

Safety Measures for Orthopedic Practice during Coronavirus Disease Pandemic

Tarek Aly*

Department of Orthopedic Surgery, Faculty of Medicine, Tanta University, Egypt

***Corresponding Author:** Tarek Aly, Department of Orthopedic Surgery, Faculty of Medicine, Tanta University, Egypt.

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Abstract

In December 2019 in Wuhan city in China, health workers identified a group of pneumonia cases of unknown aetiology and they called it Covid-19 disease. It became a pandemic disease with high mortality rate, with marked effect on the respiratory system, and multiorganic failures through vascular coagulopathies. Orthopedic surgery and its branches require safety protocols when attending patients with risk of infection, or transmission for COVID-19 and comorbidities in the outpatient and inpatient hospital setting.

A New precautions and safety guidelines were emerged to coop the pandemic.

Determining the need for special preventative measures, orthopedic physicians must change the pharmacological plan and educate in new preventative measures on the use of orthopedic devises. More research is required for more understanding of the nature of the virus and its effects on the body and ways of transmission.

Keywords: COVID-19; Coronavirus; SARS-CoV-2; Protection; Orthopaedics

Introduction

Since last December, a new mutation of corona group of viruses that was started in Chinese city of Wuhan, that has spread all over the world affecting nearly 6 million of world population till writing this manuscript leading to death of nearly 400000 people. Clinically, the disease was characterised with group of manifestations included fever, radiological pulmonary signs and acute respiratory distress, lymphopenia, and no response to antibiotics [1]. Chinese authorities found Link between the original cases discovered and Seafood Market in the city of Wuhan were the disease started. This has caused marked affection to people's health that had been reflected on the economy of the area [2]. As of April 1st, 2020, more than 1,000,000 patients were confirmed positive of the disease and nearly 60,000 died world-wide. The pandemic was characterised by an unusual scientific response, detecting the organism, with evolving of specific techniques for diagnosis and treatment plans [3].

The virus is characterized by easy way to spread among people, and this add to the burden of clinical orthopaedic practice either in outpatients clinics, inpatients wards or operating rooms. Improving the diagnosis and treatment for orthopaedic problems while trying to stop the disease transmission is a major issue that orthopedic surgeons need to deal with. The aim of this article was to review of the present informations of the COVID-19 disease and related clinical orthopaedic features that has been reported.

Methods

A literature review was made of the most recent situation reports from WHO and publications on COVID-19. A systematic search was conducted in MEDLINE, EMBASE, Google and the clinical key for articles published from January through March 2020.

Results

Clinical features and management principles of COVID-19

The incubation period of COVID-19 is still unknown clearly. It ranges from less than a week and it can last up to more than 3 weeks in some cases. Infected but asymptomatic patients are the main cause for spread of the disease. The way of transmission includes: direct contact and aerosols [1]. The main symptoms of COVID-19 are high body temperature above 38, soreness of the throat, cough usually dry, weakness, and muscle aches. A small number of patients exhibit runny nose, diarrhea and other symptoms [2]. The disease progress is rapid with dyspnea that may progress to acute respiratory distress syndrome, and multi organ failure. Total lymphocyte counts are decreased, C-reactive protein increased. Opacities in chest computed tomography (CT) in both lungs. Pulmonary consolidation, and pleural effusion can be seen in advanced cases [3].

The criteria needed for diagnosis of COVID-19 are: positive nucleic acid test, homologous genome sequencing to SARS-CoV-2 and positive serological testing of SARS-CoV-2-specific immunoglobulin G (IgG) and immunoglobulin M antibodies [4]. Suspected or confirmed case when identified, a report to the health authorities should be done, and the patients should be admitted to the designated hospital [5].

Personal protection of health workers

This is very important to be sure about the health of the persons responsible for care of the patients. Orthopedic teams are caring of large number of patients [6]. The spread of infection is predominantly via droplets and by direct contact with contaminated surfaces. A social distancing of more than 1.5 meters is needed to decrease aerosol spread during clinical practice [7]. Regular aeration of the rooms is required.

Use of face masks is mandatory. When deciding to choose such a mask, it should be well fitted around the caregiver's mouth and nose. The size of coronavirus is around 0.1 microns [8] and these particles would pass through most of the available masks. S, N95 masks are required for caregivers with medium risk while positive pressure suits are needed for high-risk practitioners [9,10]. The usual surgical designed for preventing contamination of the surgical wound from the aerosols generating by the surgical team but do not fit around the face and mouth. They provide only a 35% protection against a standard lab aerosol [11,12]. Use of glasses help to prevent droplet contamination through the eye [13].

Hand washing with disinfecting gel or soap and water is needed before and after every deal with the patient. Use of disinfectants for all patient contacts in his room is crucial as chairs, tables, etc. frequently [14].

Non-operative management of musculoskeletal disorders during the pandemic outbreak

There is controversy regarding the use of steroids during a Pandemic because of its depressive effect on the immune system. Non-steroidal anti-inflammatories (NSAIDs) had been claimed to deteriorate the COVID19 disease. This was relied on an old report proving that intra articular steroid injection reduces the potency of the influenza vaccine [15]. WHO advised to avoid steroids unless the patient is suffering from adult respiratory distress syndrome [16]? It is advised to use paracetamol instead to reduce the manifestations of the disease. Taking the drug in the early stages of the disease may induce prolonged illness or more severe respiratory or cardiac complications [17].

Remote consultations

Many are conducting phone calls with the patients during the pandemic. This way depends on the patient capacity, simplicity of the medical condition and also that the caregiver can easily access all required patient information [18-20].

Outpatient clinics

Clean the orthopedic devices every time they are used with alcohol, chloride or ammonia for further protection of the most sensitive population that use these devices. Emergency Room and Outpatient consultation of orthopedic patients must get this revision in their treatment for their protection, and in post infected patients the follow up and protection must include this measure. Postop inpatients, tests must include Dimer-D, Il-6, Troponin 1 [21,22].

Elective surgeries

Elective surgeries should ideally be postponed decreasing the possibility of spread of disease between patients and caregivers. Also, reducing surgeries saves resources of the hospital as beds, personal protective equipment, and keeping the health of health care workers [23].

Operating theatre

Better to prepare a specific operating theatre for all COVID-19 cases. It should be away from crowded areas and be only occupied with needed equipments. Also, close room is required for persons in charge with the case and equipment, medications and materials for the infected case.

The problem is operating theatres that it is designed to have positive pressure to reduce intraoperative contamination, and it is not easy to reverse it negative pressure needed in case of COVID19 infections.

Movements in the operating theatre should be reduced to minimum. Specific number of persons should be devoted to the Operating theatre to provide the needs during the operation [24-26].

Regarding the patient recovery, it should be in the operating theatre with the same staff then moved to the isolation room.

The orthopaedic residency care strategy

Every effort should be done to balance between clinical work, surgical training, studying. Keeping a healthy resident is very important to patient care. So, good regulation of the resident's work force is mandatory [27].

Schwartz., *et al.* advised a strategy that that is suitable for a resident demands while keeping the education program [28]. The first requirement is safety, through minimising the face-to-face contact with patients and colleagues to decrease the possibility of transmission of the disease. The second requirement is duty, defining the role of the orthopaedic residents in management of trauma patients or those with emergency problems as infection. The strategy must be sustainable to coop with the unknown duration and the impact of a pandemic on the residency program. The strategy must be flexible [29-32].

Nurses' protection

It is necessary to establish hospital-specific protocols to reduce the risk of nurses' infection in interactions with the patients. This includes adequate education, and training for the personal hygiene, ward disinfection, Way to get rid of medical and surgical wastes, and sterilization of patient equipments and management of occupational exposure. Also, establishing a scientific, reasonable shift schedule through either interrupted or continuous working hours according to nursing staff preference. It is very common for nurses to not be fully aware of their exposure while caring for patients so, infection control observing system that provides real-time monitoring and aids in instant correction is necessary [33]. Psychological counselling to relieve the mental stress of nurses is needed. Departments

equipped with hospital information systems, personal digital assistant systems, and a local intranet, wards monitored by cameras all are necessities [34].

Discussion

COVID-19 is known as SARS-Cov-2 or HCoV-19; is a Beta-Corona Virus that belongs to the RNA encapsulated family of viruses. This Capsule is formed by mucopolysaccharides and a lipid layer which gives the virus it's capability to adhere to cells and Attach to them transmitting their RNA into the cell for viral proliferation [35]. This capsule is also the viruses weakness due to its inability to survive for long periods of time in the environment, and it's weakness to all disinfectant substances like soap, an alcohol, Chloroquine (in current research) [36].

Multisystemic morbidity of the virus lead to lung, liver, kidney and intestinal morbidity. The last three organs are related to the 1, 25-Dihydroxycholecalciferol and calcium metabolism, affecting bone tissue in ways not determined yet [37].

Together with the virus capability from its capsule for survival and adherence to metal, plastic, surfaces, leads the way for future studies to determine if the virus is capable of surviving inside and in between the metal implants by forming viral biofilms. Biofilms are largely studied for Bacteria but not for viruses. Like prosthesis in patients with Arthroplastic Surgery in the hip, polyethylene implants and acetabular component, knee femorotibial polyethylene implant, and in the locking mechanisms of the transpedicular screws [38]. Patients with arthroplasty are in fragile age for this disease, and most have Hypertension, diabetes, and chronic disease comorbidities. So, pharmacological options must be studied to replace ACE inhibitors use until further data and new treatments are created [39].

Every effort should be made for staff training and to be informed on the current situation in their areas. The staff must do daily cleaning for all areas. The staff should minimize the risk of infection by frequent washing of their hands and avoiding touching their faces. If any is experiencing any symptoms or believe that he has been exposed to COVID-19, he has to isolated for two weeks. Some studies started to appear around the effects of this disease on the caregivers mentally. So, it is crucial for the caregivers to get the emotional support and recognition. Getting enough periods of rest, provided with ways for regular contact with their friends and family.

Having a clear surgical strategy during the COVID-19 pandemic allow to provide the best care to the populations.

Conclusion

Orthopedics as a specialty may looks far from the pandemics, but in a closer look orthopedic patients with chronic articular diseases and high age group are risky and need utmost to prevent and treat SARS Cov-2, for risk of increased morbidity and mortality.

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