Comparison of the Effect of Denosumab on Bone Mineral Density Increase Between the Hip Fracture and Non-Hip Fracture Group

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Purpose: Osteoporosis is increasing rapidly with the increase of the aging population. Denosumab is a newly developed osteoporosis medication as a fully human monoclonal antibody and has been widely used. Besides, denosumab has been known to be effective in preventing osteoporotic fractures. However, very little has been reported about the effects of denosumab on osteoporotic hip fracture patients. The purpose of this study is to analyze the effect of denosumab on bone mineral density (BMD) increase in elderly patients with hip fractures injected over 1 year (2 times).

Methods: From June 2017 to December 2021, elderly patients with osteoporosis who visited the outpatient clinics and were treated with denosumab for more than 1 year were enrolled. We retrospectively reviewed the medical records and investigated sex, age, body mass index (BMI), BMD, comorbidities, and the presence of hip fractures. We compared the difference in spine and femur BMD changes between the hip fracture and non-hip fracture groups. Patients who could not ambulate independently and with comorbidities causing secondary osteoporosis were excluded. A linear mixed model and the generalized estimating equation were used to compare the 2 groups.

Results: 179 patients received denosumab for more than 1 year. The mean age, BMD (T-score), and BMI were 77.2 years, –3.0, and 21.6 kg/m², respectively. Both spine and femur BMD increased as the number of administrations of denosumab increased ($P = 0.001$ and $P = 0.028$, respectively). The demographic data did not affect the increase in BMD. Hip fracture group was older than the non-hip fracture group ($P = 0.001$), and the initial femur BMD in the hip fracture group was lower than in the non-hip fracture group ($P = 0.002$). Other demographic data, including comorbidities, showed no significant differences between the 2 groups. In comparison with the rate of BMD increase in both groups, the rate of increase in femur BMD was significantly less in the hip fracture group than the non-hip fracture group ($P = 0.046$), while there was no significant difference in spine BMD between the 2 groups ($P = 0.148$).

Conclusion: While denosumab increased spine BMD similarly to non-hip fracture patients in hip fracture patients after treatment with denosumab for more than 1 year, it increased femur BMD less than the non-hip fracture patients. Therefore, active rehabilitation and additional management may be demanded to increase femur BMD more effectively and prevent secondary hip fractures.