

A Comparative Study of Glottic Visualization and Ease of Intubation with McCoy and Macintosh Laryngoscopes

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ABSTRACT

Introduction: The anaesthetist should protect the airways during induction, recovery and maintenance during anaesthesia. The Macintosh blade is the utmost prevalent blades with a slightly back curved that extends all the way to the tip. The McCoy blade is grounded on a normal Macintosh blade with a hinged tip and is functioned by a lever mechanism located at the handle back.

Objective: This study attempts to compare McCoy and Macintosh blades to facilitate intubation for glottis imaging.

Place and Duration: In the Department of Anesthesia, Divisional Headquarter teaching Hospital Mirpur Azad Kashmir for six months duration from June 2021 to November 2021.

Method: The study included 70 Grade I and II ASA adults of both sexes (20 to 60 years) who endured planned surgery under GA necessitating intubation by endotracheal tube. Using a computer-generated randomization table, individuals were assigned randomly to any of the 2 groups contingent on the type of laryngoscope blades used while doing intubation. After anaesthesia induction, 'laryngoscopy' was done and the intubation of trachea was done. McCoy Laryngoscope Blade was used in In Group A while Macintosh Laryngoscope Blade in Group B. The number of trials, Cormack Lehane classification, the necessity for external laryngeal manipulation and degree of intubation difficulty were evaluated.

Results: Both groups were comparable for sex, weight, age, height, MPC grading, ASA status and among the two groups; no statistically significant alteration was noted (p -value > 0.05). In Group A and B Cormack Lehane classification in Grade-I scored 82.9% and 60%, correspondingly, while Grade-II scoring in Group A and B were 17% and 25.8%, correspondingly. The Grade-I Intubation Difficulty score (IDS) in Groups A and Group B were 88.6% and 80%, respectively, while Grade-II IDS in Groups A and B were 11.4% and 14.2%. 8.5% of patients in group A and 5.7% of patients in group B required two intubation attempts.

Conclusion: There are no significant fluctuations to the glottis visualization with Macintosh and McCoy laryngoscopes, but in terms of external manipulation of larynx, the McCoy laryngoscope is superior to the Macintosh laryngoscope in terms of comfort of intubation.

Keyword: endotracheal tube, Macintosh blades, Macintosh and McCoy laryngoscopes.

INTRODUCTION

The anaesthetist should protect the airways during induction, recovery and maintenance during anaesthesia¹⁻². Failure to maintain the airway at any stage of anaesthesia, especially during induction, can cause a catastrophe, including the death of the patient³⁻⁴. The most common method of securing and maintaining the airway is orotracheal intubation, which is an integral part of the anaesthesiologist's contribution to patient care⁵⁻⁶. The epiglottis is the combination of the vocal cords (vocal cords) and the spaces between the folds (rima glottidis)⁷. The visualization of the glottis is assessed according to the percentage of glottic opening (POGO score) and the classification of Cormack Lehane grading⁸. For better visualization of the glottis, external tracheal manipulation can be performed using upward, backward or rightward compression or with bimanual laryngoscopy. The necessity for external laryngoscopy and the attempts during laryngoscopy and is indicator of difficult intubation⁹⁻¹⁰. The Macintosh blade is the utmost prevalent blades with a slightly back curved that extends all the way to the tip¹¹. McCoy's blades laryngoscope was introduced to the market in 1993 which was grounded on the normal Macintosh blade with a hinged tip and is functioned by a lever

mechanism located at the handle back¹². The tip of the blade can be conceded through the gloss-epiglottis fold and by the tip of the blade is lifted by the lever. This raises the epi-glottis and provides an improved glottis view. This study attempts to compare McCoy and Macintosh blades to facilitate intubation for glottis imaging.

METHODOLOGY

This Cross-sectional study was held in the Department of Anesthesia, Divisional Headquarter teaching Hospital Mirpur Azad Kashmir for six months duration from June 2021 to November 2021. Approval of the Ethical Committee was obtained preceding to commencing the study. The written and informed consent from every individual was taken and included in the analysis. The study included 70 Grade I and II ASA adults of both sexes (20 to 60 years of age) who suffered planned surgery under GA necessitating intubation by endotracheal tube. Patients with anticipated difficult intubation, oropharyngeal surgery, NBM < 8 hours, Obese patients (BMI > 30) were excluded. Using a computer-generated randomization table, individuals were assigned randomly to any of the 2 groups contingent on the type of laryngoscope blades used while doing intubation. After anaesthesia induction,

'laryngoscopy' was done and the intubation of trachea was done. McCoy Laryngoscope Blade was used in In Group A while Macintosh Laryngoscope Blade in Group B. A thorough pre-anaesthesia check-up was achieved during the pre-aesthesia follow-up consultation; Samsung and Young's modification of the Mallam-pati classification was used for airway assessment, the adequacy of neck movements and inter-incisor gap. All routine laboratory tests have been reviewed. In OT; pulse oximetry, ECG and capnography were connected, and non-invasive BP monitoring was automated, intravenous access was made with a IV cannula of 20Gauge, and dextrose saline (DNS) infusion was slowly started. Patient demographics such as gender, age and weight were documented. A Doughnut shaped-pillow is placed under the patient's head for the classic sniffing position. The injection Inj midazolam (1 mg), Inj glycopyrrolate (0.2 mg), Inj ondansetron (4 mg) and injection pentazocine (0.3 mg / kg) were given intravenously. 100% oxygen was given to the patients for three minutes for pre-oxygenation. Subsequently, anaesthesia with 2 mg / kg propofol was induced. Facemask ventilation was tested before injection of the depolarizing muscle relaxant. Subsequently confirmation of ventilation, 2 mg / kg succinylcholine was administered and with 100% oxygen; the patient was ventilated. Laryngoscopy were performed by the trained anaesthesiologist and intubation was done in the classic intubation position.

Laryngeal inlet visualization: scored with Cormack Lehane (CL) Grades:

Grade 1: all glottis visible Grade 2: Ant glottis invisible, Grade 3: epiglottis visible but no glottis, Grade 4: epiglottis invisible

if CL> CL Grade 2, an external manipulation of the larynx was performed.

Intubation Ease was graded as given: Grade 1: Easy intubation, Grade 2: Intubation necessitating greater force for anterior lifting and help to increase space by pulling the right mouth corner, Grade 3: Curved stylet with multiple attempts for intubation, Grade 4: failed to intubate by allocated laryngoscope.

Necessity of external manipulation: Grade 1: No external manipulation of the larynx required. Grade 2: The larynx external manipulation is classified as necessary. The attempts count for intubation was recorded. After two intubation attempts with the designated blade; intubation was done by a consultant anaesthesiologist using a Macintosh laryngoscope. The SPSS 21.0 was applied for data analysis. The chi-square and Student's t test were used as needed. The significance level was set at ninety-five percent. P <0.05 was taken significant statistically.

RESULTS

Both groups were comparable for sex, weight, age, height, MPC grading, ASA status and among the two groups; no statistically significant alteration was noted (p-value> 0.05) (Table 1).

In Group A and B Cormack Lehane classification in Grade-I scored 82.9% and 60%, correspondingly, while Grade-II scoring in Group A and B were 17% and 25.8%, correspondingly, which was insignificant statistically (p > 0.05). (Table 2).

Table 1: Demographic Features, MPC grading, ASA grading in – Group A and B

Parameters	Group A (n=35)	Group B (n=35)	p Value
Age in years	46.20± 4.1	47.73±3.2	> 0.05
Sex (Male: Female)	12: 15	13:15	> 0.05
Height (cm)	164± 7.1	170 ± 8.2	> 0.05
Weight (Kg)	57.2± 7.4	60.1±6.9	> 0.05
ASA grading (I:II)	24:1	25:5	> 0.05
MPC grading (1:2)	19:08	21:07	> 0.05

Table 2: Cormack Lehane grade for Glottic visualization in group A and B.

Cormack Lehane Grade	Group A (%)	Group B (%)	Total (%)
Grade 1	29 (82.9)	21 (60)	50 (71.4)
Grade 2	6 (17.1)	9 (25.8)	15 (21.4)
Grade 3		5 (14.2)	5 (7.2)
Total	35 (50)	35 (50)	70 (100)

The Grade-I Intubation Difficulty score (IDS) in Groups A and Group B were 88.6% and 80%, correspondingly, while Grade-II IDS in Groups A and B were 11.4% and 14.2%, correspondingly, which is not substantial statistically (p> 0.05), (table 3).

Table 3: Group A and B Intubation difficulty Score

Intubation difficulty Score	Group A (%)	Group B (%)	Total (%)
Grade 1	31 (88.6)	28 (80)	59 (84.3)
Grade 2	4 (11.4)	5 (14.2)	9 (12.9)
Grade 3		2 (5.8)	2 (2.8)
Total	35 (50)	35 (50)	70 (100)

8.5% of group A patients and 5.7% of group B patients required two intubation attempts which is statistically insignificant (p> 0.05) (Table 4).

Table 4: Attempts for patients intubation in group 'A' and 'B'.

Attempts required for Intubation	GROUP A	GROUP B
1 st attempt	32	33
2 nd attempt	3	2

While 17.1% of patients in group B required external manipulation of the larynx, in group A it was not required, which was statistically significant (p <0.05) (Table 5).

Table 5: Necessity for external manipulation of larynx in group A and B.

Requirement for external laryngeal manipulation	GROUP A	GROUP B
YES	0	6
NO	35	29

DISCUSSION

In the case of a Macintosh blade, the blade curvature performs as a visual "hill"; This hinders the field of vision known as the "Crest on the Hill" effect¹⁴. Using the Macintosh blade, the tongue moves further into the submandibular space. In the case of the Macintosh blade,

the oral and the laryngeal axis are matched, masking the glottis as it is enclosed by the epiglottis, which obscures the view of the glottis¹⁴. As the McCoy blade is used, the epiglottis is raised and the glottis is better exposed. Therefore, the required force is decreased, and the tongue just needs to be moved to the lateral side¹⁵. There are studies showing that McCoy's blade and manipulation of the external larynx are operative in difficult instances of intubation. Uchida et al. directed studies found that laryngoscopy can be accomplished with the neutral position of the neck, the view of the glottis with the use of McCoy's blade increased from second to third grade images obtained by Macintosh blade¹⁶. Bito et al study Showed that the McCoy blade views were the greatest (83 times Grade-I) and that the Grade I view gotten on a Macintosh in fewer patients (48 times Grade-I view). Arino et al. institute that the McCoy blade lever tip suggestively enhanced the laryngoscopic view (88/100 Grade I view) in comparison to the Macintosh blade (74/100 Grade I views)¹⁷. We also found that 88.6% of patients had Grade I difficulty intubation (IDS) and 11.4% of patients had Grade II difficulty when using the McCoy laryngoscope. Benumof et al study found that maneuvers such as manipulating the external larynx improved the visualization of the glottis when the glottis was not viewed easily¹⁸⁻¹⁹. 26.6% of patients needed external manipulation of the larynx when a Macintosh blade was used, and that none of the patients in the McCoy group needed this manoeuvre (p <0.05)²⁰⁻²¹.

CONCLUSION

There are no significant fluctuations to the glottis visualization with Macintosh and McCoy laryngoscopes, but in terms of external manipulation of larynx, the McCoy laryngoscope is superior to the Macintosh laryngoscope in terms of comfort of intubation.

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