determine the extension and severity of enthesophyte growth in clinical practice.

Objectives: To evaluate the feasibility of two new scores to quantify enthesophytes occurrence and its dimensional changes with time.

Methods: We have evaluated 816 entheses two years apart in a consecutive series of 68 IBD patients for the presence and size of enthesophytes. Images were collected at baseline and after 24 months using an Esaote MyLabClass, 18-6 MHz linear multifrequency transducer both in B-mode and PD-mode. The following sites were evaluated bilaterally: lateral epicondyle of the humerus, distal quadriceps insertion at the patella, superior and inferior pole of the patella, Achilles tendon insertion, and plantar aponeurosis insertion. The presence of enthesophyte was scored dichotomously as present (=1) or absent (=0) for each site and summed up to generate the ARE score (ARES). Enthesophytes was also scored semi-quantitatively in a 0-3 scale (0 = absent, 1 = minimal, 2 = discrete, 3 = massive) according to Aydin SZ et al. [2] for each site and summed up to generate RES score (RESS). All the stored images were then reviewed and scored by 4 rheumatologists (FM, GC, PM, NG) well trained in US examination of entheses. ICC inter- and intra-observers was done for each site and for the ARES and RESS.

Results: ICC was excellent for presence or absence of enthesophytes both intra and inter examiner for all the sites. ICC of the ARE score was excellent (Cronbach alpha = 0.930, 95%CI 0.72-0.98). ICC was excellent also for the semi-quantitative RESS at all the examined sites and only moderate at the plantar fascia level (Cronbach alpha = 0.571, 95%CI -0.72-0.89). The total RESS have an excellent ICC (Cronbach alpha = 0.963, 95%CI 0.85-0.99).

Conclusion: The two scores are easily feasible and have high reliability and an excellent intra- and inter-observer reproducibility.

REFERENCES

- Balint PV, et al. *Reliability of a consensus-based ultrasound definition and scoring for enthesitis in spondyloarthritis and psoriatic arthritis: an OMERACT US initiative.* Ann Rheum Dis. 2018 Dec;77(12):1730-1735.
- Aydin SZ, et al. *A relationship between spinal new bone formation in ankylosing spondylitis and the sonographically determined Achilles tendon enthesophytes.* Rheumatol Int 2016 Mar;36(3):397-404.

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AB1157

VALIDATION OF VECTOR (VELCRO CRACKLES DETECTOR) FOR THE DIAGNOSIS OF INTERSTITIAL LUNG DISEASE IN PATIENTS WITH CONNECTIVE TISSUE DISEASES

Andreina Manfredi¹, Giulia Cassone^{1,2}, Fabrizio Pancaldi³, Caterina Vacchi¹, Stefania Cerri¹, Giovanni Della Casa¹, Carlo Salvarani^{1,2}, Marco Sebastiani¹.

¹University of Modena and Reggio Emilia, Azienda Ospedaliero-Universitaria Policlinico di Modena, Modena, Italy; ²IRCCS Arcispedale Santa Maria Nuova, Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia, Reggio Emilia, Italy;

³University of Modena and Reggio Emilia, Department of Sciences and Methods for Engineering, Modena, Italy

Background: Interstitial lung disease (ILD) represents one of the most frequent pulmonary manifestations in connective tissue diseases (CTD) and it is characterized by severe implications in morbidity and overall prognosis. However, a routinely assessment of ILD is not so common in all CTDs. Velcro-type crackles are typical of lung fibrosis and have been proposed for the early diagnosis of the disease.

Recently, we validated the algorithm VECTOR (Velcro Crackles detector), developed to detect the presence of velcro-crackles in pulmonary sounds recorded by an electronic stethoscope (ES) in RA-ILD patients as screening for the diagnosis of interstitial lung involvement, showing a diagnostic accuracy, a sensitivity and a specificity of 83.9%, 93.2% and 76.9%, respectively.

Objectives: The aim of the present study was to evaluate the diagnostic accuracy of VECTOR in a population of CTDs, compared with the reference standard of high-resolution computed tomography (HRCT), in a monocentric study.

Methods: CTDs patients who underwent HRCT in the last 12 months were enrolled. They were auscultated with an ES (Littmann 3200TM 3M, USA), bilaterally, at dorsal level, in at least 3 pulmonary fields (apical, medium and basal). All tracks recorded were analyzed by suitably developed software (VECTOR) capable of recognizing pathological crackles in lung sounds. Results were compared with HRCT findings detected in a blind manner by an expert radiologist.

Results: Ninety CTDs patients were enrolled, namely 27.8% systemic sclerosis (SSc), 31.1% primary Sjögren's syndrome (pSS), systemic lupus erythematosus 11.1%, 7.8% polymyositis, 6.6% dermatomyositis, and 15.5% undifferentiated CTD (UCTD). Male/female ratio was 1/3.1 and a mean age of 63.9±12.7 years; among them 45 (50%) showed ILD at HRCT. The algorithm correctly classified 73/90 patients, with a sensitivity and specificity of 93.3% and 68.9%, respectively, and a diagnostic accuracy of 81.1% (figure 1).

Figure 1. Contingency table of diagnostic accuracy of VECTOR (Velcro-Sounds Detector)

	ILD -	ILD +	
Velcro -	31 34.4%	3 3.3%	91.2%
Velcro +	14 20.9%	42 46.7%	75%
	68.9% Specificity	93.3% Sensitivity	81.1% Diagnostic accuracy

Conclusion: These data confirm the diagnostic accuracy of VECTOR in detection of ILD in CTDs patients, as previously described also for RA-ILD. In some CTDs such as SSc, a careful evaluation of lung involvement is quite diffused, while for other CTDs, for example pSS or UCTD, ILD remains often underestimated, with a delay in diagnosis and treatment. Since lung complications represent one of the most serious and frequent cause of poor prognosis for all CTDs patients, the search for a simple, repeatable and radiation-free tool for the screening of these patients is mandatory. The routinely employment of an ES and VECTOR, combined to clinical findings (cough, dyspnea) and respiratory lung function tests, could increase our ability to early identify ILD in CTD patients.

REFERENCES

- Kelly C, Iqbal K, Iman-Gutierrez L, Evans P, Manchegowda K. Lung involvement in inflammatory rheumatic Diseases. Best Pract Res Clin Rheumatol 2016; 30:870-888.
- Pancaldi F, Sebastiani M, Cassone G, Luppi F, Cerri S, Della Casa G, Manfredi A. Analysis of pulmonary sounds for the diagnosis of interstitial lung diseases secondary to rheumatoid arthritis. Comput Biol Med. 2018; 96:91-7

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AB1158

CLINICAL AND VISUAL US PARAMETERS IN SYMPTOMATIC KNEE OSTEOARTHRITIS AND ASYMPTOMATIC PATIENTS

Natalia Martusevitch¹, Katsiaryna Gudkevich², Alexander Aleshkevich³, Tatsiana Bondar⁴. ¹Belarusian State Medical University, Department of Cardiology and Internal Diseases, Minsk, Belarus; ²Minsk City Clinical Hospital #6, Minsk, Belarus; ³Belarusian State Medical University, Minsk, Belarus; ⁴Minsk Regional Clinical Hospital, Minsk, Belarus

Background Sonography is widely used because of its easy accessibility, relatively low cost. Sonography provides distinct information that bridges the gap between clinical and radiologic evaluation. There has been a growing interest in determining the sources of pain with ultrasound (US) findings in patients with knee osteoarthritis.

Objectives The aim of this study was to determine the relationships between clinical parameters and features of US of the knee.

Methods This was a cross-sectional study, recruiting 47 consecutive patients aged 47 (36- 54), 60,42% (n=29) were female. Those with recent trauma, rheumatic diseases were excluded from the study. Patients underwent assessment for knee pain (Visual Analog Scale (VAS)), US examination of the knee joints according to the 4-point scale (synovial proliferation, joint effusion, power Doppler signal (PD), patellofemoral joint cartilage (PFJ), medial femoral cartilage (MF), medial (MM) and lateral meniscus (LM), osteophytes, Baker cysts). US staging of knee OA was also performed.

Results Patients were divided into 2 groups: those with knee pain (n=28) and asymptomatic patients (n=19). Pathological US features were found in both groups (Table). In 5 out of 19 asymptomatic patients, degenerative changes of different degree of the joint structures were identified (PFJ, MF, osteophytes, MM,

LM), in 4 patients – joint effusion. Prevalence of PFJ, MF, MM, LM changes, osteophytes and Baker cysts didn't differ between groups. Groups differed in PD signal expression in the synovia ($p=0.07$). Functional association between VAS score and PD expression ($R=1.0$, $p<0.05$) was revealed. Moderate correlation between VAS score and joint effusion ($R=0.47$, $p<0.05$), PFJ ($R=0.58$, $p<0.05$), osteophytes ($R=0.66$, $p<0.001$) was observed.

Conclusion In the patients under study, degenerative and inflammatory findings were common in the symptomatic group, but were also identified in the asymptomatic patients. Clinical parameters were more strongly associated with active inflammation (as verified by US) rather than with degenerative changes.

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AB1159

INTER-READER RELIABILITY AND COMPARISON OF FLUORESCENCE OPTICAL IMAGING ENHANCEMENT IN PATIENTS WITH EROSION HAND OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

Øystein Maugesten¹, Sarah Ohrndorf², Daniel Glinatsi³, Mads Ammitzbøll-Danielsen³, Yogan Kisten⁴, Mikkel Østergaard³, Lene Terslev³, Till Uhlig¹, Tore K. Kvien¹, Ida Kristin Haugen¹. ¹Department of Rheumatology, Diakonhjemmet Hospital, Oslo, Norway; ²Charité Universitätsmedizin, Department of Rheumatology and Clinical Immunology, Berlin, Germany; ³Rigshospitalet, Glostrup, Center for Rheumatology and Spine Diseases, Copenhagen, Denmark; ⁴Karolinska University Hospital, Department of Medicine, Rheumatology Division, Stockholm, Sweden

Background: Fluorescence Optical Imaging (FOI) is an imaging technique demonstrating indocyanine (ICG)-enhanced microcirculation in wrist and finger joints, as a sign of inflammation. A reliable scoring method is essential in the assessment of these images.

Objectives: To assess inter-reader reliability of three FOI scoring methods from Berlin, Stockholm, and Copenhagen, and to compare the amount of enhancement in joint groups of both hands in patients with erosive hand osteoarthritis (OA) and rheumatoid arthritis (RA).

Methods: Patients with erosive hand OA ($n=13$) and with RA ($n=13$) underwent FOI of both hands. Five readers blinded for clinical diagnoses scored all finger and wrist joints bilaterally on semi-quantitative 0-3 scales using three different FOI scoring methods. In the Berlin method, FOI enhancement was evaluated on three different images, defined as different phases based on the enhancement in the fingertips. A composite image (Prima Vista Mode, PVM) of the 240 first images was also assessed. The Copenhagen method assumed that inflamed tissues will demonstrate a more rapid FOI enhancement than the surrounding tissues, defining inflammation as sharply margined enhancement over a joint area with clear delineation from surrounding tissues lasting ≥ 3 sec. The Stockholm method was evaluated in PVM format of 240 and 120 images in 'temperature' palette setting, with additional scrolling through the image sequence to detect ambiguous signals. To evaluate inter-reader reliability, we calculated the intraclass correlation coefficients (ICC) of the sum scores on patient level and weighted kappa values and prevalence and bias adjusted kappa values for ordinal scales (Pabak-OS) on joint level. Finally, we compared the averaged sum scores in the different joint groups in patients with erosive hand OA vs. RA using the Mann-Whitney test.

Results: The ICC of the sum scores was very good for the Stockholm method (0.83), and for Berlin PVM (0.93) and Phase 2 (0.83), while the Copenhagen method (0.65) and Berlin phase 3 (0.73) showed good reliability. Berlin phase 1 showed fair reliability (0.30). On joint level we found moderate to good agreement with pabak-OS for all methods (table). Patients with erosive hand OA had significantly more enhancement in DIP joints across all methods, while PIP enhancement was more common in erosive hand OA for the Berlin PVM and Stockholm methods only. Enhancement in the 1st CMC was not detected in any of the methods, and no consistent differences were observed for the wrist (data not shown).

Conclusion: We found moderate to very good inter-reader reliability on patient level for all methods except for Berlin phase 1 and moderate to good agreement on joint level for all methods. FOI showed different enhancement patterns between erosive hand OA and RA, with more enhancement in the DIP joints in the OA patients across all methods, supporting its validity.

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	All joints		DIP 2 - 4		PIP 2 - 4		MCP 1 - 5		Wrist	
	W. kappa	Pabak OS	W. kappa	Pabak OS	W. kappa	Pabak OS	W. kappa	Pabak OS	W. kappa	Pabak OS
Berlin PVM	0.51	0.78	0.47	0.74	0.58	0.72	0.53	0.84	0.45	0.79
Berlin P1	0.44	0.69	0.26	0.69	0.30	0.56	0.60	0.83	0.61	0.81
Berlin P2	0.44	0.50	0.43	0.56	0.51	0.58	0.37	0.38	0.45	0.51
Berlin P3	0.37	0.62	0.36	0.77	0.40	0.57	0.30	0.56	0.40	0.62
Stockholm	0.40	0.63	0.41	0.61	0.39	0.47	0.45	0.74	0.34	0.71
Copenhagen	0.39	0.56	0.39	0.65	0.30	0.35	0.52	0.70	0.36	0.48

Table 1

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AB1160

INVOLVEMENT OF ANKLE JOINTS AND TENDONS IN SYSTEMIC LUPUS ERYTHEMATOSUS: AN ULTRASOUND STUDY

Ljiljana Smiljanic Tomicevic, Darija Cubelic, Goran Sukara, Branimir Anic, Miroslav Mayer. University Hospital Centre Zagreb, University of Zagreb, School of Medicine, Department of Internal Medicine, Division of Clinical Immunology and Rheumatology, Zagreb, Croatia

Background: Systemic lupus erythematosus (SLE) is a chronic autoimmune disease with heterogeneous clinical manifestations. The musculoskeletal involvement is among commonest and earliest symptoms occurring in 95% of patients. The clinical examination of the ankle joints may underestimate the type and distribution of pathological changes. Musculoskeletal ultrasound (US) is a useful diagnostic tool for evaluation of joints and tendons in the majority of inflammatory rheumatic diseases.

Objectives: The aim of this study is to assess the ankle joints and tendons involvement in SLE patients using US and to correlate the findings with the physical examination, laboratory tests and disease activity scores.

Methods: Forty consecutive SLE patients were enrolled in the study and underwent clinical evaluation, laboratory tests and bilateral high-resolution US on the same day. Grey-scale and power Doppler (PD) US of the talocrural (TC), subtalar joints (ST), ankle tendons, second and third MCP joints, second and third PIP joints, wrists and second and third MTP joints were performed.

Results: A total of 720 joints and 800 tendons were examined. US detected inflammatory joint abnormalities were present in 35/40 (87.5%) patients while tenosynovitis was present in 7/40 (17.5%) patients. The most frequently affected were MTP joints (67.5%) followed by MCP (42.5%) and TC joints (40%), wrists (27.5%) and PIP joints (7.5%). The most prevalent pathological US finding was joint effusion. Synovial hypertrophy and positive PD signal were less frequently observed. Effusion in TC joints was present in 40%, synovial hypertrophy in 20% and positive PD in 2.5% of the patients. Only two patients had bony erosions detected. Six out of forty patients (15%) reported pain or swelling in ankle joints and two (33%) of them didn't have any US abnormalities. As many as 47% of patients without inflammatory joint symptoms had pathological US findings in ankle joints. The most commonly affected tendon was tibialis anterior (7.5% of patients), followed by extensor hallucis longus tendon (5% of patients).

Conclusion: Results of this study show a high prevalence of US verified inflammatory joint changes in SLE patients, while tendon changes were extremely rare. Foot joints were most commonly affected, followed by wrists and ankle joints. It is important to stress that a great number of asymptomatic patients had pathological US findings in ankle joints. From this and previous studies it is clear that US should be used more in the periodical assessment of the musculoskeletal system in patients with SLE.