OSTEOSCOOP

News on current events in osteoporosis and rheumatology

Aromatase deficiency induces urinary calcium loss

N°52 – November 2008

Premenopausal women have one half the prevalence of calcium stone disease than men of comparable age. However, this sex difference disappears rapidly after the onset of menopause. Several studies have provided evidence that urinary calcium excretion increases at menopause, implicating a possible role for estrogen deficiency, and thereby increasing the risk for calcium-containing stones. In a recent study [1], the authors used the aromatase deficient (ArKO) mouse, a model of estrogen deficiency due to the lack of conversion of androgens into estrogens in peripheral tissues, to test the hypothesis that estrogen deficiency would increase urinary calcium excretion and alter the expression of molecular regulators of renal calcium reabsorption.

Compared with wild type mice, ArKO mice had increased urinary calcium excretion despite up-regulation of transporters involved in renal calcium reabsorption. Estradiol treatment of ArKO mice normalized urinary calcium excretion and renal expression of transporters and careers responsible for tubular calcium reabsorption.The authors conclude that estrogen deficiency caused by aromatase inactivation is sufficient for renal calcium loss. Changes in estradiol levels are associated with coordinated changes in expression of many proteins involved in distal tubule calcium reabsorption.

These data highlight the potential peripheral consequences of aromatase inhibition, a common adjuvant therapy in breast cancer. Urinary calcium loss is likely to potentiate the bone loss observed in this context.

1. Öz OK et al. *J Bone Miner Res*. 2007 ;22:1893–1902.

Aromatase deficiency induces urinary calcium loss

Both the kidney and the bone are target organs of estrogens. These hormones promote bone formation and modulate renal calcium excretion. In postmenopausal women, the main source of estrogens is the conversion of androgens by aromatase in peripheral tissues. Aromatase deficiency or pharmacological inhibition leads to estrogen deficiency. This leads to bone resorption and urinary calcium loss, increasing thereby the risk of osteoporosis and renal stones.