

Issues in Intubation:

# Preparation, Management, and Equipment for the Difficult Airway

by Steven E. Sittig, RRT

**I**ntubation is a procedure performed by many medical personnel today, including respiratory therapists. The experience and technical skill of the person performing the intubation can make it look easy and uncomplicated, but anyone who performs this procedure must be aware and trained to deal with the small percentage of patients who present as “difficult intubations.”

Difficult direct laryngoscopy occurs in 1.5 to 8.5 percent of general anesthetics, and difficult intubation occurs at a similar incidence.<sup>1</sup> Airway-related adverse outcomes in anesthesia led to the concept of the term “difficult airway.” The American Society of Anesthesiologists

defines a difficult airway as “The clinical situation in which a conventionally trained anesthesiologist experiences difficulty with mask ventilation, difficulty with tracheal intubation or both.”<sup>2</sup> Reviews of closed malpractice claims have shown that prolonged and persistent intubation attempts were the most common scenarios that resulted in catastrophic respiratory events.<sup>2</sup>

When catastrophic respiratory events occur, it is of paramount importance that the airway be established. Repeated forceful laryngoscopy can cause edema and bleeding that can lead to the inability to ventilate, resulting in hypoxia and death. Every institution should have a

difficult airway algorithm and the necessary personnel and equipment to quickly and effectively establish an airway.

## Predicting difficult intubations

Determining just which patient might pose a difficult intubation or risk requires a systematic approach by the anesthesiologist prior to any patient undergoing anesthesia prior to intubation.

The definition of just what defines the conditions of a difficult intubation has many variants. Some papers have used repeated intubation attempts or the use of other intubation aids such as a bougie tube.<sup>3,4</sup>

Utilizing the correlations of

patient history and physical examination, about 90 percent of difficult intubations are predictable. One physical examination classification system by Cormack and Lehane describes the best view of the larynx seen at laryngoscopy. Figure 1 shows the four classes of the Cormack/Lehane system. In this system, a grade 4 would most likely prove the most difficult intubation.

Another screening tool used in determining a potentially difficult intubation is the system developed by Mallampati and subsequently modified by Samsoon and Young. During this examination, the patient sits in front of the anesthetist and opens his mouth wide. The patient is then assigned a grade according to the best view obtained.

The concept behind this classification system is that the tongue is larger than normal, obscuring the view of other structures, and it “hangs over” the entrance of the larynx (see Figure 2).

The most difficult intubations are those in the Class 3 and Class 4 categories. The results of this test are influenced by the patient’s ability to open his mouth, the size and mobility of the tongue, and other intra-oral structures and movement at the craniocervical junction.

Thyromental distance examination can also be used to determine a potentially difficult intubation. This is a measurement taken from the thyroid notch to the tip of the jaw, with the head extended. The normal thyromental distance is

6.5 cm or greater and is dependent on several contributing anatomical factors, including the position of the larynx. If the thyromental distance is greater

In 1991, Frerk published a study that looked at combining the modified Mallampati system with thyromental distance to predict the majority of the

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than 6.5 cm, then conventional intubation is usually possible; if it is less than 6 cm, intubation may be impossible.<sup>5</sup>

difficult intubations. A patient who presented with a Mallampati grade 3 or 4 and had a thyromental distance of less than 7

Figure 1. Classification of Laryngoscopy Views

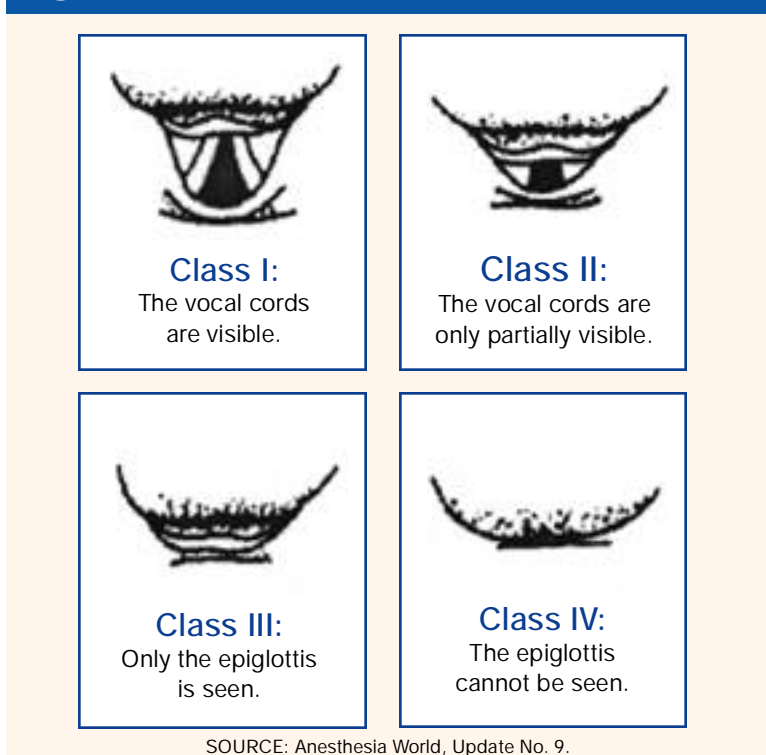
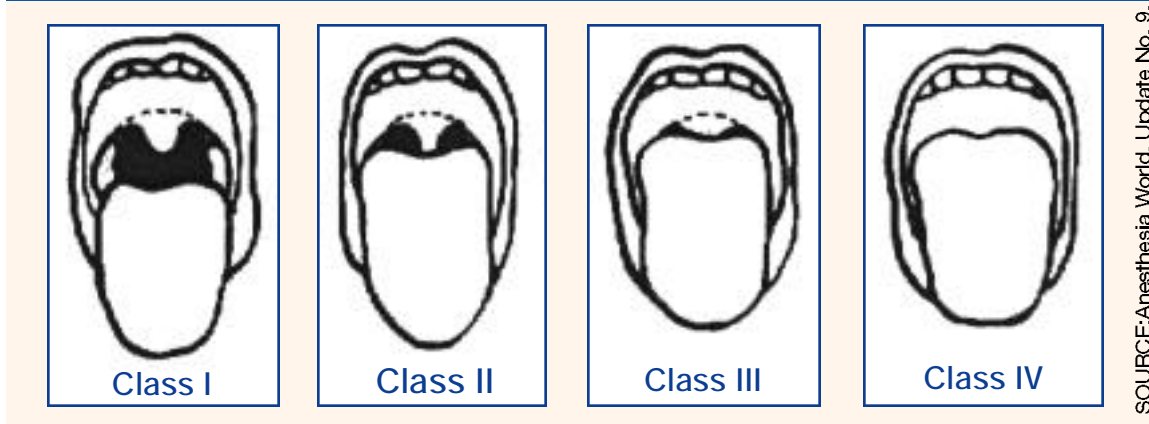


Figure 2. **Alternate Laryngoscopy Screening System**

SOURCE: Anesthesia World, Update No. 9.

cm was likely to present as a difficult intubation.<sup>6</sup>

There is no one good predictor of who may be a difficult intubation risk; but utilization of several examination systems and proper history can potentially identify the difficult airway and, therefore, allow for the proper management to be rendered when establishment of an airway is needed. Any notation of these systems in a patient's record that indicates a potential difficult intubation risk needs to be considered and passed on to all caregivers, especially respiratory therapists, who are often responsible for intubations and airway management.

#### Procedures and equipment in the difficult airway

While 90 percent of difficult intubations can be predicted, it is the remaining 10 percent for which medical personnel must anticipate and be trained to properly respond. In the early 1990s, the American Society of Anesthesiologists published and then updated clinical guidelines dealing with difficult intubations. Since the publication of

this systematic approach to the difficult airway, there has been a 30 to 40 percent decrease in respiratory-related malpractice cases, brain damage, and death.<sup>3</sup>

Many specialized systems and equipment have been designed to handle these difficult airway issues. Equipment such as the Laryngeal Mask Airway (LMA) and the Combi-tube are two examples of specialized airway adjuncts. Fiberoptic systems such as the WuScope, Bullard scope, flexible fiberoptic bronchoscope, along with fiberoptic stylets are important new options for dealing with a difficult airway.

When a difficult visualization of the airway is discovered during direct laryngoscopy, the clinician should not make more than two or three attempts.<sup>2</sup> After the first failed attempt, the patient should be supported with bag/mask ventilation with 100 percent oxygen, and cricoid pressure should be held.

The ability to maintain the airway with bag/mask is as important as the actual act of laryngoscopy and should be established before any intubation attempt is made. When

composing this article, I was reminded of something one of my consultant neonatologists told me when I first began intubating children. I can still hear Dr. Fred Kleinberg saying: "You can teach almost anyone how to hold the laryngoscope and look. The skill comes in when you need to maintain the airway with bag/mask ventilation prior to and after any intubation attempt."

When apparent difficulty in establishing an airway occurs (in both adults and children), the person performing the intubation should quickly rethink the procedure and look for any simple situation that might have affected the intubation attempt. Tracheal intubation is best accomplished in the classic "sniff" position in which the neck is flexed and there is extension of the craniocervical (atlantoaxial) junction. This position aligns the structures of the upper airway in the optimum position for laryngoscopy.

Many times, adequate positioning of both the patient and the operator will significantly improve the success percentage. If unsuccessful after the second

attempt, the operator needs to evaluate if there is a physical component with the patient that is making the procedure unsuccessful. If there is a problem that is making this a difficult airway, the institutional policy of difficult airway algorithm should be initiated. All the while, the patient should be either supported by bag/mask ventilation or allowed to recover from anesthesia.

### Familiarity with algorithms key

All respiratory therapists should be familiar with their institution's difficult airway

algorithm and equipment. While many RTs do not receive the advanced training to utilize these adjuncts to a difficult airway, they should be able to assist and should understand the operation of each piece of equipment. As more respiratory therapists get involved in the placement of endotracheal tubes, they must be aware of the 10 percent of patients who can present as a "difficult airway."

Detailed attention to each patient's chart history and physical features can help avoid the potential serious problems caused by the difficult airway. With the increased responsibil-

ity gained in providing airway management, comes the need for respiratory therapists to be educated and aware of the risks and actions needed in attempting placement of an airway in a patient with a suspected or documented difficult airway. Being aware of this 10 percent of the patient population that exists in the clinical environment can lead to improved airway and patient management provided by respiratory care practitioners. 🧠

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