

Spine Surgery and COVID-19: Early experiences from Singapore

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Introduction

The novel coronavirus was first reported in December 2019, from Wuhan, China. It has now evolved to become a global pandemic, involving multiple continents, with the World Health Organization (WHO) declaring the COVID-19 outbreak a global health emergency of international concern on January 30, 2020.¹ As of March 28, 2020, 512 701 cases have been reported globally; with 23 495 confirmed deaths.²

Singapore was the first developed country outside of China to be affected by COVID-19, and up till February 19, 2020, was the country with the highest numbers of COVID-19 outside of China.³

Although the epicenter of the global pandemic has now shifted to Europe and the United States, Singapore's ongoing efforts in disease containment has been successful in preventing the exponential rise in cases seen in other countries. This has been attributed to a multi-pronged comprehensive surveillance and containment system aimed at detecting as many cases as possible, such as through contact tracing of confirmed COVID-19 cases to halt the chain of transmission early on, and enhanced surveillance of selected patient groups (e.g. patients with pneumonia).⁴⁻⁵ As healthcare workers and spine surgeons at the epicenter of the COVID-19 pandemic in our country, we believe our experiences are unique. We aim to share some insights on these experiences and our management strategies by detailing: 1) Our role as spine surgeons in a major hospital at the frontlines of COVID-19; 2) Changes in spine surgery practice as a result of COVID-19 and management strategies; 3) The impact of COVID-19 on training and continuing medical education in spine surgery.

Our Role as Spine Surgeons

At the epicenter of Singapore's COVID-19 outbreak is the National Centre for Infectious Diseases (NCID), a 330-bedded purpose-built facility for the management of infectious diseases. The NCID is connected to Tan Tock Seng Hospital (TTSH), one of the largest acute care hospitals in Singapore, with over 1700 beds.⁵ At the forefront of containment efforts, the NCID comprises a Screening Centre (NCID SC), which assesses patients who are suspect or confirmed cases of COVID-19. As part of the hospital's manpower deployment plan, the Orthopaedic department and Spine Service was activated to assist in the NCID SC, with 23% of our combined resident and consultant manpower being

deployed to the NCID SC, doing 10-day rotations at a time. Our role in the NCID SC was to work alongside, and under the purview of the emergency department and infectious diseases physicians in assessing suspect cases of COVID-19. Despite our lack of infectious diseases knowledge, we were able to adapt quickly due to the well-constructed clinical protocols at the NCID SC, and under the guidance of our senior Emergency Department colleagues that were leading the hospital's response and frontline efforts. As spine surgeons, we rotated from performing our regular duties, termed BAU ("Business-as-usual") to a frontline role at the NCID SC, which required constant adapting and adjustment of resources.

We put in place a segregation policy in the department, and the Spine Service was split into 2 teams that were to operate independently of one another to minimize the risk of cross-contamination between healthcare workers. While segregation policies may differ between hospitals, we were not able to operate a "one week on, one week off" type of temporal segregation system where teams alternate in a work-rest cycle due to manpower constraints. Additionally, strict compliance to the personal protection equipment (PPE) guidelines by Singapore's Ministry of Health reinforced our trust in our institution's efforts to prevent nosocomial COVID-19 infections in healthcare workers.

Changes in Spine Surgery Practice as a result of COVID-19

The COVID-19 outbreak has resulted in many changes in our practice of spine surgery, mainly due to the need for conservation of healthcare resources and increased vigilance in protecting healthcare workers, as well as patients. As we needed to prepare for the increase in COVID-19 admissions, and cope with manpower constraints due to deployment, we instituted several measures to reduce our clinic and operative load.

In the outpatient setting, all scheduled clinic appointments were screened, and non-urgent appointments were rescheduled to later dates. Patients were contacted via telephone and prescriptions of their medication was done electronically, with the option of pick-up or delivery of medication available for them. Clinic appointments were reserved for patients that were severely symptomatic or required post-operative review. In addition, all patients visiting the outpatient clinic undergo a

temperature check and fill up a declaration form of their travel history and the presence of any respiratory symptoms. Patients with a positive travel history to high-risk countries, and respiratory symptoms, or fever, will have their appointments deferred and directed to seek medical attention at our NCID SC for further evaluation.

In order to conserve hospital beds for the increased COVID-19 load, as well as not to stretch our anaesthesia and intensivist colleagues looking after them, many elective surgeries were postponed or rescheduled, especially deformity and complex revision cases. We recognize that patients undergoing spinal deformity surgery often require a longer length of stay, high dependency support, and may cause strain on an already-stretched system. Our remaining elective surgical lists which were 50% of the norm comprised of patients who had severe pain or debilitating symptoms that were unable to wait for a later date. However, besides the cases that we postponed, many patients voluntarily cancelled their elective operations, likely due to uncertainty and fear of nosocomial infections. While these patients contributed to the drop in our caseload in the first month, many of them returned in the subsequent months after their symptoms prevailed. Our main challenges in prioritizing surgical cases were that of 1) Availability of peri-operative support, such as lack of autologous blood available for transfusion due to the drop in blood donations during the COVID-19 outbreak; and 2) Clinical urgency based on symptomology and disease severity. As a major tertiary trauma centre, we continued operating on emergency trauma and tumour cases. For elective cases, as far as possible, we prioritized performing minimally invasive surgery (MIS cases) and endoscopic cases as their shorter length of stay meant less strain on our hospital beds and healthcare resources. In the current climate of economic uncertainty, these measures will also allow us to keep healthcare costs down for patients, and for our nation. As a temporizing measure for pain relief, we also offered suitable patients the option of non-surgical measures such as nerve root injections, which are routinely done as day surgery and can be done under local anaesthesia, obviating the need for anaesthetist support.

Impact on residency training and continuing medical education

Due to the COVID-19 outbreak, face-to-face teaching programs and department continuing medical education (CME) meetings have been suspended to abide by social distancing guidelines. This, along with the reduction of elective surgical cases, have undoubtedly affected residency training and residents' surgical logs. In such circumstances, there is a to balance the need to provide quality training to our residents while at the same time, prioritizing our commitment to fighting COVID-19 in the hospital's frontlines. Technological advancements have helped us ensure the learning of our residents and faculty is not neglected and we have successfully shifted our weekly residency teaching and selected CME programs to video-conferencing platforms. Residents and faculty are able to log on from their personal mobile devices or laptops. As compared to conventional lectures, we have received feedback that videoconferencing facilitates more interaction between the residents and the faculty conducting the session as it eliminates traditional boundaries of "teacher versus students" that a lecture theatre may have. In the realm of surgical training, while the case load has reduced, there is now more time available for each case as elective lists are not packed back to back. This gives residents more time for pre-operative case discussions, and as time constraints in the operating theatre are reduced, residents will be able to get more hands-on experience under faculty guidance. This will also allow increased time for peri-operative feedback, which has been shown to breed longer-lasting forms of learning and knowledge.⁶

Conclusion

The global COVID-19 pandemic has far-reaching effects on all aspects of medicine, and spine surgery is not exempt. In the midst of this, we must be able to adapt quickly to ever-changing circumstances and use our finite healthcare resources wisely in the practice of spine surgery, while maintaining our commitment to training our juniors and future health-care leaders. As spine surgeons, but physicians foremost, we have a role and collective responsibility in leading our country's frontline efforts in the fight against COVID-19. Together, we can overcome this as a community and as one.

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