Comparing performance of stylets for orotracheal intubation by Glidescope videolaryngoscope

To the Editor

With great interest, we read the recent article by Sheta et al[1] comparing performance of the Parker Flex-It stylet and GlideRite Rigid stylet for orotracheal intubation by Glidescope videolaryngoscope in patients with normal airways. They showed that the 2 stylets were equally effective for intubation when used by experienced operators, but the Parker Flex-It stylet was easier and less traumatic than the GlideRite Rigid stylet. Many things of this study were well done. The authors used a randomized, controlled design, which is a gold standard for comparing efficacy of different treatments. They chose well validated endpoints of intubation assessment: intubation time, ease of intubation, and success rate for the first attempt. They had attempted to control most of known factors affecting orotracheal intubation, such as patient's upper airway anatomy, experience of the intubator, patient's head and neck position, body mass index, depth of anesthesia, external laryngeal manipulation, blade size, tube size, and so forth.[2] Furthermore, they openly discussed the limitations of their work. All of these are strengths in the study design. We congratulate the authors for conducting this clinically useful research, but we would like to ask some questions on their methodology and results.

First, sample size calculation contributes to the quality of randomized, controlled trials due to its crucial to prevent type I and type II statistical errors. In this study, a power analysis was performed on the basis of intubation time data obtained from a pilot study on 10 patients using a GlideRite Rigid stylet in 5 cases and a Parker-Flex-It stylet in 5 cases. However, the authors did not provide the means and standard deviations of intubation times obtained when using the 2 stylets in the pilot study. Due to lack of these data, we were concerned that the author would have mistakenly related statistically significant outcomes with clinical relevance.

Second, all study subjects were patients aged 18-50 years, with American Society of Anesthesiology physical status I or II, and body mass index of <35. Furthermore, preoxygenation was performed using 100% oxygen for 3 minutes via a facemask in all patients before induction of anesthesia. The mean intubation times in the 2 groups only were 34.6 to 36.4 sec. However, the mean lowest oxygen saturation (SaO_2) during intubation attempts were 95.3 to 95.9%. We would like to know the SaO_2 levels obtained after a 3-minute preoxygenation. According to the lung oxygen reserves provided by preoxygenation in healthy adult patients,[3] it seems impossible that SaO_2 rapidly decreases to 95% in a short apneic period of approximately 35 sec.

Third, this study showed that intubation was significantly easier with a Parker-Flex-It stylet than with a GlideRite Rigid stylet. It is generally believed that orotracheal intubation by Glidescope videolaryngoscope involves 2 distinct challenges: delivering the tube to the glottis, and advancing the tube beyond the glottis and into the trachea.[4] A limitation of this study design is no observation regarding causes of improved intubation performance by Glidescope videolaryngoscope when using a Parker-Flex-It stylet.

Finally, the postoperative sore throat was regarded as a secondary variable comparing intubation performance of the 2 stylets. However, the authors did not specify the postoperative analgesic protocol. When the postoperative sore throat is used as a variable to evaluate the performance of the airway devices, standardization of postoperative analgesia should be a crucial component of study design. Also, the type and dose of analgesia and the timing of its administration in relation to the assessment of postoperative sore throat should have been described in the methods.[5] In the absence of comparison of a postoperative analgesic protocol, the secondary outcome findings and their subsequent conclusions should be interpreted with caution, as they may have been determined using incomplete methodology.

Jian-Hua Liu
Fu-Shan Xue
Gao-Pu Liu
Chao Sun
Department of Anesthesiology
Plastic Surgery Hospital
Chinese Academy of Medical Sciences
and Peking Union Medical College
Beijing, People's Republic of China

Reply from the Author

I would like to thank Liu et al for thorough reading of the article, esteemed evaluation, and giving the valued remarks. In response to your esteemed remarks, I would like to verify the following: 1) from the pilot study, the power analysis was performed on the basis of

intubation time data, the mean and standard deviation of intubation times obtained when using the 2 stylets were not mentioned. However, the previous values were integrated in the statistics and resulted in the calculated sample size of the 28 patients per group to have at least an 80% power (p=0.05, ß=0.2) to detect a difference of 30%. A total sample size of 60 patients was selected in order to account for possible patient dropouts. Therefore, I would like to disclose your concern that we have mistakenly related statistically significant outcomes with clinical relevance. 2) The drop in SaO_2 was not an influencing result in the study as the values were not significantly different between the 2 groups as well as the lowest levels were relatively within acceptable values >95 (GP: 95.3% to GS: 95.9%).

None of our patients had a drop in SaO_2 below 90%. According to Tanoubi et al[3] conclusions coincide with our results. He identified that clinically, preoxygenation is considered adequate when end-tidal oxygen fraction is >90%. This is usually achieved with a 3-min tidal volume breathing (TVB) technique. Oxygen sasturation levels was continually measured all throught the intubation process. However, SaO_2 levels obtained particularly after a 3-minute pre-oxygenation was not specified in the methodology of the study. The drop of SaO_2 in both group to values not less than 95% can be attributed to: principally, the inevitable delay in some cases to immediately apply the glideslope after removing the face mask after pre-oxygenation for various reasons; namely, the enthusiasm of the anesthesiologist who is going to perform the intubation to adjust the position of the stylets and tube, checking the light of the glideslope, cleaning lenses, and so forth knowing that the measurement of intubation time starts with introduction of the scope. Patients in the study were selected from ASA I & II patients "apparently healthy patients" however, this cannot consistently assure an ideal lung oxygen reserves (smoking, hypermetabolic states, mild chest disease, and so forth). All can be missed. Few cases had second attempts for intubation and other needed external laryngeal intubations. All the above could attribute to the trivial fall in SaO_2. 3) Directing an endotracheal tube through the vocal cords using is the MAIN issue.[6,7] As it may occasionally yield to 2 important concerns; it might impinge on laryngeal structures around the vocal cords, and moreover, making intubation difficult. It was mentioned in the discussion that analyzing the results of ease of intubation should be taken cautiously. Visual analogue scale (VAS) came in favor of Parker Flex-It intubating stylet. Visual analogue scale is a subjective measurement. The capability of the operator to continually manipulate the angle of the ETT during intubation with Flex-It stylet may be responsible for the previous result. 4) There will always be a foreseeable bias that is generated from the interfering of post analgesic protocol and crucial detection of postoperative sore throat. I agree that results should be usually interpreted with thoughtfulness. In our case, we standardized that postoperative analgesia protocol by administration of immediate IV morphine sulphate increments to alleviate surgical pain. One hour after admission of the patients in the post anesthesia care unit, patients were interviewed to check for their sore throat. Moreover, they were asked to phonate to verify the presence of sore throat. Again, 24 hours after surgery, patients were investigated the same way for sore throat. However, by then analgesia were tailored to meet the patients' needs to alleviate surgical pain. Due to the diversity of surgical procedures in our study, the analgesia requirements were inevitably varied.

Saad A. Sheta
Department of Oral Maxillofacial
College of Dentistry
King Saud University
Riyadh, Saudi Arabia

References

1. Sheta SA, Abdelhalim AA, ElZoughari IA, AlZahrani TA, Al-Saeed AH. Parker Flex-It stylet is as effective as GlideRite Rigid stylet for orotracheal intubation by Glidescope. ***Saudi Med J*** 2015; 36: 1446-1452.
2. Benumof JL. Difficult laryngoscopy: Obtaining the best view. ***Can J Anesth*** 1994; 41: 361-365.
3. Tanoubi I, Drolet P, Donati F. Optimizing preoxygenation in adults. ***Can J Anaesth*** 2009; 56: 449-466.
4. Levitan RM, Heitz JW, Sweeney M, Cooper RM. The complexities of tracheal intubation with direct laryngoscopy and alternative intubation devices. ***Ann Emerg Med*** 2011; 57: 240-247.
5. Jaensson M, Olowsson LL, Nilsson U. Endotracheal tube size and sore throat following surgery: a randomized-controlled study. ***Acta Anaesthesiol Scand*** 2010; 54: 147-153.
6. Cooper RM. Complications associated with the use of the GlideScope videolaryngoscope. ***Can J Anesth*** 2007; 54: 54-57.
7. Malik AM, Frogel JK. Anterior tonsillar pillar perforation during GlideScope video laryngoscopy. ***Anesth Analg*** 2007; 104: 1610-1611.