



Workshop Abstract

W2

From the viewpoint of densitometry

Masako Ito

Division of Radiology, Nagasaki University Hospital, Japan

There are certain differences in the features of osteoporosis between Eastern and Western countries. For example:

1. Incidence of hip fracture is lower, while prevalence of spinal fracture is higher, among Asian women, compared with Caucasian women.
2. The Japanese have lower bone mineral density (BMD) at several skeletal sites than Caucasians.
3. Vitamin D deficiency is common among Japanese women, which may affect the outcome of various treatments. In fact, an additive effect of vitamin D and estrogen has been demonstrated in Japanese population.

First, is there a difference in BMD values between Caucasians and Asians? When reference curves of BMD with aging were compared among Chinese, Japanese and American Caucasian women, Japanese women had lower BMD at various skeletal sites and a higher rate of BMD decrease with aging than Caucasian women. These differences have been attributed mainly to ethnic differences in body weight and height.

Then, why do Japanese women have lower incidence of hip fracture compared with Caucasian women? Evidence so far suggests that a lower incidence of fall, a shorter stature and a shorter hip axis length in Japanese women may be involved.

It has been reported that a difference in bone geometry is responsible for the racial difference in femoral and spinal strength. Duan Y et al. demonstrated that structural basis of bone fragility differed by race, where bone fragility was calculated on the basis of volumetric BMD and cross-sectional area derived from spinal DXA data. They found that vertebral fractures would occur in a similar proportion of the Chinese and Caucasians, but structural basis and pathogenesis of bone fragility differed between the two populations.

What about the higher prevalence of vertebral fractures among Japanese women? Two epidemiological reports suggest that fracture risk of Japanese women becomes similar to that of Caucasians. The incidence of thoracic vertebral fractures among the Japanese seemed to decline by a factor of 0.5 in males and 0.6 in females for each 10-year decrease in birth year. Furthermore, according to the prediction of a Japanese cohort, the risk of spine and hip fracture was similar to the relative risk from previous reports on Caucasians, after adjusting for age, prevalent vertebral fracture and baseline BMD.

Treatment outcome differs between Caucasian and Japanese women. Combined administration of estrogen and vitamin D has an additive effect on BMD in healthy Japanese post-menopausal women, while no such additive effect has been reported in Caucasian post-menopausal women. An additive effect of raloxifene and vitamin D in Japanese osteoporotic women has also been reported. These beneficial effects of vitamin D may partly be due to higher prevalence of vitamin D insufficiency among Japanese women. According to the study comparing the effects of alendronate on spinal BMD between Caucasian and Japanese osteoporotic women, the extent of BMD increase by alendronate was similar, even though the dose of alendronate in Japan was half that used for the Caucasian study.

I would also like to touch on the differences in WHO diagnostic criteria and the Japanese version, such as detection rate of osteoporosis.