

## An Emergency Department's Approach to Chest Pain

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## General Differential

- Acute Coronary Syndrome
- Pulmonary Embolism
- Arrhythmia
- Infectious
- Musculoskeletal/Trauma
- Pneumothorax
- Dissection
- Aneurysm
- Heart Failure
- Mass
- GI Related
- Obstructive Pulmonary Disease

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### Leading Causes of Death

• Data are for the U.S.

### Number of deaths for leading causes of death

- Heart disease: 702,880
- Cancer: 608,371
- Accidents (unintentional injuries): 227,039 COVID-19: 186,552
- Stroke (cerebrovascular diseases): 165,393 Chronic lower respiratory diseases: 147,382 Alzheimer's disease: 120,122
- Diabetes: 101,209
- Nephritis, nephrotic syndrome, and nephrosis: 57,937 Chronic liver disease and cirrhosis: 54,803

Source: Mortality in the United States, 2022

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## HEARTScore for Major Cardiac

Predicts 6-week risk of major adverse cardiac events in patients with chest pain.

### INSTRUCTIONS

Use in patients <12 years old presenting with symptoms suggestive of ACS. Do not use if recent ST segment elevation ECG, new or other new ECG changes, hypotension, life-threatening arrhythmias, or other conditions requiring medical/surgical/psychiatric. Scores determined by the provider to require admission.

### Definitions

- **History:** Retrosternal pain, pressure, radiation to jaw/left shoulder/arms, duration 5-15 min, initiated by exercise/cold/indigestion, perspiration, nausea/vomiting, reaction on nitrites within mins, patient recognizes symptoms. Low risk features of chest pain include: well localized, sharp, non-exertional, no diaphoresis, no nausea or vomiting, and reproducible with palpation.
- **Non-specific repolarization disturbance:** LBBB, typical changes suggesting LVP, repolarization disorders suggesting dyspnea, unchanged known repolarization disorders.
- **Significant ST segment deviation without LBBB, LVP, or dyspnea:**
- **Risk Factors:** HTN, hypercholesterolemia, DM, obesity (BMI >30 kg/m<sup>2</sup>), smoking (current or smoking cessation <10 mo), positive family history (parent or sibling with CVD before age 65), positive family history (parent or sibling with CVD before age 65).
- **Troponin:** Use local, regular sensitivity troponin assays and corresponding cutoffs.

History

ECG

Age

Risk factors

Initial troponin

Slightly suspicious	-1
Moderately suspicious	+1
Highly suspicious	+2
Normal	-1
Non-specific repolarization disturbance	+1
Significant ST deviation	+2
No known risk factors	-1
1-2 risk factors	+1
>3 risk factors or history of atherosclerotic disease	+2
Normal troponin	-1

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## EKG's are Hard – Sneaky STEMI



"I lifted my mower 48 hours ago, I think I pulled my back."

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## Pulmonary Embolism (PE)

- Commonly Missed Diagnosis
- Most Common EKG finding is Sinus Tachycardia
- D-dimer is useful but must be used in appropriate setting (PERC Positive Patients who are not High Risk Wells Criteria)
- High Risk Wells Criteria Patients with Concern for PE should have Imaging as D-dimer false negative rate is generally around 2%

Pregnancy and Covid patients are also known to be at higher Risk

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## GI Related

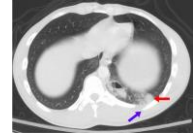
- Food Bolus Obstruction
  - Inability to tolerate secretions in an indication for EMER GENT endoscopy if the obstruction can't be cleared
  - When protecting their airway and tolerating secretions provider discretion should be used for timing of endoscopy
- Gastrointestinal Esophageal Reflux Disease
  - This is a major cause of chest pain and likely represents a large portion of the population
  - Do not take relief with GI cocktail as the be all end all
  - Previous experience of the patient can be helpful

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## Trauma, Always Break Down as Stable versus Unstable

- Chest can be difficult due to multiple organ systems involved
- Imaging is helpful to differentiate. Consider CT based on mechanism
- Some injuries will be missed on plain film (Scapular, Nondisplaced Rib Fractures, and Sternal Fractures to name a few)

- In high energy events make sure to consider cardiac and pulmonary contusion as these can present late and cause poor outcomes. On CXR be careful about consolidation reads.



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## Pneumothorax

- Spontaneous
  - Consider in the young (tall skinny male is classic presentation)
  - Can look very healthy and compensate well
  - 100% non rebreather is always the first step
  - Decompress if signs of instability



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## Obstructive Pulmonary Disease

### Asthma and COPD

- Work of Breathing assessment and symptoms dictate management
- BiPAP is a great intervention
- Beta agonist and steroids early in acute events
- Consider magnesium
- When intubating be VERY CAREFUL!!!! Make sure to count respirations before intubation and match this rate after intubation. You must be quick during this intubation

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## Hypertension

- In ED patients with asymptomatic elevated blood pressure, does screening for target organ injury reduce rates of adverse outcomes?
  - Level C Recommendations
    - (1) In ED patients with asymptomatic markedly elevated blood pressure, routine screening for acute target organ injury (eg, serum creatinine, urinalysis, ECG) is not required. (2) In select patient populations (eg, poor follow-up), screening for an elevated serum creatinine level may identify kidney injury that affects disposition (eg, hospital admission).
- In patients with asymptomatic markedly elevated blood pressure, does ED medical intervention reduce rates of adverse outcomes?
  - Level C Recommendations
    - (1) In patients with asymptomatic markedly elevated blood pressure, routine ED medical intervention is not required. (2) In select patient populations (eg, poor follow-up), emergency physicians may treat markedly elevated blood pressure in the ED and/or initiate therapy for long-term control. [Consensus recommendation] (3) Patients with asymptomatic markedly elevated blood pressure should be referred for outpatient follow-up. [Consensus recommendation]

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## References

- <https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm>
- <https://www.mdcalc.com/calc/1752/heart-score-major-cardiac-events>
- <https://www.mdcalc.com/calc/1135/wells-criteria-pulmonary-embolism>
- <https://www.mdcalc.com/calc/3951/canadian-syncope-risk-score>
- <https://www.acep.org/patient-care/clinical-policies/asymptomatic-elevated-blood-pressure>

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