All CTs were blindly processed by a rheumatologist using OsiriX to obtain the QCTi (kurtosis, skewness, mean lung attenuation). The semiquantitative scores and the QCTi were correlated through the Spearman rank test. QCTi distribution and discriminative ability were, respectively, verified using Mann-Whitney test and ROC curves.

Results: The majority of QCTi showed a statistically significant correlation of moderate degree ($0.40 < r < 0.59$) with the semiquantitative assessment (p -value < 0.01).

Patients with severe and mild ILD had dissimilar QCTi values ($p < 0.001$). Among QCTi, kurtosis (tKurt) had the best discriminative ability (AUC=0.80, 95% CI 0.65 to 0.91, $p < 0.0001$). The best tKurt cut-off value that identifies patients with severe pulmonary involvement was 3.67.

Conclusions: In RA-ILD, QCTi correlate with the CT semiquantitative scores. Our preliminary findings suggest that RA-ILD severity is related to QCTi. Moreover a QCTi (tKurt) has a cut-off that can discriminate patients with severe ILD. So, QCTi may become simple tools to help the rheumatologist to quickly evaluate the severity of ILD in RA patients and estimate the prognosis.

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FRI0561 MACROPHAGE PET IMAGING FOR PREDICTING TREATMENT OUTCOME OF DE NOVO RHEMATOID ARTHRITIS

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Background: Treatment of rheumatoid arthritis (RA) should be initiated as early as possible to prevent further damage and functional disability.¹ However, clinical assessment of treatment response usually takes 12 weeks or longer. Tools that detect earlier response can improve timely treatment decision. Previously, positron emission tomography (PET) using the macrophage tracer [11C]-(R)-PK11195 has shown promise for both early diagnosis and monitoring response to therapy in RA patients.^{2,3}

Objectives: To determine the value of [11C]-(R)-PK11195 PET to identify RA responders and non-responders to COBRA-light therapy after 2 weeks of treatment.

Methods: Twenty RA patients (female 10/20, age 54 ± 10 years) with clinically active *de novo* RA based on ACR/EULAR criteria⁴ and at least two clinically active joints were included. All patients were given COBRA-light therapy (methotrexate and prednisolone). They received standard clinical care and (clinical) evaluations were performed at 0, 2, 4 and 12 weeks of treatment. Whole body [11C]-(R)-PK11195 PET-CT scans were acquired at baseline and after 2 weeks of treatment. An experienced reader blinded to clinical data scored the 44 joints of the Disease Activity Score (DAS44) visually from 0 to 3. PET response was pre-defined as either positive if there was a decrease in whole body PET score of $\geq 10\%$ after two weeks, or as negative if the score increased or remained unchanged. PET outcome was compared with EULAR clinical response at 12 weeks.⁵

Results: After 12 weeks of COBRA-light treatment, 16 out of the 20 patients were classified as EULAR responders (13 'good' and 3 'moderate') and 4 patients as non-responders. At baseline, a total of 134 PET positive lesions were observed in the joints of 20 patients, ranging from 1 to 21 lesions per patient. Most frequently, lesions were located in hands and feet: 19% in the wrists (e.g. figure 1A), 37% in the small hand joints and 39% in the small feet joints. After 2 weeks of COBRA light treatment, the number of PET positive lesions decreased to 122 (e.g. figure 1B).

A positive whole body PET response was observed in 13 patients. Table 1 shows a side by side comparison between PET response after 2 weeks and EULAR response after 12 weeks. In 15 of the cases (75%), there was an agreement between the PET response and EULAR response.

PET response at 2 weeks	EULAR response at 12 weeks	
	Positive	Negative
Positive	12	1
Negative	4	3

Abstract FRI0561 – Table 1. Correspondence between early PET response and clinical EULAR response.

Abstract FRI0561 – Figure 1

Conclusions: This is the first study to explore the potential of macrophage PET for monitoring therapy in early RA. Preliminary visual assessment demonstrates its ability to monitor arthritis activity changes within 2 weeks of treatment. This offers a window of opportunity for development of precision medicine in the early phase of treatment. Future analyses are in progress to assess whether performance can be further improved by quantification of tracer uptake.

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FRI0562 ASSOCIATION BETWEEN JOINT REGIONS WITH ULTRASOUND-DETERMINED SYNOVITIS AND SYSTEMIC INFLAMMATORY MARKERS

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Background: It is unknown which joint arthritis the inflammatory markers such as CRP or MMP-3 reflect.

Objectives: We analysed the association between joint regions with ultrasound-determined synovitis and systemic inflammatory markers.

Methods: We enrolled 152 patients with untreated arthritis and performed musculoskeletal ultrasound on 40 joints and determined a semiquantitative grade for power Doppler (PD) signals. We analysed the associations between PD scores in 8 joint regions and CRP/MMP-3 levels using multiple linear regression models with forced entry method.

Results: Mean age was 55 years and 112 patients were female. Median CRP and MMP-3 were 0.36 mg/dl and 65.7 ng/ml. Median total PD score was 2. Standard regression coefficients for 8 joint regions were –0.009 for MCPs, 0.05 for PIPs, 0.372 for wrists, 0.183 for elbows, 0.628 for shoulders, 0.377 for knees, 0.261 for ankles, and –0.0131 for MTPs in a regression model to explain CRP using PD scores as dependent variables. Standard regression coefficients for the same joint regions were –5.134, –4.449, 24.061, 27.839, 22.508, 64.108, 36.501, and 2.539 to explain MMP-3.

Conclusions: Systemic inflammatory markers such as CRP and MMP-3 do not accurately reflect the inflammation in small joints. Conversely, it is necessary to weight the large joints for the global ultrasound synovitis score to represent the severity of systemic inflammation.

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