PERSISTENT VASCULAR 18F-FDG UPTAKE DESPITE CLINICAL-ANALYTICAL REMISSION IN PATIENTS WITH LARGE VESSEL VASCULITIS UNDER TOCILIZUMAB THERAPY: SINGLE UNIVERSITARY CENTER EXPERIENCE OF 30 PATIENTS.

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Background: Tocilizumab (TCZ) has shown efficacy in large vessel vasculitis (LVV) (1-3). Disease activity assessed by laboratory markers (ESR,CRP) may be of less value with TCZ. 18F-FDG PET/CT may be useful to monitor LVV disease activity (4-5).

Objectives: To assess a) evolution of disease activity in LVV treated with TCZ by PET/CT and b) its correlation with clinical/serological markers.

Methods: Single centre study of 30 patients with refractory LVV treated with TCZ who had a baseline and follow-up PET/CT scan. Vascular uptake was assessed quantitatively and qualitatively. Quantitative analysis was assessed as a target to background ratio (TBR)=SUV(max thoracic aorta/SUV(max aortic vascular pool). For qualitative analysis, FDG uptake at vessel wall was visually grading compared to liver. We defined a total vascular score which included 5 vascular conditions and is the primary cause of death: Medical imaging is an integral part of the routine work-up for diagnosis and monitoring of SSC-ILD and includes high-resolution computed tomography (HRCT). Radiomics is a novel research area that describes the in-depth analysis of tissue phenotypes in medical images with computational retrieval of quantitative, mineable metadata appropriate for statistical analyses.

Objectives: To explore the performance of HRCT-derived radiomic features for the assessment of SSc-associated ILD (i.e. diagnosis, staging, and lung function).

Methods: Radiomics analysis was performed on HRCT scans from 98 SSc patients, including n=33 SSC patients without ILD, n=33 with limited and n=32 with extensive ILD as defined by (6). 20% and ≥20% visual extent of fibrosis on HRCT, respectively. Following semi-automated segmentation of lung tissue on 3D reconstructed HRCT scans, 1386 radiomic features, including 17 intensity, 137 texture, and 1232 wavelet features were extracted using the in-house developed software Z-Rad (Python 2.7). In order to identify robust features, we conducted intra- and inter-reader correlation analysis (ICC) in a subgroup of patients.

Only features with good reproducibility (ICC ≥ 0.75) entered subsequent analyses. We applied the Wilcoxon test, followed by Receiver Operating Characteristic (ROC) curve analyses, to identify features significantly different between a) ILD
and non-ILD and b) limited vs. extensive ILD patients. Spearman rank correlation was performed to reveal significant associations of radiomic features from a) and b) with lung function as measured by percentage of predicted forced vital capacity (FVC%) predicted.

**Results:** In total, 1355/1386 radiomic features passed the test of robustness and were eligible for further, exploratory analyses. Radiomic features with good performance (area under the ROC curve (AUC) ≥ 0.7 and p-value ≤ 0.05) were considered as potential candidate discriminators. Under this criterion, we identified 288/1355 (21.3%) radiomic features that were significantly different between ILD and non-ILD patients and 409/1355 (30.2%) features that significantly discriminated between limited and extensive ILD (Fig. 1). For diagnosis, the texture feature *dependence count entropy* was the top parameter to distinguish ILD patients from healthy controls (AUC = 0.89, p = 1.83x10⁻¹⁰), whereas for staging the wavelet feature *HHH long run high grey level emphasis* proved to be best suited to separate limited from extensive ILD (AUC = 0.88, p = 7.76x10⁻⁹).

**Conclusion:** Our study adds novelty to the field of SSc-ILD showing that radiomic features have great potential as quantitative imaging biomarkers for diagnosis and staging of SSc-ILD and that they may reflect lung function. As the next step, we are planning to build predictive models, using machine learning, for diagnosis, staging, and lung function and validate them in external patient cohorts. If validated such models will pave the way for computer-aided management in SSc-ILD and thus improve patients’ outcome.

**References:**


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**SAT0570 CLINICAL SIGNIFICANCE OF FINGER EXTENSOR PARATENONITIS DETECTED BY MUSCULOSKELETAL ULTRASOUND**

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**Background:** The extensor tendons over fingers are devoid of a tendon sheath, so that the term paratenonitis is used to describe extra-articular hyperemia or aseptic fluid collections along the extensor tendons of the fingers. Although the grading of paratenonitis is found in one sonographic scoring system of RA known as German US7, the clinical significance of paratenonitis is not fully understood.

**Objectives:** To determine the clinical significance of finger extensor paratenonitis detected by ultrasound (US), especially in the patients with RA.

**Methods:** We reviewed 1200 reports of the US examination underwent in our division since April 2015. The items necessary for scoring US5 scores (the ‘hand-limited version’ of the German US7) have been routinely recorded. The cases with finger extensor paratenonitis over the dorsal metacarpophalangeal joint (MCPJ) were determined. The severity of articular synovitis in the perilesional MCPJ were subjectively graded for grey-scale (GS) and power Doppler (PD) on a four-step scale (0-3) and scored using EULAR-OMERACT combined scoring system. In RA patients, US5 scores were determined for the involved hands.

**Results:** Paratenonitis was found in 44 fingers in the 38 hands of the 36 patients with rheumatic diseases/disorders including 25 patients with RA (11 early RA and 14 established RA). Non-RA diseases/disorders included 4 cases of undifferentiated arthritis, 2 cases of PsA, 1 case each of SLE, Sjogren syndrome, reactive arthritides and other disorders.

**Fig 1.** Correlation analysis of the most significant (best performing) discriminative radiomic features with lung function revealed a significant negative correlation of *dependence count entropy* (rho = -0.51, p = 9.89x10⁻⁸) and *HHH long run high grey level emphasis* (rho = -0.51, p = 1.73x10⁻⁹) with FVC% predicted.

**Fig 2.** The 44 fingers were classified according to the absence or presence of articular synovitis in the perilesional MCPJ into “isolated paratenonitis” or “paratenonitis accompanied by synovitis”. The distribution of paratenonitis over the 1st-5th fingers of the dominant or non-dominant hands is shown in Figure 1. Paratenonitis was relatively frequently found in the 3rd and 2nd fingers of the dominant hands. Interestingly, articular synovitis in the perilesional MCPJ were found significantly more frequent in the cases of MCP2 in the dominant hands (73%) than in the cases of MCP3 in the dominant hands (25%) (p=0.039).

**Conclusion:** Finger extensor paratenonitis over the dorsal MCPJ tends to occur in the 3rd and 2nd fingers of the dominant hand. In RA patients, paratenonitis accompanied by active perilesional MCPJ synovitis are presumably due to active disease, while isolated paratenonitis can also be caused possibly by degenerative changes due to overuse or deformity. Isolated paratenonitis may be more frequently found in the 3rd finger than in the 2nd finger of the dominant hand.

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