

REVIEW ARTICLE

Anticipated and Unanticipated Difficult Airway: A Practical and Logical Approach; A Narrative Review

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Stability of the airway is a fundamental element of acute care medical practice. While airway management is conceptually straightforward, the wide variety of clinical circumstances, patients, and tools can make the task of ensuring a stable, open airway under all clinical conditions extremely challenging. Care providers involved in airway management must therefore not only be technically skilled but also sufficiently flexible to adjust changing the conditions, risk/benefit balances, and goals. One aspect of airway management that requires particular attention is the airway that is difficult to secure or keep patent. For clinical or anatomic reasons, both bag mask ventilation and tracheal intubation in such a patient population may be difficult without specialized expertise or tools. Because adequate oxygen delivery through a patent airway is critical to life support and resuscitative efforts, the risks of inadequate airway management are high, adding to the challenge. One significant advance in difficult airway management is the development of algorithms to standardize the technical approach to successful endotracheal intubation in a patient with a difficult airway. Such algorithms are relatively recent (The American Society of Anesthesiologists difficult airway algorithm updated in 2015), and integrate clinical experience, evidence, and technical expertise into a stepwise approach to anticipated and unanticipated airway challenges.

keywords: ASA; anticipated; unanticipated difficult airway; airway management

Keeping a patent airway after induction of anesthesia is one of the main problems for anesthesiologists in anesthesia practice. The safety margin and mortality rates are significantly reduced by following of the algorithms and organizational techniques in medical institutions [1-2]. Difficult airway can be defined as a clinical state of difficult management of patient ventilation with face mask or endotracheal tube or both of them by the efficient and experienced anesthesiologist. In spite of the fact that the incidence in which both states emerge together (intubation failure plus ventilation failure) is low, measured at less than 0.01%, it shows a quite critical state within the maneuvers of anesthetic induction [3]. Difficult intubations attribute to significant morbidity and mortality in anesthesia [4-5]. It is worth mentioning that difficult airway management can be regarded a challenge and is a central issue of anesthesia practice. Nowadays, failing in management of the difficult airway is a major reason of complications in the field of anesthesia, something that has resulted in systematic updates to the management algorithms and the emergence of new technologies. In case difficult

airway is known, it is specified as a personal record in the clinical history of the patients, and it is a necessary element in the process of provision and decision taking on their anesthetic plan. In this situation, the suitable view point is to apply an orotracheal intubation in which the patient does not lose their spontaneous breathing, that is, an “awake intubation” [5-6]. This view, either with the help of a fibroscope or video laryngoscopy, is a precious maneuver for the patients, and it is crucial that they have understood the significance and compatibility of the mentioned procedure and those they cooperate as much as possible with the anesthesiologists who carry it out. Considering the point that although alternative techniques in an unanticipated difficult ventilation or tracheal intubation are substantially big, only two researches have prospectively evaluated the usefulness of a predefined algorithm in an unanticipated difficult airway [7-8]. The first research mentioned the interest of systematic implication of the laryngeal mask airway (LMA) in the case of a combined unanticipated difficult intubation and ventilation. The researchers revealed that 94% of the patients treated with the LMA as the first rescue alternative technique were successfully ventilated. In the recent years, a research claimed high success rate of tracheal intubation employing both the ILMA™ and the light wand in [9] unpredicted laryngoscopy-assisted tracheal intubations. For protecting the airway, tracheal intubation utilizing direct laryngoscopy keeps the method of selection in majority of cases. However, direct laryngoscopic intubation is difficult in 1–4% and impossible in 0.05–0.35% of patients who have apparently normal airway [10]. The adverse respiratory results connected to difficult airway extend from sore throat and different traumatic airway damages up to brain injury and death [11]. Death and brain injury in assertions comes

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from difficult airway management related with induction of anesthesia, but not other phases of anesthesia were reduced in 1993–1999 compared with 1985–1992 because of development of extra management strategies for prediction and management of difficult airways [2]. The American Society of Anesthesiologists (ASA) has developed guidelines, “The ASA Algorithm on the Management of the Difficult Airway”, to make easy the management of the difficult airway [12] and with regular updates, the recent one was in 2015 [13]. In addition, a great deal of airway devices has been provided for clinical practice, their position in managing different clinical situations has been researched in lots of publications in anesthesia literature [14–15], and the airway management sessions and workshops become occupying a prominent position in all national and international anesthesia conferences [16]. The expertise of anesthesiologists with the use of different airway devices and their orientation with recent guidelines of airway managements is another field of research in order to identify the current status to use it as a guide for improvement [17]. Practice Guidelines are structurally made advices that help the practitioner and patient in preparation about health care. Such advices can be received, changed, or rejected based on clinical needs and constraints and are not intended to replace local institutional policies. In addition, Practice Guidelines created by the American Society of Anesthesiologists (ASA) are not considered as standards or absolute needs, and their utilization cannot guarantee any particular result [18]. Practice Guidelines can be revised as guaranteed by the advance of medical knowledge, technology, and practice. They present fundamental advices that are accepted by a synthesis and analysis of the current literature, expert and practitioner opinion, open-forum commentary, and clinical feasibility data [19].

Airway Examinations

The safety of anesthesia is predicated on anticipating difficulties in advance instead of reacting to them when they occur. Of course, we do not always have the luxury of time when dealing with unconscious patients. The manner in which we handle the airway is central to the safety of anesthesia because most of the serious problems we encounter in anesthesia usually have an airway component [20]. There are now a number of tests that we can perform during our evaluation that will allow us to detect the problematic airway in the vast majority of cases. Traditionally, we have focused most of our attention on the task of endotracheal intubation and possible problems with that procedure. We need to ask ourselves a more fundamental question when dealing with airway issues. “Will I be able to oxygenate and ventilate this patient if or when he/she becomes unconscious?” [21]. We should be able to answer that question affirmatively in all cases, and if not, we need contingency plans. The only way we can accurately answer this question is if we do a thorough assessment of the airway. Even in a dire emergency, we should be able to answer this question. Fortunately, we will have time to do a proper assessment in most of the cases. Despite the importance of this task, we do not do this very well in many cases and in this text we are appealing to those responsible for airway management to spend more time, not just evaluating the airway, but also recording the findings because quite often in modern practice the person

performing the evaluation is not the person assigned to perform the procedure. We also appreciate that not all airway emergencies involve anesthesia. Airway assessment should be done for all anesthesia encounters, including regional anesthesia or monitored-care cases [21]. The aim of the assessment is to ensure that abnormalities are detected and an appropriate safe strategy considered and employed, very much like making a diagnosis (assessment) and then treating (airway plan). The diagnostic accuracy of various screening tests has varied greatly as a result of differences in definition, incidence of difficult intubation in the study, inadequate statistical power, different test thresholds and differences in patient characteristics. No test is likely to accurately predict it, this makes the unexpected difficult airway a fact of life and it is therefore essential that every anesthetist be equipped to deal with it [22].

Anticipated Difficult Airway

An airway evaluation need to be conducted on every patient needing airway management. For the patient needing tracheal intubation, an airway evaluation is carried out mainly to assist and decide if intubation can be safely conducted after the induction of general anesthesia (with or without maintenance of spontaneous ventilation) or if intubation need to be progressed with the patient awake. Even if a lack of patient cooperation prevents a total airway evaluation or the option of awake intubation, conducting this phase acts as a “cognitive forcing strategy” [23]. Motivating proper planning and preparation for the airway intervention, however should be undertaken. A thorough airway evaluation needs to contain an assessment of not only the predicted ease or difficulty of tracheal intubation but also the predicted success of fail back options to achieve oxygenation, such as face mask ventilation, and surgical airway. As the number of predictors of difficulty grow so does the possibility of simply facing problems [24–25]. Besides physical examination and a history of prior difficulties presented by the patient, records of previous airway interventions, imaging studies, electronic databases and letters carried by the patient should be take into account if time allow and records can be sourced. Other contextual issues must also be take into account, containing patient cooperation, the clinician’s ability and practice, availability of extra skilled assistance, and whether the desired equipment is available [26].

Unanticipated Difficult Airway

The unanticipated difficult airway, a popular clinical problem faced by all anesthesiologists, is possibly the most significant reason of main anesthesia-associated morbidity [27]. For some years, it has been confirmed that strict dependence to a predefined strategy could reduce respiratory disasters and particular anesthesia-related morbidity and mortality [28]. A decade ago, the American Society of Anesthesiologists published a difficult airway management algorithm [29]. According to expert opinion and consensus conferences, strategies for difficult airway management makes sense clinically but has rarely been validated prospectively. Schematically, after induction of anesthesia, two concerning respiratory scenarios are distinguished: “cannot intubate” and “cannot ventilate.” In these circumstances, most recommended strategies for airway

management require the use of airway devices conceived to facilitate tracheal intubation, to create a patent airway, or both.

The Management of Unanticipated Difficult Airway

The transition from the patient maintaining their own airway to the critical care physician using one of the above non-surgical techniques to support the airway, typically involves a decrease in the patient's conscious state. This is associated with the potential for airway obstruction and/or apnea to occur. Techniques which allow airway management without the occurrence of apnea/airway obstruction occurring do exist but may not always be successful or clinically appropriate. Additionally they are usually only implemented when a difficult airway is anticipated. As such they have limited utility in the management of the unanticipated difficult airway. Thus the risk of an interruption to oxygen delivery occurring due to depressed conscious state remains integrally involved with the process of airway management in both the elective & emergency situation [30]. In a routine situation achieving airway patency ultimately involves implementation of the intended definitive airway technique. When establishing a definitive airway becomes difficult, however, the goals of airway management must shift. Factors such as prevention of aspiration & removal of CO₂ may have to be compromised, to achieve the primary goal of AOD. This may require the use of devices to achieve airway patency, other than the selected definitive airway and mechanisms of oxygen delivery other than ventilation. It makes sense that when a functionally difficult airway (FDA) is encountered, the highest likelihood of success in delivering oxygen to the alveoli will result from initial reliance on techniques with which the critical care clinician is most familiar, that is ventilation with oxygen via any of the three non-surgical techniques. If a patient's airway cannot be established following optimal attempts with each of these 3 non-surgical methods and the patient is not yet showing signs of spontaneous recovery of airway and breathing, immediate preparation for progression to an ESA is indicated, regardless of the patient's oxygen saturation level (SaO₂) [31].

Basic Preparation for Difficult Airway Management

Basic preparation for difficult airway management includes:

1. Availability of equipment for management of a difficult airway (i.e., portable storage unit)
2. Informing the patient with a known or suspected difficult airway
3. Assigning an individual to provide assistance when a difficult airway is encountered
4. Pre-anesthetic pre-oxygenation by mask
5. Administration of supplemental oxygen throughout the process of difficult airway management [32].

Recommendation

An airway plan suggests a single approach to management of the airway, but airway strategy is a co-ordinated logical

sequence of plans which aim to achieve good gas exchange and prevention of aspiration. Anesthetists should approach airway management with strategies rather than plans. So in difficult airway management strategy, having general strategy before each case and specific strategy before anticipated difficult airway cases is crucial. Likewise knowledge reinforcement according to recent valid guidelines, preparation and teamwork is important. The best ways for management of anticipated and unanticipated difficult airway are planning (know what we need), communication (know who we need), preparing (have what we need) and finally training (do what we need).

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