

▶ Overview on Infection Imaging by SPECT and PET

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Infectious and inflammatory diseases are a heterogeneous group of disorders comprising infection, acute and chronic sterile inflammation. In addition to its heterogeneity, these diseases can either be restricted to one organ or systemic and because of multi-organ involvement whole-body imaging is often required. It is of utmost importance for the referring physician to differentiate between sterile inflammation and an infectious pathology since it may significantly alter the therapeutic management.

Upon clinical suspicion for an inflammatory or infectious disease, diagnosis is most often based on biochemical analysis in combination with conventional imaging. For many years, medical imaging has been focused on anatomical changes, which usually occur rather late during disease progression. Nowadays, a shift towards imaging the molecular/cellular bases of diseases has been observed and nuclear molecular imaging techniques can identify these biological changes before anatomical changes have occurred. Therefore, these nuclear techniques can identify disease localization earlier leading to better therapies and optimization of treatment regimens based on imaging results.

Finally, the development and clinical introduction of hybrid systems (e.g. PET-CT and SPECT-CT) has emerged as a powerful tool by combining anatomical with molecular/functional information during one single imaging session, leading to higher diagnostic accuracy. More recently, the clinical introduction of hybrid PET-MRI systems may even further enhance the diagnostic performance by providing higher soft tissue contrast but studies are warranted to exploit the additional value compared to SPECT-CT or PET-CT.

In this lecture, an overview of the clinical indications for imaging infection and inflammation will be given, focusing on hybrid imaging techniques using labeled white blood cells and FDG.

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