Bone mineral density, **Vitamin D receptor (VDR) gene polymorphisms, fracture risk assessment (FRAX), and trabecular bone score (TBS) in rheumatoid arthritis patients: connecting pieces of the puzzle**

Purpose To assess vitamin D receptor (VDR) gene polymorphisms and bone mineral density and to investigate the possible risk factors of osteoporosis and fracture in rheumatoid arthritis (RA). Methods A total of 97 RA patients and 45 matched controls were enrolled. Serum vitamin D level, VDR genotyping, dual energy X-ray absorptiometry (DEXA) scan, trabecular bone score (TBS), and fracture risk assessment (FRAX) in 10 years were assessed. Disease activity score (DAS28) and modified health assessment questionnaire (MHAQ) were measured. Results The mean age of the patients was 47.9 ± 8.9 years; 85 females, 12 males (F:M 7.1:1) and mean disease duration 9.4 ± 6.2 years. DAS28 was 4.52 ± 1.04 and MHAQ 0.6 ± 0.4. There was a significant difference between cases and controls as regards DEXA and FRAX ($p < 0.0001$) but the TBS and VDR genotyping were comparable ($p = 0.29$ and $p = 0.12$, respec tively). The vitamin D level was comparable with the control (9.3 ± 6.5 vs 10.4 ± 7.5 ng/mL, $p = 0.4$). None of the patients was receiving anti-osteoporotic therapy or biologic therapy. There was a significant association between the presence of osteoporosis and age, disease duration, menopause, and rheumatoid factor (RF) positivity. The TBS was significantly lower and FRAX higher in patients with positive RF and anti-CCP. FRAX was significantly related and the TBS inversely with the age, disease duration, serum uric acid, alkaline phosphatase, and MHAQ. Conclusions Reduced BMD and increased tendency to fractures are remarkable in RA patients. Vitamin D level was decreased in patients and control, and VDR gene polymorphisms were not linked to RA. TBS and FRAX are effective tools to assess osteoporotic fractures in RA.