

Otolaryngology in the face of A pandemic

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Although infrequent, pandemics are serious public health concerns with unpredictable courses. The COVID-19 pandemic began over 2 years ago and is far from over. This pandemic has spread rapidly throughout the world and led to several million deaths, making it commonly compared to the deadly Spanish influenza pandemic. Policy and safety measures are constantly being adapted to reduce transmission rates. The pandemic places stress on all healthcare workers, but especially otolaryngology providers due to their direct contact with airway connected cavities. This puts them at high risk for infection and has impacted inpatient and outpatient otolaryngology care, as well as education, research, and mental health.

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Introduction

In December 2019, the first reported incidence of the novel upper respiratory infection known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was reported in Wuhan, China.¹ One month later, the disease caused by SARS-CoV-2, known as COVID-19, had reached the United States (US) when the first confirmed case was documented in northern Washington. By March 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic.² This declaration urges us to think back to previous pandemics and their impact on healthcare, society, and the economy.

Multiple pandemics have occurred throughout history, ranging from gastrointestinal to respiratory illnesses. One of the most notable pathogens is *Yersinia pestis* which led

to 3 plague pandemics. The deadliest was the Black Death which originated in East Asia and swept through Europe in the early 14th century.³ In addition to *Yersinia pestis*, *Vibrio cholera* has also led to multiple pandemics. Originally endemic to Asia, *Vibrio cholera* began to spread from India to other regions of the world in 1817.³ In more recent years, viral upper respiratory illnesses have become some of the most difficult to contain. These respiratory pandemics have been caused by 2 predominant viral pathogens, Influenza and Coronavirus. The first influenza pandemic occurred in 1510 and several have followed since then. The one most often discussed is the Spanish influenza of 1918 (aka “Spanish Flu”) which caused 50-100 million deaths.⁴ In 2002, an outbreak of Coronavirus, known as SARS-CoV-1, occurred in over 29 countries.³ Coronavirus again became a global health concern when SARS-CoV-2 emerged in 2020 and led to the current pandemic. It is common for surges in infection rates to occur throughout the duration of a pandemic which enables it to last for several years without fully resolving. For instance, the Spanish Flu had 3 waves of illness in the spring, fall, and winter

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of 1918 with peak mortality during the second surge. Similarly, as the current pandemic has progressed, surges in COVID-19 infections have occurred due to the emergence of new SARS-CoV-2 variants. The Delta variant was first identified in India in December 2020 and the Omicron variant followed in Botswana in November 2021.

Prior pandemics, including the Black Death and Spanish Flu, occurred before the development of antimicrobials or advancements in vaccines.⁵ Initially, Influenza was thought to be bacterial in nature, therefore the vaccines first created for the Spanish Flu were essentially ineffective. However, administration of vaccines still positively influenced the public because it helped mitigate anxiety and provided hope that the pandemic would soon end.⁶ It was during the Spanish Flu that public health officials first implemented strict social distancing measures, such as school closures and gathering bans, to reduce mortality rates.⁷ In addition to these more aggressive interventions, campaigns regarding hygiene, such as coughing into a handkerchief and hand washing, were employed.^{3,6} By 1925, all states in the US were participating in a national disease reporting system through which they were required to report certain diseases to the United States Public Health Service. This mandatory reporting allowed for the development of sophisticated surveillance techniques and better organized public health efforts. A large part of the public health response to the current pandemic implemented strategies used in the past, such as extensive lockdowns, travel restrictions, social distancing, and quarantining in order to limit the spread of COVID-19. However, there have been many more advances in science and public health since then that have improved our ability to manage these diseases; for example, today we can deploy antivirals, antibiotics, immune-modulating drugs, oxygen, and ventilators to treat COVID-19 and its related complications whereas in the past patients were treated for symptoms simply with Aspirin and oxygen.⁸

In addition to the global impact on public health, pandemics have strongly influenced the economy. Before the Black Death, Europe was over-populated which led to workers settling for low wages due to fear of being easily replaced.⁵ However, the onset of the Black Death caused severe labor shortages due to increased mortality associated with the plague and lower income citizens suddenly found themselves in high demand. As a result, these workers were in a novel position of having the leverage to demand better working conditions and pay. This shift in the power dynamic eventually led to the Peasants' Revolt in 1381.⁵ These events resulted in significant reform of the established socioeconomic structure that diminished the disparities between upper- and lower-income citizens. Similar labor shortages were seen in 1918, when the young male workforce was depleted due to deaths from the Spanish Flu and World War I.⁵ Women began to fill that void and joined the workforce in roles that were not previously open to them.⁹ This increase in economic power inspired women to actively advocate for women's rights and helped gain momentum for the women's suffrage movement.⁹ Simi-

lar labor shortages were seen during the current COVID-19 pandemic. Specifically, there was a large shortage of healthcare workers as a result of nosocomial COVID-19 infections, and with the combination of an overload of COVID-19 patients in the hospital, this put extreme strain on the healthcare system as a whole. Over the course of the pandemic, national and global lockdowns led to economic instability, supply chain issues, and some of the highest documented rates of unemployment.¹⁰

COVID-19 is the first disease to muster a global healthcare response since the Spanish Flu. Similar to previous respiratory pandemics, COVID-19 is spread from human to human via contact droplets and aerosols.^{11,12} Mucosal surfaces and saliva are sites that have a higher viral load.¹³ As a result, otolaryngology was quickly determined to be a high-risk specialty given the close proximity to mucosal surfaces and the upper aerodigestive tract during standard clinical examinations and procedures.^{14,15} However, despite the increased risks of exposure, otolaryngologists were also in high demand due to common COVID-19 symptoms requiring their expertise, such as anosmia, dysgeusia, and airway compromise. As a result, the otolaryngology community responded globally with the rapid development of guidelines and protocols that allowed us to safely provide care for patients during the pandemic.

Impact on inpatient care

In January 2020, when the first case of COVID-19 was documented in the US, healthcare professionals knew very little about the transmissibility and extent of disease it could cause. Due to the novelty of the virus, protocols were constantly evolving and the approach to patient care was ever-changing. This added to the difficulty otolaryngologists faced when attempting to balance the proper precautions needed to keep themselves safe and providing quality patient care that did not compromise outcomes.

As the incidence of COVID-19 grew, hospitals became increasingly overwhelmed by the number of patients who required medical attention. This led to hospitals becoming a nidus for infections, putting healthcare workers and hospitalized patients at increased risk. One institution reported an incidence of hospital-acquired COVID-19 in 29% of healthcare professionals and 12% of hospitalized patients.¹⁶ This demand on the healthcare system resulted in multiple unforeseen effects on otolaryngology care.

Visitation restrictions and supply shortages

Throughout the course of the pandemic, visitation policies were constantly changing and highly dependent on local infection rates. However, at the onset of the pandemic, many institutions restricted visitation altogether.¹⁷ These restrictions impacted patients both mentally and emotionally, especially for cancer patients whose levels of depression and anxiety increased during the pandemic.¹⁸ When families were eventually permitted to visit the hospital,

strict protocols were enforced to limit viral transmission, including masking and social distancing.

Currently, the Centers for Disease Control and Prevention (CDC) and the WHO recommend wearing N95 masks, gloves, gowns, and eye protection, as well as having established donning and doffing stations, when providers are working with COVID-19 positive patients.^{19,20} However, at the onset of the pandemic, there was a high demand for personal protective equipment (PPE) but limited access to these supplies due to supply chain shortages related to the economic impact of the pandemic.²¹ In response to these shortages, guidelines were established to instruct healthcare workers on how to reuse masks designed for single use in order to extend the lifespan of N95 masks.²¹ As the supply of N95 masks rose to meet the demand over time, providers were able to return to using them as originally intended.

PPE is especially important for aerosolizing procedures, which is defined as those that generate small (< 5-10 um) aerosols that can travel greater than 2 meters. The following is a list of procedures commonly used in otolaryngology that are considered aerosolizing: surgical procedures using (CO₂) laser vaporization, electrocautery, endotracheal procedures, nasal surgery, nasal packing for epistaxis, oropharyngeal surgeries, mastoid surgeries, endoscopic functional sinus surgery, bronchoscopy, sputum induction, manual ventilation, and nebulized or aerosol therapy.^{22,23} It is important to note that our understanding of aerosolizing procedures has evolved over the course of the pandemic. For instance, it was initially thought that flexible laryngoscopy was an aerosolization procedure. However, research has now shown that it is actually the potential reactions that the exam may evoke that are aerosolizing, including coughing, sneezing, and even phonating during the exam.² This is because any time air is forced over a respiratory mucosal surface, it will generate more respiratory particles.²⁴ As such, although some procedures may not be aerosol-generating in and of themselves, because it is unpredictable how patients may react during the procedure, many otolaryngologists adopted treating all of these procedures as potentially aerosol-generating.

Impact on perioperative care and protocols

As access to PPE improved and physicians became better equipped to treat COVID-19 positive patients, new perioperative protocols were established to ensure patient and healthcare worker safety.²⁵ Most recommendations included: (1) obtaining preoperative COVID-19 testing, (2) limiting the number of personnel involved in the procedure, (3) performing aerosolizing procedures in a controlled environment with negative pressure capabilities if possible, and (4) wearing PPE that defends against airborne transmission.^{1,26-29} Fortunately, literature published since the start of the pandemic has demonstrated that adherence to these safety recommendations is effective at decreasing the spread of infection.^{25,30,31}

In the beginning of the pandemic, in order to limit viral transmission and conserve surgical resources, non-urgent operative procedures were canceled.^{32,33} As resources became more available and our knowledge of how to protect healthcare workers against COVID-19, surgical volume began to increase, but with new preoperative testing protocols.³⁴ Over the course of the pandemic, recommendations regarding preoperative testing constantly changed depending on local infection rates and testing capabilities. At our institution, testing was initially provided on the day of surgery. However, as surgical volume increased, testing facilities were overwhelmed which forced the institution to transition to testing 3 days prior to surgery with a mandatory interim quarantine that was dependent on an honor system. Eventually, the institution only required testing 5 days before surgery, but these recommendations continue to evolve.

With the increase in preoperative COVID testing, there followed the need for protocols to guide how to proceed for patients who tested positive for COVID-19, both symptomatic and asymptomatic. Generally speaking, it was recommended to delay elective surgeries until a patient was no longer infectious and demonstrated recovery from COVID-19. According to the CDC, patients were deemed non-infectious if the patient was asymptomatic and had 2 negative COVID-19 tests 24-hours apart.³⁵ More lenient guidelines were implemented by some hospital systems which defined patients to be not infectious when it had been (1) at least 72 hours since resolution of a fever and respiratory symptoms and (2) at least 7 days since symptoms first appeared.³⁶ However, as with everything else during the pandemic, these policies have constantly been evolving over the last 2 years. Initial recommendations at our institution delayed rescheduling cases up to 2-3 months after the initial positive test. However, today this has decreased to waiting up to 6 weeks after a positive COVID-19 test before undergoing elective surgery, as it was found that risks of perioperative mortality were greatest within 6 weeks of COVID-19 onset.³⁷ Additional guidelines can be seen in [Table 1](#).³⁸ If a COVID-19 positive patient needed urgent surgical care, maximal precautions were taken to protect providers, such as using extensive PPE, including N95 facial mask, disposable long sleeve waterproof gowns, double pair of gloves, head caps, and shoe covers, as well as having designated COVID-19 operating rooms, that were ideally negative pressure rooms closest to the entrance to minimize contamination.³⁹

Various types of COVID-19 tests have been developed as the pandemic has progressed. The first was a PCR test created in February 2020 that was designed to detect the presence of viral RNA.⁴⁰ A few months later, a rapid antigen test was developed to detect viral surface proteins and was able to provide results much faster and be administered at home, but did have increased rate of false negatives compared the PCR test.⁴¹ As such, many hospitals required PCR testing due to its higher sensitivity and ability to detect early infection. However, the main downside to PCR testing is the longer processing time compared to the rapid

Table 1 Guidelines for delaying elective surgeries after positive COVID-19 test adapted from American Society of Anesthesiologists' Joint Statement³⁷

Time between COVID-19 infection and surgery with respect to minimizing post-operative complications	Four wk for an asymptomatic patient or recovery from only mild, non-respiratory symptoms. Six wk for a symptomatic patient (eg, cough, dyspnea) who did not require hospitalization. Eight to 10 wk for a symptomatic patient who is diabetic, immunocompromised, or hospitalized. Twelve wk for a patient who was admitted to an intensive care unit due to COVID-19 infection.
Time from COVID infection to surgery for patients severely ill or immunocompromised	At least 10 d and up to 20 d have passed since symptoms first appeared. At least 24 h have passed since the last fever without the use of fever-reducing medications. Symptoms (eg, cough, shortness of breath) have improved.
Time from COVID infection to surgery for patients with mild to moderate symptoms and NOT immunocompromised	At least 10 d have passed since symptoms first appeared. At least 24 h have passed since last fever without the use of fever-reducing medications. Symptoms (eg, cough, shortness of breath) have improved.

antigen test. The rapid implementation of these protocols was widely accepted by hospital personnel. However, these tests were subject to providing a false sense of security due to the potential for false negative results and patients becoming infected between testing and surgery.⁴² Ultimately, de-implementation of these practices may be difficult, however, as healthcare workers have become accustomed to the sense of security that this objective measure provides.⁴³

There were shifts observed in the prioritization of cases when resources became scarce during the pandemic. Each of the subspecialty otolaryngology societies produced guidelines for triaging which conditions required emergent operative management and which conditions could be safely delayed until further testing was performed or resources were available. Many of these guidelines will be further discussed in subsequent articles in this issue.²³ Ultimately, instead of giving preference to the sickest patients who required lifesaving interventions, triaging switched to prioritizing patients for whom the greatest number of quality life years could be salvaged.⁴⁴ However, a slightly different trend was observed for the triaging of head and neck cancer patients. While timing of care is traditionally equal for patients of all stages of cancer, during the pandemic those with early-stage tumors were postponed in order to prioritize patients with late-stage tumors.^{45,46}

Impact on otolaryngology inpatient consultations

Throughout the pandemic, there was a shift in otolaryngology consultations. At one institution in New York City (NYC), the overall number of monthly otolaryngology consults remained the same, but there was an increase in the proportion of intensive care unit (ICU) consults compared to emergency department (ED) and floor consults.⁴⁷ The majority of the consults were for management of respiratory distress, new facial and neck masses, dysphagia, and epistaxis. This suggested that many of the consults seen in

the ED were either able to be appropriately addressed by the ED providers, redirected to the outpatient setting, or that patients were simply not presenting to the ED at all. This was an interesting paradigm shift in ED otolaryngology consults during the pandemic, but further investigation is warranted to determine both why and whether this is a durable change. Not all institutions, however, experienced similar changes in otolaryngology consults. An institution in Pittsburgh experienced a 22% decrease in the number of overall monthly consults, with a large decrease in craniofacial trauma. The decrease in craniofacial trauma in Pittsburgh was mainly thought to be due to adherence to social distancing measures. At the beginning of the pandemic, the institution in Pittsburgh implemented several treatment algorithms for common otolaryngologic complaints including head and neck masses (Figure 1), airway concerns (Figure 2), and epistaxis (Figure 3). Regardless of the volume of consultations received, many institutions similarly adapted treatment algorithms for the management of otolaryngology consultations aimed to decrease unnecessary exposures.⁴⁸ For instance, the American laryngology community recommended only performing flexible laryngoscopy in critical cases where findings had an immediate impact on patient care.⁴⁹

Impact on outpatient care

The effects of COVID-19 on otolaryngology practices were not limited to the inpatient setting. In addition to surgeries being canceled due to a scarcity of PPE, many otolaryngology clinics were closed at the onset of the pandemic.^{1,2} This was in part due to the degree of perceived risk involved in performing a basic head and neck exam and the ability to inadvertently cause aerosolization.^{2,50}

Patients had an increasingly difficult time gaining access to otolaryngology providers as more clinics closed during the pandemic. Unfortunately, even after clinics were

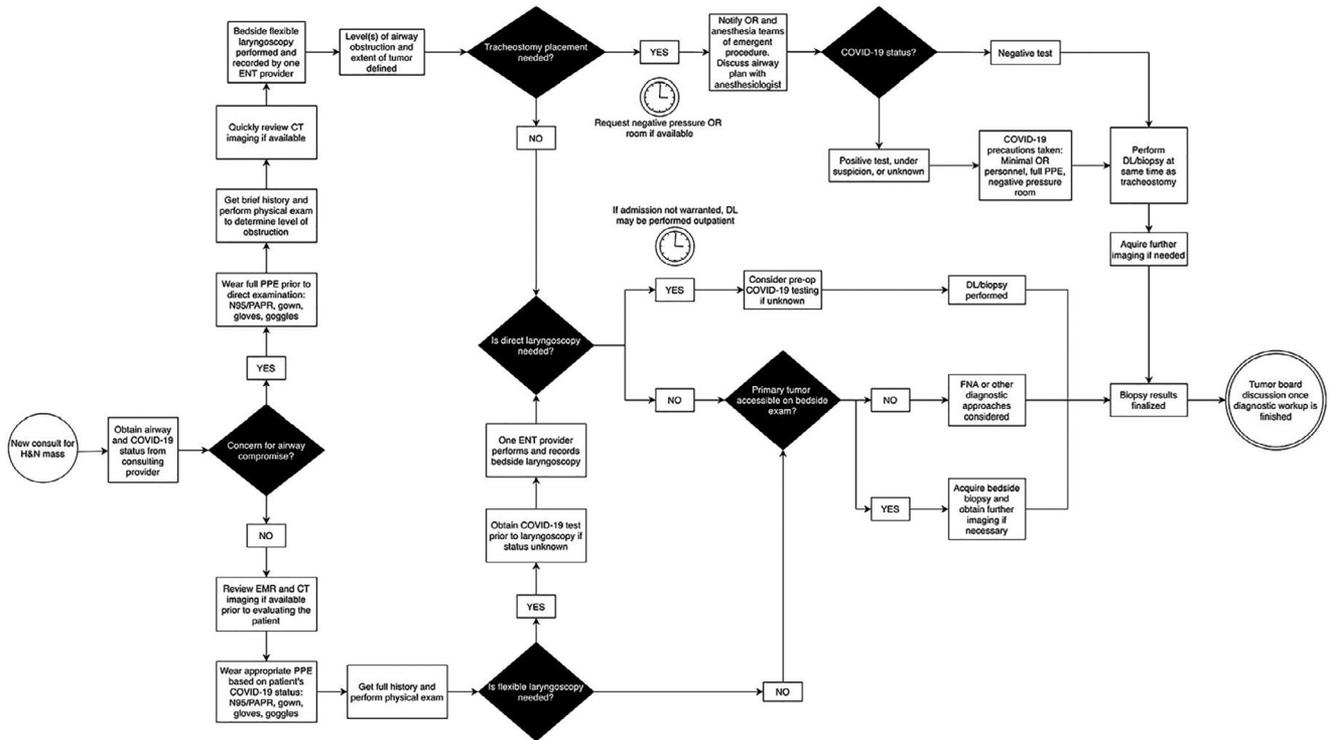


Figure 1 Algorithm for management of head and neck mass. (image reprinted with permission from Dharmarajan H, Belsky MA, Anderson JL, Sridharan S. Otolaryngology Consult Protocols in the Setting of COVID-19: The University of Pittsburgh Approach. *Annals of Otolaryngology, Rhinology and Laryngology*. 2022;131(1). doi:10.1177/00034894211005937). Abbreviations: EMR = electronic medical record; PAPR = powered air purifying respirator; OR = operating room; DL = direct laryngoscopy; FNA = fine needle aspiration; CT = computed tomography.

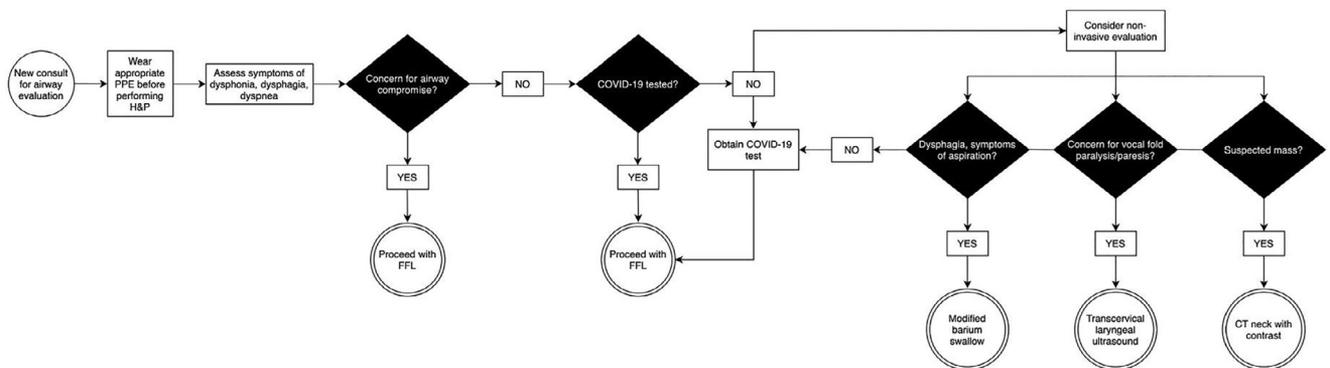


Figure 2 Algorithm for management of airway evaluation. (image reprinted with permission from Dharmarajan H, Belsky MA, Anderson JL, Sridharan S. Otolaryngology Consult Protocols in the Setting of COVID-19: The University of Pittsburgh Approach. *Annals of Otolaryngology, Rhinology and Laryngology*. 2022;131(1). doi:10.1177/00034894211005937). Abbreviations: PPE = personal protective equipment; H&P = history and physical exam; FFL = flexible fiberoptic laryngoscopy.

re-opened, patients still struggled to be seen due to a decrease in the number of available appointments and prioritization of patients with urgent or semi-urgent chief complaints.^{1,2,51} For those patients who were able to be seen, rigorous screening measures were implemented, including questionnaires regarding symptoms, temperature checks, and masking requirements.^{2,52} Furthermore, in an effort to facilitate social distancing, patients were not permitted to bring any supporting family or friends to clinic visits which was mentally and emotionally taxing for patients.⁵¹

There were many logistical challenges to safely re-open ambulatory clinics. Several of these challenges included (1) rearranging waiting room space and check-in/check-out procedures in order to limit the number of patients in the waiting rooms, (2) staggering appointments to enhance social distancing protocols, and (3) using physical barriers at check-in desks to limit the exchange of respiratory droplets.^{2,51,52} Unnecessary objects, such as informational pamphlets and 3-D anatomical models, were removed from examination rooms to allow for efficient

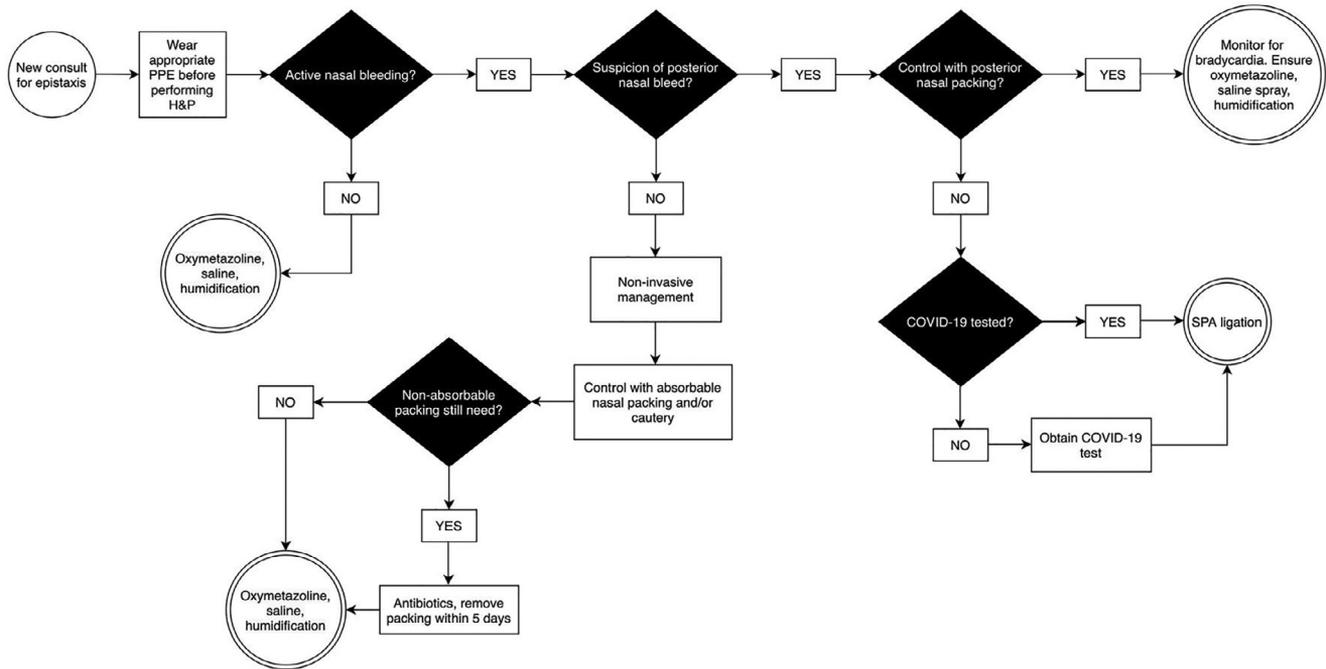


Figure 3 Algorithm for management of epistaxis. (Image reprinted with permission from Dharmarajan H, Belsky MA, Anderson JL, Sridharan S. Otolaryngology Consult Protocols in the Setting of COVID-19: The University of Pittsburgh Approach. *Annals of Otolaryngology, Rhinology and Laryngology*. 2022;131(1). doi:10.1177/00034894211005937). Abbreviations: PPE = personal protective equipment; H&P = history and physical exam; SPA = sphenopalatine artery.

disinfection of rooms between patients.^{51,52} Additionally, due to the frequency of aerosol-generating procedures performed in otolaryngology, protocols were implemented to allow for adequate air exchange to occur in the rooms which helped with decontamination. This often required rooms to be closed for upwards of an hour, impacting the overall workflow and volume of patients who could be seen in 1 day.^{2,51,52} As knowledge regarding COVID-19 transmissibility increased, many clinics opted to upgrade their clinic spaces with improved ventilation systems that allowed for quicker air turnover, which significantly decreased shutdown times and allowed for more patient visits.⁵³ The majority of these changes remain in place today and will likely continue beyond the pandemic. However, as the pandemic continues, COVID-19 fatigue surrounding these precautions has set in. While recommendations to mask and gown, as well as frequent hand washing, remain in place, many providers have followed them less stringently, compared to the beginning of the pandemic.⁴⁶

Another major change that occurred in the outpatient setting during the pandemic was the implementation of telemedicine. As an alternative to in-person visits, telemedicine was quickly adopted to limit COVID-19 exposure while maintaining uninterrupted quality care.^{54,55} This will be discussed in greater detail in a different article of this issue. The COVID-19 pandemic continues to influence inpatient and outpatient otolaryngology practices. As our knowledge of the pandemic evolves and different variants are identified, we continue to adapt how to maintain appropriate precautions while still providing quality

care that will not compromise patient outcomes. The impact of the pandemic on otolaryngology will likely persist for many years, and we are still in the nascent stage of our understanding.

Impact on education

In addition to affecting patient care, the pandemic greatly impacted otolaryngology resident education. Resident training was disrupted when otolaryngology residents were deployed to non-traditional roles in order to cover other services in the midst of staffing shortages. In response, the American Board of Otolaryngology Head and Neck Surgery (ABOHNS) changed the board eligibility requirements.⁵⁶ Rather than the required 6 months, PGY-1 residents were now only required to rotate on an otolaryngology service for 3 months in order to complete their first year of residency. In addition, the ABOHNS allowed for the months spent caring for COVID-19 patients to count towards board eligibility.

This increased flexibility in board eligibility requirements allowed for programs to enact the necessary precautions to decrease the risk of resident exposure to COVID-19. One system that programs implemented to decrease resident exposure and risk was by transitioning to a platoon system, whereby half the residents were present for clinical duties and the other half were performing educational activities from the safety of their homes. This ensured that if a resident became symptomatic, transmission to the rest of the resident complement would be limited. However, the

designated time at home made it difficult for residents to be engaged in on-site educational activities and prompted the expansion of virtual education. In an unprecedented fashion, pre-recorded lectures, step-by-step videos, and on-line workshops were shared amongst institutions across the country to help hone surgical skills while hands-on experience was restricted.⁴¹ In addition, videoconferencing became popular which allowed for multi-institutional virtual journal clubs, lecture series, and observation of live surgeries.^{1,33} As most in-person didactics transitioned to the virtual platform, continued participation in educational sessions, such as multidisciplinary head and neck oncology conferences and grand rounds was possible.

Although virtual education provided a way to enhance resident training during the pandemic, it was unable to provide vital, hands-on clinical and operative experiences. The cancellation of elective surgeries, as well as decreased resident involvement in procedures, significantly limited operative opportunities for residents.^{19,42} Sixty percent of residents described losing more than 6 months of their training, and some reported up to 10-12 months of lost time.⁵⁷ In web-based surveys, residents reported spending less time in the hospital, decreased clinical duties, lower surgical volume, and having less procedural independence than before the pandemic.^{58,59} Additionally, 55% of residents felt that the pandemic had a negative impact on their ability to secure a job or fellowship after training.⁵⁹ Over time, hybrid models were developed to combine both virtual and in-person education.⁶⁰ According to a program director survey, these models were beneficial for junior residents, and because of this success, these models are likely to remain throughout the pandemic's duration, and may even continue after. Despite these efforts to optimize resident education during the pandemic, it is clear that residents feel their training has been significantly impacted, at least in the short-term. The long-term impact of the pandemic on resident training and education is yet to be elucidated.

In addition to resident training, the pandemic also significantly affected medical student education. In past years, rotations at various institutions were highly encouraged, especially for students without a home otolaryngology program. During the pandemic, students were no longer permitted to rotate at outside institutions, which impacted their education and exposure to otolaryngology. This also limited students' abilities to demonstrate their strengths in-person which can negatively affect applicants' match potentials. One trend resulting from these restrictions has been a significant increase in the number of students matching at their home programs from 22% to 30% in 2020 and 2021, respectively.^{61,62} There were additional stresses when applying to residency during the COVID-19 pandemic, as this was the first time students had to interview over Zoom and were not able to visit prospective institutions. In a cross-sectional survey of otolaryngology applicants, participants reported that the move to virtual interviews increased the number of programs they applied to and the number of interviews they planned to attend.^{63,64}

In fact, the average number of residency programs applied to for otolaryngology applicants increased from an average of 69 to 79 between 2019 and 2021. As our response to the pandemic and our understanding of the potential impact on medical education has evolved, the ACGME has now allowed students in the 2022 otolaryngology match to do one away rotation. It is unclear at this time how restrictions on away rotations will change in the future.

Impact on research

COVID-19 presented a unique research opportunity for otolaryngologists given its direct impact in otolaryngology and the increased shift in available time for academic endeavors during the initial shut-down.⁶⁵ During the pandemic, there were over 3 times as many COVID-19 publications (759 publications) compared to publications on other popular otolaryngology topics, such as sensorineural hearing loss (237), obstructive sleep apnea (175), otitis media (167), and chronic sinusitis (120).⁶⁶ This is in stark contrast to the Spanish Flu in which no articles regarding the pandemic were published in the major otolaryngology journals during that time.⁶⁷ During the COVID-19 pandemic, there was a 42% increase in the number of otolaryngology publications in general.⁶⁸ Some of the highest increases in subspecialty publications were rhinology and laryngology (51% and 72%, respectively).⁵⁸ However, other types of research were negatively impacted during the pandemic including the majority of animal studies and clinical trials being halted at its onset.^{69,70} In a survey of American rhinologists, 36% of 71% respondents reported their otolaryngology research labs were not able to continue employing hired personnel with full salary due to loss of funding.⁶⁹ However, as the pandemic has progressed over the last 2 years, labs have been slowly returning to baseline productivity with re-engagement in animal studies and clinical trials.

Impact on mental health

The constantly changing policies and unknown future of the COVID-19 pandemic has been exhausting for all physicians. Caring for patients who may be COVID-19 positive and the fear of becoming infected themselves has impacted the mental health of practicing otolaryngologists.⁶⁵ In one survey assessing resident wellness, 24% of residents reported some level of burnout and more than half of respondents reported increased stress and anxiety during the pandemic. Interestingly, PGY-2 otolaryngology residents had higher rates of self-reported burnout compared to other years.⁵⁸ Another survey assessing attending physicians' and residents' mental health found similar results with 22% reporting burnout, 48% reporting anxiety, 11% reporting depression, and 60% reporting distress.⁷¹ The effects of COVID-19 impacted all otolaryngologists alike, with increased levels of distress shown to directly correlate with increased COVID-19 infection rates in the area. However, when assessing burnout, residents reported

higher rates of burnout compared to attendings.^{71,72} Despite these negative impacts on physician well-being, efforts have shown that providing sufficient training and education regarding COVID-19, as well as adequate amounts of PPE, significantly reduced rates of anxiety and depression among otolaryngology providers.⁷³

Conclusion

Global pandemics have plagued our world for millennia. However, the current pandemic was unlike any prior pandemics, largely in part due to current advances in technology, the internet, and access to misinformation across the globe. We have become accustomed to a world that is more easily accessible through global travel, but in a pandemic where transmissibility was high and need for social isolation and quarantine was paramount, we were unable to take part. As the pandemic persisted and became heavily politicized, there was an unprecedented impact on the economic, political, and healthcare landscapes. Although we have increased our knowledge and understanding of how to manage this disease, the extent of the pandemic's impact on our clinical practices, resident education, and mental health in otolaryngology are likely long-lasting and yet to be fully elucidated. However, as we continue to expand our scientific understanding of the disease process and improve global vaccine uptake, in addition to continued adherence to recommended safety guidelines, we will continue to adapt and find ways to stay safe without compromising optimal care for our patients.

Disclosures

The authors have no relevant conflicts of interest of financial disclosures

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