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EVALUATION OF THE CLINICAL EPIDEMIOLOGICAL PROFILE OF ELDERLY PEOPLE WITH LOW ENERGY MECHANISM FRACTURE OF THE PROXIMAL FEMUR

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ABSTRACT

Objective: To establish the clinical and epidemiological profile of proximal femoral fractures in elderly patients, contextualizing it with potential etiological risk factors and morbidity and mortality in the period from November 2020 to February 2021. **Methods**: A cross-sectional study was carried out with 61 patients radiologically diagnosed with proximal femur fracture at the Hospital Geral de Nova Iguaçu, metropolitan region of Rio de Janeiro. The variables analyzed were: sex, age, race, fracture topography, sentinel fractures, time between the fall and hospital admission, comorbidities and laboratory changes. The information was collected from the medical chart and complemented in an interview with the patient. Statistical analysis was descriptive. **Results**: Patients were 70 years old on average, with a predominance of female gender (62.29%), white race (63.93%) and transtrochanteric fractures (59.01%). Low-energy trauma was the cause of 100% of the fractures. Presence of sentinel fracture (34.42%), anemia (80.32%), hypocalcemia (63.9%), hypertension (63.93%), and report of osteoporosis (18.03%) were observed. **Conclusion**: The knowledge of the epidemiological-clinical profile of this population about the epidemic of femur fracture reinforces the need for preventive health measures, guiding public policies directed to the health of the elderly, including osteoporosis screening and clinical control of comorbidities.

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INTRODUCTION

Aging can be understood as a dynamic and progressive process, characterized by morphological, functional, and biochemical changes. These changes determine the progressive loss of the ability to adapt to the environment, causing greater vulnerability and a higher incidence of pathological processes, which can lead the individual to death (Porto, 2001). As one of its consequences, aging brings about a gradual decrease in functional capacity, which increases with age, leading mainly to a loss of skills or difficulty/inability to perform functions and activities related to daily living, making the individual more susceptible to environmental risks, and consequently increasing

the occurrence of falls (Rebelatto, 2004; Brito, 2001). Proximal femoral fractures can be classified into intra-capsular or extra-capsular (Scottish Intercollegiate Guidelines Network, 2002). Intracapsular fractures are identified as femoral neck fractures, while extra-capsular fractures are transtrochanteric, where the most prevalent is intertrochanteric. Both can be consequences of low-energy trauma, such as falls (Souza, 2007). The prevalence of falls in the elderly in the national literature is approximately 32%, which is strongly related to osteoporosis (Peracinni, 2002; Pinheiro, 2010). Individuals with osteoporosis may present postural changes, gait disturbance and body imbalance, which favor the occurrence of falls (Riera, 2003). Despite the existence of measures such as fall prevention, early treatment of osteoporosis, encouragement of regular

physical activity, and control of other diseases in the elderly, femoral fractures in the elderly remain very frequent and are associated with high mortality, which is close to 50% in one year (Souza, 2007; Peracinni, 2002; Pinheiro, 2010). The treatment usually indicated in most of these fractures is surgical. The choice of the best method of fixation and the appropriate technique are based on age, degree of mobility, mental status and the pre-existence of diseases that may interfere with the surgical process and/or rehabilitation. The most frequent indications are the placement of synthesis material by means of internal fixation, total arthroplasty, and hemiarthroplasty or partial arthroplasty. Conservative treatment is indicated only in some fractures that are classified as incomplete or without deviation, or that present absolute contraindications for surgical intervention (Rebelatto, 2004; Sakaki, 2004). In this sense, one of the main disabling events in the elderly is the proximal femur fracture, which notably constitutes an epidemic in this age group, consuming beds and resources of the public health system, either by the high hospitalization time, or by the sequelae that involve this pathology. Therefore, the aim of this study is to establish the clinical and epidemiological profile of proximal femoral fractures in the elderly, contextualizing it with potential etiological risk factors and morbidity and mortality.

MATERIAL AND METHODS

The present study was approved by the ethics committee with CAAE 13517919.4.0000.80. A cross-sectional, prospective study was carried out with 61 patients radiologically diagnosed with proximal femur fracture at the Hospital Geral de Nova Iguaçu, in the metropolitan region of the state of Rio de Janeiro. The individuals who comprised the sample met the following inclusion criteria: having suffered a fracture of the proximal third of the femur; being over 60 years of age; and seeking the service offered at a reference hospital in orthopedics and traumatology, in the period between November 2, 2020 and February 27, 2021. Patients whose femur fractures were in other regions or under 60 years of age were excluded. Patient information was collected from the medical record, and reviewed when necessary in an interview with the patient or caregiver. The variables analyzed included: sex, age, race, topography of the fracture, sentinel fractures, time between the fall and hospitalization, associated comorbidities, and laboratory changes. Laboratory tests were collected at the patient's admission to the hospital and were sent to a single laboratory, which analyzed all the samples of this research. The data collected were entered into Excel spreadsheets (Microsoft Corp, Redmond, WA, USA) and presented using descriptive statistics, with qualitative variables expressed as absolute numbers and frequencies, and quantitative variables as means and standard deviations. Categorical variables were tested using the chi square test or Fisher's exact test when appropriate, and numerical variables were tested using Student's t test. The significance level established was p value 0.05.

RESULTS

The total sample was composed of sixty-one patients, of which 38 were female (62.29%) and 23 were male (37.71%). The mean age of the study population at the time of the interview was 70.58 years, ranging from 60 to 96 years old, with a standard deviation (SD) of 14.9. The female mean age was higher than the male mean age, 72.08 and 69.38 years, respectively (Table 1). As for ethnicity, 39 patients were white (63.93%), 14 were black (22.95%), and 8 were brown (p < 0.05) (13.11%) (Table 1).

In relation to the fracture mechanism, all 61 cases (100%) were low energy traumas, which were configured as falls from height. As for the topography of the fractures presented in this study, the most commonly found fracture was transtrochanteric in 36 cases (59.01%).

Table 1. Sociodemographic characteristics of the elderly with proximal femur fracture

		N	%
Sex	Female	38	62,29
	Male	23	37,71
Age	Average	70,58	
	Average Fem	72,08	
	Average Male	69,38	
	DP	14,9	
	Minimum	60	
	Maximum	96	
Race	White	39	63,93
	Brown	14	22,95
	Black	8	13,11

Table 2. Distribution of the elderly with proximal femur fracture according to fracture location

Type of fracture	Colo	22	36,06
	Transtrochanteric	36	59,01
	Subtrancoterica	3	4,91

Table 3. Association between mean age (p<0.05) and sex by lesion topography

Fracture topography	Average Age	p	Sex % of
Colo	70,9	0,038	F 58,8
			M 41,8
Transtrochanteric	74,8		F 71,4
			M 28,6
Subtranstrocanterian	77,6		F 66,6
			M 33,3

Table 4. Distribution of the elderly with proximal femur fracture according to the presence and location of sentinel fracture

Sentinel fracture	Yes	21	34,42
	No	40	65,57
Sentinel	Proximal Humerus	10	47,61
	Distal radius	4	19,04
	Ulna	4	19,04

There were 22 cases of femoral neck fracture (36.06%) and only 3 cases of subtrochanteric fracture (4.91%). In our study there was no predominance regarding the side affected (Table 2). When mean age is associated (p<0.05) by topography of the lesion, a statistically significant relationship is found. Patients with intracapsular fractures have a lower mean age when compared to extracapsular fractures (70.9 and 76.2 years, respectively) (Table 3). Regarding the correlation between gender and topography of the lesion, a statistically significant relationship is also found, where the female gender is more prevalent in all types of fracture. In transtrocanteric fractures the greatest discrepancy between genders was observed (p<0.05) (Table 3). In the study, 21 patients (34.42%) had sentinel fractures, highlighting 10 humerus fractures (47.61%), 4 radius fractures (19.04) as well as 4 ulna fractures (19.04) (Table 4). The time between the fall and hospitalization ranged from 0 to 12 days, with a mean of 4.03 days. Regarding previous comorbidities presented by patients, it was found that 48 patients (78.79%) had at least one self-reported previous comorbidity (p < 0.05). Among them, the most frequent was Systemic Arterial Hypertension, with 39 cases, followed by Diabetes, Cerebrovascular Disease, and Osteoporosis (with 31, 13, and 11 cases respectively). (Table 5). Of the patients with multiple comorbidities (2 or more), the majority (59.01%), as well as all patients who reported osteoporosis, had a transtrochanteric fracture. Regarding laboratory findings on admission, 49 patients were found to be anemic (80.32%) and 19 patients had leukocytosis (31.14%) (Table 6). As for calcium, hypocalcemia was diagnosed in 63.9% of the patients (table 6), being more accentuated in women than in men (Table 7).

Table 5. Distribution of the elderly with proximal femur fracture according to the presence of comorbidity

No. of comorbidities	0	13	21,31%
	1	9	14,75
	2	20	32,78
	3	16	26,22
	4	3	4,91
Comorbidities	Has	39	63,93
	Dm	31	50,81
	Previous bird	13	21,31
	Osteoporosis	11	18,03

Self-reported diagnosis. A Variables investigated only when the respondent was the elderly person him/herself.

Table 6. Characteristics of the complementary exam samples at patient admission

Anemia	Yes	49	80,32
	No	12	19,67
Leukocytosis	Yes	19	31,14
	No	42	38,85
Hypocalcemia	Yes	39	63,9
	No	22	36,06

Anemia HB<12, Leuco > 11,000, hypocalcemia <8

Table 7. Analysis of serum calcium by sex and fracture type

Sex	Mean Serum Calcium
Male	7,854
Female	7,256
Type of fracture	
Colo	7,868
Transtrochanteric	7,789
Subtrochanteric	8,052

The relation between mean serum calcium levels and the type of fracture did not show any statistical difference.

DISCUSSION

Studies analyzing proximal femur fracture in the elderly, taking into consideration risk factors, epidemiological profile, and morbidity and mortality factors are recurrent in the Orthopedics and Traumatology literature. However, even though the main mechanisms of trauma are widely studied and understood, no reduction of this entity is observed. This study was carried out at a tertiary hospital with 60 beds for orthopedics and traumatology that serves the entire Baixada Fluminense region in the state of Rio de Janeiro, a highly populated region where the clinical and epidemiological profile of this pathology is unknown. Current estimates are that 30% of the beds in this unit are currently allocated to elderly patients with proximal femur fracture, as observed in national literature (Souza, 2007). The epidemiological profile of patients with femur fractures in our study was: female (62.29%), mean age 70.58 years, white (63.93%), caused by a low-energy mechanism (100%), with a predominance of transtrochanteric topography (59.01%), associated with multiple comorbidities (63.9%) as in similarity with other authors (Pereira, 1993; Eisler, 2002; Espino, 2000; Ramalho, 2001). The frequent occurrence of falls and consequent proximal femur fractures in females has been confirmed in other studies. [11-15] However, the mechanisms to elucidate this phenomenon are unclear and controversial. Some factors are assumed to be the cause: lower amount of lean mass and muscle strength than men of the same age; greater loss of bone mass due to reduced estrogen, increasing the likelihood of osteoporosis; higher prevalence of chronic diseases; greater exposure to domestic activities and risk-taking behavior (Peracinni, 2002; Lebrão, 2005; Santos, 2005). Regarding the types of fractures, extracapsular fractures are those that most affect the elderly and are aggravated by pathological conditions such as osteoporosis, which increases the morbidity and mortality rate of this population (Espino, 2000; Fréz, 2003; Amadei, 2006) The present study is in accordance with others, and the most commonly found fracture was the transtrocanteric (59.01%). It is noteworthy that all patients who reported having osteoporosis presented proximal femoral fractures in transtrochanteric topography, which may show a relationship between the risk factor and the topography of the lesion. However, the presence of osteoporosis in other types of fractures cannot be ruled out, since it is a frequent pathology in the elderly, as well as underdiagnosed, as reported by Fortes et al. (2008). Sentinel fractures are also found in the context of osteoporosis, which in this study were present in 34.42% of patients, 47.61% of which were located in the proximal humerus, 19.04% in the distal radius, and 19.04% in the ulna. Sentinel fractures are fractures that precede femoral fractures, and when diagnosed, they should be treated by health professionals to prevent the outcome that usually occurs with femoral fractures. In relation to the presence of multiple comorbidities in the present study (78.79%), it is known that coexisting diseases are important factors in mortality, either by quantity or type, and in the present study SAH was the most prevalent, as well as in similarity with Santos et al. (2005). Regarding the laboratory alterations found, anemia was present in (80.32%) of the patients on admission, this being the most prevalent hematological disorder in the elderly population (Souza, 2001) According to Sakaki et al. an elderly person with a femur fracture and severe anemia has a five times greater risk of dying than one without anemia, therefore, the greater need for transfusion, is become a risk factor for mortality (Barbosa, 2006). Finally, hypocalcemia (63.09% of cases) showed preponderance in this study, and studies show effective treatments that demonstrated a reduction in the risk of proximal femoral fractures with the use of vitamin D and calcium (Chapuy, 1992). Mean serum calcium did not show a statistically significant difference when correlated with fracture topography, as reported by Baggio et al[24]. However, it was significant ($p<0.05$) when compared with gender, revealing the predominance of lower serum calcium levels in elderly women when compared with men.

CONCLUSION

The present study provides substantial data on epidemiological, clinical and laboratory aspects, and topography of the injury, regarding cases of proximal femur fracture in the elderly, in a reference hospital in orthopedics and traumatology in the region. The knowledge of the epidemiological-clinical profile about the epidemic of femur fracture reinforces the need for preventive health measures, guiding public policies directed to elderly health, including osteoporosis screening, clinical control of comorbidities, hospital planning for screening the main types of fractures in the treated population. Furthermore, health education policies with elderly caregivers, family members, to warn about prophylactic measures for falls, since the low-energy mechanisms are the majority in this pathology.

Conflicts of Interest: The authors declare that there is no conflict of interest.

THANKS

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