THU0067

THREE-MONTH RADIOLOGICAL CHANGES IN WRIST JOINT MEASURED BY MRI AND HR-pQCT CAN PREDICT 12-MONTH CHANGES IN EROSION AND FUNCTIONAL OUTCOMES AFTER MTX AND ANTI-TNF TREATMENT IN PATIENTS WITH RHEUMATOID ARTHRITIS: A MULTI-MODALITY IMAGING STUDY

Kenji Mamoto^{1,2}, Tomohiro Shimizu³, Matthew Tanaka⁴, Valentina Padoia⁴, Andrew Burghardt⁴, Ursula Heilmeier⁴, Thomas Link⁴, Jonathan Graf⁵, John Imboden⁵, Li Xiaojuan¹. ¹Cleveland Clinic, Biomedical Engineering, Program of Advanced Musculoskeletal Imaging (PAMI), Cleveland, United States of America; ²Yodogawa Christian Hospital, Orthopaedic Surgery, Osaka, Japan; ³Hokkaido University Medical School, Orthopaedic Surgery, Sapporo, Japan; ⁴University of California San Francisco, Radiology and Biomedical Imaging, Musculoskeletal Quantitative Imaging Research, San Francisco, United States of America; ⁵University of California San Francisco, Medicine, Division of Rheumatology, San Francisco, United States of America

Background: Magnetic resonance imaging (MRI) provides noninvasive methods to quantify joint inflammation and early cartilage degeneration in monitoring rheumatoid arthritis (RA) progression¹. High-resolution peripheral quantitative computed tomography (HR-pQCT) provides reliable evaluation of bone erosion volumes².

Objectives: To investigate if changes in MR measures from baseline to 3-month (3M) can predict changes in erosion volumes, clinical and functional assessment from baseline to 12-month (12M) in RA patients receiving methotrexate (MTX) and anti-tumor necrosis factor alpha (Anti-TNF α) therapy using MRI and HR-pQCT.

Table 1. Longitudinal changes of MRI and HR-pQCT data, clinical and functional scores

	Low disease activity (N=9)			High disease activity (N=8)		
	BL	3M	12M	BL	3M	12M
SYN (cm ³)	30.6 $\pm$ 16.4	33.2 $\pm$ 15.8*	38.5 $\pm$ 18.2	66.4 $\pm$ 22.6	46.8 $\pm$ 17.1*	58.6 $\pm$ 34.4
BMEL (cm ³)	1.8 $\pm$ 1.2	2.5 $\pm$ 2.0	1.9 $\pm$ 1.8	5.1 $\pm$ 3.8	3.2 $\pm$ 2.4*	3.4 $\pm$ 1.8
T1 ρ (ms)	37.8 $\pm$ 3.0	39.2 $\pm$ 4.6	37.8 $\pm$ 3.0	38.0 $\pm$ 3.4	36.5 $\pm$ 3.0	38.2 $\pm$ 2.1
Bone Erosion (mm ³)	15.4 $\pm$ 25.1	17.2 $\pm$ 27.7*	17.3 $\pm$ 27.3*	33.5 $\pm$ 88.7	32.3 $\pm$ 86.0	30.3 $\pm$ 83.2
DAS-CRP	1.8 $\pm$ 0.6	2.4 $\pm$ 0.8*	2.3 $\pm$ 1.3	5.4 $\pm$ 1.0	3.4 $\pm$ 1.5*	3.8 $\pm$ 0.9*
HAQ	0.5 $\pm$ 0.7	0.6 $\pm$ 0.8	0.5 $\pm$ 0.8	1.4 $\pm$ 0.8	0.7 $\pm$ 0.7*	0.9 $\pm$ 0.8*
MHQ	80.2 $\pm$ 20.3	81.5 $\pm$ 23.9	82.9 $\pm$ 20.8	43.8 $\pm$ 16.3	65.5 $\pm$ 19.7*	66.5 $\pm$ 21.1*

Data presented as mean $\pm$ standard deviation. *: P<0.05 (vs BL)

Abstract THU0067 –Table 1

Figure 1. Associations between 3M change in SYN volume and 12M changes in DAS-CRP, HAQ, MHQ, and 3M and 12M changes in bone erosion volumes evaluated by linear regression models after adjusting for age, gender, disease duration and therapy (Anti-TNF α added or not).

Abstract THU0067 – Figure 1

Methods: Seventeen RA patients with MTX treatment were recruited into either a low disease activity score (DAS) group (n=9, DAS28 $\leq$ 3.2) or high DAS group (n=8, DAS28>3.2). The low DAS group received MTX treatment only, while the high DAS group received additional Anti-TNF α treatment to MTX immediately after baseline visit (BL). Volumes of synovitis (SYN), bone marrow edema-like lesions (BMEL) and cartilage T1 ρ values in wrist joint by MRI, bone erosion volumes in wrist joint by HR-pQCT, DAS28-CRP, Health Assessment Questionnaire (HAQ), and Michigan Hand Outcome Questionnaire (MHQ) were assessed at BL, 3M and 12M in all patients. Longitudinal changes were evaluated using paired t-

test. Linear regression models were used to evaluate whether changes in imaging measure changes from BL to 3M predict changes in erosion volumes and patient outcomes (DAS28-CRP, HAQ, MHQ) from BL to 12M, after adjusting for age, gender, disease duration and therapy (Anti-TNF α added or not).

Results: Anti-TNF α therapy in the high DAS group resulted in significant decreases of SYN, BMEL at 3M and DAS28-CRP, HAQ and MHQ at 3M and 12M from BL (Table.1). The low DAS group in contrast, displayed significant increases in SYN and DAS-CRP at 3M and bone erosion volume at 3M and 12M from BL despite low disease activity (Table.1). Changes in SYN, not BMEL, T1 ρ or bone erosion, from BL to 3M were significantly correlated with changes in HAQ and MHQ from BL to 12M ($P < 0.05$), and with changes in DAS-CRP from BL to 12M with marginal significance ($P=0.053$) (Figure 1). Changes in erosion volumes from BL to 3M were significantly correlated with changes from BL to 12M (Figure 1).

Conclusion: Despite the low disease activity, patients on MTX only showed significantly increased erosion volumes as measured by HR-pQCT at 3M and 12M; on the other hand, patients with MTX+Anti-TNF α treatment showed decreased erosion volumes at 3M and 12M, implying erosion repair. In this study, changes in erosion (but not other MR measures including synovitis and bone marrow edema) within the first 3M predicted changes in erosion at 12M. On the other hand, changes in synovitis volumes predicted patient functional outcomes at 12M. These results suggest that multimodality quantitative imaging with MRI and HR-pQCT provides powerful tools for evaluating early changes and predicting disease progression and therapy response after treatment in RA. Large scale studies with larger sample size are warrant to confirm the observations.

REFERENCES:

- [1] Shimizu, et al. ACR (2017)
- [2] Shimizu, et al. Arthritis Research & Therapy (2017)

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2019-eular.1986

THU0068

ANTI-CARBAMYLATED ANTIBODIES ARE ASSOCIATED WITH TOBACCO AND POOR OUTCOMES IN RHEUMATOID ARTHRITIS

Raul Castellanos-Moreira¹, Sebastian C Rodriguez-García¹, Virginia Ruiz¹, Oscar Camacho¹, Julio Ramirez¹, Andrea Cuervo¹, Cristina Garcia-Moreno², Rosa Morla¹, José Gomez Puerta¹, Juan D. Cañete¹, Isabel Haro², Raimón Sanmartí¹. ¹Hospital Clinic de Barcelona, Rheumatology, Barcelona, Spain; ²IQAC-CSIC, Unit of Synthesis and Biomedical Applications of Peptides, Barcelona, Spain

Background: Anti-carbamylated protein antibodies (Anti-CarP) represent a novel autoantibody family present in sera of patients with rheumatoid arthritis (RA) with high specificity.

Objectives: To analyse the prevalence of Anti-CarP in an established RA cohort and evaluate their association with the presence of other autoantibodies and disease activity and severity.

Methods: Cross-sectional study. Presence of Anti-CarP was analyzed in a cohort of patients with established RA (n: 158) by a home-made ELISA test using fetal calf serum. We investigated the demographic, radiological and current and at disease onset clinical features. Rheumatoid factor (RF) and anti-citrullinated peptide antibodies (ACPA) status were also assessed.

Results: Anti-CarP were positive in 46.2% of the patients in our cohort and in 15.1%, 19.2% and 9.1% of the patients negative for ACPA, RF and both respectively. Demographic and clinical features are shown in table 1. The mean titer of ACPA (1361 $\pm$ 1054 U/mL vs. 918 $\pm$ 1092 U/mL) and RF (258 $\pm$ 255 AU vs. 174 $\pm$ 205 AU) were significantly higher in Anti-CarP positive patients. No difference in symptoms at RA onset was observed. Current (24.7% vs. 11.8%) and previous (54.8% vs. 37.6%) smoking consumption were significantly associated with Anti-CarP antibodies. Anti-CarP positive patients presented a higher CRP values (1.0 $\pm$ 1.6 mg/dL vs. 0.5 $\pm$ 0.8 mg/dL), swollen joint count (1.3 $\pm$ 2.2 vs 0.7 $\pm$ 1.8) and patient global health assessment VAS (34.8 $\pm$ 21.5 mm vs. 26.4 $\pm$ 17.1 mm); although no between-group differences in disease activity (DAS28, CDAI, SDAI and RAPID3) or demographic features were observed. Anti-CarP positive patients presented significant higher scores in Larsen index (23.6 $\pm$ 15.7 vs. 15.7 $\pm$ 12.6) and disability (HAQ-DI >1) (23.3% vs. 8.3%).

Conclusion: Anti-CarP were present in approximately half of the RA cohort and were also detected in seronegative (RF and/or ACPA)

patients. In our cohort, patients with Anti-CarP antibodies presented higher tobacco consumption and poorer disease outcomes.

Table 1. Demographic and Clinical Features According to Anti-CarP Status

	Anti-CarP positive n: 73	Anti-CarP negative n: 85
Female	52 (71.2%)	71 (83.5%)
Mean age at diagnosis (SD)	53.6 (±11.9)	53.8 (±14.4)
Mean age at inclusion (SD)	58.7 (±11.9)	58.9 (±14.1)
Extra-articular manifestations	21 (28.8%)	15 (17.6%)
Disease duration (SD)	5.1 (±2.7)	5.0 (±2.7)
Smoking history	40 (54.8%)	32 (37.6%) *
• Previous and/or current	18 (24.7%)	10 (11.8%) *
• Current		
RA family history	12 (16.4%)	10 (11.8%)
BMI	27.5 (±4.5)	27.1 (±4.5)
Disease presentation at initiation (%)	15 (20.5%)	14 (16.5%)
• Palindromic rheumatism	7 (9.6%)	6 (7.1%)
• Inflammatory arthralgia	4 (5.5%)	1 (1.2%)
• Pseudopolyarthralgia	47 (64.4%)	64 (75.3%)
• Polyarthralgia		
Mean DAS28 (SD):	3.0 (±1.3)	2.8 (±1.2)
• Remission/Low	65.8%	68.2%
Mean DAS28 PCR (SD):	2.7 (±1.2)	2.4 (±1.1)
• Remission/Low	72.6%	80.0%
Mean CDAI (SD):	9.2 (±8.2)	7.2 (±6.5)
• Remission/Low	71.2%	80.0%
Mean SDAI (SD):	10.2 (±8.6)	7.8 (±6.9)
• Remission/Low	68.5%	77.6%
Mean RAPID3 (SD):	10.2 (±8.6)	7.8 (±6.9)
• Remission/Low	47.2%	48.2%
Mean HAQ (SD)	0.45 (±0.52)	0.29 (±0.39)
Poor HAQ (>1)	17 (23.3%)	7 (8.3%) **
Pain Analogue Scale mm (SD)	27.6 (±29.8)	20.6 (±22.7)
Treatment:	44 (61.1%)	49 (57.6%)
• Glucocorticoids	63 (86.3%)	71 (83.5%)
• cDMARDs	48 (65.8%)	56 (65.9%)
• MTX	7 (9.6%)	12 (14.1%)
• HCQ	14 (19.2%)	14 (16.5%)
• LEF	17 (23.3%)	32 (37.6%)
• bDMARDs		
Erosive disease	37 (50.7%)	46 (54.8%)
Modified Larsen Score	23.6 (±15.7)	15.7 (±12.6) **

Disclosure of Interests: Raul Castellanos-Moreira Speakers bureau: For Lilly and Merk Sharp and Dohme, Sebastian C Rodriguez-Garcia: None declared, Virginia Ruiz: None declared, Oscar Camacho: None declared, Julio Ramirez: None declared, Andrea Cuervo: None declared, Cristina Garcia-Moreno: None declared, Rosa Morla: None declared, José Gomez Puerta Speakers bureau: BMS, Pfizer, Amgen, Juan D. Cañete: None declared, Isabel Haro: None declared, Raimón Sanmartí Speakers bureau: PFIZER, SANOFI, LILLY, MSD, UCB, NOVARTIS, JANSSEN

DOI: 10.1136/annrheumdis-2019-eular.6240

THU0069

RHEUMATOID CACHEXIA ASSESSED BY BODY COMPOSITION IS ASSOCIATED WITH WORSE DISEASE IN RHEUMATOID ARTHRITIS PATIENTS WITH NORMAL BODY MASS INDEX

Jian-Zi Lin, Lijuan Yang, Le-Feng Chen, Li Qian-Hua, MA Jianda, Yingqian Mo, Lie Dai. Sun Yat-Sen Memorial Hospital, Sun Yat-Sen University, Department of Rheumatology, Guangzhou, China

Background: Abnormal body composition (BC) has been reported in rheumatoid arthritis (RA) patients with normal body mass index (BMI). Rheumatoid cachexia (RC) was found in RA patients with a decrease in muscle mass and an increase or limited change in fat mass, resulting in no or limited changes in BMI. However, there is no consensus on the clinical criteria for its diagnosis, and the clinical significance of RC has not been well known until now.

Objectives: To investigate the characteristics of BC in RA patients with normal BMI and the association between RC and disease characteristics.

Methods: Consecutive RA patients were recruited and clinical data including disease activity, function and radiographic assessment were collected. BC was assessed by bioelectric impedance analysis. RC was defined as those with concurrent overfat (body fat percentage $\geq 25\%$ for men and $\geq 35\%$ for women) and myopenia (appendicular skeletal muscle mass index ≤ 7.0 kg/m² in men and ≤ 5.7 kg/m² in women) in this study. Multivariate logistic regression analysis was performed to identify the association between disease characteristics and RC in RA patients with normal BMI, following the step-forward selection rule that variables were included

in the equation when the P value was <0.05 or removed when the P value was >0.10 .

Results: 1. There were 516 RA patients recruited, with 13.8% RC as well as 17.4% underweight, 56.4% normal weight, 22.5% overweight and 3.7% obese respectively. Among 71 RA patients with RC, 73.2% showed normal BMI, while 2.8% underweight, 22.5% overweight and 1.4% obese. Among RA patients with normal BMI (n=291), 17.9% patients showed RC, 28.1% showed normal fat but myopenia, 1.4% showed overfat but non-myopenia, while 52.6% showed both normal fat and non-myopenia.

2. For RA patients with normal BMI, compared with those with both normal fat and non-myopenia, RA patients with RC were older with longer disease duration, higher disease activity indicators including 28TJC, PtGA, PrGA, PainVAS, ESR, CRP, DAS28-CRP, SDAI and CDAI, higher functional indicators including HAQ-DI and rate of functional limitation, higher radiographic assessment including mTSS, JSN and JE subscores, higher rate of previous use of glucocorticosteroids (75.0% vs. 52.3%), and higher prevalence of hypertension (25.0% vs. 7.8%). Further compared with those with normal fat but myopenia, RA patients with RC showed the similar results with significantly longer disease duration, higher CRP, HAQ-DI, mTSS, JSN subscore, JE subscore, and higher rate of previous use of glucocorticosteroids (all $P<0.0167$, bonferroni correction). 3. Multivariate logistic regression analysis showed that CRP (OR=1.024, 95%CI: 1.009-1.040), mTSS (OR=1.017, 95%CI: 1.010-1.025), previous use of glucocorticosteroids (OR=2.605, 95%CI: 1.217-5.575), and suffering from hypertension (OR=3.462, 95%CI: 1.448-8.274) were positively associated with RC in RA patients with normal BMI.

Conclusion: Our data show rheumatoid cachexia is associated with worse disease including RA disease activity, functional limitation and radiographic joint damage, which imply that RC should be emphasized especially in RA patients with normal BMI.

Acknowledgement: This work was supported by National Natural Science Foundation of China (no. 81671612 and 81801606), Guangdong Natural Science Foundation (no. 2017A030313576, 2017A030310236 and 2018A030313541) and Guangdong Medical Scientific Research Foundation (no. A2017109).

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2019-eular.6477

THU0070

WHAT IS THE ADDITIONAL VALUE OF MRI OF THE FOOT TO THE HAND IN UNDIFFERENTIATED ARTHRITIS TO PREDICT RHEUMATOID ARTHRITIS DEVELOPMENT?

Yousra Dakkak¹, Debbie Boeters¹, Aleid Boer¹, Monique Reijnen², Annette van der Helm - van Mil^{1,3}. ¹Leiden University Medical Center (LUMC), Rheumatology, Leiden, Netherlands; ²Leiden University Medical Center (LUMC), Radiology, Leiden, Netherlands; ³Erasmus University Medical Center, Rheumatology, Rotterdam, Netherlands

Background: MRI-detected subclinical joint inflammation in hand-joints of patients with undifferentiated arthritis (UA) predicts progression to rheumatoid arthritis (RA). It is unknown if adding MRI of the foot increases predictive accuracy compared to the hand alone.

Objectives: To assess whether MRI-detected inflammation of the foot is predictive for RA-development, and whether combining MRI-detected inflammation of the foot to that of the hand is of additional value.

Methods: 1.5T-contrast-enhanced MRI of unilateral foot (MTP-1-5), and hand (MCP-2-5 and wrist) was performed in 123 patients presenting with UA (not fulfilling 2010 RA-criteria) and scored for bone marrow edema (BME), synovitis and tenosynovitis. Symptom-free controls (n=193) served as a reference for defining an abnormal MRI. Patients were followed for RA-development ≤ 1 -year, defined as fulfilling classification criteria or initiation of disease modifying anti-rheumatic drugs because of the expert opinion of RA. The added predictive value of foot-MRI to hand-MRI was evaluated.

Results: 52% developed RA. Foot tenosynovitis was predictive (OR 2.55, 95%CI 1.01-6.43), independent of BME and synovitis (OR 3.29, 95%CI 1.03-10.53), but not independent of CRP and number of swollen joints (OR 2.14, 95%CI 0.77-5.95). Hand tenosynovitis was also predictive independent of BME and synovitis (OR 3.99, 95%CI 1.64-9.69) and independent of CRP and swollen joints (OR 2.36, 95%CI 1.04-5.38). Adding foot tenosynovitis to hand tenosynovitis changed sensitivity from 72% to 73%, specificity from 59% to 54% and AUC from 0.66 to 0.64, the net reclassification index was -3.5.

Conclusion: MRI-detected tenosynovitis of the foot predicts progression to RA. However adding MRI of the foot does not improve predictive accuracy compared to MRI of the hand alone. In view of cost-reduction, performance of foot-MRI for prognostic purposes in UA can be omitted.