News
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November 8, 1977

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******UT Southwestern researchers develop new technique for monitoring the heart.

DALLAS--An important new medical technique that uses a radioactive tracer to light up the bloodstream is being utilized by doctors at The University of Texas Southwestern Medical School at Dallas to predict the "quality of life" for survivors of heart attacks.

Called "dynamic blood pool imaging," the technique involves injecting a chemical compound that tags red blood cells with a small amount of radioactivity as they circulate in the bloodstream.

With the bloodstream thus illuminated, scientists can look through a patient's chest wall with a radiation-sensing "gamma camera" and see the chambers of the heart pumping blood, says Dr. James Willerson, professor of internal medicine and director of the Ischemic Heart Center at UT Southwestern. "With this test we can determine what the impact of a myocardial infarct is on the heart's performance."

A myocardial infarct is an area of dead heart tissue caused by the classic type of heart attack in which the blood supply to a part of the heart is suddenly cut off, explains Dr. Robert Parkey, professor and chairman of the radiology department at Southwestern.

"The heart muscle has a tremendous workload and requires large volumes of freshly oxygenated blood," he says. "When a coronary artery is blocked, a portion of the heart muscle quickly dies from oxygen starvation."

Such attacks are the single biggest killer in the United States, striking an estimated 650,000 persons per year. But each year another 350,000 Americans survive a heart attack. This new test should help these survivors.

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The gamma camera is connected to a computer which processes the images and produces a "moving picture" of the heart beating that is displayed on a television monitor. A videotape machine provides "instant replays" like the ones seen on televised football games.

The computerized system makes it possible to analyze the movements of the heart walls in great detail and to measure the volume of blood pumped by the heart with each beat. "We can see if a section of the heart wall is not working correctly, and we can tell if the heart isn't pumping the amount of blood that it should," Dr. Parkey says.

Until now, the only way to obtain that information was by cardiac catheterization--a relatively complicated and expensive procedure in which X-ray pictures are taken after a radiopaque fluid is injected directly into the heart chamber through a thin plastic tube, a catheter. "Catheterization involves a certain amount of risk," Parkey says, "especially in patients who recently have had heart attacks, and they are the ones in which you really need to know how well their hearts are working."

In contrast, dynamic blood pool imaging has proven to be fast, accurate and completely safe. It can be performed on extremely ill patients as frequently as is necessary, thus giving doctors a way to keep track of their patients' progress during recovery. The dose of radiation received by the patient during the test is similar to that of a chest X-ray.

Another important advantage of dynamic blood pool imaging is that the radioactive label remains in the bloodstream for several hours, so a number of tests can be conducted, including exercise stress tests and tests of the effectiveness of various drugs.

"The stress of exercise often brings out abnormalities in the heart that might not be apparent when the patient is resting," says Dr. Willerson, who is also chief of cardiology and director of the coronary care unit at Dallas' Parkland Memorial Hospital.

"Some patients get much worse with just minimal exertion, such as walking around the room," he continues. "With this technique we can detect how the heart responds to exercise and we can determine what level of exercise a patient is able to handle safely."

The patient is exercised in a very controlled situation. Flat on his back in a hospital bed, the patient peddles a specially built bicycle while researchers monitor the functioning of his heart on the TV screen and computer.

Drug studies are done in a similar manner. "We are able to tell if a particular drug makes the heart beat stronger or if it doesn't help at all," Dr. Willerson says.

After further development of the technique, the Dallas researchers hope to be able to tell a heart attack patient what amount of exercise he can get--for example, how many stairs he can climb.

"If we can specify limits of activity, it should help to alleviate the anxieties that heart attack victims and their families often feel," Dr. Parkey says. "In other words, this technique whould aid us in predicting what the patient's quality of life will be."

Currently, the test is in use at several research centers across the country, he continues. "A number of other researchers have had similar results and are using the test in the same way we are."

The dynamic blood pool imaging technique is one of a number of significant advances in nuclear cardiology (the use of radioactive materials to study the heart) that have been made by Willerson, Parkey and their co-workers at the Dallas medical school. Four years ago they discovered a way to tag dead and dying heart cells with radioactivity, thus making it possible to take a picture of the heart and see the exact area of damage caused by a coronary heart attack. That test is now in use throughout the world.

Other key members of the team include Dr. Frederick Bonte, dean of UT Southwestern and former chairman of radiology, and Dr. Max Buja, a cardiac pathologist.

Both Willerson and Parkey agree that the field of nuclear cardiology is currently in a period of unusually rapid expansion.

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