MedicalXpress

Novel PET tracer narrows in on life-threatening blood clots

June 8 2015

Fatal cardiac events are often preceded by abnormal blood clots, also called thrombosis. Scientists have now developed a molecular imaging technique that could save lives by revealing troublesome thrombi, according to a study presented at the 2015 annual meeting of the Society of Nuclear Medicine and Molecular Imaging (SNMMI).

'Thrombosis is the underlying cause of deadly diseases such as stroke, pulmonary embolism, deep vein thrombosis and heart attack, which affect millions of people worldwide,' said Francesco Blasi, Ph.D., lead author of the study from the A. A. Martinos Center for Biomedical Imaging in the department of radiology at the Massachusetts General Hospital in Charlestown, Mass.

The research focused on a method of positron emission tomography (PET), which images bodily functions (other diagnostic imaging systems, such as x-ray radiography, focus on anatomical structures). PET imaging is performed with the aid of injected radiotracers, also called probes or imaging agents, that combine radioactive material with a drug compound in order to target a physiological process associated with a disease or other condition. The radioactive particles emitted by the tracer are then detected by a special camera and displayed as 'hot spots' in a reconstructed image of the body. In this case, the scientists tested the tracer Cu-64 FBP8, which binds to fibrin, a main constituent of blood clots.

For this preclinical study, PET was performed on rats injected with the

radiotracer either one, three or seven days following the development of thrombosis in either the arteries or the veins. Results of the study showed that Cu-64 FBP8 was more than 97 percent accurate for pinpointing thrombi throughout the body.

The PET probe was sensitive to changes in the fibrin content of thrombi, which reflects thrombus age and could help clinicians choose more appropriate treatments. The researchers found that the probe was able to find elusive lung emboli as well as deep vein thrombi, particularly risky clots found deep inside the legs and obscured by large muscles and bone.

'If approved, fibrin-specific PET could facilitate diagnosis, guide therapeutic choices, and help physicians monitor their patients' treatment,' said Peter Caravan, Ph.D., principal investigator of the study. 'This technique also offers full-body detection of thrombi with a single injection of probe, instead of the current imaging standards, which are limited to specific parts of the body. A one-time, whole-body scan could prevent unnecessary procedures and uncover hidden thrombi before they generate a deadly embolism.'

Contingent on approval by the FDA, Blasi and his colleagues expect to conduct a first-in-human study of FBP8-PET as soon as this fall.

Cardiovascular disease is implicated in one out of three deaths in America, according the American Heart Association. As many as 900,000 people could be affected by venous thromboembolism and pulmonary embolism in the U.S. alone. Sudden death is the first sign of disease for up to 25 percent of those diagnosed with an embolism of the lung, according to statistics from the U.S. Centers for Disease Control and Prevention (CDC).

More information: Scientific Paper 78: "Molecular imaging of thrombosis using FBP8-PET allows whole-body thrombus detection and

fibrin content estimation"

Provided by Society of Nuclear Medicine