

Aggressive Airway Management: Task, Tactics, and Techniques

By: Stephen Wilcox

Emergency medical services are evolving, and many things have changed over the last two decades. One of the most talked about skills in emergency medical services is airway management. After all, one of the most important things we must be able to do as an emergency medical service provider is to be able to manage our patient's airway. Looking back over the last fifteen years alone, airway management has changed significantly in the prehospital environment. Fifteen years ago, most ground emergency medical services did not practice rapid sequence intubation and relied on air medical providers routinely for that exact service. As time went on, emergency medical services began to provide pharmaceutical assisted intubation which eventually led to some agencies providing rapid sequence intubation using sedation and paralytics. Fast forward to the last few years and most agencies that provide advanced life support have incorporated some form of drug assisted airway management into their protocols and procedures. Now we commonly hear the question of whether or not prehospital agencies should be providing drug assisted airway management. While that is a loaded question my short answer is yes if the agency is willing to provide continuing education, skills evaluation, quality management and improvement, and constant feedback to its providers. There are many different things to consider when it comes to aggressive airway management and breaking it down into tasks, tactics, and techniques can help simplify all the things we must consider when managing a patient's airway.

Task

To be successful at airway management we must be able to manage the tasks at hand and prioritize the order in which the tasks need to be performed. When providers fail to manage the tasks usually the rest of the procedure follows suit and the procedure itself fails. Preparation is EVERYTHING in airway management. We must prepare our patient, our equipment, and our medications prior to proceeding with any type of advanced airway management. This can be challenging depending on the number of clinicians you have available to assist. The focus should be on the basics including obtaining a full set of vital signs, providing a basic life support airway, obtaining intravenous access, resuscitating the patient, preparing the patient, preparing advanced life support equipment, and preparing medications chosen to use for the procedure. There is a lot to do in a little amount of time and this is typically where the majority of errors are made by clinicians. NAP4 found that human factors contributed to over 40% of major airway complication cases, e.g. poor

teamwork, communication and planning; loss of situational awareness; task fixation under stress; and delays in decision making [3].

Checklists can be extremely beneficial during this phase to verify we have completed all the different tasks that need to be completed prior to taking a patient's airway. Although checklists may seem counter-intuitive they have been proven to work in high stress, task saturated events like aviation emergencies. Some clinicians make excuses on why they don't believe checklists are beneficial, but as Atul Gawande points out in his book, *The Checklist Manifesto: How to Get Things Right*, no matter how expert you may be, well designed check list can improve outcomes [2]. When we take our time, prepare our patients, and make sure things are done correctly the first time we tend to be more successful and have better outcomes during advanced airway management procedures.

Tactics

Tactics can be defined as an action or strategy carefully planned to achieve a specific end [6]. As prehospital airway management has transformed, so have the tactics of airway management. In the last few years prehospital providers have really begun to dive into the tactics of airway management. Just because we can do something doesn't necessarily mean we should. Knowing when and how we should proceed with an advanced airway management is extremely important and is when tactics should come into play. As discussed above, checklists are proven to be beneficial in helping us manage multiple tasks at hand and using a checklist is one of the many tactics that have become popular in managing airways in the last few years. Many years ago, patient positioning and preoxygenation or "nitrogen washout" as some like to call it came to the forefront of prehospital airway management. More recently we have realized that more should be done to prepare our patients for an advanced airway and the phrase "resuscitate before you intubate" has become the next big movement and for good reason. It's extremely important that we know what "resuscitate before you intubate" means, and exactly what we should be attempting to resuscitate. We have unfortunately been completing an invasive procedure without always making sure the patient had an adequate oxygen saturation and blood pressure prior to proceeding with the advanced airway. This has led to many peri-intubation cardiac arrests where we most likely assumed the patient went into cardiac arrest because they were super sick. The patient may have been super sick, but the reality is our lack of resuscitation prior to proceeding with the drug assisted airway management is likely to blame for causing the patient to go into cardiac arrest.

So exactly what does "resuscitate before you intubate" mean and why is it important? Most patients who are in respiratory failure, lack the ability to protect their own airway, or are hemodynamically unstable and aren't stable enough to be intubated safely

without first correcting their hypoxia and/or blood pressure. Preoxygenation/nitrogen washout is great and should be done regardless of the patient's oxygen saturation, but when the patient is not adequately oxygenating or ventilating it may take more than placing the patient on a nasal cannula and a non-rebreather mask at 15 liters per minute. If the patient's oxygen saturation is still not above 94% then we should first make sure we have utilized all of our airway adjuncts that the patient will safely tolerate (IE nasopharyngeal airways and oropharyngeal airways). We should then be using a bag valve mask to assist their ventilations and add positive end expiratory pressure to maximize the alveolar recruitment and oxygenation. This should be completed for a minimum of three to five minutes prior to attempting an advanced airway. There may be times when the patient's oxygen saturations may not increase above 94%, but we must use all our adjuncts and maximize our attempt to increase the oxygen saturation prior to making an advanced airway attempt. More recent studies are even evaluating the use of continuous positive airway pressure, bi level positive airway pressure, and high flow nasal cannula as preoxygenation tools in the spontaneously breathing patient needing an advanced airway. High flow nasal cannula also gives the added benefit of apneic oxygenation during the advanced airway procedure using oxygen and pressure to keep the patient's oxygen saturations from decreasing during the procedure. As high flow nasal cannula becomes more popular in the prehospital environment I believe we will see this start to become a standard for preoxygenation.

We must also resuscitate the patient's blood pressure if the patient is hypotensive or in any state of shock. How this is completed depends on the type of shock the patient is in. Patients who are in septic shock, anaphylactic shock, neurogenic shock, and cardiogenic shock will need to be resuscitated with fluids and pressors prior to intubation. Patients who are in hypovolemic or hemorrhagic shock will need to be resuscitated with fluids and/or blood products if carried. These patients tend to do very poorly when given a large amount of sedation prior to correcting the hypotension. This is why we should take special consideration of the medications and dosages that are being administered during drug assisted airway management. The last thing an unstable hypotensive patient needs prior to advanced airway management is a dose of Versed or even a large dose of Ketamine or Etomidate. All sedatives are likely to cause a decrease in blood pressure if given at a high or even normal dose when a patient is in any type of shock. We obviously want to sedate and treat our patients for pain prior to attempting an advanced airway, but we must keep the patient's hemodynamic status in mind. Many protocols suggest administering low doses of sedation and high doses of paralytics to patients who are suffering from shock. The point of this is to make sure that we don't cause a significant decrease in blood pressure from sedation while making sure we administer enough paralytic that will take effect quickly with the patient's hypo-perfused state.

Techniques

All clinicians use techniques to accomplish many different tasks in the prehospital field. Some techniques are deliberate while others are done without much forethought. During aggressive airway management we must deliberately use many techniques to give our patients and ourselves the best chance of success. Techniques are important from the very beginning of airway management and usually begin with patient positioning. Patient positioning is one more thing that has changed significantly over the last decade in the prehospital environment. We now know that there are three very specific axes (oral, laryngeal, and pharyngeal) that need to be obtained to give clinicians the best view of the patient's airway. How we get those three axes in view is often called the ear to sternal notch or "sniffing" position. This technique is one of the most beneficial for direct or video laryngoscopy. This technique also greatly improves bag valve mask ventilation which can be one of the more difficult tasks to do correctly during airway management.

When ventilating a patient via bag valve mask there are many techniques used to facilitate adequate ventilation. This is a basic skill that is often overlooked for proficiency. Bag valve mask ventilation should only be attempted after patient positioning has been optimized with the use of basic airway adjuncts as described above. However, there are other factors that can contribute to difficult ventilation using a bag valve mask. Patient anatomy, size, trauma, and other factors such as facial hair are a few that can make ventilation via bag valve mask difficult. When providing one person bag valve mask ventilation it is recommended that you use the C/E method using the middle finger to pull the mandible to the mask while your thumb and index finger are creating the mask seal [5]. When providing two-person bag valve mask ventilation it's recommended that you use the "two thumbs down" technique to create a better seal and ventilation. This is accomplished by one rescuer at the patient's head using one hand on each side of the mask to push the mask to the patient's face while using their fingers to pull both sides of the mandible to the mask while the second rescuer provides ventilation[5].

What about suction techniques? Who would have thought ten years ago that there would be a "technique" to suctioning our patients during advanced airway management? We have all used suctioning at one point or another during airway management and when it's needed it has probably been less than favorable in the past. Insert Dr. Ducanto who is an anesthesiologist that invented a large diameter rigid suction catheter changing airway management forever! Honestly, if you don't know what I'm talking about look it up. It is a must for prehospital airway management. With its design Dr. Ducanto also developed the SALAD (suction assisted laryngoscopy and airway decontamination) technique which should be used in every single intubation attempt regardless if you believe the airway is contaminated or not. Like many techniques it takes getting used to leading with the suction

catheter and leaving it in the airway while continuing with your airway management, but with practice it becomes second nature and improves overall success.

Now let's talk regular stylets, bougies, and rigid stylets... We all have our preferences when it comes to which one we prefer, and the data is inconclusive on if one is better than the other [3]. What I can tell you is finding the adjunct and technique you are most successful and comfortable with using is going to give you the best results if you frequently practice with that specific adjunct and technique. There are many specific techniques to using stylets, bougies, and rigid stylets which give each of them certain advantages. Just like any tool knowing how and when to use it is what really matters.

Video laryngoscopy is probably the biggest advancement in the prehospital environment over the last decade. With proven improvement in first pass success rates video laryngoscopy should be the go-to tool for endotracheal intubation in the prehospital environment. With the many different types and brands of video laryngoscopes there are of course many different techniques that come to play. One disadvantage of video laryngoscopes that is frequently brought up is the view can quickly be obstructed by a contaminated airway. This is easily taken care of when using the SALAD (suction-assisted laryngoscopy and airway decontamination) technique we discussed earlier in the article. The other technique that is huge when using video laryngoscopy or even direct laryngoscopy for that matter is placing the blade on the tip of the tongue and working your way down the airway identifying landmarks as you go and methodically advancing the blade until you reach the glottis. Gone are the days of just sticking the blade down a patient's airway and backing out "until you see the cords fall into view". This is an absolute terrible thing to do to your patient and should no longer be practiced.

What's to Come?

I hope and truly believe prehospital airway management is going to continue to progress and improve across the nation. There is some movement to take drug assisted airway management away from prehospital providers which I personally believe would be detrimental to patients across the nation. That being said, there is a high level of responsibility on the medical directors, agencies, and clinicians to make sure that we are keeping up with continuing education, frequently using high fidelity manikins to practice our skills, using quality assurance/improvement, and giving constant feedback to clinicians in order to maintain a high standard and provide a high level of care. More recently the National EMS Quality Alliance has begun publishing nationwide evidence-based quality measures which will allow us to compare our agencies to others across the nation to improve the experience and outcomes of patients and care providers [4].

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