

# A Comparison Between Airtraq Optical Laryngoscope and Conventional Macintosh Laryngoscope for Intubation in Adult Surgical Patients: A Prospective Randomized Controlled Study

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## Abstract

Tracheal intubation using a laryngoscope is considered as a gold standard <sup>1</sup> of airway management during administration of general anesthesia and also in critical care settings because of its several advantages including <sup>2,3</sup> - Isolation of respiratory tract from Gastro intestinal system and hence minimal risk of aspiration. Allows delivery of oxygen and anaesthetic gases via positive pressure ventilation without inflation of stomach. Access to tracheobronchial tree for pulmonary lavage and drug administration (e.g. inhaled bronchodilators). Improved access to head and neck surgeries. Airway management is important for anesthesia because adverse respiratory events are responsible for 75% of ASA closed claims. Of these failed ventilation is the main culprit (38%), followed by faulty placement of endotracheal tube in esophagus (17%) and difficult intubation (18%). Approximately 600 patients die each year in the developed world from complications due to airway management and also in the underdeveloped world is much grimmer.<sup>4,5,6</sup> *Context:* We compared tracheal intubation using airtraq optical laryngoscope with macintosh laryngoscope in adult patients undergoing elective procedures under general anesthesia *Aims:* This study is to compare the intubating conditions in adult surgical patients using airtraq optical laryngoscope with macintosh laryngoscope with respect to ease of intubation, time taken for intubation, airway trauma and hemodynamic response to laryngoscopy. *Settings and Design:* Prospective randomised interventional study. *Materials and Methods:* This study was done in Sree Balaji Medical College and Hospital, Chennai at Department of Anaesthesiology and Critical Care from August 2016 to February 2018. It was a Single centre, prospective, randomized, parallel group, open label, interventional controlled study. After obtaining institutional ethical committee approval. 60 patients (sample size) who were posted for elective surgery requiring general anesthesia (Recruitment) with satisfying inclusion criteria were enrolled in the study after obtaining informed consent from the patients and relatives. 2 groups by random number allotted by computer based randomization *Statistical Analysis:* Descriptive and inferential statistical methods were used. *Results:* Mean duration of intubation with the Airtraq group was 15.93 secs whereas in the Macintosh group it was found to be 38.70 secs. It was computed using Levene's T test and was found to be statistically significant. In the Macintosh group, 4 patients had an Total IDS of 5 or greater, indicating moderate to severe intubation difficulty, whereas no patient in the Airtraq group had an Total IDS of more than 3 and was found to be statistically significant. *Conclusion:* Our study concludes that endotracheal intubation is easier with Airtraq compared to Macintosh laryngoscope as it provides good glottis view. In addition to that Airtraq have less intubation duration, less hemodynamic response for intubation and less Airway trauma compared to Macintosh.

**Keywords:** Macintosh; Airtraq; Laryngoscope; Intubation; Airway.

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## Introduction<sup>7</sup>

Airway management has been the domain of dominance for anesthesiologists over ages.

Laryngoscopy and intubation are the fundamental skills that every clinician aspires to learn and practice. The most frequent end point for almost all the studies was the ease of intubation along with ability to minimize the sympathetic response to tracheal instrumentation. Airtraq is a recently developed laryngoscope which facilitates easy visualisation of glottis through matrix of sequentially arranged lenses and mirror.

## Materials and Methods

This study was done in Sree Balaji Medical College & Hospital, Chennai at Department of Anaesthesiology and Critical Care from August 2016 to February 2018.

It was a Single centre, prospective, randomized, parallel group, open label, interventional controlled study.

After obtaining institutional ethical committee approval. 60 patients (sample size) are posted for elective surgery requiring general anesthesia (Recruitment) with satisfying inclusion criteria were enrolled in the study after obtaining informed consent from the patients and relatives.

Randomization: 2 groups by random number allotted by computer based randomization.

*Allocation and intervention:* 2 groups

*Group A:* 30 Patients –airtraq optical laryngoscope

*Group B:* 30 Patients –conventional macintosh laryngoscope

### Inclusion Criteria

- ASA 1 & 2 patients
- Age 18-65 years, both sexes
- Elective surgical cases requiring GA
- MPC 1, 2, & 3 patients

### Exclusion Criteria

- Severe CVS, RS, hepatic, renal disease patients
- Any valvular, conduction abnormality, IHD, Hypertensive patients
- Patients on antihypertensive drugs or beta blockers

- Anticipated difficult airway patients
- BMI more than 40
- Patient refusal

### Material

- Airtraq optical laryngoscope adult size
- Macintosh laryngoscope 3 & 4 size blade

### Airway Assessment<sup>3,8,9,10</sup>

Previous surgery and anesthesia records, H/O snoring, H/O voice change, H/O previous surgery, Burns, Trauma, Tumour in and around the oral cavity, neck or cervical spine were asked in the history. H/O systemic illness like Hypertension, Diabetes, Ankylosing spondylitis, Rheumatoid arthritis were asked and recorded. General examination included examination for facial anomalies, Anomalies of the mouth, Temporomandibular joint pathology, and tongue, pathology of palate and pathology of nose. Weight in kilograms and Height in centimeters were recorded and Body Mass Index was calculated. Individual airway indices were measured.

### Samson and Young modification of Mallampatti grading:<sup>9</sup>

The patient kept in sitting position with maximal mouth opening with protruding tongue, without phonation and the observer's eye in level with patient's mouth and the degree to which the faucial pillars, uvula, soft palate, and hard palate were visible were recorded and classified as follows:

*Grade I:* Faucial pillars, uvula, soft palate and hard palate visible

*Grade II:* Uvula, soft palate and hard palate visible

*Grade III:* Base of uvula or none, soft palate and hard palate visible

*Grade IV:* Only hard palate visible.

### Thyromental distance

Distance between the thyroid notch and mental symphysis when the neck is fully extended and mouth closed (>6.5 cm or < 6.5 cm)

### Other ways of airway assessment

*A-O joint movement:* Patient asked to look at the ceiling without raising the eyebrow and the range of movements were measured

*Neck flexion:* Patient was asked to touch the manubrium sternum with chin and the range of movements measured.

*TMJ function:* The patient was asked to open the mouth wide open and the inter incisor distance measured. Examiner's index finger was placed in front of the tragus and thumb over the mastoid process and the patient was asked to open the mouth and sliding movement of the mandibular condyle was assessed.

*Upper lip bite test:* The patient was asked to bite the upper lip with the lower incisor and graded as follows:

Class 1: Lower incisor can bite the upper lip above the vermilion line

Class 2: Lower incisor can bite the upper lip below the vermilion line

Class 3: Lower incisor cannot bite the upper lip

*Sterno mental distance:* Distance between the sternal notch and mental symphysis when the neck was fully extended and mouth closed.

*Neck circumference:* Measured in cm at the level of thyroid notch.

*Examination of dentition:* Abnormalities like cracking, buck tooth, loose, artificial and absence of incisors were examined and recorded.

### Procedure

After assessment patient shifted to operating room. i.v line started and SpO<sub>2</sub>, ECG, NIBP and ETCO<sub>2</sub> (After intubation) monitors connected.

*Premedication:* 0.2 mg glycopyrrolate, 2 mcg/kg fentanyl iv route 10 mins before Induction.

*Preoxygenation:* with 100% O<sub>2</sub> for 3mins at tidal volume respiration

*Base line:* SpO<sub>2</sub>, HR, Systolic BP, Diastolic BP, MAP was noted

*Induction:* 2.5 mg /kg propofol

*Relaxant for intubation:* 0.5 mg/kg induction dose of atracurium 0.1 mg/kg maintenance dose of atracurium

*Intubation:* airtraq/macintosh laryngoscopy according to the group

*Monitoring:* SPO<sub>2</sub>, HR, Systolic BP, Diastolic BP, MAP at 3<sup>rd</sup>, 5<sup>th</sup>, 10<sup>th</sup> minute.

### Outcome Measures

#### Primary measures

- Ease of intubation assessed by IDS score

#### Secondary measures

- Haemodynamic response
- Airway trauma
- Intubation time

#### Intubation Difficulty Score:<sup>3,11,12</sup>

Intubation difficulty score was used to evaluate intubating performance of laryngoscopy. IDS scoring was developed by adnet *et al.* in 1997. IDS score is a blend of objective and subjective criteria that permit a quantitative and qualitative approach to the progressive nature of the difficulty in intubation. It appears to be the best indicator till date.

7 variables are used.

*N1* - No of supplementary attempts. An attempt is defined as one advancement of tracheal tube in the direction of the glottis during direct laryngoscopy. (for Attempt 1/2/3/4, N1 Score is 0/1/2/3)

*N2* - No of supplementary operators directly operating (not assisting) (for operators 1/2/3/4, N2 Score is 0/1/2/3)

*N3* - No: of alternative techniques used. (each additional techniques like oral intubation to blind nasotracheal intubation, curved blade to straight blade etc N3 Score is 1 or more)

*N4* - Cormack Lehane grade minus one. (for CLG 1/2/3/4, N5 Score is 0/1/2/3)

*N5* - Subjectively increased lifting force required during laryngoscopy. (for normal N 5=0, for increased N 5=1)

*N6* - Need for external laryngeal manipulation (for not required N6=0, for required N6=1)

*N7* - Position of vocal cords.(N7 Score 0 for abduction, 1 for adduction)

Total IDS Score = sum of scores (N1 to N7)

#### IDS Score Degree of difficulty

0 - Ease

1 to 5 - Slight difficulty

> 5 - Moderate to major difficulty

Infinitive - Impossible intubation

In this scoring the value of IDS is '0' in full visual view of glottic opening with vocal cords are seen to be nicely abducted. Every variation from this defined 'ideal' intubation increases the scoring that indicate increasing difficulty of intubation. The total IDS score being the sum of all variation from the definition.

**Cormack and Lehane Grading System:**<sup>9,13</sup>

- Entire vocal cord visualized - Grade I
- Posterior part of vocal cords seen - Grade IIa
- Arytenoids only seen - Grade IIb
- Epiglottis only seen (liftable) - Grade IIIa
- Tip of epiglottis only seen (adherent) - Grade IIIb
- No glottis structure seen - Grade IV

Apart from Cormack-Lehane and Intubation Difficulty Score, the following factors were also noted.

- *Intubation time:* It measured from entry of the device into the oral cavity until confirmation of proper placement of tracheal tube.

- *Heart rate, systolic BP, diastolic BP, mean arterial pressure and SPO<sub>2</sub>* were measured at 3<sup>rd</sup>, 5<sup>th</sup> & 10<sup>th</sup> minute from pre induction.

- *Airway trauma:* All complications will be recorded, with special attention to common complications such as upper airway, dental trauma and blood soiling of airtraq or macintosh blade after intubation. If intubation with Airtraq failed and saturation maintained, Macintosh blade was used for intubation and if the saturation decreased, mask ventilation with 100% oxygen followed by intubation with Macintosh laryngoscope.

**Results**

All data were collected and tabulated.

**Table 1: Age**

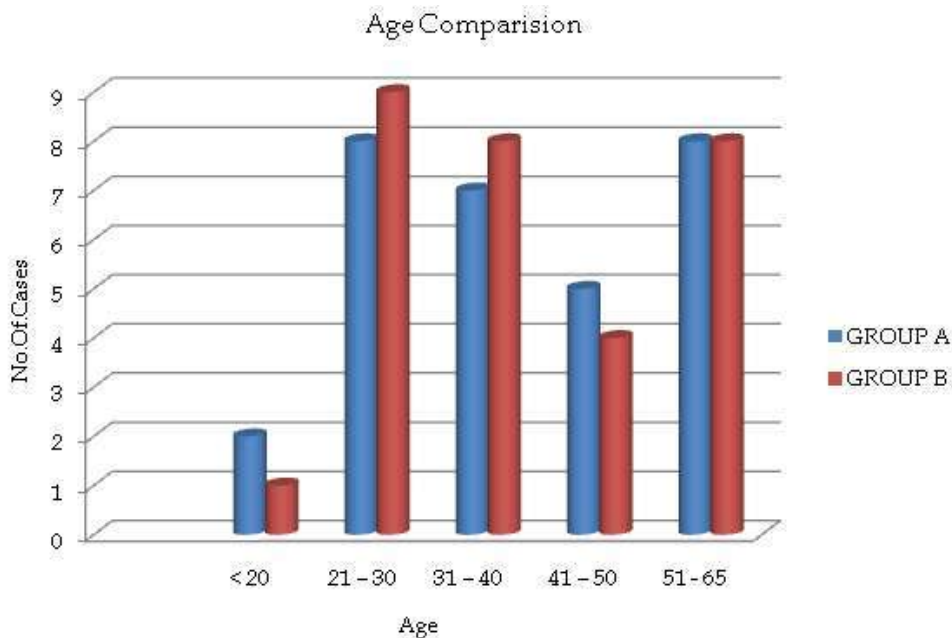
Age (in years)	Group A	%	Group B	%	p-value
< 20	2	07	1	03	0.092
21-30	8	27	9	30	
31-40	7	23	8	27	
41-50	5	17	4	13	
51-65	8	27	8	27	
Total	30	100	30	100	

**Table 2: Gender**

Gender	Group A	%	Group B	%	p-value
Male	18	60	16	53	0.524
Female	12	40	14	47	
Total	30	100	30	100	

**Table 3: BMI Distribution**

BMI	Group A		Group B		p- Value
	No	%	No	%	
< 18.5	4	13	3	10	0.001
18.5 – 24.9	10	33	11	37	
25 – 29.9	12	40	11	37	
> 30	4	13	5	17	
Total	30	100	30	100	



**Fig. 1:** Comparison of age in both groups

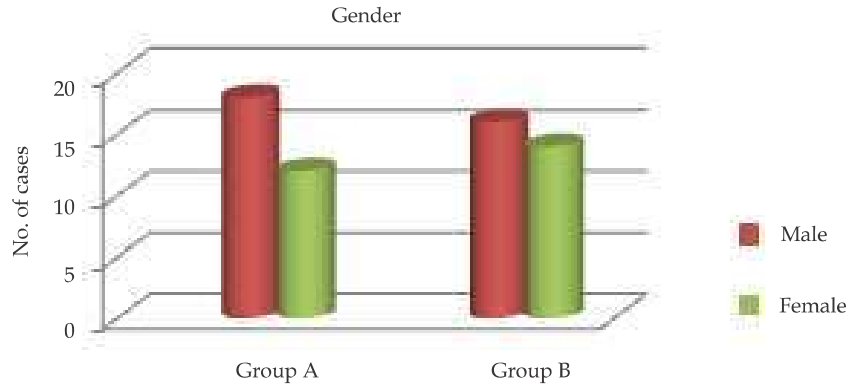


Fig. 2: Comparison of sex distribution in both groups

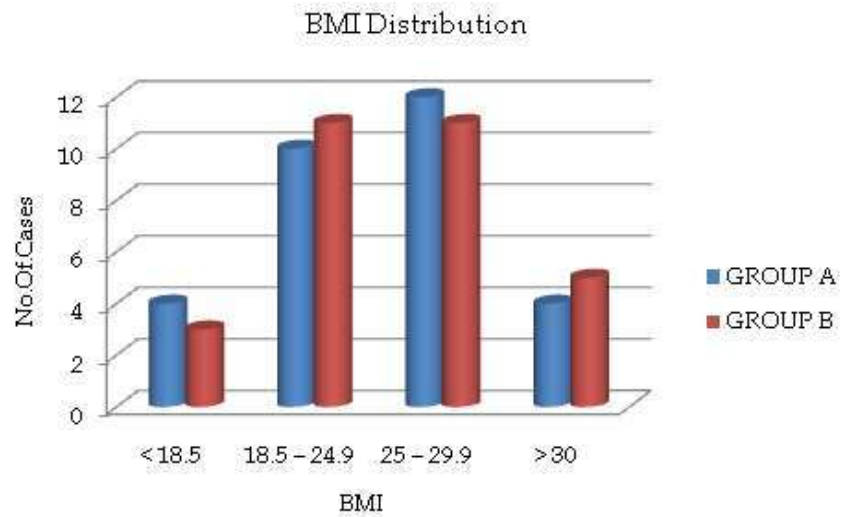


Fig. 3: Comparison of BMI distribution in both groups

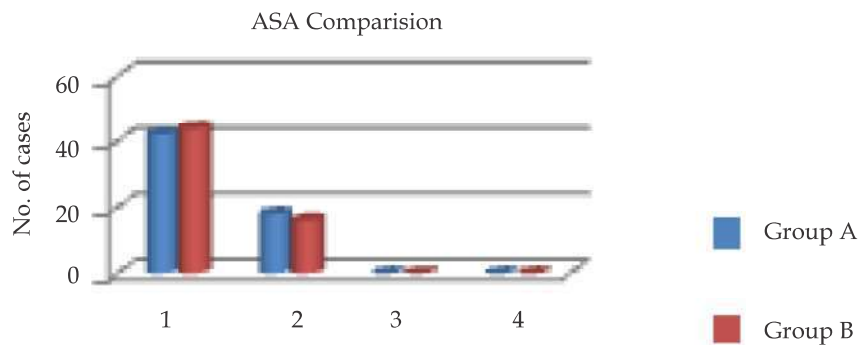


Fig. 4: Comparison of ASA distribution in both groups

Table 4: ASA

ASA Grade	Group A		Group B		P Value
	No	%	No	%	
1	21	70	22	73	0.0648
2	9	30	8	27	
3	0	00	0	00	
4	0	00	0	00	
Total	30	100	30	100	

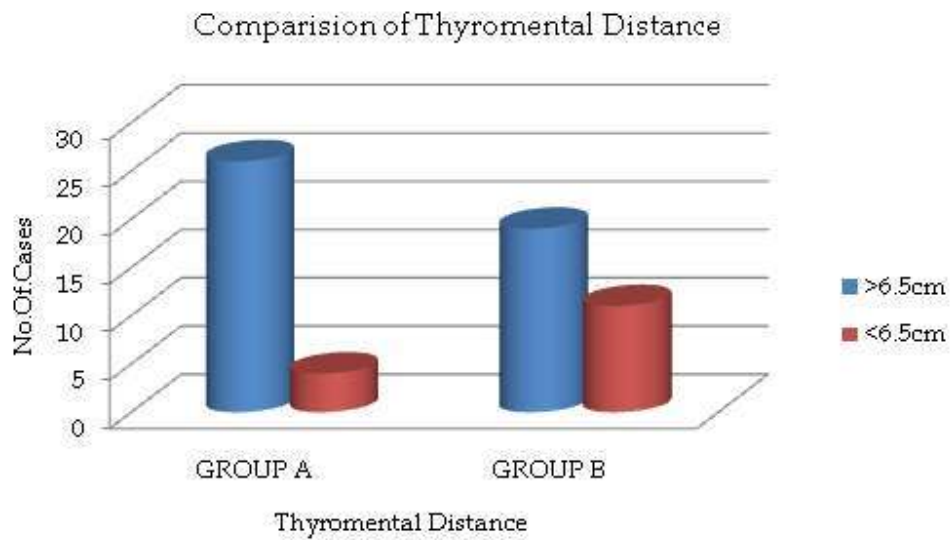
Table 5: Comparison of Thyromental Distance

Parameter Assessed	Group A		Group B		P Value
	No	%	No	%	
>6.5 cm	26	87	19	63	0.524
<6.5 cm	4	13	11	37	
Total	30	100	30	100	

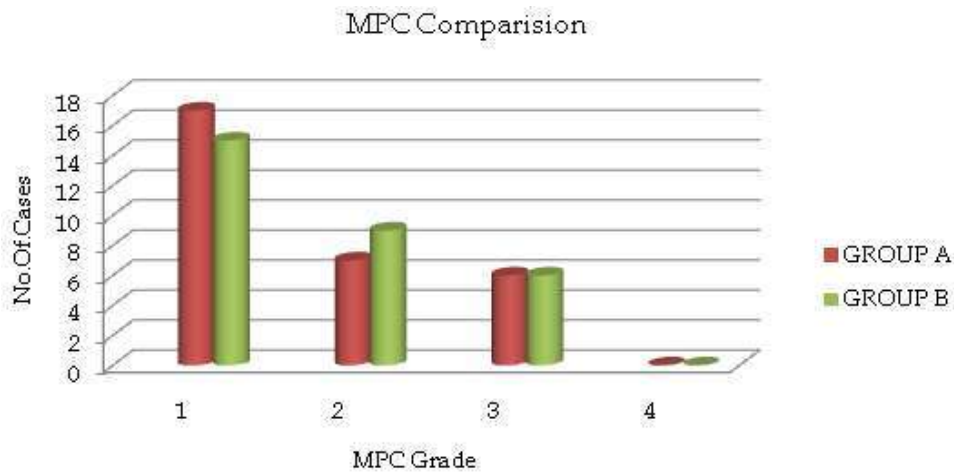
**Table 6:** Comparison of MPC

MPC Grade	Group A		Group B		P Value
	No	%	No	%	
1	17	57	15	50	0.534
2	7	23	9	30	
3	6	20	6	20	
4	0	00	0	00	
Total	30	100	30	100	

Among the total cases, In Group A, 57% belong to the MPC Grade 1, 23% belong to the MPC Grade 2, 20% belong to the MPC (Table 6)



**Fig. 5:** Comparison of thyromental distance in both groups



**Fig. 6:** Comparison of MPC grading in both groups

**Table 7:** Comparison of IDS

Total Intubation Difficulty Score	Group A		Group B		P Value
	No	%	No	%	
0	25	83.3	20	66.8	0.000
1	0	0	0	0	
2	3	10.0	4	13.3	
3	2	6.7	4	13.3	
4	0	0	0	0	
5	0	0	1	3.3	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	1	3.3	
Total	30	100	30	100	

Among the cases, the following IDS parameters were observed.

All the patients in airtraq group intubated in single attempt, in macintosh group 3 patients out of 30 intubated in 2<sup>nd</sup> attempt. (N1)

All the patients in both groups intubated by single operators. No need supplementary operators. (N2)

All patients in airtraq group intubated without using additional techniques. But in macintosh group 4 patients out of 30 required additional techniques like changing blade, using stylet and using gum elastic bougie. (N3)

Cormack and Lehane grade 1/2/3/4 found in airtraq group 17/3/0/0 patients, in macintosh 10/6/2/2 patients. (N4)

Lifting force required in 5 Out 30 patients in macintosh group, only one patient out of 30 in airtraq group. (N5)

Laryngeal pressure applied in 10 out of 30 patients in macintosh group, 3 out of 20 patients in airtraq group. (N6)

In all patients of both groups vocal cord mobility were in abduction. (N7)

3 patients in the Airtraq group had an Total IDS of more than 1, whereas 10 patients in the Macintosh group had an Total IDS of 1 or greater. In the Macintosh group, 4 patients had an Total IDS of 5 or greater, indicating moderate to severe intubation difficulty, whereas no patient in the Airtraq group had an Total IDS of more than 3. This was computed based on Levene’s T test for equality of variances and the result was found to be statistically significant with a *p* value of 0.0011 (Table 7).

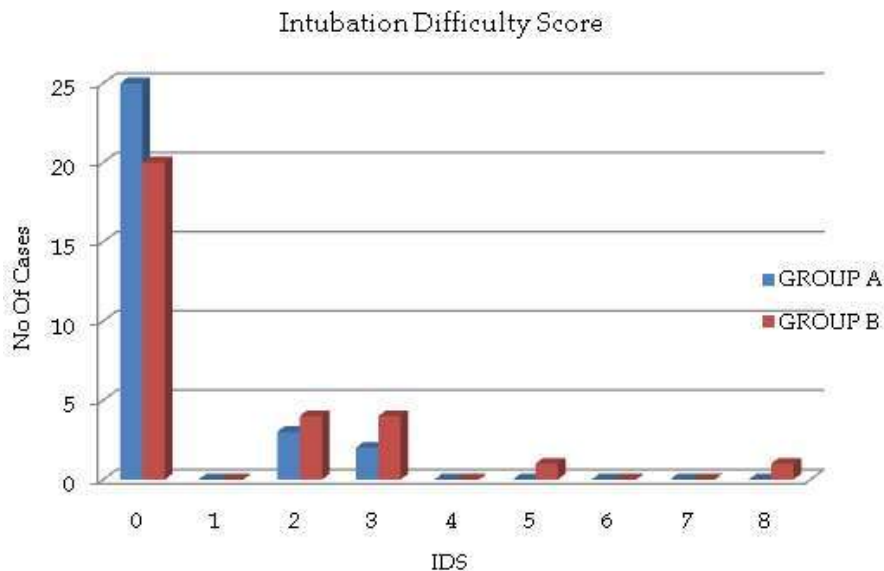
**CORMACK and LEHANE grading:**

Cormack and Lehane grade of both the group of patients were compared to grade the glottic view.

85% of patients in the Airtraq group had a CL grade of 1, compared to 50% of patients in the Macintosh group.

In the Airtraq group 15% of patients had a CL grade of 2 compared to 30% of patients in the Macintosh group.

No patient in the Airtraq group had a CL grade of 3 or 4, whereas in the Macintosh group 10% patients had a CL grade of 3 and 10% patients had a CL grade of 4 (Table 8).



**Fig. 7:** Comparison of total IDS score in both groups

**Table 8:** Comparison of Cormack and lehane grading in both groups

Group	Airraq	Macintosh	P Value	
CL 1	27	90	16	53
CL 2	3	10	9	30
CL 3	0	00	3	10
CL 4	0	00	2	07
Total	30	100	30	100

**Table 9:** Duration of Intubation

Parameter assessed	Group	N	Mean	S.D	P value
Intubation time	Airraq	30	15.93	2.55	0.000
	Macintosh	30	38.70	15.81	

Mean duration of intubation with the Airraq group was 15.93 secs whereas in the Macintosh group it was found to be 38.70 secs. It was computed using Levene’s T test and was found to be statistically significant (Table 9).

**Table 10:** Comparison of Airway Trauma

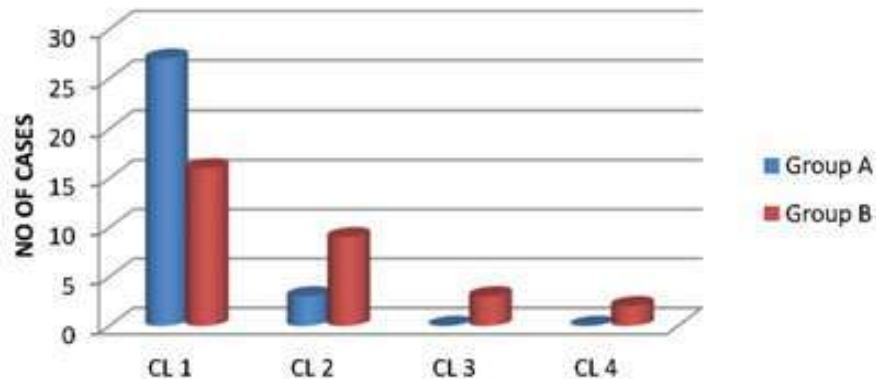
Parameter assessed	Group	Lips	Gums	Teeth	Tongue
Airway Trauma	Airraq	2	1	3	2
	Macintosh	5	4	8	5

No trauma in laryngeal structures were found in both the groups (Table 10).

**Hemodynamic Changes**

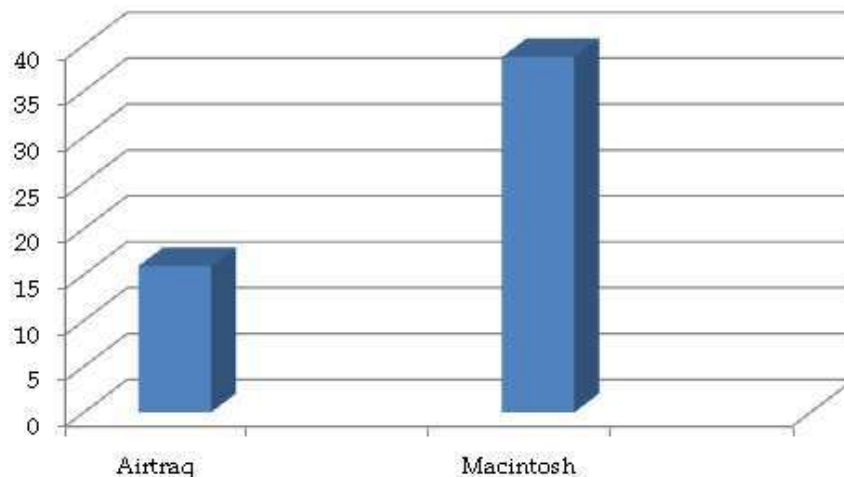
The heart rate, blood pressure and SpO<sub>2</sub> of the patients were measured baseline, aft intubation, after 3 minutes and 5 minutes and after 10 minutes post intubation and the values were computed by Chi - square test and it was found that the tracheal intubation with Macintosh laryngoscope resulted in a significant increase in heart rate, systolic, diastolic and MAP, compared with preintubation values, in contrast to the Airraq (Table 11).

**Comparison of Cormack and Lehane Grading**



**Fig. 8:** Comparison of cormack and lehane grading in both groups

**Duration of Intubation Time**



**Fig. 9:** Comparison of intubation duration in both groups



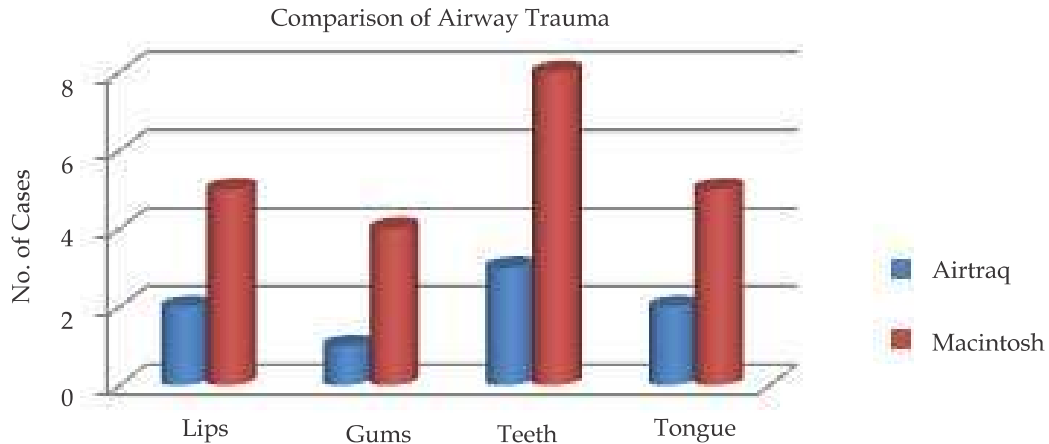


Fig. 10: Comparison of airway trauma in both groups

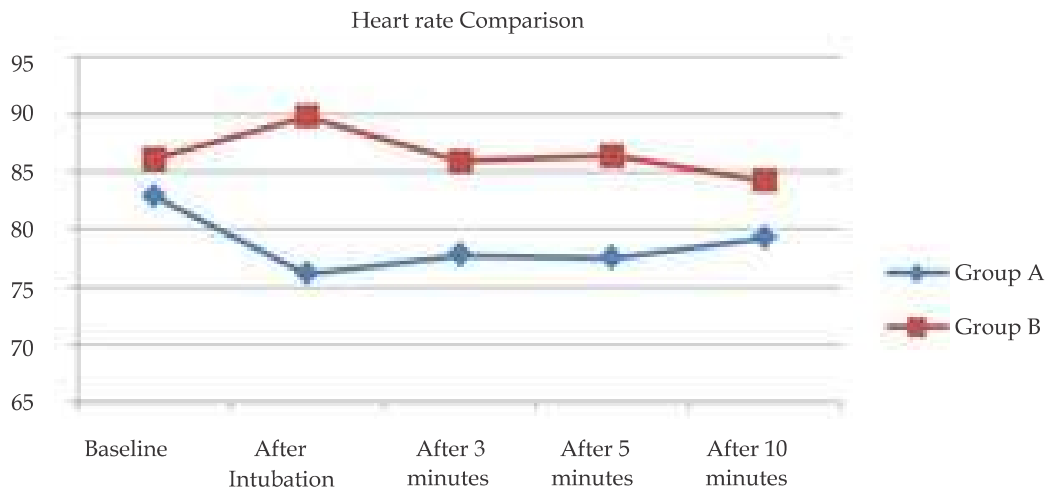


Fig. 11: Comparison of heart rate in both groups

Table 11: Heart Rate Comparison

Variables	Group A		Group B		p - value
	Range	Mean ± SD	Range	Mean ± SD	
Baseline	60 - 112	82.9 ± 12.23	63 - 110	86.20 ± 12.70	0.541
After intubation	54 - 104	76.17 ± 10.27	70 - 118	89.87 ± 3.31	0.000
After 3 minutes	55 - 105	77.80 ± 11.40	60 - 124	85.97 ± 12.25	0.002
After 5 minutes	55 - 110	77.50 ± 11.90	65 - 127	86.43 ± 12.41	0.004
After 10 minutes	60 - 95	79.27 ± 8.87	62 - 106	84.27 ± 10.02	0.217
Grand Mean					
p-value			0.001		

Table 12: Systolic Blood Pressure

Variables	Group A		Group B		p - value
	Range	Mean ± SD	Range	Mean ± SD	
Baseline	104 - 160	127.07 ± 14.52	101 - 148	123.43 ± 10.62	0.512
After intubation	90 - 169	125.37 ± 17.95	100 - 180	139.87 ± 18.33	0.025
After 3 minutes	83 - 160	114.33 ± 15.11	102 - 174	126.21 ± 18.55	0.004
After 5 minutes	87 - 162	115.57 ± 15.71	102 - 176	127.23 ± 18.52	0.023
After 10 minutes	92 - 164	124.73 ± 15.61	104 - 179	127.20 ± 13.52	0.287
Grand Mean					
p-value			0.014		

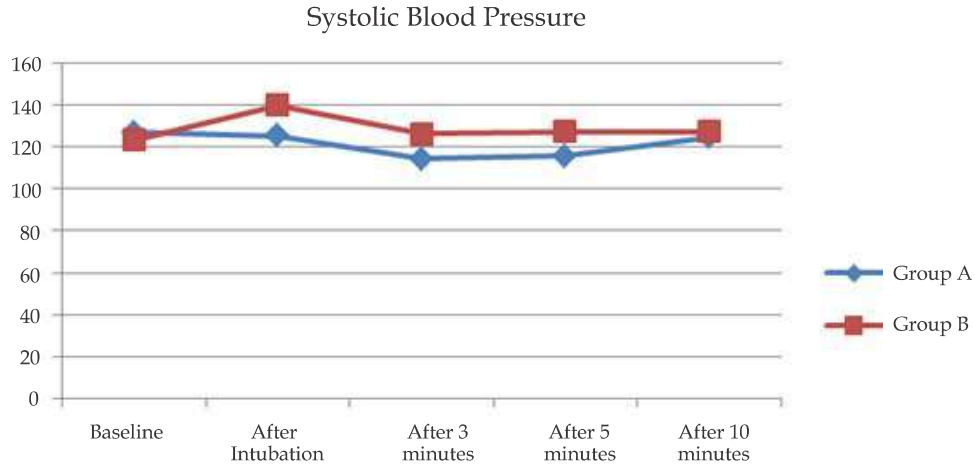


Fig. 12: Comparison of systolic blood pressure in both groups

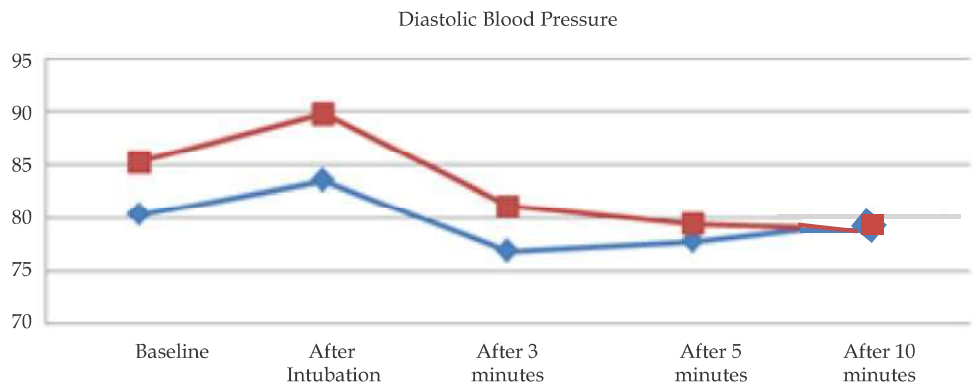


Fig. 13: Comparison of diastolic blood pressure in both groups

Table 13: Diastolic Blood Pressure

Variables	Group B		Group N		p - value
	Range	Mean ± SD	Range	Mean ± SD	
Baseline	62 - 100	80.3 ± 9.24	53 - 107	85.27 ± 12.16	0.254
After intubation	57 - 109	83.53 ± 12.35	60 - 116	89.73 ± 12.51	0.021
After 3 minutes	60 - 100	76.88 ± 9.44	57 - 100	81.14 ± 12.55	0.001
After 5 minutes	58 - 105	77.76 ± 11.84	56 - 98	79.44 ± 12.41	0.019
After 10 minutes	51 - 100	79.70 ± 11.65	60 - 97	78.87 ± 10.92	0.341
Grand Mean					
p-value	0.000				

Table 14: Mean Arterial Pressure Comparison

Variables	Group A		Group B		p - value
	Range	Mean ± SD	Range	Mean ± SD	
Baseline	62 - 100	80.3 ± 9.24	53 - 107	85.27 ± 12.16	0.254
After intubation	57 - 109	83.53 ± 12.35	60 - 116	89.73 ± 12.51	0.021
After 3 minutes	60 - 100	76.88 ± 9.44	57 - 100	81.14 ± 12.55	0.001
After 5 minutes	58 - 105	77.76 ± 11.84	56 - 98	79.44 ± 12.41	0.019
After 10 minutes	51 - 100	79.70 ± 11.65	60 - 97	78.87 ± 10.92	0.341
Grand Mean					
p-value	0.014				

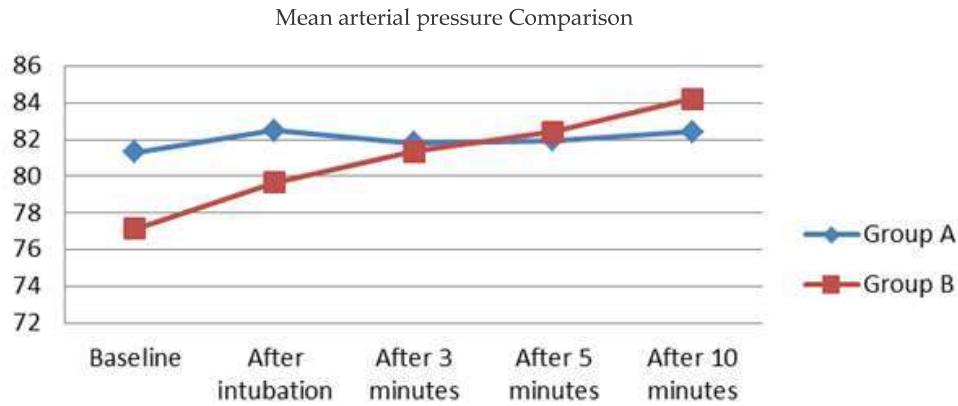


Fig. 14: Comparison of mean arterial pressure in both groups

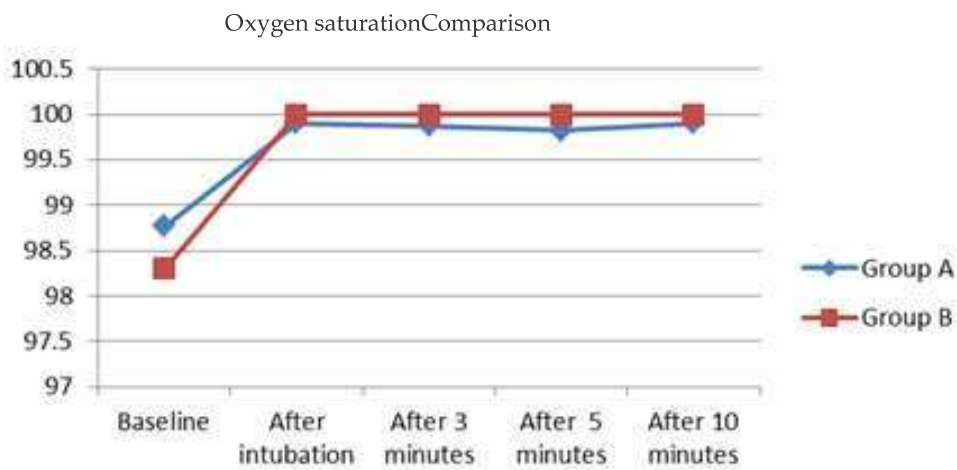


Fig. 15: Comparison of oxygen saturation in both groups

Table 15: Oxygen Saturation Comparison

Variables	Group A		Group B		p - value
	Range	Mean ± SD	Range	Mean ± SD	
Baseline	97 - 100	98.77 ± 0.94	81 - 100	98.3 ± 3.38	0.458
After intubation	98 - 100	99.90 ± 0.55	100 - 100	100 ± 0	0.524
After 3 minutes	97 - 100	99.87 ± 0.55	100 - 100	100 ± 0	0.264
After 5 minutes	97 - 100	99.82 ± 0.55	100 - 100	100 ± 0	0.365
After 10 minutes	97 - 100	99.90 ± 0.41	100 - 100	100 ± 0	0.527
p-value					0.0681

However, SpO<sub>2</sub> changes in the pre and post intubation periods in both the groups was not statistically significant.

### Discussion

Expert airway management is an essential skill for anesthesiologist. Difficult endotracheal intubation is mostly caused by difficult direct laryngoscopy with impaired view of vocal cords. Despite all the information currently available, no single factor reliably predict these difficulties. Unfortunately

many difficult intubations are not be recognized until after induction of anesthesia. Unexpected difficult intubation lead to critical situation, especially who are difficult to ventilate by mask, who are at risk for gastric regurgitation and patients with limited cardiopulmonary reserves.

When a person in supine position and head in the neutral position, the laryngeal axis is almost horizontal. The pharyngeal axis is 30-45° from the horizontal axis and the oral axis almost perpendicular to the laryngeal axis. For a successful direct laryngoscopy for the exposure of the glottis

opening, the oral, pharyngeal and laryngeal axes alignment is required. Elevation of the head about 10cm with pads below the occiput aligns the laryngeal and pharyngeal axes<sup>14</sup>

Conventional macintosh laryngoscopy fails to get desired laryngeal view in patients with difficult airway like short neck, anteriorly placed larynx, small jaw, MPC 3 & MPC 4 patients, cervical spine immobilization needed patients etc. But reports said that airtraq have shown improvement in laryngeal view and ease of intubation in normal and difficult airway patients<sup>15</sup>

The advantages of airtraq optical laryngoscope from the available literatures are<sup>15</sup>

1. Airtraq does not need alignment of the axes to improve intubating condition because the axis of airtraq is curved and the image is transmitted through lenses and mirrors.
2. Airtraq is useful in patients with altered airway and magill's position contraindicated patients.
3. The displayed anatomy is magnified in proximal viewfinder.
4. The anatomical structure and anomalies are easily viewed with help of airtraq.
5. Airtraq associated with less hemodynamic changes due to less manipulation of the airway and only clockwise or anticlockwise movement and upwards or downwards movement was required, not the lifting movement as in macintosh laryngoscope.
6. Airtraq significantly reduces the duration of intubation.
7. A clip on wireless video system is also available in airtraq which allows viewing on an external screen. It is also useful for teaching purposes.
8. Shortens the endotracheal intubation learning curve in novice personnel.
9. Channel loading type of video laryngoscope example Airtraq optimal laryngoscope provides perfect visualization of larynx yet may result in failure of endotracheal intubation<sup>17</sup>.
10. When insufficient visualization occurs the airtraq may be used to open an airway path. Insert Fibreoptic bronchoscope with an endotracheal tube either in channel or ext to the device and direct it towards the epiglottis.
11. We too have employed this combined technique in both adult and paediatric patients in difficult airway.<sup>16,17</sup>

12. Many compared the degree of cervical spine movement in laryngoscope performed using airtraq and conventional macintosh laryngoscope. Although significant movement of cervical spine from baseline was noted during all procedure ( $p < 0.05$ ), cervical spine extension with airtraq was 29% less than measured during macintosh laryngoscopy between occiput and c4 and 44% less at the c3/c4 motion segment. Anterior deviation of the vertebral bodies from baseline were 32%, 35%, 38% and 40% less at the atlas, c2, c3 and c4 vertebrae respectively during airtraq laryngoscopy ( $p < 0.01$ ).
13. Some study also demonstrated that laryngoscopy using the airtraq laryngoscope involves less movement of cervical spine compared to conventional procedure using macintosh laryngoscope.<sup>18</sup>
14. Videolaryngoscope are new intubating device which provide an indirect view of the upper airway in difficult airway management, they improves Cormack-Lehane grade and achieve the same or a higher intubation success rate in less time compared with direct laryngoscope.<sup>18</sup>

It was generally easy to insert the airtraq in to the oral cavity, to obtain a full view of the laryngeal aperture and to intubate the endotracheal tube into the trachea without major complication. In airtraq the endotracheal tube can be attached to the side of the blade and the tip of the ET tube is visible on the proximal viewfinder. Once laryngeal aperture was positioned in the centre of the proximal viewfinder, it was easy to introduce the ET tube into the trachea.

Eventhough we have a good view of glottis there was difficulty in negotiating the ET tube into the trachea, that result in prolonged intubation. The back and up maneuver or clockwise or anticlockwise movement of airtraq was needed to introduce the ET tube into the trachea.

## Summary

In our study Airtraq laryngoscopy had less intubation difficulty score than macintosh laryngoscopy. Airtraq had less Cormack and Lehane grading, less intubation duration, less airway trauma and less hemodynamic response for intubation than Macintosh.

## Conclusion

Our study concludes that endotracheal intubation is easier with Airtraq compared to Macintosh laryngoscope as it provide good glottis view. In addition to that Airtraq have less intubation duration, less hemodynamic response for intubation and less Airway trauma compared to Macintosh. Airtraq laryngoscope significantly improve the view of glottic opening and facilitates fast, easy and reliable intubation. Airtraq reduce the need of more sophisticated and complex airway instrument like flexible fibreoptic bronchoscope to a particular extent. It can also be useful in routine anesthesia management, in critical care, anticipated, unanticipated airway situations. Due to less hemodynamic response for laryngoscopy for airtraq may have advantage in clinical situation like coronary artery disease or cardiac arrhythmias and neuro surgery patients.

**Conflict of Interest:** None

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