Capillary.io presented a sensitivity (S) of 79.82% and a specificity (E) of 82% in the recognition of normal capillaries. The automatized system was able to recognize enlarged capillaries with a sensitivity of 86.97% and a specificity of 81.38%. Megacapillaries were detected with 89.41% sensitivity and 78.75% specificity. Similarly, the system was able to detect tortuosities (S 66.94%; E 67.71%), ramifications (S 54.34%; E 58.61%) and hemorrhages (S 71.36; E 73.97%).

Conclusion: Capillary.io is a simple, easy-learning web-based system to get interpretation of nailfold capillaroscopic images. It may be a very useful tool to standardize the interpretation of capillaroscopic pictures and could provide great research in that field.

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POS0257

TOWARDS A SIMPLIFIED FLUID-SENSITIVE MRI-PROTOCOL IN SMALL JOINTS OF THE HAND IN EARLY ARTHRITIS PATIENTS: RELIABILITY BETWEEN MDIXON AND REGULAR FSE FAT SATURATION MRI-SEQUENCES

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Background: MRI facilitates early recognition of rheumatoid arthritis (RA) by depicting inflammation. Contrast-enhanced T1-weighted and T2-weighted fat-suppressed sequences have been sensitive and thus recommended, but are hampered by invasiveness, costs and long scan time. Therefore we introduced a modified Dixon-sequence (mDixon) which is more patient-friendly, reduces cost, and scan times by 83%. However, it is not known if this mDixon-sequence is reliable in relation to regular MRI-sequences with and without contrast (T1- and T2-weighted, respectively).

Objectives: We determined the reliability between regular MRI-sequences with and without contrast (T1- and T2-weighted, respectively) and mDixon-MRI in early arthritis patients.

Methods: 29 early arthritis patients underwent regular fat-suppressed-MRI (T1- and T2-weighted) and mDixon-sequences, of metacarpophalangeal-2-5 and wrist-joints. Two readers scored erosions, osteitis, synovitis and tenosynovitis. Intraclass correlation coefficients (ICCs) between readers, and comparing the two sequences, were studied. Spearman correlations were determined.

Results: Performance between the two readers with the regular-MRI sequences, was good to excellent (ICCs all ≥ 0.88). The between reader ICC was also good to excellent for the mDixon-MRI (ICCs all ≥ 0.76). Next, ICCs between the two sequences was investigated to determine the reliability of mDixon. ICCs were good to excellent for total RAMRIS score 0.87 (95%CI 0.74-0.94), for erosions 0.88 (95%CI 0.69-0.95), and total inflammation score 0.84 (95%CI 0.69-0.82). The individual MRI-inflammation scores, had ICCs for osteitis 0.97 (95%CI

0.93-0.98), for tenosynovitis 0.78 (95%CI 0.58-0.89), and for synovitis 0.57 (95%CI 0.26-0.77). In addition, scores were highly correlated for total RAMRIS, erosions, and total MRI-inflammation score ($\rho=0.82$, $\rho=0.81$, $\rho=0.80$, respectively).

Conclusion: Regular-MRI sequences and mDixon-MRI perform equally well, this suggests that mDixon-sequence is reliable to detect joint inflammation. Thus, this is the first step towards a simplified and abridged MRI-protocol in small hand-joints in early arthritis patients. The ultimate goal will be implementation of this mDixon-MRI sequence. Validation in larger studies is warranted.

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POS0258

REAL-TIME VERSUS STATIC SCORING IN MUSCULOSKELETAL ULTRASONOGRAPHY IN PATIENTS WITH INFLAMMATORY HAND OSTEOARTHRITIS

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Background: Ultrasound (US) is used in rheumatic musculoskeletal diseases (RMDs) such as hand osteoarthritis (OA) as outcome measure. Traditionally scoring is performed real-time, but central reading of static US images could avoid issues of inter-rater reliability. However, agreement between real-time and static assessment has not been studied

Objectives: To study the agreement between real-time and static scoring of US in inflammatory hand OA.

Methods: Ultrasound was performed of 30 joints obtained in 75 patients with hand osteoarthritis, treated with prednisolone or placebo in a randomized double-blind trial. Hand joints were assessed for synovial thickening, effusion, Doppler signal and osteophytes by ultrasound (score 0-3 per joint) at baseline and after treatment. Two ultrasonographers blinded for clinical data scored the live images together (simultaneously) in real-time. A consensus score for each joint was recorded. Representative images stored during scanning were scored by one ultrasonographer minimally 6 months after real-time scoring. For each patient, images of each visit were scored paired, with known chronological order. Agreement between scoring methods was studied at joint level with quadratic weighted kappa. At patient level, intra-class correlations (ICC; mixed effect model, absolute agreement, with clustering taken into account) were calculated at both timepoints. ICCs were also calculated for the delta of sum scores. Responsiveness of scoring methods was analyzed with generalized estimating equations (GEE) with treatment as independent and ultrasonography findings as dependent variable.

Results: Thirty-nine patients (52%) were treated with prednisolone and 36 (48%) were treated with placebo. Patient characteristics were well-balanced between treatment groups.

All patients had signs of synovial thickening and osteophytes as assessed by real-time ultrasonography, and almost all signs of effusion (99%) or a positive Doppler signal (95%) in at least one joint. Total ultrasonography sum score for osteophytes was high (mean 45 $\pm$ SD 12), whereas sum score was low for positive Doppler signal (mean 5.9 $\pm$ SD 4.4), with intermediate sum scores for synovial thickening and effusion (mean 16 $\pm$ SD 6.3 and 11 $\pm$ SD 6.0 respectively). Static sum scores were overall slightly higher (osteophytes mean 48 $\pm$ SD 10; Doppler mean 6.9 $\pm$ SD 5.0; synovial thickening mean 20 $\pm$ SD 7.0 and effusion 13 $\pm$ SD 6.5).

Agreement at baseline was good to excellent at joint level (kappa 0.72-0.88) and moderate to excellent at patient level (ICC 0.59-0.86). Agreement for delta sum scores was poor to fair for synovial thickening and effusion (ICC 0.18 and 0.34 respectively), but excellent for Doppler signal (ICC 0.80) (Table 1).

Real-time ultrasonography showed responsiveness to prednisolone with a mean between-group difference of synovial thickening sum score of -2.5 (CI: -4.7 to -0.3). Static ultrasonography did not show a decrease in synovial thickening (Figure 1). No difference in ultrasonography scores was seen for the other ultrasonography features, neither with real-time nor static scoring.

Conclusion: While cross-sectional agreement between real-time and static ultrasonography was good, agreement of delta sum scores was not and paired static ultrasonography measurement of synovial thickening did not show responsiveness to prednisone therapy where real-time ultrasonography did. Therefore, when using ultrasonography in clinical trials, real-time dynamic scoring should remain the standard.

Table 1. Agreement on patient level

	Baseline	Week 6	Delta W6-BL
	ICC (95% CI)	ICC (95% CI)	ICC (95% CI)
Synovitis	0.59 (0.26-0.76)	0.58 (0.24-0.77)	0.18 (0 - 0.40)
Effusion	0.84 (0.66-0.92)	0.84 (0.75-0.89)	0.34 (0.12-0.53)
Osteophytes	0.82 (0.50-0.92)	0.78 (0.56-0.88)	ND
Doppler	0.86 (0.75-0.92)	0.91 (0.85-0.94)	0.80 (0.70 -0.87)

ICC: intra-class correlation coefficient linear mixed model (random patient, fixed rating), absolute agreement. ND: Not Determined

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Figure 1 Ultrasonography synovial thickening score of patients treated with prednisolone versus placebo.

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POS0259

ULTRASOUND AS AN IMAGING BIOMARKER OF EARLY RESPONSE TO TOCILIZUMAB AND METHOTREXATE IN VERY EARLY RHEUMATOID ARTHRITIS, TOVERA – A LONGITUDINAL STUDY

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Background: The combination of methotrexate (MTX) and tocilizumab (TCZ) has been proven to be superior to MTX alone in early rheumatoid arthritis (RA)¹ and was able to prevent radiographic progression. Ultrasound (US) has become a valid imaging modality in managing RA. Together with clinical examination, US may allow a comprehensive monitoring of response to therapy. So far, few data are available concerning the early response to TCZ plus MTX in very early RA (VERA).

Objectives: In this study we aimed to assess the early US response to TCZ plus MTX in VERA, DMARD-nave patients.

Methods: In this open-label, single-arm study, VERA patients received TCZ (162mg/week, subcutaneously) and MTX (15-20mg/week, per os) for 24 weeks as induction therapy, followed by MTX as maintenance therapy. RA was diagnosed according to the 2010 ACR/European league against rheumatism (EULAR) criteria. All patients who fulfilled the inclusion criteria (ClinicalTrials.gov: NCT02837146) underwent blood tests, clinical and ultrasound examinations at the predefined time-points: 0,2,4,8,12,24,32,48,54 weeks (w). Ultrasound examination of 34 joints (elbows, wrists, MCP [1-5, bilateral], PIP [2-5, bilateral], knees, ankles and MTP [2-5, bilateral]) was performed blindly to clinical data. Gray-scale (GS), power-Doppler (PD) scores, and the global OMERACT-EULAR synovitis score (GLOESS) were assessed in each joint. The sum of individual scores was calculated for 17-joint score (JS) (whole joint set), 10-JS (wrists, MCP, ankles and MTP joints), 12-JS², and 7-JS³.

Results: Forty-four patients (77% women), aged 46.7 ± 12.4 years, completed the 24-week period. Two-thirds (72.7%) were positive for anti-citrullinated protein antibody (ACPA) and 18.2% had bone erosions. At baseline, the mean 28 swollen joints count (28-SJC) was 7.55 ± 4.5, mean disease activity score (DAS28)-CRP score was 5.2 ± 0.15, mean simplified clinical activity score (SDAI) was 31.4 ± 1.9, mean clinical activity score (CDAI) was 29.1 ± 1.8 and mean health assessments questionnaire (HAQ) score was 1.3 ± 0.1. The C-reactive protein (CRP) decreased significantly at 2w (p<0.05) and, accordingly DAS28-CRP score decreased significantly at 4w (p<0.05). The 28-SJC and CDAI scores decreased significantly at 8w (p<0.05). The HAQ and visual analogue scale (VAS) disease activity reported by patients decreased significantly at 8w (p<0.05) and VAS fatigue at 12w (p<0.05).

The GLOESS and GS scores allowed us detecting the earliest significant treatment response at 2w and PD scores at 4w (p<0.05). Among US joint subsets, 17-JS (p<0.01), 12-JS (p<0.05) and 10-JS (p<0.05) were able to detect the earliest treatment response at 2w. The 7-joint score detected the earliest response at 4w, both in GS and PD (p<0.05).

Conclusion: US scores were able to detect therapeutic response to TCZ plus MTX earlier than clinical scores and may therefore be a promising imaging biomarker.

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POS0260

ULTRASOUND ASSESSMENT OF HANDS AND FEET FOR SYNOVITIS PRIOR TO FIRST CLINICAL VISIT MARKEDLY REDUCES TIME TO DIAGNOSIS - EXPERIENCE FROM ROUTINE CARE

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Background: All patients referred to our Rheumatology department suspected of having arthritis are scheduled for a visit in the out-patient fast track clinic (FTC) for arthritis. Routine blood samples including C-reactive protein (CRP), anti-CCP, IgM RF, and x-ray of hands and feet are available at the first clinical visit where the medical history and clinical examination is obtained by rheumatologists or rheumatologists-in-training under supervision. The role of ultrasound (US) in routine care for diagnosing arthritis is not fully elucidated but US is more sensitive than clinical joint examination for detecting synovitis. Therefore, US may facilitate diagnosis of arthritis.

Objectives: To assess whether US examinations of hands and feet in relation to the first clinical visit impact the time to diagnosis and number of clinical visits needed.

Methods: From Oct. 2017 to June 2018, US examination of hands and feet (wrist, metacarpophalangeal and proximal interphalangeal joints, ankle, and metatarsophalangeal joints) were performed prior to the first clinical visit by ultrasound-experienced rheumatologists. Using the OMERACT scoring system for grey-scale (GS) and Doppler, synovitis was defined as GS score >1 with or without Doppler score ≥1. Examination time was 20 minutes.

Time from the first clinical visit to the final clinical diagnosis and the number of clinical visits needed in the FTC was assessed and compared to a similar patient cohort the previous year (Nov. 2016 to June 2017) where ultrasound was performed ad hoc. Number of revised diagnoses and the number of patients re-referred after 12 months was noted. Local ethics committee ruled that approval was not needed.

Results: From 2017- 2018, 163 referred patients had US prior to first clinical visit. 76(47%) were diagnosed with inflammatory arthritis (IA), 12(7%) with crystal-related arthritis, 39(24%) with other Rheumatic Diseases (RMDs) and 36(22%) with no RMD diagnosis. The comparative cohort comprised of 109 patients of whom 29(27%) were diagnosed with IA, 16 (15%) with crystal-related arthritis, 31(28%) with other RMDs and 33 (30%) with no RMD diagnosis. Adding US to the first clinical visit reduced the time to diagnosis from mean 31 (standard deviation(SD) ±32.2) days to mean 12 (±17.3) days. The number of clinical visits needed was reduced from mean 2.8(±1.1) to 2.1 (±1.3) corresponding to a reduction of 114 visits in the period from 2017–2018. The mean number of all US examinations in the FTC was 1.1 (±0.3) in the US cohort versus 0.8(±0.7) in the comparative cohort. In the US cohort vs. comparative cohort 8 (4.9%) vs. 17