

Study finds imaging tool to diagnose heart conditions is more accurate and safer

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New heart imaging technology to diagnose coronary heart disease and other heart disorders is significantly more accurate, less expensive and safer than traditional methods, according to a new study by researchers from the Intermountain Medical Center Heart Institute in Salt Lake City.

Researchers at the Intermountain Medical Center Heart Institute compared Single Photon Emission Computed Tomography (SPECT), currently the most commonly used imaging diagnostic tool, with a new imaging technology—coronary-specific Positron Emission Tomography (cardiac PET/CT).

They found the differences were dramatic.

Researchers found that cardiac PET/CT imaging diagnosed [heart problems](#) with certainty 88 percent of the time, while SPECT imaging gave a clear diagnosis only 30 percent of the time.

Results of the study were presented at the American College of Cardiology 64th annual Scientific Session in San Diego.

"We've found that cardiac PET/CT scans offer higher accuracy and much better image quality," said Kent Meredith, MD, cardiologist at the Intermountain Medical Center Heart Institute and the lead researcher of the study. "We have much more confidence in the results and there is far less radiation exposure for patients."

When the imaging procedure gives uncertain results, physicians must then use alternative invasive diagnostic techniques like coronary angiograms and cardiac catheters. Researchers found that cardiac PET/CT scans reduced the need for these additional procedures by more than 50 percent.

In addition to higher image quality and accuracy, cardiac PET/CT also eliminates most of the drawbacks of SPECT, which had difficulty scanning patients who were female, obese, or had prominent liver or GI tract activity. Cardiac PET/CT can easily scan all of those patients, Dr. Meredith said.

Both the SPECT and cardiac PET/CT scanners use a radioactive tracer to create an image of the heart. SPECT imaging emits a single electron with relatively low energy. Because the energy is low, it takes more of the radioactive tracer to make an image, and the image isn't very clear. In addition to a higher dose of radiation, the SPECT radioactive tracer has a very long half-life and will remain in the patient's system for up to two days.

Cardiac PET/CT imaging uses two high-energy electrons for the radioactive tracers. Since the electrons are high-energy, a much smaller dose is required and the [image quality](#) is far better. The half-life of the [radioactive tracer](#) is only two minutes and the radiation is completely out of the patient's system within 20 minutes.

For years, physicians have primarily used SPECT scans to diagnose coronary artery disease and other heart problems. However, use of cardiac PET/CT imaging is growing.

To verify the difference between cardiac PET/CT and SPECT scans for diagnosing heart problems, researchers compared outcomes of patients at the Intermountain Medical Center Heart Institute who were scanned

using the SPECT scanner in 2012 to those scanned by the PET scanner in 2013. They screened from a pool of 1,000 patients from each year, and narrowed it down to 197 SPECT patients and 200 cardiac PET/CT patients who had both an imaging test and a heart catheter.

The study also looked at how often each scan falsely diagnosed a patient with a [heart](#) condition. Researchers found that the SPECT gave a false positive about six percent of the time, while the cardiac PET/CT imaging never gave a single false positive during the study period.

"The results of the cardiac PET/CT imaging were very dramatic. A significant improvement over SPECT imaging," said Dr. Meredith.

The more accurate results offered by cardiac PET/CT imaging translates into a greatly reduced need for invasive diagnostic procedures, which pose more risks to patients and are more expensive. That means cardiac PET/CT imaging eliminates unnecessary invasive procedures, which saves patients money and reduces their risks of complications and infections.

Using the cardiac PET/CT also reduces the amount of radiation patients are exposed to by a factor of 10. SPECT scans typically give [patients](#) a 30 milliSeivert dose of radiation while the dose from the cardiac PET/CT is just 2 milliSeiverts.

Provided by Intermountain Medical Center

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