

EPIDEMIOLOGY OF FRACTURES IN PATIENTS FROM SMALL TOWNS IN CEARÁ TREATED BY THE SUS

ANA LÍVIA MONTE DE ALBUQUERQUE, PEDRO GUILME TEIXEIRA DE SOUSA FILHO, MANUEL BOMFIM BRAGA JUNIOR, JOSÉ DE SÁ CAVALCANTE NETO, BÁRBARA BIANCA LINHARES DE MEDEIROS, MARCIO BEZERRA GADELHA LOPES

ABSTRACT

Objective: To scientifically prove the high number of patients with fractures coming from the small towns of the State of Ceará treated with surgery by the SUS (the Brazilian State healthcare system) in Fortaleza. **Methods:** A transversal, prospective, descriptive study was carried out involving 1694 patients treated by the SUS in Fortaleza, from August 2006 to March 2007, in four public hospitals and three private hospitals. **Results:** 38.78% of the patients came from small towns, and their ages ranged from 1 to 97 years old. The majority were single, male adults. The most common mechanism of injury was traffic accidents,

accounting for 30.4% of all the cases. The forearm was the body segment most operated on, corresponding to 19%. **Conclusions:** These results suggest there is a need for preventive measures, such as public traffic safety awareness campaigns, in order to reduce accidents. We have also verified the importance of investments aimed at developing the Traumatology Emergency services in the small towns of Ceará. **Level of evidence II, Transversal, Prospective Study (Lower quality prospective study).**

Keywords: Epidemiology. Fractures, bone. Orthopedics. Trauma centers.

Citation: Albuquerque ALM, Sousa Filho PGT, Braga Junior MB, Cavalcante Neto JS, Medeiros BBL, Lopes MBG. *Epidemiology of fractures in patients from small towns in Ceará treated by SUS Acta Ortop Bras.* 2012;20(2):66-9. Available from URL: <http://www.scielo.br/aob>.

INTRODUCTION

Trauma currently constitutes a serious public health issue, as it is responsible for a significant portion of the hospital care provided worldwide. Of the patients victims of closed trauma, 85% suffer injury to the musculoskeletal system,¹ while the vast majority of these patients seek medical care in emergency clinics. In the age bracket from 0 to 39 years, for example, trauma ranked first as etiology of morbimortality.¹ Braga Junior et al.¹ Frame² estimated that in terms of deaths among teenagers and children, respectively, 80% and 60% are secondary to traumatism. The annual costs for US society exceed 400 billion dollars, including hospitalization, insurance administration, labor costs and reduction of productivity.³

Several publications show that fractures occur frequently in traumatized patients. De Laet and Pols⁴ reported that, in elderly patients, osteoporosis and osteoporotic fractures are the main source both of morbidity and of cost, while the most common fractures are those of the hip, distal forearm and vertebrae. Rennie et al.⁵ reported in their study that 25% of children are injured every year, while 10-25% of these suffer fractures.

Although there are several studies in literature on the epidemiology of fractures in specific anatomical regions or age brackets, few studies address the epidemiological profile of fractures in

general. Moreover, the results are controversial, with fracture incidence ranging from 9.0 to 22.8/1000/year,⁶ mainly affecting the age bracket of young adults.

Another fact to be considered is that patients with musculoskeletal trauma coming from small towns in the state of Ceará currently represent a large portion of the hospital care recipients at the traumatology clinics of the capital.¹ Braga Junior et al.¹ 2005 verified that of 500 patients treated in the traumatology emergency service of IJF, in Fortaleza, 24% came from small towns in Ceará. This situation leads to the overcrowding of hospitals in the capital city, contributing to the quality impairment of the hospital service. Such a situation can be severely detrimental to the patient, as their prognosis is directly related to the quality of the medical care made available and to the speed at which such care is provided, besides the physician-patient relationship. These markers are also important in the medium and long-term follow-up of these patients.¹

Given that the knowledge of fracture incidence is important not only for the therapeutic aspects, but also for preventive measures, and that the Northeast Region lacks studies conducted with patients from the small towns of states, the importance of this study, whose objective is to scientifically prove the high number of patients with fractures coming from small towns in

All the authors declare that there is no potential conflict of interest referring to this article.

School of Medicine of Universidade Federal do Ceará.

Study conducted at the School of Medicine of Universidade Federal do Ceará.

Mailing address: Pedro Guilme Teixeira de Sousa Filho. Rua Francisco André, 1131 – Lagoa Redonda. CEP: 60832-470. Fortaleza - Ceará – Brazil

Article received on 05/01/2010 and approved on 06/10/2010.

the state of Ceará treated surgically by SUS in Fortaleza, is noteworthy, drawing attention to the possibility of treatment of these patients in their place of origin, with the performance of public preventive policies.

MATERIAL AND METHOD

It is a prospective transversal study, carried out at seven hospitals from the capital of Ceará, Brazil affiliated to SUS, four of which are public, and three private, in the period from August 2006 to March 2007.

All the patients with fractures who were treated surgically by SUS at these hospitals in the abovementioned period were included in the study, totaling a sample of 1694 patients. These were interviewed through a questionnaire prepared according to the survey objectives, as well as an analysis of their medical records. Only patients who agreed to take part and signed the informed consent form after receiving an explanation about the study were included in the survey.

This study was previously authorized by the Institutional Review Board of Instituto Dr. José Frota, with protocol number 2342/06, aiming to safeguard the precepts established in CNS Resolution 196/96.

The following data were gathered: origin of the patients, sex, age, marital status and occupation; mechanism of injury, as well as the bone exposure of the fracture; the bone segment treated surgically.

After the data were gathered, these were analyzed through the *Epi Info* program, version 3.5.1 (CDC/WHO).

RESULTS

During the period in which the survey was concluded, from August 2006 to March 2007, 1694 patients were treated surgically by SUS at the seven hospitals of Fortaleza affiliated to this health system. Of these, 61.22% came from the capital, while the other 38.78% were from small towns in the state. (Figure 1) Among the patients from small towns, 33.79% suffered the injury in the Metropolitan Region of Fortaleza, with the city of Caucaia (9.7%) ranking first, followed by Maracanaú (4.39%) and Horizonte (3.18%). The remaining 66.21% suffered the accident in the other small cities of Ceará.

Male patients predominated in the sample group originating from small towns of the state, with 65.4% of cases. The age ranged from 1 to 97 years, averaging 40.7 years. We verified that the average age was higher in the female sex, 50.9 years, and the age bracket with the highest incidence was that from 61 to 80 years. In the male sex, the average age was 35.2 years, mainly involving the age bracket from 21 to 40 years. (Figure 2) As regards marital status, 52% of the patients were single, 37% were married, 9.79% were widows or widowers, and 1.21% divorced. In the distribution by occupations, we verified that the highest levels of incidence were among students (20%), followed by pensioners (19.4%), farmers (12.6%) and housewives (5.5%). (Figure 3)

In relation to the mechanism of injury, the most common was traffic accident, involving 30.4% of the patients, followed by fall from own height (28.4%), fall from height (16.4%), and other injuries. (Figure 4)

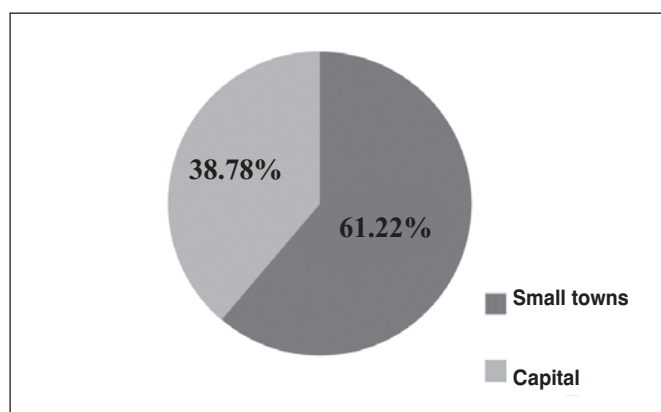


Figure 1. Distribution of the patients according to origin.

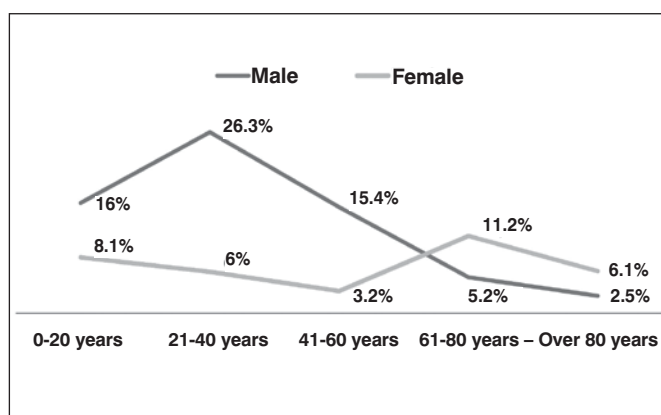


Figure 2. Distribution of the patients according to age bracket and sex.

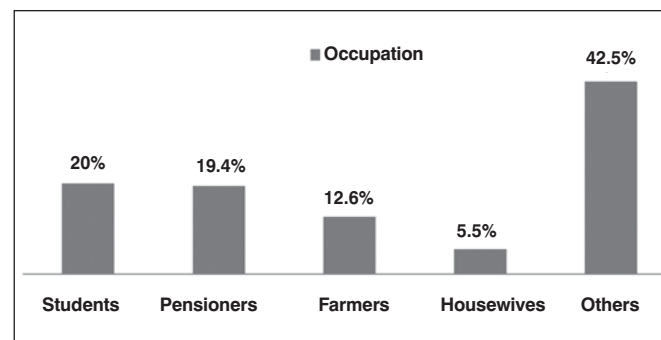


Figure 3. Distribution of the patients according to occupation.

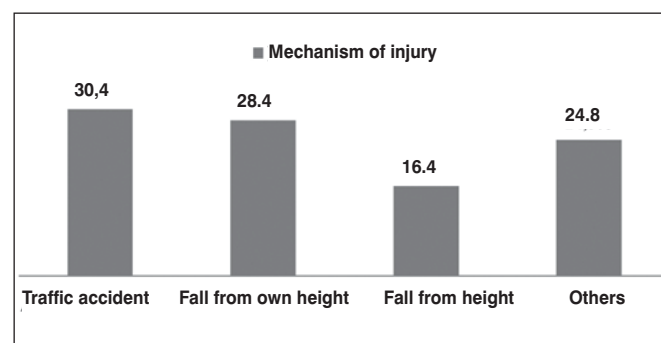


Figure 4. Distribution of the patients according to the mechanism of injury.

As regards the exposure of fractures, 9.5% were open. The anatomical region fractured with the highest number of surgical treatments was the forearm (19%), followed by the proximal femur (17.1%), the leg bones (9.6%) and the elbow (9.3%). (Figure 5)

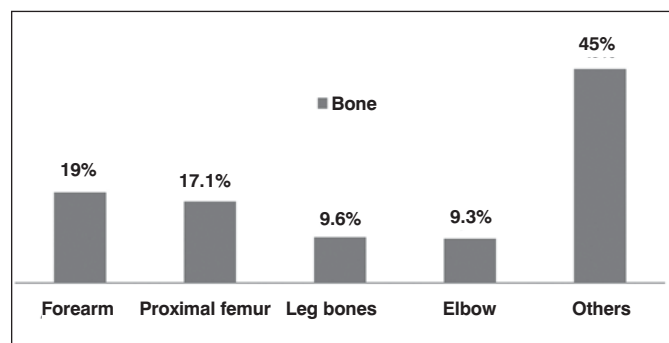


Figure 5. Distribution of the patients according to the anatomical region.

DISCUSSION

According to the results presented, 38.78% of the patients included in the study came from small towns in Ceará. This value is alarming, as it reflects the lack of support to accident victims in small towns, who are deprived of adequate and immediate care, and may have their prognosis compromised. Another factor to be considered is that the transportation of these patients to the capital is not always appropriate, causing discomfort and pain to the patient, particularly when we consider the time it takes for this individual to effectively receive medical care. Braga Junior et al.¹ and Sobania et al.⁷ evidenced a reduction in the mortality of accident victims with adequate transportation. We also observed that of the patients coming from small towns, 66.21% suffered the accident in towns not belonging to the Metropolitan Region of Fortaleza, covering a longer distance to the capital. The high number of patients coming from small towns contributes considerably to the overcrowding of hospitals from the capital, consequently leading to the impairment of the quality of service offered to all the patients.

In our survey, the average age, of 40.7 years, was only slightly different from the average age of the study by Court-Brown et al, of 49.1 years. In relation to sex, we obtained concordance with the literature,^{1,6,8} with male patients predominating as 65.4% of the cases.

As we can see in the above results, the fracture epidemiology curve presented different behaviors between sexes, an observation already confirmed in other studies.^{6,8,9} In the men, the highest incidence of fractures occurred in the age bracket from 21 to 40 years (26.3%), formed especially by younger and potentially productive individuals,⁹ causing a strong economic impact. According to literature, the male curve is of the bimodal type,^{6,8} since there is a new peak in the elderly population. This situation has become increasingly obvious, since with the increase in life expectancy, the risks of osteoporotic fractures in men are higher.⁸ This curve, however, was not encountered in our study, possibly due to the high rates of mortality in the over-80s age bracket, still persistent in Brazil. Another hypothesis would be the inconsistencies in the methodology, since our

study exclusively encompasses fractures treated with surgical procedures and patients from small towns, while the other trials encompass all fractures.

In the female sex, which corresponded to 34.6% of the cases, we noted an increased incidence in patients aged approximately 60 years, while the percentage of fractures from this age is even higher than in the men. According to the literature, the epidemiological curve of women is unimodal, with the peak related approximately to the menopause period, growing up to the last decades of life.⁸ An important explanation for this curve in the female sex is the association of fractures with the appearance of osteoporosis.^{4,6,8-10} This was not the curve found in our study for the same reasons already cited previously in relation to the male sex.

In the distribution by marital status, single patients appeared with the highest incidence (52%), followed by married patients (37%). A probable justification for this result is the significant participation of youths in our study. The distribution by occupations, in turn, showed the predominance of students (20%), also due to the extremely high percentage of youths in the survey, followed by pensioners (19.4%), possibly reflecting the greater propensity to fractures in individuals of a more advanced age. As regards the mechanism of injury, the most common was traffic accidents, in 30.4% of the patients, followed by fall from own height (28.4%) and fall from height (16.4%). These data are in concordance with the incidence of fractures in the various age brackets: high energy trauma is the most frequent cause of death in patients under 44 years of age;^{11,12} fractures in elderly individuals, in turn, are habitually caused by low energy trauma, such as falls in the home, determining mainly proximal femoral, distal radius and spinal fractures.⁴

In relation to bone exposure, 9.5% of the fractures were exposed. This incidence was lower, 3%, when only the long bones were considered in the study by Meling et al.,¹³ published in 2009. Exposed fractures occur most frequently in the lower limbs, with predominance of diaphysis of the tibia (19.1%) and of the distal tibia (16.6%), followed by the phalanges of the hand (12.5%).⁸

The highest number of surgeries was performed on the forearm bones (19%), followed by the proximal femur (17.1%), leg bones (9.6%) and elbow (9.3%). We should keep in mind that this study includes only the fractures that were treated surgically, which explains the differences found in relation to the results of other published studies, in which we found predominance of fractures in the distal radius (17.5%), metacarpi (11.7%) and proximal femur (11.6%).⁶ According to Johansen et al.,⁹ the incidence of fractures of the metacarpi, metatarsi and phalanges of the hand and foot bears no relationship whatsoever with age, while fractures of the hip, of the spine, of the humerus and of the pelvis are associated with age, and are more common in the elderly population, especially in the female sex.⁹ Fractures of wrist and ankle, in turn, present a biphasic pattern, with high incidence both in the elderly, related to the greater fragility of bones, and in young adults, related to daily activities and to work.⁹

Another category of fractures that we should also take into account are those resulting from osteopenia, which are directly related to age. Due to the rise in life expectancy, osteoporotic fractures have occupied more and more space. Moreover, the types of fractures in elderly patients have changed, generating

controversy regarding the true definition of osteoporotic fractures.⁶ Hip fractures, a classic example, and very common in the elderly female population, are those that present the strongest impact on morbidity and the highest mortality rate.¹⁴ We know that the mortality rate increases from 20 to 30% in patients who have already suffered a hip fracture, in the first year after the accident. This fact is due both to the actual fracture, and to the comorbidities, since these are more present in these patients than in the rest of the population.^{10,15} Estimates indicate that approximately 6.5 million hip fractures will occur worldwide in the year 2050.^{14,16} In our study, hip bone fractures were the second most common type, with 17.1% of the cases, of which 80.5% occurred in the over-60s age bracket, probably as a result of osteoporosis.

CONCLUSION

Analyzing the data relating to the 1694 patients treated surgically by the SUS in Fortaleza, we verified that 38.78% of them, a considerable number, came from small towns in the state of

Ceará. Moreover, exposed fractures corresponded to 9.5% of the cases, when we consider only the patients from small towns, whereas these patients are even more subject to complications due to the time it takes for them to receive care and to the precarious conditions of transportation to the capital. Hence we concluded that there is a lack of support for the performance of surgeries in small towns, contributing to the overcrowding of hospitals in the capital.

As regards the patients from small towns, most of them were single young male adults who had suffered a closed fracture of the forearm after a traffic accident. The main impact is economic, since besides the medical and hospital expenses, there is loss of salary, destruction of property and labor charges. We can conclude, therefore, that steps should be taken to reduce accidents. An example would be the performance of public campaigns, on topics such as traffic accident prevention, aimed at educating the population and, consequently, reducing accident rates.

REFERENCES

1. Braga Junior MB, Das Chagas Neto FA, Porto MA, Barrosa TA, Lima ACM, Da Silva SM et al. Epidemiologia e grau de satisfação do paciente vítima de trauma músculo-esquelético atendido em hospital de emergência da rede pública brasileira. *Acta Ortop Bras.* 2005;13(3):137-40.
2. Frame SB. Musculoskeletal trauma. In: Basic and advanced prehospital life support®. 5th ed. St. Louis: Mosby; 2003. p.272-86.
3. American College of Surgeons. Trauma músculo-esquelético. In: Advanced trauma life support®. 6th ed. Chicago: American College of Surgeons; 1997. p.243-62.
4. De Laet CE, Pols HA. Fractures in the elderly: epidemiology and demography. *Baillieres Best Pract Res Clin Endocrinol Metab.* 2000;14(2):171-9.
5. Rennie L, Court-Brown CM, Mok JY, Beattie TF. The epidemiology of fractures in children. *Injury.* 2007;38(8):913-22.
6. Court-Brown CM, Caesar B. Epidemiology of adult fractures: A review. *Injury.* 2006;37(8):691-7.
7. Sobania LC, Tatesuji BS, Pacheco CES. Acidentes de tráfego, um problema de saúde pública: análise de 160 pacientes acidentados e internados em hospitais de pronto socorro. *Rev Bras Ortop.* 1989;24(1):13-22.
8. Court-Brown CM, Caesar BC. The epidemiology of fractures. In: Buchholz RW, Heckman JD, Court-Brown CM. *Rockwood & Green's Fractures in adults.* 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2006. p.96-113.
9. Johansen A, Evans RJ, Stone MD, Richmond PW, Lo SV, Woodhouse KW. Fracture incidence in England and Wales: a study based on the population of Cardiff. *Injury.* 1997;28(9-10):655-60.
10. Kanis JA, Johnell O. Epidemiology of osteoporotic fractures. *Osteoporos Int.* 2005;16:3-7.
11. Souza JAG, Iglesias ACRG. Trauma no idoso. *Rev Assoc Med Bras.* 2002;48(1):79-86.
12. Smith DP, Enderson BL, Maull KI. Trauma in the elderly: determinants of outcome. *South Med J.* 1990;83(2):171-7.
13. Meling T, Harboe K, Søreide K. Incidence of traumatic long-bone fractures-requiring in-hospital management: a prospective age- and gender-specific analysis of 4890 fractures. *Injury.* 2009;40(11):1212-9.
14. Silveira VAL, Medeiros MMC, Coelho Filho JM, Mota RS, Noleto JCS, Da Costa FS et al. Incidência de fratura do quadril em área urbana do Nordeste brasileiro. *Cad Saúde Pública.* 2005;21(3):907-12.
15. Kanis JA, Oden A, Johnell O, De Laet C, Jonsson B, Ogllesby AK. The components of excess mortality after hip fracture. *Bone.* 2003;32(5):468-73.
16. Cooper C. Epidemiology of osteoporosis. *Osteoporos Int.* 1999;9(Suppl 2):S2-8.