BIOMARKER CHANGES AS EFFECTIVENESS CRITERIA IN RHEUMATOID ARTHRITIS PATIENTS RECEIVING BIOLOGIC THERAPY: A RETROSPECTIVE ANALYSIS

Dorela Hasankolli[1] (first author), Mirela Miraci[1], Teuta Backa[2], Marsida Mulaj[3], Fatjola Ferrollari[1]

1.University of Medicine, Department of Pharmacy, Tirana, Albania; 2. Department of Rheumatology, Mother Teresa University Hospital Center, Tirana, Albania; 3. Compulsory Health Care Insurance Fund, Tirana, Albania

Abstract: Rheumatoid arthritis (RA) is a chronic inflammatory disorder that requires ongoing assessment to evaluate treatment efficacy. Biologic disease-modifying antirheumatic drugs (bDMARDs) have transformed RA management; however, accurately monitoring therapeutic response remains a clinical challenge. This study investigates changes in key inflammatory and immunologic biomarkers among RA patients receiving biologic therapy, aiming to enhance understanding of treatment effectiveness.

Methods: This retrospective study included 162 adult RA patients treated with biologic therapy at the Mother Teresa University Hospital Center in Tirana, Albania, between 2021 and 2024. Patients met the 2010 ACR/EULAR classification criteria and were receiving bDMARDs during the study period. Exclusion criteria included incomplete clinical data, active serious infections, or coexisting inflammatory conditions. Biomarkers analyzed were erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), fibrinogen, rheumatoid factor (RF), and anti-cyclic citrullinated peptide (anti-CCP) antibodies. Biomarker levels were measured at baseline and after six months of treatment. Paired t-tests were used to assess differences, with statistical significance defined as $p < 0.05$.

Results: Significant reductions were observed in ESR and CRP, reflecting decreased systemic inflammation. ESR decreased by 14 mm/h (baseline: 32.5 ± 9.8 mm/h; post-treatment: 18.5 ± 7.2 mm/h; $t(161) = 9.84$; $p < 0.001$). CRP levels declined by 20 mg/L (baseline: 32.1 ± 10.3 mg/L; post-treatment: 12.1 ± 6.8 mg/L; $t(161) = 11.27$; $p < 0.001$). Fibrinogen levels also decreased significantly (baseline: 4.6 ± 1.2 g/L; post-treatment: 3.8 ± 1.0 g/L; $t(161) = 3.94$; $p = 0.004$), though elevated levels persisted in some individuals. RF levels showed a modest yet statistically significant reduction (baseline: 85.2 ± 22.6 IU/mL; post-treatment: 73.4 ± 19.8 IU/mL; $t(161) = 2.32$; $p = 0.022$), suggesting a limited role in short-term monitoring. Anti-CCP levels remained stable (baseline: 128.5 ± 34.1 IU/mL; post-treatment: 126.9 ± 32.7 IU/mL; $t(161) = 0.47$; $p = 0.642$), supporting its role as a prognostic rather than a dynamic biomarker.

Discussion: These findings highlight the clinical relevance of biomarker monitoring in assessing response to biologic therapy in RA. ESR and CRP proved to be reliable indicators of disease activity. Fibrinogen may serve as an additional marker, though its variability warrants individualized interpretation. RF showed limited utility for short-term evaluation, and anti-CCP remained consistent, reinforcing its role in long-term prognostication rather than treatment response assessment.

Conclusion: Monitoring biomarker trends offers meaningful insight into the effectiveness of biologic therapies in RA patients. ESR, CRP, and fibrinogen emerge as useful indicators of therapeutic response, while RF and antiCCP provide supplementary information in selected cases. Future research incorporating clinical disease activity scores and long-term biomarker trajectories may further refine treatment strategies and support personalized RA care.

Keywords: Rheumatoid arthritis, bDMARDs, ESR, CRP, fibrinogen, rheumatoid factor, anti-CCP, treatment response, biologic therapy.