HOW WELL DOES WHOLE BODY MAGNETIC RESONANCE IMAGING AGREE WITH WHOLE BODY ULTRASOUND IN THE ASSESSMENT OF JOINT INFLAMMATION IN RHEUMATOID ARTHRITIS PATIENTS

Sin Ngai Ng1, Mette Bjerrndal Axelsen2, Mikkel Østergaard3,4, Iris Eshed5, Merete L. Hettland2,6, Jakob Mellensbach Müller4, Susanne Juul Pedersen2, Lene Terslev2.

1Queen Elizabeth Hospital, Medicine, Hong Kong, Hong Kong (SAR); Copenhagen Center for Arthritis Research, Center for Rheumatology and Spine Diseases, Rigshospitalet – Glostrup, Copenhagen, Denmark; Department of Clinical Medicine, Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark; Department of Diagnostic Imaging, Sheba Medical Center, Tel Aviv University, Tel Giborim, Israel; 2Department of Radiology, Herlev Hospital, University of Copenhagen, Herlev, Denmark

Background: Whole body MRI (WBMRI) is a new promising tool for assessing synovitis in the whole body in one session, but is less validated. Ultrasound (US) is another sensitive and well-validated imaging technique that can assess the whole body in one session.

Objectives: To evaluate the agreement between US, WBMRI and clinical assessment of joint inflammation in rheumatoid arthritis (RA) patients on joint and patient level.

Methods: US, WBMRI and clinical assessment for tender joints (TJ) and swollen joints (SwJ) were performed in 19 RA patients (90% Women, median age 55 (26-73), diseases duration 5.5 years (1-42), SwJ/28 5 (1-13), TJ/28 7 (2-24) and DAS28-CRP 4.6 (3.4-6.6)) fulfilling ACR 1987 criteria for RA. The 28 conventional joints, bilateral ankles and MTP 1-5 were assessed by WBMRI and US. Joint inflammation by US was graded 0-3 on both B-mode and colour Doppler (CD), and subsequently converted to +/- by defining US synovitis as B mode ≥2 or CD ≥1, and scored for individual joint. For WMBRI, joint inflammation was defined in two ways; 1) as presence of synovitis and/or osteitis, 2) as the presence of synovitis only.

The total inflammatory burden was established as sum scores for the 28 conventional joints for US (US28) and for 26 joints (WBMRIR26) for WBMRI - same 28 joints except elbows (due to poor image quality). The max score of a joint in a US and WBMRI including osteitis was 2, while WBMRI excluding osteitis was 1. The agreement between the clinical joint assessment, US and WBMRI for joint inflammation was calculated with Cohen’s kappa (κ). The correlations between US28, WBMRIR26 and DAS28-CRP were calculated by Spearman correlation coefficient (r).

Results: When considering joint inflammation by WBMRI as synovitis and/or osteitis, US28 for synovitis and WBMRIR26 sum scores showed good correlation rho= 0.72 (p<0.003) (Fig. 1), whereas US28 andWBMRIR26 did not correlate with DAS28-CRP (rho=0.26, p=0.28; rho=0.20, p=0.47 respectively). Moderate-good agreement was found between US and WBMRI in wrists and MCP 1, 2 and 5 (κ= 0.42-0.62) but poor in other joints (κ ≤ 0.37). By comparing WBMRI synovitis (excluding osteitis) with US synovitis, US28 and WBMRIR26 sum scores showed weakened correlation rho= 0.46 (p=0.049) (Fig. 2), and without correlation between WBMRIR26 and DAS28 CRP (rho=0.07, p=0.76). At joint level, moderate-good agreement was found between US and WBMRI in wrists, MCP 2 and 5, and PIP5 (κ= 0.41-0.62) but poor in other joints (κ ≤ 0.37). Agreement between US and clinical joint tenderness was poor (κ<0.01; except κ=0.42 for wrist), but better between US and clinical swelling for shoulders, elbows, MCP1 and PIP5 (κ=0.42-0.66) while κ=0.36 for other joints. Agreement between WBMRI and clinical joint swelling or tenderness showed κ=0.38 in all joints irrespective of counting osteitis as one of the features or not.

Conclusion: WBMRI and US sum scores of joint inflammation showed good correlation in RA patients for the overall inflammatory burden. The agreement at joint level was variable.

Figure 1. Correlation between US sum score for 28 joints (US28) & whole body MRI sum score for 26 joints (WBMRIR26), which included osteitis, for assessing joint inflammation

Figure 2. Correlation between US28 & WBMRIR26, which excluded osteitis, for assessing joint inflammation

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OP0136 DIAGNOSTIC VALUE OF ULTRASOUND IN CALCIUM PYROPHOSPHATE DEPOSITION DISEASE OF THE KNEE JOINT

Kyung Ann Lee1, Sang-Heon Lee2, Hae-Rim Kim2, Soonchunhyang University Seoul Hospital, Seoul, Korea, Rep. of (South Korea); Konkuk University Medical Center, Seoul, Korea, Rep. of (South Korea)

Background: The Outcome Measures in Rheumatology (OMERACT) US sub-task force published a new definition for calcium pyrophosphate deposition (CPPD) at the knee level.

Objectives: To assess the diagnostic performance of ultrasound (US) for CPPD at the level of menisci, hyaline cartilage (HC), tendons, and synovial fluid (SF) of the knee, and to examine inter- and intra-observer reliability.

Methods: We consecutively included patients with knee effusion over a 2-year period (43 patients with CPPD and 131 controls). All patients underwent SF analysis, conventional radiography (CR), and US examination using the Outcome Measures in Rheumatology (OMERACT) definition of the US characteristics of CPPD. Two independent operators performed the US, and inter-observer agreement was calculated. Intra-observer agreement was examined with static images obtained for all enrolled patients.

Results: US revealed calcium pyrophosphate (CPP) deposits in menisci, HC, and tendons more frequently in patients with CPPD than in control patients. The presence of US CPP deposits in SF was not significantly different between the two groups. Combined US evaluation of the 3 components (menisci, HC, and tendon) showed the best diagnostic performance. The sensitivity and specificity for US evaluation of the three components were 74.4% and 77.1%, respectively, while for CR evaluation, the sensitivity and specificity were 44.2% and 96.9%, respectively. Inter- and intra-observer agreement were excellent for menisci (κ=0.930, 0.972) and lateral menisci (κ=0.905, 0.942), HC (κ=0.844, 0.957), and SF (κ=0.817, 0.925). Tendon showed fair inter-observer (κ=0.532) and good intra-observer reliability (κ=0.788).

Conclusion: Based on the OMERACT definition, US demonstrated better diagnostic capacity than CR to diagnose CPPD, with excellent reliability. Combined evaluation of menisci, HC, and tendon showed the best diagnostic accuracy.

REFERENCE:

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