Tracheal intubations performed with a Macintosh laryngoscope and videolaryngoscopes on a mannequin simulating cardiac arrest

Qiang Wang, MD · Fu S. Xue, MD ·
Xu Liao, MD · Jian H. Liu, MD · Yu J. Yuan, MD

Received: 6 June 2011 / Accepted: 13 July 2011 / Published online: 29 July 2011
© Canadian Anesthesiologists' Society 2011

To the Editor,

In a randomized crossover trial on a mannequin simulating cardiac arrest, Shin *et al.*¹ showed that tracheal intubation, during chest compressions under conditions of both normal and difficult airways, was more successful with either the Pentax-AWS[®] or the GlideScope[®] videolaryngoscope (97–100% success rate) than with the Macintosh laryngoscope (75–97% success rate). However, apart from the limitations described in the *Discussion* section of their manuscript, we note one issue in this study which may confound interpretation of the results.

In this study, the participants were inexperienced junior interns who were given a standardized 20-min training session on each of the devices before the study. The authors ignored an important issue, namely, a different learning curve is required for each of the three devices. Nouruzi-Sedeh *et al.*² showed that untrained personnel required only five tracheal intubation attempts to achieve proficiency with the GlideScope[®] in patients with a normal airway. Also, Hirabayashi³ found that a short demonstration of the Pentax-AWS[®] and a brief practice with a mannequin were the only requirements needed to perform a tracheal intubation with the device. However, in the studies of Mulcaster *et al.*⁴ and Konrad *et al.*,⁵ novice anesthesia residents or non-anesthesia trainees required 47–56 tracheal intubations to achieve a tracheal intubation success rate of $\geq 90\%$ using direct laryngoscopy. These findings suggest that less training is required to achieve proficiency with the Pentax-AWS[®] and the GlideScope[®] than with the

direct laryngoscope. Furthermore, when the Pentax-AWS[®] was compared with the GlideScope[®] in both simulated normal and difficult airway scenarios, novice operators found it easier to intubate the trachea with the Pentax-AWS[®].⁶ Thus, in Shin *et al.*'s study,¹ identical training times for the three devices may have biased both the time required for tracheal intubation and the success rate in favour of the two videolaryngoscopes, especially for the difficult airway scenario. To be precise, the differences in the performance of the three laryngoscopes may be attributed to their different learning curves. The findings of Kim *et al.* support this view.⁷ They studied emergency physicians—who had performed > 50 tracheal intubations with the direct laryngoscopy on a mannequin simulating cardiac arrest—after the physicians had received only a one-hour training session with the GlideScope[®] and the Pentax-AWS[®], and they found no significant differences between the Macintosh laryngoscope, the Pentax-AWS[®], and the GlideScope[®] in terms of intubation time during chest compression. The different learning curves might explain the inconsistent results between studies on a mannequin simulating cardiac arrest.

Competing interests None declared.

References

1. Shin DH, Choi PC, Han SK. Tracheal intubation during chest compressions using Pentax-AWS[®], GlideScope[®], and Macintosh laryngoscope: a randomized crossover trial using a mannequin. *Can J Anesth* 2011; 58: 733–9.
2. Nouruzi-Sedeh P, Schumann M, Groeben H. Laryngoscopy via Macintosh blade versus Glidescope: success rate and time for endotracheal intubation in untrained medical personnel. *Anesthesiology* 2009; 110: 32–7.

Q. Wang, MD · F. S. Xue, MD (✉) · X. Liao, MD ·
J. H. Liu, MD · Y. J. Yuan, MD
Plastic Surgery Hospital, Chinese Academy of Medical Sciences
and Peking Union Medical College, Beijing, China
e-mail: fruitxue@yahoo.com.cn

3. Hirabayashi Y. Airway Scope®: initial clinical experience with novice personnel. *Can J Anesth* 2007; 54: 160-1.
4. Mulcaster JT, Mills J, Hung OR, et al. Laryngoscopic intubation: learning and performance. *Anesthesiology* 2003; 98: 23-7.
5. Konrad C, Schupfer G, Wietlisbach M, Gerber H. Learning manual skills in anesthesiology: is there a recommended number of cases for anesthetic procedures? *Anesth Analg* 1998; 86: 635-9.
6. Tan BH, Liu EH, Lim RT, Liow LM, Goy RW. Ease of intubation with the Glidescope or Airway Scope by novice operators in simulated easy and difficult airways—a manikin study. *Anaesthesia* 2009; 64: 187-90.
7. Kim YM, Kim JH, Kang HG, Chung HS, Yim HW, Jeong SH. Tracheal intubation using Macintosh and 2 video laryngoscopes with and without chest compressions. *Am J Emerg Med* 2010; doi: [10.1016/j.ajem.2010.02.014](https://doi.org/10.1016/j.ajem.2010.02.014).

Reply

We thank Drs. Wang *et al.* for their comments and appreciate their concerns about our study.¹ We appreciate there is a difference in learning curves among the three laryngoscopes and the fact that the Macintosh laryngoscope requires a longer learning curve. However, in the course of their training sessions, participants should have mastered a certain skill level to perform three consecutive successful tracheal intubations on a mannequin. As we mentioned in the Methods section of our manuscript, participants were allowed to practise tracheal intubations with each device on a Laerdal® Airway Management Trainer (Laerdal, Stavanger, Norway) until they could perform three consecutive successful tracheal intubations. Actually,

20 min of training time was sufficient for all participants to achieve three consecutive successful tracheal intubations with the Macintosh laryngoscope. Participants were medical doctors who had passed the national board examination, which includes performing endotracheal intubations on a mannequin with a Macintosh laryngoscope. Although interns in Korea usually have limited clinical experience, they are qualified doctors and not medical school students. Since our study was implemented after the participants had performed three consecutive successful intubations with each of the three devices, the difference in learning curves should have had little influence on our study results.

Competing interests None declared.

Reference

1. Shin DH, Choi PC, Han SK. Tracheal intubation during chest compressions using Pentax-AWS®, GlideScope®, and Macintosh laryngoscope: a randomized crossover trial using a mannequin. *Can J Anesth* 2011; 58: 733-9.

Dong Hyuk Shin, MD
 Pil Cho Choi, MD
 Sang Kuk Han, MD
 Kangbuk Samsung Hospital,
 Sungkyunkwan University School of Medicine,
 Jongno-Gu, Seoul, Korea