CHEST PAIN IN THE ED

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MSN 434 Common Problems in the Emergency Nursing

Epidemiology

- Chest Pain (CP) represents 5% if the ED Visits
  - Approx 5 million visits/year
  - 40% of admissions
- Acute MI(AMI) leading cause of death in the US
- Error in diagnosis of CP accounts for approx 20% medical malpractice

Why the misdiagnosis?

- CP is often the result of referred pain from other organs

- Diagnosis must be based on history and physical exam

- CP always respresnts a possible cardiac event

- Often Laboratory tests to r/o MI are not helpful in the ED.

What's included in your differential?

- The BIG SIX (6 most serious dx from CP)
  - Unstable Angina (Acute Coronary Synd)
  - Acute MI (Acute Coronary Synd)
  - Aortic Dissection
  - Pulmonary Embolus
  - Spontaneous Pneumothorax
  - Boerhaave's Syndrome

Acute Coronary Syndrome

- Acute Chest Pain due to myocardial ischemia
- Initial assessment is difficult to differentiate b/w acute MI and Unstable Angina
- Typical ED pop with c/o acute chest pain
  - 15% will have acute MI
  - 25-30% will have Unstable Angina

History

- Evaluating of Current complaint:
  - Pain location, duration, quality, severity
  - Radiation
  - Relief/Exacerabation
  - Associated Symptoms
  - Trauma

PMH

- Other cardiac history
- Previous admissions
- Previous test results (i.e. EKG, Treadmills, MUGA, Echo, CXR)
- Rx History

Risk Factors for MI

- Absolute Risk Factors
  - Family History
  - HTN
  - DM
  - Smoking
  - Elevated Cholesterol
- Contributory
  - Age over 30
  - Male
  - Obesity
  - Sedentary life style
  - Cocaine use

Risk Factors for Pulmonary Embolus

- Immobilization
  - Paralysis
  - Paresis
  - Plaster
  - Plane
- Recent Surgery
- Trauma
- Obesity
- Cardiac Disease
- Burns
- History of PE or DVT
- Hypercoaguable states
  - Pregnancy
  - Protein C/S deficiency
  - AT III Deficiency
  - Malignancy
  - Estrogen therapy
- Cancer

Risk Factors: Aortic Dissection

- HPTN (95% of pts with dissection)
- Predisposing Conditions
  - Marfan's
  - Ehlers-Danlos syndrome
  - Turner's syndrome
  - Coarctation of Aorta
  - Pregnancy
  - Trauma

Risk Factors: Esophageal Pain

- Sensitivity to gastric acid
- Disorders of motility
- Reflux
- Spasm
- Achalasia

- Approx 20% pts admitted for CP actually have esophageal pain
- Hiatal Hernia is present in about 50% of pts over 50

Physical Exam

Look for signs of cardiac cause:

- TAchypnea
- Tachycardia
- Diaphoresis
- Cyanosis
- Pallor
- Obtain BP in both arms
- Reproducible pain
- General Appearance

Physical Findings: Angina

- Angina
  - Episodic, lasting 5-15 min
  - Indoced by exertion
  - Relieved in 3-5 min with rest or SL NTG
  - CP
    - REtrosternal in 90% of pts
    - Radiates to neck, shoulder or arms in 70%
- Unstable Angina
  - Pain at rest or minimal activtiy
  - Pain prolonged or more severe
  - Pain occurring with increased frequency

Physical Findings: MI

- Pain longer than 15-30 minutes, progressive
- Dull or pressure-like pain in the midsternal or peristernal
- Associated symptoms
  - Nausea, vomiting, dyspnea, SOB, Diaphoresis, lightheaded ness
- New Murmur: Papillary muscle dysfunction
- Extrasystolic sound-Very difficult to illicit in ED setting
- ST seg Elevation in 2 contiguous leads (80% MI) or New ST depression and T wave inversion (20% MI)

Physical Findings: MI

- Beware of five causes of silent MI or atypical presentations
  - D: Diabetes
  - E: Elderly
  - A: Alcohol
  - T: Trauma to thoracic spinal cord
  - H: Hypertension

Physical Finding: Pulmonary Embolism

- 3rd most common cause of death in US
- Decreased Pa02
- DVT
  - 25-50% of DVTs have PEs
- Clinical S&S
  - CP
  - Dyspnea (84%)
  - Cough (53%)
  - Tachypnea (92%)
  - Tachycardia (44%)
- Elevated A-a gradient
  - 140- {PO2 + 1.2(PCO2)}= A-a gradient
  - A-a gradient of 10-20 is healthy
- Non-specific T-wave changes

Physical Finding: Aortic Disscection

- Hypertension and Tachycardia
  - Hypotension can occur in dissection of ascending aorta
- Abnormal aortic contour on CXR 90%
- Decreased/Unequal pulses:
  - Radial
  - Femoral
  - Carotid arteries
- Paraplegia/Neurologic presentation (40%)
- C/O Tearing chest pain, worst at onset
- Widened mediastinum on CXR
- Usually males, between 50-70 years old

Physical Findings: Spontaneous Pneumothorax

- Acute onset of pleuritic chest pain
- Dyspnea and tachypnea
- Decreased BS on side of pneumo
- If Tension Pneumo:
  - JVD
  - Hypotension
  - Initially normal heart sounds

Physical Findings: Esophageal Rupture

- Boerhaave Syndrome (esophageal rupture)
- Sudden onset of sudden, sharp substernal CP occurring immediately after an apisode of forceful vomiting
- Ill appearance, diaphoretic, dyspneic
- Physical exam may be normal
- CXR normal or pleural effusion, penumothorax, sub-Q air
- Confirm dx with water soluble contrast study

Initial Treatment

- Pts with CP need to be immediately diagnosed for the big 6!
- ABCs
  - Oxygen
  - Monitor
  - IVs
  - VS

Initial TX: Unstable Angina/MI

- ABCs
- CXR
- EKG
- Cardiac Enzymes
  - LDH will rise 12-24 hrs
  - CKMB rises in 4-8 hrs after onset of symptoms and peaks in 24 hours, clears in 48 hours
  - Myoglobin: rise within 3 hours of onset of symtpoms, abnormally elevated at 6-8 hours and peak at 4-9 hours
  - Troponin I and T: Elevate 6 hours after injury, peak in 12 hours and remain elevated for 7-10 days.
  - Other markers evaluated: BNP (Cardiac Function), C-reactive protein (inflammation), P-selection (platelet activation)

Initial Tx: Aortic Dissection

- ABCs
- CXR
- Arteriogram

Initial Tx: PE

- ABCs
- CXR
- ABG
- VQ scan and or/arteriogram

Initial Tx: Pneumothorax

- ABCs
- If stable: CXR
- If unstable: chest tube

Initial Tx: Boerhaave's Syndrome

- ABCs
- CXR
- Gastrograffin swallow

Esophageal Pain

- Usually presents 15-60 min after eating
- Described as heartburn, odynophagia, spasm-like
- NTG and GI cocktail often relieve pain
- Impossible to distinguish between esophageal and cardiac pain

Musculoskeletal pain

- Pain lasts few seconds to hours
- Positional and tender
- Pain my be prepositional upon palpation

Cardiac Work-up

- History alone cannot be used to rule out acute ischemia
- Pts must be classified according to risk for ischemia
  - Classify the pt into a I-V Risk Category depending on their findings
  - Use algorithm for decision making

Tintinalli's Prognosis Based on Classification System for ED Chest Pain Pts

- I: Acute MI
  - Immediate revascularization

- II: Probable acute ischemia: high risk for adverse events
  - Evidence of clinical instability
  - Ongoing pain thoguht to be ischemia
  - Pain at rest associated with ischemic ECG changes
  - One or more positive myocardial markers
  - Positive perfusion imaging study

Tintinalli's Prognosis Based on Clasification for ED chest pain pts

- III: Possible acute ischemia: Intermediate risk for adverse events
  - Rest pain, now resolved
  - New onset of pain
  - Crescendo pattern of pain
  - Ischemic pattern on ECG not associated with pain

Tintinalli's Prognosis Based on Clasification for ED chest pain pts

- IV: A: Probably not ischemia: low risk for adverse events (requires all the following)
  - History not strongly suggestive of ischemia
  - ECG normal, unchanged from previous, or nonspecific changes
  - Negative myocardial markers
- IV: B: Stable angina pectoris: Low risk for adverse events
  - Requires all the following
    - More than 2 wk of unchanged symptom pattern or longstanding symp with only mild change in exertional threshold
    - Normal EKG, unchanged from previous or nonspecific changes
    - Negative myocardial markers

Tintinalli's Prognosis Based on Clasification for ED chest pain pts

- V: Definitely not ischemic. Very low risk for adverse events
  - Requires all the following:
    - Clear objective evidence of non-ischemic symptoms
    - ECG normal, unchanged from previous or nonspecific changes
    - Negative initial myocardial markers

Algorithm for risk-based decision making in CP (Tintinalli, 2004)

- Initial Evaluation of CP
  - Cardiac monitor
  - Pulse ox
  - VS
  - Oxygen
  - 12-lead EKG
  - Stat myocardial marker eval
  - Other labs
  - CXR
  - ASA
  - MAKE A DISPOSITION DECISION < OR EQUAL TO 1 HOUR AFTER ARRIVAL

Algorithm for risk-based diecision making in CP (Tintinalli, 2004)

Risks Classification	Initial EKG	Initial Myocardial Marker	Ischemia Estimate	Disposition
I	Acute MI	N/A	High	Cornonary Reperfusion
II	Nondiagnostic	+/-	-/high	Monitored bed Consider ischemic Therapy
III	Nondiagnostic	Neg	Moderate	Admit
IV	Nondiagnostic	Neg	Low	Ed Low-risk eval

Discharged Pts

- Clear Follow-up instructions
- Instructed to seek prompt attention for worsening CP
- Return to ED if condition worsens
- PMD referral

Pearls

- Normal EKG and Cardiac markers do not rule out MI
- Examine every CXR closely for pneumothorax and aortic dissection
- Obtain bilateral BPs, especially in elderly
- Always treat as the worst condition possible!!!!

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