of ERA in a population of EIA patients from an Early Arthritis Research Center (EARC).
Methods: We have assessed all patients with EIA referred to our EARC between 2012–2016. Patients who were diagnosed with other diseases except EIA or ERA, or in whom symptom duration exceeded 12 months, were excluded from the analysis. Every patient underwent clinical, laboratory and ultrasound evaluation. For the proposed US diagnostic method we have evaluated bilaterally 3 joints: wrists, MCP II and III and 2 tendon regions: the extensor ulnaris carpis tendon and the flexor tendons of the fingers. The presence/absence of synovitis/tenosynovitis either in gray-scale or power-Doppler scale was scored in a binary mode as 1/0. In order to simplify the scanning protocol, we considered the flexor tendons of the fingers as a singular structure for each hand which meant that that the presence of US abnormalities in at least one flexor tendon was scored as 1. Thus, the maximum score obtainable in both hands was 10. We analyzed the performance of the proposed US method for the diagnosis of ERA using ROC curve analysis.
Results: Of 253 patients referred to our EARC, 73 satisfied the inclusion criteria; among them, 43 fulfilled the EULAR/ACR criteria for RA (ERA patients), while the other 30 were considered to have undifferentiated EIA. The demographic, clinical and US data of the 73 patients are displayed in the table below. 34/43 ERA patients (76.7%) had a duration of symptoms less or equal to 3 months which classifies them as very ERA (VERA).

Table 1. Demographic, clinical, laboratory and US data of the study patients – data are either n (%), mean ± SD or median (IQR)

Parameters	EIA (n=30)	ERA (n=43)	p
Gender (Female)	17 (56.7%)	27 (62.8%)	0.816
Age	41.70±15.58	55.47±13.71	<0.001
Mean duration of symptoms	3.16±3.22	3.54±3.58	0.556
CRP (mg/l)	7.85 (1.99–26.20)	18.62 (3.57–14.68)	0.848
ESR (mm/h)	26.00 (10.00–44.75)	34.53 (14–51)	0.238
RF (IU/ml)	10.00 (7.85–14.56)	142.75 (35.14–201.74)	<0.001
ACPA (IU/ml)	5.00 (0.5–5.00)	153.96 (46.20–212.00)	<0.001
DAS28	4.00 (3.35–5.05)	4.89 (4.31–5.60)	<0.001
SDAI	17.82 (12.28–26.37)	27.96 (20.92–34.61)	<0.001
US evaluation	0 (0–3)	5 (3–7)	<0.001

In ROC analysis, a cut-off of the US score of 4 had best results for sensitivity and specificity (73.3% and 82.1%, respectively), with an area under the curve of 0.812. The US score correlated with the levels of RF, ACPA, DAS28 and SDAI ($p<0.001$), but not with those of acute phase reactants ($p>0.05$). The time needed for performing the ultrasound examination was less than 10 minutes.
Conclusions: The proposed US method proves to be reliable in identifying patients with ERA. The binary mode of US evaluation allows even persons with little training in US examination to diagnose patients. As the costs and time needed for US evaluation are low, the method is valuable in clinical practice for a rapid assessment of patients with EIA.
References:
[1] Aletaha D et al. Arhritis Rheum. 2010;62:2569–258.
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FRI0677 ROLE OF NAILFOLD VIDEOCAPILLAROSCOPY AND 22-MHZ DOPPLER ULTRASOUND IN THE ASSESSMENT OF SYSTEMIC SCLEROSIS-RELATED DIGITAL VASCULOPATHY

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Background: Microvascular damage plays a critical role in the initiation and perpetuation of systemic sclerosis (SSc). A comprehensive approach should investigate both superficial and deep layers of peripheral microcirculation. In addition to nailfold videocapillaroscopy (NVC), a well-established technique to evaluate outer skin layer vessels, power Doppler ultrasound (PDUS) has been recently used to study microcirculation in the inner levels [1].
Objectives: To study the severity of microvascular involvement in patients with SSc by using both NVC to measure capillary density (outer layer at the nailfold area) and PDUS to detect perfusion (deeper layers at the nailfold and pulp area).
Methods: 100 SSc consecutive patients fulfilling the 2013 EULAR classification criteria were enrolled. PDUS was performed at the 3rd and 4th finger of the dominant hand after exclusion of ulnar artery occlusion (UAO). In case of UAO non-dominant hand was examined. Ultrasound investigation was performed with Esaote MyLab 70 XVG by means of linear array transducer (10–22 MHz). Power Doppler settings were standardized (Doppler frequency 14.3 MHz, Gain 55%, PRF 750 Hz). PDUS measurements included sagittal scan of nailbed and fingertip qualitatively graded from 1 (no signal) to 4 (marked hyperemia) [2], and resistivity index (RI) of ulnar and radial proper digital arteries. Capillary density (number/mm) was calculated by NVC with magnification 200X performed on two images of the same digits examined by PDUS.
Results: 100 SSc patients, 87 (87%) women, 86 (86%) limited cutaneous SSc, median age 62.2 years old, median disease duration 8 years were evaluated. 7 (7%) patients had UAO. Concordance between fingertip and nailbed perfusion as assessed by PDUS is reported in Table 1.

Table 1

		Nailbed PDUS				Sum
		Grade 1	Grade 2	Grade 3	Grade 4	
Fingertip PDUS	Grade 1	15	19	3	1	38
	Grade 2	13	13	6	6	38
	Grade 3	3	5	10	10	28
	Grade 4	2	8	15	71	96
	Sum	33	45	34	88	200

Concordance between fingertip and nailbed perfusion as assessed by PDUS is equal to 0.7398. The lower 97.5% confidence interval limit is 0.6433.
Association between capillary density, and fingertip and nailbed perfusion as assessed by PDUS is shown in Table 2.

Table 2

	Capillary density	p-value of the difference between the mean of the category, with respect to reference (grade 1)
Fingertip PDUS		
Grade 1	2.895	
Grade 2	3.763	0.038
Grade 3	3.500	0.181
Grade 4	3.844	0.007
Nailbed PDUS		
Grade 1	3.212	
Grade 2	3.433	0.597
Grade 3	3.294	0.854
Grade 4	3.949	0.049

Conclusions: To our knowledge, this is the first study to correlate NVC and PDUS finding in SSc patients. Fingertip and nailbed PDUS grade concordance was found to be satisfactory. The mean capillary density tends to be greater with respect to grade 1. This is particularly evident comparing grade 4 and grade 1. As such, these two imaging techniques provide different and potentially complementary information on SSc-related peripheral microvascular involvement. There is potential clinical utility in these observations that has yet to be unlocked fully.
References:
[1] Lescoat A et al. Arthritis Care Res. 2016;Epub ahead of print.
[2] Newman JS et al. Radiology. 1996,198:582–584.
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FRI0678 ULTRASOUND-GUIDED SYNOVIAL NEEDLE BIOPSY: SINGLE CENTER EXPERIENCE OF AN EMERGING, MINIMALLY INVASIVE TECHNIQUE IN CLINICAL PRACTICE AND RESEARCH

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Background: Synovial biopsy remains an important tool in clinical practice and research for the study of synovitis. Ultrasound-guided needle biopsy (USNB) has recently emerged as a minimally invasive technique, which enables collection of high quality synovial tissue with very good patient tolerance.
Objectives: To report the experience with USNB in our department, since its introduction in late 2013.
Methods: We reviewed the clinical files of all patients who had an USNB in our department. Degree of US joint synovitis was evaluated on a semi-quantitative scale (0–3) in terms of synovial thickness (ST) and power Doppler (PD). Since 2015, we assessed patient tolerance and acceptance of the procedure using a standardized questionnaire, which includes visual analogue scales (VAS) of pain, stiffness and swelling of the biopsied joint. Changes in US and VAS scores were assessed using the Wilcoxon signed-rank test.
Results: Forty-eight patients had 53 USNB, mostly for diagnostic purposes (79%), performed by 4 different operators - Figure 1. All types of joints were biopsied, mostly medium sized (26 wrists, 7 ankles), but also large (3 knees, 4 shoulders, 6 elbows, 3 hips) and small (1 sternoclavicular, 1 naviculocuneiform, 1 metacarpophalangeal and 1 proximal interphalangeal) joints, 2 bursae (subacromial) and 1 tendon sheath. USNB was repeated in the same joint (wrist) twice in 3 patients and three times in one patient. Procedures were well tolerated, with 67% of patients classifying it as easy or very easy, 78% reporting no or only mild discomfort and 77% considering likely/very likely to accept to repeat the biopsy. An increase in analgesic medication in the days following the biopsy was reported by 13 out of 44 questioned patients. After a median of 8 days following the procedure, a significant decrease was observed in VAS scores of pain, stiffness and swelling of the biopsied joint, although 23%, 23% and 31% of the patients reported small increases in these scores (median 9.5, 11 and 10mm, respectively). There was no significant change in US scores pre- and post-biopsy, with only 3 and 2 patients having an increase in ST or PD scores, respectively. Biopsies were overall safe, with 6 minor immediate adverse events (11%). There were no cases of haemartrosis, joint/periarticular

infection or neurovascular damage. Two patients reported transient limitation of the 5th and 1st digit extension following a biopsy of the wrist and 1st extensor compartment tendon sheath, respectively, with no detectable tendinous ruptures on US; 1 patient had a muscular hematoma of the extensor muscles of the forearm following an elbow biopsy.

	Patient & Biopsy characteristics (N=53)		
Age / Female	56 ± 18 years / 34 (64%)		
Diagnosis	21 RA, 13 UA, 8 septic, 5 crystal, 3 PsA, 1SpA, 2 other		
Disease duration	5.3 ± 7.1 years		
DAS28	4.3±1.2		
Clinical indication	42 diagnostic (79%), 11 research (21%)		
Joint size	16 large, 30 medium, 4 small, 2 bursa, 1 tendon sheath		
Infection confirmed	3/42 (7%)		
Immediate tolerance	29% very easy, 38% easy, 24% tolerable, 9% difficult		
Discomfort during procedure	36% no disc., 42% mild disc., 11% moderate disc., 5.5% mild pain, 5.5% intense pain		
Increase pain medication	13 (30%) in days following procedure		
Likelihood to repeat biopsy	41% very likely, 36% likely, 9% maybe, 14% unlikely		
Immediate AE	5 minor local bleeding, 1 transitory forearm extensor paralysis due to anesthesia		
Other AE	2 transient digit extension limitation (D5, D1), 1 muscular hematoma forearm		
	Pre-biopsy	**Post-biopsy**	**p-value**
VAS pain biopsied joint (mm)	62±25	46±29	0.001*
VAS stiffness biopsied joint (mm)	59±30	37±31	0.004*
VAS swelling biopsied joint (mm)	61±26	44±28	0.007*
US synovial thickness score	2.5±0.6	2.2±0.8	0.092
US Power Doppler score	1.0±1.2	1.0±1.1	0.414

*p-value significant at <0.05. AE, adverse events; D1, digit 1; D5, digit 5; DAS28, disease activity score 28 joints; disc., discomfort; PsA, psoriatic arthritis; RA, rheumatoid arthritis; SpA, spondyloarthritis; UA, undifferentiated arthritis; US, ultrasound; VAS, visual analogue scale.

Conclusions: In our center, USNB has proved to be an effective technique for collection of synovial membrane that can be used for diagnostic and research purposes. The vast majority of the procedures were well tolerated, without significant worsening of local joint symptoms or synovitis, and safe, without major adverse events. Importantly, patients' concordance to repeat a USNB was mostly high.

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FRI0679 WHOLE SPINE AND SIJ MRI OF PSORIATIC ARTHRITIS PATIENTS: DESCRIPTIVE STUDY OF THE SPINE, AND SACROILIAC JOINTS INVOLVEMENT IN A CROSS SECTIONAL LARGE COHORT

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Background: Detection of axial disease has important implications. Data on the structural changes of the spine and SIJ in PsA is mainly based on plain XR and MRI of SIJ. The prevalence and distribution of spinal changes in PsA as detected by MRI is largely unknown.

Objectives: To evaluate acute and structural changes in spine and SIJ by whole spine MRI performed in a consecutive clinical cohort of PsA.

Methods: Adult PsA (CASPAR criteria) patients were enrolled in the study. All underwent clinical exam, CRP, HLA-B27 tests, and MRI of the entire spine and SIJ. Spinal sagittal T1-W, STIR and semi-coronal T1-W and T2-W with fat saturation sequences of the SIJ were performed. The spine was scored for the presence of syndesmophytes, bone marrow edema (BME)/fatty corners and enthesitis. SIJS were scored (Berlin score) for the presence of BME, fatty replacement, erosions, sclerosis, and ankylosis. Findings were further categorized into active sacroiliitis (ASAS[1]), structural sacroiliitis, and spinal findings compatible with SpA (≥3 BME or ≥4 fatty corners[2]). All MRIs were evaluated by an experienced musculoskeletal radiologist, blinded to clinical data. Data were analyzed by SPSS Version 20.0.

Results: Ninety six patients completed the study.(Table1) Active/structural/total sacroiliitis was detected in 26%/11.5%/37.5% of patients, respectively. Spinal SpA was demonstrated in 15.6%.(Table 2) Isolated spinal changes were detected in 2.1% of the cohort. Presence of inflammatory back pain (IBP) by ASAS correlated with the prevalence of active sacroiliitis (p 0.024) and SpA (axial/SIJ) (p 0.003). The extent of psoriasis severity (PASI) correlated with both SIJ and whole spine SpA changes. (*p 0.02 for both*) Gender differences or biologic therapy did not affect the prevalence of SIJ or spine involvement.

Table 1. Demographic and clinical data

Age (mean, yr)	50±13
Gender M:F	50:46
Psoriasis/PsA duration (mean, yr)	19±13.6/9±8
PASI	3.9±8.9
ASDAS-CRP	2.2±1
Back pain (%)/Inflammatory back pain by ASAS (%)	70%/30%
HLA-B27 (%)	4.4%
Current DMARD Tx (%)/Current biologic Tx (%)	45%/35%

Table 2. Whole spine MRI findings

	N (%) patients
Active Inflammatory Lesions	
≥1 BME corner	22 (23%)
≥1 posterior elements enthesitis	4 (4%)
Structural Lesions	
≥1 corner erosion	10 (10.4%)
≥1 fatty corner	30 (31%)
≥1 syndesmophytes	30 (31%)
Distribution of inflammatory lesions:	
Cervical 2.1%, Thoracic 18.8%, Lumbar 14.6%	
Distribution of structural lesions:	
Cervical 10.4%, Thoracic 32.3%, Lumbar 25%	

Conclusions: In the present PsA cohort, active and structural sacroiliitis was more prevalent vs typical spinal SpA changes. In particular, there was a paucity of SpA changes in the cervical spine. The most prominent axial findings included fatty corners and syndesmophytes. IBP presence and extensive skin disease correlated with SpA axial and SIJ changes.

References:

[1] Lambert RG. Ann Rheum Dis. 2016,75.
[2] Hermann KG. Ann Rheum Dis 2012.71.

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FRI0680 SYNOVIAL INTENSITY MEASURED BY ULTRASONOGRAPHY AS AN INDICATOR FOR JOINT INFLAMMATION IN RHEUMATOID ARTHRITIS PATIENTS UNDER TREATMENT

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Background: Ultrasonography (US) is a useful modality that can directly visualize RA joint inflammation. Recently, brightness of thickened synovium is considered to associate with local synovitis. However the accuracy of US findings with the local pathophysiology remains uncertain since synovial biopsy could be heterogeneous depending on the biopsy site and can be influenced by various medications. On another front, synovial fluid (SF) is homogenous, easy to access and contains abundant inflammatory cytokines and growth factors, which play an important role in the local pathogenesis of RA. However, the association between SF proteins and joint US findings is not clear.

Objectives: To clarify whether synovitis detected by US including synovial hypertrophy, vascularity and brightness reflect local joint molecular pathophysiology.

Methods: Forty-four RA patients were recruited. All patients were performed standardized US examination of knee joint. US images were evaluated by semi-quantitative scoring (synovial hypertrophy; grey scale (GS) US, vascularity; power Doppler (PD) US) and quantitative analysis by using Image J (National Institutes of Health, MD, Maryland USA). The average of the pixels of synovial tissue area (GS quant), PD signal area (PD quant) and mean gray values of synovium (Brightness) in 3 areas of the knee joint were calculated. US guided SF aspiration was performed on the same day and concentrations of cytokines and growth factors were measured by Cytometric Beads Array. (BD Biosciences, NJ, USA)

Results: Median age, disease duration and DAS28-ESR were 64 years, 1.5 years and 5.2 respectively. Mean GSUS and PDUS were 2.3 and 2.0. Nineteen patients were untreated. US inflammatory findings especially PD quant were well correlated with corresponding SF IL-6, IL-8, IL-1β and IL-10.(range of rho;0.40–0.72, $p<0.05$) synovial brightness also inversely correlated with SF VEGF (rho=-0.41, $p<0.05$). When we analyzed untreated and treated RA patients separately, GS quant did not correlate with any SF cytokines in treated group although, PD quant and brightness both significantly correlated with SF IL-6 and VEGF ($p<0.05$). Next, we divided the treated patients into 4 groups according to median of brightness and GS quant to compare the SF IL-6 levels. This analysis showed that SF IL-6 levels were influenced by synovial brightness rather than its hypertrophy. ($p<0.05$)

Conclusions: Our results suggest that not only US PD signals but also synovial brightness is a useful indicator for joint inflammation rather than synovial hypertrophy itself in treated RA patients.

References:

[1] Naredo E et al. Arthritis Rheum 2008; 58: 2248–56.
[2] Kelly S et al. Arthritis Res Ther. 2015 Mar 13;17:58.

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