

Advanced Head and Neck Surgery Training during the COVID-19 Pandemic

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Abstract

Background: The COVID-19 pandemic has significantly impacted medical training. Here we assess its effect on head and neck surgical education. **Methods:** Surveys were sent to current accredited program directors and trainees to assess the impact of COVID-19 on the fellow's experience and employment search. Current fellows' operative logs were compared with those of the 2018-2019 graduates. **Results:** Despite reduction in operative volume, 82% of current AHNS fellows have reached the number of major surgical operations to support certification. When surveyed, 86% of program directors deemed their fellow ready to enter practice. The majority of fellows felt prepared to practice ablative (96%), and microvascular surgery (73%), and 57% have secured employment to follow graduation. Five (10%) had a pending job position put on hold due to the pandemic. **Conclusions:** Despite the impact of the COVID-19 pandemic, current accredited trainees remain well positioned to obtain proficiency and enter the work-force.

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Introduction

The American Head and Neck Society (AHNS) maintains as its mission statement to "advance education, research and quality of care for the head and neck oncology patient" (Society, 2020). The AHNS is the single largest organization in North America for the advancement of research and education in head and neck oncology. Chief among its educational mission is the certification of advanced head and neck surgery trainees and accreditation of high-quality head and neck fellowship training programs.

The pandemic of COVID-19 has brought unprecedented challenges to the medical community. Providing clinical care and maintaining public health are the obvious priorities, but other activities such as medical research and education cannot be neglected. Continuing high quality, evidence-based education to head and neck surgery trainees is more important than ever, as they may be required to join the work-force at an accelerated pace.

Here we provide an update on the current state of head and neck oncology and reconstructive surgical fellowship training and certification and how it has been impacted by the COVID-19 pandemic. In addition, we provide an overview of approaches used to augment surgical training that can be implemented even in environments of reduced patient contact. Lastly, we give perspective from the leadership of the Advanced Training Council (ATC) and Curriculum Development and Maintenance Service (CDMS), as well as the fellowship program directors and current trainees, to gain insight into potential gaps in education and training and outline current initiatives that are underway to ensure proficiency of those who will be completing this advanced training and entering the work-force in this unprecedented time.

Methods

The ATC in collaboration with AHNS leadership determined in early March 2020 that the match deadline for the July 2021 class would need to be delayed from June 2020 to at least September 2020. Senior members of the ATC (DTW and AC) organized two separate phone conferences; the first with AHNS fellows on March 24, 2020 and the second with AHNS program directors on March 26, 2020. Follow-up online surveys were sent via email links to current AHNS fellows and AHNS program directors. The content of these calls and the focus of the survey questions included assessment of changes in didactic educational programs, impacts on current surgical and outpatient clinic experiences, assessment of fellow repurposing plans to meet anticipated needs related to COVID-19 patient surge, safety concerns regarding COVID-19, and impacts on this year's clinical fellows' job searches, including established and pending job offers.

Case log analysis was also performed to assess the impact of COVID-19 on the ability of current fellows to obtain adequate operative volume for certification. Values are based on data available in the online case log system administered by the ATC (data acquired between April 13-15, 2020). To supplement this data, the ATC also asked program directors and fellows to assess the trainee's preparedness to start independent practice at the time of the survey. Lastly, fellows were queried if they had secured an employment position to start at the completion of fellowship and if, and in what way, their career choices had been impacted by the current pandemic.

Results

Didactic Education

Twelve of 31 fellows (39%) surveyed responded that programmatic changes had occurred in their didactic curriculum, with most respondents citing the increased use of online and video platforms for journal clubs, didactic lectures, and other clinical discussion groups. Thirty one of 32 fellows (97%) reported weekly participation in the virtual tumor board series implemented by the CDMS faculty for head and neck fellows. Program director responses to similar questions included 21 of 37 (57%) reporting programmatic changes to their didactic curriculum, also citing video platforms for conferencing as the most widely incorporated change. Thirty-seven of 38 program directors (97%) were aware of the CDMS weekly tumor board series for fellows.

Clinical training

Of the 37 responses received from program directors, the majority (70%) reported a 50%-90% reduction in the number of elective cases at their institutions (March-April 2020). However, many (30/37, 81%) also stated that their fellows were still participating in oncology cases and remained active in a variety of procedures. The only area that showed significant decline was in cases related to treatment of benign processes (9/37, 24% still perform these operations). The majority of head and neck fellow-run clinics had been cancelled (31/38, 86%), while a minority of fellows were given exposure to attending-run virtual or telemedicine clinics (8/31, 26%).

About half of current fellows (15) reported being available for airway emergencies. Four fellows (13%) have been asked to be available for non-fellowship related clinical duties as part of their institution's surge planning for COVID-19. When asked if they had safety concerns regarding their institution's policy with regard to caring for patients with COVID-19 as it relates to their training, only a minority of fellows responded (10/32, 31%) and only one reported safety concerns.

Credentialing

In the current training year, the mean and median number of major head and neck operations logged by head and neck fellows were 329 and 364, respectively. Fifty of the 61 fellows (82%), who logged any cases to the system, had already passed the 100 major head and neck procedures milestone. The average number of cases of the current fellows was compared to last year graduates in specific categories (Table 1). The majority of ATC program directors viewed their trainee as well prepared for independent practice (31/36,

86%). Additionally, the majority of current ATC fellows felt prepared for both ablative (25/26, 96%) and reconstructive (19/26, 73%) procedures. In the ATC survey of program directors, 43% (16/37) responded as open to consideration of extending the current fellowship by 3 months.

Fellowship interviews and match

The majority of program directors (21/38, 55%) agreed with the ATC's decision to delay the 2020 match by at least 3 months, and 25% (10/38) were not certain if this delay would be long enough. No program surveyed had finished the interview process and a minority had set up tele interviews (7/38, 18%). The overwhelming majority of program directors (32/37, 86%) surveyed did not anticipate challenges with the onboarding process of the new fellows beginning training in July 2020. A number of program directors suggested that the new fellows start in August instead of July.

Employment search

Twenty-nine of 51 fellows responding reported having successfully secured a post fellowship appointment (57%) while 22 (43%) had not yet secured positions. Five fellows (10%) reported that they had a position nearly secured or secured but that was now in question or on hold due to hiring freezes related to COVID-19. Ten fellows reported they were still actively interviewing for positions. Nine of 37 program directors (25%) responded they would consider temporarily reappointing their fellow as an instructor beyond the end date of the fellowship year in order to support their transition to permanent employment elsewhere.

Discussion

The advanced, intensive, short period of head and neck surgical training brings specific challenges to its educators. The fellowship is generally one year and relies on exposure to a high number of clinical cases, structured learning in oncology, and gradual advancement in performing more complex operations. As can be seen from the survey results from both the fellows and the program directors, the immediate impact on the surgical case experience of this year's trainees have been substantial, with 70% of program directors reporting 50-90% reduction in elective cases. Robust fellow participation in cancer related surgical procedures has continued, however, with 81% of fellows reporting ongoing participation in these cases. A review of the surgical case logs of this year's fellows appears to support these results, as the case numbers for laryngectomy, radical tonsillectomy and microvascular procedures have already reached 70-100% of the final volumes reported for the preceding year's fellowship class while parotidectomy and thyroidectomy (cases with mix of benign and malignant indications) lag somewhat behind (Table 1). Survey results suggest many fellow-run clinics have been curtailed. However, a minority of fellows are beginning to participate in telemedicine clinic experiences.

Successful completion of the AHNS head and neck fellowship has several requirements, all of which could be affected by the COVID-19 pandemic. Each fellow is required to directly participate in the evaluation and management of at least 200 patients with head and neck neoplastic disease (Council, 2020), which should lead to the participation as either operative or teaching surgeon on at least 100 major head and neck surgical procedures. Analysis of the case logs of this year's fellows indicates that 82% of current fellows have already met this surgical benchmark. While this is certainly reassuring with regard to the current fellow class, the events of the COVID-19 pandemic provide a cautionary tale for future pandemics and how fellowship programs must be both nimble and creative with regard to their educational offerings and methods. Had pandemic conditions occurred earlier in the academic year, the impacts on surgical volumes would have likely been far more substantial.

The clinical impacts of COVID-19 may be perceived as the most obvious, and perhaps most acute with regard to fellowship training. But, social distancing and substantially altered scheduling routines have had a similarly profound impact on the didactics of the training programs. As summarized above, the majority of programs have quickly transitioned to online and video learning platforms, often alongside with their associated residency programs, and were able to rapidly adapt to these changes with robust ongoing educational offerings. Other external resources have simultaneously supplemented these didactic offerings, or

may be available for programs to consider implementing. Such offerings may also be applicable to conditions of more severely curtailed surgical experiences.

AHNS initiated effort: Virtual Tumor Board

In response to the current transition to remote didactic learning, and based on the findings of a 2016 needs assessment study, the CDMS designed a virtual tumor board session with emphasis on education. The tumor board is run by the members of the CDMS and guest faculty from all areas of head and neck oncology. Case presentations are clinically oriented, and presented weekly with each week's three cases dedicated to a specific head and neck site. Discussions are interactive with faculty and fellows, but evidenced-based decision making is emphasized along with references for each management decision. The format is based on an interactive video platform that allows for real time presentation of imaging, pathology slides, or literature references in addition to the live videos of the faculty discussants. The remote learning sessions were introduced in April of 2020. At the time of this writing, four sessions have been held. More than 50 participants have logged in during each session. As noted above, 97% of responding fellows have participated in at least one session and virtually all program directors are aware of the weekly tumor board (97%). Plans are in place to continue this format and issue a survey after five sessions. If the response is encouraging, the virtual tumor board will continue until the end of the current academic year. Other formats such as structured lectures by faculty, journal club, and surgical video viewing sessions with commentary by the faculty, and also, active participation of the fellows are under consideration.

Online Resources

Internet-based solutions have proven valuable to supplement traditional bedside teaching and enhance both knowledge and technical skills (Aloia et al., 2019). The majority of current surgical trainees have been exposed to virtual learning environments from an early age, are quick to adapt to these formats (Larvin, 2009) (Martinelli et al., 2019), and frequently incorporate online media in preparation for credentialing exams and clinical practice (Shabli et al., 2019). Flipped classroom models have been demonstrated to improve performance (Moskowitz & Hsueh, 2020). Current AHNS e-resources include standardized goals and objectives and recommended syllabus (Service, 2018), as well as online journal clubs and surgical videos for regional and free flap harvests. In addition, high-quality open access materials are available. This content is highly valued in the developing world and is also commonly used by the U.S. trainees ("Open Access Atlas of Otolaryngology, Head & Neck Operative Surgery," 2020). E-learning resources, especially those which are interactive, are highly accessible, updatable, and can, in some contexts, prove superior to traditional learning models in both user satisfaction and acquisition of surgical knowledge (Tarpada, Hsueh, & Gibber, 2017) (Satterwhite et al., 2012).

Surgical Simulation

Surgical simulation allows students to learn and practice technical skills in a setting which permits time for reflection and discussion, without risk to patients, and in a pandemic, limits the risks to trainees and the broader community. Cadaveric or animal models may offer highly realistic platforms for training a range of surgical skills, but costs and facility requirements might limit their use and the transmission risk has not yet been studied. A range of physical and virtual reality simulators have been developed to address skills training in Oto-HNS (Javia & Sardesai, 2017). Physical simulators range from low complexity task trainers to high fidelity, 3D printed, models with anatomic and haptic feedback in all fields of surgery and for all training levels (Bur et al., 2017). Virtual reality (VR) simulation offers the ability not only to more accurately replicate complex anatomy, but also to introduce realistic pathology or mimic lifelike emergency situations. Existing VR environments applicable to head and neck surgical training include the da Vinci Skills Simulator (Zhang & Sumer, 2013) (Walliczek-Dworschak et al., 2017), the Endoscopic Sinus Surgery Simulator (ES3) (Edmond, 2002) (Fried et al., 2010), and a range of VR temporal bone drilling simulations (Wiet et al., 2002) (Zirkle, Roberson, Leuwer, & Dubrowski, 2007) (Sewell et al., 2008) (Zhao, Kennedy, Yukawa, Pyman, & O'Leary, 2011).

Nonsurgical Skills

Mastery of non-technical skills (NTS) such as communication, teamwork, situational awareness, and decision-making is critical to surgical training, but challenging in a remote learning environment. Multiple behavioral rating systems have been developed as frameworks for teaching and competency-based assessment of non-technical surgical skills. The Non-Technical Skills for Surgeons (NOTSS) system, Oxford NOTECHS II, and Observational Teamwork Assessment for Surgery (OTAS) have been widely employed across a range of surgical disciplines and environments (Flin R., 2012) (Robertson et al., 2014) (Javia & Sardesai, 2017). Although NTS assessment is most often employed in clinical settings, it can also be adapted to surgical simulations (Magill & Tolley, 2020). Notably for head and neck surgical trainees, NTS training can be an integral component of simulated surgical emergencies (Wu, Kim, Fung, & Roth, 2018).

Live-feed Surgery

Surgical videos are excellent tools to be used during the pandemic, as they can walk trainees through the steps of complex surgeries. However, they do not offer the ability to interact, and often edit the “struggles” out of the videos. Similar to watching live surgery during medical conferences, the technology already exists to allow remote audiences to watch surgery and interact with the surgical team in real time. Wearing a head-mounted camera, the surgeon can broadcast a surgical-view of the operative field, and capture live video and audio to allow for a more interactive experience for the trainee (Silberthau, Chao, & Newman, 2020).

Virtual clinic visits/telemedicine proficiency

Telehealth and virtual care are rapidly being integrated into most modern health care systems, a change that has been occurring even prior to the current pandemic (Deldar, Bahaadinbeigy, & Tara, 2016). Within head and neck surgery, there is potential for telemedicine to replace a significant proportion of in-person office visits (McCool & Davies, 2018) (Rimmer et al., 2018).

Proficiency in use of telemedicine is therefore an increasingly important competency for all trainees. Fellowship directors can consider the current circumstances an opportunity to include mastery of telemedicine as an important learning objective. In our survey, only 26% of fellows reported participating in virtual clinics. Given that the majority of fellow-run clinics have been cancelled, consideration should be made to replace these with virtual clinics. This would provide exposure to this important aspect of clinical practice and allow fellows to continue with real-time education in counseling, decision-making and systems-based practice.

This technology, however, is not without its limitations and pitfalls. Creating clear sets of guidelines for use of this technology will continue to add to its potential benefit and may serve as the foundation for post-crisis use of telemedicine (Aman Prasad, 2020)

Clinical Training and Certification

Successful completion of the AHNS head and neck fellowship has several requirements, all of which could be affected by the COVID-19 pandemic. Throughout the year, the trainee’s performance is continually observed and assessed by the program director and faculty with semi-annual formal evaluations and structured feedback provided on the trainee’s performance. Prior to completing the fellowship, the program director provides an attestation of the trainee’s performance and satisfactory completion of the training program. The ATC has the ultimate responsibility for certification of fellows enrolled in the accredited programs, with this certification depending upon a number of factors, perhaps the most important of which is the program director’s final assessment of his or her fellow’s readiness for program completion. With three months remaining in the training year 86% of responding program directors feel their trainees have already achieved readiness for independent practice as head and neck surgeons. Just as importantly, 96% of responding fellows feel comfortable with their technical skills as ablative head and neck surgeons, and 73% have achieved similar levels of comfort with microvascular procedures. Moreover, in the current training year, 82% of fellows have already logged over 100 major head and neck operations. This analysis suggests that the current fellow class will comfortably achieve readiness for certification by the ATC by the completion of their fellowship year.

For any individual program whose educational experience may have been more adversely affected, the ATC

would give careful consideration of a request to extend a fellow's experience. Extension of training is certainly not a straightforward "solution", however. Such an extension of training will raise many logistical concerns, including the extension of credentialing and malpractice coverage. Trainees and their families often have relocation plans and employment contracts that may not permit extension of training beyond June 30. Finally, the ATC and program director must consider the effect this will have on the clinical experience of the incoming fellow. Clear goals for satisfactory completion of training should be recommended and directed by each fellowship program as deemed necessary by the program director and teaching faculty, taking into consideration the individual needs, circumstances, and desires of the trainee. As with any training year, but particularly given the ongoing impacts of COVID-19 for this year, the ATC will review, provide guidance where necessary, and support requests for training extension in the best interests of its trainees.

Employment search

In ATC survey of current fellows, 57% stated that they had secured a post training position before the start of the pandemic. Over a third of the fellows were still in the interview process as the crisis developed. This is comparable to what is observed at this point in most fellowship cycles. The unprecedented impact of the COVID-19 pandemic on the operational priorities of health systems and institutions in the United States and Canada, however, has created uncertainty for those seeking jobs and the administrative leaders of institutions offering positions. It is possible that departments with new positions may be forced to delay or even withdraw their positions until the normal clinical care reopens. These conditions and their impact may even linger into the 2020-2021 academic cycle with indirect effects on the next year's graduates.

Study limitations

Due to the fluid nature of the current COVID-19 crisis, many aspects of clinical care and education vary from day to day and also regionally within the North American AHNS training programs. In addition, due to the nature of survey collection, reporting bias is possible and operative log data may be inaccurate due to delays in entry or omissions by the current and past fellows. Efforts were made to interpret the best available data and to proactively make educational changes thought to enhance the current experience. Follow-up assessment will be needed to evaluate the effectiveness of these interventions.

Conclusion

The COVID-19 pandemic has had a significant impact on the landscape of head and neck surgical training. With dramatic shifts in patient care being seen in nearly all geographic regions, a thoughtful and comprehensive approach to head and neck surgical training is needed to ensure proficiency of all graduates. Fortunately, due to the high clinical volume offered by accredited institutions, as well as enhanced educational experience provided through the standardized head and neck surgery fellowship curriculum, current trainees appear well-positioned to achieve expertise before entering practice. As the length of this crisis extends, more opportunities to virtually or otherwise train our fellows will emerge. We expect this to remain a fluid set of recommendations, and the ATC and the CDMS of AHNS are prepared to remain flexible and accommodating to meet the needs of our community.

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