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## Epidemiology of fractures during COVID-19 pandemic: a short review

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### Summary

**Introduction and purpose:** The purpose of this study is to describe changes in epidemiological trends of fractures, especially osteoporotic fractures, during COVID-19 pandemic. Before the pandemic, fractures in the young population were more frequent than in elderly population, because of more active lifestyle.

**A brief description of the state of knowledge:** COVID-19 pandemic and lockdown has effectively reduced people's mobility and ability to travel. This has resulted in lowered rate of traumatogenic incidents that cause fractures, including traffic accidents and accidents during performing sport. When people spend more time at their homes, incidence of household fractures is growing, especially in elderly population. Osteoporosis makes bones of elderly people more susceptible to fracture. Majority of drugs used in treatment for osteoporosis are said not to interact with risk or severity of COVID-19 infection.

**Conclusions:** During the COVID-19 pandemic, geriatric fractures have become one of the severe problems for healthcare systems. Isolation at people's homes has resulted in increased rate of fractures occurring at home, especially in elderly population. Difficulties caused by pandemic made rates of properly performed osteoporotic treatment lower, increasing risk of fractures even more. Mortality after fractures has risen even in patients with negative result of testing for COVID-19.

**Key words:** Osteoporosis; Fracture; Low-energetic fracture; COVID-19

## **Introduction**

The outbreak of coronavirus disease 2019 (COVID-19) made an undoubted impact on Worlds' healthcare systems. This has disrupted usual treatment pathways, including the route of fracture care delivery. Like many other clinical diseases, fractures have maintained their incidence during the pandemic [1]. In addition, patients burdened with disease have a higher risk of mortality and major complications from covid-19 infection [2]. Hip fracture patients represent especially vulnerable population since older age has been associated with a higher mortality rate when concomitant COVID-19 is diagnosed [2]. Thereupon government contingency plans play a key role in reallocating scarce healthcare resources in order to face the demands of a pandemic while maintaining the standards of regular healthcare [2].

## **How the incidence of fractures has changed during COVID-19 pandemic?**

The implementation of public health measures during the COVID-19 pandemics, such as the closure of schools, sports halls and gyms reduced exposure to sports injuries, including fractures. This transfer to 2,5-fold decreased number of fractures among children, especially teenagers [3]. The new lifestyle imposed by the outbreak of the pandemic and restrictions on leaving the place of residence contributed to changes in the circumstances of the fractures [3]. There was an increase in the proportion of injuries occurring at home from 32.5% before pandemic to 57.8% during the COVID-19 pandemic [3]. The injuries were milder and required surgical intervention to a lesser extent [3]. Unfortunately, fracture rates in the elderly people are not as optimistic. The retrospective and comparative multi-center study in China confirmed the increase in low-energy fractures among the elderly. Before COVID-19 pandemic, the most frequent group reporting fractures was young men, while during the pandemic - elderly women . There was a 6-fold higher frequency of fractures occurring at home and the mean age of patients increased significantly. An increase in fractures within the femur and humerus has been reported during the COVID-19 pandemic as well as the overall increase in osteoporotic fractures. The frequency of hip fractures was higher by more than 10% [4]. This trend is far from optimistic due to the possibility of serious complications related to a fracture of the femoral neck. What should be noted, there was a significant decrease in severe open fractures and 5-fold decrease in fractures as a result of a car accidents [5].

## **The changes in treatment pathways of hip fracture during COVID-19 pandemics**

Facing the emergency of the COVID-19 pandemic, it was necessary to prioritize urgent visits and delay elective care to mitigate the spread of COVID-19. Many osteoporosis outpatient clinics were closed and treatment was based on online counseling. In addition, many hospitals reduced orthopaedic services to make space for patients with COVID-19 [6]. With these restrictions, patients with hip fractures, were quickly discharged after surgery, often without anti-osteoporotic treatment, proper post-surgical rehabilitation or further recommendations for follow up [5]. Though osteoporosis is a highly treatable disease, the number of osteoporotic fractures continues to rise [7]. Hospitalizations caused by these fractures exceeded in quantity those caused by heart disease and stroke [7]. Each year, in the USA, approximately 300,000 hip fractures occur [7]. Pharmacological and non-pharmacological treatment options for osteoporosis are available and highly effective [8]. However, it is estimated that only 20% of patients receive proper treatment [8]. During the pandemic, rates of properly performed osteoporotic treatment drop to even lower levels [8]. It is recommended that people with fragility fractures should be managed in the context of a multidisciplinary clinical system, guaranteeing not only adequate surgical treatment but also appropriate non-hospital care [8]. It is emphasized that the guarantee of successful osteoporosis treatment is the continuity of treatment after discharge from the hospital [9]. Specific guidelines on treatment and bone density screening during the COVID-19 pandemic have been released by the American Society for Bone and Mineral Research (ASBMR), the European Calcified Tissue Society and the National Osteoporosis Foundation [9]. Vitamin D supplementation is recommended because of beneficial effects not only on the skeleton but also on muscle function, gait and the immune system in all patients with COVID-19 [10]. Implementation of communication with patients and health-care providers regarding the importance of anti-osteoporosis treatment is necessary [9]. The initiation of osteoporosis therapy can be done as an outpatient via a non-face-to-face visit [9]. In particular, oral osteoporosis regimens can be easily initiated during a telemedical visit [9]. Patients who have fractures requiring hospital admission should be considered for osteoporosis medication initiation while hospitalized, to minimize the risk of being lost to follow-up in the post-discharge period [9]. There is no evidence that anti-osteoporotic therapy increases the risk or severity of COVID-19 infection, therefore patients should receive continuous therapies including oral and intravenous bisphosphonates, denosumab, estrogen, raloxifene, teriparatide, abaloparatide, and romosososab. [9]. However, there are early signals that COVID-19 may be accompanied by an increased risk for hypercoagulable complications, in which case caution may be warranted for estrogen and raloxifene use, both of which may modestly increase thrombotic risk [9]. It may therefore be prudent to instruct patients to temporarily discontinue these hormonal agents if they develop viral respiratory symptoms [9].

## **How the mortality and incidence of severe course has changed?**

From a global perspective, hip fractures have dramatic effects on the health of patients, with an fatality rate from 15% to 30% [8]. Many survivors of hip fractures become permanently handicapped and suffer long-term complications [8]. Data suggest that most hospitalized patients with COVID-19 have a median age >60 years with at least one comorbidity [11].

Prolonged immobilization and weakness associated with disease increase the risk of fragility fractures [11]. Immobilization drives rapid loss of muscle mass and muscle strength that, together with the coexistence of chronic inflammation and frailty, will contribute to increasing the likelihood of falls, which are common events in older adults that cause fractures [11]. However, a Spanish observational study showed an increase in in-hospital mortality rate from 3-5% to 10%, even for fractured patients who tested negative for COVID-19 [12]. Although this issue is likely multifactorial, it is possible that social lockdown had a significant influence, regardless of new clinical pathways specifically designed for hip fracture care during the pandemic [12]. Research conducted in the USA confirms an overall increase in mortality from 3 to 12% among patients with hip fracture [2]. However, among patients with confirmed COVID-19 infection, the mortality rate was 53% [2]. These patients also had a longer hospitalization, a higher rate of serious complications and a greater incidence of ventilator need postoperatively [2].

### Conclusions

Despite the decrease in accident-associated fractures incidence, the incidence of low-energetic fractures is rising. Geriatric fractures have become one of the most frequent causes of hospitalisation. Pandemic has also affected treatment regimens, increasing the distance between patient and the physician. Those alterations negatively affect osteoporosis therapy, resulting in even bigger increase of osteoporotic fractures incidence. Major complications related to the pulmonary consequences of the virus are often fatal in population of elderly patients. Physicians treating patients with COVID-19 infection should counsel families of the significantly increased risks after fractures.

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