

# Adaptations of a Tertiary Otorhinolaryngology Head and Neck Surgery Department in Singapore During the COVID-19 Outbreak

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## 5 KEY POINTS

1. In an outbreak, early healthcare personnel segregation should be considered to ensure that the provision of essential services may continue if a single team is quarantined
2. Establishing a sustainable PPE usage guideline for healthcare workers early in the outbreak is of paramount importance
3. Design and simulation of work processes for emergency airway creation should be considered in every otolaryngology department dealing with the COVID-19 outbreak
4. Screening and postponement of non-urgent patient follow-ups frees up manpower and resources
5. The use of videoconferencing aids in restoring essential department activities and telemedicine may be a useful tool to explore in otolaryngology clinics

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## INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) outbreak which was first reported in Wuhan, China, was declared by the World Health Organization to be a Public Health Emergency of International Concern on January 30, 2020, and a pandemic on March 11, 2020.<sup>1</sup>

In Singapore, the first case of human COVID-19 infection was reported on January 23, 2020. Singapore has a land area of 721.5km<sup>2</sup> and is served by less than 20 acute hospitals. As of March 31, 2020, this small city-state with a population of 5.6 million, has a total of 926 confirmed cases.<sup>2</sup>

Rapidly accumulating anecdotal reports from China identify otolaryngologists as high-risk healthcare workers (HCW) who are more susceptible to the COVID-19 infection due to the anatomy we treat.<sup>3,4</sup> The first documented physician death due to COVID-19 nosocomial infection, on January 25, 2020, was that of an otolaryngologist in Wuhan.<sup>5</sup>

We report the adaptations of Singapore's largest tertiary Otorhinolaryngology – Head and Neck Surgery department in preserving operationality while navigating the heightened risks during this outbreak. This was carried out via a four-pronged approach, taking into consideration our experience from the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003. Temporal adaptations were implemented as we continually gain understanding of the disease.

## FOUR-PRONGED APPROACH

### 1) Personnel Segregation

The Department of [removed for blind peer review] was divided into 2 teams comprising of otolaryngologists at different seniority. Each team comprised of Senior Consultants, Consultants, Registrars and Trainees.

The subspecialties of Otolaryngology, Head & Neck Surgery, Sleep Surgery and Rhinology were represented in each grouping.

During the 2003 SARS outbreak, high HCW infection rate and subsequent mortality highlighted the importance of HCW inter-transmission. Segregation into teams allows for essential clinical services to continue in the event one team is quarantined due to a team member infection. It also allows for efficient contact-tracing should an unprotected exposure event occur.

Two distinct clinical areas distanced at least 200 meters apart were assigned for outpatient practice. Location A was designated as the “Active” clinical area and the team assigned to Location A took charge of the week’s emergency calls, inpatient care, surgeries and outpatient follow-up. Location B was designated as the “Passive” clinical area and its assigned team attended to a reduced number of new outpatient referrals, with their activities limited only to Location B. Disinfection of both areas was performed daily and each week, the teams swapped locations and duties. Patients requiring outpatient follow-up were instructed to report to the correct location for review by the same team of doctors. Strict segregation was enforced, and each team was discouraged from meeting professionally or socially.

In anticipation of referrals for otolaryngological assessment and/or tracheostomies of confirmed COVID-19 cases, a single Senior Consultant from the “Active” team each week was placed on a week-long call duty. Each of these senior staff members had been a practicing medical professional in the 2003 SARS outbreak. To minimize the personnel exposed to confirmed cases, junior staff were relieved of this duty.

In the initial phase of the outbreak, all department activities such as weekly morbidity and mortality (M&M), grand rounds and lectures were suspended. In the tenth week, recognizing that this outbreak was a prolonged battle, a new normalcy was sought with resumption of departmental activities. M&M meetings and teaching sessions were hosted via webcast facilities. Both teams participated at distinct physical locations.

## 2) Triage and Decantment of Patients

A list of criteria was generated to identify non-urgent conditions and all scheduled clinic appointments were screened two weeks prior. Patients with non-urgent conditions were telephone-consulted and rescheduled minimally six months later, with prescriptions written for delivery. Follow-up for malignancies and immediate postoperative cases was prioritized.

The department performs an average of 40 elective surgeries a week and this number has halved since the outbreak. Only a single team of doctors operates each week. Surgeries were allowed to proceed if they were of the following nature: emergency or life-saving, suspected or known malignancy and/or procedures not requiring admission. The last criterion ensured that hospital occupancy was not affected and beds remained available for COVID-19 admissions.

## 3) Use of Personal Protective Equipment

Personal Protective Equipment (PPE) is a precious resource in major disease outbreaks. As otolaryngologists are at high risk of contact with respiratory droplets or aerosolized upper airway particles, the need for a sustainable and evidence-based PPE usage guideline was of paramount importance.

There is currently no international consensus on the best method of reducing the risk of virus transmission. In our department, the following was implemented at the initial phase of the outbreak:

- In outpatient clinics, a surgical mask was required for all patient encounters. If a nasoendoscopy was to be performed, a fitted N95 mask and eye protection (either faceshield or surgical goggles) were to be worn.
- In operating theatres, a surgical mask was required for all surgeries. If the surgery involved mucosa of the upper airway, a fitted N95 mask and eye protection were to be worn. For any surgery involving confirmed COVID-19 cases, a Powered Air-Purifying Respirator (PAPR) was to be worn.

As the outbreak intensified and medical literature expanded, debates on the type of PPE required grew. In

the tenth week of the outbreak, after discussion with Infectious Disease specialists, the department guidelines were modified to:

- In outpatient clinics, a surgical mask was required for all patient encounters. If a nasoendoscopy was to be performed, a shower cap, water-resistant gown, N95 mask and eye protection were to be worn.
- In operating theatres, a surgical mask and eye protection were required for all surgeries. For any surgery involving mucosa of the upper airway, minimum requirement included N95 mask and eye protection, regardless of the patient's COVID-19 status. PAPRs were available for surgeons who felt more comfortable donning them. Functional PAPR units are available in our institution since the SARS outbreak, and further acquisition is underway. A coordinated effort was made to ensure that daily surgery listing did not exceed the availability of PAPRs.
- At the time of writing, routine pre-operative COVID-19 testing for all patients is not available in our institution. We are constantly reviewing our guidelines to ensure sustainable use of minimum PPE and PAPR for surgeon safety.

#### 4) Changes in Clinical Practice

##### *Use of Telemedicine*

The use of Telemedicine was piloted in our laryngology clinics. Weekly, a videoconference was established with an off-site laryngologist. An on-site resident would perform videostroboscopies on patients and live-stream to the laryngologist before discussing management plans. This prevented disruption of laryngological services as our attending laryngologist had been deployed off-site.

##### *Minimization Of Aerosol-Generating Procedures*

Three aspects of our practice were identified to be potentially aerosol-generating and modifications were implemented.

The use of energy devices such as Harmonic Scalpel during surgery

Modification: A reduction in use was recommended. If use was necessary, the surgeon was to don, minimally, N95 mask and eye protection even if the surgery did not involve mucosa of the upper airway.

1. The use of high-speed drills and debridors during surgery Modification: Non-urgent endoscopic sinus surgeries were postponed. Emergent skullbase surgeries such as those performed for pituitary decompression were allowed to proceed with PAPR.
2. The use of nasal decongestant and anesthetic via a nozzle spray during nasoendoscopy Modification: Doctors were recommended to use a sterile water-based lubricant gel for nasoendoscopy (applied over the nasoendoscope) instead of nasal sprays.

##### *Simulation for Emergency Scenario*

Within the first month of the outbreak, a flowchart was designed for emergency surgical airway creation for COVID-19 patients with acute cardiorespiratory arrest. A simulation exercise was carried out to ensure familiarity and to identify areas for improvement. To date, we have not had any COVID-19 cases requiring emergency surgical airway creation but this workflow remains highly relevant in the event of need.

#### *OTHER MEASURES*

In addition to the unique four-pronged approach, our department also adhered to institutional and national measures which included:

1. Twice-daily temperature taking of all staff. Any staff with temperature  $> 37.5$  degrees Celsius (99.5 degrees Fahrenheit) were mandated to report to the staff clinic for assessment.
2. Cessation of cross-institution HCW movement - Visiting specialists were not allowed to practice at more than one acute hospital.

3. Restriction of cross-institution patient movement – Admitted patients from another acute hospital could not be transferred without hospital management approval.
4. Standardized screening of all patients attending clinics or undergoing surgery for fever, respiratory symptoms, and travel and contact history.

## CONCLUSION

The pandemic continues to evolve and changing disease trends will require constant adaptations. The lessons learnt from Singapore's SARS outbreak in 2003 are etched in the minds of many in our department. The rapid conceptualization of a business continuity plan when this outbreak gained traction, is in large part, due to past painful experience. At the time of writing, no Otolaryngologist in our institution has been infected with COVID-19 and it is our greatest hope that this remains so. We are prepared to morph our approach as the pandemic continues to evolve locally and internationally, and as more scientific reports of this disease become available.

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