	Inflammation (standard 6 slices)		Inflammation ("all slices")		Inflammation (extra slices in "all slices" not part of 6 slices)	
	Scores	ICC(3,1)	Scores	ICC(3,1)	Scores	ICC(3,1)
Status score at baseline	13 (6-21; 0-49)	0.81/0.77/0.84	14 (6-23; 0-49)	0.84/0.77/0.86	1 (0-3; 0-19)	0.65/0.53/0.73
Status score at week 52	2 (0-4; 0-12)	0.67/0.70/0.50	2 (0-5; 0-13)	0.62/0.69/0.46	0 (0-1; 0-2)	0.19/0.65/0.20
Change score (baseline to week 52)	-12 (-20 to -3; -45 to 5)	0.84/0.81/0.87	-13 (-26 to -4; -64 to +7)	0.86/0.79/0.90	-1 (-3 to 0; -19 to 1)	0.61/0.54/0.74
	Fat metaplasia (standard 5 slices)		Fat metaplasia ("all slices")		Fat metaplasia (extra slices in "all slices" not part of 5 slices)	
	Scores	ICC(3,1)	Scores	ICC(3,1)	Scores	ICC(3,1)
Status score at baseline	3 (0-10; 0-38)	0.89/0.64/0.81	4 (1-12; 0-48)	0.92/0.63/0.77	0 (0-2; 0-10)	0.80/0.40/0.49
Status score at week 52	7 (2-14; 0-35)	0.81/0.53/0.77	9 (2-19; 0-51)	0.87/0.57/0.70	1 (0-4; 0-16)	0.70/0.53/0.55
Change score (baseline to week 52)	1 (0 to 4; -4 to 18)	0.75/0.26/0.47	2 (0 to 3; -5 to 26)	0.84/0.34/0.46	0 (0 to 1; -1 to 8)	0.60/0.44/0.46
	Erosion (standard 5 slices)		Erosion ("all slices")		Erosion (extra slices in "all slices" not part of 5 slices)	
	Scores	ICC(3,1)	Scores	ICC(3,1)	Scores	ICC(3,1)
Status score at baseline	7 (1-11; 0-18)	0.70/0.66/0.73	8 (1-14; 0-23)	0.74/0.67/0.70	1 (0-2; 0-6)	0.45/0.18/0.62
Status score at week 52	3 (1-6; 0-16)	0.43/0.39/0.75	4 (1-8; 0-18)	0.42/0.38/0.69	1 (0-2; 0-6)	0.20/0.09/0.40
Change score (baseline to week 52)	-2 (-5 to 0; -11 to 1)	0.25/0.23/0.60	-3 (-6 to 0; -13 to 0)	0.23/0.29/0.37	0 (-1 to 0; -3 to 1)	0.03/0.05/0.29
	Backfill (standard 5 slices)		Backfill ("all slices")		Backfill (extra slices in "all slices" not part of 5 slices)	
	Scores	ICC(3,1)	Scores	ICC(3,1)	Scores	ICC(3,1)
Status score at baseline	0 (0-3; 0-11)	0.53/0.82/0.60	0 (0-3; 0-13)	0.48/0.79/0.63	0 (0-0; 0-2)	0.08/0.40/0.50
Status score at week 52	3 (1-5; 0-16)	0.26/0.44/0.75	4 (1-6; 0-18)	0.23/0.43/0.71	0 (0-1; 0-4)	-0.01/0.28/0.44
Change score (baseline to week 52)	1 (0 to 3; -7 to 9)	0.33/0.41/0.66	2 (0 to 4; -9 to 11)	0.35/0.40/0.74	0 (0-1; -2 to 3)	0.01/0.22/0.58
	Combined erosion and backfill (standard 5 slices)		Combined erosion and backfill ("all slices")		Combined erosion and backfill (extra slices in "all slices" not part of 5 slices)	
	Scores	ICC(3,1)	Scores	ICC(3,1)	Scores	ICC(3,1)
Status score at baseline	10 (2-13; 0-18)	0.68/0.67/0.73	12 (2-16; 0-24)	0.70/0.68/0.73	1 (0-3; 0-7)	0.52/0.31/0.66
Status score at week 52	8 (3-13; 0-20)	0.57/0.69/0.78	10 (4-14; 0-24)	0.61/0.71/0.79	1 (0-3; 0-4)	0.46/0.36/0.71
Change score (baseline to week 52)	-1 (-3 to 0; -7 to 4)	0.22/0.18/0.45	-1 (-2 to 0; -10 to 3)	0.18/0.25/0.30	0 (-1 to 0; -3 to 2)	0.09/0.09/0.40

Scores reported as median (IQR; range). ICCs are ICC(3,1), single rating, agreement, in pairwise comparisons (SK-UW/GK-UW/SK-GK). N = 53 for status score at baseline; N = 46 for status score at week 52 and change score/baseline to week 52.

Conclusions: The standardised 6/5 slices SPARCC methods had equal reliability as compared to evaluation of all cartilaginous slices. There was limited reliability to identify the posterior slice in the "all slices" approach, as opposed to good reproducibility to determine the transitional slice in the "6/5 slices" approach. Combining erosion and backfill scores tended to result in superior reliability compared to the 2 lesions separately, indicating a challenge to identify the transition from erosion to backfill.

REFERENCES:

- [1] Arthritis Care Res 2005;53:703-9.
- [2] J Rheumatol 2015;42:79-86.

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FRI0593 MANTOUX TEST IS INADEQUATE TO DEFINE ALL SUBJECTS WITH LATENT TUBERCULAR INFECTION

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Background: Latent TB infection (LTBI), defined as 'a state of persistent immune response to *Mycobacterium tuberculosis* without clinically-manifested disease', inflicts a third of the world's population and nearly 10% of LTBI positive persons develop TB within 2-5 years. The tuberculin skin test (TST) and, more recently, interferon gamma release assays (IGRAs) are most commonly used for detection of LTBI. However, in a high TB burden setting such as India, both the assays have been found to grossly underestimate the true prevalence of LTBI, since almost equal number of new TB cases emerged from the test-positive and test-negative groups during the follow-up¹.

Objectives: This study was aimed at exploring whether an *in vitro* CD3 +T cell response to PPD can complement the *in vivo* TST response for the determination of true prevalence of LTBI in healthy Indians.

Methods: In this ongoing study, 80 apparently healthy workers (age 19-61 years) at SGPGIMS have been recruited. Their demographic data, including BCG vaccination status and duration of contact with TB patients, was recorded. TST was performed with 5 TU of PPD. Blood T cell (CD3+) responses to PHA (a mitogen, used as positive control) and PPD were determined by flow cytometry in terms of expression of the proliferation-induced nuclear protein Ki67.

Results: 48% of the study subjects showed positivity for TST (skin induration ≥ 10 mm) and the size of reaction could be correlated with age. There was no association between BCG vaccination status and TST positivity. 72% of the TST positive and 62% of TST negative persons showed positivity for CD3 +T cell response to PPD. Positivity for either assay was found to be 82%.

Conclusions: By combining TST with CD3 +T cell responses, the positivity for PPD was enhanced from 48% (TST alone) to 82%. Therefore, both the assays could be considered as complementary. It remains to be seen whether these assays, either singly or jointly, show a correlation with the emergence of TB in our study population during the follow-up.

REFERENCE:

- [1] Sharma SK, Vashishtha R, Chauhan LS, Sreenivas V, Seth D. Comparison of TST and IGRA in Diagnosis of Latent Tuberculosis Infection in a High TB-Burden Setting. PLoS ONE 2017;12(1):e0169539.

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FRI0594 RETROCALCANEAL BURSITIS PRECEDES OR ACCOMPANIES ACHILLES TENDON ENTHESTITIS IN THE EARLY PHASE OF RHEUMATOID ARTHRITIS

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Background: We had reported the frequencies of various pathologies detected by ultrasound (US) in symptomatic ankles and heels in rheumatoid arthritis (RA) patients¹. Through that study, we recognised that Achilles tendon (AT) involvement is not rare in RA, because retrocalcaneal bursitis (RCB), AT enthesitis, AT tendonitis and AT paratendonitis was detected in 27%, 22%, 13%, and 6% of the symptomatic ankles examined, respectively. Recently, it has been reported that RA and SpA patients did not differ in enthesal abnormalities seen on US². However, we think that there is fundamental difference between the inflammation of synovio-enthesal complexes in RA and that in SpA.

Objectives: This study aims to investigate characteristics of enthesal abnormalities in RA by evaluating the association between US-detected RCB or AT enthesitis and clinical data.

Methods: We reviewed consecutive records of 100 ankles in 74 RA patients (filling the 2010 criteria) who underwent US examination of symptomatic ankles because of clinical need. The patients consist of 52 women and 22 men (median age 63.3 years, range 26-83 years) with median disease duration of 4.2 months (range 0.23 months to 19.4 years), as described previously. 55/74 (74%) of them were positive for RF and/or ACPA. The association between presence of RCB or AT enthesitis in a narrow definition (i.e., insertional tendinitis) and clinical data were analysed using Fisher's exact test or Mann-Whitney U test.

Results: Among the overall 100 ankles, the frequency of RCB-positive/AT enthesitis-negative ankles, that of RCB-positive/AT enthesitis-positive ankles and that of RCB-negative/AT enthesitis-positive ankles were all more than 10%. Interestingly, the frequency of RCB-negative/AT enthesitis-positive ankles among the 62 ankles with early RA (disease duration <6 months) was significantly lower as compared to that among the 38 ankles with established RA ($p=0.00595$). Similarly, the frequency of RCB-negative/AT enthesitis-positive ankles among the 58 ankles of untreated patients was lower as compared to that among the 42 ankles of already-treated patients. The disease duration was significantly longer in the RCB-negative/AT enthesitis-positive ankles than in the rest of the ankles (43.8 ± 74.6 months vs. 16.7 ± 35.3 months, $p=0.0179$).

Conclusions: McGonagle et al. advocated the concept of synovio-entheseal complex and suggested that the inflammation occurs primarily at the enthesis and spreads to adjacent synovial tissues such as bursae in SpA patients. Our cross-sectional data indirectly indicated that RCB precedes or accompanies AT enthesitis in a narrow definition in the early phase of the RA, suggesting that the inflammation around the enthesis of RA patients occurs primarily at the synovial tissues and spreads to the enthesis in an opposite way. In addition, the isolated AT enthesitis without RCB in the established and/or treated RA patients may suggest several possibilities as follow: 1. Enthesitis is more refractory to RA treatment than bursitis; 2. Enthesitis is partially due to the degenerative changes related to damages and deformities caused by RA synovitis; 3. US-detected enthesitis in RA basically represents repair process rather than ongoing inflammation.

REFERENCES:

- [1] Suzuki T, Okamoto A. Clin Exp Rheumatol 2013;31(2):281–4.
- [2] Ebstein E, et al. Joint Bone Spine 2017 Dec 9. [Epub ahead of print].

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FRI0595 THE BEACH TOOL: A QUANTITATIVE MRI-BASED METHOD FOR MEASURING OEDEMA AND FAT METAPLASIA IN SPONDYLOARTHRITIS

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Background: Magnetic resonance imaging (MRI) is an important part of diagnostic pathways in spondyloarthritis (SpA), and can be used to stratify patients and assess severity. However, measurements of the burden of inflammation currently rely on qualitative assessment, which is subjective and time-consuming thus impractical for clinical practice. There is a need for a more objective, faster method for measuring inflammation and damage with potential for automation, and quantitative MRI is a candidate tool.

Objectives: We aimed to provide proof-of-principle for the BEACH (Bone Oedema and Adiposity quantification with Apparent diffusion coefficient and Chemical shift imaging with histograms) tool, which quantifies bone marrow oedema and fat metaplasia – features of active and chronic inflammation – in the SIJs.

Methods: Fifty-three patients aged 12–24 years with either SpA or mechanical back pain were recruited prospectively, and underwent quantitative MRI consisting of diffusion weighted imaging (DWI) and fat fraction (FF) mapping,^{2,3} and conventional MRI scans. Apparent diffusion coefficient (ADC) and FF maps were assessed using the BEACH tool, which automatically propagates ROIs on sub-chondral bone after the observer defines the SIJ. Pixel values were analysed to derive the histographic parameters for ADC and FF: median, 10th, 25th, 75th and 90th percentiles (denoted ADC₁₀, ADC₂₅, FF₁₀, FF₂₅, etc), and P_{high} and plough (the proportion of high and low value pixels respectively).

Conventional MRI scans were assessed using visual scoring.⁴ Patients were deemed to have active inflammation if their inflammation score was ≥2, and to have fat metaplasia if this score was ≥3. Quantitative measurements were compared between inflamed and non-inflamed SIJs.

Results: Use of the BEACH tool is demonstrated in figure 1(a)-(f). Example ADC histograms are shown in (g),(h).

ADC₇₅, ADC₉₀, and P_{high}(ADC) were significantly increased in inflamed SIJs ($P=0.041$, 0.006 and 0.003 respectively), although median ADC values did not differ significantly between inflamed and uninflamed joints ($P=0.31$). Diagnostic performance was superior for histographic parameters (AUC=0.59, 0.67 and 0.69) than for the median (AUC=0.54): Median FF, FF₇₅, FF₉₀ and P_{high}(FF) were all significantly increased in SIJs with fat metaplasia compared to those without (all $p<0.0001$). Diagnostic performance was superior for histographic parameters FF₇₅, FF₉₀ and P_{high}(FF) (AUC=0.89, 0.92 and 0.92) than for the median (AUC=0.87).

Conclusions: ADC and FF measurements can differentiate between inflamed and non-inflamed SIJs, and between joints with and without fat metaplasia. Compared to simple averages such as the median, histographic parameters can increase diagnostic performance for detecting inflammation and fat metaplasia. There is minimal subjectivity associated with ROI placement using the BEACH tool, which can potentially make inflammation scores more reproducible.

REFERENCES:

- [1] Vendhan K, et al. Br J Radiol. 2016.
- [2] Bray TJP, et al. Rheumatol. 2017.
- [3] Bray TJP, et al. Magn Reson Med. 2017.
- [4] Maksymowych WP, et al. Arthr Care Res. 2005.

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FRI0596 FEASIBILITY OF JOINT STRUCTURAL ANALYSIS IN HEMOCHROMATOSIS HAND ARTHROPATHY USING HIGH-RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY – FIRST RESULTS AND CLINICAL CORRELATIONS

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Background: Hereditary Hemochromatosis (HH) is a common inherited disorder and characterised by an excess iron accumulation in several organs with consecutive organ dysfunction.¹ Apart from the liver, the joints are a major site of excess iron deposition. Joint pain counts among the most frequent (>50%), earliest, and most debilitating symptoms of HH.² To date, joint health status in HH patients is routinely assessed on hand radiographs.³ However, plain radiography is a low-resolution, 2D-technique with limited sensitivity to detect early joint changes or to monitor subtle progression of joint damage.⁴ With the advent of high-resolution peripheral quantitative computed tomography (HR-pQCT), a promising imaging tool has emerged allowing for *in vivo* 3D characterisation of human joint microstructure at a spatial resolution of 130 µm.⁵ Due to its high sensitivity to detect and monitor subtle, short-term joint changes, HR-pQCT has been successfully applied to patients with RA.⁶ However, to date, HR-pQCT has not been used to characterise joint and bone changes seen in HH arthropathy.

Objectives: Here, we aimed to investigate in a cohort of HH patients 1) if the usage of HR-pQCT is feasible on HH patients; 2) to quantify joint microstructure of metacarpophalangeal joints (MCP2–4) in this specific patient group; and 3) investigate the relationship between HR-pQCT-derived joint microstructural parameters and clinical outcomes.

Methods: 25 HH patients were enrolled and their HH history and treatment were recorded. MCP joints of all patients were imaged at a clinical HR-pQCT system (XtremeCT, Scanco Medical AG). 330 images were acquired covering MCP 2, 3 and 4. The joint space (JS) morphology of each MCP was quantified from the HR-pQCT images semi-automatically⁴ and volume (JSV), joint space width mean (JSW), JSW variance (JSW.SD), and JSW asymmetry (JSW.AS) were calculated.

Results: Out of the 75 MCP joints available for analysis, 79% were successfully segmentable, and 19% required semi-manual intervention to separate the individual bones. 3 joints were excluded due to motion artefacts, and 1 joint was unsegmentable. HH patients were 32–72 years old, in 64% male, and had been diagnosed with HH 2 months to 40 years ago. 15% were pain free at the study