was 11.6±12.8 and baseline PsAMRIS synovitis score was 3.7±3.3. Baseline ultrasound synovial hypertrophy and Doppler activity were 6.2±4.5 and 3.5±4.0, respectively. Specific MRI and ultrasound scores were significantly correlated with DAS28 and DAPSA at baseline. Clinical disease activity parameters significantly improved at follow up (DAS28: 2.94±0.95, $p<0.001$; DAPSA: 8.8±5.8, $p<0.001$). PsAMRIS synovitis score (2.5±2.4) as well as composite PsAMRIS score (8.8±10.0) decreased longitudinally with secukinumab treatment (p=0.034 and p=0.039, respectively). There was no progression in erosion or proliferation scores between baseline and follow-up. Synovial hypertrophy and Doppler activity in ultrasound also significantly improved with secukinumab treatment (2.3±3.5; p=0.009 and 1.8±2.7; p=0.003, respectively). A significant percentage of patients reaching minimal disease activity showed residual signs of synovitis in the MRI and US (66% and 50%, respectively).

Conclusions: Secukinumab significantly improves MRI and ultrasound signs of joint inflammation in patients with PsA.

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FRI0626 ANALYSIS OF CORRELATION AND CAUSES FOR DISCREPANCY BETWEEN QUANTITATIVE AND SEMI-QUANTITATIVE DOPPLER SCORES IN SYNOVITIS IN RHEUMATOID ARTHRITIS

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Background: Doppler US is used for the evaluation of synovitis in RA. The amount of Doppler signals are measured in the synovial tissue according to either semi-quantitative (SQS) or quantitative scoring (QS) methods. None of the SQS has been chosen by consensus so far, and this creates some heterogeneity in US in clinical practice and research. Conversely, a major strength of the QS is to allow objective measurement of Doppler pixels using a continuous numeric scale.

Objectives: This study aimed to evaluate the association between $SQS^{1,2}$, and QS^3 in RA patients with active disease. Additionally, to elucidate the reasons for potential discrepancies between SQS and QS assessments, in order to better understand the intrinsic limitations of these methods,

Methods: Adult patients with RA and inadequate clinical response to anti-rheumatic therapy were examined with US. Dorsal US of the wrists, MCP and MTP 2–5 were performed. US images with sign of synovitis were collected and the QS was measured. Five assessors blinded to the QS evaluated the images independently, according to either SQS method. Association between QS and SQS was studied using correlations and multilevel models taking into account the clustering of ratings at the rater, patient and joint levels.

Based on the cut-offs, the discrepant cases were extracted, and each participant was asked to re-grade his/her own discrepant cases, blinded to the initial SQS grading and original QS, and to provide an explanation for the discrepancy. Then, discrepant images and explanations provided were reviewed in consensus and classified into a limited number of categories

Results: Analysis of the 1190 ratings revealed a strong correlation (ρ=0.89, $p<0.0001$) and significant associations ($p<0.0001$) between QS and SQS. Correlations between QS and SQS according to Szkudlarek et al. (ρ=0.87, $p<0.0001$) or Hammer et al. (ρ=0.91, $p<0.0001$) were similar. A total of 239 (20.1%) images were given a SQS grade that did not match that expected based on initial QS, using predefined cutoffs. Main explanations for discrepancies were different perceived ROI (40.7%) and Doppler pixel count near cutoffs between SQS grades (32.3%).

Conclusions: We showed that both SQS methods correlated well with QS to assess synovitis, but SQS methods are intrinsically limited when the Doppler pixel count is close to the cutoffs between the SQS grades. Analysis discrepancies between these methods may help further revision of criteria used to assess disease activity with MSUS in RA.

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FRI0627 ULTRASOUND HAND EXAMINATION IS MORE SENSITIVE IN DIAGNOSING HAND OSTEOARTHRITIS THAN CONVENTIONAL RADIOGRAPHY: COMPARISON BETWEEN DIFFERENT ULTRASONOGRAPHIC SCORES

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Background: Hand osteoarthritis (OA) diagnosis is based on a combination of clinical, imaging features and assessment of risk factors, together with clinical associations and outcomes (1). In a real-life context, clinicians face difficulty in differentiating between OA and other hand arthropathies, particularly when the clinical examination is equivocal (e.g. no obvious bony enlargement with the characteristic distribution for hand OA).

Objectives: This is the first study to investigate the usefulness of a standardised ultrasound (US) examination protocol for hand joints in diagnosing hand osteoarthritis (OA) and the correlations between several US scores and clinical, inflammatory and radiographic parameters, aiming to explore which type of investigations are the most useful for diagnosing hand OA.

Methods: We conducted a cross-sectional study including 62 patients, ultimately diagnosed with hand OA based on the ACR diagnosis criteria (2). We compared the 34 joint score of the hand, with smaller, pre-defined joint scores including two scores of 22 and 12 joint each, and another 10 and 6 joint scores for OA. We correlated the US findings with radiographic scores (2108 joints).

Results: Radiographic osteophyte scores correlated very well with the predefined US scores detailed above (R=0.381 to 0.645, $P<0.05$), despite having a low sensitivity for detection of osteophytes (58.6%), and an even lower sensitivity for detection of erosions (38.4%) when compared with the 34 joint US score. There was a good correlation between different US scores (R =0.53 to 0.97, $P<0.05$), apart from the 6 joint score excluding the proximal interphalangeal joints (R= -0181 to 0.207, $P>0.05$).

Conclusions: US examination of the hands can facilitate the diagnosis of hand OA in patients who do not fulfil the ACR criteria, by identifying the presence of osteophytes with the particular distribution and number required for diagnosis in a proportion of patients that was three times higher than that of patients diagnosed based on clinical examination and hand radiography alone.

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FRI0628 ULTRASOUND SHOWS SIGNS OF INFLAMMATION IN MOST PATIENTS WITH RHEUMATOID ARTHRITIS IN LONGSTANDING CLINICAL REMISSION, IRRESPECTIVE OF CONVENTIONAL SYNTHETIC OR BIOLOGIC DMARD THERAPY

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Background: None of the currently accepted remission criteria in rheumatoid arthritis (RA) incorporate inflammation on imaging. Signs of inflammation on ultrasound (US) and magnetic resonance imaging are frequently seen in RA patients in clinical remission.(1–3) It is not known whether patients in longstanding clinical and radiographic remission obtained through a DAS28 driven treat to target (T2T) strategy by conventional synthetic disease modifying anti-rheumatic drugs (csDMARD) or by biologic (bDMARD) therapy differ with respect to US detected synovitis.

Abstract FRI0626 – Table 1

Cut-offs between grades*	Sensitivity and specificity in the different statistical models							
	Raw data		Model 1		Model 2		Model 3	
	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity
Grade 0–1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Grade 1–2	0.94	0.72	0.99	0.85	0.99	0.82	0.96	0.77
Grade 2–3	0.90	0.84	0.99	0.92	0.99	0.91	0.98	0.92

*Cut-off between grade 0 (G0) and G1: 0%; between G1 and G2: 10%; between G2 and G3: 50%.

Objectives: In RA patients in longstanding clinical and radiographic remission, achieved by a DAS28-driven T2T strategy, to investigate if US signs of inflammation differs between RA patients, treated with csDMARD or bDMARD (+/- csDMARD).
Methods: Eighty-seven patients with RA in longstanding clinical (continuous DAS28<2.6 for the preceding year) and radiographic (no progression for at least 1 year) remission, were included in the study. US of elbows, wrists, MCP2–5, knees, ankles and MTP2–5 were performed using a GE LOGIQE9 US unit. Each joint was scored for grey-scale synovitis (GSS) and synovial color Doppler activity (CDA) by a 0–3 semi-quantitative score. Ultrasound remission was defined in two ways: either no (GSS=0 and CDA=0) or minimal (GSS≤1 and CDA=0) inflammation in any of the 24 assessed joints.
Results: Clinical characteristics and US findings are shown in the table. All 87 patients fulfilled DAS28 remission criteria at entry and CDAI remission was fulfilled in 76% and 79% in the csDMARD and bDMARD group, respectively. Complete absence of any signs of US inflammation (GSS=0 and CDA=0) was seen in 0% and 14% in the csDMARD and bDMARD groups, respectively (p=0.01), while minimal US inflammation (GSS≤1 and CDA=0) was seen in 33% and 40% (NS). CDA in at least one joint was seen in the majority of patients in both groups, 58% and 57% respectively.

Table 1

	csDMARD (n=45)	bDMARD (n=42)	
Females	28 (62%)	28 (67%)	NS
Age (years)	64 (31–82)	57 (25–82)	NS
Disease duration	6 (1–44)	12 (0–54)	p<0.01
IgM-RF/anti-CCP positive	25 (56%)/25 (56%)	28 (67%)/33 (79%)	NS/p<0.05
Erosive disease	23 (51%)	34 (81%)	<0.01
Tender joint count	0 (0–1)	0 (0–1)	NS
Swollen joint count	0 (0–2)	0 (0–2)	NS
C-reactive protein (mg/L)	4 (1–13)	5 (4–26)	p<0.01
DAS28	1.7 (1.1–2.4)	2.0 (1.6–2.5)	p<0.01
CDAI	1.4 (0–5.3)	1.8 (0–7.7)	NS
GSS-score (0–72)	4 (1–18)	6 (0–18)	NS
CDA-score (0–72)	0 (0–12)	0 (0–7)	NS
US minimal inflammation (GSS≤1 & CDA=0)	15 (33%)	17 (40%)	NS
US no inflammation (GSS=0 & CDA=0)	0 (0%)	6 (14%)	p=0.01

Values are given as numbers (percentages) and median (range). Fisher's exact or Mann-Whitney test used for comparisons.

Conclusions: The majority of RA patients, in this cohort of patients in longstanding clinical and radiographic remission obtained through a DAS28 driven T2T strategy, had signs of inflammation as assessed by US, irrespective of receiving biologic treatment or not. For patients in clinical remission, the consequences of sustained US inflammation still have to be investigated.
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FRI0629 MAGNETIC RESONANCE IMAGING (MRI) INFLAMMATION OF THE FEET DEMONSTRATES SUBCLINICAL INFLAMMATORY DISEASE IN CUTANEOUS PSORIASIS PATIENTS WITHOUT CLINICAL ARTHRITIS

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Background: Up to 40% of patients with cutaneous psoriasis may develop psoriatic arthritis (PsA). Early detection of PsA by advanced imaging techniques results in better response to therapy. There are very few studies evaluating the MRI appearance in feet of patients with psoriasis and PsA.
Objectives: This study sought to evaluate inflammation at the small joints of feet in a subset of psoriasis patients without clinical arthritis, using an office-based extremity MRI (eMRI) as compared to the findings in overt PsA patients.
Methods: Patients with psoriasis were recruited from Dermatology and Rheumatology clinics of a tertiary care institution in southern India were divided into those without arthritis (PsO) and PsA groups. All consenting patients underwent non-contrast eMRI of the right foot. Demographic and physical examination details were recorded. PsO patients completed the early arthritis in psoriasis (EARP) questionnaire. Two trained readers scored the MRI inflammation (synovitis, tenosynovitis, osteitis) using a modification of the PsAMRI scores (PsAMRIS). [1] Inter-reader agreement was assessed in a random subset of 42 cases using intra-class correlation coefficient (ICC). Proportion of patients with any sign of MRI inflammation was noted. Mann-Whitney U test was used to compare inflammation scores of PsO with PsA patients. Clinical variables were compared with inflammation scores for any association.
Results: A total of 83 patients (30 PsA and 53 PsO) with 75% males and mean age of 42.2±11.6 years were included. ICC for all three variables between the readers was very good (>0.8). There was no statistical difference between the median eMRI inflammatory scores in PsA and PsO patients (p=0.493). Evidence of inflammation was present in 64% and 67% patients in the PsO and PsA groups, respectively (Table 1). Higher NAPSI scores were associated with presence of MRI inflammation (p=0.022).

Table 1. PsAMRIS variables for MRI inflammation of foot in PsO and PsA subgroups

Variable	PsO (n=53)	PsA (n=30)
Synovitis	34 (64%)	19 (63%)
Osteitis	2 (4%)	2 (7%)
Flexor tenosynovitis	9 (17%)	8 (27%)
Inflammation	34 (64%)	20 (67%)

Conclusions: This study corroborates a high proportion of psoriasis patients with subclinical disease of the small joints of foot. Patients with nail involvement had a higher risk of subclinical disease. The cohort is being assessed longitudinally to determine the clinical utility of MRI feet in predicting subsequent development of PsA in patients with psoriasis.
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FRI0630 CAN WHOLE BODY MRI AT BASELINE IDENTIFY DEFINITE INFLAMMATORY ARTHRITIS PATTERNS IN UNDIFFERENTIATED ARTHRITIS?

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Background: When diagnosing inflammatory arthritis (IA) early, focal joint imaging may not reflect the overall inflammatory burden/distribution. Whole body MRI (WBMRI) offers the potential to feasibly scan most joints in a single session.
Objectives: The aims were (i) to describe the WBMRI pattern of disease in early IA (ii) to identify patterns associated with subsequent definite IA.
Methods: Patients were recruited with early inflammatory joint symptoms and/or signs of IA. Clinical data included age, gender, symptom duration, CRP, HLA-B27, RF, CCP Ab and tender/swollen joint counts. Using 3T WBMRI, T2-weighted fat suppressed spine/SIJ images pre contrast and 3D VIBE Dixon images of peripheral joints and entheses post IV contrast were acquired. Images were consensus scored for inflammation/erosion at the spine, SIJ, GHJ, SCJ, wrist, MCP, PIP, hip, knee, ankle, mid/hind foot, MTP and IP joints plus shoulder, ASIS, greater trochanter, knee, Achilles and plantar fascia entheses. Subjects were clinically classified at baseline and 1 year as undifferentiated arthritis (UA), CCP+RA, CCP-RA or Spondyloarthropathy (SpA). Clinicians were unaware of the MRI findings.
Results: 39 patients (23 female) were recruited; mean age 43 years, median symptom duration 18 months (7, 24), TJC 5 (2,11), SJC 1 (0,3) and CRP 2 (2,2). At baseline, 14 were classified as definite disease (RA or SpA) and 25 (14 female) as UA with mean age 40 years, median symptom duration 16.5 months (9.8, 24.3), TJC 3 (1,8), SJC 0 (0,1), CRP 2 (2,2) and 3 (12%) were HLA-B27 positive. The distribution of WBMRI findings in the classified (i.e. definite IA) group was predominantly small joint and tendon-based in the CCP+ RA group, large joint based with 50% having SIJ disease in the CCP- group and similar findings in the SpA group. In the non-classified group (i.e. pUA and rUA), the distribution in pUA was both axial and peripheral, involving joints and entheses, with 25% having SIJ disease. In comparison, findings in the rUA group were similarly distributed but less frequent with no cases of SIJ disease. After 1 year of clinical/laboratory follow-up, 8 were identified as pUA, 6 rUA, 7 CCP+RA, 6 CCP-RA and 12 as SpA. Table 1 shows WBMRI disease distribution by 1 year diagnostic category. The inclusion of affected WBMRI sites in the diagnostic work-up would have appropriately classified 6 further cases of definite SpA, 3 from the pUA and 3 from the CCP-RA groups.

Site of Disease Activity at Baseline on MRI

	Clinical Diagnostic category at 1 year				
	pUA (n=8)	rUA (n=6)	CCP+ RA (n=7)	CCP– RA	SpA (n=12)
Axial	1 (13%)	1 (17%)	0 (0%)	1 (17%)	0 (0%)
SIJ	2 (25%)	0 (0%)	0 (0%)	3 (50%)	4 (33%)
Large Joints	3 (38%)	4 (67%)	4 (57%)	6 (100%)	6 (50%)
Small Joints	6 (75%)	2 (33%)	7 (100%)	5 (83%)	6 (100%)
Tendons	3 (38%)	1 (17%)	5 (71%)	5 (83%)	4 (33%)
Entheses	6 (75%)	3 (50%)	4 (57%)	5 (83%)	8 (67%)

Key: pUA = Persistent UA, rUA = Resolved UA, RA = Rheumatoid arthritis, SpA = Spondyloarthropathy.