- [2] Yang H, et al. *Int J Rheum Dis* 2017.
 [3] Chiba K, et al. *Eular* 2017.

Disclosure of Interest: None declared
DOI: 10.1136/annrheumdis-2018-eular.3851

SAT0659

IS SYNOVIAL HYPERTROPHY WITHOUT DOPPLER ACTIVITY IN RHEUMATOID ARTHRITIS JOINTS SENSITIVE TO CHANGE? – RESULTS OF A LONGITUDINAL ULTRASOUND STUDY

L. Terslev¹, M. Østergaard¹, J. Sexton², H.B. Hammer². ¹Center for Rheumatology and Spine Disease, Rigshospitalet-Glostrup, Glostrup, Denmark; ²Rheumatology, Diakonhjemmet, Oslo, Norway

Background: Ultrasound (US) is used to assess disease activity in rheumatoid arthritis (RA). Grey scale (GS) US shows the synovial hypertrophy (SH) and Doppler the amount of hyperemia which is believed to reflect disease activity. Some joints with SH may have no Doppler activity despite the use of high-end US equipment and these joints are generally believed to be inactive without potential to change.

Objectives: The aim was to investigate if joints with SH but no Doppler activity is sensitive to change during treatment with biological DMARD (bDMARD) in RA patients.

Methods: RA patients initiating or changing bDMARD treatment were included. US examination was performed at baseline, 3 and 6 months using Siemens Antares US equipment with Doppler settings for slow flow.

36 joints were evaluated at each visit. SH and Doppler activity was graded from 0–3 according to the US atlas by Hammer et al.⁽¹⁾ The GS score for SH in joints without Doppler activity was registered for the individual joints using GS SH ≥ 1 as threshold. The changes were compared to changes in SH in joints with Doppler activity.

Results: 151 patients (82.8% women, 80.1% seropositive for anti-CCP) were included, with a mean (SD) age 51.4 (13.2) years, disease duration 9.9 (7.9) years. At baseline, 50.7% used prednisolone (mean (SD) 5 mg (4.68)).

The patients had a mean (SD) baseline DAS28 of 4.5 (1.5). At baseline 23% of the joints had SH without Doppler activity and 23% of the joints had SH with Doppler activity.

Doppler-negative joints had overall lower grades of SH (mean 1.2) than Doppler-positive joints (mean 2.2) at baseline using GS SH > 1 as cut-off. The improvement in SH was similar in Doppler-positive and Doppler-negative joints but when adjusting for the baseline score of SH, Doppler-negative joints had a higher tendency towards decrease than Doppler-positive joints for all grades (3 months: $p < 0.0001$; 6 months: $p = 0.0006$).

A weak correlation was found to changes in DAS 28(crp) (Doppler-negative joints: 0.27 ($p = 0.001$) and 0.18 ($p = 0.03$) at 3 and 6 months respectively – Doppler-positive joints: 0.25 ($p = 0.004$) and 0.33 ($p = 0.0002$) at 3 and 6 months respectively).

Conclusions: SH in joints without Doppler activity improves during bDMARD, i.e. is sensitive to change. Thus, SH without Doppler activity is not a sign of inactive disease. These findings document that both Doppler and SH should be evaluated when assessing disease activity by US.

REFERENCE:

- [1] Hammer HB, Bolton-King P, Bakkeheim V, et al. Examination of intra and interrater reliability with a new ultrasonographic reference atlas for scoring of synovitis in patients with rheumatoid arthritis. *Ann Rheum Dis* 2011;70:1995–8.

Disclosure of Interest: None declared
DOI: 10.1136/annrheumdis-2018-eular.2265

SAT0660

CLINICAL SIGNIFICANCE OF ANTI-RA33 AUTOANTIBODIES IN RHEUMATOID ARTHRITIS

M. Volkava, A. Kundzer. *BeIMAPGE, Minsk, Belarus*

Background: Recently heterogeneous nuclear ribonucleoproteins (hnRNPs) were identified as antigenic targets for autoantibodies in RA. Autoantibodies to RNP B1, B2 and heterogeneous complex A2/b are the most studied and are referred to as "antigen RA33". Clinical value of anti-RA33 in RA continues to be studied, so the question is about the diagnostic and pathogenetic significance of these autoantibodies in patients with RA remains open.

Objectives: The aim of this study was to investigate the frequency of occurrence of anti – RA33y patients with RA and compare them with clinical manifestations and immunological parameters of disease.

Methods: The study included 139 patients with RA. The diagnosis was verified according to the classification criteria of ACR/^{EULAR 2010}. Autoantibodies to RNP B1 IgG was assessed in samples of blood serum by enzyme immunoassay (ELISA; Medipan AG, Germany). Anti-CCP, RF and antibodies to Sa-antigen (anti-Sa) was evaluated by ELISA according to the manufacturer's instructions (Euroimmun AG company, Germany). The results were expressed in relative units (U/ml). Statistical data processing was carried out using the software Statistica 7.0 (StatSoft, USA) and Medcalc 12.5.0.0 (USA), including standard methods of parametric and nonparametric analysis. Differences were considered significant at $p < 0.05$.

Results: In our cohort of patients with RA, the incidence rate of RF IgM was 96.02%, anti-CCP – 81.75%, anti-Sa – 69.88%, anti-RA33%–35.97% of patients. For further analysis of the clinical significance of anti-RA33 patients were divided into 2 groups: anti-RA33 positive and anti-RA33negative.

Positive and negative for anti-RA33 patients did not differ ($p > 0.05$) by key characteristics, such as age, gender, duration of disease, and indicators of disease activity (CRP levels, DAS28, SDAI, CDAI). In contrast to the data obtained Maslyansky A. L. and co-authors the correlation relationship between the levels of anti-RA33 and indicators of disease activity as well as duration of disease has not been established. At the same time seronegative for anti-RA33 patients demonstrated a higher frequency of extraarticular manifestations ($p < 0.05$).

When analysing the frequency of occurrence of anti-CCP, RF IgM, anti-Sa and anti-RA33 autoantibodies, there were no differences between the groups of seropositive and seronegative for anti-RA33. Correlation relationship between the levels of the investigated autoantibodies is not established.

Conclusions: Thus anti-RA33 is a perspective independent biomarker of RA, which has its own potential. The possible pathogenic significance of anti-RA33 as a biomarker of a more favourable course of the RA should be considered.

To clarify the diagnostic and pathogenic value of anti-RA33 further research with a large sample size, comparison of immunological data with genetic factors, the results of other laboratory and instrumental studies, clinical manifestations of the disease are required. The obtained data will allow us to more thoroughly study the pathogenesis of RA and contribute to the search for new therapeutic options.

Disclosure of Interest: None declared
DOI: 10.1136/annrheumdis-2018-eular.6873

SAT0661

MEASUREMENT OF THE INTIMA MEDIA THICKNESS OF TEMPORAL AND AXILLARY ARTERIES IN SUBJECTS WITH DIFFERENT RISKS OF CARDIOVASCULAR DISEASE: AN ULTRASOUND STUDY

M.V. Martire¹, A. Di Matteo², E. Filippucci², E. Cipoletta², D. Jesus³, M. Di Carlo², W. Grassi². ¹Instituto Médico Platense, La Plata, Argentina; ²Clinica Reumatologica, Università Politecnica delle Marche, Jesi (Ancona), Italy; ³Centro Hospitalar e Universitario de Coimbra, Coimbra, Portugal

Background: The "halo sign" is considered the well known qualitative ultrasound (US) finding for the diagnosis of giant cell arteritis (GCA). Recently, the measurement of the intima-media thickness (IMT) of temporal and axillary arteries has been proposed as a potential complementary US biomarker. A cut-off for IMT of 0.42, 0.29, 0.34 and 1.0 mm for superficial temporal arteries, parietal and frontal branches and axillary arteries, respectively, has been suggested. In fact, other conditions, such as atherosclerosis, may determine an increase of the IMT.

Objectives: To measure the IMT of the temporal and axillary arteries in subjects with different risks of cardiovascular (CV) disease and to investigate the prevalence of IMT values greater than the reference cut-off values.

Methods: Consecutive patients older than 50 years without signs or symptoms and without a previous history of GCA or polymyalgia rheumatica, were included. The European Guidelines of CV disease prevention were used to define different categories of CV risk. The subjects were divided in two groups: a first group made up of subjects with very high or high risk of CV disease and a second group made up of subjects with moderate or low risk of CV disease. The US examination was performed with a My Lab Twice (Esaote S.p.A. Genoa, Italy). The temporal arteries (superficial temporal arteries, parietal and frontal branches) were evaluated using a 18–22 MHz probe, whereas the axillary arteries were studied using a 6–18 MHz probe.

Results: Eight hundred and eight arteries were evaluated in 101 subjects (mean age 66.1 SD 8.5, 73.3% females). Thirty-one subjects (30.7%) were classified with very high risk of CV disease, 7 (6.9%) with high risk, 34 (33.7%) with moderate risk and 29 (28.7%) with low risk. The IMT of the superficial temporal and axillary arteries were significantly higher in the group made up of subjects with very high or high risk of CV disease than in the group made up of subjects with moderate or low risk of CV disease (0.21 SD 0.82 vs 0.19 SD 0.86 $p < 0.013$; 0.54 SD 0.17 vs 0.48 SD 0.10 $p < 0.20$). The value of the IMT was higher than the reference cut-off in 13 out of 808 (1.61%) of the studied arteries (2 superficial temporal artery, 6 parietal branch, 4 frontal branch and 1 axillary artery), in at least one artery in 10 out of 101 patients (10.1%). Of these 10 patients, 8 (98%) were classified as having very high or high risk of CV disease.

Conclusions: These preliminary results suggest that an increased value of IMT may be observed in patients with very high or high risk of CV disease. However, the IMT value was higher than the reference cut-off only in a limited number of the studied arteries.

REFERENCES:

- [1] Schäfer VS, Juche A, Ramiro S, Krause A, Schmidt WA. Ultrasound cut-off values for intima-media thickness of temporal, facial and axillary arteries in giant cell arteritis. *Rheumatology (Oxford)* 2017 Sep 1;56(9):1632.
- [2] De Miguel E, Beltran LM, Monjo I, Deodati F, Schmidt WA, Garcia-Puig J. Atherosclerosis as a potential pitfall in the diagnosis of giant cell arteritis. *Rheumatology (Oxford)* 2018 Feb 1;57(2):318–321.

Disclosure of Interest: None declared

DOI: 10.1136/annrheumdis-2018-eular.6472

SAT0662 SCREENING RESEARCH OF ULTRASONOGRAPHIC PERIPHERAL ARTHRITIS AND ENTHESITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

M. Uematsu^{1,2}, T. Okano¹, K. Inui¹, Y. Yamada¹, K. Mandai¹, Y. Sugikoka³, K. Mamoto¹, T. Koike^{3,4}, H. Nakamura¹. ¹Department of Orthopedic surgery, Osaka City University Graduate School of Medicine; ²Department of Orthopedic surgery, Higashimurayoshi morimoto hospital; ³Center for Senile Degenerative Disorders (CSD), Osaka City University Graduate School of Medicine, Osaka; ⁴Search Institute for Bone and Arthritis Disease (SINBAD), Shirahama Foundation for Health and Welfare, Wakayama, Japan

Background: Some patients with inflammatory bowel diseases (IBD) such as ulcerative colitis (UC) and Crohn's disease (CD) develop spondyloarthritis (SpA). Conventionally, the assessment of affected joint count in patients with SpA was relied for the detection of swelling and tenderness in the joints and entheses by clinical physical examination. To date, high quality ultrasonography (US) can detect inflammatory condition in the joint and entheses more sensitively than clinical assessment.

Objectives: The aim of this study was to research the utility of US screening for detection of peripheral arthritis in patients with IBD.

Methods: Total 42 patients including 27 patients with UC and 15 patients with CD were consecutively included. HI VISION Ascendus (HitachiAloka Medical, Tokyo, Japan) was used with an 18 MHz linear array transducer. US examination was performed in MCP, PIP, DIP and wrist joints in both hand. Greyscale (GS) and power Doppler (PD) US were scored on a 0–3 semiquantitative scale for each joint. Moreover, the US assessment of entheses was performed. Lateral epicondyle, triceps entheses, the proximal and distal patella tendon entheses, Achilles tendon and fascia plantaris tendon entheses was scanned in both GS and PD assessment. Abnormal findings of entheses was defined structure, thickness, bur-sitis, erosion, calcification in GS and power Doppler signal.

Results: In the joint clinical assessment, 12 patients with UC and 7 patients with CD had joint symptoms. US active synovitis (GS Grade $\geq$ 2 · PD Grade $\geq$ 1) was found in 8 patients with UC and 6 patients with CD. The concordance rate between clinical findings and US findings was relatively low in UC and high in CD patients. In the enthesial clinical assessment, 9 patients with UC and 7 patients with CD had tenderness in any entheses. Active enthesitis in US was found in 16 patients with UC and 8 patients with CD. The concordance rate between clinical findings and US findings was relatively high and subclinical enthesitis was also found in many patients.

	UC (n=27)	CD (n=15)
Male (%)	9 (33.3%)	7 (46.7%)
Age (years)	46.1 $\pm$ 14.2	39.4 $\pm$ 11.6
Height (cm)	161.2 $\pm$ 8.4	163.1 $\pm$ 5.8
Weight (kg)	56.4 $\pm$ 17.4	56.0 $\pm$ 9.16
BMI	21.3 $\pm$ 4.9	21.0 $\pm$ 3.0
Duration of IBD (years)	13.3 $\pm$ 12.5	12.3 $\pm$ 9.7
Clinical peripheral joint symptom	12 (44.4%)	7 (46.7%)
Active US synovitis (GS $\geq$ 2, PD $\geq$ 1)	8 (29.6%)	6 (40.0%)
Clinical enthesial symptom	9 (33.3%)	7 (46.7%)
US enthesitis (any pathological findings)	16 (59.3%)	8 (53.3%)
Inflammatory back pain	12 (44.4%)	9 (60.0%)

Conclusions: The peripheral arthritis and enthesitis findings in patients with IBD was compared between clinical and US examination. The prevalence rate of sub-clinical synovitis was not high, thus US screening might not be useful in patients with IBD without arthritis symptom. However, the subclinical enthesitis was found in patients without any enthesial symptoms. US screening might be useful to detect subclinical enthesitis than clinical examination in patients with IBD.

REFERENCE:

- [1] Eshed I, Hermann KG. Novel imaging modalities in spondyloarthritis. *Curr Opin Rheumatol* 2015;27:333–42.

Disclosure of Interest: None declared

DOI: 10.1136/annrheumdis-2018-eular.2025

SAT0663 A NEW OPERATOR INDEPENDENT AUTOMATIC TOOL FOR ACCURATE IDENTIFICATION OF VERTEBRAL FRAGILITY FRACTURES

F. Conversano¹, R. Franchini¹, E. Quarta², P. Pisani¹, E. Casciaro¹, D. Lobreghio², M. Muratore². ¹National Research Council, Institute of Clinical Physiology, Lecce; ²O.U. of Rheumatology, Galateo Hospital, ASL-LE, San Cesario di Lecce, Italy

Background: Osteoporosis is a systemic skeletal disease characterised by a compromised bone resistance that predisposes a subject to an increased risk of fracture. In particular, vertebral fractures are the most common of all osteoporotic fractures. A common clinically-used method for vertebral fracture detection is vertebral morphometry, which is based on measurements of front (Ha), middle (Hm), and rear (Hp) heights of vertebral bodies in radiographic images. This method is quantitative and does not require specific operator skills, but its actual accuracy is affected by errors made during the time-consuming manual measurements.

Objectives: In this work we propose a fully automatic algorithm for morphometric measurement, whose final goal is to reduce errors due to manual and semi-automatic processes. Our automatic method identifies the vertebrae and their edges. Then, the algorithm measures the characteristic vertebra heights (Ha, Hm, Hp) and determines possible vertebral deformities.

Methods: The vertebral morphometry uses lateral X-ray images and it is based on height measurements of vertebral bodies:

$$Hp = ||P1 - P2||_2,$$

$$Ha = ||A1 - A2||_2,$$

$$Hm = ||M1 - M2||_2.$$

Where: Pi: rear vertebral corners;

Mi: middle vertebral points;

Ai: front vertebral corners.

The vertebral deformities can be determined as follows:

biconcave deformity: $Hm/Hp < 0.80$, crushing deformity: $Hp/Hp(\pm 1) < 0.80$, wedge deformity: $Ha/Hp < 0.80$.

The main problem in implementing our fully automatic algorithm was the correct placement of the six reference points for each detected vertebra. Our approach first combined literature-reported methods for the identification of vertebrae in X-Ray images, subsequent emphasise the vertebral borders. The four corners of the vertebra (Pi and Ai) were localised on the borders detected vertebra. While, the middle points Mi were positioned at equal distance from Pi and Ai.

Results: The performance tests were based on the comparison between the results coming from our automatic approach and those obtained from the manual measurements by an experienced radiologist. We analysed 100 conventional lateral radiographs. The following metrics were used: sensitivity and specificity in vertebra detection; errors in the localization of characteristic points and in the measurement of diagnostic parameters; correlation between manual and automatic measurements. The results of our method showed a sensitivity of 90.8% and a specificity of 99.0%. Average errors in the localisation of vertebral characteristic points were always smaller than 3 mm. Bland-Altman analysis documented a mean error in automatic measurements of diagnostic ratios of 0.01 ± 0.15 (bias ± 2 SDs), while Pearson's correlation coefficient resulted $r = 0.71$ ($p < 0.001$).

Conclusions: Obtained results of our method compared to the results obtained by a trained radiologist showed an acceptable low error rate, a very good performance in vertebra detection and the same diagnosis (normal, biconcave deformity, crushing deformity, and wedge deformity). Overall, the adopted method has a strong potential for an effective employment in clinical routine for fast and accurate diagnosis of vertebral fractures.

REFERENCE:

- [1] Melton LJ, et al. "Epidemiology of vertebral fractures in women". in *Am J Epidemiol* 1989 May;129(5):1000–1011.

Disclosure of Interest: None declared

DOI: 10.1136/annrheumdis-2018-eular.7032