

COVID – 19 AND THE ORTHOPAEDIC SURGEON

Disease/ Origin

In December 2019, a cluster of patients with pneumonia of unknown cause was linked to a seafood wholesale market in Wuhan, China. A previously unknown betacoronavirus was discovered through the use of unbiased sequencing in samples from patients with pneumonia (1).

Human airway epithelial cells were used to isolate a novel coronavirus, named 2019-nCoV, which formed a clade within the subgenus sarbecovirus, orthocoronavirinae subfamily. 2019-nCoV is the seventh member of the family of coronaviruses that infect humans (1).

Coronaviruses are enveloped RNA viruses that are distributed broadly among humans, other mammals and birds that cause respiratory, enteric, hepatic and neurologic diseases. There are currently six species of coronavirus known to cause human disease. Four viruses – 229E, OC43, NL63 and KHU1 are prevalent and typically cause common cold symptoms in immunocompetent individuals. The other two strains – (SARS-CoV) Severe Acute Respiratory syndrome coronavirus and (MERS-CoV) Middle East Respiratory syndrome coronavirus are zoonotic in origin and can cause fatal illness. Given the high prevalence and wide distribution of coronaviruses, the large genetic diversity and frequent recombination of their genomes and increasing human-animal interface activities, novel coronaviruses are likely to emerge periodically in humans owing to frequent cross-species infections and occasional spill over events. (1).

Symptoms

Some of the earliest documented cases are three adult patients who presented with severe pneumonia and were admitted to a hospital in Wuhan on 27th December 2019. These patients reported fever (temperature 37 to 38 degrees Celsius), cough with chest discomfort in late December (between the 20th and 23rd) later progressing to respiratory distress resulting in one patient requiring ventilation. Since then the symptoms documented in patients worldwide include dry cough, fever, headache, difficulty in breathing, sore-throat, diarrhoea and body aches. While some patients have been asymptomatic, others have exhibited symptoms ranging from mild to severe (1).

Spread

Although the majority of the earliest cases were linked to Huanan Seafood Wholesale Market and the patients could have been infected through zoonotic or environmental exposure, it is now clear that human

to human transmission has been occurring and that the epidemic has been gradually growing in recent weeks (6).

According to Quin Li *et al* (6) the disease has an estimated R₀ of approximately 2.2 meaning that on average each patient has been spreading infection to 2.2 other people. In general, an epidemic will increase as long as R₀ is greater than 1 and control measures aim to reduce the reproductive number to less than 1. By March 2020, the disease had spread to every continent and was declared a pandemic by the World Health Organization (WHO) on 11th March 2020.

Routes of spread

While the basic outlines of disease transmission have not been upended by COVID-19, there are some nuances that could play an important role in the spread of the disease. SARS-CoV-2 is a respiratory virus and as such it is transmitted through respiratory droplets when symptomatic people sneeze or cough. This is according to CDC and also according to the findings by WHO-China joint mission on COVID 19, the virus is transmitted via droplets and fomites during close unprotected contact between an infector and infectee. This idea that large droplets of virus laden mucus are the primary mode of transmission, guides the advice to maintain at least a 6- foot distance between people. The thinking is that gravity causes those large droplets to fall to the ground within a distance of 6 feet from the infected persons (9,11).

Airborne spread has not been reported for this virus and it is not believed to be a major driver of transmission based on available evidence, however it can be envisaged if certain aerosol generating procedures are conducted in health care facilities, this was according to the initial report by WHO-CHINA task force. Although we do know that for the virus to be spread without being coughed or sneezed in large drops of mucus, it has to somehow be able to suspend in the air for long enough to infect passers-by. People emit virus particles in a range of sizes, some small enough to be considered aerosols or fine particles that can be suspended in the air for hours and can travel with air currents across tens of feet. One recent study has shown that the virus particles that were aerosolized could remain viable for up to 3 hours. But the study was not clear on whether aerosols are a common mode of transmission and how long the virus remains infectious in aerosols in real world settings (9, 11).

In contact transmission, it is thought that the viral particles emitted from the respiratory tract of

an infected person land on a surface. Then another individual touches the object then touches their mouth, nose or eyes. Then the virus gains entry into the body via these mucous membranes (9,11).

Fecal shedding has been demonstrated from some patients. However, the fecal-oral route does not appear to be a driver of COVID-19 transmission, more remains to be determined (11).

Current status including disruptions

Here in Kenya, the numbers are still below three hundred but continue to slowly increase with many of the new infections thought to be due to community transmission. To try and curb the spread of the disease many countries have instituted total or partial lockdowns. Schools have been closed, people have been informed to work from home, any form of gathering of more than 10 people have been restricted and only those services/businesses termed as essential are still operational in most affected countries.

Illness and death are just the obvious health effects of a pandemic, but they are compounded by children being out of school, business closed, many people on the brink financially, transportation networks halted and travel restricted.

Health care implications

General

The effect of COVID-19 on healthcare systems goes beyond the morbidity it produces in individual patients. It extends to health care systems already constrained by existing levels of non-communicable and communicable diseases. Further to this, healthcare workers are reporting an increased incidence of mental health issues associated with the measures implemented to curb the spread. This is a huge challenge since in all too many cases, as seen in countries that have had significant spike in number of cases, the systems cannot cope with the volume of patients needing care as a result of COVID 19, even if there were no other cases such as those associated with cardiovascular, pulmonary, metabolic disease, cancer, trauma and musculoskeletal disorders among others (7).

For a long time, primary care has held on to the promise that problems like access and care could be delivered digitally, the current pandemic is accelerating the adoption of this at a faster rate than it had been before. The effect of this virus upon digital solutions around not only delivery but also training of healthcare has been and continues to be very significant (7).

The pandemic is also affecting the global health product supply chains, disrupting key material and ingredients, finished products, logistics, shipping and many more (8).

Surgical including orthopaedic surgery

Looking at guidelines from almost all the surgical specialities including orthopaedic surgery, the general plan has included the following measures/recommendations: post-ponement of all elective surgical and endoscopic cases, all non-essential hospital or office staff to be allowed to stay at home and telework, all non-urgent in-person clinic/office visits should be cancelled or postponed unless needed to triage active symptoms or manage wound care, multidisciplinary meetings should be held virtually as much as possible. These are supposed to help preserve resources which are quickly being consumed by the pandemic but also minimise risk of spreading the infection. Emergency surgeries and oncology related care is still being carried out. Different countries have adopted different guidelines for use of Personal Protective Equipment (PPEs). The consensus is more precautions being taken on all confirmed or suspected cases and reserving the full protective gear while still providing adequate protection when dealing with low risk patients (2,3,4, 5,12).

Orthopaedics

Orthopaedics has also followed much of what has been stated above of course tailored to fit orthopaedic care delivery.

Conclusion on the way forward for the orthopod...

There are several guidelines that have been produced to help guide the orthopaedic practice during this COVID-19 pandemic, including one from Kenya Orthopaedic Association (KOA). These are but guidelines hence the final decision will rest with the team on the ground based on condition of patient, availability of qualified personnel, Personal Protective Equipment and other equipment needed to provide the best care for the patient (12). Surgeons should continue to provide quality care while ensuring their safety and that of their teams.

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