

Does the COVID-19 pandemic period itself increases early mortality rates of elderly patients with hip fractures in Turkey?

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Abstract

Hip fractures are common in elderly patients and prone to serious morbidity and mortality particularly when the treatment is delayed. The objective of this study was to evaluate the effect Coronavirus disease of 2019 (COVID-19) pandemic on the early mortality rates of geriatric patients with hip fractures.

281 patients who were followed and operated on with the diagnosis of proximal femur fracture were included in this retrospective study. Patients were divided into 2 groups, that is, 180 patients presenting between March and June 2018 to 2019 (prepandemic period) and 101 patients presenting between March and June 2020 (pandemic period). Age, sex, type of fracture, time from fracture to presentation to hospital, comorbidities, time from admission to operation, length of intensive care unit stay, length of hospital stay, and mortality rates were retrieved from hospital records and evaluated.

While there was no significant difference in terms of age, sex, type of fracture, in-hospital mortality, 30-day mortality, time to surgery, Charlson comorbidity index and length of intensive care unit stay through pandemic and prepandemic period ($P > .05$), significant differences were observed in terms of length of hospital stay, time to admission, refusal of hospitalization and attending outpatient visits regularly ($P < .05$). Attending outpatient visits and the length of hospital stay were the main significant differences in multivariate analysis.

The early mortality rates in patients with hip fractures were similar during the pandemic period to before in Turkey. However, the length of hospital stay was prolonged and more patients refused the treatment and fewer of them attended regular outpatient controls in the pandemic.

Abbreviations: COVID-19 = Coronavirus disease of 2019, ICU = intensive care unit.

Keywords: Coronavirus disease of 2019, geriatric, hip fracture, mortality

1. Introduction

In the geriatric patient population aged >65 years, there is an increased incidence of fractures due to increased age, chronic

diseases, medications, and comorbid diseases as osteoporosis.^[1,2] Each year, at least one-third of the geriatric population experience a fall, which is a common cause of morbidity and mortality.^[3] Fractures in geriatric patients have a high risk of unfavorable outcomes.^[4] There are many studies in the literature on geriatric age group patients with fractures, especially hip fractures.^[5-7] In a study by Schuijt et al,^[8] 30-day mortality was reported to be high irrespective of the treatment method. Delayed treatment of geriatric hip fracture is known to have a negative impact on mortality.^[9]

The viral disease named Coronavirus disease of 2019 (COVID-19), caused by the SARS-CoV-2 virus, emerged in Wuhan, China, in December 2019, and was declared a global pandemic by the World Health Organization in March 2020. In Turkey, as in all countries worldwide, new regulations and adaptations have been made to the healthcare system and orthopedics practice because of the COVID-19 pandemic.^[10,11] During the pandemic, the treatment of many fatal diseases, including malignancies, had to be delayed.^[12,13] In addition, it is known that COVID-19 frequently has a fatal course in elderly patients with additional comorbid diseases.^[14] Fracture surgery in COVID-19 patients may have extra difficulties, such as lack of financial resources, delays in operations, fear and anxiety of medical staff, and isolation of patients.^[15] While it has been recommended that fractures such as distal radius fractures, for which urgent treatment is not imperative, be treated with telemedicine during the pandemic, fractures such as hip fractures requiring urgent treatment should be treated.^[16]

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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The present study aimed to determine if the COVID-19 pandemic effected the early mortality rates of patients with hip fracture, in association with social or medical factors in Turkey.

2. Patients and method

2.1. Study design

A retrospective cross-sectional study was conducted to compare the mortality rates of patients with hip fractures through 2 different periods as pandemic period (20 March–20 June 2020) and pre-pandemic period (20 March–20 June 2018 and 20 March–20 June 2019). As the first COVID 19 case was detected in March 2020 in Turkey, 3 months following this date was evaluated as the pandemic period and, we studied the same period for the last 2 years for the control group as pre-pandemic period. The study inclusion criteria were age >65 years, admitted to the emergency department with proximal femur fracture, and consent to participate. Patients were excluded from the study if they declined to participate, had a pathological fracture or multiple trauma, had a history of ipsilateral fracture, or underwent revision surgery due to implant failure. Approval for this study was granted by the Institutional Ethics Committee of the institute and all procedures were performed following the principles of the Helsinki Declaration. Informed consent was obtained from all participants (IRB number: 06.07.2020-91/07).

2.2. Data source

Patient's charts were retrospectively evaluated and age, gender, type of fracture, time from fracture to hospital admission, treatment refusal (patients who refused hospitalization, surgical treatment, and left the emergency department), comorbid diseases, time from admission to surgery, length of intensive care unit (ICU) stay, length of hospital stay, and attending regular outpatient controls were recorded for further analysis. Charlson comorbidity index was calculated and recorded for all patients.^[17] In both groups, in-hospital and 30-day mortality rates were recorded as the main outcome measure. Patients presenting during the pandemic were questioned about the presence of any symptoms consistent with COVID-19. COVID-19 PCR tests were applied, and the results were recorded.

2.3. Statistics

Data obtained in the study were analyzed with IBM SPSS statistics software (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) The groups were tested for normality with the Shapiro–Wilk test. Normal distributed data were compared with ANOVA and Student *t* test concerning the group number. Non-normally distributed data were evaluated with the Mann–Whitney *U* test and the Kruskal–Wallis test. The Fisher Exact test or the Chi-square test were applied to categorical data. The cofounders that have <.2 *P* value difference through groups were further analyzed with a multivariate binary logistic regression. A value of *P* < .05 was accepted as statistically significant.

3. Results

The evaluation was made of a total of 281 patients with hip fractures (180 patients in the pre-pandemic period and 101

patients in the pandemic period), comprising 191 (68%) females and 90 (32%) males with a mean age of 82 ± 7.9 years. The mean time from fracture to hospital admission was 0.03 ± 0.3 days in the period before the pandemic and 0.2 ± 1 days in the pandemic period (*P* = .042). The median Charlson comorbidity index was 6 (2–9; min–max) and 6 (2–9; min–max) for the pre-pandemic and pandemic periods (*P* = .394). The most common associated diseases were diabetes mellitus, hypertension, and coronary artery diseases for all patients. The mean time to surgery was 2 ± 2 days in the pre-pandemic period and 3.7 ± 8.3 days during the pandemic (*P* = .059). No significant difference was determined between the 2 periods in respect of the length of ICU stay (pre-pandemic: 2 ± 2 days, pandemic: 2.6 ± 3.3 days; *P* = .213). The mean length of stay in the hospital was longer in the pandemic period at 9.6 ± 11.2 days compared to 5.7 ± 5 days in the pre-pandemic period (*P* = .008). Hospitalization was refused by 24/180 (13%) patients in 2018 and 2019, and by 36/101 patients (36%) during the pandemic in 2020 (*P* = .001). Routine outpatient follow-up visits were attended by 145/180 (81%) of the surviving patients who completed treatment in the pre-pandemic period and by 41/101 patients during the pandemic (*P* < .001). The in-hospital and 30-day mortality rates were similar in both periods (Table 1).

The multivariate analysis of 2 time periods revealed that the length of hospital stay and attendance to regular outpatient visits were the 2 significant variables through the groups (Table 2).

4. Discussion

The most important finding of the present study was the similar in-hospital and 30-day mortality rates of geriatric patients with hip fractures between the pre-pandemic and pandemic periods. In studies from New York, considered the epicenter of the pandemic in the USA, it was reported that mortality was significantly higher in hip fracture patients who were COVID-19 positive than in those who were negative.^[18–20] Those studies highlighted the effect of the COVID-19 pandemic on patient care and demonstrated the higher mortality and complication rates of patients treated for hip fractures in this period. These different results were probably caused by the difference in COVID case numbers in Turkey and New York. There were approximately 186,000 reported COVID cases in June 2020 in Turkey and approximately 410,000 in New York at the same time. The higher burden of these cases on the healthcare system probably influenced the outcomes of patient care for elderly patients with hip fractures. In addition, there were no COVID-19-positive patients in this study series.

In a study by Malik-Tabassum et al^[21] in England, the treatment of hip fractures in corresponding periods in 2018, 2019, and 2020 were retrospectively investigated in a high-volume hip fracture center. Similar to the present study, no difference was observed between the above-mentioned periods, in terms of treatment type, complications, and mortality rates. However, the length of hospital stay was found to be prolonged during the pandemic period as we observed in this study. A longer hospital stay may be a result of waiting for COVID-19 test results and the limited capacity of operating theatres and ICUs. Malik-Tabassum et al stated that the positive parameters in their study were due to institutional adaptations made to facilitate rapid treatment of hip fractures during the pandemic. Other similar studies have also reported a longer hospital stay for patients with hip fractures during the pandemic. Kayani et al,^[22] reported that

Table 1**Main findings of patients with hip fractures through the different periods.**

	Prepandemic period (n=180)	Pandemic period (n=101)	P
Age (yr) (mean ± SD)	82.6 ± 8	81.2 ± 8.8	.146
Gender (female/male)	120/60	71/30	.595
Type of hip fracture (femur neck/intertrochanteric/subtrochanteric)	64/95/21	26/64/11	.196
Charlson comorbidity index (median (min–max))	6 (2–9)	6 (2–9)	.394
Refusal of treatment (%)	24 (13)	36 (36)	.001
Time to admission (d, mean ± SD)	0.03 ± 0.3	0.2 ± 1	.002
Time to surgery (d, mean ± SD)	2 ± 2	3.7 ± 8.3	.071
Length of ICU stay (d, mean ± SD)	2 ± 2	2.6 ± 3.3	.788
Length of hospital stay (d, mean ± SD)	5.7 ± 5	9.6 ± 11.2	.001
Regular outpatient follow-up (%)	134 (96)	41 (72)	<.001
In-hospital mortality (%)	11 (6)	6 (9)	.570
30-day mortality (%)	22 (12)	8 (12)	.738

Significant values are bold.

COVID-19 positive hip fracture patients had a longer hospital stay, a higher rate of admission to ICU, a higher risk of perioperative complications, and increased mortality. Segarra et al^[2,3] compared hip fracture cohorts in 2019 and 2020, and found no significant difference in respect of 30-day mortality, as in the present study.

In the current study, other striking findings related to the COVID-19 pandemic were the long time to the presentation at the hospital, lower rates of attending outpatient follow-up examinations, and the higher rate of treatment refusal. These may have been due to the anxiety experienced by patients, who were already at high risk, in respect of admission to hospitals where the COVID-19 infection risk is high and that elderly individuals living alone may have less social support compared to previous periods. Similar to the current study, Gök et al^[10] reported an increased rate of treatment rejection in this period for patients scheduled for an emergent general surgery procedure. Although this study revealed similar mortality rates, a delay in admittance or rejection of essential surgery will have consequences of increased morbidity or mortality. The prognosis of patients who refused treatment could not be investigated in this study and thus the effect of treatment refusal on morbidity and mortality could not be determined. The increase in treatment refusal rates may be attributed to the fear of elderly patients with comorbid diseases related to being treated in risky hospitals in this period. However, the results of this study demonstrated that geriatric hip fracture

surgery under elective conditions with sufficient isolation measures did not increase in-hospital and 30-day mortality rates. Therefore, these results obtained during the pandemic can be considered important in respect of being able to give patients accurate information.

In the present study, there was not seen to be any significant change in the number of presentations with hip fractures between the prepandemic period and during the pandemic. Although orthopedic presentations decreased during the pandemic, hip fractures remained constant and it was concluded that emergency plans should be carefully prepared, as the number of conditions such as osteoporotic hip fractures does not decrease during a pandemic.^[24,25] Murphy et al^[12] reported that in England during the pandemic period, injuries in younger people decreased, while low-energy and stability fractures remained constant. In a study by Kumar Jain et al^[26] in India, it was stated that as elderly patients with hip fractures are at higher risk, they should only undergo operations in well-equipped facilities with ICUs and treatment should be conservative as far as possible, and medical care services should be arranged properly to reduce contamination.

There are several limitations of the present study. As the study was cross-sectional and compared a short snapshot of time for each period. Thus, the sample size was quite small. There was no statistically significant difference between the groups in terms of age and gender. Therefore, these variables were not analyzed as confounders that could affect the results. However other confounders were not evaluated in the present study. There were no COVID-19 positive patients in this series so the differences between COVID positive and negative patients could not be determined. Nevertheless, comparisons were made of patients in the prepandemic period and during the pandemic to reveal the effects of restrictive social conditions implemented. Since the prognosis of patients refusing surgery was not known, only the surgically treated patients could be evaluated.

5. Conclusion

The in-hospital and 30-day mortality rates of elderly patients who underwent an operation for hip fracture were not different through the pandemic and prepandemic periods. The rates of delayed admittance to the hospital, length of hospital stay, and refusal of treatment were higher in the outbreak. Patients tended to avoid routine outpatient follow-up appointments.

Table 2**Multivariate analysis of pandemic and nonpandemic period groups' confounders.**

	OR (95% CI)	P-value
Age	0.986 (0.944–1.029)	.516
Type of hip fracture		
Femoral neck fracture	1.00	
Intertrochanteric femur fracture	1.606 (0.728–3.546)	.241
Subtrochanteric femur fracture	1.623 (0.546–4.823)	.384
Refusal of treatment, yes	1.754 (0.893–3.447)	.103
Time to admission	1.352 (0.808–2.264)	.251
Time to surgery	1.051 (0.883–1.251)	.575
Length of hospital stay	1.079 (1.024–1.137)	.004
Regular outpatient follow-up	0.113 (0.043–0.292)	<.001

CI=confidence interval, OR=odds ratio.
Significant values are bold.

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