

# Lecture.4 Chest pain

#### **Importance of Chest pain**

- Chest pain is a common challenge for clinicians in the office or emergency department.
- The differential diagnosis is wide, includes conditions affecting organs throughout the thorax and abdomen, with prognostic implications that vary from benign to lifethreatening.
- Detailed history and thorough clinical examination and appropriate subsequent investigative pathway is needed



# Differential diagnosis of chest pain

#### **Central chest pain**

- Cardiac
- Myocardial ischaemia (angina)
- Myocardial infarction
- Pericarditis
- Mitral valve prolapse
- Myocarditis
  - Aortic
- Aortic dissection
- Aortic aneurysm
  - Oesophageal
- Oesophagitis
- Oesophageal spasm
- Mallory–Weiss syndrome
- Oesophageal perforation
  - Pulmonary embolus
  - Mediastinal
- Malignancy
  - Anxiety/emotion



# Peripheral chest pain

#### Lungs/pleura

- Pulmonary infarct
- Pneumonia
- Pneumothorax
- Malignancy
- Tuberculosis
- Connective tissue disorders

# Musculoskeletal

- Osteoarthritis
- Rib fracture/injury
- Acute vertebral fracture
- Costochondritis
- Intercostal muscle injury
- Epidemic myalgia
  - Neurological
- Prolapsed intervertebral disc
- Herpes zoster
- Thoracic outlet syndrome

# History Is The Key To The Diagnosis Of Etiology Of Chest Pain

Key features in chest pain history

- Site and radiation of pain
- Character of pain
- Onset of pain
- Associated features with pain
- Relieving and provocating factors





#### Site and radiation of pain

- Myocardial ischemia pain located in the centre of the chest. It may radiate to the neck, jaw, and arms.
- Myocarditis or pericarditis pain felt retrosternally, to the left of the sternum, or in the left or right shoulder.
- ✤ Aortic dissection is typically central with radiation to the back.
- Central chest pain may also occur with mediastinal tumors or oesophageal disease
- Pain situated over the left anterior chest radiating lateraly may due to pleural or lung disorders, musculoskeletal problems or anxiety. And mitral valve prolapse.

#### **Character of pain**

- The pain of myocardial ischaemia is dull, constricting, choking or 'heavy', squeezing, crushing, burning or aching or even discomfort rather than a pain.
- Pleurisy, sharp chest pain aggravated by deep breathing or coughing
- Myocarditis or pericarditis 'sharp' and may 'catch' during inspiration, coughing, swallowing or lying flat.
- The pain of aortic dissection is severe and 'tearing'



# Onset of pain

- The pain associated with myocardial infarction (MI) typically take several minutes or longer to develop to its maximal intensity
- Angina builds up gradually in proportion to the intensity of exertion.
- Massive pulmonary embolism (PE) or pneumothorax is usually very sudden in onset.



# Relieving and provocating factors

- Angina occurs during exertion, relieved by rest and sublingual tablets, may occur after a large meal or in a cold wind.
- Crescendo or unstable angina, similar pain may be precipitated by minimal exertion or at rest.
- Decubitus angina induced by lying down
- Musculoskeletal The pain may vary with posture or movement of the upper body, or be associated with a specific movement. Pain that occurs after, rather than during, exertion is usually musculoskeletal or psychological in origin.

#### Associated features with pain

- Autonomic disturbance, including sweating, nausea and vomiting. impending death usually accompany pain of MI, massive PE or aortic dissection.
- Breathlessness accompany myocardial ischemia due to pulmonary congestion, also accompany respiratory causes of chest pain and associated with cough or wheeze
- prodromal viral illness described in myocarditis or pericarditis
- Oesophageal pain dysphagia may be present
- Anxiety-induced chest pain may be associated with Breathlessness, throat tightness, and other evidence of emotional distress.

	Ischemic cardiac chest pain	Non-cardiac chest pain
LOCATION	Central, diffuse	Peripheral, localized
RADIATION	jaw/neck/shoulder/arm	Other or no radiation
CHARACTER	Tight, squeezing, choking	Sharp, stabbing, catching
PRECIPITATION	Precipitated by exertion and/or emotion	Spontaneous, not related to exertion, provoked by posture, respiration or palpation
RELEAVING FACTORS	Rest response to nitrates	Not relieved by rest Slow or no response to nitrates
ASSOCIATED FEATURES	Breathlessness	Respiratory, gastrointestinal, locomotor or psychological

# Characteristics of ischemic cardiac pain

- Site: Cardiac pain is typically located in the center of the chest
- Radiation: Ischemic cardiac pain may radiate to the neck, jaw, and upper or even lower arms. Occasionally, cardiac pain may be experienced only at the sites of radiation or in the back
- Character: Cardiac pain is typically dull, constricting, choking or 'heavy', and is usually described as squeezing, crushing, burning or aching. The sensation can be described as breathlessness, or discomfort rather than a pain.
- Provocation:
- Anginal pain occurs during exertion and is relieved by rest. The pain may also be precipitated or exacerbated by emotion, after a large meal or in a cold wind.
- Unstable angina pain precipitated by minimal exertion or at rest.
- Decubitus angina induced by lying
- Myocardial infarction (MI) may be preceded by a period of stable or unstable angina but often occurs de novo.



# **Examples of cardiac chest pain**

#### • Stable Angina

Effort-related chest pain is the hallmark of angina pectoris or 'choking in the chest. The reproducibility, predictability and relationship to physical exertion (and occasionally emotion) of the chest pain are the most important features. The duration of symptoms should be noted.

#### Acute Coronary Syndromes

Prolonged, severe cardiac chest pain may be due to

1.Unstable angina



which comprises recent-onset limiting angina, rapidly worsening or crescendo angina, and angina at rest)

2. Acute MI

# • Myocarditis and pericarditis

Pain is characteristically felt retrosternally, to the left of the sternum, or in the left or right shoulder, and typically varies in intensity with movement and the phase of respiration. The pain is described as 'sharp' and may 'catch' the patient during inspiration, coughing or lying flat

# Aortic dissection

This pain is severe, sharp and tearing, is often felt in or penetrating through to the back, and is typically very abrupt in onset .The pain follows the path of the dissection.

#### Mitral valve prolapse

Sharp left-sided chest pain that is suggestive of a musculoskeletal problem may be a feature of mitral valve prolapse

Examples of non-cardiac causes of chest pain

#### Oesophageal pain

This can mimic the pain of angina very closely, is sometimes precipitated by exercise and may be relieved by nitrates. However, it is usually possible to elicit a history relating chest pain to supine posture or eating, drinking or oesophageal reflux. It often radiates to the interscapular region and dysphagia may be present

# Musculoskeletal chest pain

This is a common problem that is very variable in site and intensity but does not usually fall into any of the patterns described above. The pain may vary with posture or movement of the upper body and is sometimes accompanied by local tenderness over a rib or costal cartilage.

# Life threatening causes of chest pain

- Acute coronary syndrome(MI, unstable angina)
- Aortic Dissection
- Pulmonary Embolism
- Tension pneumothorax
- Oesophageal rupture



# Clinical signs in assessment of chest pain

Cardio -respiratory examination may detect clinical signs that help guide ongoing investigation.

- Vital signs
- Clinical evidence of increased intracardiac pressure (especially a raised jugular venous pressure) in myocardial ischemia or massive Pulmonary embolism (PE)
- Evidence of deep vein thrombosis in PE
- Signs of pneumothorax: absent breath sounds and a hyper-resonant percussion note on the affected side.

BODY TEMP	1	degree	
HEART RATE	All	min	
BLOOD PRESSURE	P	mmHg	
RESP RATE	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	/ min/	

- bronchial breathing or crackles, are most likely to indicate a respiratory tract infection
- pericardial friction rub in pericarditis
- asymmetrical pulses, Marfan's syndrome and new early diastolic murmur due to aortic regurgitation in aortic dissection
- pleural rub may be audible in pleurisy
- Local tenderness of the chest wall in musculoskeletal pain

#### **Initial investigations**

- Chest X-ray
- ECG
- Biomarkers (e.g. troponin, D-dimer)

