



Successful Nasotracheal Intubation in a Patient with Distorted Airway Anatomy by Combined Use of Flexible Fiberoptic Bronchoscope and Trachway

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Nasotracheal intubation for airway anatomy distorted patients is often frustrating. Here, we describe a redo oral cancer patient who received awake nasotracheal intubation under flexible fiberoptic bronchoscopy (FFB) guidance with assistance of the Trachway[®] intubating stylet. After repeated failures of locating the epiglottis or vocal cords with the FFB, we put Trachway stylet into the oropharynx to assist identifying glottic structures. With the assistance of Trachway, glottic structures and the tip of FFB were identified, and fiberoptic intubation was achieved without complications. Therefore, this feasible application may be applied to patients with distorted airway who requires nasotracheal intubation.

Key words: Trachway, flexible fiberoptic bronchoscope, difficult airway management

INTRODUCTION

The safest plan for anticipated airway difficulty is to perform awake tracheal intubation under topical anesthesia. The gold standard for the management is awake intubation with flexible fiberoptic bronchoscope (FFB), but it may be failed due to the presence of secretions, a large floppy epiglottis, or distorted airway anatomy and deviation of the larynx after head and neck surgeries. Use of alternatives or combination of more than two techniques for tracheal intubation may be considered. The Trachway intubating stylet, a new patented Food and Drug Administration (FDA)-registered intubating stylet, was used for endotracheal intubation. Here, we present a case that was successfully intubated with the use of two intubation instruments, which could be a novel technique for the management of difficult airways.

CASE REPORT

A 44-year-old man was admitted with a painful, poorly-healing surgical wound of 2 weeks' duration, following

treatment for squamous cell carcinoma of the left buccal mucosa with wide excision, neck dissection, and buccal reconstruction with an anterolateral thigh flap. Debridement and split-thickness skin grafting was planned for the buccal region, as well as the donor site on the thigh. Preoperative airway assessment revealed limited neck extension, mouth opening for 1 cm, old scars on the cheek and neck, a thyromental distance of 3 cm, and a modified Mallampati score of Class IV. The surgeon requested general anesthesia with nasotracheal intubation, which was planned to be performed under FFB guidance while the patient awake. Routine monitorings were established and adequate preoxygenation was provided; subsequently the oropharynx and nasal passage were anesthetized with 10% lidocaine spray, and the nasal passage prepared with 2 mL of phenylephrine with the help of cotton-tip applicators. Light anesthesia was then induced with 100 µg of fentanyl administered via the intravenous route, following which nasotracheal intubation was attempted under FFB guidance with a 7.0-mm tracheal tube that had been placed in a warm water bath. It was not possible to identify the epiglottis and vocal cords even after several attempts because of the distorted airway anatomy after buccal reconstruction. Therefore, the Clarus Video System (Trachway[®] Intubating Stylet, Biotronic Instrument Enterprise Ltd., TaiChung, Taiwan, R.O.C.) was used to locate the laryngeal inlet and vocal cords on the monitor through the distal camera [Figure 1]. Anatomical structures were observed on the monitor, while advancing the stylet along the dorsum of the tongue until the epiglottis and the tip of the FFB were identified. The FFB was then manipulated to advance its tip below the epiglottis, while searching for the vocal cords under the guidance of the Trachway stylet

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[Figure 2]. The vocal cords were identified, and 4 mL of 2% lidocaine injected through the working channel of the FFB. The FFB was then advanced under direct vision between the vocal cords into the trachea, followed by the insertion of the nasotracheal tube. The cuff on the tube was inflated immediately upon removal of the FFB. The patient had mild reflex cough and retching, but no other complications during the procedure. After the debridement, we did not extubate nasotracheal tube, but suggested maintain nasotracheal intubation with ventilator support and transfer to intensive care unit for further treatment. The intensivist evaluated the indications of extubation by clinical assessment and weaning profiles.

DISCUSSION

There are no reports, to the best of our knowledge, of the combined use of Trachway and FFB for awake nasotracheal intubation in patients with anticipated difficulty in airway access. Here, we present the case of a patient who was



Figure 1. Combined use of the Trachway intubating stylet and flexible fiberoptic bronchoscope for anticipated difficult airway by two anesthesiologists

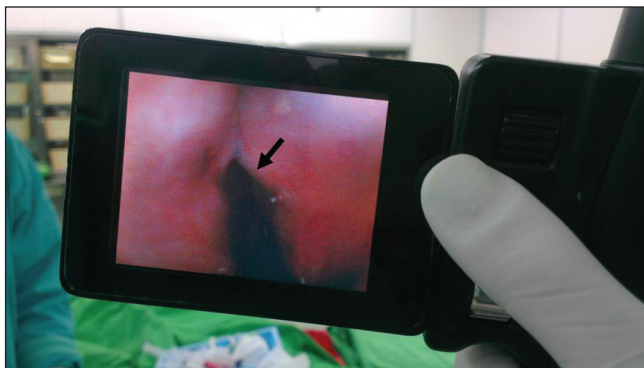


Figure 2. The flexible fiberoptic bronchoscope was advanced through the vocal cords into the trachea under direct vision offered by the Trachway device. A black arrow indicates the opening of vocal cord

successfully intubated with the help of two intubation instruments, despite limited mouth opening consequent to surgery for cancer of the buccal mucosa.

The gold standard for the management of difficult airways is awake intubation under FFB guidance, but its failure rate may be as high as 13%.¹ The challenge points of vocal cord identification with FFB include secretions, edema, hemorrhage, and difficult tracheal tube passage. Moreover, distorted airway anatomy and deviation of the larynx after reconstruction of buccal mucosa make fiberoptic visualization more difficult, for example, we failed to obtain glottic exposure with FFB in our patient even after several attempts.

The Trachway intubating stylet is a new patented FDA-registered intubating stylet for endotracheal intubation. It has a rigid intubating stylet, a light source, and a camera on the distal tip of the stylet with a monitor to show the oral structures, the epiglottis, and the glottic opening during tracheal intubation.² The design of the Trachway device makes it useful in the management of difficult airways in patients with limited mouth opening. It also avoids dental trauma, and minimizes the chance of inadvertent misplacement of the tube in the esophagus.² Tracheal intubation with Trachway is considered to be easy because of its simple operating principle and ease of handling. The Trachway stylet is reported to provide faster and easier intubation in patients with cervical collars, in comparison with the Airway Scope in the hands of experienced anesthesiologists.³ There is a report of the use of the Trachway device for awake tracheal intubation in a patient with a history of odontoid fracture.⁴ However, it is not possible to use Trachway to perform nasotracheal intubation. In a study done on manikins, this device provided faster, easier, and less traumatic intubation than the Macintosh laryngoscope.⁵ The Trachway device provides a better view of the glottis during tracheal intubation than does conventional direct laryngoscopy, but the stylet is too rigid to use it for nasotracheal intubation.

Combined use of Glidescope and FFB has been reported for the management of difficult orotracheal intubations.^{6,7} However, for those with limited mouth openings such as the patient described here, Glidescope has no role for intubation for the difficulty of putting it in oropharynx. Therefore, these patients usually receive intubation under FFB guidance through nasotracheal route. In our case, we initially tried nasotracheal intubation under FFB guidance, but were repeatedly thwarted by the altered oropharyngeal anatomy as a result of the oral cavity reconstruction. This challenge is encountered often in patients who have undergone airway procedures. We tackled this problem by inserting the Trachway device into the oropharynx to locate the position of the FFB and vocal cords. Once the FFB and vocal cords were visualized, FFB was

advanced into the trachea, followed by the nasotracheal tube.

Fiberoptic nasotracheal intubation is often performed for patients undergoing head and neck surgeries; many of these patients have distorted airway anatomy as a result of previous surgeries, which make it more difficult to intubate even under FFB guidance. Traditional laryngoscopy or Glidescope could not insert to this case to assist nasotracheal intubation due to limited mouth opening (about 1 cm) in this case. However, we successfully insert Trachway from the limited mouth opening to identify the tip site of FFB and vocal cord due to the design of the rigid and curved stylet. We present this feasible application which may be utilized to all difficult fiberoptic nasotracheal intubation patients with limited mouth opening.

DISCLOSURE

All authors declare no competing financial interests.

REFERENCES

1. Delaney KA, Hessler R. Emergency flexible fiberoptic nasotracheal intubation: A report of 60 cases. *Ann Emerg Med* 1988;17:919-26.
2. Ong J, Lee CL, Lai HY, Lee Y, Chen TY, Shyr MH. A new video intubating device: Trachway intubating stylet. *Anaesthesia* 2009;64:1145.
3. Kim JK, Kim JA, Kim CS, Ahn HJ, Yang MK, Choi SJ. Comparison of tracheal intubation with the airway scope or clarus video system in patients with cervical collars. *Anaesthesia* 2011;66:694-8.
4. Cheng WC, Lan CH, Lai HY. The clarus video system (Trachway) intubating stylet for awake intubation. *Anaesthesia* 2011;66:1178-80.
5. Hung KC, Tan PH, Lin VC, Wang HK, Chen HS. A comparison of the Trachway intubating stylet and the Macintosh laryngoscope in tracheal intubation: A manikin study. *J Anesth* 2013;27:205-10.
6. Weissbrod PA, Merati AL. Reducing injury during video-assisted endotracheal intubation: The “smart stylet” concept. *Laryngoscope* 2011;121:2391-3.
7. Xue FS, Li CW, Zhang GH, Li XY, Sun HT, Liu KP, *et al.* GlideScope-assisted awake fiberoptic intubation: Initial experience in 13 patients. *Anaesthesia* 2006;61:1014-5.