

STATISTICS ON THE OSTEOPOROTIC VERTEBRAL FRACTURES TREATED IN THE ORTHOPAEDICS AND TRAUMATOLOGY CLINIC OF SIBIU

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study

Abstract: The aim of this study is to analyse the occurrence of the osteoporotic spine fractures within the pathology treated by the Orthopaedics and Traumatology Clinic. **Material and method:** The study included the osteoporotic spine fractures patients who were admitted to the hospital between 2008 and 2012. The data collected were statistically analysed. **Results:** during the study there were 385 cases of spine fracture patients admitted to hospital, out of which 50.12% with osteoporotic spine fractures. Majority 62.70% of our subjects were female patients, after the age of 74, 61.14% come from urban areas and 61.13% also present cardiovascular problems. **Discussion:** Data obtains are the same with those obtained in international studies. **Conclusions:** These data demonstrate that the osteoporotic spine fractures represent an important pathology, frequently connected to the increasing life expectancy of the population with severe effects on the morbidity and mortality of the patients.

Cuvinte cheie:
osteoporoză, fracturile
vertebrale
osteoporotice, studiu
retrospectiv

Rezumat: Scopul lucrării este de a studia incidența fracturilor vertebrale osteoporotice în cadrul patologiei tratate într-o clinică de Ortopedie Traumatologie. **Material și metodă:** Au fost luate în studiu fracturile vertebrale osteoporotice care au fost internate în cadrul Clinicii de Ortopedie Sibiu, pe perioada 2008 și 2012. **Datele obținute au fost analizate din punct de vedere statistic. Rezultate:** în această perioadă au fost internate un număr de 385 cazuri cu fracturi vertebrale, din acestea 50,12% au îndeplinit criteriile de fractură vertebrală osteoporotică. 62,70% din persoane sunt de sex feminin, după vârsta de 74 ani, numărul de fracturi este mult mai mare la femei, 61,14% din cazuri sunt din mediul urban, iar 61,13% prezintă afecțiuni cardiovasculare. **Concluzii:** Toate aceste date, împreună, demonstrează că fracturile osteoporotice reprezintă o patologie importantă, frecvent întâlnită pe fondul creșterii speranței de viață a populației cu grave implicații asupra morbidității și mortalității pacienților cu această patologie.

INTRODUCTION

The fractures of the dorsal and lumbar spine represent a frequently treated pathology within the Orthopaedics and Traumatology Clinic of Sibiu. Aging is a process that cannot be escaped, which affects almost every component of the human body, including the vertebrae, as well as the intervertebral articulations and the musculo-ligamentous structures. Thus, these changes affect the mobility of the spine, its capacity to transmit and absorb the generated stress, the vertebral microstructure.

Altogether, these facts represent important changes which affect the structure of the anterior and the posterior parts of the vertebral body within the functional spinal unit. It is estimated that approximately 500.000 Caucasian women aged 50 or more in the U.S.A. suffer from vertebral body fracture.(1) Various studies show that in the U.S.A 1.5 million fractures are registered regardless of race or age, mainly cause due to osteoporosis, and half of the cases are represented by the spine fractures.(2) Most of the fractures occur at the dorsal and lumbar junction of the spine.(3)

METHODS

In order to have a general understanding of what the occurrence of the osteoporotic spine fractures means we studied

the osteoporotic spine fractures patients admitted to the Orthopaedics and Traumatology Clinic of Sibiu between 2008 and 2012.

We need to consider several clinical (gender, age, symptoms) and imagistic criteria (radiograph characteristics, CT and MRI) when classifying a spine fracture as being an osteoporotic one. Thus, for this study we took into consideration the clinical and imagistic criteria, which represent strategic factors in classifying a vertebral body fracture as being an osteoporotic fracture. The selection criteria for the study of female patients: aged more than 50; the patient reached menopause; low energy trauma (fall on the same level, lifting heavy weights, etc.); the radiograph of the fracture has to be characteristic for a osteoporotic vertebral fracture (osteoporotic signs on the radiograph at the level of the vertebral body, anterior wedge fracture, biconcave fracture, crush fracture or type A compression fracture according to AO classification).

The selection criteria for the study of male patients: aged more than 65; male patient with a major risk of osteoporosis (according to WHO.); low energy trauma (fall on the same level, lifting heavy weights, etc.); the image of the fracture is characteristic to osteoporotic vertebral fracture (osteoporotic signs on the radiograph at the level of the vertebral

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CLINICAL ASPECTS

body, anterior wedge fracture, biconcave fracture, crush fracture or type

A compression fracture according to AO classification).

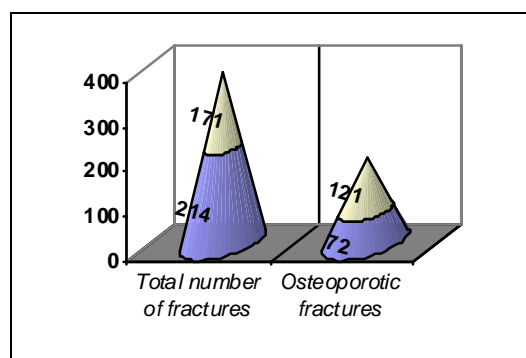
In the case of male patients we chose to include in the study the individuals aged more than 60, whose radiographs present the characteristics of the osteoporotic spine fractures associated with other chronic diseases (which are known to favour osteoporosis), use of corticosteroids, unbalanced diet and biologic status as well as use of alcohol and cigarettes, as well as the fact that the fracture was generated by a minor trauma. We also take into consideration the fact that the osteoporosis process is faster in the case of males aged more than 70.(4)

RESULTS

During the study, there were 385 patients admitted to hospital who presented dorsal and lumbar spine fractures, and 193 (50.12%) of them met the clinic and imagistic requirements to be classified as osteoporotic spine fracture.

If we are to consider the classical structure of these cases based on gender, we can observe differences between the two groups, males and females. Thus, 214 (55.59%) of the total number of cases diagnosed with dorsal and lumbar spine fractures are male patients and 171 (44.41%) are female patients. In the case of osteoporotic vertebral fractures 121 (62.70%) cases are female patients and the rest of 72 (37.30%) are male patients (figure no. 1).

Figure no. 1. Division of the spine fractures based on gender



A different classification of the spine fractures can be based on the living environment of the patients, whether they come from the rural or urban areas. Thus, 241 (62.60%) of the total number of patients belong to urban areas and the rest of 144 (37.4%) patients come from the rural areas.

In the case of osteoporotic spine fractures 118 (61.14%) patients come from the urban areas and 75 (38.86%) patients come from rural areas.

We found very interesting the classification of the osteoporotic fractures based on 5 year intervals of age. In the case of male patients the groups were considered starting with the age of 60, and in the case of female patients the groups were formed starting the age of 50.

Figure no. 2 presents the division of the patients presenting osteoporotic fractures based on age groups and gender in order to underline the segments which are prone to osteoporotic fractures based on these criteria.

In order to have a clear image on the evolution of the number of patients between 2008 – 2012, we divided the patients admitted each year based on the number of times they were admitted to hospital.

Figure no. 2. Division of the fractures based on age groups and gender male/ female

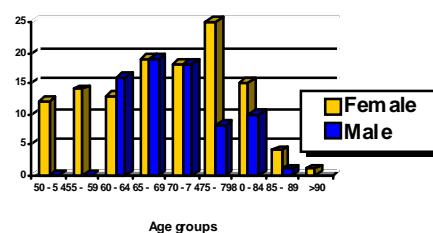
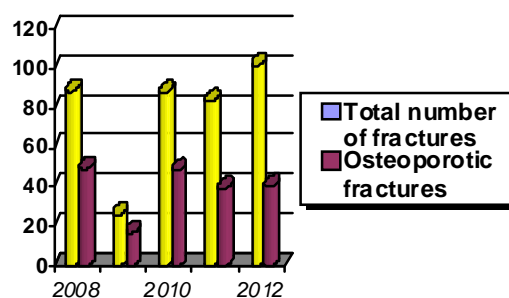


Figure no. 3 presents the evolution of the number of patients diagnosed with spine fracture regardless of their age (the total number) and the number of the patients with osteoporotic spine fractures.

Figure no. 3. Evolution of the number of times the patients with dorsal and lumbar spine fractures were admitted to hospital



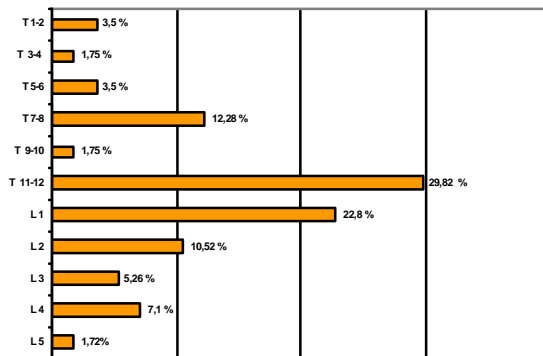
If we analyse the percentage of patients with osteoporotic fractures as compared to the total number of patients with spine fractures who are admitted to hospital each year, we can observe that they sum up approximately 50% of the cases. This proves that the occurrence of the osteoporotic spine fractures is increased, correlated also with treatment costs issues.

The number of the patients admitted every year is fairly equal, except from 2009. We found no objective or theoretical cause for the reduced number of patients in that year as compared to the other years included in the study. In this first part of the study dedicated to statistical analysis we also used a classification of the spine fractures based on the level they occurred.

Taking into consideration their division according to the traumatic centres of the spine, we classified them in two groups at the thoracic level, out of objective reasons, which facilitated counting the spine fractures, as we have to take into consideration the fact that this is a retrospective study.

Figure no. 4 presents the distribution for each individual vertebra in the case of the fractures classified as osteoporotic (those fractures which present the imagistic characteristics of a type A compression fracture, according to AO classification system).

Figure no. 4. Distribution of osteoporotic spine fractures according to their location



If we analyse the data we can underline the fact that the fractures occur mainly at the level of L1 vertebra, no matter that we are considering the total number of spine fractures or the number of the osteoporotic spine fractures. The following vertebrae more frequently prone to occurrence of fractures are the adjacent vertebrae, L2 and T12.

We found it very interesting to study the associated pathology of the patients admitted to hospital with osteoporotic fractures due to the fact that it can have an important impact on the evolution of the patients, thus influencing the morbidity and the mortality of these patients. Analysing the data we can underline that the comorbidities most frequently associated to osteoporotic spine fractures are cardiovascular diseases, which were met in the case of 118 (6113%) patients. In this category the most frequent are the arterial hypertension and the cardiac ischaemia.

DISCUSSIONS

Analysing the data we can observe that male patients suffer more frequently from spine fractures if we consider the total number of spine fractures, unlike the osteoporotic fractures where the larger group is that of female patients. The data analysed meet the results of other studies in literature which show that the osteoporotic spine fractures are more frequent in the case of female patients (5), unlike the situation of the general population where the male patients present a larger percentage of the spine fracture cases.

Another classical division is that one based on the environment where the patients come from. Analysing data we can observe that the larger group is that of the patients coming from the urban areas, as compared to the patients coming from rural areas. The results are similar both in the case of the total number of spine fractures and in the case of osteoporotic fractures. In my opinion, these values reflect the larger percentage of population living in urban areas as compared to the rural ones (6), as well as the awareness of illnesses and the easier access to hospital of the patients belonging to urban areas.

The classification of the patients based on 5-year age groups revealed results which correlate to the results of most of the studies in literature. Thus, we compared our study to a study published in 2003 frequently referred to in the literature, European Prospective Osteoporosis Study (EPOS)(7). Both studies show an increased occurrence of osteoporotic spine fractures, regardless of the patient's gender, as they grow older and older, reaching a peak value in the case of patients aged 70 to 80. After this age, the number of cases reduces, probably also due to the life expectancy of the patients, which in Romania is a little lower than in the case of the western countries.

We can also notice that the number is larger in the case of female patients. Noticeable, as a characteristic of the data revealed within our study, is the number of male patients aged 60 – 74. The number of the male patients is similar to the number of the female patients, fact that can be explained by the social and biological status of the male patients (use of cigarettes, alcohol, unbalanced diet and hygiene, hepatic diseases – cirrhosis, etc.). After the age of 75, the difference between the male and female groups increases in case of the latter, values which correspond to the values presented in the specialized literature.(7) This fact can be due to the increased life expectancy, as shown in the OMS report for 2009 (8) in the case of female patients (77 years old) as compared to the male patients, whose life expectancy reaches lower values (70 years old).

If we consider the classification of the fractures according to the position where they occur, the data of our study correlate to a large extent to the data in the international specialized literature where we can also observe that the most frequent fractures occur at the level of L1 vertebra, followed by the adjacent vertebrae.(9) Analysing the statistics and the imagistic results we can also underline the fact that most of the low energy compression fractures occur at the level of the dorsal – lumbar junction. The dorsal – lumbar junction is the connection between the stiff thoracic segment and the mobile lumbar one. The sudden transfer from a stiff segment to a mobile one makes this section be more sensitive and trauma prone.

The analysis of the diseases associated to the osteoporotic spine fractures emphasized the frequency of the cardiovascular diseases. In my opinion this is due to the increased number of cardio vascular cases in Romania and the even higher incidence of arterial hypertension and angina (10). It is known that the risk of a fracture is correlated to the degree of cardiovascular disease (11), especially in the case of female patients suffering from coronary diseases.(12,13)

This data suggest the fact that in the case of cardiovascular diseases, we can say that they are associated with metabolic distress of the bones in case of osteoporosis, which increases the risk of osteoporotic fractures.

CONCLUSIONS

The osteoporotic spine fractures represent a frequently met pathology in hospital life, reality which is supported by the fact that they can represent half of the number of the spine fracture patients admitted to the Orthopaedics Clinic.

After the age of 70 the number of the female patients is larger than the number of the male patients. Between 60 – 70 years old the values are similar, probably due to the more active life of the male patients, which makes them trauma prone, even for low energy trauma.

When grouping fractures based on the level where they occur we emphasize that the most frequent cases are registered at the level of L1 vertebra, followed by the adjacent vertebra T12 and L2.

The most frequently associated comorbidity is represented by the cardio-vascular diseases.

All these data demonstrate together that the osteoporotic spine fractures represent an important pathology, frequently met due to the increased life expectancy of the population, with severe effects on the morbidity and the mortality of the patients suffering from it.

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