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ORIGINAL ARTICLE

FEMORAL FRACTURE IN THE ELDERLY: SURGERY WAITING TIME AND HOSPITALIZATION OUTCOME[1]

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ABSTRACT

Objective: To analyze the waiting time for femoral fracturerepair, its associated factors, and the outcome of hospitalization. **Method**: This is a cross-sectional exploratory study involving an elderly population aged ≥60 years old and admitted to hospital for femoral fracture from 2015 to 2017. Data were collected from physical medical records, with statistical analyses considering $p < 0.05$ as the level of statistical significance. **Results**: Of the studied elderly patients, 61.4% are female. Those who stayed for more than seven days waiting for surgery showed association with a hospital stay longer than 10 days, pressure injuries ($p<0.001$), and death as outcome ($p=0.003$). The average hospital stay was 13.8 days, and the expected time until surgery was 6.6 days. Waiting for the surgical risk assessment and waiting for a vacancy in the intensive care unit were factors that caused delay in the surgery among 23.2% of the elderly. **Conclusion**: Waiting for surgery for more than seven days increased the length of hospital stay and the mortality rate. In addition, the absence of intensive care unit beds and waiting for the surgical risk assessment contributed to the delay in the surgery and its outcome..

Keywords: Femoral fracture. Length of hospital stay. The elderly. Hospitalization.

INTRODUCTION

Projections by the Brazilian Institute of Geography and Statistics [*Instituto Brasileiro de Geografia e Estatística*] (IBGE) on the country's population estimate that its growth by sex and age, year by year, will happen until 2060, and one quarter of the population (25.5%) might be over 65 years old – which means 58.2 million elderly people –, while in 2018 this proportion was 19.2 million (9.2%). Aging is one of the causes of the increase in the population's dependence ratio, being represented by the relationship between economically dependent and potentially productive segments[(1)].

The aging process affects the body, causing it to undergo physiological changes, leading to the onset of several factors, such as diseases and disabilities that can impact the quality of life of the elderly, thus hindering their autonomy[(2)].

One of the main situations that cause disabilities is femoral fractures. In Brazil, femoral fractures are a major public health problem due to their high incidence and high mortality rate, with women being the most affected, as their bone loss is higher than that of men[(3)].

Hospitalizations for femoral fractures is common in the elderly, considering the aging process, along with osteoporosis, which is one of the main global factors, affecting approximately 7% of men and 17% of women, 70% of which are over 80 years old. Thus, it is estimated that more than 8 million femoral fractures[(4)] will occur in the next 50 years in the United States, Japan and Europe.

In Brazil, femoral fracture is considered one of the biggest public health issues[(3)]. From 2011 to 2016, a total of 530,203 hospitalizations from femoral fracture were recorded, with 15,405 deaths and a higher incidence in the southeastern region[(4)].

Bone fragility is characterized by osteometabolic diseases, which are caused by

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bone mineral reduction, generating a high risk of fractures in the elderly. Other risk factors include old age, being a female, being Caucasian, family history, low calcium and vitamin D intake, and sedentary lifestyle[5].

Old age is a challenging phase for senior citizens, as it is when the body goes through transformations, which bring changes in health and, oftentimes, chronic diseases[6]. Comorbidities, in addition to being an important factor, are associated with post-surgical complications and mortality[7]. Risk factors for fracture complications include respiratory and heart diseases, obesity and infections, besides a high mortality rate after fractures[8].

In addition to previousand hospital-acquired comorbidities, which influence the occurrence of complications, another structural aspect is the service demand volume, which affects the care for elderly patients. The risk of death increases when there is a delay in surgery longer than 48 hours. The reduction in the time of surgical approach is a factor in which the surgeon can interfere, thus decreasing the risk of complications and mortality[8-9].

Surgical repair is the option in cases of femoral fracture, while a conservative treatment is usually prescribed for incomplete fractures. The hospitalization process for the elderly is necessary, but waiting for the surgical procedure for more than seven days is a determining factor, as it significantly influences the mortality rate[7].

Considering factors such as the high incidence of femoral fractures among the elderly, the vulnerability in this population, the waiting time for surgical execution, as well as the development of complications in the hospital environment, which is associated with high death rates, this study is justified by the need to understand the factors that lead elderly people with femoral fractures to wait for surgical repair and, consequently, increase their length of hospital stay.

Thus, the objective of the study was to analyze the waiting time for femoral fracturerepair, its associated factors, and the outcome of hospitalization.

METHOD

The design of this study was characterized by a cross-sectional exploratory and documentary research using medical records; it analyzed 226 senior citizens (≥60 years old) admitted to hospital due to femoral fractures from 2015 to 2017. It was carried out in a tertiary-level Teaching hospital, which is a reference for the Brazilian Unified Health System in the Northern region of Paraná. The inclusion criteria for this research were elderly individuals with femoral fractures, identified with the International Disease Registry: S72 to S72.4. Of the total, 189 medical records of elderly patients were included in the study. Medical records that had diagnosis errors, were incomplete or illegible, and did not allow sourcing essential data for this study were excluded, and so were users transferred to other services. Data were stored using the Google Docs form tool and automatically organized in an Excel file for categorization and tabulation. For statistical analysis, the Statistical Package for the Social Sciences Program – SPSS, version 2.0, was used.

The statistical analyses comprised two stages: the first one was a descriptive analysis to distribute the frequencies of the categorical variables and the mean (standard deviation) of the continuous variables; the second one was a bivariate analysis of the proposed associations, using the multinomial linear regression test. It is worth noting that, for all analyses, a level of statistical significance of $p<0.05$ was considered.

The study variables were: length of hospital stay; waiting time for surgery; time between the surgery (in days) and the outcome (discharge or death); type of surgery (osteosynthesis and arthroplasty); type of fracture (transtrochanteric, and femoral neck); hospital-acquired morbidity; time for releasing the surgical risk assessment longer than 48 hours; lack of vacancy in the Intensive Care Unit (ICU), and clinical instability.

The project complied with all ethical principles, and was reviewed and approved by the Ethics and Research Committee, under legal opinion No. 2.415.316.

RESULTS

A total of 226 medical records of elderly people over 60 years of age who suffered a femoral fracture were analyzed; of those, 16.3% (37) were excluded, in accordance with the

criteria adopted, and 189 medical records were used for the research. The distribution of the studied population's profile shows ages varying between 60 and 95 years old, with higher frequency (45.5%) in the age above 80, a majority of women (61.4%), elderly people without a partner (57.7%), and patients self-reported as being white (93.7%).

Considering the type of fracture – femoral neck or transtrochanteric –, and that the surgery performed is either arthroplasty or osteosynthesis, no association was found with length of hospital stay.However, after the seventh day, elderly patients who underwent surgical repair showed an association with length of hospital stay longer than 10 days (Table 1).

Table 1. Factors associated with length of hospital stay for elderly patients with femoral fractures, 2015–2017. Brazil, 2018.

Factors	Length of stay				Total	"p"
	< 10 days		≥ 10 days			
	n	%	n	%		
Time until surgery (days)						**<0.001**
0-2	24	80.0	6	20.0	30	
3-7	42	42.9	56	57.1	98	
≥8	0	-	61	**100.0**	61	
Type of surgery						0.059
Arthroplasty	12	24.0	38	76.0	50	
Osteosynthesis	54	38.8	85	61.2	139	
Type of fracture						0.066
Femoral neck	16	25.8	46	74.2	62	
Transtrochanteric	50	39.4	77	60.6	127	

Source: Data from the 2015-2017 survey.

Among the elderly with femoral fractures, the average length of hospital stay was 13.8 days, with 6.6 days waiting for the surgical procedure, and 7.2 days between the procedure and the discharge (Table 2).

Table 2. Description of the waiting time for surgery, post-surgery and hospitalization of elderly patients with femoral fracture in a tertiary hospital 2015–2017. Brazil 2018.

Time (in days)	Minimum	Mean	Median	Maximum	*Shapiro-Wilk
Length of hospital stay	3	13.8	11.0	64	<0.001
Time until surgery	1	6.6	6.0	29	<0.001
Post-surgery time until outcome	0	7.2	4.0	47	<0.001

Source: Data from the 2015-2017 survey.

Os idosos que aguardaram a cirurgia por um tempo superior a sete dias apresentaram associação com o tempo de hospitalização maior do que 10 dias, presença de lesão por pressão eduas ou mais comorbidades (Tabela 3).

Table 3. Factors associated with time for femoral fracture repair, 2015–2017. Brazil, 2018.

	Time until surgery				Total	
	1-7 days		≥8 days			
	n	%	n	%		
Length of hospital stay (days)						**<0.001**
≤9	66	100.0	0	-	66	
≥10	62	60.4	61	49.6	123	
Urinary infection						0.324
Yes	18	60.0	12	40.0	30	
No	110	69.2	49	30.8	159	
Sepses						0.110
Yes	5	45.5	6	54.5	11	
No	123	69.1	55	30.9	178	
Pneumonia						0.412
Yes	21	61.8	13	38.2	34	
No	107	69.0	48	31.0	155	
Pressure injury						**<0.001**
Yes	7	29.2	17	**70.8**	24	
No	121	73.3	44	26.7	165	

To be continued…

Hospital-acquired morbidities						**0.026**
0	70	74.5	24	25.5	94	
1	43	67.2	21	32.8	64	
≥2	15	48.4	16	**51.6**	31	

Source: Data from the 2015-2017 survey.

Elderly patients who waited for surgical procedure for more than eight days (24.6%) showed association with length of stay longer than 16 days (31.7%) and with death as outcome (Table 4).

Table 4. Association of time until surgery and hospital stay related to the discharge and deathoutcomes, 2015–2017. Brazil, 2018.

Factors	Outcome					
	Discharge		Death			
	n	%	n	%	Total	"p"
Time until surgery (days)						**0.011**
0-3	48	90.6	5	9.4	53	
4-7	69	92.0	6	8.0	75	
≥8	46	75.4	15	**24.6**	61	
Length of stays (days)						**<0.001**
≤9	62	93.9	4	6.1	66	
10-15	60	95.2	3	4.8	63	
≥16	41	68.3	19	**31.7**	60	

Source: Data from the 2015-2017 survey.

In 11.6% of the elderly patients, the surgical risk assessment was released only after 48 hours; the same percentage had their procedure canceled due to lack of vacancy in the ICU, which delayed their surgical repair (Table 5).

Table 5. Incidence of factors that influenced the time until surgery for the elderly, 2015–2017. Brazil, 2018.

Factors	n	%
Surgical risk >48hrs	22	11.6
No UCI bed	22	11.6
Clinical instability	9	4.8
No medical record	136	72.0
Total	189	100

Source: Data from the 2015-2017 survey.

However, among those who had no record of impediment for surgery, corresponding to 72% (136), only 22.1% (30) had their surgeries performed within 48 hours. As for the others, 55.1% (75) waited three to seven days for surgery, followed by those who waited for more than seven days, referring to 22.8% (31), with no explanation noted in the medical record.

DISCUSSION

The study showed that the elderly are the most affected when they need to be hospitalized for femoral fracture repair, bearing in mind their fragility associated with exposure to the hospital environment for a long time.

The presence of two or more comorbidities was associated with a length greater than ten days of hospital stay and death as outcome. Studies corroborate these findings and add that an increase in the length of stay had a significant relationship with the presence of morbidities, which can lead to complications, in addition to raising the risk of mortality[10-12]. A retrospective study involving 213 elderly people evidenced that the absence of comorbidities was associated with the survival group, and that the presence of three or more comorbidities increased the mortality rate[13]. Several publications relate comorbidities to the occurrence of death; among them is a Brazilian study that assessed 195 elderly people with femoral fractures. Said study noted that early death was related to a greater number of existing comorbidities[14].

On the other hand, in the case of elderly patients subjected to a femoral surgical procedure after 48 hours, there was an increase in the chances of mortality, exclusively, in those hospitalized on the weekend, when femoral fracture repair is not performed[19].

Joint decree No. 21 of September 24, 2018, brings important and necessary recommendations as guidelines for treating femoral fractures in the elderly, considering clinical protocols with reliable scientific evidence, according to which the procedure must be performed within 24 to 48 hours with a view to reducing complications, mortality, infections, pain, and length of hospital stay[20].

Elderly patients who stayed waiting for surgery showed, after the seventh day, an association with a length greater than 10 days of hospital stay, developed more than two morbidities, and presented pressure injuries. Comorbidities can also impact the length of hospital stay, as revealed in a study with 635 elderly people conducted by the University of Washington, which associated comorbidity with surgery delay and, consequently, with length of hospital stay[15].

Corroborating these findings, a retrospective cohort study based on the analysis of the medical records of 81 elderly patients admitted with a diagnosis of femoral fracture showed that there is a propensity to decreased length of hospital stay and mortality in six months when surgery for treating this type of fracture in the elderly is performed within 48 hours of hospitalization[16].

In addition, the waiting time for the surgical procedure was 6.6 days, with a median of six, revealing a satisfactory result compared to other studies with greater lengths. This result corroborates with an exploratory Brazilian study that identified that 6.8 days of waiting time for surgery after fracture was harmful for the recovery of elderly patients[17]. In an Argentinian study involving 481 senior citizens, a mean of 3.5 days was found, with low levels of complications, being close to Spanish results with a median of three days[11].

In Germany, in a study with 242 elderly people who had a femoral fracture, the average waiting time for the surgical procedure was even shorter – between 1.6 and 1.4 days, with a median of one. All of these findings confirm the hypothesis that the shorter the waiting time, the greater the bed supply, as a consequence of early discharges and minimized costs[18].

It is known that, in spite of all measures to control chronic diseases, morbidities among the elderly, resulting from a set of factors, are frequent. Thus, learning about their consequences during hospitalization reinforces the importance of measures to prevent falls and fractures.

Still concerning the time between the execution of the surgery and the outcome, a mean of 7.2 days was found. This finding varies in the studies, as a cohort research conducted in Brazil showed a mean of two days in 57.1% of the sample[7]. In data from a research carried out at Hospital Universitário Mãe de Deus, in Rio Grande do Sul, the survival group comprehended those who stayed in hospital for less than 15 days and were discharged less than seven days after surgery[13]. The similarity of the findings of these studies is due to the early time of discharge and confirms that the shorter the length of stay after surgery, the higher the survival rate.

At the same time that the hospitalization rate of the elderly population is higher than that of adults, secondary complications and comorbidities cause the length of hospital stay to rise[19]. This total length of hospital stay can be directly affected by comorbidities in the postoperative period, but also by the preoperative period, when the need for procedures for the surgical risk affects the time until surgery.

Our results pointed out some factors that prolonged the wait for surgery: delay in completing the surgical risk assessment, and the wait for an ICU vacancy. In an American study, those who underwent surgical risk assessment had an average delay in surgery of 3.2 days compared to those who did not undergo it – equivalent to 1.7 days –, which led to a longer hospital stay[15].

The matter is to ensure an effective and essential preoperative assessment, without the surgical risk assessment becoming a cause for delay in the treatment and, consequently, a generator of risks for the elderly. Delay is a point to be measured when it comes to urgent procedures, understanding that the surgical risk assessment aims to evaluate the cardiac function, especially in elderly people with morbidities.

It should also be considered that tertiary hospitals, in addition to being a reference for trauma care, also are, at the same time, responsible for handling several other cases of clinical urgencies/emergencies, which can be an obstacle for the elderly to be operated on more quickly, considering the postponement of

procedures because of untimely urgencies. This is a major challenge for healthcare teams and managers, taking into account the volume of the demand.

This research was linked to a tertiary service of the university, which determines several aspects related to the care process and its recording. The identification of lack of information in the medical records as to the reason for postponing and/or canceling the surgical procedure, which is the most evident factor (72%), leads us to reflect on the work process, on the comprehensive and clear recording of everything that happens to the user, in addition to the legal fulfillment of professional duties, mainly in teaching hospitals.

The dynamics of these hospitals, with frequent changes in the service teams between the academic staff and the fixed clinical staff, increases the risks of these failures in recording. A lack of documentary entries was observed in the medical records; despite this being considered an extremely important place for the interlocution of the multidisciplinary team, it is still neglected by health professionals[21].

The limitation of the study was the difficulty in interpreting the physical medical records because of how they are arranged, in single envelopes together with the several clinics, without a chronological order of service, and with non-readable words, which can prevent the variables from being found. It is believed that a chronological organization of the documents by the professionals who care for the users would be an option for a better filing of physical medical records. Likewise, the writing must provide a clear and objective understanding when describing the service provided. Thus, the possibility of implementing a user-friendly computer system for medical records can minimize these difficulties.

CONCLUSION

This study identified that waiting for a surgical procedure for more than seven days contributed to raising the patients' length of hospital stay and mortality rate. Elderly victims of femoral fractures who stayed longer in hospital were exposed to the risk of developing affections from pressure injuries and morbidities, increasing their mortality rate.

Lack of ICU vacancies and delay in completing surgical risk assessments also influenced the waiting time for the surgery and, consequently, the increase in hospital stay, revealing that the early execution of surgical repair is a factor that can accelerate discharge, improve the chances of recovering the functionality of the limb, and guarantee a better quality of life for the elderly.

Furthermore, hospital services need to monitor the causes of delayed surgeries, review procedures, propose urgency preoperative protocols for the elderly, develop strategies to accelerate surgical treatment, facilitating bed turnover, as well as reduce hospital costs, thus optimizing the stay of the frail elderly.

FRATURA DE FÊMUR NOS IDOSOS: TEMPO DE ESPERA CIRÚRGICA E DESFECHO DA HOSPITALIZAÇÃO

RESUMO

Objetivo: Analisar o tempo de espera para correção de fratura de fêmur,seus fatores associados e o desfecho de hospitalização. **Método:** Transversal exploratório, com a população de idosos ≥60 anos internados por fratura de fêmur no período de 2015 a 2017. Os dados foram coletados através do prontuário físico, comanálises estatísticas considerando o nível de significância estatística de *p<0,05*. **Resultados:** Dos idosos estudados, 61,4% correspondem ao sexo feminino. Aqueles que permaneceram por mais do que sete dias à espera de cirurgia se associaram ao tempo de hospitalização maior do que 10 dias, lesão por pressão (p<0,001) e ao desfecho óbito (p=0,003).A média de permanência hospitalar foi de 13,8 dias e do tempo esperadopela cirurgia de 6,6 dias. A espera da realização do risco cirúrgico e vaga em unidade de terapia intensiva foram fatores que provocaram atraso na realização da cirurgia em 23,2% dos idosos. **Conclusão**: Esperar pela cirurgia por mais de sete dias aumentou o tempo de permanência hospitalar e a taxa de mortalidade. Além disso, a ausência de vaga de terapia intensiva e a espera pelo risco cirúrgico contribuíram para o atraso da cirurgia e seu desfecho.

Palavras-chave: Fraturas do fêmur. Tempo de internação. Idoso. Hospitalização.

FRACTURA DE FÉMUR EN PERSONAS MAYORES: TIEMPO DE ESPERA QUIRÚRGICA Y DESENLACE DE LA HOSPITALIZACIÓN

RESUMEN

Objetivo: analizar el tiempo de espera para la corrección de fractura de fémur, sus factores asociados yelresultado de hospitalización. **Método:** transversal exploratorio, conla población de personas mayores ≥60 años internados por fractura de fémur en el período de 2015 a 2017. Los datos fueronrecolectados através del registro médico, con análisis estadísticos considerando el nivel de significancia estadística de *p<0,05*. **Resultados:** de los ancianos estudiados, 61,4% eran del sexo femenino. Aquellos que pasaron más de siete días a la espera de cirugía se asociaron al tiempo de hospitalización mayor que 10 días, lesión por presión (p<0,001) ycomo desenlace el óbito (p=0,003). Elpromedio de permanencia hospitalaria fue de 13,8 días yel tiempo esperado por la cirugía de 6,6 días. La espera por la realización del riesgo quirúrgico y una cama en unidad de cuidados intensivos fueron factores que provocaron el retraso en la realización de la cirugía en 23,2% de los ancianos. **Conclusión**: esperar por la cirugía por más de siete días aumentó el tiempo de permanencia hospitalariayla tasa de mortalidad. Además, la falta de camas en cuidados intensivosyla espera por el riesgo quirúrgico contribuyeron para el retraso de la cirugía y su desenlace.

Palabras clave: Fracturas del fémur. Tiempo de internación. Personas mayores. Hospitalización.

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