Comparison between the Truview PCD™ or the GlideScope® video laryngoscope and direct laryngoscopy for tracheal intubation in pediatric patients

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To the Editor,

In a randomized clinical trial, Riveros *et al.*¹ compared the performance of the Truview PCD™ or the GlideScope® video laryngoscope (GVL) with Macintosh laryngoscopy for tracheal intubation in children aged neonatal to ten years. Trial results showed that the laryngeal view obtained with the original GVL was significantly worse than that obtained with a Macintosh laryngoscope. The findings were not in agreement with those of two recent randomized studies in which a second generation Cobalt GVL provided a laryngeal view in children superior to that provided by direct laryngoscopy.^{2,3} Riveros *et al.* attributed their findings to the limited size options in the original GVL blades for the study participants. In our view, the unique characteristics of the Cobalt GVL blades *vs* the original GVL blades also account for differences in laryngeal visualization between the two recent studies and Riveros *et al.*'s study.

The disposable blades of the Cobalt GVL are narrower and longer than the reusable blades of the original GVL. This enables manipulation of laryngeal structures and allows more room in the oral cavity to insert the tracheal tube.³ Furthermore, the original GVL uses a curved blade with a 60° angle in the midline, and the field of view of the camera does not cover the tangent of the distal half of the blades. This results in a blind area below the blade tip.

Hirabayashi *et al.*⁴ show that the blind area below the blade tip of the original GVL is 2 mm and 13 mm in the small- and medium-size blades, respectively. Although a small blind area below the blade tip of the small-size GVL blade may not interfere with laryngoscopy, the mid-size GVL blade with a 13-mm width blind spot may require a camera view in a more anterior direction and optimum external laryngeal manipulation to obtain better exposure of the glottis. Kim *et al.*⁵ have shown that Cormack and Lehane grades of laryngeal visualization using the original GVL without optimum external laryngeal manipulation can overestimate the reported frequency of difficult laryngoscopy in children aged three months to 17 yr. Compared with the original GVL, however, the camera of the Cobalt GVL is closer to the blade tip, especially in pediatric devices. In the original GVL, the blade length in front of the camera is 3.6 cm, 5.5 cm, and 6.1 cm in the small-, medium-, and large-size blades, respectively, whereas in the Cobalt GVL, the blade length in front of the camera is 0.7 cm, 1.5 cm, 2.8 cm, 3.7 cm, and 5.3 cm, in size 0, 1, 2, 3, and 4 blades, respectively (<http://verathon.com/language/en-us/products/glidescope.aspx>). Due to the smaller distance between the camera and blade tip, the airway structures can be visualized with the pediatric Cobalt GVL without a blind area below the blade tip.

Additionally, the proper function of a laryngoscope is dependent on using an appropriate blade length. In the Methods section of their study, Riveros *et al.* described use of the small Truview PCD blade for neonates and infants, whereas the medium-size blade was used for children. Currently, five sizes of the Truview PCD blades are commercially available. The manufacturer (Truphatek International Ltd., Netanya, Israel; www.truphatek.com), recommends the following blade sizes: size 0, for patients aged less than one year and weighing 0.8–4 kg; size 1, for patients aged one to

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three years and weighing 4–8 kg; size 2, for patients aged two to 16 yr and weighing 8–60 kg; size 3, for patients aged more than 16 yr and weighing 50–120 kg; and size 4 for patients aged more than 16 yr and weighing more than 120 kg. In the Riveros *et al.*'s study, it is unclear what corresponding standard sizes of small- and medium-size Truview PCD blades they used. It is arguable that different results may have been possible, such as an improved laryngeal view with Truview PCD laryngoscopy compared with direct laryngoscopy, if a larger selection of the Truview PCD blades (e.g., sizes 0, 1, and 2) were included in the study design.

Competing interests None declared.

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Reply

We appreciate the comments of Drs. Liu, Li, and Xue regarding our clinical trial.¹ In their correspondence, they refer to a vast array of different blade sizes currently available for the Truview PCD™ and the Glidescope® video laryngoscope (GVL). We address these limitations in the discussion section of our article and agree that these limitations may have been potential factors affecting the view in our younger pediatric patients. The original GVL blade used in our trial has the issue of the blind spot below the tip, as described by Hirabayashi,² as well as the issue of the 60° angle, which had a direct effect on the visualization of the larynx in our study. We agree that the better design of the Cobalt GVL and more available sizes improve glottis visualization, especially in small neonates, as described by Fiadjoe.³ On the other hand, our study was novel in using

the Truview PCD, which offers an image on an LCD screen. The Truview blades used in our study were “small size”, i.e., sizes 0 and 1 and “medium size”, i.e., size 2. As a matter of fact, the different sizes mentioned by Dr. Liu *et al.* were being developed at the same time we were conducting our study. We point out that we remained in contact with the Truview manufacturer regarding limitations of the current product throughout our evaluation. As we mentioned in our discussion, two factors regarding use of the Truview PCD could affect the result. First, the 46° angle of the Truview can improve visualization in neonates without a significant difference in older children, and second, a learning curve is needed to develop appropriate eye-hand coordination.

In summary, in our study, laryngeal visualization using the original GVL and the Truview PCD was not superior to direct laryngoscopy using a Macintosh blade. As we mentioned in our discussion, the design characteristics of the original GVL and the learning curve for eye-hand coordination using the Truview PCD are potential problems affecting the laryngeal view in younger pediatric patients. As we progress in the advancement of pediatric airway management, more solutions and better designed devices should facilitate pediatric laryngeal visualization. Consequently, we are grateful to Drs. Kim⁴ and Fiadjoe for providing us with additional evidence on the use of video laryngoscopes in pediatric patients, as further improvements on these devices should simplify pediatric airway management in the near future.

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