

Supplements 5

MRI protocol:

The target hand, chosen per protocol was imaged using both conventional and Dynamic contrast-enhanced (DCE-MRI) examination in a 3 T Siemens Verio® MR scanner with the patient supine and the target hand along the side of the body inside a semi flex 15-channel body coil covering all 4 ulnar fingers from wrist to fingertips. The sequences were performed in the following order Gradient echo scout (GRE) (slice thickness (ST) 6 mm, field of view (FOV) 400×400 mm, time to echo (TE) 3.69 ms, repetition time (TR) 7.8 ms, scan time 17 s), coronal T1-weighted (T1W) turbo spin echo (TSE) (ST 1.5 mm, FOV 250×250 mm, matrix resolution 0.3×0.3×1.5 mm, TE 25 ms, TR 832 ms, scan time 4 min 28 s), coronal short-tau inversion recovery (STIR) (ST 2.5 mm, FOV 180×180 mm, matrix resolution 0.9×0.8×2.5 mm, TI 220 ms, TE 32 ms, TR 4500 ms, scan time 2 min 48 s), axial STIR covering the MCP joints to the fingertips of the 4 ulnar fingers (ST 5 mm ST, FOV 180×180 mm, matrix resolution 0.6×0.6×5 mm, TI 220 ms, TE 32 ms, TR 4500 ms, scan time 2 min 30 s), gradient echo three-dimensional (3D) T1W volumetric interpolated breath-hold examination (VIBE) (ST 0.9 mm, FOV 250×250 mm, matrix resolution 0.9×0.9×0.9 mm, Flip angle (FA) 10°, TE 6 ms, TR 13.5 ms, scan time 2 min 35 s). Simultaneously with the intravenous injection of 0.1 mL/kg body weight Gadolinium contrast (Dotarem, Guerbet United, <http://www.guerbet.co.uk>) using a power injector (2 mL per second), a sequential coronal DCE-MRI gradient-echo T1W (VIBE) sequence was performed in 10-12 2 mm slices every 9 s, with 30 repetitions using the following parameters: TE 1.86, TR 5.51 FA 15°, matrix resolution 256×256, total scan time 4 min 40 s) covering the hand from wrist to fingertips. Following the DCE-MRI sequence, the 3D T1W VIBE sequence was repeated. Total imaging time was approximately 30–35 min.

PsAmris-score

The coronal and axial STIR and 3D coronal T1 gradient echo VIBE pre- and post-contrast images of DIP-joint 2 to 5 were used for PsAMRIS scoring including synovial hypertrophy, tenosynovitis, bony proliferation, bone marrow oedema and erosions and the score for each DIP-joint ranges from 0 - 35 [1].

A modified PsAMRIS-score was used in this study encompassing the DIP-joint: D-PsAMRIS (range 0-35) = synovial hypertrophy (0-3) + flexor tenosynovitis (0-3) + palmar periarticular inflammation (0-1) + dorsal periarticular inflammation (0-1) + proximal bone oedema score (0-3) + distal bone oedema score (0-3) + proximal bone erosion score (0-10) + distal bone erosion score (0-10) + bone proliferation score (0-1).

Flow evaluation using DYNAMIKA

The sequential axial T1 gradient-echo DCE-MRI images were analysed using DYNAMIKA®. The images were analysed in 2 independent ways: 1) the slice with most enhancement as judged by eye was selected. An ROI was drawn around the each of the DIP 2-5 joints, each of the fingers and each of the hand muscles respectively, excluding large blood vessels from analysis, and 3) A 2-dimensional ROI was drawn around the distal phalanges and DIP from 2nd to 5th fingers in all available coronal slices and summed into a 3-dimensional volumetric ROI (VOI). The computed mean output data in the whole hand analysis and the various VOIs comprise the mean of the initial rate of enhancement (IRE), maximum enhancement (ME), number of enhancing voxels (NVoxels) as well as their composite scores of IRE*NVoxels and ME*Nvoxels.

References

- 1 D. G, P. B, F. G, *et al.* Validation of the OMERACT Psoriatic Arthritis Magnetic Resonance Imaging Score (PsAMRIS) for the hand and foot in a randomised placebo-controlled trial. *J Rheumatol* 2015;**42**:2473–9. doi:10.3899/jrheum.141010 LK -