

Practising Orthopedics in COVID Times: The Way Forward

Abstract

This article highlights the influence of coronavirus pandemic in patient care from an Orthopedic surgeon's perspective and enumerates the modifications in routine practice while providing quality service to the society. The authors have reviewed the recently available articles regarding the changes in orthopedic practice with respect to the coronavirus disease pandemic. Prioritizing surgical treatment of obligatory fractures and conservative management of non-obligatory fracture will be the cornerstone of management strategy in patient care during these troubled times. Formalizing evidence-based protocols for various subsets of orthopedics not only reduces the event-response time lag but also helps in accurate implementation of services for the best patient outcome.

Keywords: *Coronavirus disease 2019, obligatory fractures, operative intervention, orthopaedic practice, osteoporosis*

Introduction

The coronavirus belongs to a family of single-stranded RNA viruses known as Coronaviridae. These viruses spread infections known as zoonoses (transmitted from animals to humans). The Coronavirus Study Group by the International Committee on Taxonomy of Viruses has scientifically named it SARS-CoV-2, but the disease is popularly known as coronavirus disease 2019 (COVID-19).^[1] The first cases of COVID-19 were confirmed in Wuhan, China, in December 2019, before the virus had spread globally. Now, there are >60 million confirmed cases worldwide. The current outbreak has been officially recognized as a pandemic by the World Health Organization (WHO) on March 11, 2020. The two most important modes of the virus transmission are aerosols (droplet infection) and fomites (contact with virus bearing surfaces). Blood aerosols have been postulated to transmit the virus though they were not confirmed.^[2]

The symptoms of COVID-19 vary substantially among patients, ranging from no symptoms to fulminant respiratory failure. Mild presentations include flu-like symptoms such as cough, muscle pain, sore throat, and fever. However, more severe pulmonary symptoms can also occur in the elderly and those with existing

co-morbidities. In such patients, the disease is characterized by severe dyspnea, interstitial pneumonia, acute respiratory distress syndrome, and multi-organ dysfunction. Apparently, the mortality may be attributed to the lack of protocols and resource availability for the management of these patients. COVID-19 has substantially affected the health-care scenario across the globe with varying impact on different medical specialties. This article highlights the influence of the coronavirus pandemic in patient care from an orthopedic surgeon's perspective, and enumerate the modifications in routine practice while providing quality service to the society.

Coronavirus Disease 2019 and Orthopedic Surgeons

Globally, COVID-19 has affected frontline healthcare workers for obvious reasons of exposure, with a mortality rate of up to 1.4%. Health care professionals, including orthopedic surgeons, are bound to come across patients with suspected or confirmed COVID-19 infections. In such circumstances, they will have to act diligently not only to provide quality care but also to prevent the spread of infection. A more conservative approach should be sought, except in emergencies where the benefits of operative intervention outweigh

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the risk associated. As of now, there are no universal guidelines for complete orthopedic care in the face of the coronavirus pandemic.

Routine outpatient facilities are disrupted due to restrictions in the hospitals and clinics and due to travel restrictions. As per the latest recommendations of the British orthopedic association, except for the most essential situations, face to face clinics are now switched to virtual or telephonic clinics.^[3,4]

The latest screening recommendations are based on the Centers for Disease Control and Prevention (CDC) and WHO guidelines, but these are subject to change because of the evolving nature of the disease. All the patients undergoing essential orthopedic surgeries should be enquired about their history over the past 14 days with regard to symptoms such as fever, cough, shortness of breath and contact with a person positive for COVID-19. With increasing community spread, the patients have a high risk of being asymptomatic carriers. Travel history can no longer be a reliable factor given the widespread nature of the disease. Another feature of COVID-19 is the alteration of smell and taste early in the disease process. Symptom severity varies widely, with many people who are asymptomatic or mildly symptomatic and appear to have a mild cold 20–24. Guo *et al.* recommend patients to be tested for COVID-19 before surgery, if available and advises them to wear a mask at all times.^[5] As per the recommendations of ICMR, reverse transcription polymerase chain reaction of nasopharyngeal or throat swab is the best for early diagnosis and isolation, and serological tests are recommended only for surveillance.

During the lockdown period, the number of injuries due to motor vehicle accidents might have come down. However, there is no reduction in the incidence of low energy fractures around the hip like the neck of femur fractures due to osteoporosis. Any fracture in the elderly is associated with increased mortality, poor quality of life, and functional limitations as well as substantial economic burden to the health sector. This further compromises the care in COVID-19 related orthopedic management.^[6]

The management of a patient with osteoporosis requires a multidisciplinary approach, integrative care, and patient-centric rehabilitation; all of which can be impacted by the COVID-19 pandemic.^[7] Osteoporosis is a multifactorial metabolic bone disease which is characterized by low bone mass, with normal mineralization but abnormal bone microarchitecture.^[8] Recently, there has been emerging evidence that Vitamin D protects against COVID-19 and reduces the severity of the disease. The plausible mechanisms include induction of cathelicidins and defensin proteins by Vitamin D that can decrease the viral replication rates and the COVID-19-related cytokine storm that produces inflammation in the lining of lungs leading to pneumonia.^[9]

Fragility fractures are those that result from mechanical forces that would not, as a general rule, result in fracture. According to the WHO, these low-level or low-energy trauma are forces equivalent to a fall from a standing height or even less. There is a likely connection between COVID-19 infection and fragility hip fractures in elderly patients. Fragility fractures may be induced as a result of a fall from standing height due to the fatigue and weakness caused by the COVID-19 disease. A DEXA scan for BMD assessment may not be feasible because of the lockdown, travel restrictions and the closure of routine services in hospitals. Therefore, an accurate clinical history and other osteoporosis-related fracture prediction tools gain importance. With the limited evidence, there is concern that COVID-19 infection may also be associated with hypercoagulable conditions.

Need for Operative Intervention

Obligatory fractures such as fractures around trochanter and fractures of the spine with neurological deficit require operative intervention. All patients should be screened and tested for COVID-19 in the emergency setup. All the precautions pertaining to COVID-19 should be taken whilst managing patients in the emergency department and in the in-patient wards until reports are available. If COVID testing is not possible then an “human immunodeficiency virus model,” can be adapted in the operative management of these patients and every patient should be treated as COVID-19 positive until proved otherwise.

Confirmed or suspected COVID-19 infection in these patients is not a reason to postpone or cancel hip surgeries. It is recommended that elderly patients with hip fractures should undergo minimally invasive procedures. This reduces operating time, minimizes blood loss, allows immediate weight-bearing postoperatively to allow rehabilitation, and reduces the length of stay, thereby reducing the exposure to coronavirus.

Fragility hip fractures can be treated by cemented bipolar Hemi-replacement arthroplasties or Austin Moore prosthesis for intra-capsular fractures and implants such as proximal femoral nails.

The benefits of early hip fracture surgery for elderly patients include short span of bed rest, early mobilization, pain control, improved function, and reduced mortality. Absorbable sutures are suggested for wound closure, so that a subsequent hospital visit to remove the suture may be avoided.

There is, however, a higher mortality rate in elderly patients with hip fractures and an associated positive test for COVID-19. Conservative treatment with traction immobilization should be considered for high-risk patients with severe comorbidities. Furthermore, severe respiratory dysfunction and pneumonia secondary to COVID-19 infection may represent a contraindication to urgent hip fracture surgery in COVID-positive patients.

Nonobligatory Fractures

Distal radius fractures, vertebral fractures without neurological deficit or proximal humerus fractures without dislocation or unacceptable displacement can be managed conservatively as much as possible. The conservative treatment of stable vertebral fractures includes analgesics, anti-inflammatory medicines with absolute bed rest for initial months, followed by mobilization with the spinal corset. Fracture of the distal radius, if displaced, should be reduced and maintained in a removable splint or Plaster of Paris slab. This allows self-removal of splints or plasters at home and avoids out-patient visits. Some degree of mal-union may be accepted and this can be managed by reconstruction surgery in future if absolutely necessary.

Immobility is a moderate risk factor for osteoporosis. As people remain inside their homes due to lockdown, there are higher chances for osteoporosis to develop. Physiotherapy plays an important role in preventing fragility fractures. Patients should be prescribed low or high impact aerobic activity (e.g., indoor walk >30 min a day), muscle-strengthening and balance exercises (use of weights for static exercises and exercise bikes). A fall-prevention strategy for the elderly includes physical exercises and education regarding risks within the home. The factors that can be the source of falls such as wires, rugs, greasy floors, improper footwear, poor lighting, etc., must also be corrected.

Identification and Patient Selection for Surgery

Patient identification is done based on four parameters - COVID infection status/exposure, age, ASA physical status classification system/risk factors, socio-professional situation and surgical indication. According to Fineberg, patients should be treated according to their COVID-19 exposure. The author defined five types of patient categories: (1) A person who is not known to have been exposed or infected, (2) who has been exposed but is asymptomatic, (3) who has recovered from infection and maybe adequately immune, (4) who is possibly infected (persons with sign and symptoms consistent with coronavirus infection who initially test negative), and (5) who is infected.^[10] Comorbidities that need to be considered include high blood pressure, cardiovascular diseases, diabetes, lung diseases, cancer, liver, and kidney diseases. Patients with body mass index >30 kg/m² are also considered at risk for severe forms of COVID-19. Finally, the socio-professional situation should be considered with probability, and a priority kept for active workers.^[11-13]

The American Academy of Orthopedic Surgeons defines four types of orthopedics procedures during a pandemic: (A) emergency only, (B) urgent types of surgeries, (C) urgent/somewhat elective, and (D) elective. The applicability of AAOS' guidelines on elective surgery depends on the disease curve, as well as the availability

of resources including healthcare personnel, personal protective equipment (PPE), etc., in your institution.^[14,15]

Emergency Only

This is to be applied when the institutional set up is facing a critical shortage of resources. Only true-life or limb-threatening injuries should be taken to surgery with the goal of minimizing the need for ventilatory support, even if this is outside the usual standard of care (e.g., the use of spinal anesthesia for surgery).

Urgent-only

These are the conditions where immediate surgical intervention would prevent significant impairment of function or where failure to repair the injury would result in increased morbidity. For example, fracture-dislocations, pilon fractures, distal biceps rupture, inter-trochanteric fractures, pelvic fractures, femur fracture, etc.

Elective Surgery

Elective surgery is applicable for chronic problems whose surgery can certainly be delayed without significant harm to the patient or the eventual outcome. Types of procedures, for example, total joint arthroplasty, chronic intra and periarticular ligament, tendon conditions, chronic peripheral nerve compression syndromes.

As the virus becomes more prevalent, some outpatient surgery may be considered depending on the availability of resources. For example, acute intra and periarticular ligament and tendon-related conditions such as meniscal tears and selected trauma cases.

Preoperative Evaluation

All the cases should be treated as a suspected case and proper precautionary measures should be taken since a large number of cases are asymptomatic. Moreover, positive pressure operation rooms should not be used. They should ideally be turned off or changed to negative pressure if possible as increased air pressure can distribute fine particles through the room. There should be separate operation rooms for COVID positive patients. Electrocautery/laser smoke or other orthopedic interventions (drilling, reaming, etc.) power tools, pulsatile lavage create aerosolized particles (virus). Therefore, aerosol-generating procedures represent a clear risk to the surgical team. The CDC guidance on the level of PPE required for the surgical team members is an immediate necessity. Moreover, general anesthesia should be avoided if possible and regional block should be preferred. Spinal anesthesia has been reported to be safe for use in COVID-positive patients. The UK Public Health England guidance of March 27, 2020, recommended PPE consisting of level 4 surgical gowns, face shields or goggles, double gloves, FFP2-3 (Filtering facepiece) or N95-99 respirator masks for orthopedic surgeons working in a COVID-19 environment.^[16]

Postoperative Period

Postoperatively, the hospital stay should be cut short to the bare minimum to avoid the risk of hospital-acquired infections. Postoperative appointments should be planned in the early postoperative phase to detect potential COVID-related complications and made, if possible, with the use of video conference and/or tele-healthcare to minimize repeated postoperative visits, thereby limiting patient displacement.

Conclusion

The COVID-19 has made us rethink how we manage orthopedic cases. Prioritizing surgical treatment of obligatory fractures and conservative management of non-obligatory fractures will be the cornerstone of management strategy in patient care during these troubled times. The importance of telemedicine or virtual consultations in such a situation cannot be overemphasized. The elimination of patient modifiable risk factors for osteoporosis such as sedentary lifestyle, diet, etc., is also a matter of prime concern. COVID-19 is an unexpected pandemic but the insights gained can help set the frame of reference for modifying conventional orthopedics. Formalizing evidence-based protocols for various subsets of orthopedics not only help reduce the event - response time lag but also in accurate implementation of the services for the best patient outcome.

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Conflicts of interest

There are no conflicts of interest.

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