Evolving role of PET imaging in assessment of atherosclerosis

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Background: Atherosclerosis is a major health problem and a leading cause of cardiovascular disease worldwide. The disease frequently coexists in more than one vascular bed and the clinical outcome and therapeutic options are largely dependent on early diagnosis.
Content: Atherosclerosis represents a dynamic inflammatory process, therefore many principles of diagnostic imaging studies can be directed at the biological composition and inflammatory state of atherosclerotic lesions. FDG-PET/CT holds great potential in the diagnostic work-up of atherosclerosis, by enabling both functional imaging reflecting the inflammatory activity within the atherosclerotic plaques and structural whole-body imaging reflecting local arterial wall thickening and the degree of arterial stenosis. Functional imaging becomes especially relevant knowing that vascular FDG uptake and calcification do not overlap significantly. Studies also show that FDG PET may be useful in evaluating and individualizing therapeutic interventions as the arterial FDG activity attenuates after administration of lipid-lowering medication or life style interventions. The presentation provides a brief overview of animal and clinical studies illustrated with relevant images on this topic.
Conclusion: Data from both animal and human studies show that FDG-PET has great potential for assessing large artery atherosclerosis and evaluating the effect of therapeutic interventions. However, new studies are needed for further validation and standardization of imaging protocols before FDG-PET imaging of atherosclerosis can be adopted in clinical practice.
Key words: Atherosclerosis, positron emission tomography, FDG-PET/CT.