Commentary

Video-assisted laryngoscopic devices: Have we found the panacea for difficult airway yet?

Ensuring uninterrupted oxygenation and ventilation has always been the Holy Grail of airway managers. Inability to do so remains the most common cause of anesthesia-related morbidity and mortality.[1] The incidence of failed tracheal intubation ranges from 0.1% to 0.2% in the elective setting to as high as 1%–11% in the Emergency Department.[1,2]

Direct laryngoscopy (DL) remains most commonly used technique to secure airway. When >2 DL is performed, a dramatic rise in airway complications has been observed.[2] When DL proves difficult, alternative techniques should be attempted early.

Advent of video laryngoscopes (VLs) has revolutionized the practice of airway management. Reviews, meta-analyses, and latest airway guidelines (Difficult Airway [DA] Society and American Society of Anesthesiologists) have established the effectiveness and safety of VL and have advocated their early use for airway management.[3-6]

Airway managers have recently been flooded with innumerable VL devices and the resulting "paradox of choice" persists.[7] VLs generally are based on fiber-optic technology or prisms to bend light around corners so as to offer an indirect view of larynx which is then displayed on an integrated or a remote screen. The video-assisted devices can be subdivided into rigid laryngoscopes (e.g., C-MAC, Glidescope, Truview, Bullard, and McGrath), optical stylets (e.g., Bonfils, Shakini, and Levitan), and flexible fiber-optic-based devices (e.g., flexible bronchoscope and Foley Airway Stylet).[4] All such devices have reported excellent success rates in expert hands in various anticipated, simulated, and unanticipated DA scenarios in the past, but there is no current recommendation regarding the preference of one device over other in any particular situation.[3,4] Their use is mostly dependent on individual skills, preference, and accessibility. In the present issue, Vivek *et al*. have explored the effectiveness of two video-assisted intubation devices (Bonfils intubation fiberscope [BIF] and Truview picture capture device (TV-PCD)]) in patients with DA simulated using a soft cervical collar and have found them comparable for successful intubation.[8]

In most of the studies comparing airway devices, the DA has been effectively simulated by immobilizing the cervical spine (CS) using a cervical collar. This poses a dual challenge for airway managers by restricting both the neck movements and mouth opening (MO). In the present study, the fact that on DL in the Macintosh laryngoscope-Bonfils group, no part of vocal cord was visible in 75 out of 76 patients, affirms successful simulation of DA scenario.[8] The alignment of oral, pharyngeal, and laryngeal axis is difficult using a conventional DL in a patient with immobilized CS. VLs abolish the requirement of sniffing position and a direct line of sight vision. VLs abolish the requirement of sniffing position and provide nonline of sight vision by shifting the angle of view from operator's eye to near the tip of the blade.[4]

BIF is a rigid optical stylet with camera at its curved end which is bent 40° anteriorly and is useful in cases of anteriorly placed larynx. It has been found to provide superior laryngeal views and success rate as compared to DL in patients with simulated DA. Its steel shaft is preloaded with the endotracheal tube (ETT) and requires a MO almost equal to the external diameter of the ETT. BIF has a camera at its tip which ensures visualized ETT placement as compared to other devices (DL and VL) where initial device insertion part is blind and hence decreases the possibility of airway trauma. In a patient wearing a neck collar, there is very little pharyngeal space to negotiate the scope, so maneuvers such as tongue-jaw lift, external jaw thrust, and assistance of a Macintosh laryngoscope (used by the authors) may be required to aid its insertion.[9] Furthermore, need for an assistant to thread the ETT, operator-dependent success rate, ETT connector getting stuck to its holder, difficulty in maneuvering its fixed curvature underneath an

Access this article online	
Quick Response Code:	Website: www.joacp.org
	DOI: 10.4103/joacp.JOACP_250_16

How to cite this article: Gupta A. Video-assisted laryngoscopic devices: Have we found the panacea for difficult airway yet? J Anaesthesiol Clin Pharmacol 2017;33:446-7.

overhanging epiglottis, barotrauma with a high flow of oxygen, and a nonsteep learning curve along with cost concerns have been cited as its limitations. In addition, it has a relatively high incidence of fogging as is the case with most such devices relying on indirect laryngoscopic view. Use of antifogging solution at the tip and insufflation of oxygen can counter this limitation to a major extent.[9,10] Systematic reviews have recommended the use of BIF specifically in case of difficult or failed DL.[3] A meta-analysis detected intubation success rate of 96.4% in normal and 95.6% in predicted DA patients when BIF was attempted.[11] Authors of the present study have also reiterated that BIF has a high success rate in DA scenario and should be considered in the same laryngoscopy attempt in case DL proves difficult.[8]

Truview-PCD VL is a prism-based device which provides a 48° angled deflection view through a 15 mm nonmagnifying eyepiece and camera attachment. It also has a port to provide oxygen (flow rate, 4–6 L/min) for paraoxygenation. Limitations of TV are fogging and the fact that good glottis view may not translate into successful intubation, and this may lead to prolonged time to intubation or failures.[4,12]

A recent meta-analysis comparing intubation choices in CS injury patients has found that all the VLs (including TV and BIF) consistently improved the Cormack–Lehane grade and increased the first attempt success as compared to DL.[13]

In the studies comparing airway devices including VLs, operator blinding is not feasible, and this may confound the results. Moreover, the study findings may not be applicable for intubation in real DA scenarios in patients with congenital or acquired airway pathologies. Furthermore, in patients with unstable CS injury, the standard of care for neck immobilization during airway management is to use manual inline stabilization, but most studies immobilize CS using only soft collars. In addition, all such studies have cautioned that the results may not be applicable to novices.

To conclude, VLs can be effectively used in anticipated or unanticipated DA scenario, and choice of a particular device depends on individual case scenario, local resources, operator's familiarity, and dexterity with the device. However, such devices have a learning curve which needs to be tided over in routine intubations before attempting them in a DA patient.

Anju Gupta
VMMC and Safdarjung Hospital,
New Delhi, India

Address for correspondence: Dr. Anju Gupta,
437 Pocket A, Sarita Vihar, New Delhi - 110 076, India.
E-mail: dranjugupta2009@rediffmail.com

References

1. Benumof JL. Management of the difficult adult airway. With special emphasis on awake tracheal intubation. Anesthesiology 1991;75:1087-110.
2. Mort TC. Emergency tracheal intubation: Complications associated with repeated laryngoscopic attempts. Anesth Analg 2004;99:607-13.
3. 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.
4. Pott LM, Murray WB. Review of video laryngoscopy and rigid fiberoptic laryngoscopy. Curr Opin Anaesthesiol 2008;21:750-8.
5. Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG, *et al*. Practice guidelines for management of the difficult airway: An updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Anesthesiology 2013;118:251-70.
6. Hagberg CA, Gabel JC, Connis RT. Difficult Airway Society 2015 guidelines for the management of unanticipated difficult intubation in adults: Not just another algorithm. Br J Anaesth 2015;115:812-4.
7. Greenland KB. Art of airway management: The concept of 'Ma' (Japanese: 間, when 'less is more'). Br J Anaesth 2015;115:809-12.
8. Vivek B, Sripriya R, Mishra G, Ravishankar M, Parthasarathy S. Comparative evaluation of success of intubation using either Macintosh laryngoscope-assisted Bonfils intubation or Truview video laryngoscope in simulated difficult airway. JOACP 2016;33:107-11.
9. Thong SY, Wong TG. Clinical uses of the Bonfils Retromolar Intubation Fiberscope: A review. Anesth Analg 2012;115:855-66.
10. Byhahn C, Nemetz S, Breitkreutz R, Zwissler B, Kaufmann M, Meininger D. Brief report: Tracheal intubation using the Bonfils intubation fibrescope or direct laryngoscopy for patients with a simulated difficult airway. Can J Anaesth 2008;55:232-7.
11. Mihai R, Blair E, Kay H, Cook TM. A quantitative review and meta-analysis of performance of non-standard laryngoscopes and rigid fibreoptic intubation aids. Anaesthesia 2008;63:745-60.
12. Sun Y, Lu Y, Huang Y, Jiang H. Pediatric video laryngoscope versus direct laryngoscope: A meta-analysis of randomized controlled trials. Paediatr Anaesth 2014;24:1056-65.
13. Suppan L, Tramèr MR, Niquille M, Grosgurin O, Marti C. Alternative intubation techniques vs Macintosh laryngoscopy in patients with cervical spine immobilization: Systematic review and meta-analysis of randomized controlled trials. Br J Anaesth 2016;116:27-36.