: all types most common is sinus tachycardia, VPCs</td>
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<tr>
<td>2. Conduction defects</td>
<td>2. Post MI angina</td>
</tr>
<tr>
<td>3. LVF and pulmonary edema</td>
<td>3. Frozen shoulder</td>
</tr>
<tr>
<td>4. Cardiogenic shock</td>
<td>4. Ischemic cardiomyopathy</td>
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### Early Complication
- Coronary care unit admission
- Rest
- Analgesic for pain
- O2 therapy
- Nitrate sublingual or IV

### Antiplatelets
- Aspirin
- Clopidogrel

### Reperfusion therapy
- Thrombolytic therapy
  - Streptokinase
  - Tissue type plasminogen activator t-PA (Actylase)
- Primary angioplasty and stenting
- Surgical CABG

### Follow up treatment:
- A aspirin & ACEI
- B B-blockers, BP
- C cholesterol control
- D diabetes control, diet

### Treatment of complications
- Pericarditis
- Arrhythmias
- Heart block
- Shock
- LVF and pulmonary edema
- Thrombo-embolism

## Treatment
General measures
- Coronary care unit admission
- Rest
- Analgesic for pain
- O2 therapy
- Nitrate sublingual or IV

Antiplatelets
- Aspirin
- Clopidogrel

Reperfusion therapy
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