Epidemiology of scaphoid fractures in Odense, Denmark

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During a 7-year period, 273 scaphoid fractures were diagnosed in the approximately 175,000 residents of the municipality of Odense. The average annual incidence of scaphoid fracture was 8 per 100,000 women and 38 per 100,000 men, predominantly in young persons. The cause of injury was a fall in 69 percent and a blow in 28 percent.

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We have determined the age-specific incidence of scaphoid fractures and have compared our data with other studies.

Patients and methods

Odense University Hospital is the only hospital in the area. All the patients with a scaphoid fracture are treated at our hospital. From the centralized computerized hospital discharge system in Fuenen County, Denmark, all the cases with a fracture of the carpal scaphoid seen at Odense University Hospital, during the period July 1, 1982 to June 30, 1989 were extracted. The population at risk increased from 170,648 in 1983 to 174,948 in 1989. Data on each patient including personal data, radiographic examinations, and diagnoses were collected and analyzed. Residents initially treated elsewhere were included in the study. All the radiographic examinations were reviewed by the authors. The patients living in Odense municipality were selected for computation of incidence rates. Calculations were performed using the population census of 1 January of each year. The period was divided into 7 registration years centered around 1 January, for which official Danish population statistics are computed and published.

The cause of injury was classified according to the Nordic Medico-Statistical Committees (NOMESKO 1990) classification for accident monitoring used since January 1, 1987. The codes that were used from 1982 to 1986 were converted into the new coding system.

The algorithm for examination and treatment of suspected fractures of the carpal scaphoid was consistent throughout the period (Larsen et al. 1983, Taleisnik 1987). In all the patients with a clinically suspected fracture, five radiographs were obtained to visualize the entire length of the scaphoid bone. Patients with fractures that were obvious on initial radiographs were treated accordingly. If a fracture was suspected clinically but was not confirmed on initial radiographs, a cast was applied for 2 weeks and the radiographic examination was repeated after removal of the plaster cast.

The calculation of confidence intervals was carried out using the computer program Confidence Interval Analysis (CIA).

Results

273 fractures of the carpal scaphoid were identified during the 7-year period, of which 13 (5 percent) were nonunions. Two of the 13 patients with a nonunion were able to recall a wrist trauma more than a month before the actual trauma. None of the patients had been examined clinically or radiographically for a suspected scaphoid fracture. There were 222 men and 51 women, and their age ranged from 9 to 87 years.

During the survey, there was an average annual incidence of scaphoid fracture of 8 per 100,000 women (95 percent confidence interval 6 to 10), and 38 per 100,000 men (95 percent confidence interval 34 to 43).

In the age interval from 15 to 29 years, the age-specific incidence rates for men were strikingly higher than the corresponding rates for women (Figure 1). There was an increase in the age-specific incidence for both sexes in the age interval 55–59 years. In the age interval 60–70+ years, the age- specific incidence for

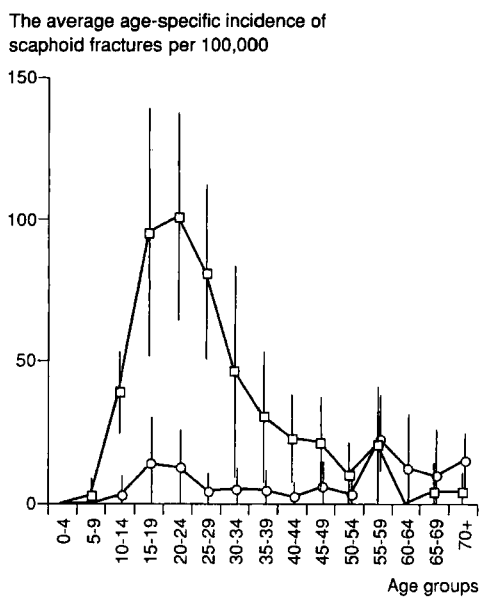

Figure 1. The average annual age-specific rates of scaphoid fractures per 100,000 inhabitants per year in the municipality of Odense. 95 percent confidence intervals.
□ men, ○ women

women was higher than that for men. Using the highest and lowest confidence limits for the overall average incidence for women and men, the proportion of scaphoid fractures was 3.1 to 7.2 times higher for men.

Sixteen men (8 percent) sustained associated fractures (distal radial fractures, metacarpal and phalangeal fractures). The median age of these patients was 25 years. Three men had an associated carpal instability. Six women (12 percent) sustained associated fractures. Apart from one 15-year-old girl with a distal radial fracture, all the women were 50 years of age or more and had sustained distal radial fractures.

The mechanism of injury was a fall in 69 percent, and a blow in 28 percent.

Discussion

The scaphoid is the most common of the carpal bones to be fractured; it accounts for 51 to 62 percent of all the carpal fractures (Gasser 1965). Fractures of the scaphoid represent nearly 2 percent of all the fractures (Leslie and Dickson 1981), and an incidence of 23 fractures per 1,000 inhabitants for men in Trondheim, Norway has been reported (Sahlin 1990). Using this information, an incidence of carpal fractures of 46 per 100,000 men can be estimated. This corresponds well to our results (38 per 100.000 men, 95 percent confidence interval 34 to 43).

A number of different factors might have influenced our results. To enter the study, patients had to be treated at Odense University Hospital. An unknown number of patients do not seek medical attention, and some scaphoid fractures initially involve minor discomfort. If the number of unrecognized fractures is high, this might introduce considerable changes in the age-specific incidence of scaphoid fractures, especially due to few scaphoid fractures among women. The number of nonunions discovered after a second wrist trauma was 5 percent, indicating underreporting of scaphoid fractures as a minor cause of bias.

A fall was the dominating cause of injury, consistent with the concept that most wrist injuries are caused by a force applied to the palmar aspect of the wrist while it is in extreme dorsiflexion, which often occurs when a person attempts to break a fall with an outstreched hand.

A high number of associated injuries in the presence of scaphoid fractures have been reported (Stolther 1976, Kristiansen 1982, Greene and Anderson 1982, Wallander and Hemborg 1984). This was confirmed in the present study. In men the associated injuries predominately occur in the younger age groups and include different fractures and dislocations, which emphasizes the need of a careful examination of the radiographs in the presence of a scaphoid fracture in the wrist. Carpal instability was diagnosed in 3 patients during the initial radiographic examinations. The true incidence of a scaphoid fracture associated with posttraumatic carpal instability might be higher, because the diagnosis is often missed in the acute stage, and especially in fractures sustained in severe traffic accidents.

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