CHEST PAIN

ZSMU

Department of general practice – family medicine

CHEST PAIN

- 5% of all ED visits per year
- Differential diagnosis is difficult

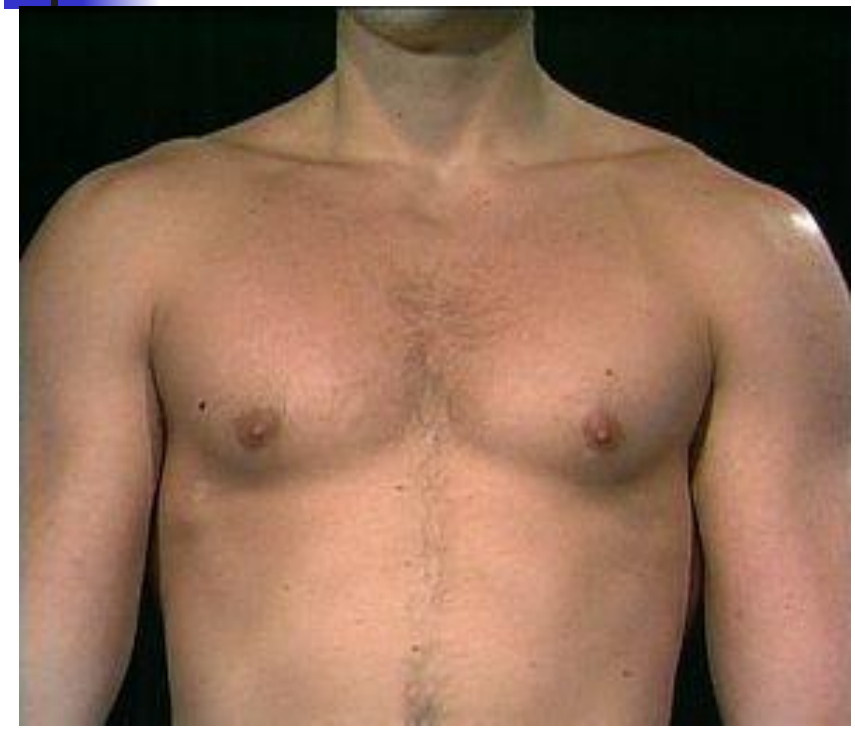
CHEST PAIN

- ANATOMY
- DIFFERENTIAL DIAGNOSIS
- BRIEF OVERVIEW OF DISEASE PROCESSES CAUSING CHEST PAIN
- APPROACH TO CHEST PAIN

ANATOMY

- In devising a differential diagnosis for chest pain, it becomes essential to review the anatomy of the thorax.
- The various components of the thorax can all be responsible for chest pain

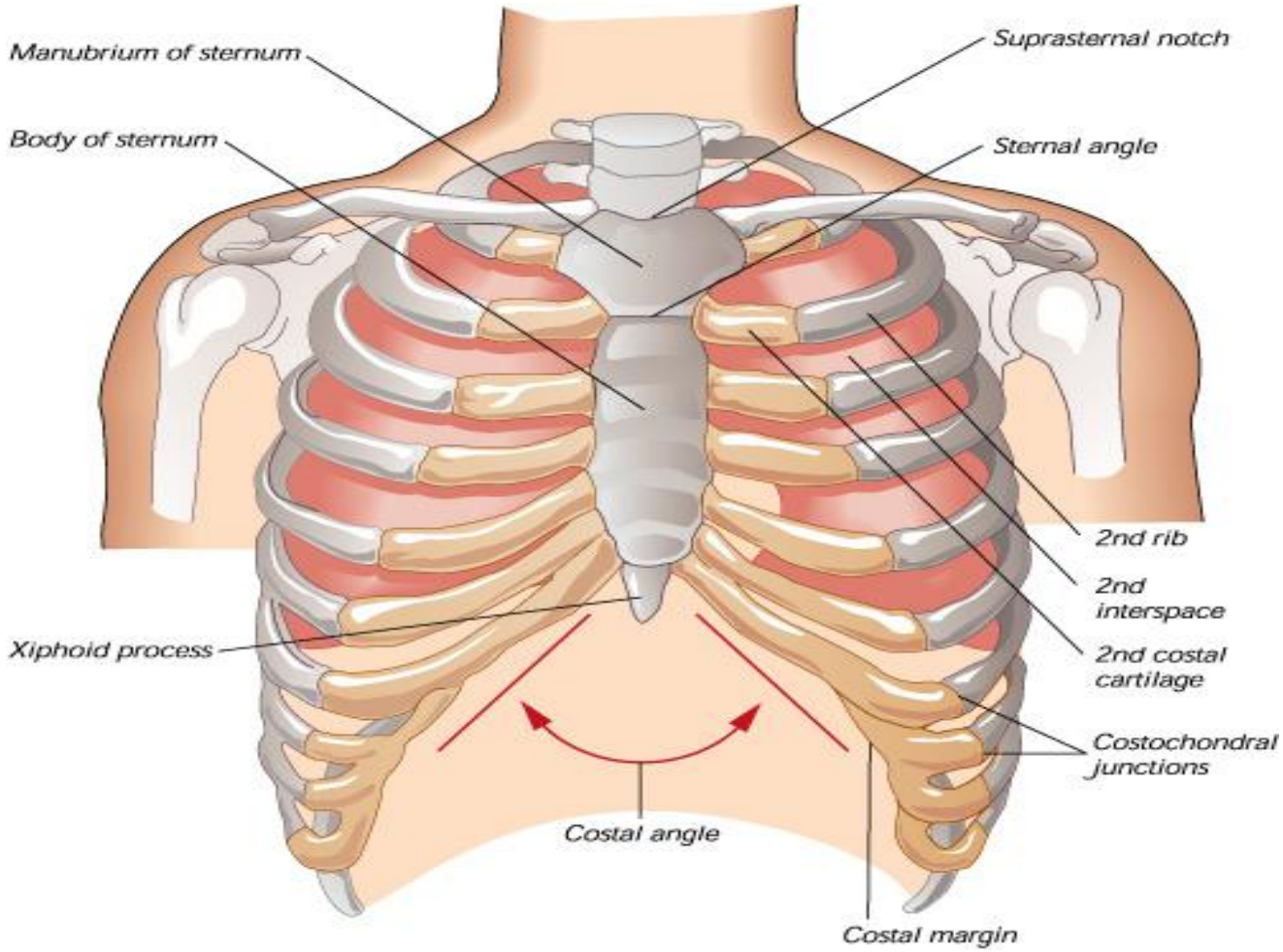
ANATOMY



SKIN

MUSCLES

ANATOMY

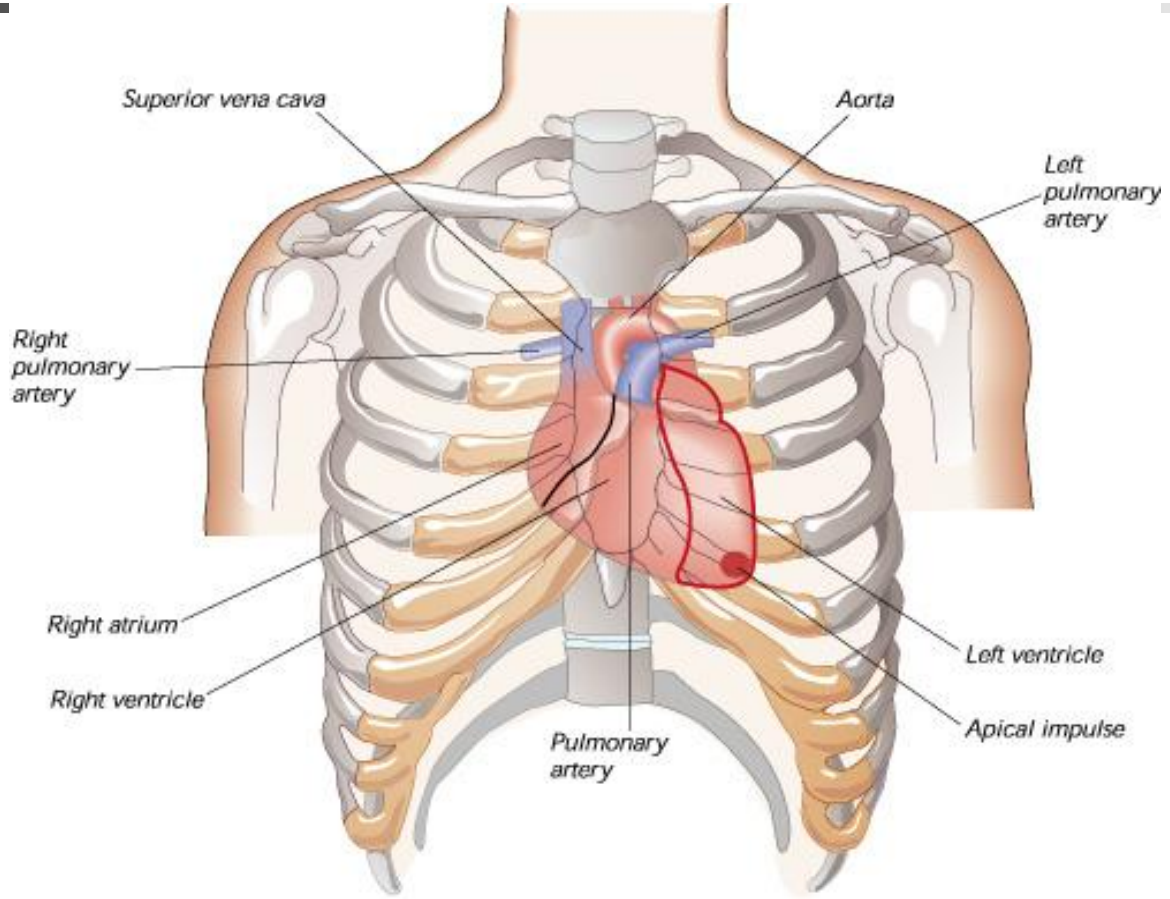


BONES

ANATOMY

PULMONARY SYSTEM

ANATOMY



HEART

ANATOMY

VASCULAR AND GI SYSTEM
AORTA AND ESOPHAGUS

DIFFERENTIAL DIAGNOSIS OF CHEST PAIN

- CHEST WALL PAIN
- PULMONARY CAUSES
- CARDIAC CAUSES
- VASCULAR CAUSES
- GI CAUSES
- OTHER (PSYCHOGENIC CAUSES)

DD: CHEST PAIN

- CHEST WALL PAIN

1 - Skin and sensory nerves

-Herpes Zoster

2 - Musculoskeletal system

- Isolated Musculoskeletal Chest Pain Syndrome

*Costochondritis

*Xiphoidalgia

*Precordial Catch Syndrome

*Rib Fractures

- Rheumatic and Systemic Diseases causing chest wall pain

DD: CHEST PAIN

- PULMONARY CAUSES

1 - Pulmonary Embolism

2 – Pneumonia

3 - Pneumothorax/ Tension PTX

4 - Pleuritis/Serositis

5 - Sarcoidosis

6 - Asthma/COPD

7 - Lung cancer (rare cases)

DD: CHEST PAIN

- CARDIAC CAUSES

- Coronary Heart Disease
  - *Myocardial Ischemia
  - *Unstable Angina
  - *Angina
- Valvular Heart Disease
  - *Mitral Valve Prolapse
  - *Aortic Stenosis
- Pericarditis/Myocarditis

DD: CHEST PAIN

- Vascular Causes:

  -Aortic Dissection

DD: CHEST PAIN

- GI CAUSES

-ESOPHAGEAL

*Reflux

* Esophagitis

* Rupture (Boerhaave Syndrome)

* Spasm/Motility Disorder/Foreign Body Secondary to Stricture/Web/Etc

-OTHER

*Consider Pain referred from PUD, Biliary Disease, or Pancreatitis

DD: CHEST PAIN

- PSYCHIATRIC

- PANIC DISORDER
- ANXIETY
- DEPRESSION
- SOMATOFORM DISORDERS

CHEST PAIN

- BRIEF OVERVIEW OF DISEASE PROCESSES CAUSING CHEST PAIN

CHEST WALL PAIN

CHEST WALL PAIN

- HERPES ZOSTER

-Reactivation of Herpes Varicellae

- Immunocompromised patients often at risk for reactivation.

- 60% of zoster infections involve the trunk

- Pain may precede rash

HERPES ZOSTER

- Clusters of vesicles (with clear or purulent fluid) grouped on an erythematous base. Lesions eventually rupture and crust.
- Dermatome distribution.
- Usually unilateral involvement that halts at midline

HERPES ZOSTER

TREATMENT:

* Antivirals: reduce duration of symptoms; incidence of postherpatic neuralgia.
* +/- corticosteroids: may reduce inflammation
* Analgesia

POSTHERPETIC NEURALGIA:

* May follow course of acute zoster
* Shooting, acute pain.
* Hyperesthesia in involved dermatome
* Treatment: analgesics, antidepressants, gabapentin

CHEST WALL PAIN

- Musculoskeletal Pain

  - Usually localized, acute, positional;

  - Pain often reproducible by palpation, by turning or arm movement;

  - May elicit history of repetitive or unaccustomed activity involving trunk/arms

  - Rheumatic diseases will cause musculoskeletal pain via thoracic joint involvement

MUSCULOSKELETAL PAIN

- DIAGNOSIS
- COSTOCHONDRITIS
- TIETZE SYNDROME
- XIPHODYNIA
- PRECORDIAL CATCH SYNDROME
- RIB FRACTURE

- **CLINICAL FEATURES**
- Inflammation of costal cartilages +/- sternal articulations. No swelling
- Painful swelling in one or more upper costal cartilages.
- Discomfort over xyphoid reproduced by palpation
- Sharp pain lasting for 1-2 min episodes near the cardiac apex and associated with inspiration, poor posture, and inactivity
- Pain over involved rib

MUSCULOSKELETAL PAIN

- Treatment:

  Analgesia (NSAIDs)

PULMONARY CAUSES OF CHEST PAIN

PULMONARY EMBOLISM

- **RISK FACTORS: VIRCHOW'S TRIAD**

- Hypercoagulability

*Malignancy

*Pregnancy, Early Postpartum, OCPs, HRT

*Genetic Mutations: Factor V Leiden, Prothrombin, Protein C or S deficiencies, antiphospholipid Ab, etc

- Venous Stasis

* Long distance travel

* Prolonged bed rest or recent hospitalization

* Cast

- Venous Injury:

* Recent surgery or Trauma

PULMONARY EMBOLISM (PE)

CLINICAL FEATURES

- Shortness of breath
- Chest pain: often pleuritic
- Tachycardia, tachypnea, hypoxemia
- Hemoptysis, Cough
- Consider diagnosis in new onset A fib
- Look for asymmetric leg swelling (signs of DVT) which places patients at risk for PE
- If massive PE, may present with hypotension, unstable vital signs, and acute cor pulmonale. Also may present with cardiac arrest (PEA >>asystole).

PE: DIAGNOSTIC TESTS

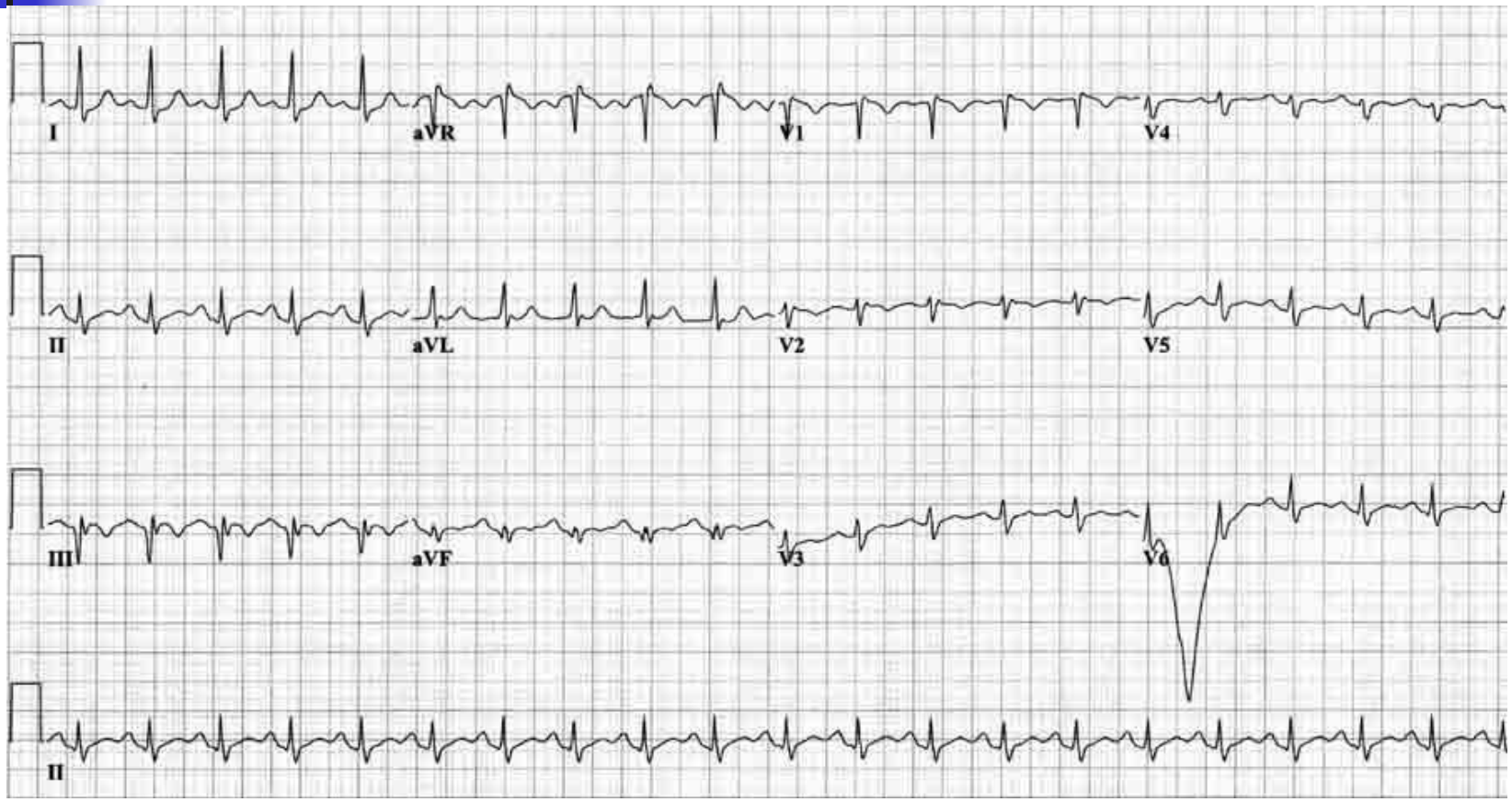
- **ECG:**

-Sinus tachycardia most common

- Often see nonspecific abnormalities

- Look for S1 Q3 T3 (S wave in lead I, Q wave in lead III, inverted T wave in lead III)

PE: S1Q3T3



PE: DIAGNOSTIC TESTS

- CHEST X-RAY

- Normal in 25% of cases

- Often nonspecific findings

- Look for Hampton's Hump (triangular pleural based density with apex pointed towards hilum): sign of pulmonary infarction

-Look for Westermark's sign: Dilation of pulmonary vessels proximal to embolism and collapse distal

CXR: Hampton's Hump and Westermark's Sign

PE: DIAGNOSTIC TESTS

- ABG:

  *Look for abnormal PaO2 or A-a gradient

- D-Dimer:

  *Often elevated in PE.

  * Useful test in low probability patients.

  *May be abnormally high in various conditions:

  (Malignancy, Pregnancy, sepsis, recent surgery)

PE: DIAGNOSTIC TESTS

- VQ SCAN (Ventilation-Perfusion scan)- use in setting of renal insufficiency
- Helical CT scan with IV contrast
- Pulmonary angiography - Gold Standard

PE: TREATMENT

- Initiate Heparin
  * Unfractionated Heparin: 80 Units/Kg bolus IV, then 18units/kg/hr
  * Fractionated Heparin (Lovenox): 1mg/kg SubQ BID
  * If high pre-test probability for PE, initiate empiric heparin while waiting for imaging
  * Make sure no intraparenchymal brain hemorrhage or GI hemorrhage prior to initiating heparin.
- Consider Fibrinolytic Therapy:
  * Especially if PE + hypotension

PNEUMONIA

- CLINICAL FEATURES

- Cough +/- sputum production
- Fevers/chills
- Pleuritic chest pain
- Shortness of breath
- May be preceded by viral URI symptoms
- Weakness/malaise/ myalgias
- If severe: tachycardia, tachypnea, hypotension
- Decreased sats
- Abnormal findings on pulmonary auscultation: (rales, decreased breath sounds, wheezing, rhonchi)

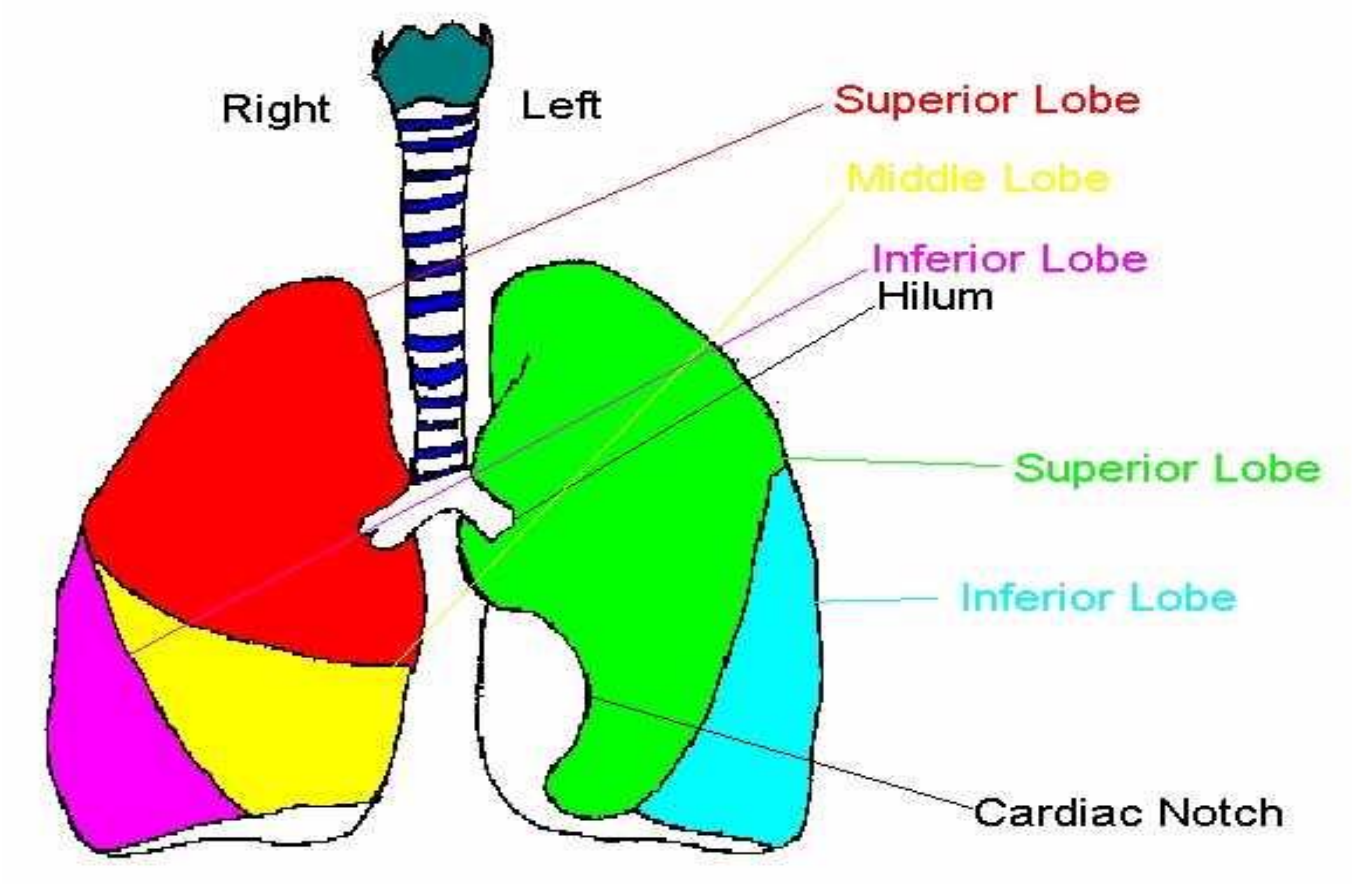
PNEUMONIA: DIAGNOSIS

- X-Ray

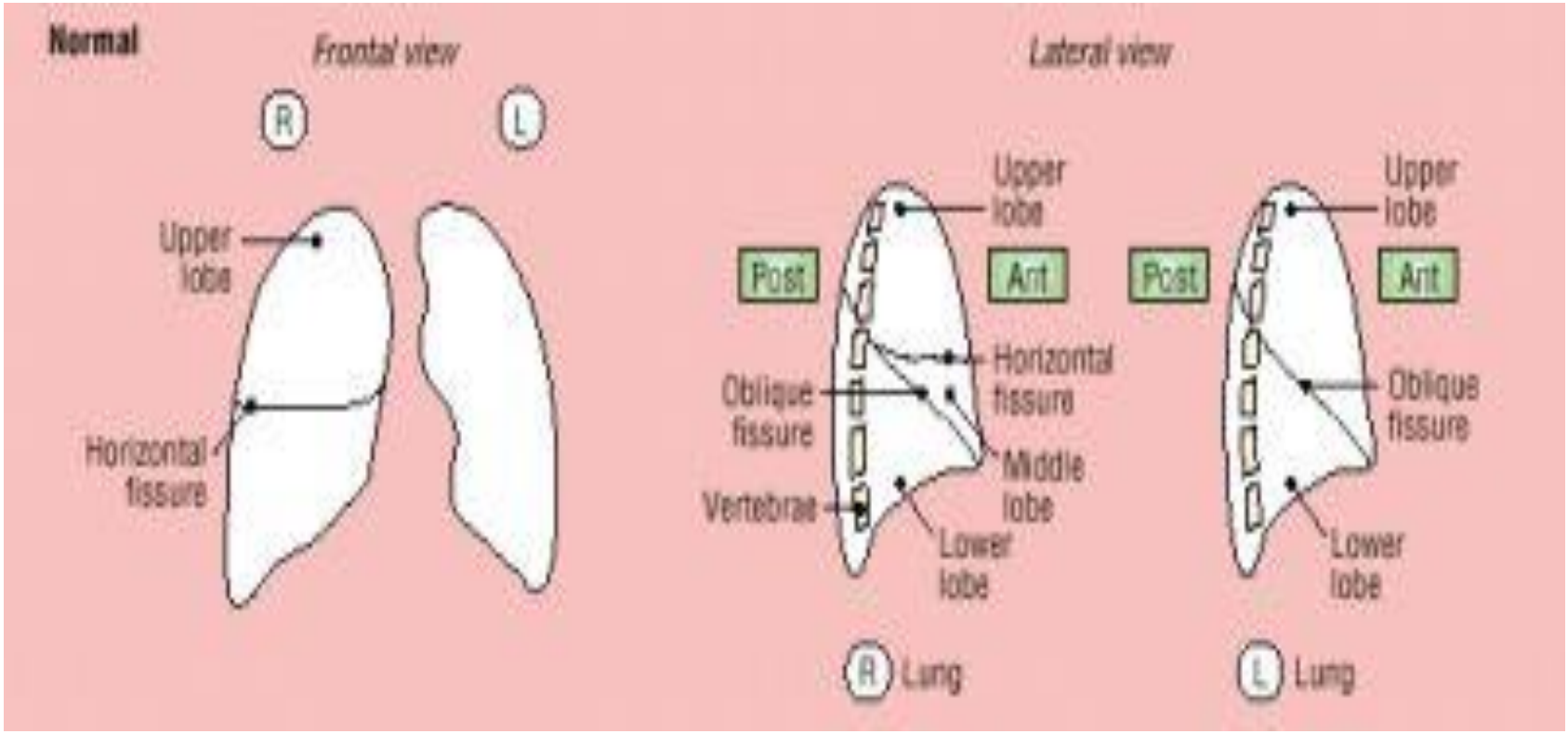
If patient is to be hospitalized:

- Consider GBC (to look for leukocytosis)
- Consider sputum cultures
- Consider blood cultures
- Consider ABG if in respiratory distress

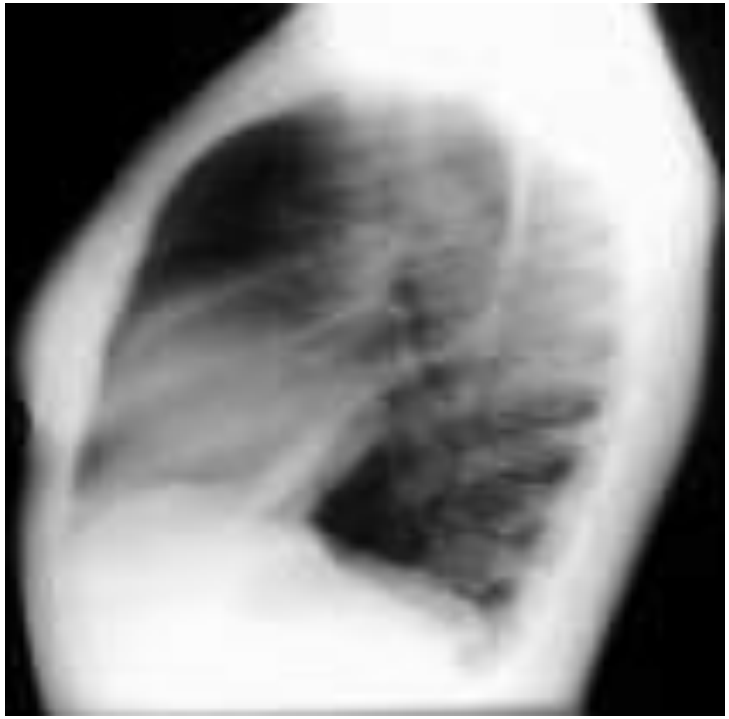
LOCALIZING THE INFILTRATE



IDENTIFYING LOCATION OF INFILTRATES



RUL PNEUMONIA



- RUL INFILTRATE

RML INFILTRATE

- Notice that right heart border becomes obscured on PA view of RML pneumonia

RLL PNEUMONIA

- RLL infiltrate

PNEUMONIA: TREATMENT

- Community- Acquired:

- **OUT-PATIENT**

*Doxycycline: Low cost option

* Macrolide

*Newer fluoroquinolone: Moxifloxacin, Levofloxacin, Gatifloxacin

- **IN-PATIENT**:

* Second or third generation cephalosporin +macrolide

* Fluoroquinolone: Avelox

- Nursing Home: * Zosyn + Erythromcyin

* Clindamycin + Cipro

SPONTANEOUS PNEUMOTHORAX

- RISK FACTORS:

- Primary

* No underlying lung disease
* Young male with greater height to weight ratio
* Smoking: 20:1 relative risk compared to nonsmokers.

-Secondary

* COPD
* Cystic Fibrosis
* AIDS/PCP
* Neoplasms

PNEUMOTHORAX

- CLINICAL FEATURES

- Acute pleuritic chest pain: 95%
- Usually pain localized to side of PTX
- Dyspnea
- May see tachycardia or tachypnea
- Decreased breath sounds on side of PTX
- Hyperresonance on side of PTX
- If tension PTX, will have above findings + tracheal deviation + unstable vital signs. This is rare complication with spontaneous PTX

TENSION PNEUMOTHORAX

- What is wrong with this picture??

TENSION PNEUMOTHORAX

- Answer: Chest X-ray should have never been obtained
- Tension PTX is a clinical diagnosis requiring immediate life saving measures

Tension Pneumothorax

- Trachea deviates to contralateral side
- Mediastinum shifts to contralateral side
- Decreased breath sounds and hyperresonance on affected side
- JVD
- Treatment: Emergent needle decompression followed by chest tube insertion

NEEDLE DECOMPRESSION

- Insert large bore needle (14 or 16 Gauge) with catheter in the 2nd intercostal space mid-clavicular line. Remove needle and leave catheter in place. Should hear air.

SPONTANEOUS PTX

- RIGHT SIDED PTX

SPONTANEOUS PTX

- TREATMENT:

  - If small (<20%), observe with repeated X-rays

  - Give oxygen: Increases pleural air absorption

  - If large, place chest tube

PLEURITIS/SEROSITIS

- Inflammation of pleura that covers lung
- Pleuritic chest pain
- Causes:
  - Viral etiology
  - SLE
  - Rheumatoid Arthritis
  - Drugs causing lupus like reaction:
    Procainamide, Hydralazine, Isoniazid

COPD/ASTHMA EXACERBATIONS

- CLINICAL FEATURES:

- Decrease in O2 saturations

- Shortness of Breath

- May see chest pain

- Decreased breath sounds, wheezing, or prolonged expiratory phase on exam

- Look for accessory muscle use (nasal flaring, tracheal tugging, retractions).

Order CXR to r/o associated complications: PTX, pneumonia that may have led to exacerbation

COPD EXACERBATION: TREATMENT

- Oxygen: Must prevent hypoxemia. Watch for hypercapnia with O2 therapy
- B2 agonist (albuterol)
- Anticholinergic (atrovent)
- Corticosteroids
- Consider Abx if: change in sputum or fever)
- If patient is tiring out, not oxygenating well despite O2, developing worsening respiratory acidosis or mental status changes, then intubate.

ASTHMA TREATMENT

- Oxygen
- Inhaled short acting B2 agonists: Albuterol
- Anticholinergics: Atrovent
- Corticosteroids
- Magnesium
- Systemic B2 agonists: Terbutaline
- Heliox
- If tiring (normalization of CO2/ rising CO2 or mental status changes) or poorly oxygenating despite O2, then intubate

CARDIAC CAUSES OF CHEST PAIN

RISK FACTORS FOR CAD

- Age
- Diabetes
- Hypertension
- Family History
- Tobacco Use
- Hypercholesterolemia
- Cocaine use

ISCHEMIC CHEST PAIN

- EXERTIONAL ANGINA

  * BRIEF EPISODES BROUGHT ON BY EXERTION AND RELIEVED BY REST ON NTG

- UNSTABLE ANGINA

  * NEW ONSET
  * CHANGE IN FREQUENCY/SEVERITY
  * OCCURS AT REST

- AMI

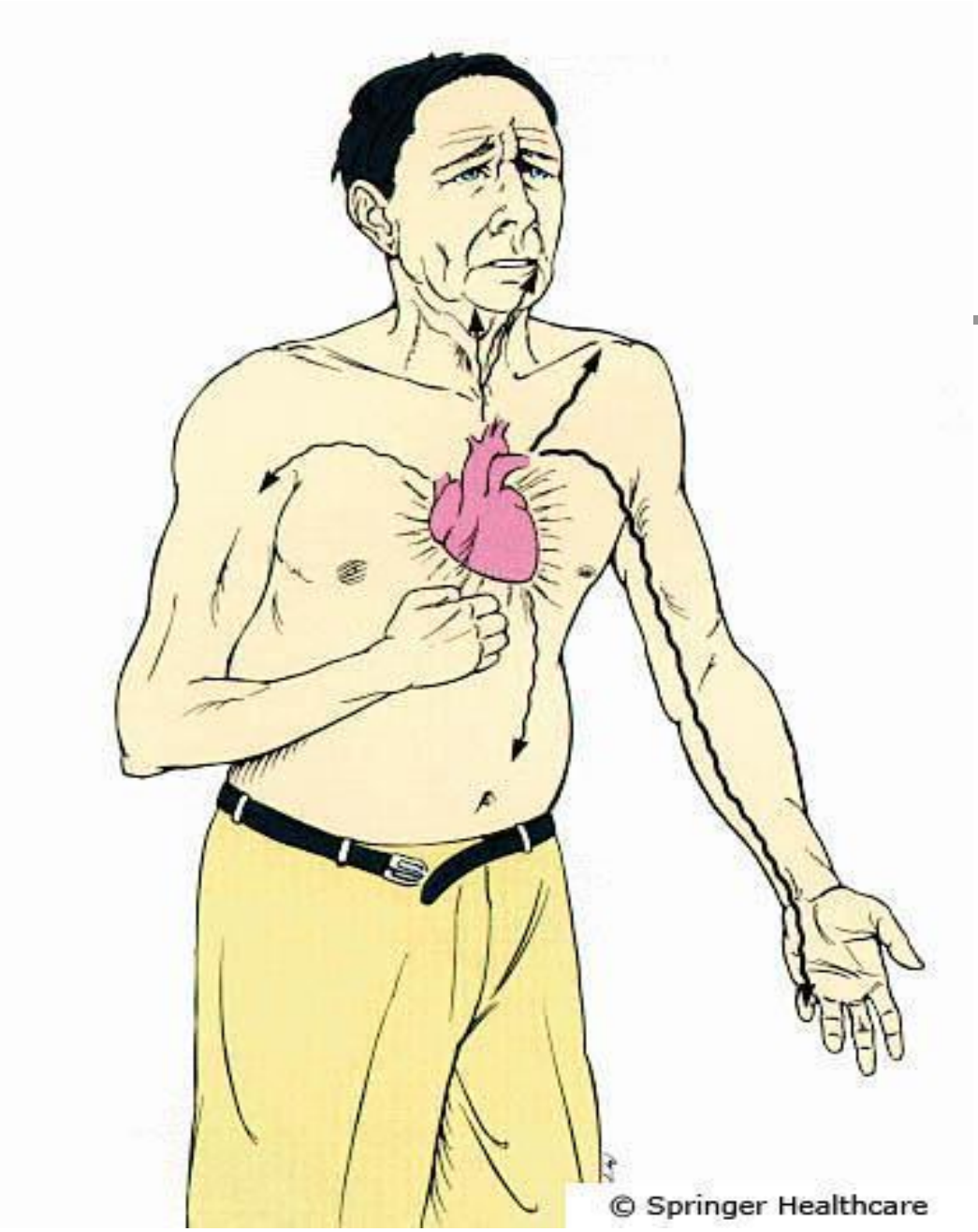
  * SEVERE PERSISTENT SYMPTOMS
  * ELEVATED TROPONIN

Angina pectoris

- Stable angina pectoris is a clinical syndrome characterized by precordial or anterior chest discomfort, often with radiation to the left shoulder or arm.
- The pain typically accompanies physical activity or emotional stress, although many patients with chronic stable angina pectoris have intermittent rest pain.
- The pain may radiate to the left side of the neck or jaw.

Angina pectoris

- The chest discomfort may be described by the patient either as a true pain or as a variety of symptoms, such as heaviness, squeezing, tightness, pressure, or aching.
- True angina is accompanied by some sternal or substernal localization.
- Some individuals may experience an associated sensation of dyspnea, which can be the dominant symptom (angina equivalent) in a small number of patients.



The chest discomfort usually lasts up to 20 minutes; a typical episode of angina rarely lasts longer than 20 minutes unless the precipitating stimulus continues. Usually, the chest pain abates when the aggravating activity is stopped. Emotion-triggered symptoms can last longer. Most patients obtain relief from angina in 3 to 10 minutes with sublingual or oral-spray nitroglycerin.

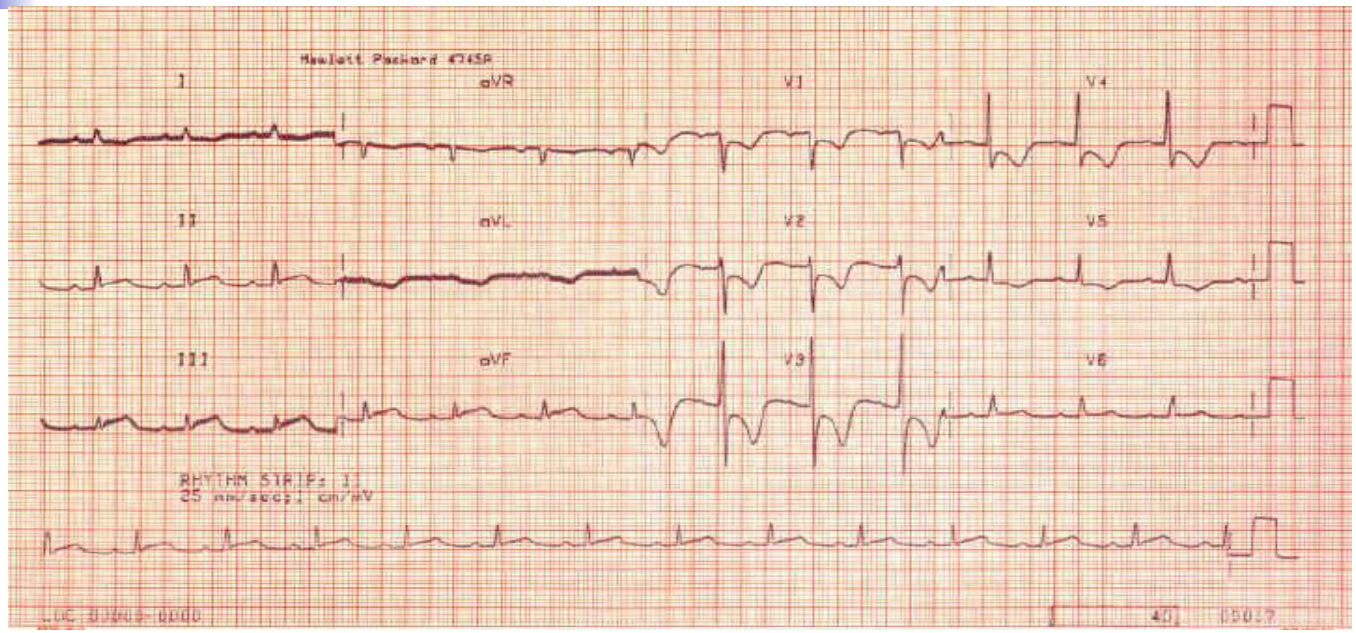
ISCHEMIC CHEST PAIN: DIAGNOSIS

- 12 LEAD ECG
  - Look for ST segment elevation (at least 1mm in two contiguous leads)
  - Look for ST segment depression
  - Look for T wave inversions
  - Look for Q waves
  - Look for new LBBB
  - Always compare to old ECGs

ACUTE MYOCARDIAL INFARCTION

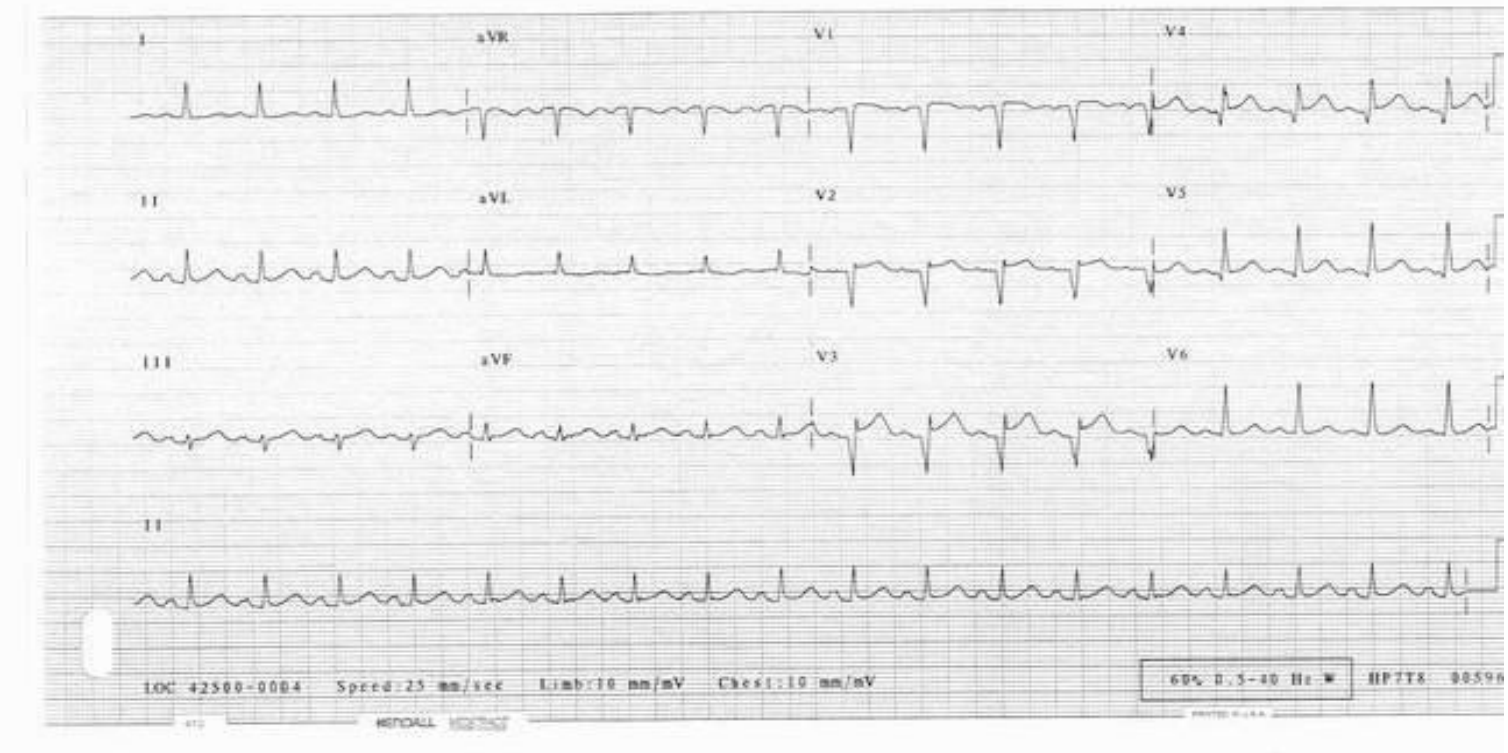
TERRITORY	CORONARY ARTERY	ECG
INFERIOR	RCA	II, III, AVF
ANTERIOR	LAD	V2-4
LATERAL	CIRCUMFLEX	V5-6, I, AVL
POSTERIOR	VARIABLE	TALL R WAVE IN V1/2 OR ST SEGMENT DEPRESSION

ACUTE INFERIOR MI



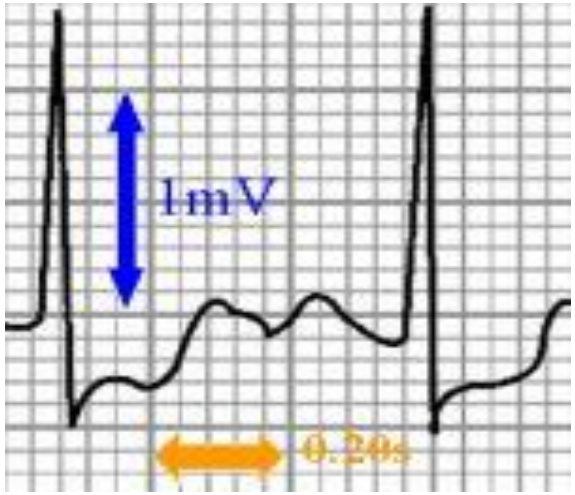
- ST ELEVATION II, III, AVF

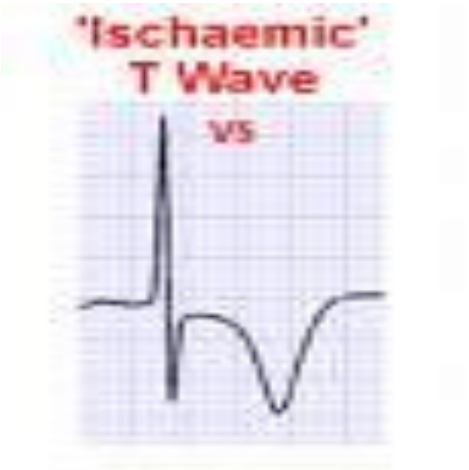
ACUTE ANTERIOR MI



- ST SEGMENT ELEVATION V2-4

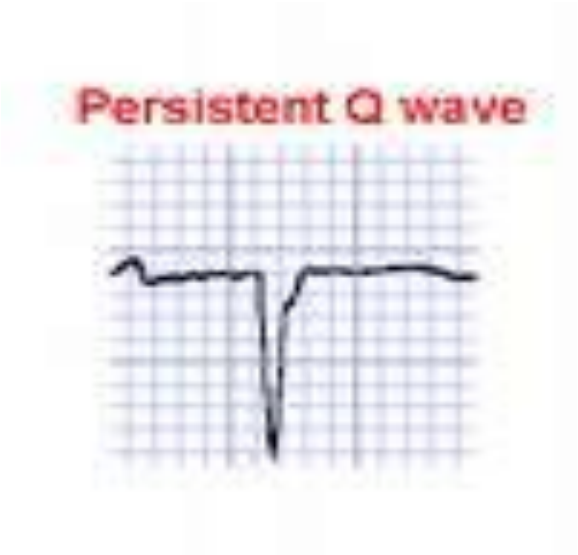
ECG CHANGES IN ISCHEMIC HEART DISEASE

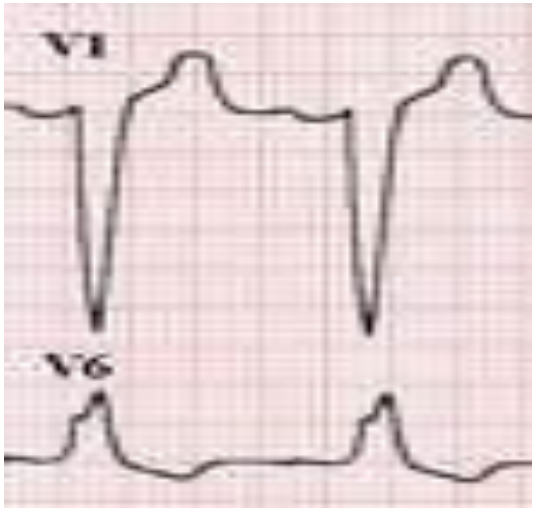




- ST SEGMENT DEPRESSION
- T WAVE IINVERSIONS

ECG CHANGES IN ISCHEMIC HEART DISEASE





- Q WAVES
- LBBB

ISCHEMIC CHEST PAIN: DIAGNOSTIC TESTS

- CARDIAC ENZYMES
  - Myoglobin
    * Will rise within 3 hours, peak within 4-9 hours, and return to baseline within 24 hrs.
  - CKMB
    * Will rise within 4 hours, peak within 12- 24 hours and return to baseline in 2-3 days
  - TROPONIN I
    * Will rise within 6 hours, peak in 12 hours and return to baseline in 3-4 days

ISCHEMIC HEART DISEASE TREATMENT: ACUTE ST SEGMENT ELEVATION MI

- **OXYGEN**
- **ASPIRIN (4 BABY ASPIRIN)**
- **IV NITROGLYCERIN**
  * Hold for SBP <100
    * Use cautiously in inferior wall MI. Some of these patients have Right ventricular involvement which is volume/preload dependent.
- **BETA BLOCKERS**
    * Hold for SBP <100 or HR <60
    * Hold if wheezing
    * Hold if cocaine use (unopposed alpha)
- **MORPHINE**
- **HEPARIN**: Before starting,
  *Check rectal exam.
    *Check CXR: to r/o dissection
- **CATH LAB VS TPA**

ISCHEMIC HEART DISEASE TREATMENT: NONSTEMI AND UNSTABLE ANGINA

- **OXYGEN**
- **ASPIRIN (4 BABY ASPIRIN)**
- **NITROGLYCERIN**
  * Hold for SBP <100
    * Use cautiously in inferior wall MI. Some of these patients have Right ventricular involvement which is volume/preload dependent.
- **PLAVIX**
- **BETA BLOCKERS**
    * Hold for SBP <100 or HR <60
    * Hold if wheezing
    * Hold if cocaine use (unopposed alpha)
- **MORPHINE**
- **HEPARIN:** Before starting, *Check rectal exam.
  *Check CXR: to r/o dissection

LOW RISK CARDIAC CHEST PAIN

- If low risk chest pain, can consider serial ECGs and enzymes. If normal, can order stress test in ED if available.

VALVULAR HEART DISEASE

- **AORTIC STENOSIS**

*Classic triad: dyspnea, chest pain, and syncope

* Harsh systolic ejection murmur at right 2nd intercostal space radiating towards carotids

* Carotid pulse: slow rate of increase

* Brachioradial delay: Delay in pulses between right brachial and right radial arteries

* Try to avoid nitrates: Theses patients are preload dependent

- **MITRAL VALVE PROLAPSE**

* Symptoms include atypical chest pain, palpitations, fatigue, dyspnea

* Often hear mid-systolic click

* Patients with chest pain or palpitations often respond to β-blockers.

ACUTE PERICARDITIS

- CLINICAL FEATURES

- Acute, stabbing chest pain
- Pleuritic chest pain
- Pain often referred to left trapezial ridge
- Pain more severe when supine.
- Pain often relieved when sitting up and leaning forward
- Listen for pericardial friction rub

ACUTE PERICARDITIS

- COMMON CAUSES

  * IDIOPATHIC
  * INFECTIOUS
  * MALIGNANCY
  * UREMIA
  * RADIATION INDUCED
  * POST MI (DRESSLER SYNDROME)
  * MYXEDEMA
  * DRUG INDUCED
  * SYSTEMIC RHEUMATIC DISEASES

ACUTE PERICARDITIS: DIAGNOSTIC TESTS

- ECG

*Look for diffuse ST segment elevation and PR depression.

* If large pericardial effusion/tamponade, may see low voltage and electrical alternans

- X-Ray

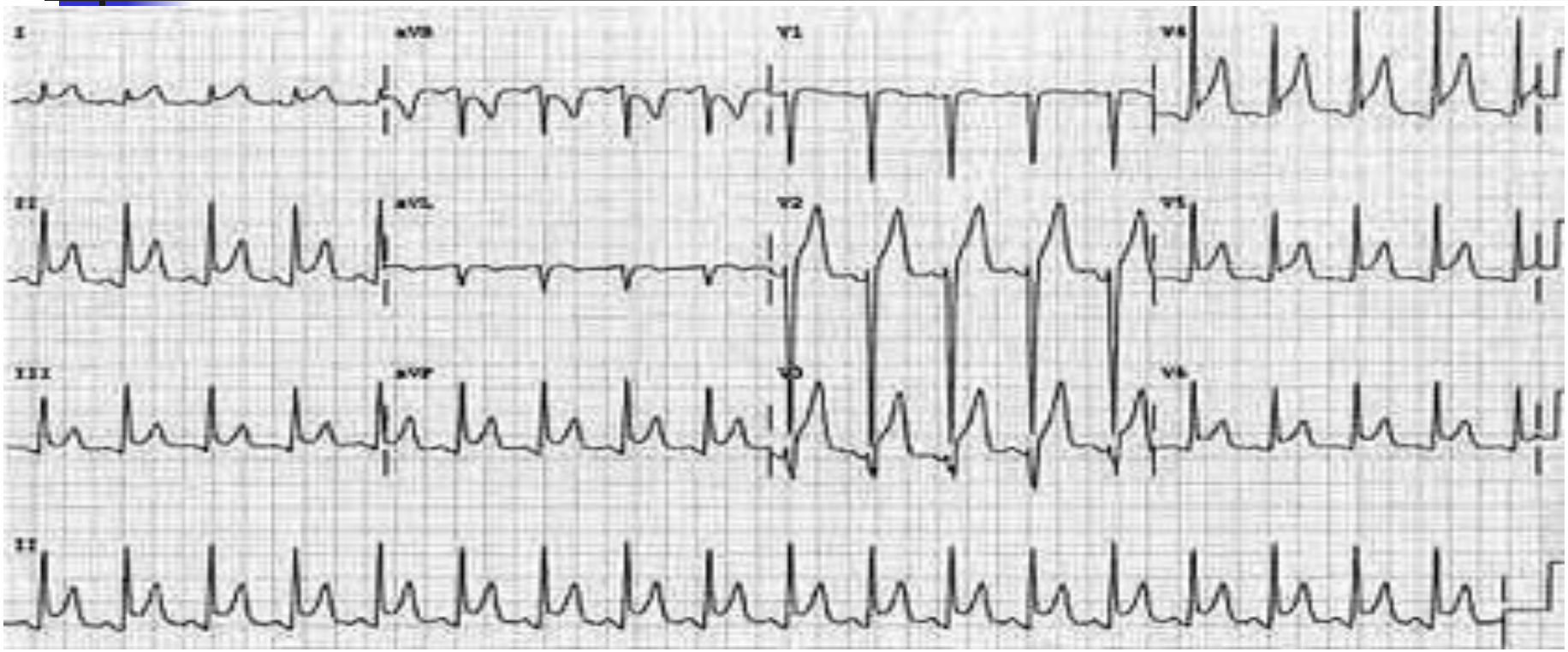
* Of limited value.

* Look at size of cardiac silhouette

- US

*To look for pericardial effusion

ACUTE PERICARDITIS



- Diffuse ST segment elevation

TAMPONADE

- ELECTRICAL ALTERNANS

ACUTE PERICARDITIS

- TREATMENT:

  - If idiopathic or viral: NSAIDs

  - Otherwise treat underlying pathology

MYOCARDITIS

- Inflammation of heart muscle
- Frequently accompanied by pericarditis
- Fever
- Tachycardia out of proportion to fever
- If mild, signs of pericarditis +fevers, myalgias, rigors, headache
- If severe, will also see signs of heart failure
- May see elevated cardiac enzymes
- Treatment: Largely supportive

VASCULAR CAUSES OF CHEST PAIN

AORTIC DISSECTION

- RISK FACTORS
  - UNCONTROLLED HYPERTENSION
  - CONGENITAL HEART DISEASE
  - CONNECTIVE TISSUE DISEASE
  - PREGNANCY
  - IATROGENIC: S/P AORTIC CATHETERIZATION OR CARDIAC SURGERY

AORTIC DISSECTION

CLINICAL FEATURES

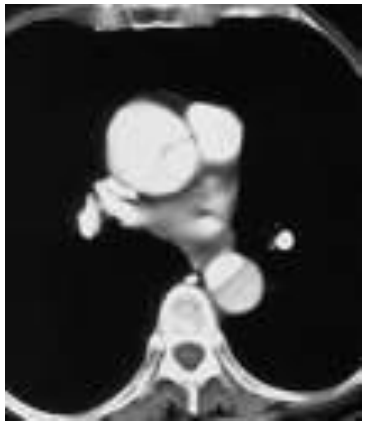
* Abrupt onset of chest pain or pain between scapulae
* Tearing or ripping pain
* Pain often worst at symptom onset
* As other vessels become affected, will see
    - Stroke symptoms: carotid artery involvement
    - Tamponade: Ascending dissection into aortic root
    - New onset Aortic Regurgitation
    - Abdominal/Flank pain/Limb Ischemia: Dissection into abdominal aorta, renal arteries, iliac arteries
    - AMI
* Decreased pulsations in radial, femoral, carotid arteries
* Significant blood pressure differences between extremities
* Usually hypertension (but if tamponade, hypotension)

DIAGNOSIS: AORTIC DISSECTION

- CXR: Look for widened mediastinum
- CT SCAN:
- ANGIOGRAPHY
- TEE

** suspected dissectons must be confirmed radiologically prior to operative repair.

AORTIC DISSECTION



- WIDENED MEDIASTINUM

AORTIC DISSECTION

- TREATMENT:

  - ANTIHYPERTENSIVE THERAPY

    *Start with beta blockers (smell, labetalol)

    * Can add vasodilators (nitroprusside) if further BP control is needed ONLY after have achieved HR control with beta-blockers

  - If ascending dissection: OR

  - If descending: May be able to medically manage

GI CAUSES OF CHEST PAIN

ESOPHAGEAL CAUSES

- REFLUX
- ESOPHAGITIS
- ESOPHAGEAL PERFORATION
- SPASM/MOTILITY DISORDER/

GERD

- RISK FACTORS
  * High food fat
  * Caffeine
  * Nicotine, alcohol
  * Medicines: CCB, nitrates, Anticholinergics
  * Pregnancy
  * DM
  * Scleroderma

GERD

- **CLINICAL FEATURES**

* Burning pain
* Association with sour taste in mouth, nausea/vomiting
* May be relieved by antacids
* May find association with food
* May mimic ischemic disease and visa versa

- **TREATMENT**

* Can try GI coctail in ED (30cc Mylanta, 10 cc viscous lidocaine)
* H2 blockers and PPI
* Behavior modification:
    - Avoid alcohol, nicotine, caffeine, fatty foods
    - Avoiding eating prior to sleep.
    - Sleep with Head of Bed elevated.

ESOPHAGITIS

- CLINICAL FEATURES

  *Chest pain +Odynophagia (pain with swallowing)

- Causes

  *Inflammatory process: GERD or med related

  *Infectious process: Candida or HSV (often seen in immunocompromised patients)

- DIAGNOSIS: Endoscopy with biopsy and culture
- TREATMENT: Address underlying pathology

ESOPHAGEAL PERFORATION

- CAUSES

*Iatrogenic: Endoscopy

* Boerhaave Syndrome: Spontaneous rupture secondary to increased intraesophageal pressure.

- Often presents as sudden onset of chest pain immediately following episode of forceful vomiting

*Trauma

*Foreign Body

ESOPHAGEAL PERFORATION

- CLINICAL FEATURES

*Acute persistent chest pain that may radiate to back, shoulders, neck

* Pain often worse with swallowing

* Shortness of breath

* Tachypnea and abdominal rigidity

* If severe, will see fever, tachycardia, hypotension, subQ emphysema, necrotizing mediastinitis

* Listen for Hammon crunch (pneumomediastinum)

ESOPHAGEAL PERFORATION

- DIAGNOSIS

*x-Ray: May see pleural effusion (usually on left). Also may see subQ emphysema, pneumomediastinum,pneumothorax

*CT chest

* Esophagram

- TREATMENT

*Broad spectrum Antibiotics

*Immediate surgical consultation

ESOPHAGEAL MOTILITY DISORDERS

- CLINICAL FEATURES:

  * Chest pain often induced by ingestion of liquids at extremes of temperature

  * Often will experience dysphagia

- DIAGNOSIS:

  Esophageal manometry

OTHER GI CAUSES

In appropriate setting, consider PUD, Biliary Disease, and Pancreatitis in differential of chest pain.

PSYCHOLOGIC CAUSES

- Diagnosis of exclusion

APPROACH TO THE PATIENT WITH CHEST PAIN

PUTTING IT ALL TOGETHER

INITIAL APPROACH

- Like everything else: ABCs

  A: Airway

  B: Breathing

  C: Circulation
- IV, O2, cardiac monitor
- Vital signs

CHEST PAIN: HISTORY

- Time and character of onset
- Quality
- Location
- Radiation
- Associated symptoms
- Aggravating symptoms
- Alleviating symptoms
- Prior episodes
- Severity
- Review risk factors

CHEST PAIN: HISTORY

- TIME AND CHARACTER OF ONSET:

  * Abrupt onset with greatest intensity at start:

-Aortic dissection

-PTX

-Occasionally PE will present in this manner

  * Chest pain lasting seconds or constant over weeks is not likely to be due to ischemia

CHEST PAIN: HISTORY

- **Quality:**

*Pleuritic Pain: PE, Pleurisy, Pneumonia, Pericarditis, PTX

*Esophageal: Burning, etc

*MI: squeezing, tightness, pressure, heavy weight on chest. Can also be burning

* acute, tearing, ripping pain: Aortic Dissection

- **Location:**

* If very localized, consider chest wall pain or pain of pleural origin

CHEST PAIN: HISTORY

- RADIATION:

* To neck, jaw, down either arm: consider Ischemia

- ASSOCIATED SYMPTOMS:

* Fevers, chills, URI symptoms, productive cough: Pneumonia
* Nausea, vomiting, diaphoresis, shortness of breath: MI
* Shortness of breath: PE, PTX, MI, Pneumonia, COPD / Asthma
* Asymmetric leg swelling: DVT
* With new onset neurologic findings or limb ischemia: consider dissection
* Pain with swallowing, acid taste in mouth: Esophageal disease

CHEST PAIN: HISTORY

- AGGRAVATING SYMPTOMS:

* Activity: consider ischemic heart disease
* Food: Consider esophageal disease
* Position: If worse with laying back, consider pericarditis
* Swallowing: Esophageal disease
* Movement: Chest wall pain
* Respiration: PE, PTX, Pneumonia, pleurisy
* Palpation: Chest Wall Pain

CHEST PAIN: HISTORY

- **ALLEVIATING SYMPTOMS**

* Rest/ Cessation of Activity: Ischemic
* NTG: (Cardiac or esophageal)
* Sitting up: Pericarditis
* Antacids: Usually GI system

- **PRIOR EPISODES**

* Have they had this kind of pain before
* Does this feel like prior cardiac pain, esophageal pain, etc
* What diagnostic work-up have they had so far?

Last echo, last stress test, last cath, last EGD, etc

- **SEVERITY**

CHEST PAIN: HISTORY

- RISK FACTORS

* Hypertension, DM, high cholesterol, tobacco, family history: Ischemia
* Long plane trips, car rides, recent surgery or immobility, hypercoagulable state: PE
* Uncontrolled HTN/ Marfan's: Dissection
* Rheumatic Diseases: Pleurisy
* Smoking: PTX, COPD, Ischemia

CHEST PAIN: HISTORY

- When did the pain start?
- What were you doing when the pain started? Were you at rest, eating, walking?
- Did the pain start all of a sudden or gradually build up?
- Can you describe the pain to me?
- Does it radiate anywhere? Neck, jaw, back. down either arm
- Have you had any nausea, vomiting, diaphoresis, or shortness of breath?
- Have you had any fevers, chills, URI symptoms, or cough?
- Have you been on any long plane trips, car rides, recent surgeries? Have you been bed- bound? Have you noticed any swelling in your legs?
- Have you had any tearing sensation in your back/chest?
- Does anything make the pain better or worse? Activity, food, deep breath, position, movement, NTG.
- Have you ever had this type of pain before. If so what was your diagnosis at that time?
- When was the last time you had a stress test, echo, cardiac cath, etc.
- Remember to review risk factors!

CHEST PAIN: PHYSICAL EXAM

- **Review vital signs**

* Fever: Pericarditis, Pneumonia
* Check BP in both arms: Dissection
* Decreased SATs: More commonly in pneumonia, PE, COPD
* Unexplained sinus tachy: consider PE

- **Neck:**

* Look for tracheal deviation: PTX
* Look for JVD: Tension PTX, Tamponade, (CHF)
* Look for accessory muscle use: Respiratory Distress - COPD/Asthma

- **Chest wall exam**

* Look for lesions: Herpes Zoster
* Palpate for localized tenderness: Likely musculoskeletal cause

- **Lung exam**

* Decreased breath sounds/hyperresonance: PTX
* Look for signs of consolidation: Pneumonia
* Listen for wheezing/prolonged expiration: COPD

CHEST PAIN: PHYSICAL EXAM

- **CV EXAM**

* Assess heart rate
* Listen for murmurs:
* Listen for S3/S4
* Pericardial friction rub: pericarditis
* Hammon crunch: Esophageal Perforation
* Muffled heart sounds: Tamponade
* Assess distal pulses

- **ABDOMINAL EXAM**

* Assess RUQ and epigastrium (GI disorders that can cause chest pain)

- **NEURO EXAM**

* Chest pain +neurologic findings: consider dissection

CHEST PAIN: ANCILLARY TESTING

- **LABS: Consider…….**

* Baseline labs: CBC, BMP, PT/PTT
* D dimer (PE)
* Blood cultures (pneumonia)
* Sputum cultures (pneumonia)
* Peak flow (Asthma)
* ABG
* Cardiac Enzymes (MI)
* Urine tox (cocaine- MI)
* ESR (pericarditis)

- **ECG**

CHEST PAIN: ANCILLARY TESTS

- IMAGING: CONSIDER……

* x-Ray
  - Rib fractures
    - Hampton's Hump/ Westermark's sign: PE
    - Infiltrates: Pneumonia
    - Widened mediastinum: Aortic dissection
    - Pneumothorax
    - Cardiac size: enlarged silhouette without CHF: pericardial effusion

* CT CHEST if suspect PE or Aortic Dissection
* VQ SCAN: PE
* STRESS TESTS: Angina
* CATH: Ischemia
* ECHO
* EGD: Esophageal disease

CHEST PAIN

- Remember, many symptoms overlap.
- Goal in ED is to r/o life threatening causes of chest pain
- With appropriate history, physical exam, and ancillary tests, rule out
  * Pneumothorax
  * Aortic Dissection
  * PE
  * Unstable Angina
  * MI
  * Esophageal Perforation