

Original Research Article

Comparative study of Truview Evo-2 laryngoscope versus Macintosh laryngoscope for hemodynamic response & POGO Scoring

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Abstract: Life begins with breath. The primary responsibility of the anesthesiologists as a clinician is to safeguard the airway i.e. to preserve and protect it during induction, maintenance and recovery from the state of anesthesia. Failure to maintain a patent airway for more than a few minutes' results in hypoxia, hypercarbia, metabolic alterations, brain damage or death. 90 patients with age ranging from 18-65 years. There was rise in heart rate in both the group but significant rise was seen in patient in Macintosh –group. There was rise in systolic blood pressure in both the group but significant rise was seen in patient in Macintosh -group as compared to patient in Truview evo-2 - group. Hemodynamic response: There was lesser rise in hemodynamic parameters such as heart rate, systolic blood pressure and rate pressure product as the lifting force required was less in T-group. Laryngoscopic view: Truview laryngoscope provides better glottic view as expressed by Cormack and Lehane grade and Percentage of glottic opening score and makes intubation easier.

Keywords: Laryngoscope, Heart rate, Blood pressure

INTRODUCTION:

Life begins with breath. The primary responsibility of the anesthesiologists as a clinician is to safeguard the airway i.e. to preserve and protect it during induction, maintenance and recovery from the state of anesthesia¹. Failure to maintain a patent airway for more than a few minutes' results in hypoxia, hypercarbia, metabolic alterations, brain damage or death [1]. More than 85% of all respiratory related closed malpractice claims [2, 3] involve a brain damaged or dead patient.

Direct rigid laryngoscopy, tube placement and inflation of cuff induces arterial hypertension, tachycardia due to increased catecholamine concentration secondary to proprioceptor stimulation by stretch exerted on supraglottic structure [4]. Laryngoscopy also produces a balanced stimulation of cardiac accelerator fibre and produces less vagal stimulation [4]. Truview EVO2® laryngoscope (Truphatek - Israel) has been claimed to be associated with a lesser rise in heart rate & blood pressure, a better glottic view expressed as POGO Score(Percentage of

Glottic Opening Score), Cormack and Lehane grade and reduced intubation time [5]. In theory, blind nasal intubation may cause less of pressor response as laryngoscopy is avoided [5, 6].

Laryngoscopy in addition to pressor response could cause arrhythmias which are mostly sinus arrhythmias. Others were ventricular premature beats, nodal rhythm, sinus bradycardia, ventricular tachycardia and fibrillation [7]. These changes can be detrimental in patients with high risk and elderly patients [7]. So in order to prevent these untoward hemodynamic changes at the time of induction, there are various drugs such as anaesthetic agents, adjuvants and analgesics which have been employed to blunt the stress response during laryngoscopy and intubation [6, 8]. Various attempt have been made such as changing the type of blade, smaller number endotracheal tube, minimum inflation of cuff to blunt the stress response during laryngoscopy and intubation [9, 10]. Our study was conducted to compare Macintosh laryngoscope and Truview evo 2 laryngoscope with respect to heart rate, blood pressure,

Cormack and Lehane grade and POGO Score(Percentage of glottic opening Score).

33%: lower third and aretnoids seen
0%: No portion of glottis visible

AIMS & OBJECTIVES

To compare effectiveness of Truview Evo-2 laryngoscope versus Macintosh laryngoscopy with respect to

1. Hemodynamic changes like
 - a) Heart rate
 - b) Blood pressure
2. Visibility of glottic aperture
 - a) Cormack and Lehane grading of laryngoscopic view
 - b) POGO Scoring

MATERIAL AND METHODS:

A randomized controlled clinical trial of 90 cases was carried out to compare effectiveness of Truview Evo-2 laryngoscope (T- group) n= 45, & Macintosh laryngoscope M-group n=45 to perform endotracheal intubation in patient undergoing elective surgical procedure under general anaesthesia after taking written informed consent from the patients in a period of 2 years.

Inclusion criteria:-

- Patient belonging ASA I & ASA II grade
- Patients between 18 yrs to 65 yrs of age.
- Patient undergoing any procedure under general anesthesia with endotracheal intubation.
- Mallampatti Classification Grade I & II.

Exclusion criteria:-

- Patient less than 18yrs or greater 65yrs of age.
- Mallampatti Classification grade III & IV
- Risk for gastric aspiration
- Patient not willing for study
- Patient with h/o Hypertension and ischemic Heart Disease
- Patient of Laryngeal & thyroid surgery
- Patient belonging ASA III & ASA IV grade

Operational classification

Laryngoscopic view was graded according to **Cormack and Lehane** [11, 12] classifications.

- Grade I: Full glottic exposure
- Grade II: Only posterior portion of glottis seen
- Grade III: Only epiglottis seen, no glottic exposure
- Grade IV: Not even the epiglottis can be seen

POGO score (Percentage of glottic opening score) [13]

100%: full glottic view

Data collection:

Premedication: On the morning of surgery, patient was given inj. Glycopyrrolate 4 mcg/kg im ½ hr prior to surgery. Pre induction monitor such as cardio scope lead II, pulse oximeter, Noninvasive Blood pressure monitor, manual Blood pressure monitor, Capnometer was attached. Baseline pulse rate, Blood pressure, Oxygen saturation & ECG rhythm was recorded. Intravenous access on forearm with appropriate Gauze intravenous cannula was secured and pre oxygenation was done with 100% Oxygen 6L/min for 3 min.

Sedation was given with inj. Midazolam 0.03 mg/kg and inj. Fentanyl 2 mcg/kg. After sedation patients was induced with inj. Propofol 2 mg/kg and confirming the mask ventilation muscle relaxant inj. vecuronium.0.1mg/kg was given. Trachea was intubated with appropriate no. endotracheal tube by an anesthetist with either of two blades & placement of endotracheal tube was confirmed by equal chest movement, 5 point auscultation & capnography. Patient was mechanically ventilated during procedure after confirmation of successful intubation. Anesthesia was maintained with intermittent positive pressure ventilation with Oxygen & Nitrous oxide, muscle relaxant inj. vecuronium 0.1 mg/kg & inhalational agent.

During laryngoscopy 6 liter of oxygen/min was administered via oxygen port of Truview Evo 2 laryngoscope. Intubation time was noted from introduction to removal of laryngoscope blade from mouth. POGO score & Cormack Lehane grading was done. Hemodynamic changes were recorded from baseline value to 10 min post intubation interval. No other medication was administered or procedure done affecting the above parameter during 10 min data collection period after tracheal intubation. This was considered as end point. Rescue technique was applied in cases of difficult intubation in the form of external pressure, bougie or both.

Statistical analysis was done by using SPSS16 software. 't' test was used for quantitative data and chi square test was used for qualitative type of data for analysis. The p value <0.05 was considered significant.

OBSERVATION AND RESULTS

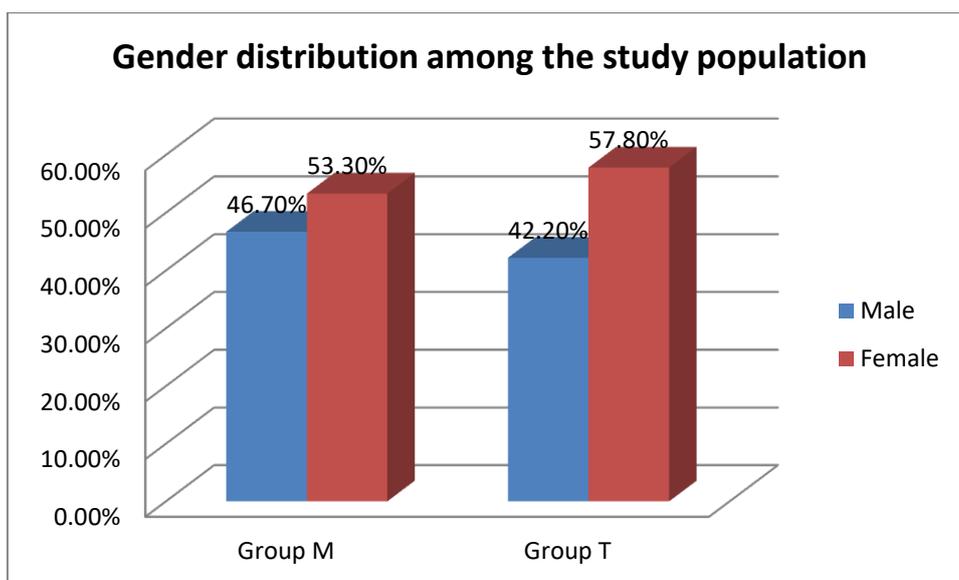
In our study, 90 patients with age ranging from 18-65 years posted for elective surgery under general anaesthesia with endotracheal intubation were studied in two years period.

Group M= Macintosh laryngoscope
 Group T= Truview Evo-2 laryngoscope

Table1: Age-wise distribution of patients

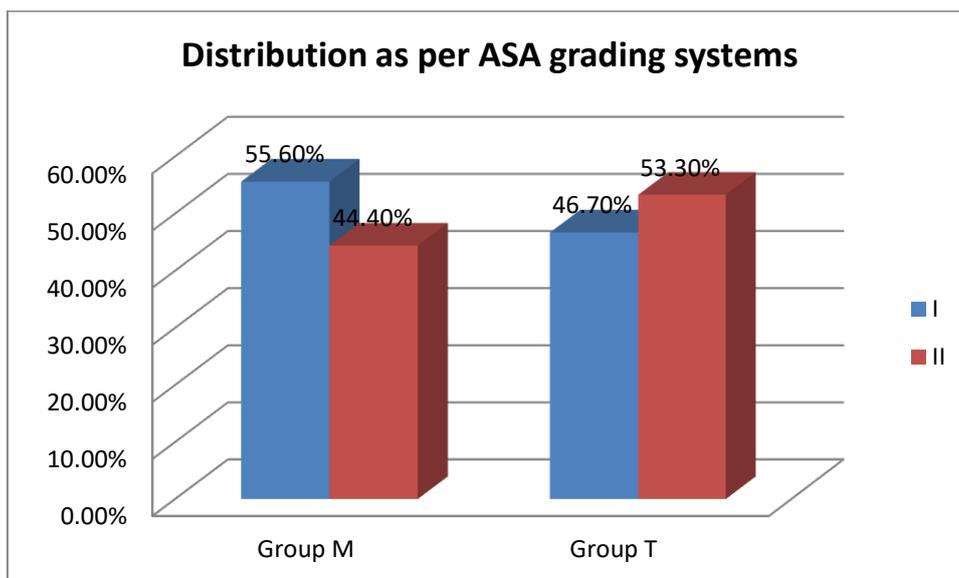
Age in years	N	Mean	SD
Group M	45	38.07	12.95
Group T	45	39.62	13.07

p value (t test)= 0.57, not significant.



Applying Chi square test, p value=0.67 not significant.

Fig 1: Gender distribution among the study population



Applying chi square test, p value=0.39, not significant.

Fig 2: Distribution as per ASA grading systems

Table 2: Comparison of heart rate/intergroup

Heart rate	Group	n	Mean	SD	P value	Significance
Base line	Group M	45	75.7	7.9	0.24	Not significant
	Group T	45	73.9	6.6		
At Laryngoscopy	Group M	45	82.4	8.8	0.01	Significant
	Group T	45	78.0	6.7		
Post intubation 1 min	Group M	45	99.4	9.2	<0.001	Significant
	Group T	45	92.5	5.6		
2 min	Group M	45	95.0	8.7	<0.001	Significant
	Group T	45	88.6	5.5		
3min	Group M	45	89.8	8.1	0.006	Significant
	Group T	45	85.6	5.5		
5 min	Group M	45	83.9	6.6	0.001	Significant
	Group T	45	75.5	5.0		
10 min	Group M	45	74.2	8.8	0.78	Not significant
	Group T	45	74.6	4.4		

Table 2 shows that there was rise in heart rate in both the group but significant rise was seen in patient in M-group as compared to patient in T-group. Heart rate was maximally increased during one minute post intubation period with 31.5% in M-group

and 25.1% in T- group. It was also noted that heart rate came down to baseline value around 5min post intubation period in T- group and in M-group it took 10min time for the same which is statistically significant with a P value of <0.05.

Table 3: Comparison of systolic blood pressure

Systolic BP	Group	n	Mean	SD	P value	Significance
Base line	Group M	45	112.0	6.2	0.14	Not significant
	Group T	45	114.6	10.2		
At Laryngoscopy	Group M	45	121.8	6.1	0.40	Not significant
	Group T	45	123.2	9.9		
Post intubation 1 min	Group M	45	141.8	7.6	<0.001	Significant
	Group T	45	134.2	11.0		
2 min	Group M	45	130.3	8.1	0.001	Significant
	Group T	45	123.6	9.8		
3min	Group M	45	120.4	7.9	<0.001	Significant
	Group T	45	113.7	9.3		
5 min	Group M	45	115.4	7.9	<0.001	Significant
	Group T	45	103.6	7.6		
10 min	Group M	45	110.3	7.8	<0.001	Significant
	Group T	45	98.6	9.6		

Table 3 shows that there was rise in systolic blood pressure in both the group but significant rise was seen in patient in M-group as compared to patient in T- group. systolic blood pressure was maximally increased during one minute post intubation period with

26.6% in M-group and 17% in T- group It was also noted that systolic blood pressure came down to baseline value around 3min post intubation period in T- group and in M-group it took 5min for the same which is statistically significant with a P value of <0.05.

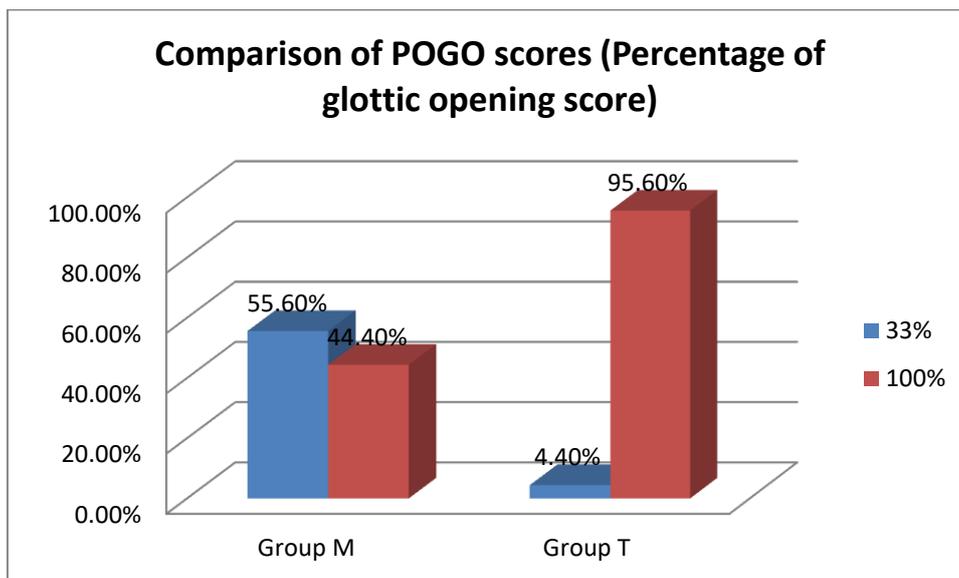


Fig 3: Comparison of POGO scores (Percentage of glottic opening score)

Figure 3 shows that the POGO Score was significantly lower in M-group as compared to in T-group which is statistically significant ($P < 0.001$).

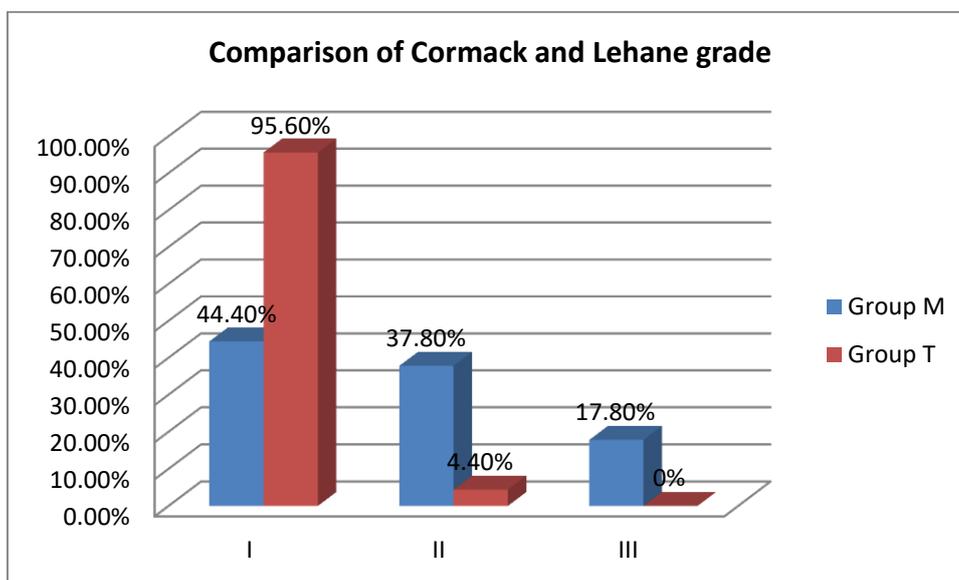


Fig 4: Comparison of Cormack and Lehane grade

Figure 4 shows that 44.4% cases of M-group as compared to 95.6% cases of T- Group belonged to Cormack and Lehane grade I. 37.8% cases of M-group as compared to 4.4% cases of T- Group belonged to Cormack and Lehane grade II. Only 17.8% cases of M-group belonged to Cormack and Lehane grade III. These values are statistically significant ($P < 0.001$).

DISCUSSION

Rashid M Khan *et al.*; [5] done a comparative study regarding Truview evo-2 vs macintosh laryngoscopy in 44 patients of either sex ranging from 20-50yrs and found that the ASA grading, mean age, weight and sex distribution was nearly equal in both groups ($p > 0.005$). They also found that 44 patients' heart rate and systolic blood pressure raised in both the

group but significant rise was found in patients intubated with macintosh laryngoscopy and also the glottic opening was inferior in macintosh laryngoscopy.

Mohammad Maroof *et al.*; [14] found that the maximum rise in heart rate and systolic blood pressure following laryngeal intubation was significantly lesser [$p < 0.05$] in patients intubated using Truview evo-2 laryngoscope. In our study we also found that there was lesser rise in haemodynamic parameters such as heart rate, systolic blood pressure, and rate pressure product belonging to T-group.

Ishwar Singh *et al.*; [15] performed a study comparing Macintosh laryngoscope and Truview laryngoscope in 100 patients with 1 or 2 predictors of difficult intubation. The Cormack and Lehane grading improved with Truview as also confirmed by other investigators mentioned above.

SUMMARY AND CONCLUSION

Hemodynamic response: There was lesser rise in hemodynamic parameters such as heart rate, systolic blood pressure and rate pressure product as the lifting force required was less in T-group.

Laryngoscopic view: Truview laryngoscope provides better glottic view as expressed by Cormack and Lehane grade and Percentage of glottic opening score and makes intubation easier.

REFERENCES:

1. American Heart Association, Guidelines on Adult Basic Life Support, Circulation 2005; 112; IV-19-IV-34.
2. Caplan RA, Posner KL, Ward RJ, Cheney FW. Adverse respiratory events in anesthesia: a closed claims analysis. Anesthesiology. 1990 May; 72(5):828-33.
3. Cheney FW, Posner KL, Caplan RA. Adverse respiratory events infrequently leading to malpractice suits. A closed claims analysis. Anesthesiology. 1991 Dec; 75(6):932-9.
4. Gupta AK, Ommid M, Nengroo S, Naqash I, Mehta A. Predictors of Difficult Intubation: Study In Kashmiri Population. British Journal of Medical Practitioners. 2010 Mar; 3(1).
5. Khan RM, Maroof M, Jain S, Khan FR, Madhu M. Truview Evo-2 vs Macintosh laryngoscopy: study of cardiovascular responses & POGO scoring. Journal of Anaesthesiology Clinical Pharmacology. 2008 Jul 1; 24(3):311.
6. Kanchi M, Nair HC, Banakal S, Murthy K, Murugesan C. Haemodynamic response to endotracheal intubation in coronary artery disease: Direct versus video laryngoscopy. Indian journal of anaesthesia. 2011 May 1; 55(3):260.
7. Gerola A, Feinberg H, Katz LN. Myocardial oxygen consumption and coronary blood flow in hypothermia. Am J Physiol. 1959 Apr; 196(4):719-25.
8. Helfman SM, Gold MI, DeLkser EA, Herrington CA. Which Drug Prevents Tachycardia and Hypertension Associated with Tracheal Intubation: Lidocaine, Fentanyl, or Esmolol?. Anesthesia & Analgesia. 1991 Apr 1; 72(4):482-6.
9. Collins VJ. Autonomic reflexes during anesthesia and surgery. In: Collins Vincent J., editor. Principales of Anesthesiology General and Regional Anesthesia. 3rd ed. Philadelphia: Lea and Febiger; 1993: 1186–1187.
10. Forbes AM, Dally FG. Acute hypertension during induction of anaesthesia and endotracheal intubation in normotensive man. British journal of anaesthesia. 1970 Jul 1; 42(7):618-24.
11. Cormack RS, Lehane J. Difficult tracheal intubation in obstetrics. Anaesthesia. 1984 Nov; 39(11):1105-11.
12. 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. Canadian Journal of Anesthesia/Journal canadien d'anesthésie. 1985 Jul 1; 32(4):429-34.
13. Thomas Gal. Airway Management. In Ronald D Miller 6th ed Miller's Anesthesia, Elsevier, USA; 2005:1617-1651.
14. Maroof M, Khan RM, Verma V, Jain S, Khan Y. Intubation with Truview Evo2 Is Superior to Macintosh in Terms of Force Used & Hemodynamic Changes. Anesthesiology. 2006; 105:A1284.
15. Singh I, Khaund A, Gupta A. Evaluation of Truview evo2® Laryngoscope in Anticipated Difficult Intubation-A Comparison To Macintosh Laryngoscope. Indian journal of anaesthesia. 2009 Mar 1; 53(2):164.