Ischemic Heart Disease

Evaluating for Potential Disease in the Previously Undiagnosed, Those Experiencing Angina, and in Those with Stable Disease

Craig Hricz, MPAS, PA-C[a,b,*]

KEYWORDS

- Ischemic heart disease • Stress testing • Coronary artery disease
- Medical management

KEY POINTS

- Determining the appropriate modality for evaluating the patient with potential or existing coronary artery disease is discussed.
- Understanding the advantages and limitations of the various coronary artery disease modalities allows the provider to select the appropriate test and maximize the accuracy of the results.
- The provider should be comfortable with how and when to assess for advancement of coronary artery disease in the patient with an established history.
- Once a diagnosis of coronary artery disease is established, the provider must use the latest recommendations to initiate appropriate medical therapy to slow progression of the disease and improve quality of life.
- The provider should be able to make appropriate adjustments to medical therapy and order the appropriate imaging modality for patients with longstanding coronary artery disease when there is a change in symptoms.

A 55-year-old man presents to the office for evaluation of chest pain. His electrocardiogram (ECG) is unremarkable; however, his described symptoms and his known risk factors make the provider concerned that this could be due to coronary artery disease (CAD). What is the most appropriate testing modality to order? What if the patient has known CAD and is experiencing anginal equivalent pains or has been without symptoms for an extended period? These are common scenarios that the primary care

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[a] School of Physician Assistant Studies, Massachusetts College of Pharmacy and Health Sciences, 1260 Elm Street, Manchester, NH 03101, USA; [b] Emergency Department, Wentworth-Douglass Hospital, 789 Central Avenue, Dover, NH 03820, USA
* School of Physician Assistant Studies, Massachusetts College of Pharmacy and Health Sciences, 1260 Elm Street, Manchester, NH 03101.
E-mail address: craig.hricz@mcphs.edu

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or physician assistant in cardiology encounters on a frequent basis. Having a comfortable knowledge of what diagnostic studies are available, how they are performed, and the basic indications and contraindications of each are essential to providing the patient with the most appropriate and accurate work-up. Once a diagnosis is established, the provider must be familiar with the recommendations for aggressive medical management to minimize further progression of disease.

NONINVASIVE STRESS TESTING MODALITIES: STRESSING METHODS

The following sections summarize the methods used to increase a patient's cardiac demand which, if cardiac in nature, should result in a reproduction in the patient's symptoms and ECG changes consistent with a coronary artery occlusion.

Exercise (Treadmill) Electrocardiogram Stress

Overview

The exercise stress test is the most widely used modality for stress testing. The test can be performed by having the patient walk on a treadmill or by using a stationary bicycle while having ongoing ECG monitoring and blood pressure measurements during each stage of exercise. Both ECG and blood pressure monitoring are continued for at least 5 minutes after completion of exercise.[1] Several protocols have been developed for conducting the exercise stress test, with the Bruce protocol being the most widely used.[2] After completion, the results are analyzed using a prognostic scoring tool, the most popular being the Duke Treadmill Score, which determines the patient's level of risk as low, intermediate, or high.[3]

Indications

Exercise testing is most commonly used to assess for the possibility of CAD as the cause of concerning symptoms in a patient determined to be in the intermediate pretest probability (PTP) category. Other uses include assessing a patient's response to therapeutic interventions, such as initiation of anti-ischemia therapies or after a revascularization procedure; assessing the possible need for a revascularization procedure in high-risk patients with known CAD; and as a preoperative screening when noncardiac surgery is planned in patients with known CAD or risk factors.[1]

Contraindications

Absolute contraindications include ongoing unstable angina, uncontrolled heart failure or hypertension or arrhythmia, symptomatic aortic stenosis, or severe pulmonary hypertension. The patient should also not have any ongoing pericarditis or myocarditis and, as with other stress modalities, pulmonary embolism and aortic dissection should be excluded from the differential as the cause of the symptoms. Relative contraindications include known left main coronary artery stenosis, outflow tract obstruction, extremes of heart rate, high-degree atrioventricular (AV) block, and abnormal potassium or magnesium levels. The study should be terminated if angina, near-syncope, cyanosis, sustained tachycardia, or significant ST-segment depressions or elevations occur.[1]

Pharmacologic (Chemical) Stress

Overview

This test involves the IV administration of either a vasodilator or a medication with positive inotropic or chronotropic effects in combination with an imaging modality (see later discussion) rather than exercise. Imaging is a necessary component to increase the sensitivity compared with just ECG monitoring. The patient should not eat for at least 2 hours before start of the test and should avoid caffeine and dipyridamole