

# CARDIAC CONSIDERATIONS OF THE PODIATRIC PATIENT

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This paper is not meant to be a detailed description of every cardiovascular problem that may present itself, but instead a practical approach to the podiatric patient who may have an underlying cardiovascular problem.

## **CARDIOVASCULAR HISTORY**

In spite of all the recent advances in high-tech diagnostic modalities, the patient's history is still the richest source of information. Therefore, the patient's history is a logical place to begin. In pursuing the cardiovascular history, there are five areas which should be carefully evaluated: chest pain, palpitations, dyspnea, hypertension and risk factors.

### **Chest Pain**

When asking a patient about chest pain or tightness, the character, location, and factors provoking the uncomfortable sensations should be delineated. Since there are many types of chest discomfort, it is sometimes difficult to differentiate the discomfort that is consistent ischemic heart disease (angina pectoris) from other etiologies. In terms of the character of the pain, a constricting, squeezing or "heavy feeling" in the chest is usually consistent with an ischemic origin. This is in comparison to a sharp knife-like stabbing or jabbing pain which is most often due to some cause other than ischemia.

Angina pectoris is the chest discomfort which is secondary to coronary artery disease. The discomfort is usually substernal but can radiate across the mid thorax to both arms, shoulders,

neck, chest, teeth, forearms, and infrascapular region. Angina is less likely to be isolated to the left submammary or left hemithorax.

Another important consideration in the evaluation of chest pain is its timing. Angina pectoris usually occurs during the actual exercise, excitement, or other stressful activity as opposed to other types of chest pain which sometimes occur after the completion of the exercise. The duration of the discomfort is also important. Most episodes of angina last five to ten minutes per occasion, but may last slightly longer. A patient that describes pain that has lasted "all afternoon over the last three days" is usually not having angina pectoris, but rather some other noncardiac origin of chest pain. It should also be remembered that in most cases, angina is not painful. It can also be described as an unpleasant sensation, or merely an awareness of a mild tightness in the previously described areas.

Even in patients with known coronary artery disease and angina, the severity and frequency should be put in perspective prior to any elective surgical procedure. Obviously, a new onset of angina or the presence of unstable angina warrants further evaluation and treatment prior to any elective surgical procedure. Those individuals with well-controlled chronic, stable angina may be perfectly safe to proceed with their elective procedure after a basic cardiovascular evaluation.

### **Palpitations**

The occurrence of palpitations is another clinical condition which should be carefully considered when taking a cardiovascular history. All patients

at one time or another have had "skipped beats". This is an ubiquitous sensation. However, a patient's description of the sensation of sustained tachycardia accompanied by dizziness, light-headedness, near syncope, or syncope may be extremely important and reflect significant underlying tachyarrhythmia. Some of these same symptoms, in the absence of palpitations or sensations with tachycardia may be due to significant bradyarrhythmia. A sensation of a chaotic or irregular fast beating of the heart may represent the onset of atrial fibrillation. Atrial fibrillation with a controlled ventricular response is not a contraindication to any surgical procedure. However, a new onset of atrial fibrillation or atrial fibrillation, with a vast ventricular response needs further evaluation and treatment prior to any surgical procedures.

### **Dyspnea**

The symptom of dyspnea is another important factor which should be evaluated when considering the cardiac history prior to any surgical procedure. Dyspnea, the uncomfortable sensation of breathlessness, can be associated with an extremely wide variety of diseases. There are certain types, however, which are suggestive of congestive heart failure. Dyspnea associated with exertion may represent a cardiomyopathy or significant valvular heart disease. The patient describing orthopnea or paroxysmal nocturnal dyspnea may also have significant cardiomyopathies. The history of dyspnea should always be thoroughly evaluated prior to any surgical procedure.

### **Hypertension**

One should always question the patient about a prior history of hypertension as part of a complete cardiovascular history. It is important to know the duration of the hypertension as well as the method and degree of control in the past. Obviously, if the patient has had hypertension for many years and has been suboptimally controlled or non-compliant with their medications, then he is much more likely to have end organ damage secondary to the disease.

Even in asymptomatic patients, one should always question the patient for the usual risk factors associated ischemic heart disease. The most commonly evaluated factors are hyper-

cholesteremia, tobacco use, family history, diabetes mellitus, and hypertension. Identifying individuals at increased risk for ischemic heart disease and directing them for further evaluation may have a significant impact on their morbidity and mortality.

In those individuals who have known coronary artery disease, a prior history of myocardial infarction is obviously significant. Evaluation of these patients prior to any surgical procedure is particularly important for those undergoing any general anesthesia. Prior to anesthesia and surgery, these individuals should be evaluated for the stability of their angina, their overall ventricular function and for any possible arrhythmias.

## **EXAMINATION**

During examination of the lower extremity, there are signs which may suggest underlying cardiovascular disease. When evaluating and treating a diabetic patient for diabetic ulcers, it should be recognized that cardiovascular disease is the leading cause of death among diabetic patients. Unlike other individuals, diabetic patients often do not have the usual symptoms of angina, and are therefore at high risk for "silent" myocardia ischemia and injury. Peripheral vascular disease also occurs much more frequently in the diabetic patient, with a propensity for the smaller arteries below the knee.

Any patient who presents with significant peripheral vascular disease may have diffuse atherosclerotic cardiovascular disease. Therefore, further evaluation of the vascular status of the lower extremities with doppler flow studies should be initiated, and the patient should be carefully questioned regarding the possibility of coronary artery disease.

Ischemic ulcerations are characteristically seen above the lateral malleolus. These may represent significant underlying hypertensive disease. When these lesions are found, the patient should be thoroughly evaluated for hypertension and any other end organ damage which may have occurred secondary to hypertension. Any individual with both hypertension and diabetes must be included in a group with a dramatic increase in incidence of cardiovascular disease.

Edema of the lower extremities can be due to any number of causes, however, it is a com-

mon finding in patients with congestive heart failure and should lead one to consider this possibility when other similar etiologies have been ruled out. The edema associated with congestive heart failure usually starts in the foot and ankle and then progresses up through the pretibial area and then into the thighs and groin. If the patient is confined to bed, it is usually limited to the posterior area in the thighs. Ambulatory patients will discover that their edema is usually worse at the end of the day and better when they rise in the morning, after having been in the horizontal position all night. The presence of this pitting edema should stimulate further discussion regarding other symptoms of congestive heart failure such as dyspnea, fatigue, weakness, or exercise exertion.

Clubbing of the digits may also suggest cardiovascular disease. This condition is suggestive of central cyanoses and may reflect a cyanotic congenital heart disease or a pulmonary disease with hypoxia.

Osler nodes and Janeway's lesions, as well as petechiae noted on the extremities are all consistent with infective endocarditis. An additional peripheral finding is that of Xanthoma tendinosum. This entity shows nodular swelling of the tendons, notably those on the elbows, hands and achilles tendon. Patients affected usually demonstrate a Type 2 hyperlipoproteinemia.

## **CARDIAC EXAMINATION**

Although a complete cardiac exam is beyond the scope of most podiatrists in an office setting, simple auscultation of the heart can reveal the presence or absence of a murmur or irregular rhythm. Findings of either would warrant further medical evaluation.

## **COMMON CARDIOVASCULAR TOOLS FOR PATIENT EVALUATION**

### **EKG**

Electrocardiogram can establish the diagnosis of a prior myocardial injury. However, it should be noted that not every individual with a prior myocardial infarction has an abnormal electrocardiogram. In fact, approximately 15% of individuals with prior inferior wall myocardial infarctions have had their electrocardiograms return to nor-

mal. It should also be noted that an electrocardiogram only demonstrates prior injury or an acute ischemic change. One can have severe triple vessel coronary artery disease and have an absolutely normal twelve-lead electrocardiogram. Therefore, an abnormal electrocardiogram should definitely stimulate further evaluation and treatment. However, a normal-appearing electrocardiogram does not necessarily represent the absence of coronary artery disease.

A simple, twelve-lead preoperative electrocardiogram will also demonstrate whether the patient is in a normal sinus rhythm. The presence of a significant or high-grade AV block, or any arrhythmia may warrant further evaluation and treatment prior to any elective surgical procedure.

### **2-D Doppler Echocardiogram**

The 2-D Doppler Echocardiogram is an ultrasound of the heart measured in real time with a doppler evaluation of the blood flow through the heart. This is used to evaluate the various gradients across each of the four valves of the heart, as well as to evaluate the left ventricular function and assess for prior myocardial injury.

When a patient has a suspicious electrocardiogram suggesting a prior myocardial injury, a 2-D echocardiogram can quickly establish whether or not the patient has actually had previous myocardial injury. If the patient has had a previous transmural infarction, then a segmented wall motion deficit will be noted on the echo. This study is commonly available in most community hospitals and can be done quickly in the preoperative setting to clear a patient for surgery. It is not uncommon to find a pseudo-infarction pattern on the electrocardiogram which can be quickly clarified by a 2-D echocardiogram and then allow the patient to proceed with their surgical procedure.

The most important information available from the echocardiogram is the overall evaluation of the left ventricular function or ejection fraction. This is particularly true for those patients undergoing general anesthesia. Risks during surgery are directly related to the patient's overall left ventricular function. Anyone with significant deterioration of their ejection fraction warrants further evaluation and treatment prior to any surgical procedure.

In a patient with suspected valvular disease,

the doppler portion of the echo can delineate which of the patient's lesions are hemodynamically significant and which are not.

### **Thallium Exercise Stress Testing**

In the evaluation of ischemic heart disease, the most common screening tool is the thallium exercise stress test. However, since many podiatric patients have impaired or restricted ambulation, an exercise thallium stress test may not be a viable option as part of the preoperative evaluation. The advent of persantine thallium stress testing allows the patient to merely lie in the supine position while the test is performed.

An injection of dipyrimadole (persantine) is given intravenously over approximately four minutes. This redistributes the blood flow through the heart in much the same way that exercise would. At the end of the infusion of the dipyrimadole, thallium is injected intravenously and the initial scintigrams are performed. Two hours later, the same views are re-evaluated to look for any reperfusion abnormalities, thus demonstrating ischemic heart disease. A positive persantine thallium test may lead to further studies such as a cardiac catheterization with coronary arteriography to further delineate the extent of disease.

### **Twenty-Four Hour Halter**

For those patients who have palpitations suggestive of underlying arrhythmias, a twenty-four hour halter monitor can measure two leads of an elec-

trocardiogram in a continuous fashion for a 24-hour period.

There are also devices called event recorders, about the size of a hand-held tape recorder. These devices can be carried by the patient and are placed on the chest during a symptomatic episode to record a thirty-second rhythm strip. The recorder is then placed over a telephone and the recording is transmitted to a central service where it is placed on strip recorder and forwarded to the patient's physician. These devices are particularly helpful for patients who have symptomatic palpitations only every week or two. All the previously mentioned non-invasive tests may be performed relatively quickly on an out-patient basis to better evaluate the patient and his risk in terms of any operative procedure.

### **SUMMARY**

A significant amount of cardiac pathology can be discovered during a careful history and physical examination performed in the office. This process may lead to simple non-invasive tests that will better define the patient's cardiac status. If the results of these tests rule out any significant underlying cardiac disease, then the planned surgical procedures can proceed without delay. If, on the other hand, the findings are positive, then further evaluation and treatment needs to be performed prior to proceeding with any elective surgical procedure, and possibly avoid a significant cardiac complication from a routine elective procedure.