IDENTIFICATION OF THE EPIDEMIOLOGICAL PROFILE OF PROXIMAL FEMUR FRACTURE IN THE SANTA CASA DE MISERICÓRDIA DE FRANCA

Matheus Machio Cezaro
Orthopedist and traumatologist at Santa Casa de Franca.
Ribeirão Preto/SP

Esther Vieira Soares
Resident of Santa Casa de Franca. Graduated.

Felipe Bosco Mendes da Silva
Resident of Santa Casa de Franca. Graduated.
Franca/SP

Henrique Lopes Haber
Orthopedist and traumatologist at Santa Casa de Franca. Graduated.
Franca/SP

Marina Parzewski Moreti
Graduated in Medicine from the University of Franca in December 2021

1

Abstract: Objective: To identify the epidemiological profile of proximal femur fracture at Santa Casa de Misericórdia Franca-SP. Methods: a collection of data from the fall and personal through a questionnaire in the first care and other data of the fracture and treatment, through the patient's medical records. The statistical analysis was made by the SPSS (*Statistical Package for the Social Sciences*). Result: A total of 164 patients were identified, 101 female (61.6%) and 63 male (38.4%) patients, with an average age of 74.27 years, and most of these traumas are approximately 90% low energy. We identified 89 patients with transtrochanterian fracture (54.26%), 55 patients with femur neck fracture (33.50%), and 20 patients with subtrochanteric fracture (12.75%). An average rate of 6 to 7 days of hospitalization was obtained, with a 1-year mortality rate of 20% (33 cases). Conclusions: What was found in the study corroborates with findings in the literature, having the female gender as the predominant, the low energy generated the trauma, the main classification of fracture that was found is transtrocanterian, the death rate was also close to the literary data. On the other hand, an lower average age than the published studies was observed, as well as the time of admission of patients until treatment, even though this is higher than that recommended in therapeutic protocols.

Keywords: Fracture; Proximal femur, Elderly population, Morbidity and mortality, Epidemiological profile.

INTRODUCTION

Proximal femur fracture is considered one of the most severe fractures for the elderly, requiring hospitalization and surgical treatment, presenting high rates of morbidity and mortality, and therefore, there is a need to rely on a fast and efficient treatment. The majority of this comorbidity is older women, which is sometimes related to pathologies such as osteoporosis and has as the main triggering factor of low-energy traumas (fall from one's own height). This disease affects approximately 200 million people worldwide, as well as patients who are victims of car accidents, medium and high-energy traumas (1-2).

The incidences of that with the elderly have increased significantly and are related to the increase in life expectancy of these patients. In the next 30 years, the number of elderly people in Brazil tends to double. According to IBGE, in 2018, individuals over 60 years of age corresponded to 13.4% of the Brazilian population (28 million people), already in 2030, the projection is 18.7% (42 million) and in 2050, will reach about 28.4% (66 million) of the population, since life expectancy is increasing with the advance and technological development of medicine, there is simultaneously an expectation of an increase in the number of fractures. (3-4).

According to Sakaki et al. (5), morbidity and mortality related to this pathology are about 5.5% during the hospital stay; 4.6% after a month, 11.9% after three months, 10.8% after six months; and 19.2% after a year of evolution, therefore, it has a high mortality rate. (6).

Hip fractures affect the proximal femur at any site between the femoral head and about 5 centimeters further to the lesser trochanter(7). It can be classified as intracapsular lesions, which involve femoral neck fractures, or extracapsular involving the area between the greater and lesser trochanter, which can also be classified as transtrochantors (between trochanters) and subtrochanteric (below the lesser trochanter). (8,4).

The identification of the type of fracture and its classification is fundamental because, through this standardization, the care and treatment of the pathology are facilitated

generating faster and more accurate care. The most used classifications in the literature are the alphanumerical system (AO) and Garden for femur neck fractures, AO and Tronzo for transtrochanterian, and among subtrochanteric, the main one is Seinsheimer. Thus, standardization in the identification of fracture favors the choice for the best treatment, besides enabling the improvement of future studies. (9).

Therefore, this study aims to identify and quantify the number of cases of proximal femur fracture, treated at the Hospital of Santa Casa de Franca. To verify the prevalence between the sexes, the type of energy of trauma, the mortality rate due to these fractures, and variables that contribute to its occurrence, using, for this, a previously established questionnaire and comparing it to the data found in the literature.

JUSTIFICATION

The justification for the chosen theme comes, first, from the interest of students in the area of orthopedics, being the area they want to follow in the future, by the commitment that Prof. Daniel Machado demonstrated in indicating and assisting in the project.

This project seeks to expand the area of knowledge in orthopedics, a theme that is underrated during medical education, which proved to impact and have relevance in the lives of the patients, besides urging to seek and carry out this study.

The identification of patients' profile has supported the idea of the need to improve the care and efficiency of the service to deal with such pathology. Given the high mortality rate involved, it is essential to characterize the population affected systematically, in order to improve and speed up the health-disease binomial in order to improve the performance of orthopedics.

The main objective of this study is to characterize the epidemiological profile of proximal femur fractures of users of Santa Casa de Franca, located in the town of Franca, in the country of São Paulo.

As the specific goals, it is intended to write the epidemiological profile of users treated at the hospital of Santa Casa de Franca with proximal femur fracture;

Identify how the fracture occurred, the comorbidities that may have contributed to the fracture, the classification of this fracture, and the mortality rate of these patients.

Identify the protocols of care for femoral fractures and correlate the findings with the literature on the subject.

MATERIALS AND METHODS

This is an observational, cross-sectional study of quantitative character, developed in the town of Franca, in the country of São Paulo. In this study, the data was obtained after the application of a questionnaire performed during the first care by residents and physicians of Santa Casa de Franca, with the students of the Municipal University Center of Franca - Uni-FACEF, with the goal of getting at accurate information about trauma. The information regarding the treatment was completed through the analysis of medical records, as well as the data related to the hospitalization. These were recorded in excel 2.0 spreadsheets and subsequently statistically analyzed with SPSS (*Statistical Package for the Social Sciences*).

The questionnaire includes topics such as age, gender, fractured leg, trauma energy, type of fracture, classification, treatment, time of hospitalization, complications, reoperation, death, whether or not the patient needs assistance to walk, and previous comorbidities. However, due to the Covid-19 pandemic that began in Brazil in March 2020, research activities were temporarily halted and

resumed only in June of that same year. Thus, there was a change in the already established research method, so the data collection from March to May, was performed only through the analysis of the medical records.

The data collection occurred from May 2019 to May 2020, in which 250 patients were analyzed, all of them classified as victims of femoral fractures, during admission to the hospital's emergency department, receiving the definitive diagnosis after care. From all patients analyzed, those who suffered diaphyseal fractures or contusions were removed from the study. Besides patients that suffered from periprosthetic fractures, whose primary fracture did not happen in the considered period, those were also ruled out. In the end, 164 patients with proximal femur fracture were considered for the research.

This investigation was authorized by the coordinators of the health institution of the Research Ethics Committee of the Santa Casa de Misericórdia de Franca, according to rule 3.334.303. as commanded in the resolution 466/12 CNS/MS.

FINDINGS

In the systematic evaluation, 164 patients were identified, 101 female (61.6%) and 63 male (38.4%) patients, female patients were in a higher age group, having an average of 78.6 years compared to males, who had an average of 67.3 years ($p<0.05$). The total age average was of 74.27 years, with a calculated average of 78 years (ranging from 21 to 101 years). Among them, 90.68% are injuries affected by low-energy trauma and 9.32% high-energy trauma. However, some data obtained during the answering of the questionnaire, such as the specificity of the trauma concerning the location, form, and triggering factor, in addition to the need for assistance or not in ambulation, were compromised, since the patient or companion did not have clarity of the information or if it was answered correctly.

Among the 164 patients, 89 were with transtrocanterian fractures (54.26%), 55 with femoral neck fractures (33.50%), and 20 patients with subtrochanteric fractures (12.75%) were identified. Of these, the trauma with the highest mortality rate corresponded to transtrocanterian fractures, with 18 patients (10.9%). However, when observing fractures separately, the pathology with higher mortality was related to subtrochanteric
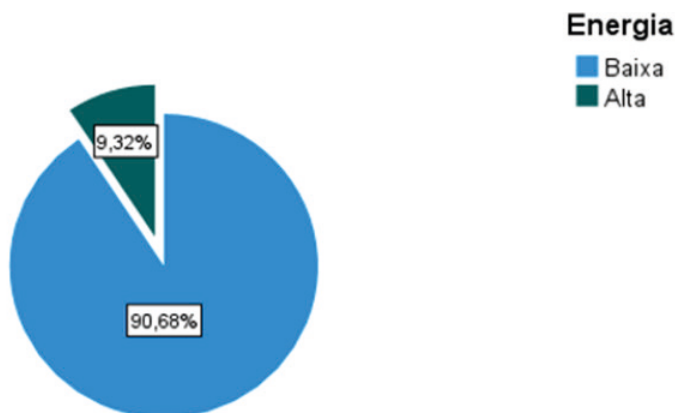
Graph 1 - Type of trauma energy

Source: Prepared by the authors.

fractures amounting to 5 deaths (33.3%), while transtrocanterian and cervical fractures corresponded to 18 deaths (25.3%) and 10 deaths (22.2%), respectively.

The estimated average time from the trauma incident to surgery was 3.46 days. The hospitalization period of the patients studied ranged from 1 to 24 days with an average of 6.77 days, so that women had a longer hospital stay, with an average of 7.27 days, while for men, an average of 5.87 days was observed.

The total number of deaths was 33 cases (20.1%), and the average age of these patients (77.7 years) is higher than the average of patients who evolved satisfactorily (73.41 years).

Regarding previous diseases reported by the patient or companion during the answering of the questionnaire, a prevalence of hypertension and diabetes was identified in 75 patients (45.7%) and 37 patients (22.6%), respectively. In addition to diseases such as osteoporosis in 3 patients (1.8%), Alzheimer's in 19 (11.6%), and Parkinson's disease in 2 patients (1.2%), the others, 28 patients (17.1%) had no pathologies or were diseases that could not be identifiable. In these data,

there was also statistical bias, since the patient or companion did not have evidential data of the diagnoses mentioned.

DISCUSSION

The epidemiological profile of the individuals found in this study, in relation to the proportion between the sexes, is close to that found in existing publications, while the average age affected, is below the values found in the literature, having as a proportion 1.6:1 of women over men and the average age of patients is of 74.27 years. Daniachi et al. (10) published results whose proportion was 3:1 and the average age of 79 years, as well as Hungary et al. (5), in the ratio of 2:1 and average of 78.2 years, which relate their work to national and international studies, whose average proportion maintains these values. This mismatch of the reality in relation to the literature, with regard to the average age found, may be related to the diversification of the population of each region studied, or some specific factor, not yet found, which contributes, in some way, to the increase of fractures in the population of Franca.
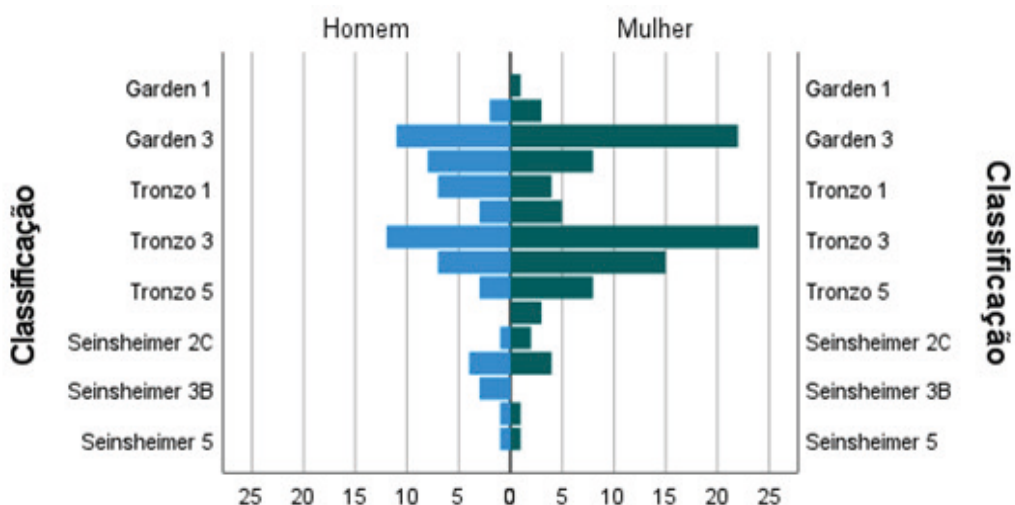
Graph 2 - Population pyramid in relation to gender and type of fracture

Source: Prepared by the authors.

Regarding the energy of trauma, the result found was in agreement with the literature, in which there is a predominance of low energy, 90.68% occurring, mostly, due to the fall of one's own height, indoors, on high energy disorders, 9.32%. However, the trauma specifications, because they were compromised during data collection, were unable to produce statistical data relevant to compare with the literature. The statistical importance is due to the fact that low-energy traumas have preventable causes, as shown by the works of Hungary et al. (5), who found that 40.6% of the falls occurred while walking or when the patient was standing still, 27.5% of the fractures occurred when getting up, 11.6% due to falls on stairs and 4.3% due to stumbles while walking. Andrade et al. (11) observed a prevalence of 56.75% in falls from their own height in adults older than 40 years, increasing the proportion when combined with some form of dementia, due to the postural damage caused, thus showing the importance of care to the elderly population.

The comorbidities reported in this study – hypertension (45.7%), diabetes (22.6%), osteoporosis (1.8%), Alzheimer's (11.6%), Parkinson's disease (1.2%) among others (17.1%) – and the medications used for their treatment, also could not be considered for statistical comparison with the literature, due to the lack of concrete information collected at the time of filling out the questionnaire.

These data would be extremely relevant, since in the literature it is clear the high prevalence rates of these comorbidities and the relationship of underlying diseases as the cause of the fracture and the interference in the time of hospitalization, in addition to the favorable clinical conditions for submission to surgical treatment, as can be seen in the studies by Rocha et al. (2001), which bring as main comorbidities the decrease in eyesight (33.99%), followed by systemic arterial hypertension (20.37%) and osteoporosis (19.93%), in agreement with the findings of Hungary Neto et al. (5) – (31.7% hypertensive, 16.5% diabetic, 8.9% with some neurological disease (e.g., Parkinson's or Alzheimer's) and 13.9% had a previous diagnosis of osteoporosis.

In reference to fracture types, the literature presents transtrocanterian fractures as the most prevalent, similar to that found in this study (54.26%), 33.50% of patients with femoral neck fracture and 12.75% with subtrochanteric. According to Daniachi et al. (10) there was a prevalence of 50.4% transtrocanteric, over 7.1% subtrochanteric, and 42.5% of the femoral neck. As well as Coqueiro, Pirolo, and Yamamoto (12), who found transtrophanric percentages, 58.3%, femoral neck, 33.9%, and subtrophreric percentages, 7.9%, justifying their data found, anatomical factors altered by the aging process may favor such injury.

Regarding the time of admission to surgery, the result found, with a value of 3.46 days (approximately 77-78 hours) is below the results of studies analyzed, and in turn, close to that recommended by clinical protocols and guidelines that is 48 h.

> Surgical treatment of femoral neck fracture should be performed as soon as possible, provided that the patient is clinically fit for the proposed surgery (osteosynthesis or arthroplasty). Avoiding exceeding a longer period for 48 h, from the occurrence of the fracture (13).

According to Daniachi et al. (10), the average waiting time for the surgical procedure was 7 days, as was Andrade et al. (11), whose time was 6.46, being higher than the research. However, the result discovered here resembles that found by Coqueiro, Pirolo, and Yamamoto (12), 3.24 days.

Regarding the average time of hospitalization, there is a discrepancy between the studies. Daniachi et al. (10) found 13.5

6

International Journal of Health Science ISSN 2764-0159 · DOI 10.22533/at.ed.1592120108

days, Coqueiro, Pirolo, and Yamamoto (12),7.46 days, Ferreira, Petros, and Petros (14) 9 days, while this work obtained 6.77 days average. There is no clear evidence of the reason for these disagreements, so it is necessary to study with a focus on factors that may interfere in the length of hospitalization of patients treated for proximal femur fractures, however, it is known that a shorter hospitalization period reduces the chance of nosocomyal infections, which may favor the recovery of these patients.

The deaths found in the analyzed period, 20.1% of the sample, occurred both during the hospitalization period and in future hospitalizations, not directly related to trauma. In addition, the causes of death were not properly filled out in the patients' medical records, becoming inappropriate for statistical analysis, but it is possible to notice that death occurred due to sepsis, whether in urinary, pulmonary, or surgical focus, factors such as arrhythmias, pulmonary thromboembolism and acute chronic kidney disease as the most cited for impairment of these patients, regardless of the clear or non-relationship with the fracture, thus requiring a more specific study of morbidity and mortality in these patients.

When searching for data in the literature, one can observe in the works of Arliani et al. (9), that the mortality rate was 32.7% in the analyzed period, however, as in this study, they did not find data with relevant evidence for statistical analysis on the causes of mortality. Borger et al. (4) found a 13.5% rate in one year, in which the main causes were pulmonary focus sepsis, upper gastrointestinal hemorrhage, and deep vein thrombosis, a fact that shows the need to expand the identification of the precursor pathology of death and improve care in order to decrease mortality rates.

In the relationship between the mortality rate and the factors related to hospitalization, duration, and the waiting time for surgery, there is no consensus in the literature. Arlani et al. (9) concluded, in their work, that there is no such relationship, although there are publications such as Kalra et al. (15) that propose an increase in morbidity and mortality after 48 hours of admission, considering some statistical biases, such as age, gender, hospital structure, comorbidities and clinical conditions of patients that may cause changes in morbidity and mortality.

Other surveys addressed factors that contribute to the delay to treatment in our country, data pointed out by Daniachi et al. (10), such as the association of the pre-and post-surgical clinical condition, the lack of vacancies in wards or ICUs, as well as delays in procedures due to lack of material in the operating room, leading to the suspension of the procedure, and this may have contributed to the high mortality rates. In this study, it was possible to perceive a satisfactory time of trauma until treatment and, therefore, a shorter period of hospitalization was observed, however, mortality rates remained high, that is, with numbers close to the published studies, thus, it is necessary to deepen the studies to analyze what leads to this mortality rate.

FINAL CONSIDERATIONS

During the research, it was possible to perceive a scarcity of information on the subject, which made the analysis difficult in parts and revealed the need to proceed on the subject and discuss it.

Through this study, one can understand the social impact generated to the patient with fracture. It was evident that the elderly population is the most affected and among it, the female sex, therefore, adequate guidance on low-energy traumas and falls are necessary.

The time of approach to trauma up to the surgical moment, in the study, showed a reduction in the time of hospitalization, however, it did not demonstrate a better prognosis to trauma, maintaining death rates close to the ones described in the literary, therefore, a more detailed investigation is necessary on the reason for these deaths, and factors such as pre-hospital care, pre-and post-surgical aspects and other events that may have corroborated this higher mortality rate should be investigated.

Finally, the work fulfills its role of identifying the population affected by this pathology and can help in the identification and orthopedic care of these patients, contributing to the care offered by Santa Casa to the population of Franca.

REFERENCES

1 Pinheiro MM, Ciconelli RC, Jaques NO, Genaro PS, Martini LA, Ferraz MB. O impacto da osteoporose no Brasil: dados regionais das fraturas em homens e mulheres adultos. The Brazilian Osteoporosis Study (BRAZOS). Rev Bras Reumatol, v. 50, n. 2, p. 113-27, 2010.

2 Radominski SC et al. Diretrizes brasileiras para o diagnóstico e tratamento da osteoporose em mulheres na pós-menopausa. Rev Bras Reumatol, v.5, n.7, p. S452–S466, 2017.

3 IBGE. Projeção da população por sexo e idades simples, em 1º de julho - 2010/2060. [periodical on the Internet]. [cited 2020, oct 10] Available from: <www.ibge.gov.br/estatisticas-novoportal/sociais/populacao/9109-projecao-da-populacao.html?=&t=resultados.

4 Borger RA, Leite FA, Araújo RP, Pereira TFN, Queiroz RD. Avaliação prospectiva da evolução clínica, radiográfica e funcional do tratamento das fraturas trocantéricas instáveis do fêmur com haste cefalomedular. Rev Bras Ortop, V.46, N.4, P.380-89, 2011

5 Hungria NJS, Almeida JDB, Dias CR. Características epidemiológicas e causas da fratura do terço proximal do fêmur em idosos. Rev Bras Ortop, v. 46, n. 6, p. 660-67, 2011.

6 Carvalho WS et al. Estudo epidemiológico retrospectivo das fraturas do fêmur proximal tratados no Hospital Escola da Faculdade de Medicina do Triângulo Mineiro. Rev Bras Ortop. v.36, n. 8, ago., 2001.

7 Gillespie LD, Gillespie WJ, Parker MJ. Hip protectors for preventing hip fractures in older people. Cochrane Data base of Systematic Reviews, 2010, Issue 10. Art.No.:CD001255. BJM. v. 322, p. 968-975, 2001.

8 Bastos EO, Lustosa LP. Fraturas proximais do fêmur em idosos: qual o melhor tratamento? Acta ortop. bras. v.17 n.5. São Paulo, 2009.

9 Arliani GG et al. Correlação entre tempo para o tratamento cirúrgico e mortalidade em pacientes idosos com fratura da extremidade proximal do fêmur. Rev Bras Ortop. v.46, n.2, p.189-94, 2011.

10 Daniachi D et al. Epidemiologia das fraturas do terço proximal do fêmur em pacientes idosos. Revista Brasileira de Ortopedia (English Edition). v. 50, Issue 4, p. 371-377, July–August, 2015.

11 Andrade MAP, Gomes LP, Nascimento LD, Campos TV, Paiva EB, Guimarães HC. Influência da idade no atraso para o tratamento cirúrgico das fraturas do fêmur proximal. Acta Ortop Bras. v. 23(6), p. 315-8, 2015.

12 Coqueiro DP, Pirolo SM, Yamamoto FT. Perfil epidemiológico de idosos submetidos à cirurgia de fratura de fêmur proximal em hospital escola na cidade de Marília, SP RBCEH, Passo Fundo, v. 12, n. 2, p. 101-110, maio/ago. 2015.

13 CONITEC. Protocolo clínico e diretrizes terapêuticas para fratura de colo de fêmur em idosos. [periodical on the Internet]. Jun/2017 [cited 2020, nov 8] Available from: http://conitec.gov.br/images/Consultas/Relatorios/2017/Relatorio_PCDT_Fratura_Colo_Femur_em_idosos_CP_29_2017.pdf.
14 Ferreira PEV, Petros RSB, Petros RSB. Influência das fraturas do fêmur proximal na autonomia e mortalidade dos pacientes idosos submetidos a osteossíntese com haste cefalomedular Rev. Bras. Ortop. v. 52(S1), p. 57–62, 2017.

15 Kalra S, Khan SK, Khanna A, Thiruvengada MM, Parker MJ. Timing of surgery for hip fractures: a systematic review of 52 published studies involving 291,413 patients. Injury. 2009;40(7):692-7.