

Is osteoporosis a risk factor for ankle fracture? : Comparison of bone mineral density between ankle fracture and control group

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Introduction/Purpose: It is well known that fracture of the ankle is different from the typical osteoporotic fracture. Nevertheless, there remains controversy over osteoporotic feature of the ankle. Therefore, we investigated the possibility of the existence of a relationship between axial bone mineral density (BMD) in patients with ankle fracture with that of the normal population under control of other confounding factors such as body mass index (BMI).

Methods: This study retrospectively reviewed medical records of patients who were treated in our institution from 2005 to 2015. A comparative analysis was carried out between 115 patients with ankle fracture and 72 patients admitted with other orthopedic reasons (control group). Sex, age, energy level of trauma, and BMI were analyzed as variables affecting axial BMD.

Results: Patients in ankle fracture group were significantly younger as compared to control group ($p=0.041$). BMI of ankle fracture group was higher. The other variables showed no differences between the two groups. The energy level of trauma in ankle fracture group was related to only BMI ($p=0.01$). Only lumbar BMD was correlated with BMI in ankle fracture group ($p=0.003$).

Conclusion: Axial BMD of ankle fracture patients showed no difference from that of normal population. The occurrence of ankle fracture is affected by only BMI rather than axial BMD. Moreover, it appears that axial BMD is not always correlated with BMI in non-osteoporotic population.

BMD according to trauma level in patients with ankle fracture.

| Trauma level | n | BMD | | | BMI |
|-------------------------------|----|-------|------------|------------|---------------|
| | | L1-L4 | Femur neck | Trochanter | |
| 0 | 0 | N/A | N/A | N/A | N/A |
| 1 | 94 | 0.841 | 0.640 | 0.568 | 24.9 |
| 2 | 18 | 0.835 | 0.603 | 0.568 | 23.0 |
| P-value [†] | | 0.956 | 0.087 | 0.615 | 0.010* |
| Adjusted p-value [‡] | | 0.842 | 0.485 | 0.916 | N/A |

NA, not applicable

[†]P value using the Mann Whitney Test

[‡]Adjusted P value using the partial correlation analysis (age, sex, and BMI controlled)

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