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Fragility fractures in fragile people-

Epidemiology of the age quake

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Akademisk avhandling

som med vederbörligt tillstånd av Rektorsämbetet vid Umeå universitet för avläggande av medicine doktorsexamen, kommer att offentligen försvaras i Sal B 9tr, Tandläkarhögskolan, fredagen den 12 juni 2009, kl. 09:00.

Fakultetsopponent: Professor Karl Obrant,
Enheten för Ortopedi, Universitetssjukhuset Malmö, Lunds Universitet, Sverige.

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Osteoporosis-related fracture is already today a major public health problem and the number of hip fractures is expected to double to 2030. Sweden has one of the highest hip fracture incidences worldwide. This may be explained by several factors: e.g. age, genetic, climatologic, geographic and a relative vitamin D deficiency, secondary to the limited sunlight exposure especially during winter months. Intrinsic and extrinsic factors contribute to a fracture, although a prior low energy fracture is one of the strongest predictors for a subsequent one and this should be a target for secondary fracture prevention in an orthopaedic setting.

Since 1993 all injured patients admitted to the emergency floor and all in-hospital fractures at Umeå University Hospital, Sweden, were registered according to the Injury Data Base, former EHLASS. There were 31,173 fracture events (one or more fractures at the same time), of which 13,931 were in patients' ≥ 50 years old. The fracture database was co analyzed with the Northern Sweden Health and Disease Study cohort in a nested case-control study for investigations of associations between osteoporotic fracture and serum markers, lifestyle data, nutrition etc. We found that there were differences in fracture pattern depending on age and sex. Both injury mechanism and fracture site were strongly dependent of age. The most severe fragility fracture, hip fracture, had a decreasing incidence. However, the incidence curve was right-shifting leading to an increase, both in numbers and in incidence of hip fractures among the oldest female. To identify people at high risk for fractures, re-fracture patients are useful. No less than 21% of the fracture patients had suffered more than one fracture event, accounting for 38% of all fracture events. The total risk ratio for a subsequent fracture was 2.2 (2.1-2.3 95% CI). In males the highest risk for re fracture was in the age cohort 70-79 years (RR 2.7, 2.3-3.2 95% CI), in females > 90 years (RR 3.9, 3.2-4.8 95% CI).

Another possible risk factor in this subarctic population is the lack of sunlight, leading to a vitamin D deficit. The overall adjusted risk of sustaining a hip fracture in this population was 2.7 (95%CI:1.3-5.4) in subjects with a serum 25 hydroxyvitamin D below 50 nmol/l. The association was, however, different according to age at baseline. Thus in subjects aged 60 years and above at baseline, the adjusted odds ratio of sustaining a hip fracture was 6.2 (1.2-32.5 95%CI) for the group of individuals with a serum 25OHD below 50 nmol/l, whereas no significant association was found in the youngest age group.

In the next 30 years the ongoing demographic changes will accelerate. The World War II baby boomers will cause an age quake. We can already see signs heralding a new fracture pattern: an increasing cohort of mobile but fragile elderly, with considerable co-morbidity is now at risk for fragility fractures. In fracture patients, clinical information is sufficient to pinpoint patients with a high risk for re-fractures. It is therefore clinically important to use the information provided by the fracture event. We suggest that trauma units and primary care units should screen for risk factors and inform patients about the treatment options, and to organize fracture liaison services. This seems to be especially cost-efficient for our oldest and frailest patients. Secondary prophylaxis and follow-up treatment after cardiovascular disorders are now a matter of course worldwide, but the screening for risk factors, in order to prevent a second fracture, is often neglected. This is one of the most important issues of fracture care in the future in order to improve general health.

Keywords: Fragility, fractures, elderly, epidemiology, age quake, population based, Vitamin D.

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