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Economic implication of osteoporotic spine disease: cost to society

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Abstract The costs of vertebral fractures are less well defined than the costs of hip fractures. Large studies are urgently needed. From the data that exist, vertebral fractures have a higher cost than previously expected: for hospitalized fractures in a US study, USD 10 000 per year without rehabilitation costs, for all clinical fractures USD 2000 the first year, and in a Swedish study slightly more. These new data on the cost of vertebral fractures will have an impact on health economy calculations. In the future it may be cost-effective only to prevent vertebral fractures.

Keywords Vertebral fractures · Spine fractures · Cost · Osteoporosis · Health economy

Vertebral fractures are one of the most important consequences of osteoporosis. Vertebral fractures can be divided into those detected radiologically in large populations and those that come to clinical attention. For the fractures detected in population surveys, the annual incidence at 65 years of age in the EPOS study is approximately 1% per year for women and 0.6% per year for men [2]. The figures for clinical fractures are roughly one-third of this, and a third of these are hospitalized. The reason for the difference is partly differences in pain, but also differences in attitudes in hospitals and by the patients, in that doctors sometimes do not take an X-ray of a woman over 50 years of age, if X-rays are taken some of them are misinterpreted [4], and the patients have learnt that very little can be done. To detect all vertebral fractures, we must have a campaign for the doctors to take more X-rays and for the patients to realize that we can do something about these fractures. Apart from the fact that they are common, they also reduce quality of life, as has been shown both for radiological vertebral fractures and for vertebral fractures that come to clinical attention [7]. This will of course have implications, in that the fractures will be costly.

There are numerous, well-performed studies on the cost of hip fractures. However, there are fewer studies on the cost of vertebral fractures.

Radiologically detected vertebral fractures in the population

The most cited study is from Rotterdam [1], which studied the additional cost of medical care (the incremental cost) caused by incident hip and vertebral fractures using a matched case–control design for the longitudinal follow-up. The incident vertebral fractures were recorded by morphometric comparison of spinal radiographs taken at an average interval of 2.2 years. The matched controls were randomly selected from other participants after the Rotterdam study. The cost for a vertebral fracture was USD 1000 per year. However, almost half of this difference was already present in patients before occurrence of the fracture. Thus, this incremental cost for radiographically detected vertebral fracture was approximately USD 500 per year [1].

Vertebral fractures which come to clinical attention

The cost of these fractures – i.e., those for which the patient visits a doctor because of pain – can be divided into those that lead to hospitalization and all clinical fractures.

Hospitalized vertebral fractures

Gehlbach et al. [5] studied the resource implications of hospitalization for osteoporosis-related vertebral fractures. They used data from national samples of patients with hospitalized fractures, mainly from discharge databases. Patients with metastatic cancer or severe trauma were excluded. The total charges averaged USD 8000–10 000 per hospitalization and were higher in men. The length of stay was just under 6 days, and more than 50% of discharged patients required some form of continuing care, indicating that the overall cost is much higher than just the hospitalization. These costs were gathered from a US database where vertebral fracture accounted for over 400 000 total hospital days and generated charges in excess of USD 500 million. In total, vertebral fractures were responsible for almost 70 000 annual hospitalizations, about one-fourth of the number due to hip fractures, and it was found that the average total charge for vertebral fracture hospitalization was about half of that of hospitalization due to hip fracture. However, the average length of stay was shorter for vertebral fracture than for hip fracture.

In a study from Europe the hospital cost of vertebral fractures was estimated using national data sets [3]. In that study there was a marked difference in length of stay, ranging from 0.3 days in Austria to 20.2 days in Spain. The total cost of vertebral fractures in the European Union was estimated at € 377 million per year, and across the European Union the hospital cost of vertebral fractures was on average 63% that of a hip fracture. The cost estimate was done using the average cost per day in hospital in the various countries. The hospitalization rate for vertebral fracture was estimated at 8%.

All clinical fractures

A pilot study for all vertebral fractures coming to clinical attention has been done in Sweden, where patients were followed prospectively for 1 year in order to assess the reduction in quality of life and also the costs [7]. The study in-

cluded hip fractures, clinical vertebral fractures, wrist fractures, and shoulder fractures. At baseline there were only 42 vertebral fractures. The quality of life reduction was similar to that with hip fractures. The cost did not include all nursing home costs and therefore the total cost will be higher. The total costs for this small group of vertebral fractures were: direct costs SEK 30 000, and indirect costs SEK 31 000, i.e., an annual total cost of SEK 61 000. On the basis of this pilot study a large study has been started.

In a recent study from the Mayo clinic [6], the incremental cost in a case-control series was calculated for osteoporotic fractures. In this study, too, nursing home patients were not included. For 283 vertebral fractures, the incremental cost in the case-control study was almost USD 2000 per year.

Thus, the estimates of cost to society are only preliminary. The definitive data for vertebral fractures are still being acquired. It may be concluded that radiological fractures have an increased incremental cost of USD 500 per year. For hospitalized fractures, the cost is higher than expected – in a US study, up to USD 10 000 during the first year – and, surprisingly, this is roughly half the cost of a hip fracture. The rehabilitation cost is not included in this. In a European study it was also noted that the hospitalization cost of vertebral fractures was more than 50% of the average cost of a hip fracture, and that the total yearly cost of hospitalized vertebral fractures in the European Union was estimated at € 377 million per year. It is more difficult to estimate the total cost of all clinical vertebral fractures. A pilot study has shown a rather high amount in Sweden, with direct costs of SEK 30 000 and indirect costs that are almost as high. A new large study has been started to verify this in a larger population. In a US study the incremental cost was USD 2000 per fracture per year. All this indicates that the cost of vertebral fractures has been underestimated; it is high, and is substantial even in comparison to hip fractures.

These new data showing a higher cost than expected, and also a greater loss of quality of life than previously calculated, will have an impact on health economy calculations. In the future, prevention of only vertebral fractures might be cost-effective on the basis of these data.

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