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EDITORIAL

Cannot intubate cannot ventilate—focus on the 'ventilate'

Eugene H. Liu · Takashi Asai

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Introduction

In this issue, Tachibana and colleagues [1] have reported much dreaded "cannot intubate, cannot ventilate" during anesthesia. Their results suggest that this is uncommon (1 in 32,000 cases), but with potentially catastrophic outcomes. In the 1990s [2], the incidence of death or permanent brain damage associated with airway management during general anesthesia was found to be much higher than the incidence associated with cardiovascular management, and since then several major efforts have been made to reduce the serious adverse outcomes associated with airway management. These include guidelines for difficult airway management formulated by major anesthesiology organizations [3–5], development and use of new and reliable airway devices, and widespread monitoring with oximetry and capnography [6]. Nevertheless, a recent nationwide prospective survey (the 4th National Audit Project, NAP4) has shown that serious airway complications still occur for a small number of patients, with an estimated incidence of 1 per 5,000–22,000 patients in the UK [7]. The report of Tachibana and colleagues [1] indicates that Japan and, very likely, other nations face similar challenges.

So what is new about the report of Tachibana and colleagues [1]? All the hospitals in Tachibana's report were equipped with a videolaryngoscope (Pentax Airway Scope), which has advantages over conventional laryngoscopes. Tachibana's report [1] indicates that the availability of videolaryngoscopes did not seem to reduce the incidence of "cannot intubate, cannot ventilate" situations if several attempts at tracheal intubation had been made with a conventional laryngoscope.

Lessons learnt from studies

The main lesson from Tachibana's report (and previous reports) is to avoid several attempts at tracheal intubation. It is failed oxygenation and pulmonary aspiration, and not failed tracheal intubation, that harm patients [8]. The NAP4 study has shown that the commonest factor associated with serious airway complications was difficulty with tracheal intubation, whereas pulmonary aspiration was the commonest cause of serious airway complications [7]. When there is difficulty, rather than trying to intubate the patient's trachea, we must *stop* trying to intubate [9]. The patient should be awakened as swiftly as possible by stopping general anesthesia. Where necessary, we should give naloxone to reverse the inhibitory effect of opioids on respiration. Sugammadex at a dose of 16 mg/kg can reverse, within 2 min, the effect of high-dose rocuronium (1.0–1.2 mg/kg) [10]. Thus sufficient doses of sugammadex should be readily available in the operating room when rocuronium is used.

If it is not possible to awaken the patient, for example, if surgery is extremely urgent, such as truly emergent

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E. H. Liu
Department of Anesthesia, Yong Loo Lin School of Medicine, National University of Singapore, National University Health System, 5 Lower Kent Ridge Road, Singapore 119074, Singapore

T. Asai (✉)
Department of Anesthesiology, Dokkyo Medical University, Koshigaya Hospital, 2-1-50 Minamikoshigaya, Koshigaya, Saitama 343-8555, Japan
e-mail: asaita@dokkyomed.ac.jp

Cesarean section, all efforts should be taken to prevent hypoxia, because it harms first and fast, whereas aspiration harms more slowly. Cricoid pressure should be temporarily released if it is suspected cricoid pressure is impeding mask ventilation and laryngoscopy.

There is now much evidence that videolaryngoscopes are useful for patients with difficult airways [11, 12]. Nevertheless, in cases 1 and 2 in Tachibana's report, blood and secretions contributed to failure with the videolaryngoscope [1]. It seems reasonable that, if tracheal intubation using a conventional laryngoscope has failed, a videolaryngoscope should be used at an early stage. In addition, several attempts to use a videolaryngoscope should not be made, because videolaryngoscopes do not enable oxygenation, and it may be difficult to insert a tube into the trachea even if the glottis can be seen [12, 13].

Supraglottic airways are included as rescue devices in several difficult airway algorithms [3–5], but we should be aware that placement of and ventilation though a supraglottic airway may be difficult if there is severe anatomical abnormality or swelling of the upper airway or bleeding after repeated attempts at tracheal intubation (as in Tachibana's report) [14]. Therefore, it is, again, advisable to avoid several attempts at tracheal intubation and to change technique early, to increase the chance of success with a supraglottic airway.

Cricothyroid puncture, cannulation, and jet ventilation have been recommended, for example in Advanced Trauma Life Support (ATLS) teaching. This is fraught with its own complications, for example barotrauma and emphysema. The NAP4 study indicates that cannula cricothyroidotomy may frequently fail to oxygenate the patient [7]. We should therefore ask experts for preparation of surgical tracheostomy while placement of a supraglottic airway or cricothyroid puncture is being attempted.

Be prepared!

Prevention of "cannot intubate, cannot ventilate" is much better than attempting to correct it. We can learn from the Boy Scouts' motto: "Be prepared". Preoperative evaluation does not take much time, yet can enable identification of patients for whom tracheal intubation is likely to be difficult. Currently available predictive tests are not highly sensitive and specific [15], but this should not deter testing.

The low specificity of airway screening tests can result in "over preparation" for some patients for whom airway management is found to be easy [15]. Some cost and time will be incurred with over preparation, but this should be considered in the context that harm that can result from unpreparedness. We need to provide our patients the assurance that we are prepared. We will be relieved if airway care is found to be easy, rather than anxious about having over prepared for difficulty.

More important in preoperative assessment is prediction of difficult oxygenation. Recently, the Japanese Society of Anesthesiologists formulated a guideline on airway management [5]. The guideline, which includes recommendations of strategies for routine induction of anesthesia in addition to those for managing difficult airways, emphasizes the importance of routine preoperative assessment methods that predict not only difficult intubation but also the risk of aspiration and difficulty in ventilation through a face mask, a supraglottic airway, or a surgical airway. In addition, it is necessary to perform preoperative planning of appropriate airway management for patients with difficult airways [9]. If there is uncertainty about difficulty, endoscopy before induction of anesthesia may enable difficult airway management to be predicted more reliably [16].

It has repeatedly been pointed out that education in airway skills does not occupy a central place in anesthesia training and the training system for management of the difficult airway is less than ideal worldwide [17]. Tachibana and colleagues' report [1] and previous studies [7, 18] have shown that a suboptimum standard of care was a major contributing factor. Emergencies are not the time to try a new technique or device; we should be regularly trained in airway management on the basis of difficult airway algorithms. Rather than providing a whole range of airway devices, familiarity and experience with a few is what helps in rescues.

We also should be aware that patients with difficult airways are at increased risk of airway obstruction and pulmonary aspiration not only during induction of anesthesia but also after surgery. It is now apparent that postoperative airway complications are likely to occur if neuromuscular blockade has not been fully reversed [19], and thus it is crucial to prevent and correct residual neuromuscular blockade.

Conclusions

In summary, the report of Tachibana and colleagues [1] indicates that, although rare, "cannot intubate, cannot ventilate" situations still occur, even when advanced airway devices, for example videolaryngoscopes and supraglottic airways, are available. It is likely in many cases that mask ventilation was initially possible after induction of anesthesia, and that several attempts at tracheal intubation led to "cannot intubate, cannot ventilate" situations. When this occurs, even videolaryngoscopes and supraglottic airways may fail. Therefore, to minimize serious airway complications after induction of anesthesia we should

focus on maintaining oxygenation, and not keep trying to intubate the trachea.

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