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The impact of COVID-19 on global disparities in surgical training in pediatric otolaryngology

Tina Munjal^a, Katherine R. Kavanagh^b, Rami M. Ezzibdeh^a, Tulio A. Valdez^{a,*}

^a Department of Otolaryngology, Head & Neck Surgery, Stanford University, Stanford, 801 Welch Road, Palo Alto, CA, 94304, USA

^b Department of Otolaryngology, Head & Neck Surgery, Connecticut Children's, Hartford, 282 Washington St., Hartford, 06106, Connecticut, USA

ARTICLE INFO

Keywords:

COVID-19
Pandemic
Surgical education
Simulation
Reallocation

ABSTRACT

Objective: To assess global trends in otolaryngologic and non-otolaryngologic education in response to COVID-19, specifically with regard to surgical simulation and personnel reallocation needs in case of patient demand.

Study design: Online survey.

Methods: A multiple-choice survey regarding operative caseload and impact on resident education was sent to Otolaryngology residents and Pediatric Otolaryngology faculty globally. The survey was open for responses for ten days in March 2020.

Results: A total of 96 completed surveys were received across 22 countries. 87.5% of respondents reported that no supplementary operative education is being provided. Despite 71.43% of responses indicating that simulation was useful for all levels of residents, 20.95% of responses indicated that simulation is not possible at their institution, with the majority of these being skewed toward responses from South America.

Conclusion: Despite the majority of respondents stating that simulation was helpful, there were disparities in access to simulation seen across countries. The results inform the need for a coordinated effort to expand educational efforts outside of the operating room and clinical environment. A major limitation of this study is the low domestic response rate.

1. Introduction

As of this article writing, the global pandemic COVID-19 caused by SARS-CoV-2 has resulted in over **twelve** million confirmed cases worldwide [1]. On March 18, 2020, the Centers for Medicare & Medicaid Services (CMS) announced a recommendation that all elective surgeries be postponed [2]. On April 19, 2020, CMS provided guidelines on expanding procedural, chronic disease, and preventative care in regions passing the White House Gating Criteria, outlining requirements with regards to symptoms, cases, and hospital capacities in the given regions [3,4]. The return to normalcy, however, is expected to be a prolonged and difficult process, especially in areas that continue to have high case rates. Furthermore, early reports suggest that otolaryngologists may be particularly susceptible to occupational exposure to SARS-CoV-2 [5]. As a result, there are widespread changes in otolaryngology practice patterns around the world that continue to evolve rapidly.

The "Collaborative Multi-Institutional Otolaryngology Residency Education Program" was established to provide virtual lectures to

residents during this time of modified case load [6]. However, the support of operative education remains a challenge. Furthermore, otolaryngologists in certain geographic areas are being reallocated to medical and critical care roles, furthering the uncertainty of operative education. This survey-based study aimed to evaluate global patterns and opinions in two distinct areas: 1) the provision of surgical education to otolaryngology residents, and 2) the provision of non-otolaryngologic education in case of personnel reallocation needs.

2. Materials and methods

This study was exempt from review by the Institutional Review Board at Stanford University. A survey was sent to Otolaryngology residents and Pediatric Otolaryngology faculty globally using Qualtrics software [7]. The survey was made available in English, German, Spanish, French, Italian, Hebrew, Farsi, Hindi, Korean, Japanese, and Chinese. Responses were collected during a 10-day period in March 2020.

* Corresponding author. 801 Welch Road, Palo Alto, CA, 94304, USA.

E-mail address: tvaldez1@stanford.edu (T.A. Valdez).

<https://doi.org/10.1016/j.ijporl.2020.110267>

Received 23 April 2020; Received in revised form 15 July 2020; Accepted 15 July 2020

Available online 20 July 2020

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3. Results

A total of 96 completed surveys were returned. 93.8% (90) of respondents were from outside of the United States. Responses spanned 22 countries and seven continents (Fig. 1). 68.8% (66) of respondents were residents, and 31.3% (30) were faculty (Fig. 2). 91.7% (88) reported all elective cases are cancelled. Of these, 86.4% (76) of respondents indicated all levels of residents are affected equally, with 8% (7) reporting junior resident-level cases are disproportionately affected.

Overall, 87.5% (84) of respondents reported that no supplementary operative education is being provided. 3.1% (3) of respondents reported simulations of common otolaryngologic procedures are being conducted. Several respondents reported that they are being provided with video discussions of surgical cases or additional seminars. From a grand rounds and seminars perspective, 40.6% (39) reported that all seminars are cancelled completely, with another 41.7% (40) reporting that all such seminars are virtual-only.

With regards to simulation, 105 responses were received across 96 respondents. 71.43% (75) of responses indicated that simulation is useful for all residents and 5.71% (6) reported it is only useful for junior residents. 20.95% (22) of responses indicated that simulation is not possible at their institution. The top reason provided for simulation not being possible was lack of equipment or access. Of the responses indicating that simulation was not possible, 63.6% (14) were from South America, despite only 37.5% of respondents being from South America. 31.8% (7) of respondents reporting simulation was not possible were from Europe (comparable to the overall prevalence of European responders at 38.5%) and one was from Australia.

An emerging challenge is the need for otolaryngologists to be reallocated to other specialties. 68.8% (66) of all respondents reported that reallocation is either planned or underway. 63.6% (42) of those expecting reallocation report having received no training in the new need areas. For respondents for whom training was provided, the topics included the use of personal protective equipment (PPE), the execution of pharyngeal swabs, and ventilator mechanics. Table 1 summarizes responses regarding simulation and personnel reallocation.

Fig. 1. Survey respondents by continent. It is notable that the vast majority of respondents (93.8%) were from outside of the United States. The most highly represented regions were Europe and South America.

Fig. 2. Survey respondents by faculty or resident status. The survey was distributed to Otolaryngology residents and Pediatric Otolaryngology faculty worldwide. The majority of respondents (68.8%) were residents.

4. Discussion

With the global crisis at hand, trainee education is in a period of flux. The Accreditation Council for Graduate Medical Education (ACGME) response to the pandemic acknowledges that trainees may not complete all of the planned educational experiences, leaving the decision to graduate a trainee on the individual programs [8]. The ACGME also advises that prior to reassignment, the trainee should receive appropriate training for the new setting⁸.

Otolaryngologists are no strangers to change. The twentieth century saw the specialty morph from one focused on infectious diseases of the head and neck to one that includes oncologic ablation and reconstruction, skull base surgery, and cosmetic surgery [9]. Over the years we have also seen programmatic changes, shifting to allow more time on otolaryngology services earlier in training [10]. The response to the current crisis will again necessitate innovation and adaptability. Firstly, considering that many otolaryngologists are stepping up to care for COVID patients outside of otolaryngology settings, we need to ensure that trainees are prepared for cross-disciplinary physicianship, both now and in the future. Secondly for the long-term, our future otolaryngologists must have the necessary skills to be safe, independent surgeons once practice patterns return to a new normal.

An area of exploration in this regard is that of simulation. Traditionally, simulation often requires a great deal of resources, including PPE (currently in dire shortage in the United States and elsewhere [11]) and proximity to other residents during sessions (ill-advised with social distancing guidelines [12]). Furthermore, 20.95% of responses indicated simulation was not possible at their institution, often due to lack of access, with the majority of responses in this category coming from South America, highlighting geographic disparities that may affect residency education around the world.

A spectrum of solutions will be needed, including low-cost, rapidly implementable options. These may include computer simulations or take-home modules, allowing residents to learn independently while also abiding by social distancing and not consuming limited PPE. This may require programs to allocate a budget for simulation needs.

We acknowledge that the results of this survey are limited in scope due to a small sample size, low domestic response rate (considering nearly 94% of respondents were from outside of the United States), and furthermore, a rapidly changing response to the pandemic on a national and international level. Despite these limitations, it is evident that the

Table 1

Trends in simulation and reallocation in response to COVID-19.

Simulation	Africa	Asia	Australia	North America	Central America	South America	Europe	Total
Not needed	0.0%	0.0%	0.0%	0.0%	0.0%	100.0% (1)	0.0%	0.95% (1)
Not possible	0.0%	0.0%	4.5% (1)	0.0%	0.0%	63.6% (14)	31.8% (7)	20.95% (22)
Not useful	0.0%	100.0% (1)	0.0%	0.0%	0.0%	0.0%	0.0%	0.95% (1)
Only useful for junior residents	0.0%	16.7% (1)	0.0%	16.7% (1)	0.0%	33.3% (2)	33.3% (2)	5.71% (6)
Useful for all levels of residents	1.3% (1)	8.0% (6)	1.3% (1)	12.0% (9)	2.7% (2)	34.7% (26)	40.0% (30)	71.43% (75)
Reallocation	Africa	Asia	Australia	North America	Central America	South America	Europe	Total
None planned	0.0%	6.7% (2)	6.7% (2)	16.7% (5)	0.0%	40.0% (12)	30% (9)	31.25% (30)
Planned or underway. No additional education provided	0.0%	11.9% (5)	0.0%	9.5% (4)	4.8% (2)	33.3% (14)	40.5% (17)	43.75% (42)
Planned or underway. In-person training.	0.0%	0.0%	0.0%	0.0%	30.0% (3)	70.0% (7)	10.42% (10)	
Planned or underway. Virtual training.	7.1% (1)	7.1% (1)	7.1% (1)	0.0%	50.0% (7)	28.6% (4)	14.58% (14)	

Data was acquired from a multinational survey distributed to Otolaryngology residents and Pediatric Otolaryngology faculty during a 10-day period in March 2020. A total of 105 responses were obtained from 96 respondents that finished the survey. Percentages in table indicate proportion of responses per question from a given continent.

global otolaryngology community is grappling with these challenges. Our results are in-line with similar reporting from the International Pediatric Otolaryngology Group (IPOG), which conducted a survey regarding institutional practices across 306 facilities worldwide [13]. In this cohort, 82% reported performing only urgent cases, and 44% reported that urgent and time-sensitive procedures are allowed. With regards to trainee participation in emergent cases, 41% of respondents indicated trainees can participate regardless of the patient's COVID-19 status, with 31% reporting trainees can only be involved in the case if the patient is confirmed negative. For non-emergent cases, 65% of respondents indicated no trainee participation is permitted. Didactics are affected as well, with 28% of institutions reporting no conferences at this time, including virtual. Pediatric otolaryngology teams report reallocation to non-pediatric otolaryngology duties in 22% of cases, including emergency department shifts, transfer from private to public practice, and COVID-19 testing.

5. Conclusion

The impact of all of these changes on education is undeniable. The results of our survey indicate that there is global interest in surgical simulation, but not yet consistent access. These preliminary data indicate the possibility of disparities between developed and developing countries in providing trainees with simulation, which may be a key component of surgical training in the coming post-COVID era. While the operating room has traditionally been the surgeon's classroom, supplements and surrogates to traditional operative education must be created by necessity. The COVID-19 crisis will require current and future otolaryngologists to maintain both subspecialty expertise and general medical relevance. As a global community, we must create an educational infrastructure that rises to this challenge, adapting to an ever-changing world. This may take the form of an online platform of simulation exercises that would be easily accessible—ideally with minimal hardware and software requirements—and with options for use in several languages. While domestic efforts for online education are growing, these may not be as useable by those in the countries most impacted by educational disparities. Thus, global solutions must be uniquely suited to this challenge rather than a one-size-fits-all approach.

Declaration of competing interest

None.

Acknowledgments

Author TM acknowledges the generous support of the T32DC015209 training grant from the National Institutes of Health/National Institute on Deafness and Other Communication Disorders.

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