Robert T. Sataloff, MD, DMA, Associate Editor

Intubation Considerations for Singers

Kari Ragan and Kunal Gangopadhyay



Kari Ragan, DMA



Kunal Gangopadhyay, MD, FRCS

Journal of Singing, September/October 2012 Volume 69, No. 1, pp. 43–46 Copyright © 2012 National Association of Teachers of Singing S SINGERS AND TEACHERS OF SINGING who are on the front line of vocal health, it is imperative we make known intubation considerations for the singer. Surgical intubation can be problematic for singers; however, there are pre- and postsurgical strategies that can help to achieve optimal vocal health. First and foremost, singers should educate themselves and have a direct conversation with the anesthesiologist. Additionally, singers should have realistic expectations about the vocal recovery process postsurgery and a reliable team in place. Although there are different concerns with long-term intubation, the purpose of this article is to discuss short-term (less than twenty-four hour) surgical intubation.

WHAT IS INTUBATION?

To begin, it is helpful to understand the particulars of tracheal intubation commonly referred to as intubation. It occurs under deep sedation or general anesthesia to maintain/support the airway and to provide a means for oxygenation (oxygen delivery) and mechanical ventilation.

The most common type of tracheal intubation is intubation by oral route, also known as orotracheal intubation, which is the insertion of a flexible tube through the mouth and larynx (past the vocal folds) into the trachea. An inflatable balloon (cuff) near the end of the tube is then inflated to obtain an air seal to reduce the likelihood of aspiration and for positive pressure ventilation. Orotracheal intubation usually requires the use of a device to visualize the larynx. The most commonly used device is an intubation laryngoscope.

Somewhat less common is tracheal intubation through the nose, also known as nasotracheal intubation. Here the endotracheal tube is passed through the nose and larynx (past the vocal folds) into the trachea. Opinion has varied as to whether a more stable nasotracheal route decreases tube motion and allows less mucosal ulceration in the larynx or if greater endotracheal tube flexibility during orotracheal intubation is less likely to cause laryngeal injury.¹

An alternative to tracheal intubation is placement of SupraGlottic Airway (SGA). The most commonly used SGA is Laryngeal Mask Airway (LMA). LMA uses an inflatable mask and a connecting tube inserted without the help of a laryngoscope into the pharynx. This forms a low pressure seal around the inlet of larynx. Because the tube does not pass through the vocal folds, LMA is less likely to cause vocal dysfunction. However, LMA does not protect the lungs from aspiration and therefore it is unsuitable for patients who are at risk of aspiration.

Kari Ragan and Kunal Gangopadhyay

Since endotracheal intubation has more potential of causing vocal dysfunction, this article will focus on its specific effects on the singer.

CONSIDERATIONS FOR INTUBATION

In most surgeries, it is the anesthesiologist, or in some cases the Certified Registered Nurse Anesthetist (CRNA), who performs intubation and with whom the communication should occur before surgery. In some procedures like surgery of the larynx, the otolaryngologist (ear, nose, and throat surgeon) may intubate the patient. Singers need to know what steps can be taken to prevent trauma to the larynx so that postsurgical vocal function would be normal. One must not underestimate the importance of making it clear in advance of surgery that you are a singer. There are reports of singers going so far as to mark "I'm a singer" on their foreheads with a pen before going under anesthesia. This is especially important when having surgery in which an otolaryngologist is not involved; singers should be particularly communicative with physicians and anesthesiologists who are not specialists in issues of the larynx. In the American system, preanesthesia clinics exist mostly in academic medical centers. In other medical centers or ambulatory surgery centers, singers must ask the surgeon for a referral for preoperative anesthesia consult. Whatever the protocol, make certain to speak with both the surgeon and the anesthesiologist about your vocal health concerns when the operation is being planned and well before the day of surgery. Make assurances that the most experienced person in the room is responsible for the intubation procedure. It is your right to do so.

Important intubation considerations for the anesthesiologist taking care of a singer include size of the tube, good view of the vocal folds (which should be relaxed) during tube placement, minimum attempts at intubation (preferably at first attempt), keeping the cuff pressure to minimum, preventing movement of the tube during surgery and during emergence from anesthesia, and prevention of aspiration in the perioperative period. Unfortunately there are few evidence-based data to support clinical practice.

Tracheal tube size is an easily controllable aspect of tracheal intubation and therefore should be strongly considered. In a 2002 survey of 26 physicians (primarily ENTs), there was a strong consensus (76%) who favored a small endotracheal tube for singers.² The physician author's practice is to use 5.5 mm I.D. (Internal Diameter) endotracheal tube for a woman and 6.0 mm I.D. for a man. Some practitioners use even smaller endotracheal tubes.

The most obvious cause of intubation trauma would be abrasion, which can happen by the contact pressure on the vocal folds or movement of the tube. Furthermore, depending on the length of intubation and other factors, more serious and lasting trauma can result from hematomas, lacerations of the vocal folds, false vocal folds and epiglottis, arytenoid dislocation, granulomas, ulcer, and paralysis of vocal folds. Intubation with direct view of the vocal folds and relaxed vocal folds (by pharmacological paralysis) with minimum number of attempts (preferably at first attempt) are common sense logic to prevent mucosal injury during intubation.

Similarly, prevention of movement of the tube against the larynx during surgery or during emergence from anesthesia would be necessary. Securing the tube well after intubation and avoiding anesthesia getting light during surgery (which might cause the patient to swallow) and possibly keeping the vocal folds relaxed by periodic administration of muscle relaxant (or with continuous infusion of muscle relaxant) would be vitally important. Of course, it depends on what type of surgery one is undergoing, but the more stable the head and neck, the less likely inadvertent motion of the tube would occur.

It is often recommended that the inflation of the cuff of an endotracheal tube should be with a volume that just prevents air leak ("just seal volume"). Excessive cuff pressure will block capillary circulation of the underlying mucosa of larynx and trachea and may lead to tracheal damage, vocal fold dysfunction from recurrent laryngeal nerve injury, and sore throat after surgery.³ Because palpation of the pilot balloon is not a good guide to cuff pressure, use of a monitor to maintain cuff pressure in the range of 25–30 cm of water has been recommended.

Extubation or removal of the tube has its own considerations. Prevention of bucking or coughing before or during extubation is of utmost importance though not always possible. The physician author would try any of the three strategies: deep extubation, deep extubation followed by an LMA placement or intravenous lidocaine immediately before extubation . Because aspiration of stomach contents can occur, it is important that proton pump inhibitors are given preand postoperatively to minimize complications from acid reflux. Issues of aspiration are a primary concern not only because of pneumonia or acute respiratory distress syndrome, but also because aspiration can cause extreme irritation of a larynx already compromised by the intubation procedure.

Advice to Singers Before Surgery

As previously mentioned, talk to the anesthesiologist who would be taking care of you. This could be a face to face or telephonic conversation. Explore alternatives and options for intubation. Some surgeries can be done without a general anesthetic (like under spinal anesthesia), and in some short procedures under general anesthesia it may be possible to use a face mask and avoid endotracheal tube or SGA.

Ask the surgeon if it would be acceptable to start a proton pump inhibitor before surgery and continue for a week after surgery. Over the counter (OTC) omeprazole is a good choice.

In the Operating Room (Per Anesthesiologist)

Considerations:

- 1. Small endotracheal tube; microlaryngoscopy tube (MLT) may be chosen (MLT is longer and has larger cuff).
- 2. Direct visualization of vocal folds during intubation.
- 3. Vocal fold relaxation during intubation (pharmacological paralysis) and keeping the vocal folds relaxed during anesthesia (avoiding light anesthesia, pharmacological paralysis).
- 4. Fixation of the tube and avoiding tube movement against the larynx.
- 5. Avoiding overinflation of cuff.
- 6. Avoiding nitrous oxide (an anesthetic gas) which may diffuse into the cuff that has been inflated with air and increase the volume and pressure within the cuff.
- 7. Intravenous (IV) dexamethasone if not contraindicated, to prevent or minimize vocal fold swelling.
- 8. Smooth extubation : deep extubation/deep extubation + LMA/extubation with IV lidocaine and endotracheal tube untaped before the patient starts

swallowing (untaped tube would allow the tracheal tube to move with larynx during swallowing).

- 9. Liberal IV fluids if not contraindicated.
- 10. Postoperative nausea vomiting (PONV) prevention (pharmacological).

Postoperative:

- 1. Head up position if not contraindicated during recovery from anesthesia.
- 2. Maintenance of hydration and preventing/minimizing nausea/vomiting.
- 3. Continuation of PPI for approximately 7 days.

What the Singer Should Expect Postoperatively

Many postoperative symptoms such as hoarseness, vocal fatigue, throat clearing, globus pharyngeus (lump in the throat), and throat pain mostly subside within 24 hours postextubation.⁴ Furthermore, any acute trauma that occurs during intubation usually subsides within one month after surgery. However, this does not necessarily mean voice function returns to what the professional would consider baseline normal. Under the best of circumstances, most patients experience relatively mild problems following endotracheal intubation. Although the vocal symptoms of short-term intubation can be significant, they often resolve within 12–72 hours. However, for a period of time hoarseness, roughness, a sore throat, and some acoustic changes can be expected.

As the singer begins to vocalize within the weeks after surgery, it is crucial not to inadvertently compensate one's singing technique in response to the perceived vocal and acoustic changes experienced. A trusted voice teacher with close knowledge of the singer's instrument is invaluable during this period. Even better is having a multidisciplinary team in place, including a laryngologist, speech language pathologist (SLP), and a trusted voice teacher already familiar with the singer's voice.

Robert T. Sataloff (MD, DMA, FACS) urges patients experiencing postoperative hoarseness immediately following extubation to seek an otolaryngology consult. This would allow for identification of any problems and immediate intervention if necessary.⁵

As with anything in life, going in with eyes wide open and armed with proper information, a singer should be able to ask the right questions to properly prepare and

Kari Ragan and Kunal Gangopadhyay

protect vocal health. A direct conversation with the surgeon and anesthesiologist appears among the most important steps in preparation for surgery. Although there is always the possibility for problems to occur, having the right team in place beforehand is the singer's best avenue for a positive outcome.

NOTES

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Soprano Kari Ragan holds degrees from Indiana University (BM, MM) and the University of Washington (DMA). Dr. Ragan was the 2012 recipient of the NATS Pedagogy Award and contributed at the 51st Annual Conference on a panel entitled "It Takes A Team: Managing Voice Disorders." Two of her articles were published in 2010: "The Connected Voice Studio" in Journal of Singing and "Intubation Considerations for Singers" in New York Singing Teachers Association VOICEPrints. Also in 2010, Dr. Ragan was awarded NYSTA's Distinguished Voice Professional Certificate, and she joined the University of Washington voice faculty where she teaches Vocal Pedagogy and applied voice, among other courses. Additionally, she has developed and maintained a thriving and collaborative independent voice studio for over twenty-five years. Her interest in voice science, voice pedagogy, and the interdisciplinary aspect of teaching grew exponentially after becoming a NATS member. Although her primary training, performing, and teaching is in the classical genre, she has additionally specialized in CMT (Contemporary Music Theater) pedagogy and as an SVS (Singing Voice Specialist) working closely with the Otolaryngology Department at the University of Washington. She is a frequent performer, adjudicator, and clinician throughout the Pacific Northwest. Dr. Ragan was on the organizing committee of the Northwest Chapter of the Voice Foundation, NYSTA, Northwest Artists, and past board member of the Puget Sound NATS Chapter.

As an active performer she has sung with such companies as Seattle Opera, Spokane Opera, Fort Collins Symphony, Helena Symphony, Washington East Opera, Spokane Symphony, Lyric Opera Northwest, and Opera Idaho, among others. In addition, she is a frequent recitalist, having recently presented a series of recitals throughout the Northwest, with Maestro Dean Williamson at the piano. She has been recognized as the regional finalist for the Metropolitan National Council Competition and the MacCallister Competition.

Kunal Gangopadhyay is a graduate of Calcutta Medical College, India. He did his residency in otolaryngology at Post Graduate Institute of Medical Education and Research, Chandigarh, India, and in United Kingdom where he became Fellow of the Royal College of Surgeons (FRCS), Edinburgh. He was a practicing otolaryngologist and head and neck surgeon with special interest in head and neck cancer, for eight years at King Faisal Specialist Hospital and Research Center, Riyadh, which is the leading tertiary care medical center in the Middle East. Dr. Gangopadhyay then completed a fellowship in laryngology at the University of Washington, Seattle. He has authored many articles for peer reviewed journals in otolaryngology. Subsequently, following a change of interest, he changed his specialty and completed residency in anesthesiology at the same university. He is a practicing anesthesiologist, belonging to the group Physicians Anesthesia Service Inc. in Seattle and works at the Swedish Medical Centers in Seattle area. Having specialized in both otolaryngology and anesthesiology, his special interest is in providing anesthesia care for professional voice users.

Robert T. Sataloff, MD, DMA is Professor and Chairman of the Department of Otolaryngology-Head and Neck Surgery and Senior Associate Dean for Clinical Academic Specialties at Drexel University College of Medicine. He is also on the faculty at Thomas Jefferson University, the University of Pennsylvania, Temple University, and the Academy of Vocal Arts. Dr. Sataloff was conductor of the Thomas Jefferson University Choir and Orchestra for nearly four decades. He is director of The Voice Foundation's annual symposium on Care of the Professional Voice. Dr. Sataloff is also a professional singer and singing teacher. He holds an undergraduate degree from Haverford College in Music Composition, graduated from Jefferson Medical College, received a DMA in Voice Performance from Combs College of Music, and completed his Residency in Otolaryngology-Head and Neck Surgery at the University of Michigan. He also completed a Fellowship in Otology, Neurotology, and Skull Base Surgery at the University of Michigan. Dr. Sataloff is Chairman of the Board of Directors of The Voice Foundation and of the American Institute for Voice and Ear Research. He is Editor-in-Chief of the Journal of Voice, Editor-in-Chief of the Ear, Nose and Throat Journal, an Associate Editor of the Journal of Singing, and on the Editorial Board of Medical Problems of Performing Artists and numerous major otolaryngology journals in the United States. Dr. Sataloff has written over 750 publications, including thirty-nine books. Dr. Sataloff's medical practice is limited to care of the professional voice and to otology/neurotology/ skull base surgery.