



## The *Heart* of the Matter

Cardiology Associates, P.C.

Tuesday, September 14

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### A Message from Cardiology Associates, P.C.



Dear Colleagues,

The September issue of our Referring Physician Newsletter focuses on nuclear stress testing and when it should be utilized for diagnosis of coronary artery disease. Many patients with significant coronary artery disease don't know of their disease until their first myocardial infarction. Early detection of coronary artery disease before the first cardiac event is the goal of all clinicians. There are preventative therapies available that can reduce both the morbidity and mortality related to coronary artery disease, and nuclear stress testing has become an invaluable tool in achieving this goal. When used in appropriately selected patients, nuclear stress testing has proven to be both accurate and cost effective in risk stratification for the diagnosis of coronary disease.

#### **About the Author:**

Kelley W. Sullivan, MD has been a member of Cardiology Associates, P.C. since 1999. She is a board-certified consultative cardiologist with special interests in cardiac imaging, preventive cardiology, and early detection. She holds sub-specialty board certifications in both Nuclear Cardiology and Echocardiography. Dr. Sullivan is the Director of our ICAEL accredited echo labs in our Annapolis, Bowie and Kent Island office locations.

Dr. Sullivan graduated from the University of Maryland School of Medicine and completed her residency at the Medical College of Virginia in Richmond and her fellowship at Emory University Hospitals in Atlanta, Georgia. She is a Fellow in the American College of Cardiology and is a member in the American Medical Women's Association and the Women and Heart Disease Program.

### FOCUS ON NUCLEAR STRESS TESTING



#### **A Shark in the Water: Detecting Coronary Disease Before it Strikes**

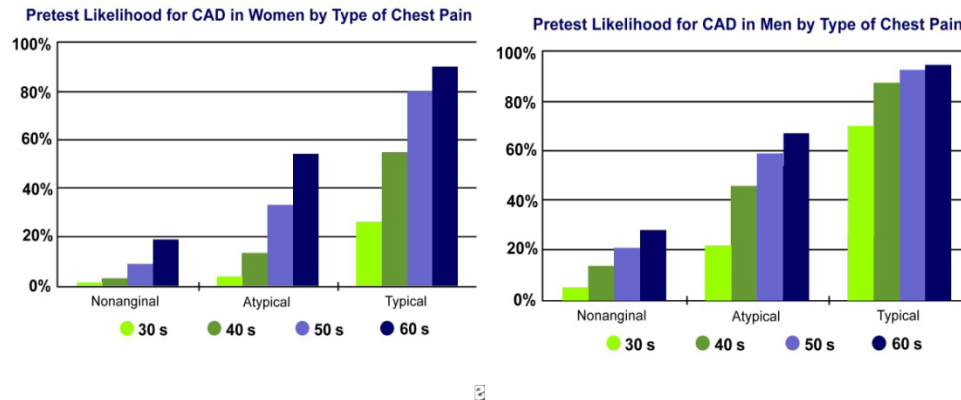
The key to testing accuracy is pre-selecting those patients with an intermediate to high pre-test probability of disease that would benefit from the addition of imaging as compared to traditional exercise tolerance testing. Although there are several methods of determining risk, a commonly used method was published by Diamond and Forrester 1.

Pre-test probability was based on age, gender and symptoms. Chest pain was characterized as

being typical, atypical, or non-cardiac based on three questions:

1. Is the pain retro-sternal?
2. Is it precipitated by stress?
3. Is it relieved by nitroglycerine?

Typical chest pain has all three characteristics, atypical two out of three, and non-cardiac one or less out of three.



Other risk factors are also used such as the determination of 10-year risk of CHD by ATP III guidelines and also determining those in a high risk category because of the presence of diabetes mellitus, peripheral vascular disease, or cerebral vascular disease. Patients with a prior history of myocardial infarction or ECG evidence of prior MI would also be considered in a high pre-test probability of significant disease.

For the primary provider, the most common indications for referral for nuclear stress testing suggested by current guidelines 2 would include:

1. Detection of Coronary Artery Disease
  - o Patients with intermediate pre-test probability of CAD based on age, gender, and symptoms
  - o Patients with high risk factors for CAD such as diabetes mellitus, cerebral or peripheral vascular disease
  - o Asymptomatic patients with and Agatston coronary calcium score greater than 400
  - o Asymptomatic patients with risk factors for CAD and an Agatston score between 100 and 400
2. Risk stratification before intermediate risk non-cardiac surgery to include:
  - o Patients with known CAD
  - o Patients with poor functional capacity (< 4 METS)
  - o Patients with high risk factors [e.g. compensated or prior heart failure, cerebral vascular disease, diabetes mellitus (requiring insulin) or renal insufficiency (creatinine >2.0)]
3. Evaluate response to therapy in patients with known CAD

Based on the pre-test risk assessment, the selection of the appropriate test can be made more easily.

- For patients with a low pre-test probability of disease, counseling about risk factor modification is all that is needed.
- For patients with a low to intermediate risk, a normal baseline ECG, and the ability to walk on a treadmill and achieve a HR greater than 85% of their age-predicted maximum HR, then exercise tolerance testing without imaging is indicated. One must

always keep in mind that false positive exercise ECGs are seen with greater frequency in women and those patients with HTN, hypokalemia, and those taking digoxin.

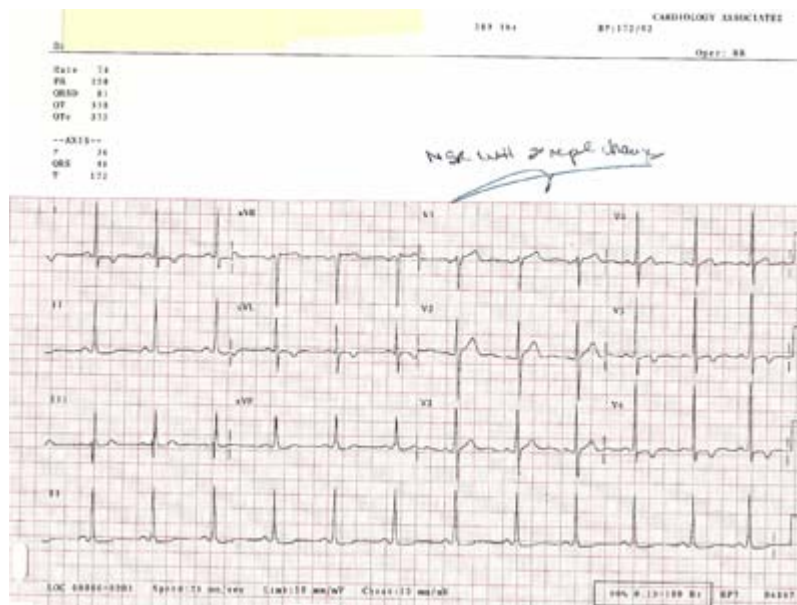
- For those patients with a positive stress test, intermediate to high pre-test probability of disease, abnormal baseline ECG, or are unlikely to achieve their target HR, then nuclear stress testing is the appropriate choice with excellent prognostic value in this selected population.

See the following Case Presentation.

## Case Presentation:

64-year-old woman with HTN, hyperlipidemia and atypical chest pain.

A 64-year-old woman presents to the office with a 2-week history of an occasional sensation of epigastric and lower sub-sternal discomfort that is not associated with activity, shortness of breath, or diaphoresis; but it seems to occur more in the late evening hours while watching television. On one or two occasions, she has experienced a vague pressure-like sensation in her epigastric area when carrying her laundry up the stairs. She is morbidly obese with a 10-year history of treated hypertension and hyperlipidemia. Her mother had a myocardial infarction at the age of 60. Her mother was a smoker. The patient is a non-smoker and has no history of diabetes mellitus. Her baseline ECG is shown below:



64 yo with HTN, hyperlipidemia and atypical chest pain

Because of her cardiac risk factors but atypical symptoms, she was determined to have an intermediate pre-test probability of coronary disease and was scheduled for exercise tolerance testing. However, her baseline ECG abnormalities precluded regular stress testing, and she was scheduled for a nuclear stress test. During her exercise test she had a hypertensive response to exercise with a peak blood pressure of 200/98 mmHg. She was able to reach her target heart rate; however, the test was stopped at the patient's request because of exertional dyspnea. Initial nuclear images showed a fixed distal anterior wall defect likely due to breast attenuation artifact. With prone imaging, this defect resolved and the entire anterior wall appeared normally perfused. The patient's left ventricular ejection fraction was 60% by gated SPECT images. Her antihypertensive regimen was intensified and the patient was encouraged to exercise not only to lose weight but also to improve her overall level of cardiovascular conditioning.

Ultimately guidelines are just suggestions for doctors to follow. We have all treated patients that do not fall neatly into these categories, such as patients with suspected "ischemic equivalent" symptoms. These are situations when it is the physician's best judgment that determines the most appropriate test for their patient.

1. Diamond, GA, Forrester, JS Analysis of probability as an aid in the clinical diagnosis of coronary artery disease. NEJM June 14, 1979; 300(24):1350-8
2. Hendel et al. Appropriate Use Criteria for Cardiac Radionuclide Imaging JACC June 9, 2009;53(23):2201-29

All of our physicians are Board Certified in Cardiology and several of them have sub-specialty Board Certification in Nuclear Cardiology. We are pleased to inform you that all of our nuclear medicine labs in Maryland and Washington, DC are accredited by ICANL (Intersocietal Commission for the Accreditation of Nuclear Medicine Laboratories.)

## Our Locations

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