

## Are videolaryngoscopes useful for nasotracheal intubation?

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### Introduction

Nasotracheal intubation has been used as an established method of airway management since 1902, when Kuhn [1] was the first to report this method. Nevertheless, compared with orotracheal intubation, fewer studies have been done on nasotracheal intubation to increase the success rate of intubation and to reduce complications. In this issue of the *Journal of Anesthesia*, Ono and colleagues [2] report the efficacy of a videolaryngoscope (Pentax Airway Scope) for nasotracheal intubation, factors that may make nasotracheal intubation more difficult, and solutions to these difficulties.

### Methods of nasotracheal intubation

In the early 1920s, Robotham and Magill [3] popularized nasotracheal intubation, and Magill initiated “blind nasal intubation” [3, 4]. This technique is now mainly used in a patient who is breathing spontaneously. In a patient to whom a neuromuscular blocking agent has been given after induction of anesthesia, the conventional method is to insert a laryngoscope orally and advance a nasally inserted tracheal tube into the trachea. With this method, it is often not easy to advance the tube into the trachea.

The fiberoptic bronchoscope is regarded as the most reliable tool for nasotracheal intubation, but considerable skill and knowledge are required to achieve a smooth tracheal intubation [5, 6]. In addition, its routine use may be impractical, partly because of the high cost of purchasing and maintaining the device. Rigid indirect-optical laryngoscopes (or ‘videolaryngoscopes’), which are known to be useful for orotracheal intubation [7–9], may well be useful for nasotracheal intubation. Ono and colleagues, in this issue of the *Journal of Anesthesia* [2], studied 103 patients (without limited mouth opening), to assess the efficacy of the Airway Scope, and nasotracheal intubation was always successful within 30 s. A previous study [10] has also reported that nasotracheal intubation using another videolaryngoscope (Glidescope) was always successful in 34 patients.

### Solutions to difficult nasotracheal intubation

One major difficulty in nasotracheal intubation is that, even when a clear view of the glottis is obtained at laryngoscopy, it may often be difficult to drive the tip of a tracheal tube toward the glottis. Three major methods have been reported to solve this problem: lifting of the head, inflation of a tracheal tube cuff, and the use of Magill forceps. When a tracheal tube is passed through the nose, the tip of the tracheal tube is usually being advanced along the posterior pharyngeal wall, toward the esophageal inlet. Lifting the head (or flexing the head on the neck) would shift the tip of the tube away from the posterior pharyngeal wall, toward the glottis. Similar to flexing the head, inflating the cuff when the tube tip reaches near the esophageal inlet would shift the tube tip toward the glottis [11].

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In the 1920s, Magill was the first to describe the use of forceps (Magill forceps) to pick up a nasally inserted tracheal tube in the pharynx and to drive the tube to the glottis [3, 4]. Although the efficacy of Magill forceps has not been formally assessed, it is safe to say that the device has stood the test of time. Nevertheless, the use of Magill forceps may be associated with several complications, such as rupture of the cuff of a tracheal tube and accidental injury to the uvula.

In the study by Ono and colleagues [2], nasotracheal intubation was achieved without using any of the three solution techniques in 35 of 103 patients (34 %). In the remaining 68 patients, lifting the head enabled tracheal intubation in 31 patients (30 %), the cuff inflation technique in 37 patients (36 %), and in no patient were Magill forceps used. In the previous study using the Glidescope [10], Magill forceps were not necessary either. Therefore, it is reasonable to conclude that videolaryngoscopes may provide high success rates of nasotracheal intubation, without the aid of Magill forceps.

### Efficacies of different videolaryngoscopes

Currently, videolaryngoscopes can be categorized into three major categories: the first generation (Macintosh-type blades), the second generation (anatomically shaped blades without tube guide), and the third generation (anatomically shaped blades with tube guide) [12]. For orotracheal intubation, the third-generation videolaryngoscopes are more advantageous than the first- or second-generation laryngoscopes, mainly because difficulty in advancing a tracheal tube toward the glottis is less likely to occur with the third-generation laryngoscopes [13, 14].

For nasotracheal intubation, because the tube is passed through the nose and the tube guide of a third-generation device does not function, it is not clear whether the third-generation videolaryngoscopes are better than the first- or second-generation laryngoscopes. In a previous study [10], the average time required for nasotracheal intubation using a second-generation videolaryngoscope (Glidescope) was 44 s (with the interquartile range of 40–67 s), which is longer than the time required with the Airway Scope (always <30 s) in the study of Ono and colleagues [2]. Randomized studies comparing different videolaryngoscopes would elucidate which type of videolaryngoscope is more suitable for nasotracheal intubation.

### Elucidation of difficulty

Videolaryngoscopes are believed to have potential roles in patients with difficult airways [12]. Nevertheless, in a

limited number of patients, videolaryngoscopes may fail. For orotracheal intubation, a few causes of difficulties have been elucidated, such as blurred vision (by fogging, secretions, blood, or vomitus) or difficulty in insertion of a blade in patients with a limited mouth opening. In this issue, Ono and colleagues [2] have found three independent risk factors of difficult nasotracheal intubation using a videolaryngoscope: male gender, a large tongue, and a less clear view of the glottis (Cormack and Lehane grade 2 in comparison with grade 1). Elucidation of the causes of difficulties in tracheal intubation with a videolaryngoscope will establish the role of each device in patients with difficult airways.

### Conclusions

There is growing evidence that a videolaryngoscope is useful for routine nasotracheal intubation. The efficacy and the safety of each videolaryngoscope should be compared with a conventional direct laryngoscope, with the other videolaryngoscopes, and with the other types of intubation devices (e.g., a fiberoptic bronchoscope), to determine which device is more suitable for nasotracheal intubation and to establish the true role of videolaryngoscopes in patients with difficult airways.

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