

The Ultimate Difficult Airway: Minimizing Emergency Surgical Access

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As a sage observer once noted, the more treatments there are available for a condition, the less likely any of them are ideal. The same principle might hold for assessing and managing airway difficulties. Readers well know how our literature is replete with tests, scoring systems, and devices aimed at anticipating and dealing with these vexing problems. However, a small but persistent number of unanticipated airway catastrophes and near-catastrophes seem to occur. No method of examination can identify the variety of pathologies connoted by the term “difficult airway,” and certainly no single piece of equipment can resolve all of these difficulties. Other components include lack of equipment or facility in its use and even failure to identify previously discovered difficulties. Thus, it requires a combination of best practices in preoperative evaluation, communication about prior experiences, availability of airway equipment, and training to deal with the small but important population occupying the very end layers of the American Society of Anesthesiologists’ algorithm¹ for management of the difficult airway.

In this issue of *Anesthesia & Analgesia*, Dr. Berkow et al.² document how a multifaceted program instituted in 1996 contributed to a sharp reduction in, but not complete elimination of, emergency surgical airways in a large teaching hospital. There were 5 components: 1) Information: Patients were reported to a centralized database; they were given special hospital identification bands and written information for future reference by medical personnel; and they were encouraged to enroll in the MedicAlert® difficult intubation registry. 2) Evaluation: The anesthesia preoperative evaluation form was redesigned to target more specific issues in airway assessment; patients with possibly difficult airways were noted on the operating room (OR) schedule. 3) Equipment: Standardized difficult airway carts were placed to be readily accessible in the ORs, obstetric unit, and intensive care units. 4) Training: Regularly scheduled training sessions were developed for staff and residents, including a “difficult airway” rotation for residents and twice yearly interdisciplinary grand rounds. 5) Oversight: An interdisciplinary team was formed to serve as expert resources, trainers, and supervisors of the program.

The effort paid dividends. In the 4 yr before 1996, there were 6–7 emergency surgical airways required per year because an anesthesiologist was unable to intubate the trachea or ventilate the patient’s lungs. For the 11 yr after instituting the program, the range of emergency surgical airways was 0–3 per year, even though the patient population had increased by more than 50%.

No single component of the program can be identified as responsible for the improvement. Surely, many things were happening during the years the program was underway. There was rapid growth in recognizing the problem of difficult airways. Hundreds of articles have appeared in the anesthesia literature, documenting new observations, assessment tools, intubation devices, and in many cases, revisiting the old (e.g., the reintroduction of lighted stylets in the 1990s subsequent to their first introduction in the 1950s). Fiberoptic devices proliferated in the 1990s, and, in the 2000s, we have witnessed the introduction of camera-based videolaryngoscopes. Computers have become accessible in or near most ORs, and software to

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manage databases has been developed. So, it is gratifying to see this study that so clearly documents that these innovations collectively have made a difference in this one aspect of anesthesia care.

One of the issues that electronic medical records (EMRs) should resolve is the problem of failing to discover information that is already available. In fact, it is conceivable that some of the reduction in emergency surgical airways lies with elimination of cases in which the difficult airway was unexpectedly rediscovered during a subsequent encounter. But an EMR is only as useful as the data entered. In the study by Berkow et al., when a web-based reporting system was substituted for the previous system in which a member of the difficult airway team was paged, the number of difficult airways reported per year actually decreased. That there was a true reduction in the number of difficult airways is unlikely, so one can surmise that reporting became more onerous, or more relaxed attitudes about labeling patients "difficult" emerged.

Regarding the first possibility, although EMRs facilitate information cataloging and retrieval,³ they also introduce barriers to providing that information. Barriers include the effort required to enter free text,³ limited selection from checklists, or tediously long branching menus.^{4,5} A reasonable alternative to relieve the physician altogether of keyboard tasks would be a dictated note based on a standardized template, which is then transcribed to the EMR.⁶

The other possible explanation for the reduction in reported difficult airways is that with increased varieties of rescue devices, operators may have shifted their criteria about labeling a patient as "difficult."⁷ Berkow et al. allude to this in stating, "providers may not have reported a patient as a difficult airway if awake intubation was chosen as the primary technique and no difficulty was encountered." This highlights the need to use a common vocabulary for the term "difficult airway."⁸ Difficulty is a *post hoc* finding of problematic mask ventilation, laryngoscopy, or intubation. The meaning has been understandably nebulous,^{1,9} because it encompasses a vast territory of craniofacial, supraglottic, and infraglottic anatomical problems, as well as changing airway dynamics. Thus, it is essential when reviewing studies and recommendations that one distinguish between anticipated and proven difficult airways and what criteria were used for classification.

The anticipated difficult airway is based on a clinical array of findings, which have weak positive predictive value for difficult mask ventilation, laryngoscopy, or intubation.^{8,10,11-13} How to approach a patient with an anticipated difficult airway is thus a matter of judgment, strongly colored by the operator's experience.¹⁴ If my collegial groups over the years are representative, enthusiasm to undertake fiberoptic intubation ranges from reluctant to hopeful, with a small number at the "comfortably confident" side of the curve. I

suspect a large part of this variability can be explained by the inability to practice the technique regularly. Preparation of equipment and patient are time-consuming barriers to frequent rehearsal.

The ease of direct visualization of the larynx through the newer videolaryngoscope and rigid optical laryngoscope has shifted the concept of a difficult intubation. The techniques are intuitive, easily learned, and highly successful.¹⁵ Thus, they can be practiced often, with no interruption in schedules. Though not supplanting flexible fiberoptic, the new laryngoscopes likely will have rendered a large fraction of anticipated difficult airways easily managed. Should these patients be labeled "difficult"? Should elective videolaryngoscopic intubation be accompanied by conventional laryngoscopy for documentation of true "difficulty"? Additionally, the videolaryngoscopes may be responsible for rescued intubation attempts in many unanticipated difficult airways. Further research is needed to find whether any positive impact on morbidity they have is not countered by complications of their use.¹⁶

To avoid the confusion attended by labeling airways difficult or anticipated difficult, one might simply specify whether intubation could be accomplished with 1) a simple means of direct glottic visualization (using a conventional laryngoscope or a rigid video or optical device) or 2) a complex technique, such as fiberoptic bronchoscope or multistep procedure (e.g., with laryngeal mask airways and tube exchangers). Thus, the confusion about what is meant by "difficult laryngoscopy"⁸ would be a moot point. The distinction is between one-step devices taking almost no more time or effort than conventional direct laryngoscopy and techniques that require specialized training, preparation, or multiple steps.¹⁷ Finally, a variety of blind techniques and devices may be used per the operator's experience. Whichever approach is taken for the patient with an anticipated difficult airway, it may not be known for sure if conventional laryngoscopy would have sufficed. Given the variety of meanings, skills, and lack of reproducibility in scoring laryngoscopy,^{8,12} that may not be so important as recording the method and ease of intubation. I believe we are entering an era in which no anesthesia or emergency department will want to be without a videolaryngoscope or rigid optical laryngoscope.

The need for surgical airways will not totally disappear, as evidenced in Table 5 in the article by Berkow et al. in which 7 patients are listed as requiring surgical airways after emergence from anesthesia. Five patients had nondifficult intubations initially, yet could not be intubated at the point of postoperative decompensation. As another example, in some thyroidectomy patients with postoperative bleeding, rapid hematoma expansion in the closed space under the strap muscles promoted venous congestion and lymphatic obstruction, causing edema and distortion

of laryngeal structures. Patients who had easy laryngoscopies then became impossible to intubate. Opening the suture line may fail to relieve obstruction. If a rapid fiberoptic intubation does not succeed, there should be little hesitation to proceed to a surgical airway, because the trachea is easily exposed by retracting the strap muscles.¹⁸

Prevention of emergency surgical airways may be impossible, but poor outcomes can be avoided by implementing the comprehensive approach highlighted by Dr. Berkow et al.: dissemination of important information, multidisciplinary cooperation, early recognition of problems, skillful use of the variety of devices now available, and an unhesitating willingness to call for help.

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