EJR European Journal of Rheumatology

DOI:10.5152/eurjrheum.2023.23005

Letter to the Editor

Prediction of Response to Treatment Using Doppler Signal Positivity Measured by Ultrasound in Rheumatoid Arthritis: A Proof-of-Concept Study

Ummugulsum Gazel[1], Gizem Ayan[1], Dilek Solmaz[2], Nancy Maltez[1], Tim Ramsay[3], Jacob Karsh[4], Antonio R. Cabral[4], Servet Akar[2], Sibel Zehra Aydin[1]

Clinically active rheumatoid arthritis (RA) patients whose synovitis scores on ultrasound (US) were higher at baseline were shown to respond better to enhancements in RA therapies.[1-3] But a clear cutoff to use US as a predictor of response in clinically active RA has not been studied. Our group recently demonstrated that "having at least 1 joint with moderate/severe Doppler signals" was a predictor of future flares.[4] Our aim was to generate data to ascertain whether the value of power Doppler (PD) positivity on US to predict the response of therapy enhancements in clinically active RA patients.

This single-center, prospective, proof-of-concept study was approved by the The Ottawa Hospital (Approval No: 20180680-01H) Health Science Network Research Ethics Board and written informed consent was obtained from patients. RA patients, with moderate/high disease activity, measured by the CDAI in whom an imminent escalation of pharmacologic treatment was included.

At baseline and follow-up (between 3 and 6 months), disease activity parameters were collected. At baseline visit only, patients underwent a US assessment. Gray-scale and Power Doppler Ultrasound (PDUS) were performed on 36 joints blinded to the clinical data and scored between 0 and 3.[5] PD positivity was defined as having >1 PD activity in at least 1 joint.

Eleven of the 20 patients were female with a mean (±SD) age of 57 years (±16.9).

Half (n = 10) of the patients had at least 1 joint with >1 PD positivity. Patients with PD positivity had numerically better improvement than PD-negative ones in all activity parameters. The decline in the mean of Tender Joint Count (TJC) (ΔTJC) (PD-positive patients = 5.1, PD-negative patients = 1.1) was the greatest improvement, followed by Swollen Joint Count (ΔSJC) (PD-positive patients = 3.5, PD-negative patients = 1.1) and patient Visual Analogue Scale (ΔVAS) (PD-positive patients = 3.1, PD-negative patients = 0.7). Improvement of the acute phase reactants was more prominent in PD-positive patients.

Among the 10 PD-positive patients, TJC decreased in 7 and remained the same in 3 (30%) patients; none of the patients worsened. Among the 10 PD-negative ones, the mean TJC increased in 4, decreased in 5, and remained the same in 1. The mean decrease of TJC in the 7 PD-positive patients was 7.2 ± 5.1 compared to the mean decrease in 4 PD-negative patients of 4.2 ± 2.9.

Our results showed that the simple definition of the presence of moderate PD positivity in 1 joint may predict favorable clinical responses to treatment alterations. There is only indirect evidence in the literature to support the use of US for this indication. Three studies have shown that the high burden of inflammation at the start of an advanced therapy by PDUS is a predictor of achieving a better response and sustained remission.[1-3] However, these studies do not provide a cutoff to determine the responders; therefore, it is challenging to apply these strategies in everyday clinics. In conclusion, our proof-of-concept study with the limitation of a small sample size, suggests that the presence of PD-positivity in 1 joint in RA patients may be a useful tool in guiding clinicians in predicting favorable clinical responses to treatment alterations. This finding also supports the need for an Randomized Controlled Trial (RCT) to reach more definitive conclusions.

Data Availability Statement: The data underlying this article will be shared on reasonable request to the corresponding author.

ORCID iDs of the authors:
U.G. 0000-0003-2697-3217;
G.A. 0000-0003-1889-9619;
D.S. 0000-0002-9035-689X;
N.M. 0000-0002-8535-4312;
T.R. 0000-0001-8478-8170;
J.K. 0000-0003-3960-4082;
A.R.C. 0000-0003-0871-5986;
S.A. 0000-0002-3734-1242;
S.Z.A. 0000-0001-8792-4449.

Cite this article as: Gazel U, Ayan G, Solmaz D, et al. Prediction of response to treatment using doppler signal positivity measured by ultrasound in rheumatoid arthritis: A proof-of-concept study. *Eur J Rheumatol.* 2023;10(3):118-119.

[1] Department of Rheumatology, The Ottawa Hospital Research Institute, University of Ottawa, Faculty of Medicine, Ottawa, ON, Canada
[2] Department of Internal Medicine, Izmir Katip Çelebi University, Division of Rheumatology, Izmir, Turkey
[3] The Ottawa Hospital Research Institute, The Ottawa Methods Centre, University of Ottawa, Faculty of Medicine, Ottawa, ON, Canada
[4] Department of Rheumatology, University of Ottawa, Faculty of Medicine, Ottawa, ON, Canada

Corresponding author:
Sibel Zehra Aydin
E-mail: saydin@toh.ca

Received: January 18, 2023
Accepted: June 28, 2023
Publication Date: August 11, 2023

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Ethics Committee Approval: This study was approved by Ethics committee of The Ottawa University (Approval No: 20180680-01H, Date: September 21, 2018).

Informed Consent: Written informed consent was obtained from the patients/patient who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – S.Z.A., J.K.; Design – S.Z.A., T.R.; Supervision – S.Z.A; Resources – S.Z.A., A.C.; Materials – S.Z.A., A.C., J.K.; Data Collection and/or Processing – U.G., G.A., D.S.; Analysis and/or Interpretation – U.G., D.S., S.Z.A., S.A.; Literature Search – S.Z.A, U.G.; Writing – U.G., S.Z.A.; Critical Review – N.M., J.K., A.C., T.R., S.Z.A.

Declaration of Interests: Sibel Zehra Aydin received honoraria from Abbvie, Celgene, UCB, Novartis, Jannsen, Pfizer, and Sanofi. The other authors have disclosed no conflicts of interest.

Funding: The Ottawa Hospital Department of Medicine Research Grant.

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