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Original Research Article

To compare the use of Indirect (Airtraq) laryngoscope versus the direct (Macintosh) laryngoscope blade for routine airway management

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Abstract:
Background & Method: The aim of the study is to compare the use of Indirect (Airtraq) laryngoscope versus the direct (Macintosh) laryngoscope blade for routine airway management. Direct laryngoscopy is carried out (usually) with the patient lying on his or her back; the laryngoscope is inserted into the mouth on the right side and flipped to the left to trap and move the tongue out of the line of sight, and, depending on the type of blade used, inserted either anterior or posterior to the epiglottis and then lifted with an upwards and forward motion. This move makes a view of the glottis possible.
Result: Independent T-test was applied. P value > 0.05 shows no statistically significant difference among two Groups (P value 0.418). In Group A, Mean Thyromental distance was 7.07±0.44, while In Group M Mean Thyromental distance was 6.99±0.42. The two Groups were comparable in relation to Mean Thyromental distance as were evident from the above table showing no significant difference giving a P value 0.418.
Conclusion: The group A patients showed insignificant increase in heart rate as compared to significant increase in group M patients in response to respective mode of laryngoscopy. No significant increase in mean blood pressure was found in both the groups A and M. Both the groups showed no statistically significant difference in postoperative complications. Therefore considering above mentioned findings, it can be concluded that indirect laryngoscope (Airtraq) is a superior device than the conventional direct laryngoscope (Macintosh).

Keywords: Airtraq, laryngoscope blade & airway management.

Study Designed: Randomized Comparative study.

1. Introduction

The history of tracheal intubation techniques dates back to 18th century. Intubating the trachea and securing the airway remains a challenge although it is a routine practice for the anesthesiologist. Failure to successfully intubate the trachea remains a leading cause of

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morbidity and mortality in anesthetic and emergency setting [1-5].Despite various innovations and numerous developments in the airway devices, the Macintosh laryngoscope [6] (1943) remains the most frequently used device for orotracheal intubation since 1943. With Macintosh laryngoscopy, it is important to align the oral, laryngeal and tracheal axes to obtain the direct view of the glottic aperture to facilitate tracheal intubation. It is considered to be the "gold standard" for endotracheal intubation and it is against this device that the various airway devices are evaluated [6]. The indirect (Airtraq 2005) laryngoscope is a recently developed video laryngoscope for use in patients with normal or difficult airways. The curvature of the indirect laryngoscope (Airtraq) blade and the special internal arrangement of the optical components allow visualization of the glottic plane without alignment of the oral, pharyngeal, and tracheal axis. The resultant indirect laryngeal exposure may require less movement of the cervical spine as compared to conventional Macintosh laryngoscopes.

The aim of this study was to evaluate and compare the Indirect laryngoscope (Airtraq) and direct (Macintosh) laryngoscope for success rate of tracheal intubation, overall duration of intubation, intubation difficulty score, optimization maneuvers, POGO (percentage of Glottic opening) score, haemodynamic changes while insertion of endotracheal tube and post operative complications.

2. Material & Method

This study was conducted on 80 patients undergoing elective surgery under general anaesthesia. After approval of Institutional ethics committee, written informed consent was obtained from all patients. Patients were randomly allocated by computer-generated random tables to one of two Groups comprising 40 patients in each: Group A-indirect laryngoscope (Airtraq) and Group M-Direct (Macintosh) laryngoscope.

In order to conduct the study, the following materials were needed:

- Indirect (Airtraq) laryngoscope
- Direct (Macintosh) laryngoscope
- Endotracheal tube (Appropriate size)
- Xylocaine jelly (2%)

Direct laryngoscopy is carried out (usually) with the patient lying on his or her back; the laryngoscope is inserted into the mouth on the right side and flipped to the left to trap and move the tongue out of the line of sight, and, depending on the type of blade used, inserted either anterior or posterior to the epiglottis and then lifted with an upwards and forward motion ("away from laryngoscopist and towards the roof "). This move makes a view of the glottis possible.

3. Results

Table No. 1: Distribution of patients according to age in both the Groups

Age Group	**Group A-indirect (n=40)**		**Group M-Direct (n=40)**	
	No.	**%**	**No.**	**%**
20-29 years	6	15	6	15

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30-39 years	8	20	13	32.5
40-49 years	12	30	13	32.5
50-65 years	14	35	8	20
Total	40	100	40	100
Mean ± SD (Years)	44.25±13.52		40.85±12.1	
P Value	0.239			

The above table shows the distribution of patients according to age Group.
Independent T-test was applied. P value >0.05 shows statistically no significant difference. In Group A, 6 (15%) patients were there in the age Group 20-29 years, 8 (20%) were there in the age Group 30-39 years, 12 (30%) were there in the age Group 40-49 years and 14 (35%) were there in the age Group 50-65 years. In Group M, 6 (15%) patients were there in the age Group 20-29 years, 13 (32.5%) were there in the age Group 30-39 years, 13 (32.5%) were there in the age Group 40-49 years and 8 (20%) were there in the age Group 50-65 years.

The mean age in Group A was 44.25±13.52 years and in Group M it was 40.85±12.1 years. The difference was found to be statistically not significant (P > 0.05), showing that the mean age in both the Groups was comparable.

Table No. 2: **Distribution of patients according to ASA Grade in both the Groups**

ASA classification	**Group A-indirect (n=40)**		**Group M-Direct (n=40)**		**P value**
	No.	**%**	**No.**	**%**	
ASA classification I	27	67.5	27	67.5	1.000
ASA classification II	13	32.5	13	32.5	
Total	40	100	40	100	

The above table shows the distribution of patients according to ASA Grading.

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Chi square test was applied. P value > 0.05 shows no statistically significant difference in two Groups (P value =1.000). In Group A, 27 (67.5%) patients were in ASA Grade I, while rest 13 (32.5%) were in the ASA Grade II. In Group M, 27 (67.5%) patients were in ASA Grade I, while rest 13 (32.5%) were in the ASA Grade II. Majority of the patients in our study were in the ASA Grade I, in comparison to Grade II.

Table No. 3: Distribution of patients according to Mouth opening (cm)

	Group A-indirect ± SD (n=40)	**Group M-Direct ± SD (n=40)**	**P-value**
Mean Mouth opening (cm)	4.24±0.33	4.23±0.32	0.945

The above table shows the distribution of patients according to mouth opening.

Independent T-test was applied. P value > 0.05 indicated that there was no statistically significant difference among two Groups (P value 0.945). In Group A, Mean mouth opening was 4.24±0.33, while In Group M Mean mouth opening was 4.23±0.32. The two Groups were comparable in relation to Mean mouth opening as were evident from the above table showing no significant difference giving a P value 0.945.

Table No. 4: Distribution of patients according to Mean Thyromental distance (cm)

	Group A-indirect ± SD (n=40)	**Group M-Direct ± SD (n=40)**	**P-value**
Mean Thyromental distance(cm)	7.07±0.44	6.99±0.42	0.418

The above table shows the distribution of patients according to Thyromental distance.

Independent T-test was applied. P value > 0.05 shows no statistically significant difference among two Groups (P value 0.418). In Group A, Mean Thyromental distance was 7.07±0.44, while In Group M Mean Thyromental distance was 6.99±0.42. The two Groups were comparable in relation to Mean Thyromental distance as were evident from the above table showing no significant difference giving a P value 0.418.

4. Discussion

In this prospective and randomized comparative study, 80 patients of the age Group 20 to 65 years of ASA grade I & II and Mallampatti classification I & II were included. All these patients were comparable in regards to their demographic profile.

Our study results go in hand with the study done by Maharaj CH, Buckley E et al in 2007 [(7)] where the mean duration of intubation attempts was 13.2±5.5 seconds in the Group A (indirect laryngoscopy and intubation) while it was 20.3 ±12.2 seconds in the Group M (direct laryngoscopy and intubation). The difference between the two Groups regarding duration of tracheal intubation attempts was statistically significant (P<0.001).

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Similar results were obtained in the studies done by Geeta Bhandari et al [8] in 2013 where the mean duration of tracheal intubation attempts in Group A was 18± 2.6 seconds while it was in Group M was 29 ± 5.04 seconds (P<0.001). Again similar studies done by Di Marco P et al [9] in 2011where the mean duration of tracheal intubation attempts in group A was 40 ± 23 seconds while it was in group M was 59 ± 26 seconds (P value < 0.001). Various other studies have also shown that indirect laryngoscopy and intubation time for experienced as well as novice intubators.

This study was supported by the study done by Maharaj CH, D. O'Croinin et al [10] The data were given as mean (SD). *Significantly different compared to baseline (i.e. pre-intubation) value. †Significantly different compared between the groups were at 30 s Pre-Induction, 30 s prior to induction of anaesthesia; – 30 s, 30 s prior to tracheal intubation, +1min, one minute post tracheal intubation (P value <0.05). Further study done by Maharaj CH, Buckley E, et al [7] in 2007 the data were mean ± SD. * The significantly different mean heart rate was found between the Groups, at 30 s Pre-Induction = 30 s before induction of anesthesia; −30 s = 30 s before tracheal intubation; +1 min = 1 min after tracheal intubation; +2 min = 2 min after tracheal intubation; +3 min = 3 min after tracheal intubation; +5 min = 5 min after tracheal intubation (P value <0.05).

5. Conclusion

The group A patients showed insignificant increase in heart rate as compared to significant increase in group M patients in response to respective mode of laryngoscopy. No significant increase in mean blood pressure was found in both the groups A and M. Both the groups showed no statistically significant difference in postoperative complications. Therefore considering above mentioned findings, it can be concluded that indirect laryngoscope (Airtraq) is a superior device than the conventional direct laryngoscope (Macintosh).

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