Biochemical Markers of Bone Metabolism in Postmenopausal Women – the Effect of Hormone Replacement Therapy and Smoking

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Aim. Investigation of biochemical markers of bone metabolism in postmenopausal women with respect to hormone replacement therapy and smoking as a risk factor for osteoporosis.

Methods. Cross-sectional study of 107 healthy women receiving hormone replacement therapy (24 smokers) and 50 postmenopausal women (20 smokers) who served as a control group. The following biochemical parameters were analyzed in the serum: total calcium, inorganic phosphate, total alkaline phosphatase, procollagen I C-terminal propeptide (PICP), and cross-linked carboxyterminal collagen I telopeptide (ICTP). The effect of hormone replacement therapy and smoking on biochemical parameters was assessed by a two-way ANOVA.

Results. Significantly lower values of total calcium, inorganic phosphate, alkaline phosphatase, and ICTP in women on hormone replacement therapy compared to the control group indicated a higher rate of bone remodeling in the untreated postmenopause. In women smokers versus non-smokers, significantly lower values of only ICTP were found. Both hormone replacement therapy and smoking affected total calcium and phosphate levels, with the lowest values in non-smoking women on hormone replacement therapy and the highest in non-smoking control women.

Conclusion. Reduction of bone turnover by hormone replacement therapy in menopause was indicated by lower values of biochemical parameters and collagen-related bone markers. Hormone replacement therapy is the prevalent factor affecting biochemical parameters, and probably conceals the possible effect of smoking.

Key words: bone; postmenopausal bone loss; postmenopausal hormone replacement therapy; postmenopause; smoking

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