Short-Term Oral Magnesium Supplementation Suppresses Bone Turnover in Postmenopausal Osteoporotic Women

Introduction: Postmenopausal osteoporosis is closely associated with genetic factors and lifestyle. Minerals in the diet influence both the development and treatment of osteoporosis. Results of retrospective studies indicate that dietary calcium, magnesium and phosphorus are below the recommended daily allowances for many populations. Further studies show a decreased magnesium status in serum, erythrocyte and bone in patients with osteoporosis.

Dietary magnesium directly affects skeletal magnesium content and magnesium deficiency affects all phases of bone metabolism. It is well known that serum magnesium levels decrease in serum and bone in postmenopausal women. Furthermore, dietary magnesium content correlates with the development of osteoporosis.

The aim of this study was to evaluate the short-term effects of daily oral magnesium supplementation on biochemical markers of bone turnover in postmenopausal osteoporotic women.

Materials and Methods: 20 postmenopausal women with osteoporosis were randomly assigned into two groups. The supplemented group (n=10) received a daily dose of 1830 mg magnesium citrate (Magnesium-Diasporal Pastilles) for 30 days. The control group with 10 subjects did not receive any treatment or placebo. The following measurements were done in all subjects: Blood samples and first-void urine samples were obtained between 8.00-9.00 a.m. on day 0, 1, 5, 10, 20 and 30 respectively. The serum levels of magnesium, calcium, osteocalcin and parathormone (iPHT) were measured. The urine samples were used for the measurement of deoxypyridinoline and creatinine.

Results: Basal serum levels of magnesium and calcium were in the normal range. There was no significant effect of magnesium supplementation on serum electrolytes in both groups. Serum osteocalcin levels were significantly increased on the tenth day of magnesium supplementation and stayed significantly high at the end of 30 days compared with the unsupplemented group (p<0.001) serum osteocalcin levels increased by 43.7% and decreased by 5.0% in the magnesium-supplemented and unsupplemented group, respectively. However, there was no correlation between serum magnesium and serum osteocalcin levels. Urine deoxypyridinoline levels decreased by 40.5% in the magnesium-supplemented group and by 5.3% in the magnesium-unsupplemented group. There was no correlation between serum magnesium level and urine deoxypyridinoline level in either magnesium-supplemented or unsupplemented group. Serum iPHT levels were found to be significantly lower on the 20th day in the magnesium-supplemented group compared to the unsupplemented group and decreased by 32.1% while it decreased by 4.0% in the control group.

Conclusion: This is the first study which shows that oral magnesium supplementation in postmenopausal osteoporotic women increases serum osteocalcin levels and decreases urinary deoxypyridinoline levels indicating a reduction in bone turnover.