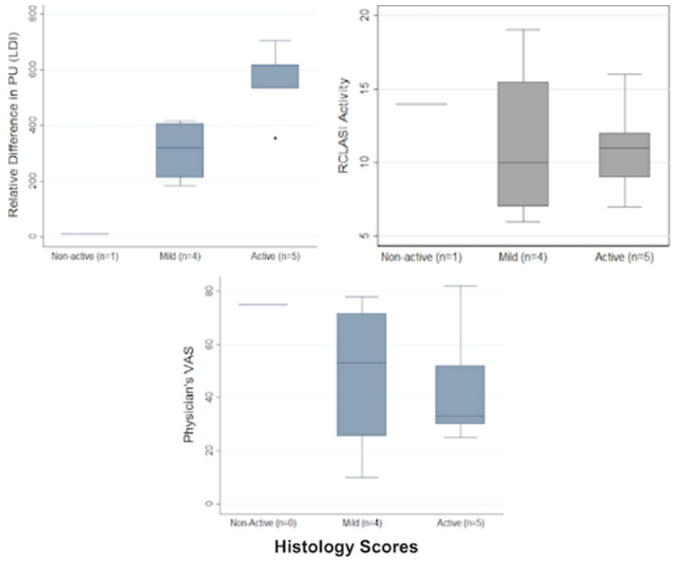

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SAT0648 ULTRASOUND FINDINGS IN SYMPTOMATIC AND ASYMPTOMATIC JOINTS IN PATIENTS WITH GOUT

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Objectives: To determine sensitivity and specificity of ultrasound (US) findings for gout: "double contours" (DC) and hyperechogenic aggregates (HAGs) of symptomatic and asymptomatic joints in patients with gout.
Methods: This prospective study included 69 persons (34 patients with primary gout and 35 healthy subjects). Including criteria for patients with gout were: age ≥18 years; diagnosis of primary gout; absence of acute gout attacks during the study tests; the absence of any other inflammatory and infectious joint disease, and secondary gout. The research included: demography and medical history. Physical and US examination covered following structures: 138 radiocarpal joint, 276 patellar and triceps tendon and 414 articular cartilages (first metatarsal, talar and femoral condyle).
Results: Both groups were compatible for age and gender. In the gout group 124 (30%) symptomatic and 284 (70%) asymptomatic joints were found and in healty group all joints was asymptomatic. The sensitivity of the DC for symptomatic joint was 56 to 84% and specificity also was very high 91 to 94% as well as positive and negative predictive value (69 - 86% and 38 - 71%). Sensitivity of DC finding for the asymptomatic joints was 42 to 73% and specificity was 91 to 94%, with also high positive and negative predictive value (69 - 89% and 44 - 62%). The specificity of the HAGs for both symptomatic and asymptomatic joints was very high 99% but sensitivity of HAGs symptomatic structures was moderate (41 do 56%), while its sensitivity for asymptomatic structures was low (18 to 34%), table 1.

Table 1

Structure		Sensitivity (%)	Specificity (%)	"Cut-off"	PPV (%)	NPV (%)
Symptomatic	DC	56–84	91–94	0.50	69–86	38–71
	HAGs	41–56	98–99	0.50	69–89	44–62
Asymptomatic	DC	42–73	91–94	0.50	58–86	38–71
	HAGs	18–34	98–99	0.50	49–75	31–60

DC - "double contours"; HAGs - hyperechogenic aggregates; PPV - positive predictive values; NPV - negative predictive values.

Conclusions: Ultrasound examination of symptomatic and asymptomatic joints in patients with gout equally observed structural changes characteristic of gout. The finding of "double contours" in the symptomatic and asymptomatic joints has a very high sensitivity and specificity. Consequently, future research should be focused on the ultrasound examination of asymptomatic joints in patients with gout.
Disclosure of Interest: None declared
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SAT0649 CHANGES IN CARTILAGE QUALITY (DGEMRIC) FOLLOWING KNEE JOINT DISTRACTION OR HIGH TIBIAL OSTEOTOMY: A TWO-YEAR FOLLOW-UP

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Background: Since abnormal loading can cause onset and progression of OA, unloading the affected compartment of an osteoarthritic knee, should slow down OA progression, or even enable joint repair. High tibial osteotomy (HTO) is a well-known unloading approach for treating unilateral compartment osteoarthritis (OA) with mechanical axis deviation. Transient unloading using knee joint distraction (KJD) has demonstrated a progressive decrease in pain, normalization of function, and an increase in cartilage thickness[1]. Although both treatments show indications of joint repair, there is limited information about the actual quality of the regenerated tissue.
Objectives: To evaluate the change in quality of the repaired cartilaginous tissue using dGEMRIC after KJD or HTO treatment.
Methods: 40 patients (20 with KJD, and 20 with HTO), treated for medial tibiofemoral OA, are included in this study. Radiographic changes, clinical changes, and changes in cartilage quality are evaluated after one and two years follow-up. Joint space width (JSW) is evaluated on weight-bearing radiographs. Clinical improvement is evaluated by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Visual Analogue Scale (VAS) pain score. In order to evaluate the quality of the (newly formed) cartilaginous tissue, quantitative MRI analysis, in the form of Delayed gadolinium enhance Magnetic Resonance Imaging of cartilage (dGEMRIC) is performed.
Results: A significantly increased medial (Δ1.15 mm,p<0.000), minimal (Δ0.93 mm,p<0.000) and mean (Δ0.79 mm,p=0.003) JSW one year after KJD, sustaining up until 2 years, was demonstrated (medial (Δ0.99 mm,p=0.002), minimal (Δ1.04 mm,p<0.000), mean JSW (Δ0.68 mm,p=0.027)). Similarly, medial (Δ0.49 mm,p=0.017) and minimal (Δ0.32 mm,p=0.023) JSW were significantly increased one year after HTO, sustaining up until 2 years (medial: Δ1.03 mm,p<0.000, minimal: Δ0.72 mm,p=0.015), after which mean JSW (Δ0.46 mm,p=0.030) is also significantly increased. Both interventions led to clinical improvement, observed as an increase in WOMAC after one year (KJD: Δ36.89,p<0.000, HTO: Δ33.74,p<0.000) and two years (KJD: Δ32.52,p<0.000, HTO: Δ24.19,p=0.002), and a decrease in VAS Pain, after one year (KJD: Δ-30.79,p=0.001, HTO: Δ-41.89,p<0.000) and two years (KJD: Δ-30.50,p=0.004, HTO: Δ-34.64,p<0.000). However, no statistically significant changes in cartilage quality were found after KJD or HTO, not in the medial and lateral compartments of the tibiofemoral joint, nor in the separate ROIs (see figure 1).

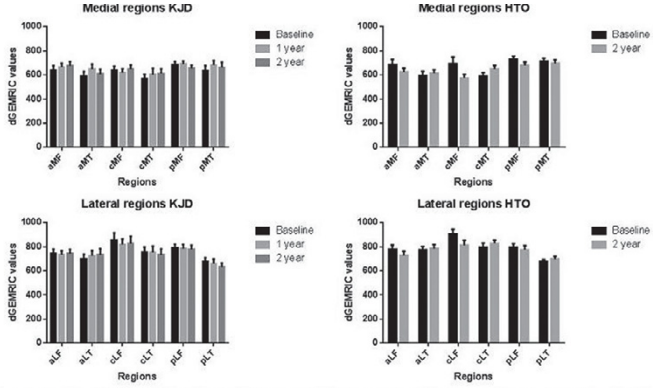

Figure 1: Average dGEMRIC indices (in ms) for the six ROIs of the medial and lateral compartment at baseline and after follow-up.

Conclusions: Treatment of medial compartmental OA by either HTO or KJD leads to alleviation of pain and recovery of function, achieved one year after either intervention, and maintained for another year. Within the first year after treatment, KJD shows a statistically significantly higher increase in WOMAC as compared to HTO. Both treatments led to a statistically significant increase in JSW after one and two years, postponing the natural osteoarthritis progression rate. No statistically significant change in the quality of newly formed cartilaginous tissue could be detected by dGEMRIC.
References:
[1] van der Woude et al. Knee joint distraction compared with high tibial osteotomy. 2016. Knee Surgery,Sports Traumatology,Arthroscopy,1–11.
Disclosure of Interest: None declared
DOI: 10.1136/annrheumdis-2017-eular.3400

SAT0650 [18F]FLUORO-PEG-FOLATE PET: A NOVEL IMAGING TECHNIQUE TO VISUALIZE RHEUMATOID ARTHRITIS

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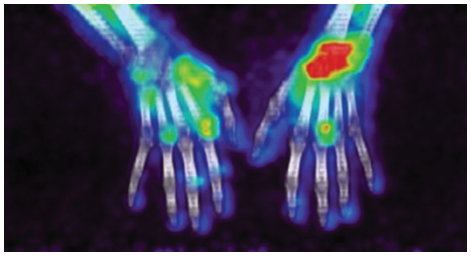
Background: Imaging arthritis activity in rheumatoid arthritis (RA) patients using PET macrophage tracers holds promise for both early diagnostics and monitoring response to therapy (1,2). Previously, (*R*)-[^{11}C]PK11195 has been used, but this macrophage tracer is limited due to high background uptake, especially in bone and bone marrow. Recently, a novel macrophage tracer, [^{18}F]fluoro-PEG-folate,

was developed, which showed excellent targeting of the folate receptor beta on activated macrophages in synovial tissue in a preclinical arthritic rat model (3).
Objectives: To assess the value of [^{18}F]fluoro-PEG-folate PET-CT for imaging inflamed joints in patients with clinically active RA.
Methods: Nine RA patients with at least two clinically inflamed hand joints were included. PET-CT scans of the hands were acquired after intravenous administration of either 185 MBq of [^{18}F]fluoro-PEG-folate (n=6) or 425 MBq of (*R*)-[^{11}C]PK11195 (n=3). Volumes of Interest (VOI) were drawn over joints with visually marked uptake and Standardized Uptake Values (SUVs) were calculated. Background VOIs were drawn on metacarpal bone in order to calculate Target-to-Background (T/B) ratios.
Results: No side effects were observed, establishing the safety of [^{18}F]fluoro-PEG-folate for use in humans. [^{18}F]fluoro-PEG-folate clearly showed uptake in arthritic joints, as shown in Figure 1. In patients scanned with [^{18}F]fluoro-PEG-folate, 25 positive joints were seen, with a minimum of two joints per patient. Clinical arthritis was confirmed in 10 of these 25 joints, and was absent in 15 positive joints, suggesting the presence of subclinical inflammation. Whilst both [^{18}F]fluoro-PEG-folate and (*R*)-[^{11}C]PK11195 accumulated in arthritic joints, [^{18}F]fluoro-PEG-folate showed a significantly lower background uptake than (*R*)-[^{11}C]PK11195 (SUV of 0.18 vs 0.75; $p<0.001$) respectively. T/B-ratios were significantly higher for [^{18}F]fluoro-PEG-folate (3.60vs 1.72, p=0.009).



Conclusions: This first in patient study clearly demonstrates the potential of [^{18}F]fluoro-PEG-folate PET-CT as macrophage tracer to image both clinically and sub-clinically affected joints in RA patients. [^{18}F]fluoro-PEG-folate showed better characteristics for arthritis imaging than the established tracer (*R*)-[^{11}C]PK11195 because of its lower background signal.
References:
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[2] Gent YY, et al. Arthritis Rheum. 2012; 64: 62–6.
[3] Gent YY, et al. Arthritis Res Ther. 2013; 15: R37.
Disclosure of Interest: None declared
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SAT0651 QUANTIFICATION OF DYNAMIC MRI EXAMINATIONS IN JUVENILE IDIOPATHIC ARTHRITIS

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Background: In chronic inflammatory conditions, the need for a more objective measurement of disease activity has been identified. Imaging biomarkers as outcome measurements based on the automated quantification of dynamic contrast enhanced magnetic resonance images (DCE-MRI) have been studied in adult patients with rheumatoid arthritis (RA)[1]. In children with juvenile idiopathic arthritis (JIA) similar knowledge is very limited.
Objectives: To compare treatment related changes of clinical scores in patients with JIA and automated DCE-MRI quantitative parameters analyzed with a dedicated software Dynamika^{tm} also compared to clinical outcomes of the patients.
Methods: In patients with polyarticular JIA with insufficient ($\geq$3 affected joints) response or intolerance to $\geq$3 months Methotrexate, Etanercept was started. Six Slice Axial DCE-MRI of the metacarpophaleangeal (MCP) 2–5 joints in the clinically most affected hand was performed at 3 time points: baseline (BL), month 3 and 6 of treatment using a 0.2 Tesla Esaote C-Scan. Clinical scores included active joint (AJ) counts. Clinical response was considered a state of $\leq$3 AJ. DCE-MRI was analyzed using regions of interest (ROI) covering synovium in slices where MCPs 2–5 were visible. Output parameters included dynamic MRI quantification scores (DEMRIQvol) corresponding to the volume of enhancing voxels within the synovial ROIs alone or multiplied with the mean of the maximum enhancement (ME) or the initial rate of enhancement (IRE). Differences in DEMRIQvol scores between visits were analyzed using t-test ($p<0.05$* = statistically significant, $p<0.25$** = clinically meaningful). Concordance between clinical and DEMRIQvol scores were described.
Results: 18 Caucasian patients (12 girls, median age 12,6 years, median disease duration 1,2 years) were included in the study. Two patients discontinued imaging after BL but continued treatment. In all but 3 of the remaining patients statistically significant and/or clinically meaningful changes were documented for DEMRIQvol ME between visits.
In 4 patients clinical and DEMRIQvol scores showed corresponded changes but these were non-concordant in all others patients.
Based on DEMRIQvol change (irrespective of the clinical scores) the outcome of the patient could be predicted:
- in 5 patients improvement of DEMRIQvol scores predicted response to treatment (within 2–6 months after last MRI examination)
- in 4 patients the increase or the persistence of a high DEMRIQvol predicted non-response to treatment
- in 7 patients increase in DEMRIQvol (after initial decrease) or persistence of a high DEMRIQ vol predicted flare (in 3 of the patients flare occurred after treatment discontinuation)

In all patients subclinical disease could be detected on MRI in clinically unaffected joints.
Conclusions: Dynamika based scores appear to be useful for depicting disease activity in JIA and seem to support clinical examination by detecting subclinical inflammation. More over, in the present study DEMRIQvol scores were predictive for the outcome of the patients and were able to "foresee" response to treatment, flare of disease, non-response to treatment in most patients possibly making DEMRIQvol scores supportive in research and clinical decision taking.
References:
[1] Kubassova O et al; Eur J Radiol. 2010 Jun;74(3):e67–72.
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Disclosure of Interest: N. Tzaribachev: None declared, R. Hagoug Employee of: Image Analysis Group, P. Louka Employee of: Image Analysis Group, J. Islam Employee of: Image Analysis Group, M. Hinton Employee of: Image Analysis Group, O. Kubassova Employee of: Image Analysis Group, M. Boesen Shareholder of: Image Analysis Group
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SAT0652 CLINICAL AND IMMUNOLOGICAL SIGNIFICANCE OF RADIOGRAPHIC THYMIC ALTERATIONS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: The thymus, a primary lymphoid organ, plays a crucial role in immune system homeostasis [1,2]. Although several small-scale studies of the association between radiographic thymus alterations and serological features have been reported in systemic autoimmune diseases, information in patients with rheumatoid arthritis (RA) is limited.
Objectives: We conducted a large-scale cross-sectional analysis of radiographic thymus alterations and their association with clinical and immunological features in patients with RA.
Methods: RA patients were randomly selected from all patients who visited our department and underwent chest CT scan between January 2013 and December 2015. Patients with thymoma or thymic cyst and those aged less than 30 years were excluded. Thymic enlargement and thymus attenuation score in axial images of CT scans were quantitatively interpreted. We defined thymic enlargement as a thickness of more than 13 mm and graded the score by a four-point scale (score 0–3) according to previous studies [3,4]. Associations with immunophenotyping data of peripheral blood by flow cytometry and clinical and serological information were statistically analyzed in some available patients.
Results: 387 RA patients were enrolled. 78% were women and mean age was 65.2±12.3 years. Thymic enlargement was found in 76 (19.6%) patients. Thymus attenuation (score $\geq$2) was found in 154 (39.8%) patients. These findings were more frequent than in undiagnosed controls (11.3% (P=0.078) and 22.5% (P=0.017)). Importantly, radiographic thymus alterations in these RA patients, especially thymus attenuation score, were significantly associated with serological features such as serum level of CRP, ESR, IgG, RF-positivity or ACPA-positivity (P=0.0003, 0.001, 0.0009, 0.005, and 0.0009 respectively). When we investigated the association with the proportion of 68 peripheral blood subpopulations in 83 RA patients, thymic enlargement was significantly associated with the proportions of CD45RA+CCR7+ naïve CD4+T cell or CD45RO+CCR7-effector memory CD4+T cell (P=0.04 and 0.009). Furthermore, thymus attenuation score was also significantly associated with the proportions of CD4+ naïve T cell, CD4+effector memory T cell, CXCR5-CXCR3+CXCR6+CD4+Th1/Th17 cell, CD45RO-CCR7+CD95+CD4+ stem cell memory T cell, and CD19+ B cell (P=0.03, 0.02, 0.04, 0.04, and 0.037 respectively).
Conclusions: Radiographic thymus alterations are frequent in RA patients and may reflect immunological features of autoantibody production or T cell differentiation and function.
References:
[1] Gorozny JJ, et al. Trends Immunol 2001;22:251–255.
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Disclosure of Interest: None declared