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LETTER TO THE EDITOR

Letter to the Editor

The Effect of Long-term Alendronate Treatment on Cortical Thickness of the Proximal Femur

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To the Editor:

We read with interest the recent article by Unnanuntana et al. [8], who found no increase in proximal femoral cortical thickness in patients receiving prolonged alendronate therapy. Given the contrast to earlier observations by Lenart et al. [6], we raise the question of whether the technique of assessing proximal femoral cortical thickness and cortical thickness ratio on dual-energy x-ray absorptiometry are comparable to that of measuring off plain radiographs as performed by Lenart et al. [6]. Further, in light of the current findings reported by Unnanuntana et al., should a generalized increase in cortical thickness of the femoral diaphysis still be included as a minor criterion for atypical fractures, as previously proposed by Shane et al. and a task force for the American Society for Bone and Mineral Research [7]?

The issue of cortical thickness after alendronate treatment has been a somewhat confusing entity in the recent orthopaedic literature [1, 5, 6, 8]. One study had documented an increased mean percentage of cortical thickness after alendronate treatment for 1 to 2 years [1]. Initially thought to be a beneficial effect of osteoclastic suppression, cortical thickening began to be viewed as a double-edged sword when lateral thickening was observed in atypical femur fractures [5]. Generalized increased cortical thickness in the proximal femur was first observed by Lenart et al. [6] in femurs with atypical fractures. This led to the notion that alendronate therapy may cause changes in cortical thickness around the subtrochanteric region of the femur, which may in turn predispose to atypical fractures.

The recent study by Unnanuntana et al. [8] seems to show the contrary—that long-term alendronate therapy does not lead to increased cortical thickness. This raises the question of whether the increased cortical thickness observed in some patients with atypical femoral fractures is coincidental or causative. It is possible these patients already have increased cortical thickness before commencing alendronate therapy or that susceptible individuals have increased cortical thickness develop in response to alendronate therapy. However, increased normalized cortical thickness per se may not be pathologic and is to be expected in young, healthy individuals. Since atypical fractures first caught the attention of the medical community owing to their occurrence in otherwise healthy, postmenopausal women [2], many of whom had no documentation of osteoporosis observed on bone mineral density measurements [3], the observed increase in cortical thickness could represent radiographic evidence of good bone stock. Further, it is uncertain whether the original technique described by Lenart et al. [6] for measuring cortical thickness just below the fracture line is an appropriate indicator of general cortical thickening or part of the distal periosteal reaction. This latter supposition is consistent with our

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observations of only localized thickening in the lateral cortex and not generalized thickening in atypical femoral fractures [4]. Atypical fractures reportedly cluster in regions subject to maximal tensile loading in the femur [4] and the CT/MRI of contralateral cortical thickening reported by Kwek et al. [5] in patients with atypical fractures showed a localized region of resorptive cavities and bone marrow invasion into these lesions associated with thinning of the overlying cortex. Therefore, cortical thickening associated with atypical fractures appears to be a local phenomenon, possibly representing callus formation in response to microfractures in regions subject to abnormal stress.

Cortical thickening in atypical fractures requires a more precise definition and analysis. The observed general cortical thickening is open to further discussion and research. Localized cortical thickening, however, heralds bone remodeling in response to stress and should be treated with caution [3].

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