Published in final edited form as:

JAMA Otolaryngol Head Neck Surg. 2016 December 01; 142(12): 1233–1236. doi:10.1001/jamaoto.2016.3620.

Transforming Head and Neck Surgeon Into Thyroid Expert The 2016 Hayes Martin Lecture

Ashok R. Shaha, MD

Memorial Sloan Kettering Cancer Center, New York, New York

Abstract

With the rapid rise in the incidence of thyroid cancer, the number of thyroidectomies has increased remarkably in the last 10 years. Thyroidectomy accounts for approximately 40% of the workload in head and neck fellowship. The decision making in thyroid surgery is quite complex, especially when patients present with recurrent or advanced thyroid cancer. The complications of thyroid surgery can be very serious in relation to quality of life. Some of these complications can be avoided with meticulous surgical technique. Thyroid surgery continues to span various specialties, and surgical volume continues to be an important parameter in outcomes. Technological advances have made a significant impact in thyroid surgery; however, these need to be carefully evaluated before their routine implementation and for extracervical approaches to thyroidectomy. The use of external radiation therapy and targeted therapies has expanded in recent years for patients with recurrent thyroid cancer. In a specialized and tertiary care center, the thyroid expert should be well-trained to make appropriate complex decisions. Thyroid experts should be part of the multidisciplinary team managing thyroid cancer from A to Z.

It is a great honor for me to serve as the Hayes Martin lecturer. This represents the pinnacle of my academic career, and I am extremely thankful to Dr Dennis Kraus for his kindness and confidence in asking me to deliver this prestigious lecture. Since approximately 4 years ago, when Dr Kraus first mentioned this to me, I have been thinking about a topic for the lecture, and believe it or not, I have gone through at least 25 different possibilities. After considerable thought, I realized that any eponymous lecture should be of general interest and appeal to as many people as possible. If I were to choose a complex subject for this lecture, I am sure that the majority of people in attendance would either be sleeping during the talk or texting on their iPhones. I also felt very strongly that my talk should honor the legacy of Hayes Martin. Dr Martin's greatest legacy is his outstanding surgical technique, his determined leadership, and his exceptional teaching. Dr Martin trained a great number of head and neck surgeons around the world, and he is generally considered the father of modern head and neck surgery in the United States. I am also honored to be included among the list of the many outstanding head and neck surgeons who have delivered this lecture.¹

Corresponding Author: Ashok R. Shaha, MD, FACS, Department of Surgery, Memorial Sloan Kettering Cancer Center, 1275 York Ave, New York, NY 10065 (shahaa@mskcc.org).

Conflict of Interest Disclosures: The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Previous Presentation: This study was presented at the American Head & Neck Society Ninth International Conference on Head and Neck Cancer; Seattle, Washington; July 17, 2016.

This is the 45th Hayes Martin lecture, since its beginning in 1972, with William MacComb. The former speakers comprise a who's who of head and neck surgeons. Personally, I feel I have deep roots with Hayes Martin, starting from Elliot Strong and Ronald Spiro, to Jatin Shah, and now myself.

Over the years, the field of head and neck surgery has expanded in both clinical practice and fellowship training and now spans head and neck ablative surgery; reconstructive surgery; skull base surgery; endoscopic surgery; microvascular surgery; laryngology; skin cancer, melanoma, and oropharyngeal cancer treatment; and robotics and minimally invasive surgery. Endocrine surgery now accounts for a bulk of the surgical procedures in the head and neck surgeon's practice. Interestingly, at Memorial Hospital, the number of thyroidectomies performed has increased by almost 60% in the last 10 years, now accounting for 40% of the workload on the Head and Neck Service.

Hayes Martin and Surgery of Head and Neck Tumors

In 1957, Dr Martin wrote one of the most important books in head and neck tumor surgery: *Surgery of Head and Neck Tumors*.² I recently became interested in reviewing his recommendations on thyroid cancer, and, interestingly, he shows a double trifurcate incision for neck dissection. For thyroid cancer, radical neck dissection was commonly used then. But, over time, it came to be realized that there is rarely a reason to consider radical neck dissection for well-differentiated thyroid cancer. Additionally, there are 2 interesting figures in his chapter on thyroid cancer—one showing resection of the tumor adherent to the cricoid cartilage with a cricotracheal window, and another showing difficulty in reconstructing this defect and making a tracheocutaneous fistula by suturing the skin to the tracheal opening. This was clearly an innovative thought, and it just shows how difficult it was, at one time, to unite radical surgery and reconstruction. Since then, we have made enormous progress in the field of thyroid surgery, starting from the Kocher approach of standard thyroidectomy to the most recent robotic approaches led by Woong Youn Chung from South Korea.³ In the face of the changing presentations and increasing incidence of head and neck cancers—and, in particular, thyroid cancers—these technological advances represent significant and greatly welcome additions to the head and neck surgeon's armamentarium.

The Epidemiology of Thyroid Cancer

We are clearly experiencing an epidemic of thyroid cancer.^{4,5} And it is not just the United States where we are seeing this rising incidence—the increase appears to be worldwide. The overall incidence of thyroid cancer in the United States, in the general population, is 5% to 6%. By calculation, that means approximately 20 million individuals in the United States harbor microscopic thyroid cancer. According to studies reported from South Korea, the incidence of thyroid cancer there has increased almost 15-fold in the last 10 years, with more and more surgeries being performed for microcarcinomas.

We can draw a direct analogy to prostate cancer here. The majority of these thyroid tumors are silent. In recent clinical practice, routine imaging studies—such as ultrasound, computed tomography scan, magnetic resonance imaging, and positron emission tomography scan—

have identified these microcarcinomas. Once an imaging study shows a thyroid nodule, there is a general tendency to consider needle biopsy; however, recent guidelines from the American Thyroid Association (ATA) suggest avoiding needle biopsy for lesions smaller than 1.5 cm, unless there are strong indications to perform one.

Observation of papillary microcarcinomas remains a popular choice, and it has been used as the defined practice for a large number of patients in Japan.⁶ Obviously, the idea of observation does not translate to neglecting the patient—rather, it involves carefully observing the patient in a system of close surveillance—essentially, it amounts to a deferred intervention.

There is some concern about the use of the term “microcarcinoma” when talking about these lesions, and there appears to be interest in changing the term to “papillary microtumor” or “IDLE (indolent lesion of epithelial origin).” Regardless, it is clear that there needs to be more public education about these tumors, and it would be appropriate to avoid routine investigations of the thyroid unless clinical evaluation uncovers strong reasons to do so. Interestingly, in 2014, the physician coalition group published recommendations opposing the routine screening of the thyroid with ultrasound, which had been common practice before. This resulted in a considerable reduction of thyroidectomies the following year.⁷ Needless to say, this will continue to generate considerable debate and political discussion.

At Memorial Sloan Kettering, we divide thyroid cancer into the good, the bad, and the ugly, with respective survivals of 99%, 85%, and 57%.⁸ Taken one step further, this allows us to focus our attention and expertise on high-risk patients with thyroid cancer, such as those with gross extrathyroid extension and involvement of the surrounding tissues, trachea, esophagus, and recurrent laryngeal nerve—and allows us to avoid investing time and resources in pursuit of cases that are often indolent or of low to no risk.

Why the Need for Expertise?

One might wonder why we need to discuss the training of a head and neck surgeon for expertise in the treatment of thyroid malignancies. Primarily, and perhaps most importantly, the incidence of thyroid cancer has for some time been increasing in the United States, as mentioned above. In fact, it has almost quadrupled during the last quarter of a century. Approximately 120 000 thyroidectomies are performed yearly in the United States, and it is estimated that, by the year 2020, that number will approach 200 000.⁹

Concomitant with this increase in incidence, the number of surgical procedures performed in the field of thyroid surgery has grown remarkably over the last few years. The average chief resident applying for board examination in the field of general surgery will have experience with approximately 20 surgical procedures, whereas the average otolaryngology chief resident will have experience with approximately 50.⁹ This requires a major paradigm shift in the training of thyroid surgery.

Although most otolaryngologists are board certified in Otolaryngology–Head and Neck Surgery, many such individuals have limited experience with and may not sufficiently understand the complexities and controversies involved in the management of thyroid cancer

—and they likely are not fully familiar with risk group stratification and the biology of thyroid cancer.³ The recent ATA guidelines are a classical example of how knowledge of the biology of the tumor can be used to guide clinical practice and to determine the extent of surgery, thereby avoiding treatment-related medical and surgical complications. Yet these individuals stand at the doorstep of the evaluation of thyroid nodules and incidentalomas.

Thyroid surgery is also performed by surgical oncologists; however, their experience is often quite limited in this regard. Most surgical oncologists performing thyroid surgery are well-trained oncologic surgeons. Still, their understanding of and experience with vocal cord evaluation, neck dissection, and tracheal resection is generally limited. Their understanding of the biology of thyroid cancer itself may not be complete.

Well-trained endocrine surgeons from a general surgery background are fully trained, with special expertise and training in endocrine surgery. They are well-recognized specialists, and many general surgery departments are currently expanding their endocrine surgery divisions. However, since the fellowship started in 2005 and the match for endocrine surgery started in 2009, there are a limited number of such surgeons around the country. And, again, unless they have had dedicated experience during their fellowships, they may be deficient in vocal cord evaluation, neck dissection, and tracheal resection.

A well-trained head and neck surgeon may come from a general surgery background or an otolaryngology background and will have a thorough understanding of the biology of thyroid cancer. They will have experience treating all forms of malignancies of the head and neck and will be proficient with vocal cord evaluation, neck dissection, and management of the trachea. At present, individuals from various disciplines participate in the care of patients with thyroid cancer, and there continues to be friction regarding who should perform thyroid surgery.

It should not be overlooked that the complications of thyroid surgery can be very serious—even disastrous. Most thyroid surgery for low-risk thyroid cancer involves a standard surgical procedure; however, complex thyroid surgical procedures can be very difficult to undertake, and successful outcomes of thyroid cancer treatment are directly related to appropriate and adequate surgery, especially in patients with extra thyroidal extension or recurrent thyroid cancer.

Interestingly, John Lore Jr presented his concerns about “dabbling” in head and neck oncology to this organization and, furthermore, made a plea for additional qualifications.¹⁰ He called individuals with a superficial interest in the management of head and neck tumors “dabblers.” Indeed, the surgeon undertaking the treatment of thyroid cancer should take it “from A to Z.” It is not appropriate to “dabble” in the patient’s care and, at some later point, refer the patient somewhere else. The care of a patient should be individualized, personalized, and precise.

Unequivocally, success in thyroid surgery depends on surgical volume.¹¹ A large number of papers have been published on the subject of complications and issues related to low- and high-volume surgeons. The definitions of “low-volume” and “high-volume” remain in dispute, as does the number of surgical procedures considered “adequate.” But, generally

speaking, 30 procedures per year is often considered an adequate number. Individuals who perform fewer procedures may be called “dabblers,” just as John Lore Jr mentioned.¹⁰

Understanding the influence that low- vs high-volume institutions and procedure complexity have on outcomes is of utmost importance, since we now know that the complications of thyroid surgery are inversely proportional to the experience of the operating surgeon and directly proportional to the extent of thyroidectomy. With regard to surgical extent, the famous statement by Blake Cady remains true: “Let the punishment fit the crime.”¹²

We can arrive, then, at the acknowledgment that there are certain critical aspects of thyroid surgery and the ideal thyroid surgeon. These include the ability to manage complex cases, recurrences, and inadvertent and expected complications, as well as the possession of an understanding of the implications of adjuvant treatments and their indications. The ideal thyroid surgeon should be equipped to oversee the treatment of these often complex patients from beginning to end. The modern-day thyroid surgeon should be an expert not only in thyroid surgical procedures, including the technological advances in the field, but should also be a surgeon-scientist, a teacher, a leader, and a researcher.³

History of Thyroid Surgical Training

The Society of Surgical Oncology, which was initially known as the James Ewing Society, was formed in 1940; the name was changed to the Society of Surgical Oncology in 1975.¹³ The majority of thyroid surgeons have traditionally belonged to this organization. The Society of Head and Neck Surgeons was founded in 1952, and the American Society for Head and Neck Surgery—a competing society, favored primarily by “the young Turks” in otolaryngology—was founded in 1958.¹⁴ The fellowship in head and neck surgery was started in 1975 under the leadership of John Lore Jr. The initial certifying body was called the Joint Training Council; subsequently its name was changed to the Advanced Training Council in Head and Neck Oncology. Over the years, thyroid surgery has been dominated by general surgeons, and, as mentioned above, there has always been a dispute and a rivalry regarding who would perform thyroid surgery. The majority of otolaryngology programs were divisions of general surgery, and general surgery retained thyroid surgery in its department; however, over a period of time, the otolaryngologists became actively involved in head and neck surgery and, subsequently, in thyroid surgery. Over the years, a large number of otolaryngologists have progressed from head and neck fellowship training to otolaryngology and head and neck surgical training. Recently, the Advanced Training Council and American Head and Neck Society have also developed a certification in endocrine surgery of the head and neck, with dedicated and devoted training programs in thyroid surgery. The American Association of Endocrine Surgeons, which was primarily formed through general surgery, was established in 1979, with their fellowship starting in 2005. The 2 competing organizations in head and neck surgery, The Society of Head and Neck Surgeons and the American Society for Head and Neck Surgery, were combined in 1998 to form the unified American Head and Neck Society.¹⁵ Several members of the American Head and Neck Society have been actively involved in the training council, including John Lore Jr, Helmuth Goepfert, Jatin Shah, Paul Levine, Henry Hoffman, William Lydiatt, Ara Chalian, and myself. The majority of head and neck surgeons are

actively involved in thyroid surgery. At present, there are 35 programs, with 49 positions in head and neck surgery. The American Association of Endocrine Surgeons has 23 programs, with 25 positions.

Training a Thyroid Expert

Generally speaking, progress in medicine occurs by improving our understanding of the disease process through clinical and laboratory research and by developing and applying new technologies. The training of expert thyroid surgeons should establish a core knowledge of anatomy, pathology, and biology. Clinical expertise should encompass preoperative evaluation, diagnostic workup, and an understanding of prognostic factors and risk group analysis (Box). Surgical expertise should include judicious application of newer technologies, such as nerve monitors and harmonics, as well as proficiency with endoscopic and robotic techniques. Although postoperative care is generally delivered by endocrinologists, the well-trained thyroid surgeon should be conversant in the rationale of the follow-up, as well as the indications for radioactive iodine and targeted therapies.

Box

Essentials of Training of a Thyroid Surgeon

Core Knowledge

- Anatomy, pathology, biology

Clinical Expertise

- Preoperative evaluation
- Diagnostic work-up
- Understanding the prognostic factors and risk groups

Surgical Expertise

- Management of locally aggressive thyroid cancer
- Judicious application of newer technologies
- Proficiency with nerve monitors, harmonics, endoscopic and robotics

Postoperative Care and Follow-up

- Evaluating the need for adjuvant treatment
- Follow-up for recurrence
 - Biochemical
 - Imaging
 - Working with endocrinologist and multidisciplinary team

The thyroid fellowship should also include training in thyroid sonography. Once training is complete, it would be ideal for individuals devoting their careers to thyroid surgery to

robustly study ultrasound, ultrasound-guided needle biopsy, the pathology of thyroid tumors, and the endocrine aspects of thyroid cancer. Candidates should visit 3 or 4 well-established thyroid centers to learn the organization of the endocrine service and the application of ultrasound in day-to-day practice. They should perform an individual audit of surgical procedures to ensure awareness and proficiency. A dedicated rotation in radiology would be an ideal platform from which to gain fluency with ultrasound, endocrinology, and pathology. In addition, such individuals should get actively involved in the major national organizations, such as the American College of Surgeons, American Academy of Otolaryngology–Head and Neck Surgery, American Head & Neck Society, Triological Society, American Association of Endocrine Surgeons, and International Association of Endocrine Surgeons.

On the institutional level, specialists in thyroid malignancies should regularly attend endocrine conferences and thyroid tumor boards. If possible, they should seek out dedicated and devoted mentors, on both the national and international levels, to help foster an understanding of the variances in the management of thyroid cancer across the globe. Substantial time should be devoted to clinical research, including case reports, retrospective studies, and basic science studies. The SEER and the National Cancer databases contain copious data that aspiring experts in thyroid cancer should become familiar with and use in their investigations.^{16,17}

In even greater detail, the future of training surgeons to meet the expectations of thyroid cancer treatment was described by Harness et al¹⁸ in their 2000 paper “Future of thyroid surgery and training surgeons to meet the expectations of 2000 and beyond.” Init, the authors identify the key step of developing thyroid centers of excellence, which will serve to increase efficiency and quality of care, decrease costs, encourage a more individualized approach to thyroid surgery, lower complication rates, and drive innovation in technology and disease management. And, as identified by Harness et al, dedicated fellowships in thyroid and endocrine surgery and hands-on involvement in a wide range of research endeavors remain the best means of developing the next generation of thyroid surgeon-scientists.

Technology has clearly made a major impact on thyroid surgery, and a well-trained thyroid surgeon should understand the applications of technology, including endoscopic and robotic thyroid surgery. Endoscopic and robotic thyroid surgery has generated considerable debate as it is now commonly used in Korea and Japan.^{19,20} Its application in the United States appears to be quite limited, as very few centers have expertise in robotic thyroid surgery. Obviously, a well-trained thyroid surgeon should be familiar with the limitations, the pros and cons, and the complications of robotic thyroid surgery.

Training Outside of the United States

Thyroid surgery outside of the United States is still dominated by general surgeons; however, there seems to be considerable interest in thyroid surgery from head and neck surgeons abroad. To improve their expertise in thyroid cancer management, international head and neck surgeons should work with general practitioners and endocrinologists to gain

a better understanding of the management of patients with complex thyroid cancers, especially those with recurrent disease and locally aggressive and advance thyroid cancer. In addition, they should seek out the other parties directly involved in the management of thyroid cancer. It is crucial that centers of excellence be developed in these countries, with the thyroid surgeon as the leader of the thyroid cancer treatment team. And, of course, these surgeons should establish close working relationships with their colleagues in radiology, pathology, endocrinology, nuclear medicine, and radiation oncology.

Any center of excellence in the United States should actively pursue international fellowships for candidates from different parts of the world, who will emerge well-trained and able to serve as messengers of the current state of clinical practice, with the hope of standardizing thyroid surgery globally.

The path to expertise in thyroid cancer surgery is, in truth, no different from that of any other subspecialty: work hard, be honest, be humble, have a great attitude, and enjoy the work. The goal of this journey should be to make thyroid surgery your hobby or passion, rather than seeing it as a chore. The result of dedicated training in thyroid and endocrine surgery will be a new expertise in the management of thyroid cancer from A to Z, with demonstrated expertise in all aspects of the disease and all implications of treatment.

References

1. Shah, JP., Patel, SG., Singh, B. Jatin Shah's Head and Neck Surgery and Oncology. 4. Elsevier; Philadelphia, PA: 2012.
2. Martin, HE. Surgery of Head and Neck Tumors. Hoeber-Harper; New York, NY: 1957.
3. Shaha AR. Training of a thyroid surgeon: from scalpel to robot. *Surgery*. 2012; 152(6):943–952. [PubMed: 23158169]
4. Davies L, Welch HG. Increasing incidence of thyroid cancer in the United States, 1973–2002. *JAMA*. 2006; 295(18):2164–2167. [PubMed: 16684987]
5. Davies L, Welch HG. Current thyroid cancer trends in the United States. *JAMA Otolaryngol Head Neck Surg*. 2014; 140(4):317–322. [PubMed: 24557566]
6. Ito Y, Miyauchi A, Inoue H, et al. An observational trial for papillary thyroid microcarcinoma in Japanese patients. *World J Surg*. 2010; 34(1):28–35. [PubMed: 20020290]
7. Ahn HS, Welch HG. South Korea's thyroid-cancer "epidemic"—turning the tide. *N Engl J Med*. 2015; 373(24):2389–2390. [PubMed: 26650173]
8. Shaha AR. Implications of prognostic factors and risk groups in the management of differentiated thyroid cancer. *Laryngoscope*. 2004; 114(3):393–402. [PubMed: 15091208]
9. Zarebczan B, McDonald R, Rajamanickam V, Levenson G, Chen H, Sippel RS. Training our future endocrine surgeons: a look at the endocrine surgery operative experience of U.S. surgical residents. *Surgery*. 2010; 148(6):1075–1080. [PubMed: 21134536]
10. Loré JM Jr. Dabbling in head and neck oncology (a plea for added qualifications). *Arch Otolaryngol Head Neck Surg*. 1987; 113(11):1165–1168. [PubMed: 3663342]
11. Sosa JA, Bowman HM, Tielsch JM, Powe NR, Gordon TA, Udelsman R. The importance of surgeon experience for clinical and economic outcomes from thyroidectomy. *Ann Surg*. 1998; 228(3):320–330. [PubMed: 9742915]
12. Cady, B. Keynote lecture at the Interdisciplinary Conference of Mammography Education, Inc; Scottsdale, Arizona. November 10–13, 2004;
13. Shah JP. Hayes Martin lecture. The making of a specialty. *Am J Surg*. 1998; 176(5):398–403. [PubMed: 9874421]

14. Shah JP. The making of a head and neck surgeon. *Am J Surg*. 1991; 162(4):284–287. [PubMed: 1951877]
15. Shaha AR. Birth of a new society: American Head and Neck Society challenges for the future. *Arch Otolaryngol Head Neck Surg*. 2000; 126(3):274–280. [PubMed: 10721997]
16. National Cancer Institute Surveillance, Epidemiology, and End Results Program. [Accessed October 18, 2016] SEER Data. 1973–2013. <http://seer.cancer.gov/data/>
17. American College of Surgeons. [Accessed October 18, 2016] National Cancer Database. <https://www.facs.org/quality%20programs/cancer/ncdb>
18. Harness JK. Interdisciplinary care—the future of endocrine surgery. *Surgery*. 2000; 128(6):873–880. [PubMed: 11114618]
19. Lee CR, Chung WY. Robotic surgery for thyroid disease. *Minerva Chir*. 2015; 70(5):331–339. [PubMed: 26149523]
20. Shaha AR. Transaxillary thyroidectomy—a critical appraisal. *J Surg Oncol*. 2015; 111(2):131–132. [PubMed: 25411137]