Efficacy of monthly oral Minodronic Acid Hydrate for Chronic Kidney Disease-Mineral and Bone Disorder in Kidney Transplant Recipients

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Objectives:

Minodronic acid hydrate (MAH) was the first bisphosphonate developed and approved for osteoporosis treatment in Japan. To report the results of a clinical study on the efficacy of MAH against chronic kidney disease-mineral and bone disorder (CKD-MBD) in kidney transplant recipients.

Methods:

We administered, according to the instructions in the package insert, MAH Tablet 50 mg once every 4 weeks to 17 adult patients who had undergone kidney transplantation, and evaluated the therapeutic outcomes by regular measurements of bone mineral density and bone turnover markers, and serum parathyroid hormone.

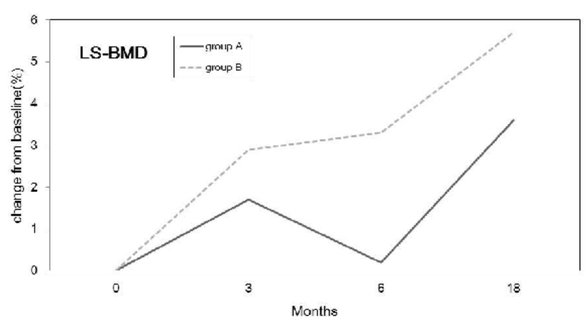
Results:

In 3 men of the 17 patients, the tablets were administered within 1 year of transplantation, while in the remaining 14 patients (7 men, 7 women), at least one year after the transplantation. The mean observation period was 17.7 months. According to bone mineral density measurements, 2 patients were diagnosed as having osteoporosis, while according to bone resorption marker measurements, 15 patients fell into a high-risk group for fractures. The number of patients categorized as having osteoporosis and a high risk of fractures were 0 and 6, respectively, at 6 months and 0 and 5, respectively, at 17 months after the start of MAH treatment. There were no remarkable adverse effects of the MAH treatment.

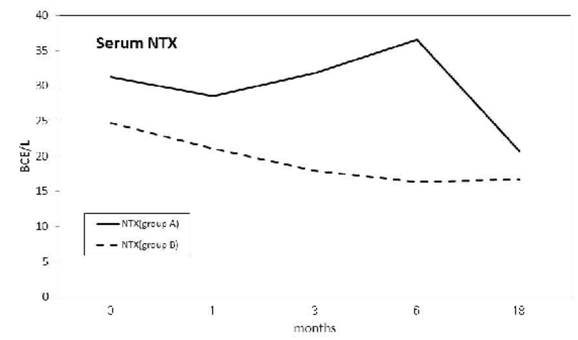
Table 1 Demographics and baseline characteristics of subjects

	Group A	Group B
n	3	14
Male / Female	3 / 0	7 / 7
age (years)	44.7 (41-52)	60.9 (28-73)
LS-BMD (g/cm^2)	0.839 (0.704-0.924)	0.820 (0.66-1.017)
Serum NTX (nmol BCE/L)	31.2 (21.8-47.0)	24.7 (15.9-37.4)
Serum TRACP-5b (mU/dl)	664 (612-931)	349.6 (159-643)
Serum BAP (U/l)	38.8 (12.8-74.0)	12.4 (6.7-20.9)
Serum PINP (μg/l)	119.1 (51.6-219.6)	38.2 (13.0-101.8)
Serum intact PTH (pg/mL)	204.7 (117-280)	102.8 (14-165)
Serum creatinine before MAH treatment (mg/ml)	1.98 (0.98-2.26)	2.51 (1.88-3.44)
Serum creatinine at 18 months after the MAH treatment (mg/ml)	1.97 (1.0-2.19)	2.54 (1.87-3.58)

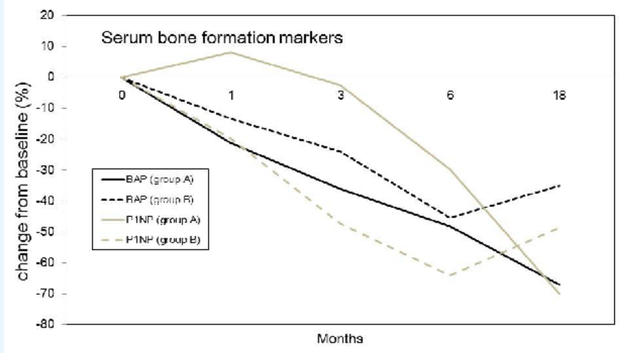
Data are means (range) for the indicated number of subjects in each group



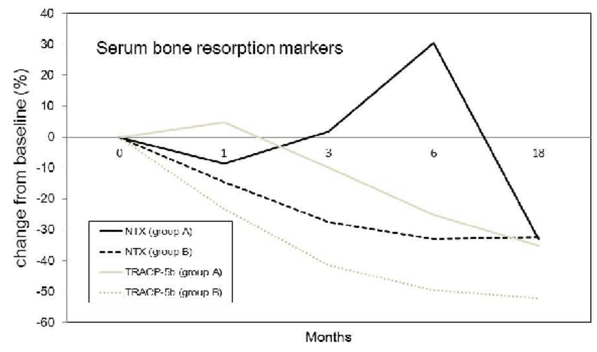
Time-course of changes from baseline in the mean value of the LS-BMD and the mean serum NTX



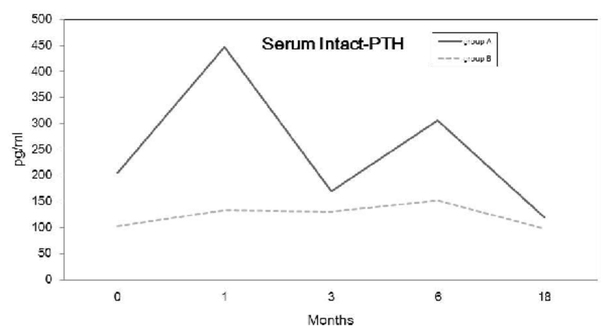
Time-course of changes from baseline in the mean value of the mean serum NTX



Time-course of changes from baseline in the mean serum bone formation markers: BAP, PINP



Time course of changes from baseline in the mean serum bone resorption markers: NTX, TRACP 5b



Conclusions:

MAH is expected to improve the treatment adherence and to be effective against CKD-MBD after kidney transplantation. In addition to the recommendations by the Kidney Disease: Improving Global Outcomes (KDIGO) guideline, diagnosis and treatment of CKD-MBD by a combination of bone mineral density and bone turnover marker measurements are important even after 1 year from transplantation.

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