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Osteoporosis and osteoporotic fracture occurrence and prevention in the elderly: a geriatric perspective

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Age is a major determinant of osteoporosis, but the elderly are rarely assessed and often remain untreated for this condition. Falls, co-morbidities and co-medications compound the risk of fracture in senile osteoporosis. The prevalence of osteoporosis is expected to increase with increasing life expectancy, and the associated fractures – particularly hip fractures – will lead to significant demands on health resources. Treatment of senile osteoporosis can include pharmacological and non-pharmacological intervention. Calcium and vitamin D dietary supplementation is a relatively low-cost way of reducing the risk of fracture. Pharmacological interventions with risedronate, zoledronic acid, or teriparatide have been shown to reduce vertebral fracture risk in osteoporosis patients over the age of 75. Zoledronic acid has been shown to reduce fracture risk in frail patients with recent hip fracture. In the oldest old (patients over 80), strontium ranelate is the first agent with documented anti-fracture efficacy for both non-vertebral and vertebral fracture and documented sustained efficacy over 5 years. Falls prevention is an essential component of any strategy for decreasing fracture risk in old age. Currently, senile osteoporosis is under-diagnosed and under-treated, but age should not be a barrier to intervention.

Key words: senile osteoporosis; hip fracture; falls; risedronate; teriparatide; strontium ranelate.

Age is a major determinant of osteoporosis. In a recent analysis of individuals in the USA, over 30% of the age group $\geq$80 years old had osteoporosis, compared to 18.5% of those aged 60–64 years[1]; 90% of spine and hip fractures arise from osteoporosis[2], and vertebral fractures, consequent on osteoporosis, occur in 45–55% of women aged 80–89 years.[3] Women aged $\geq$80 years comprise approximately 8% of the postmenopausal population, but contribute up to 30% of all fragility fractures and 60% of hip fractures.[4] Of additional concern, particularly in the elderly, is that the rate of increase in fractures is greater than that accounted for by demographic changes alone.[5] The increased morbidity and mortality, chronic pain and reduced quality of life, as well as the demands on health resources, associated with fractures are most severe in the very elderly.[6–8] With the worldwide increase in life expectancy, the prevalence of osteoporosis and its outcomes is expected to increase in the coming decades.

FRACTURES IN THE ELDERLY WITH OSTEOPOROSIS

The risk of fracture associated with osteoporosis increases with age, as illustrated by the Australian study shown in Figure 1.[9] Hip fractures are predicted to increase from 1.66 million in 1990 to 6.26 million in 2050 worldwide due to demographic changes[10], although there is considerable regional variation in the incidence.[11] It has been estimated that there were 1.4 million new vertebral fractures in the year 2000, and the prevalence increases with age both in women and men.[3,12–14] The incidence of non-vertebral fractures other than hip fractures exceeds that of hip fractures in the elderly.[15] It is well established that the risk of a fracture cascade is increased following a first fracture, and this risk increases with age. In one study the 5-year risk of a femur/hip fracture following a vertebral fracture in women aged 65 years was 13.3% compared with 23.9% in women aged 85 years or more.[16]

OUTCOMES OF FRACTURES IN THE ELDERLY

Outcomes of osteoporosis-related fractures include increased mortality, functional decline, an increased requirement for long-term care, a decline in the quality of life, and increased utilization of health-care resources.