

Barcelona, Spain

Annual Congress of the
European Association of Nuclear Medicine

October 12 – 16, 2019
Barcelona, Spain

Joint Symposium 1

Bone & Joint + Inflammation & Infection Committee / The European League Against Rheumatism (EULAR)

Sunday, October 13, 08:00-09:30

Session Title

Bone Imaging in Chronic Inflammatory Joint Conditions

Chairpersons

Willm Uwe Kampen (Hamburg, Germany)

Xenofon Baraliakos (Herne, Germany / EULAR)

Programme

08:00 - 08:30 Holger Palmedo (Bonn, Germany): Bone SPECT/CT Versus MRI in Rheumatologic Patients

08:30 - 09:00 Olivier Gheysens (Leuven, Belgium): Impact of FDG-PET/CT in Patients with PMR

09:00 - 09:30 Xenofon Baraliakos (Herne, Germany / EULAR): Imaging of Osteoblast-/Osteoclast-Activity in New Bone Formation in Rheumatologic Patients

Educational Objectives

1. To get an update on the current state of diagnostic procedures in imaging of rheumatologic patients.
2. To learn about the role and the significance of PET/CT imaging in rheumatologic patients with otherwise inconspicuous findings in conventional diagnostics.
3. To get an idea about the cellular mechanisms involved in new bone formation in rheumatic diseases.

Summary

Rheumatic diseases, like rheumatoid arthritis, often starts with an autoimmune inflammatory reaction against antigens located at the synovium. At the later stage of disease, this process results in subchondral and osseous destruction of the joints leading to severe limitations of the patient's quality of life.

Bone scintigraphy can evaluate the synovial activity and soft tissue involvement by blood-pool imaging. Osseous alterations due to rheumatic activity can be diagnosed by late bone scintigraphic imaging. Whole body imaging technique is important when the extent of rheumatic disease has to be defined. SPECT-CT can add valuable information by localizing precisely the areas of increased bone metabolism. If SPECT-CT includes a diagnostic CT scan, also subchondral and bony abnormalities can

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be characterized with higher resolution compared to low-dose CT images. MRI-imaging has a high tissue contrast and permits an early detection of cartilage changes, bone and soft tissue edema and the characterization of synovial involvement. The disease activity can be specified as well as the existence of bone alterations and joint deformities.

The role of both imaging techniques, bone scintigraphy and MRI, will be discussed and the potential impact on patient management will be evaluated. Integration of these functional imaging techniques within conventional protocols should be considered not only for diagnostic purposes but also for treatment monitoring of arthropathies.

The diagnosis of polymyalgia rheumatic (PMR) remains challenging and is merely based on clinical and biochemical grounds. However, these findings can also be observed in several other inflammatory conditions and are not specific for PMR. Provisional classification criteria for PMR have been published with relatively low sensitivity (68%) and specificity (78%). Since PMR affects specific sites and FDG-PET/CT allows to evaluate disease activity, an overview of the FDG-uptake patterns suggesting PMR will be given in combination with a literature overview on the usefulness of FDG-PET/CT in the work-up of patients with suspicion of PMR.

The basis of the radiographic changes of structural damage in inflammatory musculoskeletal (MSK) conditions is the disturbance of the homeostasis of osteoblasts and osteoclasts. Nuclear medicine imaging techniques such as positron emission tomography (PET) are now increasingly being used for detection of the biologically active molecules at the sites of increased disease activity that later leads to these structural changes. Especially diseases that are associated with bone hyperproliferation such as ankylosing spondylitis (AS) or diffuse idiopathic skeletal hyperostosis (DISH) are currently in the focus of PET-imaging.

Recent data indicate that beyond inflammation (the hallmark of inflammatory MSK diseases), also the residual chronic changes have the highest potential to develop new bone formation. Subsequently, the use of PET/MRI could be considered as a tool for predicting future syndesmophyte formation in AS. These data were backed up by dual-phase ^{18}F -Fluoride PET/MRI analysis of the sacroiliac joints in AS patients.

Furthermore, dual-energy virtual noncalcium (VNCa) computed tomography (CT) have also been found to have an excellent diagnostic performance in evaluation of the extent of bone marrow edema in patients with active sacroiliitis associated with AS.

This presentation is aiming to give an overview on the current data for imaging of osteoblastic-/osteoclastic-activity in new bone formation in patients with rheumatic diseases and discuss the potential collaboration between rheumatologists and nuclear medicine specialists based on common interests and future plans.

Key Words:

Bone SPECT/CT, MRI, rheumatoid arthritis, synovitis, PMR, osteoblast, osteoclast