

Foot and Ankle Fracture Incidence in South-Eastern Australia: An Epidemiological Study

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Methods

Participants

This study included residents living in the Barwon Statistical Division (BSD), located in south-eastern Australia. This region is useful for epidemiological fracture studies because of the large (~250,000) population and the existence of only four medical imaging centres serving the entire region. Additionally, the BSD is representative of the whole Australian population [12]. This study was approved by The Barwon Health Human Research Ethics Committee.

Fracture ascertainment

Fractures were ascertained using X-ray reports from the imaging centres serving the BSD during the years 2006 and 2007. All fractures with ICD-9 code 824 (ankle) or 825 (foot) were included in this study. Individuals living outside of the BSD were excluded. This study included 312 males and 274 females with foot fractures and 344 males

Cause of fracture was documented for 494 individuals (351 males and 143 females). For both sexes, the predominant cause of fracture at all sites was accidental falls (all proportions over 75%) (Table 2). Falls contributed more than 75% to the fractures. The next most common cause was "other accidents" which included "striking against or struck accidentally by objects or persons" and "overexertion or strenuous movements." Approximately 8-10% of foot and ankle fractures in both sexes resulted from this cause. The next most common cause was "motor vehicle accidents" which included "motor vehicle traffic accident involving collision with pedestrian" and "other non-collision motor vehicle accidents". Males had a higher proportion of fractures resulting from this cause; approximately 8.9%, while females had proportions around 1.5-2.5%.

Incidence rates

Figures 1 and 2 show the incidence rates of foot and ankle fractures in males and females, respectively. The pattern of foot fractures was similar to the pattern for ankle fractures in both sexes and across all age groups. For males, most of the foot/ankle fractures combined occurred in adolescence (10-19 years) with an incidence of 44.14 per 10,000 person-years or young adulthood (20-29 years) with an incidence of 43.11 per 10,000 person-years. There was a substantial decrease in fracture incidence in the older age groups, with a small peak at 60-69 years (incidence 24.66 per 10,000 person-years). Females showed a similar pattern to males, but the incidence was greater. In females, there was a small peak in adolescence (10-19 years) with an incidence rate 14.01 per 10,000 person-years for foot/ankle fractures combined. From the age of 50 years, the incidence of foot and ankle fractures increases substantially. For all age groups over 50 years, the incidence was 25 per 10,000 person-years or higher.

The total incidence of male foot/ankle fractures combined was 25.85 per 10,000 person-years and the incidence for females was a similar, 25.88 per 10,000 person-years. For adulthood-only incidence, the values were 25.36 for males and 28.71 per 10,000 person-years for females. Despite these similar incidence rates overall, the distribution of foot and ankle fractures differed between the sexes. This can be described by considering the incidence rate of those aged 50 years and over. For males, this rate was 19.74 and for females, 40.51 per 10,000 person-years. Overall incidences for all ages and both sexes were 11.31, 14.56 and 25.87 per 10,000 person-years for foot, ankle and foot/ankle combined, respectively.

Discussion

This study reports on foot and ankle fractures occurring in the BSD over a two year period. The results show that the median age when males sustained a foot or ankle fracture was lower than the age for females. This was also evident in the incidence rates, where males had a high peak of fracture incidence in adolescence and young adulthood, while females were more likely to sustain a foot or ankle fracture in older age (50 years and over). The incidence rates we report here were similar for males and females overall, but differed substantially when comparing the incidence rates for individuals over 50 years.

There have been some studies that report on the incidence of foot and ankle fractures in various age groups and populations. One such study involved 9704 elderly women (aged 65 years or over) from the USA who were followed over 10 years from their first clinical visits between 1986 and 1988 [10]. Over the follow up period, 301 women had sustained a foot fracture and 291 an ankle fracture. The authors

reported an incidence of 3.1 for foot and 3.0 per 1000 woman years for ankle fractures. In another study by Kannus et al. [10], patients 60 years of age or over were selected from Hospital Discharge Registers in Finland for a study of low trauma ankle fractures. The study covered the years 1970 and 2000 and showed that the incidence of low trauma ankle fractures in the elderly had increased over this time period. In 1970, the age-adjusted incident rate for ankle fractures was 38 per 100,000 persons per year in men and 66 per 100,000 person-years in women. In the year 2000, the incidence had increased substantially to 114 per 100,000 person-years in men and 174 per 100,000 person-years in women. The values for the year 2000 are similar in magnitude to our 66 per 100,000 person-years for men and women of "5

completed for a three year period between 1989 and 1991 and aimed to describe the incidence rates of all types of fractures[13]. During the

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