**Comparing a novel WEB videolaryngoscope with conventional Glidescope® videolaryngoscope in simulated difficult airway: a manikin study**

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# *Introduction*

Since the introduction of the first video-assisted intubation device in 2001, namely the Glidescope®, videolaryngoscopes have gained significant popularity over the years. These novel devices have been developed to complement the role of traditional laryngoscopes (1). They may be useful alternatives for both routine and difficult airway management, and for educational purposes (2). They are claimed to provide a comparable or superior glottic view when compared with direct laryngoscopy using the standard curved Macintosh blade (3,4).

Currently there are many different types of videolaryngoscope available in the market. With continuing advancement in video and optical technology, manufacturers keep improving their videolaryngoscope development. In this study, we are evaluating, for the first time, this newly available WEB videolaryngoscope. We are comparing it with the widely used Glidescope**®** videolaryngoscope (5). The reason for comparing these two devices is because the blade design of both devices is similar. Both videolaryngoscopes have a high-resolution camera and light source embedded at the distal end of the blade. It allows the view of anterior glottis without the need for direct line of sight. The image is displayed on a coloured monitor.

This trial is therefore designed to compare the effectiveness of using these two devices in performing endotracheal intubation in a manikin with simulated difficult airway.

## Study Design

**Hypothesis:** The use of a novel WEB videolaryngoscope allows a faster tracheal intubation time as compared to the Glidescope® videolaryngoscope in simulated difficult airway.

**Research Question:** In simulated difficult airways, does the novel WEB videolaryngoscope allow a faster tracheal intubation time as compared to the Glidescope® videolaryngoscope?

# Methods

We will prospectively recruit 30 voluntary anaesthetic residents, registrars or consultants for this study. Baseline data including the level of clinical experience and the estimated number of prior videolaryngoscopy performed will be collected. This trial is a randomized crossover study. All participants will be tested on using each of the two intubation devices on a manikin with a simulated difficult airway. Participants will be assigned to one of the two groups – Group 1: novel WEB videolaryngoscope followed by Glidescope® videolaryngoscope, or Group 2: Glidescope® videolaryngoscope followed by novel WEB videolaryngoscope.

Each participant will receive standardized instruction for the use of each device as per the manufacturer’s guidelines before the commencement of the study. The difficult airway will be simulated using tongue swelling in the SimMan patient simulator (Laerdal Medical). A standard 7.0 endotracheal tube will be used for all participants. Adjuncts such as stylets or bougies, are allowed to be used as per the discretion of the participants. Endotracheal position is confirmed by inflating the manikin’s lungs with air from a self-inflating bag.

**Outcomes**

*Primary outcome:*

* The time taken for successful tracheal intubation (time is measured from the time the videolaryngoscope is handed to the participant to when the participant declare successful intubation, with censoring of failed intubation).

*Secondary outcomes:*

* Number of failed intubation (failure is defined as unrecognized oesophageal intubation, abandoned procedure, intubation taking >120 seconds or > 3 attempts of intubation).
* Number of intubation attempts (an attempt is defined as removal of videolaryngoscope or endotracheal tube from the mouth without declaration of successful intubation).
* Number and type of intubating adjuncts used.
* The best laryngoscopy view achieved using the Cormack and Lehane grading system (Grade I to IV)
* The ease of intubation, which will be surveyed using a visual analogue scale from 0-100mm.

# Data Analysis

*Sample size estimation:*

Based on a previous study, we estimate that the mean intubation time with the use of Glidescope® videolaryngoscope in patients with C-spine immoblisation (simulated difficult airway) is 20 (with SD of 8) seconds (6). Power analysis shows that in order to show a 40% reduction (to 12 sec) to successfully intubate with a new WEB videolaryngoscope, a study of 30 participants (15 in each group) will be required to detect a difference with a power of 80% and an alpha error of 0.05.

*Statistical analysis planned:*

Values will be expressed as mean and standard deviation. Median and interquartile ranges will be used for data, which are not normally distributed. Comparisons between the groups will be performed by t-test for parametric continuous data and Wilcoxon’s signed rank test for non-parametric or not normally distributed continuous data. Chi-square or Fisher exact test will be used for categorical data. A P value < 0.05 is considered statistically significant.

**Data Management**

Data will be recorded on a standardised case report form and transferred to a Microsoft Excel spreadsheet. All the data collected will remain anonymous and confidential. A unique subject number, not used for any other purpose, will be used. The data collected and all the research-related documents will be stored securely in a locked office in the Department of Anaesthesia and Pain Management at the Royal Melbourne Hospital. Only the principal investigator and the co-investigators are allowed to have access to the documents.

**Feasibility**

Preparation 8 weeks

Recruitment of participants 1 week

Data acquisition & analysis 2 weeks

Statistics 2 weeks

Manuscript preparation 4-8 weeks

*Total study time*~*5 months*

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