

THE EFFECT OF TERIPARATIDE TREATMENT ON QUANTITATIVE ULTRASOUND AND BONE DENSITY IN WOMEN WITH ESTABLISHED OSTEOPOROSIS

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It is wellknown that BMD (Bone Mineral Density) by DXA is not able to register all the positive changes induced in bone by teriparatide. Moreover many studies have reported that QUS parameters may reflect not only bone density, but also other qualitative properties of bone (elasticity, structure, microarchitecture) which are strictly related to bone strength.

This study aimed to determine whether teriparatide influences Quantitative Ultrasound (QUS) parameters and to compare the changes of QUS with that of BMD. Sixty postmenopausal women (aged 71.1 ± 6.8 years) with established osteoporosis under treatment with antiresorptive drugs for at least 2 months were studied. The patients, after a 2-month run-in phase during which they received only daily supplements of calcium (1000 mg) and vitamin D (400 IU), were randomly assigned to either once daily 20 µg Teriparatide (Forsteo, Eli Lilly and Co) s.c. injection (n=30) or to continue the previous antiresorptive treatment (n=30). At baseline and at 2-month intervals we measured QUS at calcaneus, by Achilles-GE, Lunar (speed of sound: SoS; broadband ultrasound attenuation: BUA; Stiffness: S), at phalanges, by Bone Profiler-IGEA (amplitude dependent speed of sound: AD-SoS; bone transmission time: BTT; fast wave amplitude: FWA) and BMD at right hand (BMD-H) by DXA-GE Lunar. BMD at lumbar spine and at femur was measured on a 6-monthly basis.

After 1-year teriparatide treatment the changes in BMD were 7.1% at lumbar spine, 2.6% at femoral neck, -0.8% at total hip and -0.6% at whole body. Teriparatide induced a significant and persistent decrease in BMD-H (-3.6% at month 6 and -2.7% at month 12). In teriparatide group at month 12 AD-SoS was slightly increased (0.7%; n.s.); whereas BTT significantly decreased (-16.4%; $p < 0.001$) and FWA significantly increased (17.5%; $p < 0.001$). FWA/BTT ratio increased by 26.6% and 32.9% respectively at month 6 and 12 in teriparatide group and remained unchanged in the antiresorptive group. The patients treated with antiresorptives did not show any significant changes in QUS at phalanges and BMD-H.

In conclusion in women with established osteoporosis who had been previously on therapy with various antiresorptive drugs, a 1-year teriparatide treatment determined the expected increase in BMD at axial skeleton and a significant and prolonged decrease in BMD at hand. Moreover, teriparatide induced significant and divergent changes in some QUS parameters at phalanges (namely FWA increased and BTT decreased), which could be considered in monitoring the early effect of PTH 1-34 on bone.