Chest Pain & Ischaemic Heart Disease

CHEST PAIN & ISCHAEMIC HEART DISEASE

INTRODUCTION

Ischaemic heart disease is a common condition encountered in primary care. It is defined as a condition of the heart as a result of an imbalance between myocardial oxygen supply and demand.

APPROACH TO CHEST PAIN

A careful history taking and physical examination is still the best approach.

Table 1. Causes of Chest Pain

<table>
<thead>
<tr>
<th>Cardiac / Vascular</th>
<th>Pulmonary</th>
<th>Gastrointestinal</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute ischaemic heart disease</td>
<td>Pulmonary embolus</td>
<td>Oesophageal reflux</td>
<td>Musculoskeletal</td>
</tr>
<tr>
<td>Acute pericarditis</td>
<td>Pneumothorax</td>
<td>Biliary colic</td>
<td>Herpes zoster</td>
</tr>
<tr>
<td>Acute aortic dissection</td>
<td>Pneumonia / Pleurisy</td>
<td>Gastritis / Peptic ulcer disease</td>
<td>Functional /</td>
</tr>
<tr>
<td>Valvular heart disease</td>
<td>Pulmonary hypertension</td>
<td>Esophageal rupture</td>
<td>Psychogenic</td>
</tr>
<tr>
<td>Myocarditis</td>
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</tbody>
</table>

Table 2. Features Differentiating Angina-like, Oesophageal Pain & Cardiac Pain

<table>
<thead>
<tr>
<th>Precipitating Factors</th>
<th>Favouring Peptic-Oesophageal</th>
<th>Favouring Biliary</th>
<th>Favouring Cardiac</th>
<th>Non-Discriminating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meals, posture</td>
<td>Fatty food</td>
<td>Consistently with exercise</td>
<td>Emotion</td>
<td></td>
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<tr>
<td>Antacids</td>
<td>Below R scapula</td>
<td>Rest, nitrates</td>
<td>Rest</td>
<td></td>
</tr>
<tr>
<td>Epigastrum</td>
<td>Tip R shoulder</td>
<td>Left Arm and jaw</td>
<td>Back</td>
<td></td>
</tr>
<tr>
<td>Heartburn</td>
<td>Flatulence</td>
<td>Dyspnoea</td>
<td>Sweating</td>
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<tr>
<td>Regurgitation</td>
<td>dyspepsia</td>
<td>Diaphoresis</td>
<td></td>
<td></td>
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<tr>
<td>Dysphagia</td>
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</table>

Angina is a clinical syndrome characterized by discomfort in the chest, jaw, shoulder, back or arm. It is typically aggravated by exertion or emotional stress, and relieved by rest or nitroglycerin. A decrease in functional status since the onset of chest pain is suggestive that it is cardiac in origin. Consistency in the quality of symptoms on repetitive occasions also suggests that further work-up is required for esophageal-peptic / biliary / cardiac origin. After the history is obtained, the doctor can classify the symptom-complex using Table 3.
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Table 3. Clinical Classification of Chest Pain

<table>
<thead>
<tr>
<th>Typical Angina (Definite)</th>
<th>Atypical Angina (Probable)</th>
<th>Non-cardiac Chest Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Substernal chest discomfort with a characteristic quality and duration that is provoked by exertion or emotional stress</td>
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<tr>
<td>• Relieved by rest or nitroglycerin</td>
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<td></td>
</tr>
<tr>
<td>Meets 2 of the above characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meets up to 1 of the typical angina characteristics</td>
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<td></td>
</tr>
</tbody>
</table>

Table 4. Recommendations for Initial Laboratory Tests, ECG, and Chest X-ray for Diagnosis

<table>
<thead>
<tr>
<th>Class I (Conditions for which there is evidence and / or general agreement that a given procedure is useful and effective)</th>
<th>Class IIa (Conditions for which the weight of evidence / opinion is in favour of usefulness / efficacy of a given procedure)</th>
<th>Class IIb (Conditions for which the usefulness / efficacy of a given procedure is less established by evidence / opinion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Haemoglobin</td>
<td></td>
<td></td>
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<tr>
<td>• Fasting glucose</td>
<td></td>
<td></td>
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<tr>
<td>• Fasting lipid panel, including total cholesterol, HDL, LDL and triglycerides</td>
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<td></td>
</tr>
<tr>
<td>• Resting ECG for patients without an obvious noncardiac cause of chest pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Resting ECG during an episode of chest pain</td>
<td></td>
<td></td>
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<tr>
<td>• Chest X-ray for patients with signs or symptoms of pulmonary disease.</td>
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<td></td>
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<tr>
<td>• Chest X-ray for other patients</td>
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<tr>
<td>• Electron beam computed tomography</td>
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</tbody>
</table>

Acute Coronary Syndrome ranges from unstable angina, Non-STEMI, to STEMI. NSTEMI is distinguished from unstable angina by elevation of cardiac enzymes. NSTEMI has poorer prognosis compared to unstable angina.
INVESTIGATIONS

If myocardial ischaemia is suspected, an ECG should be obtained without delay.

ECG CHANGES OF AMI

1) STEMI – ST Elevation MI.
   - Signifies acute transmural myocardia injury
   - Requires immediate reperfusion within 60 minutes for best result

2) Non-STEMI – Non ST elevation may indicate ischaemic changes. This comes in the following patterns:
   - ST segment depression – The deeper the ST segment, the more severe the ischaemia
   - T wave inversion – May be suggestive of ischaemia especially if T waves inversions are new and deep
   - Non specific ST changes – Up to 40% of MI present with non-diagnostic ECG changes or near normal ECGs
   - Dynamic ST-T changes

Note:
- Q waves in lead III can be normal
- Nice gentle slope of ST elevation can be of normal variant (usually prominent in precordial leads V2, V3 and should have no reciprocal changes)
- Sharp slope of ST elevation usually suggests AMI
- Beware of MI changes in patients with RBBB and LBBB. New onset LBBB can be secondary to MI. LBBB may mask ST changes but RBBB does not

Repeat ECG every 15 to 30 minutes to detect any diagnostic change.
Consult a senior doctor when suspicious-looking ECG is encountered.
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IMMEDIATE MANAGEMENT OF PATIENTS SUGGESTIVE OF AMI OR UNSTABLE ANGINA

- Call for assistance / help
- Bed rest, elevate head
- Monitor PR, BP & RR
- Oxygen intra-nasally, 4L/min
- IV Plug
- Aspirin 300 mg po
- S/L GTN. Contraindicated in severe aortic stenosis and concurrent sildenafil use
- IV Morphine 2-4 mg, if pain is not relieved with nitroglycerin. Caution: Do not use if hypotensive
- IV frusemide 40 mg or more if patient has signs of heart failure
- Send patient to A&E via ambulance

INDICATIONS FOR CARDIOLOGY CONSULTATION

- Acute myocardial infarct – IMMEDIATE
- Unstable angina – IMMEDIATE
- 1st episode of congestive heart failure
- Worsening heart failure (Breathless on less than usual exertion or at rest – NYHA III & IV)
- Q waves or ischaemic ST-T waves changes in resting ECG
- Markedly depressed systolic function e.g. orthopnoea, exertional dyspnoea, paroxysmal dyspnoea, lower extremity oedema, fatigue

MANAGEMENT OF PATIENTS WITH ISCHAEMIC HEART DISEASE

1) Management of Risk Factors

Table 5. Risk factors for coronary heart disease

<table>
<thead>
<tr>
<th>Non-modifiable</th>
<th>Modifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Smoking</td>
</tr>
<tr>
<td>Gender</td>
<td>Stress</td>
</tr>
<tr>
<td>Genes</td>
<td>Cholesterol</td>
</tr>
<tr>
<td></td>
<td>Obesity</td>
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<tr>
<td></td>
<td>Hypertension</td>
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<tr>
<td></td>
<td>Physical inactivity</td>
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<tr>
<td></td>
<td>Diabetes Mellitus</td>
</tr>
</tbody>
</table>

Management of these risk factors are covered in other workgroup education materials.

2) Control of Precipitating Factors

- Anaemia e.g. bleeding from haemorrhoids
- Valvular heart disease, especially aortic stenosis
- Arrhythmia e.g. atrial fibrillation
- Hyperthyroidism
- Uncontrolled hypertension

3) ACC / AHA’s ABCDE Management of Chronic Stable Angina

A : Antiplatelet / Anticoagulation, ACEI / ARB and Antianginal therapy
B : Beta-blocker and Blood pressure control
C : Cholesterol and Cigarette smoking
D : Diet and Diabetes control
E : Education and Exercise
ABCDE MANAGEMENT OF CHRONIC STABLE ANGINA

A. Antiplatelet / Anticoagulation, ACEI / ARB and Antianginal therapy

1) Start and continue low dose aspirin (75-325 mg per day) indefinitely, if not contraindicated. Consider clopidogrel (75 mg/day) or Ticlopidine or warfarin if aspirin is contraindicated. Manage warfarin to INR 2.0 to 3.0 in post-MI patients when clinically indicated or those not able to take aspirin or clopidogrel.

- Neutropenia is associated with ticlopidine.
  Prior to initiation, do a baseline FBC, repeat 2 weeks later and like-wise repeat monthly for the next 3 months.

2) Aspirin, in the absence of contrindications, should be used indefinitely in all patients with atherosclerotic vascular disease.

3) Treat all post-MI patients with ACEI (evidence for Ant. MI and LV systolic dysfunction). Start treatment early in stable high-risk patients. Consider chronic therapy for all other patients with coronary or other vascular disease unless contraindicated.

4) ACEI is recommended in patients with
   a. IHD
   b. IHD and diabetes and / or left ventricular systolic dysfunction
   c. Other vascular disease

5) ARBs are suitable:
   a. For patients who are intolerant of ACEIs (especially those who develop a persistent cough)
   b. As a reasonable second line therapy for patients who are still hypertensive on ACEI and diuretic therapy. There is no clear evidence for ACEI-ARB combination.

6) Long-acting calcium antagonists and / or nitrates are used as initial therapy for the reduction of symptoms when beta-blockers are contraindicated or not successful

7) Sublingual nitroglycerin or nitroglycerin spray can be used for the immediate relief of angina.
ABCDE Management of Chronic Stable Angina

B. Beta blocker and blood pressure control
   i) Start beta-blocker therapy in all post-MI and acute ischaemic syndrome patients and consider continuing indefinitely. Observe usual contraindication. Use as needed to manage angina, rhythm or blood pressure in other patients.
   ii) Treatment goal is < 130/80 mmHg for those with diabetes or ischaemic heart disease (JNC VII), though optimal BP is considered to be < 120/80 mmHg.

C. Cholesterol and Cigarette Smoking
   i) In patients with documented IHD, the recommended LDL-C goal level is < 2.6 mmol/L.
   ii) Strongly encourage patient and family to stop smoking and to avoid second hand smoke. Provide counseling, pharmacologic therapy and formal smoking cessation programmes as appropriate

D. Diet / weight management and Diabetes control
   i) According to the current WHO classification, the desirable BMI range is 18.5 to 24.9 kg/m². (Note: The Asian BMI cut-off point for action is 18.5-22.9). Overweight begins at 25 kg/m² and obesity is defined as BMI of > 30 kg/m². Please refer to MOH CPG on Obesity for more details.
   ii) Anti-slimming pills are not recommended in view of the uncertain long-term side effects. The mainstay of treatment to weight management is dietary control and exercise.
   iii) Diabetes / glycaemic control: HbA1c ≤ 7%. Please refer to MOH CGP / NHGP guidelines for DM for details on target blood / capillary glucose.

E. Education and Exercise
   i) Encourage a minimum of 30 minutes of moderate intensity activity, 3 – 5 times per week (e.g. walking, cycling, jogging or other aerobic activity) supplemented by an increase in daily lifestyle activities (e.g. walking breaks at work, gardening, household work). Please refer to MOH CPG / NHGP guidelines for Obesity.

PROBLEMS ENCOUNTERED IN POST-MYOCARDIAL INFARCT
- Congestive heart failure
- Re-infarction
- Arrhythmias e.g. VT, VF (which can cause sudden cardiac death)
- Septal rupture leading to VSD
- Mitral regurgitation especially with inferior infarct causing papillary muscle rupture
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Table 6. Fitness to Drive (Angina, MI, Coronary angioplasty) [SMA Guidelines (1997)]

<table>
<thead>
<tr>
<th>Cardiovascular Disorders</th>
<th>Group 1 (Class 1, 2, 3)</th>
<th>Group 2 (Class 4, 5 &amp; Vocational License)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angina</td>
<td>Not fit until angina is satisfactorily controlled</td>
<td>Cardiologist to certify Not fit until patient is symptom-free and is able to complete the exercise stress test to the required standard (at least 9 minutes of standard Bruce protocol or at least 85% of the maximal predicted heart rate if he / she can only manage less than 9 minutes of exercise)</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>Cardiologist to certify Not fit until patient is symptom-free and is able to complete the exercise stress test to the required standard (at least 9 minutes of standard Bruce protocol or at least 85% of the maximal predicted heart rate if he / she can only manage less than 9 minutes of exercise)</td>
<td></td>
</tr>
<tr>
<td>CABG</td>
<td>Not fit for at least one month after episode</td>
<td>Cardiologist to certify Not fit for at least 2 months. May return to driving only if symptom-free and there are no other disqualifying conditions and patient is able to complete the required stress test</td>
</tr>
<tr>
<td>Any Episode of Unstable Angina</td>
<td>Cardiologist to certify Not fit for at least one month after episode</td>
<td>Cardiologist to certify Not fit for at least 2 months. May return to driving only if symptom-free and there are no other disqualifying conditions and patient is able to complete the required stress test</td>
</tr>
<tr>
<td>Coronary Angioplasty</td>
<td>Not fit for at least 1 week Resume driving if recovery resumes</td>
<td>Cardiologist to certify Resume driving only if symptom-free and able to complete exercise stress test of required standard Those with coronary stents should be observed for at least 2 months and pass the stress test</td>
</tr>
</tbody>
</table>

**References**

2. SMA recommended guidelines on fitness to drive, 1997.
5. MOH Clinical Practice Guidelines in Obesity, April 2004.