Original Article

Hip Fracture Incidence in the Canton of Vaud, Switzerland, 1986–1991

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Abstract. The objective of this study was to estimate the incidence of hip fracture in the canton of Vaud, Switzerland (total population 584 000), for the period 1986–1991 using routine hospital discharge data collected by the Cantonal Service of Statistical Research and Information (SCRIS). For the survey period, the estimated average annual crude incidence rate of hip fractures was 167 per 100 000 persons aged 20 or older (241 for women and 84 for men). For the population aged 50 years or older, the crude incidence rate was 388 per 100 000 persons (546 for women and 185 for men). The average annual age-specific rates rose exponentially by successive 5-year age groups. The median age of patients at the time of the fracture was 82 years in women and 74 years in men. There was no significant difference between the total number of cervical and trochanteric fractures. Between the ages of 20 and 84 years, the cumulative risk for a woman to be admitted to hospital with a hip fracture was twice that of a man (15.8% vs 7.8%). From 1986 to 1991, the age- and sex-adjusted incidence rate did not show any significant trend, although it was consistent with an increase in men (p = 0.09). However, the annual number of fractures rose from 644 to 776, particularly among very aged men. The mean length of stay in the acute care hospital fell from 38 days in 1986 to 25 days in 1991. Finally, the comparison of these results with those obtained in 1986 for the same population from more exhaustive sources has confirmed the provision of a consistent, although overestimated, assessment of hip fracture incidence by means of these routine hospital statistics in the canton of Vaud, Switzerland.

Keywords: Epidemiology; Hip fracture; Incidence; Osteoporosis; Proximal femur; Trends

Introduction

Fracture of the proximal femur, or hip fracture, is considered the most important osteoporosis-related fracture in terms of morbidity, mortality and cost. Its incidence rises exponentially with age [1,2]. Therefore, due to the aging of the population, a phenomenon present in most Western countries, the crude hip fracture incidence rate will increase in the next decade. In addition, age-adjusted incidence has increased during the last 30 years and continues to rise in several countries [1–11]. If the current trend persists, the annual incidence of hip fractures occurring each year will increase by more than 30% over the next 30 years [1]. Thus, upward epidemiological trends together with an increased lifespan of the population make the prevention of hip fracture a major public health concern.

In Switzerland, no nationwide incidence rates of hip fracture are available. The only published data are for the canton of Vaud in 1986 by Gonin et al. [12], the canton of Geneva in 1987 by Nydegger et al. [13] and a rough estimate for the whole country in 1988 by Gass [14]. Moreover, there is no evaluation of time trends. Therefore, the present study estimates the evolution of hip fracture incidence in the canton of Vaud between
1986 and 1991 on the basis of routine hospital discharge data.

Methods

In the canton of Vaud, Switzerland (total population 583,903 in December 1991), almost all patients with hip fractures are referred to the 18 public hospitals including the University Hospital (CHUV). All these hospitals participate in the Medical Statistics of the canton of Vaud (MSV), according to the statistical system of the Swiss Medical Association, supplying standard information on each patient discharged, including age, sex, principal and concomitant diagnosis, month of admission, length of stay and discharge destination. These data are compiled by the Cantonal Service of Statistical Research and Information (SCRIS).

All patients aged 20 years and older, hospitalized for hip fracture in the canton of Vaud during the period January 1986 to December 1991, were included in this study. Diagnostic codes are based on the International Classification of Diseases, 9th revision (ICD-9: 820.0), corresponding to open and closed cervical and trochanteric fractures of the proximal femur. Pathological fractures (cancer, Paget’s disease, bone cyst) and subtrochanteric fractures were excluded, as were patients hospitalized for a complication or with a diagnosis of ‘previous hip fracture’. As 7 hospitals did not participate in the MSV in 1986 and 1987, MSV was extended by the 44 hip fracture cases concerned in 1986 and in 1987. Those 44 cases were included in the 1986 study by Gonin et al. [12], using other sources of data for the 7 non-participating hospitals. The 44 cases were added to the corresponding sex- and age-stratified groups for 1986 and 1987.

The age-specific and the age-adjusted incidence rates were calculated. The age-specific rates were stratified by 5-year age groups and by sex using, for each year, the mid-year population supplied by the vital statistics of the canton of Vaud. For calculation of the age-adjusted rates, the age structure of the population studied was standardized, using the direct method, to the age distribution of the December 1990 canton of Vaud population aged 20 years and older, women and men combined, as given by the federal census. For international comparison the age distribution of the 1985 United States white population aged 35 years and older, both sexes combined, was used. The average annual crude incidence rates and the average annual age-specific incidence rates for the whole period surveyed (1986–1991) were calculated by the ratio of the total number of hip fractures recorded during this period divided by the sum of person-years. Confidence intervals were not calculated, because the data were considered exhaustive. Risk of being hospitalized with a hip fracture was estimated by the density method [15]. Statistical testing for trends in hip fracture incidence was by means of Friedman’s test. The statistical analyses were made by using anonymous data pooled from the 18 hospitals. The SPSS/X statistical package running on a VAX (VMS) cluster was used for statistical analysis, and figures were drawn by means of Microsoft Excel 4.0.

Results

The total population aged 20 years and older in the canton of Vaud has increased by 7.8% from 412,831 in 1986 to 447,689 in 1991, with 41.5% and 40.3% of the population aged 50 years and older, and 4.9% and 5.3% of the population aged 80 years and older, in 1986 and 1991 respectively.

From 1986 to 1991, 4216 patients were hospitalized for hip fracture and reported in the MSV. To this total was added 44 cases for each of the years 1986 and 1987, corresponding to patients in the hospitals not included in the MSV in those years. Overall, there were 3284 women and 1020 men (ratio women/men = 3.2), although men predominated in the group younger than 50 years. The mean age of patients with a hip fracture was 79 years in women and 69 years in men (median age: 82 in women, 74 in men). From 1986 to 1991 the mean age at the time of fracture rose gradually from 78 to 80 years in women (median age: 81 to 82); no increase was found in men.

The average annual crude incidence rate was 167 per 100,000 population with corresponding rates of 241 for women and 84 for men (ratio women/men = 2.9). The average annual age-specific incidence rates for 5-year age groups (Tables 1, 2) rose almost exponentially with age in both sexes. Above 70 years, rates in women were twice those of men.

If we consider only the population aged 50 years or older, the average annual crude incidence rate was 388 per 100,000 population with corresponding rates of 546 in women and 185 in men, respectively; the respective figures are 353, 432 and 205 when the rates were standardized to the 1985 United States white population. From 1986 to 1991 the age-adjusted incidence did not show a clear trend in women (p = 0.6) but was consistent with an increasing trend in men (p = 0.09). However, on average the annual number of fractures has increased regularly: +2.8% in men (95% confidence interval (CI) −5.8 to +11.4%) and +1.6% in women (95% CI −12.0 to 15.2%). An increase was observed particularly in persons aged 75 years and older compared with younger people (+27% v +7%, respectively).

The cumulative risk from 20 to 64 years of age was 1.6% in both sexes. However, between 20 and 84 years it was twice as high in women (15.8%) compared with men (7.8%). In addition, the lifetime risk above 50 years was 8.0% and 21.8% in men and women, respectively.

Hip fractures were divided into two groups: cervical and trochanteric. For the whole period, in women, cervical fractures dominated until the age of 75 years,