EM Basic- Chest Pain

Look at the chart, vitals, EKG
Rapid EKG interpretation
- Is this a STEMI? (1mm elevation in 2 contigous leads)
- Look in anatomical locations
- I and AVL (lateral)
- II, III, AVF (inferior)
- V1-V3 (anterior/septal)
- V4-V6 (lateral)
- AVR (isolation)

Rate- look at machine or divide 300 by number of boxes between two R waves or 300, 150, 100, 75, 60, 50, etc…
Rhythm- P before every QRS (sinus) or not?
Axis- if upright in I and AVF, normal
Ischemia
- Flipped T waves- can be ischemia
- Elevations= infarction
- Depression= infarction opposite of that lead

Look at computer interpretation and reconcile with your own reading

Chest pain history
OPQRST
- **Onset**- When did the symptoms start AND what were you doing?
- **Provocation/Provoking**- What makes you pain better or worse?
- **Quality**- What does your pain feel like (sharp, dull, pressure, burning?
- **Radiation**- Where does your pain radiate to (neck, jaw, arm, back?)
- **Severity**- 1 to 10 scale
- **Time**- When did your pain start?
- **PEARL-** Make sure this isn't syncope (much different workup)

Associated signs and symtpoms- nausea, vomiting, diaphoresis, abdominal pain or back pain, syncope
Similarity to previous pain or MI?
Past history- HTN, hyperlipidemia, MI, CHF, echo with EF in chart?
History of stress tests or caths- confirm if possible
PEARL: a "negative cath" can still have 30% occlusions- that is heart disease!
Medications- BP meds, statins, aspirin, plavix, coumadin, pradaxa

Physical exam key points
Volume status- volume up, down, or euvolemic (wet or dry?)
Heart and lung sounds- Murmurs? Wet lungs or wheezing?
Abdominal and back exam- palpable AAA?
Legs- edema or swelling?
Pulses- asymmetric deficits suggest a dissection

Differential
Take your **PET MAC** for a walk**-** the 6 deadly causes of chest pain
PE **E**sophageal rupture **T**ension pnuemothorax
MI **A**ortic Dissection **C**ardiac Tamponade

Workup
Every patient- Chest x-ray and EKG
Chest pain + EKG with 1mm elevation in 2 contiguous leads or new left bundle branch block = CATH LAB
Chest x-ray- Pneumothorax, screen for dissection (widened mediastinum is 60-70% sensitive), esophageal rupture
PEARL: Be liberal with your EKGs and stingy with your enzymes
If you are suspecting cardiac chest pain:
Labs- Cardiac set- (major reasons for labs in parentheses)

CBC (anemia)	Chem 10 (electrolyte abnormalities)
Coags (baseline)	Cardiac Enzymes (Troponin, CK, CK-MB)

PEARL: One set of enzymes USUALLY means admission for rule out ACS
Treatments- Aspirin 325mg PO, Nitroglycerin (0.4mg sublingual q5 minutes x3 total doses, hold systolic BP <100 or pain free, contraindicated with Viagra, Cialis, etc.
PEARL: have an IV in place before giving nitro, if hypotensive usually fluid responsive to 500cc NS bolus, avoid nitro in posterior MIs
If not pain free after aspirin and nitro- can give morphine, zofran
PEARL: Get a pain free EKG and make sure there are no changes!
If patient has persistent pain despite interventions- consider unstable angina and admission to CCU instead of tele floor

If you are suspecting Pulmonary Embolism

Symptoms- pleuritic chest pain, SOB, tachycardia, tachypnea, hypoxia
Risk factors- OCPs, pregnancy, trauma, recent surgery, malignancy
PEARL- Therapeutic INR (2-3) is NOT 100% protective against PE
Workup- EKG and CXR
CBC (low yield but consultants want it)
Chem 10 (creatinine for a CT)
Coags (baseline)
PEARL- DON'T indiscriminately order D-dimers

Decision making in PE
First step- Gestalt ("gut feeling")
Low probability- no workup or proceed to PERC criteria below
Moderate or high probability- CT pulmonary angiogram (CTPA)

PERC criteria- low risk gestalt PLUS all of the following- **BREATHS**
Blood in sputum (hemoptysis)
Room air sat <95%
Estrogen or OCP use
Age >50 years old
Thrombosis (in past or current suspicion of DVT)
Heart rate >100 documented at ANY time
Surgery in last 4 weeks

If negative- no testing (risk of PE 1.8%, risk of anti-coagulation 2%)
If positive- if negative D-dimer- no further testing, if positive- CTPA

Treatment
If you diagnose a PE- get cardiac enzymes and BNP for risk stratification
Regular PE (vitals stable, no elevation in cardiac enzymes or BNP)- lovenox 1mg/kg SQ, admit

Submassive PE (vitals stable with elevation in CEs or BNP, right heart strain on echo)- lovenox 1 mg/kg SQ, strongly consider ICU admit

Massive PE (unstable vitals, systolic BP less than 90 at any time)- thombolytics and ICU admit, ?interventional radiology intervention

Other diagnoses

Esophageal rupture (Boorhave's syndrome)

History- recent forceful vomiting, recent endoscopy, alcoholic, sick and toxic looking patient
Chest x-ray- Free air under diaphragm, rigid abdomen on exam
Treatment- resuscitation, surgical intervention

Aortic Dissection

History- ripping or tearing chest that goes into the back or shoulder area
PEARL- Chest pain + motor or neuro deficit **OR** chest pain but a seemingly unrelated complaint elsewhere in the body- think about dissection- aorta connects them both
Risk factors- HTN (#1), pregnancy, connective tissue diseases (Marfan's and Ehler-Danlos)
Exam- unequal BPs (more than 20 mmHg, 60-70% sensitive), pulse deficits (20% sensitive)
Chest x-ray- widened mediastinum (60-70% sensitive)
Testing- CT Aorta with contrast, TEE if dye allergy or creatinine elevated, cardiac MRI

Miscellaneous:
Sample conversation with cardiologist regarding a low risk chest pain admission in the "cardiology format":

Hi, this is Dr. Turn and Burn in the ED, I have a 40 year old male with a history of HTN with no known coronary artery disease who comes in with 3 hours of chest pain at home. It started at rest and persisted for 3 hours. It wasn't exertional or positional. He described a sharp in his chest, 5 out of 10 severity. No other associated signs or symptoms. Exam is normal, EKG is normal and non-ischemic, Chest x-ray normal, and cardiac enzymes are normal as well. He got a 325mg ASA and one sublingual nitro with total relief of his pain. Repeat EKG has no changes. I would like to admit him for a low-risk rule out.

(**Contact for suggestions or comments-** steve@embasic.org)