

The Video Revolution: A New View of Laryngoscopy

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The development of less expensive, smaller, and more reliable video cameras has revolutionized the design of laryngoscopes and the process of endotracheal intubation. The term video laryngoscopy defines a broad range of devices, distinct from fiberoptic bronchoscopes, in which a video camera is used in place of line-of-sight visualization to accomplish endotracheal intubation. Over a dozen laryngoscopes are marketed currently. Each model of video laryngoscope has its own unique strengths, weaknesses, and best applications. For the purposes of this review, video laryngoscopes are grouped into 3 different designs: stylets, guide channels, and video modifications of the traditional (usually Macintosh) laryngoscope blades. Key words: equipment and supplies; diagnostic equipment; endoscopes; laryngoscopes, therapeutics; respiratory therapy; respiratory, artificial; positive-pressure respiration, therapeutics; emergency treatment; resuscitation; respiration, artificial. [Respir Care 2010;55(8):1036–1045. © 2010 Daedalus Enterprises]

Introduction

Despite many advances in patient safety, endotracheal intubation remains a specialized learned skill, and a difficult endotracheal intubation remains an important adverse event.¹ The development of algorithms for airway man-

agement has been helpful, and certain technological advances, such as the laryngeal mask airway, have helped make airway management safer.² Over the past several years, enhanced visualization of the airway has been accomplished with the adaptation of fiberoptic bronchoscopes for this purpose. These instruments, however, largely remain in the operating room environment and are awkward to use in emergency situations. The skill of fiberoptic intubation is difficult to learn, and the scopes are expensive to maintain. Hence, the goals of making endotracheal intubation an easier skill to learn and maintain and a highly reliable procedure remain unattained.

Recently, the development of less expensive, smaller, and more reliable video cameras has revolutionized the design of laryngoscopes and the process of endotracheal intubation. The term video laryngoscopy defines a broad range of devices, distinct from fiberoptic bronchoscopes, in which a video camera is used in place of line-of-sight visualization to accomplish endotracheal intubation. Over

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a dozen laryngoscopes are marketed currently, and the field continues to develop and grow. Most use high intensity light-emitting diode (LED) or fiberoptic light sources, and charge couple device (CCD) or CMOS (complementary metal oxide semiconductor) video chips for visualization. This review intends to provide a snapshot of this growing field.

Three advantages of video laryngoscopy are obvious when compared to intubation techniques that use the line-of-sight of a single operator (Table 1). First, traditional direct laryngoscopy depends on an unobstructed line-of-sight. Certain patient abnormalities, such as limited mouth opening, limited neck mobility, obesity, and craniofacial or chest-wall abnormalities, can prevent visualization. In such situations, fiberoptic laryngoscopy has been the usual recommended technique, but is not quickly available outside the operating room or available to paramedical personnel. Sometimes the patient's position within a traction device, within radiologic equipment, or entrapped within a vehicle or rubble prevents adequate visualization. In these situations, endotracheal intubation can be impossible.

Teaching line-of-site techniques is difficult because the teacher cannot share the view with the learner. Video laryngoscopy provides a shared view for the teacher and student. In the case of video modifications of traditional laryngoscope blades such as the Storz DCI or C-MAC, the learner can practice a traditional direct laryngoscopic technique, while the teacher can view what the student sees.³⁻⁵ Indeed, the teacher need not even be physically present, if the video output can be streamed through a video conferencing or Internet link.⁶ This makes distance learning and consultation possible.⁷ The better laryngoscopic view generally provided by video techniques may improve the likelihood of success for inexperienced operators.^{8,9}

Third, and perhaps most importantly, video techniques permit the easy sharing of critical information among the medical team. Especially in emergency situations, communication among providers can be limited or even misleading. By using a video technique, especially with a large independent view screen, information concerning the patient's anatomy, ease and success of endotracheal intubation, and any difficulties that the operator is experiencing is easily evident. An assistant may have an easier time helping the operator because the assistant can immediately see the effect of maneuvers such as applying cricoid pressure or manipulating the position of the thyroid cartilage. For these reasons, video laryngoscopic techniques are becoming more popular for difficult intubations. In my institution, for example, video techniques are now used in nearly half of anticipated difficult intubations in the operating rooms, while optical fiberoptic techniques were used in only 20%.

Despite the attractiveness of video laryngoscopy, the technique is not without its disadvantages. Depending on

Table 1. Advantages and Disadvantages of Video Laryngoscopy

Advantages
Eye and airway need not line up
Better view when mouth opening or neck mobility is limited
Others can see and help
Permits sharing of medical information among the team
Generally higher success rate, especially in difficult situations
Disadvantages
Variable learning curves; may take longer to intubate
Passage of tube may be difficult despite great view; stylet often necessary
Fogging and secretions may obscure view
Loss of depth perception
More complicated
Expensive
Greater processing time and expense

the device, the learning curve can be steep. Because of the acute angle of some video blades, insertion of the endotracheal tube (ETT) into the trachea may be difficult, despite a clear view. An acutely angled stylet often is necessary. Depth perception is lost with a 2-dimensional video image, and sometimes operators may become fixated on the video screen and do not directly observe where the laryngoscope blade or ETT is being placed, which can result in patient injury.¹⁰⁻¹⁴ Fogging or the presence of secretions can obscure the video picture as well. In general, the devices are more complicated and more expensive than a traditional laryngoscope.¹⁵ Some devices also require special attention during reprocessing and sterilization, which can add to costs.

Many Products, Much Confusion

Over a dozen products, some modeled on the familiar Macintosh blades, others quite unique, are currently being marketed. Each has particular advantages and disadvantages. It is probably impractical for any but the most motivated individual to buy and gain expertise in all of them. What are the characteristics that might be sought in selecting a video laryngoscope?

1. Ideally, the device should be intuitive to an operator skilled in traditional direct laryngoscopy. Thick instruction manuals are usually not found on an intubation cart. Most of us prefer that a new skill be easy to learn (and teach), especially if it is a critical one.

2. The device should be adaptable for different types of endotracheal intubations. Some devices, characterized as guide channels in this paper, are designed only for oral intubation. Ideally, a single device should be equally useful for oral or nasal intubation, in both adults and children, and permit the use of special-purpose tubes such as double-lumen endobronchial tubes.

Table 2. Types of Video Laryngoscopes

Stylets
Bonfils
RIFL (rigid and flexing laryngoscope)
Guide Channels
AirTraq
Pentax AWS
Res-Q-Scope II
Traditional Modifications
Coopdech VLP-100
Storz DCI
Storz C-Mac
McGrath
GlideScope

3. For teaching purposes and for sharing of information among the medical team, a large separate view screen is useful. Many of the advantages of a video technique are lost if only the operator can see the view screen.

4. The laryngoscope should be inexpensive. Cost of acquisition can be high for both reusable and disposable devices. Reusable devices can have costs far in excess of initial acquisition costs, since these must be reprocessed and sterilized, and the purchase of additional backup devices may be necessary if the turnaround time of processing is prolonged. Ideally, the less processing required, the better.

5. The laryngoscope should be lightweight, low profile, and easy to maneuver. Video laryngoscopy promises success in unusual locations in the field, during transport, and on hospital floors.¹⁶⁻¹⁸ Some devices are large, difficult to transport, or require a lot of space around the patient's head for maneuvering. Others are highly portable, and hence may have greater utility.

6. Anti-fog capability is surprisingly important. The greatest camera may be rendered useless if condensation is present on the lens. Some of the devices have heating elements to reduce this effect.

7. A long-lasting rechargeable battery with an alternative alternating-current (AC) power source is important. An electrical plug is not always available, and these devices are nothing but paperweights if the battery is dead and AC power is unavailable.

8. Image storage for review, quality assurance, and teaching is available on some devices, and may be of value for users in teaching settings or for quality assurance.

For the purposes of this review I will group video laryngoscopes into 3 very different designs: stylets, guide channels, and video modifications of the traditional (usually Macintosh) laryngoscope blades (Tables 2 and 3).

Stylets

Stylets are rigid or semi-rigid rods that carry both light and video bundles. These are typified by the Bonfils stylet (Karl Storz, Tuttlingen, Germany, <http://www.karlstorz.com/cps/rde/xchg/SID-642F366A-A24088B8/karlstorz-en/hs.xml/49.htm>) and by the Video RIFL (Rigid and Flexing Laryngoscope, AI Medical Devices, Williamston, Michigan, <http://www.aimedicaldevices.com/videorifl.html>). The Bonfils intubation endoscope was invented as an optical device over 25 years ago to permit retromolar intubation in patients with limited mouth opening (Fig. 1).¹⁹ The insertion rod is available in 2, 3.5, and 5 mm outside diameters, and has a 1.2 mm working channel for continuous oxygen flow. The insertion rod is bent at a 40° angle at the distal end, and the optics provide a 110° view angle that includes a view of the distal tip of the ETT, which is mounted over the insertion rod and then slid off the rod and through the glottis. A video camera (35,000 pixels) can be attached to the eyepiece and improves both ergonomics and visualization for the operator. The light source can be powered by battery or AC; the camera attachment does not have battery power. The device may be helpful in situations when difficult intubation is expected or initial direct laryngoscopy has failed.^{20,21} The time required for intubation appears to be a bit longer than other video techniques.

The Video RIFL has an insertion rod that is flexible and can articulate to 135° by squeezing a lever on the device (Fig. 2). The device is limited to standard ETTs of at least 6.5 mm inner diameter. It is battery powered. The LED light source is integrated at the tip, and the video image is displayed on a small integrated LCD screen. The RIFL image can also be displayed on an external monitor. After use, the stylet portion of the device can be detached for sterile reprocessing.

Video stylet devices may be advantageous for oral endotracheal intubation when mouth opening is limited. They require a substantial learning curve and are not particularly intuitive. Both the Bonfils and RIFL have various viewing options. Both devices are rather large, and the optics may be subject to secretions and fogging. These devices appear most suited to special situations and use by operators willing to practice and attain sufficient skill in their use.

Guide Channels

Guide channel scopes have designs similar to the optical Bullard (Gyrus ACMI, Southborough, Massachusetts) and Wu Scopes (Achi, San Jose, California), and are used in a similar manner. Representative laryngoscopes include the Airtraq (Airtraq, Bonita Springs, Florida, <http://www.airtraq.com>), Pentax AWS (AMBU, Glen Burnie, Maryland, http://www.ambu.com/com/airway_management/

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Table 3. Characteristics of Video Laryngoscopes

Characteristic	Stylets	Guide Channels	Coopdech	McGrath	Storz DCI, C-Mac	GlideScope
Intuitive	No	Acceptable	Excellent	Good	Excellent	Excellent
Adaptable	No	No	Excellent	Excellent	Excellent	Excellent
Large separate view screen	No	No	No	No	Yes	Yes
Sterile processing	Required	No	Required	No	Required	No
Size and maneuverability	Acceptable	Good	Good	Good	Excellent	Excellent
Anti-fog capability	Acceptable	Good	Good	Good	Acceptable	Excellent
Battery and power source	Acceptable	Acceptable	Acceptable	Acceptable	Excellent	Excellent



Fig. 1. The Bonfils intubating stylet with video camera attachment.



Fig. 2. The Video RIFL (rigid and flexing laryngoscope). (Courtesy of AI Medical Devices.)

airway_management.aspx), and the Res-Q-Scope II (Res-Q-Tech, Humble, Texas, <http://www.res-q-tech-na.com>). These devices hold an ETT within a guide channel. Image and light bundles run alongside the channel. The laryngoscopes can be inserted in patients with reduced mouth opening. Also, the

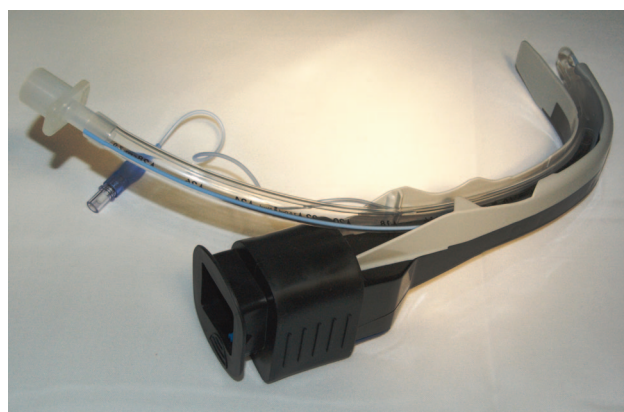


Fig. 3. The Airtraq. A small video camera (not shown) can attach to the optical lens.

angle of force applied with the laryngoscope is more perpendicular to the cervical spine, which may reduce cervical spine displacement during laryngoscopy. All are designed for oral endotracheal intubation using a standard ETT. The view screens are generally small and attached directly to the device, making the laryngoscopes highly portable.

The Airtraq is a single-use optical device with a 60 min battery life (Fig. 3). Different sizes are available for various ETT sizes, pediatric, nasotracheal, and double-lumen endobronchial intubations. A video camera can attach to the optical lens to permit viewing on an external monitor or recording. A 30–45-second warm-up time is necessary to reduce fogging. Turkstra and colleagues compared the use of the Airtraq to standard Macintosh laryngoscopes in 24 patients with normal anatomy.²² They found that intubation could be accomplished with significantly less cervical spine motion with the Airtraq, suggesting that the device might be useful in patients with unstable cervical spines or reduced mobility of the cervical spine. Similar findings have been reported by Hirabayashi and co-workers.²³

The Pentax AWS is a similar device that is powered by 2 AA batteries (Fig. 4). The 2.4-inch color LCD view screen, CCD camera, and light bundle are reusable. Intubation is accomplished with a clear plastic disposable guide channel blade that snaps onto the device. The tip of the



Fig. 4. The Pentax AWS. (Courtesy of AMBU.)

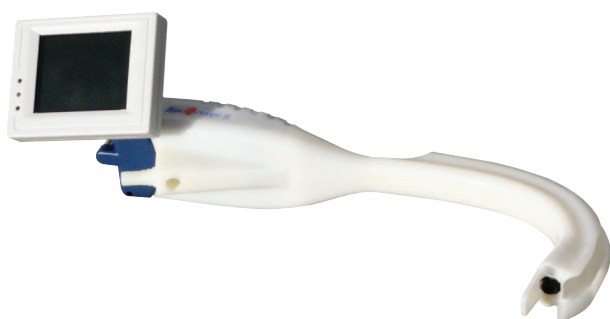


Fig. 5. The Res-Q-Scope II. (Photo courtesy of AllMed www.allmed.net.)

blade is angled at 135°. A target symbol on the monitor shows the intended path of the ETT. The device is suitable for use with standard ETTs of at least 6.5 mm inner diameter. A video-out port permits recording or separate display. Hirabayashi and Seo reported 405 successful intubations with the device.²⁴ The time required for intubation ranged from 13 to 192 seconds. Asai and colleagues examined the use of the Pentax AWS in 270 patients in whom direct laryngoscopy with a Macintosh blade had been difficult.²⁵ Successful intubations were accomplished in 268 patients. Similar findings have been presented by other authors.^{26,27} Compared with traditional direct laryngoscopy, tracheal intubation with the AWS appears to result in less movement of the upper cervical spine.²⁸

The Res-Q-Scope II is a similar 2-piece device (Fig. 5). The main unit contains a color LCD view screen with a video-out port and rechargeable battery (a backup battery



Fig. 6. The Coopdech C-scope. (Courtesy of Camera Screen Laryngoscope.)

pack that uses 4 AA batteries is available). A plastic disposable guide channel containing additional suction and oxygen ports, the video imaging system, and an LED light source attaches to the main unit. Clinical studies of the Res-Q-Scope are limited, but one would expect it to perform similarly to the other guide channel devices.

Video Modifications of Traditional Laryngoscopes

Multiple devices have incorporated video systems into laryngoscopes of a traditional design, most using various modifications of a typical Macintosh laryngoscope blade. These devices have the strong advantage of appearing familiar to operators experienced in traditional laryngoscopy. The view screen and enhanced view may make reduce the learning curve for traditional intubation by novice operators.²⁹

The Coopdech C-scope (Camera Screen Laryngoscope, Brooklyn, New York, distributed by Daiken Medical, Osaka, Japan, <http://www.intubate123.com>) resembles a traditional battery-powered laryngoscope with an attached 3.5-inch 320 × 234 RGB (red, green, blue) view screen on its handle (Fig. 6). The view screen has an external video-out port. A flexible bundle containing the LED light source and CCD camera unit attaches to a reusable blade. The angle of view is 39° × 52°. Sizes 2, 3, and 4 Macintosh and sizes 0 and 1 Miller blades are available. The life of the rechargeable lithium-ion battery is approximately one hour. The unit can also be run on AC power via a dedicated charger. Experience with this laryngoscope in the United States is limited.

Storz produces 2 reusable video laryngoscopes that use an external power source and video system (<http://www.karlstorz.com/cps/rde/xchg/sid-642f366a-a24088b8/karlstorz-en/hs.xsl/49.htm>). The Berci-Kaplan DCI (V-MAC) video laryngoscope is compatible with other Storz endo-



Fig. 7. The Storz Berci-Kaplan DCI video laryngoscope with difficult airway cart and external monitor. The cart contains the laryngoscope's light source and camera electronics.

scopic video imaging systems (Fig. 7).³ Miller and Macintosh blades in pediatric and adult sizes are available. Sterile processing of the blade is necessary after use. The camera's electronics are incorporated into the handle of the laryngoscope. The angle of view is 60°. A high-resolution (15,000 pixel) image is viewed on an external monitor, which simplifies shared viewing and teaching. Kaplan and co-workers examined 865 intubations using traditional laryngoscopy compared with the Storz video laryngoscope. While both techniques provided good conditions in 85% of patients, they reported that the video system provided a better view in 12%. Direct laryngoscopy provided a better view in only 1% of cases.³⁰ Jungbauer and colleagues randomized 200 patients with Mallampati scores of 3 or 4 to receive traditional laryngoscopy or video laryngoscopy with the DCI. The video technique produced better visualization of the glottis, a higher success rate, and shorter intubation time, compared to direct laryngoscopy.³¹ In pediatric patients, Vlatten and colleagues compared the use of the DCI laryngoscope to stan-



Fig. 8. The Storz C-Mac video laryngoscope.

dard laryngoscopy using a Miller 1 or Macintosh 2 blade in children ≤ 4 years old. Video laryngoscopy provided a better view of the glottis, but intubation time was longer (median time 27 s with video, versus 21 s with direct laryngoscopy).³² Macnair and colleagues published similar results.³³

The C-Mac laryngoscope is designed similarly, but uses a dedicated 7-inch portable external monitor to display a high-resolution image (800 \times 480) with an 80° angle of view (Fig. 8).³⁴ The camera's electronics are incorporated into the handle of the laryngoscope, with the image acquired by a CMOS chip incorporated into the blade along with an LED light source. Sizes 2, 3, and 4 reusable Macintosh blades are available. Sterile processing of the reusable blade is required after use. The device is powered by a rechargeable battery supply that permits about 2 hours of continuous operation. The system can be used while recharging on AC. Images can be recorded in JPEG or MPEG4 format.

The McGrath video laryngoscope (Aircraft Medical, Edinburgh, United Kingdom, <http://www.aircraftmedical.com/products>) has a modified variable-length Macintosh-style blade (Fig. 9).³⁵ A disposable clear plastic sleeve fits over the adjustable blade and snaps in place. A compact



Fig. 9. The McGrath video laryngoscope. (Courtesy of Aircraft Medical Limited.)

1.7-inch LCD VGA (video graphics array) view screen is mounted on the handle. The screen angle is adjustable. The device is powered by a single AA battery, which provides about an hour of use, and uses a high-intensity LED light source. Shippey and McKeown, describing their initial experience with the McGrath laryngoscope in 150 normal patients, reported a 98% success rate.³⁶ O'Leary and co-workers reported successful endotracheal intubation with the McGrath in 30 instances in which traditional laryngoscopy had failed.³⁷ In inexperienced hands, however, Walker and colleagues concluded that the McGrath offered no advantage to traditional laryngoscopy, and they found the intubation time longer than with direct laryngoscopy (median 47 s vs 30 s).³⁸

GlideScope

The GlideScope (Verathon, Bothell, Washington, http://www.verathon.com/glidescope_index.htm) uses a plastic blade curved to a 60° angle to visualize the glottis.^{39,40} Several different models are available: the GVL and Ranger have reusable blades; the Cobalt, Cobalt AVL, and Ranger Single-Use have disposable clear plastic blades that fit over a flexible video bundle. All use a CMOS camera chip with an anti-fogging mechanism and an LED light source. The image is displayed on a separate view screen. The GVL and Cobalt (Fig. 10) use a 7-inch 320 × 240 monitor, which also has a video-out port. The Cobalt AVL has a higher-resolution camera, a 6.4-inch VGA (640 × 480) monitor, and is capable of recording images in MPEG4



Fig. 10. The GlideScope Cobalt GVL video laryngoscope. The disposable plastic blade snaps onto the reusable video bundle. The "hockey stick" stylet generally facilitates passage of the endotracheal tube.

format (Fig. 11). The monitor also has video-out and USB ports. A separate digital video recorder is available. The Ranger devices, which have a 3.5-inch, 320 × 240 pixel monitor, are highly portable and ruggedly designed for emergency or pre-hospital use. The Ranger is powered by a rechargeable battery that permits 90 min of continuous use. The GVL and AVL can use either battery or AC power. Various blades sizes are available. Intubation with the GlideScope is generally facilitated with a curved rigid stylet.

In general, the GlideScope appears to increase the likelihood of a good laryngoscopic view, compared with traditional techniques.^{41,42} Stroumpoulis and colleagues performed direct laryngoscopy followed by laryngoscopy with the GlideScope in 112 patients with predicted difficult intubation.⁴³ The percentage of Comack grade 1 and 2 views increased from 63% to 90% with the GlideScope, and intubation was successful in 98% of cases. In pediatric patients, Kim and colleagues reported that the laryngo-



Fig. 11. The GlideScope Cobalt AVL video laryngoscope.

scopic view with GlideScope was equal to or better than that with direct laryngoscopy.⁴⁴ The average time required for tracheal intubation, however, was longer with the GlideScope (36 s vs 24 s). Serocki and co-workers compared direct and video laryngoscopic (DCI and GlideScope) views of 120 patients with at least one predictor for difficult intubation.⁴⁵ They reported a Comack view ≥ 3 in 30% with direct laryngoscopy. The incidence was reduced to 11% with either the DCI or the GlideScope. The laryngoscopic view was improved with the DCI in 64% of cases, and in 94% with the GlideScope. Intubation was unsuccessful in 10% with direct laryngoscopy, but only in 2.5% of cases with the DCI or GlideScope.

Learning how to use the GlideScope appears to be quite intuitive, and the learning curve for the device is steep.⁴⁶ Nouruzi-Sedeh and colleagues studied 20 untrained volunteers who attempted 5 intubations with either direct laryngoscopy or the GlideScope in patients scheduled for elective surgery.⁴⁷ The likelihood of successful intubation was higher (93% vs 51%, $P < .01$) when the GlideScope was used, and the time required for intubation was shorter (63 ± 30 s vs 89 ± 35 s, $P < .01$). Not all studies, however, have been uniformly positive, perhaps reflecting a certain learning curve for the technique. In a nonrandom observational study of intubations by residents in an emergency department, Platts-Mills and colleagues reported no difference in success on first intubation attempt for the

GlideScope (81%), compared with direct laryngoscopy (84%), and intubation with the GlideScope took more time to complete (42 s vs 30 s).⁴⁸

The separate view screen can be helpful when access to the patient's head is limited. Nakstad and Sandberg examined the use of the GlideScope Ranger during intubations of a simulated entrapped patient.⁴⁹ In this study, 8 anesthesiologists intubated a manikin with access only to the caudal end of the head. While only half could successfully accomplish the intubation with a Macintosh laryngoscope, all could secure the airway within 60 seconds using the GlideScope. The utility of the GlideScope Ranger in the hands of paramedics performing out-of-hospital intubations has been studied in a sequential study of 300 patients undergoing direct laryngoscopy, compared with 315 patients intubated with the GlideScope.¹⁵ Intubation with the GlideScope was quicker (average 21 s vs 42 s) and required fewer attempts (1.2 vs 2.3 attempts). The overall success rates were similar (97% vs 95%).

Which One Is Best?

Is one model of video laryngoscope "the best"? Probably not. Van Zundert and co-workers compared success rates of the GlideScope Ranger, Storz DCI, and McGrath when used for endotracheal intubation without a stylet in 450 patients with normal airways who were to undergo elective surgery. All patients were successfully intubated with the assigned laryngoscopic technique, and all video techniques provided an equal or better view of the glottis compared with traditional direct laryngoscopy with a Macintosh blade. Intubation with the DCI laryngoscope was faster (average 18 s) compared with the GlideScope (34 s) or the McGrath (38 s). A stylet had to be used in only 7% of cases with the DCI, compared with 43% with the GlideScope and 59% with the McGrath.⁵⁰

In a follow-up study, this same group specifically randomized obese patients to laryngoscopy with the GlideScope Ranger, Storz DCI, or McGrath, compared with traditional direct laryngoscopy.⁵¹ All the video techniques offered a view that was equal to or better than direct laryngoscopy. The time required for intubation was 33 s with the GlideScope, 17 s with the C-Mac, and 41 s with the McGrath, but a stylet was used only if the intubation was not successful after 2 attempts. This probably put the GlideScope, with its 60° angulated blade, at a relative disadvantage.

Each model of video laryngoscope has its own unique strengths, weaknesses, and best applications. No one model appears uniformly superior to another, and none is 100% successful. That said, those instruments that appear familiar and intuitive to the experienced user, such as the C-Mac, Coopdech, GlideScope, and McGrath, may be more easily accepted into clinical practice. The use of guide

channel devices, however, appears easy to learn in multiple studies and may be advantageous when cervical spine mobility or mouth opening is limited. Devices capable of displaying the image on a separate view screen may be better when access to the patient's head is poor, when teaching, or during difficult or emergency intubation when the assistance of additional individuals is needed. The laryngoscopic view and the difficulty or success of intubation is easily communicated when all medical personnel in attendance can share the view.

Summary

Video techniques are quickly replacing direct laryngoscopy in many practices, especially when teaching novices or when intubation is anticipated to be difficult.⁵² It is likely that video techniques will continue to evolve, and that video capability will become available routinely as a first alternative to direct laryngoscopy. In my own institution, video laryngoscopy already has become our technique of choice, next to fiberoptic techniques, for anticipated difficult intubations.

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