The influence of ibandronate treatment on bone density and biochemical bone markers in patients with osteogenesis imperfecta.

Osteogenesis imperfecta (OI) is characterized by different signs including increased bone fragility, short stature, blue sclera, abnormal tooth growth and often secondary immobility. No curative therapy has been found for this rare disease up to now, and different pharmacological substances have been tried as treatment for severe forms of OI. Promising results were seen with intravenous bisphosphonates in the treatment of patients with OI. The aim of present study was to show the effect of intravenous ibandronate therapy on bone density and bone metabolism markers. We analyzed the data of 27 patients with the diagnosis of OI who were treated off-label with intravenous ibandronate. Ibandronate was administered by intravenous infusion every three months at a dosage of 0.3-2 mg. Bone turnover markers and bone density were measured before starting therapy and every three months during treatment. Bone density was measured by using an ultrasound imaging system providing an accurate image of the calcaneus and by evaluating broadband ultrasound attenuation (BUA). Twenty-seven patients were treated with intravenous ibandronate during the observation period. 18 were female. The mean age of all patients was 23.9 years ± 19.6 (range 4-63). Seventeen patients were categorized to have OI Type I, 5 patients to have OI Type III and 5 patients to have OI Type IV. There was a statistically
significant decrease in total alkaline phosphatase (P<0.0001). We detected also a statistically significant decrease in the ratio urinary deoxypyridinoline/urinary creatinine (P=0.0048) and the ratio urinary pyridinoline/urinary creatinine (P<0.0001) respectively. There was also a statistically significant increase in serum magnesium (P=0.034) and BUA (P=0.0071). No statistically significant changes were seen for total serum calcium (P=0.16), the ratio of urine calcium/urine creatinine (P=0.29), alkaline phosphatase (isoform bone) (P=0.3), procollagen-I-peptide (P=0.5), osteocalcin (P=0.9), serum phosphatase (P=0.71), parathormone (P=0.11) and the ratio urine phosphatase/urine creatinine (P=0.58)

Therapy with ibandronate in patients with OI leads to a normalisation of bone turnover markers and increasing bone density. Therefore serum alkaline phosphatase and bone density are possible parameters to monitor bisphosphonate treatment in patients with OI.