

Impact of Comorbidities on Mortality and Functional Outcomes in Patients Following Surgical Treatment of Proximal Femur Fractures in the Elderly. A Study of 52 Cases

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ABSTRACT

Introduction: These common geriatric conditions most frequently occur in individuals with comorbidities related to advanced age and result in a fragile physiological state. The objective of our study was to analyze the impact of comorbidities on mortality and functional outcomes.

Materials and Methods: This was a retrospective, observational, cross-sectional study conducted over 2 years, during which we enrolled 52 patients aged 75 years and older with a proximal femur fracture. The mean age ($\pm$ standard deviation) was 82.0 ± 6.0 years, with a clear predominance of women (59.6%). We assessed mobility using the Parker score, which we modified and adapted to our context. We examined the impact of comorbidities on mortality and functional outcomes.

Results: High blood pressure and diabetes were the most common comorbidities, at 67.3% and 34.6%, respectively. We recorded 12 deaths, including 2 that occurred during hospitalization. We found no statistically significant association between comorbidities and death.

At a mean follow-up ($\pm$ standard deviation) of 9.0 ± 4.1 months, the mean Parker score ($\pm$ standard deviation) decreased from 7.7 ± 1.4 preoperatively to 6.8 ± 1.3 postoperatively. We found no statistically significant association between comorbidities and the Parker score.

Conclusion: Proximal femur fractures most commonly occur in older adults with comorbidities. These comorbidities should be considered because they influence patient management.

Keywords

Comorbidities Mortality Functional, Outcome Surgical treatment, Proximal femoral fractures, Older adults.

Introduction

Proximal femur fractures are pathologies that affect both functional and vital prognosis, with a high risk of complications [1].

Given the mortality, loss of functional capacity, and reduced quality of life they cause, these fractures constitute a global public health problem [2]. This pathology affects elderly individuals, often frail

and with multiple comorbidities, sometimes with already limited autonomy and low functional reserve [3]. Hip fractures are most often caused by a fall and are the second leading cause of fracture in individuals over 50 years of age, after radius fractures [4]. Beyond the physical and psychological suffering, proximal femur fractures result in significant healthcare expenditures stemming from both medical care, social assistance, and the very high costs of surgical interventions and hospitalization [5]. Trends suggest that, due to the aging population, the number of hip fractures is estimated to increase by 12% per year until 2030 [6].

The objective of our study was to analyze the impact of comorbidities on mortality and functional outcomes in elderly patients after surgical treatment of proximal femur fractures.

Materials and Methods

This was a retrospective, descriptive, and analytical study. Patients underwent surgery between January 2024 and December 2025. The study was conducted in the Orthopedics and Traumatology Department of the Ignace-Deen University Hospital in Conakry, Guinea. The records of patients admitted for proximal femur fractures associated with a comorbidity were included in the study. Incomplete records and those of patients without comorbidities were excluded. We obtained informed consent from patients before the final follow-up assessment. The diagnosis was confirmed after an anteroposterior pelvic X-ray and a lateral pelvic X-ray of the painful hip, supplemented by laboratory tests based on underlying conditions.

The time to surgery depended on the comorbidities observed upon admission and the patient's financial resources. The surgical approach and implants used were determined by the injury and the patient's age. For femoral neck fractures, the posterolateral (Moore) approach was used for total hip arthroplasty (THA) in patients under 80 years of age, and the lateral (Hardinge) approach for hip replacement (HHA) in patients 80 years of age and older. For trochanteric fractures, the distal radiofrequency fixation (DHS) and PFN and PFNA nails were used under fluoroscopic guidance. Specialized pre- and postoperative care services managed comorbidities. Functional outcomes were assessed using Parker and PMA scores [7] after a minimum follow-up of 8.5 months ± 4.5, and in-hospital and out-of-hospital deaths were counted.

Results

Sociodemographic categories

The study included 52 patients aged over 60 years. The mean age was 82.0 ± 6.0 (75-100) years. We analyzed age, sex, circumstances of injury, and area of residence (see Table 1).

Table 1: Distribution of patients by age, sex, circumstance of injury, and area of residence.

Sociodémographic characteristics	Number (N = 52)	Percent-age
Age groups		
Very elderly (75-84 years)	36	69,2
Geriatric (85 years and over)	16	30,8
Mean age (± Standard deviation) : 82,0 ± 6,0 years		
Sex		
Female	31	59,6
Male	21	40,4
Sex-ratio (M/F) : 0,7		
Circumstances of injury		
Fall from height 49 94,2		
Road traffic accident 3 5,8		
Area of residence		
Urban 33 63,5		
Rural 19 36,5		

Clinical characteristics

The injuries consisted of fractures of the femoral neck and trochanteric region (Figures 1 and 2). These injuries, as well as the pre-fracture Parker score and comorbidities, are recorded in Table 2.

Table 2: Distribution of patients according to fracture type, peri-fracture Parker score, and comorbidities.

Clinical characteristics	Number (N = 52)	Percentage
Fracture type		
Femoral neck fracture	28	54
Pertrochanteric fracture	24	46
Prefracture Parker Score		
Semi-autonomous	17	32,7
Autonomous	35	67,3
Mean Parker Score (± Standard deviation) 7,7 ± 1,4		
Comorbidities		
Hypertension	35	67,3
Diabetes	18	34,6
Stroke	11	21,2
Cancer	6	11,5



Figure 1: Femoral neck fracture

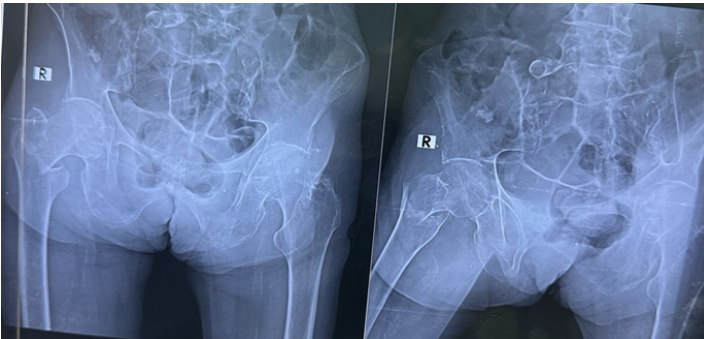


Figure 2: Pertrochanteric fracture.

Table 3: Distribution of patients according to implants used, rehabilitation, postoperative Parker score, and complications.

Therapeutic characteristics	Number (N = 52)	Percentage
Implants		
Bipolar Hip Prothesis	24	46,2
Dynanic Hip Screw	22	42,3
Total Hip Prothesis	4	7,7
Proximal Femoral Nail	2	3,8
Rehabilitation		
No	27	51,9
Yes	25	48,1
Postoperative Parker score		
Bedridden	1	1,9
Semi-autonomous	30	57,7
Autonomous	21	40,4
Mean Parker Score ($\pm$ standard deviation): $6,8 \pm 1,3$		
Complications		
Bedsore	11	21,2
Infection	5	9,6
Dislocation	3	5,8
DHS removal	3	5,8
Pulmonary embolism	1	1,9
Death	12	23,1

Table 4: Distribution of patients according to PMA score.

PMA score	Number	Percentage
Excellent (18)	0	0
Very good (15-17)	1	1,9
Good (13-14)	27	51,9
Average (11-12)	16	30,8
Poor (≤ 10)	8	15,4
Total	52	100

Table 5: Impact of Comorbidities on Death.

Comorbidities	Death		p-value
	No n = 40	Yes n = 12	
Diabete			0,7
No	27 (67,5%)	7 (58,3%)	
Yes	13 (32,5%)	5 (41,7%)	
Hypertension			>0,9
No	13 (32,5%)	4 (33,3%)	
Yes	27 (67,5%)	8 (66,7%)	
Stroke			0,7
No	32 (80,0%)	9 (75,0%)	
Yes	8 (20,0%)	3 (25,0%)	
Cancer			>0,9
No	35 (87,5%)	11 (91,7%)	
Yes	5 (12,5%)	1 (8,3%)	
Fisher's Exact Test			

Therapeutic and outcome characteristics

The mean time to treatment was 5.3 ± 2.5 [2-15] days. All patients underwent surgery under regional anesthesia. The orthopedic operating table was used for all trochanteric region fractures. Table 3 records the implants used, rehabilitation, postoperative

Parker score, and complications. The mean follow-up was 8.5 ± 4.5 [7-13] months. The PMA score at follow-up is shown in Table 4. We assessed the impact of comorbidities on mortality and postoperative functional outcomes using Fisher's exact test in Tables 5 and 6.

Table 6: Impact of comorbidities on functional outcome (postoperative Parker score).

Comorbidities	Postoperative Parker			p-value
	Bedridden n = 1	Semi-autonomous n = 30	Autonomous n = 21	
Diabete				0,13
No	0 (0,0%)	22 (73,3%)	12 (57,1%)	
Yes	1 (100,0%)	8 (26,7%)	9 (42,9%)	
Hypertension				0,4
No	1 (100,0%)	9 (30,0%)	7 (33,3%)	
Yes	0 (0,0%)	21 (70,0%)	14 (66,7%)	
Stroke				>0,9
No	1 (100,0%)	23 (76,7%)	17 (81,0%)	
Yes	0 (0,0%)	7 (23,3%)	4 (19,0%)	
Cancer				>0,9
No	1 (100,0%)	26 (86,7%)	19 (90,5%)	
Yes	0 (0,0%)	4 (13,3%)	2 (9,5%)	
Fisher's Exact Test				

Discussion

Hip fracture is one of the most frequent causes of disability and hospitalization in older adults. Due to the high frequency of sequelae and significant morbidity and mortality rates, the overall prognosis for older adults with a hip fracture is far from certain [1-2]. As this study shows, hip fractures are most often caused by domestic accidents involving falls and primarily affect older women, with a mean age of 82.0 ± 6.0 years [3,5,8]. Aging leads to decreased physiological reserves, declining muscle mass, and progressive deterioration of bone quality. Thus, even minor trauma can be sufficient to cause a fracture in older adults.

Comorbidities and Older Adults

The age of onset of old age is debated. The World Health Organization has proposed 60 years of age [9].

In this study, we observed the coexistence of at least two comorbidities in the same patient. Patients over 80 years of age had the most polymorbidities. Cardiovascular diseases were the most frequent, with the highest incidence of comorbidities.

The health status of most older adults is characterized by the coexistence, in the same individual, of multiple conditions of varying severity. Some of these conditions may result from aging, such as cataracts or osteoporosis, from the after-effects of past illnesses, or from ongoing chronic diseases (such as ischemic heart disease, rheumatoid arthritis, and chronic obstructive pulmonary disease). The burden of these chronic diseases, or comorbidities, increases progressively with age. For clinicians, comorbidities matter because they influence diagnosis, treatment approach and

management, and ultimately the patient's life expectancy. Current knowledge regarding comorbidity shows that the greater the comorbidity, the higher the risk of loss of functional independence, institutionalization, and mortality. Comorbidity also has public health implications, increasing the costs of associated care and hospitalizations. Cardiovascular diseases are the most frequent and are responsible for the majority of morbid complications [10].

Impact of Comorbidities on Mortality

This study focused on deceased patients with at least one comorbidity. We observed that the majority of deceased patients had at least one comorbidity, particularly in the postoperative period. Despite this finding, we did not observe a statistically significant association between mortality and comorbidity. Some authors have reported this lack of correlation [11,12]. All deaths occurred outside of hospitals. These deceased patients were all bedridden postoperatively with a poor PMA score due to decompensation of their underlying conditions and inadequate rehabilitation. Studies have shown that the presence of at least three comorbidities is the most significant preoperative risk factor for mortality in patients with a hip fracture [13-15]. Other factors have been implicated [12,16], including age over 90, male sex, and a poor Parker score.

We encountered considerable difficulties in managing patients with comorbidities within a multidisciplinary setting. After hospital discharge, consultations with other specialties were not maintained.

In developed countries, significant progress has been made in the preoperative management of comorbidities through the creation of specialized orthogeriatric units. These units allow a multidisciplinary approach that includes anesthesiology and intensive care, geriatrics, internal medicine, and physiotherapy to improve care and reduce mortality rates [10,12,17].

Impact of Comorbidities on Functional Outcome

We observed at least one comorbidity in semi-autonomous and bedridden patients after surgery. We noted that some patients who were autonomous pre-fracture became semi-autonomous and bedridden postoperatively due to the consequences of comorbidity decompensation in the post-fracture period. The long hospital stay, prolonged bed rest, and lack of rehabilitation could explain this. Despite this observation, we did not find a statistically significant link between functional outcome and comorbidity.

Other factors are implicated in the development of impaired mobility. These include: age, pre-fracture functional status, fracture site, type of surgery, and delays in surgery and functional rehabilitation [18]. Numerous studies have examined the relationship between postoperative functional outcomes and these factors [11,19,20]. Various comorbidities (e.g., osteoporosis, sarcopenia, cognitive impairment) have been shown to negatively affect functional outcomes [11,21,22].

In our series, we did not examine the relationships between these comorbidities and functional outcomes; this is one limitation of

our work.

Conclusion

Proximal femur fractures dominate geriatric trauma. In developed countries, their incidence is very high due to the aging population and its corollary, osteoporosis. Fractures most often occur in individuals with comorbidities due to advanced age, implying a precarious physiological state. This is a public health problem with a very high mortality rate.

In Africa, the incidence of this condition is difficult to determine due to the scarcity of national studies on the subject. However, this traumatic condition is becoming increasingly common. Therefore, we deemed it important to assess the impact of comorbidities on mortality and functional outcome.

We found that the majority of patients who died postoperatively had at least one comorbidity. Functionally, bedridden and semi-autonomous patients after surgery also had at least one comorbidity. The management of these frail patients must be carried out within a multidisciplinary framework to reduce mortality and functional disability.

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