**Abstract**

**Nitrogen-bisphosphonate therapy is linked to compromised coenzyme Q10 and vitamin E status in postmenopausal women.**


**BACKGROUND:** Nitrogen-bisphosphonates (N-BP) are the most widely used drugs for bone fragility disorders. Long-term or high dose N-BP use is associated with unusual serious side effects such as osteonecrosis of the jaw, musculoskeletal pain and atypical fractures of long bones. It has escaped notice that the pathway N-BP block is central for the endogenous synthesis of coenzyme Q10, an integral enzyme of the mitochondrial respiratory chain and important lipid soluble antioxidant.

**OBJECTIVE:** Our objective was to assess the coenzyme Q10 and antioxidant status in relation to N-BP exposure in women with postmenopausal osteoporosis.

**METHODS:** 71 postmenopausal women (73.5±5.5 yrs) with osteoporosis and no other malignancy were included in this cross-sectional study. 17 were treatment naive, 27 on oral, and 27 on intravenous (IV) N-BP.

**RESULTS:** Vitamin E gamma-tocopherol levels (μmol/mL) were significantly reduced in N-BP users (H(2)=18.5, p=0.02 oral; H(2)=25.2, p<0.001 IV; mean rank comparisons following Kruskal-Wallis test). Length of time (days) of N-BP exposure, but not age, was inversely associated with the coenzyme Q10/cholesterol ratio (μmol/mol) (β=-0.27, p=0.025), which was particularly low for those on IV N-BP (mean difference = -35.0±16.9, 95% CI = -65.2 to -4.9, p=0.02).

**CONCLUSION:** The degree of N-BP exposure appears related to compromised coenzyme Q10 status and vitamin E gamma-tocopherol levels in postmenopausal women with osteoporosis. This phenomenon may link to certain adverse N-BP-associated effects. Confirmation of this would suggest therapeutic supplementation could prevent or reverse certain complications of long-term N-BP therapy for at risk individuals.

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