Non- Coronary Chest Pain Emergencies

Lecture 24

red book pp. 49 ; 140 - 143; 162; 172-178; 182-186; 197; 207-209; 227-228; 499

Outcomes

At the completion of this lecture, the learner will be able to:

- Integrate pathophysiological principles and assessment findings to formulate a diagnostic impression and implement a treatment plan for the patient with non cardiac chest pain
- Discuss the pitfalls of misinterpretation of the presenting signs and symptoms of the various types of non cardiac chest pain

Outcomes, cont.

- Integrate pathophysiology, assessment, and treatment of :
  - Pericarditis (p. 141; 172-175)
  - Mitral valve prolapse (p. 162)
  - Aortic dissection (p. 184-186)
  - Pulmonary embolism (p. 175-178)
  - Respiratory causes
    - pleuritic (p. 197)
    - barotrauma (p. 207-209)
  - Musculoskeletal causes
    - Infectious / costochondritis (p. 141)
    - Hyperventilation / intercostal muscle strain (p. 49)
  - Gastrointestional causes
    - GERD / spasm / perforation (p. 227 - 228)
    - dyspepsia / GB / pancreatitis
  - Misc. : Zoster (p. 499)

Chest Pain

- Acute Coronary Syndromes
  - acute MI
  - unstable angina
- life threatening non-coronary causes
- common and uncommon potentially dangerous causes of chest pain
- common, non-dangerous causes

Most Dangerous Diagnostic Concerns

- TA dissection
- PE
- Tension pneumothorax
- Acute pericardial tamponade

Potentially Dangerous and Much More Common Causes of Chest Pain

- GI
  - GB
  - pancreatitis
- pneumonia
- pneumothorax
- hyperventilation

Aortic Dissection

Dissection of the aorta p. 184-186

- Causes
  - hypertension
  - congenital (Marfan's)
  - pregnancy (in women < 40 YO , TA is usually 2^{0} to pregnancy)
  - trauma
- setting : 60^{+} %
  - male
    - with a Hx. of high BP

Aortic Dissection

- Dissection symptoms
  - nausea, vomiting
  - chest pain
    - tearing, unrelieved, deep pain :
      - most often present
      - *not always* present
    - location
      - anterior
      - posterior
      - both or neither
    - severity
      - severe, *sudden*
      - maximum at the onset

Aortic Dissection

Signs of dissection :

- SBP > 160 : in 40 % of patients
- abn. pulses : in 50 % of patients
- neuro. abn.s : in 40 % of patients
- CHF : in 10 % of patients
- diaphoresis : common

Suggestive of dissection :

- SBP difference of > 15mmHg *
- absence of BP +/or absence of the pulse

Thrombolytic therapy:

- *ABSOLUTELY* contraindicated

* " no thresholds have been established "

Pulmonary Embolism

Difficult diagnosis.

Why study ?

increase in death rate :

- $8\text{-}30^{+}$ % (~ 20 %)
  - if diagnosis not suspected by
    - paramedic
    - ED staff

Pulmonary Embolism

Predisposing factors:

- heart:
  - MI
  - A. Fib.
  - CHF : poor peripheral circulation
- poor peripheral circulation:
  - obesity
  - prolonged immobilization (including post op.)
  - pregnancy
  - smoking
- abnormal coagulation:
  - BCP
  - pregnancy
  - cancer

PE

Clinical Presentation

Symptoms

- Pain
  - 90 % of pt.s
  - usually pleuritic
  - often occurs 3-4 days prior to presentation
- SOB
  - 80% of pt.s
- Anxiety
  - 60% of pt.s
- Syncope
  - 15% of pt.s

PE

Signs
- VS
  - RR↑ : 90 % of pt.s
  - HR↑ : <50 % of pt.s
- DVT signs
  - << 30% of patients

Chest Pain due to Pericarditis

Pericarditis ± tamponade (p. 141; 172-175)

- Causes
  - post MI (Dressler's syndrome)
  - infectious (viral,…)
  - malignancy ; radiation
  - drugs (procainamide,…)
  - renal failure / uremia
  - hypothyroidism
  - rheumatoid diseases (connective tissue dz.s: lupus,…)
- Thrombolytics
  - *CONTRAINDICATED*

Pericarditis Chest Pain

- Pathophysiology
  - inflamed pericardium
    - myocardial irritability
  - normally: < 50 mL of pericardial fluid
  - low mortality
    - unless perhaps if thrombolytics are adm.
- Clinical features
  - Hx :
    - chest pain: sharp, non-crushing, radiating,
      positional: worse- supine; better- leaning forward
    - SOB
    - fever

Pericarditis Chest Pain

Clinical features
- PE :
  - non-specific ; not very helpful
  - fever
  - pericardial friction rub
- EKG - 12 lead
  - "heart attack in every lead" - diffuse ST-segment elevation
  - *unlike* the EKG of tamponade
  - deep PR-segment or deep "Q" wave

Treatment
- observation

Complications
- tamponade

Pericarditis / Non-Traumatic Tamponade

Causes
- same as for pericarditis
- hemorrhage (Coumadin)

Pathophysiology
- excess fluid pressure > pericardial space pressure

Complications
- shock

Non-Traumatic Tamponade

Clinical features
- Hx:
  - SOB ; marked DOE
- PE
  - Kussmaul sign (> JVD on inspiration)
  - Beck's triad (shock, JVD, muffled HS)
  - tachycardia
  - low BP, narrow pulse pressure, pulsus paradoxus
  - NO basilar rales [i.e., pure RCHF]
- EKG
  - low voltage ; deep PR-segment
  - electrical alternans (R amplitude varies beat to beat)

Treatment
- IV NS 500-1000 mL
- eventual pericardiocentesis

Respiratory Causes of Chest Pain

- asthma
- pleuritic (p. 197)
- barotrauma (p. 207-209)
  - pneumothorax
  - pneumomediastinum

Respiratory Chest Pain

- Asthma
  - intercostal muscle fatigue / pain
  - Hx : asthma; meds , …
  - PE: typical wheezing
  - COPD
- Pleuritic (p. 197)
  - Pneumonia
  - Hx : cough, F, chills, sputum
  - PE : F, localized abn. BS
- Sickle Cell
  - pneumonia
  - infarct

Respiratory Chest Pain

Barotrauma (p. 207-209)

- pneumomediastinum
  - Hx : inhalational drug use; cough
  - PE : crunching HS ; SQ emphysema
  - benign
- pneumothorax
  - 3 populations :
    - newborns (meconium, HMD, …)
    - " 19 YO male - not sick "
    - " COPD - real sick "

Respiratory Chest Pain

Pneumothorax (p. 207-209)

- Incidence : common
  - +/- 20% do not seek help
  - smoking: 20 x increased risk
  - male : 6 x increased risk
  - FH +
- Spontaneous pneumothorax
  - in tall / thin
  - recurring
  - with ascension
  - with exertion
  - with menstruation

Respiratory Chest Pain

Pneumothorax

- cause
  - ruptured bleb
  - pleural tear and negative pressure
    - collapsed lung : partial or total

Chest Wall Pain

Musculoskeletal causes

- Strain of intercostal muscles (p. 49; 141)
  - hyperventilation

    NOT a prehospital Dx. - must R/O:
    - asthma / pneumothorax / pneumonia
    - PE / MI
    - DKA / metabolic acidosis
  - coughing
  - muscle strain or tension (wt. lifting, stress,…)
- Infectious / inflammatory
  - costochondritis
  - epidemic pleurodynia

Chest Wall Pain

Symptoms
- pain
  - movement
  - deep inspiration
- and NO sx or PMH suggestive of cardiac disease

Signs
- fever
- tender to palpation

Infectious Chest Wall Pain

Infectious causes (p. 499)

Zoster
- Viral (chickenpox)
  - shingles
  - reactivation of Varicella / Herpes infection
  - thoracic dermatomes
  - incidence : 20 %
- Clinical features
  - chest pain
    - intense, burning for 1-3 days , then
  - rash
    - a single dermatome chickenpox rash
- Treatment
  - consider morphine

Gastrointestional Causes of Chest Pain

- Esophageal (p. 227 - 228)
  - GERD / dyspepsia
  - spasm
  - perforation
  - esophagitis
    - infectious
    - chemical burn (NSAIDs : Advil,…)
- Infra esophageal
  - gastritis
  - GB
  - pancreatitis

Gastrointestional Causes of Chest Pain

GERD / Esophagitis
- Symptoms
  - pain : very MI-like
    - after meals; may have N, V
    - pressure
    - radiation
  - CV risk factors
- Signs
  - tender to palpation

Gastrointestional Causes of Chest Pain

Esophageal Perforation

Symptoms
- pain
  - acute (unlike MI)
  - after meal and vomiting
  - retrosternal, radiating to neck; worse with movement
  - unrelenting

Signs
- crunching heart sounds (Hammon's)
- SQ emphysema of neck

Valvular Chest Pain

Valvular Causes (p. 140; 162 . Bates/340)
- Mitral Valve Prolapse
  - incidence: 5% of population
  - cause: small redundant flap of tissue on valve
  - pathophysiology
    - during systole, flap prolapses
    - stimulation of ANS
      - epinephrine/panic-like symptoms
      - angina-like chest pain
  - "benign"

MVP Chest Pain

Clinical features
- symptoms
  - chest pain
    - usually not crushing
    - substernal ; radiation to neck/ left arm
  - N, V
  - SOB
  - palpitations, weakness, even syncope
- PE
  - increased HR, RR, BP
  - late-systolic murmur
  - early- systolic click
- EKG
  - flipped T waves II, III, AVF [ischemic-like]

Potentially Life-Threatening Chest Pain

Dx	Hx	PE / EKG
Pulmonary Embolism	sudden pleuritic pain	increased HR, RR DVT (rare)
Aortic Dissection	tearing pain with radiation to back	unequal BPs + pulses
ACS	SOB, N,V, crushing pressure, with radiation, diaphoresis	diaphoresis; anatomical ST-segment
Esophageal Rupture	after vomiting; constant retrosternal pain	SQ emphysema crunching HS
Pericarditis	positional pain SOB	increased HR, RR low BP; NVD; pulsus paradoxus "all lead" ST-segment or alternans (tamponade)

Summary

- We have discussed the pathophysiology, assessment, differentiation and treatment of non-cardiac chest pain :
  - Aortic dissection
  - Pulmonary embolism
  - Respiratory causes
  - Hyperventilation
  - GI causes
    - Esophageal spasm / esophageal perforation
    - GB / pancreatitis
  - Pericarditis ; mitral valve prolapse
  - Musculoskeletal causes
  - Infectious : Zoster