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A COMPARISON OF GLOTTIC VISUALIZATION AND EASE OF INTUBATION BETWEEN MACINTOSH AND C-MAC VIDEO LARYNGOSCOPE BLADES IN MPC III AND IV

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ABSTRACT

Introduction: Anaesthesia in a patient with a difficult airway can lead to direct airway trauma and morbidity from hypoxia and hypercarbia. Management of the difficult airway sometimes involves the increased application of physical force to the patient's airway than is normal, which can cause direct airway trauma. The reported frequency of difficult intubations is between 1.5% and 13%, which is a problem that requires a prompt solution. Although the likelihood of a difficult intubation can be estimated from preoperative measurements and scoring systems, obtaining direct access to the glottis during preoperative direct laryngoscopy can be difficult. This study was performed to evaluate the glottic visualization and ease of endotracheal intubation in anaesthetized, paralyzed adults having MPC III and IV with Macintosh blade and C –MAC video laryngoscope blade. **Aim:** To compare the efficacy of Macintosh vs C- MAC video laryngoscope blade. **Methodology:** This study was conducted after taking due approval from Institutional Ethical Committee and obtaining consent from patients. The prospective and randomized type study included 60 subjects of age group 18-75 years, randomly allotted in 2 groups of 30 each, using 'chit in a box' method. Laryngoscopy and intubation were carried out in classical intubating position by a single trained anaesthesiologist (senior consultant), familiar to use of Macintosh and C – MAC video laryngoscope blades. **Results:** There was no statistically significant difference between the two groups as regarding demographic data (age, sex, body mass index, height and ASA physical status). The success rate was 100% in both groups. Intubation time was significantly higher 61.52 ± 33.84 seconds in group M compared to 21.64 ± 2.76 seconds in group V, p value < 0.05. As regard number of attempts, all of intubation were successful from the first attempt in group V, while the intubations were successful from the first attempt only in 22 patients in group M and 8 patients from the second attempt. **Conclusion:** From the results of the study we concluded that, Glottic visualization assessed using Cormack Lehane grading was significantly better with C- MAC video laryngoscope blade as compared to Macintosh blade. In terms of ease of intubation C-MAC video laryngoscope blade (86.67% grade I ease) had better outcome as compared to Macintosh blade (70% grade I ease).

KEYWORDS: C-MAC, Macintosh, difficulty laryngoscopy, intubation.

INTRODUCTION

It is the prime responsibility of the anesthesiologist to secure, preserve and protect an airway during induction, maintenance and recovery from anesthesia. Failure to manage airway can lead to catastrophic results; death or worse; brain damage. Most anaesthesia mishaps occur at the time of induction of anaesthesia.[1] Orotracheal intubation is the most common method used to secure and maintain airway. The reported frequency of difficult intubations is between 1.5% and 13%, which is a problem that requires a prompt solution.[2] Although the likelihood of a difficult intubation can be estimated from preoperative measurements and scoring systems, obtaining direct access to the glottis during preoperative direct laryngoscopy can be difficult.[3] Direct laryngoscopy relies on the formation of a 'line of sight' between the operator and the laryngeal inlet, success reliant on careful head positioning and consistent anatomy.[4-6] Glottic view during laryngoscopy can be classified using Cormack Lehane grading.[6] Glottic view can be improved by external manipulation of larynx using backward-upward-rightward pressure (BURP). The need for external manipulation, the number of attempts and change of laryngoscopic blades are indicators of difficulty encountered during laryngoscopy and intubation. Literature suggests that glottis is viewed better with the straight blades while tracheal intubation is better with the curved blades. In 1943 Sir Robert

Reynolds Macintosh invented the curved laryngoscope blade. It is the most popular device used to facilitate orotracheal intubation and constitutes a gold standard.

Video laryngoscopy is a recent development that attempts to improve the success of tracheal intubation [8]. The end of the blade is equipped with a video camera, enabling the operator to visualize the glottis indirectly on a video screen. Video laryngoscopes allow a wide viewing angle and make the alignment of the oral, pharyngeal and tracheal axis unnecessary. Currently, several different types of video laryngoscopes are available, each with a different blade shape, user interface and geometry, and tube insertion strategy [9]. Some reviews have indicated an advantage when using video laryngoscopy but a need remains for evidence-based review of the efficacy of video laryngoscopy above that of direct laryngoscopy.

We therefore compared the two laryngoscopes in terms of laryngeal visualization and ease of intubation in Mallampati Grade III and IV.

1) Macintosh blade: Conventional rigid curved blade with detachable handle coupled with bulb-on-blade illumination system.
2) C-MAC Video Laryngoscope: The C-MAC incorporates a conventional Macintosh-type blade, with the addition of a micro video camera on the distal portion of the blade.[7] So, the C-MAC has the advantage of being able to be used as a direct laryngoscope, as well as a video laryngoscope. This could be useful if the video view becomes obscured by gross contamination of the camera lens during video laryngoscopy.[6]

AIMS AND OBJECTIVES

To compare the laryngeal visualization and ease of endotracheal intubation in anesthetized, paralyzed adults with MPC III and IV

1. To evaluate the laryngeal visualization With Macintosh blade.
2. To evaluate the laryngeal visualization With C-MAC video laryngoscope.
3. To compare the efficacy of laryngeal visualization and ease of endotracheal intubation with Macintosh laryngoscope and C-MAC video laryngoscope.

MATERIAL AND METHOD

The study was conducted in the Department of Anaesthesia, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi (Meghe) Wardha after taking due permission from Institutional Ethical Committee.

The study included 60 subjects of age group 18-75 years, randomly allotted into 2 groups of 30 each.

1. Group M: Cases in which intubation was done with Macintosh laryngoscope
2. Group V: Cases in which intubation was done with Video laryngoscope

The patients were explained the procedure.

Inclusion criteria

1. ASA Grade 1 and 2 patients
2. Age group between 18 years and 75 years
3. Mallampati Grade III and IV

Exclusion criteria

1. ASA grade III and grade IV
2. Potential difficult mask ventilation and/or anticipated difficult intubation.
3. Edentulous patient, facial anomalies, pathology in neck, cervical spine fracture, upper respiratory tract and upper alimentary tract pathologies.
4. Pregnant females
5. Patient's refusal to give consent

The selection of patients was done using 'chit in the box' method. A total of 60 chits were made with 30 labelled as 'Macintosh' and 30 as 'Video' and put in a box.

For the purpose of study, following steps will be followed

1. A detailed routine pre-anaesthetic check-up was performed where airway was assessed using Malampatti Scale, Inter-incisor gap, thyro-mental distance, sterno-mental distance, Mandibulo-hyoid distance, normalcy of neck movement, and routine laboratory investigations were obtained. Demographic data such as age, sex and weight of the patient was noted.
2. All patients were kept fasting 8 hours before surgery.
3. When we received the patient on table, NBM status was confirmed. I.V. line with 18G cannula was secured and RL was started.
4. After attaching all multi modular monitors baseline reading of HR, BP, SpO2, ECG was noted.
5. Patient was kept in supine position with head rested on ring pillow of height approx. 7cms
6. Pre-anesthetic medication (inj glycopyrolate0.2mg, inj midazolam 1mg, inj butorphenol 1mg) was given followed by preoxygenation with 100% O2 for 3 minutes.
7. Induction was done with inj. Propofol 2mg/kg body weight.
8. After confirming that patient can be ventilated through bag and mask, inj scoline 100 mg body weight i.v. was given and patient was ventilated for 2 minutes manually on bag and mask with Bain's circuit.
9. The laryngoscopy and intubation were carried out in classical intubating position by a trained anaesthesiologist (senior consultant), familiar to use ofc-mac video laryngoscope.
10. If the glottic is not visualized with Macintosh blade, the C-MAC video Laryngoscope was used for laryngoscopy and intubation.

11. If glottic is visualized by Macintosh blade the intubation will be done (maximum one attempt), if not then will be changed to video laryngoscope and intubation will be done.

The following aspects were studied during tracheal intubation

Visualization of laryngeal inlet: This was graded using Modified Cormack Lehane (CL) grades -
Grade 1 : Complete glottis visible
Grade 2 a : Partial view of glottis
Grade 2 b : Only posterior extremity of glottis seen or only arytenoid cartilages
Grade 3 : Only epiglottis seen, none of glottis seen
Grade 4 : Neither glottis nor epiglottis seen

Ease of intubation: This was graded as follows -
Grade 1: Intubation easy
Grade 2: Intubation requiring an increased anterior lifting force and assistance to pull the right corner of the mouth upwards to increase space.
Grade 3: Intubation requiring multiple attempts and a bougie.
Grade 4: Failure to intubate with the assigned laryngoscope.

Number of attempts were noted. After failure at first attempt bougie were used. Patients were ventilated with 100% oxygen between attempts at laryngoscopy and intubation so that no patient will be allowed to desaturate below 95%. After 2 attempts at intubation with assigned blade, patients were intubated using Macintosh blade.

SAMPLE SIZE

Sample size was 60 subjects divided into 2 groups 30 each.
1. Group M: Intubation was done with Macintosh laryngoscope
2. Group V: Intubation was done with C –MAC video laryngoscope

STATISTICS

Statistical analysis was done by using descriptive and inferential statistics using Student's unpaired t test and Chi square test and software used in the analysis were SPSS 22.0 version and Graph Pad Prism 6.0 version and $p<0.05$ is considered as level of significance.

RESULTS

Table 1: Patients' demographic characteristics. Data were presented as (mean ± SD) or no (%).

	Group M (n = 30)	Group V (n = 30)	p-value
Age(years)	40.13 ± 8.21	39.45 ± 7.19	0.614
Weight(kg)	68.72 ± 14.12	69.53 ± 15.28	0.226
Body Mass Index(kg/cm2)	31.24 ± 2.88	31.67 ± 2.72	0.488
Gender (no.%) • **Male** • **Female**	 21 (70%) 09 (30%)	 24 (80%) 06 (20%)	0.068
ASA (no.%) • **ASA I** • **ASA II**	 13 (43%) 17 (57%)	 16 (53%) 14 (47%)	0.835

There was no statistically significant difference between the two groups as regarding demographic data (age, sex, body mass index, height and ASA physical status) (Table 1).

Table 2: Intubation Metrics – Grade view, time for intubation, no of attempts, success rate and Mallampati classification in both studied groups. Data were presented as (mean ± SD) or no (%).

	Group M (n = 30)	Group V (n = 30)	p-value
(CL) Grade View	3.0 ± 0.7	1.4 ± 0.5	< 0.001
Duration of Intubation	61.52 ± 33.84	21. 64 ± 2.76	< 0.001
Number of attempts **1 attempt** **>1 attempt**	 22 (73.3%) 08 (26.7%)	 30 (100%) 0 (0%)	< 0.001
Success rate	30 (100%)	30 (100%)	----
Mallampati Classification **Class 1** **Class 2** **Class 3** **Class 4**	 0 (0%) 0 (0%) 21 (70%) 09 (30%)	 0 (0%) 0 (0%) 21 (70%) 09 (30%)	 1

The success rate was 100% in both groups. Intubation time was significantly higher 61.52 ± 33.84 seconds in group M compared to 21.64 ± 2.76 seconds in group V, p value < 0.05 (Table 2). As regard number of attempts, all of intubation were successful from the first attempt in group V, while the intubations were successful from the first attempt only in 22 patients in group M and 8 patients from the second attempt.

DISCUSSION

The results of this study demonstrate that the use of the video laryngoscopes improved the CL grade view as compared to the Macintosh blade. There was a significant reduction in time to intubation with Video laryngoscope blade as compare to Macintosh blade.

Although Macintosh laryngoscope is considered the gold standard for tracheal intubation, the aim of the present study was to investigate that C-MAC video laryngoscope would become the "golden" standard for all intubations, not only those predicted to be "difficult". But also will be used in all elective intubation.

The results of the present study showed statistically significant difference in intubation time between the two studied groups. It was significantly longer in patients intubated using the Macintosh laryngoscopy compared to patients intubated using the new C-MAC laryngoscopy.

These results were comparable with results of Ofelia L. et al [10] during their study on a randomized prospective study comparing tracheal intubation with the C-MAC video laryngoscope device to fiberoptic bronchoscope in patients undergoing cervical spine surgery which showed that the procedures times (including the time required to obtain glottic view, and to secure the airway with a tracheal tube) were consistently shorter in the C-MAC group, but only the time to confirm correct placement using end tidal CO2 waveform tracing was significantly shorter in C-MAC group (60 ± 30 seconds vs. 84 ± 30 seconds, p value < 0.05).

Thus in anticipated difficult airway, C-MAC video laryngoscope has been shown to perform better in terms of shorter intubation time.

CONCLUSION

In conclusion, C-MAC video laryngoscope had become a good alternative and was associated with better visualization of laryngeal structures in shorter time and less intubation attempts as compared to traditional flexible Macintosh laryngoscopy.

REFERENCES

1. Cheney FW, Posner KL, Caplan RA. Adverse respiratory events infrequently leading to malpractice suits. A closed claimsanalysis. Anesthesiology, 1991; 75: 932-9.
2. Crosby ET, Cooper RM, Douglas MJ, Doyle DJ, Hung OR, Labrecque P,et al. The unanticipated difficult airway with recommendations for management. Can J Anaesth, 1998; 45: 757-76.
3. Henderson jj, Popat MT, LattoIP, Pearce AC; Difficult Airway Society. Difficult airway society guidelines for management of unanticipated difficult intubation. Anaesthesia, 2004; 59: 675-94.
4. Cormack RS, Lehane j. Difficult tracheal intubation in obstetrics. Anaesthesia, 1984; 39: 1105-11.
5. Arino JJ, Velasco JM, Gasco C, Lopez-Timoneda F. Straight blades improve visualization of the larynx while curved bladesincrease ease of intubation: A comparison of the Macintosh,Miller, McCoy, Belscope and Lee-Fiberview blades. Can JAnaesth, 2003; 50: 501-6.
6. Salama AK, Hemy A, Raouf A, Saleh N and Rady S. C-MAC Video Laryngoscopy Versus Flexible Fiberoptic Laryngoscopy in Patients with Anticipated Difficult Airway: A Randomized Controlled Trial.
7. Niforopoulou P, Pantazopoulos I, Demestiha T, Koudouna E, Xanthos T. Video-laryngoscopes in the adult airway management: a topical review of the literature. Acta Anaesthesiol Scand, 2010; 54: 1050-61.
8. Wikipedia (https://en.wikipedia.org/wiki/Cormack-Lehane_classification_system)
9. Rosenstock CV, Thøgersen B, Afshari A, Christensen AL, Eriksen C, et al. Awake fiberoptic or awake video laryngoscopic tracheal intubation in patients with anticipated difficult airway management: a randomized clinical trial. Anesthesiology, 2012; 116: 1210-6.
10. Ofelia L, Lazo E, Yumul R, Lennon C, Ternian A, et al. A Randomized Prospective Study Comparing Tracheal Tntubation with the C-MAC Device to Fiberoptic Bronchoscopy in Patients Undergoing Cervical Spine Surgery. American Society of Anesthesiologists, 2011.