APPROACH TO CHEST PAIN DYSPNEA AND PALPITATION

LEARNING OBJECTIVES

• At the end of the lecture, students should be able to:
  • Know how to approach to a patient with chest pain, dyspnea and palpitation.

CHEST PAIN

• Accounts for 5% of all ER visits per year.
• The differential diagnosis of patients presenting with chest pain is extensive, ranging from benign musculoskeletal etiologies to life-threatening cardiac disease.
HEART

D/D OF CHEST PAIN

Chest pain may be divided into:

- Non Cardiac
- Cardiac

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- Non Cardiac
- Cardiac

DIFFERENTIAL DIAGNOSIS OF CHEST PAIN

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

**DDX: CHEST PAIN**

- CHEST WALL PAIN
  - Skin and sensory nerves
  - Musculoskeletal system

**DDx: CHEST PAIN**

- CHEST WALL PAIN
  - Skin and sensory nerves
  - Herpes Zoster
  - Musculoskeletal system
  - Isolated Musculoskeletal Chest Pain Syndrome
    - Costochondritis
    - Xiphoidalgia
    - Precordial Catch Syndrome
    - Rib Fractures
  - Rheumatic and Systemic Diseases causing chest wall pain

**DDx: CHEST PAIN**
• CARDIAC CAUSES
  - Coronary Heart Disease
    * Myocardial Ischemia
    * Unstable Angina
    * Angina
  - Valvular Heart Disease
    * Mitral Valve Prolapse
    * Aortic Stenosis
  - Pericarditis/Myocarditis

DDX: CHEST PAIN

• PULMONARY CAUSES
  - Pulmonary Embolism
  - Pneumonia
  - Pneumothorax/ Tension PTX
  - Pleuritis/Serositis
  - Sarcoidosis
  - Asthma/COPD
  - Lung cancer (rare presentation)

DDX: 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

DDX: CHEST PAIN

• Vascular Causes:
  - Aortic Dissection

• PSYCHIATRIC:
  - Panic disorder
- Anxiety
- Depression
- Somatoform disorders
(Diagnosis of exclusion)

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

CHEST WALL PAIN

• Musculoskeletal Pain
- Usually localized, sharp, positional
- Pain often reproducible by palpation
- At times reproduced 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.

Treatment: Analgesia (NSAIDs)

CARDIAC CAUSES OF CHEST PAIN

RISK FACTORS FOR CAD

• Age
• Diabetes
• Hypertension
• Family History
• Tobacco Use
• Hypercholesterolemia
• Cocaine use
ISEMIC CHEST PAIN

• CLINICAL FEATURES:

- Chest pain: often described as pressure, heaviness, tightness, squeezing
- Pain usually substernal or in left chest
- Pain can radiate to neck, jaw, arm
- Associated symptoms: nausea, vomiting, diaphoresis, shortness of breath, lightheadedness, palpitations
- In appropriate setting, consider above associated symptoms, as well as neck/jaw/arm pain, and epigastric pain as ischemic equivalents.
- Pain may be associated with activity
- Symptoms may improve with rest or NTG

CHEST PAIN

• Typical Chest Pain
• Atypical Chest Pain
• NON ANGINAL PAIN

ISEMIC 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 TROPOIN

ISEMIC CHEST PAIN: DIAGNOSIS

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

ACUTE MYOCARDIAL INFARCTION

<table>
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<tr>
<th>TERRITORY</th>
<th>CORONARY ARTERY</th>
<th>EKG</th>
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ACUTE INFERIOR MI

- ST SEGMENT ELEVATION V2-4

EKG CHANGES IN ISCHEMIC HEART DISEASE

- ST SEGMENT DEPRESSION
- T WAVE INVERSIONS

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

LOW RISK CARDIAC CHEST PAIN

- If low risk chest pain, can consider serial EKGs 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: These patients are preload dependent

VALVULAR HEART DISEASE

- 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 beta blockers.

ACUTE PERICARDITIS

- CLINICAL FEATURES
  - Sharp, stabbing chest pain
  - Pleuritic chest pain due to inflammation of adjacent parietal pleura
  - Pain often felt at the tip of d shoulder, neck, ant chest, upper abd or back.
  - Pain more severe when supine.
  - Pain often relieved when sitting up and leaning forward
  - Listen for pericardial friction rub
VASCULAR CAUSES OF CHEST PAIN

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
  * Decreased pulsations in radial, femoral, carotid arteries
  * Significant blood pressure differences between extremities
  * Usually hypertension (but if tamponade, hypotension)

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
  * Sharp, 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: PHYSICAL EXAM**

**Review vital signs**
* Fever: Pericarditis, Pneumonia
* Check BP in both arms: Dissection
* 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 PAIN: PHYSICAL EXAM**

**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
• CV EXAM

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

**CHEST PAIN: 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)

• EKG

**CHEST PAIN: TESTS**

• IMAGING: CONSIDER

* Chest X-Ray:
  - Rib fractures
  - Infiltrates: Pneumonia
  - Widened mediastinum: Aortic dissection
  - Pneumothorax
  - Cardiac size: enlarged silhouette without CHF: pericardial effusion

**INVESTIGATIONS**

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

- Acute coronary syndrome
- Aortic dissection
- Pulmonary Embolism
- Tension Pneumothorax
- Esophageal Rupture

*Five life-threatening causes of Chest Pain*

**CHEST PAIN**

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

**DYSPNEA , PALPITATION**

- Time and MODE of onset
- Associated Symptoms
- Aggravating symptoms
- Alleviating symptoms
- Prior episodes
- Severity
- Review risk factors

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<tr>
<th>Class</th>
<th>Patient Symptoms</th>
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<tbody>
<tr>
<td>Class I</td>
<td>No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitaton or dyspnea</td>
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<tr>
<td>Class II</td>
<td>Slight limitation of physical activity. Comfortable at rest but ordinary physical activity results in fatigue, palpitaton or dyspnea</td>
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<tr>
<td>Class III</td>
<td>Marked limitation of physical activity. Comfortable at rest but less than ordinary activity causes fatigue, palpitaton or dyspnea</td>
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Class IV (Severe)
Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency at rest. If any physical activity is undertaken, discomfort is increased

THE END !!!!