Awake Video Laryngoscope Intubation: Case Report of a Patient With a Nasopharyngeal Mass

Mitch Dotson, CRNA, MSN, ARNP, CCRN

Difficult airway management remains central to anesthesia practice. Video laryngoscopes have been an adjunct to airway management since the early 2000s. They have been shown to improve visualization of the glottic opening and have become a useful aid in managing difficult airways. To date, the preferred method for difficult airway management remains awake fiberoptic intubation. The purpose of this article is to summarize the use of a video laryngoscope for an awake intubation and to suggest alternative uses of these devices in other awake intubation scenarios. The case report presented offers a description of successful awake intubation using a video laryngoscope in a patient with a large pedunculated mass arising from the nasopharynx and extending down into the oropharynx.

Keywords: Awake intubation, difficult airway, video laryngoscope.

The American Society of Anesthesiologists\(^1\) (ASA) developed its “Practice Guidelines for Management of the Difficult Airway” to provide anesthesia practitioners with an evidence-based, stepwise approach to making decisions when encountering an actual or potentially difficult airway. The ASA guidelines describe a difficult airway as “difficulty with facemask of the upper airway, difficulty with tracheal intubation, or both.”\(^1\) The guidelines further describe difficult laryngoscopy as a situation in which “it is not possible to visualize any portion of the vocal cords after multiple attempts at conventional laryngoscopy.”\(^1\) Difficult tracheal intubation is described as a situation in which “tracheal intubation requires multiple attempts, in the presence or absence of tracheal pathology.”\(^1\) The practice guidelines list or describe useful techniques for difficult intubation including alternative laryngoscope blades, fiberoptic intubation laryngeal mask airway, and light wand. Although recommended for the management of difficult airways, the use of these techniques in clinical practice may be limited because of lack of proficiency in their use or lack of availability.

The ASA guidelines note that “awake intubation improves intubation success and reduces airway-related adverse outcomes.”\(^1\) Several studies evaluating anesthesiologists’ current clinical practice patterns found that most anesthesiologists continue to use awake fiberoptic intubation and direct laryngoscopy in most clinical circumstances of difficult airway.\(^2-6\) When presented with various difficult airway scenarios, anesthesiologists routinely chose awake fiberoptic intubation as the preferred choice of managing the difficult airway, followed by direct laryngoscopy when regional anesthesia or awake tracheotomy was not indicated.\(^2-6\) Whereas awake fiberoptic intubation is the stated preferred technique for difficult intubations, in a survey of ASA members, Ezri et al\(^2\) found that only 59% of respondents reported skill in the use of a fiberoptic bronchoscope. Since the ASA guidelines adoption in 1993 and update in 2003, many new airway devices have been introduced into clinical practice including numerous video laryngoscopes that have the potential to become a preferred method of awake intubation.

Awake fiberoptic intubation is a skill that requires practice and may not be a technique that gets routinely used in some clinical practice settings. Lack of proficiency with fiberoptic intubation combined with the familiarity of direct laryngoscopy may be a leading reason why anesthesia providers continue to utilize direct laryngoscopy as the second choice for difficult airway management. The GlideScope (Verathon Inc), McGrath (LMA North America Inc), and Storz DCI (Karl Storz) video laryngoscopes offer a similarity of shape and use to those of conventional laryngoscopes. All 3 devices incorporate a video camera at the tip of the blade to allow indirect visualization of the glottis. Cooper, who had early experience with a video laryngoscope in patients with difficult airways, wrote that “this technique potentially challenges the prevailing wisdom that such patients must be managed by awake fiberoptic intubation.”\(^7\) The efficacy of the GlideScope, McGrath, and Storz video laryngoscopes in successfully handling the difficult airway, difficult laryngoscopy, and difficult tracheal intubation as they are defined in the ASA guidelines has been explored in the literature.\(^8-12\) Experience with all 3 devices has routinely demonstrated the ability to provide or improve Cormack-Lehane laryngoscopic view to grade 1 or 2 in a high percentage of patients in which
Video laryngoscopes were used while maintaining a high intubation success rate (Table). Video laryngoscopes have also demonstrated the ability to maintain high percentages of Cormack-Lehane grades 1 and 2 in patients with predicted difficult airways while maintaining a high successful intubation rate (Table). Video laryngoscopes have successfully been used after failed direct laryngoscopy and have shown evidence as useful rescue devices after failed fiberoptic intubation. Because of their reported success in managing difficult airways while maintaining a high successful intubation rate (Table), video laryngoscopes have successfully been used after failed direct laryngoscopy and have shown evidence as useful rescue devices after failed fiberoptic intubation.

Despite literature supporting their utility in difficult airway situations, none of the video laryngoscopes used in clinical practice are listed in the ASA guidelines as one of the commonly cited techniques for managing difficult intubation. Because of their reported success in managing difficult airways, they should be included in the “techniques for difficult intubation” and the “alternative approaches to intubation” sections in the next algorithm update, this author believes. There is currently no evidence that would suggest that fiberoptic intubation is superior to these techniques in terms of expected outcomes concerning awake intubation. The high success rate of video laryngoscopes in patients with known predictors of potential difficult intubation along with their success rate as a rescue device after failed intubation provides the opportunity for video laryngoscopes to have an expanded role as an alternative difficult airway technique for awake intubation scenarios.

The case report presented here offers a description of successful awake intubation using a video laryngoscope in a patient with a large pedunculated nasopharyngeal mass.

**Case Report**

A 27-year-old, 80-kg man, with an ASA status 1, was scheduled for surgery after presenting to the otolaryngology clinic with abrupt onset of upper respiratory tract infection and sinusitis. Specific symptoms for this patient included bifrontal headache, fatigue, nasal congestion, anosmia, sore throat, and dysphagia and odynophagia. Computed tomographic (CT) scan of the head showed polyposis in both nasal passages. In addition, a large pedunculated mass measuring 7.3 × 2.4 × 3.9 cm completely obstructed the nasopharynx and extended down

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**Table.** Cormack-Lehane View and Successful Intubation Rate of 3 Video Laryngoscopes

<table>
<thead>
<tr>
<th>Device</th>
<th>N</th>
<th>C/L = 1/2 (%)</th>
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<th>N</th>
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<td>GlideScope</td>
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<td>99.7</td>
<td>29</td>
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**Difficult airway**

Note: One or more of the following: Mallampati grade 3 or 4, mouth opening < 3 cm, thyromental distance < 6 cm, Cormack-Lehane grade > 2 on direct laryngoscopy, body mass index > 35 kg/m², limited neck range of motion, or failed direct laryngoscopy.

Abbreviations: C/L, Cormack-Lehane grade; dash, no data.
into the oropharynx just posterior to the uvula.

The patient presented for surgical resection of this mass. On physical examination, the mass was visible in the posterior aspect of the oral cavity, with the tip extending downward out of view. After assessment of the airway, the major concerns for this patient included the following:

1. Potential to hit the mass during laryngoscopy or advancement of the endotracheal tube (ETT), causing hemorrhage and worsening visualization of the airway during laryngoscopy.

2. Potential for airway obstruction if pharmacologic relaxation was used for laryngoscopy making ETT placement difficult.

3. Possibility of poor mask ventilation secondary to obstruction or diminished air movement through the mass-filled nasal cavity.

The anesthesia provider thought that successful intubation with the patient awake could be done using a video laryngoscope, rather than an awake fiberoptic intubation. It was determined that video laryngoscopy offered the following advantages: (1) better visualization of the glottic opening should bleeding occur, (2) a wider view of the mass as the upper airway was entered, and (3) the ability to create room to maneuver the ETT should the mass take up more space than perceived on the CT scan.

After the explanation of the anesthetic plan, the patient verbalized understanding. He consented to undergo awake video laryngoscopy, with the established goals for this procedure, which included absence of pain or discomfort, absence of gagging or coughing, successful placement of the ETT with safe maintenance of the airway, and the right to change his mind on the initial plan at any point during the procedure. A fiberoptic bronchoscope was available in the operating room (OR) if he did not tolerate the video laryngoscope. The otolaryngology surgeons scheduled to perform the surgery were present in the room for induction in the event that intubation was unsuccessful and emergent tracheotomy was necessary. The facility had a GlideScope video laryngoscope, which was used for this awake intubation.

Topicalization of the airway began with a 5% lidocaine “lollipop”—a 2.54-cm dab of lidocaine paste spread on both sides of a tongue depressor applied to the back of the throat—in the preoperative holding area for 10 minutes before entering the operating room. Additionally, 1 mg of midazolam was administered in the preoperative area to help calm the patient because of his sensitive gag reflex during the initial desensitization. Once in the OR, the patient received 0.2 mg of glycopyrrolate to help control secretions, and airway topicalization was continued with 4 mL of aerosolized 4% lidocaine to the back of the throat positioned toward the larynx. One hundred percent oxygen via the ventilator circuit was blown by the patient’s face because of the nasal mass. A bolus dose of 1 μg/kg/min of dexmedetomidine was administered over 10 minutes while topicalization continued until there was absence of the gag reflex to the aerosolizer being placed to the back of the throat. After completion of the bolus, an infusion of dexmedetomidine was initiated at 4 μg/kg/min for the duration of intubation. The patient appeared comfortable, interacted appropriately with staff, and followed commands well throughout the intubation. The patient was laid supine and preoxygenated with 100% oxygen via mask. Because he had demonstrated a sensitive gag during the preoperative topicalization, the patient was told we would perform a “test run” to further assess the topicalization before we proceeded with the awake intubation.

Initial placement of the video laryngoscope was unsuccessful because the patient’s gag reflex remained strong with advancement of the video laryngoscope. The video laryngoscope was removed, and an additional 1 mg of midazolam was administered. Additional topicalization with 4 mL of 4% lidocaine to the back of the throat was completed. The patient was again preoxygenated with 100% oxygen via mask, and a second attempt was performed with the video laryngoscope. A Cormack-Lehane grade 1 view was obtained without the patient gagging or coughing. Then 4 mL of 4% lidocaine was administered directly to the vocal cords, which resulted in mild coughing. A 7.0-mm ETT was advanced and directly visualized passing through the vocal cords. Visualization of the vocal cords and ETT was maintained while balloon inflation and connection to the anesthesia circuit was completed. Once end-tidal carbon dioxide confirmed placement, the video laryngoscope was removed. The patient received 200 mg of propofol, and 8% sevoflurane was started to induce anesthesia rapidly. Bilateral breath sounds were confirmed, the ETT was secured in place, and the surgery began.

At the end of the surgery, an awake extubation was performed, and the patient was taken to the postanesthesia recovery unit (PACU), where he had an unremarkable recovery. Before discharge from the PACU, the patient was interviewed by a member of the anesthesia team to assess his tolerance to the awake video laryngoscope intubation. The patient reported remembering entering the OR and the subsequent topicalization of the airway. He recalled the initial placement and removal of the video laryngoscope but not the second attempt or the placement of the ETT. The patient denied any pain during the procedure and offered no complaints about the anesthetic plan or the awake video laryngoscope intubation.

**Discussion**

Limited descriptions of awake video laryngoscope intubation are provided in the literature. Awake video laryngoscopy has been successfully used for patients with macroglossia in which standard laryngoscopy and
fiberoptic bronchoscopy was unsuccessful, patients with laryngeal edema and severely narrowed airways due to malignancy and radiotherapy, patients with facial deformity resulting from multiple cancer surgeries, morbidly obese patients, patients with previous difficult awake fiberoptic bronchoscope intubation with Cormack-Lehane grades 3 to 4, patients with severe ankylosing spondylitis, and patients with unstable cervical spines. In most of the patients described, a Cormack-Lehane grade 1 was obtained while successful intubation occurred with a fully cooperative patient, maintenance of stable oxygen saturation concentrations, and minimal reported discomfort. The patients all received routine doses of benzodiazepines, opioids, or both in combination with localized airway anesthesia with lidocaine orally and/or transtracheally. In all episodes, the patients maintained consciousness with the ability to interact, and most patients had the ETT placed without experiencing coughing or gagging. None experienced adverse events.

The ASA guidelines recommend: “Additional evaluation may be indicated in some patients to characterize the likelihood or nature of the anticipated airway difficulty.” Jones and Harle described their experience using a video laryngoscope preoperatively to examine the airway of patients who were predicted to have difficult intubations based on standard preoperative airway assessment. Their assumption was that successful intubation could be achieved in an asleep, paralyzed patient if video laryngoscopic examination showed a good portion of the glottis with the patient awake. Video laryngoscopic examination of the airway of these awake patients revealed Cormack-Lehane grade 1 or 2 view. All the patients tolerated the video laryngoscopic assessment without discomfort, and 1 experienced coughing, which resolved with further topicalization with lidocaine. Under general anesthesia with muscle relaxation, all the patients had Cormack-Lehane grade 1 views with the video laryngoscope, followed by uneventful ETT placement.

The technique of Jones and Harle offers an advanced next step of airway evaluation in accordance with the ASA recommendation, which states “An airway physical examination should be conducted, whenever feasible, prior to the initiation of anesthetic care and airway management in all patients. The intent of this examination is to detect physical characteristics that may indicate the presence of a difficult airway.” The guidelines note that “a directed airway physical examination detects a difficult airway and reduces airway-related adverse outcomes.” Performing a video laryngoscope airway examination may take the ASA recommendation for an airway examination further than is commonly needed. However, it does provide a reasonable technique for further evaluation of suspected difficult airways, thus avoiding unexpected intubation difficulties and unnecessary awake airway intubation, which can be traumatic for some patients. Furthermore, an airway examination such as this may provide more useful clinical information to the anesthesia practitioner than an airway assessment using a fiberoptic bronchoscope in identifying the most appropriate approach to provide a safe and successful tracheal intubation.

A final novel use of the video laryngoscope in the awake intubation scenario described in the literature is the video laryngoscope-assisted awake fiberoptic intubation of 13 patients with known difficult airways. All 13 patients received standard topicalization with lidocaine, as well as fentanyl and midazolam for sedation. After completion of topicalization, the video laryngoscope was introduced in the airway to assess the laryngoscopic view, followed by fiberoptic bronchoscope along the right side of the video laryngoscope blade. While the fiberoptic bronchoscope operator manipulated it into position, the video laryngoscope operator monitored the display to guide the bronchoscope to the glottic opening and into the trachea with passage of the ETT through the vocal cords. All 13 patients were successfully intubated on the first try, with the video laryngoscope used to monitor placement and confirm passage through the vocal cords. Advantages noted from this combined technique include the ability to observe the laryngoscopic and fiberoptic bronchoscope views, simultaneously affording the ability to monitor advancement all along the airway. The addition of a flexible tip on the fiberoptic bronchoscope may allow easier advancement of the ETT into the airway. This maneuverability was noted to be particularly beneficial with higher Cormack-Lehane grades in which the steep angle of the video laryngoscope view may not allow easy passage of a stylet-fitted ETT. Other advantages noted were the ability to lift the tongue and jaw to provide a clear path of view for the fiberoptic bronchoscope to identify anatomical landmarks.

Sukernik et al developed an algorithm using the combination of a video laryngoscope with a fiberoptic bronchoscope in patients with expected difficult airways. They advocate guiding the fiberoptic bronchoscope into the glottis solely under video laryngoscopic view and using it as a stylet with a controlled maneuverable tip in those patients with a Cormack-Lehane grade 1 and 2 on video laryngoscopic view. When only Cormack-Lehane grades 3 and 4 are obtained with the video laryngoscope, an anesthesia practitioner advances the fiberoptic bronchoscope until the glottis is displayed on the fiberoptic bronchoscope monitor. A second team member manipulates the video laryngoscope to optimize positioning as the fiberoptic bronchoscope is advanced through the glottis and the ETT is confirmed in place with the video laryngoscope. The fiberoptic bronchoscope then can be advanced through the glottis and the ETT can be confirmed in place with the video laryngoscope. Although
this combined technique requires 2 team members familiar with the scopes, the authors found this technique easy to perform, and it provided a more rapid intubation than with the standard fiberoptic technique.31-33

Available video laryngoscopes have a similar structure to the Macintosh blade, which provides the anesthetist the advantage of sensory and functional familiarity that a fiberoptic bronchoscope may not offer. In addition to the common features of traditional direct laryngoscopy, video laryngoscopy offers several advantages over other techniques for awake intubation. A wider view of the airway and surrounding tissues compared with the more narrow view of a bronchoscope often provides excellent Cormack-Lehane grade 1 and 2 views of the vocal cords.34 The view on the video monitor is magnified, making recognition of airway structures or anomalies easier.34 This provides the anesthesia provider the ability to appreciate the structures and make manipulations more quickly and easily. The video laryngoscope is less affected by secretions or blood and is less susceptible to fogging than is a fiberoptic bronchoscope.34 All of these issues can make fiberoptic intubation considerably more difficult and time-consuming. The video laryngoscope does not have a restriction on the size or type of ETT that can be placed, unlike the fiberoptic method, which has functional limits on the size of the ETT placed.34

Similarly, one can easily change the size of the ETT being placed while maintaining the view of the glottis when using the video laryngoscope; whereas the fibroscope must be removed and reinserted if the ETT is too big to pass through the airway. Video laryngoscopy does not require the passage of a device (fiberoptic bronchoscope) through the glottis and allows a patent airway through which the patient can breathe throughout the procedure.26 Video laryngoscopy allows the confirmation of the ETT passing through the vocal cords that other methods do not offer.34 A noted benefit is that everyone present can observe the intubation, which is accomplished with fiberoptic intubation only if a bronchoscope tower is attached.23,26 This can be of particular importance in teaching institutions where trainees are learning to master airway management or in settings other than the operating room where a video tower may not be available for a necessary awake intubation.

Although there are no limitations to awake video laryngoscope intubation noted in the literature, limitations noted to video laryngoscopic use in general provide theoretical limits to its use with the awake patient. Aziz et al13 noted 4 preoperative predictors that are significantly associated with failed video laryngoscope intubation. Abnormalities of neck anatomy including scars, radiation, or mass were more likely to have failed video laryngoscope intubation compared with patients who had a normal anatomy. Patients with a thyromental distance less than 6 cm were more likely to have a failed video laryngoscope intubation than were patients whose thyromental distance was greater than 6 cm. Patients with limited cervical range of motion were also more likely to have failed video laryngoscope intubation. Finally, the authors suggested that the practitioner’s experience with video laryngoscope intubation affects success rates.13 Of note, the patient’s age, gender, body mass index, Mallampati classification, and mouth opening were not significant predictors of failed video laryngoscope intubation.13

A study by Tremblay et al17 found that previously identified high-grade Cormack-Lehane views of the glottic opening, limited mandibular protrusion, and short sternothyroid distance (assessed with the patient in a sitting position and neck extended) resulted in more challenging video laryngoscope intubation.17 This study also did not find a correlation between Mallampati classification, age, gender, large neck circumference, small mouth opening, history of snoring, and reduced m-nubriomental distance in extension to be independent predictors of difficult video laryngoscope intubation.17

Other factors unique to video laryngoscopy could create situations of more difficult intubation. The screen image in the video monitor can become hazy, particularly in bright light, which can make visualizing the airway anatomy more difficult.22 Passage of the ETT is blind until the tip comes into view on the screen. This creates the possibility of soft-tissue damage and bleeding as the ETT is advanced into view.21 Because the oral, pharyngeal, and laryngeal anatomy does not need to be aligned for successful glottic view with the video laryngoscope, the ETT must pass around a relatively acute angle to enter the larynx.23 This may present a more difficult intubation of patients with neck pathology or anatomy that would limit ETT manipulation. The acute entry angle necessitates the use of an appropriately shaped stylet to optimize successful intubation.16 Because of the acute angle, there may be certain situations in which difficulty in removing the stylet could result in displacement of the ETT from the trachea.

Patients with a predicted difficult airway may demonstrate many of the described features that may make video laryngoscope intubation more difficult. Any patient undergoing an awake intubation will require desensitization of the airway with topical local anesthetic. Although it has been suggested that total lidocaine doses of 600 mg (8.2 mg/kg) are safe for topicalization for fiberoptic bronchoscope, standard dosing regimens for awake video laryngoscopy are undefined at this time.35 Because lidocaine can be readily absorbed from the upper airway, the possibility always exists for susceptible patients to have deterioration of the airway as a result of toxicity from topical local anesthesia. A thorough assessment of the airway and evaluation of the factors predictive of more difficult video laryngoscope intubation should be performed in any patient undergoing awake video laryngoscopy. Proper as-
sessment allows anesthesia practitioners to prepare themselves and the patient for scenarios in which awake video laryngoscope intubation may be more difficult, as well as allows them to identify risks that they may encounter.

Conclusion

Awake video laryngoscope intubation is occurring in clinical practice. The successful case study presented benefited from working with a healthy young patient who was cooperative with the anesthetic plan. In retrospect, a smoother intubation may have occurred had more time been allowed either for topicalization of the airway initially (or possible use of transtracheal localization) or for the dexmedetomidine to take greater effect. The only adverse effect the patient experienced was coughing after his vocal cords were sprayed with lidocaine, but this coughing did not appear to be any worse than what occurs with some awake fiberoptic bronchoscope intubations. Review of the anesthetic record revealed the time from entering the OR to placement on the anesthesia circuit was less than 15 minutes, comparable to the time in which one could expect to complete localization and fiberoptic bronchoscope intubation.

Awake video laryngoscope offers a reasonable alternative to fiberoptic bronchoscope intubation in the appropriately identified patient with a difficult airway. Because the laryngoscopic views obtained from the Glidescope, McGrath, and Storz video laryngoscopes are similar, the choice of device and safety of any awake intubation comes down to provider preference and comfort level with the chosen device.

More clinical descriptions need to be documented in the literature to provide anesthesia practitioners with a wider perspective of patients in which awake video laryngoscopy may be useful. Also needed are descriptions of techniques to improve the success of video laryngoscope intubation. The anesthesiology profession would benefit from studies to validate appropriate patients for video laryngoscope intubation and to describe appropriate analgesia, sedation, and local anesthetic topicalization regimens, in order to obtain successful awake video laryngoscope intubation. Comparison studies between video laryngoscope and fiberoptic bronchoscope intubation could be undertaken to compare successful intubation rates, time to intubation, ease of intubation, and patient hemodynamic response to establish evidence on the clinical usefulness of awake video laryngoscopy as an alternative technique that could be included in the ASA difficult airway guidelines. Awake intubations can be distressful for some patients; however, they will continue to be an integral part of safe airway management. Until such studies are completed, it is at the discretion of anesthesia practitioners to evaluate each patient to determine the usefulness of the video laryngoscope for awake intubation in their clinical practice.

REFERENCES

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