

# USING THE GLIDESCOPE FOR VIDEO-ASSISTED AIRWAY MANAGEMENT

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Difficulty with tracheal intubation, particularly in patients with an unanticipated difficult airway remains a frequent cause of clinical morbidity and mortality. While adherence to a precompiled airway management strategy such as the ASA Difficult Airway Algorithm [1] is an important means to decrease respiratory-related morbidity and mortality during airway management, instruments which make intubation easier are obviously important as well. In particular, video-assisted airway management using various forms of video laryngoscope (GlideScope, McGrath, Pentax, Storz etc.) has recently been employed to help ameliorate this problem. This section will briefly discuss the use of GlideScope Video Laryngoscope in clinical airway management.

The GVL is an electronic system for tracheal intubation that utilizes a color CMOS video camera and LED light source embedded into a plastic laryngoscope blade (Figure 1). The standard (adult) blade is 14.5 mm at its maximum width, and bends 60 degrees at the mid-line. This configuration provides a view that is almost always superior to that obtained with a conventional laryngoscope. The video image is displayed on a Liquid Crystal Display (LCD) monitor, and can also be recorded electronically. An anti-fog mechanism helps ensure that a quality image is obtained. In addition to the standard blade, a mid-sized (pediatric) blade and a neonatal blade are also available. All blades are easily disinfected using cold sterilization solution.

**GlideScope Ranger.** In addition to the standard GlideScope described above, a portable battery-operated version with a slightly smaller blade known as the GlideScope Ranger is available for EMS personnel, hospital rapid response teams, and aeromedical

and military settings where portability is essential (Figure 2). Operation of the Ranger is essentially the same as for the standard unit.

**GlideScope Cobalt.** The most recent addition to the GlideScope family is the GlideScope Cobalt (Figure 3), which features a single-use, sterile cover (“Cobalt GVL® Stat”) and reusable video baton. Since this product requires no waiting for disinfection (which is typically a 30 to 60 minute process at our institution) it can be utilized in fast-paced intubation settings where time delays may not be well-tolerated.

**Clinical Use.** Clinical experience with the GlideScope family has shown that the system is easy to use, even in some patients who are ordinarily very difficult to intubate [2-5]. In fact, the principal limitation in using the unit is not in getting a good view of the glottis, but rather in manipulating the endotracheal tube (ETT) through the vocal cords, since the ETT tip often tends to hit against the anterior tracheal wall. It should also be noted that using an ordinary ETT without a stylet results in a floppy ETT that is very hard to direct through the vocal cords, and successful oral ETT placement always requires some form of stylet, such as a Mallinckrodt Satin-Slip® Intubating Stylet bent in the shape of a "hockey stick" or the reusable rigid stylet offered by the manufacturer (Figure 4).

**Awake Intubation.** While clinical experience to date using the GlideScope in anesthetized patients has been excellent [2-5], experience in using the GlideScope in awake patients has been more limited. Doyle [6] described the successful use of the

GlideScope in four cases of awake intubation where the airway was anesthetized with gargled and atomized 4% lidocaine, and where superior laryngeal and transtracheal blocks were not employed. Since that time, use of the GlideScope for awake intubation has become far more commonplace. Note also that the GlideScope can be particularly helpful in ensuring that topical anesthesia is sprayed directly on the vocal cords under direct vision. As with any awake intubation method, judicious sedation is usually also administered.

There are several potential advantages of using the GlideScope for awake intubation. First, the view is excellent. Second, the method appears to be less affected by the presence of secretions or blood as compared to the use of fiberoptic intubation. (It has not been my practice to administer glycopyrrolate when using the GlideScope for awake intubation, while it is when performing awake intubation using the fiberoptic bronchoscope.) Third, everyone can see what is going on, while this is the case only with fiberoptic intubation carts with a video option. (This is an important point for teaching.) Fourth, with the GlideScope the whole process can be recorded electronically using a regular camcorder. Fifth, it is possible to add a spray device to the GlideScope to spray additional topical anesthesia into the glottis under direct vision. Sixth, there are no special restrictions on the type of ETT that can be placed when using the GlideScope, while this is not the case for fiberoptic methods. Seventh, the GlideScope is much more rugged than a fiberoptic bronchoscope, and is far less likely to be damaged with use. Eighth, the GlideScope is much more easily cleaned than a fiberoptic bronchoscope. Finally, while it is well known that advancing the ETT into the

trachea over the fiberoptic bronchoscope often fails as a result of the ETT impinging on the arytenoid cartilages [7], this is not a problem with the GlideScope.

**Use with Fiberoptic Intubation.** The GlideScope can also be used to assist in fiberoptic intubation (FOI), either for teaching purposes, or in difficult cases [8]. The technique is simple. The GlideScope is introduced in the usual manner, followed by introduction of the fiberoptic bronchoscope (FOB). While the first operator manipulates the FOB into position, a second person monitors the GlideScope display to see where the tip of the FOB is located. (The first operator looks only through the FOB eyepiece and does not look at the GlideScope display.) The second operator then provides verbal feedback to the first as to the location of the tip of the FOB. Once the FOB has entered well into the trachea, the endotracheal tube is then passed over the FOB into the glottis. Here, use of the GlideScope can again be helpful, since should the endotracheal tube get caught on the arytenoids [9] or other laryngeal structures, it becomes evident on the GlideScope display, and appropriate corrective action (such as twisting the endotracheal tube) can easily be taken.



**Figure 1.** The standard GlideScope



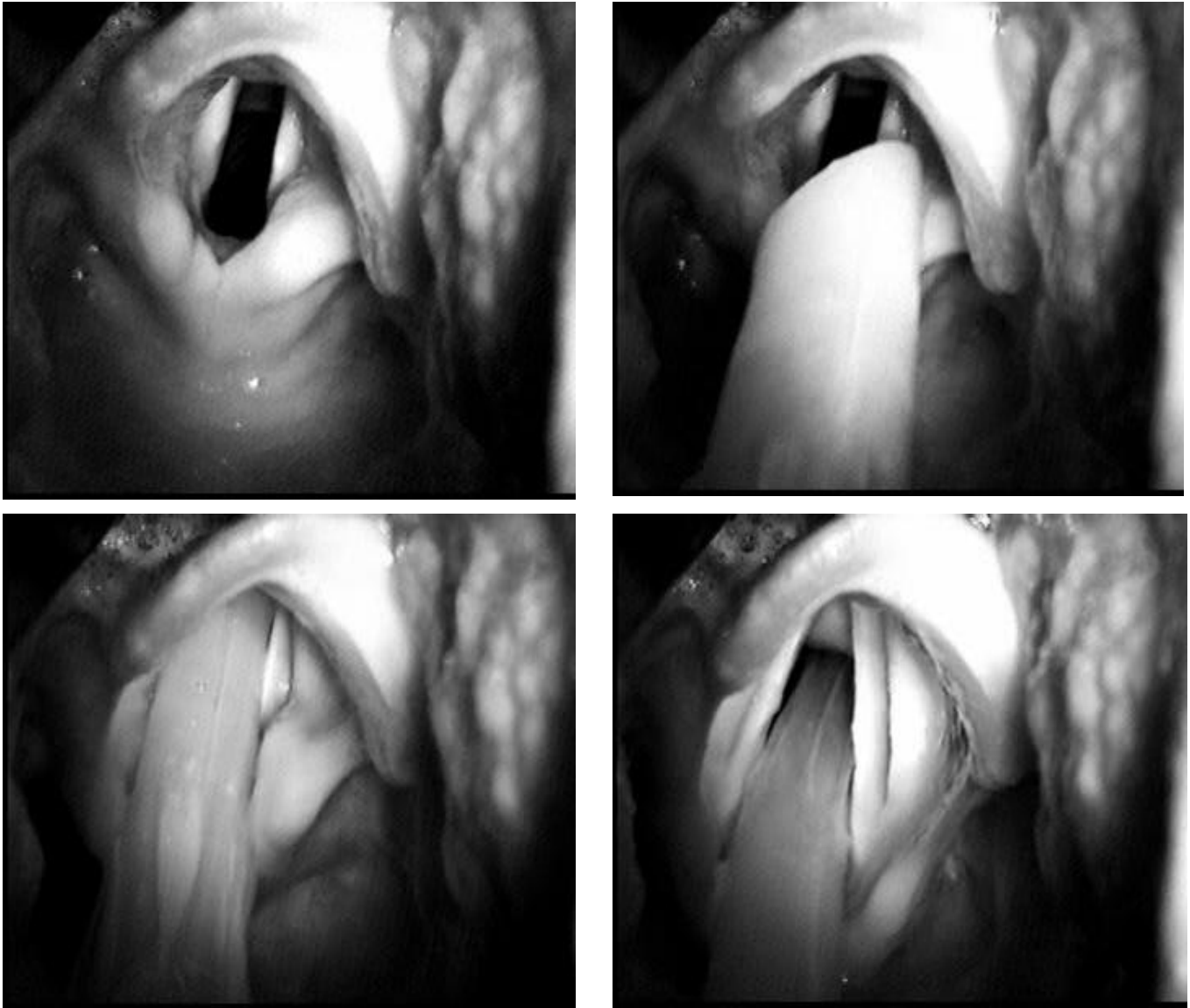
**Figure 2.** The GlideScope Ranger



**Figure 3.** The GlideScope Cobalt, offering a disposable cover.



**Figure 4.** The manufacturer's recommended stylet.



**Figure 5.** Close-up views from the GlideScope, as the endotracheal tube (ETT) passes through the vocal cords, from case 112 of the author's personal series. Note that during ETT placement the tube tip often tends to hit against the anterior tracheal wall. This problem is easily handled by pulling back the stylet by about 3 cm and then advancing the ETT. Sometimes it also helps to rotate the ETT 180 degrees to direct the ETT tip more posteriorly (once the stylet has been removed).

**Conclusion.** While the use of video laryngoscopes such as the GlideScope is not yet ubiquitous, their ease of use is likely to change this situation in the next few years, and we are likely to see them used frequently in both routine settings as well as in more complex cases, such as in patients requiring awake intubation.

## References

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