



Anaesthesiology

COMPARATIVE STUDY OF TRUIVIEW EVO2 LARYNGOSCOPE WITH MACINTOSH LARYNGOSCOPE FOR LARYNGOSCOPY AND INTUBATION IN ADULTS RECEIVING GENERAL ANAESTHESIA FOR ELECTIVE SURGERIES

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ABSTRACT

INTRODUCTION: Though macintosh laryngoscope is a standard for intubation, new laryngoscopes are being introduced to reduce the disadvantages of macintosh. Trueview EVO2 laryngoscope has some advantages over macintosh laryngoscope.

MATERIAL AND METHODS: For this randomized, prospective study, 60 patients were allocated to either of the two groups and laryngoscopy and endotracheal intubation done in Group A by macintosh laryngoscope and in Group B by truiview EVO2 laryngoscope. The time taken for intubation, number of intubation attempts, POGO score., Cormack-lehane grading, rescue technique for intubation, haemodynamics and side effects were studied

RESULTS: POGO score of 100% was seen in maximum number of patients in group B compared to group A. Cormack lehane grade I was seen in maximum number of patients in group B. Number of attempts taken were more in group B and statistically significant. Rescue technique like use of bougie, external pressure were used more in group A compared to group B. Mean time for laryngeal intubation was more in group B compared to group A. Haemodynamics were comparable between the groups. Minor complications seen and they were comparable.

CONCLUSION: Truiview EVO2 laryngoscopy is associated with improved view of glottis, stable hemodynamic parameters, less complications but at the cost of longer intubation time and increase number of attempts compared to Macintosh laryngoscope.

KEYWORDS : Truiview Evo2 Laryngoscope, Mcintosh Laryngoscope, Pogo Score, Cormack-lehane Grading

INTRODUCTION:

One of the first skill anaesthesiologists must master is direct visualization of the vocal cords to safely and successfully intubate the trachea of surgical patients under general anaesthesia.¹ To maximize the likelihood of successful intubation at first attempt, to limit duration and number of attempts of laryngoscopy and intubation and to prevent cant intubate cant oxygenate situations,² there is a strive for better laryngoscope.

Macintosh laryngoscope is the standard laryngoscope used since its introduction in 1943. There has been progression from macintosh to videolaryngoscope. Truiview EVO2 optical laryngoscope has been introduced in year 2004 with 42 degree angled tip which allows to see around the scope which is not possible with direct laryngoscopy by macintosh.

Videolaryngoscopy reduces intubation failures, makes intubation easier, improves glottis view,^{3,4} reduces the number of laryngoscopies and reduces incidence of laryngeal and airway trauma but with no evidence of fewer attempts to intubate or whether intubation takes less or more time.³ Other systematic reviews found that videolaryngoscopy reduces the risk of difficult oral tracheal intubation and esophageal intubation and increased first attempt success in ICU patients⁵ and in emergency intubations⁶ while some studies found truiview less advantageous than macintosh.⁷

The rationale behind the study was to find out the efficacy and safety of macintosh laryngoscope compared to truiview laryngoscope for laryngoscopy and intubation in patients receiving general anaesthesia for elective surgeries

MATERIAL AND METHODS:

This prospective randomized controlled trial was conducted after taking ethical committee approval. Patients undergoing elective surgical procedure under general anaesthesia with endotracheal intubation was the study population. Sample size of 30 was taken and convenient sample used. Inclusion criteria was patients of both gender of age 18-60 yrs, weight 50-70kg, ASA grade I and II, mallampatti grade I and II. Exclusion criteria was ASA grade III and IV, Mallampatti grade III and IV, risk of gastric aspiration, patient of laryngeal and thyroid surgery, hypertensive and ischemic heart disease patient. After taking informed written consent, patients were allocated to Group A or Group B by simple randomization method. In Group A, oroendotracheal intubation was done by macintosh laryngoscope and in Group B, by truiview EVO2 laryngoscope (Truphatek International).

On day of surgery, patients preoxygenated with 100% oxygen for 3 mins. Premedication given with inj. Midazolam 0.02mg/kg and inj. Fentanyl 2ug/kg and inj. Ondansetron 0.08 mg/kg. Patient induced with inj. Propofol 2-2.5 mg/kg and after confirming mask ventilation, muscle relaxant inj. Vecuronium 0.1mg/kg given. Trachea intubated with appropriate size of endotracheal tube by an anaesthesiologist according to group allocation of patient. Placement of endotracheal tube confirmed by capnography and chest auscultation. Anaesthesia maintained with intermittent positive pressure ventilation, with 50% oxygen and 50% nitrous oxide and inj. Vecuronium 0.02mg/kg and inhalation agent isoflurane. During laryngoscopy 6L/min of oxygen administered via oxygen port of truiview EVO2 laryngoscope to prevent fogging. The outcome measured were time taken for intubation, number of attempts at intubation, POGO score, Cormack-lehane grading, rescue techniques used in case of difficult intubation like bougie, external pressure over thyroid cartilage or both, haemodynamic changes in heart rate and mean arterial pressure post intubation for 10 mins at interval of 1 min. Intubation time noted from introduction of laryngoscope to confirmation of placement of tube. POGO score measured as view of glottis at laryngoscopy (0-100%).

Surgery was allowed to commence only after collection of last haemodynamic data at 10 mins post intubation. Complications like trauma to lips, trauma to pharynx, tooth fall, loosening of tooth, secretions, laryngospasm, bronchospasm, desaturation, oesophageal intubation was noted. At end of surgery reversal done with inj neostigmine and inj glycopyrolate. Patient extubated after fulfilling extubation criteria.

STATISTICAL ANALYSIS:

Data was entered using MS excel and analysed using SPSS software. Appropriate statistical test like unpaired t-test for comparison of mean between two groups, chi-square test used as per the data. The p value less than 0.05 was taken as statistically significant.

RESULTS:

Demographic parameters like age, gender, ASA grade, Mallampatti grade were comparable in between the two groups. (table 1)

Table 1:

Parameters	Group A Mean ±SD	Group B Mean ±SD	P value
Age(years)	38.93±12.43	39.42±12.67	0.8088
Male	20(44.44%)	21(46.67%)	0.832
Female	25(55.56%)	24(53.33%)	
Weight(kg)	60.00±6.87	58.80± 7.54	0.521

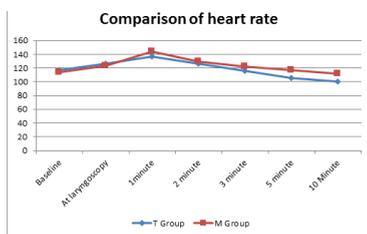
ASA			
Grade I	25(55.56%)	26(57.78%)	0.1000
Grade II	20(44.44%)	19(42.22%)	
MPC			
Grade I	24(53.33%)	22(48.89%)	0.673
Grade II	21(46.67%)	23(51.11%)	

Table 2: Outcome parameters

Sr.no.	Parameters	Group A	Group B	P value
1.	POGO score 33% 100%	23(51.11%) 24(49.89%)	3(6.67%) 42(93.33%)	<0.001
2.	Cormack lehane grade Grade I Grade II Grade III	21(46.67%) 16(35.56%) 8(17.78%)	42(93.33%) 3(6.67%) 0(0%)	<0.001
3.	Number of attempts	1.06±0.252	1.36±0.484	<0.0006
4.	Rescue technique Bougie External pressure None	7(15.56%) 15(33.33%) 23(51.11%)	10(22.22%) 0(0%) 35(77.78%)	<0.001
5.	Mean time for laryngeal intubation	42.17 sec	55.51 sec	

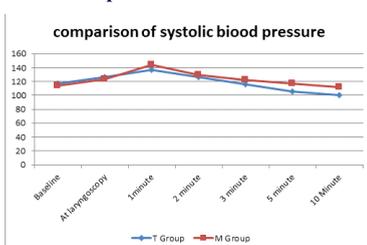
The POGO Score was significantly lower in group A compared to group B and was statistically significant (P< 0.001). 46.67% cases of group A belonged to Cormack and Lehane grade I as compared to 93.33% cases of group B. 35.56% cases of group A and 6.67% cases of group B belonged to Cormack and Lehane grade II. 17.78% cases of group A and no case of - group B belonged to Cormack and Lehane grade III. These values were statistically significant (P< 0.001). Mean time for Laryngeal intubation in Group A was 42.17sec and in Group B it was 55.51sec. Mean intubation attempt required in group A was 1.06±0.252 as compared to group B in which it was 1.36±0.484 which was statistically significant (P< 0.0006). Rescue technique were required in 48.89% of cases in group A compared to 22.22% of cases in group B which showed statistical significance(<0.001). Requirement of rescue technique in the form of external pressure was 33.33% and bougie was required in 15.56% of cases in group A whereas only 22.22% of cases in group B required bougie for passage of tube .5 cases of group A had minor injury and 3 case of group B suffered minor injuries but this was not statistically significant(P=0.999). (table 2)

Graph 1: Heart rate at various intervals



There was rise in heart rate in both the group but significant rise was seen in patients in group A as compared to patient in group B. Heart rate was maximally increased during one minute post intubation period with 29.79% in group A and 24.43% in group B. It was also noted that heart rate came down to baseline value around 10min post intubation period in both group B and in group A.(graph 1)

Graph 2: Systolic blood pressure at various intervals



There was a rise in systolic blood pressure in both the group but significant rise was seen in patient in group A as compared to patient in group B. Systolic blood pressure was maximally increased during one minute post intubation period with 26.09% in group A and 16.85% in group B. It was also noted that systolic blood pressure came down to baseline value around 3min post intubation period in group B and in group A it took 5min for the same, which was statistically significant(P<0.05)(graph 2)

DISCUSSION:

In our study demographic parameters of the patient in both group were comparable. Similar to our study, improved POGO score^{8,9,10} and improved cormack lehane grading^{9,11-17,19,20} was seen with truviescope. POGO score is a simple and an easy way to categorize laryngeal view and it has better inter physician reliability than Cormack Lehane grading. POGO is more sensitive than Mallampati grading and has been shown to have good inter and intra observer reliability. Truview evo2 is an angled indirect laryngoscope that provides an anterior refraction of 42° thus provides better laryngeal view.¹⁸

Agreeing with our study mean time for intubation was increased with truviescope^{8,12,14,17,19-24} but few studies found equal time taken for intubation with both laryngoscopes^{9-11,25} We experienced requirement of certain manipulative movements while negotiating the endotracheal tube under Truview evo2 vision even when the best of laryngeal view was available. This was the main reason for requirement of longer time for tracheal intubation under Truview vision as compared to conventional laryngoscopy . Laryngoscopy and intubation is performed in an indirect manner with Truview , seeing the ETT through the lens. The anaesthesiologist looks through the Truview lens and focuses on the vocal cords. Then the tube needs to be advanced blindly until its tip enters the Truview vision field. Performing this maneuver requires good eye-hand co-ordination and some practice. The field of vision is narrower and smaller , requiring more time to identify the pharyngeal and laryngeal structures. There is also angulated view of the larynx, which necessitates the use of stylet to direct the tracheal tube to the glottis opening. Mandatory use of stylet and the relative inexperience with the Truview evo2 blade may be the reason for the difference in duration of intubation.

One study was congruent with ours regarding increased number of attempts with truviescope⁹ but other studies found more number of attempts with macintosh^{10,20-22,26} and equal number of attempts in both groups.^{12,13,16,19,25} Increase number of attempts required for intubation in Truview Evo2 laryngoscope was may be due to relative inexperience with the newer device.

Similar to our study, more rescue techniques needed with macintosh in other studies^{7,13,20} The angle between the laryngeal axis and line of vision is 42±12° in neutral position. Truview evo2 is an angled indirect laryngoscope that provides an anterior refraction of 42° thus eliminating the need for external laryngeal manipulations which is required frequently in Macintosh laryngoscope.

In congruence to our study, more pressor response seen with macintosh^{14,27} and in other study with truviescope¹⁹ but many studies had similar haemodynamic changes with both blades^{12,15,17,24} All important structures of relevance during direct laryngoscopy and tracheal intubation such as epiglottis and glottis are anteriorly placed. This necessitates application of moderate force to visualize glottis during laryngoscopy. Reducing this force by using a laryngoscope designed for anterior viewing would thus be helpful in reducing hemodynamic response to orotracheal intubation. Exposure of the glottis during laryngoscopy requires elevation of the epiglottis by forward and upward lifting of the laryngoscope blade. This is associated with increase in heart rate and blood pressure secondary to sympathetic discharge. Any laryngoscopy technique requiring lesser lifting force would proportionally reduce the sympathetic discharge and hence change in heart rate and blood pressure.^{24,28}

There were minimal or no side effects in other studies^{9,12,15,16,19,25} with both laryngoscopes while one study found incisor damage with macintosh.¹⁰ Less number of complications may be, due to, not taken cases having MPC III and above.

CONCLUSIONS:

Truview Evo2 laryngoscope is associated with improved view of

glottis, stable hemodynamic parameters, less complications but at the cost of longer intubation time and increase number of attempts compared to Macintosh laryngoscope. Practice and familiarity is required to achieve good eye-hand co-ordination with Truview Evo2 blade.

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