OP0180	DIAGNOSTIC VALIDITY OF ULTRASOUND INCLUDING EXTRA-CRANIAL ARTERIES IN GIANT CELL ARTERITIS

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Background: Giant cell arteritis (GCA) is a chronic vasculitis of the medium and large arteries. The involvement of large vessel (LV) either isolated or associated with cranial artery is frequent, so it is necessary to use imaging techniques for diagnosis, because the biopsy in these cases is not useful. European League Against Rheumatism (EULAR) recommends an early imaging test in patients with suspected GCA, and ultrasound of temporal±axillary arteries is recommended as the first imaging modality in patients with suspected predominantly cranial GCA (1).

Objectives: To assess the validity of Colour Doppler ultrasound (CDUS) of temporal superficial arteries (TA) and LV (axillary, subclavian and carotid) in the diagnosis of GCA, using as gold standard the patient's definitive clinical diagnosis. Analyse if routine ultrasound examination of LV improves the diagnostic accuracy.

Methods: This was an observational, descriptive and analytical study of 198 consecutive patients with GCA suspicion. A baseline CDUS of the TA and LV was performed. Ultrasound diagnosis was made according to the OMERACT (Outcome Measures in Rheumatology) definitions of halo sign and was established as a limit of average intimal thickness ≥ 0.34 mm for superficial temporal arteries and ≥ 1 mm for axillary, subclavian and carotid arteries. Statistical analysis was performed using SPSS version 25.

Results: Eighty-seven patients (43.9%) were CDUS compatible with GCA, and 111 patients (56.1%) had a negative CDUS. Among the patients with positive CDUS three different patterns were detected: 45 patients (51.7%) had an exclusive cranial involvement, 31 (35.6%) had a mixed pattern with involvement of both TA and LV and 11 (12.6%) had an exclusive LV involvement. The validity (sensitivity and specificity) and security (positive predictive value and negative predictive value) of diagnostic are shown in table.

When we analyse patients with LV involvement, 87.8% have axillary artery involvement, 77.4% subclavian involvement and 34.4% carotids involvement. If we only explored the axillary arteries, 12.2% of patients with LV involvement would not be diagnosed. However, if we explored axillary and subclavian arteries, 100% of patients with LV involvement would be diagnosed.

Conclusion: Half of the patients with GCA have LV involvement and up to 12.8% exclusively LV affectation in our series. Adding CDUS exploration of LV arteries to TA increases both sensitivity and diagnostic specificity. The minimum ultrasound examination of LV should include both axillary and subclavian arteries.

References:

[1] Dejaco C, Ramiro S, Duftner C, et al. EULAR recommendations for the use of imaging in large vessel vasculitis in clinical practice. Ann Rheum Dis. 2018;77(5):636–3

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
CDUS TA and LV	97,7%	97,3%	96,6%	98,2%
CDUS TA	83,9%	97,3%	96,1%	88,5%

OP0181	FUNCTIONAL CUT-OFFS TO DISTINGUISH PULMONARY VASCULAR AND PARENCHYMAL INVOLVEMENT IN SYSTEMIC SCLEROSIS (SSC): A QUANTITATIVE ANALYSIS OF IMAGING FEATURES AT CHEST COMPUTED TOMOGRAPHY (CT)

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Background: Interstitial lung disease (ILD) and pulmonary arterial hypertension represent the most frequent causes of morbidity and mortality in SSc, with chest CT representing the gold standard in ILD assessment, while FVC and DLco allow functional assessment.

Objectives: As qualitative analysis of given chest CT scans is hampered by low reproducibility, we aimed to perform a quantitative analysis (QA) of CT scans able to investigate the parenchymal and vascular features in SSc-ILD and thus testing the relationship with clinical-functional data.

Methods: We prospectively enrolled 80 patients who underwent PFTs and spirometry-gated chest CT scan at TLC on the same day. Clinical, lung functional and diffusion data, as well as disability indexes were collected. CT images were analyzed by a computational platform for texture analysis of ILD patterns (CALIPER) through Imbio LTA. It quantified the extent of normal lung (%N), ground-glass opacities (%GG), reticulation (%RET), honeycombing (%HC), hyperlucent (%HL), absolute (PVV, cm^3) and normalized (PVV/LV, %) pulmonary vascular volumes. Cut-offs of normality for %FVC and %DLco of 80% and 70% were tested to differentiate parenchymal and vascular features.

Results: 73 patients/CT scans were eligible for both software analyses. CALIPER showed GG% as the most frequent radiological pattern (mean 5.5±10.4%). %FVC and % TLC negatively correlated with all ILD patterns, while %DLco with RET% only; PVV and PVV/LV negatively correlated with %FVC and %TLC, while %DLco with PVV/LV only. Positive correlations were found between all ILD patterns and vascular volumes (Table 1).

		LV (cm^3)	%N	%GG	%RET	%HC	%HL	PVV (cm^3)	% PVV/LV
FVC%	r	.60	-.19	-.40	-.34	-.30	.35	-.26	-.44
	p	<.001	-	<.001	.004	.01	.003	.04	<.001
FEV$_1$%	r	.58	-.02	-.38	-.25	-.24	.23	-.35	-.49
	p	<.001	-	.002	.04	.05	-	.004	<.001
FEV$_1$/FVC	r	-.16	.33	.22	.16	.21	-.35	-.15	-.08
	p	-	.02	-	-	-	-	-	-
TLC%	r	.71	-.14	-.42	-.37	-.48	.40	-.43	-.64
	p	<.001	-	.001	.01	<.001	.002	<.001	<.02
DLco%	r	.38	-.05	-.21	-.31	-.22	.30	-.21	-.33
	p	.01	-	.01	-	-	-	-	.006
FVC/DLco	r	.03	-.08	-.06	-.003	-.09	.08	-.06	-.08
	p	-	-	-	-	-	-	-	-

Cut-offs equal to 80 for %FVC and 70 for %DLco distinguished both parenchymal and vascular features, while 80 for %DLco characterized vascular features only. These results were confirmed also when patients were stratified according to absent/single/combined %FVC and %DLCO impairments with 80% cut-offs (Table 2).

Conclusion: In SSc a cut-off at 80 for %DLco may help identifying vascular changes as automatically assessed on chest CT scan, without any underlying

	FVC<80%	FVC ≥80%	p	DLco<80%	DLco ≥80%	p	DLco <70%	DLco ≥70%	p
%N	82.7 (9.6)	86.2 (14.7)	-	86.6 (12.7)	80.8 (15.8)	-	84.1 (13.9)	86.4 (13.5)	-
%GG	10.3 (8.9)	2.4 (3.9)	<.001	5.0 (6.7)	3.9 (6.9)	-	6.2 (7.5)	2.4 (4.8)	.002
%RET	2.9 (2.9)	0.8 (1.3)	<.001	1.6 (2.1)	0.7 (0.9)	-	1.9 (2.4)	0.6 (0.8)	.007
%HC	0.4 (0.6)	0.1 (0.1)	<.001	0.2 (0.4)	0.1 (0.1)	-	0.2 (0.4)	0.05 (0.2)	.010
%HL	3.6 (6.8)	8.9 (12.1)	-	5.4 (8.8)	14.1 (15.4)	.050	6.3 (10.1)	9.2 (12.7)	-
PVV	125.6 (39.1)	90.9 (26.9)	<.001	101.9 (34.8)	84.7 (19.4)	.016	106.9 (38.3)	87.5 (20.5)	.012
PVV/LV	3.8 (1.6)	2.0 (0.7)	<.001	2.51 (1.3)	1.7 (0.6)	.002	2.76 (1.4)	1.83 (0.6)	.001

ILD. The 80% cut-off for %DLco may be proposed to identify isolated vascular involvement, while %FVC at 80% or %DLco at 70% to identify significant parenchymal involvement. These results need to be confirmed in larger multi-centric cohorts.

OP0182 | **PROTEOGLYCAN LOSS IN ARTICULAR CARTILAGE IS ASSOCIATED WITH JOINT INFLAMMATION SEVERITY IN PSORIATIC ARTHRITIS – A COMPOSITIONAL MAGNETIC RESONANCE IMAGING STUDY**

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Background: Even though cartilage loss is a known feature of psoriatic arthritis (PsA), little is known about its role in the pathogenesis of PsA. Using delayed gadolinium-enhanced magnetic resonance imaging of cartilage (dGEMRIC) as a non-invasive marker of the tissue's proteoglycan content, such early (i.e. pre-morphological) changes have been associated with inflammation in rheumatoid arthritis (RA). Yet, this association has not been studied before in PsA.

Objectives: Is the severity of local joint inflammation associated to local proteoglycan loss in PsA patients?

Methods: Metacarpophalangeal (MCP), proximal interphalangeal (PIP), and distal interphalangeal (DIP) joints of 17 patients with active PsA were evaluated by high-resolution clinical standard morphological and dGEMRIC sequences using a 3T MRI scanner (Magnetom Skyra, Siemens) and a dedicated 16-channel hand coil. Images were analyzed by two independent raters for dGEMRIC indices, PsA MRI scores (PsAMRIS) and total cartilage thickness (TCT). Kendall-Tau correlation coefficients (τ) were calculated.

Results: We found significant negative correlations between dGEMRIC indices and total PsAMRIS (τ = -0.5, p= 0.012), synovitis (τ = -0.56, p= 0.006), flexor tenosynovitis (τ = -0.4, p= 0.049), and periarticular inflammation (τ = -0.72, p< 0.001). Significant positive correlations were found between TCT and dGEMRIC indices in all joint levels (τ = 0.43, p<0.001). No significant correlations were determined between dGEMRIC indices and bone erosion, bone edema or bone proliferation.

Conclusion: In PsA, proteoglycan loss as assessed by dGEMRIC is associated with periarticular inflammation, synovitis, and flexor tenosynovitis, but not with bone erosion or proliferation, thereby highlighting the need for effective anti-inflammatory treatment regimes. Beyond morphology, advanced MRI techniques may be used to assess cartilage composition in PsA and to identify early
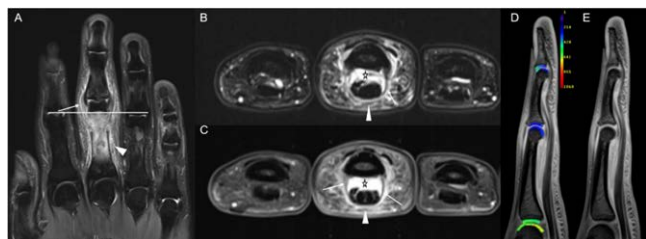

Figure 1 *Right hand of a 26-year-old male with psoriatic arthritis Coronal STIR image (A) of digits 1-5, transversal fat-saturated (fs) T2-weighted image of digits 2-4 (B) and the corresponding transversal fs contrast-enhanced T1-weighted image (C) at the distal portion of the proximal phalanges. Horizontal white bar in (A) indicates level of transversal slices (B) & (C). Sagittal fs Proton Density-weighted image of the third digit (D). A: Increased signal at the collateral ligaments and synovitis of the proximal interphalangeal (PIP) joint of the third digit (white arrow). Periarticular inflammation around the PIP joint and the body of the proximal phalanx of the third digit (arrowhead). B & C: Extensive flexor tenosynovitis (asterix) and periarticular inflammation in the subcutaneous tissues (arrowhead) alongside thickened flexor tendon pulleys (arrow). D & E: Representative sagittal T1-weighted images of the MCP, PIP and DIP joint of the 3rd digit. Following iv contrast administration and appropriate delay of 40 min, A gives the morphological T1 map, while B gives the corresponding parameter map with dGEMRIC values [ms] overlaid. Note the significant decrease in dGEMRIC indices of the PIP joint as compared to the MCP joint.*

changes in cartilage as an imaging biomarker with potential application in detection and monitoring of PsA.

OP0183 | **DO CARTILAGE LAMINAR COMPOSITIONAL CHANGES AS ASSESSED BY T2 RELAXOMETRY PREDICT INCIDENT AND WORSENING OF STRUCTURAL MORPHOLOGIC DAMAGE IN THE SAME PLATE 3 YEARS LATER?**

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Background: To address the question whether laminar changes in knee cartilage T2 are relevant for prediction of lesion onset or progression in the same articular plate we included two different samples from the Osteoarthritis Initiative (OAI) study without radiographic osteoarthritis (ROA), i.e. so-called "healthy controls" with no ROA in either knee and being free of risk factors, and those with K-L 0 in one knee and ROA in the contralateral knee. Given the concept of the osteochondral unit, we hypothesize that superficial T2 is elevated in cartilage plates with subsequent surface damage development or worsening and deep layer T2 is elevated for those with subsequent bone marrow lesion (BML) development or worsening.

Objectives: To analyze whether knees with subsequent morphologic cartilage and BML development or worsening exhibit elevated cartilage T2 compared to those that do not develop such structural damage in the same plate 3 years later.

Methods: We included 63 knees from the OAI without ROA (K-L 0), but with definite ROA (K-L ≥2) in the contralateral knee, and 78 participants from the OAI healthy reference cohort.

Cartilage integrity or damage and subchondral bone marrow lesions (BMLs) were assessed for year 1 (i.e. baseline (BL) in this analysis) and year 4 (Y4) in chronological order using the semi-quantitative MOAKS scoring system.

BL deep and superficial layer cartilage T2 was computed from sagittal multi-echo spin echo MR images. Because cartilage T2 is known to display spatial variation with tissue depth, the segmented cartilages were computationally divided into superficial and deep 50%, based on the distance between the segmented cartilage surface and bone interface. Statistical analyses were performed for the femoro-tibial (FT) joint on a plate level, i.e. medial femur (MF), medial tibia (MT), lateral femur (LF) and lateral tibia (LT), using UNIANOVA with adjustment for age, body mass index, sex, and sample.

Results: 141 participants were included. Of these 79 (56%) were women, had a mean age of 59.4 ± 9.1 years and a mean body mass index of 25.8 ± 4.1 m/kg[2].

52 (37%) had prevalent cartilage lesions in the medial FT joint and 67 (48%) in the lateral FT joint. For BMLs these numbers were 15 (11%) medially and 14 (10%) laterally. Worsening of FT cartilage lesions from BL to Y4 were seen in 10 (7%) medially and 21 (15%) in the lateral FT compartment. Incident FT cartilage lesions were seen in 11 (11.5%) medially and 8 knees laterally. No worsening BMLs were seen