

Taking the stress out of choosing the right stress test

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Stress tests are good front-line tests indicators of heart disease, but just how good depends on ordering the right one, researchers say.

Thirty percent of all women, for example, have a false positive exercise treadmill test, in which they walk for several minutes at a slightly increasing incline with an electrocardiogram measuring the electrical activity of the heart, they say.

“So if you are female, I put you on a treadmill and the waves that measure the electrical activity of your heart drop. You say, ‘Am I going to die?’” says Dr. Vincent J.B. Robinson, nuclear cardiologist at the Medical College of Georgia and the Veterans Affairs Medical Center in Augusta. “That probably is not the case. But instead of then taking those 30 percent of women to the catheterization lab to look for blood vessel blockages, we put them back on the treadmill this time with a contrast medium so we can see the heart work and possibly with a pharmacologic stress agent as well.”

To help ensure all physicians know the best strategy, a team of MCG cardiologists reviewed the literature on stress tests and wrote a comprehensive article for the October issue of Southern Medical Journal.

“Coronary artery disease is a very, very prevalent condition and every physician, regardless of specialty, has to face the disease one way or the other,” says Dr. Rakesh N. Patel, MCG research assistant who will start a

cardiology fellowship in July. “A lot of stress tests are available to help assess disease. To maximize the sensitivity and specificity, you have to choose the appropriate stress test.” Dr. Patel is the paper’s first author.

The paper, complete with algorithms for doing just that, is followed by a quiz that offers continuing medical education credit.

Pharmacologic stressors, needed by about half of patients getting stress tests, dilate healthy blood vessels but not diseased vessels, which already are maximally dilated. The addition of a radioactive contrast agent enables heart images where segments fed by healthy vessels glow and diseased areas look like black holes, says Dr. Robinson, the paper’s corresponding author.

About one-third of all patients can’t exercise adequately to get good information without those pharmacologic agents. That means being able to walk for at least five minutes and reach 85 percent of maximum age-predicted heart rate: 220 minus age.

“If you can exercise adequately, it increases blood flow to the heart about twofold, so you don’t need pharmacologic agents, which increase blood flow four- to fivefold,” says Dr. Robinson. “An exercise EKG is the test we should try first if it’s feasible.”

However, if a patient can’t walk without pain, shortness of breath or other symptoms that led to testing in the first place, he goes right to stressing the heart with pharmacologic agents. The agents reduce the risk of the test for some patients, because their hearts don’t have to work as hard. In fact, they have been used safely in patients approximately 48 hours after a heart attack, Dr. Robinson says.

Without these agents, exercise EKGs have about a 64 percent probability of picking up disease, leaving lots of room for concern if serious disease

is suspected, he says. “If you perform like an athlete, walk for 12 minutes with no EKG changes, are laughing and have no symptoms, that is a great test. That means your chance of needing revascularization, of having dangerous coronary artery disease that could kill you, is almost zero,” Dr. Robinson says. “But if you puttered along, got to five minutes and had chest pain but your EKG was still normal, you better believe I would go on to do pharmacologic stress with the perfusion agent. The point here is, in a lethal disease, you cannot accept a 64 percent probability of picking up the disease.”

In some patients, such as those with pacemakers, exercise EKGs are not even a first option; pharmacologic stress agents alone must be used to perfuse the heart.

However, the physicians note that the best images are produced in patients who can also exercise, which pulls blood from the abdomen to the heart, resulting in sharper images. In fact, the MCG researchers have shown pharmacologic agents work even better when given after exercise has started.

Picking the right pharmacologic agent can even be an issue. For example, the two most popular agents – adenosine and dipyridamole – can increase problems such as wheezing, says Dr. Patel. In patients with those problems, physicians opt for dobutamine, the least used agent because it creates a catecholamine surge that causes the heart to shake and blood pressure to rise and can be harmful in patients at high risk of a heart attack.

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