The Emergency Airway Algorithms

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CHAPTER 3  THE EMERGENCY AIRWAY ALGORITHMS

This chapter presents and discusses the emergency airway algorithms, which we have used, taught, and refined for >15 years. These algorithms are intended to reduce error and improve the pace and quality of decision making for an event that is uncommonly encountered by most practitioners, and often disrupts attempts at sound and orderly clinical management.

When we first set out to try to codify the cognitive aspects of emergency airway management, we were both liberated and impaired by the complete lack of any such algorithms to guide us. In developing The Difficult Airway Course: Emergency™, The Difficult Airway Course: Anesthesia™, and The Difficult Airway Course: EMS™, and in applying successively each iteration of the emergency airway algorithms to tens of thousands of real and simulated cases involving thousands of providers, we felt guided by both our continuous learning about optimal airway management and the empirical application of these principles on a large scale. They are based on the best evidence available and the opinions of the most reputable experts in the field of emergency airway management. These algorithms, or adaptations of them, now appear in many of the major emergency medicine textbooks and online references. They are used in airway courses, for residency training, and in didactic teaching sessions, both for in-hospital and out-of-hospital providers. They have stood the test of time and have benefited from constant update.

The revolution in video laryngoscopy has caused us to rethink concepts related to the definition and management of the “difficult airway” (see Chapter 2). This current iteration reflects the broader application of flexible endoscopic methods, which formerly were all flexible fiberoptic scopes, now improved by adoption of complementary metal-oxide semiconductor video, which largely will supplant fiberoptic devices. There are new options with extraglottic devices (EGDs), both with and without intubating capability. Surgical airway management, while still an essential skill, moves from uncommon to rare as the sophistication of rescue devices and techniques increases.

Together, as before, these algorithms comprise a fundamental, reproducible approach to the emergency airway. The purpose is not to provide a “cookbook,” which one could universally and mindlessly apply, but rather to describe a reproducible set of decisions and actions to enhance performance and maximize the opportunities for success, even in difficult or challenging cases.

The specialized algorithms all build from concepts found in the universal emergency airway algorithm, which describes the priority of the key decisions; the determination whether the patient represents a crash airway, a difficult airway, or a failed airway. The algorithms do not attempt to deal with the decision to intubate. This is discussed in Chapter 1. Therefore, the entry point for the emergency airway algorithm is immediately after the decision to intubate has been made.

This iteration of the algorithms introduces a new concept, the “forced to act” situation. There are clinical circumstances in which it is essential to use neuromuscular blocking agents (NMBA) even in the face of an identified difficult airway, simply because there is not sufficient time to attempt any other approach. The operator, forced to act, uses an induction agent and an NMBA to create the best possible circumstances for intubation. In other words, to take the one best chance to secure the airway, and for successful rescue should the primary method fail. An example of this might be the morbidly obese difficult airway patient who prematurely self-extubates in the ICU and is agitated, hypoxic, and deteriorating. Although the patient’s habitus and airway characteristics normally would argue against the use of rapid sequence intubation (RSI), the need to secure the airway within just a few minutes and the patient’s critical deterioration mandate immediate action. By giving an NMBA and induction agent, the operator can optimize conditions for video or direct laryngoscopy, with a plan to either insert a laryngeal mask airway (LMA) or perform a surgical airway if unsuccessful. In some cases, the primary method may be a surgical airway.

The algorithms are intended as guidelines for management of the emergency airway, regardless of the locus of care (emergency department [ED], inpatient unit, operating room, ICU, and out-of-hospital). The goal is to simplify some of the complexities of emergency airway management by defining distinct classes of airway problems. For example, we single out those patients who are essentially dead or near death (i.e., unresponsive, agonal) and manage them using a distinct pathway, the crash airway algorithm. Similarly, a patient with a difficult airway must be...
identified and managed according to sound principles. Serious problems can ensue if a NMBA is given to a patient with a difficult airway, unless the difficulty was identified and planned for and the NMBA is part of that planned approach.

In human factors analysis, failure to recognize a pattern is often a precursor to medical error. The algorithms aid in pattern recognition by guiding the provider to ask specific questions, such as “Is this a crash airway?” and “Is this a difficult airway?” The answers to these questions group patients with certain characteristics together and each group has a defined series of actions. For example, in the case of a difficult airway, the difficult airway algorithm facilitates formulation of a distinct, but reproducible plan, which is individualized for that particular patient, yet lies within the overall approach that is predefined for all patients in this class, that is, those with difficult airways.

Algorithms are best thought of as a series of key questions and critical actions, with the answer to each question guiding the next critical action. The answers are always binary: “yes” or “no” to simplify and speed cognitive factor analysis. Figures 3-1 and 3-2 provide an overview of the algorithms, and how they work together.

When a patient requires intubation, the first question is “Is this a crash airway?” (i.e., is the patient unconscious, near death, with agonal or no respirations, expected to be unresponsive to the stimulation of laryngoscopy?). If the answer is “yes,” the patient is managed as a crash airway using the crash airway algorithm (Fig. 3-3). If the answer is “no,” the next question is “Is this a difficult airway?” (see Chapter 2). If the answer is “yes,” the patient is managed as a difficult airway (Fig. 3-4). If the answer is “no,” then neither a crash airway nor a difficult airway is present, and RSI is recommended, as described on the main algorithm (Fig. 3-2). Regardless of the algorithm used initially (main, crash, or difficult), if airway failure occurs, the failed airway algorithm (Fig. 3-5) is immediately invoked. The working definition of the failed airway is crucial and is explained in much more detail in the following sections. It has been our experience that airway management errors occur both because the provider does not recognize the situation (e.g., failed airway), and because, although recognizing the situation, he or she does not know what actions to take.

**Figure 3-1 ■ Universal Emergency Airway Algorithm.** This algorithm demonstrates how the emergency airway algorithms work together. For all algorithms, green represents the main algorithm, yellow is the difficult airway algorithm, blue is the crash airway algorithm, red is the failed airway algorithm, and orange represents an end point. (© 2012 The Difficult Airway Course: Emergency™.)
The main emergency airway algorithm is shown in Figure 3-2. It begins after the decision to intubate and ends when the airway is secured, whether intubation is achieved directly or through one of the other algorithms. The algorithm is navigated by following defined steps with decisions driven by the answers to a series of key questions:

- **Key question 1: Is this a crash airway?** If the patient presents in an essentially unresponsive state and is deemed to be unlikely to respond to laryngoscopy, then the patient is defined as a crash airway. Here, we are either identifying patients who are in full cardiac or respiratory arrest or those with agonal cardiorespiratory activity (e.g., agonal, ineffective respirations, pulseless idioventricular rhythm). These patients are managed in a manner appropriate for their extremis condition. If a crash airway is identified, exit this main algorithm and begin the crash airway algorithm (Fig. 3-3). Otherwise, continue on the main algorithm.

- **Key question 2: Is this a difficult airway?** If the airway is not identified as a crash airway, the next task is to determine whether it is a difficult airway, which encompasses difficult laryngoscopy and intubation, difficult bag-mask ventilation (BMV), difficult cricothyrotomy, and difficult EGD use. Chapter 2 outlines the assessment of the patient for a potentially difficult airway using the various mnemonics (LEMON, MOANS, RODS, and SMART).
SECTION I  PRINCIPLES OF AIRWAY MANAGEMENT

Critical action: Perform RSI. In the absence of an identified crash or difficult airway, RSI is the method of choice for managing the emergency airway. RSI is described in detail in Chapter 19 and affords the best opportunity for success with the least likelihood of adverse outcome of any possible airway management method, when applied to appropriately selected

Figure 3-3  Crash Airway Algorithm.  See text for details. The portion at the bottom is essentially identical to the corresponding portion of the main emergency airway algorithm. IVP, intravenous push. (© 2012 The Difficult Airway Course: Emergency™.)

corresponding to these dimensions of difficulty. Difficult video laryngoscopy is sufficiently new and rare that useful predictive parameters have yet to be defined. This is discussed further in Chapter 2. It is understood that virtually all emergency intubations are difficult to some extent. However, the evaluation of the patient for attributes that predict difficult airway management is extremely important. If the patient represents a particularly difficult airway situation, then he or she is managed as a difficult airway, using the difficult airway algorithm (Fig. 3-4), and one would exit the main algorithm. Although it is the LEMON assessment for difficult laryngoscopy and intubation that may be the main driver, evaluation for the other difficulties (BMV, cricothyrotomy, and EGD) also is critical at this point. If the airway is not identified as particularly difficult, continue on the main algorithm to the next step, which is to perform RSI.

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patients. This step assumes that the appropriate sequence of RSI (the seven Ps) will be followed. If the patient is in extreme respiratory distress, or if haste is indicated for any reason, an accelerated or immediate RSI protocol can be used (see Chapter 19). During RSI, intubation is attempted. According to the standard nomenclature of the National Emergency Airway Registry, a multicenter study of emergency intubation, an attempt is defined as activities occurring during a single continuous laryngoscopy maneuver, beginning when the laryngoscope is inserted into the patient’s mouth, and ending when the laryngoscope is removed, regardless of whether an endotracheal tube is actually inserted into the patient. In other words, if several attempts are made to pass an endotracheal tube (ETT) through the glottis during the course of a single laryngoscopy, these aggregate efforts count as one attempt. If the glottis is not visualized and no attempt is made to insert a tube, the laryngoscopy is still counted as one attempt. These distinctions are important because of the definition of the failed airway that follows.

- **Key question 3: Was intubation successful?** If the first oral intubation attempt is successful, the patient is intubated, postintubation management (PIM) is initiated, and the algorithm terminates. If the intubation attempt is not successful, continue on the main pathway.

- **Key question 4: Can the patient’s oxygenation be maintained?** When the first attempt at intubation is unsuccessful, it often is possible and appropriate to attempt a second laryngoscopy without interposed BMV because oxygen saturations often remain acceptable for an extended period of time because of proper preoxygenation. Desaturation may be delayed even further by continuous supplemental oxygen by nasal cannula. In general, supplemental oxygenation with a bag and mask is not necessary until the oxygen saturation falls to
approximately 90%. When the oxygen saturation reaches this level, the appropriate first maneuver is BMV of the patient. This approach underscores the importance of assessing the likelihood of successful BMV (MOANS, see Chapter 2) before beginning the intubation sequence. In the vast majority of cases, especially when neuromuscular blockade has been used, BMV will provide adequate ventilation and oxygenation for the patient, defined as maintenance of the oxygen saturation at 90% or higher. If BMV is not capable of maintaining the oxygen saturation above 90%, better technique, including oral and nasal airways, two-person two-handed technique, and optimal positioning of the patient usually will result in effective ventilation (see Chapter 9). If BMV fails despite optimal technique, the airway is considered a failed airway, and one must exit the main algorithm immediately and initiate the failed airway algorithm (Fig. 3-5). Recognition of the failed airway is crucial because delays caused by persistent, futile attempts at intubation will waste critical seconds or minutes and may sharply reduce the time remaining for a rescue technique to be successful before brain injury ensues.

- **Key question 5:** Have three attempts at orotracheal intubation been made by an experienced operator? There are two essential definitions of the failed airway: (1) “can’t intubate, can’t oxygenate” (CICO) (described previously); and (2) “three failed attempts by an experienced operator.” If three separate attempts at orotracheal intubation by an experienced operator have been unsuccessful, then the airway is again defined as a failed airway, despite the ability to adequately oxygenate the patient using a bag and mask. If an experienced operator has used a particular method of laryngoscopy, such as video laryngoscopy or direct laryngoscopy, for three attempts without success, success with a subsequent attempt is unlikely. The operator must recognize the failed airway and manage it as such using the failed airway algorithm. If there have been fewer than three unsuccessful attempts at intubation, but BMV

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**Figure 3-5** Failed Airway Algorithm. See text for details. EGD, extraglottic device. (© 2012 The Difficult Airway Course: Emergency™.)
is successful, then it is appropriate to attempt orotracheal intubation again, provided the oxygen saturation is maintained and the operator can identify an element of the laryngoscopy that can be improved (e.g., patient positioning or different instrument). Similarly, if the initial attempts were made by an inexperienced operator, such as a trainee, and the patient is adequately oxygenated, then it is appropriate to reattempt oral intubation until three attempts by an experienced operator have been unsuccessful. Rarely, even a fourth attempt at laryngoscopy may be appropriate before declaring a failed airway. This most often occurs when the operator identifies a particular strategy for success (e.g., better control of the epiglottis by using a larger laryngoscope blade) during the third unsuccessful attempt. Similarly, it is possible that an experienced operator will recognize on the very first attempt that further attempts at orotracheal intubation will not be successful. In such cases, provided that the patient has been optimally positioned for intubation, good relaxation has been achieved, and it is the operator’s judgment that further attempts at laryngoscopy would be futile, the airway should be immediately regarded as a failed airway and the failed airway algorithm initiated. Thus, it is not essential to make three laryngoscopic attempts before labeling an airway as failed, but three failed attempts by an experienced operator should always be considered a failed airway, unless the laryngoscopist identifies a particular problem and potential solution, justifying one more attempt.

THE CRASH AIRWAY ALGORITHM

Entering the crash airway algorithm (Fig. 3-3) indicates that one has identified an unconscious, unresponsive patient with immediate need for airway management. It is assumed that BMV or some other method of oxygenation is occurring throughout.

- **Critical action: Intubate immediately:** The first step in the crash algorithm is to attempt oral intubation immediately by direct or video laryngoscopy, or, less commonly, by flexible endoscopy, without pharmacological assist. In these patient circumstances, direct oral intubation has success rates comparable to RSI, presumably because the patients have flaccid musculature and are unresponsive in a manner similar to that achieved by RSI.

- **Key question 1: Was intubation successful?** If yes, carry on with PIM and general resuscitation. If intubation was not successful, resume BMV or oxygenation using an EGD and proceed to the next step.

- **Key question 2: Is oxygenation adequate?** If oxygenation is adequate using a bag and mask or an EGD, then further attempts at oral intubation are possible. Adequacy of oxygenation with a crash airway usually is not determined by pulse oximetry, but by assessment of patient color, chest rise, and the feel of the bag (reflecting patency of the airway, delivered tidal volume, airway resistance, and pulmonary compliance). If oxygenation is unsuccessful in the context of a single failed oral intubation attempt with a crash airway, then a failed airway is present. One further attempt at intubation may be rapidly tried, but no more than one, because intubation has failed, and the failure of oxygenation places the patient in serious and immediate jeopardy. This is a CICO-failed airway, analogous to that described previously. Exit here and proceed directly to the failed airway algorithm (Fig. 3-5).

- **Critical action: Administer succinylcholine 2 mg per kg intravenous push:** If intubation is not successful, it is reasonable to assume that the patient has residual muscle tone and is not optimally relaxed. The dose of succinylcholine is increased here because these patients often have severe circulatory compromise, impairing the distribution and rapidity of the onset of succinylcholine. Bag ventilation is continued for 60 to 90 seconds to allow the succinylcholine to distribute. Remember, it is oxygen the patient requires most, not the ETT. From this point onward, the crash airway algorithm is virtually identical to the corresponding portion of the main airway algorithm, with the exception that the patient has not been adequately preoxygenated, and pulse oximetry is generally incapable of accurately reflecting the state of
Identification of the difficult airway is discussed in detail in Chapter 2. This algorithm (Fig. 3-4) represents the clinical approach that should be used in the event of an identified potential difficult airway.

- **Critical action: Call for assistance.** The “call for assistance” box is linked as a dotted line because this is an optional step, dependent on the particular clinical circumstances, skill of the airway manager, available equipment and resources, and availability of additional personnel. Assistance might include personnel, special airway equipment, or both.

- **Key question 1: Is the operator forced to act?** In some circumstances, although the airway is identified to be difficult, patient conditions force the operator to act immediately, before there is rapid deterioration of the patient into respiratory arrest. An example of this situation is given earlier in this chapter. Another example is a morbidly obese patient with severe status asthmaticus who is hypoxemic, diaphoretic, agitated, and uncooperative. In such cases, there is not time to consider the use of an “awake” technique (see below and Chapter 2), and all rescue techniques, including a surgical airway, are not possible, given the patient’s agitated state. In such circumstances, a prompt decision to give RSI drugs and create circumstances for a best attempt at tracheal intubation, whether by laryngoscopy or surgical airway, often is preferable to considering other (likely impossible) approaches as the patient progresses to respiratory arrest and death. Administration of RSI drugs might permit the operator to intubate, perform a surgical airway, place an EGD, or use a bag and mask to oxygenate the patient. The key is for the operator to make the one best attempt that, in the operator’s judgment, is most likely to succeed. If the attempt, for example, intubation using video laryngoscopy, is successful, then the operator proceeds to PIM. If the attempt is not successful, a failed airway is present, and the operator proceeds to the failed airway algorithm.

- **Key question 2: Is there adequate time?** In the context of the difficult airway, oxygen is time. If ventilation and oxygenation are adequate and oxygen saturation can be maintained over 90%, then a careful assessment and a methodical, planned approach can be undertaken, even if significant preparation time is required. However, if oxygenation is inadequate, then additional oxygenation or BMV is initiated. If oxygenation still is not adequate, move immediately to the failed airway algorithm. This situation is equivalent to a “can’t intubate (the identified difficult airway is a surrogate for can’t intubate), can’t oxygenate (adequate oxygenation saturation cannot be achieved)” failed airway. Certain difficult airway patients will have chronic pulmonary disease, for example, and may not be able to reach an oxygen saturation of 90%, but can be kept stable and viable at, say, 86%. Whether to call this case a failed airway is a matter of judgment, based on the adequacy of oxygenation. If a decision
is made to proceed down the difficult airway algorithm rather than switching to the failed airway algorithm, it is essential to be aware that in cases such as this desaturation will occur rapidly during intubation attempts (see Chapter 19) and to increase vigilance with respect to hypoxemia.

- **Key question 3: Despite the presence of the difficult airway, is RSI indicated?** If the patient is adequately oxygenated, the next step is to consider RSI. This decision hinges on two key factors.

  The first, and most important factor is whether one predicts with confidence that gas exchange can be maintained by BMV or the use of an EGD if RSI drugs are administered rendering the patient paralyzed and apneic. This answer may already be known if BMV has been required to maintain the patient’s oxygenation or if the difficult airway evaluation (see Chapter 2) did not identify difficulty for oxygenation using BMV or an EGD. Anticipating successful oxygenation using BMV or an EGD is a virtually essential prerequisite for RSI, except in the “forced to act” situation described above. In some cases, it may be desirable to attempt a trial of BMV, but this approach does not reliably predict the ability to bag-mask ventilate the patient after paralysis.

  Second, if BMV or EGD is anticipated to be successful, then the next consideration is whether intubation is likely to be successful, despite the difficult airway attributes. In reality, many patients with identified difficult airways undergo successful emergency intubation employing RSI, particularly when a video laryngoscope is used. So if there is a reasonable likelihood of success with oral intubation, despite predicting a difficult airway, RSI may be undertaken. Remember, this is predicated on the fact that one has already judged that gas exchange (BMV or EGD) will be successful following neuromuscular blockade. In these cases, RSI is performed using a “double setup,” in which the rescue plan (often cricothyrotomy) is clearly established, and the operator is prepared to move promptly to the rescue technique if intubation using RSI is not successful (failed airway). In most cases, however, when RSI is undertaken despite identification of difficult airway attributes, appropriate care during the technique and planning related to the particular difficulties present will result in success.

  To reiterate these two fundamental principles, if gas exchange employing BMV or EGD is not confidently assured of success in the context of difficult intubation, or if the chance of successful oral intubation is felt to be poor, then RSI is not recommended, except in the “forced to act” scenario.

- **Critical action: Perform “awake” laryngoscopy:** Just as RSI is an essential technique of emergency airway management, “awake” laryngoscopy is the cornerstone of difficult airway management. The goal of this maneuver is to gain a high degree of confidence that the airway will be secured if RSI is performed. Alternatively, the airway can be secured during the “awake look.” This technique usually requires moderate sedation of the patient, similar to that used for painful procedures, and the liberal use of local anesthesia (usually topical) to permit laryngoscopy without inducing and paralyzing the patient (see Chapter 23). The principle here is that the patient is awake enough to maintain the airway and effective spontaneous ventilation, but is sufficiently obtunded to tolerate the awake look procedure. Thus, strictly speaking, “awake” is somewhat of a misnomer. The laryngoscopy can be done with a standard laryngoscope, flexible endoscope, video laryngoscope or a semirigid fiberoptic or video-intubating stylet, such as the Shikani Optical Stylet. These devices are discussed in detail in Chapters 12 to 16. Two possible outcomes are possible from this awake examination. First, the glottis may be adequately visualized, informing the operator that oral intubation using that device is highly likely to succeed. If the difficult airway is static (i.e., chronic, such as with ankylosing spondylitis), then the best approach might be to proceed with RSI, now that it is known that the glottis can be visualized, using that same device. If, however, the difficult airway is dynamic (i.e., acute, as in smoke inhalation or angioedema), then it likely is better to proceed directly with intubation during this awake laryngoscopy, rather than to back out and perform RSI. This decision is predicated on the possibility that the airway might deteriorate further in the intervening time, arguing in favor of immediate
intubation during the awake examination, rather than assuming that the glottis will be visualized with equal ease a few minutes later during an RSI. Intervening deterioration, possibly contributed to by the laryngoscopy itself, might make a subsequent laryngoscopy more difficult or even impossible (see Chapter 34). The second possible outcome during the awake laryngoscopic examination is that the glottis is not adequately visualized to permit intubation. In this case, the examination has confirmed the suspected difficult intubation and reinforced the decision to avoid neuromuscular paralysis. A failed airway has been avoided and several options remain. Oxygenation should be maintained as necessary at this point.

Although the awake look is the crucial step in management of the difficult airway, it is not infallible. In rare cases, an awake look may provide a better view of the glottic structures than is visible after the administration of a neuromuscular blocking drug. Thus, although the likelihood that the glottis will be less well seen after paralysis than during the awake look is remote, it is not zero, and the airway manager must always be prepared for this rare eventuality.

**Critical action:** Select an alternative airway approach: At this point, we have clarified that we have a patient with difficult airway attributes, who has proven to be a poor candidate for laryngoscopy, and thus is inappropriate for RSI. There are a number of options available here. If the awake laryngoscopy was done using a direct laryngoscope, a video laryngoscope or flexible endoscope likely will provide a superior view of the glottis. The main fallback method for the difficult airway is cricothyrotomy (open or Seldinger technique), though the airway may be amenable to an EGD that facilitates intubation, that is, one of the intubating LMAs (ILMAs). In highly select cases, blind nasotracheal intubation may be possible, but requires an anatomically intact and normal upper airway. In general, blind nasotracheal intubation is used only when flexible endoscopy is not available or is rendered impossible by excessive bleeding in the airway. The choice of technique will depend on the operator’s experience, available equipment, the particular difficult airway attributes the patient possesses, and the urgency of the intubation. Whichever technique is used, the goal is to place a cuffed ETT in the trachea.

**THE FAILED AIRWAY ALGORITHM**

At several points in the preceding algorithms, it may be determined that airway management has failed. The definition of the failed airway (see previous discussion in this chapter and in Chapter 2) is based on one of three criteria being satisfied: (1) a failure of an intubation attempt in a patient for whom oxygenation cannot be adequately maintained with a bag and mask, (2) three unsuccessful intubation attempts by an experienced operator but with adequate oxygenation, and (3) failed intubation using the one best attempt in the “forced to act” situation (this is analogous to the “CICO” situation, but oxygenation by bag and mask, or by EGD, may be possible). Unlike the difficult airway, where the standard of care dictates the placement of a cuffed ETT in the trachea providing a definitive, protected airway, the failed airway calls for action to provide emergency oxygenation sufficient to prevent patient morbidity (especially hypoxic brain injury) by whatever means possible, until a definitive airway can be secured (Fig. 3-5). Thus, the devices considered for the failed airway are somewhat different from, but inclusive of, the devices used for the difficult airway (see Chapter 2). When a failed airway has been determined to occur, the response is guided by whether oxygenation is possible.

**Critical action:** Call for assistance. As is the case with the difficult airway, it is best to call for any available and necessary assistance as soon as a failed airway is identified. Again, this action may be a stat consult to emergency medicine, anesthesia, or surgery, or it may be a call for special equipment. In the prehospital setting, a second paramedic or a medical control physician might provide assistance.
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Key question 1: Is oxygenation adequate? As is the case for the difficult airway, this question addresses the time available for a rescue airway. If the patient is a failed airway because of three failed attempts by an experienced operator, in most cases, oxygen saturation will be adequate, and there is time to consider various approaches. If, however, the failed airway is because of a CICO situation, then there is little time left before cerebral hypoxia will result in permanent deficit, and immediate action is indicated. Many, or most, CICO patients will require surgical airway management, and preparation for a surgical airway should be undertaken. It is reasonable, as the first rescue step, to make a single attempt to insert a rapidly placed extraglottic airway device, simultaneously with the preparation for a cricothyrotomy. Successful oxygenation using the EGD converts the CICO situation into a can’t intubate, can oxygenate situation, allowing time for consideration of a number of different approaches to securing the airway.

Critical action: Achieve an airway using flexible endoscopy, video laryngoscopy, an EGD, a semirigid intubating stylet, or cricothyrotomy. In the can’t intubate, but can oxygenate situation, various devices are available to provide an airway, and most also provide some degree of airway protection. Intubation by flexible endoscopy or video laryngoscopy will establish a cuffed endotracheal in the trachea. Of the EGDs, the ILMAs are preferable because they have a high likelihood of providing effective ventilation and usually permit intubation through the device (see Chapter 10). Cricothyrotomy always remains the final common pathway if other measures are not successful, or if the patient’s oxygenation becomes compromised.

Key question 2: Does the device used result in a definitive airway? If the device used results in a definitive airway (i.e., a cuffed ETT in the trachea), then one can move on to PIM. If an EGD has been used, or intubation was not successful through the ILMA, arrangements must be made to provide a definitive airway. A definitive airway may be provided in the operating room, ICU, or ED, once the necessary personnel and equipment are available. Until then, constant surveillance is required to ensure that the airway, as placed, continues to provide adequate oxygenation, with cricothyrotomy always available as a backup.

CONCLUSIONS

These algorithms represent our best thinking regarding a recommended approach to emergency airway management. The algorithms are intended as guidelines only. Individual decision-making, clinical circumstances, skill of the operator, and available resources will determine the final, best approach to airway management in any individual case. Understanding the fundamental concepts of the difficult and failed airway; identification, in advance, of the difficult airway; recognition of the crash airway; and the use of RSI as the airway management method of choice for most emergency intubations will foster in successful airway management while minimizing preventable morbidity.

EVIDENCE

Evidence for the algorithms. Unfortunately, there are no systematized data supporting the algorithmic approach presented in this chapter. The algorithms are the result of careful review of the American Society of Anesthesiologists difficult airway algorithm, the algorithms of the Difficult Airway Society of the United Kingdom, and composite knowledge and experience of the editors and faculty of The Difficult Airway Courses, who function as an expert panel in this regard.1,2 There has not been, and likely never will be, a study comparing, for example, the outcomes of cricothyrotomy versus alternate airway devices in the CICO situation. Clearly, randomization of such patients is not ethical. Thus, the algorithms
are derived from a rational body of knowledge (described previously) and represent a recommended approach, but cannot be considered to be scientifically proven as the only or even necessarily the best way to approach any one clinical problem or patient. Rather, they are designed to help guide a consistent approach to both common and uncommon airway management situations. The evidence for the superiority of RSI over other methods not involving neuromuscular blockade can be found in Chapter 19.

REFERENCES
