

Assessing Chest Pain in the Office

Patients with chest pain who present to their primary care physicians worry as to the cause of their discomfort. In this article, Dr. Josephson, uses three examples of assessing an office patient with chest pain and provides readers with points to consider in order to properly diagnose coronary artery disease.

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“Chest pain often makes the patient, as well as the doctor, concerned about the possibility of manifestations of [ischemic] heart disease, [such as] angina pectoris or MI.”¹ However, although as much as 1.5% of primary care consultations are for chest pain, only 17% of these are associated with definite or possible angina.¹

Therefore, when patients present to your office with chest pain and would like to know if they are going to have a heart attack, there are several simple points to investigate:

Assessment

1. Patient's age

Patients < 40 years are unlikely to have coronary disease as an etiology for chest pain, unless they have significant risk factors. The diagnosis should be seriously considered in any patient > 65 years.

2. Patient's gender

Males are more likely to have coronary disease than premenopausal females.

3. Patient's history

Consideration of coronary artery disease (CAD) risk factors can be helpful. CAD risk

Bill's Burning Pain

Bill, 60, comes to you with a six-month history of burning chest pain on his left side. He explains that this burning sometimes occurs when he walks his dog after supper, but that it occasionally occurs when he is resting or experiencing mental stress. The burning usually lasts for 10 minutes to 15 minutes and is relieved with rest.

Bill's history shows that he has:

- gastroesophageal reflux disease,
- normotensive BP with the help of anti-hypertensive treatment,
- total/HDL-cholesterol is 4.5,
- normal fasting blood sugar and
- no family history of premature coronary artery disease (CAD).

His physical exam is normal. You find that his resting ECG demonstrates sinus rhythm and is normal.

What do you do?

Bill appears to be at intermediate risk of having CAD and he needs further testing. A standard stress test would be a reasonable approach.

For another case, go to page 33.

About the author...

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factors include:

- hypertension,
- smoking,
- a family history of premature CAD (men < age 55 and females < age 65),
- hyperlipidemia and
- diabetes.

Typical angina, with multiple risk factors, makes the likelihood of coronary disease, as an etiology of chest pain, highly likely. Non-anginal pain associated with minimal risk factors makes coronary disease an extremely unlikely cause (Table 1 and Figure 1).

4. Presence of diabetes

Diabetes is an especially important consideration in that ischemic heart disease is the major cause of mortality in people with diabetes. The proportion of patients with cardiovascular disease increases with the duration of Type 2 diabetes (Figure 2 and Figure 3).

5. Physical examination

The physical exam can be helpful in detecting coronary disease, especially if there is evidence of other vascular disease manifested by:

- carotid bruits,
- femoral bruits, or
- reduced or absent pedal pulses.

However, always remember that a normal exam does not rule out CAD.

6. ECG

A resting ECG should be done on all patients. Although ischemic changes on a resting ECG increases the likelihood of coronary disease, a normal resting ECG does not rule out CAD. As well, there is a significant incidence of repolarization abnormalities in otherwise healthy young women.

Connie's Chest Pressure

Connie, 66, has a 15-year history of non-insulin dependent diabetes mellitus. She comes to you with a six-month history of central chest pressure that is consistent with exertion. This pressure is relieved with rest.

Connie reveals the following to you:

- She quit smoking two years ago (*i.e.*, a pack of cigarettes a day for 50 years)
- She is hypertensive and hyperlipidemic
- She has no family history of CAD
- She has right carotid bruit (no central nervous system symptoms)
- Her resting ECG is normal

What do you conclude?

Connie clearly has angina. She does not need further testing or referral to confirm the diagnosis. She should be aggressively treated with medical therapy (β -blockers, acetylsalicylic acid, statins and an angiotensin-converting enzyme inhibitor). If, despite treatment, her angina is still interfering with her quality of life and/or she cannot tolerate the medications, or her angina progresses, she should be referred to a specialist for further assessment or to investigate different treatment options.

For another case, go to page 36.

Table 1

Classification of chest pain

Definite and/or typical angina:

- typical quality (retrosternal, pressure-like), duration (> 5 minutes but < 30 minutes),
- provocation by exertion or emotional stress and
- relief by rest or by taking nitroglycerine.

Possible and/or atypical angina:

- presents with two-thirds of the above characteristics.

Non-anginal chest pain:

- presents with one or none of the above characteristics of definite and/or typical angina.

Table 2

Pretest probability of CHD and accuracy of exercise test³

Clinical history	Gender	Prevalence of CHD	False positive	False negative
Definite angina	Male	89%	4%	65%
	Female	63%	27%	23%
Probable angina	Male	70%	13%	44%
	Female	40%	46%	22%
Nonischemic chest pain	Male	22%	91%	14%
	Female	5%	94%	5%

CHD: Coronary heart disease

The Coronary Artery Surgery Study examined, in part, the pretest probability of CHD and the accuracy of exercise testing among patients presenting with complaints of chest pain. The exercise test was considered positive when there was ≥ 1 mm ST segment depression or elevation for at least 0.08 seconds, compared to the baseline ECG. When patients were divided into subgroups based upon gender and the quality of their chest pain complaints, the pretest probability of CHD (as determined by coronary angiography) varied between 5% and 89% and the false positive and negative rates of exercise testing varied between 4% and 94% and 5% and 65%, respectively. The higher false positive rate in women, compared to men, could be explained by the lower prevalence of CHD in women.

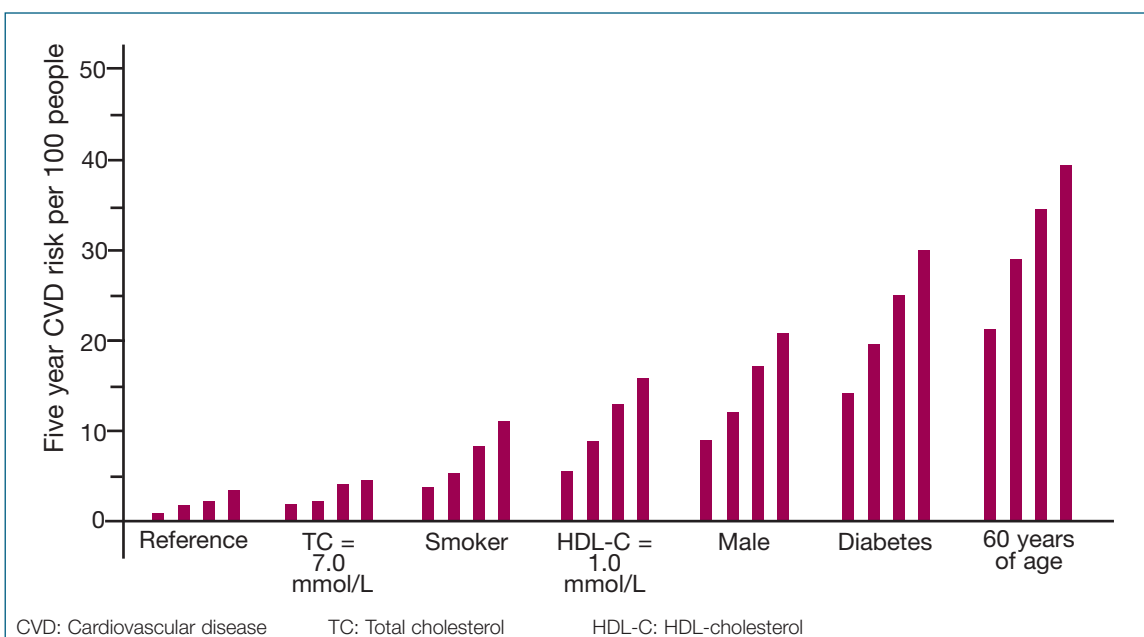


Figure 1. Cumulative absolute risk of CVD at five years³

Cumulative absolute risk of CVD at five years, according to systolic BP and specified levels of other risk factors. The reference category is a nondiabetic, nonsmoking 50-year-old woman with a serum TC of 54 mg/dL (4.0 mmol/L) and HDL-C of 62 mg/dL (1.6 mmol/L). The CVD risks are given for systolic BP levels of 110 mmHg, 130 mmHg, 150 mmHg and 170 mmHg. In the other categories, the additional risk factors are added consecutively. For example, the diabetes category is a 50-year-old diabetic man who is a smoker and has a TC of 7.0 mmol/L and HDL-C of 1.0 mmol/L.

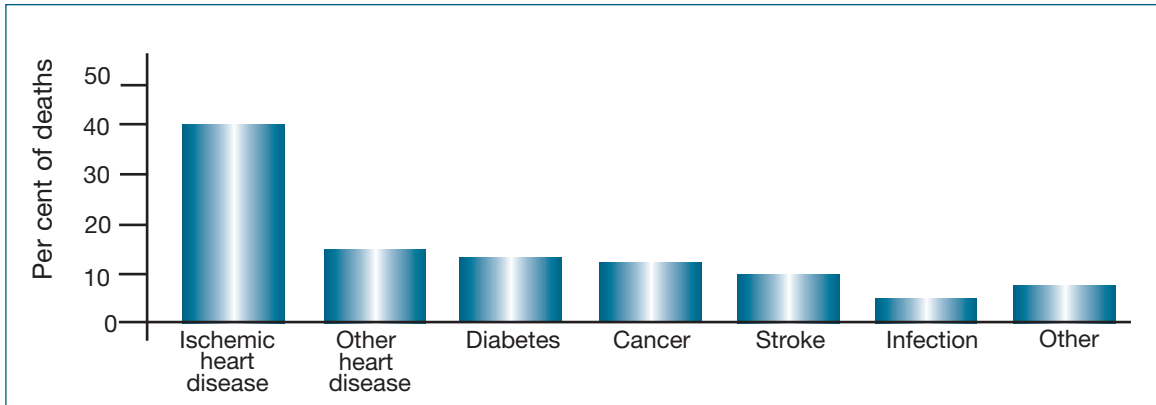


Figure 2. Mortality in people with diabetes: Causes of death

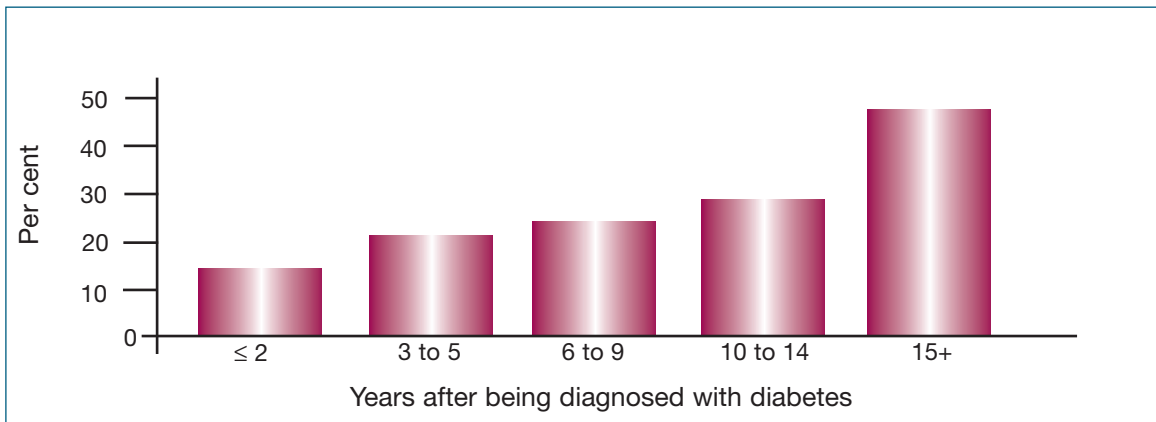


Figure 3. Proportion of patients with CVD increases with the duration of Type 2 diabetes

Summary

One can accurately diagnose a patient's chest pain as either that of low-risk, intermittent-risk or high-risk for CAD by properly performing the following:

- Careful classification of the chest pain
- A complete patient history is taken
- A careful physical examination is done
- Basic lab work is performed
- A resting ECG is taken

Diagnosing the degree of a patient's chest pain is important because it determines how to proceed with regards to further testing or referral.

Although as much as 1.5% of primary care consultations are for chest pain, only 17% of these are associated with definite or possible angina.

Stacey's Stabbing Pain

Stacey, 33, presents to your office with stabbing chest pain on her left side. The pain usually occurs for a few seconds when she is resting, but it can also occur when she uses her arms.

Stacey's history, physical exam and tests reveal the following:

- She is a non-smoker
- Her father had a coronary artery bypass graft at the age of 70, but there is no other family history of CAD
- Stacey's physical exam is normal
- Her cholesterol and blood sugars are at normal levels
- Her resting ECG demonstrates sinus rhythm, with minor inferior T wave changes

What do you conclude?

She has atypical pain and is clearly low-risk for coronary disease.

What do you do?

You should do nothing other than reassure her that her heart is normal and that this is not the cause of her pain.

The proportion of patients with cardiovascular disease increases with the duration of Type 2 diabetes.

Frequently asked questions

Who needs a stress test?

Low-risk patients have a significant false positive rate, often leading to unnecessary and possibly risky tests (Table 2). Also, the longer the elapsed time before a lack of CAD is proven; the less likely patients are able to accept that there is nothing seriously wrong with them. Therefore, stress testing is unnecessary for low-risk patients.

Intermediate-risk patients should undergo some form of stress testing for diagnostic purposes, before embarking on therapy, as long as they are not felt to be unstable.

A negative test in a high-risk patient does not rule out CAD and may lead to a false sense of security. High-risk patients should be treated for CAD and only then tested for prognosis or response to therapy.

Who needs a nuclear/echo stress test as a first step?

Individuals require a nuclear/echo stress test as a first step in the diagnosis of their chest pain if they:

- cannot exercise,
- have left bundle branch block,
- have pre-excitation,
- have resting ST depression,
- have left ventricular hypertrophy,
- take digoxin and/or have a pacemaker.

When should I refer a patient with chest pain?

Patients should be referred to a specialist if:

- New Class III-IV typical angina is present. They should be immediately referred or sent to the ED and promptly started on treatment

- There is clinical evidence of severe concomitant valvular disease, such as aortic stenosis or mitral regurgitation, or if there is evidence of heart failure
- Typical angina is present and the patient is not satisfied with his/her exercise tolerance, despite medical therapy, or is intolerant of medications
- The patient is at intermediate-risk and they do not have direct access to non-invasive testing


Who should receive a CT coronary scan?

A 64-slice CT scan, if available, provides consistently good image quality of the coronary arteries. However, the patient needs to have a sinus rhythm between 40 bpm and 60 bpm; hence, patients may need to be acutely β -blocked.

Physicians should note that extensive calcification and stents may hinder stenosis detection in a CT scan. Moreover, predictive value for coronary events is unknown.

Because of the high negative predictive value of a 64-slice CT coronary scan, it may be most valuable in patients with ongoing symptoms, who are at low-risk, in order to avoid more invasive procedures.

Conclusion

In summation, the more risks your patient has, the more likely it is that they have CAD. Yet, having risk factors for coronary disease does not necessarily mean the patient's pain is related to coronary ischemia. 

Take-home message

- A careful history and physical exam, along with an assessment of cardiac risk factors, should differentiate patients who present with chest pain into low, intermediate and high-risk for having CAD
- Low-risk patients should be reassured that they are fine. Intermediate-risk patients should undergo further testing and high-risk patients should be aggressively treated for CAD and referred if symptoms do not improve or progress
- A 64-slice coronary CT scan may be useful in low-risk patients with ongoing symptoms due to its high negative predictive value

References

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