ABSTRACT: Association of the Dietary Inflammatory Index to Bone Mineral Density and Fracture Risk in the Women's Health Initiative

Tonya Orchard Ph.D., M.S., R.D. 1, Vedat Yildiz, M.S 2, Susan E. Steck, Ph.D., M.P.H., R.D. 3, James R. Hebert, Sc.D. 3, Yunsheng Ma, M.D., Ph.D. 4, Jane A. Cauley, DrPH 5, Wenjun Li Ph.D. 6, Yasmin Mossavar-Rahmani, Ph.D., RD 7, Karen C. Johnson M.D., M.P.H. 8, Maryam Sattari, M.D., M.S. 9, Meryl LeBoff, MD 10, Jean Wactawski-Wende PhD 11, Rebecca D. Jackson M.D. 10

1 Ohio State University 2 Women’s Health Initiative Midwest Regional Center for Biostatistics, Ohio State University 3, University of South Carolina 4 University of Massachusetts Medical School 5 University of Pittsburgh 6 Albert Einstein College of Medicine 7 University of Massachusetts Medical School 8 University of Tennessee 9 University of Florida 10 Harvard Medical School 11 University at Buffalo

Background: Previous studies suggest that bone loss and fracture risk are associated with a higher inflammatory milieu, and that diet may modulate inflammation.

Objective: Evaluate the association of the inflammatory potential of diet, as measured by the Dietary Inflammatory Index (DII), with changes in bone mineral density (BMD) and fracture risk in postmenopausal women.

Design: DII scores were calculated from baseline food frequency questionnaires (FFQ) of 161,595 participants of the Women’s Health Initiative. Year 3 FFQs were used to calculate a DII change score. BMD measurements (dual-energy X-ray absorptiometry) from baseline, year 3 and 6 were analyzed in a sub-group of women (n=10,290). Fractures were reported at least annually; hip fractures were confirmed by medical records. Changes in hip BMD were analyzed by pair-wise comparisons by quartile (Q1 = referent, most anti-inflammatory diet) of baseline DII scores. Hazard ratios for fractures were computed using multivariate-adjusted Cox proportional hazard models.

Results: After multivariate adjustment, women with the most anti-inflammatory DII score had less loss of hip BMD (p=0.01) by year 6, despite lower baseline hip BMD. DII score improved significantly over three years (mean change: - 0.4 ± 2.4; p <0.01), but change was not associated with fracture risk at any site. No significant associations were found between baseline DII score and hip fracture risk (HR Q4: 1.02; 95% CI 0.92, 1.14; p=0.71). Unexpectedly, women with the most pro-inflammatory DII-scores had slightly lower risk for total fractures (HR Q4: 0.95; 95% CI 0.92 0.98; p<0.01) and lower-arm fractures (HR Q4: 0.92; 95% CI 0.86-0.98; p=0.02); however, after stratification by calcium intake, the association remained significant only for lower arm fractures in women consuming >1200 mg calcium/day.

Conclusion: An anti-inflammatory dietary pattern was associated with less BMD loss in postmenopausal women, but this did not translate into reduced fracture risk during six years of follow-up.
Presenter:

Tonya Orchard, PhD, MS, RD
Assistant Professor
The Ohio State University
Department of Human Sciences
Human Nutrition Program
Campbell Hall, Rm 343E
1787 Neil Avenue
Columbus, OH 43210
Orchard.6@osu.edu