

When eyes aren't enough: Computer analysis can help doctors diagnose severe heart disease

7 June 2010

A study revealed at SNM's 57th Annual Meeting urges physicians using molecular imaging for the diagnosis of heart disease to use computer data analysis rather than visual interpretation alone. The study shows that when combined, these techniques can improve early detection and diagnosis, especially in conditions that can be more difficult to catch early on, such as diseased arteries.

"Molecular imaging plays a very important role in evaluating blood distribution to the heart, but standard relative perfusion imaging may underestimate the severity of disease," said Keiichiro Yoshinaga, M.D., Ph.D., lead author of the study and associate professor of photobiology at Hokkaido University Graduate School of Medicine, Sapporo, Japan. "With this computer-based approach, we can obtain absolute numbers of blood flow to the [heart tissue](#), which will help cardiologists make better diagnoses for their patients."

Ordinarily, molecular imaging techniques and a procedure called myocardial perfusion imaging are highly accurate in detecting heart disease by revealing the diminished function of diseased hearts and blood vessels. However, when multiple [arteries](#) to the heart are blocked, blood flow can be seen as stable on scans. This has led researchers to seek ways of improving the diagnostic accuracy of different imaging techniques using a range of imaging agents and a method of computer-based data analysis that demonstrates blood flow in distinct regions.

Severe coronary artery disease, which is characterized by a narrowing of multiple arteries supplying blood to the heart, can sometimes elude diagnosing physicians due to the limited contrast of blood flow between many blocked arteries. This

has been demonstrated using single photon emission computed tomography (SPECT), which is considered the standard for detecting coronary artery disease. More recently, the use of another technique, called positron [emission tomography](#) (PET), has been shown to be even more accurate in some cases. In this study, doctors evaluated the benefit of computer analysis of segmented areas of the heart and arteries to determine blood flow using PET with Rubidium-82, an imaging agent that is easier to produce than other PET agents and is widely available for many patients.

The research involved 12 patients known or suspected of having [coronary artery disease](#). Subjects had 70 percent or greater blockage of arteries to the heart and underwent X-ray angiography and PET imaging studies to quantify myocardial blood flow at rest and under pharmacological stress. Segmented data were classified in three groups indicating narrowing of the arteries with reduced blood flow in relative perfusion image as standard clinical practice, narrowing of the arteries with normal blood flow, and healthy arteries showing normal blood flow. Using computer analysis with PET and Rubidium-82, researchers were able to detect reduced myocardial [blood flow](#), even in some sections that were thought to have been functioning normally in relative perfusion imaging. This will affect not only how [molecular imaging](#) physicians diagnose heart patients, but it may also play a role in whether SPECT or PET is used for diagnosis.

Provided by Society of Nuclear Medicine

APA citation: When eyes aren't enough: Computer analysis can help doctors diagnose severe heart disease (2010, June 7) retrieved 8 July 2022 from <https://medicalxpress.com/news/2010-06-eyes-analysis-doctors-severe-heart.html>

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