Conclusion: Thus, the level of fetuin-A in the blood serum of patients with RA is significantly lower in the case of a high degree of disease activity. The level of visfatin in the blood serum in women with RA is significantly higher in patients with a higher degree of disease activity. Therefore, the concentration values of fetuin-A and visfatin in the blood serum of patients with RA can be used in an integrated assessment of the prognosis of disease activity.

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POS0452

SYNOVIAL MYELOID-STROMAL PATHOTYPE PREDICTS ONE-YEAR RADIOGRAPHIC PROGRESSION IN ACTIVE RHEUMATOID ARTHRITIS

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Background: Rheumatoid arthritis (RA) is a heterogeneous disease with variable prognosis. The cellular composition in synovium is the driving force of joint destruction in RA, and the predictive values of histopathological assessments on the clinical outcomes of RA have been identified. However, current synovial histopathological assessments mainly focus on the infiltrated immunocytes to distinguish RA synovium into different synovial pathotypes. Whether addition of stromal cells improve the accuracy of histopathological assessments remains unknown.

Objectives: To distinguish synovial pathotypes of RA based on intercellular connection and explore their predictive value on one-year radiographic progression.

Methods: Active RA patients who underwent needle synovial biopsy at baseline were recruited from a real-world prospective cohort. Clinical data were evaluated at baseline and 1, 3, 6, 12 months. Histopathologic assessments included Krenn synovitis score and semiquantitative score of immunohistochemical staining for CD20, CD38, CD4, CD8, CD68, CD31 and CD90. Cluster analysis was used to distinguish synovial pathotypes. The primary outcome was one-year radiographic progression defined as a change in total Sharp/van der Heijde modified score ≥ 0.5 units.

Results: 1. Among 134 RA patients who received synovial biopsy at baseline and finished one-year follow-up, 105 had qualified synovial tissue. The mean age was 50.2 ± 13.3 years with 77.1% female. The median disease duration was 24 (9-120) months. All patients were active RA, and 64.8%, 26.7% and 8.6% patients in high, moderate and low disease activity, respectively. There were 41 (39%) patients who have never been treated with corticosteroids or disease-modifying anti-rheumatic drugs.

2. During one-year follow-up, there were 48.6%, 63.8%, 71.4%, and 69.5% patients achieved CDAI LDA target, and 12.4%, 30.5%, 34.3%, and 32.4% patients achieved CDAI remission after 1, 3, 6, and 12 months, respectively. A total of 33 (31.4%) patients had radiographic progression.

3. All patients were divided into three clusters using cluster analysis based on the seven synovial cellular scores. Patients in cluster 1 ($n=50$, 47.6%) had higher scores of sublining CD68+ macrophages, CD31+ endothelial cells and CD90+ fibroblasts, thus named as myeloid-stromal pathotype. Patients in cluster 2 ($n=26$, 24.8%) had higher scores of CD20+ B cells, CD38+ plasma cells, CD4+ T cells and CD8+ T cells, thus named as lymphoid pathotype. Patients in cluster 3 ($n=29$, 27.6%) had lower scores of all seven cell types, thus named as pauci-cellular pathotype (Figure 1).

4. RA patients with baseline synovial myeloid-stromal pathotype showed higher rate of one-year radiographic progression versus lymphoid and pauci-cellular pathotypes (48% vs. 16.4%, $P<0.001$), whereas there was no difference between lymphoid and pauci-cellular pathotypes (11.5% vs. 20.7, $P=0.475$). Adjusted for confounding factors including age, sex, smoking, disease duration, RF status, ACPA status, CDAI, HAQ-DI and mTSS at baseline, multivariate logistic regression analysis showed that baseline synovial myeloid-stromal pathotype independently predicted one-year radiographic progression ($AOR=3.602$, 95%CI:1.257-10.324, $P=0.017$, Table 1).

Conclusion: Baseline synovial myeloid-stromal pathotype in RA can predict one-year radiographic progression.

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Figure 1 Representative HE staining and immunohistochemistry of three synovial pathotypes

POS0453

VALIDATION OF THE SIMPLIFIED DISEASE ACTIVITY INDEX (SDAI) WITH A QUICK QUANTITATIVE C-REACTIVE PROTEIN ASSAY (SDAI-Q) IN PATIENTS WITH RHEUMATOID ARTHRITIS: A NATIONAL, MULTICENTER STUDY

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Background: Therapeutic decisions in RA patients should be based on regular disease activity assessment using scores like the Simplified Disease Activity Index (SDAI) or the Clinical Disease Activity Index (CDAI) [1]. The CDAI has the benefit of being immediately available, while the SDAI encompasses with the C-reactive protein (CRP) an acute phase reactant and therefore is the recommended score for the use in clinical trials. However, CRP determination takes hours to days, thus hindering the treat-to-target concept using the SDAI. Quick quantitative CRP (qCRP) tests allow CRP measurement within a few minutes. Therefore, qCRP based SDAI (SDAI-Q) could combine the advantages of both scores.

Objectives: To validate the SDAI-Q in a prospective, multicenter study of RA patients.

Methods: The study was conducted in five centers in Berlin, Germany. Consecutive adult (≥ 18 years) RA patients were included. In addition to a rheumatological assessment, including patient reported outcomes, routine CRP was measured in the local labs. Additionally, a qCRP testing with the „QuikRead go instrument“ (Aidian Oy, Finland) was performed locally (measurement range 0.5 - 200 mg/l). Statistical analysis included descriptive statistics, cross tabulation and weighted Cohen's kappa comparing disease activity categories, Bland-Altman plots and intraclass correlation coefficient (ICC) for CRP, qCRP, SDAI, SDAI-Q and CDAI.

Results: In this study 100 RA patients were included (mean age: 60.9 years, mean disease duration: 11.4 years, 73.0% were female, 63.0% RF positive, 57.0% ACPA positive, 49.0% positive and 29% negative for both parameters). 75.0% patients were treated with csDMARD, 15% with tsDMARDs, 39.0% with bDMARDs and 40% with glucocorticoids (mean prednisolone equivalent: 5.4 mg prednisolone/d). Mean CRP and qCRP-levels were 6.97 and 7.89 mg/l, respectively (ICC 0.992; 95%CI: 0.987; 0.995). Comparing SDAI-Q and SDAI, all patients (100%) achieved the same disease activity status (Table 1A); weighted Cohen's kappa was 1.000 (95%CI: 1.000; 1.000). ICC for SDAI-Q- and SDAI-values was 1.000 (95%CI: 1.000; 1.000). The agreement of SDAI-Q and SDAI is shown in a Bland-Altman plot (Figure 1). When comparing the CDAI with the SDAI-Q 93 patients (93%) were assigned to the same disease activity category (Table 1B); weighted Cohen's kappa was 0.929 (95%CI: 0.878; 0.981). ICC for numerical values of SDAI-Q and CDAI was 0.989 (95%CI: 0.978; 0.994).

Conclusion: SDAI-Q showed an absolute agreement with SDAI on the assignment to disease activity categories with the important advantage of time. With SDAI-Q, rheumatologists could base their clinical decision-making immediately on an index-based disease activity measurement by using a composite score considering acute phase reactants. Consequently, SDAI-Q can be integrated in clinical routine and clinical trials and could be implemented into the treat-to-target concept in RA patients.

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Table 1. A) Disease activity categories by SDAI-Q vs. SDAI; B) Disease activity categories by SDAI-Q vs. CDAI

		SDAI-Q (n = 100)			
		Remission (≤ 3.3)	Low Disease Activity (> 3.3 and ≤ 11)	Moderate Disease Activity (> 11 and ≤ 26)	High Disease Activity (> 26)
SDAI	Remission (≤ 3.3)	28 (28.0%)			
	Low Disease Activity (> 3.3 and ≤ 11)		31 (31.0%)		
	Moderate Disease Activity (> 11 and ≤ 26)			35 (35.0%)	
	High Disease Activity (> 26)				6 (6.0%)
		SDAI-Q (n = 100)			
		Remission (≤ 3.3)	Low Disease Activity (> 3.3 and ≤ 11)	Moderate Disease Activity (> 11 and ≤ 26)	High Disease Activity (> 26)
CDAI	Remission (≤ 2.8)	26 (26.0%)			
	Low Disease Activity (> 2.8 and ≤ 10)	2 (2.0%)	28 (28.0%)	2 (2.0%)	
	Moderate Disease Activity (> 10 and ≤ 22)		3 (3.0%)	33 (33.0%)	
	High Disease Activity (> 22)				6 (6.0%)

Fields highlighted in red indicate that disease activity categories do not match. SDAI = Simplified Disease Activity Index; SDAI-Q = SDAI calculated with a quick quantitative CRP assay; CDAI = Clinical Disease Activity Index.

Figure 1. Bland-Altman plot for SDAI and SDAI-Q Acknowledgements

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POS0454

COMPARISON OF MBDA SCORE, PATIENT GLOBAL ASSESSMENT AND EVALUATOR GLOBAL ASSESSMENT FOR PREDICTING RISK OF RADIOGRAPHIC PROGRESSION

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Background: Busy rheumatologists may assess disease activity and risk for radiographic progression (RP) in RA with informal, qualitative versions of evaluator and/or patient global assessments (EGA and PGA). RA patient care may be improved by having a convenient, objective disease activity measure that predicts risk for RP more accurately than EGA or PGA.

Objectives: To compare the abilities of MBDA score, patient global assessment and evaluator global assessment to assess risk for radiographic progression (RP), and to assess the ability of MBDA score to predict RP among patients with concordant or discordant PGA and EGA.

Methods: Patients were pooled from two RCTs of patients with recent onset RA treated with conventional and biologic DMARDs (OPERA and SWEFOT, N=386) and from a registry of patients with predominantly established RA and diverse treatments (BRASS, N=380). Pearson correlations were determined between MBDA scores (adjusted for the effects of age, sex and adiposity) (scale 1-100), PGA and EGA (each on a scale of 1-10) at baseline. PGA and EGA were considered discordant when they differed by >2.5. Univariable logistic regression assessed ability to predict RP (change in TSS >5 over 1 year) for MBDA score, PGA and EGA as continuous variables; and for discordance of PGA and EGA as 2-level (concordant vs. discordant) or 3-level (PGA>EGA, concordant, EGA>PGA) categorical variables. Multivariable regression considered the main effect and interaction terms of the MBDA score, as a continuous variable, paired with each other variable, to test the ability of each pair to assess risk of RP. All models included a random effect on cohort. Odds ratios were reported for every 10-unit increase in MBDA score. Frequency of RP was determined in subgroups with MBDA score low (<30), moderate (30-44) or high (>44) for patient groups based on PGA/EGA concordance or discordance.

Results: The 766 patients studied were 76% female, 76% positive for RF and/or anti-CCP Ab, with mean age 55 years, DAS28-CRP 4.7, CRP 22 mg/L, CDAI 26, SJC 9.1, PGA 4.4, EGA 3.4, MBDA score 53. No interaction was seen between MBDA score and type of cohort (early vs established RA). PGA and EGA were discordant in 294 of 766 (38%) patients and were weakly to moderately correlated ($r=0.38$). Among discordant patients, PGA was >EGA in 227 cases and EGA was >PGA in 67 cases. Correlations between MBDA score and PGA or EGA were $r=0.41$ and $r=0.34$, respectively. In univariable analyses, MBDA score was a statistically significant predictor of radiographic progression ($OR=1.53$, $p=6.3 \times 10^{-8}$) whereas PGA, EGA, 2-level discordance and 3-level discordance were not ($p=0.38$, 0.47 , 0.74 , 0.83 , respectively). In multivariable analyses, significant interactions were observed between MBDA score and discordance (2-level, $p=0.0029$; 3-level, $p=0.0087$). The interaction analysis demonstrated, in PGA/EGA-concordant patients, low risk of radiographic progression when MBDA score was low and elevated risk when it was high ($OR=1.33$ [1.1, 1.59]). A relationship between MBDA score and RP risk was also demonstrated, with heightened trend, among discordant patients with PGA >EGA ($OR=2.04$ [1.53, 2.81]) and EGA >PGA ($OR=3.43$ [1.37, 13.8]) (Figure 1).

Conclusion: MBDA score was a significant predictor of radiographic progression, whereas PGA and EGA were not. MBDA score predicted progression whether PGA and EGA were concordant or discordant. These results suggest that MBDA score detects joint-damaging disease activity more accurately than PGA and EGA and it does so whether or not PGA and EGA are in agreement.