

Radiographic Analysis of Fractures of the Proximal Femur in Patients Over 50 Years Old at Hospital Universitario De Los Andes, Merida, Venezuela, 2008-2012

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ABSTRACT

AIM: An observational, retrospective analysis of the XR is presented. Preoperative tests performed on patients older than 50 years of age treated surgically for fractures of the proximal femur at the University Hospital of the Andes (Merida, Venezuela).

MATERIALS AND METHODS: These XRs were analyzed with reference to age, sex and fracture modality according to the AO/ASIF alphanumeric classification, which considers A the trochanter fractures and B the femoral neck ones. The mean annual frequency for the Hospital Universitario de Los Andes was estimated according

to age, sex and fracture type strata.

RESULTS: Between 2008 and 2012, in people over 50 years of age, 463 hip fractures were present, affecting 334 women and 129 men (2.6/1). Hip fractures are 7.3 times more frequent after age 80, compared to strata between 50 and 60 years of age. The average annual frequency is 0.12%: 0.15% for ladies and 0.09% for gentlemen. Trochanteric fractures represent 76.4% of the total and are more common in women, with a mean age of 80.4 years. About 70% of these hip fractures are considered unstable injuries.

CONCLUSION: In the city of Mérida (Venezuela), hip fractures affect women over 80 and more commonly in the trochanteric area with high indices of instability.

Key words: Elderly; Hip fractures; Frequency; Trochanter; Femoral neck; Stability of fractures

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INTRODUCTION

The proximal femur is anatomically the region above a line passing through the lower border of the minor trochanter^[1] and its complete fracture occurs at the time the stress generated by an external trauma exceeds the capacity of the bone to absorb energy resulting from the combination of elastic (reversible) and plastic (irreversible) forces. The lateral falls precipitate most of the osseous lesions by a combination of axial flexion and compression, well analyzed from a biomechanical point of view. In this sense, hip fractures could be prognosticated taking into account the inter-trochanteric diameter, cortical thickness, hip axis length, neck-diaphysis angle, density and trabecular structure in specific areas^[2,3].

In a large number of population studies, no differentiation is found between trochanteric and femoral neck fractures, i.e., they are both

considered as fractures of the proximal femur^[4-5]. This modality of injury in the elderly constitutes a worldwide health problem, with high economic costs for surgical medical care, affecting significantly the health care budgets in different countries^[4].

Its incidence varies substantially between different regions, especially because of the increase in the population's life expectancy. The information available in Latin America related to this traumatic pathology in this age group is scarce^[6].

In this study carried out at the Hospital Universitario de Los Andes in the city of Mérida (Venezuela), we investigate the radiological characteristics of fractures of the proximal femur surgically treated in over 50 years old in a period of 5 years.

METHOD

This is an observational, cross-sectional study (level IV of evidence) to determine the frequency and radiological characteristics of proximal femur fractures, the product of low intensity trauma and for the purposes of this work, pathological or high impact fractures were excluded. Patients older than 50 years were taken into account and for that purpose, the clinical records used belonged to patients admitted and surgically operated, in the period January 2008 December 2012, at the Hospital Universitario de Los Andes (HULA) located in the city of Mérida, Venezuela, which is a Centre of reference for patients without economic resources. The state of Merida, is a geographical area located in the southwest of Venezuela, in the Andes Mountains (8° N and 71° W). According to the latest population census in 2011 (<http://www.ine.gov.ve/>), the state of Merida has 828,592 inhabitants. Those over 50 years of age add up to 73,600, of which 38,228 are women and 35,372 are men. For the purpose of this study, the latter groups were divided into decades (Table 1). Frequency was determined by dividing the number of cases between the exposed population and multiplying by 100. In the period of this publication, approximately 93 cases were found per year, 59 women and 34 men, representing a cumulative frequency of 0.12 % fractures, 0.15% for women and 0.09% for men. From the anatomical point of view, only those which concerned the trochanter and the femoral neck were taken into account and the alphanumeric classification of the AO/ASIF^[1] was used, dividing them into intra capsular, femoral neck (168 cases), and subdividing them into basicervical or stable (31-B2.1) and mediocervical or unstable (31B2.2 or B2.3); and the extra capsular, trochanteric (295 cases), fractionated in the same way in stable (intertrochanteric) 31A 1 and unstable (perthrochantericas) 31-A2 and A3.

RESULTS

In the five-year period analyzed and in over 50 years old age patients, the results showed a total of 463 fractures, 334 in women and 129 in men, an F / M ratio of 2.6: 1 in the case of those older than 80 years (56.8%). The female/male ratio is 1.3: 1 (Table 2). The average age is 78.7 (range between 52-108), specifically, for women: 80.3 years (55-108) and for men: 74.5 years (52-99). When analyzing the total number of cases, trochanteric fractures concerned 63.4% of the patients and the femoral neck, 36.6%, a ratio between 1.8 and 1; The frequency of this fracture modality increases exponentially according to age groups, and between 50 and 80 years of age, it increases from 36 to 253 cases (Figure 1, Table 2). According to sex, the trochanteric ones affect more the feminine in a relation 2.4/1 and the same happens with the femoral neck ones, although the relation is somewhat higher: 2.7/1. Regarding the trochanteric, the increase between the 50-60 years old patients and those older than 80 years, in

Table 1 Population of Merida Venezuela.

Age group	Population of Merida (Censo 2011)	
	Female	Male
50-59	12,076	11,815
60-69	9,251	8,774
70-79	6,973	6,348
80-+	9,928	8,435

Table 2 Modality of fractures, by age group and sex.

Age group	Trochanterics (A)		Femora Neckl (B)		Total
	Female	Male	Female	Male	
50-59	11	16	6	3	36
60-69	23	13	14	8	58
70-79	52	26	21	7	106
80-+	125	29	82	27	263
Total	211	84	123	45	463

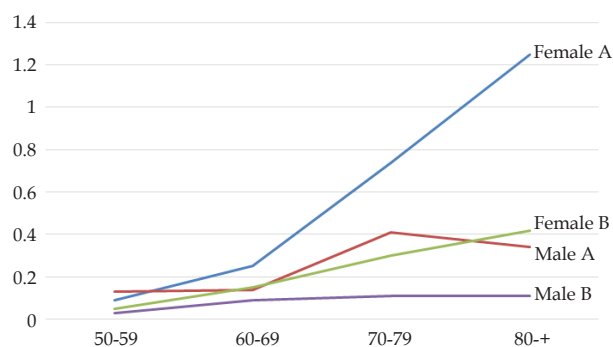


Figure 1 Frequency of Hip Fractures by Age, Sex and Type.

women was 11.4, while for the male, the increase was 1.8; as for the femoral neck, in women it increased 13.7 times and in male patients, 9 times (Table 2). The mean age of trochanteric fractures in women was 80.8, and in men, 74.8 years and for the femoral neck fractures, it was 78.8 and 73.7 years respectively. On a whole, according to the stability criteria, the stable fractures B2.1 occurred in a 17.5%, the A1, in a 22.3% and the unstable B2.2 and 3 in the 82.5 % and the A2 and 3 in the 77.3%.

DISCUSSION

Women suffer 80% of all fractures of the proximal femur with a mean age of 80 years and a prevalence of 20% while the occurrence in male gender is 10%. It is estimated that by 2050, there will be, around the world, between 500 thousand and one million new fractures with a cost that has been estimated in the USA between 10.3 and 15.2 billion dollars^[7].

The results of this analysis show that a total of 463 cases of fractures of the proximal femur in patients over 50 years old took place in five years (2008-2012). This could represent 93 cases per year, 59 females and 34 males, with a cumulative frequency of 0.12% fractures, 0.15% for women and 0.09% for men. In relation to sex and age group, the ratio is 3.7/1 (207/56) in those over 80 years of age (56.8%), although according to the last census the ratio of both sexes in this group of age, it is 1.2/1 (Tables 1 and 2). In general, men have younger age 74.5/80.3.

Table 2 shows an exponential growth of the type of fracture. Comparing the groups of 50-59 years with those of 80 and over, the

trochanteric fractures rose in women from 11 to 125(11.4 times) while in men, it went from 16 to 29(1.8 times). With respect to those of the femoral neck, they rose from 6 to 82(13.7 times) in the female, and from 3 to 27(9 times) in the male. It is noteworthy that in the 50-59 age group of men, there were more trochanteric fractures (16/11).

This finding of more trochanteric in the female sex had previously been reported in other HULA reports. This mode of fracture for the male sex slightly rebounds among those over 70, while those of the neck (in smaller quantity) with a continuous increase in the ladies, especially after the 70 years, in men they remain almost unchanged; but in the particular case of the femoral neck, they increase in more than 70 years old patients. Hip fractures in patients over 80 years of age are 3.9 times more frequent than in the 50-60 age group (369/94) and this is much lower than that reported by Orce in Ecuador, who reports that in his population it is 50.5 times (777/15.4)^[8,9].

The trochanteric region is more prone than the femoral neck to the loss of bone mass and that makes it more vulnerable. So, the conclusion could be that osteoporosis, as a major health problem, increases the number of fractures in this area. In this review, women older than 80 years have more fractures of this region, which may be secondary to the association of postmenopausal and senile osteoporosis, but men, as though they are younger, should be carriers only of the senile modality; added to this fact, there is a substantial increase of neck fractures - 9 times more-, when comparing the groups of 50 years of age and the ones older than 80 years, which leads us to suspect that there could be other factors involved^[10-12].

In most fractures of the proximal femur epidemiological studies there is no discrimination between the trochanter and femoral neck fractures^[10], but there are differences related to their incidence or age. The femoral neck is more frequently present in Northern Europe, Spain, Middle East and some Latin American countries^[13-18]. In this review, trochanter scores reach 1.8 : 1, which is lower than Chile's 2.14 and USA's 2.0 : 1^[19,20] but larger than in studies of Japan^[21], Singapore^[22], Prague^[23], Greece^[24] and in the particular case of Latin America, Sao Paulo^[25], Cuba^[26], and Argentina^[27].

The author estimated the stability of fractures and found that the unstable ones are more frequent. This could be an important finding to deduce the evolution of the patient; in this environment, this modality of injury is quite higher than in other statistics, but in none of the Latin American countries do they consider this factor and, therefore, it is difficult to discuss it^[11].

In conclusion, this cross-sectional, observational study has limitations, because only patients treated surgically in a Public Hospital were taken into account, those who were not operated and those who attended private institutions were not considered. Therefore, it is not possible to estimate the real frequency of this pathology in Merida State (Venezuela). In spite of this, we may recommend that further studies be carried out to find out why there are more trochanteric than femoral neck fractures, their predisposing causes and why the greater frequency of instability. Besides, the evolution after discharge from the hospital, including mortality, should be studied with the purpose of designing preventive programs for the region.

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