Baptist Health
HEART INSTITUTE

Evaluation of Chest Pain in the Primary Care Setting

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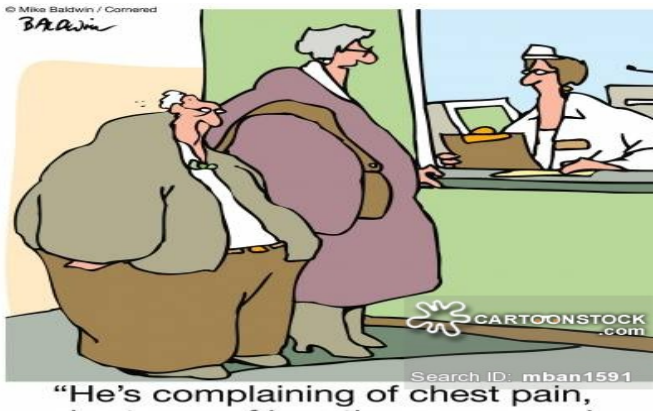
Disclosures

I have no relevant relationships with commercial interests to disclose.

Objectives

1. **Discuss the different etiologies of chest pain**
2. **Discuss the initial diagnostic approach to chest pain in the clinic**
3. **Discuss who to refer for further testing**



"He's complaining of chest pain, shortness of breath, cramps and dizziness. Do you sell earplugs?"

Etiologies of Chest Pain

Table 1 Aetiology to chest pain in various clinical settings

Aetiology	General practitioner (1–3) %	Dispatch centre (4) %	Ambulance crew (5) %	Emergency department (6) %
Cardiac	20	60	69	45
Musculoskeletal	43	6	5	14
Pulmonary	4	4	4	5
Gastro-intestinal	5	6	3	6
Psychiatric	11	5	5	8
Other	16	19	18	26

European Heart Journal (2002) **23,** 1153–1176

Etiologies of Chest Pain

View/Print Table

TABLE 1
Epidemiology of Chest Pain in Primary Care and Emergency Department Settings

DIAGNOSIS*	PERCENTAGE OF PATIENTS PRESENTING WITH CHEST PAIN		
	PRIMARY CARE: UNITED STATES[4]	PRIMARY CARE: EUROPE[3]	EMERGENCY DEPARTMENT[3]
Musculoskeletal condition	36	29	7
Gastrointestinal disease	19	10	3
Serious cardiovascular disease†	16	13	54
Stable coronary artery disease	10	8	13
Unstable coronary artery disease	1.5	—	13
Psychosocial or psychiatric disease	8	17	9
Pulmonary disease‡	5	20	12
Nonspecific chest pain	16	11	15

*— Diagnoses are listed in order of prevalence in United States.

†— Including infarction, unstable angina, pulmonary embolism, and heart failure.

‡— Including pneumonia, pneumothorax, and lung cancer.

Adapted with permission from Klinkman MS, Stevens D, Gorenflo DW. Episodes of care for chest pain: a preliminary report from MIRNET. J Fam Pract 1994;38:349, with additional information from reference 3.

Am Fam Physician. 2005 Nov 15;72(10):2012-2021.

Angina Characteristics

Table 4 Traditional clinical classification of chest pain

Typical angina (definite)	Meets all three of the following characteristics: • substernal chest discomfort of characteristic quality and duration; • provoked by exertion or emotional stress; • relieved by rest and/or nitrates within minutes.
Atypical angina (probable)	Meets two of these characteristics.
Non-anginal chest pain	Lacks or meets only one or none of the characteristics.

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Cardiac Chest Pain

Stable Angina

- Substernal or left-sided
  - Pressure/heaviness/tightness
- Exertional
- Relieved with rest
- Associated symptoms
  - Radiation
  - Dyspnea
  - Nausea/vomiting
  - Diaphoresis
  - Near syncope

Unstable Angina/ACS

- Similar symptoms, but…
  - Occur at rest
  - New onset and not predictable
  - Progressive

Other Cardiac Chest Pain

Aortic dissection
- **Acute, sharp chest and back pain, often with tearing sensation**

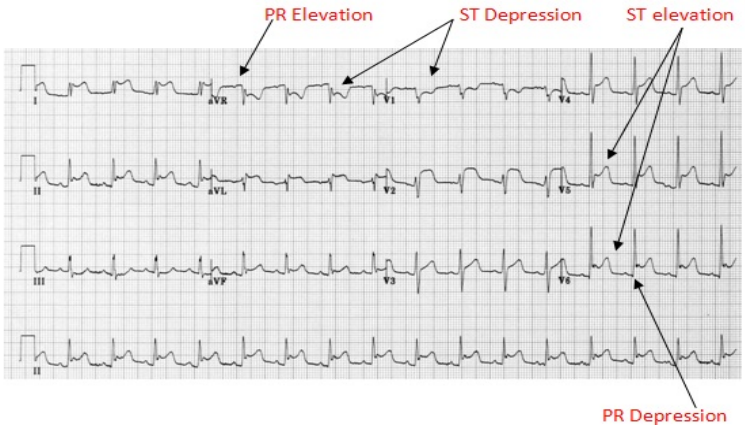
Heart failure
- **Often with chest pain in addition to the usual symptoms**

Pericarditis/Myopericarditis
- **Pleuritic**
  - **Relieved by sitting up and leaning forward**

Stress cardiomyopathy (Takotsubo)
- **Symptoms similar to MI**

Mitral valve disease
- **Chest pain from RVH and pulmonary HTN**

Pericarditis ECG



Pulmonary Chest Pain

Pulmonary embolism
- **Pleuritic chest pain**

Pneumothorax
- **Sudden onset pleuritic chest pain**

Pneumonia
- **Pleuritic chest pain with cough and fever**

Malignancy
- **Chest pain with cough, dyspnea, and possibly hemoptysis**

Asthma/COPD
- **Chest tightness and dyspnea**

Pleuritis
- **Pleuritic chest pain**

Acute chest syndrome
- **Sickle cell patient with chest pain and infiltrate on CXR**

Gastrointestinal Chest Pain

Esophageal perforation
- **Retrosternal chest pain usually preceded by retching**

GERD
- **Similar symptoms to myocardial ischemia but relieved with antacids**

Esophageal pain
- **Pain > 1 hr resolving with antacids, associated with heartburn**

Esophagitis
- **Sudden onset retrosternal pain**

Hiatal hernia
- **Chest pain with reflux symptoms**

Musculoskeletal Chest Pain

Costochondritis
- **Local or regional chest tenderness**

Rib fracture
- **Pleuritic chest pain reproducible with palpation**

Trauma

Diagnostic Approach - History

Table 2. Clinical Decision Rule for Identifying Patients with Chest Pain Caused by CAD

Variable	*Points*
Age 55 years or older in men; 65 years or older in women	1
Known CAD or cerebrovascular disease	1
Pain not reproducible by palpation	1
Pain worse during exercise	1
Patient assumes pain is cardiogenic	1
Total points:	_____

Points	*Patients with CAD*	*Patients without CAD*	*Likelihood ratio*	*Predictive value (%)*
0 or 1	3	542	0.0	0.6
2 or 3	91	659	0.9	12.1
4 or 5	94	56	11.2	62.7

CAD = coronary artery disease.

Information from reference 2.

American Family Physician. March 1, 2011 ◆ Volume 83, Number 5. Pages 603-605

Diagnostic Approach - History

Description
- **Highest relative risk of MI**
  - **Radiation to upper extremity**
  - **Diaphoresis**
  - **Nausea and vomiting**

Quality
- **Pleuritic**
- **Positional**
- **Sharp or dull**
- **Tearing**
- **Reproducible**

Diagnostic Approach - History

Location and radiation
- **Focal vs not**
- **Wide extension of radiation increases probability of MI**

Temporal elements
- **Abrupt vs not**
  - **Ischemia often gradual in onset**
- **Duration**
  - **Ischemia often last for minutes, but usually not > 20-30 minuts**

Diagnostic Approach - History

Clinical impression based on description of pain must be interpreted with other historical aspects
- **Age**
- **Past medical history**
- **Risk assessment**
  - **Framingham risk score**
    - **Age, gender, cholesterol, smoking, diabetes, BP**

Diagnostic Approach - History

The general practitioner — call for action — fast track

- The degree of symptoms is a poor indicator of the patient's risk of having a serious condition.
- The type of chest discomfort (pain), pattern of radiation and concomitant symptoms, such as nausea, sweating and cold, pale skin are valuable signs of a possible serious condition.
- A patient who is haemodynamically unstable (shock, low blood pressure) or who displays an arrhythmia (severe bradycardia/tachycardia) needs immediate attention regardless of the underlying cause.

If a serious, life-threatening condition is suspected:

- Do not lose time in reaching a diagnosis unless there are therapeutic options such as fibrinolysis and a defibrillator available
- Optimize the patient's condition by relieving pain, reducing anxiety and stabilizing any haemodynamic and/or electrical disturbance
- If a heart attack is suspected treatment should be initiated with
  - aspirin
  - short-acting nitrate
  - morphine
  - beta-blocker (bearing in mind heart rate, systolic blood pressure and high degree AV block)
  - and in selected cases based on ECG findings fibrinolytics
- Other treatment may be given on special indications
  - i.v nitrates
  - diuretics

European Heart Journal (2002) **23,** 1153–1176

Diagnostic Approach - History

Table 13 Clinical pre-test probabilities[a] in patients with stable chest pain symptoms[108]

	Typical angina		Atypical angina		Non-anginal pain	
Age	Men	Women	Men	Women	Men	Women
30–39	59	28	29	10	18	5
40–49	69	37	38	14	25	8
50–59	77	47	49	20	34	12
60–69	84	58	59	28	44	17
70–79	89	68	69	37	54	24
>80	93	76	78	47	65	32

ECG = electrocardiogram; PTP = pre-test probability; SCAD = stable coronary artery disease.
[a] Probabilities of obstructive coronary disease shown reflect the estimates for patients aged 35, 45, 55, 65, 75 and 85 years.
- Groups in white boxes have a PTP <15% and hence can be managed without further testing.
- Groups in blue boxes have a PTP of 15–65%. They could have an exercise ECG if feasible as the initial test. However, if local expertise and availability permit a non-invasive imaging based test for ischaemia this would be preferable given the superior diagnostic capabilities of such tests. In young patients radiation issues should be considered.
- Groups in light red boxes have PTPs between 66–85% and hence should have a non-invasive imaging functional test for making a diagnosis of SCAD.
- In groups in dark red boxes the PTP is >85% and one can assume that SCAD is present. They need risk stratification only.

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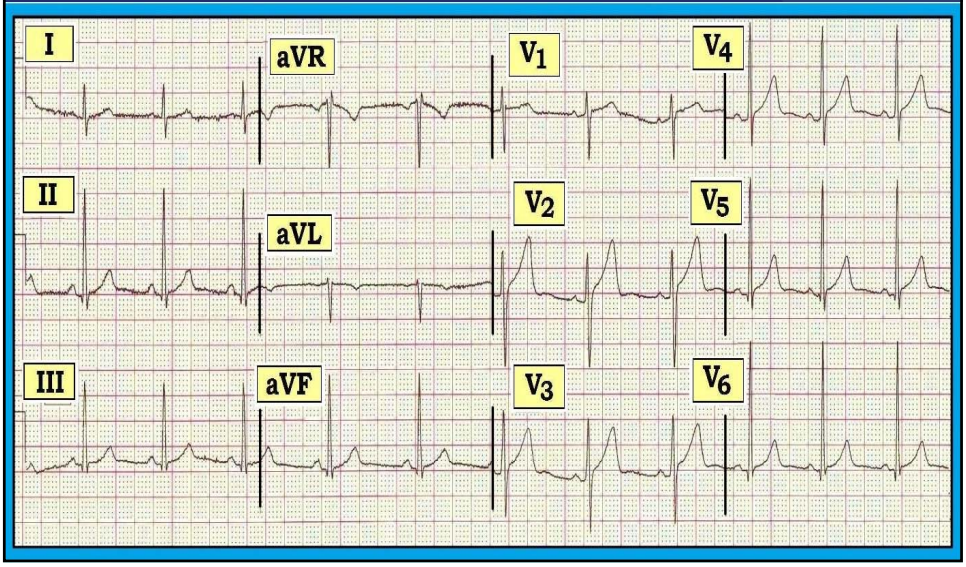
Diagnostic Approach – Physical Exam

- Vitals and O2 saturation
  - BP both arms if concern for aortic dissection, etc.
- Cardiac exam
  - Rhythm
  - Murmurs
  - S3 or S4
  - Rub
- Pulmonary exam
  - Breath sounds symmetric?
  - Abnormal breath sounds (wheezes, rales, etc.)
- Musculoskeletal and skin exam
  - Palpation
  - Rash
- Abdominal exam
  - RUQ pain
  - Abdominal aorta (pulsatile mass?)

Electrocardiogram



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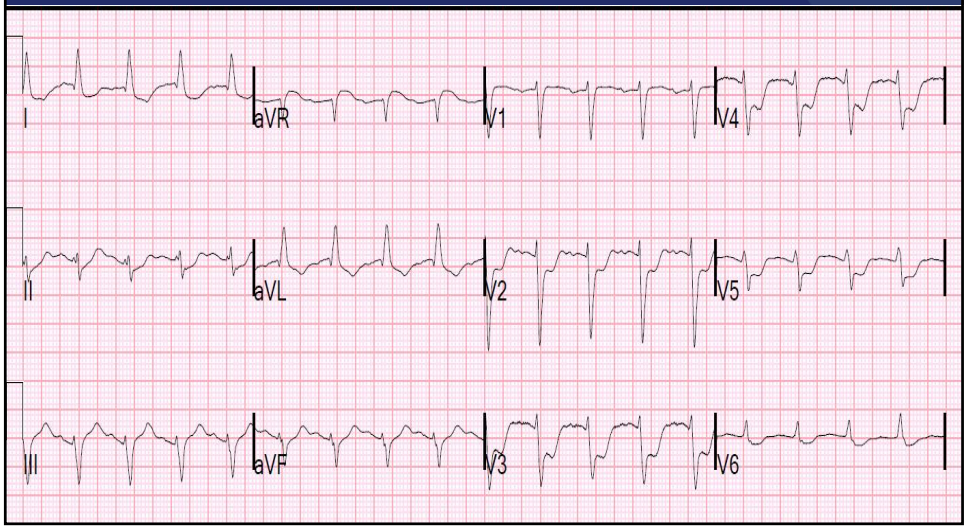

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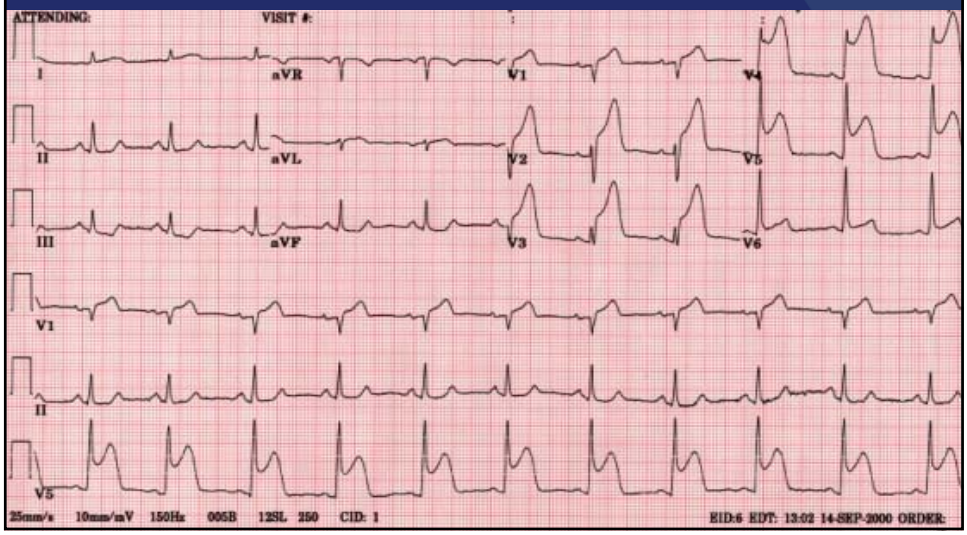

Diagnostic Algorithm

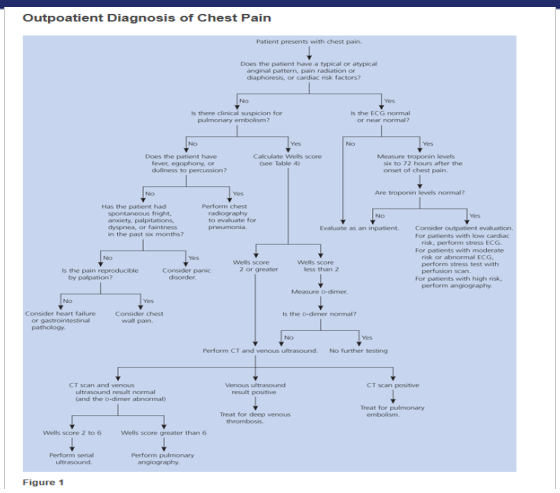

Figure 1

Am Fam Physician. 2005 Nov 15;72(10):2012-2021.

Diagnostic Algorithm

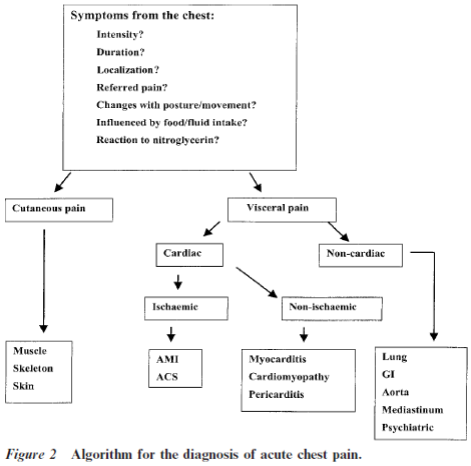

Figure 2 Algorithm for the diagnosis of acute chest pain.

European Heart Journal (2002) **23,** 1153–1176

Who to Refer? – Life threatening etiology

The general practitioner — call for action — fast track

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Who to Refer? – Stable angina

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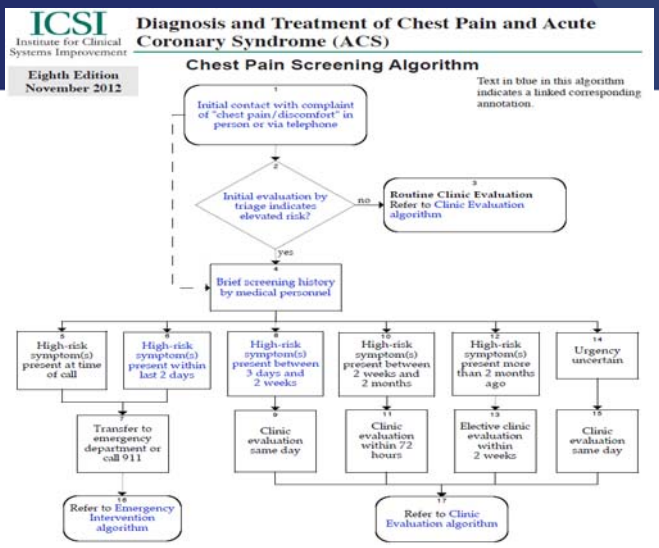
Algorithms



Davis T, Bluhm J, Burke R, Iqbal Q, Kim K, Kokoszka M, Larson T, Puppala V, Setterlund L, Vuong K, Zwank M. Institute for Clinical Systems Improvement. Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS).

Algorithms

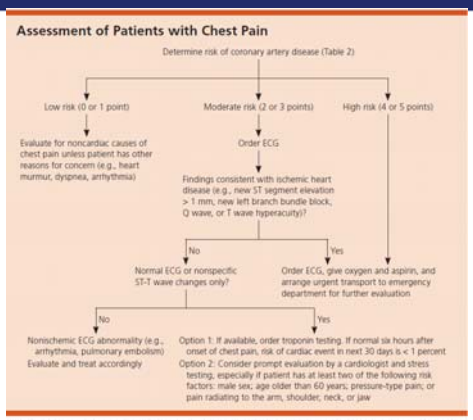


Figure 1. Algorithm for the evaluation of patients with chest pain in the primary care setting. (ECG = electrocardiography.)

American Family Physician. March 1, 2011 ◆ Volume 83, Number 5. Pages 603-605

Thank You