

**Family Medicine Preceptorship
Discussion Cases
Chest Pain**

Learning Objectives:

- Discuss the differential diagnosis of chest pain
- Define elements of the history and physical examination which can help to differentiate causes of chest pain
- Describe the acute coronary syndromes, and how they are diagnosed
- Identify differences in acute coronary syndrome presentation in older adults

Suggested Readings:

McConaghy JR, Oza RS. Outpatient Diagnosis of Acute Chest Pain in Adults. *Am Fam Physician*. 2013 Feb 1;87(3):177-182. <http://www.aafp.org/afp/2013/0201/p177.html>

Barstow C, Rice M, McDivitt JD. Acute Coronary Syndrome: Diagnostic Evaluation. *Am Fam Physician*. 2017 Feb 1;95(3):170-177. <http://www.aafp.org/afp/2017/0201/p170.html>

Engberding N, Wenger NK. Acute Coronary Syndromes in the Elderly. *F1000Research*. 2017;6:1791. doi:10.12688/f1000research.11064.1. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5627582/>

Case 1:

Sam is a 23-year-old male medical student who walks into your clinic with acute chest pain and shortness of breath. Chest pain is described as “sharp” and is located in the right anterior chest. He reports that symptoms started suddenly while studying in the library. He has some shortness of breath and lightheadedness, and states he is currently very anxious about his symptoms. He denies leg swelling/pain, abdominal pain, diaphoresis, syncope, or recent nausea/vomiting. He states he recently got over a viral upper respiratory tract infection a few days ago. He reports that he has been under a lot of stress lately at school, and is very anxious about an upcoming biochemistry exam. He states that he takes occasional antacids for heartburn, but otherwise has no known personal medical problems. He did recently travel out of state last weekend, driving several hours to see his significant other. Family history is positive for mother with recurrent blood clots (she currently takes long-term anticoagulation), though there is no family history of heart disease in primary relatives. He is a never-smoker.

Question 1: What is the differential diagnosis for chest pain?

Differential diagnosis for chest pain is broad. Potentially life-threatening causes include acute coronary syndrome, pulmonary embolism, pneumothorax, aortic dissection, or esophageal rupture. Other causes include pericarditis, panic attack, GERD, or chest wall pain (such as costochondritis).

Question 2: What are possible causes of this patient’s chest pain, based on history?

Further objective information is needed at this time to confirm the diagnosis, however the differential diagnosis based on history for this patient includes pulmonary embolism, anxiety attack, spontaneous pneumothorax, pleurisy, GERD, or costochondritis. Acute coronary syndrome seems unlikely based on age, risk factors, and presentation. Thorough physical

examination and—if deemed appropriate—targeted laboratory and imaging testing may help to clarify diagnosis.

Case 2:

Mary is a 66-year-old woman with history of hypertension, tobacco use disorder, type 2 diabetes mellitus, and obesity, who presents with symptoms of chest discomfort and shortness of breath. She states the pain is a “heaviness” sensation which radiates into both arms, as well as nausea. She first noticed pain while taking the garbage out this morning, and states pain worsens with activity and improves somewhat with rest. On physical examination she appears diaphoretic and pale. Blood pressure is 160/90, heart rate is 100, heart sounds are unremarkable, lungs are clear to auscultation, there is no lower extremity edema noted or jugular venous distension. EKG and troponin results are pending.

Question 1: What features of this patient’s presentation are consistent with acute coronary syndrome?

This patient’s presentation is very concerning for acute coronary syndrome. “Typical” symptoms include retrosternal chest pain (with or without radiation to either arm, the neck, or the jaw), oppressive chest pressure, abdominal pain, dyspnea, nausea, vomiting, diaphoresis, and syncope. Concerning features in this patient include chest pain radiating into both arms, worsening of symptoms with exertion, and unwell diaphoretic appearance. Additionally, this patient has numerous cardiovascular risk factors. She requires an EKG and troponin blood test, and she will need to be hospitalized for serial troponin monitoring.

Question 2: What are the different types of acute coronary syndrome, and how are they diagnosed?

ACS consists of three entities: unstable angina, NSTEMI, and STEMI. They can be differentiated based on presence/absence of cardiac enzymes and EKG findings.

- *Unstable angina is diagnosed in the presence of symptoms characteristic of cardiac ischemia, without elevation of troponin. EKG may or may not show ST depressions, T wave flattening/inversions, or other non-specific ST-T changes. Unstable angina is caused by disruption of atherosclerotic plaque, leading to partial coronary artery occlusion or vasospasm.*
- *NSTEMI (non-ST elevation myocardial infarction) is diagnosed in the presence of symptoms characteristic of cardiac ischemia, with simultaneous elevation of troponin. As stated in the name, ST segment elevation are absent, however the EKG may or may not show ST depressions, T wave flattening/inversions, or other non-specific ST-T changes. NSTEMI is caused by disruption of atherosclerotic plaque, leading to partial or complete coronary artery occlusion.*
- *STEMI (ST elevation myocardial infarction) is diagnosed in the presence of symptoms characteristic of cardiac ischemia, with simultaneous EKG findings of significant ST segment elevations. Additionally, a new left bundle branch block is the equivalent of ST elevations. Troponin elevation is not required for diagnosis, as serum troponin levels may not become elevated for several hours after onset of acute chest pain. STEMI is caused by atherosclerotic plaque rupture causing coronary artery occlusion. STEMI REQUIRES URGENT CARDIAC CATHETERIZATION OR THROMBOLYSIS.*

Case 3:

Norman is an 86-year-old male with history of hypertension, gout, GERD, and generalized anxiety disorder, who presents to clinic with feeling of fatigue and shortness of breath. He lives independently with his wife, and states that symptoms started while walking outside this morning to take the garbage out. Shortness of breath and fatigue are also accompanied by some mild nausea. He states symptoms are mildly improved with rest. He denies cough, chest pain, or lightheadedness. He appears fatigued on exam; cardiac auscultation reveals no abnormalities, lung auscultation reveals bibasilar rales, and there is no lower extremity edema. Vital signs show that he is afebrile, heart rate 95, blood pressure 155/95.

Question 1: How does ACS differ in older adults, compared to ACS in younger adults?

Not surprisingly, ACS is common in adults >65, and 85% of ACS mortality occurs in Medicare population. What may be surprising however is that older adults tend to present with atypical symptoms and signs of ACS. Older adults often do not present with chest pain, but rather present with dyspnea, diaphoresis, syncope, nausea, and/or vomiting. Older patients may also be more likely to present with frank pulmonary edema, relative to younger patients. They are also more likely to have complicated outcomes from ACS, and may develop heart failure, arrhythmia, or ventricular rupture.

Question 2: What is the next step in evaluating Norman's chest pain?

Obtaining a 12-lead electrocardiogram is always the correct choice for initial evaluation of symptoms concerning for ACS. He will also need to be admitted to a cardiac monitoring unit for serial troponin testing and monitoring of clinical status.