

DELAYED APPEARANCE OF HIP FRACTURES IN CITIZENS OF BERGEN BORN IN THE COUNTRYSIDE COMPARED TO CITYBORN

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Of a total of 1735 consecutive patients admitted to Engen Hospital in Bergen, 299 had sustained a hip fracture. A distinction was made according to sex, and according to whether the patients were born in the city of Bergen or in the surrounding rural areas. At the time of fracture, the countryborn had lived on average 51 years in Bergen. A delay in fracture appearance of approximately 3 years in the countryborn relative to the cityborn was found.

Keywords : hip ; fracture ; age.

Mots-clés : hanche ; fracture ; âge.

INTRODUCTION

Bergen is situated on the western coast of Norway. It is surrounded by 7 mountains which form a well-defined border to the surrounding rural districts. A distinction between citizens born in the countryside and citizens born in the city is consequently easily performed. Through the years, many countryborn have moved to Bergen for employment. Thus, among the patients admitted to Engen Hospital Chronic Care department in Bergen no less than 42% were born in the surrounding rural districts (10, 13). In previous studies, we have found that patients who were born in the countryside and had moved to Bergen at a median age of 28 years lived statistically significantly longer than patients who were born and had lived their lives in Bergen (11, 12). It seems as if the average countryborn has acquired a resistance before the age of 28 which delays aging and bone fragility. Reduced length of life following hip fractures has been established (8, 16). We conducted an investigation of the differences in frequencies with which hip fractures occurred in the countryborn relative to the cityborn. Furthermore, we speculated whether the countryborn

sustained their hip fractures later in life than the cityborn.

PATIENTS AND METHODS

The medical records of 1735 consecutive patients admitted to the Engen Chronic Care department over a 16-year period, who had sustained a total of 299 hip fractures (138 trochanteric and 161 fractures of the femoral neck), were investigated with special reference to sex, place of birth and age at which the fractures were sustained. For a representative cross section of the countryborn patients, the number of years spent in Bergen at the time of fracture was also recorded. A correlation test was performed to determine whether the number of years spent in the countryside before moving to Bergen influenced the age at which the fracture was sustained. Statistical analysis was performed with Student's T-test with a level of significance of $p < 0.05$.

RESULTS

The mean time spent by the countryborn in Bergen at time of fracture was 51 years. There was no correlation between age when moving to Bergen and age at which the fracture was sustained. A total of 16% of the countryborn and 18% of the cityborn patients had sustained hip fractures. This difference was not statistically significant. However a significant delay in fracture appearance

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was found in the countryborn relative to the cityborn (Tables I and II).

DISCUSSION

A distinct indication as to a delay in fracture appearance was found in the countryborn relative to the cityborn (Table II). With regard to the femoral neck fractures, countryborn men sustained their fractures 8.01 years later than cityborn ($p < 0.05$), while a delay of 2.1 years in the women was not statistically significant. As to the pertrochanteric fractures, the countryborn women sustained their fractures 4.94 years later than the cityborn ($p < 0.05$), while a delay of 2.07 years in men born in the countryside was not significant. The regional differences that exist in the frequencies with which hip fractures occur within a country is well known (4, 6). The age- and sex-adjusted incidence of hip fractures seems lower in rural populations than in urban populations (7, 14, 15). Our results indicate that resistance in time to hip fractures may be "imported" from one region to another. The question arises as to what nature this resistance is. From our point of view, the explanation should be sought in dietary factors.

The diet in the rural district at the time when the patients in this study grew up was a lean one, rich in fish (vitamin D) and with a high calcium content. This may have provided for a higher calcium pool, which has delayed bone fragility due to osteoporosis. Other authors have investigated the significance of calcium content in the diet (9, 17). On the other hand, the significance of osteoporosis in hip fractures has recently been questioned in several works. Thus investigations of bone quality measured by dual-photon densitometry (5) as well as by metacarpal morphometry (1) have been unable to demonstrate differences in bone quality in hip fracture groups compared to age-matched control groups. Thus reduced eyesight, impaired muscle coordination, postural instability and consequences of cerebral atherosclerosis have been proposed as equally predisposing factors in the elderly (2, 3, 18). Our study seems to indicate that citizens of Bergen who were born in the countryside carried with them a resistance when moving to Bergen, which postponed fractures later in life. There are however several limitations to this study. First, the data have been based upon the incidence of hip fractures among patients admitted to a hospital chronic care department.

Table I. — Number of fractures related to place of birth

| Place of birth | Number of patients | Femoral neck fractures | Intertrochanteric fractures |
|---------------------|--------------------|------------------------|-----------------------------|
| Countryside, male | 242 | 12 | 13 |
| Countryside, female | 417 | 52 | 28 |
| City, male | 468 | 24 | 31 |
| City, female | 608 | 73 | 66 |
| Total | 1735 | 161 | 138 |

Table II. — Mean age at fracture related to place of birth

| Place of birth | Age at femoral neck fracture | | Age at intertrochanteric fracture | |
|---------------------|------------------------------|------------|-----------------------------------|-------------|
| | Mean age | n | Mean age | n |
| Countryside, female | 80.25 years | (n=52) | 84.25 years | (n=28) |
| City, female | 78.15 | (n=73) | 79.31 | (n=66) |
| Delay | 2.10 | $P > 0.1$ | 4.94 | $P < 0.002$ |
| Countryside, male | 80.59 | (n=12) | 79.62 | (n=13) |
| City, male | 72.58 | (n=24) | 77.55 | (n=31) |
| Delay | 8.01 | $P < 0.05$ | 2.07 | $P > 0.1$ |

This population is therefore perhaps not perfectly representative of the general population in Bergen. However countryborn and cityborn were admitted for similar conditions and this should not therefore bias the overall result, although a generalization to the general population may not be valid. Second, other factors than dietary factors may play a role. Socioeconomic factors and genetic factors may also play a role ; however, these data were not available to us in this study.

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SAMENVATTING

B. F. IVERSEN, P. F. IVERSEN, N. LEVI. Laattijdiger voorkomen van heupfracturen bij de inwoners van Bergen, geboren op het platte land, vergeleken met deze die in de stad waren geboren.

Van 1735 patiënten welke in het Engen-ziekenhuis te Bergen werden opgenomen, waren er 299 met een fractuur rond de heup. Deze gevallen werden verdeeld in verschillende subgroepen in functie van geslacht en in functie van de oorsprong van patiënt, afhankelijk of zij van plattelandsafkomst waren of indien zij stadsbewoners van de stad Bergen waren. Op het ogenblik van hun fractuur hadden de patiënten van het platteland ongeveer 51 jaar in Bergen geresideerd. Deze studie toont een vertraging van ongeveer 3 jaar ten opzichte van de patiënten welke in de stad waren geboren.

RÉSUMÉ

B. F. IVERSEN, P. F. IVERSEN, N. LEVI. Comparaison de l'âge de survenue des fractures de hanche chez des habitants de Bergen, citadins d'origine ou provenant de la campagne.

Parmi 1735 patients admis à l'hôpital d'Engen, 299 avaient présenté une fracture de hanche. Ces cas ont été répartis en plusieurs groupes en fonction du sexe et en fonction de l'origine des patients, selon qu'ils étaient originaires de la ville de Bergen ou de son environnement rural. Au moment de leur fracture, les patients provenant de la campagne avaient vécu en moyenne 51 ans à Bergen. Cette étude a montré un décalage d'environ 3 ans en ce qui concerne l'âge de survenue de la fracture, entre les patients provenant de la campagne et les citadins d'origine.