the K&L scale. Patients with stage I according to standard radiography had no erosive process.

In DMFs OP (100% and 78%, OR=1.28, 95%, CI [1.08-1.5], $p=0.02$), SO (74% and 11%, OR=6.8, 95%, CI [2.6-17.8], $p<0.0001$), subchondral cysts (SC) (61% and 24%, OR=2.5, 95%, CI [1.3-4.82], $p=0.005$) and subluxations (43% and 14%, OR=3.2, 95%, CI [1.3-8.23], $p=0.01$) were significantly more often found in patients with EOA. In PIPs SO (43% AND 5%, OR=8.04, 95%, CI [1.93-33.5], $p=0.0005$), SC (52% and 27%, OR=1.93, 95%, CI [0.1-3.73], $p=0.045$) and subluxations (17% and 0%, $p=0.01$) were significantly more frequently detected in patients with EOA compared to the non-erosive group. According to the results of the AUSCAN questionnaire, a significantly greater severity of pain was found in patients with EOA (65%) in comparison with the non-erosive (30%) form of HOA (OR=2.19, 95%, CI [1.23-3.9], $p=0.008$).

Conclusion: DIPs is most often affected in OA of interphalangeal joints, less often PIPs, the most common symptoms are JSN and OP. At EOA in addition to more frequent detection OP, cysts, SO, subluxations in DIPs, SO, cysts and subluxations in PIPs, there is also significantly more pronounced pain according to AUSCAN data, it can be concluded that EOA is more severe in comparison with the non-erosive form of HOA.

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AB1113

DIAGNOSTIC VALUE OF ANTI-SA AND ANTI-HN RNP K ANTIBODIES IN SERONEGATIVE RHEUMATOID ARTHRITIS

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Background: The diagnostics of seronegative rheumatoid arthritis (RA) remains the important issue in modern rheumatology. Other biomarkers are studied to close the diagnostic gap.

Objectives: The aim of work was to assess anti-Sa and anti-hnRNP K in patients with RA and to evaluate their diagnostic value in seronegative by anti-CCP and RF RA.

Methods: In the study were included 270 patients, which fulfill EULAR/ACR 2010 criteria for RA and 50 healthy controls. The mean of patients age was 52.80 (95% CI:51.70-54.80 years).

Levels of antibodies to anti-CCP and anti-Sa were evaluated by ELISA according to the instructions of the manufacturer (Euroimmune, Germany), anti-hnRNP K according to the instructions of the manufacturer ((Medipan, Germany). Levels of rheumatoid factor (RF) were assessed by kinetic nephelometry using an automatic analyzer Beckman Coulter (USA).

Results: Anti-CCP in patients were found 209 (77.41%) patients, RF - in 192 (71.11%) patients, anti-Sa - in 163 (60.37%) patients, anti-hnRNP K - in 63 (23.33%) patients. The incidence of Anti-CCP, RF, anti-Sa, anti-hnRNP K in RA was significantly higher ($p<0.05$) than in healthy individuals (0 (0%), 0 (0%), 1 (2.00%), 0 (0%) respectively).

The diagnostic sensitivity and specificity of anti-Sa to discriminate seronegative by anti-CCP and RF RA patients from healthy controls by ROC - analysis were determined and made up for anti-Sa - 50,00% (95%CI: 26.1 - 73.9) and 96.77% (95%CI: 83.2 - 99.5) respectively (area under ROC-curve 0.734; 95%CI: 0.588-0.850, $p=0.0026$), for anti-hnRNP K - 55.56% (95%CI:35.3 - 74.5), 100,00% (95%CI: 95.7 - 100.0) respectively (area under ROC-curve 0.778; 95%CI: 0.689-0.851, $p=0.0001$). There were no significant differences in clinical (DAS 28, CDAI, SDAI, treatment options) and laboratory characteristics (ESR, CRP, anti-CCP, RF levels) between anti-Sa-positive and anti-Sa-negative patients ($p>0.05$) as well as between anti-hnRNP K-positive and anti-hnRNP K-negative patients ($p>0.05$).

Conclusion: Anti-Sa and anti-hnRNP K may serve as potential additional laboratory biomarkers for seronegative RA to allow to close the seronegative RA gap and confirm the diagnosis of RA.

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AB1114

HANDWORK VS MACHINE; A COMPARISON OF RHEUMATOID ARTHRITIS PATIENT POPULATIONS AS IDENTIFIED BY MACHINE-LEARNING AND CRITERIA-BASED CHART REVIEW.

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Background: Electronic Medical Records (EMRs) offer a magnitude of observational data which is currently often manually reviewed to identify patient cases. Machine-Learning (ML) methods are highly efficient tools for data extraction, being able to process the information-rich free-text physician notes from EMRs. [1]

We postulate that incorporating this data into an ML pipeline, will enable the high-throughput identification of RA case cohorts qualitatively equal to conventional EULAR/ACR criteria based chart review.

Objectives: To investigate the comparability of Rheumatoid arthritis (RA) cases identified through EMR free-text enriched machine-learning algorithms to the field's gold-standard (GS) of criteria based chart-review.

Methods: We developed a classification algorithm using a Support Vector Machine (SVM) trained on 1000 manually reviewed patient EMRs and validated on a separate 1000 records. [2]

The SVM assigns a probability of being an RA case to each patient at a speed of >5000 records per second. The probability cutoff for case identification can be tailored to studies' needs, optimizing on sensitivity, specificity, etc. We optimized on PPV, resulting in a cutoff of 0.48 with a PPV of 0.96.

We used the 1987 and 2010 EULAR/ACR criteria based diagnoses of RA at one year after inclusion in a prospective arthritis cohort as GSs and compared the baseline characteristics of ML identified RA cases with both GSs separately and for those fulfilling at least one set of criteria using Pearson chi-squared and Mann-Whitney U tests ($\alpha = 0.05$).

Results: At the 0.48 cutoff the ML model performs very well on the annotated set and when compared to criteria based GSs. (Table 1)

Table 1. Performance of ML-model in the annotated data[†] (N = 1000) predicting cases and 1987, 2010 or either criteria based data^{*} (N = 1235, 1218 & 1244 respectively) predicting cases (prob. ≥ 0.48). TP; True Positive, FP; False Positive, TN; True Negative, FN; False Negative, PPV; Positive Predictive Value, NPV; Negative Predictive Value, Spec; Specificity, Sens; Sensitivity

	Accuracy	PPV	NPV	Spec	Sens
Annotated Cases [†]	0.98	0.96	0.98	1.00	0.74
Criteria Definite Cases 1987*	0.82	0.79	0.83	0.92	0.61
Criteria Definite Cases 2010*	0.78	0.81	0.77	0.93	0.55
Either Criteria Cases*	0.76	0.90	0.72	0.95	0.51

Since patients diagnosed with RA do not necessarily meet classification criteria, it is not surprising that the ML cases and GSs do not completely overlap. The ML cases overlap to a larger degree with the 1987 GS than with the 2010 GS. Clinically, the ML identified cases do not differ from the 2010 and 1987 GS cohorts except for a slightly higher CCP2 positivity compared to the 1987 GS (65 vs 51%) and the combined criteria (65 vs 56%). (Table 1 & 2)

Conclusion: ML algorithms processing clinician notes enable fast and efficient selection of cases that are clinically similar to cases selected by criteria based chart review. This allows a significant reduction of time and effort required to construct high quality research cohorts.

Table 2. Comparison of baseline characteristics between 3 ML defined cohorts and a criteria based gold standard. [†] Not statistically tested; * significantly different to the ML selected cases at $\alpha = 0.05$, Pearson Chi-Squared for proportions, Mann-Whitney U for medians

	Predicted Definite Case	1987 Criteria Based Case	2010 Criteria Based Case	Either Criteria Based Case
N [†]	335	399	609	666
Proportion Women	0.67	0.63	0.65	0.65
Proportion CCP2 Positive	0.65	0.51*	0.61	0.56*
Proportion RF positive	0.67	0.60	0.69	0.64
Median BMI	26.0	25.5	25.6	25.6
Median BSE	28	29	26	26
Median CRP	9.6	11	9	9
Median Age at Inclusion	57.7	58.7	57.2	58.3
Median Symptom Duration at Diagnosis (in Days)	95.5	90	91	89
Median Number of Swollen Joints	5	6	6	5

References:

[1] Maarseveen et al. ARD 2019;78

[2] https://github.com/levrex/DiagnosisExtraction_ML

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