

## Facilitating tracheal intubation by additional conduit on GlideScope videolaryngoscope blade

*To the Editor*

We read with interest the recent article of Almarakbi et al<sup>1</sup> regarding the use of an additional conduit to facilitate tracheal intubation with GlideScope videolaryngoscope (GSVL) in patients with a normal airway. They showed that compared with the standard intubation procedure with the GSVL, this modified technique made the passage of the tracheal tube easier and intubation time shorter, without increasing adverse events, or intubation failure. This method appears interesting, but there are several aspects of this modified technique that need to be clarified before adoption into routine practice. We believe that such information would be helpful for others who would like to try this modified technique.

First, the authors in their study<sup>1</sup> described that this modified blade was developed by attaching a tracheal tube to the right side of the GSVL blade with adhesive tapes. However, in **Figure 1**, we did not see any tape fixation location. It was unclear, whether multiple fixations were needed to obtain a firm attachment. We are concerned that the adhesive tapes placed on the distal part of the GSVL blade may obstruct, or affect the visualization of the camera located midway along the bottom of the blade.<sup>2</sup>

Second, the lateral wall of the attached tracheal tube was split throughout its length. It would be interesting to know how to keep the lumen of the attached tracheal tube open for easy passage of the tracheal tube. Does it need to remove a part of lateral wall of the attached tube?

Third, the length of the attached tube was cut to match the length of the GSVL blade, and the distal end of the attached tube was positioned at the GSVL blade tip. The manufacturer's description specifies that the GSVL is introduced into the patient's mouth along the midline, the blade tip is placed into the epiglottic vallecula, and gently lifted to expose the glottis.<sup>3</sup> In this case, the glottis is under the epiglottic vallecula, and there are soft tissues and epiglottis between the GSVL blade tip and the anterior commissure. Therefore, when the tracheal tube is advanced along the attached conduit on the right side of the GSVL blade, the tube tip would be directed into the epiglottic vallecula on upper right of the glottis. Even the epiglottis may also obstruct the correct insertion of the tracheal tube. It would be

interesting to know, whether the standard intubation procedure with the GSVL is needed to change when this modified blade is used.

Fourth, because the distal end of the attached tube was positioned at the GSVL blade tip, the distal part of the attached tube before the camera of the GSVL may limit field of view on the right side. Also, it can obstruct observation of tracheal tube insertion. Currently, there are several different channelled rigid indirect laryngoscopes available, such as Airtraq optical laryngoscope (Prodol, Vizcaya, Spain), Pentax-Airway Scope (Pentax-AWS, Ambu Glen Burnie MD, USA), and AP Venner scope (Intavent Direct, Maidenhead, UK).<sup>3-5</sup> Similarly, these devices incorporate a tube guiding channel to the right of the viewing axis. However, the distal ends of their tube guiding channels are designed at the sites close to the viewing lens, or the cameras on the middle or distal part of the blade for visualization of the larynx, and the tube tip movement during laryngoscopy and intubation.

Fifth, the GSVL has a curved blade with a 60° angle.<sup>2</sup> As the attached tracheal tube is curved to follow the contour of the GSVL blade and split to become open, there is a potential risk of tracheal tube slipping out of this added conduit during intubation, especially when a large tracheal tube passes the maximal curve site of the attached tracheal tube on the midway. The authors should provide some suggestions to prevent this issue, and allow them to achieve successful intubation.

Finally, other than difficulty with the introduction of tracheal tube through the glottis, another issue of intubation with the GSVL is difficulty with advancement of the tracheal tube into the trachea, after its tip has passed the glottis and the stylet has been removed.<sup>2-4</sup> This situation often results from the tube tip being snagged in the anterior tracheal wall, because an inherent anterior curvature of tracheal tube and a 60° curve configuration in the styletted tracheal tube will always result in a tendency that the tracheal tube is advanced anteriorly.<sup>6</sup> This modified technique reported by the authors seems inadequate to solve this issue because the tracheal tube within the attached conduit tends to move anteriorly.

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*Reply from the Author*

Thank you for your interest in our article<sup>1</sup>. Our comments to your questions are as follows:

First, we do agree with Dr. Liu and his colleagues that the tape fixation location was not clear in **Figure 1**, as we used thin adhesive tape on more than one point to fix the tracheal tube to GSVL. We cut the tracheal tube shorter than the GVL blade, and avoid any obstruction of GSVL on the camera.

Second, the lateral wall of attached tracheal tube was split throughout its length. There is no need to remove a part of the lateral wall as the 2 sides were kept apart from each other. Even if they were collapsed on each other, you will be able to pass the second tracheal tube easily as they will expand.

Third, whether you need to change the intubation procedure with the modified GSVL or not? You may need to do that if the epiglottis is floppy or large. In such case, you need to lift the epiglottis with the GSVL blade, similar to the intubation of pediatric patient using Miller direct laryngoscope. We were able to intubate the tracheal directly without any manipulation. Further studies are needed to examine the use of modified GSVL in patients with difficult airways.

Fourth, the distal end of the attached tube was not positioned at the GSVL blade tip, to avoid any obstruction of the viewing lens or camera. We cut the tube shorter than the GSVL blade length. We do agree with you that there are several different channelled rigid indirect laryngoscopes available,<sup>3-5</sup> where a tube guiding channel to the right of the viewing axis were added. In a similar way, we adjusted the length of attached tracheal tube to avoid any interference with the visualization of the camera and to provide a conduit on the blade of GSVL.

Fifth, although GSVL has a curved blade with a 60° angle,<sup>2</sup> and the attached tracheal tube was curved to follow the contour of the GSVL blade with a complete spilt of the lateral wall. We did not remove any part of the lateral wall to limit any potential risk of tracheal tube slipping out of this added conduit during intubation, while it allowed conduit expansion to accommodate the intubating tube.

Finally, we do agree with you that the difficulty associated with the introduction of tracheal tube through the glottis, might be related to difficulty with advancement of the tracheal tube into the trachea after its tip has passed the glottis and the stylet has been removed.<sup>2-4</sup> Yes, it often results from the tube tip being snagged in the anterior tracheal wall, because an inherent anterior curvature of tracheal tube, and a 60° curve configuration in the styletted tracheal tube will result in a tendency that the tracheal tube is advanced anteriorly.<sup>6</sup> We developed our modification to overcome this difficulty as no intubating stylet is needed and the tracheal tube will be forwarded easily through the conduit into the glottis and the trachea. We encourage you to try our technique in normal cases, and in difficult airway patients.

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