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Therapeutics

Tips and Troubleshooting for Use of the GlideScope Video Laryngoscope for Emergency Endotracheal Intubation☆

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ABSTRACT

Video laryngoscopy (VL) is still a relatively novel advancement in airway management that offers many potential benefits over direct laryngoscopy. These advantages include decreased time to intubation in difficulty airways, unique opportunities in teaching as the video screen allows for real time teaching points, increased first pass success, particularly with novice operators, and decreased cervical spine motion during intubation. Despite the advantages, the intubation procedure itself has some subtle but significant differences from direct laryngoscopy that change the expected motion as well as troubleshooting techniques, which might discourage the use of the GlideScope by practitioners less familiar with the product. With the hope of generating confidence in the video laryngoscopy procedure, we have compiled some basic tips that we have found helpful when intubating with the GlideScope. These tips include inserting the blade to the left of midline to improve space allowed for the endotracheal tube itself, backing the scope up a small amount to improve the view, holding the tube close to the connector to improve maneuverability, and withdrawing the tube with your thumb to improve advancement through the cords. We hope that, with these tips, in conjunction with ample practice, clinicians can gain comfort and experience with all the tools at our disposal in an effort to provide the best possible care for our patients.

1. Introduction

Emergency airway management is one of the cornerstones of emergency medicine procedural skills, with the standard of definitive emergency airway control being endotracheal (ET) intubation. The procedure of ET intubation has a long history, with reports of blind intubations with metal and leather tubes cited in the medical literature as far back as the 1700s. Interestingly, development of a method to visualize the larynx itself is credited not to a physician but to a voice professor, Manuel Garcia, in London during the middle of the 19th century. Garcia described using a series of mirrors to visualize his own trachea and vocal cords, performing the first indirect laryngoscopy [1]. The credit for this discovery is somewhat controversial, however, as other sources cite a young medical student named Benjamin Guy Babington in 1829 as the first to use mirrors to allow visualization around the tongue and of the larynx [2,3]. In either case, the technique was advanced by Alfred Kirstein in Berlin, Germany, at the end of the 19th century. Kirstein borrowed ideas from esophageal endoscopy to develop the "autoscope," the first documented tool that allowed direct visualization of the larynx using a headlamp for light. Chevalier Jackson modified this device to include a tungsten light bulb on the distal end. Advances continued throughout the 20th century, with improvements in both adjuvant medications and the blades themselves. In the 1940s, Robert Miller and Sir Robert Macintosh described the blades that carry their names and are still widely used today [1]. Despite decades of advances and its remarkable efficacy, direct laryngoscopy (DL) still left cases with inadequate glottic exposure, and it is these cases that led to the development of, or return to, indirect laryngoscopy with video laryngoscopes.

2. Video laryngoscopes

Video laryngoscopes consist of a laryngoscope blade with a video camera fixed near the distal end of the blade (Fig. 1). The camera allows the glottic view to be projected to a video screen, allowing the clinician to look past the curvature of the tongue and into the larynx without the required alignment of the pharyngeal, laryngeal, and tracheal axes. Although DL is by no means obsolete, video laryngoscopy (VL) has several potential advantages over it. First, VL can be a safe choice when approaching an expected difficult airway, as it can improve the view of the glottic opening and decrease the time needed for intubation [4].

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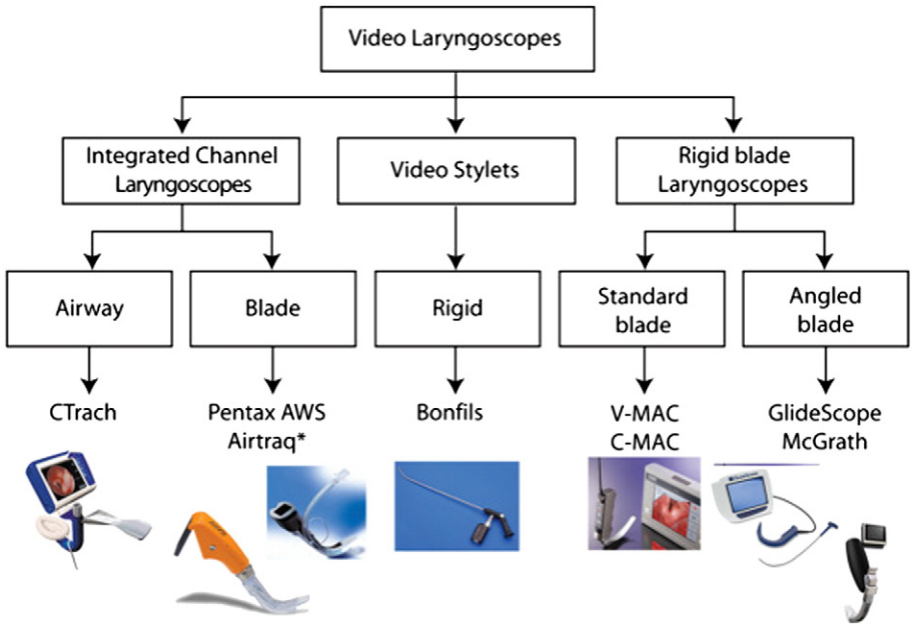

Fig. 1. A classification of video laryngoscopic devices. In this system, video laryngoscopes are classified according their shape and form. Left, Video laryngoscopes with an integrated channel (to guide placement of the ET tube). Middle, Video laryngoscopes taking the form of a video stylet (with the ET tube placed around the device). Right, Video laryngoscopes with a rigid blade (without a channel, the ET tube requiring an independent stylet to guide placement). From Healy DW, Maties O, Hovord D, Kheterpal S. A systematic review of the role of videolaryngoscopy in successful orotracheal intubation. *BMC Anesthesiol.* 2012;12:32. Copyright 2012 Healy et al; licensee BioMed Central Ltd. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Second, a video laryngoscope provides a unique opportunity for teaching, as the supervising practitioner is able to see what the learners see as they attempt to intubate. This provides the opportunity for direct feedback, real-time teaching points, and discussion of the visualized anatomy. Moreover, although the literature has been mixed, several studies have pointed to advantages of VL over DL when it comes to first-past success, particularly for novices and less experienced operators [5-9]. Beyond the act of teaching, the ability for more than 1 practitioner to see the procedure allows more easily directed laryngeal manipulation, ensuring that the ET tube passes through the vocal cords appropriately. In addition, VL requires less force and repositioning, which may lead to less cervical spine motion during intubation, an advantage of some significance in trauma patients [10,11].

For whatever reason VL is chosen, once the decision is made, the next task is to decide which device to use. The 2 most widely used video laryngoscopes are the GlideScope (Verathon Medical, Bothell, WA) and the C-MAC (Karl Storz, Tuttlingen, Germany). Both come with a variety of blade shapes and styles designed to meet the needs for nearly any intubation. The original GlideScope Advanced Video Laryngoscope had a standard hyperangulated blade, with a 60° curvature intended to improve glottic exposure in difficult airways. The theory behind the improved exposure is that the angulated nature of the blade allows an easy glottic view and positions the ET tube more anteriorly, which is superior for use in situations in which the pharyngeal, laryngeal, and tracheal axes cannot be aligned (for example, in patients with airway swelling and obstruction and those requiring cervical spine immobilization) [12,13]. This hyperangulated shape necessitates the use of a correspondingly curved stylet, the GlideRite stylet, to guide the ET tube to the laryngeal inlet. Some clinicians prefer malleable stylets over the rigid GlideRite stylet provided by the manufacturer. An alternative in this case is to use a stylet in the shape of a "hockey stick" where a 90° angle is created 8 cm from the distal tip of the ET tube to ensure that the tube is directed anteriorly enough to enter the glottis (Fig. 2) [14,15].

On the other hand, GlideScope's competitor, C-MAC, was initially marketed with a video-capable Macintosh blade, now called the standard C-MAC blade. Proponents of the C-MAC blade argue that the familiar Macintosh shape allows the use of DL in the event that video fails and provides a feel similar to that of DL, allowing easier use. It is well recognized that both styles have advantages and disadvantages, and both companies now offer similar blades. In 2010, C-MAC produced the C-MAC D blade with a 60° angulation for anticipated difficult airways, with the advantages described above. Similarly, GlideScope recently produced the titanium T3 and T4 blades that feature video capability with the standard Macintosh shape. Both companies offer equipment for a range of patient ages and sizes as well as single use and reusable forms. So far, direct comparisons between the 2 tools have not shown any clear advantage of one over another [16], so the choice falls to practitioner or institutional preference.

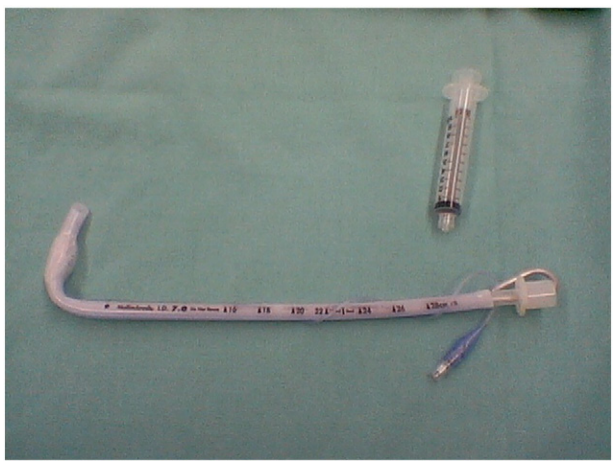

Fig. 2. Endotracheal tube bent at a 90° angle ("hockey stick") created 8 cm from the distal end of the ET tube using a malleable stylet.