Evolving Phenotype of the Head and Neck Surgeon

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Objective: Characterize the evolution of head and neck (H&N) surgical practices in the United States over two decades by using resident case log data as a surrogate.

Methods: National residency case log data from all Accreditation Council for Graduate Medical Education-accredited otolaryngology residency programs was reviewed for the past 20 academic years (1996–2015). Key indicator procedures in each subcategory of H&N were analyzed to characterize standard ablative H&N surgical practices. Mean number of cases completed per resident each year was calculated.

Results: The proportion of H&N surgeries contributing to the total number of otolaryngology cases performed yearly remained relatively stable during the study period, ranging from 6.4% to 8.7%, indicating concurrent growth of H&N cases with all otolaryngology surgeries. Although each subcategory within H&N demonstrated modest increases in the number of cases performed per resident each year over the study period, the most significant growth occurred in the endocrine surgery subcategory: a 288% increase from 18.4 in 1996 to 71.5 in 2015. The proportion of H&N cases represented by each subcategory decreased, except for endocrine, which more than doubled in proportion from 21% in 1996 to 43% in 2015.

Conclusion: Our findings suggest that the modern H&N surgeon is increasingly becoming an endocrine and H&N surgeon. The proportion of endocrine surgeries performed in residency, which serves as a surrogate for H&N practices, has more than doubled over the past 20 years and now represents the largest subcategory of H&N surgery.

Key Words: Endocrine surgery, thyroidectomy, parathyroidectomy, head and neck surgery.

Level of Evidence: NA

INTRODUCTION

Over the past 25 years, there has been a trend toward organ-sparing, nonoperative management of head and neck cancers, particularly at certain subsites. Beginning in 1991, the U.S. Department of Veterans Affairs study for treatment of advanced laryngeal cancer revealed induction chemotherapy followed by radiation therapy (RT) can be effective in preserving the larynx in a high percentage of patients without compromising overall survival when compared to surgery followed by adjuvant RT. A few years later in 1996, the European Organization for Research and Treatment of Cancer trial reported similar findings of equivalent survival rates and laryngeal preservation when comparing operative and nonoperative management of hypopharyngeal cancers. Nonoperative management of laryngeal cancers was further strengthened in 2003 with the Radiation Therapy Oncology Group 91-11 trial, which revealed improved laryngeal preservation and locoregional control with concurrent chemotherapy and RT compared to induction chemotherapy followed by RT and RT alone. Bolstering the trend started by these landmark trials has been the rising incidence of human papilloma virus (+HPV)-related oropharyngeal carcinomas, which display increased sensitivity to concurrent chemotherapy and RT; and advances in intensity-modulated RT, which have allowed for the delivery of higher doses of RT with less toxicity.

Concurrent with this trend toward nonoperative management of head and neck (H&N) cancers has been the growth of endocrine surgery within the field of otolaryngology. Graduating otolaryngology residents are now performing 87% and 28% more thyroidectomy and parathyroidectomy surgeries, respectively, compared to graduating general surgery residents. And in addition to operating more, otolaryngologists are also contributing a growing proportion of publications compared to general surgeons for both thyroid and parathyroid surgery.

Considering these two simultaneous phenomena, our hypothesis is that H&N surgeons are now performing fewer procedures for laryngeal, hypopharyngeal, and oropharyngeal cancers, while increasingly performing more thyroid and parathyroid surgeries. The objective of this study is therefore to characterize the evolution of the H&N surgical practices in the United States over the past two decades by using resident case log data as a surrogate.

MATERIALS AND METHODS

After approval was obtained by the institutional review board at the Augusta University Medical Center, Augusta, Georgia, a cross-sectional analysis was performed of the national...
residency case log data from all Accreditation Council for Graduate Medical Education (ACGME)-accredited otolaryngology–H&N surgery residency programs over the past 20 years (1996–2015). Otolaryngology residency case log data is divided into four main categories of surgical procedures: H&N, otology/audiology, facial plastics/reconstructive surgery, and general/pediatrics. Our attention was focused on the H&N category for purposes of this article.

The H&N category is further divided into nine subcategories: salivary glands, nose/maxilla, lips, oral cavity, ear, neck, endocrine, pharynx/esophagus, and larynx/trachea. Within each subcategory, the Residency Review Committee has identified representative surgical procedures to track. We then selected those procedures within each subcategory that best characterized the standard ablative H&N surgical practice in the United States and omitted those procedures that are often performed as complementary to primary ablative surgeries (e.g., tracheotomy, tracheoesophageal puncture, cricopharyngeal myotomy, repair pharynx or cervical esophagus, sentinel node biopsy, neck dissection, and major vessel ligation) or had substantially crossed over into other subspecialty fields of otolaryngology since the original classification (e.g., tracheal resection, tracheal repair, thyrotomy, and drainage of deep space neck abscess). Lastly, subcategories with small numbers were combined to facilitate comparison (e.g., nose/maxilla with lips and larynx/trachea with pharynx/esophagus).

A complete list of the subcategories within H&N and their selected procedures is shown in Figure 1. With this categorization of procedures established, the mean number of surgical cases completed per graduating resident each academic year was then calculated. In 2004 to 2005, the custodian of resident case log data changed from the American Board of Otolaryngology (ABO) to the ACGME, which resulted in slight changes to surgical case coding and classification of subcategories within H&N. Where applicable, any identified ablative procedures that changed classification were maintained in their original subcategory.

Permission to analyze the de-identified resident case logs was sought and granted by the ABO and the ACGME.

RESULTS

The number of residents per year from which data was compiled ranged from 255 to 309, and the number of resident training programs during the study period ranged from 99 to 104 (data not available before 2005) (Fig. 2). The overall number of surgeries performed by

Fig. 1. Head and neck surgical subcategories.

Fig. 2. Number of residents completing training and number of resident training programs by year. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]
each graduating otolaryngology resident has steadily grown from 1,029 in 1996 to 1,945 in 2015. The proportion of H&N surgeries contributing to the total number of otolaryngology cases performed remained relatively stable during this time, ranging from 6.4% to 8.7% (Fig. 3). This reveals growth of H&N surgical cases that was concurrent with the growth of all otolaryngology surgeries during the study period.

Although each subcategory within H&N demonstrated modest increases in the number of cases performed per resident over the 20-year study period, the most significant growth occurred in endocrine surgery, in which there was a 288% increase from 18.4 surgeries per resident in 1996 to 71.5 surgeries per resident in 2015 (Fig. 4). Consequently, the proportion of H&N cases represented by each of the subcategories decreased, with the exception of endocrine, which more than doubled from 21% in 1996 to 43% in 2015 (Fig. 5). Considering exclusively the endocrine subcategory, the mean number of thyroidectomy surgeries performed by graduating residents increased from 16.5 in 1996 to 55.2 in 2015 (235% increase), and parathyroid surgeries increased from 2.0 in 1996 to 16.3 in 2015 (715% increase) (Fig. 6).

**DISCUSSION**

There has been a profound trend toward nonsurgical management of H&N cancers at certain subsites over the past 20 years. Despite the introduction of less-invasive, organ-sparing transoral endoscopic and robotic surgical techniques during this time period, there has been a continued increase in the utilization of chemotherapy/RT for primary treatment of H&N cancers. Concurrent with this trend has been the growth of endocrine surgery within the field of otolaryngology. Otolaryngology residents now perform more than double the number of thyroid and parathyroid surgeries undertaken by general surgery residents. As a result of this evolution, it has
been recommended that general surgery residents seek fellowship training to stay competitive within the field of endocrine surgery.\(^7\) Given these two simultaneous trends, our hypothesis was that H&N surgical practices in the United States have increasingly become dominated by endocrine surgery.

Our data shows that the number of surgical cases being performed by residents has grown proportionately with the increase in number of all otolaryngology surgeries over the past 20 years. Interestingly, despite resident work-hour restrictions introduced in 2003, this means that overall surgical volumes have increased, including all H&N procedures. During the study period, endocrine surgery manifested the greatest growth within H&N (288%) and was the only subcategory to grow (more than doubled) in the relative proportion of cases, contributing to the overall number of H&N surgeries performed.

There was not an obvious decline in laryngectomies for laryngeal and hypopharyngeal cancers, as might have been predicted. This is likely reflective of the fact that residency case log data before 1996 was not archived for review, which is well after the first landmark paper for nonoperative laryngeal preservation was published in 1991. Similarly, the effect of nonoperative management of oropharyngeal cancers as the result of the rising incidence of +HPV-related SCC at this subsite may not have been entirely evident due to the nature of case logging restraints for residents. Radical tonsillectomy and transoral robotic surgery tonsillectomy cannot currently be distinguished from standard tonsillectomy in resident case logs, nor can transoral lingual tonsillectomy or base-of-tongue excisions be differentiated from standard tonsillectomy or other glossectomy procedures, respectively.

![Fig. 5. Proportion of head and neck cases by subcategory. H&N = head and neck.](www.laryngoscope.com]

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![Fig. 6. Endocrine surgical cases. H&N = head and neck.](www.laryngoscope.com]

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Limitations of this study include the retrospective design, lack of archived resident case log data before 1996, evolving resident logging practices during the study period (e.g., new codes, bundling and unbundling of cases), advanced disease and nonsurgical candidate referral bias to tertiary medical centers, and the change in custodian of resident case log data from the ABO to the ACGME in 2004 to 2005. Head and neck fellowship surgical case logs would represent a more suitable surrogate for H&N surgical practices; however, there is no systematic acquisition of this data. Despite these limitations, this study is the first of its kind to characterize the evolving practice of H&N surgery in the United States utilizing resident case log data as a surrogate. Further research will be needed as H&N surgical practices continue to evolve over time, especially with regard to endocrine surgery considering the growing literature supporting the safety of observing low-risk micropapillary thyroid carcinomas and recent changes to guidelines in the workup and management of thyroid nodules. The later will likely result in a decreased frequency of screening ultrasounds and fine needle aspirations, possibly leading to fewer thyroidectomies being performed.

CONCLUSION

The modern H&N surgeon is increasingly becoming an endocrine and H&N surgeon. Thyroid and parathyroid operations account for a proportion of H&N surgeries undertaken in otolaryngology residency that has more than doubled over the past 20 years. Endocrine procedures now represent the largest subcategory of H&N surgeries being performed.

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