Diagnosing atherosclerosis makes Nuclear Medicine a tissue imaging modality

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Atherosclerosis can be identified by fluorine-18-fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT) [1-4] and is associated with cardiovascular events and all-cause mortality. Inflammation and classification appear jointly in the formation of atherogenesis. Arterial calcification has been also determined by CT, by ^{18}F-FDG PET and also in the last few years by ^{18}F-sodium fluoride (NaF) PET [1-6].

Beheshti et al [4] have introduced a new concept for the detection of early molecular and cellular calcification in the atherosclerotic plaques of the heart and aorta, based upon the concept of global disease burden, which had been employed earlier using ^{18}F-FDG PET. Fluorine-18-NaF uptake in the heart and aorta increased significantly with advancing age.

In a screening study involving 1,825 individuals, CT coronary artery calcification (CAC) was found to be common in healthy middle-aged individuals with a low Heart Score and, on the contrary, high-risk subjects very frequently did not have CAC. It is obvious that atherosclerosis appears early in life and also that the actual limits of atherosclerosis related to serious cardiovascular events should be determined by more research, since atherosclerosis is not the only cause of these episodes. It is possible that ^{18}F-NaF PET/CT may provide information about ongoing active molecular calcification in the plaque before calcification as a cause of cardiovascular episodes is detectable.

Global molecular cardiovascular calcification, before becomes macroscopically visible, before it can be identified by CT, may be assessed by nuclear medicine procedures. ^{18}F-NaF PET/CT is the first non-invasive imaging method to identify and localize high risk coronary plaque [7], a new frontier in nuclear cardiology [8].

The above nuclear medicine diagnostic technique is a major and historical new application, for the diagnosis and the study of cardiovascular diseases, by which a certain tissue per se can be identified.

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