*Speaking of Science*

# Lawsuit Points up Debate over Exercise Electrocardiograms

One of the most common diagnostic tests in cardiology is the exercise electrocardiogram (ECG), first devised in 1929. In this test, a patient exercises (generally by walking a treadmill) while his heart's electrical activity is monitored by an electrocardiograph. Hundreds of thousands of patients are estimated to be tested each year, generally in their doctors' offices.

Until recently, there had never been a malpractice suit arising from exercise ECG's. Now, however, two cardiologists and a lawyer report in the November issue of *Cardiovascular Medicine* on the first, and so far the only, such suit. The purpose of their report is to suggest guidelines that would make physicians more responsible for their patients' welfare when the tests are administered. But the case also gives rise to the question of who should be given exercise tests and why.

The details of the case were reported by Jonathan Alexander and Stephen Wolfson of Yale Medical School together with Angela R. Holder of Yale Law School. The patient in this case was given an exercise test in order to determine whether he had coronary artery disease, but the test was terminated when the patient became dizzy, his heartbeat became rapid, and his blood pressure fell. The patient's doctor could not determine the results of this test because the ECG leads had been incorrectly placed. Consequently, the doctor repeated the test the next day. This time, the patient's blood pressure again fell, whereupon he went into shock and died. His widow sued and the case was settled out of court for an undisclosed sum of money.

### Doctor Was Negligent

Alexander, Wolfson, and Holder point out that the doctor was negligent because he did not recognize the significance of a drop in blood pressure during an exercise test. This drop may indicate that the heart is not getting enough blood because the coronary arteries supplying the blood are blocked.

The Yale team suggests that doctors not only be aware of the proper standards of care during exercise tests, but also that they obtain written informed consent from patients they test. Most doctors, they say, do not now obtain informed consent from patients before giving them exercise tests.

The fact that this patient died while his doctor was trying to decide whether he had coronary artery disease points up a heated controversy among cardiologists about the use of exercise tests. Although very few patients die as a result of the test (the mortality rate is thought to be on the order of 0.01 percent), a number of cardiologists question the common assumption that the test should be used to diagnose coronary artery disease. The basis of this assumption is that patients with chest pains arising from coronary artery disease often have abnormal ECG's when they are resting. Therefore, it seemed reasonable to assume that patients without symptoms of this disease but with abnormal ECG's when their hearts are subjected to the strain of exercise may also have coronary artery disease. Good evidence to support this assumption, however, does not exist.

Jeffrey Borer, John Brensike, David Redwood, and their associates at the National Heart, Lung, and Blood Institute (NHLBI) find that two-thirds of asymptomatic patients with positive exercise tests have no evidence of significant coronary artery disease. (The results have been confirmed by two studies by other investigators.) Thus, the NHLBI investigators conclude, patients without chest pains cannot rely on exercise tests to decide whether they have coronary artery disease. Moreover, according to Borer, even if a doctor does find that an asymptomatic patient has coronary artery disease, "there is no hard evidence that any therapy will change the natural history of the disease. Furthermore, there is no evidence that the natural history of the disease in these patients is terribly bad. We know nothing of the risks for individual asymptomatic patients."

As for patients with the typical chest pains of coronary artery disease, the exercise test may not be necessary, Borer says. As many as 95 percent of patients with these typical chest pains have coronary artery disease. According to cardiologists who, like Borer, question the widespread use of exercise ECG's, the patient in the malpractice suit may never have needed an exercise test at all.

### A Different View of the Test

A somewhat different view of exercise tests is expressed by Paul McHenry of Indiana University. Although McHenry agrees with Borer that the current widespread use of exercise tests for asymptomatic patients is not justified, he believes the tests are still valuable for some patients. For example, he says it is often difficult to persuade asymptomatic patients to change their life-styles, but after being informed that their exercise tests were positive, such patients tend to be motivated to stop smoking, to take drugs to lower their blood pressure, and to change their diets. Nonetheless, McHenry believes that it is not warrented to subject asymptomatic patients to invasive tests, such as coronary angiography, even if their exercise test results are positive.

McHenry also believes that exercise tests are valuable in deciding how to treat patients with chest pains. He says that the tests can be used to decide how much a patient can safely exert himself. He reports that he sometimes prescribes drugs to blunt a patient's heart rate and blood pressure response to exercise on the basis of the results of an exercise test.

The current debate over the indications for and the value of exercise tests is not likely to be resolved soon. Cardiologists become emotional about this issue, and their arguments are often based on their clinical experience rather than on hard data. Yet, Alexander says, "The test is with us and will always be with us. And the question of how far you can go in using the test for diagnois is controversial and will always be so."—GINA BARI KOLATA


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