What happened to hip fragility fractures during the COVID-19 pandemic?

Mazeda C[1*], Santos PB[1*], Vilas-Boas P[1*], Antão J[2], Barcelos A[1]

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ABSTRACT

Purpose: COVID-19 changed the dynamics of all healthcare system, leading to the restructuring of inpatient teams as well as the emergency department. Scheduled surgeries were suspended, operating rooms were closed, and anesthesiologists redistributed among the various intensive care units. At the Centro Hospitalar do Baixo Vouga the number of patients admitted to the emergency department decreased to approximately 8.000 during the period of lockdown which ranged from 18th March to 1st June 2020. The aim of this study was to compare the number of patients presenting with hip fractures during the first wave of the COVID-19 pandemic with the equivalent period in 2019 and to analyze postoperative outcomes.

Methods: An observational retrospective study was conducted in two different periods. Patients over the age of 50 years admitted with hip fracture were included for analysis. The data was collected from the hospital database. A general descriptive analysis was performed.

Results: There was an overall reduction in the number of admissions due to hip fractures in Period 2020 compared with homologous Period in 2019 (68 patients and 94 patients, respectively). No statistically significant differences were found regarding age, gender, ASA grade and pre-admission residence among patients admitted during these both periods. Nursing home patients in Period 2020 had a longer hospital stay (p=0.03), independently of the functional status (p=0.07). There were no statistically significant differences in the time it took the patient to go to the emergency department after the fall, place where the fracture had occurred, waiting time to perform the surgery, type of treatment performed, post-surgical complications and mortality. There was no relationship between mortality and the time it took the patient to access the emergency department (p=0.49), or mortality and the mean length of stay in the hospital (p=0.15). All the patients admitted to the emergency department in Period 2020 were negative to PCR test for SARS-CoV-2.

Conclusion: The measures taken by the hospital during the pandemic had no impact in the healthcare provided to the admitted patients. This should be taken into account in order to optimize the efficiency of the health care system in future outbreaks.

Keywords: Osteoporosis; Hip fracture; Covid-19; Outcomes.

INTRODUCTION

All over the world, healthcare systems are facing a biological battle with proportions never seen before. This is the third time in the humankind history that the Global Health entities are forced to prevent the spread of a contagious viral strain by using prophylactic measures. After it started in Wuhan, China, with the first case reported on 31st December 2019, the World Health Organization (WHO) declared a pandemic caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2) on 11th March 2020[1]. In Portugal, the first case was reported on the 2nd of March. Following the increasing numbers of new cases diagnosed a state of emergency was declared on the 18th of March[2]. The Portuguese Government enforced temporary lockdown to contain the number of new cases, in an effort to flatten the contagion curve. This scenario changed the dynamics of all healthcare system leading to the restructuring of inpatient teams as well as the Emergency Department (ED). Scheduled surgeries were suspended, operating rooms were closed and anesthesiologists redistributed among the various intensive care units. On the other hand, there was a lower influx of patients to the ED in our hospital, reflected by a decrease of approximately 8,000 patients during the period of lock-

* These authors contributed equally to this work
1. Serviço de Reumatologia - Centro Hospitalar Baixo Vouga
2. Universidade de Aveiro

down, which ranged from 18th March to 1st June 2020[3].In highly prevalent diseases such as osteoporosis and fragility fractures, the magnitude of the consequences in terms of morbidity and mortality is unknown. In Portugal, there are annually close to 10,000 new femoral neck fractures[4] with the numbers growing in recent years due to the increase of the average life expectancy. It is well recognized that early surgical intervention in these patients with fragility fractures and a rapid onset of postoperative recovery are associated with better long-term results[5].

The aim of this study was to compare the number of patients presenting with hip fractures admitted in ED of Centro Hospitalar do Baixo Vouga (CHBV) during the first wave of the COVID-19 pandemic with the equivalent period in 2019 and to analyze postoperative outcomes.

METHODS

An observational retrospective study was conducted between 18th March to 1st June 2020 (Period 2020) on patients with hip fractures at Centro Hospitalar do Baixo Vouga. This period was in line with the initial lockdown announcement and covered the peak of the first wave of the pandemic. The second period corresponded to the homologous timeframe in 2019 (Period 2019).This study included all patients over the age of 50 years with hip fracture who were admitted to the ED in the two periods analyzed. The type of fractures included in this study were trochanteric fractures, subtrochanteric fractures, periprosthetic and intracapsular femoral neck fractures. Patients with fractures resulting from polytrauma were excluded.

Socio-demographic variables such as age and gender were collected. The clinical variables used were the time elapsed between falling and coming to the ED, the place where the fracture occurred (home, nursing home or outdoor), type of fracture, time until surgery (up to 48 hours or more), type of treatment performed, American Society of Anaesthesiologists (ASA) grade, length of hospital stay, post-surgical complications and 30 day mortality. Functional status was measured using the Katz Index. Polymerase chain reaction (PCR) test for SARS-CoV2 was performed on all patients at admission, in the period between March 18th and June 1st of 2020.

A general descriptive analysis of the data was performed. Continuous variables were reported as means and standard deviations (SD). Categorical variables were presented as absolute numbers and percentages. Pearson chi-square test was used to compare categorical variables and, to compare continuous variables with a non-normal distribution, the Mann-Whitney U was used. A p-value less than 0.05 (typically ≤ 0.05) was considered statistically significant.

RESULTS

There was an overall reduction of the number of patients presented at the emergency department due to hip fractures in Period 2020 compared with homologous Period in 2019 (sixty-eight patients and ninety--four patients, respectively). There were no statistically significant differences in age, gender, ASA grade or pre-admission residence among patients admitted during these periods (Table I). Table I summarizes the sociodemographic and clinical characteristics of the study population. No differences could be observed regarding the time elapsed between falling and coming to the ED (p = 0.66), and more than 90% were admitted to the ED in less than 24 hours after the fall. Most patients suffered a fall in their own home, with no difference regarding the place where the fracture had occurred between the two periods (p = 0.12). In both periods, there was a greater proportion of trochanteric fractures in relation to the remaining types of fractures (Table 1). The waiting time to perform the surgery was similar in both periods of time (p = 0.20), with the vast majority also having surgical intervention in less than 48 hours. Surgical treatment was the preferred approach in both periods versus conservative treatment (p = 0.24). During the pandemic period (Period 2020), there was a significant reduction (p = 0.02) in the mean length of stay (6.93 days; σ=4.43) compared to the Period 2019 (9.35 days; =7.56). As compared to the Period 2019, nursing home patients had a longer hospital stay (p=0.03) during Period 2020. However, a lower index of independence in activities of daily living (measured with Katz Index) was not associated with a longer stay in both Periods (2019 p=0.05; 2020 p=0.07). The most frequent complications during hospitalization were anaemia and nosocomial infections, with no differences regarding both periods (Period 2019: p=0.34 and Period 2020: p=0.22, respectively). There was a non-significant difference between the two periods, concerning the 30-day mortality (p = 0.20) (Table II). There was no relationship between mortality and the time it took the patient to access the ED (p=0.487), or mor-

TABLE I. PATIENT SOCIO-DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF THE STUDY POPULATION

	Period 2019 (18th March to 1st June)	Period 2020 (18th March to 1st June)
Number of factures, n	94	68
Age, median (SD)	83.55 (9.9)	82.63 (8.5)
Gender, n		
Female	74	49
Male	20	19
Katz Scale, n (%)		
Autonomous	14 (15)	16 (24)
Totally Dependent	14 (15)	11 (17)
ASA Grade, n (%)		
1	0	0
2	12 (12.8)	21 (30.9)
3	31 (33)	32 (47.1)
4	1 (1.1)	2 (2.9)
No data	50 (53.2)	13 (19.1)
Pre-admission residence, n (%)		
Residencial care	9 (9.6)	12 (17.6)
Own home	76 (80.9)	53 (77.9)
Public highway	9 (9.6)	2 (2.9)
No data	0	1 (1.5)
Comorbidities, n (%)		
Auricular Fibrillation	10 (10.6)	6 (8.8)
Hypertension	70 (74.5)	54 (79.4)
Hyperlipidemia	60 (63.8)	44 (64.7)
Dementia	33 (35.1)	23 (33.8)
Fracture type, n (%)		
Trochanteric	62 (66.0)	36 (52.9)
Subtrochanteric	18 (19.1)	22 (32.4)
Intracapsular	13 (13.8)	5 (7.4)
Periprosthetic	1 (1.1)	5 (7.4)

n – number; ASA - American Society of Anaesthesiologists; SD- standard deviation

TABLE II. POST-OPERATIVE OUTCOMES

	Period 2019 (18th March to 1st June)	Period 2020 (18th March to 1st June)	p-value
Length of inpatient stay, mean (SD)	9.33 (7.56)	6.93 (4.43)	0.02
Post-operative complications, n (%)	40 (42.60)	37 (54.40)	0.07
30-day mortality, n (%)	5 (5.30)	5 (7.40)	0.20

SD- standard deviation

tality and the mean length of stay in the hospital (p=0.151).

All the patients admitted to the ED in Period 2020 were negative to PCR test for SARS-CoV2.

DISCUSSION

Our study showed a reduction in hip fracture incidence during the first wave of the pandemic COVID-19, how-

ever we couldn t observe any differences regarding age, gender, ASA grade, time elapsed between falling and coming to the emergency department, waiting time to perform the surgery and the type fracture. Fear of infection by SARS-CoV-2 could lead to a lower influx to the ED in our hospital to avoid exposure or a new flux of these patients to the private hospitals of the area. It is unclear what motivated this decrease. The impact of the COVID-19 pandemic in fractures incidence had been transversal through several countries and Portugal is not an exception[6-10]. It was well stablished that an early intervention in hip fractures is associated with lesser complications during surgery procedures and better outcomes associated to functional rehabilitation and survival[5]. However, during the first wave of the pandemic, most hospitals, including our own, had to reorganize the healthcare to the COVID patients and orthopedic surgeons and nurses were mobilized to the COVID-19 areas. We expected this would lead to an extended delay between the hip fracture patient admission and surgery time. In our study, we do not find an impact to the time to hip surgery in these patients, and most patients had the surgical procedure in less than 48 hours. We did not find significant difference between the two periods in analysis (Period 2019: $p = 0.663$ and Period 2020: $p = 0.201$). Atrial fibrillation was the only comorbidity that was associated with a longer hospital stay, probably due to the need for anticoagulation suspension before elective surgery.

We did not observe significant difference between patients in both periods in post-operative complications and 30-days mortality. One possible explanation for this, is the fact we did not have any case of COVID-19 infection in our hip fracture patients during pandemic and there was not age, gender and ASA grade differences between the two groups of patients. The results of our study are in line with the findings of several other similar studies around the world. Malik-Tabassum et al notes that the implementation of contingency measures resulted in similar outcomes for patients with hip fractures during the pandemic, when compared to the national average in the United Kingdom[11]. Maryada *et al* also showed that the lockdown had no effect on hip fractures in the geriatric population[12]. However, we found a statistically significant difference ($p = 0.016$) between the two groups, regarding the length of hospital stay, with lower duration of hospitalization during pandemic period.

Our study has some limitations: first, the small sample from a single-center study, it may not reflect the overall pattern of orthopedic trauma and the lower admission rate does not exclude patients with hip fracture being admitted to other hospitals. Second, it was a retrospective study based only on medical records. Finally, the analyzed period was not broad enough to provide further extrapolations about the socioeconomic impact to the hospital system and patient's care quality.

In conclusion, the measures taken by the hospital during the lockdown period had no impact in terms of healthcare quality provided to the patients with hip fracture. The post-surgical outcomes, even with lower length of hospital stay, did not differ statistically, regarding short-term complications and mortality rate. In the future, the lessons learned during the pandemic period, despite adequate performance in timing of surgical intervention, we should optimize the length of stay for these patients through the efficiency of the entire healthcare system.

CORRESPONDENCE TO
Carolina Mazeda
Serviço de Reumatologia - Centro Hospitalar Baixo Vouga
Av. Artur Ravara 3814-501 Aveiro
E-mail: carolina_m43@hotmail.com

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