

Is the light green for your airway management?

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Introduction

The difficult airway (DA) management guidelines which have been formulated and disseminated by various influential anesthesia societies and associations have greatly contributed to the decreasing incidence of fatal adverse events during DA management [1–3]. Nevertheless, severe hypoxemia resulting from DA events remains the major cause of death or cardiac arrest attributable to anesthetic management [1–4]. Any possible seminal approaches, therefore, should be incorporated into the DA guidelines to improve safety during the induction of general anesthesia. As both the use and effectiveness of video-laryngoscopy, the new generation of supraglottic airway devices, and sugammadex are increasingly in clinical practice, we suggest that now is the time to take further steps in improving DA management [5–8]. For many years the Japanese Society of Anesthesiologists (JSA) has been organizing symposiums to provide forums for discussing the causes and strategies of DA management. This has ultimately led to the release of the JSA's own airway management guideline in this issue of the *Journal of Anesthesia* [9]. Members of the JSA–American Medical Association (AMA) Discussion Group should be congratulated on this achievement in providing this guideline aimed at improving DA management.

Noticeable features of the JSA airway management guideline

The JSA airway management guideline basically follows the existing DA guidelines regarding responses to the critical DA situation [3, 5]. However, it introduces novel concepts and strategies for preventing severe hypoxemia. First, the JSA airway management algorithm (JSA–AMA) uses the analogy of traffic lights to classify the difficulty of airway management, making it simpler and easier to remember. Unlike other DA algorithms, the JSA–AMA algorithm includes strategies for the daily practice of anesthesia induction and focuses on the ability to perform mask ventilation—not tracheal intubation—for maintaining oxygenation within the green zone. The JSA–AMA does not use the severity of hypoxemia as a criterion for moving the light zone and proposes the use of the capnogram waveform to determine the adequacy of ventilation. This strategy allows earlier recognition of difficult mask ventilation and earlier movement to the yellow zone, thereby preventing the development of severe hypoxemia. The ventilation grades based on the capnogram waveform can be applied to mask ventilation as well as ventilation through a supraglottic airway device and tracheal tube, providing a common language for accurately describing ventilation status. Particular emphasis on strategies for preventing DA situation features the JSA–AMA as an “airway management guideline”—not a “DA guideline.”

JSA–AMA is for an airway amateur, not for an expert like you?

The JSA–AMA is not perfect because it excludes any complexities and does not recommend specific airway devices

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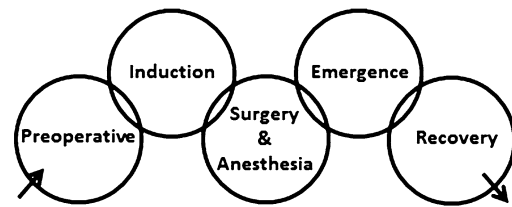
and skillful techniques. Some airway experts may consider it immature and useless for managing patients with anticipated DA management. Certainly, the JSA–AMA is constructed for anesthesiologists with various levels of skill, including amateurs in the skills of airway management. The JSA–AMA simply provides fundamental frameworks for customizing DA management depending on the anesthesia providers, institutes, and patients to be managed. For example, in the green zone, the anesthesia provider can choose any preferred or available intubation technique as long as mask ventilation is adequate. In the yellow and red zones, the JSA–AMA simply suggests the insertion of a supra-glottic airway device and establishment of a surgical airway, respectively, in addition to possible awakening from anesthesia. It does not specify strategies after recovery from the airway crisis because the optimal strategies available may vary depending on the situation. This diversity-accepted approach provides anesthesiologists with the opportunity to integrate the JSA–AMA into current practices and ensure its long-term usefulness regardless of newcomers to the current population of airway devices and techniques.

Limitations of the JSA airway guideline and our next steps

Of course, the JSA guideline has many limitations and much room for future improvement. Basically, it is an expert opinion and is not supported by strong scientific and clinical evidence. Notably, the airway experts do not completely agree with any one of the specific airway strategies recommended in this guideline, although they all agree with its dissemination and positive use. As evident from the NAP4 reports, large nationwide data accumulation will clarify the incidence, types, and possibly causes of perioperative airway complications [2]. JSA has established an annual surveillance system for perioperative accidents based on approximately 1.3 million cases [4]. The incidences of severe hypoxemia, cardiac arrest, and death due to DA during anesthesia induction before and after the introduction of this guideline are to be carefully assessed by the JSA. Hopefully, the prevalence of mask ventilation difficulties and the contributions of new airway devices and drugs to safety airway management are also to be integrated by the JSA survey. Most importantly, JSA needs to develop educational programs which systematically teach the contents of this guideline to any anesthesia provider, including JSA members.

Future directions

Critical phases in terms of the potential occurrence of severe airway complications in the operating room include



Interlinked risk information for consistent and flexible perioperative airway management

Fig. 1 In order to perform consistent and flexible perioperative airway management, information of the airway difficulties obtained at each perioperative period should be interlinked and integrated

not only the induction of anesthesia but also the emergence from anesthesia [1, 10, 11]. The Practice Guidelines for Management of the Difficult Airway by the American Society of Anesthesiologists include extubation strategies for patients with DA [5]. A tracheal extubation guideline recently released by the Difficult Airway Society includes protocols for daily extubation practice [12]. Our goal is to safely manage the patient throughout the perioperative period, and not just through the induction phase. Anesthesia management is to be continuous and consistent. Accumulated and interlinked information of airway management during the preoperative, induction, and intraoperative periods can be effectively used for determining strategies of emergence from anesthesia and tracheal extubation (Fig. 1). JSA should consider the construction of a JSA-emergence AMA which links with this JSA-induction AMA in the near future.

JSA and I strongly recommend the JSA members to carefully read the JSA airway management guideline and follow it when they anesthetize patients tomorrow. Then, ask yourself whether you have a green light for your airway management protocol.

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