

Ten Commandments of Airway Management

Simple lessons to guide oxygenation and ventilation

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Nothing can be done to reverse hypoxic brain damage once it occurs. Because of this fact, maintaining an airway and ensuring adequate oxygenation supersedes everything other than scene safety. Each of us must have a well-planned algorithm to deal with both expected and unexpected problems we face when trying to stabilize a patient's airway. Similarly, once we've mastered the basic techniques of airway maintenance and ventilation, we should continue to stay current by learning newer concepts and treatments. The following "commandments" formalize a set of principles for airway management.

Commandment #1

Oxygenation and ventilation are the top priorities. There's an old medical adage that remains true: "Patients do not die or suffer brain damage because you cannot, or do not, intubate them; they die or suffer brain damage because you cannot, or do not, oxygenate and ventilate them."

Care must center on oxygenation and ventilation. Becoming overly focused and developing tunnel vision during intubation attempts can ultimately lead to a disastrous end. Remember, the No. 1 priority is to oxygenate and ventilate the patient, not to place a device or perform a skill.^{1,2}

Commandment #2

Airway management does not mean intubation. Airway management means just that — managing the patient's airway to ensure patency, provide adequate ventilation and maintain appropriate oxygenation. This should be done in the most prudent and expeditious way available.

Many times we focus on using advanced measures or procedures, forgetting that they're often useless, and perhaps detrimental, without the basics. Merely performing a chin lift or jaw thrust can open and/or salvage many airways. The proper use of basic airway adjuncts, such as oral and nasal airways, can convert a difficult-to-ventilate patient into a stable, well-ventilated one.

The appropriate administration of high-flow oxygen is enormously beneficial. However, patients *in extremis* continue to be treated with low-flow oxygen or have ventilation attempted with improperly sized or fitted masks. Even worse, some hypoxic patients receive no oxygen therapy at all while their caregivers try multiple medications rather than simply providing oxygen.

Understanding proper oxygen administration and the rationale behind it are paramount. We must never forget that airway management is a collection of skills and techniques, not just an attempt to place a tube or another device into the patient's mouth or trachea.³

Commandment #3

Be an expert at bag-valve-mask (BVM) ventilation. BVM ventilation is the most underrated — and perhaps most undermastered — EMS skill. Using properly fitting masks, using the correct size bag for your patient (an adult, a child or a neonate) and employing excellent technique are all imperative to good patient care. Proper technique involves lifting the mandible upward and using an oral airway (and/or a nasal airway) as an adjunct during BVM ventilation. Paying attention to the basics of this skill will make it maximally effective.⁴

Beware of using high bag volumes and pressures; both can cause gastric distention and increase the risk of regurgitation. The use of a nasogastric or an orogastric tube to decompress the stomach is optimal for the infant or child. Your system should consider use of nasogastric and orogastric tubes as airway adjuncts in the mask ventilation of pediatric patients.

Take advantage of clinical time in the operating room or any other opportunities you have to learn and master proper bagging techniques. Practice this skill, remembering that *consistent airway basics* are usually more helpful than *occasional airway brilliance*.

Finally, it's important to remember that *two or three are better than one* when it comes to BVM ventilation. Too many EMS providers feel embarrassed when they can't successfully bag a patient and prefer to let ineffective ventilations continue rather than ask for help.

A two- or three-person technique — with one provider maintaining a good mask seal, another provider bagging and a potential third individual providing cricoid pressure — is almost always more effective than one person trying to bag, maintain a good seal and not provide cricoid pressure.

Commandment #4

Know your equipment. Becoming an expert in BVM ventilation starts with knowing your equipment. Does your bag have a reservoir? Where's the pop-off valve? What special features does your bag have?

That daily check sheet is there for a reason. You must regularly check and maintain your airway supplies and equipment. Airway equipment is arguably the most important thing you carry, so why not maintain and check it every shift? Be vigilant. A good provider leaves nothing to chance.

Having backups (e.g., laryngoscope blades, bulbs and handles) and the ability to troubleshoot equipment are also important. To enhance your knowledge base, read the product inserts that accompany BVMs, airways and endotracheal (ET) tubes. Manufacturers also provide a lot of information on their Web sites and in other publications.

No new piece of equipment should be introduced into your system without proper training and followup. Know all your airway management equipment, and assume personal responsibility for its proper functioning.

Commandment #5

Know at least one rescue ventilation technique. Rescue ventilation can best be described as a ventilation attempt or technique to use in the face of a failed airway — a technique to use in the "can't-intubate/can't-ventilate" scenario.

The most basic rescue technique is two-person BVM ventilation. It should be tried immediately when you have difficulty ventilating a patient.

If multi-person ventilation isn't effective, at least two techniques should be considered — use of a blind insertion device, such as the CombiTube or King LT-D Airway, and use of the Laryngeal Mask Airway (LMA). These devices are easy to use, can be inserted quickly and safely, and can accomplish ventilation when previous airway attempts fail.^{5,6}

The CombiTube allows for blind insertion in the most difficult of patients and situations and provides some protection against aspiration and higher airway pressures. Inexpensive, easy to learn and simple to master, the CombiTube or another blind insertion device should be in every provider's arsenal of equipment.

The LMA has found its way into the prehospital and emergency department (ED) settings. Its use as a rescue device has been well documented. It forms a seal around the laryngeal inlet and provides a pathway to ventilate the patient and some protection against aspiration. The ability to blindly insert this device and rapidly and effectively ventilate most patients makes it a great prehospital tool for difficult airways.

Commandment #6

Develop a personal airway algorithm. Each provider should have an algorithm specific to their skill level and approved scope of practice. Not all patients and situations you encounter are going to be the same. Therefore, having only one or two skills in your repertoire constitutes a potentially dangerous, one-size-fits-all approach to airway management.

Everyone's algorithm should begin with the basics — sort of a "plain vanilla" approach. The basics taught in an American Heart Association Basic CPR course work great; begin there and then enhance your skills in a step-wise approach. Your algorithm should proceed from basic, less-invasive maneuvers to more advanced and potentially invasive techniques as indicated. *Example:* Start with BVM ventilation; advance to ET intubation; then place a blind esophageal device or use an LMA; and, finally, perform a needle cricothyrotomy.

Each provider must have a plan for a patient they can't intubate or ventilate. A can't intubate/can't ventilate scenario is a nightmare. When faced with a critically ill patient, each of us must have a carefully thought-out, step-by-step plan — one that was calmly devised and practiced, not one thought up at the spur of the moment in the middle of a panicked and potentially fatal situation.

Commandment #7

Don't let your ego get in the way. Hubris (exaggerated pride) can be dangerous for your patient, your partner or colleagues, and your career. Remember, your goal is proper patient care and a good outcome, not skill accumulation or personal success. The "Rule of 2" is a good one to live by: If you're unsuccessful at a skill, give your partner a chance after you've failed twice.

Similarly, if you're unsure about how or when to perform a skill, ask for assistance. Teamwork in EMS is essential, so don't be embarrassed about asking for help. Just be thankful when it arrives. Do the right thing, and don't let your pride get in the way.

Commandment #8

Invest time in learning airway skills. We all have a finite amount of time that we can use to keep our skills updated. Regularly devote training and practice time to airway management. Practice is important because, as time goes by, we often lose some of the finer points of airway management.

Try to not limit yourself to manikins. Work on gaining access to a local operating room or ED to practice and expand your skills. Contact the attending anesthesiologist or ED director, and explain your needs and goals. Many physicians and certified registered nurse anesthetists are happy to have someone accompany them for a day. During your time with these airway professionals, view airway anatomy and work on improving your BVM ventilation techniques in this controlled, well-lit environment.

Another way to maintain your airway skills is to read about the latest techniques and advances in airway management.⁷ The Internet is a great place to start. Here are a few well-organized and informative sites:

- <http://www.combitube.org/>;
- www.theairwaysite.com/home.html; and <http://www.airwayeducation.com/>.

Finally, if the above venues are unavailable or don't meet your specific needs, you can attend a major EMS conference. Many sessions focus on advanced airway management and several offer hands-on training with simulators or cadavers.

Commandment #9

Use an end-tidal CO₂ (EtCO₂) detector and/or esophageal detector device to confirm every intubation.

For many years, the proper placement of an ET tube was thought to be best confirmed via the physical exam. The gold standard for confirming correct ET tube placement was thought to be observing the tube passing through the vocal cords, determining the presence of breath sounds over the chest, condensation in the ET tube and absence of breath sounds over the epigastrium. However, even with confirmation by all these signs, some patients are still esophageally intubated.⁸

Relying solely on a physical exam for ET tube confirmation is risking up to a 10% chance that the tube is in the wrong location. The physical exam is notoriously inaccurate and should not, by itself, be used to confirm ET tube placement.

If anesthesia personnel are required to use EtCO₂ devices for patients they intubate, we should be required to use a confirmatory device, too. Remember that patients in the OR usually haven't eaten for six to 12 hours, have been evaluated with a full history and physical exam before the intubation and are intubated in a calm, quiet, well-lit operating room. *Our* patients, however, have to be intubated in the worst of conditions and are usually encountered with food in their stomach or blood or emesis in their mouths. Prehospital intubations are usually performed in uncontrolled settings, such as on the side of the road, or in poorly lit environments, including the inside of partially collapsed vehicles. Therefore, it's appropriate that we are required to use the same aids to confirm an intubation as the certified airway experts do. It's shocking to see published rates for unrecognized esophageal intubations by EMS providers as high as one in four when EtCO₂ detectors aren't used.⁹

Another quick and easy way to confirm ET tube placement is with an esophageal detector device (EDD), which uses a syringe or bulb in an attempt to aspirate air from the trachea or esophagus.¹⁰ The rigid, cartilaginous trachea won't collapse around an ET tube, thus allowing the EDD to aspirate fully. If the tube is improperly placed in the esophagus, the soft tissue of the esophageal wall will collapse around the end of the tube, and little or no air can be aspirated by the EDD.

EDDs can be used in conjunction with the EtCO₂ and should be mandatory in pulseless patients who don't have any detectable expired CO₂. These devices are inexpensive, fast and simple to use. The use of one or both should be considered a standard of care for all intubations performed in any emergency setting.

Commandment #10

When seconds count, don't count on seconds. Each airway maneuver or intubation attempt should be your best effort. Often, our best chance at getting a patient intubated or an airway placed is the first attempt. Maximize your chances by leaving *nothing* to chance. Carefully pre-oxygenate and appropriately position the patient, correctly position yourself, and then perform the procedure. Don't give a second-best effort to any airway management skill.

Each maneuver or attempt at airway management should be the clinician's best effort, using optimal skills and judgment. Taking an extra few seconds to verify that everything is optimally positioned and prepared for the existing conditions often means the difference between success and failure.

Summary

Excellent clinicians have a solid knowledge base and use sound principles to guide their practice. Most of us work in dynamic and, at times, uncontrolled settings. To succeed, you must follow some established guidelines. As you grow in your chosen career, also continue to improve your airway knowledge and strive to follow these commandments. Hopefully, they'll empower you to maximize your skills, expand your knowledge base and enhance your problem-solving abilities.

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