

Chest Pain in the Hospitalized Patient

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Chest pain is a common complaint in the hospitalized patient. Excellent discussions of the differential diagnosis can be found in most standard medicine texts. Etiologies range from benign musculoskeletal causes to potentially catastrophic pulmonary or cardiovascular processes.¹ The challenge for the medicine consultant is to quickly identify the potentially life threatening conditions (such as myocardial ischemia, aortic dissection, and pulmonary embolus) and initiate appropriate treatment. The evaluation should begin with a history that includes the character of the pain, associated symptoms, and the past medical history, focusing on cardiac risk factors. The physical examination should include vital signs, cardiac, pulmonary, and peripheral vascular exam. An electrocardiogram should be obtained as soon as possible. Malpractice losses related to acute chest pain are commonly related to failure to document the clinical examination and failure to perform or correctly interpret the electrocardiogram.²

Lee and Goldman describe the EKG as "the most important single source of data" in the evaluation of a patient with chest pain.³ In their review of ER patients with chest pain, the prevalence of acute MI was 80% in patients with greater than 1 mm of new ST segment elevation and 20% in patients with ST depression or flipped T waves not known to be old. In the absence of these EKG changes, the risk of AMI was 2-4%. Serum cardiac markers, chest X-ray, and ABG or oximetry may also yield useful information in the initial evaluation. CK MB isoenzymes and troponin levels are usually elevated within four hours of ischemia and serial sampling over 12 hours should detect all acute myocardial infarctions. However, serial enzymes should not be drawn in an unmonitored setting. Class I recommendations by the AHA and ACC in 2003 for risk stratifications includes the following:

- 1.) Patients who present with chest discomfort should undergo early risk stratifications focused on anginal

symptoms, physical findings, ECG, and biomarkers of cardiac injury.

- 2.) A 12-lead ECG should be obtained immediately in patients with ongoing chest discomfort.
- 3.) Biomarkers of cardiac injury should be measured in all patients who present with chest discomfort consistent with ACS. In patients with negative cardiac markers within 6 hours of the onset of pain, another sample should be drawn between 6 and 12 hours.

If the patient has a high likelihood of ischemia, initiate standard of care therapy (establish IV access, place on a monitor and oxygen, and give aspirin, nitrates and pain control) and contact cardiology regarding transfer to an ICU setting.

If myocardial ischemia is felt to be unlikely, other life threatening etiologies should not be forgotten. If the pain is described as severe, sudden onset, tearing, or radiating to the back, blood pressure and pulses in both arms should be documented, and aortic imaging considered. Untreated aortic dissection has greater than twenty-five percent mortality at twenty-four hours, so the diagnosis must be confirmed or excluded promptly.

Pulmonary embolus (PE) is a more common cause of chest pain and should always be in the differential diagnosis. Most hospitalized patients are at high risk because of their underlying diseases, immobilization, or recent surgery. Patients younger than forty, with no hypercoagulable risk factors who are having minor surgery have a risk of clinical PE of 0.2%.⁴ The risk increases ten fold for patients under forty undergoing major surgery or for patients 40-60 undergoing any surgery. Patients at highest risk (4-10% risk of clinical PE) are those with a malignancy or other hypercoagulable state undergoing major lower extremity orthopedic surgery, and those with hip fractures or multiple trauma or spinal cord injury. As another chapter provides an excellent review of the diagnosis and treatment of PE, it will not be covered further here.

Most other causes of chest pain can be assessed less urgently. Chest wall pain can usually be pin pointed by the patient and is increased with movement, deep inspiration, or palpation. Etiologies include

costochondritis, muscle strain, and rib fracture from trauma or metastases. Neurologic etiologies include cervical root compression, thoracic outlet syndrome, and zoster. The pain of zoster may precede the rash by several days and be associated with hypoesthesias or hyperesthesias on physical exam. Pulmonary etiologies include pleuritis from a host of causes and pneumothorax. Spontaneous pneumothorax is most common in patients with COPD and tall young men. Further cardiac causes of chest pain include mitral valve prolapse and pericarditis. Rarely chest pain can be referred from cholecystitis, peptic ulcer disease, or pancreatitis. Gastroesophageal reflux and esophageal spasm or hypersensitivity probably account for a substantial portion of noncardiac chest pain.⁵

References

1. Braunwald: Heart Disease: A Textbook of Cardiovascular Medicine, 6th ed., pp1220-25
2. Ghaemmaghami C, Brady,W: Pitfalls in the emergency department diagnosis of acute myocardial infarction. Emerg Med Clin North Am 2000;19:351-369.
3. Lee T, Goldman L: Evaluation of the patient with acute chest pain. N Engl J Med 2000;342: 1187-95.
4. DeWet C, Pearl R: Postoperative thrombotic complications. Anesthesiol Clin North Am 1999;17:895-922.
5. Fennerty B: Extraesophageal gastroesophageal reflux disease. Gastroenterol Clin North Am 1999;28:861-873.
6. Braunwald E: Management of patients with Unstable Angina and Non-ST-Segment Elevation Myocardial Infarction. ACC/AHA Task force Report on Practice Guidelines. 2003:1-35.