Three Complex Cases from NYU Langone
Otolaryngology–Head and Neck Surgery 2013
“I go to nature to be soothed and healed, and to have my senses put in order.”

John Burroughs (1837–1921)
American naturalist and essayist important in the evolution of the U.S. conservation movement. Interestingly, today people seek the expertise of otolaryngologists for some of the same reasons.
Letter from the Chair

In the following pages, you will find three complex cases that illustrate how our multidisciplinary teams work together to diagnose, treat, and rehabilitate patients. Although our department is advancing the field of otolaryngology on numerous fronts, these cases, along with a selection of recent research highlights, were chosen to represent how insight and innovation can push the boundaries of research and care.

The advent of cochlear implantation in the early 1970s restored functional hearing to more than 219,000 individuals across the globe, but not every patient with hearing loss is an appropriate candidate or will do well with the device over the long term. Our first case highlights how auditory brainstem implants provided another option for one of our pediatric patients.

The second case focuses on a patient for whom time constraints and voice preservation were critical considerations due to his profession and the vocal demands associated with it. It highlights successful voice restoration strategies involving a time-saving in-office biopsy, surgical resection of an early-stage laryngeal cancer with the CO2 laser, and an intensive program of voice therapy and retraining.

Patients with congenital anterior glottic web may never speak. Our third case illustrates how vocalization has been restored for a young child. Techniques involved endoscopic division of the laryngeal web, balloon dilation, and the application of topical mitomycin to reduce both scarring and the likelihood of recurrence.

Beyond our core program, our humanitarian missions provide an opportunity to extend our reach and work alongside colleagues from around the globe. We are proud of the work we are performing domestically as well as internationally, and we are truly inspired by our patients and their caregivers. Lastly, our expanding research program, now ranked in the top 10 in the United States in NIH funding, continues translational work that contributes to new therapies and advancements in the understanding of the afflictions of communication and the head and neck.

J. Thomas Roland Jr., MD, FACS
Chair, Department of Otolaryngology–Head and Neck Surgery
The Mendik Foundation Professor of Otolaryngology
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Complex Case #1

Novel Use of Auditory Brainstem Implant Provides Option for Pediatric Patient with Hearing Loss

Since the advent of cochlear implantation in the early 1970s, more than 219,000 people around the world have had functional hearing restored. But of course, not every patient with hearing loss is a suitable candidate for a cochlear implant or will do well with the device over the long term. For example, a nine-year-old girl who received a cochlear implant in Chicago at age two due to bilateral hearing loss. She eventually lost hearing capacity with the device due to a cochlea that had become severely ossified, and she was experiencing overstimulation of her facial nerves. These problems could not be corrected through revision surgeries or reprogramming of the device.

Until recently, little could be done for a patient who had a failed cochlear implant surgery. Such patients and their families were often told that their only option was to learn sign language and continue intensive speech reading training.

But NYU Langone is one of a select group of institutions in the United States that can restore hearing for many of these patients with the off-label use of an auditory brainstem implant (ABI)—a complex electronic device with a small, rectangular Silastic® paddle with 21 contacts originally developed for adults with neurofibromatosis type 2 (NF2).

As the nation’s second-largest center for the treatment of NF2, we offer innovative medical and surgical therapy for patients afflicted with this genetic disease. Additionally, we are one of the most active clinical- and research-oriented cochlear implant and ABI programs. Leveraging this experience, a multidisciplinary team of neurotologists, neurosurgeons, and audiologists at NYU Langone has already implanted these devices in three children.

Outcome

The young girl received her ABI when she was ten in 2013. The initial activation of the implant was performed a month after surgery. Now, several months out, she is consistently developing more auditory capacity. She is making excellent progress with assistance from intensive auditory and speech therapy
near her home in St. Louis and is now reaching levels of hearing and language that exceeds that achieved with the initial cochlear implant.

NYU Langone neurotologists and neurosurgeons pioneered the minimally invasive surgical techniques for implanting an ABI, which result in quicker healing and less trauma. First, they drill a dime-sized hole behind the mastoid bone and access the auditory system and brainstem. Then, they thread a match-head-sized electrode through the entrance that leads to the fourth ventricle, until it reaches the nucleus of the cochlea. This electrode is then placed on the cochlear nucleus to bypass the cochlear nerve, sending impulses directly to the brain. Soon after implantation, audiologists deliver signals to make sure that only the auditory nerves have been affected and that no nerves were compromised during the surgery.

The patient’s mother communicates with the NYU Langone team on a regular basis to discuss her daughter’s progress and her continued amazement at her daughter’s response to new sounds, such as the clicking of a car’s turn signal.

Buoyed by the success of the off-label procedures, the NYU Langone team is awaiting approval from the U.S. Food and Drug Administration for an investigational device exemption. The team’s clinical trial protocol has tentative institutional review board approval to implant ABIs in 10 pediatric patients with no cochlea or cochlear nerve, and 10 who have failed cochlear implantation, often with severe congenital malformations. The results of this study are expected to help raise the standard of care for many patients previously untreated for hearing loss.
Complex Case #2

In-Office Biopsy Expedites Diagnosis and Treatment of Early-Stage Laryngeal Cancer

A male politician in his 60s with a three-year history of gradual, progressive hoarseness came to NYU Langone’s Voice Center for evaluation in 2012, just before a new campaign. Laryngoscopy revealed a lesion on the superior and medial surfaces of his right true vocal fold, and stroboscopy identified stiffness along the free edge of the right vocal fold. He was a non-smoker who did not regularly consume alcohol.

Due to the rigors of the patient’s campaign schedule, a biopsy was performed in-office under local anesthesia during his initial visit. NYU Langone is one of only a few medical institutions in the country with the experience, expertise, and tools to perform biopsies, augmentations, and other vocal cord procedures in-office saving time and expense. The diagnosis: early-stage laryngeal cancer.

The American Cancer Society estimates that about 12,260 new cases of laryngeal cancer were diagnosed in the United States in 2013. About 60 percent of these tumors originate in the glottis, while about 35 percent develop in the supraglottis. Early-stage laryngeal cancers are typically curable with cold-steel vocal fold surgery, laser surgery, or radiation therapy. Patients are then monitored closely for recurrence. Ninety percent of laryngeal cancers that recur will do so within the first year.

In this patient’s case, voice preservation and time sensitivity were the two most crucial factors affecting treatment decisions. Radiation therapy is often first-line treatment, but involves a six-week course of therapy, which might negatively affect the patient’s campaign activities. Previous research suggests that voice quality is better following radiation than surgery, but refinements in surgical techniques have closed this gap. In addition, surgical resection also avoids the morbidity associated with radiation to the upper airway, including dysphagia. Surgeons can now clearly visualize cancer borders and can therefore remove a smaller piece of laryngeal tissue, minimizing recovery and voice-related side effects. Moreover, if initial radiation fails, follow-up treatment options are limited. Surgery can be followed with additional procedures and/or radiation.

Outcome

This patient underwent surgical resection with a CO2 laser, followed by voice therapy and retraining. The patient remains cancer-free, and has no limitations related to his voice. He did not win the election, but remains active in political life.

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Complex Case #3

Pediatric Otolaryngologists Help Infant with Rare Laryngeal Anomaly to Vocalize

An infant in South America was born with stridor, respiratory distress, and no audible cry. A local pediatric otolaryngologist performed a lifesaving tracheotomy in January 2013. Upon evaluating the newborn’s larynx, the physician diagnosed a congenital anterior glottic web, a rare laryngeal anomaly manifesting as dysphonia and airway obstruction.

Congenital anterior glottic web, a potentially fatal condition if not treated early, is more common outside the United States due to disparities in prenatal screening. The otolaryngologist in South America performed two laryngoscopic procedures in an attempt to divide the web, but neither was successful. Her parents were told that the tracheotomy tube would remain, and that their daughter would never be able to speak as a normal child.

Through online research, the family learned that NYU Langone’s Department of Otolaryngology–Head and Neck Surgery was doing groundbreaking work in this area, and was the first to report on the use of topical mitomycin to decrease scarring of the larynx. Only two-and-a-half months old, the child was brought to us for evaluation by a team of pediatric otolaryngologists, voice specialists, and speech pathologists. The multidisciplinary team performed two endoscopic procedures to divide the laryngeal web, including balloon dilation and the application of mitomycin to reduce the likelihood of recurrence.

The initial procedure was done on an outpatient basis. When the second surgery was performed six weeks later, surgeons found a much-improved airway and vocalization with the tracheotomy tube occluded. They performed another balloon dilation. One week later, the patient was able to maintain an excellent airway with the tracheotomy tube occluded. She was admitted to the hospital in South America six weeks later for the successful removal of the tracheotomy tube.

**Outcome**

Today the patient can vocalize, is in voice therapy and undergoes regular follow-up, both locally and at NYU Langone, to ensure that her airway and vocal folds are healing.
Recent Research Highlights


Leadership

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Richard A. Lebowitz, MD  
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Expertise

Cochlear Implants and Auditory Brainstem Implants  
Facial Plastic and Reconstructive Surgery, Facial Nerve Paralysis Center  
General Otolaryngology and Sleep Surgery  
Head and Neck Surgery and Oncology  
Neurofibromtosis Center  
Pediatric Otolaryngology and Airway Center  
Otolaryngology/Neurotology and Skull Base Surgery  
Rhinology and Sinus, Anterior Skull Base Surgery  
Laryngology, Voice and Swallowing Disorders  
Audiology and Vestibular Center, Speech Pathology

For more information about our programs and expert physicians, please visit www.nyulmc.org/ent.

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