AB1117

CLINICAL IMPACT OF MUSCULOSKELETAL ULTRASOUND ON RHEUMATOID ARTHRITIS IN ROUTINE CLINICAL PRACTICE

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Background: Musculoskeletal ultrasound (MSUS) is a useful tool to assess disease activity in rheumatoid arthritis (RA) patients. However, it has not yet been established if its use would change treatment decisions within a treat to target strategy or whether it would lead to better outcomes in RA patients

Objectives: Our aim was to determine the impact of MSUS in the clinical management of RA patients and investigate factors associated with subsequent clinical actions by the referring rheumatologist

Methods: A prospective analysis of RA patients seen at an MSUS clinic over a 6-month period was undertaken. Pre- and post-US follow-up data ($\pm$ 3 months) were analyzed. Baseline assessment included clinical features, physical examination and laboratory tests. All MSUS examinations were performed according to EULAR guidelines and using an Esaote MyLab 8 (Esaote, Genoa) with a high frequency (8-15 MHz) transducer. Patients were stratified in groups based on the clinical impact of the MSUS visit: 1) No clinical impact and 2) US findings leading to subsequent clinical action by the referring rheumatologist (including changes in dosages of current rheumatologic treatments, addition/subtraction of medications or interventional procedures based on the MSUS results). First, differences between groups were tested using chi-squared and Student-t tests in the univariate analysis. Second, multivariate logistic regression models were employed to investigate factors associated to a change in clinical management

Results: A total of 61 RA patients were included for analysis. Mean age was 61.9 $\pm$ 11.4 years and 51 (83.6%) were female. Disease activity assessment was the most frequent referral reason (43; 70.5%). Overall, MSUS led to a subsequent therapeutic action by the referring rheumatologist in 39 (63.9%) patients, and to a change in the underlying diagnosis and/or in the clinical impression of the chief complaint that generated the referral in 7 (11.5%) patients. Baseline characteristics between both groups are compared in Table 1. In the univariate analysis, the detection of Power Doppler (PD) synovitis/tenosynovitis and 28 swollen joint count were significantly associated with a subsequent clinical action. In the multivariate analysis only PD synovitis/tenosynovitis (OR=3.28; 95%CI 1.06-10.27) remained significantly associated with a change in clinical management (Table 2)

Table 1. Baseline characteristics of RA patients

	Total n= 61	Change in clinical management n= 39 (63.9%)	No change in clinical management n= 22 (36.1%)	p
Age	61.9 $\pm$ 11.4	61.5 $\pm$ 12.5	62.6 $\pm$ 9.2	0.7
Sex				0.09
Female	51(83.6%)	35(89.7%)	16(72.7%)	
Smoking				0.08
Non smoker	33(54.1%)	17(43.6%)	16(72.7%)	
Smoker	13(21.3%)	11(28.2%)	2(9.1%)	
Former smoker	15(24.6%)	11(28.2%)	13(21.3%)	
Radiographic erosions	29(48.3%)	22(57.9%)	7(31.8%)	0.05
28 Tender Joint Count	2.3 $\pm$ 3.4	2.7 $\pm$ 3.9	1.6 $\pm$ 2.4	0.2
28 Swollen Joint Count	2 $\pm$ 3	2.6 $\pm$ 3.5	1.1 $\pm$ 1.6	<0.05
ESR (mm/h)	28.1 $\pm$ 20.6	26.1 $\pm$ 15.5	31.7 $\pm$ 27.4	0.4
CRP (g/L)	1 $\pm$ 1.5	1 $\pm$ 1.4	0.9 $\pm$ 1.7	0.7
RF (IU/mL)	175.8 $\pm$ 452.8	139.9 $\pm$ 249.5	243.9 $\pm$ 697.4	0.4
ACPA (IU/mL)	775.6 $\pm$ 998.6	619.4 $\pm$ 797.1	1079.9 $\pm$ 1,275.9	0.2
US PD synovitis/tenosynovitis	37(60.7%)	28(71.8%)	9(40.9%)	<0.05

Table 2. Independent factors associated with a change in clinical management based on logistic regression model

	p	Odds ratio	95% C.I.	
			Lower	Upper
28 Tender Joint Count	0.13	1.24	0.94	1.64
US PD synovitis/tenosynovitis	0.04	3.28	1.06	10.17

Conclusion: The most common indication of MSUS examination in RA patients was disease activity assessment. MSUS findings led frequent changes in therapeutic management and even to a change in the diagnosis in some of cases. The presence of PD synovitis/tenosynovitis was significantly associated to a change

in the therapeutic management. These data highlight the impact of MSUS inflammatory findings in RA patients in daily clinical practice

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AB1118

OPEN MUSCLE BIOPSY AS A SAFE AND USEFUL MEANS OF DIAGNOSING VASCULITIS: A SINGLE-CENTER EXPERIENCE OF 210 BIOPSY CASES

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Background: We previously reported the utility of open muscle biopsies in diagnosing vasculitis [1]. The number of open muscle biopsies performed at our department has increased to over 200. The purpose of the present study was to evaluate the diagnostic utility of vasculitis and the safety of the open muscle biopsies.

Objectives: To clarify the diagnostic utility of vasculitis and the safety profile of the open muscle biopsy.

Methods: We retrospectively examined all cases of open muscle biopsy performed between May 2012 and June 2018 in our department. The biopsy results, the presence or absence of adverse events, and blood test data at the time of the biopsy were extracted from the patients' electronic medical records.

Results: Between May 2012 and June 2018, 210 open muscle biopsies were performed, 120 of which were done for vasculitis diagnosis. Diagnostic histopathological findings were obtained in 42 of the 120 cases (35%). The definitive diagnosis in these cases was microscopic polyangiitis (30 cases), eosinophilic granulomatosis with polyangiitis (seven cases), granulomatosis with polyangiitis (one case), polyarteritis nodosa (three cases), and other vasculitis (one case). In 57 cases with myeloperoxidase-anti-neutrophil cytoplasmic antibody (MPO-ANCA) $\geq$ 10 U/ml, 31 cases (54.3%) showed histopathology of vasculitis. In six cases with proteinase-3-ANCA (PR3-ANCA) $\geq$ 10 U/ml, histopathology of vasculitis was found in one case (16.7%).

In all 210 open muscle biopsy cases, complications included minor wound dehiscence (11 cases) and small subcutaneous hematoma (six cases), which were able to be managed by local treatment. Albumin was significantly lower in the patients with wound dehiscence (mean 3.2 vs 2.7, $p = 0.049$)

Serious complications included anaphylaxis due to local anesthesia (one case), compartment syndrome due to hematoma (one case), hematoma requiring surgical removal (one case), and arterial hemorrhage requiring surgical intervention (one case). The patients in the latter three hemorrhagic cases were receiving antiplatelet drugs.

Conclusion: An open muscle biopsy is useful for diagnosing vasculitis, especially for MPO-ANCA-positive anca-associated vasculitis. Its safety profile is acceptable. Serious adverse events are rare, but the procedure should be performed carefully when patients are receiving antiplatelet drugs.

References:

[1] Nunokawa T. et al. The use of muscle biopsy in the diagnosis of systemic vasculitis affecting small to medium-sized vessels: A prospective evaluation in Japan. *Scand. J. Rheumatol.* 2016;45:210-214

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AB1119

U9: A NOVEL CLINICALLY ORIENTED ULTRASONOGRAPHIC SCALE AS A USEFUL MARKER FOR MONITORING THERAPEUTIC RESPONSE IN RHEUMATOID ARTHRITIS (MULTI CENTERS STUDY)

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Background: Musculoskeletal Ultrasonography (MSUS) is now a widely used tool for monitoring of rheumatoid arthritis (RA). Although there are many proposed sets of composite scores, a fixed set of joints may not be an ideal tool to assess a disease like RA, which affects many joints and tendons in different presentations. In previous study (1) U9 score was proven to be correlated with disease activity parameters.

Objectives: To determine whether US assessment using U9 score is useful for monitoring response to treatment for RA or not?

Methods: A prospective, multicenter study were conducted in period from July 2019 to December 2019. All recruited RA patients were subjected to: Disease activity assessment by clinical disease activity indices (CDAI and DAS28 ESR). Functional status assessment by (HAQ) and ultrasonographic assessment using U9 score which include 8 joints (bilateral wrists, 2nd MCP, 3rd MCP and knees) plus most clinically affected joint or tendon (one joint or one tendon). Most clinically affected joints from 48 joints. Any affected tendons could be choosing. All targeted joints were evaluated according to EULAR guidelines and by EULAR/ OMERACT combined score (0-3). Targeted tendons were scored (0-3). All patients received their treatment (biologic and non biologic DMARDs) according to the decision of the treating physicians. No specific therapy is needed. CDAI and DAS28 ESR, HAQ and U9 score were repeated after 3 months to detect the response to change after receiving the therapy.

Results: One hundred and forty patients (23.6% were male) with mean age 39.26±11.30 were recruited from 4 tertiary referral university hospitals.

There was a significant difference (<0.001) between the first and second visits as regards clinical, laboratory and ultrasonographic parameters. DAS 28 decreased from (5.29±1.21) to (3.95±0.99), ESR decreased from (42.12±15.24) to (26.84±12.32), HAQ2 improved from (0.652±0.350) to (0.510±0.237) and U9 total US score decreased from (13.56±5.18) to (8.02±4.28).

There was significant correlation between U9 ultrasonographic score and clinical parameters at both visits (table 1).

Table 1. correlation between U9 ultrasonographic score and clinical parameters.

		U9 at 1 st visit	U9 at 2 nd visit
DAS-28	Pearson Correlation	0.806	0.790
	(P value)	<0.001	<0.001
CDAI	Pearson Correlation	0.787	0.773
	(P value)	<0.001	<0.001
HAQ	Pearson Correlation	0.431	0.317
	(P value)	<0.001	<0.001

We found that the most suitable cut-off value of U9 score to predict high disease activity was 11.5 (sensitivity 85.7% and specificity 80.6%), cut off value for moderate disease activity was 5.5 (sensitivity 83.2% and specificity 88%) and cut off value for low disease activity was 3.5 (sensitivity of 83.3% and specificity 57.1%). These results are summarized in the following table:

Conclusion: U9 ultrasonographic score is very useful method for evaluating the monitoring the response of treatment.

References:

[1] Mortada, et al. Annals of the Rheumatic Diseases 2019;78:1009.

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AB1120

A TRIAD OF ULTRASOUND DETECTED HIGH-GRADE SYNOVITIS (MID TARSAL & ANKLE JOINTS), HIGH-GRADE TENOSYNOVITIS IN (TIBIALIS POSTERIOR & PERONEAL TENDONS) AND EROSIONS OF FIBULAR DISTAL END IS HIGHLY SUGGESTIVE OF CHARCOT ARTHROPATHY

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Background: Charcot arthropathy poses many clinical challenges in its diagnosis and management. Ultrasonography (US) may be able to identify pathological changes in cases of Charcot arthropathy (1).

Objectives: to characterize the ultrasonographic features of patients in early pre-radiographic stages of neuropathic (Charcot) arthropathy.

Methods: This is an extension of our previous study of ultrasonographic features Charcot ankle and foot (1).

an observational study where 42 patients with neuropathic (Charcot) arthropathy of the foot between January 2013 and October 2019 were enrolled. Inclusion criteria included: 1- Foot pain and swelling. 2- Typical MRI findings of Charcot arthropathy in the form of subcondral bone marrow edema with or

without sub-chondral microfractures, joint effusion or soft-tissue inflammation. 3- Grade 0 Modified Eichenholtz classification system which means normal radiography of the affected foot. Patients with other forms of arthropathy that may mimic Charcot arthropathy e.g. gouty arthritis and rheumatoid arthritis, were excluded from the study. Ultrasonographic (grey scale and Doppler US) examination of mid-tarsal and ankle joints was performed according to the EULAR guidelines.

Results: Synovitis and effusion at mid tarsal joints were found in all patients and to a lesser extent in the ankle joints. High degree Doppler activity at both ankle and mid tarsal joints could be observed in most patients. Bony erosions were also common as well as tendonitis. A triad of active synovitis (in mid tarsal joints and ankle joints), active tendonitis (of tibialis posterior and peroneal tendons) and erosions in the distal end of fibula was present in 40 (95.2%) cases.

Conclusion: our study confirms the ability of ultrasonography to detect inflammatory lesions in early stages of Charcot arthropathy.

References:

[1] Mortada M, Hammad M, Ezzeldin N. Annals of the Rheumatic Diseases 2016;75:1231-1232.

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AB1121

IMPLEMENTING HIGH VALUE CARE IN INPATIENT ANTINUCLEAR ANTIBODY TESTING

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Background: Antinuclear Antibody (ANA) testing forms the basis on which many rheumatological diseases are subsequently diagnosed. ANA testing quantifies the dilution of plasma to produce the titer and staining pattern and this can be a part of an ANA order set that reflexively cascades to sub-serology if positive. Studies have shown that a low titer ANA may potentially translate into an erroneous diagnosis: if one estimates a 1 percent prevalence of ANA associated disease in the general population then 30% of those individuals would have a false positive result of ANA detected at 1:40 titer [1]. We theorized that there is no need for several methods to coexist within a single inpatient hospital setting especially since diagnostic value of staining patterns alone is limited.

Objectives: To compare the utility and yield of "ANA screening reflex to profile" (ARP) and "ANA reflex to titer" (ART) order sets in the inpatient setting of a community tertiary care hospital. We aim to identify the appropriateness of the ANA testing ordered including cost-effectiveness of ordering ARP over ART in order to implement the identified quality measures towards improving utilization of ANA testing.

Methods: We identified all inpatient ANA reflex testing orders performed at Community Regional Medical Center, Fresno, California completed between 11/2018 till 07/2019. This included ART and ARP orders with 6 sub-serologies: SSA, SSB, dsDNA, Smith, Scl-70 and U1RNP. A Health Information Management report was generated which included patient's age, gender, length of hospital stay, dates of testing ordered, principal diagnosis and type of ANA testing ordered. Descriptive statistics were computed and analyzed.

Results: We reviewed a total of 1,012 ANA lab orders performed between 11/01/2018 until 07/30/2019 performed on 700 patients. According to the laboratory standard using Immunofluorescence Assay, an ANA titer starting from 1:40 is reported as positive. Out of the 1,012 tests, 334 tests were positive i.e. 33%. The ART order by itself contributed to 29.9% of the positive testing while ARP formed 70% of the positive testing. 56 of the 910 ARP (6%) performed had one or more sub-serology antibody positive while in 178 ARP orders (20%) only the ANA titer was positive with negative serology. The most common sub-serology antibody noted positive was dsDNA forming 54% of the positive serology results. Multiple testing was noted with 218 orders of ARP and ART being ordered on the same patient within the same week, which shows 21.5% of ANA lab orders were repetitive. Length of stay was noted to be more than 3 days for 89% of the patients who had repetitive testing, majority of those tests (99%) on the same day by the same medical provider. It cost \$5.0 for an ART order that resulted negative and \$5.0 for an ARP panel that resulted negative. It cost \$10.0 for those patients who had both ART and ARP ordered with negative results. A positive ART result added \$12.0 additional to the cost of each positive ANA profile (\$67.36) when both tests were ordered together.

Conclusion: Our study findings reflect the need for using higher yield ANA testing that has been standardized. It demonstrated that physicians ordering the testing were not familiar with the ART vs. ARP, and the laboratory orders