SAT0643 VALUE OF POWER DOPPLER ULTRASONOGRAPHY FOR PREDICTION OF TREATMENT FOR RHEUMATOID ARTHRITIS (RA) IN EARLY ARTHRITIS DURING THE FIRST 12 MONTHS OF FOLLOW-UP

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Background: There is a short window of opportunity for early diagnosis and treatment of rheumatoid arthritis, that may be crucial for reaching remission and a low rate of radiographic progression. High resolution power doppler ultrasonography (PDUS) is helpful in early detection of synovitis and may help to select patients that will need early establishment of treatment for RA.

Objectives: To study whether the presence of basal power doppler signal in patients with early arthritis in a clinical basis treatment decision could predict the risk of receive treatment for AR at 3 and 12 months of follow-up.

Methods: We studied the presence of ultrasonographic Power Doppler (PD) signal on 28 joints (shoulders, elbows, wrists, MCPs, knees) and 44 joints (28 joints and in addition hips, Tarsus, ankles and MTPs), with a mid-range equipment GE L5, in 70 patients with suspected early arthritis. The patients were included with at least one of the following inclusion criteria: a) Swelling in 2 or more joints b) pain in MCPs, MTPs and/or the wrists c) morning stiffness of more than 30 minutes with <12 months duration of the symptoms. Clinical treatment decision was not aware to basal power doppler results. Statistical study: Chi-square, Fisher exact test, p univariate and Odds Ratio calculation.

Results: The presence of basal power doppler signal in ≥ 1 joints of 44 (PD44) at baseline shows statistically significant association with treatment with oral steroids ($p < 0.001$, OR 8.6 (2.4–30.5), DMARD $p = 0.028$, OR 4.2 (1.3–13.3), metotrexate (MTX) $p = 0.002$ OR 6.6 (1.9–22.1) but not sulfasalazine (SSZ) ($p = 0.145$) at 3 months and with steroids ($p < 0.0005$ OR 14.8 (3.9–44.4), DMARDs ($p < 0.0005$, OR 10.3 (2.6–40.4), MTX ($p < 0.0005$, OR 8.67 (2.6–29.2)), sulfasalazine ($p = 0.001$, OR 8.7 (2.2–33.9), at 12 months The presence of at least one joint with power doppler signal of 28 joints (PD28) was significantly associated to esterooids ($p = 0.003$, OR 5.4 (1.8–16.8) and metotrexate ($p = 0.016$, OR 4.1 (1.4–12.7) treatments in the first 3 months but not to other DMARDs $p = 0.146$ (including sulfasalazine $p = 0.416$) and with steroid ($p = 0.01$ OR 7.3 (2.2–24.9), DMARD, ($p = 0.03$, OR 5.8 (1.8–18.7), MTX ($p = 0.012$, OR 4.3 (1.4–12.8), and sulfasalazine ($p = 0.008$, OR 4.9 (1.5–15.6) during first 12 months of follow-up. Predictive value of other risk factors for RA (RF, basal erosions=EROS BAS) is shown in the table below.

BASAL N=70		ESTEROID 12M	DMARD 12M	MTX 12M	SSZ 12M
		P univariate OR IC 95%	P univariate OR IC 95%	P univariate OR IC 95%	P univariate OR IC 95%
PD28	SI	44/50(88%)	33/50 (66%)	37/50(74%)	31/50(51,4%)
	NO	10/20(50%)	5/20 (7,1%)	8/20(40%)	5/20(25%)
		0,001 OR 7,3 (2,2-24,9)	0,003 OR 5,8 (1,8-18,7)	0,012 OR 4,3 (1,4-12,8)	0,008 OR 4,9(1,5-15,6)
PD44	SI	47/52(90,4%)	35/52 (67,3%)	40/52(76,9%)	33/52(63,5%)
	NO	7/18(38,9%)	3/18 (16,7%)	5/18(27,8%)	3/18(16,7%)
		<0,0005 OR 14,8(3,9-44,4)	<0,0005 OR 10,3(2,6-40,4)	<0,0005 OR 8,67 (2,6-29,2)	0,001 OR 8,7(2,2-33,9)
RCP	SI	40/45(88,9%)		37/45(82,2%)	
	NO	14/25(56%)	NS	8/25(32%)	NS
		0,003 OR 6,3 (1,9-21,3)	1,000	P<0.0005 OR 9,8 (3,2-30,6)	0,624
FR	SI	19/20(95%)		19/20(95%)	
	NO	35/50(70%)	NS	26/50(52%)	NS
		0,028 OR 8,1(1,66,5)	0,430	0,001 OR 17,5 (2,1-141)	0,433
ACPA	SI			12/13(92,3%)	
	NO	NS	NS	33/57(57,9%)	NS
		0,272	0,193	0,024 OR 8,7(1,1-71,7)	0,622
EROS BAS	SI			26/30(86,7%)	
	NO	NS	NS	17/35(48,6%)	NS
		0,139	0,161	0,002 OR 6,9(1,9-23,9)	0,622
n=65					

Conclusions: Power doppler ultrasonography in at least one joint of 44 (PD44) may predict the patients that will need esterooids, any DMARD, MTX and SSZ therapy in early arthritis at 3 and 12 months of follow-up. PD28 may predict the patients that will need esterooids, any DMARD, MTX and SSZ therapy in early arthritis at 12 months, but may only predict the need of steroid and MTX at three months.

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SAT0644 IS ANKLE INVOLVEMENT IMPORTANT IN RHEUMATOID ARTHRITIS?

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Background: The ankles may be affected by rheumatoid arthritis (RA). In daily evaluation of RA patients, the ankles are often neglected by clinical examinations, while composite activity scores do not include them

Objectives: The aim of the study is to assess the inflammatory lesions in RA ankles, regarding frequency and possible correlation with activity disease

Methods: The study included 76 RA patients fulfilling the 2010 ACR/EULAR classification criteria. In every patient we recorded clinical ankle involvement (ankle swelling and/or tenderness on physical examination); both ankles were evaluated by gray scale (GS) and Power Doppler (PD) ultrasound examination, graded from 0–3. In each joint we assessed: tibio-talar joint (TT); tibialis anterior (TA) tendon; extensor hallucis (EH) and extensor digitorum (ED) tendons; talonavicular joint (TN); tibialis posterior (TP) tendon; flexor digitorum (FD) and flexor hallucis (FH) tendons; peroneus brevis (PB) and longus (PL) tendons; Achilles tendon (AT); subtalar joints (SJ); posterior, lateral, medial recesses; plantar fascia (PL). We recorded the following abnormalities: synovitis, tenosynovitis, bursitis, entesopathy and rupture. Activity scores (DAS28, DAS44, SDAI), inflammatory markers (ESR, CRP), serology (RF, ACPA) and HAQ were also assessed

Results: The mean age was 57.2±14.2 years; 88% were women; mean disease duration was 12.2±9.2 years; 56.6% had symptomatic ankles; 81.6% had ultrasound ankle abnormalities. The most frequent ultrasound pathology encountered was ST synovitis (56.6%), followed by TT synovitis (48.7%), TN synovitis (38.2%), TP tenosynovitis (30.3%), PL tenosynovitis (15.8%). Ultrasound abnormalities were recorded in 93% of the symptomatic ankle patients and in 66.7% of the asymptomatic ankle patients ($p = 0.008$). Overall, 43% had positive PD signals, but the prevalence of positive PD signals was significantly higher in symptomatic ankle patients than in asymptomatic ankle patients (60.5% compared to 21.2%, $p = 0.011$). Statistically significant correlations were found between ultrasound inflammatory pathology (synovitis and tenosynovitis), activity disease markers and quality of life (Table 1).

Table 1. Correlations of GS ultrasound measures with disease activity and HAQ

	ESR	CRP	DAS28 _{CRP}	DAS28 _{ESR}	DAS44	SDAI	HAQ
TT	0.104	0.360**	0.395***	0.283*	0.317**	0.352**	0.150
TN	0.159	0.426***	0.442***	0.330**	0.366**	0.391***	0.007
PL	0.272*	0.366**	0.368**	0.347**	0.362**	0.340**	0.292*
PB	0.074	0.139	0.200	0.215	0.231*	0.223	0.243*
TP	0.408***	0.466***	0.543***	0.548***	0.558***	0.542***	0.268*
FD	0.166	0.145	0.254*	0.260*	0.285*	0.259*	0.256*

Note: the reported values represent the rho coefficients of bivariate Spearman correlations: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Conclusions: Musculoskeletal ultrasound detected a high prevalence of inflammatory abnormalities in rheumatoid arthritis ankles, in both symptomatic and asymptomatic patients, while power Doppler signal was present mostly in symptomatic patients. The ultrasound pathology was highly correlated with activity disease markers and quality of life

References:

- [1] M Backhaus, G-R Burmester, T Gerber et al., Guidelines for musculoskeletal ultrasound in rheumatology, Ann Rheum Dis 2001.; 60:641–649.
- [2] M Alsuwaidi, B Ehrenstein, M Fleck et al., Ankle Joint in Rheumatoid Arthritis. An Ultrasound Study Using High Resolution- and Clour Doppler Ultrasound, 2013 ACR/ARHP Annual Meeting, Abstract No 1969.

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SAT0645 MAGNETIC RESONANCE IMAGING AND HISTOPATHOLOGICAL CORRELATION IN DERMATOMYOSITIS

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Background: Dermatomyositis represents one of the major forms among the inflammatory myopathies (IIM). Although the muscle biopsy remains the definitive test, MRI has been used to detect unique patterns of muscle involvement. To date, no studies have compared MRI with muscle pathology in naïve DM.

Objectives: To compare the pattern of muscle MRI with muscle pathology.

Methods: All the patients enrolled in the Hospital Clínic de Barcelona (HCB) from January 2009 to December 2016 with an available MRI, performed just before muscle biopsy were included. The HCB ethics committee approved this study, and written informed consent was obtained from each participant.

MRI data and the clinical and demographic features were prospectively collected. Patients were classified as having definite DM (ref 4). MRI was performed on a 1.5T with standardized protocol of whole body or scapular and pelvic girdle MRI, which include coronal and axial T1-weighted and STIR images. Image analysis was performed by two experienced musculoskeletal radiologists masked

to the disease activity. The presence of oedema, fatty replacement and fascial oedema was evaluated in the biopsied muscle. Muscle and fascial inflammation was scored using a 0–3 point scale. The extent of muscle involvement was also evaluated by the analysis of 12 to 14 axial images and a percentage of muscle volume was calculated. Fatty replacement was scored using a 0–3 point scale. Muscle biopsies were evaluated by two trained pathologists at the HCB. Muscle biopsies were routinely processed. Quantification of fiber necrosis, regeneration and inflammation infiltrate were recorded. All statistical analyses were performed using "SPSS v22.0 ©". In all statistical tests performed p value of 0.05 was considered significant.

Results: A total of 16 (13 female) patients were included. Except in one patient all of them had proximal muscle weakness, and all of them except one had typical DM skin lesions. In 12% of the patients a solid cancer was diagnosed. All patients had fascial edema at muscle MRI while no one had fatty replacement, and 65% had muscle oedema. Only one biopsy was normal. A significant correlation was found between muscle inflammation and MRI muscle edema ($p=0.036$) and the percentage of volume muscle involvement at MRI ($p=0.027$). Muscle necrosis was seen in those patients with moderate and severe fascial edema compared with those with mild fascial edema ($p=0.032$). More regenerating cells were seen in those patients with moderate and severe muscle edema compared with negative or mild muscle oedema ($p=0.018$).

Conclusions: A strong and significant correlation between histological and imaging findings was found. Fascial and muscle edema were the predominant findings in DM patients

References:

- [1] Garcia J. MRI in inflammatory myopathies. *Skeletal Radiol* 2000;29:425–38.
- [2] Connor A, Stebbings S, Hung N, et al. STIR MRI to Direct Muscle Biopsy in Suspected Idiopathic Inflammatory Myopathy. *J Clin Rheumatol* 2007;13:341–45.
- [3] Dalakas MC. Inflammatory muscle diseases. *N Engl J Med* 2015;373:393–4.
- [4] Hoogendijk JE, Amato AA, Lecky BR, et al. 119th ENMC international workshop: trial design in adult idiopathic inflammatory myopathies, with the exception of inclusion body myositis, 10–12 October 2003, Naarden, the Netherlands. *Neuromuscul Disord* 2004;14:337–45.

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SAT0646 COMPARISON OF US, CT, X-RAY AND MRI EFFICACY FOR SEQUENTIAL ASSESSMENT OF CHRONIC GOUT MANIFESTATIONS

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Background: Ultrasonography (US), magnetic resonance imaging (MRI), computed tomography (CT), and X-ray are the alternative diagnostic modalities used to identify affected joints and surrounding tissues (tophi, erosions and synovitis) in gout patients, but the potential of each method for sequential assessment of disease regression in pts receiving urate-lowering therapy is not sufficiently studied [1]

Objectives: Comparison of US, CT, X-ray and MRI efficacy for sequential assessment of affected joints in pts treated with urate-lowering agents.

Methods: The open prospective study was conducted in 2013–2015 yy at V.A. Nasonova Research Institute of Rheumatology. 22 pts with crystal-verified gout (4 (15%) f and 18 (85%) m), mean age – 54.5±12.7 years, were included. The dose of allopurinol administered in all pts was adjusted by titration starting from 100 mg/day. Instrumental diagnostic examination (US, MRI, CT and plain X-ray

of knee joints) was performed at baseline and after one year of follow up. US of knee joints was performed using multi-frequency linear array transducer, at 7 to 17 MHz frequencies; for MRI examination "Esaote Artrosan 0.25T1" was used, GE "Light Speed" - for CT scans, and Stephanix – for plain X-ray examination. Applied descriptive statistics STATISTICA 10.0 (StatSoft/Inc., USA) package was used for statistical analysis.

Results: Mean serum level of uric acid decreased from 568±115 $\mu\text{mol/l}$ to 302±135 $\mu\text{mol/l}$. The target level ($<360 \mu\text{mol/l}$) was achieved in 20 pts (91%), ($<300 \mu\text{mol/l}$) was achieved in 11 pts (50%). Median allopurinol dose was 400 [300; 600] mg/day, 9 (45%) pts had to take 600 mg/day and more. At baseline US examination detected peritartaral tophi in 13 (59%) pts, MRI - in 6 (28%) pts, CT in 3 (14%), X-ray - 1 (5%) pts, after one year - by US in 9 (41%) pts and MRI - 3 (14%) pts, CT in 2 (9%), X-ray - 1 (5%) pts. At baseline intraosseous tophi were detected only by CT and X-ray in 18 (81%) and 2 (9%) pts respectively, after one year 17 (77%) pts and 3 (14%) pts respectively. At baseline erosions were detected in 19 (86%) pts by MRI, in 11 (50%) pts – by US, in 14 (65%) pts – by CT, and in 9 pts (41%) – by X-ray, after one year in 14 (64%) pts by MRI, 10 (45%) pts by US, 12 (54%) pts by CT, 8 (36%) pts by X-ray. At baseline synovitis was reliably diagnosed by MRI and US: in 15 (68%) pts and 17 (77%) pts, after one year in 2 (9%) pts and 3 (14%) pts respectively

Conclusions: MRI and US, as for synovitis, erosions and tophi dynamics, are comparable, at that for erosions MRI is more accurate. CT is the most informative approach to monitor intraosseous tophi regression. X-ray is low-informative modality for sequential assessment of gout.

References:

- [1] Grainger R, Dalbeth N, Keen H, et al. Imaging as an outcome measure in gout studies: report from the OMERACT gout working group. *J Rheumatol* 2015; 42(12):2460e4.

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SAT0647 LASER DOPPLER IMAGING: AN OBJECTIVE OUTCOME MEASURE FOR ASSESSMENT OF CUTANEOUS LUPUS ERYTHEMATOSUS

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Background: Cutaneous lupus erythematosus (CLE) is the most common manifestation of SLE and may occur without systemic features. Skin disease is particularly heterogeneous, rendering assessment of activity difficult. Laser Doppler imaging (LDI) is a non-invasive imaging tool that monitors blood perfusion in dermal tissue. It has been shown to correlate with inflammation in psoriasis but no study has been undertaken in CLE.

Objectives: To evaluate validity of LDI against the gold standard of histology from skin biopsy as well as other clinical tools including the Revised Cutaneous Lupus Erythematosus Disease Area and Severity Index (RCLASI) and Visual Analogue Scale (VAS) scoring of photographs.

Methods: A prospective observational study was conducted in consecutive patients with CLE flare at a single centre. Disease activity was assessed using RCLASI and measured using a high resolution LDI system (Moor Instruments) by JB and YY, both blinded to clinical assessment. Relative difference to the non-lesion area was calculated and expressed in perfusion unit (PU). Skin biopsy was obtained in those who consented and scored as 0=non-active, 1=mild activity and 2=active. Photographs were taken on the same day and were later assessed by a dermatologist and a rheumatologist who were blinded to LDI results using a 100mm VAS. The agreement of VAS between both clinicians was analysed using Bland-Altman limits of agreement (LOA) and the correlation between histology and LDI, RCLASI and VAS were analysed using Kendall's Tau-a.

Results: 20 patients were studied (19 female, median age 47.2 (range 21–62) years, 6 smokers, 2 CLE only, 14 (70%) ANA positive at the time of the scan). The distribution of CLE type were: acute CLE=7, subacute CLE=6 and chronic CLE=7. The agreement between the VAS scores of the two clinicians was fair; mean difference 7.8 (95% CI LOA -26 to 42) mm versus average. In 10 patients with skin biopsy, the correlation with histology was better for LDI ($\tau\text{-a}=0.56$) than RCLASI [-0.09 ; difference (90% CI) 0.64 (0.10, 1.19)] or VAS [-0.16 ; 0.71 (0.13, 1.29)] (figure 1). One patient who was deemed to have a subacute CLE flare based on clinical assessment indeed had a negative histology and a low PU.

Conclusions: In this preliminary analysis, assessment of blood perfusion to dermal tissue using LDI provides a valid quantitative and objective measure of inflammation in cutaneous lupus. The findings from LDI also had a better correlation with histology from skin biopsy compared to currently used clinical tools. Further validation and longitudinal analysis including assessment of responsiveness to therapy will provide further evidence on the usefulness of LDI in clinical practice and trials.

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