Secular trends in the osteoporotic fractures of the distal humerus in elderly women

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Abstract. Osteoporotic fractures, with their sequelae of fracture, is a major, continuously increasing threat to the health of the elderly, and therefore reliable epidemiological information is needed for assessment of the fracture development in the future and for effective fracture prevention. However, very little population-based information is available concerning the nationwide numbers, incidences and especially secular trends of osteoporotic fractures other than those occurring at the hip. We determined the current trends in the number and incidence of osteoporotic fractures of the distal humerus in Finnish women in 1970–1995 by collecting from the National Hospital Discharge Register all female patients aged 60 years or more who were admitted to our hospitals in 1970–1972, 1974–1975, 1978–1980, 1983–1985 and 1988–1995 for primary treatment of first osteoporotic fracture of the distal humerus. The fracture was defined as osteoporotic if it occurred on individuals aged 60 years or more as a consequence of a moderate or minimal trauma only (a fall from standing height or less). We also predicted the fracture development till the year 2030 by a regression model, a model that took into account the predicted changes in the fracture incidences and population at risk. The number and incidence (per 100,000 women) of osteoporotic fractures of the distal humerus in Finnish women aged 60 years or more increased from 42 (number) and 11 (incidence) in 1970 to 175 and 30 in 1995. The age-adjusted incidence of osteoporotic fractures of the distal humerus also increased, from 12/100,000 women in 1970 to 28/100,000 women in 1995. If this trend continues, the number of these fractures in Finnish women will be almost three-fold in the year 2030 compared with that in 1995. We conclude that the number of osteoporotic fractures of the distal humerus in elderly Finnish women is increasing more rapidly than can be accounted for by the demographic changes alone and therefore effective preventive measures are imperative to keep this problem in control.

Key words: Elderly, Epidemiology, Humerus fractures, Incidence, Osteoporosis, Secular trends

Introduction

Osteoporosis and osteoporotic fractures are an increasing problem worldwide. Osteoporosis is characterised by a low bone mass (BMD more than 2.5 SD below the mean value of healthy young reference population) and disruption of bone architecture resulting in reduced bone strength and increased risk of fracture [1, 2]. Osteoporotic fractures can be characterised by the facts that their number and incidence increase with age, they are more common in women than in men, they occur at sites which contain substantial amounts of trabecular bone, and that they are associated with a moderate or minimal trauma only (typically a fall from standing height or less) [3, 4]. The most common fracture sites are the hip, vertebrae, distal forearm, proximal humerus and pelvis [5].

In epidemiological studies of osteoporotic fractures the emphasis has been on fractures of the hip [6–10], spine [11–13], distal forearm [14–16] and proximal humerus [17–19], whereas other fractures, such as those occurring at the distal humerus, have been almost neglected, although their treatment is also demanding and expensive, often requiring surgery, long-term immobilisation, or both. Thus, the secular trends of many less commonly occurring fractures are unknown. For example, we did not find any previous population-based study focusing on the long-term secular trends of osteoporotic fractures of the distal humerus; the few studies found reported the numbers and incidences of these fractures for a short period of time only (shorter than ten years) [18, 20–24].

The objective of this investigation was therefore to determine the time trends for the absolute number and incidence of osteoporotic fractures of the distal humerus, and the age-adjusted and age-specific inci-
Figure 1. Number and incidence of osteoporotic fractures of the distal humerus in Finland in 60-year-old or older women over the period 1970–1995. The change in the number of female population of same aged is also shown.

Figure 2. Changes in the age-adjusted incidence of osteoporotic fractures of the distal humerus in 60-year-old or older women in Finland over the period 1970–1995.

dence rates of these fractures in Finnish women aged 60 years or more over the period 1970–1995. We also predicted the fracture development till the year 2030. Since more than 80% of these fractures occur in elderly women, we were unable to extend our study to elderly Finnish men.

Subjects and methods

As other epidemiologic studies of osteoporotic fractures [3–5, 19], we defined an osteoporotic fracture of the distal humerus as a fracture which occurred on individuals aged 60 years or more as a consequence of a moderate or minimal trauma only (a fall from standing height or less). Thus, all female patients aged 60 years or more who were admitted to Finnish hospitals in 1970–1972, 1974–1975, 1978–1980, 1983–1985 and 1988–1995 for primary treatment of first fracture of the distal humerus were selected from the National Hospital Discharge Register (NHDR). The unique personal identification number allowed us to focus the analysis on the first recorded admission. Besides, the NHDR contained data on age, sex, place of residence, hospital number and department, patients admission and discharge days, place and etiology of injury, and the place of secondary treatment. According to the directives given by the Finnish National Board of Health, the first diagnosis described the main reason for the patients’ hospital stay. The second, third and fourth diagnoses indicated other possible diseases or injuries.

The diagnoses were coded with a five-digit code according to the eighth and ninth revision of the International Classification of Diseases (ICD) indicating the type of the fracture. Between 1970 and 1986, the eighth revision of ICD and its two codes (81242 and 81252) for the distal humeral fractures were used. Since 1987, the codes 8124A and 8125A were used.

The study was based on the whole Finnish female population, thus completely covering the intended study population (Finnish women). In other words, the given absolute numbers and incidences of distal humeral fractures were not cohort-based estimates but true final results.

The annual midyear populations in each five-year age group in the period 1970–1995 were obtained from the official statistics of Finland [28]. The fracture incidences were calculated for women and expressed as the number of cases/100,000 women/year. To establish age specific incidences for the selected age groups (60–69, 70–79, 80–), the yearly numbers of distal humeral fractures were divided by the midyear population for each age group. The rates were expressed as the number of cases/100,000 women/year, by age