



COMPARISON OF INTUBATION CHARACTERISTICS BETWEEN VIDEO LARYNGOSCOPE AND MCCOY LARYNGOSCOPE IN PATIENTS UNDERGOING GENERAL ANAESTHESIA: A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Background: Airway management remains a fundamental component of anaesthetic practice. Video laryngoscopes have emerged as valuable tools for improving glottic visualisation and facilitating endotracheal intubation compared to conventional laryngoscopes. The present study evaluated and compared the intubation characteristics of video laryngoscope and McCoy laryngoscope in patients undergoing general anaesthesia.

Methods: This prospective comparative study was conducted in the Department of Anaesthesiology, Gandhi Medical College and Associated Hospitals, Bhopal, among 100 patients aged 18–60 years belonging to ASA physical status I and II undergoing elective surgeries under general anaesthesia. Patients were randomly allocated into two groups: Group M (McCoy laryngoscope) and Group V (Video laryngoscope), with 50 patients in each group. Parameters assessed included intubation time, number of attempts, Intubation Difficulty Score (IDS), Cormack–Lehane grading, haemodynamic responses, oxygen saturation, and complications. Statistical analysis was performed using appropriate statistical tests.

Results: Video laryngoscope demonstrated significantly better glottic visualisation with lower Cormack–Lehane grades and lower IDS scores compared to McCoy laryngoscope. The first-attempt intubation success rate was higher in the video laryngoscope group. Mean intubation time was significantly shorter in Group V compared to Group M ($p < 0.05$). Haemodynamic responses including pulse rate and blood pressure changes were comparatively lower in the video laryngoscope group following intubation. Complication rates were minimal and comparable between both groups.

Conclusion: Video laryngoscope provided superior glottic visualisation, easier intubation, improved first-pass success rate, and better haemodynamic stability compared to McCoy laryngoscope in patients undergoing general anaesthesia. Video laryngoscopy may therefore be considered a preferable technique for routine endotracheal intubation.

Keywords: Video Laryngoscope, McCoy Laryngoscope, Intubation, Airway Management.

INTRODUCTION

Airway management is one of the most important responsibilities of an anaesthesiologist, and successful endotracheal intubation remains a cornerstone of safe anaesthetic practice.

Direct laryngoscopy using conventional Macintosh blades has traditionally been the standard technique for tracheal intubation. However, difficult airway situations continue to contribute significantly to anaesthesia-related morbidity and mortality [1, 2].

The McCoy laryngoscope was developed as a modification of the Macintosh blade with a hinged tip designed to improve glottic exposure by elevating the epiglottis. It is particularly useful in patients with restricted neck mobility and anticipated difficult airways. The levering tip decreases the force required during laryngoscopy and may reduce haemodynamic stress responses associated with intubation [3, 4].

Video laryngoscopes represent a major advancement in airway management. These devices incorporate a miniature camera and display monitor that provide indirect visualisation of the glottis without the need for alignment of oral, pharyngeal, and laryngeal axes. Video laryngoscopy has been associated with improved glottic visualisation,



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higher first-pass success rates, reduced airway trauma, and easier intubation in difficult airway scenarios [5, 6].

The Difficult Airway Society (DAS) guidelines recommend availability and training in video laryngoscopy for modern airway management. Several studies have compared video laryngoscopes with conventional and modified direct laryngoscopes, reporting improved ease of intubation and glottic visualisation with video laryngoscopy [7, 8].

Despite increasing use of video laryngoscopy, comparative evidence regarding its performance against McCoy laryngoscope in routine elective surgeries remains limited. Therefore, the present study was undertaken to evaluate and compare the intubation characteristics of video laryngoscope and McCoy laryngoscope in patients undergoing general anaesthesia.

Aim and Objectives

To evaluate the outcome of using video laryngoscope and McCoy laryngoscope during endotracheal intubation in patients undergoing general anaesthesia.

MATERIALS AND METHODS

Study Design & Setting

This prospective comparative observational study was conducted in the Department of Anaesthesiology, Gandhi Medical College and Associated Hospitals, Bhopal, over a period of 18 months

Study Population

Patients undergoing elective surgeries under general anaesthesia requiring endotracheal intubation were enrolled in the study

A total of 100 patients were included and divided into two groups:

- Group M: McCoy laryngoscope group (n=50)
- Group V: Video laryngoscope group (n=50)

Inclusion Criteria

- Patients aged 18–60 years
- ASA physical status I and II
- Elective surgical procedures under general anaesthesia
- Patients providing written informed consent

Exclusion Criteria

- Emergency surgeries
- ASA grade III and IV
- Patients with severe cardiopulmonary disease

- Known difficult airway requiring advanced airway techniques
- Patients refusing consent

Preoperative Assessment

All patients underwent detailed pre-anaesthetic evaluation including airway assessment, Mallampati grading, Thyromental distance, Upper lip bite test & Anticipated Difficult Airway (ADA) score. All routine investigations were reviewed before surgery.

Anaesthetic Technique

All patients were kept nil per oral as per standard guidelines and pre-medicated appropriately. Standard monitoring included: ECG, Pulse oximetry, Non-invasive blood pressure & Respiratory rate. After pre-oxygenation, induction was performed using intravenous anaesthetic agents and muscle relaxants as per institutional protocol. Endotracheal intubation was performed by experienced anesthesiologists.

Various parameters like time taken for intubation, Number of intubation attempts, Intubation Difficulty Score (IDS), Cormack–Lehane grading, Pulse rate, Respiratory rate, Systolic blood pressure, Diastolic blood pressure, Oxygen saturation & Complications such as mucosal injury, desaturation, dental trauma, and sore throat were assessed among both the groups.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using SPSS software version 25. Quantitative data were expressed as mean $\pm$ standard deviation and qualitative data as percentages. Student's t-test and Chi-square test were used where appropriate. A p-value <0.05 was considered statistically significant.

Ethical Approval

The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants.

RESULTS

Both the groups were comparable regarding demographic and baseline characteristics. The mean age was 35.0 ± 9.57 years in the McCoy group and 32.7 ± 9.61 years in the video laryngoscope group. Male predominance was observed in both groups. Most patients belonged to ASA Grade I. Duration of surgery and ADA scores were also comparable between the groups with no statistically significant difference ($p > 0.05$).

Table 1: Comparison of demographic Profile between McCoy Laryngoscope and Video Laryngoscope Groups

Demographic variable	McCoy Group (n=50)	Video Laryngoscope Group (n=50)	P-value
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Age Group (Years)	18-28	15 (30%)	20 (40%)	>0.05
	29-39	18 (36%)	13 (26%)	
	40-50	17 (34%)	17 (34%)	
	Mean $\pm$ SD	35.00 $\pm$ 9.57	32.70 $\pm$ 9.61	
Gender	Male	28 (56%)	26 (52%)	0.68
	Female	22 (44%)	24 (48%)	
ASA Grade	ASA Grade 1	38 (76%)	33 (66%)	0.27
	ASA Grade 2	12 (24%)	17 (34%)	
Duration of Surgery (Hours)		1.46 $\pm$ 0.62	1.51 $\pm$ 0.64	0.69
ADA Score	4	1 (2%)	3 (6%)	0.20
	5	13 (26%)	19 (38%)	
	6	36 (72%)	28 (56%)	

Respiratory rate remained stable and comparable in both groups throughout the peri-intubation period.

No significant respiratory fluctuations were observed at different time intervals ($p>0.05$).

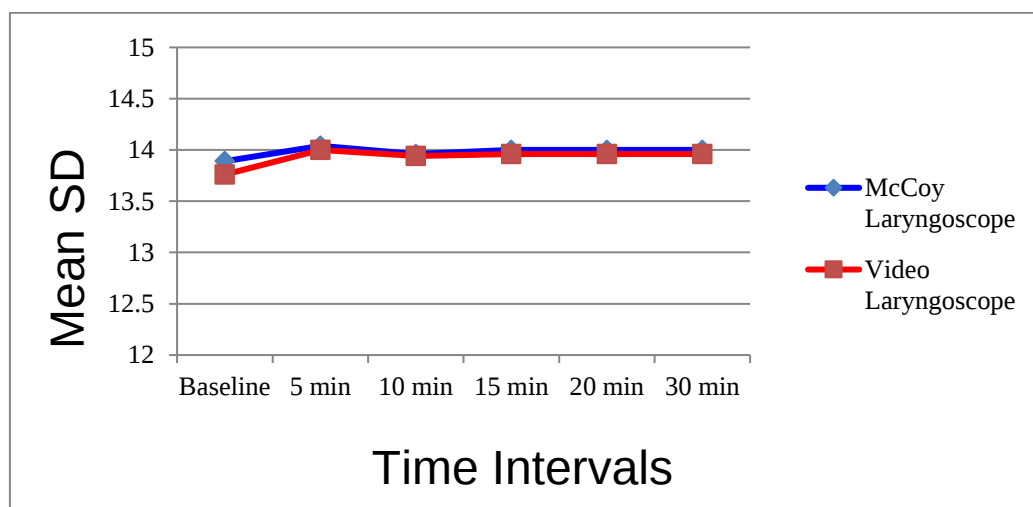


Figure 1: Comparison of Respiratory Rate (RR per Minute) between the Groups at Different Time Intervals

Pulse rate increased transiently following intubation in both groups; however, the rise was more pronounced in the McCoy laryngoscope group. The

video laryngoscope group demonstrated better haemodynamic stability with lower pulse rate fluctuations during the observation period.

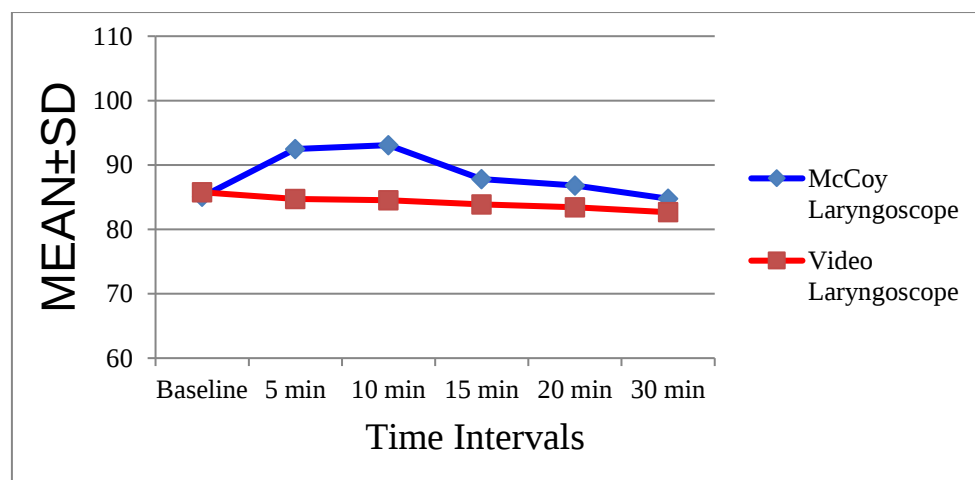


Figure 2: Comparison of Pulse Rate (PR per Minute) between the Groups at Different Time Intervals

Oxygen saturation remained within normal physiological limits in both groups at all measured

intervals. No clinically significant desaturation episodes were observed during intubation or thereafter.

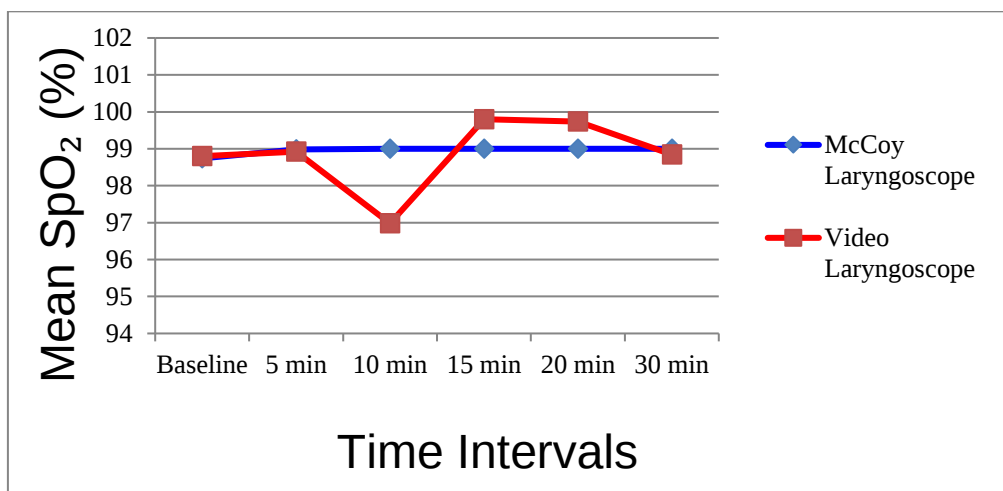


Figure 3: Comparison of Oxygen Saturation (SpO₂%) between the Groups at Different Time Intervals

Both groups showed a transient increase in systolic and diastolic blood pressure after intubation. However, the increase was significantly lower in the video laryngoscope group at 5 and 10 minutes,

indicating better haemodynamic stability compared to the McCoy group ($p < 0.05$). Blood pressure values gradually returned toward baseline in both groups over time.

Table-2: Comparison of Systolic Blood Pressure and Diastolic Blood Pressure between the groups

Blood Pressure		McCoy Group (n=50)	Video Laryngoscope Group (n=50)	P-value
SBP (mmHg)	Baseline	118.26 ± 10.18	120.56 ± 9.61	0.2482
	5 min	123.68 ± 10.32	119.36 ± 8.08	0.021
	10 min	121.24 ± 7.99	117.24 ± 8.25	0.015
	15 min	117.0 ± 7.08	116.24 ± 7.65	0.607
	20 min	115.02 ± 6.87	116.40 ± 7.38	0.335
	30min	114.48 ± 5.01	115.04 ± 6.88	0.125
DBP (mmHg)	Baseline	77.26 ± 8.15	79.56 ± 6.19	0.115
	5 min	82.64 ± 7.30	78.96 ± 6.49	0.009
	10 min	80.88 ± 8.45	78.24 ± 6.43	0.081
	15 min	77.60 ± 7.15	77.40 ± 7.16	0.889
	20 min	75.46 ± 6.75	76.02 ± 7.89	0.703
	30min	73.96 ± 6.83	76.16 ± 6.58	0.104

The mean time taken for intubation was significantly lower in the video laryngoscope group compared to the McCoy group ($p < 0.05$). First-attempt intubation success rate was higher in the video laryngoscope

group. Fewer patients required multiple attempts in Group V compared to Group M. The IDS score was significantly lower in the video laryngoscope group, indicating easier intubation conditions.

Table-3: Comparison of Intubation Related Factors between the Groups

Intubation Related Factors		McCoy Group (N=50)	Video Laryngoscope Group (N=50)	P-Value
Time Taken for Intubation (seconds) Mean ± SD		24.22 ± 2.01	22.58 ± 3.99	0.022
Number of Attempts for Intubation	1st	47 (94%)	50 (100%)	0.07
	2nd	3 (6%)	0 (0%)	
Intubation Difficulty Score	Score 0	0 (0%)	2 (4%)	0.008
	Score 1	20 (40%)	34 (68%)	

	Score 2	25 (50%)	8 (16%)	
	Score 3	2 (4%)	4 (8%)	
	Score 5	2 (4%)	1 (2%)	
	Score 6	1 (2%)	1 (2%)	

Video laryngoscope provided superior glottic visualisation with a significantly higher proportion of Grade I views compared to McCoy laryngoscope.

Table-4: Comparison of Cormack-Lehane Grading between the Groups

Cormack-Lehane Grading	McCoy Group	Video Laryngoscope Group	P-value
1	39 (78%)	44 (88%)	0.182
2	11 (22%)	6 (12%)	

The mean vocal cord exposure time and endotracheal tube passing time were lower in the video laryngoscope group compared to the McCoy

group, suggesting easier and faster intubation performance with video laryngoscopy.

Table-5: Comparison of Vocal Cord Exposure and Endotracheal Tube (ETT) Passing Times between the Groups

Cormack-Lehane Grading	McCoy Group	Video Laryngoscope Group	P-Value
Vocal Cord Exposure time	5.78 ± 0.41	5.32 ± 0.81	0.182
Vocal Cord ETT passing time	10.64 ± 0.64	9.96 ± 1.43	

Complications such as airway trauma, sore throat, and desaturation were minimal and comparable between groups.

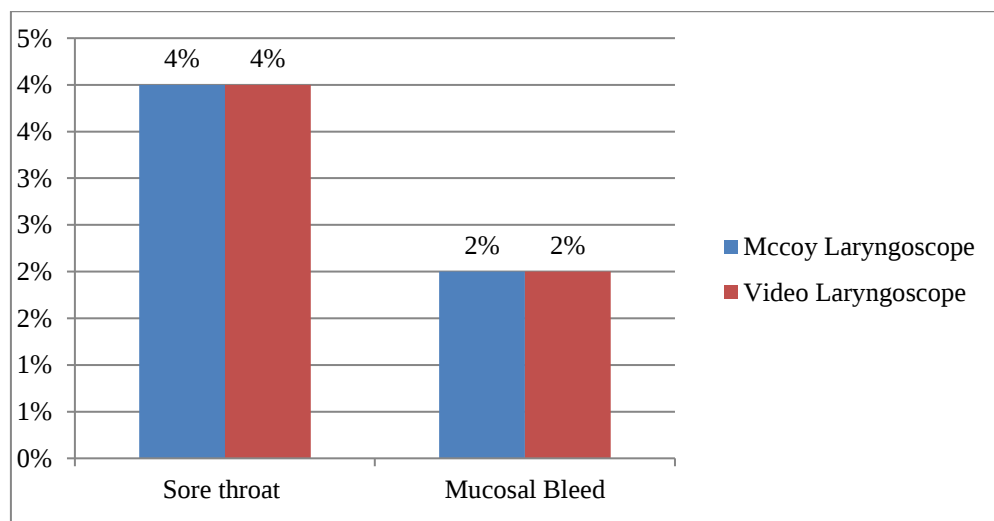


Figure 4: Comparison of Complications between McCoy Laryngoscope and Video Laryngoscope Groups

DISCUSSION

In our study both groups were comparable regarding demographic variables, ASA grading, duration of surgery, and anticipated difficult airway scores, indicating appropriate randomisation and baseline comparability. Similar demographic comparability has also been reported by Garg et al [8] and Yadav et al [9], showed no significant baseline differences between groups, thereby validating comparison of airway outcomes.

In the present study, respiratory rate and oxygen saturation remained stable throughout the peri-

intubation period in both groups, and no clinically significant desaturation episodes were observed. This finding suggests that both devices are safe and effective in maintaining adequate oxygenation during airway manipulation, in agreement with Altun et al [10], who noted stable oxygen saturation with video laryngoscopy due to improved glottic visualisation and reduced intubation difficulty.

A significant finding of the current study was the superior haemodynamic stability associated with video laryngoscopy. Pulse rate and blood pressure increased transiently after intubation in both groups;

however, the rise was significantly lower in the video laryngoscope group. The reduced sympathetic response may be attributed to less lifting force and minimal airway manipulation during indirect laryngoscopy. Similar results were documented by Aggarwal et al [6] and Ghanem et al [11].

The mean intubation time in the present study was significantly shorter in the video laryngoscope group compared to the McCoy group. Faster intubation with video laryngoscopy may result from improved glottic exposure and enhanced visual guidance during endotracheal tube advancement. Similar findings were reported by Seo et al [7] and Kumar et al [12], also observed shorter intubation duration with video laryngoscopes during cervical spine surgeries.

The first-pass intubation success rate was higher in the video laryngoscope group, with all patients successfully intubated on the first attempt. Multiple intubation attempts are associated with airway trauma, hypoxia, and haemodynamic instability. Therefore, higher first-pass success is clinically advantageous. Lee, et al [13] and Ahmad et al [3], reported better first-pass success with video laryngoscope compared to McCoy laryngoscope. The Intubation Difficulty Score (IDS) was significantly lower in the video laryngoscope group in the current study, indicating easier intubation conditions. Lower IDS scores reflect reduced need for optimisation manoeuvres, lesser lifting force, and easier tube placement, consistent results observed by Garg et al [8] and Manisha S, et al [14]. Video laryngoscope also provided superior glottic visualisation, with a greater proportion of Cormack–Lehane Grade I views compared to the McCoy laryngoscope group. Better glottic visualisation is one of the principal advantages of video laryngoscopy because alignment of oral, pharyngeal, and laryngeal axes is not required. This finding correlates with the observations of Chandra et al [15] and Aggarwal H et al [6], reported significantly improved laryngeal views with C-MAC video laryngoscope compared to McCoy blade.

The present study further demonstrated lower vocal cord exposure time and endotracheal tube passing time with video laryngoscopy, suggesting smoother and more efficient intubation performance. Improved visualisation likely facilitated quicker localisation of the glottic opening and easier advancement of the endotracheal tube. Comparable findings have been reported in several recent airway studies evaluating video-assisted intubation devices [16, 17].

Complication rates were minimal and comparable between both groups. Incidence of sore throat and mucosal trauma was low, indicating that both devices are relatively safe when used by experienced anesthesiologists. Previous studies have similarly

reported low airway complication rates with video laryngoscopy and McCoy laryngoscopy [6, 18].

CONCLUSION

Video laryngoscope provides superior glottic visualisation, improved first-pass intubation success, lower Intubation Difficulty Score, and better haemodynamic stability compared to McCoy laryngoscope in patients undergoing general anaesthesia. Although both devices are effective and safe for endotracheal intubation, video laryngoscope appears to be a more efficient airway management tool and may be preferred for routine as well as potentially difficult intubations.

Future Recommendations

Further multicentric studies with larger sample sizes involving difficult airway patients are recommended to validate the findings.

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