Revista Colombiana de Anestesiología
Colombian Journal of Anesthesiology
www.revcolanest.com.co

Review

Extubation of the perioperative patient with a difficult airway☆

Carin A. Hagberg[a,*], *Carlos A. Artime*[b]

[a] *Joseph C. Gabel Professor and Chair, Department of Anesthesiology, University of Texas Medical School at Houston, Houston, TX, United States*
[b] *Assistant Professor, Department of Anesthesiology, University of Texas Medical School at Houston, Houston, TX, United States*

ARTICLE INFO

Article history:
Received 2 July 2013
Accepted 28 May 2014
Available online 26 July 2014

Keywords:
Airway Management
Airway Extubation
Perioperative Period
Intubation
Intratracheal
Anesthesia

ABSTRACT

A considerable amount of literature has been dedicated to the topic of difficult airway management and a number of algorithms and recommendations have been established to safely manage patients at risk for difficult intubation. Only recently, however, has extubation of the difficult airway gained more awareness since this procedure, although elective, is often fraught with complications. The importance of developing pre-planned strategies for extubation of the difficult airway to improve patient safety and outcomes is apparent from data from both the ASA Closed Claims Analysis and the UK's recent Fourth National Audit Project of major complications of airway management. The key to successful management of patients at risk for difficult extubation is accurate risk assessment, application of appropriate strategies, and preparedness by both the individual practitioner and the institution.

Extubación del paciente perioperatorio con una vía aérea difícil

Palabras clave:
Manejo de la Vía Aérea
Extubación Traqueal
Periodo Perioperatorio
Intubación Intraraqueal
Anestesia

RESUMEN

Existe un volumen importante de literatura dedicada al tema del manejo de la vía aérea difícil, y se han desarrollado una serie de algoritmos y recomendaciones para el manejo seguro de pacientes en riesgo de una intubación difícil. Sin embargo, solo recientemente se ha despertado una mayor conciencia acerca de la extubación de la vía aérea difícil, pues aun cuando sea un procedimiento programado, suele estar plagado de complicaciones. La importancia de desarrollar estrategias pre-programadas para la extubación de la vía aérea difícil a fin de aumentar la seguridad del paciente y sus desenlaces se hace evidente a

☆ Please cite this article as: Hagberg CA, Artime CA. Extubación del paciente perioperatorio con una vía aérea difícil. Rev Colomb Anestesiol. 2014;42:295–301.

* *Corresponding author at*: 6431 Fannin, MSB 5.020, Houston, TX 77030-1501, United States.
E-mail addresses: Carin.A.Hagberg@uth.tmc.edu, Carin.Hagberg@gmail.com (C.A. Hagberg).

partir de los datos del ASA *Closed Claims Analysis* y del reciente Cuarto Proyecto Nacional de Auditoría del Reino Unido sobre complicaciones mayores en el manejo de la vía aérea. La clave para un manejo exitoso de los pacientes en riesgo de extubación difícil es efectuar una evaluación precisa de riesgo, aplicar estrategias apropiadas y la preparación tanto del médico como de la institución.

Introduction

Over the last 20 years, much of the attention on difficult airway management has been focused on intubation. The development of Practice Guidelines for Management of the Difficult Airway and the Difficult Airway Algorithm by the American Society of Anesthesiologists (ASA) Difficult Airway Task Force in 1993 has led to improved outcomes associated with airway-related complications at induction.[1,2] Successful management of the difficult airway, however, does not end with placement of an endotracheal tube (ETT). Analysis of the ASA Closed Claims database has shown that the trend of improved outcomes at induction and intubation has not been seen at extubation.[2] Airway management complications are not confined to the US. As was made evident in the recent 4th National Audit Project report of the Royal College of Anesthetists in the United Kingdom, safe extubation is by no means guaranteed.[3,4] This report demonstrated that one third of major complications of airway management occurred at extubation or in the recovery room with a mortality rate of 5%. The most common problem was airway obstruction, with causes including laryngospasm and airway edema.[3] Poor anticipation of an at-risk extubation and poor planning for management after intubation were found to be common contributing factors.[3–5] Data such as this has led to increased recognition for the need to develop strategies for the safe and successful extubation of patients with a difficult airway.

In 2012, the Difficult Airway Society (DAS) published the first comprehensive guidelines for management of tracheal extubation in adult perioperative practice.[6] While not explicitly focused on extubation of the difficult airway, the guidelines included recommendations and strategies for "at-risk" extubations. In all versions of the ASA Practice Guidelines for Management of the Difficult Airway, including the most recent revision in 2013, formulation of an extubation strategy for the difficult airway is recommended.[1,7,8] This strategy should include a consideration of clinical factors which may adversely affect ventilation post-extubation, and an airway management plan that can be implemented if extubation fails.[7]

Extubation failure refers to the inability to tolerate removal of an ETT due to airway obstruction after intubation.[5,9] Possible mechanisms for this include laryngospasm, laryngeal edema, tracheomalacia, and upper airway collapse due to edema, hematoma, or residual anesthetic effects.[5] This should be differentiated from a failure to wean from ventilatory support.[10] Patients who fail to meet extubation criteria during spontaneous breathing trials should not be extubated regardless of the presence of a difficult airway.[11] On the other hand, usual weaning indices are poorly predictive of extubation failure because they do not assess airway patency.[12]

The difficult airway poses multiple challenges at extubation. Many conditions associated with difficult mask ventilation and/or intubation may also predispose to a higher risk for failed extubation.[5,13,14] Reintubation then poses a greater challenge in the difficult airway. Because of the potential for serious morbidity related to failed extubation if reintubation is not quickly achieved, anesthesia practitioners must: (1) be armed with techniques that successfully address the specific challenges in extubation of the difficult airway, and (2) appreciate the potential complications associated with extubation. Determining which patients are at risk for extubation failure and a discussion of the strategies that can be used to aid in reintubation of the difficult airway is the focus of this review.

Methods

This article is a non-systematic review of the literature regarding extubation of the difficult airway. Targeted literature searches were carried out using databases (PubMed and Medline) and a search engine (Google Scholar). Expert opinion in the form of textbooks and editorials were included.

Recognizing the difficult airway at extubation

The first challenge when formulating an extubation plan is to determine whether one is dealing with a difficult airway or not. A difficult airway, as defined in the ASA Practice Guidelines, is "the clinical situation in which a conventionally trained anesthesiologist experiences difficulty with facemask ventilation of the upper airway, difficulty with tracheal intubation, or both".[7] Clearly, if difficulty with mask ventilation or endotracheal intubation was encountered at induction, particular caution should be exercised at the time of extubation due to the expected difficulty of reintubation, if needed. Often, a higher rate of failed extubation is seen in this scenario due to airway trauma as a result of multiple attempts at securing the airway at induction. Airway edema and swelling from the multiple attempts can lead to obstruction after extubation and an inability to adequately ventilate.

On the other hand, there may have been no difficulty with the initial airway management, but because of changes to the airway that have occurred during or after surgery, difficulty may be encountered at extubation. It is important to remember that simply because an airway was easy to manage at the start of an anesthetic, does not mean that airway management will be easy after completion of surgery.