

Primary Health Care Initiatives (PHCI) Project
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Abt. Associates Inc.

CHEST PAIN

LEARNING OBJECTIVES

- Describe the most common causes of chest pain, and the characteristics of each
- Develop a systematic approach to the evaluation and emergency management of chest pain
- Be able to effectively manage and treat the non-life-threatening types of chest pain

TEACHING STRATEGIES

- To diagnose normal ECG and use case studies to stimulate discussion and thinking about the initial evaluation and management of chest pain
- Use lecture or informal presentation for didactic material, small group discussion for prevention, counseling, and patient education issues.

LEARNING POINTS

Common Causes of Chest Pain:

1. Coronary artery disease (Angina, Acute Myocardial Infarction)
2. Pulmonary embolism (*PE*)
3. Acute Aortic Dissection
4. Pleuropericarditis
5. Spontaneous Pneumothorax
6. Musculo-skeletal
7. Gastro-intestinal Tract
8. Psychosomatic Disorders

Clinical Presentation

1. Coronary Artery Disease (Angina, Acute Myocardial Infarction)

Angina: Pain with angina pectoris is often retrosternal, radiates to the neck, jaw, epigastrium, shoulder, or arm

- a. aggravated by exertion or stress

- b. pain typically lasts less than 10 minutes and is relieved with rest or with nitro-glycerine

Myocardial Infarction: Patients with (MI) typically complain of sudden onset of substernal pain which may radiate

- a. Associated with dyspnea (shortness of breath), diaphoresis, nausea, vomiting, and anxiety.
- b. Pain is unrelieved by nitro-glycerine and usually lasts 30 minutes or longer

2. Pulmonary embolism (PE)

Pulmonary embolus is another common cause of pleuritic pain and tachypnea, tachycardia, shortness of breath and possibly hemoptysis

- a. Rales and a pleural rub may be present
- b. May progress to acute right failure and pulmonary hypertension
- c. Typically associated with risk factors such as immobility and surgery or labor

3. Acute Aortic dissection

Dissecting Aortic Aneurysm: presents with excruciating, tearing, or knifelike pain which is sudden and maximally at onset and lasts for hours

- a. Usually pain is located in the anterior chest but may be located in the abdomen and move as the dissection progresses; often radiates to thoracic area of back and lower limbs
- b. Signs may include lowered blood pressure in one arm, absent pulses and paralyses

4. Pleuropericarditis

- Stitching or stabbing pain
- Increases with respiration or movement

May be preceded by history of febrile illness

5. Spontaneous pneumothorax

Spontaneous pneumothorax can cause acute, unilateral, stabbing pain with dyspnea

- a. Typically, there is decreased breath and voice sounds over the involved lung
- b. Incidence is highest in young men or in older patients with chronic obstructive pulmonary disease

6. Musculo-skeletal

Chest pain due to musculoskeletal factors is variable and may last from few seconds to several days and may be sharp, dull or aching

- Pain is aggravated by movement and cough; the chest is tender on palpation

7. Gastro-intestinal tract

- a. cholecystitis: tender right hypochondria
- b. Gastro-esophageal reflux: relieved by antacid
- c. Peptic ulcer disease: pain in epigastrium (frequently misdiagnosed with inferior cardiac ischaemia)

8. Psychosomatic disorders

- a. Special type of personality
- b. Usually very prolonged history
- c. Other psychosomatic symptoms

Diagnosis/Evaluation:

History: (Length of history will depend on patient's clinical presentation; rapid history for any patient with a suspected emergency condition such as MI or dissecting aortic aneurysm and pulmonary embolism)

- Determine whether onset was sudden or gradual
- Ask patient to describe the pain: location, region of radiation (to shoulder, inner arm, forearm, neck, back, lower jaw or epigastrium), and duration: (Usually minutes, but if more than 15 minutes, assess for MI)
- Inquire about aggravating factors such as exercise, stress, food intake, movement, coughing, cold weather, smoking.
- Inquire about relieving factors such as use of nitro-glycerine, antacids, intake of food, rest
- Ask about associated symptoms such as dyspnea (shortness of breath), hemoptysis, fever, chills, sputum production, exanthema, diaphoresis (cold sweating), syncope, nausea
- Determine whether patient has a coexistent viral illness or if other members of the household have a viral disease
- Explore stress-related factors in the patient's school, work or home environments
- Ask about risk factors for ischemic heart disease such as smoking, hyperlipidemia, hypertension, sedentary lifestyle
- Explore past medical history

- Inquire about family history of chest pain and cardiovascular disease

Physical Examination:

- Observe general appearance of patient, assessing for level of distress and anxiety, obesity
- Measure vital signs. Take blood pressure in both arms (dissecting aortic aneurysm may present with discrepancy in readings between arms)
- Inspect skin for pallor, cyanosis, jaundice, or herpetic rash
- Examine eyes for jaundice and arcus senilis (circular cholesterol deposits on the cornea)
- Auscultate carotid pulse
- Palpate neck for lymphadenopathy and thyromegaly
- Perform a complete examination of the heart, noting extra heart sounds, murmurs, and clicks
- Examine chest wall for herpes lesions and signs of trauma
- Palpate chest wall noting tenderness and swelling
- Auscultate lungs for equal breath sounds, a pleural rub, and crackles and wheezes
- Auscultate abdomen for bowel sounds and bruits
- Palpate abdomen for tenderness and masses (particularly in the right upper quadrant and epigastrium), organomegaly, bounding pulses, and ascites
- Palpate for femoral pulses (with absent pulses suspect dissecting abdominal aneurysm)
- Assess lower extremities for diminished pulses, unilateral oedema, and other signs of phlebitis
- Patients who present with pain that changes with movement should have a musculoskeletal and neurological exam performed, focusing on focal tenderness, muscular weakness, and motor and sensory deficits

Diagnostic Tests

If MI is suspected, refer patient immediately for emergency care at the hospital. Do not wait to carry out any tests.

Diagnostic tests are based on the information collected in the history and physical examination; not every patient needs a routine chest x-ray and electrocardiogram

(ECG). If Diagnostic Tests are not available at the facility refer patient for further investigation.

- Consider ordering an ECG in patients with suspected MI, angina pectoris, pericarditis (ECG may be completely normal in ischaemic cardiac conditions).
- Consider ordering a chest x-ray in the following cases
 - a. Suspected chest trauma such as rib fractures
 - b. Suspected pulmonary diseases such as pneumonia
 - c. Suspected pneumothorax or pulmonary embolus

Plan/Management

1. If considering ischemic chest pain give:
 - NTG and oxygen, if not responding:
 - Narcotic (Morphine 10mg.) and transfer to hospital
2. If suspecting aortic dissection:
 - If blood pressure is elevated, reduce immediately
 - Narcotic for pain
 - Transfer to hospital
3. If suspecting pulmonary embolism:
 - oxygen
 - relief of pain (Not narcotic)
4. If pain is relieved by NTG tablets, advice the patient to go to a specialist
5. Other cause of chest pain will be treated accordingly

PREVENTION ISSUES AND PATIENT EDUCATION

- To avoid cardiac neurosis when no organic causes can be found for the pain, carefully explain to the patient or parents that a thorough history and physical exam revealed no abnormality
- Allow time for the patient to express concerns and questions
- For Angina

Educate the patient about the symptoms of angina and when to recognize that he/she has coronary chest pain.

1. During the attack/pain, patient should stop all activities

2. Administer Nitro-glycerine 0.4 - 0.6 mg. sublingually
 - This should be taken as soon as the pain is felt (discomfort). Relief is usually within 1-2 minutes. If pain is not relieved, another tablet can be taken after 5 minutes up to a maximum of 3 tablet per one attack.
 - The patient can be instructed to take a sublingual tablet before any effort that is known to cause the chest discomfort, e.g. climbing stairs meals etc.
 - If the pain lasts longer and is not relieved, the patient should be quickly taken to a hospital for possible unstable angina or acute myocardial infarction.

CRITICAL ELEMENTS FOR REFERRAL

- Suspected myocardial infarction, pulmonary embolism, aortic dissection, pneumothorax, or pericarditis.
- Persistent chest pain that does not respond to usual treatment measures
- Chest pain of any type with severe hypertension or decreased blood pressure, persistent tachycardia, increased respirations or shortness of breath

CASE STUDIES

1. You are seeing an anxious 30 year old woman in your health center. She presents with a complaint of chest pain for a week. She describes the pain as a dull ache in her left chest without shortness of breath, diaphoresis or arm or jaw pain. It occurs at rest and is not worse with exercise. On physical exam, she is afebrile with a BP of 110/70. In general, she is thin and in no apparent distress. Her heart sounds are normal and her lungs on clear. On palpation, she does have some mild pain in at her sternoclavicular joint of her left chest.
 - a. What is your differential diagnosis?
 - b. Do you need to order an EKG?
 - c. What treatment will you initiate for this patient?
2. A 50 year old woman presents with complaint of chest pain for several days. She describes it as a dull ache in her substernal area that comes and goes, sometimes causing diaphoresis and occasionally left arm pain. It is not worse with exertion. Her cardiac risk factors include hypertension, smoking and hyperlipidemia. On one occasion, her pain was so severe that she took her husband's sublingual nitroglycerin and felt better a few minutes later. She is convinced that she is having a heart attack, although she is without pain today. Her physical exam shows a mildly obese woman, with HR 87, BP 132/87, afebrile. Her cardiac exam is normal and her lungs are clear. You order an EKG which is unremarkable.

- a. Besides a cardiac etiology, what could be causing her symptoms?
 - b. Do you need to do further testing to evaluate her chest pain?

3. A 30 year old woman presents to the health center for chest pain that started earlier today. She describes the pain as sharp and on her right side, worse with coughing or taking a deep breath. The pain started suddenly. She feels slightly short of breath. Upon asking further questions, she denies any previous medical problems, only takes OCPs and smokes a pack of cigarettes a day. She recently returned from a business trip to the United States. On physical exam, her temperature is 38.5 celsius, pulse is 110, respirations are 16 and BP is 150/100. You listen carefully to her lungs which have trace rales at the bases, however she is unable to take a deep breath secondary to the pain. Her heart sounds are normal except for tachycardia and she has no chest wall pain. You order an EKG and a chest X-Ray.
 - a. What do you think is the cause of her pain?
 - b. What other tests would you like to order?
 - c. What is your next step in managing this patient?

4. You are at the end of a busy day in your health center. The father of one of your patients is sitting quietly in the waiting room, when he suddenly clutches his chest and slumps over. You rush to assess him and find him to be clammy and breathing slow shallow breaths.
 - a. What should be the first step in managing this patient?
 - b. What other steps should you take at the health center?
 - c. What is your differential diagnosis?