Journal of Anesthesia & Clinical Research
ISSN: 2155-6148

Kajekar and Mendonca. J Anesth Clinic Res 2011, 2:11
DOI: 10.4172/2155-6148.1000102e

Editorial Open Access

Awake Intubation - Videolaryngoscope or Fibreoptic Scope?

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The past decade has seen significant advances in indirect laryngoscopy and a wide range of videolaryngoscopes have been introduced into clinical practice. Videolaryngoscopes (VL) are increasingly being used as an adjunct to fibreoptic intubation and to perform awake intubation in patients with difficult airways, cervical spine disease and morbidly obese patients. Their use for awake intubation seems quite promising although it seems unlikely to replace the flexible fibreopticscope (FOS), which has its own merits.

Videolaryngoscope Vs Flexible Fibreoptic Scope for Tracheal Intubation

Awake intubation using a FOS has been the gold standard in patients with unstable cervical spine and difficult airways. It can be performed orally or nasally with minimum haemodynamic disturbances and is the best device for inspecting the airway in patients with restricted mouth opening and upper airway pathology. It can be used to confirm endotracheal tube placement and also to suction and perform pulmonary toilet [1]. The demerits are that a successful awake fibreoptic intubation (FOI) requires adequate planning, patient preparation and administration of antisialogogue. Even with reasonable experience and practice, FOI can be challenging [2]. It is a skill that requires practice, a high degree of manual dexterity and an ability to manoeuvre quickly under stressful clinical situations. The success rate of awake nasotracheal intubation performed by trainees even after structured training varied from 66 to 90% [3]. There may also be technical difficulties while performing the procedure - such as inability to identify the anatomy due to collapsed pharyngeal mucosa contacting the lens, and difficulty in advancing a tracheal tube over the fibrescope due to tube impingement [4]. The biggest drawback is that advancing the tracheal tube over the fibrescope is a blind technique. Certainly some of these problems can be overcome by using a videolaryngoscope.

Several of the videolaryngoscopes have been used for awake intubation but the most popular ones seem to be the Pentax-Aiway Scope (AWS) and the GlideScope. In certain scenarios, use of videolaryngoscopes may altogether avoid the need for awake intubation. A preoperative assessment of the airway with the VL after topicalisation can allow for visualization of the glottis. If the larynx is easily visible and the tube placement considered to be easy, general anaesthesia can be induced; if not one can proceed for an awake intubation using either VL or FOS [5].

Pentax-airway scope

The Pentax-Airway scope (AWS) has been used for awake intubation in patients with difficult airways, restricted neck movement and even when fibreoptic intubation has failed. Y Hirabayashi. et al have described awake intubation in nine patients using AWS. The indications included anticipated or documented difficult airway secondary to massive tumours, abscesses and deformities in the neck. All the tracheal intubations were successful in the first attempt, without any complications [6]. It's use for awake nasal intubation has been reported in three patients in whom using FOS had failed [7]. Two of the cases had severe laryngeal oedema and reason for failure of FOS was unable to visualize the glottis in one patient, and unable to advance a tube over the FOS in the trachea in the other one. The third patient had a retropharyngeal hematoma and the FOS could not be advanced beyond the epiglottis [7]. There is also a case report of its successful use when intubation using an intubating laryngeal mask airway had failed [8].

Several other authors have reported awake intubation using AWS in cases of anticipated difficult airway, unstable cervical spines [9-13] and it has also been used successfully to intubate morbidly obese patients [14,15]. Direct laryngoscopy can be difficult in morbidly obese patients and requires optimum positioning of the patient. As indirect laryngoscopy with AWS does not require positioning the head and neck in the sniffing position and only a minimal lifting force is needed to expose the larynx; it is well tolerated by an awake patient [7,16]. Hence awake intubation using AWS can be chosen as an alternate to awake intubation using flexible FOS. The integrated tube channel, suction port and adjustable monitor are of definite benefit for successful tracheal intubation [12,17].

The glidescope

Clinical experience to date using the GlideScope in anesthetized and paralyzed patients has been excellent [18,19], and its use in awake patients is also gaining popularity. Doyle first described its use in four cases of awake intubation where the airway was anesthetized with gargled and atomized 4% lidocaine. The GlideScope can be particularly helpful in ensuring that topical anaesthesia is sprayed directly on the vocal cords under direct vision. In all cases a good view of the glottis was obtained and the end tracheal tube (ETT) was passed without difficulty [20].

A Sinofsky et al reported the use of glidescope in five patients who met the criteria for awake intubation due to high BMI or difficult intubation. Four of their patients had a successful awake glidescope intubation whereas in one patient it was stopped due to patient discomfort, and the patient was intubated using FOS. The author rightly claims that although it seems to be a reasonable alternative to awake FOS, it may not be suitable for all difficult intubations [21]. Other authors have described good results for awake intubation both through oral and nasal routes using the GlideScope [20,22,23] and some of them have used this VL successfully after failed FOI [24].

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Received November 10, 2011; **Accepted** November 12, 2011; **Published** November 14, 2011

Citation: Kajekar P, Mendonca C (2011) Awake Intubation - Videolaryngoscope or Fibreoptic Scope? J Anesth Clinic Res 2:102e. doi:10.4172/2155-6148.1000102e

Other indirect laryngoscopes for awake intubation

A Cohn et al, have described awake intubation using the Bullard laryngoscope in five cases. In one of their patient, multiple attempts using fibreoptic scope following failed direct laryngoscopy had failed, but Intubation using Bullard laryngoscope was successful [25].

Abramson et al have described a similar case series of five patients, using Bonfils retromolar intubation fibrescope [26].

B.E. McGuire described the use McGrath VL in three patients who were predicted difficult direct laryngoscopy and had signs of upper airway obstruction [27] and B Uslu described the same in a patient with severe ankylosing spondylitis [28].

What are their benefits?

Awake intubation using VL has several benefits over FOS. They are fairly easy to use, fast to set up and provide a clear and real time view of the airway and tube placement. VLs such as glidescope and AWS are available with single use blades of various sizes for use in preterm to morbidly obese patients. VLs are more robust, easier to maintain and clean than a FOS. In emergency and trauma scenarios VLs are preferred over FOS as the laryngoscopic view is less likely to be affected by secretions and blood. They seem to be a more easier technique for a novice to master and hence less experience required than for FOI. The time required for intubation is faster than fibreoptic intubation for less experienced operators [1].

Another advantage of VL is that the process of tracheal intubation and tube passage through glottis is possible under direct vision whereas with FOS tube passage through glottis is blind. VLs can be used as an aid during fibreoptic intubation to monitor the process of intubation. Xue et al, have described Glidescope assisted awake FOI in 13 patients anticipated to be difficult intubation. The GlideScope was first introduced, followed by introduction of the FOS along the right side of the GlideScope blade. While the FOS operator manipulated it into position, the GlideScope operator monitored the display to observe the location of the tip of the FOS and gave verbal feedback to the FOS operator [1,29]. This will enable the operator to appropriately manipulate the tube. VLs enable the anaesthetic assistant to effectively use the external laryngeal manipulation whilst observing the view of the larynx on the monitor.

VLs with integrated tube channel do not require stylet or other devices in the tube lumen; therefore, the cross-sectional area of the glottis will not be diminished and patients can breathe more easily during tube insertion compared to the FOS.

What are the disadvantages?

Videolaryngoscopes lack the versatility of FOS. When mouth opening is restricted, nasotracheal intubation can only be performed using a FOS as at least 25 mm of mouth opening is required for the insertion and manipulation of a VL [9]. When VLs without tube channel are used, the mouth opening should not only allow passage of VL, but also a stylet loaded with tracheal tube and subsequent manipulation of the tube.

In the presence of abnormal upper airway anatomy, previous surgery involving airway and radiotherapy to the neck the use of FOS may favour over a videolaryngoscope. When performing video laryngoscopy, the operator's visual attention may be diverted from the mouth to the screen while introducing the laryngoscope and endotracheal tube. This could potentially result in damage to the surrounding soft tissue or endotracheal tube cuff [30]. There have been case reports of palatopharyngeal arch injuries requiring surgical interventions during the use of Glidescope. Hence tube advancement, whenever possible, should be visually controlled [30]. In one study the incidence of minor complications such as bleeding and sore throat was similar with the use of VL and FOS although the FOI was done by experienced operators [31].

Some VLs have only one fixed-size blade for use in difficult airway, hence not suitable for use in children and also it can limit its use in some adults. In patients with increased distance from the mouth to the larynx, the use of the pre-designed length of the laryngoscope bade may be inadequate. Difficulty can also be experienced in introducing the laryngoscope in patients with fixed flexion deformity of the neck. Finally there are occasional case reports of failed videolaryngoscopy where other methods had to be used [32].

What level of evidence for efficacy of videolaryngoscope?

Currently the level of evidence for the use of VL for awake intubation is limited to case reports and case series (Level 4). Of course these have a vital role in the progress of our understanding of the use of the device but according to the recent introduction of ADEPT (Airway Device Evaluation Project Team) guidance for selection of airway devices the authors propose requiring at least a Level 3b evidence for all airway related equipment [33]. Therefore further large scale studies are required to determine the efficacy of VL for awake intubation.

Conclusion

In summary, the new era of videolaryngoscopes can be used for awake intubation. From the available evidence, it appears that the use of videolaryngoscopes for awake intubation is quite promising and it may have a role in future difficult airway, but further large scale studies are warranted to confirm these positive findings. Currently it does add to the previous existing armamentarium in this clinically challenging situation, but FOS still holds its place to go round the corners. The decision of whether to use a VL or FOS as first line for awake intubation would depend on several factors such as anticipated cause for difficult airway and clinical experience of the anaesthetist in using the device. Finally the success of a device must incorporate good communication with the patient, sedation that does not compromise ventilation and adequate topical anaesthesia of the airway.

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