

Evolving role of FDG-PET in detecting and characterizing infectious and inflammatory disorders

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Background: Because of its ability to quantify the rate of 2-deoxy-2-[18F]fluoro-D-glucose (FDG) uptake, FDG PET/CT can provide valuable information related to the degree of inflammatory activity, its location and extension even before morphological changes may become evident. It is not surprising that the modality is being used as a diagnostic tool in a variety of infectious and inflammatory disorders.

Content: Due to its high sensitivity and whole-body approach, FDG PET has been used for detecting culprit lesions and/or evaluation of disease activity in systemic infections and inflammations, fever of unknown origin, chronic osteomyelitis, prosthetic joint infections, vasculitis, spinal infections, diabetic foot infections, inflammatory bowel disease (IBD), degenerative joint disease, active granulomatous diseases such as sarcoidosis, as well as in a variety of non-infectious/inflammatory or proliferative conditions such as radiation pneumonitis and post-lung transplant lymphoproliferative disorders. Novel PET radiopharmaceuticals for imaging infection and inflammation tracers are also being tested. The presentation reviews the current state of this very important application of FDG-PET imaging. Relevant FDG PET/CT and PET/MRI images showing the pattern of FDG uptake in common infectious and inflammatory disorders are also provided.

Conclusion: FDG-PET/CT imaging represents a perspective modality for evaluation of infectious and inflammatory disorders that can provide valuable information in the appropriate clinical setting.

Key words: Positron emission tomography, infection and inflammation imaging, fever of unknown origin, FDG.

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.