INTRODUCTION

Trabecular Bone Score (TBS, Med-Imaps, Pessac, France) is an index of bone microarchitecture independent of BMD calculated from anteroposterior spine DXA scans. TBS was associated with fracture in prior case-control and prospective studies (1). In addition, an earlier study showed a positive maintenance of TBS in patients treated with alendronate while treatment-naive controls were significantly losing bone microarchitecture (2).

Yearly infusions of 5 mg of zoledronic acid (ZOL) showed pronounced antifracture efficacy in the HORIZON fracture endpoint trial producing significant reductions in new vertebral, non-vertebral, and hip fractures over a 3-year period in postmenopausal women with osteoporosis (3). This fracture risk reduction was consistent with improvements in bone mineral density observed at the lumbar spine and the hip but the order of magnitude of fracture risk reduction exceeded that expected from BMD changes alone.

Micro-CT analyses of iliac crest bone biopsies performed in a subset of patients included in the HORIZON trial showed that ZOL significantly increased trabecular bone volume and the number of trabeculae, significantly decreased trabecular separation, and numerically improved connectivity density, suggesting better preservation of trabecular structure with zoledronic acid than with placebo, although these increases were not of a large magnitude (4).

OBJECTIVE

The aim of this study was to compare the effects of yearly intravenous zoledronate (ZOL) and placebo (PLB) on spine BMD and microarchitecture as assessed by TBS in postmenopausal women with osteoporosis.

RESULTS

- Baseline characteristics (mean ± SD) were similar between groups in terms of age, 76.5 ± 5.1 years; BMI, 24.4 ± 4.1 kg/m²; L1-L4 T-score, −2.55 ± 1.44 SD, and TBS 1.200 ± 0.12.
- ZOL induced an early and sustained significant increase in spine BMD compared to placebo (% delta spine ZOL vs % delta spine PLB at 6 and 36 months, p value < 0.01).
- TBS was significantly greater with ZOL than with PBO at month 36 (p value < 0.05). Spine BMD and TBS were weakly correlated (r² = 0.11).
- In addition, there were no correlations between changes in BMD and TBS from baseline at any visit. This suggests and confirms that TBS reflects bone properties other than BMD.

CONCLUSION

In postmenopausal women with osteoporosis, once-yearly intravenous ZOL therapy significantly increased lumbar spine BMD during three years compared to PLB and prevented bone microarchitecture decay assessed by TBS.
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