



Managing fragility fractures during the COVID-19 pandemic

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The COVID-19 pandemic has broad implications for the care of patients with bone fragility. A dramatic surge in fractures and related mortality is expected in the next few months. We pledge to intensify the current efforts to improve the management of bone health, and to prioritize fragility fracture care and prevention.

The unprecedented outbreak of COVID-19, caused by severe acute respiratory syndrome coronavirus 2, has affected more than four million people worldwide, causing more than 300,000 deaths with a 6.5% case fatality rate¹. Facing the emergency of the COVID-19 pandemic, the US Center for Disease Control and Prevention (CDC) recommended prioritizing urgent visits and delaying elective care to mitigate the spread of COVID-19. Soon thereafter, in many countries, osteoporosis outpatient clinics were either closed or were seeing very few, urgent patients; in addition, many hospitals reduced orthopaedic services to make space for patients with COVID-19 (REF.²). As a consequence, medical services for urgent or emergent diseases that are unrelated to COVID-19 have been underutilized, with a considerable decrease in admissions for life-threatening conditions, such as acute coronary syndrome, and increased mortality from illnesses not related to COVID-19 (REF.³). As a result, the CDC released additional guidelines in order to “prioritize services that, if deferred, are most likely to result in patient harm”². Musculoskeletal injury is classified among the conditions with a ‘less likely’ risk of patient harm if deferred; the CDC recommendation is to “arrange for in-person care as soon as feasible”². With these restrictions, patients with hip fractures, if admitted, are quickly discharged after surgery, often without anti-osteoporotic treatment, proper post-surgical rehabilitation or further recommendations for follow up.

Osteoporosis, which is a highly treatable disease, is on the rise globally and is responsible for more than two million fractures in the USA alone⁴. Hospitalizations due to these fractures exceeded those due to breast cancer, heart disease and stroke⁴. Each year, in the USA, approximately 300,000 hip fractures occur⁴, with a cumulative incidence per year of hip fracture in women over age 65 years of 17.9%⁵. An osteoporotic fracture has considerable effects on the physical, financial and psychosocial status of an individual, as well as their caregivers. Estimated yearly costs for treating osteoporotic fractures are ~US\$22 billion in the USA⁴. These costs might even be underestimations of the actual financial burden,

as they do not include the costs of lost productivity or the loss of wages of the patient or their caregivers.

From a global perspective, hip fractures have dramatic effects on the health of patients, with an overall fatality rate that ranges from 15% to 30% for community-dwelling residents and from 40% to 55% in the long-term care facility setting⁵. Many survivors of hip fractures become permanently disabled, developing long-term complications⁶. Importantly, patients are at highest risk of another fracture in the 12 months⁶ after the initial hip or vertebral fracture, which for many patients will coincide with the period of time when care has been compromised by the COVID-19 pandemic.

Pharmacological and non-pharmacological treatment options for osteoporosis are available and highly effective in preventing further fractures⁶. In the past two decades, we have been facing a major and unacceptable treatment gap after fractures and it has been documented that globally only approximately 20% of patients receive appropriate treatment after a hip fracture^{5,6}. It follows that during the pandemic, our dismal rates of treatment of patients who have had a fracture will probably drop to almost undetectable levels. This problem will be largely below the radar of most medical practices, as osteoporosis continues to be low on the list of clinical priorities.

It is strongly 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 care after discharge through a Fracture Liaison Service (FLS)⁶. However, the FLS programmes, which are part of the ‘Routine primary or specialty care’ (that is, deferral has low risk to patient health) in the CDC COVID-19 guidelines² have largely been closed, as have rehabilitation facilities. Therefore, most patients after hip fractures are at high risk of experiencing fracture-related complications, with a high risk of disability and mortality. At a time when economic resources have also been diverted for the prevention of COVID-19 and the care of patients with COVID-19, we expect a lack of attention and funds

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for the care of adults older than 65 years old at risk of fracture.

Bone fragility in patients with COVID-19

Available data suggest that most hospitalized patients with COVID-19 have a median age >60 years with at least one comorbidity, and have a rise in levels of pro-inflammatory cytokines⁷. Other crucial clinical risk factors for fracture, including immobilization and long-term glucocorticoid treatment, will increase the risk of bone fragility and eventually of fractures. Frailty further deteriorates the health status of these patients and a complete recovery and independence in daily living activities after discharge might take several weeks (if it is ever reached). In people aged 65 years or older, immobilization also drives rapid loss of muscle mass and muscle strength that, together with the coexistence of other COVID-19-related comorbidities, such as chronic inflammation and frailty, will contribute to increasing the likelihood of falls, which are common events in older adults that cause fractures⁸.

Recommendations

Clinical management of patients with osteoporosis or fragility fractures is already complex and neglected under normal circumstances. Considering the current barriers to seeing patients in a regular osteoporosis clinic or hospital setting, the importance of guaranteeing adherence to treatment should be emphasized. The continuity of care is not only a pre-requisite for treatment success but it is also important to preserve the safety of patients on specific treatments. 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 American Association of Clinical Endocrinologists, the Endocrine Society, the European Calcified Tissue Society and the National Osteoporosis Foundation⁹. Vitamin D treatment should be recommended as well, as this strategy might have beneficial effects not only on the skeleton but also on muscle function, gait and the immune system in all patients with COVID-19 (REF.¹⁰). We further recommend implementation of communication with patients and health-care providers regarding the importance of anti-osteoporosis treatment and the referral to primary care providers to obtain appropriate clinical follow-up.

For patients who sustain fragility fractures, as recommended by a multi-stakeholder and international coalition convened by ASBMR, pharmacological treatment should be initiated early after fracture and multi-disciplinary care is critical⁶. Appropriate management of older people with fragility fractures includes assessment of pre-existing chronic diseases, pain management and

rapid access to rehabilitation, which are all steps that will have a positive effect on the outcome of the fracture treatment, survival rate and recovery. All of these guidelines could be easily applied as the appropriate personal protective equipment, distancing and hygienic protocols can be implemented during hospitalization or rehabilitation. Moreover, medication prescriptions or refills do not necessarily require an in-person visit.

As the pandemic continues, although it remains imperative to minimize risk to patients and health-care personnel, new strategies should be implemented to balance the need to provide necessary health services to patients with fractures who do not have COVID-19 beyond the acute recovery period. Alternative models of care are urgently needed, with multi-disciplinary care teams eventually being organized to serve patients and their families with, for example, telemedicine tools. This approach not only has the potential to improve quality of life and survival outcomes but is also cost-effective, lowering the economic burden of fracture and saving resources for tackling the COVID-19 pandemic.

In conclusion, to respond to the threat posed to the health systems, individuals and their families from the COVID-19 pandemic, it is important to prioritize the overall health of older adults, and to advocate for acute and long-term fragility fracture care and prevention by governments and national health service providers.

1. World Health Organization. *Coronavirus disease (COVID-19) situation report – 125* https://www.who.int/docs/default-source/coronavirus/situation-reports/20200524-covid-19-sitrep-125.pdf?sfvrsn=80e7d7f0_2 (WHO, 2020).
2. Center for Disease Control and Prevention. *Framework for Healthcare Systems Providing Non-COVID-19 Clinical Care During the COVID-19 Pandemic*. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/framework-non-COVID-care.html> (CDC, 2020).
3. De Filippo, O., D'Ascenzo, F. & Angelini, F. Reduced rate of hospital admissions for ACS during Covid-19 outbreak in northern Italy. *N. Engl. J. Med.* <https://doi.org/10.1056/NEJMc2009166> (2020).
4. American Society for Bone and Mineral Research. *The Crisis. ASBMR: Secondary Fractures* <https://www.secondaryfractures.org/the-crisis> (ASBMR, 2020).
5. Black, D. M. et al. The ability of a single BMD and fracture history assessment to predict fracture over 25 years in postmenopausal women: The Study of Osteoporotic Fractures. *J. Bone Miner. Res.* **33**, 389–395 (2018).
6. Conley, R. B. et al. Secondary fracture prevention: consensus clinical recommendations from a multistakeholder coalition. *J. Bone Miner. Res.* **35**, 36–52 (2020).
7. Richardson, S. et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. *JAMA* <https://doi.org/10.1001/jama.2020.6775> (2020).
8. Kortebein, P., Ferrando, A., Lombeida, J. & Wolfe, W. Effect of 10 days of bed rest on skeletal muscle in healthy older adults. *JAMA* **297**, 1772–1774 (2007).
9. Yu, E. W., Tsourdi, E., Clarke, B. L., Bauer, D. C. & Drake, M. T. Osteoporosis management in the era of COVID-19. *J. Bone Miner. Res.* <https://doi.org/10.1002/jbmr.4049> (2020).
10. Ebeling, P. et al. Therapeutics of vitamin D. *Eur. J. Endocrinol.* **179**, R239–R259 (2018).

Competing interests

The authors declare no competing interests.