Stress tests and echocardiograms are investigations that are utilized for a wide variety of indications. In many cases the test is part of a comprehensive assessment of a patient carried by a cardiologist, surgeon or internist. However in certain instances these tests may be employed by a family physician to answer a single diagnostic question. If the interpretation of the test is straightforward, and the diagnostic value high, efficiency of patient management increased. To this end, the Division of Cardiology is suggesting specific types of patients in whom stress testing or echocardiography will be useful to family physicians. This document provides a guide to patient selection as well as patient management based on test results. Patient selection criteria will also be clearly spelled out on a special requisition to be used by family physicians.

**STRESS TESTING**

**PATIENT SELECTION**

Using the criteria described in the preamble, we arrived at a set of characteristics which describe patients for whom a family physician might order a stress test. The literature shows that a stress test is most likely to be helpful in patients with an intermediate pretest likelihood of having coronary artery disease. If patients have a high pretest likelihood, a positive test would only confirm the clinical impression, while a negative test is likely to be a false negative. The most efficient management of such patients consists of the starting of anti-anginal medications and direct referral to a specialist, rather than the ordering of a stress test. If patients have low pretest likelihood of coronary disease, a negative test simply confirms the clinical impression, while a positive test is likely to be false positive.

For family physicians ordering of stress tests in the NSHA Central Zone, we will consider patients to have an intermediate pretest likelihood of coronary artery disease if all of the following criteria apply:

- Patient has atypical angina
- There are 1-2 risk factors for coronary artery disease
- Age 40-60 years if male and 50-70 if female
Typical Angina, Atypical Angina and Non-Anginal Chest Pain

Typical angina pectoris, as every physician knows, is exertional chest, jaw, or arm discomfort lasting at least a few minutes. If these features are not all present, or if the pain often occurs at rest, if it is very localized, or if it lasts only a minute or two, the pain can be considered atypical angina. The term atypical angina can also be used if there are features of angina but also features of another disorder such as anxiety, musculoskeletal pain or gastroesophageal reflux. Non-anginal pain which lasts less than a minute or has occurred for hours on end on multiple days or has absolutely no relationship exertion.

Risk factors for Coronary Artery Disease

Risk factors are significant dyslipidemia (LDL greater than 4 and/or HDL less that 0.8), diabetes, hypertension, smoking, or premature coronary disease in first degree relatives (age of less then 55 in men and less then 65 in women). We have arbitrarily suggested one or two risk factors, since patients with zero risk factors and non-anginal pain are likely to have a low pretest likelihood of coronary artery disease, especially in the lower end of the age ranges suggested. On the other hand, many risk factors in the upper end of the age ranges are associated with high pretest probability of coronary disease.

READING STRESS TEST REPORTS

Stress test reports will provide the following key information:

Exercise protocol: Bruce protocol (treadmill speed and incline increase every 3 minutes), modified Bruce protocol for patients who are frail or have difficulty walking, RAMP protocol for rehab programs. Regardless of the protocol, end points, target heart rate for a diagnostic test, ECG criteria for a positive test and workload measurement are the same.

End point(s): Chest pain or other symptoms that prevent further exercise or ST depression indicative of a positive stress test or target heart rate is achieved (85% of age predicted maximum rate)

ST segment change: 1mm or more of horizontal or down sloping ST depression indicates a positive stress test

Workload measurement: Measured in METS (metabolic equivalents). Functional class I is greater than 7 METS, Functional Class II is 5-7 METS, Functional Class III is 2-5 METS. A fit individual with no cardiorespiratory problem can usually can get to 10 METS or higher.
TYPES OF TEST RESULTS

- Positive test
- Positive test in the absence of chest pain
- Negative test (no chest pain or ST depression provided target heart rate is reached)
- Negative test but with chest pain
- Non-diagnostic test since target heart rate not reached
- Non-diagnostic test since ECG difficult to interpret because of left bundle branch block, paced rhythm or resting ST changes

WHAT TO DO WITH A TEST RESULT

Positive test with or without chest pain - Start aspirin, a statin and an antianginal and refer to cardiologist or internist.

Negative test – Reassure patient, no need to refer to cardiologist if pain continues to be nonanginal or atypical.

All other test results – Refer to a cardiologist or internist if patient continues to have chest pain. May not need to refer if pain has resolved and 75% of target heart rate was achieved and/or workload was 7 METS or higher.

Findings which are of questionable significance

Hypertensive or exaggerated blood pressure response.

Dyspnea in the absence of cardiac ischemia. At relatively low workloads (< 5 METS), this is likely due to poor fitness or lung disease. However, other contributing factors should be considered. These include atrial fibrillation, left ventricular dysfunction, severe hypertension, pulmonary hypertension or valve disease.

Frequent ventricular ectopic beats. Atrial ectopic beats or a few ventricular ectopies may be ignored.
ECHOCARDIOGRAPHY FOR FAMILY PHYSICIANS

Since echocardiography can be used to look at many different conditions and since the indication for echocardiography in these conditions can be quite variable, it was decided to begin echocardiography access for family physicians with a single indication – previously undiagnosed murmur. The ACCC/AHA guidelines for echocardiography in an asymptomatic patient with a murmur states that there is a Class I indication if the murmur has any of the following characteristics – diastolic, continuous, late systolic, associated with ejection clicks, those that radiate to the neck or back and Grade III or louder murmur. On the other hand, there is little or no indication for ordering echocardiography in patients with systolic murmurs considered innocent. A murmur can be considered innocent if all of the following criteria are met – Grade II or softer, disappears when the patient goes from supine to standing, no associated symptoms and no family history of valve disease.

Interpretation of Reports

There are a number of findings on echocardiography which have no clinical significance. These are listed below. If the echo report indicates any abnormality apart from these, patient should be referred to a cardiologist or internist.

Echo Findings of no Clinical Significance

Trivial (trace) or mild valvular regurgitation with a structurally normal valve. This is a very common finding in the general population and represents a normal variant.

The following valve findings – aortic valve sclerosis, mild thickening, mild or focal calcification, minor degenerative changes, mitral annular calcification.

Minor congenital abnormalities – large or giant Eustachian valve, Chiari network

Mild left ventricular diastolic dysfunction

Mildly dilated atria

Mild dilation of ascending aorta (3.2 to 3.5 cm)

Robbie Stewart
Director, Noninvasive Cardiology Laboratories