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A comparative study of laryngoscopic view by Truview EVO2 and Macintosh laryngoscope in anticipated difficult intubation

KEYWORDS

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ABSTRACT

Aim:To compare laryngoscopic view by Truview EVO2 and Macintosh laryngoscope in anticipated difficult intubation. Methodology :ASA I and II patients within age group 18 to 60 yrs undergoing elective surgery requiring GA and endotracheal intubation were included. Evaluated for 3 predictors of difficult intubation (PDI) a)modified Mallampati test b)thyromental distance c)atlanto-occipital joint extension numerical scores were assigned for each grade in each category. Cumulative PDI score of 8 predicted maximum difficulty and score of 0 indicated none. Patients underwent routine pre-anesthetic check up and laboratory investigations as per protocol. Standard non invasive monitoring with PR,BP,SpO2 and EtCO2 done.Preoxygenation done with 100% O2 for 3 min and induced with inj thiopentone 5 mg/kg and mask ventilation confirmed.patient with difficult ventilation were excluded .rest of patients were paralysed with inj succinylcholine 1.5mg/kg.Patients head placed on 8 cm high cushion and manipulations to achieve maximum possible sniffing position done.Cormack-Lehane grade with Macintosh laryngoscope recorded in this position by a laryngoscopist using either no 3 or 4 blade as deemed suitable.No external laryngeal manipulations or aid taken to improve C&L grade. Cases with C&L grade II or more further evaluated by Truview EVO2 laryngoscopy and new laryngoscopic view noted as per C&L grading.Intubation done with appropriate no.endotracheal tube.Any attempt requiring more than 1 min time terminated as failed attempt and alternative method used. Statistical analysis:data were expressed as mean±standard deviation. Analysis of data was done by Wilcoxon signed –rank test and Marginal homogenecity test. P value less than 0.05 was considered to be significant. Results: Laryngoscopic view by Macintosh blade shows 27(67.5%) cases in grade III and IV which were considered to be difficult to intubate and 13(32.5%) cases were in grade II. Truview had improved the glottic view to grade I in 32(80%) cases. Total 38(95%) cases showing C&L grade I and II with Truview laryngoscopy and only 2(5%) cases remained in grade III which were considered difficult to intubate and none of the patient remained in grade IV. Conclusion:laryngoscopic view by Truview EVO2 was better compared to Macintosh laryngoscope ,in anticipated difficult intubation.

INTRODUCTION: The Truview EVO2 laryngoscope has been designed using optical principle to provide better view of objects situated more anterior to straight line of vision. It is deemed to be useful in situations where conventional laryngoscopy fails to get desired laryngeal view.Although various types of laryngoscopes with different technical specifications and operational characteristics have been developed,Macintosh laryngoscopes remain the most widely used.The newer Truview EVO2 laryngoscope has an optical accessory,a different blade angle and an oxygen flow apparatus attached to the device.In the present study we compared the Truview EVO2 and Macintosh laryngoscopes in the same set of patients by measuring the Cormack-Lehane scores during direct laryngoscopy in anticipated difficulty.

METHODOLOGY: After institutional and ethical committee approval and written informed consent we investigated the patients of ASA I and II patients within age group 18 to 60 yrs undergoing elective surgery requiring GA and endotracheal intubation .Patients were evaluated for 3 predictors of difficult intubation (PDI)

a)modified Mallampati test

b)thyromental distance

c)atlanto-occipital joint extension

numerical scores were assigned for each grade in each category. Cumulative PDI score of 8 predicted maximum difficulty and score of 0 indicated none. Patients underwent routine pre-anesthetic check up and laboratory investigations as per protocol. Standard non invasive monitoring with PR,BP,SpO2 and EtCO2 done.Preoxygenation done with 100% O2 for 3 min and induced with inj thiopentone 5 mg/kg and mask ventilation confirmed.patient with difficult ventilation were excluded .rest of patients were paralysed with inj succinylcholine 1.5mg/kg.Patients head placed on 8 cm high cushion and manipulations to achieve maximum possible sniffing position done.Cormack-Lehane grade with Macintosh laryngoscope recorded in this position by a laryngoscopist using either no 3 or 4 blade as deemed suitable.No external laryngeal manipulations or aid taken to improve C&L grade. Cases with C&L grade II or more further evaluated by Truview EVO2 laryngoscopy and new laryngoscopic view noted as per C&L grading.Intubation done with appropriate no.endotracheal tube.Any attempt requiring more than 1 min time terminated as failed attempt and alternative method used. Statistical analysis:data were expressed as mean±standard deviation. Analysis of data was done by Wilcoxon signed –rank test and Marginal homogenecity test. P value less than 0.05 was considered to be significant.

OBSERVATIONS AND RESULTS

DEMOGRAPHIC DATA:

Demographic profiles of the patients are shown in table 1. Both male and female patients were adequately represented. All patients studied were in the age group of 18 to 60 years. Average age of the patients is 37.3 years (±12.7)

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Table 1: Demographic profile of the study group

Patient characteristics	Ratio or Mean (SD)
Gender M:F	21:19
Age (Yrs)	37.3 (±12.7)
Height (cms)	155.4 (±5.39)
Body Weight (kgs)	55.35 (±5.7)

Assessment of predictors of difficult intubation:

a. Modified Mallampati test in sitting position with fully protruded tongue.

b. Thyro-mental distance in cm, distance from the mentum to the thyroid notch, while patients neck is in full extension.

c. Atlanto-occipital joint extension in degree recorded by measuring the angular distance traveled by occlusion surface of the upper incisors while achieving full extension from neutral position.

Numerical scores assigned for each grade as per following table:

Parameter	Difficulty grade	Numerical score
Modified Mallampati	Grade I Grade II Grade III Grade IV	0 1 2 3
Atlanto-occipital joint extension	Grade I (>350) Grade II (22°-34°) Grade III (12°-21°) Grade IV(<12°)	0 I 2 3
Thyro-mental distance	Grade I (>6.5cm.) Grade 11(6-6.5cm.) Grade III (<6cm.)	0 1 2

After assessing PDI we found that 16 patient had PDI 2, 17 patient had. PDI 3, 7 patient had PDI 4 and only 2 of them had PDI 5.

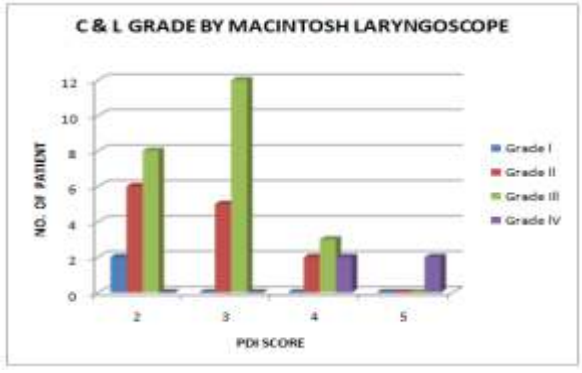
Table2: No of patients as per different PDI scores

PDI	2	3	4	5	**Total**
No. of Patients	16	17	7	2	**42**

After doing laryngoscopy by Macintosh blade we noted the Cormack — Lehane grades of the above study patients; which were as follows:

Table 3: C and L grade by Macintosh laryngoscope as per the PDI scores

C & L by Macintosh	**P01**				**Total**
	2	**3**	**4**	**5**	
Grade I	2	0	0	0	2
Grade II	6	5	2	0	13
Grade III	8	12	3	0	23
Grade IV	0	0	2	2	4
Total	16	17	7	2	42



All 42 patients were evaluated with Macintosh blade laryngoscopy and as per C & L grade they were observed.

In 16 patients with P01 score 2, 2 patients were in grade I, 6 in grade II and 8 in grade III.

In 17 patients with PDI score 3, 5 patients were in grade II andl2 patients in grade III.

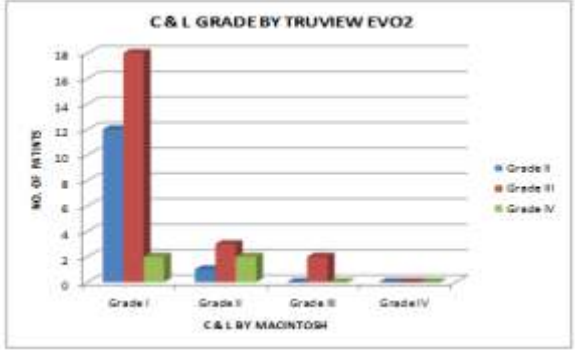
In 7 patients with PDI score 4, 2 patients were in grade II, 3 in grade III and 2 in grade IV.

Both patients with PDI score 5, were having grade IV.

The 2 patients in grade I were not included in the study as the present study is to evaluate the improvement in visualization with Truview EVQ2 and hence the total number of patients evaluated for improvement in laryngoscopic view were 40.

Table 4: C and L grade by Truview EVO2 for each grade by Macintosh laryngoscope

C & L by Truview EVO2	**C & L by Macintosh**			**Total**
	Grade II	**Grade III**	**Grade IV**	
Grade I	12	18	2	32
Grade II	1	3	2	6
Grade III	0	2	0	2
Grade IV	0	0	0	0
Total	13	23	4	40



From the above observations, we found that:

1. Out of 13 patients who were having C&L grade II by Macintosh laryngoscopy, 12 patients were converted to C&L grade I by Truview and only I patient did not show any improvement by Truview laryngoscopy.

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2. Twenty three patients who showed C&L grade III by Macintosh laryngoscopy, 18 patients showed improvement by two grades and were changed to C&L grade I by Truview laryngoscopy and 3 patients showed improvement by one grade and were changed to C&L grade II by Truview laryngoscope. Only two patients not observed to have any improvement in C&L grade by truview laryrigosopy and remained in grade UI.

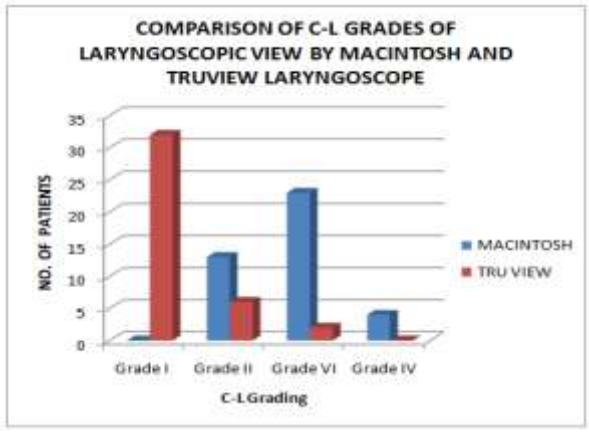
3. All four patients who were in C&L grade IV by Macintosh laryngoscopy, observed improvement in laryngeal view by C&L grading when done by Truview laryngoscopy, out of which 2 patients showed improvement by three grades and were changed to C&L grade I by Truview laryngoscopy and 2 patients showed improvement by two grades and were changed to C&L grade II by Truview laryngoscopy.

Out of 40 cases, 37 (92.5%) showed improvement in glottic view by atleast I or 2 C&L grade when assessed with Truview EVO2. 20/40(50%) cases had shown improvement by 2 grades and 15/40(37.5%) cases had shown improvement by I grade. All the four cases with Grade IV view by Macintosh were improved to Grade I or II level by Truview EVO2. In 3 cases (i.e. 7.5%) we did not observed any improvement in laryngoscopic view. The differences in view by both the laryngoscopes have been found very strongly significant and consistent for all grades of laryngeal view (pcO.00I).

IMPROVEMENT IN CORMACK - LEHANE GRADE BY TRUVIEW ASCOMPARED TO MACINTOSH LARYNGOSCOPIC VIEW.

Table 5: Comparison of C-L grades of laryngoscopic view by Macintosh and Truview laryngoscope.

Laryngoscope / C-L Grade	MACINTOSH	TRU VIEW
Grade I	0	32
Grade II	13	6
Grade VI	23	2
Grade IV	4	0
Total	40	40



Above comparison of C&L grades of laryngoscopic view by Macintosh and Truview EVO2 laryngoscope shows that from total 40 cases, Laryngoscopic view by Macintosh blade shows 27(67.5%) cases in grade III and IV which were considered to be difficult to intubate and 13(32.5%) cases were in grade II.

Truview had improved the glottic view to grade I in 32(80%) cases. Total 38(95%) cases showing C&L grade I and II with Truview laryngoscopy and only 2(5%) cases remained in grade III which were considered difficult to intubate and none of the patient remained in grade IV. Hence we can say that most of the patients (95%) were seemed to have better laryngeal view i.e. C&L grade I and II by Truview laryngoscopy in anticipated difficult intubation.

DISCUSSION : Our results have shown improvement in laryngeal view by Truview laryngoscopy as compared to Macintosh laryngoscopy.Even the few cases showing C&L grade IV view by Macintosh blade have been improved laryngoscopic view to grade I or II by Truview EVO2.The view of laryngoscopy was improved in 37(92.5%) cases by atleast Cormack-Lehane grade I or II when assessed with Truview laryngoscope (p value < 0.001).these findings are similar to those obtained in other studies comparing Truview EVO2 laryngoscope with Macintosh laryngoscope.

J.B.Li ,Y.C.Xiong et al1 in their study compared Macintosh laryngoscope with the Truview EVO2 in 200 patients.91 patients had the same C&L grade score with both laryngoscopes.Of the remaining 105 showed improvement in C&L grade when Truview was used compared to the Macintosh laryngoscope.In 4 patients a better grade view was noted with the Macintosh laryngoscope than with the Truview laryngoscope. 2 patients who had a grade 4 view with the Macintosh laryngoscope were intubated with the Truview laryngoscope,which improved the view of the glottis to grade 2 and 3 respectively.

Ishwar singh,Abhishek Gupta et al2 in their study found that there was improvement in C&L grade by Truview for each grading by Macintosh.Truview had improved the glottis view to grade I in 39/50(78%) cases.46/50(92%) cases had shown improvement in glottis view. 23/50(46%) cases had shown improvement by 2 grades and 20/50(40%) cases had improvement by 1 grade Ayse Cigdem et al3 found that of the 185 patients studied ,147(79.1%) with a C&L score improved by one or two grades with Truview EVO2 blade. The 50 of all patients 26.7% with C&L scores of grade 3 or 4 after a Macintosh laryngoscopy improved by atleast one grade with the Truview.

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Yasir Khan4 in their study found that Truview improved the C&L grading by a mean of 2 grades while POGO scoring was a high 85% vs 2.9% in Truview and Ma-cintos-hrespe-ctively-.Mats-moto5 reported the use of Truview video laryngoscope in 2 patients with difficult airways and found improved laryngoscopic view and successfully intubated with help of gum elastic bougie.

Although the Truview EVO2 laryngoscope may provide a better view of the larynx than the standard Macintosh blade,the addition of the optic port increases the overall size and weight of the blade. Consequently ,it may be more difficult to insert in patients who have only limited mouth opening. The Truview scope improves the laryngeal view,but the oropharyngeal and the laryngeal axes are not aligned so intubation may not be easy.Since it utilizes the principle of optics ,in situations where there are lots of secretions or bleeding, visualization of vocal cord may not be possible.

As the Truview utilizes the principle of indirect laryngoscopy ,visualization of the vocal cord may be done without manipulation of the head and neck.so its of great use in clinical situations where neck manipulations are not advisable(e.g.patients with unstable cervical spine.

M .A.Malik6 in their study found that the glidescope and airwayscopes required more time but reduced intubation difficulty and improved glottis view over the Macintosh laryngoscope more than the Truview EVO2 when used in patients going cervical spine immobilization .

Miceli L7 found that the Truview EVO2 blade allowed the best laryngeal view as judged by C&L grade in two separate situations,under simulated tongue inflation and under simulated neck rigidity.

Lieberman8,M.Maroof9 reported that the Truview optical laryngoscope significantly improved the laryngeal view grades while using significantly less force .It therefore can be used in patients with hypertension and ischemic heart disease without producing a severe hemodynamic response.The force used in laryngoscopy was however not compared in our study.Since the force used during laryngoscopy with the Truview is considered to be lesser than the Macintosh there is less chance of bleeding and soft tissue damage.M.Barak10 found no significant difference in the anesthetists estimation of intubation effort ,tooth damage or post operative stridor and hoarseness. In our study there were no complications like bleeding or trauma to the oropharyngeal structures with either blade.

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