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ANTICIPATED DIFFICULT TRACHEAL INTUBATION: A PROSPECTIVE COMPARISON OF DIRECT LARYNGOSCOPY AND VIDEO LARYNGOSCOPY IN 40 PATIENTS

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ABSTRACT **INTRODUCTION:** The Berci – Kaplan video laryngoscope was developed to improve the visualization of the glottis and ease of tracheal intubation. The study prospectively evaluated the conditions and success rate of tracheal intubation in patients with a Mallampati score of III or IV. **AIM:** To compare the visualization of the glottis, the time for tracheal intubation, the success rate of intubation by using direct laryngoscopy or video laryngoscopy in patients with expected difficult intubations.**METHODOLOGY:** Forty patients undergoing general anaesthesia were randomized. Group-A using direct laryngoscopy (n-20) Group-B using video laryngoscopy (n-20) Visualization of the vocal cords, Time for intubation, The need for additional manoeuvres (laryngeal manipulations, head positioning, and Eschmann stylet). Success rate were evaluated. **Inclusion Criteria:** Aged >18 yr, Modified Mallampati score of III or IV, H/O difficult intubation, Mouth opening of atleast 2cm, **Exclusion criteria:** ASA IV, Patients undergoing Rapid Sequence Induction, Mallampatti score of less than III, Visualization of the laryngeal inlet was assessed according to the classification of Cormack and Lehane. General anaesthesia was induced in the supine position. The time for an attempt was defined from when the patient's mouth was opened until the cuff of the tube was inflated. Laryngoscopic view according to Cormack and Lehane was noted. Optimizing manoeuvres - external manipulation of the larynx, gum elastic bougie (Eschmann stylet) and changes in head positioning. **RESULTS:** Videolaryngoscopy showed a better view of laryngeal entrance than direct laryngoscopy. (Cormack Lahane score II > III in video laryngoscopy) (p value 0.025). The mean time taken for intubation was less in videolaryngoscopy when compared with that of direct laryngoscopy. (mean 43.58< 53.75) (p value – 0.01). **CONCLUSION:** Video laryngoscopy, when compared with direct laryngoscopy for difficult intubations- provides a significantly better view of the cords, Faster intubations, Less need for optimizing manoeuvres and higher success rate.

KEYWORDS : Difficult tracheal intubation, Direct laryngoscopy, Video Laryngoscopy Cormac Lahane,

INTRODUCTION:

Securing the airway with a cuffed tube in the trachea is still one of the most important skills in anaesthesia. However, the placement of a tracheal tube can be expectedly or unexpectedly difficult or even impossible. Difficult tracheal intubation still contributes to anaesthesia-related morbidity and mortality. Video-assisted techniques offer the opportunity to improve the teaching of airway management. In general, these techniques offer the advantage of abandoning the need to align the optical axis in the pharynx and mouth to visualize the entrance of the larynx. In 2003, Kaplan and Berci introduced the Storz video laryngoscope into clinical practice. The Storz video laryngoscope is built like a standard Macintosh laryngoscope with an integrated video camera. The camera projects the image to a portable screen. Besides the improved view for the anaesthesiologist, the system allows supporting staff to optimize their assistance (external manipulation of the larynx). Whether the Storz video laryngoscope can improve the intubating conditions and finally the success rate in difficult intubations remains unknown. Therefore, the aim of this study was to compare the visualization of the glottis, the time for tracheal intubation, the success rate of intubation, and the need for manoeuvres to optimize the view using direct laryngoscopy or video laryngoscopy in patients with expected difficult intubations.

METHODS

After approval by the institutional Ethics Committee, 40 patients undergoing surgery under general anaesthesia with tracheal intubation in Government Theni medical College were analysed for the study. The patients were aged >18 yr were recruited if they had a modified Mallampati score of III or IV, or a history of a difficult intubation. Patients who were ASA IV or higher and those undergoing rapid sequence induction were excluded. Among the 50 patients selected, 40 patients were randomised using computerised randomization after excluding the patients with exclusion criteria. The randomised patients gave their informed, written consent to participate in this study. The modified Mallampati score was assessed with the patient in sitting position, the mouth fully open and the tongue protruded. The patients were asked to phonate. Visualization of the laryngeal inlet was assessed according to the classification of Cormack and Lehane: I, vocal cords visible; II, less than half of the glottis or only the posterior commissure is visible; III, only the epiglottis is visible; and IV, none of the foregoing is visible.

The video laryngoscope (Karl Storz Endoskope, Tuttlingen, Germany) was introduced into clinical practice by Kaplan and Berci. The video laryngoscope is built like a standard Macintosh laryngoscope with fibreoptic fibres built into the end of the blade. This way the video laryngoscope allows at the same time a direct view, like the view with a normal Macintosh blade, and the view of the camera at the end of the blade projected on a monitor. The camera projects the image in real time to a portable video system with the option to record sequences or pictures. For the study, blades Macintosh size three and four were used. Size of the blades and tracheal tubes (7.0–8.0 mm ID) were used to the discretion of the intubating anaesthesiologists.

After having obtained the consent, the patient was assigned to tracheal intubation via direct laryngoscopy or video laryngoscopy according to a computer-based randomization list. Before induction of anaesthesia, the anaesthesiologist performing the tracheal intubation confirmed the Mallampati score and started preoxygenation. The patients were placed in the supine position. General anaesthesia was induced according to the preference of the attending anaesthesiologist. The time for an attempt was defined from when the patient's mouth was opened until the cuff of the tube was inflated. The attending anaesthesiologist noted the laryngoscopic view according to Cormack and Lehane. Always the best view and the number of manoeuvres to optimize this view were noted. In the case of video laryngoscopic intubations, both views (direct view with the blade and the view on the screen) were recorded. Optimizing manoeuvres were the external manipulation of the larynx (BURP manoeuvre), use of a gum elastic bougie (Eschmann stylet), and changes in head positioning. A number of zero optimizing manoeuvres meant that the patient was intubated in neutral position without any manipulations. In cases where the anaesthesiologist could not intubate a patient despite all manoeuvres, the intubation attempt was declared as failed.

During the tracheal intubation, standard monitoring, i.e. non-invasive arterial pressure measurement, heart rate, and arterial oxygen saturation (pulse oximeter), was performed and the results were recorded before induction of anaesthesia and at the end of the intubation.

The statistical analysis used in this study were mean, standard deviation and unpaired t test.

RESULTS:

Chart 1: Demography

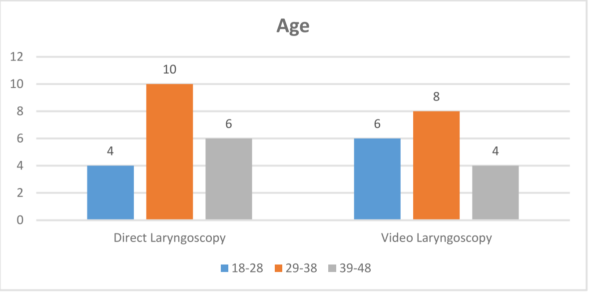


Chart 2: Mallampatii grade

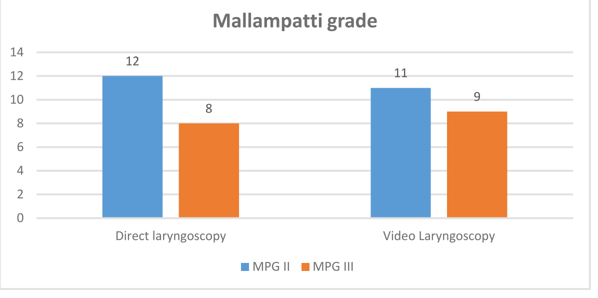


Table 1: Cormack Lehane grading, number of optimizing maneuvers and Time for intubation

	Direct Laryngoscopy	Video Laryngoscopy	P value
Cormack Lehane Grade II	6	13	P = 0.025
Cormack Lehane Grade III	14	7	P=0.025
No. of optimizing maneuvers	13	5	P<0.0001
Time for Intubation (sec) (Mean)	53.75	43.58	P=0.01

Chart 3: Cormack Lehane Grading

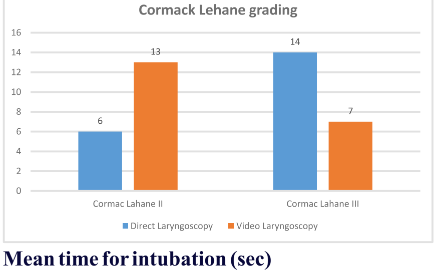
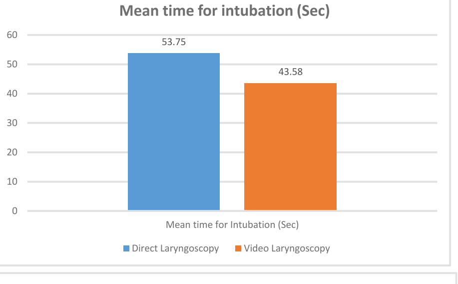
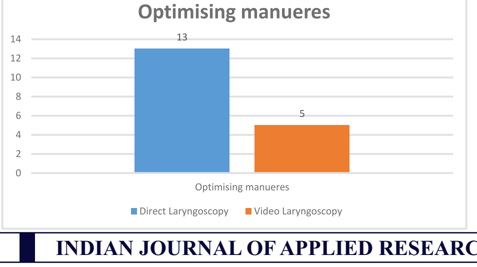


Chart 4: Mean time for intubation (sec)





From the above results it is evident that videolaryngoscopy showed a better view of laryngeal entrance than direct laryngoscopy. (Cormack Lahane score II > III in video laryngoscopy) (p value 0.025). Moreover the mean time taken for intubation was less in videolaryngoscopy when compared with that of direct laryngoscopy. (mean 43.58< 53.75) (p value – 0.01). The optimizing manueres are minimized while using video laryngoscope when compared to direct laryngoscopy.

DISCUSSION

In patients with an expected difficult intubation, video laryngoscopy leads to a better view of the laryngeal structures, facilitates faster intubations with a higher success rate and less need for optimizing manoeuvres. As a limitation of the study, we have to state that despite all efforts to avoid any bias by the selection of the patients and the standardization of the anaesthesia technique and technique of intubation, we cannot exclude an unintended bias due to the fact of an unavoidable unblinded study design. Depending on the management, tracheal intubation in patients with difficult airways can lead to airway trauma or even a life-threatening disaster. Therefore, on the one hand, difficult airway management guidelines have been developed and, on the other hand, video-assisted devices have been developed to ease tracheal intubation. The rationale behind the development of these devices is to abandon the need for the alignment of the optical axis to receive a direct view of the glottis.

CONCLUSION

The use of the video laryngoscope eases tracheal intubations in patients with expected difficult intubations. The view of the laryngeal entrance is significantly improved, with a decreased number of optimizing manoeuvres and in less time. Overall, these improvements of the conditions for tracheal intubations result in a significantly higher success rate of tracheal intubations.

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