



Original Article

A Comparative Study of McCoy Laryngoscope versus Coreray Video Laryngoscope in Orotracheal Intubation in Adult Surgical Patients undergoing General Anaesthesia

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ABSTRACT

Objectives: McCoy flexi-tip levering laryngoscope and Coreray video laryngoscope have been used for endotracheal intubation for securing airway during general anaesthesia in general surgical patients. A prospective randomized interventional study was conducted to evaluate and compare the two laryngoscopes with regard to the efficiency of their laryngeal visualization, the magnitude of haemodynamic changes produced and any trauma inflicted by them.

Methods: 260 adult surgical patients of American Society of Anaesthesiologists physical status I and II, aged between 20 – 50 years posted for various general surgical procedures whom general anaesthesia was administered and the airways were secured with endotracheal intubation, were randomly divided into two groups, Group M (n = 130) for whom McCoy laryngoscope was used and Group C (n = 130) for whom Coreray video laryngoscope was used for intubation. Intubation difficulty score, haemodynamic changes and airway trauma were observed.

Results: The IDS count was lower in McCoy group with 85.38% (111) patients had count '0', 11.54% (15) patients had '2' and 3.08% (4) patients had '3'. Whereas, count is higher in Coreray group where no patient had count '0', 16.92% (22) patients had '2' and 83.08% (108) patients had count '3'. There was higher haemodynamic upsurge in Coreray in comparison to McCoy group and no significant airway trauma was observed in both the groups.

Conclusion: McCoy laryngoscope provides better laryngeal visualization and produces lesser haemodynamic stress than Coreray video laryngoscope. Improper alignment of camera direction with the direction of tip in Coreray provides partial laryngeal view and demands greater lifting force leading to greater haemodynamic stress.

Keywords: McCoy, Coreray, video laryngoscope, IDS, laryngoscopy, intubation.

INTRODUCTION

Laryngoscopy and intubation are important techniques for patients undergoing operation under general anaesthesia. Improved visualization of larynx, less haemodynamic insults and atraumatic instruments have been a constant search since long. In clinical practice, tracheal intubation can be a significant cause of morbidity and mortality, especially in emergency or challenging circumstances. Laryngoscopy and endotracheal intubation elicit noxious stimuli which are invariably associated with transient but marked increase in heart rate (HR), blood pressure (BP) and a wide variety of cardiac arrhythmias due to the lifting force exerted by the laryngoscope blade on the base of the tongue while lifting the epiglottis to visualize the glottis.[1] These effects are deleterious in susceptible individuals culminating in perioperative myocardial ischaemia, acute heart failure and cerebrovascular accidents.[2] A subgroup of patients, which includes those

with coronary artery disease, recent myocardial infarction, hypertension, pre-eclampsia, and cerebrovascular pathology such as tumours, aneurysms or increased intracranial pressure, are at increased risk of morbidity and mortality. The sympathetic response to laryngoscopy and tracheal intubation is sinus tachycardia which is accompanied not only by increased sympathetic activity but also by increased adrenomedullary catecholamine activity. The common hypertensive and tachycardiac responses to tracheal intubation are generated by these sympathetic efferents.[3]

The therapeutic armamentarium to counteract the cardiovascular responses to laryngoscopy and tracheal intubation includes a wide variety of topical and intravenous pharmacological agents, [4,5] techniques and modification of laryngoscope blades into varied shapes.[6]

Especially, since airway catastrophe is still one of the leading causes of mortality and morbidity in anaesthesia, various attempts have been made to modify laryngoscope blades from the traditional Macintosh laryngoscope to the digital video laryngoscope.

Eamon P McCoy modified the conventional Macintosh laryngoscope blade in 1992 and introduced in anaesthesia in 1993 originally to facilitate tracheal tube placement in cases of difficult visualization of the larynx. The modification includes putting a flexible or hinged tip which is attached with a lever that can be easily manipulated while doing laryngoscopy by the thump of the hand holding the handle.(Fig.1) The modification offers the unique advantage of the hinged tip, controlled by the lever that allows elevation of the epiglottis while decreasing the overall laryngoscopic elevation or levering movement required. This design has two advantages compared with the conventional laryngoscopes; improved laryngeal visualization by lifting the epiglottis, especially in patients with fixed necks in neutral position and the force applied during laryngoscopy is adjustable and lower and hence stress response to laryngoscopy is low.[6] Thus, it is postulated that it provides better visibility and causes less mechanical stimulation of respiratory tract so haemodynamic response should be lower than that of other forms of laryngoscope blades.



Fig. 1: McCoy and Coreray video laryngoscopes (reproduced with permission Coreray Technology)

Relatively newer Coreray video laryngoscope on one hand is a lightweight portable instrument with 3" liquid crystal display (LCD), resolution of 1280 x 720 RG, viewing angle $\geq 60^\circ$, weight 225g, available with full range of re-usable and disposable blades of sizes MIL0, MAC1 to 4 and difficult airway (D) blade. Blades are attached to the display module by rotating 90° leftward. The display has omnidirectional rotation screen. It is powered by lithium battery rechargeable through micro USB port with a battery life of around 200 mins. It is anatomically curved video intubation aid with fixed 30° angulated tip away from an endoscopic camera direction with illumination of ≥ 400 LUX. (Fig.1)

Though McCoy is not a video laryngoscope, study shows that its performance is very good due to its flexible nature of the tip which may be comparable with a digital non-flexible video laryngoscope.[7,8] But literature provides scant evidence of comparing the use of McCoy and Coreray blades during orotracheal intubation. Thus, this study was conducted to compare intubating performances, haemodynamic insults and any traumatic effects between the McCoy flexi-tip laryngoscope and the Coreray video laryngoscope in orotracheal intubation in adult surgical patients undergoing general anaesthesia.

METHODS

This hospital based prospective randomized and comparative observational study was conducted in the department of anaesthesiology in general surgical operation theatre of Kokrajhar Medical College and Hospital, a tertiary teaching hospital of Assam, India, from August 2024 to July 2025 after obtaining clearance from institutional ethical committee. (Certificate No. KMCH/IEC/2024/01)

A total of 260 general surgical patients of American Society of Anesthesiologists (ASA) physical status of I and II,[9] aged between 20 to 50 years, normotensive and Mallampati (MP) Class I and II [10] put for various elective general

surgical procedures to be performed under general anaesthesia (GA) were enrolled. Patients who refused to participate or having anticipated difficult airway, haemodynamic and respiratory compromise, hypertensives, history of gastroesophageal reflux disease, neurological and psychiatric disease and body mass index (BMI) >35 kg/m² were excluded from the study.

The eligible general surgical patients were informed about the study. Clinical details and relevant documents of the patients were retrieved. Informed consents were obtained.

On average 800 general anaesthesia cases are performed per year in Kokrajhar Medical College and Hospital. 260 patients in total were included to have a confidence level of 95%, type I error (α) of 0.05 and the power of study of 80% based on Krejcie & Morgan table, 1970.[11] Sample size of 260 patients were randomly divided into two equal groups of 130 each using computer generated random numbers by an anaesthetist not involved in the study. The groups were assigned as Group M (McCoy group) and Group C (Coreray group).

Before inducing general anaesthesia, standard monitoring devices of pulse rate (PR), oxygen saturation (SpO₂), non-invasive blood pressure (NIBP), electrocardiogram (ECG) and temperature probe were connected. Baseline data were recorded and continuous monitoring was done thereafter.

All the patients were uniformly premedicated with inj. glycopyrrolate 0.04 mg/kg, inj. ondansetron 0.08 mg/kg, inj. midazolam 0.04 mg/kg intravenously (i.v.) 10 minutes before induction. Pre-oxygenation was done with 100% O₂ for 5 minutes. Induction was done with 2.0 mg/kg propofol i.v. and inj. succinylcholine 1.5 mg/kg i.v. was used as the muscle relaxant to facilitate the intubation. Post induction vitals (pre-laryngoscopy): PR, systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and SpO₂ were noted.

An anaesthesiologist having good experience with McCoy and Coreray video laryngoscopes carried out intubation according to the group allocated. In Group M, intubation was carried out in sniffing position and with the help of McCoy laryngoscope the tube was inserted into the glottis. In Group C, after switching on and connecting the adequate size blade the Coreray video laryngoscope was inserted through the right angle of the mouth till the tip reaches vallecula on the anterior aspect and base of the epiglottis. After obtaining adequate view of the larynx in the LCD display, intubation was performed with adequate size endotracheal tube (ETT). Intubation was confirmed by end tidal carbon dioxide (EtCO₂) in both the groups.

The primary outcome measures were recorded by Intubation Difficulty Score (IDS) [12]. The intubating performances of laryngoscopes were assessed using intubation difficulty score. It covers both subjective and objective basis for quantitative and qualitative measurement of airway access for endotracheal intubation. (Table 1)

Table 1: Intubation Difficulty Score

PARAMETER	SCORE
Number of attempts: Attempt 1/2/3/4	N1 0/1/2/3
Number of operators: Operators 1/2/3/4/ Number of alternative techniques	N2 0/1/2/3 N3
Cormack and Lehane Grade (CLG) CLG Grade I: Entire vocal cord visualized CLG Grade IIa: Posterior part of vocal cords seen Grade IIb: Arytenoids only seen CLG Grade IIIa: Epiglottis only seen (liftable) Grade IIIb: Tip of epiglottis only seen (adherent) CLG Grade IV: No glottis structure seen	N4 0 1 2 3
Lifting force required Normal Increased	N5 0 1
Laryngeal pressure Not applied Applied	N6 0 1
Vocal Cord mobility Abduction Adduction	N7 0 1
TOTAL SCORE: IDS = sum of scores	N1 to N7

IDS Score	Degree of Difficulty
0	Ease
1 to 5	Slight difficulty
> 5	Moderate to major difficulty

When the glottic opening is fully visible and the vocal cords are clearly abducted by a single operator with normal lifting force without applying external laryngeal pressure, the IDS score in this position is '0'. Every deviation from this ideal view raises the score, which denotes a rise in intubation difficulty. The sum of all points from various parameters in the system is the overall IDS score.

Secondary outcome measures recorded in our study are haemodynamic response where heart rate (HR), SBP, DBP, MAP and SpO₂ were recorded before premedication as baseline (TB), just before insertion of laryngoscope (T0), immediately after intubation (TE) and later at 1 (T1), 3 (T3) and 5 (T5) minutes after intubation. The duration of intubation was measured from the moment the device entered the oral cavity past the incisors until the tracheal tube was confirmed to be positioned correctly. Particular attention was paid to common problems including upper airway trauma and laryngoscope blood soiling which were recorded as secondary outcomes.

RESULTS

The patient age, weight, height, body mass index (BMI), ASA status, MP class, gender, size of laryngoscope blade and the mean time required for performing laryngoscopy and intubation were comparable in both the groups ($p>0.05$). (Table 2)

Table 2: Demographic and intubation profile

Parameters	Group M (n=130) (Mean±SD)	Group C (n=130) (Mean±SD)	p value
Age (yrs.)	35.5±10.85	33.5±11.68	0.69
Weight (kg.)	58.12±7.10	58.80±7.05	0.63
Height (cm.)	161.5±7.1	162.2±6.66	0.82
BMI	23.6±2.22	24.0±3.12	0.74
ASA Status			0.26
I	110	116	
II	20	14	
MP Class			0.40
I	119	115	
II	11	15	
Gender			0.31
Male	72	80	
Female	58	50	
Size of laryngoscope blade (n) (3/4)	95/35	101/29	0.38
Duration of Intubation (sec)	10.52±2.08	10.88±2.23	0.41

Table 3: Type of operations

Types of Surgery	Group M (n = 130)		Group C (n = 130)		p value
	Number	Percent	Number	Percent	
Cholecystectomy	91	70%	88	68%	0.76
Appendicectomy	18	14%	22	17%	
Choledocholithotomy	9	6%	10	7%	
Hysterectomy	5	4%	4	3%	
Mastectomy	5	4%	2	2%	
Thyroidectomy	2	2%	4	3%	

The table 3 above shows the distribution of surgeries performed in patients under study. It shows that there was no statistical difference in type of surgeries across the groups. Calculation for statistical significance shows that the p value calculated by Chi-square test is >0.05 which indicates that there is no difference in types of surgery across the groups.

Table 4: Intubation difficulty score

IDS Count		Group		Total	
		Group M (n=130)	Group C (n=130)		
INTUBATION DIFFICULTY SCORE (IDS)	0	Count	111	0	111
		Percentage	85.38%	0.0%	42.69%
	2	Count	15	22	37
		Percentage	11.54%	16.92%	14.23%
	3	Count	4	108	112
		Percentage	3.08%	83.08%	43.08%
5	Count	0	0	0	
	Percentage	0.0%	0.0%	0.0%	
Total		Count	130	130	260
		Percentage	100%	100%	100%

Table 4 shows the IDS count which is significantly low in Group M with 111 numbers of patients (85.38%) having count '0'. Whereas, count is higher in Group C where 108 patients (83.08%) were having IDS count '3'. We didn't find IDS count of 5 or more in both the groups.

Haemodynamic changes

Table 5: Mean values of heart rate (HR) ± SD (bpm) at different intervals in both the groups.

Time intervals →		TB	T0	TE	T1	T3	T5
Groups ↓							
Group M	Mean	84.04	83.24	110.18	98.32	87.12	83.60
	S.D.	5.02	5.05	7.86	6.63	5.02	5.25
Group C	Mean	84.38	83.40	125.98	108.64	87.86	84.96
	S.D.	4.62	5.05	6.84	7.05	5.82	4.98
P value		0.7251	0.8745	<0.0001	<0.0001	0.4979	0.1869

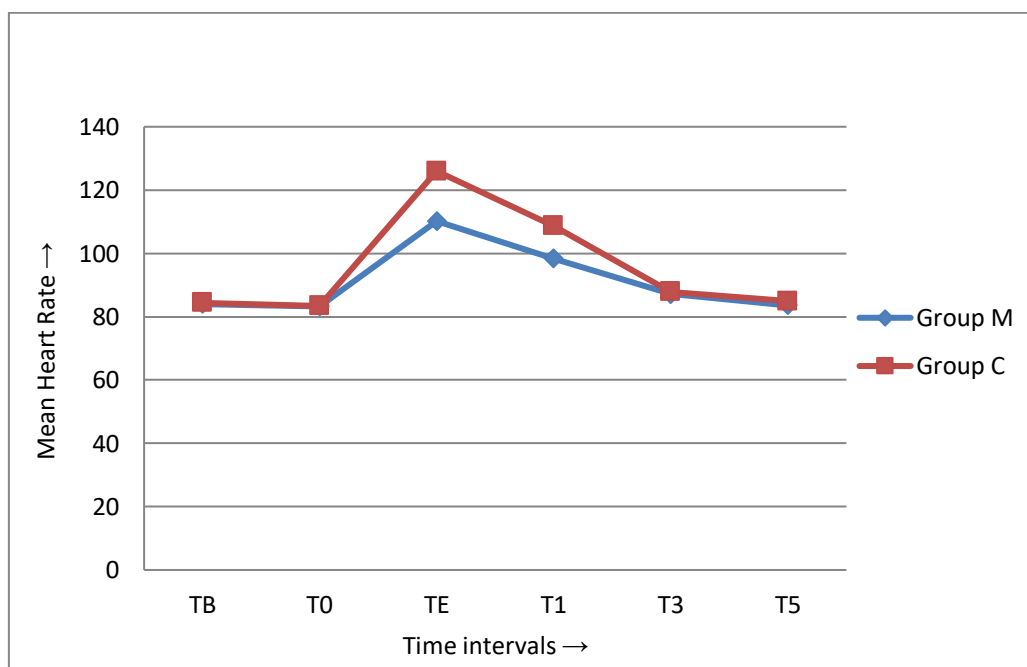


Fig. 2: Mean heart rate in both the groups

From Table 5/Fig. 2 we observed that there was a rise in heart rate immediate after laryngoscopy and intubation in both the groups and it continued up to 1 minute and returned to near baseline by 3rd minute. The rise was lower in Group M which is statistically significant ($p < 0.05$) in comparison to Group C.

Table 6: Mean values of systolic blood pressure (SBP ± SD) at different intervals in both the groups.

Time intervals →		TB	T0	TE	T1	T3	T5
Groups ↓							
Group M	Mean	123.04	121.82	144.50	132.50	124.02	122.06
	S.D.	4.57	4.64	6.28	5.65	4.98	4.19
Group C	Mean	123.14	122.04	157.36	146.22	126.50	122.30
	S.D.	4.71	4.41	7.33	7.09	6.67	4.40
P value		0.9144	0.8085	<0.0001	<0.0001	0.0377	0.7806

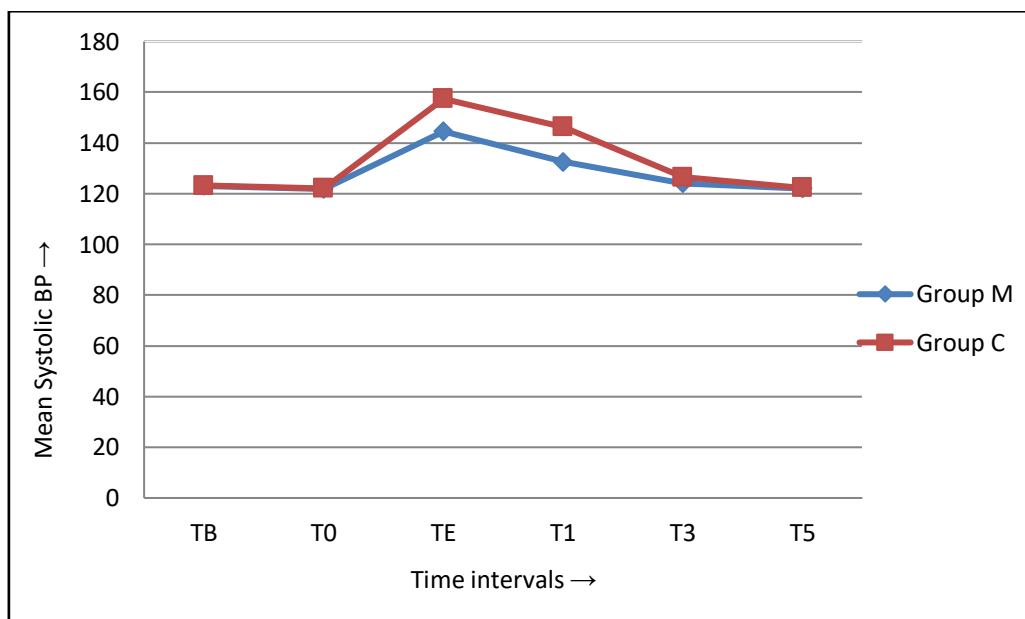


Fig. 3: Mean SBP in both the groups

Immediate after laryngoscopy and intubation there was a sharp rise of systolic blood pressure remaining high up to 1st and 3rd minute post intubation in both the groups. The rise was significantly lower in Group M (p value < 0.05). Thereafter systolic blood pressure returned to baseline value at 5th min post intubation.

Table 7: Mean diastolic blood pressure (DBP± SD) at different intervals between the groups.

Time intervals →		TB	T0	TE	T1	T3	T5
Groups ↓							
Group M	Mean	81.64	80.06	101.78	91.40	81.32	80.04
	S.D.	4.33	4.58	5.57	5.57	5.73	5.32
Group C	Mean	80.76	79.02	119.90	102.40	82.92	81.02
	S.D.	4.56	4.32	5.02	5.90	5.07	5.08
P value		0.3248	0.2456	<0.0001	<0.0001	0.1424	0.3485

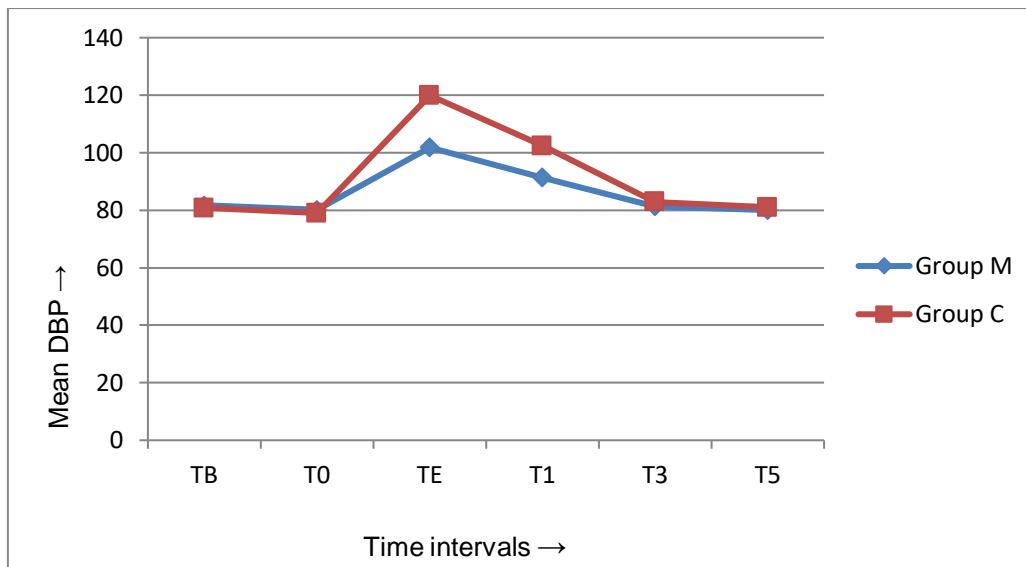


Fig. 4: Mean DBP in both the groups

In Table 7/ Fig 4, there was rise of diastolic blood pressure immediate after laryngoscopy and intubation in both the groups and at 1st min post-intubation. The rise was lower in Group M patients and found to be statistically significant ($p < 0.05$) in comparison to Group C.

Table 8: Mean arterial blood pressure at different intervals between the two groups.

Time intervals →		TB	T0	TE	T1	T3	T5
Groups ↓	Mean	95.48	93.88	115.96	105.04	95.58	94.04
	S.D.	4.41	4.49	5.61	5.48	5.29	4.61
Group M	Mean	94.84	93.36	132.78	117.02	97.34	94.78
	S.D.	4.59	4.13	5.42	5.92	5.07	4.60
P value		0.4788	0.5481	<0.0001	<0.0001	0.0926	0.4236

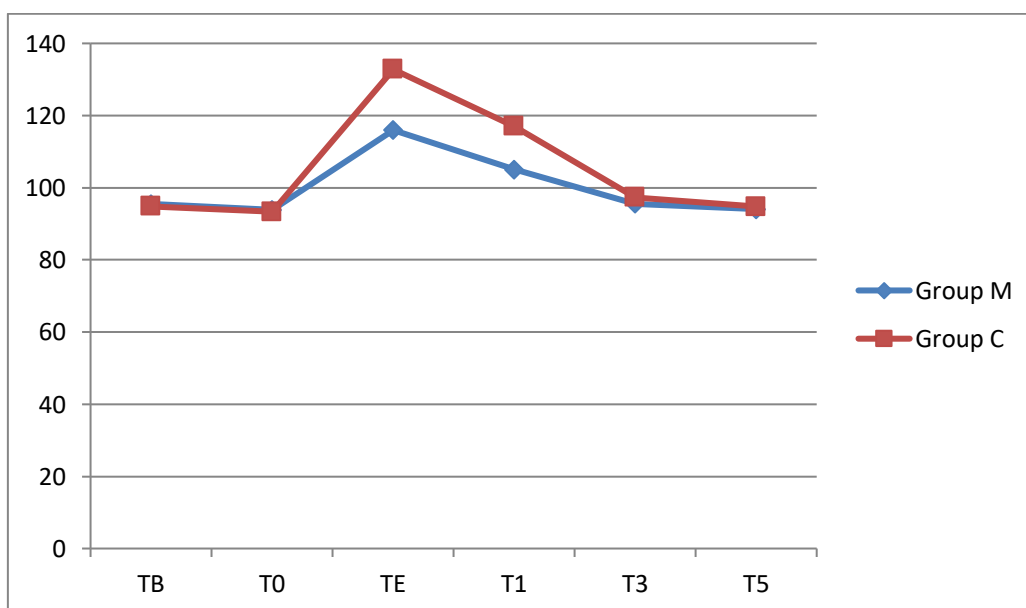


Fig. 5: Line diagram shows distribution of mean values of MAP.

Immediate after laryngoscopy and intubation it is seen that there was a sudden rise of mean arterial blood pressure sustaining up to 1st and 3rd min post-intubation in both the groups (Table 8/Fig. 5). The rise is significantly lower in Group M than Group C returning early towards baseline value.

Airway trauma

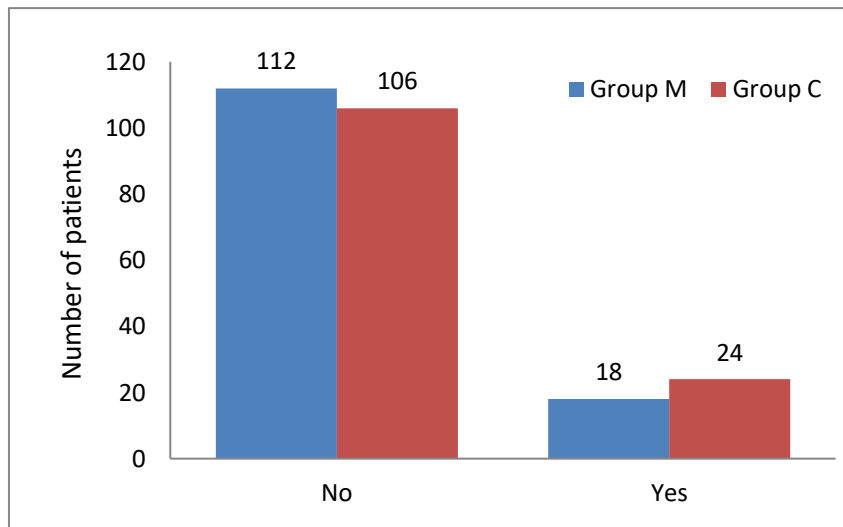


Fig. 6: Bar diagram showing airway trauma in both the groups.

In Group M 14% patients (18) had blood stain on endotracheal tube whereas in Group C 18% patients (24) had blood stain on endotracheal tube. Airway trauma is comparable in both the groups.(Fig 6)

DISCUSSION

The necessity for sophisticated airway devices is a topic of ongoing research because a failed intubation with catastrophic consequences is a nightmare for anesthesiologists. Since long, there has been a continuous search for an instrument of laryngoscopy and endotracheal intubation with better laryngeal imaging, atraumatic and causing lesser hemodynamic insults. Our study aimed at finding out the better option between McCoy and Coreray video laryngoscope in general surgical patients. We did this by evaluating the intubation difficulty score, the haemodynamic response and complications if any.

In our study the demographic, intubation profile and the type of operations were comparable.(Table 2/3) The IDS count found to be significantly low in McCoy group with 111 numbers of patients (85.38%) having count '0', 15 patients (11.54%) had '2' and 4 patients (3.08%) had '3'. Whereas, count is higher in Coreray group where 108 patients (83.08%) were having IDS count '3', 22 patients (16.92%) had '2' and no patient had '0' IDS count. Higher IDS count in Coreray video laryngoscope group is due to increased lifting force and higher external laryngeal pressure required to visualize the posterior part of the vocal cords. This higher IDS count and inadequate visualization of vocal cord in the digital screen of Coreray video laryngoscope may be attributed to the camera placement, the direction of which does not follow the sharp and fixed 30° angulation of the tip of the blade away from the camera direction. The visibility of anterior commissure is difficult and posterior half of the glottis can only be seen leading to higher IDS score.(Table 4)

On the other hand in McCoy laryngoscope the flexible tip is placed on the vallecula to lift the epiglottis till the larynx is fully visualized directly through widely opened mouth without applying external laryngeal pressure in majority of cases. Hence lower count of IDS recorded. It is known that McCoy blade improves the laryngeal visualization grade in patients with anticipated difficult intubation.[13] This bias was not there in our study as all patients belonged to easier airways with MP grade I or II. We didn't find IDS count of 5 or more in both the groups.

Jain D et al. found significantly lower IDS score in C-MAC group than McCoy in a comparative study of McCoy and C-MAC video laryngoscope in simulated cervical spine injuries.[14] Patel J et al. found lower IDS total in TAScope group comparative to McCoy in a study between McCoy laryngoscope versus the TAScope in orotracheal intubation.[15] In another comparative study of King Vision video laryngoscope versus McCoy laryngoscope for endotracheal intubation in patients with immobilized cervical spine by Yadav et al., they also found better IDS score in King Vision group.[16] We also anticipated similar results from the Coreray video laryngoscope compared to the McCoy. However, it fell short of our expectations.

Laryngoscopy and intubation of the trachea alters cardiovascular physiology via reflex responses. The usual circulatory responses to laryngeal and tracheal stimulation in anaesthetized subject are tachycardia and rise in arterial pressure and may be associated with various dysrhythmias. These facts are derived from studies during different form of inhalational anaesthesia [17,18] and are interpreted as being the result of reflex sympathoadrenal stimulation. Takeshima, Noda and Higaki,[19] in 1964 reported that the cause of these cardiovascular changes was investigated and conclusion was reached that pressure by the laryngoscope blade on the deep soft tissues adjacent to the epiglottis probably contributed to the electrocardiographic findings. Derbyshire and colleagues,[20] in 1983 observed changes in plasma catecholamine concentration during endotracheal intubation and it was found that there were both non adrenergic and adrenergic responses suggesting an increased sympathoadrenal activity during laryngoscopy and intubation.

It is now well known that amount of forces exerted during laryngoscopy and intubation is the key determinant for mechanical stimulation of stretch receptors present in the respiratory tract. Thus use of different types of laryngoscope blades can help decreasing this response.[21]

Haemodynamic parameters immediately after laryngoscopy and intubation were taken in a single record because; changes are due primarily to the effect of laryngoscopy and not to the passage of the endotracheal tube.[19,21] It may not be possible to separate the relative contributions of laryngoscopy and tracheal intubation to the total pressor response when laryngoscopy is less than 30 to 45 seconds.[22] In our study laryngoscopy and intubation was quick and the duration was short and comparable in both the groups (10.52±2.08 sec. in McCoy and 10.88±2.23 sec. in Coreray group) keeping in mind that shorter duration of laryngoscopy stimulates lesser haemodynamic reflex. Major cause of sympathoadrenal response arises from stimulation of supraglottic region by the tip of laryngoscope blade while endotracheal intubation and cuff inflation contributing little additional stimulation.[23,24]

On comparing HR at different point of time from baseline in both the groups it was seen that there was significant upsurge of HR immediate after laryngoscopy and intubation. This significant rise of HR remained up to 3rd min returning to baseline value at 5th min post-intubation. The maximum rise of HR was 31% in McCoy and 49% in Coreray from baseline. The baseline and pre-laryngoscopy values were comparable. The rise of heart rate was significantly lower in Group M than Group C patients immediate after laryngoscopy and intubation and at 1st min post-intubation which was statistically significant (p<0.0001). After 3rd min post-intubation values were comparable.(Table 5/ Fig. 2)

While comparing systolic blood pressure, the baseline and the pre-laryngoscopy values were statistically comparable. But the values of rise of systolic blood pressure of McCoy group immediate after laryngoscopy and intubation and at 1st and 3rd minutes post-intubation were lower than Coreray group which shows statistically significant (p<0.05) difference between two groups. At 5th minute post-intubation the difference was statistically not significant. (Table 6/ Fig. 3)

Diastolic blood pressure in both the groups showed upsurge at intubation, 1st and 3rd min post-intubation returning to baseline at 5th min. While in comparing diastolic blood pressure response to laryngoscopy and intubation in between Group M and Group C, it was seen that the mean rise of diastolic blood pressure immediate after laryngoscopy and intubation and at 1st min post-intubation was lower in Group M patients than Group C and found to be statistically significant (p value <0.0001). At 3rd and 5th min post-intubation no statistical difference was found. (Table 7/ Fig 4)

Comparing mean arterial blood pressure between the groups, here also it was seen that there was a significant (p value <0.0001) statistical difference in increase of mean arterial blood pressure immediate after laryngoscopy and intubation and at 1st min post-intubation between the two groups. The difference was less significant at 3rd min and not significant at 5th min post-intubation. (Table 8/ Fig. 5) These haemodynamic findings corroborate with the findings of McCoy et al., 1995; Castillo et al., 1996; Nishiyama et al., 1997; Tewari et al., 2005 and Singhal et al., 2008.[21,25,26,27,28]

The significantly higher haemodynamic upsurge in Coreray group of patients in comparison to McCoy group can also be attributed to the sharp and fixed 30° angulation of the tip away from the viewing direction of camera. Since the camera direction does not follow the angulation of the tip due to which higher pressure is required to elevate the epiglottis by the tip of the laryngoscope as well as higher pressure applied externally to bring the laryngeal opening in the line of viewing angle of camera to be visible on the digital screen.

In McCoy laryngoscope the flexible tip can be adjusted by applying lifting force only up to a required amount till the larynx is fully visualized directly through widely opened mouth without applying external laryngeal pressure in majority of cases. Hence lesser amount of forces exerted during laryngoscopy and endotracheal intubation so the exaggerated reflex haemodynamic response is clinically lower. The reason could be that only epiglottis is elevated by the hinged tip instead of the associated structure being moved forward by the other form of curved blades.[29] It is essential to become familiar with and understand how to operate the McCoy laryngoscope correctly since, even with its lever in the "on" position, one could be tempted to use it more readily like other curved laryngoscope blades.

In our study, airway trauma was observed in 14% patients (18) in Group M as compared to only 18% patients (24) in Group C with a p value of 0.31 which is comparable and statistically not significant.

LIMITATIONS

Since this comparative study is between a direct and a video laryngoscope potential bias cannot be ruled out. It is impossible to blind the anaesthesiologist to the devices being used. Study was done by experienced anaesthesiologist of both the laryngoscopes; results may vary in less experienced or in novice. Lastly, difficult airway was not included in the study where the performances of the devices may differ.

CONCLUSION

From observations and analyses of the this study, it has been observed that McCoy laryngoscope provides better laryngeal view and produces lesser haemodynamic stress than comparatively newer Coreray video laryngoscope during laryngoscopy and intubation by virtue of its flexible and adjustable tip and the established property of exerting less pressure over the supraglottic structures. On the other hand Coreray video laryngoscope is also a good device for orotracheal intubation with its added advantages of camera and omnidirectional movable digital display. But non-alignment of camera angle with the angulated tip provides partial laryngeal view and greater lifting force needed for better exposure leading to greater haemodynamic stress.

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Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. King BD, Harris LC, Greifenstein FE, Elder JD, Dripps RD. Reflex circulatory spones to direct laryngoscopy and tracheal intubation performed during general anesthesia. *Anesthesiology* 1951; 12:556-66.
2. Stoelting RK. Circulatory changes during direct laryngoscopy and tracheal intubation - influence of duration of laryngoscopy with or without prior lidocaine. *Anesthesiology* 1977; 47(4): 381-4.
3. Derbyshire DR, Chmielewski A, Fell D, Vater M, Achola K, Smith G. Plasma catecholamine responses to tracheal intubation. *Br J Anaesth*. 1983 Sep;55(9):855-60.
4. Hamill JF, Bedford RF, Weaver DC, Colohan AR. Lidocaine before endotracheal intubation: Intravenous or laryngotracheal? *Anesthesiology* 1981; 55: 578-81.
5. Vucevic M, Purdy GM, Ellis FR. Esmolol hydrochloride for management of the cardiovascular stress responses to laryngoscopy and tracheal intubation. *Br J Anaesth* 1992; 68: 529-30.
6. McCoy EP, Mirakhur RK, McCloskev BV. A comparison of the stress response to laryngoscopy - the Macintosh versus the McCoy blade. *Anaesthesia* 1995; 50: 943-6.
7. Garg M, Shakya R, Mary Lyngdoh N, et al. (July 09, 2022) Comparison Between McCoy Laryngoscope and C-MAC Video Laryngoscope in Anticipated Difficult Airway: A Prospective Randomised Study. *Cureus* 14(7): e26685. DOI 10.7759/cureus.26685
8. Jain D, Bala I, Gandhi K. Comparative effectiveness of McCoy laryngoscope and CMAC® videolaryngoscope in simulated cervical spine injuries. *Journal of Anaesthesiology Clinical Pharmacology | January-March 2016 | Vol 32 | Issue 1*
9. Hendrix JM, Garmon EH. American Society of Anesthesiologists Physical Status Classification System. 2025 Feb 11. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. PMID: 28722969.
10. Mallampati SR, Gatt SP, Gugino LD, Desai SP, Waraksa B, Freiburger D, Liu PL. A clinical sign to predict difficult tracheal intubation: a prospective study. *Can Anaesth Soc J*. 1985 Jul;32(4):429-34.
11. Krejcie RV, Morgan DW. Determining Sample Size for Research Activities. *Educational and Psychological Measurement*. 1970; 30: 607-10.
12. Adnet F, Borron SW, Racine SX, Clemessy JL, Fournier JL, Plaisance P, Lapandry C. The intubation difficulty scale (IDS): proposal and evaluation of a new score characterizing the complexity of endotracheal intubation. *Anesthesiology*. 1997 Dec;87(6):1290-7.
13. McCoy EP, Mirakhur RK. The levering laryngoscope. *Anaesthesia*. 1993 Jun;48(6):516-9.
14. Jain D, Bala I, Gandhi K. Comparative effectiveness of McCoy laryngoscope and CMAC® video laryngoscope in simulated cervical spine injuries. *J Anaesthesiol Clin Pharmacol* 2016;32:59-64.
15. Patel, J., Shah, R., Jain, A., Shah, A., & Chauhan, D. (2022). A comparative study between McCoy laryngoscope versus the tascope in orotracheal intubation in adult surgical patients undergoing general anaesthesia. *International Journal of Health Sciences*, 6(S2), 2842–2854.
16. Yadav, J. K. ., Harshwal, R. K. ., Meena, S., Sharma, N., Sharma, S., & Abhay, J. P. (2023). Comparison of king vision video laryngoscope versus mccoyle laryngoscope for endotracheal intubation in patients with immobilized cervical spine. *Journal of Applied Pharmaceutical Research*, 11(3), 11-17.
17. Reid LC, Brace DE. Irritation of the respiratory tract and its reflect effect upon the heart. *SurgGynec& Obstet*. 1940;70:157.

18. King BD, Harris LC, Greifenstein FE, Elder JD, Dripps RD. Reflex circulatory responses to direct laryngoscopy and tracheal intubation performed during general anesthesia. *Anesthesiology* 1951 Sep; 12(5):556-66.
19. Takeshima K, Noda K, Higaki M. Cardiovascular response to rapid anesthesia induction and endotracheal intubation. *AnesthAnalg.* 1964 Mar-Apr;43(2):201-8.
20. Derbyshire DR, Chmielewski A, Fell D, Vater M, Achola K, Smith G. Plasma catecholamine responses to tracheal intubation. *Br J Anaesth.* 1983 Sep;55(9):855-60.
21. McCoy EP, Mirakhur RK, McCloskey BV. A comparison of the stress response to laryngoscopy: The Macintosh versus the McCoy blade. *Anaesthesia.* 1995;50(11):943-946.
22. Stoelting RK. Circulatory changes during direct laryngoscopy and tracheal intubation: Influence of duration of laryngoscopy with or without prior lidocaine. *Anesthesiology* 1977;47:381-383.
23. Shribman AJ, Smith G, Achola KJ. Cardiovascular and catecholamine responses to laryngoscopy with and without tracheal intubation. *Br J Anaesth.* 1987 Mar;59(3):295-9.
24. Barak M, Ziser A, Greengerg A, Lischinsky S, Rosenberg B. Hemodynamic and catecholamine response to tracheal intubation: direct laryngoscopy compared with fiberoptic intubation. *J of ClinAnesth.* 2003;15(2):132-136.
25. Castillo J, Castano J, Escolano F, Arilla M. Cardio-circulatory response to laryngoscopy. Comparative study between Macintosh and McCoy laryngoscopes. *Rev EspAnesthesiolReanim.* 1996 Jun-Jul;43(6):219-21.
26. Nishiyama T, Higashizawa T, Bito H, Konishi A, Sakai T. Which laryngoscope is the most stressful in laryngoscopy; Macintosh, Miller, or McCoy? Masui. 1997 Nov;46(11):1519-24.
27. Tewari P, Gupta D, Kumar A, Singh U. Opioid sparing during endotracheal intubation using McCoy laryngoscope in neurosurgical patients: the comparison of haemodynamic changes with Macintosh blade in a randomized trial. *J Postgrad Med.* 2005 Dec;51(4):260-5
28. Singhal SK, Neha MD. Haemodynamic response to laryngoscopy and intubation: comparison of McCoy and Macintosh laryngoscope. *The Int J Anesth.* 2008;17(1): DOI: 10.5580/107d.
29. McCoy EP, Mirakhur RK, Rafferty C, Bunting H, Austin BA. A comparison of the forces exerted during laryngoscopy. The Macintosh versus the McCoy blade. *Anaesthesia.* 1996 Oct;51(10):912-5.