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ORIGINAL

Geriatric hip fractures treated with AO plate. Clinical and surgical Evolution

Fracturas de cadera geriátrica, tratadas con placa ao. Evolución clínico-quirúrgica

Yoslandy Robaina Miranda[1], Lázaro Leduan Cordero Betancourt[1], Mario Mesa Martí[1], Rafael Díaz Domínguez[1], Guillermo Breijo Madera[1]

[1]Universidad de Ciencias Médicas de Pinar del Río, Hospital Docente General Abel Santamaría Cuadrado, Departamento de Ortopedia y Traumatología. Pinar del Río, Cuba.

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Corresponding Author: Yoslandy Robaina Miranda

ABSTRACT

Introduction: hip fracture in the elderly generates negative connotations at a functional level, in addition to the repercussions on mortality.
Objective: to identify the clinical and epidemiological profile of older adults with hip fracture operated on with hemiarthroplasty by posterior approach.
Method: observational, longitudinal, ambispective and descriptive research, carried out at the "Abel Santamaría" Hospital; between 2020 and 2023. The sample consisted of 180 older adult patients with Garden III and IV hip fracture and who underwent hemiarthroplasty by the Osborne technique. For statistical analysis, the absolute and percentage frequency, the mean and the standard deviation were used.
Results: 81,1 % were 70 years of age or older, 62,8 % were female. HBP and diabetes mellitus were present in 60,0 % and 24,4 % of the patients. Extracapsular fractures occurred in 61,7 %; the most affected limb was the left with 59,4 %; 62,2 % of the patients underwent surgery within 24 hours of the event. While the Austin Moore prosthesis was implanted in 78,3 %; pain and anemia were the most frequent complications. 95,6 % of the patients were discharged alive, meanwhile, 68,6 % had an adequate evolution 12 weeks after surgery.
Conclusions: the findings described in this research reaffirm that hip fracture is an important health problem originating in older adults, and hemiarthroplasty offers high levels of satisfaction, by quickly integrating them into daily activities.

Keywords: Hip Fracture; Clinical Epidemiological Characteristics; Complications; Mortality; Elderly; Comorbidities; Hemiarthroplasty; Osborne Technique.

RESUMEN

Introducción: la fractura de cadera en el anciano genera connotaciones negativas a nivel funcional, además de las repercusiones en la mortalidad.
Objetivo: identificar el perfil clínico y epidemiológico de los adultos mayores con fractura de cadera operados con hemiartroplastia por abordaje posterior.
Método: investigación observacional, longitudinal, ambispectiva y descriptiva, ejecutada en el Hospital "Abel Santamaría"; entre 2020 y 2023. La muestra se conformó con 180 pacientes adultos mayores con fractura de cadera Garden III y IV y en los que se realizó hemiartroplastia por la técnica de Osborne. Para el análisis estadístico se utilizaron la frecuencia absoluta y porcentual, la media y la desviación estándar.
Resultados: el 81,1 % tenían 70 o más años de edad, el 62,8 % fueron féminas. La HTA y la diabetes mellitus estuvieron presentes en el 60,0 % y 24,4 % de los pacientes. Las fracturas extracapsulares ocurrieron en el

61,7 %; la extremidad más afectada fue la izquierda con 59,4 %; el 62,2 % de los enfermos se operó antes de las 24 horas de ocurrido el hecho. Mientras que la prótesis de Austin Moore se implantó en el 78,3 %; el dolor y la anemia fueron las complicaciones más frecuentes. El 95,6 % de los pacientes egresaron vivos, entretanto, el 68,6 % tuvo una evolución adecuada 12 semanas posterior a la cirugía.
Conclusiones: los hallazgos descritos en esta investigación reafirman que la fractura de cadera es un problema de salud importante originado en los adultos mayores, y la hemiartroplastia ofrece elevados niveles de satisfacción, al insertarlos rápidamente a las actividades diarias.

Palabras clave: Fractura de Cadera; Características Clínico Epidemiológicas; Complicaciones; Mortalidad; Adulto Mayor; Comorbilidades; Hemiartroplastia; Técnica de Osborne.

INTRODUCTION

The human interest in living as long as possible, together with the increasing development of science and technology, is underpinning the current trend that considers that if it is important to live longer, it is also essential that these years are spent with the best possible quality of life. Studying older people's problems is a necessary and decisive factor in medical and social research.[1,2]

In contrast to previous centuries, the 20th century was considered to be the century of mass births and the threat of overpopulation. In the current 21st century, another phenomenon, population aging, is on the horizon.[3]

Aging results from the adverse effects of the passage of time on a biological entity, where the organism declines when its adaptive capacity deteriorates.[4]

Countries are currently facing drastic changes in their population structure due to a process called 'demographic transition,' whereby a country's population shifts from one demographic profile with specific characteristics to a different one. This results in a demographic profile characterized by an older population. Scientific and technological advances have increased life expectancy, a factor that impacts mortality rates.[1,5,6]

In Cuba, as in other parts of the world, a demographic and epidemiological transition is taking place, and life expectancy at birth has increased considerably in recent years, so the number of older adults is growing daily. Cuban society shows a different scenario, with qualitatively superior changes and transformations; this is recognized by the fact that life expectancy in 1900 was barely 50 years, while in the first decade of the 2000s, it reached approximately 75 years and continues to increase. This prolongation of the average lifespan of Cubans has been achieved due to the conquests and triumphs attained by the State's constant concern for the population's well-being.[3,7,8]

Based on the above, Cuba is an example of a developing country with a significantly aging population, given its economic and social implications, and will have the oldest population in Latin America at the dawn of the year 2025. It is also expected that by 2050, Cubans will enjoy one of the oldest average ages on the planet.[1,9,10]

During 2015, individuals aged 60 years and over represented 18,5 % of the total population, a situation that has led to a considerable increase in the elderly population and, with it, an increase in cases of hip fractures.[3,8]

The aging processes lead to a reduction in muscle mass, which causes a decrease in bone strength. In addition, there is a limitation in the range of motion and alterations in coordination and balance so that the body's ability to respond quickly is minimized, increasing the risk of falls and the occurrence of fractures.[3,11,12,13,14,15,16]

When discussing a fracture, it is essential to consider that it consists of the loss of continuity of tissue, be it bone and/or cartilage, in which this continuity can be affected by trauma of great intensity. This pathology generates trauma of lesser intensity towards a diseased tissue or a fracture produced by a continuous mechanical demand on healthy or diseased tissue.[17]

Hip fracture is the most common cause of emergency admission to an orthopedic and trauma department. However, this condition causes problems beyond orthopedic damage, with repercussions in other specialties. For this reason, it is considered a geriatric syndrome because it is multifactorial, with the involvement of various elements, such as the affection of the biopsychosocial system, its significant impact on the quality of life, both of the older adult, their caregiver, and their family, their potential disability and the need to be managed by a multidisciplinary team that comprehensively treats the patient.[1,2,18,19,20]

In correspondence with the above, Gallardo[21], in his scientific article, points out that older adults with hip fractures can be considered a paradigm of frailty. They represent one of the most complex and challenging patients to treat, both in the geriatric and trauma areas.

Hip fracture has become a real global problem, not only because of its high prevalence but also because of the consequences to which it can lead.[11,14,21]

The world's population over 60 increased in the 20th century from 400 million in the 1950s to 700 million in

the 1990s. By 2025, there will be about 1,2 billion older adults. Of these, 80-year-olds will constitute 30 % and 12 % of older adults in developed and developing countries, respectively, in the next 30 years.[1,9]

By 2025, the number of older persons in the world's population will be 13,7 percent, and by 2050, 20 percent (estimated at 2 billion older persons).[1,22]

The global incidence of hip fracture will increase to 2,6 million in 2025 and reach 4,5 to 6 million by 2050. This increased incidence will increase hospital demand.[3,7,11,13,14,18,20,23,24,25,26]

The incidence of hip fractures has been estimated in different countries. It varies from 137,9 to 264,7 cases per 100 000 population over 50 years of age per year. However, the periods of analysis have been short, which has made it challenging to explore temporal changes in incidence, both in trend and seasonality.[1,27]

In the UK, 66 000 femoral neck fractures are treated yearly; about 75 % of these are displaced and managed by hip hemiarthroplasty. The number of femoral neck fractures requiring treatment is projected to increase to 100 000 per year by 2033.[28,29]

In Spain, more than 50 000 such fractures per year are associated with an annual growth rate of more than 3 % and an incidence of 100/100 000 inhabitants.[19,30]

The demographic transition, which began recently in Latin America and the Caribbean, is characterised by its rapidity. It is a widespread process. All countries in the region are moving towards older societies.[1]

In Latin America, the incidence varies from 40 to 360 patients per 100 000 inhabitants in different countries.[3,11,23,25,26,31]

In Argentina, the incidence in men and women over 50 years of age ranges between 78 - 64 and 167 - 362 per 100 000 inhabitants, respectively, with an estimated average of 488 per 100 000 inhabitants.[3,21,23]

In Chile, it is estimated that by the year 2030, there will be more than 17 000 hip fractures per year in the age group of 60 years and older.[21]

In Cuba, where life expectancy exceeds 75 years on average, it is somewhat higher in women, and more than 12 % of the population is represented by the 65 and over age group; this problem is no exception.[25]

More than 1 million inhabitants belong to older people, and the incidence of hip fractures is rising due to the aging population. It is estimated that 12 000 hip fractures occur annually in the country. This constitutes a significant challenge for the healthcare system.[1,11,20,25,26,31,32]

Given the above, the general objective is to determine the clinical and epidemiological characteristics of older adults with hip fractures operated on with posterior approach hemiarthroplasty.

METHOD

An observational, descriptive, and longitudinal research was carried out in the General Teaching Hospital 'Abel Santamaría Cuadrado' of Pinar del Río in the study period from 2020 to 2023.

The Study Universe consisted of all patients admitted with hip fractures during the aforementioned period and place (n = 515).

The study sample consisted of patients who underwent surgery and were considered to be older adults (n = 180).

Sampling: non-probabilistic by convenience or intentional.

Inclusion criteria

1. Patients aged 60 years or more.
2. Patients with hip fracture Type III or IV of the Garden classification.
3. Patients in whom a partial hip prosthesis was used posteriorly.
4. Patients with intact cognitive function.
5. Patients with complete documentation.
6. Patients belonging to the health areas of the province.

Exclusion criteria

1. Patients who required partial prosthesis but the cause was not a fracture.
2. Patients who have undergone osteosynthesis surgery.
3. Patients who have not been treated surgically.
4. Patients with hip fractures Type I and II of the Garden classification.
5. Patients with a history of hip fracture or concomitant musculoskeletal injury.
6. Those patients in whom death occurred before being operated on.
7. Patients who were surgically treated using total arthroplasty.
8. Patients diagnosed with cancer on admission, pathological hip fracture, periprosthetic fracture associated with a previous hip prosthesis.

For the elaboration of the research, it was essential to make use of different methods of both study and analysis, among them should be mentioned:

Methods employed

Theoretical, historical, and logical scientific research methods were used, supported by analysis, synthesis, induction, and deduction. An exhaustive and updated search of epidemiological studies was conducted to obtain an international and national overview of geriatric hip fractures treated with a plate. Within the empirical methods, a survey was used to collect the data and information left out of the objectives and variables studied.

Summary measures for qualitative and quantitative variables were used for data analysis and processing. From an ethical point of view, this research complied with the fundamentals of ethics that appear in the Declaration of Helsinki 2008. Its essential aim was scientific.

RESULTS

The results related to the incidence, proportion, and rate of older adults with hip fractures operated on with posterior approach hemiarthroplasty according to age groups and sex showed a predominance of the group equal to or older than 80 years of age, with 46,7 %. When referring to sex, it was observed that the incidence was higher in females, with 62,8 %. Regarding skin color, there was a predominance of white skin in 137 patients (76,1 %).

Table 1. Comorbidities present in the patients under study

Comorbidities	No.	%*
	108	60,0
Hypertension	44	24,4
Diabetes Mellitus	28	15,6
Anaemia	22	12,2
Ischemic Heart Disease	11	6,1
Obesity	8	4,4
Bronchial Asthma	7	3,9
Senile Dementia	6	3,3
Stroke	3	1,7
Otros	31	17,2

Note: *Percentage based on total sample (n = 180)

Table 1 shows the comorbidities of the patients under study. Arterial hypertension was present in 108 patients (60,0 %), followed by diabetes mellitus (24,4 %) and anemia (15,6 %), respectively. Regarding comorbidities, 90,6 % of patients had one of the conditions listed in the table, while 45,6 % had more than one.

Table 2. Modality of fracture in patients under study

Modality of fracture	No.	%
Intracapsular	69	38,3
Extracapsular	111	61,7
Total	180	100,0

Table 2 shows the fracture modality, depending on whether it occurred inside or outside the joint capsule. In 61,7 % of the patients, it happened outside the capsule (extracapsular).

Table 3. Affected limb of the patients under study

Affected limb	No.	%
Left	107	59,4
Right	73	40,6
Total	180	100,0

Table 3 shows the distribution of the patients under study according to the affected limb. 59,4 % of the patients had injuries in the left lower limb.

Table 4. Length of stay prior to surgery of the patients under study		
STAY (hours)	**No.**	**%**
< 24	112	62,2
24 – 47	36	20,0
48 – 71	17	9,4
≥ 72	15	8,4
Total	180	100,0

$\bar{x}$ ± DE – 26,8 ± 2,3 hours IC 95 % -- [22,8; 30,8] hours

Table 4 shows the length of stay before surgery. 62,2 % of patients stayed less than 24 hours, followed by the 24-47-hour interval, with 20,0 %. The average length of stay was 26,8 hours, with a standard deviation of ± 2,3 hours.

Table 5. Prosthetic materials used in the patients under study		
Prosthetic material	**No.**	**%**
Thompson	39	21,7
Austin Moore	141	78,3
Total	180	100,0

Table 5 shows the distribution of the patients studied according to the prosthetic material used, and shows that 141 patients used the Austin Moore prosthesis (78,3 %).

Table 6. Typology of local and general post-surgical complications				
Complications	**Immediate (n = 53)**		**Late (n = 48)**	
	No.	**%***	**No.**	**%***
Premises				
Pain	29	54,7	23	47,9
Haematoma of the surgical site	7	13,2		
Surgical wound infection	6	11,3		
Pressure ulcers			9	18,8
Deep infection			6	12,5
Late bleeding			3	6,3
Dislocation of the prosthesis			2	4,2
Periprosthetic fracture			1	2,1
General				
Complications	Immediate (n = 43)		Late (n = 22)	
Anaemia	19	44,2	12	54,5
Dehydration	14	32,6		
Confusional state	11	25,6	6	27,3
Paralytic ileus	8	18,6		
Pulmonary thromboembolism	3	7,0	1	4,5
Pneumonia	2	4,7	4	18,2
Note: * Percentage based on the total of immediate and delayed				

Table 6 shows the distribution of the patients under study according to the main immediate, late, and general post-surgical complications. Within the local complications, pain was predominant both immediately in 54,7 % and late in 47,9 % of the patients. Anaemia was the main complication among immediate general complications, 44,2 %, and delayed, 54,5 %.

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Another result was related to the condition of the patients at discharge: 95,6 % were discharged alive, and only eight in-hospital deaths (4,4 %) occurred.

When presenting the results of the patients under study according to the categorization of postoperative evolution up to 12 weeks, it was observed that 68,6 % of the patients had an adequate evolution, 19,8 % had a discrete improvement, and in 20 patients, the evolution at 12 weeks was unfavorable. It should be noted that during this time, three patients died from causes not dependent on complications of the surgical intervention.

DISCUSSION

There is a proportional relationship between age and the phenomenon studied; in other words, as age increases, the number of patients with hip fractures who undergo hemiarthroplasty increases.

Generally, hip fracture occurs in a medically complex elderly patient with a decrease in physiological reserve and the capacity to respond to intrinsic and extrinsic stress factors, and who also present nutritional problems, dehydration, fragility, neuropathology, polypharmacy, among other elements.[27,30]

This means that the growth of this event in the elderly is due to osteoporosis, which creates modifications in the microstructure of the bone and is the fundamental causal component; the fall in these patients is the mechanism that precipitates it.[18,33,34,35,36,37,38,39,40]

Thus, older people have a high incidence of hip fractures, and the heterogeneity in both their condition and post-fracture outcomes is well known. Hence, some authors have already used the term epidemic to describe this increase in the incidence of proximal femoral fracture.[8,21,30,41-52]

In correspondence with those above, all of the scientific articles reviewed state the intimate relationship between older age and hip fractures; this is shown in the study carried out by Nápoles Mengana[14], who states that in Spain, there are approximately 36 thousand hip fractures per year in patients over 65 years of age.[4] Bachiller[19] also corroborates these data. In addition, this author alleges that the incidence rate is different in the regions of this country.

Gallardo[21] found that the increase in the frequency of hip arthroplasty is directly proportional to increasing age. This may have been possible because a higher proportion of patients had femur fractures related to bone fragility and the risk of osteoarthritis, which increased with age.[3,4,27] This researcher suggests that the most frequent group was the over-80s.

Similarly, González Navarro[30] points out that hip fracture is a health problem whose incidence increases from the age of 60 and follows an exponential pattern from the age of 80.

Morales[27] states in his work that the group with the highest number of accidents leading to hip fractures corresponds to people over 70 years of age, as is to be expected. There are various reasons for this.

Cuba is not excluded from this problem since, at the moment, around 22 % of its population is over 60 years of age, and 10,9 % of them are 70 years of age or older. In the coming years, a significant increase in this sector of the population is expected, which will, therefore, increase the number of hip fractures that may occur. Other elements, such as increased life expectancy, lower mortality, and low birth rate, are added.[14,50,53,54]

Throughout the approaches taken and in coincidence with the multiple works consulted, the results obtained are similar to those of the set of studies analyzed both nationally and internationally.[1,3,15,16,18,20,22,23,28,35,55,56,57,58]

All the studies suggest an average age between 75,7 and 81,7 years; a similar result was obtained in this research.[3,22,23,35]

Sex is a separate issue, as it has disparities concerning fractures, specifically hip fractures. Research shows that the female sex is the most affected by this type of fracture, with proportions of between two and three women for every man.[16]

This disproportion in the frequency between the sexes is due to various anatomical and demographic elements that predispose women to suffer hip fractures; among them are a longer life expectancy among men, a varus disposition of the hip, and the suffering of the osteoporotic process to a greater extent, due to the fall in estrogen consequent to the menopause, the peak of bone mass, which also plays a significant role in the geometry of the bone. The influence of psychological lifestyle factors and health concerns are also mentioned. On the other hand, the frequency and type of falls show that women fall more easily than men.[3,4,18,20,27,57]

In Cuba, other conditioning factors, in addition to the above, are related to demographics. On this basis, it can be pointed out that the predominance of the female sex is also due to the structure of the demographic pyramid; according to data from the Statistical Yearbook of Health 2022, the Cuban population of older women outnumbered that of men. The same happened in the province of Pinar del Río.[20,23,54]

All researchers report that women are much more likely to suffer a hip injury than men; all report frequencies above 50,0 % and as high as 79,0 %, as was the case in this research.[1,15,20,23,27,35]

Most of the studies consulted do not mention skin color among the variables they analyze, making it difficult to compare the results.

However, Rego Hernández[3] states that in his study, there was a predominance of white skin colour (80,6 %). In addition, white skin color was associated with an increased risk of hip fracture, with a 4,2 times greater

probability of suffering it in comparison with those of black and mestizo skin color.

Perch[16] and Rodríguez Santiago[18] state that studies carried out by other researchers show that hip fractures are more frequent in the Caucasian and post-menopausal population.[18,56,57]

Similarly, a study carried out in the United States of America found that 91,2 % of the patients with hip fractures were white.[3]

The results obtained may be related to the composition of the Cuban population in this age group, it is thought.

Many authors highlight the importance of the comorbidities that patients present with at the time of the fracture event, as these are intimately linked to postoperative evolution, mortality, and even the decision to perform the surgical intervention.[14,18,44,46,47,52]

This is because the minimum conditions of hemodynamic stability cardiovascular, respiratory, or renal function are necessary to guarantee the success of the surgery. Therefore, these comorbidities are responsible for the delay in the surgical solution of the hip fracture and the significant increase in mortality.[14,18,44,47,52]

About the comorbidities that can be associated with hip fracture in the elderly, arterial hypertension is the most frequent among the different scientific articles reviewed, with a frequency ranging from 39,5 % to 91,8 %. Arterial hypertension has increased significantly in all latitudes, which is partly explained by the new blood pressure values that are currently accepted. It is a chronic disease that evolves silently and is a public health problem in most parts of the world. It is estimated that 691 million people suffer from it, not least because it is the single most important modifiable risk factor for coronary heart disease, cerebrovascular disease, congestive heart failure, end-stage renal disease, and peripheral vascular disease.[1,14,15,23,35,43-56]

For its part, diabetes mellitus is another affliction that is one of those that harms the elderly, not only because of the complications that derive from it but also because several scientific articles show its relationship with hip fractures, as it is associated with a reduced physical function due to the neurovascular alterations that occur in this disease. In general terms, the researchers mentioned that its frequency among older adult patients with hip fractures is between 15,0 % and 57,1 %.[15,23,35,50,55,57]

Arterial hypertension and diabetes mellitus are common diseases of high incidence. At the same time, obesity and dementia do not represent significant figures; they are latent risks to be investigated, prevented, and treated, and they are a sign of the aging of the Cuban population.[23]

Similarly, Martínez[48], Jean[59], and Wei[60] recognize the influence of dementia, in which the dissociation and confusion that these provoke in affected older adults can increase the risk of hip fracture.

González Navarro[30] states that more than 50 % of patients with hip fractures have some comorbidity, and up to 35 % may have four or more baseline diseases. Cardiac, respiratory, and renal conditions have the most significant influence on perioperative morbidity and mortality.

The distinction between intracapsular and extracapsular fractures is of prognostic importance and determines the surgical treatment to be used.[20]

On reviewing the literature, there is agreement about the predominance of extracapsular fractures (cervical base, intertrochanteric, and subtrochanteric) over intracapsular fractures (subcapital and transcervical).[27]

Similarly, Sánchez Delgado[23] affirms that extracapular fractures occurred more frequently in his series, with 57,1 %, including those in the intertrochanteric region.

Likewise, in his work, Nápoles Mengana[14] points out that extracapsular fractures were the most frequent variety in this study, with 49 patients for 71,0 % of the total. Intertrochanteric fractures were the most common of these, accounting for 44,9 %. It is also mentioned that intertrochanteric fractures are more frequent in elderly patients and result in high morbidity and more difficult rehabilitation due to the deterioration of muscle strength and proprioceptive function.

Based on the above considerations, it can be said that when reviewing the literature, there are coincidences in terms of the predominance of extracapsular fractures (cervical base, intertrochanteric, and subtrochanteric) about intracapsular fractures (subcapital and transcervical).[1,15,20,22,30,44,34,47,58]

When analyzing the lower extremity affected, Gómez Sarduy[1] reports that there was a predominance of hip fractures on the left side with 23,5 %.

For his part, Nápoles Mengana[14] notes that in his series, 71,0 % of patients had fractures of the left hip.

Several authors have argued that there is a high percentage of right-handed people in the general population. However, it has also been suggested that humans, as a defense mechanism, generally use the contralateral side as support during falls, which may justify this high incidence.[14,50,51]

The results obtained in this research coincide with those referred to above. In contrast to the above, both Lozano[15] and González Gutiérrez[50] point out that in their series, the right extremity prevailed as the most frequent location of hip fractures.

Another critical risk factor described is the time between injury and surgery. According to some authors, delaying surgery could increase the incidence of severe complications due to immobilization, such as pneumonia, urinary tract infection, disorientation, and delirium.[30]

In his study, Gómez Sarduy[1] reports that the average time between admission and surgery was 18:00 hours,

which is less than the time obtained in this study.

González Gutiérrez[50] in his work states that in 88,5 % of his cases, the time between the fracture and surgery was less than three months. This author himself states that these time intervals do not apply to hip fracture, which was the main indication for arthroplasty, where the preoperative time intervals should be shorter, generally in hours or days, since the fracture is an emergency and the shorter preoperative time is related to fewer complications and less mortality.

Lozano[15] also states that concerning preoperative time, this was 3 to 6 months in 71,8 % and more than 6 months in 28,2 %.

These time lapses differ significantly from the times established in this research.

This surgical approach should be performed within the first hours after admission, generally within 48 hours or as soon as possible after stabilizing the patient's medical conditions. Delays in treatment are associated with higher mortality at one year and worse postoperative prognosis.[45]

Surgical delay in our center (median 2) affected 45,2 % of patients operated on after 48 hours and 38,7 % after 72 hours, which correlates with that described in the literature.[45]

The importance of surgical delay is a controversial and 'inconclusive' issue in the literature, with contradictory studies. Some authors advocate urgent surgery within 48 hours, arguing that this reduces the risk of morbidity and mortality, while others do not correlate early surgery with lower mortality.[45]

If the patient has no underlying decompensation or pharmacological contraindication, the elderly patient could benefit from early intervention within the first 48 hours, as it allows early rehabilitation, a lower rate of postoperative complications, shorter hospital stay and associated costs, and lower mortality.[45]

In 78,8 % of patients, the surgical delay from admission was more than 48 hours. Other published studies have observed that surgery could be delayed due to patients' poor clinical condition compared to those who underwent surgery earlier.[52]

Early surgery in patients with hip fractures before 24 hours is of great importance to avoid post-surgical complications in patients. The multidisciplinary evaluation of the patient's pathological history is fundamental, as the risks following surgery increase the mortality rate in patients without indicating the failure of the operation itself.[46]

According to Azar[32] there are elements to be considered when choosing a prosthesis. However, the main factor is the amount of calcar adequate for the placement of the prosthetic material, as the Moore prosthesis needs at least 1,3 cm of calcar to be securely fixed. In contrast, the Thompson prosthesis can be used when the calcar is deficient or damaged. The Moore prosthesis was used in the hemiarthroplasty of the patients investigated because of its greater availability. In contrast, the Thompson prosthesis was reserved for cases with a better-established calcar for prosthesis seating.

The literature reviewed suggests that the Thompson prosthesis, because it is not fenestrated, has the advantage that it can be removed more easily than the Moore prosthesis when there is a complication and prosthetic replacement or total arthroplasty is necessary.[42]

The average age of patients who suffer hip fractures is over 70 years, so in these patients, in addition to the standard post-surgical complications of any trauma procedure, there are also constitutive geriatric complications, which combine with the above to form what is colloquially known as the 'Fracture Syndrome of the Elderly.' This syndrome encompasses the full range of physiological, psychological, and functional repercussions of hip fracture for the geriatric patient. These include pain, immobility, blood loss, anemia due to loss, decompensation of previous pathologies, confusional syndrome, thromboembolic disease, loss of independence, pressure ulcers, difficulty in recovery, loss of mobility, post-fall syndrome, etc. This conglomerate of complications that occur one from the other transform and have repercussions on different systems of the patient and makes the geriatric patient not only a complex patient to manage in the acute and chronic stages but also turns hip fracture into a pathology marker of morbimortality.[35]

The complications that can occur in patients who undergo surgery for hip fracture are dissimilar, and they can originate during the operative act, immediately or late.

Country[54] in his study, alludes to the fact that complications of hip arthroplasty are relatively frequent and proposes a classification into short-term (< 6 weeks after surgery) and long-term (≥ 6 weeks after surgery). Among the short-term complications he suggests are acute infection with an incidence between 0,3 % and 3,0 %, periprosthetic fracture (1 % - 4 %), and thromboembolic disease, among others. In the long term, he states: aseptic loosening, septic loosening or late infection, heterotopic ossification, material wear or breakage, metallosis, and dysmetria. Likewise, among those that may occur in the short or long term, he mentions the dislocation of the prosthesis.

González Gutiérrez[50] mentions that complications occurred in approximately 10 % of patients, a lower figure than that obtained in this study. The main complications in his series were dislocation (3,4 %) and infection of the operative wound in two patients (2,3 %).

Bermúdez, cited by González Gutiérrez[50], found complications in 21,1 %, the most common being operative

wound infection. Lozano[15] states that the most common post-surgical complications were urinary tract infections (22,7 %) and dislocation of the prosthesis (13,6 %), while 25 % had no complications; this figure is lower than the one reported in this study.

Similarly, Ormaza[17] points out that one of the main complications, because the fracture remains in fixation, is the formation of clots, which, being a large fracture, can produce moderate-sized clots that can migrate towards the pulmonary region and produce pulmonary thromboembolism. Another complication is the formation of pressure ulcers, which are considered postoperative complications of hip fractures because keeping a person static maintains pressure on the object, in this case, the skin, which can withstand high pressures but only for short periods. If kept longer than necessary, crushing occurs at the tissue level, preventing correct blood flow and generating hypoxia and later tissue death. This author also states that after hip fracture interventions, there is damage to the organism and risks of diseases such as pneumonia, one of the leading causes of postoperative fever, or the production of the same mechanical ventilation required by the patient.

It should be added that Paz González[35] emphasizes in his work that one of the most frequent postoperative complications and greatest clinical-surgical relevance is postoperative infections of joint prostheses. This is based on the fact that prosthetic material acts as a foreign body, understood as any object introduced into an organism to which it is foreign. This material can stimulate the aggregation and formation of bacterial layers. In the same way, during the surgical procedure, an entry point for various pathogens is created, especially for those belonging to the patient's skin. Together, these two elements increase the risk of infection, either at the level of the surgical wound or deep within it.

As can be seen, the most frequent complications vary between studies. This difference may be due to variations in the criteria for considering a complication, such as whether it is directly related to the joint.

This study presents post-surgical complications similar to those reported in the literature.[40,53,61,62,63,64,65,66]

Hip fracture represents the most serious complication of osteoporosis, which is also associated with considerable morbidity and excessive mortality; it has high costs not only for public health systems but also on a social scale.[1,3,20,46,67]

The mortality of this process, especially in the first three months, is due to the combination of the fracture together with the performance of a primary surgical process in a patient with severe comorbidities. Despite advances in surgical and anesthetic techniques, the mortality rate for hip fracture ranges from 14 % to 36 % in the first year after injury, double that of people of the same age without fracture. Various risk factors for mortality after hip fracture surgery have been described, such as advanced age, male gender, and number of associated comorbidities.[28,30]

According to González Gutiérrez[50], arthroplasty as a direct cause of death is reported internationally in a very low percentage; in the work carried out by this author, only one death was reported, but due to causes external to the surgical procedure.

The different scientific articles reviewed state that mortality per year in patients with hip fractures is close to one-third of those operated on and that only 50 % of those who survive return to their previous functional status.[11,21,60]

For their part, Vivero[9] and Perch[16] state that between 20 % and 40 % of older adults with this condition die within the first year after sustaining the injury.

Tabares Neyra[28] also notes in his study that the mortality rate after six months of treatment is due to clinical complications such as pneumonia, pulmonary thromboembolism, and sepsis and ranges between 12 % and 41 %.[68,69,70]

On the other hand, the results of the study conducted by Vento[42] show that the hip fracture surgery population has an in-hospital mortality of 4,1 % and a cumulative mortality at 3 and 6 months of 18,2 %. Thus, the results of this research agree with what has been referred to previously.

In his article, Calderon[46] points out that the mortality rate among elderly patients during the first year after fracture fluctuates between 14 % and 36 %. Epidemiological studies show that hip fracture is associated with a significantly increased risk of mortality for 6 to 12 months after injury. However, after the first year after the fracture, the mortality rate becomes equal to that of people of the same age and gender who have not suffered the fracture.

In this study, deaths occurred in 4,4 % of patients, a result equivalent to that reported in the literature.[52,54,55,54,57,58]

Assessing functional capacity in older people is an essential indicator of quality of life in the elderly. Performance in basic activities of daily living is currently the widely accepted and recognized parameter for this. The main component of functional recovery is regaining the ability to walk, which has essential privileges for achieving independence. This allows health professionals a more accurate picture of the severity of the disease and its sequelae.

Several studies highlight the importance of clinical, socio-demographic, functional, mental, and care factors in the functional recovery of elderly hip fracture patients.[59]

Calderón[46] states in his work that to recover functional independence and return to the home after a hip fracture, the patient should:

- Regain the ability to perform basic activities of daily living, which include feeding oneself, bathing, dressing, and being able to use the toilet.
- Perform instrumental activities of daily living: buy their food, prepare their meals, manage their finances, do their laundry, perform household activities, and be able to use public transport. A substantial proportion of elderly hip fracture patients do not recover their ability to perform basic or instrumental activities of daily living: 33,40 % of patients recover their previous ability to perform basic activities of daily living, but only 14,21 % recover their ability to perform basic instrumental activities of daily living. Most recoveries occur within the first six months after fracture.

Vento[60], in his work 'Prognostic factors associated with poor outcome in hip fracture patients over 65 years of age', compared the functional status of these patients before the injury and six months after surgery and found that 27. The results showed that 27,3 % were self-sufficient, 26,3 % walked with some difficulty, 19,2 % were independent with a cane, 11,1 % walked with a walker or required little help from one person, 10,1 % needed help from two people or had habitual incontinence. In comparison, 6,1 % did not walk or were incontinent. Six months after surgery, these were their results: 6,5 %) were self-sufficient, 20,8 % walked with some difficulty, 19,5 % were independent with a cane, 24,7 % walked with a walker or required little assistance, 16,9 % needed help from two people or were habitually incontinent, while 11,7 % did not walk or were incontinent.

In the study done by Reguant, cited by Vento[60] of 86 patients who before the fracture had normal walking ability, one year after surgery, only 33 (38,4 %) had recovered their previous walking ability, 47 patients (54,6 %) needed some assistance to walk, and six patients (7 %) did not walk at all.

Montalbán[59] states in his study that, with regard to functional evolution, despite some patients having a very tight level of walking autonomy, 87,5 % were walking again 3 months after discharge, with or without assistance.

Several studies have demonstrated a higher proportion of patients with walking independence following a rehabilitation program. In the same context, a literature review on walking ability after hip fracture shows that 54 % of patients in one study and 76 % in another need technical assistance to walk one year after the fracture.[59]

On the other hand, Calderon[46] states that about 50 % to 65 % of hip fracture patients recover their previous level of ambulation, 10 % to 15 % do not recover the ability to walk outside the home, and about 20 % lose the ability to ambulate inside and outside the house.

These results are consistent with other studies in which the patients in the sample walked either completely independently or with assistance before the fracture and had a favorable recovery following surgery.[60]

CONCLUSIONS

Hip fractures are a frequent global health problem with important implications in daily practice. They are high in incidence, prevalence, morbidity, and mortality and constitute a social problem of great magnitude. Hip hemiarthroplasty, as a treatment for these displaced fractures of the upper end of the femur, Garden stages III and IV, offers valuable satisfaction and guarantees the patient's return to daily life activities, with little pain and a low incidence of complications.

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AUTHORSHIP CONTRIBUTION

Conceptualization: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Formal analysis: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Research: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Methodology: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Project management: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Supervision: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Validation: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Visualisation: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Writing - original draft: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.

Writing - revision and editing: Yoslandy Robaina Miranda, Lázaro Leduan Cordero Betancourt, Mario Mesa Martí, Rafael Díaz Domínguez, Guillermo Breijo Madera.