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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

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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

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

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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)