Whole-body MRI in rheumatic joint disease
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Which prerequisites?
Magnetic resonance imaging has undergone a considerable development in the past few years triggered by parallel imaging, new fast sequence techniques, dedicated contrast agents and clinical high-field scanners (1.5T/3T). All these techniques attributed to the improvement of image resolution and the decrease of acquisition time which made whole body (WB) imaging with high spatial resolution possible within reasonable scanning time.

Which protocol?
For an WB-MR assessment of inflammatory joint diseases imaging of the big joints (sacroiliac joints, hip joints, knees, shoulders), the small joints (hands, feet, ankles, sternoclavicular joints, costovertebral and costotransverse joints) and the spine with the main entheses and ligaments is necessary and can be best and most easily achieved by a full coverage of these regions with body coils. For the detection of bone marrow edema which typically precedes bony erosions STIR or PD fs sequences are suitable. Bony erosions can be detected on STIR/PD fs sequences as well as on contrast enhanced images. Synovial inflammation / proliferation and enthesitis / bursitis are best seen on contrast enhanced fat saturated images. Time resolved images of a dedicated area allow the assessment of contrast kinetics and perfusion.

Which patients?
There are several indications for WB-MRI in rheumatic joint disease. There is the possibility of early diagnosis and detection of pre-erosive changes (when conventional images are still negative) in patients with clinically suspected inflammatory joint disease. Besides, treatment decisions (esp. considering disease-modifying drugs) are based on the extent and activity of changes on MRI and patient can be monitored under therapy. Moreover, there is a high negative predictive value for patients with polyarthralgia and suspected inflammatory diseases when there is no evidence of synovial inflammation or bony abnormality on MRI.

Which modality?
MRI has proven more sensitive than clinical assessment in detecting synovitis, sacroiliitis and especially enthesitis [1,2]. The main advantage of MRI compared to conventional radiography is the possibility to detect early inflammatory changes [3,4,5]. Conventional radiography has been the mainstay for diagnosis in late stages of inflammatory joint diseases since is insensitive to early changes. Early tendinous changes in superficial joints are most easily seen with ultrasound which, however, has major imitations in the evaluation of deeper structures.

Which results?
Differential diagnosis of rheumatoid arthritis and psoriatic arthritis may be clinically difficult in some cases. By MRI, in some cases a differentiation seems possible. In psoriatic arthritis bone marrow changes are often not related to the joint capsule and seem extend far beyond the joint capsule. The same is true for inflammatory enthesitis which is typically seen in psoriatic arthritis and ankylosing spondylitis. In rheumatoid arthritis changes are typically localized within the joint capsule. Typical findings in seronegative spondylarthropathies include Romanus lesions, Anderson lesions, the building of syndesmophytes, sacroiliitis and bursitis. Soft tissue edema, joint effusion, tendon sheeth effusion and bursitis are general findings seen in all forms of inflammatory joint disease.

Which potentials?
MRI is a very sensitive modality for the diagnosis and follow-up of rheumatoid diseases, even in the diagnostic process of the small joints of the hands and feet [6]. Early diagnosis of inflammatory joint diseases by MRI enables rheumatologists to immediately initiate aggressive treatment (TNF-alpha-inhibitors as first line treatment) to prevent joint damage. By whole body MRI the extent and activity of the disease can be assessed and treatment response can be identified. In our institution, quantitative techniques which are included in the WB imaging protocol are used for the grading of (subclinical) disease activity and might be used as additional outcome measures in future clinical studies.

References:
1. McQueen FM, Stewart N, Crabbe J, Robinson E, Yeoman S, Tan PL, McLean L. Magnetic resonance imaging of the wrist in early rheumatoid arthritis reveals a


