Results: The sample values gained with BÜHLMANN calibrators showed an excellent correlation with values gained with the WHO international standard for infliximab as calibrator. Passing-Bablok regression analysis revealed a slope of 0.96 and correlation coefficient (R) of 0.99. Bland-Altman analysis revealed a mean difference in the obtained values of less than five percent. Regarding spiking recovery analysis, all tests exhibit an excellent mean recovery of 101% (85-114%; a), 99% (91-105%; b); 101% (95-107%; c) and 94% (88-100%; d).

Conclusion: Current standardization of Quantum Blue® Infliximab rapid test correlates very well with the WHO international standard for infliximab (NIBSC 16/170). Spiking recovery was highly comparable for ELISAs and the Quantum Blue® Infliximab assay. This rapid test represents a unique and modern analytical method, for fast time-to-result and simplicity of usage in a more patient near medical environment.

References:

[1] Westgard, James. (2008). Basic Method Validation.

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AB1111

PREDICTIVE VALUE OF FLUORESCENCE-OPTICAL IMAGING TECHNIQUE IN DETECTION OF PSORIATIC ARTHRITIS IN PSORIASIS PATIENTS

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Background: Psoriasis (Pso) is one of the most common chronic inflammatory skin diseases in Europe. Psoriatic arthritis (PsA) is closely associated to Pso whereas the skin manifestation appears usually years before PsA-related symptoms emerge. Up to 30% of Pso patients develop PsA, but there is no clear correlation between disease duration of Pso and PsA development. Therefore, biomarkers for its early detection are of major importance. In early PsA, changes in synovial vascularisation combined with increased expression of proangiogenic factors appear first. Therefore, imaging biomarkers for detection of changes in vascularisation might be useful for early detection of musculoskeletal disease. Fluorescence-optical imaging (FOI) is a new method to detect changes in microvascularisation of the hands.

Objectives: To determine the number of positive PsA diagnosis within a 24 month follow-up period in Pso only patients with subclinical MSK-inflammation detected in FOI.

Methods: Sensitivity of FOI for detection of subclinical signs of musculoskeletal inflammation as biomarker for early PsA was observed in a prospective, multicentre study (XCITING) including patients with dermatological confirmed skin psoriasis. 411 patients were included from dermatology care units across Germany without diagnosis of PsA but potential risk factors for its development (nail psoriasis and/or joint pain or swelling within the last 6 months). Clinical examination (CE; swollen (66) and tender (68) joint count, enthesitis, dactylitis assessment) and standardised ultrasound (US) assessment was performed by a qualified rheumatologist to assess musculoskeletal inflammation. FOI was performed additionally. Data was analysed in focus on increased vascularisation of musculoskeletal structures as inflammatory markers. In case of discrepant results (positive FOI and negative CE and US), MRI was performed to prove the findings. In case of MRI negativity, a follow-up period of 24-months was performed including FOI, CE, US and MRI assessment.

Results: 83 of the 411 patients of the cohort were negative in all assessments (Pso only), 136 of the 411 patients were classified as PsA by rheumatologic assessments. 119 patients showed subclinical signs of musculoskeletal inflammation in the central reading of FOI, whereas CE and US were negative. In 37,5% of those patients, subclinical inflammation was confirmed by MRI assessment. 22 patients of the cohort without MRI positivity were willing to be followed up until month 24. 5 (7,5%) patients developed a clinical PsA until month 24 whereas 7 (10,5%) patients converted to be FOI negative. In 5 patients an additional MRI examination was performed in which one patient showed positive signs for inflammation.

Conclusion: FOI is an innovative method for measurement of changes in microvascularisation in the hands. 6/22 patients initial only positive in FOI (no clinical signs for PsA, negative US, negative MRI) developed either clinical evident PsA (n=5) or new inflammation in MRI (n=1) during follow-up of 24 months. Therefore, FOI positive signals in Pso patients increase the probability for PsA development.

Figure 1. Flow Chart of the Follow-up period of the XCITING study.

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AB1112

THE DIAGNOSTIC OF THE OSTEOARTHRITIS OF THE HANDS BY CONVENTIONAL RADIOGRAPHY

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Background: The most severe phenotype of osteoarthritis (OA) is currently considered to be an inflammatory or erosive phenotype (EOA). There is currently no reliable x-ray picture of this disease in the literature, and the question of whether it is an independent form of OA, a natural more pronounced stage of progression, or a separate nosology is debated in the literature.

Objectives: To identify the localization, frequency, and severity of pain and radiological symptoms in patients with EOA and non-erosive (NOA) disease in the interphalangeal (DIP and PIP) and metacarpal (MCP) joints of the hands.

Methods: 64 women with diagnosis of OA of the hand (HOA) joints according to the ACR criteria were included into study after signing the informed consent form. Mean age was 65.28 ± 6.82 years (48-77), mean BMI 27.7 ± 4.4 kg/m², mean disease duration 12 ± 8.1 years. Individual patient's medical record included relevant anthropometric data, records from case history and clinical examination, AUCAN scores, patient's articular status. Instrumental diagnostic methods included plain radiography of the hand joints in an anterior-posterior projection. The images were described in accordance with the Kellgren&Lawrence (K&L) system.

When evaluating radiographs of 64 patients with HOA, the most common was stage II (49%) according to K&L, and the most common symptoms in distal (DIP), proximal (PIP) interphalangeal and MCP were joint space narrowing (JSN) (100%, 100%, and 95%, respectively) and osteophytes (OP) (88%, 70%, and 45%, respectively). Subchondral osteosclerosis (SO) (5%), erosions (8%), and subluxations (3%) in MCP, as well as subluxation in PIP (6%) were less common. Statistica 10.0 was used for statistical analysis.

23 patients had EOA, 37 had NOA. Depending on the presence of erosions in interphalangeal joints patients were divided into 2 groups comparable in terms of age, age of OA onset and duration of disease (the average age of patients with EOA interphalangeal joints was 68 ± 6.15 years, and mean disease duration 18,34 ± 7.11 years; in the group without erosive changes in the average age amounted to 65,13 ± 5.43 years, mean disease duration of 16,56 ± 8.4 years).

Results: EOA DIP and PIP was detected in 15 (23%) with radiological changes corresponding to stages III-IV of HOA and in 8 people (12%) with stage II on

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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