Comparative Performance of Direct and Video Laryngoscopes in Patients with Predicted Difficult Airway

To the Editor:
In a prospective, randomized, clinical study including a broad range of patients with predictors of difficult intubation, Aziz et al. demonstrated that compared with the direct laryngoscope, the C-MAC® video laryngoscope (Karl Storz, Tuttingen, Germany) achieved a higher intubation success rate on first attempt, but required a longer intubation time. Other than the limitations described in the discussion, however, there are several issues related to this study that warrant cautious interpretation of the results.

First, the 296 airway management procedures were completed by a total of 91 participants. It is reported that novice anesthesia residents or nonanesthesia trainees require about 47–56 tracheal intubations to achieve a success rate of 90% or more using direct laryngoscopy. Thus, we believe that all participants have achieved proficiency with the direct laryngoscope. In Materials and Methods, the authors stated that all participants were given didactic instruction on the proper use of the C-MAC® and were afforded the opportunity to use the device for clinical use in the 3 months preceding the study. However, they did not provide the actual or lowest number of tracheal intubation attempts with the C-MAC® by each participant. In previous studies comparing performance of different video laryngoscopes (including V-MAC®, an older model of C-MAC®) with Macintosh laryngoscope, the experienced anesthesiologists were required to have a minimum of 30–50 uses of each video laryngoscope before the study. More importantly, the authors should explain if they attempted to define proficiency with each airway device to avoid bias.

In addition, Levitan et al. suggest that if a stylet is used with the C-MAC®, a tube shape similar to that of direct laryngoscopy (straight-to-cuff, with a 35-degree “hockey-stick” bend) should be used, because excessive tube shaping can create tube advancement problems. This is significantly different from the McGrath and GlideScope video laryngoscopes with angulated blade, in which much greater tube bend angles (60–90 degrees) are often required to navigate a tube around the curve of the tongue and to the glottis. We deduce that if a stylet is used with the C-MAC®, a tube shape similar to that of direct laryngoscopy (straight-to-cuff, with a 35-degree “hockey-stick” bend) should be used, because excessive tube shaping can create tube advancement problems. This is significantly different from the McGrath and GlideScope video laryngoscopes with angulated blade, in which much greater tube bend angles (60–90 degrees) are often required to navigate a tube around the curve of the tongue and to the glottis. We deduce that a prolonged intubation time and six failed cases of primary intubation approach under a good laryngeal view with the C-MAC® may be contributed to no use of a stylet.

Fu-Shan Xue, M.D.,* Xu Liao, M.D., Jian-Hua Liu, M.D.
*Plastic Surgery Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, People’s Republic of China. fruitxue@yahoo.com.cn

Second, in this study, sample size (141 patients per group) was selected to detect a projected difference of 10% in the incidence of multiple intubation attempts between the two devices, with a power of 80% and \( P = 0.05 \). Obviously, the sample size of studied population is insufficient to detect statistically significant differences between the two devices with respect to the intubation success rate achieved by the certified registered nurse anesthetist providers or attending anesthesiologists, and intubation success rate in patients with two or multiple predictors of difficult intubation.

Third, there were a total of 34 failures with the primary intubation approach. Of these 34 cases, 6 of 11 (54%) in the C-MAC® group and 8 of 23 (35%) had an adequate laryngeal view. Although a good laryngeal view with video laryngoscopy does not always guarantee intubation success, the laryngeal view obtained by direct laryngoscopy is usually an important determinant of successful intubation. Unfortunately, the authors did not provide the detailed cause of failed primary intubation approach in these patients with a good laryngeal view. In Materials and Methods, they did not describe whether the endotracheal tube with a malleable stylet was used on first intubation attempt. Use of a stylet to preform or stiffen an endotracheal tube can facilitate guidance through the glottis when this is seen under direct laryngoscopy, or can be used as a blind technique with a narrow endotracheal tube. Furthermore, it has been shown that the Macintosh blade of the V-MAC® can reduce, but does not replace, routine stylet use for tracheal intubation. Without use of a stylet, incidence of failed intubation on first attempt with the V-MAC® is 16% in patients with normal airways and 24% in morbidly obese patients, respectively. Therefore, when a successful initial intubation attempt is important for patient safety – for example, in managing a known or predicted difficult airway – mounting the endotracheal tube onto a stylet and angling the distal tip upward is very helpful for bringing the tube tip up to the glottis under direct or indirect laryngoscopy.

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We deduce that a prolonged intubation time and six failed cases of primary intubation approach under a good laryngeal view with the C-MAC® may be contributed to no use of a stylet.
At Higher Risk of Difficulty Is Not True Difficulty: The Challenge of Device Performance Assessment in the Difficult Airway

To the Editor:
I read with interest the article by Aziz et al. on the comparative effectiveness of the C-MAC® video laryngoscope versus direct laryngoscope in the setting of the predicted difficult airway.1 I congratulate them on a well designed and executed comparative study, providing more information to clinicians regarding the performance of this device.

Aziz et al. examined the clinical entity of patients who are best described as being at increased risk of difficulty during laryngoscopy because of abnormal preoperative airway testing, but not truly difficult at laryngoscopy. By examining their figure 2, it can be seen that the majority of the study population had an easy view at laryngoscopy (Cormack–Lehane view grades I or II) irrespective of whether the C-MAC® (Karl Storz, Tuttlingen, Germany) or standard direct laryngoscope was used.

Unfortunately, their findings are indirectly extended to conclude a performance benefit when using the C-MAC® in true difficult airways compared with standard direct laryngoscopy. The low incidence of true difficulty at intubation in their study population is unsurprising given the weakness of our current preoperative airway tests to predict true difficulty at laryngoscopy.2 Prediction is further weakened by the accepted definition of true difficulty at laryngoscopy (Cormack–Lehane view grades III or IV during direct laryngoscopy), as in clinical practice many patients with a grade III view are relatively easily intubated with or without the use of a bougie. The use of a bougie during standard direct laryngoscopy was not considered in their study design, limiting its overall clinical relevance.

Success at first laryngoscopic attempt was chosen to be the outcome of interest. The authors reasoned that this was because of safety concerns regarding multiple intubation attempts in patients with true difficult airways. As previously discussed, the great majority of their study population consisted of easy laryngoscopy, making the point less valid. This outcome of first-attempt success is particularly affected by unblinding, because the clinician randomized to the direct laryngoscopy group may be inclined to abandon the direct laryngoscopy attempt early and move on to another device managing these patients thought to be at risk of laryngoscopic difficulty. In contrast, the unblinded providers may have been more inclined to persevere with the C-MAC®, with the idea that this device has particular utility in the difficult airway. After examining their figure 1, it can be seen that the actual overall success rate for C-MAC® versus direct laryngoscopy use was 96% versus 92%, respectively. This difference is not statistically significant. The emphasis on first-attempt success is certainly of interest, but does reduce the clinical relevance of their findings. The term “overall success rate” is used misleadingly throughout the manuscript when describing the first-attempt success rate.

The efficacy of a new laryngoscopic device in patients with a known difficult airway is very hard to study. The use of such a device in an anesthetized, paralyzed patient with a known difficult airway is ethically dubious given the accepted guidance that a technique that retains spontaneous ventilation should be considered when difficulty is anticipated at laryngoscopy.3 The most common method used by North American anesthesiologists in this situation is awake fiberoptic intubation.4 For this reason, prospective studies of novel airway devices in elective intubations, where laryngoscopy is known to be truly difficult, are rare and likely unethical. The use of good retrospective data to study such a rare occurrence should not be discounted, particularly when ethics, blinding, and the requirement of adequate statistical power preclude a prospective study design.

References

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