The trend of Fracture risk on BMI and age in postmenopausal women: Ajou Bone Love Data (ABLD)

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Background

The goal of osteoporosis treatment is not only to escape from low bone mineral density itself, but to prevent future fracture. At present, anti-osteoporosis therapy is based on bone mineral density, and T-score less than -2.5 is generally accepted as the starting point of therapeutic intervention. Previous studies pointed out that factors such as age and BMI affects fracture probability.

We tried to create a simple tool which incorporates easy variables that predicts fracture probability.

Method

This was a retrospective cohort study over 10 years, using BMD data from women greater than 50 years who underwent DXA test between January 1, 2006 and December 31, 2014, at Ajou university hospital and health promotion center. Entry date was the date of DXA test and follow-up continued until a diagnosis of clinical fragility fracture, or December 2021.

A total of 6,503 women were included in the analysis.

Subjects with diseases or drug that interfere with normal bone metabolism were excluded (e.g., Thyroid illness, Rheumatoid arthritis, liver cirrhosis, malignancy, HIV, anti-osteoporosis drugs, steroids, hormones, anti-coagulants, diuretics, anti-epileptics)

Bone mineral density (BMD) was classified as normal (T-score ≥ -1.0 standard deviation [SD]), osteopenia (T-score < -1.0 and > -2.5), and osteoporosis (T-score ≤ -2.5) from dual-energy X-ray absorptiometry. BMI was classified as underweight (kg/m^2 < 18.5), normal (kg/m^2 ≥ 18.5 and < 23), overweight (kg/m^2 < 25), obese I (kg/m^2 ≥ 25 and < 30), and obese II&III (kg/m^2 > 30).

Result

Fracture rate in 50-54 years was less than 5% regardless of T-score in all BMI groups. Underweight group was vulnerable to fracture as early as 60 years with fracture rate 15.4%. Median group showed increased fracture rate of 15.1% at 70 years. Overall, fracture rate showed abrupt increase at age 70 years and older. Fracture rate in above 80 years showed varying results in different BMI groups most probably due to small subject numbers.

Conclusion

This is the study that demonstrated the risk of fracture only by using two simple variables such as BMI and age. Although BMD reflects the health of bone, significant independent risk factors should be considered together to assess a women's risk of fracture at clinical setting. Our data showed that augmenting anti-osteoporosis therapy based solely on BMD could be unnecessary in some women regardless of BMD. We demonstrated target population which could benefit the most from anti-fracture intervention. CRACK can provide a useful guide to identify who needs medical advice and intervention.