ORIGINAL ARTICLE

Estimation of Disease Activity in Rheumatoid Arthritis: A Correlation Study between Clinical, Inflammatory Markers and Power Doppler Ultrasonography

Tuhin S Sarkar[1], Kripasindhu Gantait[2]

Abstract

Objective: To correlate between clinical, inflammatory markers and power Doppler (PD) ultrasonography (USG) to assess the disease activity in rheumatoid arthritis (RA) patients.

Methods: Sixty consecutive patients with RA were included. Demographic and clinical data, C-reactive protein (CRP) level, and erythrocyte sedimentation rate (ESR) were recorded. All patients underwent an USG PD by an experienced ultrasonologist. USG joint effusion, synovitis, and PD signal were graded from 1 to 3 in a small joint of both hands (metacarpophalangeal, proximal interphalangeal, and wrist). Joint count and joint index for effusion, synovitis, and PD signal were recorded for a total of 22 joints.

Result: Among 60 patients, 41 were female and 19 were male. The correlation coefficient between ESR with tender joint, swollen joint, USG synovitis, and USG hyperemia was 0.13, 0.13, 0.58, and 0.33, respectively. The correlation coefficient between CRP with tender joint, swollen joint, USG synovitis, and USG hyperemia was 0.46, 0.07, 0.36, and 0.27, respectively.

Conclusion: USG PD is an important tool along with clinical assessment and inflammatory marker to assess the disease activity in RA patients.

Keywords: CRP, ESR, Rheumatoid arthritis, USG Power Doppler.

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Introduction

Rheumatoid arthritis (RA) is the most common form of chronic inflammatory arthritis in a symmetric distribution. The usual feature of an established RA is persistent inflammatory synovitis that routinely involves the peripheral joint.[1] Traditionally, the disease activity has been estimated by clinical, biochemical, and radiological measures.[2-4] Musculoskeletal imaging in rheumatology has greatly been improved with high-frequency ultrasonography (USG). A number of studies have shown the relation between power Doppler (PD) quantification and biochemical measures of disease activity in RA. A link between Doppler activity in the synovium and high values of both erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) has been established.[5-8]

Similarly, a relation between Doppler activity and tender and the swollen joint count has been demonstrated.[9]

Methods

Participants (n = 60) diagnosed as RA based on 2010 ACR/EULAR criteria, attending the outpatient rheumatology clinic, were included. Participants with traumatic, septic, or microcrystalline arthritis and previous joint surgery within the past 12 months before the study were excluded. The following data were recorded for each patients: age, sex, disease duration, tender joint count, swollen joint count, rheumatoid factor, CRP level, and ESR. Joint count was only recorded in joints of hands (metacarpophalangeal, proximal interphalangeal, and wrist) (total 22 joint).

Results

Among the 60 patients, 41 were female and 19 were male. The mean age of the study population was 41.76 ± 12.05 (mean ± S.D.) where the minimum was 20 years and the maximum was 69 years. The mean (mean ± S.D.) of ESR and CRP was 42.26 ± 20.60 and 6.01 ± 5.75, respectively. The mean (mean ± S.D.) joint count for tender joint, swollen joint, USG PD-detected joint synovitis, and USG PD-detected joint hyperemia was 5.1 ± 4.8, 1.2 ± 2.7, 5.3 ± 3.7, and 1.3 ± 1.7, respectively (Table 1).

Discussion

Naredo et al. done a similar type of study. They selected 90 consecutive patients with a mean (S.D.) age of 58.1 (14.3), mean tender joint count of 14 (16.1), mean swollen joint count of 10.9 (7.8), mean ESR of 28.4 (19.4), and mean CRP of 15 (19).[7]

Ellegaard et al. done a similar type of study among 109 patients (women, 78 and men, 31) with a median age of 59 years (range, 26–84 years). The median number of tender and swollen joints was 9 (range, 0–28) and 7 (range, 0–26), respectively. The median CRP was 13 (range, 1–168), and median ESR mg/L was 24.5 (range, 2–115).[10]

[1]RG Kar Medical College, Kolkata, West Bengal, India

[2]Midnapore Medical College, Midnapore, West Bengal, India

Corresponding Author: Kripasindhu Gantait, Midnapore Medical College, Midnapore, West Bengal, India, Phone:+91 9434243054, e-mail: drkripa2000@gmail.com

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Table 1: Correlation of ESR and CRP with clinical (tender and swollen joint) and USG PD (synovitis and hyperemia)

	Tender joint	*Swollen joint*	*USG PD-detected joint synovitis*	*USG PD-detected joint hyperemia*
ESR	0.13	0.13	0.58	0.33
CRP	0.46	0.07	0.36	0.27

In our study among the 60 patients, 41 were female and 19 were male. The mean (S.D) age of the study population was 41.76 (12.05) (range, 20–69). The mean (S.D.) of ESR and CRP was 42.26 (20.60) and 6.01 (5.75), respectively. The mean (mean ± S.D.) joint count for tender joint, swollen joint, USG PD-detected joint synovitis, and USG PD-detected joint hyperemia was 5.1 (4.8), 1.2 (2.7), 5.3 (3.7), and 1.3 (1.7), respectively.

In Naredo et al. study, the correlation coefficient between ESR with tender joint, swollen joint, USG synovitis, and USG hyperemia was 0.12, 0.41, 0.50, and 0.45, respectively. The correlation coefficient between CRP with tender joint, swollen joint, USG synovitis, and USG hyperemia was 0.08, 0.51, 0.63, and 0.62, respectively.[7]

In Ellegaard et al. study, the correlation coefficient between USG PD with a tender joint count, swollen joint count, ESR, and CRP was 0.07, 0.35, 0.5, and 0.5, respectively. It shows a significant correlation between ESR and USG PD, CRP and PD, and swollen joint and PD study.[10]

In our study, the correlation coefficient between ESR with tender joint, swollen joint, USG synovitis, and USG hyperemia was 0.13, 0.13, 0.58, and 0.33, respectively. The correlation coefficient between CRP with tender joint, swollen joint, USG synovitis, and USG hyperemia was 0.46, 0.07, 0.36, and 0.27, respectively.

Since our results resemble those that are obtained in other studies,[6,11,12] they are credible.

Conclusion

USG PD is an important tool along with clinical assessment and inflammatory marker to assess the disease activity in RA patients. Joint synovitis is detected more than joint hyperemia in USG PD.

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