

Nuclear Imaging Approach to Plaque Characterization

Joon Young Choi, M.D., Ph.D.

Department of Nuclear Medicine

Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

Atherosclerosis is a leading cause of mortality and reduced quality of life worldwide resulting from the rupture of vulnerable atherosclerotic plaques and subsequent thrombus formation. Therefore, the detection of vulnerable plaques is important for risk stratification and appropriate treatment. While atherosclerosis was previously considered to be a relatively inert structural abnormality, many research works during past decades have shown that it is a biologically active process, mainly driven by active inflammation. Positron emission tomography (PET) using ^{18}F -Fluorodeoxyglucose has been most extensively studied for detecting and characterizing vulnerable atherosclerotic plaques based on increased glucose metabolism in active inflammatory cells such as macrophage. Additional PET or single photon emission computed tomography (SPECT) tracers such as ^{18}F -sodium fluoride and $^{99\text{m}}\text{Tc}$ -MDP provide additional information for characterizing atherosclerosis development. This presentation will deal with recent advances in the development of PET/SPECT probes for visualizing and characterizing atherosclerotic plaques, their mechanism of action, and their potential clinical applications such as therapy monitoring and prognostication.