SPECIAL ARTICLE COVID-19

Novel Changes in Resident Education during a Pandemic: Strategies and Approaches to Maximize Residency Education and Safety

Jared Johnson[1,*] Michael T. Chung[1,*] Michael A. Carron[1] Eleanor Y. Chan[1,2] Ho-Sheng Lin[1] Jeffrey Hotaling[1]

[1] Department of Otolaryngology – Head and Neck Surgery, Wayne State University School of Medicine, Detroit, MI, United States
[2] Division of Neurotology/Skull Base Surgery, Michigan Ear Institute, Farmington Hills, MI, United States

Address for correspondence Michael T. Chung, MD, Department of Otolaryngology – Head and Neck Surgery, Wayne State University School of Medicine, 4201 St. Antoine, 5E-UHC, Detroit, MI 48201, United States (e-mail: michael.chung@wayne.edu).

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Abstract

Introduction The COVID-19 pandemic has led to a reduction in surgical and clinical volume, which has altered the traditional training experience of the otolaryngology resident.

Objective To describe the strategies we utilized to maximize resident education as well as ensure patient and staff safety during the pandemic.

Methods We developed a system that emphasized three key elements. First and foremost, patient care remained the core priority. Next, clinical duties were restructured to avoid unnecessary exposure of residents. The third component was ensuring continuation of resident education and maximizing learning experiences.

Results To implement these key elements, our residency divided up our five hospitals into three functional groups based on geographical location and clinical volume. Each team works for three days at their assigned location before being replaced by the next three-person team at our two busiest sites. Resident teams are kept completely separate from each other, so that they do not interact with those working at other sites.

Conclusions Despite the daily challenges encountered as we navigate through the COVID-19 pandemic, our otolaryngology residency program has been able to establish a suitable balance between maintenance of resident safety and well-being without compromise to patient care.

Keywords
- COVID-19
- pandemic
- resident education
- strategies

Introduction

The novel coronavirus disease 2019 (COVID-19) pandemic has led to unprecedented and sudden changes within our world over the past few months. Even as the Centers for Disease Control and Prevention (CDC) advocates "shelter in place," "social distancing" and adherence to meticulous personal hygiene, COVID-19 has proven to be highly transmissible, and has swiftly spread throughout our country.[1–3] With the rapid rise in the number of confirmed COVID-19 cases, the burden imparted on the healthcare system has been unparalleled in the last century. This strain on healthcare delivery has led to numerous changes in the usual day-to-day operations, including the cancellation of all surgical cases except for those that are considered essential, emergent, or cancer-related.[4–6] Clinic schedules have been severely reduced to include only urgent patients who need to be seen in a time sensitive manner,

* *Authors contributed equally to this manuscript.*

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while telemedicine has swiftly usurped the traditional face-to-face doctor to patient encounter.

The conventional otolaryngology residency education involves a balance of surgical training in the operating theater, patient encounters in clinic, academic time in the form of didactic lectures and self-study. The reduction in surgical and clinical volume has altered the residency experience, and has required novel approaches to make up for these lost opportunities. As a residency training program, considering the health and well-being of residents is of utmost importance. Ensuring resident safety and limiting unnecessary exposure to COVID-19 is critical, as those who are infected and symptomatic must be quarantined according to CDC guidelines.[7] Infected residents pose a risk to fellow residents and staff whom they work closely with, and thus appropriate precautions must be taken to avoid propagating infection to other members of the residency, which can have detrimental effects on the ability of the department to deliver patient care.[7,8] Additionally, infected medical professionals pose a risk to patients they interact with, thus causing further potential endangerment to those we are tasked to care for, and worsening the dissemination of disease. Our otolaryngology residency serves downtown Detroit and its surrounding communities, which have been particularly hard hit by COVID-19, and thus, developing effective and reliable mechanisms to keep our residents, staff and patients safe during this time has been paramount.[9] The present paper describes our strategies and techniques utilized to maximize resident education as well as ensure patient and staff safety during the COVID-19 pandemic.

Methods

Residency programs across all medical and surgical specialties currently find themselves in a complicated predicament, and are forced to maintain some level of normalcy in a situation which could have never been truly anticipated or prepared for.[10] As our department considered contingency plans, we identified three unifying key elements that guided our decisions. First, patient care was to remain the top priority, and all members of the clinical team expressed that this could not be compromised, especially under such critical circumstances. Second, resident safety and well-being had to be preserved at all times, and clinical duties were reorganized to ensure minimization of unnecessary exposure to COVID-19 patients. Last but not least, substantial effort was made to ensure continuity of resident education and learning opportunities during the pandemic despite the overall reduction of surgical and clinic volume. The present study was deemed by the authors to be exempt from institutional review board review at (XXX blinded for review process XXX) Wayne State University according to institutional policy.

Results

To implement the key elements described above, our residency resorted to a five-team approach divided among three practice sites. At our program, we cover multiple hospitals including a tertiary referral freestanding cancer center, two American College of Surgeon (ACS) designated Level 1 Trauma Centers, a smaller community hospital, and a Veterans Affairs (VA) hospital. We divided up the five hospitals into three functional groups based on geographical location and clinical volume. The 2 busiest hospital groups were each assigned 2 different teams consisting of three residents (PGY-4/5, PGY-2/3, PGY-1/2). The least busy group was assigned a team of two residents (PGY4, PGY2) due to the slower clinical volume and limited call coverage needed at these hospital sites. Each team works for 3 days at their assigned location before being replaced by the next 3-person team at our 2 busiest sites. Resident teams are kept completely separate from each other, so that they do not interact with the other team covering the same site nor with those working at other sites. This not only enables us to limit the possibility of cross infection spreading amongst a large number of residents, but also decreases the risk of multiple residents and staff being quarantined simultaneously.[7,11] Additionally, by adhering to a 3-day-on 3-day-off schedule, extra precautions can be undertaken should an infected resident start to present COVID-19 symptoms, in which case he/she can be kept off work duties to reduce inadvertent spread to coworkers and patients. Each resident is paired with a backup resident who can relieve him/her should that resident be unable to work. Should a whole team of three residents fall ill, we have another team that can fill in seamlessly. Residents rotate call and are given postcall days whenever possible. Residents are encouraged to go home immediately after rounds if there are no surgical cases or clinics scheduled for the rest of the day, to minimize their time in hospital where there may be an inherently greater risk of contracting COVID-19. Residents are able to take home call as well, which is the normal routine for our program.

Every resident who is not in the hospital performing clinical duties is considered to be on "academic time," and are expected to engage in all offered online didactics, self-study and research. Even those residents who are tasked with clinical responsibilities are expected to utilize any downtime, such as that in between surgical cases or clinics, to immerse themselves in academic activities. All residents are expected to keep a record of all academic pursuits during this crisis.

In this fashion, we have been able to continue providing around-the-clock coverage at multiple hospital sites without any compromise on patient care or overall resident and staff health and well-being. Our hope is that other training programs may use this information to serve as a guide for setting up their own system within their department. It is anticipated that residency programs which cover fewer hospital sites may have even greater flexibility in devising this type of disaster resident coverage for maintenance of patient care while considering resident interests and safety.

Resident Education

Surgical education has changed drastically throughout the past century. Although the principles developed by William S. Halsted, M.D., the father of American surgical residency training programs, are still the focus of modern-day resident education, the development of new technologies and methodologies have led to an evolution of surgical education. Today's surgical

residents use multiple platforms to gain information, including online textbooks, current literature in the form of journal articles, live and recorded surgical videos, informational podcasts, and participation in multidisciplinary rounds, just to name a few.[12] Smartphones and tablet devices in surgery have become ubiquitous, allowing rapid communication between attendings and residents, ready access to references for clinical decision making, and real-time management of patient data.[13] Nonetheless, hands-on training in the operating room has always been the mainstay of surgical training.

Unfortunately, the COVID-19 pandemic has had a profound impact on otolaryngology residency education. Otolaryngology residents have seen a dramatic decline in their in-person academic activities and clinical case volumes. In response to the detrimental impact of the COVID-19 pandemic experienced by otolaryngology programs nationally, faculty from around the country have come together to develop resources to support ongoing daily resident education.

Didactic Education

At our institution, residents usually have four hours of protected academic time every week to ensure well-rounded scholarly development. These activities include Grand Rounds, multidisciplinary tumor board conference, basic science lectures, trauma conference, head & neck review series, and translational research symposium. Other scholarly activities include mock oral boards, journal clubs and quality improvement conferences.

The COVID-19 pandemic has served as a catalyst for positive changes in the structure of our Otolaryngology residency education. First, we implemented a videoconference format for our weekly two-hour Grand Rounds, utilizing Zoom (Zoom Video Communications, San Jose, CA, USA). Not only has this facilitated continuation of our scheduled didactic curriculum, the ease of access has enabled increased participation by our diverse faculty group, of whom some would have otherwise been unable to join weekly due to conflict in their clinical schedules at distant hospital sites. In addition, residents have access to remote lectures given live by world-renown faculty from numerous institutions through three major national otolaryngology educational consortiums. Didactic lectures are provided via the Consortium of Resident Otolaryngologic Knowledge Attainment Initiative in Otolaryngology (led by the University of Kentucky Department of Otolaryngology – Head and Neck Surgery), The Great Lakes Otolaryngology Consortium (led by University Hospitals/Case Western Reserve University), and by the Collaborative Multi-Institutional Otolaryngology Residency Education Program (led by USC Caruso Department of Otolaryngology – Head and Neck Surgery). The staggered timing of these lectures has enabled easy access daily by residents, creating a very robust yet flexible, disciplined learning experience. The video lectures are also recorded so that those who missed the live lectures due to clinical responsibilities can watch the videos on their own time in the future.

Surgical Education

"See one, do one, teach one" has been the traditional method of teaching in surgery. Many critics have recently argued that this method is out of date, with the main contention being that patient safety is at risk because surgical residents are unable to safely perform a procedure after only seeing it once.[14] Although quality care and error reduction have been a major focus of concern in healthcare for several decades, it remains true that in surgery, learning is often hands on. The structure of graded responsibility with each advancing year is still featured in our current training system. While attending supervision is often mandated, "see some, do some, teach some" continues to mold future otolaryngologists in our program.

Subsequent to the World Health Organization (WHO) declaration that the novel coronavirus disease 2019 (COVID-19) was a global pandemic, the United States Surgeon proclaimed a formal advisory to cancel/postpone elective surgeries at hospitals. The American Academy of Otolaryngology – Head and Neck Surgery recommended that all otolaryngologists limit providing patient care activities to those individuals with time-sensitive, urgent, and emergent medical conditions. From a compilation of information based on personal communication with international colleagues reporting their individual experiences, we found out that a significant number of doctors who died in China, Iran, and Italy were otolaryngologists, possibly due to the high viral shedding from the nasal cavity. Based on this information, Stanford University sent out their guidelines of performing only urgent/emergent cases of endoscopic endonasal surgery. The COVID-19 pandemic has profoundly impacted facial plastic and reconstructive surgeons, who have ceased providing non-essential services. Many facial plastic and reconstructive surgeons have even deployed their privately owned anesthesia machines/ventilators to hospitals in need. In the state of Michigan, many hospitals have even cancelled/delayed surgery for cancer patients as they were forced to allocate resources to a surge of COVID-19 patients. Our program is affiliated with the Karmanos Cancer Institute, a freestanding, NIH-designated comprehensive cancer center, so certain cancer surgeries are still being performed after taking into account the medical condition, social circumstances, and needs of each individual patient. Nonetheless, over the last 6 weeks, our surgical case volume has been nowhere near prepandemic levels. In addition, to limit the total number of exposures and mitigate the potential for disease, our program has restructured coverage of surgical cases such that only one resident is allowed in each operating room.

Previous studies have shown that there is a correlation between visual-spatial ability and surgical performance in trainees.[15] The Web Initiative for Surgical Education of Medical Doctors (WISE-MD) is a collection of Web-based modules designed to enhance the teaching of common surgical problems and practices to surgical residents. It was built on the theoretic framework laid out by Richard E. Mayer, who proposed that improved learning occurs when animation and narration occur simultaneously.[16,17] Ahmet et al performed a systematic review to explore the influence of videos on surgical education and found that video-based education can provide substantial benefits in surgical education by promoting faster acquisition of skills and accelerating the learning curve.[18] In our program, the Division Chief of Facial Plastic and Reconstructive

Surgery reviews high-quality surgical videos with us in a group study format via an online platform to help make up for the significant loss of time in the operating room.

Clinical Education

As with surgical volume, the resident clinical experience during these times has also been significantly affected. Clinic schedules have been significantly reduced, with primarily only patients undergoing active cancer treatment, postoperative patients, and those with urgent needs being seen. Additionally, when possible, resident coverage of attendings during clinics has been more limited in an attempt to reduce exposure and to maintain a healthy resident workforce. To substitute for time missed in the clinic setting, residents have been involved in telehealth visits where they can practice and refine their history taking skills in the presence of the attending. Although the concept of telehealth has existed for decades, it has been relatively slow to catch on. Providers have faced an uphill battle when it came to legally treating patients and being reimbursed for their virtual care. Social distancing and shelter-in-place practices due to the COVID-19 pandemic have made telehealth a necessity.[19] For the first time, the government and private insurers have empowered healthcare providers to implement telehealth visits in their practices. However, one unique challenge of telehealth within the field of otolaryngology is the difficulty in performing a physical exam in the remote setting. The physical exam is a crucial component of any otolaryngology clinic visit, and a complete head and neck exam frequently relies on specific medical equipment, such as an otoscope or flexible fiberoptic laryngoscope. While they are often crucial components of the physical exam, these tools cannot be utilized in the remote setting. Also, even the ability to perform essential, but basic physical exam maneuvers, such as assessing the oral cavity and oropharynx or palpating the neck are difficult or even impossible to perform. We have found that routine postoperative patients, along with patients presenting with obstructive sleep apnea, in particular those we are assessing for hypoglossal nerve stimulator placement, to be excellent candidates for telehealth visits. As the use of telehealth in our clinics is a new experience, we have emphasized reviewing the telehealth rules and procedures to be critical to ensuring patient confidentiality.

Discussion

In the short term, otolaryngology resident education faces an uncertain future. These are unprecedented times and there is no guide that those in charge of otolaryngology residency education can use to help maneuver through this experience. Our rotating three-person team at each hospital that our residency has utilized, as outlined above, has allowed our program to ensure that we have residents available at all hospitals to care for patients as needed, while also ensuring that residents are able to stay healthy, safe, and rested during these difficult times. It also decreases the number of residents that interact with one another, thus preventing the inadvertent spread of COVID-19 to a large portion of the residency. Additionally, it allows us to quickly adapt should residents become infected with COVID-19 and need to be quarantined, which is likely to inevitably occur with increasing frequency as more people become infected.

The COVID-19 pandemic has inevitably transformed otolaryngology training and practice and how we proceed in the future. As mentioned previously, the rise of telemedicine during this time, and the inherent convenience and benefits it offers in certain circumstances, will lead to its continued use as we proceed into the post-COVID-19 future. With its continued use, further refinement and improvements to the process will follow, leading to a more streamlined process that will make this technology more applicable to a wide variety of patient health concerns. Our program has also found benefit in surgical videos as a substitute for surgical experience, during these times. The opportunity to see a surgery and hear expert commentary, while no replacement for actually performing a surgery, has proven to be useful especially for more junior residents. Given that certain otolaryngology surgeries are frequently difficult to observe for those not directly involved in the surgery, these videos have been beneficial for our fellow residents and will be something that we will look to continue even after surgeries resume. Additionally, the opportunity to stream grand rounds remotely has proven very popular with residents. Our residents frequently have to drive to other hospitals prior to grand rounds, and having the option to remotely stream these conferences reduces the driving burden. Thus, our program has considered continuing the option of remote access to grand rounds for these residents.

Despite all the challenges during these times, the willingness of the otolaryngology academic community to step up for the benefit of resident education as a whole has been unprecedented. Otolaryngology residents have access to upwards of 8 hours of live lectures per day, 5 days a week, due to the dedication of those within the field and their commitment to resident education. Our approach has limitations. We recognize that not all cities are geographical hot spots for COVID-19.

Conclusions

Despite the difficulty during these times, our program has found that maintaining resident safety and well-being does not need to compromise patient care, but requires strong leadership and unique solutions to novel challenges. We remain optimistic in the future of our education despite these challenges, and cautiously look forward to returning to the operating room and clinic, armed with new knowledge and experiences developed during this time.

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