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CARDIAC IMAGING: MORE THAN A PRETTY PICTURE

In many ways the heart is a simple organ. It is a specialized muscle that pumps blood to the rest of the body. That is its only role, but obviously a vital one; making sure it's healthy is critically important.

Hidden and protected behind your sternum the heart is not easily visualized, so we use various tools to image it. Often the first two tests you get to image the heart are a chest x-ray and an electrocardiogram (EKG). The chest x-ray can determine if the heart is enlarged and if the adjacent lungs are affected. The EKG tells us a lot about the electrical system of the heart and indirectly can tell us about heart damage. An EKG is more useful when taken during an episode of chest pain.

By far the most useful tool we have for imaging the heart is the echocardiogram (ECHO). Using safe ultrasound technology, the ECHO gives us very accurate information about the pumping function of the heart (your ejection fraction-normal being 60%), any enlargement of the four heart chambers and

the functioning of the four heart valves. It can be combined with a stress test to look at heart function after exercise. It can also be attached to a probe that is inserted into your esophagus to visualize the valves more clearly. Most recently, handheld cardiac ultrasounds have been used in the emergency department for rapid evaluation and 3-D imaging in the operating room during valve repair.

Radioactive isotopes can be used to image the heart usually during a stress test. These include the nuclear stress test, the MUGA scan and the PET scan. These tests are more expensive and the radiation exposure limits its routine use.

When a problem is identified in the heart our two best imaging tests are the CT scan and the MRI. CT scans are easier to obtain but do require a contrast agent and expose you to radiation. They can give detailed pictures of the heart, the aorta and the vessels that provide blood flow to the heart itself—the coronary arteries. MRI provide similar imaging

but without the radiation. Congenital heart conditions and aortic aneurysms are best seen with this technique.

A powerful screening test for the heart is the coronary calcium score. This simple CT scan of the chest done without an IV or contrast is used to pick up early buildup of plaque (blockages) in the coronary arteries. Stress testing picks up only advanced blockages (greater than 70%). It is best done in patients with a family history of heart disease or those needing to go on statin therapy for high cholesterol. If the calcium score is zero, then statin therapy can be delayed for at least 3 years and a nuclear stress test can often be avoided. Once a calcium score is positive, subsequent tests to check a response to therapy should be avoided as healing and shrinkage of the plaque can actually increase the score. Despite the tremendous value of the test, most insurances do not cover the cost but it can often be done for \$75-150 depending on the facility.

The final imaging tool is the cardiac catheterization (angiogram). This is an invasive test which I have discussed in a previous article (June 2014). Now done most often through the wrist, the small catheter is taken directly to the heart and using a dye, images of the heart chambers, blood vessels and pressure measurements can all be obtained.

Check with your physician which imaging test best suits your needs—and don't forget to ask for a copy of the pictures! ■



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