CHEST PAIN

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Objectives

- Describe various etiologies for chest pain
- Review approach to chest pain
- Focus on life threatening causes of CP

Chest Pain

- Common complaint in ED
  - 5% of all ED visits or 5 million visits per year
- Wide range of etiologies
  - Cardiac, Pulmonary, GI, Musculoskeletal
- Why does distinguishing these causes matter?
- How do you distinguish causes of chest pain?

What are the 6 cause of chest pain that can kill?

Chest Pain That Can Kill

- Acute Coronary Syndromes
- Pulmonary Embolism
- Aortic Dissection
- Esophageal Rupture
- Pneumothorax
- Pneumonia

Various others: Pulmonary HTN, Myocarditis, Tamponade

Common “benign” causes of chest pain?

Benign Causes

- Musculoskeletal
- Esophagitis
- Bronchitis (Chest Pain secondary to cough)
- “Non-Specific Chest Pain” *

*Most common – means we don’t know, but it is not going to hurt you.

What are the key parts of the HPI in the CP patient?

What can you get out of the pt in 4 minutes?

History matters!

- **Location**: Central, left, or right
- **Associated symptoms**: SOB, sweating, nausea
- **Timing**: Gradual or sudden onset
- **Provocation**: What makes worse or better?
- **Quality**: Visceral vs somatic
- **Radiation**: Back, neck, arm
- **Severity**: Scale of 1-10

What are the key parts of the rest of the History?

What can you get out of the pt in 4 minutes?

The Rest of the History

- **PMH** –
- **Meds** – Cardiac meds? Nitro? ASA? Plavix? Coumadin?
- **Allergies** – Always important!
- **Social** – Smoker? Alcoholic? Cocaine?
- **Family** – Sudden Death? Early MI? DVT? PE?

What are the key parts of the Physical?

What can you exam in only 2 minutes?

Key Emergency Physical

- General Appearance
- Vital Signs
- Heart (Muffled? Regular? Fast?)
- Lungs (Equal? Wet? Tympanitic?)
- Neck (JVD?)
- Abdomen (Distention?)
- LE (Edema? calf tenderness?)

This guy is rushed by EMS, what do you do?

Approach to Chest Pain

- INITIAL GOAL in ED is to identify life threats
  - MI, PE, aortic dissection
- Remember ABCs always first

What do you do in the first 60 seconds?

First 60 seconds

- How does the pt look?
- What are the pt's vital signs?
- EMS story?

Next 5 minutes?

What are 2 bedside tests to consider?

What is an important and cheap medication you should consider?

Next 5 Minutes

- Brief History
- Brief Physical (ABCs)
- What are 2 bedside tests that can be done to help stratify the pt?
  - EKG
  - Portable CXR
- What is an important and cheap medication you should consider?
  - ASA

Next 10 Minutes

- Patient already stabilized, initial data gathered, and initial orders submitted
- Secondary survey: More detailed history and physical exam
- Address patient's pain
- Goal now is to categorize patient
  1) Chest wall pain- Musculoskeletal
  2) Pleuritic chest pain- Respiratory
  3) Visceral chest pain- Cardiac

Case 1

- 46 yo M with DM, HTN, CAD and MI 1 year ago says “I think I am having a heart attack.”

What diagnostic test do you want NOW?

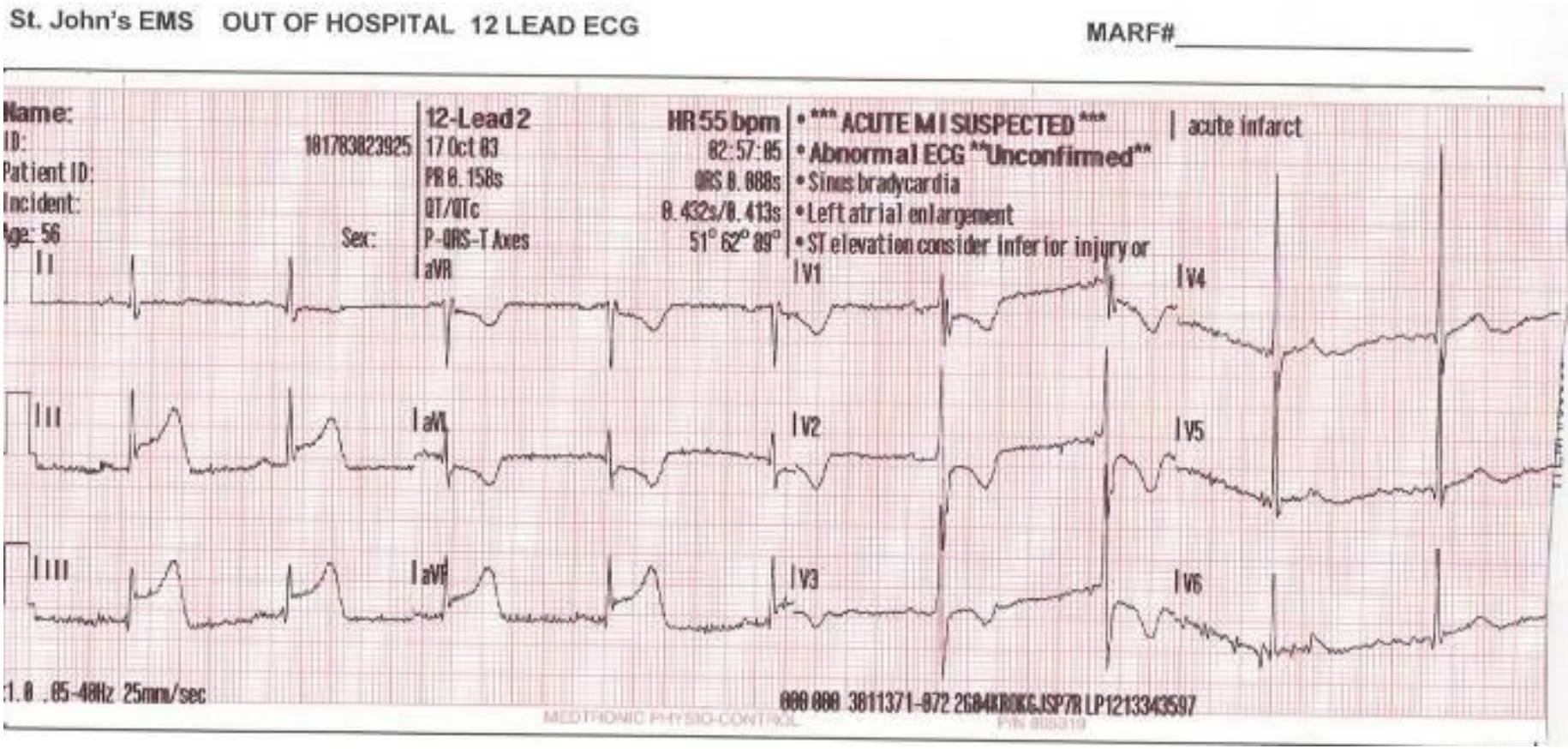
What are you looking for on this test?

Case 1 - ACS

- EKG – This will differentiate what you must do *now*. (Specific but not sensitive)
  - ST elevation in 2 contiguous leads: STEMI
  - New LBBB
  - Ischemia/strain: ST depressions, new T wave inversions, Q waves
  - Nonspecific: T wave flattening/inversions or Q waves without old EKG

Case 1 - ACS

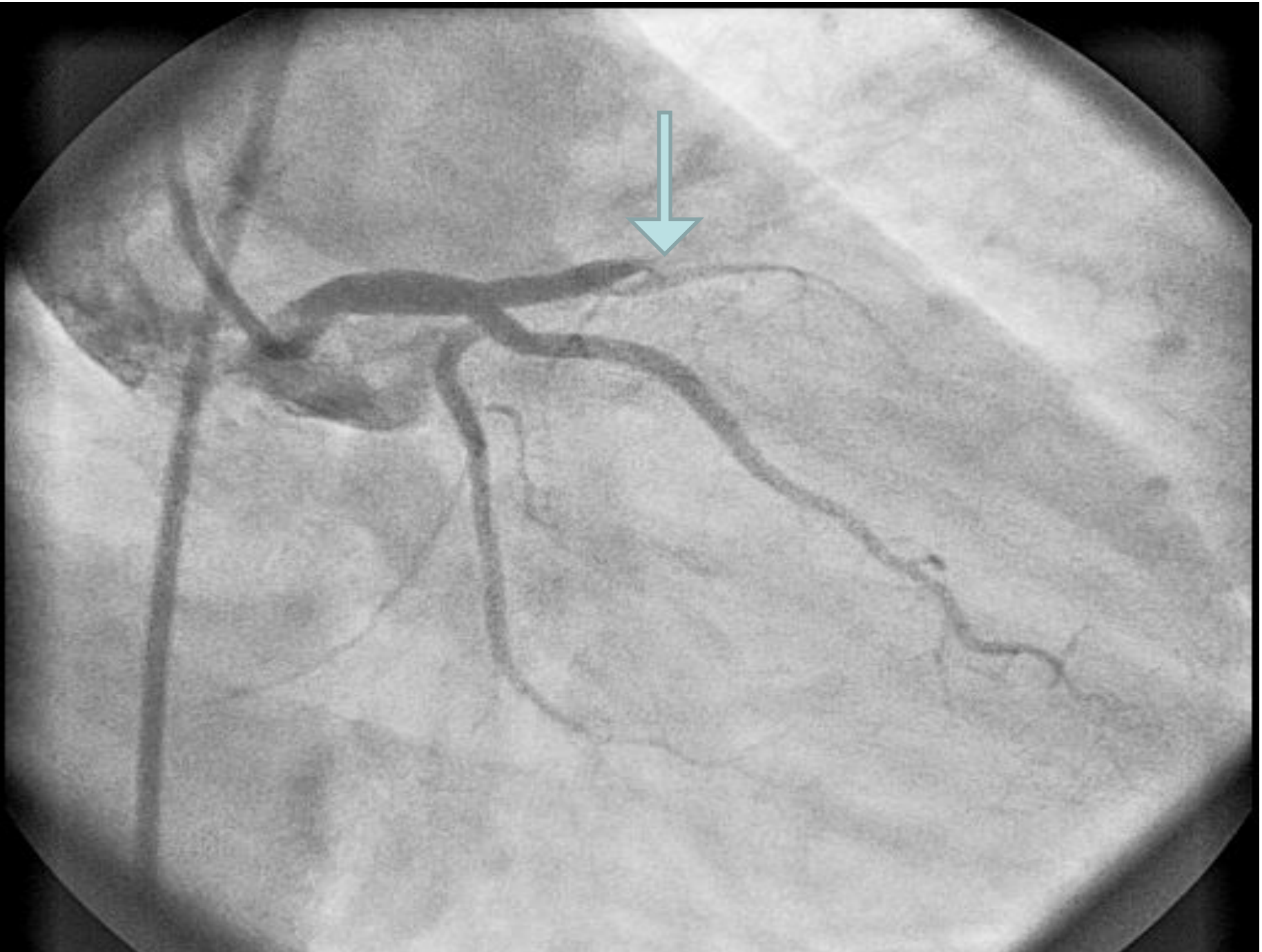
What do you do if you see this?

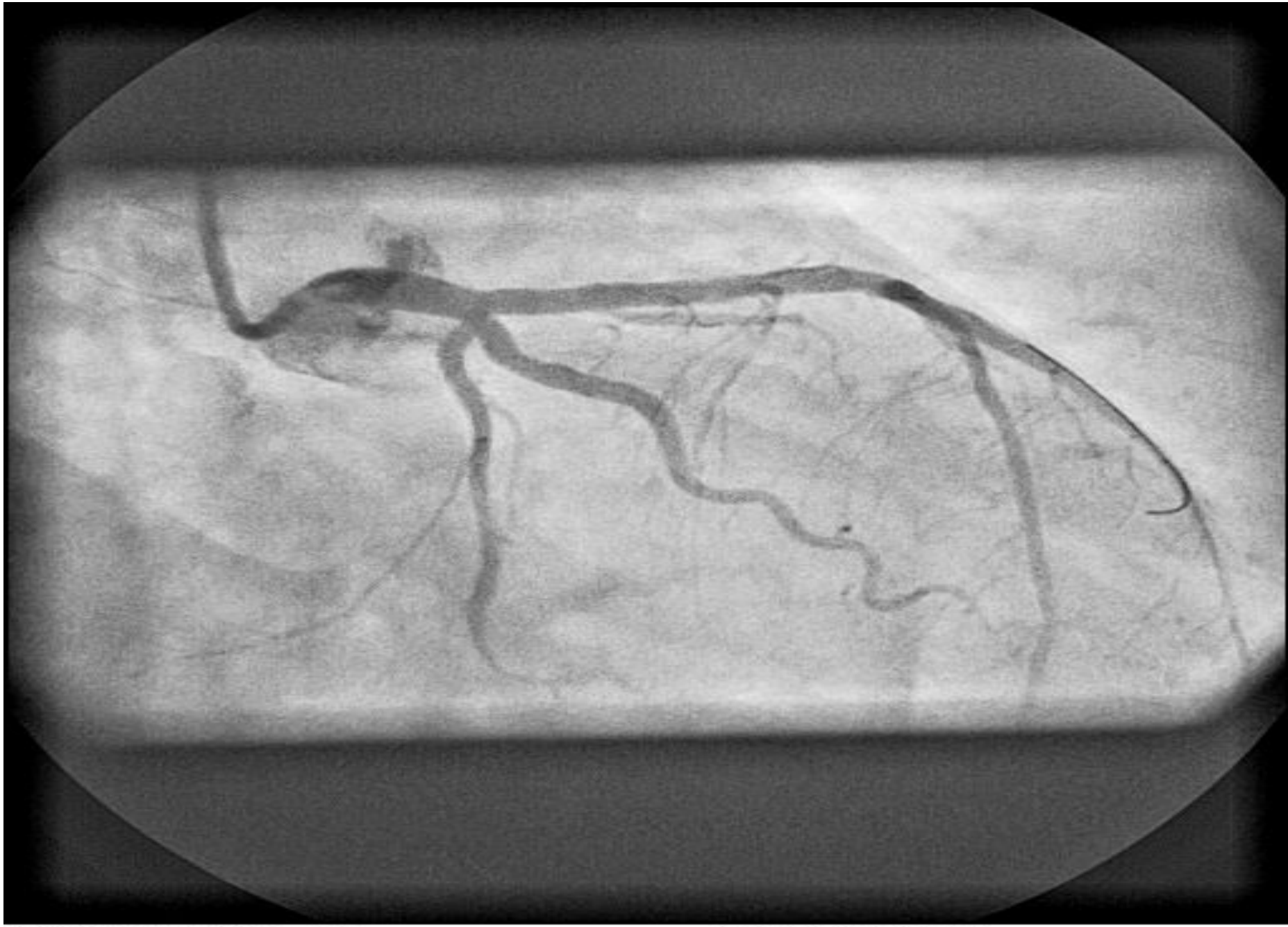


Case 1 - ACS

STEMI

- Cath. Or transfer to PCI center
- If PCI not immediately available and pt has had chest pain for less than 180 minutes then consider lytics.



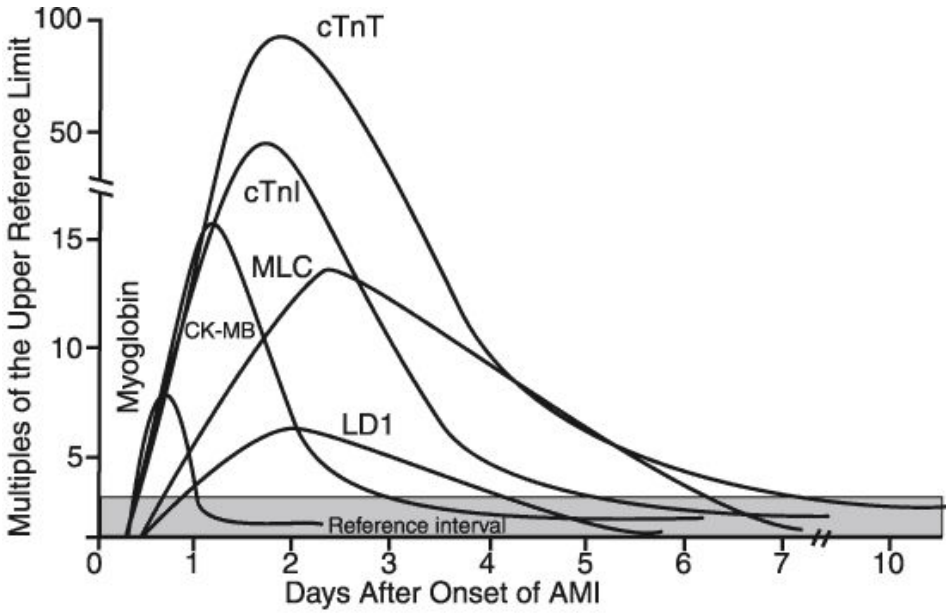


Case 1 - ACS

What other tests do you want?

Case 1 - ACS

- CXR
  - To look for failure and evaluate for other cause of chest pain
- Cardiac Enzymes



Source: Tintinalli JE, Kelen GD, Stapczynski JS: *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*, 6th Edition: http://www.accessemergencymedicine.com

Case 1 - ACS

What else can you do for the ACS patient?

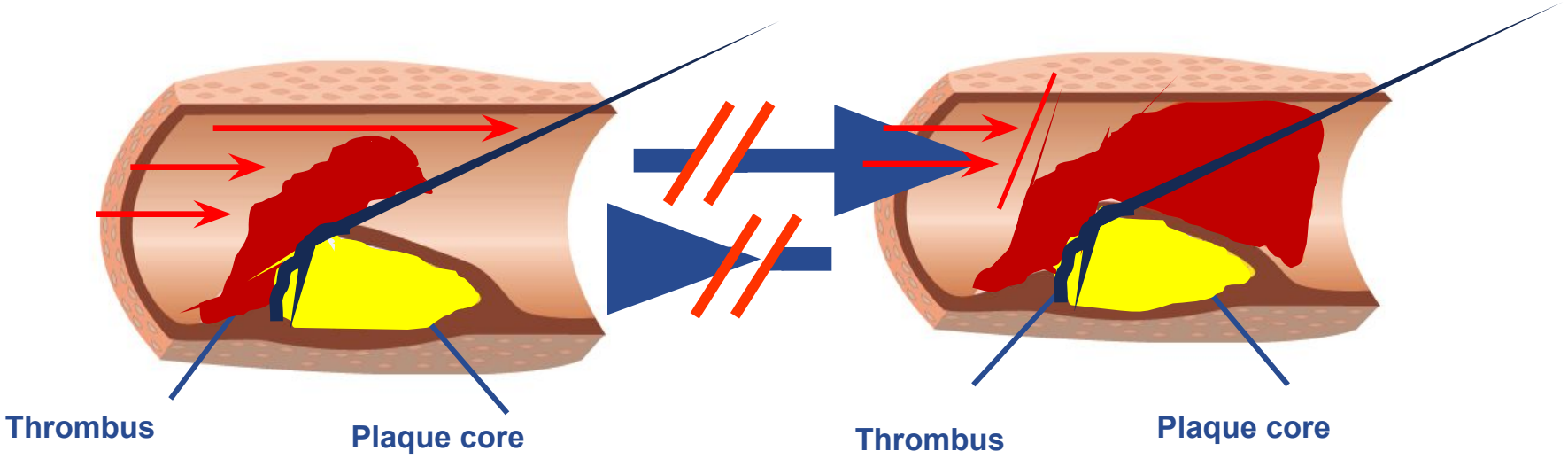
Case 1 - ACS

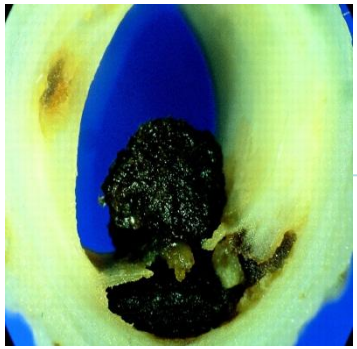
- **ASA**
  - Great benefit, little risk
  - Give minimum of 182 mg
- **NTG**
  - Vasodilator, also reduces preload
  - Can give SL or IV
- **Heparin**
  - Mild benefit, consider risks
- **Morphine?**
  - Questionable benefit, reduces stress
- **B-Blocker?**
  - May give oral, avoid if pt has symptoms of hear failure (includes HR <110)
- **Tica/clopido? IIbIIIa inhibitor?**
  - Very cardiologist dependent.

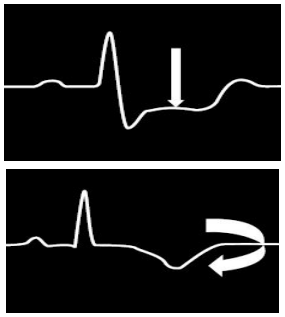
Acute coronary syndromes

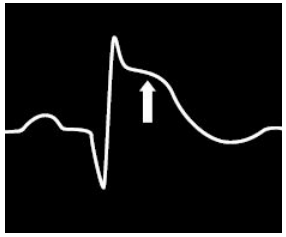
Non ST elevation acute coronary syndromes (NSTE-ACS)
(partially occluding thrombus)

ST elevation myocardial infarction (acute coronary syndrome)
(totally occluding thrombus)









Adapted from Davies MJ. *Circulation.* 1990; 82 (supl II): 30-46.

Case 2

- 30 yo M had an ORIF of ankle fx 2 weeks ago, c/o sudden onset of chest pain.

What are the signs/symptoms of this disease?

What are the risk factors for this disease?

PE Diagnosis

- Symptoms
  - SOB or dyspnea- Present in 90%
  - Chest pain (pleuritic)- 66% of patients with PE
  - Cough
  - Sudden onset

- Signs
  - Tachycardia > 100 beats per minute
  - Tachypnea > 20 breaths per minute
  - Hypoxia < 95% on RA (no other cause)
  - Lower extremity swelling

Pulmonary Embolus Risk Factors

- Hypercoaguability
  - » Malignancy, pregnancy, estrogen use, factor V Leiden, protein C/S deficiency
- Venous stasis
  - » Bedrest > 48 hours, recent hospitalization, long distance travel
- Venous injury
  - » Recent trauma or surgery

Case 2 - PE

How will you confirm your suspicion?

PE Diagnosis

- D-dimer
  - Very sensitive in low to moderate probability
  - Not sensitive enough for high probability
  - Not specific (Lots of false positives)
- Spiral CT
  - Current gold standard
  - Quick and available
  - Caution if impaired creatinine clearance
- V/Q
  - Many studies will be “Indeterminate”

Case 2 - PE

How will you treat this patient?

PE Treatment

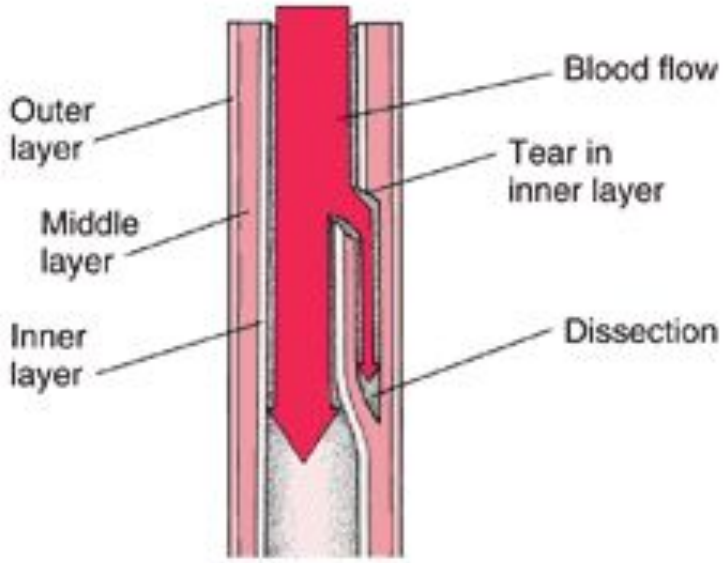
- IV fluid to maintain blood pressure
- Heparin (Will limit propagation but does not dissolve clot)
  - Unfractionated: 80 u/kg bolus, 18 h/kg/hr
  - Fractionated (Lovenox): 1 mg/kg SC BID
- Fibrinolytics
  - Consider with large if pt is unstable
  - No study has shown survival benefit, but very difficult to study.
  - Alteplase 50–100 mg infused over 2–6 hrs, (bolus in severe shock)

Case 3

- 35 yo M with sudden ripping pain radiating to back.

Aortic Dissection

- Blood violates aortic intimal and adventitial layers
- False lumen is created
- Dissection may extend proximally, distally, or in both directions



In whom should you suspect this disease?

Aortic Dissection

- Bimodal distribution
  - Young: Connective tissue (Marfan) or pregnancy
  - Older: Most commonly > 50 (mean age 63)
- Risk factors
  - Male: 66% of patients
  - Hypertension: 72% of patients
  - Connective tissue disease
    - 30% of Marfan's patients get dissections

What are the clinical features of this disease?

Aortic Dissection

- Presentation (Difficult clinical diagnosis)
  - 85% have chest or back pain
  - “Ripping” or “tearing” in 50%
  - Neurologic symptoms in 20%
  - Hematuria
  - Asymmetric pulses

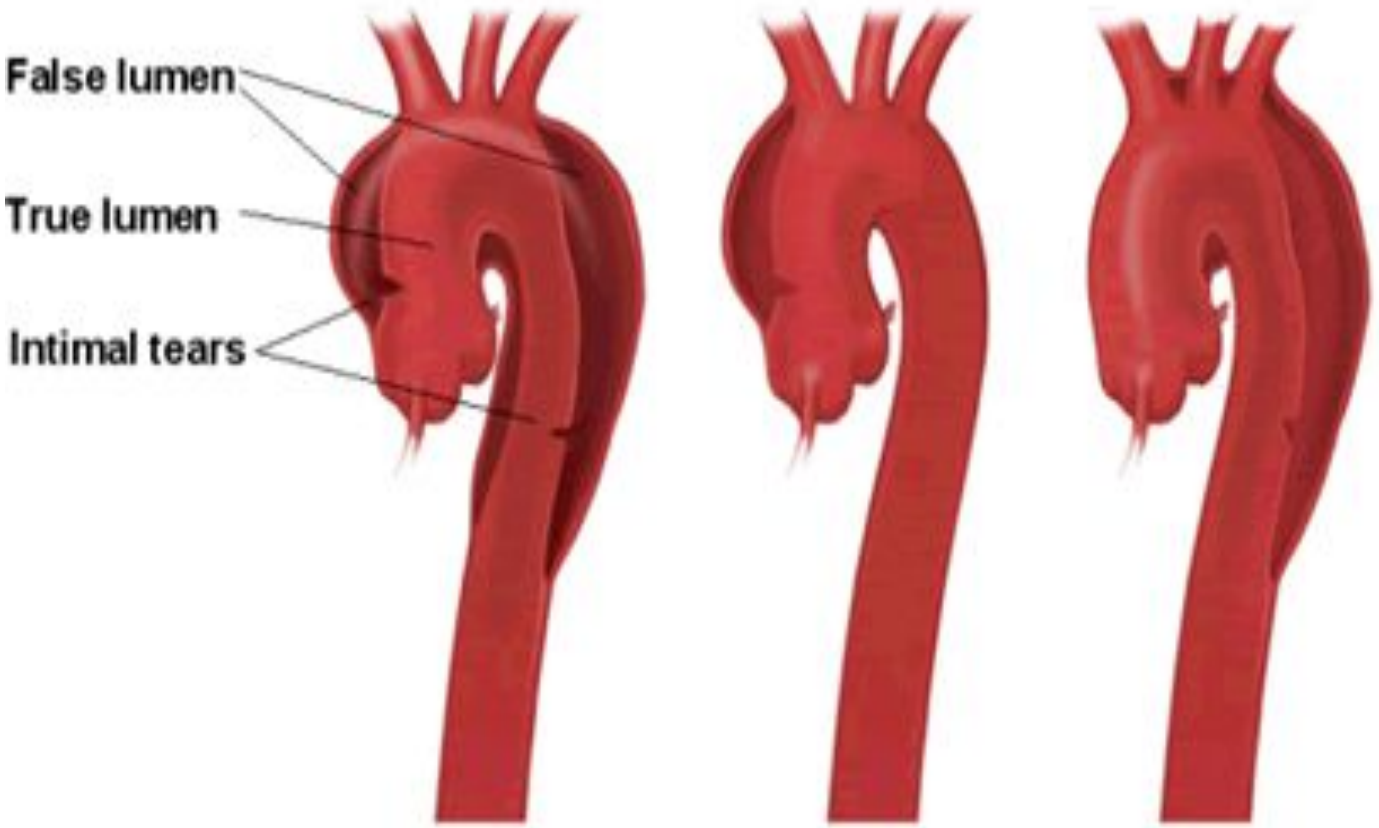
How do you confirm the diagnosis of this disease?

Aortic Dissection Diagnosis

- CXR- Widened mediastinum, abnormal aortic knob, pleural effusions
  - » Not sensitive (25% have wide mediastinums)
- Chest CT- Very sensitive and specific
  - » Quickly obtained
  - » Must think about kidney + contrast
- Angiography- Gold standard
  - » Most reliable anatomy of dissection
- *Bedside US* – evaluate aorta and look at heart to r/o tampanode.

How do you manage this disease?

Anatomy and Classification of Aortic Dissection



DeBakey	I	II	III
Stanford	A		B

Aortic Management

- Involve CT surgery early
- Blood pressure control
  - Goal SBP 120-130 mmHg
  - Beta blockers are first line (Labetalol and Esmolol)
  - Can add vasodilators i.e. nitroprusside
- Admission to ICU
  - Ascending dissections will need surgery
  - If dissection is only descending, management is only medical

Triple rule-out CT scan

- R/O coronary artery disease
- R/O pulmonary embolism
- R/O aortic dissection

Case 4

- 55 yo alcoholic with persistant vomiting presents with sudden onset of CP followed by hemetemisis.

Case 5

- 18 yo healthy male was lifting weights when he had sudden onset of sharp CP + SOB.

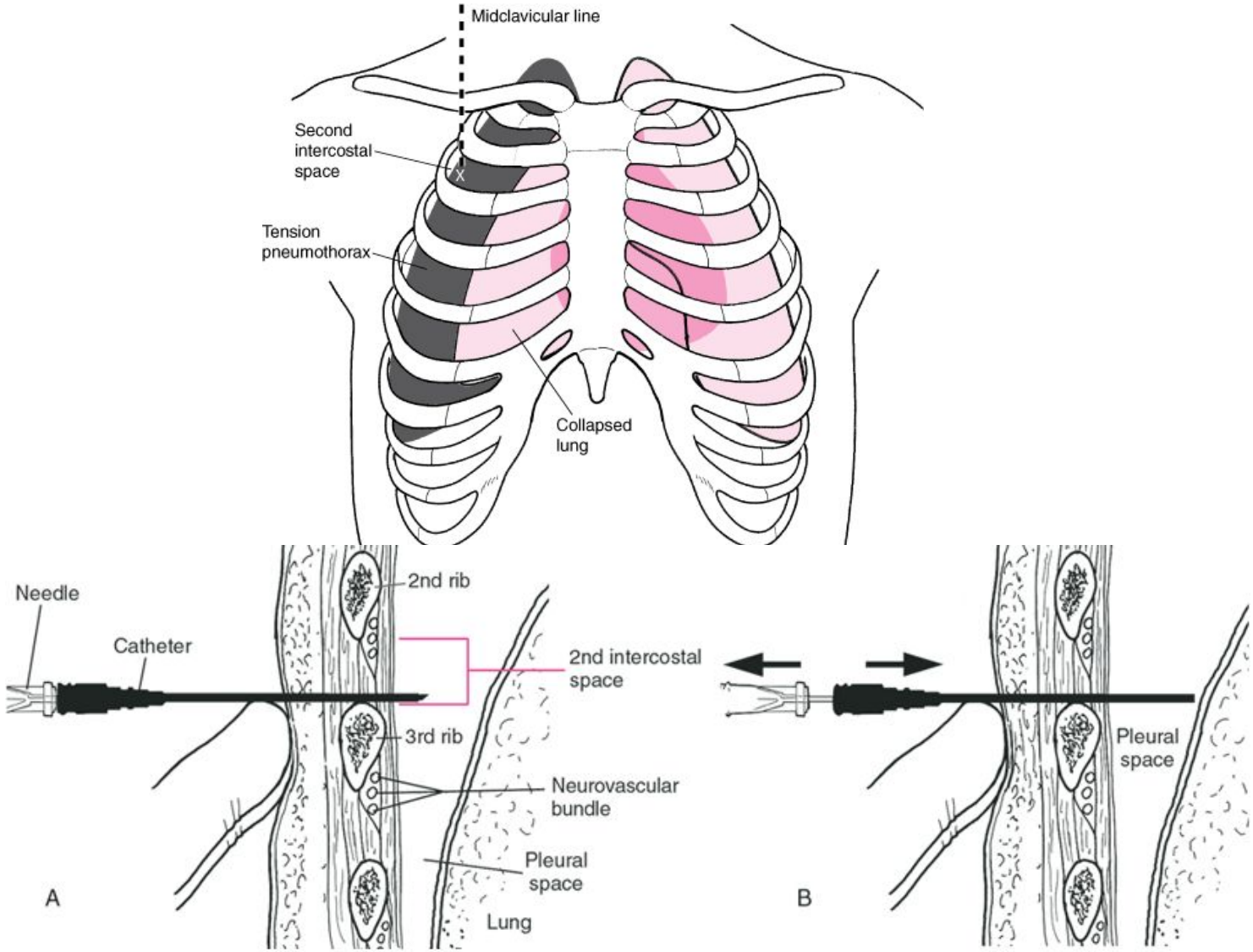
- HR 122, RR 34, BP 70/P, Sat 88%
- Decreased breath sounds on left.

What do you do *first*?

TENSION PNEUMOTHORAX

- No vascular markings on right
- Shift of mediastinum to left
- Deep sulcus
- Atelectatic right lung
- Increased haziness on left: Diversion of entire cardiac output

Needle Decompression



Source: Reichman EF, Simon RR: *Emergency Medicine Procedures*: http://www.accessemergencymedicine.com.

THANK YOU