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Standing on Your Foot and Ankle During COVID-19: Perspectives From a Singaporean Orthopedic Foot and Ankle Surgery Unit



The Coronavirus Disease 2019, otherwise known as the COVID-19, has now reached a tipping point. The first case of COVID-19 in Singapore was confirmed on January 23, 2020 when a tourist from Wuhan travelled to Singapore (1). Singapore dealt expediently with the first wave of cases, being recognized by the World Health Organisation (WHO) for its effort on 18 February 2020 (2). Despite this, Singapore is currently facing its second wave of COVID-19 cases as Singaporeans and permanent residents returned from abroad with an inevitable increase in imported cases and now local transmissions. As of the first week of May 2020, we have the highest number of COVID-19 patients in Southeast Asia. This surge in the number of COVID-19 cases places a significant stress on the healthcare system and the community; and the situation is not unique to Singapore. Currently, all but a few countries have been affected by COVID-19 (3).

The aim of writing this article is to outline the challenges that we have faced as a Foot and Ankle unit during the pandemic, how they are being dealt with and the lessons we have learnt so far. We hope that these early experiences from our Foot and Ankle unit could help the preparedness of other Orthopedic surgeons. For purposes of this article, the challenges, responses and lessons learnt during the pandemic are presented in 4 main categories; upholding standards of care, protecting healthcare workers and uninfected patients, conserving healthcare resources and continuing medical education.

Upholding Standards of Care

One of the paramount principles during the pandemic is that we must never forget our primary duties as doctors and that no patient should be denied care. This principle has been repeated multiple times within the institution and strategies to deal with the pandemic have always made sure that all patients are well taken care of regardless of their COVID-19 status.

One of the departmental strategies included setting up a “contaminated team” whose main responsibility is to look after patients who are suspected or confirmed to have COVID-19. Each team is led by an attending consultant and comprises of individuals from different levels of practice within Orthopedic surgery, including the house officer, junior resident, senior resident, and attending consultant. The mix of team members ensures that the team can function independently and all matters with regards to these patients can be dealt with by the team expediently. All members of the department take turns to be part of the “contaminated team,” including members of the foot and ankle unit. However, as the team functions with only one attending consultant, it is understandably not uncommon for these attending consultants to be faced with cases that were not within their subspecialty. Therefore, when required, the team will obtain assistance from the other subspecialty attending consultants. For instance, in the case of complex foot and ankle trauma or limb salvage surgeries, the “contaminated team” consultant could seek advice from the foot and ankle specialist consultants. Likewise, if we as foot and ankle surgeons face complex cases that are beyond our subspecialties (such as spine trauma), we similarly seek assistance from our spine colleagues. Once directly involved in the care of these patients, the subspecialty consultant involved would then join the “contaminated team” for the rest of the period when they are on duty and return to normal clinical duties together with the “contaminated team” subsequently. The “contaminated team” rotates on a

weekly basis with handovers from one team to the next to ensure that the team members had adequate rest and were at their best condition to uphold the standards of care for these patients. Handovers are done via secured messaging platform or via video conferencing to minimize physical contact.

The rest of the department are segregated into 2 teams. Each team is comprised of at least one subspecialty attending consultant from every subspecialty. This is to ensure that the department remains functional should any of the team members contract COVID-19. One team is responsible for delivering care to the inpatients while the other team is responsible for delivering care to the outpatients. Boundaries are drawn clearly, and strict regulations are implemented to ensure that the teams do not meet each other to prevent cross-infection. The inpatient team attends to all inpatients, performs operations and provides on-call services. This means that all foot and ankle patients, including those who were previously taken care of by other consultants, come under the inpatient foot and ankle team’s purview. Handovers are, therefore, essential from one team to another to ensure continuity of care. All team members ensure that they are contactable at all points in time regardless of the team they are in should the need for clarifications arise. Patients are managed in a universal evidence-based manner, and when the opinions of the consultants differ when a patient is handed over from one to the next, an online discussion is had amongst the consultants in the unit for consensus. The same applies for the outpatients. The outpatient team oversees the running of the outpatient specialist clinics. As much as possible, the clinic attempts to arrange the appointments of the patients under their original consultants, however, in the event where a patient’s appointment cannot be postponed, for example, due to postoperative wound inspection, infected foot wounds or ulcers, these patients are managed by the outpatient team with telephone consultation from the original consultant if required.

Beyond the department, team segregation is also performed at a national level where healthcare professionals are not allowed to travel from one institution to another. All cross-institution deployment and teaching sessions were suspended with immediate effect when local transmission was detected in Singapore. Without cross-institution deployment, the institution also had to ensure that there were adequate specialists from each subspecialty and adequate allied health professionals from each division. Foot and ankle surgeons had to be divided amongst the different sister-institutions to ensure that all foot and ankle patients were attended to regardless of the institution they were in. Patients who were originally under the care of these deployed consultants were then managed by the remaining foot and ankle surgeons in the institute, and some surgeries were subsequently performed by the other foot and ankle surgeons that remained in that institute.

In order to further minimize the possibility of cross infection, acute hospital and community hospital pairings were formalized, and all patients were only allowed to travel within the paired hospitals should they require rehabilitation after being admitted in an acute hospital or should they require acute care while undergoing rehabilitation in a community hospital. No transfer of patients is allowed from one institution to another outside of the paired institutions, although prior approval can be obtained from the Chief Executive Officer of the hospital should there be a clinical need to do so in cases where the specific expertise to treat that patient was not available in the paired institution.

Apart from delivering care within Orthopedic Surgery, members of the department are also expected to deliver care to patients outside of the department. Junior and senior residents have been redeployed to other departments including the Emergency Department, Intensive Care Units and the Infectious Diseases Unit to assist with the surge in COVID-19 patients in those departments. Training and retraining were performed over online tutorials and video conferencing to ensure that these doctors were well-equipped to help in these other departments. Many members of the team have stepped up to volunteer for other services, such as surveillance duties in the community, in hope to pick up those asymptomatic patients that are infected with COVID-19 early to break the chain of infection. In addition, we have also volunteered to provide healthcare services and swab testing in workers dormitories to isolate those whom are infected from living in close proximity in dormitories.

Protecting Healthcare Workers and Uninfected Patients

The setting up of segregated teams and the restriction of the flow of healthcare professionals and patients within the teams whether at the departmental level or at the national level, are instituted with the intention of protecting the uninfected patients and healthcare professionals from cross-infection.

Additionally, all healthcare professionals are also ensured an adequate supply of personal protective equipment. Healthcare professionals are repeatedly told to be mindful of their use of personal protective equipment to decrease wastage. In place of surgical masks with visors, surgeons and nurses in the operating theater were issued goggles for protection against eye splashes. These are particularly important in Orthopedic surgery, and in foot and ankle surgery, as many of our operations involve mechanical work with drilling and sawing, increasing the risk of possible eye splashes. Risk stratification of patients is also important to avoid unnecessary use of personal protective equipment.

Refresher training is conducted on the use of personal protective equipment to ensure that whole staff is up to date. Examples of this training included mask fitting of N95 masks. Healthcare workers involved in the care of suspected or confirmed COVID-19 patients are also trained on the donning and doffing of powered air purifying respirators (PAPRs) on top of personnel protective equipment. These are worn by Orthopedic surgeons when performing surgeries or procedures on suspected or confirmed COVID-19 patients. Aerosol-generating procedures are also outlined and highlighted to ensure that the involved healthcare workers take adequate precautions when performing those procedures. As much as possible, modifications of the surgical techniques are also made to avoid aerosol-generating procedures, such as high-speed power tools and jet lavage systems. For example, instead of using a saw for amputations or freshening of fracture edges, bone cutters and nibblers are used to minimize aerosolization. Low pressure irrigations of wounds are also performed instead of using jet lavage systems.

Patients who are suspected or confirmed with COVID-19 are isolated in negative pressure rooms in order to protect the healthcare workers and other uninfected patients. Transport of these patients from one facility to another is minimized when possible. Dedicated routes are planned when transport of these patients is required, and dedicated personnel, donned in full personal protective equipment, are stationed to minimize unnecessary traffic along the route before and during the transport to minimize infection. Additionally, specific logistics and resources are also set apart for patients with COVID-19. Two negative pressure operating theaters were freed up at the beginning of the pandemic, specifically for use when any suspected or confirmed COVID-19 patients requires an operation. These operating theaters are close to the entrance of the operating theater suite allowing for expedient

transport of these patients in order to minimize the risk of transmission during the transportation as well as during the procedure.

A triage system is set up to minimize the possibility of spread of COVID-19 from potential patients to healthcare workers or other uninfected patients. All hospital entrances are staffed with the triage team to ensure that all patients are screened prior to entering the hospital. Thermal scanners are installed at all entry points. The patients are administered a health and travel declaration at the entrance of the hospital, and patients with significant travel history to affected areas as well as patients with flu-like symptoms are triaged to a separate facility to be seen by the “contaminated team.” In order to mitigate underreporting by patients, the Ministry of Health has also included an additional automatic travel history alert to the electronic health records of the patients, alerting the healthcare workers involved that the patient has recently traveled out of Singapore once their medical records are assessed.

Similarly, all patients scheduled for surgery are contacted by telephone for mandatory preoperative screening. This is because many of the Foot and Ankle patients are scheduled for surgeries before the outbreak and will not return to the hospital until the time of the surgery. The screening over the phone therefore involved a similar health and travel declaration. Following the declaration, all patients who are determined to be at risk of COVID-19 are advised to be screened when appropriate and to postpone their elective surgeries if the clinical situation allowed. Patients with recent travel history are also only scheduled for surgery at least 14 days following their return to Singapore if their clinical condition permits. Patients are screened again on arrival in the hospital on the day of the surgery.

The registration of all patients and visitors to the hospital allows for contact tracing should any of the patients or healthcare workers become positive for COVID-19. Stricter visiting regulations are also put in place in order to limit the number of visitors at any time point. All suspected and confirmed cases of COVID-19 are not allowed visitors until they are deisolated.

Extra effort is also made to screen the medical records of all patients scheduled for outpatient consultations in order to minimize the number of patients in the hospital at any point in time. Patients who require early medical attention are still scheduled for their outpatient consultation while patients with routine or chronic conditions have their consultations postponed thus limiting the number of patients per clinic session. For the Foot and Ankle division, this means that patients on follow-up for chronic conditions, such as hallux valgus, hallux rigidus, lesser toe deformities, ankle arthritis, osteochondral lesions, posterior tibial tendon insufficiencies, Achilles tendinitis, plantar fasciitis, and many others have their outpatient appointments postponed. Patients who have postoperative or chronic foot wounds to manage, tendon ruptures, foot and ankle fractures, symptomatic conditions that require interim management or recently postoperative patients are still scheduled for their outpatient consultations. To prevent any potential complications that could arise from the postponing of the appointments, phone calls are made to patients to ensure that they are well, and medication refill is given over the phone with home delivery of the medications when required. In the event where there is doubt whether the patient requires early follow-up, phone calls are also made to check on the patient's situation, and the appointments for these patients are scheduled accordingly as discussed during the phone consultations. Teleconsultation with video conferencing is also offered to selected patients who might require explanation of their diagnostic imaging results with visual aids, and for patients who might require follow-up without the need for physical examination. These have helped to decrease the number of patients' physically in clinic each session and prevent the surge in the clinic numbers once the pandemic ends.

All healthcare professionals are mandated to perform temperature screening twice daily and input their temperature into the online

hospital surveillance system. In order to facilitate this, all healthcare workers within the institution were issued personal thermometers at the beginning of the outbreak. A message is sent to all hospital staff twice daily to remind them to take and record their temperature. Healthcare workers who develop symptoms are advised to seek immediate medical consultation and not report to work. In order to minimize the risk of transmission amongst healthcare workers and to uninfected patients, mandatory travel declaration was similarly imposed on all healthcare workers in January 2020 and subsequently until December 2020. All healthcare workers with significant travel history were placed on a mandatory 2-week paid leave of absence and are allowed to work only if they remained asymptomatic following the leave of absence.

Additionally, the hospital management as well as the Ministry of Health ensure that all healthcare professionals on the ground are updated on the situation regularly. Daily emails are sent to update healthcare professionals on the latest situation in the hospital as well as on the international developments with regards to the pandemic. Virtual department meetings are called whenever there is a change of events. Routine interdisciplinary webinars are conducted to allow the exchange of ideas regarding the evolving pandemic.

Conserving Healthcare Resources

In the battle against what is expected to be a prolonged pandemic, conservation of healthcare resources is of paramount importance. These include the conservation of personal protective equipment (as mentioned earlier), as well as the triaging of cases and early discharge of patients to ensure the efficient use of resources.

A stepwise reduction in elective orthopedic surgeries has therefore been instituted. This involved firstly postponing elective surgeries that will require hospital admission in order to free-up hospital beds and resources for COVID-19 patients. Day surgeries and surgeries requiring less than 23 hours of admission were originally allowed to continue during the early stages of the pandemic. This meant that most foot and ankle surgeries could continue in the initial phase of the COVID-19 era in Singapore. Subsequently, as the pandemic evolved and the surge in the number of patients increased, surgeries requiring less than 23 hours of admission and day surgeries were also postponed unless clinically urgent. Surgeries involving trauma, infection or tumor are still allowed to continue. Inpatients are reviewed for possible discharges daily, and discharges were performed expediently whenever possible. A dedicated operating room was provided for elective listing for foot and ankle cases that were inpatients, especially for those with diabetic foot conditions that usually require a longer hospital stay. A large proportion of wound debridements, minor amputations and limb salvage surgeries were then performed by the foot and ankle division each day to reduce the duration of inpatient stay. This not only relieved the strain on the hospital resources, but also decreased the chances of the patients contracting nosocomial COVID-19 infections.

Continuing Medical Education

With the decrease in the patient and surgical load of orthopedics and foot and ankle during the pandemic, the delivery of medical education has also evolved. Video conferencing and webinars are used to conduct daily teaching and presentations. Weekly departmental teaching and journal clubs are performed using video conferencing platforms. More time is dedicated to case discussions after clinic or operating theater sessions due to the reduced case load. Preoperative planning and surgical procedures are discussed in greater detail with the attending consultants. Opportunistic teaching focusing on surgeries for foot and ankle fractures, foot wounds and infections, limb salvage surgeries, and tumors of the foot and ankle are also conducted as these cases took the

front seat during the pandemic. For the residents and fellows, there is more time available for them to read up about the various foot and ankle conditions and to perform research related work whilst there is obviously much less opportunity for practical outpatient clinic and operative experience (4,5).

Reflections

Beyond orthopedic surgery, the pandemic has taught all of us the importance of social responsibility. Many doctors have risen to the occasion and stepped out of their comfort zones to deliver care. Indeed, in times of pandemic, we as foot and ankle surgeons may have to forgo the comfort of our subspecialty and go back to “doctoring” regardless of the department or divisions we are deployed to. With the incoming easing of lockdown measures across the world and locally, we have to continually remind ourselves to take extra precautions while planning to restart our clinical services and elective surgeries. Our fight against the pandemic is only just beginning and surgeons and juniors will all need to be fully ready to step to the challenges that lie ahead.

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