The Airway Gazette

Autumn 2020 (Volume 25, #3)

Awake Intubation

The official publication of the Society for Airway Management

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The Airway Gazette is published quarterly each year as follows:

Spring, Summer, Autumn, and Winter.

Papers for Publication

We enthusiastically encourage submissions. Submitted material for publication should conform to published guidelines (please see prior Gazette issues at www.samhq.com).

Please send manuscripts to the Editor-in-Chief by the 15th day of March, June, September, or December (≈45 days prior to issue publication). Authors must give citation to material obtained from other published sources before publication in the Gazette.

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Editorial Expressions

Autumn 2020 issue of The Airway Gazette is presented in portrait orientation with new, improved design, color effects, simple but elegant appearance, and enhanced reading experience. Thank you, Nicole Ludmer, our Design Editor!

The Editorial Board of the Gazette has been expanded to include Dr. Daniel Perin as Associate Editor, Dr. Alexander Bautista as Assistant Editor, and Dr. Narasimhan Jagannathan as Consultant. We have also included Drs. Matthew Gunst and Maged Soliman as Trainee Representatives and Nicole Ludmer as the Design Editor. Dr. Lorraine Foley is the Guest Editor for this issue.

Updates from the Society for Airway Management's headquarters! Dr. Felipe Urdaneta has taken office as the President and Dr. Paul Baker as the President-Elect. Drs. Narasimhan Jagannathan and Richard Galgon have been elected as the Vice President and Treasurer, respectively. Drs. Tracey Straker and Jarrod Mosier have been elected as Members-at-Large.

SAM welcomes its new members and congratulates them on becoming part of a special society determined to advance airway management around the world.

The Gazette has introduced the concept of theme-based articles for its editions. The theme of the current issue is "Awake Intubation." Articles written by world-renowned airway experts include a review of airway anatomy with local anesthetic blocks, considerations in Covid19 patients, and airway management in the emergency department. The question and answer series highlights an interview with the third SAM past president, Dr. Ulrich Braun. We have added an interesting case from the DocMatter forum posted by Dr. Daniel Perin from Brazil. A summary of the discussion has been incorporated. The 5th Ovassapian lecture was presented at the 2020 virtual ASA annual meeting by Dr. Allan Klock. A video link and a summary of the lecture have been included.

The next Gazette issue will expand the theme of awake intubation to include articles about management in pediatric patients, use of ketamine, and question and answer series from an airway expert to name a few. SAM needs support from its members and welcomes them to submit materials for publication in the Gazette. Be sure to check the updated author guidelines at samhq.com from the Winter 2019 issue of the Gazette.

Save the date! The next SAM Annual Scientific Meeting and Workshops will occur on September 23-26, 2021, in Boston, MA, under the leadership of Dr. Tracey Straker as the Program Director. We will include detailed information about the scientific program and others in the following Gazette issues.

Regards,
Praveen Maheshwari, MD
Editor-in-Chief

WELCOME TO THE SOCIETY FOR AIRWAY MANAGEMENT'S NEWEST MEMBERS!

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New Membership Signup

Considerations for Awake Intubation in the Covid19 Patient

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The Covid19 pandemic has changed much in our lives and medical practice. Though some would like to bellow that "everything has changed" and the old rules must be thrown out, the truth is that the past thirty years have seen remarkable changes in the manner in which patient airways are managed and best practices in patient care still ring true. It would be unethical to deny or modify patient care routines for the sake of operator safety when science and experience have proven this unnecessary. Our colleagues in infectious disease have worked diligently to provide the best advice for healthcare worker protection and incorporation of these practices will protect the airway manager. Despite this, it is prudent for us, as a profession, to consider honing our approach to the difficult airway patient so that our decisions and techniques do not compromise, but rather may even complement these efforts.[1]

To this end, I would like to consider what we can do to make awake intubation safer and more convenient for both the operator and the patient. Why focus on awake intubation? Recently, while writing similar guidelines and cautioning that airway manager protection is paramount when an awake intubation patient might cough, a reviewer commented "why would a patient cough? Where is the topical anesthesia?" This comment did not change my position – even in the very best hands, patients may cough during awake

intubation preparation or the awake intubation itself. To deny this is analogous to anesthetizing a patient with a supraglottic airway (SGA) and not keeping a laryngoscope in the room: "what could go wrong?"

Do I need to do awake intubation?

I believe that the most difficult aspect of awake intubation is the decision to do it. Though any single airway finding (suspected difficult intubation, difficult ventilation, aspiration risk, risk of oxyhemoglobin desaturation) might be of significant enough importance to drive an airway operator towards this decision, most patients undergo awake intubation when there is a combination of factors that render airway rescue difficult or hazardous during routine management. Importantly, the decision must be made by the individual charged with airway management. In most cases, awake intubation is chosen when there is a risk of difficult intubation by videolaryngoscopy and/or direct laryngoscopy, and any of the following: risk of difficult ventilation (face mask or supraglottic airway), risk of aspiration, or risk of rapid oxyhemoglobin desaturation.[2] Because each of these factors requires risk assessment based on prior experience and clinical context, a clinician may rightly make radically different determinations, based on their experiences and other situational elements.[3]

Once the determination is made following the above strategy, variation from the plan is difficult to justify based on a patient's Covid19 status. If clinicians experience trepidation regarding Covid19 exposure, they might justly seek another course of action: They may consult a colleague who has better skills and more assurance with awake techniques or may consult someone who, based on experience and situational factors, believes routine induction and airway management are safe and is willing to participate. Finally, if airway management is necessary for medical care of a failing Covid19 patient, it may be explained to the medical caregivers that airway management is extremely hazardous to the patient in this case. Alternative medical therapies that might improve the patient's condition (such as diuretics, inotropes, THRIVE, and so forth to avert the need for intubation, if possible) should be considered.

Unique aspects for Covid19 patients

There is little that distinguishes the Covid19 patient from others who require awake intubation solely based on the disease. But what we should consider is a modification of the technique to reduce the risk of exposure to the airway manager and team. The following discussion is not "how to do awake intubation." There are countless resources for that. Rather, I will stick to a targeted discussion on what you may do differently. I will not elaborate on Personal Protective Equipment (PPE) issues except where needed.

Communication

Awake intubation is a team sport! Your team consists not only of your assistants but also the patient. True awake intubation, for a truly at-risk airway, includes a patient able to cooperate and follow simple commands (e.g., "breathe deeply" or "stick out your tongue"). The added burden of PPE

makes this job harder – not only because voices may be muffled, but also the facial expressions and lips are often hidden. Unlike routine intubation cases where a standard N95 mask may suffice, strive for PPE that allows the best facial visibility and communication. A clear shield Powered Air Purifying Respirator (PAPR) that does not hide the mouth is the most desirable option for the airway manager in charge, although this may be impossible in many clinical settings.

Oxygen

This is a controversial area. In that the Covid19 patient who may need intubation for respiratory support is probably already oxygen-dependent, it is difficult not to administer supplemental oxygen. Recently, High Flow Nasal Cannula oxygenation has been shown not to cause undue aerosolization.[4] Most nasal oxygen delivery devices are probably safe. But it may not be unreasonable to shy away from these techniques. Endoscopy masks with a diaphragm or simple cut-away for the endoscope are reasonable alternatives.

Antisialogogue

Early drying of the mouth is always a good idea in preparing a patient for awake intubation. It decreases dilution of local anesthetic agents by saliva, minimizes secretions within the imaging pathway of the intubation device, and reduces coughing and laryngospasm by removing a functional "foreign body." By the time they are recognized to need airway support, many Covid19 patients could be fragile and facing cardiovascular support. Though glycopyrrolate causes less of a heart rate response than atropine, it is not unusual to see a modest tachycardia. This can be offset with short-acting beta-blockers, but you should deliberate as to whether or not this is appropriate for your patient.

Airway blocks

I rarely perform any needle-based blocks. I might consider the exception to be when caring for a Covid19 patient. Any action that might induce coughing and/or gagging (e.g. a swab in the throat) should be avoided. Swab-based placement of local anesthetic on the glossopharyngeal nerve, and gently applying a viscous solution of local anesthetic onto the back of the tongue while the tongue is being held forward by the operator, maybe the safest course (holding the tongue reduces the forcefulness of cough). A superior laryngeal nerve block where the needle pierces the thyrohyoid membrane might be considered. One of the most effective blocks, the transtracheal injection block should be avoided because it is certain to cause coughing and aerosolization of viral particles. Atomized lidocaine could give the virus another pathway for suspension, and I avoid this technique also. Lack of adequate analgesia will definitely be associated with coughing during passage of the tracheal tube. Therefore, one should use the method that affords maximum efficacy (from one's experience) while trying to prevent spread due to cough.

Sedation

Sedation should never be a substitute for good airway manager-patient rapport or airway analgesia. Despite this, some patients will require some sedation. No one technique or agent has proven superior to another, as measured by the success of intubation and patient satisfaction. Sedation with Dexmedetomidine has been associated with fewer desaturation events.[5] I also use small doses of fentanyl (50-75ug), not as an analgesic, but rather for cough suppression. Other authors have recommended Remifentanil infusions.

Technique pearls

Many clinicians prefer to use small diameter flexible scopes for their awake intubations. Not only are these devices inefficient in delivering all but the smallest endotracheal tubes to the larynx, they may also lead to hang-up obstruction secondary to a mismatch between the outer diameter of the scope and the internal diameters of larger endotracheal tubes. In addition, Covid19 patients intubated for ventilatory failure might require larger endotracheal tubes to facilitate pulmonary toilet and to reduce biofilm plugging. A flexible scope with an external diameter not more than 2mm smaller than that of the chosen endotracheal tube's internal diameter should be used.

Summary

This discussion is not meant to be a definitive "awake intubation in the Covid19 patient" cookbook. Rather it is meant to highlight the few concerns the airway manager should have when caring for a patient that poses an aerosol danger to the manager and team. Every patient care context will differ, and the airway manager will need to be flexible in the approach to these patients.

I recommend that all Airway Gazette readers seek out the recent Society for Airway Management Guidelines for the Covid19 Difficult Airway Patient, written by general members and the Board of Directors of SAM.

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A Review of the Anatomy and Blocks for Awake Intubation

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Introduction

Awake fiberoptic intubation is a critical skill for airway management, especially in the setting of a difficult airway. There are various techniques to facilitate the securement of the airway. Ordinarily, the underlying goal is for the patient to tolerate the insertion of an endotracheal tube through a combination of sedation and anesthesia. In patients with serious comorbidities, even minimal sedation may be harmful or not well tolerated. In lieu of unwanted risks of heavier sedation or in addition to judicious smaller amounts of sedation or none, local airway anesthesia can provide adequate intubating conditions while maintaining patient comfort. This review highlights relevant airway anatomy and nerve blocks to facilitate comfortable and safe conduct of awake fiberoptic intubation.

Anatomy

The airway is innervated by multiple nerve branches. Satisfactory anesthesia requires desensitization of all anatomical structures contacted by the bronchoscope, ancillary devices, or endotracheal tubes. If nasotracheal intubation is preferred, nasopharyngeal structures must be appropriately prepared. The nasal mucosa is innervated by the ophthalmic and maxillary branches of the trigeminal nerve— specifically, the anterior, inferior, and lateral branches of the anterior ethmoid nerve, as well as the palatine and nasopalatine nerves.

The oropharyngeal area provides more space for maneuvering than the nasopharynx but requires anesthetization of the tongue in addition to other oropharyngeal structures. The lingual nerve, a branch of the mandibular division of the trigeminal nerve, supplies the anterior 2/3 of the tongue. The glossopharyngeal nerve— specifically, the visceral afferent fibers which also supply taste— supplies the posterior 1/3 of the tongue. The anterior surface of the epiglottis is supplied by branches of the glossopharyngeal nerve.

Sensory innervation to the posterior surface of the epiglottis, larynx, and trachea is supplied by branches of the vagus nerve. The internal branch of the superior laryngeal nerve innervates the base of the tongue, as well as the mucosa involving the posterior epiglottis, tissues surrounding the vocal cords, and superior surface of the vocal cords. The recurrent laryngeal nerve supplies sensory fibers to the inferior surface of the vocal cords and distally far into the trachea.

Local Anesthetic

Adequate anesthesia of the airway may require one or more different local anesthetics including solutions, aerosolized, jelly, or viscous forms.

Nasopharyngeal anesthetic administration may be preceded by vasoconstricting sprays to lessen risks of epistaxis from trauma due to the insertion of pledgets, swabs, or an endotracheal tube. Phenylephrine (0.5%) or oxymetazoline (0.05%) are more commonly used than 1:200,000 epinephrine. These can be applied as one spray per nostril, followed by another after several minutes, and only while patients are in a vertical, head-up position, to avoid cardiac side effects. Vasoconstrictor solutions can also be combined with local anesthetic solutions for simultaneous administration and can be used in soaking pledgets or nasal swabs. The vasoconstrictor to local anesthetic ratio should be 1:3 by volume, respectively.

- As the nasopharynx is a semi-enclosed space, topical anesthesia can be adequately achieved with instillation from a syringe of 2–4% lidocaine in viscous, jelly, or ointment forms.
- Another technique utilizes the insertion of pledgets or nasal swabs that can be soaked in solutions of lidocaine +/– vasopressor or 4% cocaine alone. Cocaine has vasoconstricting properties and to avoid toxicity, the maximum dose in adults is 2 swabs per nostril or less than 1.5 mg/kg. Pledgets or swabs should be advanced slowly (to prevent trauma) until the nasal mucosa is fully anesthetized.
- Variations on Pacey's paste for instillation is another alternative. It combines 7mL 2% viscous or jelly lidocaine frothed with 3mL air added to 7mL 2% lidocaine solution frothed with 3mL air, resulting in a total of 14mL.

- Regarding injection techniques, most commonly, either 1 or 2% solutions of lidocaine are administered. Concentrations of at least 1% lidocaine should be chosen to provide an adequately-dense sensory block.[1] Lidocaine tends to

be a better choice for airway anesthesia than bupivacaine, as its speed of onset is quick, 1-5 minutes, and its duration of action is appropriately short. In contrast, bupivacaine can last greater than 6 hours, which could pose a risk to airway protection for extubation if the intubation period lasts for a shorter duration.

Glossopharyngeal Nerve Block

By anesthetizing the glossopharyngeal nerve and its sensory supply to the tongue's posterior 1/3 and the lingual side of the epiglottis, discomfort and the gag reflex can be abolished before devices and an endotracheal tube approach the vocal cords. There are various techniques for glossopharyngeal nerve block with patients sitting, reclined, or in the supine position:

- One method involves spraying 2-3% lidocaine for one second with a malleable, blunt-tip atomizer aimed at each tonsillar pillar. All topical applications intraorally should be performed at least 20 minutes after receiving an intravenous antisialogogue agent to prevent dilution of the anesthetic from excess saliva.
- Another method instructs patients to gargle lidocaine mixtures (e.g. Pacey's paste) over 3-4 minutes.
- Other techniques involve the direct application of ointment to the tongue.
- As an alternative to the invasive method, lidocaine-soaked (4% gel or solution) gauze balls or pledgets can be tightly packed just lateral to the tongue such that they fill the space next to each tonsil. While this approach is more convenient, it has a higher likelihood of failure as it is less precise.[2]
- Finally, the injectable technique is least preferred secondary to the risk of intravascular injections, and other dangers, including injury to the patient or airway caregiver who holds needle systems close to open mouths in awake patients. It involves injecting 2-3 cc of local anesthetic with a 25-gauge needle submucosally at the caudal edge of the tonsillar pillars, between the palatoglossal and palatopharyngeal arches approximately 0.5cm lateral to the edge of the tongue.

Superior laryngeal Nerve Block

The superior laryngeal nerve's supply to the tongue base, laryngeal side of the epiglottis, and the cephalad portion of the glottis can be anesthetized to avoid discomfort, coughing, and laryngospasm if equipment contacts the vocal cords. This block can be accomplished by various techniques with patients sitting, reclined, or in the supine position:

- Sprays can be directed toward each piriform fossa/recess or centrally toward the larynx. These and gargles with materials described previously can block the superior laryngeal nerve at the piriform fossa/recess, and can even trickle down to the larynx. These methods can also result in a small degree of anesthesia intratracheally if patients are requested to inhale during the process. The same is true for the intraoral spray, gargling, or direct application methods because materials can be aspirated over time as numbing ensues.
- Less commonly, for the internal approach, 4% lidocaine-soaked gauze balls or pledgets can be pressed into the piriform fossa/recess for at least five

minutes on each side by using a curved forceps. This is a more time-consuming technique.

• Direct blockade by injection for the external approach, is a very good method of anesthesia, as it will prevent laryngospasm that might be provoked by materials from sprays or gargles hitting the vocal cords. The block is performed most often in the supine position with the neck slightly extended. The carotid artery must be identified and avoided. The hyoid bone is displaced towards the side of the block by pressing slightly on the opposite hyoid cornua in a medial direction. A 25-gauge needle is inserted from the lateral aspect of the neck directed towards the greater cornu.

• The simplest version: Once the hardness of the hyoid bone has been contacted, the needle-syringe system has been securely braced, and negative aspiration for blood has become evident, 3mL of 1% lidocaine is injected. The procedure is then repeated on the opposite side.

• Another version of this block differs in that once the hyoid is contacted, the needle is walked off inferiorly and 2-3mL of injectable lidocaine is deposited just outside the thyroid membrane. If the membrane is inadvertently pierced, the local anesthetic can be deposited there but will only anesthetize the internal branch. An additional 1mL of lidocaine can be injected as the needle is withdrawn to assist in anesthetizing the external branch to block the cricothyroid muscle. The block is then repeated on the opposite side.

• If the hyoid bone is not palpable, the needle would be directed to contact the superior cornu of the thyroid and walked off superiorly and anteriorly just superficial to the thyroid membrane for injection.[3]

Recurrent Laryngeal Nerve Block

The recurrent laryngeal nerve provides sensation to the inferior aspect of the vocal cords plus the tracheal mucosa. It also controls most of the motor function of the vocal cords. Its complete blockade is inadvisable because it could result in airway obstruction due to bilateral vocal cord paralysis. Instead, its sensory blockade can be accomplished topically by one of two methods:

• One technique is a transtracheal injection of 4mL of 2-4% lidocaine just through the cricothyroid membrane in the midline. This can be performed between the thyroid and cricoid cartilages, using a 22- or 23-gauge needle on a 10mL syringe under negative aspiration pressure. The needle should be advanced slowly and perpendicularly into the trachea to avoid piercing the posterior wall of the trachea or injuring the larynx. The appearance of bubbles in the syringe indicates entrance into the trachea. At this point, after complete maximal exhalation with a securely-braced needle-syringe system, the forceful injection of lidocaine will spray the vocal cords and coat the trachea because of subsequent repeated inspiratory attempts and coughing (due to liquid in the trachea).

• An alternative method involves spraying the cords under direct visualization through the bronchoscope or with an atomizer (under direct vision of the bronchoscope or with a laryngoscopic device). Following anesthesia of the other oropharyngeal structures, a fiberoptic bronchoscope can be advanced until it is 2-3cm proximal to the cords. Forcefully, 3-4mL of 4% lidocaine can

be injected through the bronchoscope's side port at the vocal cords. This may trigger coughing which would distort visualization of the area much more if the bronchoscope had been closer. After perhaps 10-20 seconds, the bronchoscope can be inserted through the cords and another 3-4mL should be injected quickly before more coughing ensues.[4]

Sedation

Sedation may be necessary for the performance of local nerve blocks or the introduction of an endotracheal tube into the trachea. Multiple agents exist to facilitate this sedation, and the choice of agent depends on the individual patient as well as the familiarity of the physician with the specific agent. Benzodiazepines such as short-acting midazolam (typically 1-5mg in adults) will provide anxiolysis and if used sparingly, will not decrease respiratory rate or drive and will not significantly decrease airway protection. Fentanyl (typically 50-250mcg in adults) can provide analgesia, sedation, and decreased reactivity of cough and gag reflexes. However, it also decreases the respiratory rate and drive. One must be judicious in combining opiates and benzodiazepines due to synergistic respiratory depression. Fentanyl titration should entail 5-10 minutes between 50mcg doses to assess for sedation with a target respiratory rate of 10 breaths/min. Finally, ketamine (typically 25-100mg in adults) is a dissociative anesthetic that provides analgesia and sedation without reducing cardiac or respiratory drive in most circumstances. The relative safety of ketamine makes it an ideal choice for block-assisted awake intubation. It can be titrated in 10mg increments giving 1-2 minutes between doses.

Conclusion

Awake nasopharyngeal intubation can be accomplished with topical local anesthesia within the nasopharynx plus superior laryngeal nerve block and transtracheal blockade. For this type of intubation, a glossopharyngeal block is not necessary. When choosing the oral intubation route, blocking the glossopharyngeal, superior laryngeal, and recurrent laryngeal nerves can achieve adequate intubating conditions with or without supplemental sedation. This is critical in the sickest of patients, particularly those with comorbidities; and/or those for whom significant contraindications might exist to routine methods of induction of general anesthesia followed by intubation. By having a thorough understanding of the innervation of the airway, the airway caregiver can increase his/her ability to maximize patient comfort while also maximizing patient safety.

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Awake Intubation in the Emergency Department

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Roughly 140 million patients have been treated annually in emergency departments (EDs) across the United States. While most of these patients are not critically ill, a small percentage are and will require advanced airway management in the ED. The most common method of airway control (85%) is rapid sequence intubation (RSI). This method of intubation optimizes conditions for laryngoscopy and minimizes the risk of aspiration in typical unfasted ED patients. It is associated with a high first-pass success rate and low incidence of complications. Although RSI is a suitable technique for most ED patients requiring emergency intubation, there is a small subset of patients in which this technique is too risky, and awake intubation must be performed.

Historically, awake intubation has been the recommended approach in patients with "anatomically" difficult airways. Patients that have anatomic features that make intubation and oxygenation extremely challenging are at risk for a catastrophic "can't intubate-can't oxygenate" (CICO) situation if they are induced with general anesthesia before an airway is secured. Thus, awake intubation is considered the safest approach, where spontaneous ventilation is maintained until the airway is secured. More recently, concerns about the "physiologically difficult airway" have arisen, and the potential role of awake intubation in this group of patients. The physiologically difficult airway is a term that was introduced into the literature to describe critically ill or injured patients with such profound derangements in their physiology that they are at great risk of complete cardiovascular collapse during airway management. While several physiologic derangements can contribute to a physiologically difficult airway, the most common and consequential are hypoxemia and hypotension. Most patients with physiologically difficult airways can safely undergo RSI after appropriate resuscitation and physiologic optimization, however, some patients are so precarious that they simply cannot tolerate the interruption of oxygenation and/or the hemodynamic insult associated with this technique. For example, a patient with severe acute respiratory distress syndrome (ARDS) and a clinically

significant right-to-left intrapulmonary shunt might not be able to maintain adequate oxygen saturation caused by neuromuscular paralysis–associated apnea and alveolar derecruitment. Similarly, the hemodynamically unstable patient might not be able to tolerate depressant effects of the rapid push of an induction agent which is needed for RSI. Awake intubation might be a prudent option for airway control in these patients to avoid the significant physiologic insults associated with RSI.

Recently, the Difficult Airway Society (DAS) in the United Kingdom published excellent guidelines on awake intubation, which should be carefully reviewed by all clinicians responsible for airway management. Patients in the ED can be quite challenging to perform awake intubation for several reasons. First, ED visits are unplanned and unanticipated and thus patients are not mentally prepared for what can be a frightening procedure for them. Second, patients are typically very anxious as they realize that they may be in the midst of a life-threatening medical crisis. Often the reason for awake intubation is some type of progressive obstructive airway pathology, such as rapidly developing angioedema, which leaves little time for planning and preparation. While technically challenging, awake intubation in the ED is not impossible. Even though most clinicians tend to equate awake intubation with flexible endoscopic intubation, this is not necessarily the case. Awake intubation indicates that the patient will be kept awake and ventilating spontaneously as the airway is secured. It is independent of the device used. While typically it is performed with a flexible endoscope, it can be performed with a video laryngoscope or even a direct laryngoscope. The fundamental issue is that the patient is spontaneously ventilating so that maintenance of oxygenation can be safely preserved throughout the procedure.

Whenever I perform awake intubation in the ED, I am always prepared for catastrophic airway failure, as this is always a small, but not a negligible risk, when performing the procedure. I obtain all the help I can get and move the patient to a large resuscitation bay in the ED to allow adequate space for extra personnel and equipment. I typically will place a patient on high flow nasal oxygen (HFNO) to maximize the patient's oxygen stores before I start the procedure, as well as to help maintain oxygenation during the procedure. I have drugs and equipment immediately available to rescue the airway if necessary. Drugs are drawn up in case conversion to RSI becomes necessary. Multiple devices for airway rescue are set up including a direct laryngoscope, rigid video laryngoscope, supraglottic airway, and surgical airway kit. Before I start laryngoscopy I ultrasound the patient's neck to identify and mark the cricothyroid membrane in the rare event that an emergency surgical airway becomes necessary.

I often administer a dose of glycopyrrolate prior to the administration of local anesthetics before laryngoscopy. This helps to dry up the secretions for a better anesthetic block (due to less lidocaine dilution by saliva) and decreases saliva interference at the optical tip of the flexible scope. The most common drug for local anesthesia is lidocaine. It allows the patient to tolerate laryngoscopy and intubation without gagging or coughing. I like to topicalize the upper airway by placing a dollop of 5% lidocaine ointment on the tongue. As heat from the mouth liquefies the ointment, it drips down the throat, coats

the upper airway, and results in a very dense block. Additional topical anesthesia can be provided with a 4% lidocaine solution instilled through an atomizer or down the working channel of the flexible endoscope as it is advanced towards the glottic inlet. I tend to avoid any sedation at all, as it is critically important to keep the patient awake and spontaneously ventilating to maintain a patent airway. In a patient with obstructive airway pathology, even a small amount of a sedative can convert a partially obstructed airway to a completely obstructed airway. If necessary, sometimes I will use small aliquots of ketamine, for example, 10 mg at a time, to facilitate patient cooperation because of its lesser respiratory depressant effect.

If using a flexible endoscope, I prefer to employ the transoral approach. Patients find this more tolerable and it also eliminates the complications associated with prolonged nasotracheal intubation. If there is no access to the mouth due to intraoral pathology then I will use a transnasal approach. When using a transnasal approach I apply a topical vasoconstrictor such as oxymetazoline to the nasal mucosa to decrease bleeding and to dilate the nasal passages. I then topicalize the nasal mucosa with lidocaine ointment. Rather than inserting the flexible endoscope directly into the nose, I prefer to preload it with the tracheal tube before entering the nasal cavity. I advance it through the nasopharynx and into the oropharynx just above the laryngeal inlet. This provides a nice guide to essentially deliver the scope to the supraglottic region while protecting the optical elements on the tip of the scope from contamination from secretions.

When performing awake intubation with a flexible endoscope, it is important to remember that the intubation is not complete until the tracheal tube has been successfully advanced over the scope into the trachea and that correct placement is confirmed with end-tidal capnography. Once placement is confirmed appropriate analgesia and sedation can be administered to avoid accidental self-extubation. Placing a note at the patient's bedside and in the medical record indicating that the patient has a difficult airway is important to optimize ongoing medical care.

In conclusion, while most patients are good candidates for RSI in the ED, a small percentage are better served by an awake intubation. While most emergency physicians will not have an adequate caseload to be proficient with awake intubation, it is important to know when it is indicated, what consultant to call for help, and how to work with them as a team in managing a difficult airway in the ED.

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Q and A Series with the Third SAM Past President

Ulrich Braun, M.D.
Professor Emeritus of Anesthesiology
Goettingen, Germany

Interviewer: Katherine Gil, M.D., Associate Editor.
Preface: This article is the result of an informal interview with the 3rd president of the Society for Airway Management, Dr. Ulrich Braun. Among other leadership positions, Dr. Braun was appointed head of a section of the Department of Anesthesiology, Rescue– and Intensive Care Medicine, at the University Clinic of Goettingen (also known as Göttingen), Germany. He has been involved with research extensively, written more than 170 publications, and authored at least 18 chapters. His latest article, published in February 2020, illustrated safe anesthetic care in Noma patients.

Question: *What airway management experiences were significant in your background?*
Dr. Braun: During my time as an assistant physician at the University of Tuebingen (Tübingen) (1971-1977), I had been involved with some difficult airway intubation cases. Because of them, I searched for a solution to overcome this problem. It appeared with the publication by Raj et al.[1] Dr. Raj described fiberoptic laryngoscopy techniques. In 1978 after I became a professor at the University of Goettingen, I promised myself to use them.

The first challenge came in 1983 when a very small 11-year old boy with Treacher-Collins Syndrome (synonymous with Franceschetti-Collins) presented for anesthetic care before undergoing surgical dental corrections (Fig. 1). Three prior attempts at anesthesia and direct laryngoscopic

intubation had failed. Among other abnormalities, he had a very small mouth opening, severe mandibular retrognathia, and relative macroglossia. We began by anesthetizing him with halothane without any intent to interrupt his spontaneous respiration. The objective was to keep his ventilation stable while using a 3.6 mm flexible FO bronchoscope for intubation (FOI). I did not see much at first but, after some time, without clearly identifying the larynx, I suddenly recognized the trachea as the fiberscope fell into it. I grasped the moment to intubate him and he remained under anesthesia for four hours. Following this event, the patient's mother always contacted me before any other dental treatment or surgery. I anesthetized this boy approximately seven more times. I learned from these experiences that direct and video laryngoscopy were useless and that FOI became easier the more it was possible to adopt a sitting position. During this patient's first encounter, his supine position under deep anesthesia resulted in a gravitational effect on intraoral soft tissues to minimize further his pre-existing, small oropharyngeal space. (Fig 2) On the right side of figure 2, one can imagine that loss of tone caused the tongue to press against the posterior pharyngeal wall.

I had different management experiences in 1991 after being introduced to the Laryngeal Mask Airway (LMA) by its inventor, Dr. Archie Brain. The LMA had been in routine clinical use in the United Kingdom since 1988 but not in Germany. In his friendly, unobtrusive way, Dr. Brain explained it to me in a few words and allowed me to insert it into a patient scheduled for a small gynecologic intervention. Following induction, when I wanted to administer preoxygenation by facemask to increase the available time (if needed for apneic LMA insertion maneuvers), Dr. Brain said calmly but in a determined voice: "This is not necessary!" While reflecting on some of the lectures and discussions, when Dr. Brain introduced his invention at SAM meetings, I felt that he had presented the LMA splendidly, implementing the idea of how the solutions to this new airway approach had developed.[2]

At the 8th World Congress for Bronchology and Interventional Pulmonology in 1994 in Munich, I presented some pediatric difficult airway cases. Dr. Andranik Ovassapian, chairmen of one session, was a world-famous airway manager from Chicago, USA. His best choice for managing elective difficult airway cases was to use the awake fiberoptic intubation technique. He was an enthusiastic clinician and teacher, politically experienced, and open-minded.
After the presentations, Dr. Ovassapian told me he wanted to bring together a group of physicians with an interest and expertise in airway management to establish a medical society. He asked me if I was interested in contributing to this initiative. The Society for Airway Management (SAM) was founded on October 22, 1995, in the course of the American Society of Anesthesiologists Annual Meeting in Atlanta. To my surprise, I had become a founding member.

Question: *Was anyone notably helpful to your efforts while you were in office?*

Dr. Braun: After the SAM presidencies of Dr. Ovassapian and Dr. Antonio Sanchez, I took over the office in New Orleans in 1999 as the 3rd president of SAM. I conducted the Board of Directors Meeting for the first time, an exciting experience. I presided over annual SAM meetings in Quebec City, Canada in 2000, and Newport Beach in 2002. For my presidency, I received much support from Dr. Ovassapian, who at that time was the Executive Director of SAM. I also was very much assisted by the dedication and efforts from the program chairs, Dr. D. John Doyle (2000) and Dr. Maya S. Suresh (2002), who did a great job in preparing the SAM Meetings.

I organized an Airway Meeting in 2001 at Goettingen, in the "SAM style" with hands-on-workshop, airway simulation, the value of the fiberscope, pharyngeal and laryngeal airways, rapid sequence intubation, and emergency care. Drs. Ovassapian, John Schaefer, Brain, Chandy Verghese, and Michael Frass (SAM members) were present. Participants included 386 attendees and 21 companies. There was no SAM meeting in 2001 due to the events of the Eleventh of September. My presidency ended in 2002 after three years.

Question: *What were the benefits or highlights of your term?*
Dr. Braun: The position of SAM President was extraordinary — for me to contact the best airway experts of the world: to watch them present, hear what they said and how they said it, to benefit from the process of ongoing learning, and to be able to talk to them personally. I always enjoyed coming to the SAM Meetings and contacting colleagues and friends who had the same enthusiasm for a "true" clinical challenge— airway management.

Question: *How adequate was the time available to accomplish your objectives?*
Dr. Braun: I cannot say in hours per week how much time I spent on the presidency. It depended mostly on the forthcoming Annual Meetings, what I had to prepare, and whom I had to contact. It was a pleasure for me to be on the Board of Directors and to cooperate with them to serve SAM. During my presidency, I learned to confer with members, companies, and anesthetic societies to arrange matters of interest.

Question: *Were you able to accomplish most of your presidential agenda during your term?*
Dr. Braun: My area of expertise was to enhance the awareness of airway problems and to make more use of instruments such as the flexible fiberscope and supraglottic airways. I also actively advanced the idea of using these devices together, in combination, to overcome difficult airway problems, with special emphasis on pediatric patients.

Innovations
I would like to mention two impressive innovations, which were not strictly confined only to the duration of my presidency: 1) simulated airway management and 2) video laryngoscopes. These had significant consequences for the options of airway practice and teaching. Firstly, Dr.

Schaefer and Dr. Rene Gonzales initiated airway management simulation in 1996. They provided prototypes and offered simulation courses to teach decision-making in difficult airway situations for anesthesiologists and other airway personnel, who were already at a good knowledge and skill level. The prototypes later became commercially available systems and filled a gap in the arsenal of airway tools.
Secondly, the development of a video laryngoscope, and subsequent commercial availability in 2000 improved airway access. It had a much more acute modification of the angle and structure of the laryngoscope blade. It also had a camera to enhance vision with live transmission to a nearby monitor, facilitating teaching options secondary to team input on seeing monitor views.[3] As a consequence, it was increasingly clear that the direct laryngoscope and the indirect video laryngoscope have become deeply rooted in the hearts and minds of anesthesiologists.

In 2000, I was in Sokoto, Nigeria for three weeks to treat Noma (cancrum oris) patients with a surgical team of eight, including Dr. Arnd Timmermann from Goettingen (also a member of SAM). Noma is an acute infectious disease acquired by children between ages 1–7 years. It causes painful degenerating ulceration of oral mucous membranes extending through nearby facial tissues, and even including loss of boney structures. Victims of Noma usually are suffering from concomitant poverty and malnutrition, and their mortality rate is at least 85%. The survivors have severe disfigurements of the face, which can be treated surgically. We successfully anesthetized all our 65 patients by employing the flexible fiberoptic intubation technique. When we learned that there was no comprehensive literature reference about anesthetic care for these patients, we published our data.[4]

Question: *What have you been doing since your presidential term ended?*
Dr. Braun: I became president of the European Airway Management Society (EAMS) from 2003-2006. The first German Society for Anesthesiology Airway Management Guidelines appeared in 2004.[5]

Question: *Are there any areas/ideas in airway management that should be acted upon?*
Dr. Braun: It goes almost without saying that in times of Covid-19 hygienic aspects of all difficult airway management may be demanding and have to be considered carefully.
Additionally, all international anesthetic guidelines mention the flexible fiberscope as the ultimate instrument to control difficult airway cases. Prominent studies on FOI usage is also well-known to be a desirable technique to learn by participants themselves in teaching programs. Unfortunately, after the birth of the video laryngoscope, the interest to use FOI became somewhat lax. I can only strongly encourage interested colleagues and other specialists to go forward with it, take courses, train with it, and apply it in patients, to be able to control not just 95%, but almost 100% of all difficult airway situations.

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Fig. 1: The 11-year old boy with Treacher-Collins Syndrome[1]

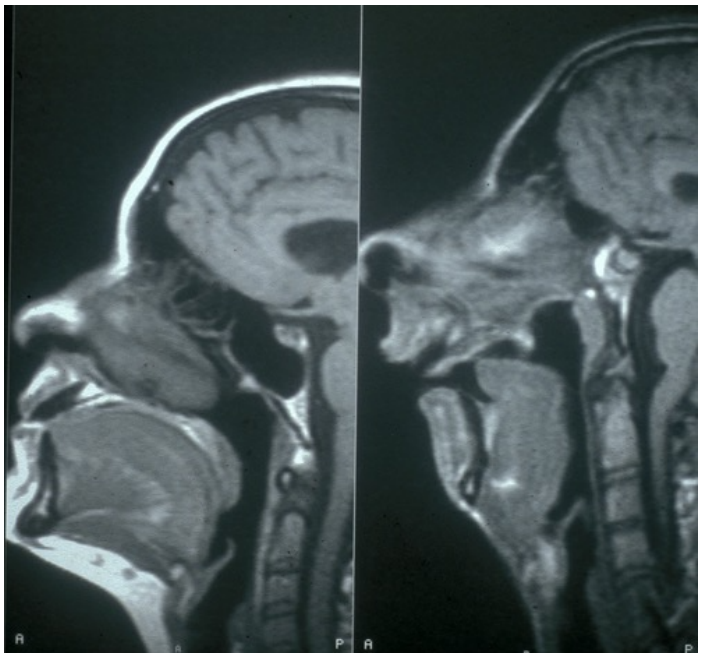

Fig. 2:
Left image—Magnetic Resonance Imaging (MRI) of a normal, young adult (tongue in its typical position).
Right image— MRI scan of the case presented (tongue almost freely floating in the oropharyngeal space).[2]

DocMatter Discussion: Case of the Month

Daniel Perin, M.D.
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Editor's comment: *A very interesting case was posted by Dr. Daniel Perin from Brazil. This case received tremendous attention at the DocMatter Forum by the airway experts around the world. A summary of the discussion written by Dr. Maged Soliman from Montefiore Medical Center in New York has been presented here. Please log on to DocMatter.com to see the experts detailed responses and post your comments.*

Dr. Perin:
Hello all! I want to kick-off our SAM DocMatter Community Case of the Month series by sharing this first case below:

33 y/o female, 34 weeks pregnant, with a chief complaint of an intense headache. In the waiting room, she experiences a generalized seizure and bites her tongue. At the time of the exam she is in a postictal state with marked somnolence. Her tongue is bloody and protrudes beyond the lips.

Vitals: BP 175/125; HR 110; SpO2 95% on room air, breathing spontaneously but with snoring sounds.
Patient Information: She is 230 pounds (104Kg), ate her last meal 6 hours prior, has a history of sleep apnea (uses CPAP regularly). On exam, you notice a receding mandible (class III upper lip bite test: lower first molar is anterior to the upper first molar). No Mallampati score is determined.

OB/GYN admits to the hospital and starts an IV magnesium sulfate drip. Her current vitals are: BP 160/90; HR 105; SpO2 99% on 2L/min O2 via nasal cannula.

A cardiotocography measurement reveals a fetal HR of 55, indication for an immediate cesarean section. OB-Gyn service confirms there is no time for regional anesthesia.

How would you handle this case? What would be your go-to plan for airway management? If your Plan A fails, what is your next move?

(SIC)

Summary of the discussion from DocMatter.com

Maged Soliman, M.D.
Montefiore Medical Center
New York

Dr. Soliman:
Dr. Perin has presented SAM membership with an extraordinary DocMatter case for a time-constrained emergency Caesarian section secondary to severe fetal bradycardia in a probably obese 34-year-old patient. The case represents many difficulties to the provider. The following information was supplied by SAM members.

The efforts of the most-experienced airway manager and at least one capable assistant are mandatory for any patient with both an anatomic and physiologic difficult airway. Both of these are present in this 34- week pregnant, postictal patient with obstructive sleep apnea (OSA), receding chin, class III upper lip bite test with protruding lower incisors, and bloody protruding swollen tongue. This scenario poses problems due to the potential of a full stomach, diminished functional residual capacity (FRC), decreased tolerated apnea time, and likely inability to control the airway. Her tachycardia,

probable eclampsia, and possible hypovolemia heighten the possibility of adverse cardiac/ hypertensive responses to airway management and anesthesia.

To deal with this patient's airway, the airway manager should have a systematic approach.
For rapid preparation, this uncooperative but somnolent patient presents the disadvantage of not permitting oral Bicitra (sodium citrate-citric acid) to neutralize stomach acidity, however, intravenous aspiration prophylaxis medications can be given and might be useful later. She also needs COVID-19 precautions (negative pressure operating room, such as personal protective equipment (PPE) and possibly powered air purifying respirator (PAPR)—depending on time for application. The cricothyroid space needs to be marked preoperatively. If less experienced, the airway manager should alert an additional surgical team to be ready to perform emergency front of neck access (FONA).

Equipment preparation should include standard intubating equipment including smaller size 6 and 6.5 endotracheal tubes (ETTs) in case of edema, reliable acute-angle videolaryngoscope (VL) supported by literature, flexible fiberoptic scope, bougie, Aintree Intubation Catheter, size 3 and 4 second or third generation supraglottic airways (SGAs) — depending on a brand) with wide bore suction channels, two suction catheters ready to go, supplementary oxygen via nasal cannula, a nasal device with continuous pressure and/or oral catheter or better, and a difficult airway cart. This cart can be completely covered but ready to go in the operating room or just outside the door with an attendant waiting for a signal if the room is too small. It should have a Scalpel Bougie set or cricothyrotomy set ready to go.

Techniques: The safest course for this case would be awake fiberoptic intubation with topicalization of the airway, but this option may not be feasible due to time constraints. However, very experienced airway providers can perform fiberoptic intubations in 60 seconds with a spray-as-you-go technique of local anesthetic administration.

Plan A, B, and C.
Optimization of the first attempt at intubation is of paramount importance. This includes optimal positioning (ramp or reverse Trendelenberg) and preoxygenation (even during intubation or SGA insertion)— to benefit from a gravitational effect on soft airway tissues and apneic oxygenation. Most DocMatter responders agreed in approaching this case to use rapid sequence general anesthesia with VL as Plan A. if intubation was unsuccessful, they recommended moving to Plan B, which will be the

insertion of SGA to maintain ventilation and provide an outlet for gastric contents. If oxygen saturation stayed normal (assuming end- tidal carbon dioxide is acceptable), they would ask the surgeons to proceed with the delivery of the baby but without fundal pressure or uterine exteriorization. They would either continue with the SGA until the surgery is finished or intubate through the SGA using a flexible fiberoptic scope. However, if Plan B (ventilation through the SGA) failed, then "failed ventilation" should be declared. In that case, they would activate Plan C, which is FONA—preferably by the "Scalpel Bougie Technique."

One comment said that if the VL could not enter the mouth, then plan B should be instituted immediately and the LMA protector was more commonly cited.

Some recommended the use of a VL and fiberoptic combination while others suggested an SGA and fiberoptic +/- Aintree Catheter combination.

One mentioned a concern with iGel SGA having a small bore gastric decompression tube and a slower sealing "cuff" (non-inflatable) dependent on its thermoelastomer to expand to improve the seal.

Dr. Perin:

All comments and ideas are really very interesting. Thank you all for participating and exchanging experiences.

Imagine now that the baby is ok. C-section is over and your patient was intubated (6, 0 ID reinforced tube) through a 2nd generation SGD aided by a bronchoscope because your VL failed due to blood and "lack of room" in the mouth. Would you extubate the patient? If your response is yes, would you have a strategy for failed extubation (exchange catheter in place for example)? If your response is no, would you change the tracheal tube in the O.R to send patient to the ICU (How would you do it?)?

(SIC)

Dr. Soliman:

Postoperatively, this patient should be kept intubated and sent to the intensive care unit (ICU) until her tongue swelling subsides. Because of the need to undergo diagnostic imaging tests for cerebral pathology, the possibility of airway injury from manipulation during airway device placement, and respiratory-depressant effects of narcotics for postoperative pain control, she might require a stay of more than one day to prevent the development of an airway emergency. As an alternative, one might decide to extubate her in the operating or recovery room. Simultaneously, one could leave an exchange catheter in place for emergency reintubation. However, considering the history of reintubations with exchange catheters, choosing this alternative is one that many might consider too risky to succeed.


Andranik Ovassapian 1936 - 2010

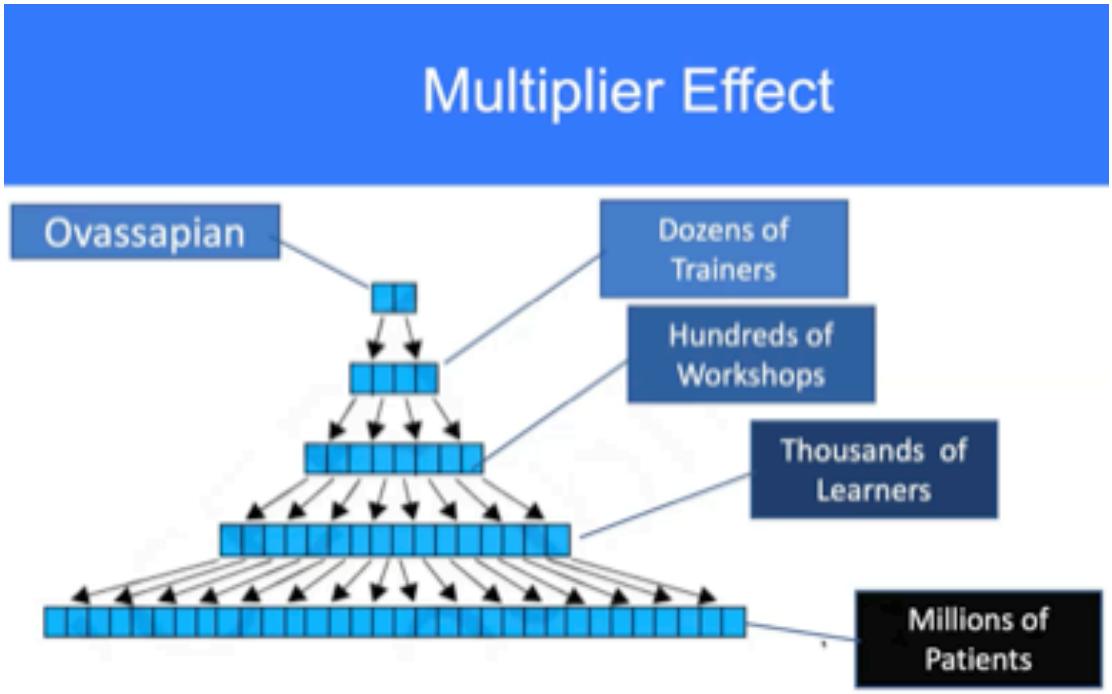
ASA Annual Meeting (2020) 5th Ovassapian Lecture

P. Allan Klock, Jr., M.D.
University of Chicago
Chicago, IL

At the 2020 American Society of Anesthesiologists virtual Annual Meeting, Dr. P. Allan Klock, Jr. presented the 5th biennial Society for Airway Management – Ovassapian Lecture titled "**The Art and Science of Airway Management, Past, Present, and Future"**

Please click below links to watch the video presentation of the lecture.
www.asahq.org/anesthesiology
https://www.youtube.com/watch?v=TT5EUOGeG_U

Dr. Allan Klock expertly highlighted the educational efforts in which Dr. Ovassapian immersed himself. He described Dr. Ovassapian as a teacher, author, investigator, lecturer, and member of the original Task Force formulating Guidelines for Management of the Difficult Airway (ASA 1992). He noted Dr. Ovassapian's promoted innovative workshops to teach flexible fiberoptic intubation/usage and founded the Society for Airway Management to pursue airway concerns within different medical specialties and new ideas for all facets of airway care. Dr. Klock emphasized Dr. Ovassapian's role as a proponent of force multiplication (see the Multiplier Effect figure): one instructor may affect innumerable patients.



Dr. Klock reflected on airway management that he thought Dr. Ovassapian would have wanted ASA members to know at this present time. He selected five significant points:

1) Actively seek improved oxygen delivery during airway management: use THRIVE > buccal > nasal O_2 and limit intubation attempts to 2-3 optimized ones while considering alternatives to avoid airway trauma.
2) VL tips: alternately eye the patient and the monitor during insertion. Insert it minimally with less lifting and less angling. Reverse the ETT/stylet camber and possibly corkscrew the ETT into the trachea counter-clockwise. In small mouths, insert a thumb and ETT following it, then VL.
3. Prevent FOI–ETT hang-up by matching diameters of both, or use bent tip ETT (e.g., Fastrach or Parker).
4. For FOI, direct its tip down in the oropharynx, up to vocal cords, and down upon passing vocal cords.
5. Cricoid pressure can make intubation/SGA insertion more difficult. Relaxing it may be relatively safe.

(Summary by Dr. Katherine Gil)