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A PROSPECTIVE, RANDOMISED, OPEN LABEL STUDY FOR COMPARISON OF THE INCIDENCE AND SEVERITY OF POSTOPERATIVE SORE THROAT(POST) USING C-MAC VIDEO LARYNGOSCOPE D BLADE AND TRADITIONAL MACINTOSH LARYNGOSCOPE FOR INTUBATION

Anaesthesiology

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ABSTRACT

Background and Aims: Postoperative sore throat is well-known complication after endotracheal intubation. One of the major contributing factors is trauma associated with laryngoscopy. With decreased force applied to visualise cords with Videolaryngoscope, it should decrease the incidence of postoperative sore throat. In this study we compared the incidence and severity of postoperative sore throat when laryngoscopy was done using C MAC Videolaryngoscope D-blade (Group V) versus Macintosh laryngoscope (Group M). **Method:** Fifty four American society of Anaesthesiologists *1&2* patients between age 18-60 years, undergoing laparoscopic surgeries were included in this study and laryngoscopy was performed using Macintosh laryngoscope in Group M and with C MAC Video laryngoscope D-blade in Group V. Patients were followed up at 2,6,12 and 24 hour in postoperative period for postoperative sore throat and hoarseness of voice. **Result:** In Group M, the incidence of postoperative sore throat was high at 6,12 and 24 hour and severity was high at all time intervals. No difference seen in incidence of postoperative sore throat in both groups at 2 hour interval however severity was high in Group M. Higher incidence of postoperative hoarseness of voice was observed at 2,6,12 and 24 hour in Group M. Severity was high at 2,6 and 12 hour interval. However no difference was seen at 24 hour interval. **Conclusion:** The incidence and severity of postoperative sore throat and hoarseness of voice was reduced when C MAC Videolaryngoscope was used instead of traditional Macintosh laryngoscope.

KEYWORDS

Endotracheal tube. Postoperative sore throat, Hoarseness of voice Macintosh laryngoscope, C MAC Video laryngoscope

INTRODUCTION:

Tracheal intubation is a standard technique in general anaesthesia, which, despite its advantages like prevention of aspiration, reduction of dead space, accessibility of the airway for suction and controlled ventilation, is not free from side effects. Postoperative sore throat (POST) is a common occurrence following general anaesthesia. Although postoperative sore throat is considered a common self-limiting complication following endotracheal intubation, the symptoms can be very distressing to the patients.[1-3] Trauma during endotracheal intubation is thought to be main causative factor. As we know direct laryngoscopy needs more force to align oral, pharyngeal and laryngeal axis to visualise cords. Invention of Videolaryngoscope has revolutionised ease as well as method of laryngoscopy and subsequent endotracheal intubation. Videolaryngoscopes have higher range of visibility when compared to traditional Macintosh laryngoscopes.[4-9] Videolaryngoscopes do not need the mechanical alignment needed for visualisation of vocal cords as they look around the curve of the tongue. Laryngoscopy with Videolaryngoscope requires lesser force applied for visualisation of vocal cords.[4,6]

The aim of this study is to compare the incidence and severity of postoperative sore throat after intubation with two different types of laryngoscopes macintosh laryngoscopes and C MAC Video laryngoscope using D-blade. The secondary objective is to compare the incidence and severity of postoperative hoarseness of voice in both the groups.

Methodology

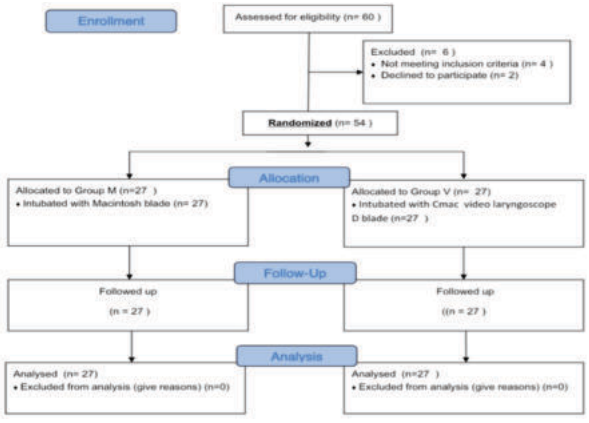

Figure 1:Recruitment of study subjects

Following approval from the Institutional Ethical Committee and informed consent from patients posted for laparoscopic surgeries of less than 2 hour duration (laparoscopic cholecystectomy, laparoscopic appendicectomy), patients were randomly allocated into 2 equal Groups, M and V, based on computer generated random sequence of numbers.

Table 1: Grading of Postoperative sore throat and hoarseness of voice

Post operative sore throat	Grade
*No sore throat at any time since the operation	0
*Minimal - patient answered in the affirmative when asked about sore Throat	1
*Moderate - patient complained of sore throat on his/her own	2
*Severe - patient is in obvious distress	3
Postoperative hoarseness of voice	
*No complaint of hoarseness at any time since the operation	0
*Minimal - minimal change in quality of speech. Patient answers in the affirmative only when enquired about	1
*Moderate - moderate change in quality of speech of which the patient complains on his/her own	2
*Severe - gross change in the quality of voice perceived by the observer	3

Patients received general anaesthesia as per a standardized protocol. They were premedicated with intravenous glycopyrrolate 0.2 mg, midazolam 1 mg, and fentanyl 2µg/kg. Following 3 minutes of preoxygenation, the patients were induced with propofol 2mg/kg.

Neuromuscular blockade was provided with vecuronium 0.1mg/kg and 3 minutes later, laryngoscopy was performed using traditional Macintosh laryngoscope in Group M and with C MAC Videolaryngoscope using D-blade in Group V. In both the groups, patients were intubated using a low pressure, high-volume cuffed polyvinylchloride endotracheal tube with 8 mm diameter in males and 7 mm in females.

Correct endotracheal tube placement confirmed with auscultation and capnography. Endotracheal tube cuffs were filled with the minimal volume of air required to prevent an audible leak, cuff pressure was checked immediately after intubation and Intracuff

pressure maintained at 20–22 cm of H_2O throughout procedure. When more than one attempt needed for laryngoscopy patients were mask ventilated and second attempt was made when oxygen saturation was more than 95%.

Patient who required three or more attempts at laryngoscopy were excluded from the study. Anaesthesia was maintained using oxygen and nitrous oxide with 1% of end tidal concentration of sevoflurane. Neuromuscular block was maintained with intermittent vecuronium. Towards the end of surgery ondansetron at 0.1mg/kg was given to decrease postoperative nausea and vomiting. Adequate analgesia was given with 1 gram paracetamol intravenously.

After completion of surgery residual muscular blockade was reversed with neostigmine 0.05-0.07mg/kg and glycopyrrolate 10 micrograms per kilogram. Following gentle oropharyngeal suction extubation was done. Postoperative analgesia was given with intravenous paracetamol 1 gram every 8th hourly and tramadol 100 mg on demand. After extubation postoperative sore throat and hoarseness of voice was graded at 2,6,12 and 24 hour from the time of extubation, based on the (Table 1).

RESULTS

Table 2: Distribution of study groups

	Group M NO (%)	Group V NO (%)	P VALUE
GENDER			
MALE	11 (40.70)	15 (55.56)	0.2765
FEMALE	16 (59.26)	12 (44.44)	
MPC GRADE*			
MPC 1	9 (33.33)	8 (29.63)	0.765
MPC 2	18 (67.67)	19 (70.37)	
NO. OF ATTEMPTS TAKEN			
ONE	19(70.37)	22 (81.48)	0.3396
TWO	8(29.63)	5 (18.52)	
ANY MANEUVER REQUIRED (SELLICK'S, OELM**)			
YES	1 (3.70)	4 (14.81)	0.1590
NO	26 (96.30)	23 (85.19)	

* MPC Grade - Mallampati grade **OLEM- Optimum External Laryngeal Manipulation

Sixty patients were enrolled in the study. Six patients were excluded due to change of plan from laparoscopic surgery to open surgery intra operatively, non-consenting patients and those whose nasogastric tube was kept even after extubation were excluded from the study.Patients were divided into 2 groups. In Group M laryngoscopy was done with traditional Macintosh laryngoscope and Group V laryngoscopy was done with C MAC Videolaryngoscope using D-blade. The demographic data were comparable in both the groups. Incidence of sore throat at 6,12,24 hour was much more in M Group as compared to Group V . At 2 hour there was no difference seen in incidence in both groups. However, severity of postoperative sore throat was high at 2,6,12 and 24 hour in M Group.Incidence of postoperative hoarseness of voice was high in M Group at 2,6,12 and 24 hour. Severity was high at 2,6,12 in M Group but no difference was observed in severity at 24 hour.

DISCUSSION

In modern anaesthesia practice, many of the general anaesthetic procedures are carried out with endotracheal intubation. It is well-known that prolonged intubation can have serious complications, but it is less well recognised that uneventful intubation for routine surgical procedures can also cause complications and pathological changes that may provide an organic basis for patients' postoperative throat symptoms. There is focal or complete loss of mucosal epithelium even if patients were intubated for less than an hour.

Postoperative sore throat (POST) is a well-recognized side effect after endotracheal intubation. POST comprises of variety of signs and symptoms ranging from mild discomfort to obvious laryngitis, tracheitis, hoarseness, cough or dysphagia after endotracheal intubation. Several contributing factors for sore throat after surgery have been implicated including patient age, sex, size of tracheal tube, cuff design and intra cuff pressure, application of lubricants, type of surgery, duration of surgery. One of the main contributing factor is trauma associated with laryngoscopy. Injury can be due to Epithelial loss, Glottic hematoma, Glottic edema, Submucosal tears and Contact ulcer granuloma. In routine anaesthesia practice, intubations are performed with the help of traditional Macintosh laryngoscope. When using a Macintosh laryngoscope, high forward and upward force is usually needed to align the oral, pharyngeal, and laryngeal axes. This helps in better visualisation of the glottis. Varying degrees of head extension, neck flexion, and manoeuvres like backward upward rightward pressure (BURP) may be required during laryngoscopy. It had been shown that about 35–40 Netwon force is usually required to expose glottis while using Macintosh laryngoscopes. The associated hemodynamic stress, risk of soft tissue injury, dental and cervical spine injuries depend on the force applied during laryngoscopy. All efforts should be taken to decrease such trauma during intubation. In this study we evaluated the effect of laryngoscopy method using two different laryngoscopes while keeping all other factors causing postoperative sore throat controlled.

A study done by Tosh et al[10] found that incidence and severity of postoperative sore throat at 2,6,12 and 24 hour was high in Group M compared to Group V and showed decreasing trend at 2,6, 12 and 24 hour. Similar studies done by Najafi et al[11] and Aqil et al[12] to compare the incidence and severity of postoperative sore throat with glidescopes and macintosh laryngoscopes showed higher incidence and severity in Macintosh group.

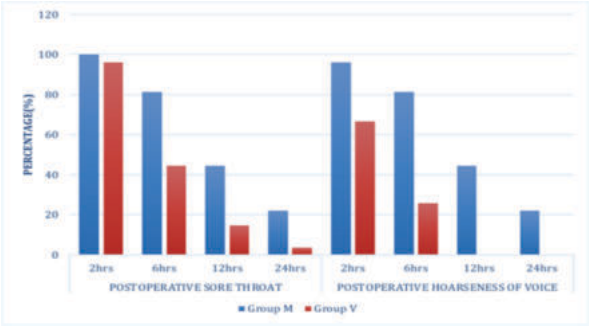

Figure 2: Incidence Of Postoperative Sore Throat And Hoarseness Of Voice

In our study we found that incidence of sore throat 2 hour in Group M was 100% and 96.3% in Group V and there was no statistical difference. At 6 hour it was 81.48% in Group M and 44.44% in Group V. At 12 hour it was 44.44% in Group M and only 14.81% in Group V. At 24 hour sore throat was present in 22.22% of patients in Group M and 3.70% of patients in Group V. So we found that incidence of sore throat at 6,12 and 24 hour were significantly high in Group M as compared to Group V, however no such difference was seen at 2 hour post extubation but severity of postoperative sore throat was high at 2 hour with 3.70% patients grade 3 sore throat, 51.35% patients had grade 2, 44.44% patients had grade 1 sore throat. Thus Severity of postoperative sore throat at 2,6,12 and 24 hour was high in Group M as compared Group V such that at 24 hour 22.22% patients were experiencing grade 1 sore throat in Group M and only 3.70% patients had grade 1 sore throat in Group V.

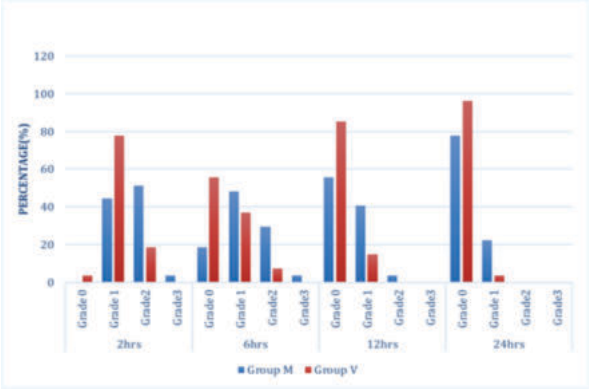

Figure 3: Severity Of Postoperative Sore Throat

The main difference between traditional Macintosh laryngoscope and C MAC Video laryngoscope D-blade is the curvature of blades. The C MAC Videolaryngoscope D-blade has higher curvature when compared to traditional Macintosh laryngoscope and provides direct

glottis vision. There is no need to align the oral, pharyngeal, and laryngeal axes to a straight line for better visualisation and intubation. Thus it requires less force compared to traditional Macintosh laryngoscope. This also decreases the haemodynamic stress response and soft tissue trauma associated with laryngoscopy. Compared to Macintosh Laryngoscope, Videolaryngoscopes need less extension and flexion of the head and neck, pressure on the neck and distortion of the upper airway so the cervical spine movement will be less.[13] All these factors may attribute to decreased postoperative sore throat when Intubation carried out with Videolaryngoscope.

In studies done by Tosh et al[10], Najafi et al[11] found that incidence and severity of hoarseness of voice was high where Macintosh blade was used for intubation compared to Videolaryngoscope.

In our study at 2 hour 96.30% patients had hoarseness of voice in Group M and 66.67% in Group V. At 6 hour 81.48% patients had hoarseness in Group M and 25.92% in Group V. At 12 hour 44.44% patients had hoarseness of voice in Group M and none in Group V. At 24 hour 22.22% patients had hoarseness in Group M and none had hoarseness in Group V. So after 12 hour hoarseness of voice was not seen in Group V. Severity of hoarseness of voice was also high in Group M at 2,6 and 12 hour but there was no significant difference seen at 24 hour post extubation with only 7.41% of patients experiencing grade 1 hoarseness of voice in Group M.

In majority of patients, postoperative hoarseness of voice is temporary and self limited. It usually lasts for 2–3 days. Trauma during endotracheal intubation is most common cause. Arytenoid cartilage dislocation can lead to prolonged hoarseness of voice. Use of appropriate sized tubes and regular measurement of cuff pressure significantly reduce mucosal damage and thereby hoarseness.

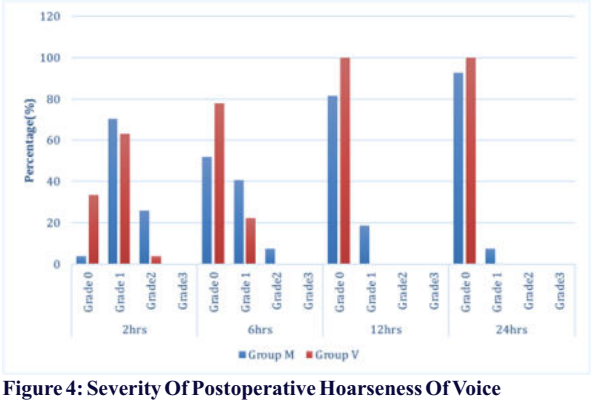

Figure 4: Severity Of Postoperative Hoarseness Of Voice

The sequelae that result from POST can negatively impact the patient's perception of care during their perioperative experience. Interventions aimed at reducing the incidence of POST could improve this perception and lead to improvements in patient satisfaction, shorten the length of stay in a postanesthesia care unit (PACU) and potentially decrease the overall cost of care.

Thus Identification of the factors associated with an increased risk of postoperative sore throat will allow anaesthesia providers to avoid combinations of controllable factors, decrease the incidence of postoperative sore throat and improve post anaesthetic outcomes .

Limitations of study:

In this study we used C MAC Videolaryngoscope D-blade and our results may not be applicable to other types of Videolaryngoscopes as there are gross differences in the shapes and clinical performance of different kinds of Videolaryngoscopes.

CONCLUSION :-

In conclusion, our study demonstrated that the incidence and severity of postoperative sore throat and hoarseness of voice are reduced when intubation is done by C MAC Video laryngoscope using D-blade compared to traditional Macintosh laryngoscope.

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