Ibandronate in the Treatment of Pediatric Osteoporosis

We administered oral ibandronate (once a month) to 7 children (6 boys) with low bone mineral density and prevalent low energy fractures. We observed a significant increase (17%) in bone density after one year and additional 3% increase after second year. No further fractures occurred.

Keywords: *Bone mineral density, Fractures, Ibandronate*.

Oral ibandronate is an effective agent in the treatment of postmenopausal and male osteoporosis [1,2]. There are scarce data regarding its use in children and adolescents [3-6].

We evaluated the effect of once-monthly oral ibandronate on bone health in seven osteoporotic children (six boys and one girl; age range 8-18 y). Informed consent was obtained from all patients and/or their legal representatives prior to the treatment. Patients had low spinal (L1-L4) bone mineral density (BMD) measured by dual *X*-ray absorptiometry (DXA) (mean 0.746 g/cm^2; mean Z-score -3.3) and/or prevalent low-energy fractures (***Web Table* I**). We have earlier published details of one of these cases elsewhere [6]. The patients were not taking any other drugs that could have influenced BMD (except Patient No.7) prior to its first measurement or within last 3 months. None of the children suffered from any other chronic disease or fulfilled criteria for osteogenesis imperfecta. Three patients had primary osteoporosis and four had secondary osteoporosis (***Web Table* I**). Oral ibandronate (150 mg/tablet) was administered at home by parents/legal guardians once-a-month [1,2] . All patients were receiving oral calcium (1000-1500 mg/day) and vitamin D (cholecalciferol, 1000-1500 IU/day). Laboratory parameters (serum potassium, sodium, chloride, calcium, phosphate, alkaline phosphatase, alanine-aminotransferase, aspartate-aminotransferase, urea nitrogen, creatinine, parathyroid hormone, osteocalcin, Crosslaps-CTx, and blood counts) were assessed on baseline and then every three months within the first year of therapy, and every six months afterwards. L1-L4 BMD was assessed by DXA (Lunar in six children and Hologic in one) at the baseline and every 12 months of the treatment. New fractures and adverse events were recorded in the course of therapy.

The duration of the treatment was one year (*n*=2), two years (*n*=3), and 3 years (*n*=2). After one year there was a mean 17% increase in BMD to 0.866 g/cm^2 (0.118 SD); Z-score -2.2 (1.4 SD); *P*=0.0003. After second year of treatment, the additional mean increase in BMD was non-significant (+3%) 0.920 g/cm^2 (0.057 SD); *Z*-score -2.1 (2.0 SD); *P*=0.4]. The two children who completed three years treatment had mean additional 9% increase in BMD. The baseline values of all laboratory parameters were within reference ranges and did not significantly change in the course of the treatment. No new fractures occurred. One child had transient epigastric pain and myalgia after the first dose of ibandronate, without recurrence. None of the patients experienced dental problems. We conclude that once-monthly oral ibandro-nate might have significantly increased BMD, and probably contributed to a reduction in fracture occurrence in these children with osteoporosis. However, this is just a preliminary observation in few patients that needs to be evaluated by well-controlled studies with adequate sample size. Further, bisphosphonates are off-label drugs in children, and should be used only in the context of an established clinical program with specialist consultation [7].

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WEB TABLE I DETAILS OF CHILDREN WHO RECEIVED IBADRONATE FOR OSTEOPORASIS

Age (y)	*Diagnosis*	*Number of prevalent fractures*	*Number of fractures one year prior to treatment*	*Baseline BMD L1-L4Z-score (SD)*
18	Recurrent fractures – osteoporosis	12	3	-4.4
17	Recurrent fractures – osteoporosis	7	2	-2.8
17	Recurrent fractures – osteoporosis	4	2	-4.4
17	Cerebral hemorrhage -quadriplegic	0	0	-4.6
08	Duchenne muscular dystrophy	2	2	-0.5
17	Cushing syndrome - hypophyseal adenoma	2	2	-4.3
12	Corticodependent nephrotic syndrome	1	1	-2.3