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Original Research Paper

Anaesthesiology

VIDEO LARYNGOSCOPY VS DIRECT LARYNGOSCOPY FOR TRACHEAL INTUBATION IN ADULTS

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ABSTRACT

Aims: Difficult tracheal intubation still leads to anesthesia related morbidity & mortality. Poor visualization of laryngeal structures and numerous attempts at intubation are mostly associated with conventional direct laryngoscopes. Introduction of video laryngoscopes have significantly improved the ease of intubation by their superior laryngeal visualization. Here is the comparison of the ease of tracheal intubation using Macintosh conventional direct laryngoscope and ClearVue videolaryngoscope. **Methodology:** A total of 100 patients undergoing elective surgery under general anesthesia were included in this study with 50 patients in each group. Comparison of first successful intubation attempt, Cormack–Lehane grade and intubation time was done between the two groups. **Results:** Intubation time was significantly longer in patients with GROUP V than GROUP C (P 0.0001) whereas visualization of laryngeal inlet (P 0.0001) and first intubation attempt was better with GROUP V. **Conclusion:** This study showed elective video-laryngoscopy was superior for the first attempt intubation success rate as well as better glottic visualization as compared to conventional direct laryngoscopy. But the time needed for successful intubation with video-laryngoscopy was longer as compared to direct laryngoscopy.

KEYWORDS : laryngoscope, intubation, glottic visualization

INTRODUCTION:

Tracheal intubation is considered to be the gold standard of airway management during administration of general anesthesia and critical care settings. Difficult airways and failed intubations can lead to airway injury, a need for intensive care unit (ICU) admission, cardiovascular instability, desaturation, and even hypoxic-based morbidity and mortality.[1–4] Repeated tracheal intubations may contribute significantly to patient morbidity. Guidelines given by ASA Task Force on the Management of the Difficult Airway and Difficult Airway Society limits the laryngoscopic attempts to 3 in lieu of the considerable patient injury that might occur.

Video laryngoscope is a device in which images from the distal end of the laryngoscopic blade are carried on to the screen which is either attached to the handle or carried to it by optical cable. They provide superior visualization of glottic structures. According to previously published data, in patients with predicted difficult airways, video-laryngoscopy is associated with better glottic visualization and higher success rates of both first attempts and overall intubation.[5-7]

I conducted this study to compare elective video-laryngoscopy versus conventional direct laryngoscopy in adults with normal airways posted for general anesthesia. The hypothesis is that the success rate of first intubation attempts with video-laryngoscopy might be better than those with conventional direct laryngoscopy due to better visualization of glottic structures. The primary outcome was the first attempt intubation success rate. Secondary outcome was the time required for successful intubation.

Methodology:

This study was approved by ethical committee of SMS Hospital and Attached Hospital, Jaipur. Hundred adult patients aged 18-60 years old with American Society of Anesthesiologists (ASA) physical status I & II and BMI of 18-30 kg/m^2 posted for elective surgery under general anesthesia from February to July 2022 were enrolled. All patients provided written and informed consent. The study excluded possible difficult airways, pregnancy, cardiac conditions, and neuromuscular diseases.

Patients were assigned randomly (computer-derived random number sequence) into two groups of 50 patients each.

GROUP C: patients were intubated using conventional direct laryngoscopy (MacIntosh blade)

GROUP V: Patients were intubated using video laryngoscope(ClearVue)

On arrival in operating room, intravenous access was established. Monitors were attached following the ASA standards which included a 5-lead electrocardiogram, non-invasive blood pressure, pulse oximeter, end-tidal carbon dioxide, and temperature.

Patients were pre-oxygenated with 100% oxygen for 3 minutes followed by intravenous induction with fentanyl 2μg/kg, propofol 2mg/kg and vecuronium 0.1mg/kg. Positive pressure mask ventilation was done for around 3 minutes until the full onset of muscle relaxant reached followed by tracheal intubation. Group C patients were intubated using conventional direct laryngoscope with MacIntosh blade. Group V patients were intubated using video laryngoscope. Correct tracheal tube placement was assessed using careful auscultation and end-tidal carbon dioxide measurement. Mechanical ventilation was initiated with tidal volume of 7ml/kg and respiratory rate of 12 breaths/min; respiratory parameters were adjusted according to EtCO2 during the operation. Maintenance of anesthesia was with nitrous oxide (50%), oxygen (50%), and isoflurane. Vecuronium 0.02 mg/kg was used for maintenance of muscle relaxation.

The following information was recorded on the intubation data collection sheet: patient demographics, first successful intubation attempt, Cormack–Lehane grade and intubation time. One failed attempt at intubation was defined when either MacIntosh blade or video laryngoscope blade had to be removed entirely from the mouth and then reinserted before endotracheal intubation. Time taken to intubate was measured from the time of insertion of laryngoscope till confirmation of placement of endotracheal tube.

At end of surgery, reversal of neuromuscular blockade was achieved with intravenous neostigmine 0.05mg/kg and intravenous glycopyrrolate 0.01mg/kg and patients were extubated and shifted to PACU.

RESULTS:

Demography:

Variables	Direct Laryngoscopy (n)	Video Laryngoscopy (n)	P-value
Age (years)	51±5.39	50±6.10	0.387
Gender			

Female	18	14	0.391
Male	32	36	
BMI (kg/m2)			
Upto 25	27	26	0.841
>25	23	24	

First Intubation Attempt:

Type of laryngoscopy	First attempt	p-value
Group C	39	0.021
Group V	47	

Glottic Visualization:

Cormack Lehane Grade	GROUP C	GROUP V	P-VALUE
CL GRADE 1	33 (66%)	46 (92%)	0.0001
CL GRADE 2	13 (26%)	2 (4%)	
CL GRADE 3	2 (4%)	2 (4%)	
CL GRADE 4	2 (4%)	0 (0%)	

Intubation Time:

	GROUP C	GROUP V	P-VALUE
INTUBATION TIME (seconds)	25.92 ± 10.77	38.87 ± 13.29	0.0001

DISCUSSION:

Since the invention of direct laryngoscopy by Macintosh and Miller, we have witnessed many technological advancement in the form of video or optic fibre assisted devices to improve the glottic visualization leading to an easy intubation. The use of video assisted devices has significantly reduced the stress of anesthesiologists by improving glottic visualization and success of tracheal intubation using high resolution micro cameras with portable flat-screen monitors which has revolutionized difficult airway management.[8]

Current study showed higher first attempt at intubation with GROUP V than GROUP C. This observation was supported by a study done by Peyton J et al[9] which showed higher efficacy i.e higher first attempt intubation success rate which might be more easily achieved with video-laryngoscope as compared to a standard blade design. Cormack and Lehane grading was lesser in GROUP V as compared to GROUP C. To support this, various studies have shown that glottic visualization has been better with video-laryngoscope as compared to direct laryngoscope with various airway scenarios, and particularly trainees have demonstrated improved success rates with normal airway.[10-12] Intubation time was longer in GROUP V as compared to GROUP C in this study. This can be explained because of possible technical difficulties based on indirect intubation [13,14]

CONCLUSION:

This study showed elective video-laryngoscopy was superior for the first attempt intubation success rate as well as better glottic visualization as compared to conventional direct laryngoscopy. But the time needed for successful intubation with video-laryngoscopy was longer as compared to direct laryngoscopy.

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