

APPROACH TO CHEST PAIN

A SYMPTOM CAUSED BY SEVERAL LIFE-THREATENING DISEASES AND THUS HAD BROAD DIFFERENTIAL

APPLICATION OF A SIMPLE ALGORITHM IS IMPOSSIBLE

PATHOPHYSIOLOGY:

- Afferent fibres from the heart, lungs, great vessels and oesophagus all enter the same thoracic dorsal ganglia
 - Each organ produces the same indistinct quality and location of pain

DIAGNOSTIC APPROACH:

Table 18-1 Differential Diagnosis of Chest Pain

ORGAN SYSTEM	CRITICAL DIAGNOSES	EMERGENT DIAGNOSES	NONEMERGENT DIAGNOSES
Cardiovascular	Acute myocardial infarction Acute coronary ischemia Aortic dissection Cardiac tamponade	Unstable angina Coronary spasm Prinzmetal's angina Cocaine-induced pericarditis or myocarditis	Valvular heart disease Aortic stenosis Mitral valve prolapse Hypertrophic cardiomyopathy
Pulmonary	Pulmonary embolus Tension pneumothorax	Pneumothorax Mediastinitis	Pneumonia Pleuritis Tumor Pneumomediastinum
Gastrointestinal	Esophageal rupture (Boerhaave)	Esophageal tear (Mallory-Weiss) Cholecystitis Pancreatitis	Esophageal spasm Esophageal reflux Peptic ulcer Biliary colic
Musculoskeletal			Muscle strain Rib fracture Arthritis Tumor Costochondritis Nonspecific chest wall pain
Neurologic			Spinal root compression Thoracic outlet Herpes zoster Postherpetic neuralgia
Other			Psychologic Hyperventilation

- First consideration is whether immediate intervention is warranted, followed by considering LIFE-THREATENING possibilities in an individual patient
- Information pertinent to the differential diagnosis is obtained by the history, physical exam and ECG in 80-90% of cases
- HISTORY:
 - **Character of pain:**
 - Varies from:
 - Crushing, pressure, squeezing → cardiac ischaemia
 - Sharp/stabbing → PE vs musculoskeletal
 - Tearing, migratory pain → dissection
 - Burning, indigestion → GI aetiology
 - HOWEVER, due to visceral nature of chest pain, ALL causes of pain may present with any of preceding descriptions

- **Activity at onset:**
 - During exertion → ischaemia
 - At rest → AMI
 - Sudden onset → PE, dissection, pneumothorax
- **Location:**
 - If localised to small area, more likely to be SOMATIC
 - Periphery → pulmonary more likely than cardiac
- **Radiation:**
 - Transthoracic pain to back:
 - Dissection
 - Pancreatitis
 - Posterior ulcer
 - Inferoposterior MI
 - Arms, neck, jaw → cardiac ischaemia
- **Duration:**
 - Seconds → cardiac cause unlikely
 - Maximal at onset → aortic dissection, PE
 - If not severe and lasting days → serious cause unlikely
- **Aggravating/relieving factors:**
 - Worsens with exertion, relieved by rest → cardiac ischaemia
 - Related to meals → GI
 - Worsens with respiration → pulmonary, pericardial, musculoskeletal
- **History of prior pain and associated diagnoses on those occasions**
- **Risk factors associated with catastrophic causes of chest pain:**
 - It is important to note that in the ED, PRESENCE OR ABSENCE OF RISK FACTORS IN AN INDIVIDUAL PATIENT WITHOUT ESTABLISHED DISEASE HAS MINIMAL OR NO EFFECT ON CLINICAL LIKELIHOOD
 - ACS → the usual suspects
 - PE:
 - Prolonged immobilisation
 - Surgery >30 minutes in last 3 months
 - Prior DVT/PE
 - Pregnancy
 - Pelvic or lower extremity trauma
 - OCP
 - Cigarettes
 - COPD
 - CHF
 - Obesity
 - Family history of PE, hypercoagulable state
 - Dissection:
 - HT
 - Inflammatory aortic disses

- Congenital disease of the aorta or aortic valve
- Connective tissue disease
- Pregnancy
- Arteriosclerosis
- Cigarette use
- Pericarditis, myocarditis:
 - Infection
 - Autoimmune disease
 - Acute rheumatic fever
 - Recent MI/cardiac surgery
 - Malignancy
 - Radiation therapy to mediastinum
 - Uraemia
 - Drugs
 - Prior pericarditis
- Pneumothorax:
 - PRIOR pneumothorax
 - Valsalva manoeuvre
 - Chronic lung disease
 - Cigarette use

Associated dyspnea (SOB, DOE, PND, orthopnea)	Acute MI Coronary ischemia PE Tension pneumothorax Pneumothorax Unstable angina Pericarditis
Associated hemoptysis	PE
Associated nausea/vomiting	Esophageal rupture Acute MI Coronary ischemia Unstable angina Coronary spasm Esophageal tear Cholecystitis

Associated symptoms with chest pain and related diagnoses

- PHYSICAL EXAMINATION:

Table 18-3 Pivotal Findings in Physical Examination

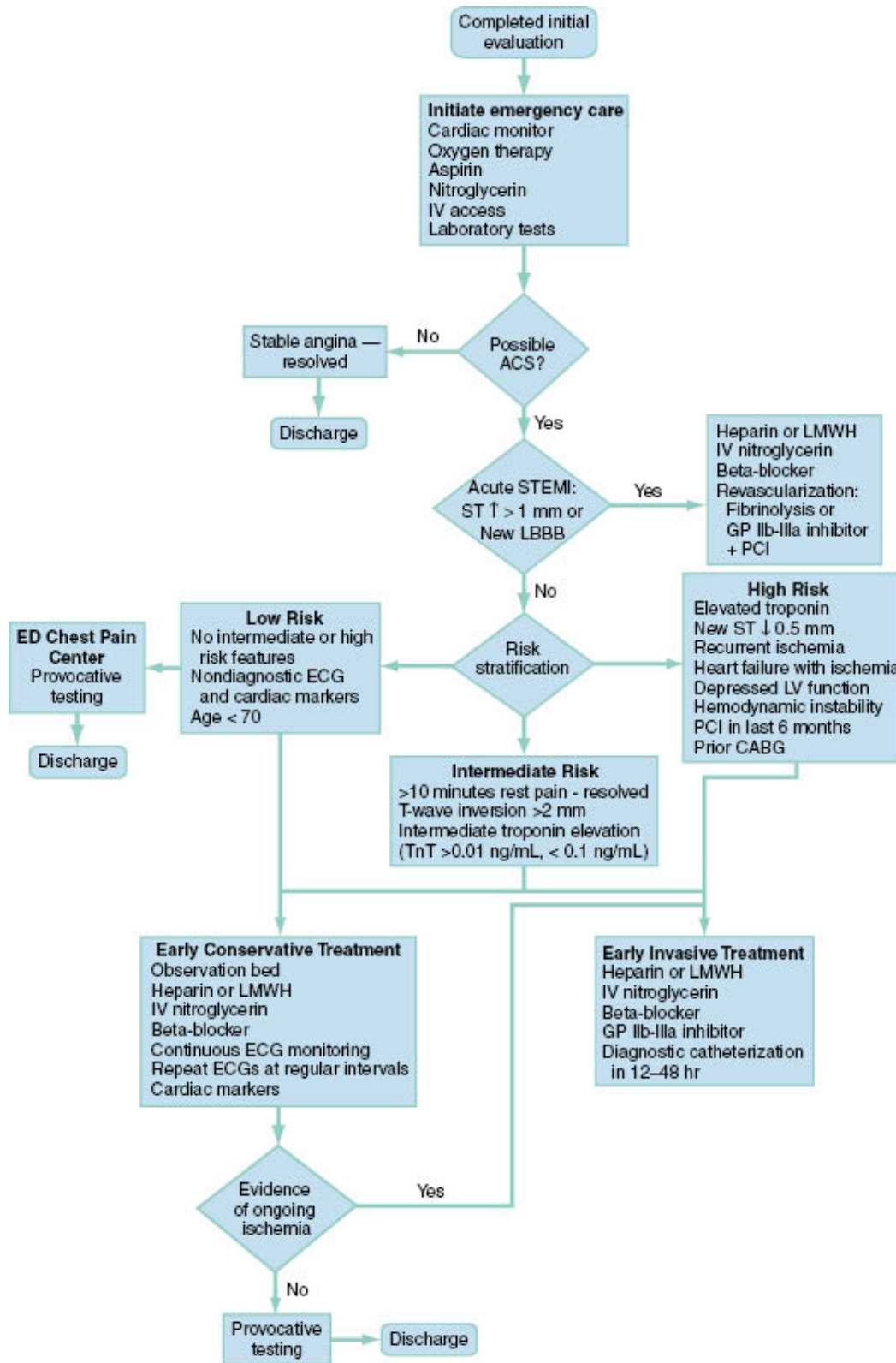
SIGN	FINDING	DIAGNOSES	SIGN	FINDING	DIAGNOSES		
Appearance	Acute respiratory distress	PE Tension pneumothorax Acute MI	Cardiovascular examination	Significant difference in upper extremity blood pressures	Aortic dissection		
	Diaphoresis	Pneumothorax Acute MI Aortic dissection Coronary ischemia PE Esophageal rupture Unstable angina Cholecystitis Perforated peptic ulcer		Narrow pulse pressure New murmur	Pericarditis (with effusion) Acute MI Aortic dissection Coronary ischemia Acute MI Coronary ischemia		
Vital signs	Hypotension	Tension pneumothorax PE Acute MI Aortic dissection (late) Coronary ischemia Esophageal rupture Pericarditis Myocarditis	Pulmonary examination	S ₃ /S ₄ gallop	Pericarditis Esophageal rupture Mediastinitis		
		Tachycardia		Acute MI PE Aortic dissection Coronary ischemia Tension pneumothorax Esophageal rupture Coronary spasm Pericarditis Myocarditis Mediastinitis Cholecystitis Esophageal tear (Mallory-Weiss)	JVD	Acute MI Coronary ischemia Tension pneumothorax PE Pericarditis	
	Bradycardia	Acute MI Coronary ischemia Unstable angina		Unilateral diminished/absent breath sounds	Tension pneumothorax Pneumothorax		
	Hypertension	Acute MI Coronary ischemia Aortic dissection (early)		Pleural rub Subcutaneous emphysema	PE Tension pneumothorax Esophageal rupture Pneumothorax Mediastinitis		
	Fever	PE Esophageal rupture Pericarditis Myocarditis Mediastinitis Cholecystitis		Rales	Acute MI Coronary ischemia Unstable angina		
		Hypoxemia		PE Tension pneumothorax Pneumothorax	Abdominal examination	Epigastric tenderness	Esophageal rupture Esophageal tear Cholecystitis Pancreatitis Pancreatitis
						Left upper quadrant tenderness	
						Right upper quadrant tenderness	Cholecystitis
					Extremity examination	Unilateral leg swelling, warmth, pain, tenderness, or erythema	PE
					Neurologic examination	Focal findings Stroke	Aortic dissection Acute MI Coronary ischemia Aortic dissection Coronary spasm

ANCILLARY TESTING:

Table 18-4 Ancillary Testing of Patients with Chest Pain		
TEST	FINDING	DIAGNOSIS
ECG	New injury	Acute MI Aortic dissection
	New ischemia	Coronary ischemia Coronary spasm
	RV strain	PE
	Diffuse ST segment elevation	Pericarditis
CXR	Pneumothorax with mediastinal shift	Tension pneumothorax
	Wide mediastinum	Aortic dissection
	Pneumothorax	Esophageal rupture Pneumothorax
	Effusion	Esophageal rupture
	Increased cardiac silhouette	Pericarditis
	Pneumomediastinum	Esophageal rupture Mediastinitis
ABG	Hypoxemia, A-a gradient	PE
\dot{V}/\dot{Q} scan or spiral CT	High probability or any positive in patient with high clinical suspicion	PE

MANAGEMENT OF POTENTIAL ACS:

- **Good algorithm below**
- For more detail, see notes on ACS



MANAGEMENT OF OTHER POTENTIALLY DISASTROUS CHEST PAIN SYNDROMES:

