Context-Sensitive Airway Management

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The case presented by Mathew et al. in this issue of Anesthesia & Analgesia presents us with an opportunity to explore a broader view of difficult airway management: first, how a situation or context influences our approach to the problem; second, the “unwritten truth” of bronchoscopic intubation; and third, the importance of gas-exchange preservation over devices and techniques.

In Chinese, the written word for “crisis,” “Wei Ji,” is formed by combining 2 separate words: “Wei” or “danger” and “Ji” or “opportunity.” This combination most likely originated from ancient teachings about how to live a life that thrives while responding to unpredictable mystical, political, and environmental forces. This frame of reference reflects a deep-seated philosophy of cultural survival. History provides a unique context that has resonance and reverberations in this day and age. In other words, although what we do today is often shaped by history and guided by evidence, our actions are frequently tempered by the circumstances (or “context”) in which we act. It has been said that we are in the midst of a medical-legal “crisis.” Perhaps, as the ancient Chinese did, we ought to seize this as an “opportunity,” though alert to the “danger” posed by this “crisis.” But in this modern context, the “opportunity” is shaped by evidence rather than mystical, environmental, and political forces.

Caplan et al. first reported alarmingly poor outcomes related to the management of the difficult airway in their review of the American Society of Anesthesiologists (ASA) closed claims database in 1990. They reported that adverse outcomes associated with respiratory events constituted the single largest class of injury, and litigation, in anesthesia in the United States (34%). The review also identified that most of these airway management–related adverse respiratory outcomes were preventable. Recognizing that reversing this finding was paramount to our specialty, the ASA formed a task force to review the existing evidence and to recommend corrective airway management strategies. The ASA Difficult Airway Algorithm and Guidelines were published in 1993 and subsequently revised in 2003. Although there are limitations to the recommendations, the ASA guidelines provide clinicians with an evidence-based approach to the airway evaluation and management of patients about to undergo an anesthetic. Although it is difficult to assess the true impact of these guidelines on clinical outcomes, a recent review of the closed claims database showed that there are signs of improvement, with reduction in the number of adverse events (especially death and brain death) associated with airway management misadventures. Unfortunately, this improvement was limited to the management of the airway on induction of anesthesia, but not outside the operating room. Clearly, continuing efforts to increase awareness of the difficult airway and improve airway assessment and education, coupled with the enhancement of predictive and management strategies, are crucial to the difficult airway management approach in a controlled environment. The findings of Peterson et al. also suggest that a broader understanding and approach to airway management is needed to improve overall outcome.

During the last 2 decades, many new airway devices and techniques have been developed, and these have changed the landscape of airway practice and management. In addition, there has been a major paradigm shift in airway management, emphasizing gas exchange (ventilation and oxygenation) over tracheal intubation. Clinicians use only 4 methods of ventilation and oxygenation: a bag mask, an extraglottic device (e.g., a laryngeal mask airway), a tracheal tube, and a surgical airway. Selection of one of these techniques to provide gas exchange depends not only on the devices best suited to the patient’s anatomy but also on the situation faced by the clinician. In other words, airway management is “context sensitive” in that it is heavily dependent on the clinical situation and the environment. If, for instance, a patient presents with a history or clinical features predictive of an “impossible” tracheal intubation using a laryngoscope, and also possesses predictors of difficult bag-mask ventilation and difficulty in using an extraglottic device, such as the laryngeal mask airway, it would be prudent for the clinician in the setting of an operating room to secure the airway awake, frequently utilizing a flexible fiberoptic bronchoscope. However, the management plan would be quite different if this same patient required airway management in the prehospital setting, in the emergency department, or in the magnetic resonance imaging suite where skill sets and limited resources play decisive roles. The selection of an airway approach might also be different if the patient requires immediate and rapid emergency airway intervention, if the patient is a small child who is extremely uncooperative, or if the patient is pregnant. There are
multiple situational modifiers that influence how the clinician approaches airway management. The availability of equipment, the expertise of available assistance, and the skill sets of the airway practitioner are all “contextual modifiers” that can determine the approach to airway management. These “modifiers” may be even more significant considerations in a battlefield environment or in developing countries.

Stated another way, airway management is fundamentally about gas exchange, not only about placing a tracheal tube by whatever chosen method. The technique used to assure gas exchange will be dictated largely by the clinical situation and circumstances of the environment. In many situations, simply waking the patient or “cancelling the case” is not a realistic option, particularly in an emergency.

Context-sensitive airway management implies that managing a difficult or failed airway should be driven by the principles of “gas exchange” and not be “device dependent.” Clinicians must be trained to understand the basic principles of airway management using basic techniques and learn how to apply these techniques properly in an appropriate environment. Many clinicians believe that tracheal intubation should always be performed under direct vision and that there is no place for nonvisual or “blind” techniques of airway management. Unfortunately, in many clinical situations, tracheal intubation under direct vision is not possible for a variety of reasons, such as large amounts of blood in the oropharynx. Even devices that “see around corners,” such as videolaryngoscopes, are not perfect. Although visualization of the glottis may be relatively easy, placement of an endotracheal tube (ETT) under the indirect vision provided by these devices is often more difficult than under direct vision.

More importantly, the clinician may select an inappropriate device because of a misunderstanding of how the device works. For example, it would be inappropriate to use a lightwand intubation technique in a morbidly obese patient when transillumination of the neck tissues is predicted to be poor. Similarly, it is a mistake to assume that performing flexible bronchoscopic intubation is a “direct-vision” technique equivalent to laryngoscopic visualization of the glottis. The clinician using the flexible bronchoscope for intubation visualizes the glottic opening indirectly via a camera or through fiberoptic bundles and passes the tip of the bronchoscope into the tracheal lumen positioning the tip just short of the carina. Negotiating the ETT over the bronchoscope into the trachea is done blindly; the bronchoscope serves merely as an “intubating guide,” much like an Eschmann tracheal introducer or “bougie.” Although the bronchoscope can be used to confirm the location of the tip of the ETT after the tube placement, at no time during the insertion of the ETT over the bronchoscope can the tip of the ETT be visualized by the operator. As a result, tracheal intubation using a flexible bronchoscope should be used with great caution in patients with upper airway lesions, such as retropharyngeal abscess, pedunculated polyps or tumors at the glottis, and foreign bodies in the upper airway.

Mathew et al.,1 in this issue of *Anesthesia & Analgesia*, illustrate this principle. They reported the management of a patient with intralaryngeal rhinosporidiosis presenting with stridor. The mass was pedunculated, moving in and out of the glottic opening with each respiratory cycle. To avoid inadvertent traumatic excision of the mass, with possible displacement of the mass into the trachea during orotracheal intubation, Mathew et al. used 2 endoscopes to aid the tracheal intubation. One flexible bronchoscope was used to advance the ETT through the glottis while a second telescopy was used to observe and guide the ETT in such a manner that trauma to the pedunculated glottic mass was avoided.

This case serves to remind clinicians that tracheal intubation using a bronchoscope is not “direct-vision” intubation and great caution is needed to avoid trauma and other complications when a bronchoscope is used to intubate the trachea. This case also serves to remind clinicians that all airway devices have limitations. Successful outcomes in airway management rely not only on the clinician’s knowledge of and skill in using the airway technique but also on the application of such airway management techniques in a manner that recognizes the prevailing environment and circumstances. In other words, careful evaluation and interpretation of “context” are essential guides to safe airway management practices.

In summary, we wish to make 2 points:

1. Airway management is context sensitive, and
2. Gas exchange is a fundamental principle of airway management.

A change in airway management focus from “devices and techniques” to the “preservation of gas exchange” is crucial. To cling to traditional ways of thinking is to be overwhelmed by the “Wei,” the danger, of a crisis, and to miss the “Ji,” the opportunity, to better serve the needs of patients in that crisis. Rather than being buffeted by mystical, political, or environmental forces, we must seize the opportunity to recognize and welcome a new era: context-sensitive airway management.

REFERENCES