Osteoporosis — a major public health issue

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1% of the population sustain a fracture each year, of which one third are in postmenopausal women. In the USA 40% of women and 13% of men will sustain a fracture of hip vertebra or distal forearm after the age of 50, although fracture rates and the sex difference are lower in Asian populations. Of those able to walk beforehand, only 50% are still able to walk independently after a hip fracture, and the economic and social costs of fractures are considerable. A study in Oxfordshire has shown a doubling of the incidence of hip fractures over 27 years[2], due to a combination of falling birth rate increasing the proportion of elderly adults in the population, increased life expectancy, and also an age-specific increase. The UK experienced a temporary increase in the birth rate in the early 1950s, creating a population bulge who will reach old age and dependency in the second and third decades of the next century. This group is now approaching menopausal age, and action must be taken now to reduce the incidence of fracture in the future. The recent fall in the Sri Lankan birth rate is also creating a population bulge and similar problems will have to be faced here.

Changes in bone mass result from the balance between bone formation and bone resorption. Peak bone mass is accumulated by the fourth decade, and depends on genetic factors such as inherited variations on the vitamin D receptor,[3] nutrition including calcium intake, sex steroids, and exercise. Thereafter bone formation declines leading to a small loss of bone each year. Superimposed upon this is a marked increase in bone resorption during the first few years after the menopause, which accounts for the sex difference in fracture rates.

Osteoporotic fractures are associated with corticosteroid therapy, thyrotoxicosis, hyperparathyroidism, malnutrition, alcoholism, and cigarette smoking, but the correlations are weak. More important predictors are an early menopause (or other causes of oestrogen deficiency) and a positive family history of fracture. Measurements of bone mineral density give an indication of bone strength and the risk of fracture doubles for each fall of one standard deviation from the mean[4]. Dual photon absorptiometry has become the standard method of assessing bone density and gives results reproducible to ± 3%. The radiation dose is equivalent to one sixth of a chest Xray, and each scan takes 10-20 minutes. These measurements are of potential value either in screening the whole population to detect those at higher risk of fracture, or used selectively in those with clinical indicators of higher risk (e.g. early menopause), or only in those in whom the result will influence a treatment decision.

Post menopausal bone loss is associated with a small but significant rise in plasma calcium, increased calcium excretion, and mild suppression of parathyroid hormone and calcitriol levels.

There is no evidence that calcium or vitamin D supplements are helpful, but the effects of oestrogen replacement are dramatic. The rate of vertebral fracture has been reduced from 38% to 4% in oophorectomised women,[5] and there is a calculated 50% reduction in the cumulative risk of hip fracture after 10 years' treatment. In addition, oestrogen replacement reduces coronary heart disease by 30%[6] and cerebrovascular disease by 25%. These benefits far outweigh the possible small increase in breast cancer after more than 10 years of treatment.

References

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