Table 1. US findings at the patient level

	Total n = 121	AAGU n = 20	AANGU n = 101	AANGU B27- n = 40	AANGU B27+ n = 61	AANGU vs AANGU	AAGU vs AANGU B27-	AAGU vs AANGU B27 +	AANGU B27- vs AANGU B27+
Entesophyte, n. (%)	109 (90.1%)	16 (80%)	93 (92.1%)	39 (97.5%)	54 (88.5%)	0.111	0.038	0.451	0.142
Enthesal erosion, n. (%)	12 (9.9%)	0	12 (11.9%)	5 (12.5%)	7 (11.5%)	0.213	0.159	0.184	1
Hypoechoogenicity, n. (%)	5 (5.1%)	0	5 (5%)	3 (7.5%)	2 (3.3%)	0.589	0.544	1	0.382
Thickened entheses, n. (%)	118 (97.5%)	19 (95%)	96 (98%)	37 (97.4%)	59 (97.3%)	0.440	1	0.440	1
Doppler signal at entheses, n. (%)	32 (26.4%)	1 (5%)	31 (30.7%)	13 (32.5%)	18 (29.5%)	0.024	0.023	0.032	0.750
Active enthesitis, n. (%)	10 (8.3%)	0	10 (9.9%)	5 (12.5%)	5 (8.2%)	0.211	0.159	0.326	0.512
Structural damage, n. (%)	109 (90.1%)	16 (80%)	93 (92.1%)	39 (97.5%)	54 (88.5%)	0.111	0.038	0.451	0.142

Results are presented as number and percentage of patients having at least 1 enthesal abnormality, with significance

Methods: 121 consecutive patients diagnosed with AAU [91 AANGU (40 B27-, 61 B27+) and 20 AAGU, M/F 32/29, mean age 45.4±12.8 y, mean disease duration 44±84 m] from the Immunology Eye Unit (AUSL-IRCCS Reggio Emilia, Italy) entered the study. Patients with Fuchs uveitis were enrolled as controls (AAGU group). A complete rheumatological examination, including 68/66 peripheral joint count, entheses and bone spine mobility evaluation, was conducted. Using an Esaote MyLabClass, 18-6MHz linear multifrequency transducer both in B-mode and PD-mode, 6 entheses were evaluated bilaterally for the presence of any elementary lesion, structural damage and active enthesitis, according to OMER-ACT definitions². The following sites were studied: lateral epicondyle of humerus, distal quadriceps insertion into the patella, proximal and distal patellar tendon insertions, calcaneal insertion of Achilles tendon and plantar fascia. Knee and ankle joints, were evaluated for synovial hypertrophy, effusion and PD signal. Extensor and flexor tendons of the foot and ankle were also examined for tendon sheath effusion, synovial hypertrophy and PD signal.

Results: Abnormal US findings, consisting in the presence of at least one enthesal abnormality, were detected in 110/121 patients (90.2%), the mean number of abnormal entheses per patient was 6.71±5.46. At the entheses level, structural damage was significantly higher in AANGU, as compared with AAGU (30.9% vs 21.7%, $p<0.001$) and in AANGU B27+ as compared with B27- (27% vs 36%, $p<0.001$). The presence of PD signal at entheses was significantly increased in AANGU vs AAGU (7.1% vs 0.4%, $p<0.001$) but also among AANGU B27+ vs AANGU B27- pts (5.9% vs 9%, $p=0.040$). Analysis based on patient-level data showed a significantly higher percentage of patient in AANGU group having at least one entheses exhibiting PD signal, when compared with AAGU (31% vs 5%, $p=0.023$) (Table 1). The prevalence of US joint and tendon sheath alterations was negligible in the entire AAU population (<1%) without any difference between groups.

Conclusion: US enthesal structural damage is frequent in AAU patients, whereas US active enthesitis has a low prevalence. At the patient level, the presence of PD signal at entheses seems to be associated with AANGU, without apparent influence of HLA-B27 positivity.

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SAT0546

COMPARISON OF SHEAR WAVE ELASTOGRAPHY AND CONVENTIONAL ULTRASONOGRAPHY OF SALIVARY GLANDS IN PATIENTS WITH PRIMARY SJÖGREN'S SYNDROME: CAN SHEAR WAVE ELASTOGRAPHY CAPTURE LESIONS THAT ARE DIFFICULT TO DIAGNOSE WITH CONVENTIONAL ULTRASONOGRAPHY?

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Background: Sjögren's syndrome (SS) is a chronic inflammatory autoimmune disease characterized by lymphocyte infiltration in salivary and lacrimal glands. Recently, salivary gland ultrasonography (US) proved valuable for assessing salivary gland involvement in SS and seemed to exhibit good diagnostic properties. In the literature, studies conducted by the scoring of the structural changes according to B-Mode US of salivary glands showed a wide variability regarding sensitivity and specificity. Our previously study demonstrated that although conventional B-mode US findings were useful for the diagnosis of SS with low salivary flow they were not for subclinical SS with normal salivary flow (EULAR 2016). Recently, we reported that the tissue elasticity was decreased due to structural changes in the submandibular glands (SG) at the advanced stage

of the disease and the shear wave elastography (SWE) is useful to distinguish pathological changes of the SG in patients with SS (EULAR2018).

Objectives: The aim of this study was to compare the usefulness of SG conventional B-mode US and SWE findings in non-SS and SS patients classified by salivary flow.

Methods: Twenty-two non-SS patients and 99 SS patients who fulfilled the American College of Rheumatology (ACR) / European League Against Rheumatism (EULAR) classification criteria for SS were studied. SS patients were divided into three groups according to salivary flow using gum test (VL/SS <5mL/10min. (n=38), L/SS 5-10mL/10min. (n=41) and N/SS >10mL/10min. (n=20)). All patients were examined SGUS by a single investigator who was blinded to device (TUS-A300; Canon Medical Systems, Tokyo, Japan) with a linear transducer (7.5-10MHz). The examination consisted of conventional B-mode US (US staging score), pulsed wave Doppler US (PD grading score) and SWE with quantitative assessment. US staging scores were assessed by glandular size, inhomogeneity and contrast of diaphragmatic muscle (stage 0 to 3). PD grading scores were graded by pulsed wave pattern in pulsed wave Doppler US at the internal SG facial arteries (grade 0 to 2). With the region-of-interest (ROI) placed over the stiffest areas of the lesion on SWE, the quantitative means of the elasticity values were measured by shear wave velocity (Vs; m/s) and elasticity (E; kPa) for each lesion.

Results: The US staging score, the PD grading score, the values of Vs and E were significantly higher in patients with SS than in non-SS group (SS vs non-SS; US staging score 2.10±1.07 vs 0.86±0.99, $p<0.0001$, PD grading score 1.17±0.83 vs 0.23±0.61, $p<0.0001$, Vs 1.75±0.34 vs 1.57±0.29m/s, $p=0.02$, E 9.64±4.02 vs 7.81±2.27kPa, $p=0.04$). However, there was no significant difference between non-SS and N/SS in early-stage SS by US staging score (N/SS vs non-SS; 0.95±0.89 vs 0.86±0.99) and PD grading score (N/SS vs non-SS; 0.40±0.15 vs 0.23±0.61). In contrast, the values of Vs and E were highest in N/SS as compared with all groups, and were significantly higher in N/SS than in non-SS (N/SS vs non-SS; Vs 2.02±0.24 vs 1.57±0.29m/s, $p<0.01$, E 12.58±3.16 vs 7.81±2.27kPa, $p<0.01$).

Conclusion: The present study demonstrated that although the tissue elasticity was decreased due to structural changes at the advanced stage, it increased due to inflammation and high viscosity in the SG at the subclinical SS with normal salivary flow comparing that in non-SS patients. The SWE may be a useful tool for the differential diagnosis between patients with non-SS and subclinical SS with normal salivary flow, which is difficult to distinguish by conventional B-mode US.

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SAT0547

RADIOGRAPHIC IMAGING IN ASSESSMENT OF FLUOROSCOPIC GUIDED INJECTION OF RHEUMATOID ATLANTOAXIAL JOINT INFLAMMATION

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Background: Rheumatoid spondylitis is a feature of long-lasting Rheumatoid arthritis (RA) that is presented by neck pain, headache and sleep disturbance. Atlantoaxial joint (AAJ) is the commonest cervical spine joint that affected in patients with RA. When it is involved, it can be associated with dangerous complications. Magnetic Resonance Imaging (MRI) can be used for assessing the disease activity, the amount of cartilage destruction, associated cervical myelopathy and differentiating synovial fluid from inflammatory pannus (Taniguchi D, et al., 2008).

Objectives: This study aimed to evaluate the efficacy of intra-articular steroid injection of inflamed AAJ in RA patients, regarding neck pain, headache and sleep quality using pre and post-interventions MRI.

Methods: A prospective case control study. Patients with inflamed AAJ were recruited. Group 1 (AAJ group, n = 30), received intraarticular AAJ steroid injection, guided by fluoroscopy and Group 2 (control group, n = 30), received systemic steroids. Both groups were assessed with: Visual Analogue scale (VAS) for

nocturnal neck pain and headache. Pittsburgh sleep quality index (PSQI) was used for sleep disturbance. Pre and post contrasts enhanced MRI interventions were done for both groups during the period of follow up (three months).

Results: Nocturnal neck pain, headache and sleep disturbance have significantly decreased, during follow up visits (3 months), in AAJ group in comparison to the control group. The Pre-intervention nocturnal pain score was 60.3 ± 17.1 in AAJ group & 58.5 ± 17.9 in control group. Pain has significantly decreased after 2 weeks in AAJ group with continuous improvement till 3 months' post-intervention 6.9 ± 4.65 & 51.26 ± 10.54 respectively. The pre-intervention headache was 22.68 ± 16.74 in AAJ group & 45.17 ± 15.83 in control group decreased to 7.54 ± 5.23 & 48.52 ± 11.98 respectively post intervention. The percentage of patients who had sleep disturbance at baseline was 66.7% & 73.3% in AAJ and control groups respectively which has significantly decreased to 6.7% & 43.3% after 3 months. Regarding MRI, AAJ group had a statistical significant decrease in the percentage of patients with MRI synovial enhancement, inflammatory pannus, fibrosis and bone marrow edema in comparison to control group 3 months post intervention. All post-procedural side effects resolved within 1 month without further medical intervention, and no long-term sequelae were identified.

Conclusion: Fluoroscopic guided intra-articular steroid injection of inflamed atlantoaxial joints is considered a beneficial therapeutic option in rheumatoid arthritis patients regarding clinical and radiological assessments.

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SAT0548

DEVELOPMENT AND VALIDATION OF THREE PRELIMINARY MRI SACROILIAC JOINT COMPOSITE STRUCTURAL DAMAGE SCORES IN A 5-YEAR LONGITUDINAL STUDY OF PATIENTS WITH AXIAL SPONDYLOARTHRITIS

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Background: In axial spondyloarthritis (axSpA), MRI reliably detects structural lesions in the sacroiliac joints (SIJs). The SPARCC SIJ Structural Score (SSS) (1) is a reliable and validated method to assess the individual structural lesions of the SIJs, i.e. fat lesion, erosion, backfill (fat metaplasia in an erosion cavity) and ankylosis. Several MRI studies have indicated that bone destruction, i.e. erosion, is often followed by formation of new bone in the erosion cavity (backfill), ultimately leading to ankylosis(2).

Objectives: The aim was to combine SPARCC SSS for erosion, backfill and ankylosis into a composite score for SIJ structural damage and to test this score in a 5-year follow up study.

Methods: Thirty-three patients fulfilling ASAS criteria for axSpA were followed for 5 years after initiation of TNF inhibitor in the BIOSPA study(3). T1-weighted and STIR MRI sequences of the SIJs acquired at week 0, 46 and year 2, 3, 4, 5 were evaluated with SPARCC SSS. In each of 5 slices of each SIJ, erosion is scored 0-1 per joint quadrant (score range 0-40), backfill 0-1 per joint half (score range 0-20) and ankylosis 0-1 per joint half (score range 0-20). Based on the scores for erosion, backfill and ankylosis 3 versions of a preliminary Composite axSpA MRI SIJ Structural Damage Score (CSDS) were calculated:

CSDS-A: (erosion score x0.5) + backfill score + ankylosis score

CSDS-B: (erosion score x1) + (backfill score x4) + (ankylosis score x6)

CSDS-C: (erosion score x1) < (backfill score x4) < (ankylosis score x6)

The "<" indicates a hierarchical order, meaning that erosion was not scored if backfill was present in the same joint half and erosion and backfill were not scored if ankylosis was present in the joint half.

Results: Patients were divided into two groups: patients with almost complete bilateral ankylosis (baseline SPARCC SSS Ankylosis ≥ 18 , n=10) and patients with no/minor ankylosis (baseline SPARCC SSS Ankylosis ≤ 7 , n=23). At baseline patients with no/minor ankylosis were younger, had shorter symptom duration, lower BASMI, higher SPARCC SIJ Inflammation, lower SSS Fat, Erosion, Backfill and Ankylosis, as compared with patients with almost complete ankylosis.

At baseline, CSDS-A, -B and -C correlated positively with SPARCC SSS Fat and Ankylosis and modified New York criteria grading, and negatively with BASDAI and SPARCC inflammation. Change in CSDS-B and -C over 5 years correlated positively with change in SSS Fat and Ankylosis and negatively with change in SPARCC Inflammation. There was no change in the group with almost complete ankylosis.

The annual progression for CSDS-B and -C was statistically significantly larger in year 1 compared with year 4 (p=0.01) and numerically larger compared with year 2 (p=0.075), 3 (p=0.382) and 5 (p=0.073). Figure 1 shows the annual change in patients with no/minor ankylosis.

Figure 1

Figure 1. The figure shows the annual progression in the group with no/minor ankylosis at baseline in CSDS -A, -B and -C. Data are shown as mean. Annual progression was calculated as the change between MRI scans divided by the exact interval (years) between MRI assessments. Comparison of annual progression year 1 (week 0-46) with the other time intervals were calculated with Wilcoxon signed rank test. *p<0.05.

Conclusion: Three preliminary Composite Structural Damage Scores for MRI assessment of the SIJs in patients with axSpA, which allows scoring of MRI progression of erosion through backfill to ankylosis, were introduced. Progression was most pronounced the first year after TNF inhibitor initiation. This novel approach may be useful for monitoring structural progression in axSpA. We suggest that these methods are further tested for responsiveness and ability to differentiate between different therapies in randomized controlled trials.

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SAT0549

A SEMI-QUANTITATIVE MRI SCORING SYSTEM FOR INFLAMMATION IN JOINTS AND ENTHESES IN THE LOWER EXTREMITIES DEMONSTRATES GOOD RELIABILITY AND VALIDITY: POST-HOC ANALYSIS OF DATA FROM THE CRESPIA TRIAL

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