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Incidence of Sore Throat with Endotracheal Intubation Using Mcintosh Blade Versus Video Laryngoscope

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Abstract

Introduction: Postoperative Sore Throat (POST) is an undesirable common complaint following general anesthesia. The objective of this study was to compare the incidence of sore throat and hoarseness of voice following endotracheal intubation using McIntosh laryngoscope or king vision video laryngoscope. *Methodology:* It was a prospective randomized control trial in which 200 ASA 1 and 2 patients, scheduled for elective surgery requiring endotracheal intubation were randomly allocated to VCL (Video laryngoscope) and MCL (McIntosh laryngoscope) Group. Endotracheal intubation was performed using McIntosh Laryngoscope in MCL Group and kingvision video laryngoscope in VCL Group. POST and hoarseness was assessed at 6, 12, 24 and 48 hours. Incidence of sore throat, hoarseness of voice, laryngoscopy time and ease of insertion was noted and compared. *Results:* There was no significant difference in the incidence of sore throat and hoarseness of voice between the Two Groups . However, duration of laryngoscopy was longer in VCL Group. *Conclusion:* Incidence of Postoperative sore throat and hoarseness of voice does not alter when Kingvision video laryngoscope as compared to McIntosh laryngoscope is used for endotracheal intubation, however the time taken for laryngoscopy and intubation is longer with kingvision video laryngoscope

Keyword: Hoarseness; Sore throat; Laryngoscope; Peroperative complications; Endotracheal intubation.

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Introduction

Postoperative sore throat and hoarseness of voice are major airway complications after general anesthesia with Endotracheal Intubation (ETI) with overall incidence varying from 14.4% to 50%.[1] Although postoperative sore throat usually resolves within a week, it is considered as one of the leading patient complaints after tracheal intubation. Factors responsible for these are pharyngotracheal tissue damage secondary to laryngoscopy and intubation, use of lubricants, longer duration of intubation etc. Different laryngoscopic blades used can have varied extent of tissue damage and hence the incidence of these can be different. Several identified independent risk factors for POST include larger ETT size, age, female sex, prolonged intubation, and trauma during airway manipulation.[2] There is a strong evidence that female patients are at

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1.5 fold risk for POST than men.[3] Although video laryngoscope is better for difficult intubation in terms of success rate than McIntosh laryngoscope, the airway trauma because of the same needs a better assessment. We plan to assess the incidence of postoperative sore throat and hoarseness of voice comparing both devices McIntosh and king vision video laryngoscope used for endotracheal intubation. The primary objective of our study was to assess the incidence of sore throat and hoarseness of voice following endotracheal intubation using king vision video laryngoscope in comparison with McIntosh laryngoscope. Secondary objective was to assess the laryngoscopy time and ease of insertion of the endotracheal tube.

Materials and Methods

Based on the power analysis of the study done by Atabak Najafi et al.[4] considering proportion of 0.28 in Group MCL and 0.54 in Group VDL, with 5% level of significance and 80% power, the sample size required was 82. However, we decided to conduct the study with 100 subjects in each group. A Prospective randomized controlled trial was carried out. After Institutional ethical committee approval two hundred patients aged between 18 and 60 years, American Society of Anesthesiology (ASA) Grade I and II posted under general anesthesia were chosen for the study. Randomization was done using computer generated table. Patients with difficult airway, pregnancy, obesity (with BMI > 30), duration of surgery more than 4 hours were excluded from the study. Written informed consent was obtained and patients were allotted to one of the study groups Endotracheal intubation was performed using McIntosh Laryngoscope in MCL Group and using king Vision video Laryngoscope in VCL Group.

On the operation table, monitors including ECG, Pulse oximetry (SpO_2), NIBP were connected to the patient. Baseline vital parameters including heart rate, blood pressure and SpO_2 were noted. Intravenous access was secured and premedicated with injection Glycopyrollate 0.2 mg, injection Midazolam 0.02 mg/kg, injection Fentanyl 2 microgram/kg induction with injection Propofol 1–2 mg/kg, paralyzed with injection atracurium 0.5 mg/to facilitate endotracheal intubation. Endotracheal intubation was performed by anesthesiologist with more than 5 years of experience using McIntosh Laryngoscope in MCL Group and Video Laryngoscope in VCL Group. Laryngoscopy time (from the time of start of insertion till removal of the laryngoscope blade) and ease of insertion (easy/difficult, graded as difficult if external laryngeal manipulation was needed and number of attempts were more than one) were noted. Patients with unanticipated difficult airway in whom change of laryngoscope blade was needed for intubation were excluded from the study. Postintubation vitals including heart rate, blood pressure and SpO_2 were noted. During extubation care was taken to prevent patient from coughing on the tube. Duration of anesthesia was noted. Postoperatively, sore throat (no, mild, moderate and severe) and hoarseness of voice were assessed at 6 hours, 12 hours, 24 hours and 48 hours. Incidence of sore throat (with grading) and hoarseness of voice, laryngoscopy time and ease of insertion in both groups were noted and compared. Patients with persistent sore throat and hoarseness of voice were planned for further evaluation and follow-up till they resolved.

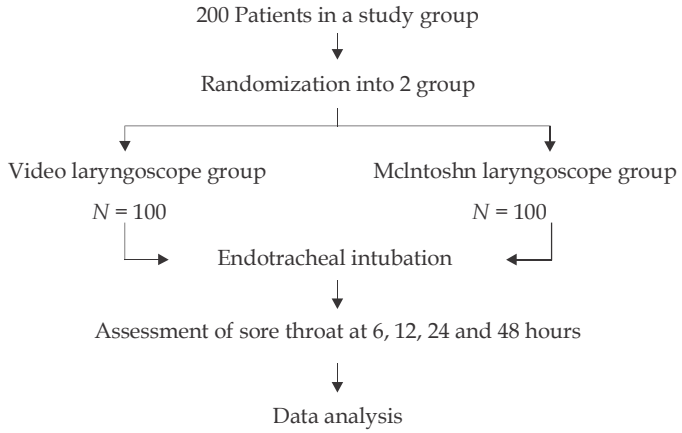

Fig. 1: Data-flow diagram

Statistical Analysis

Following data entry results were analyzed using SPSS 23 version software. Descriptive statistics were reported using mean and SD for the continuous variables, number and percentages for the categorical variables. Proportion of existence of postoperative sore throat and hoarseness were reported using number and percentages. Chi-square test was used to test the significance for the categorical variables. Student's *t*-test was used for comparison of means for the continuous variables. A *p* - value of < 0.05 was considered as statistically significant.

Results

The mean age and weight were similar in both the groups (Table 1). Distribution of sex and ASA grading were comparable (Table 1). The average duration of anesthesia in Group I and II were 108 ± 32 minutes and 102 ± 38 minutes respectively with no significant difference (*p* – value = 0.237) between groups.

Comparison of vital parameters between the study group is given in Table 2. There was no significant difference in basal heart rates between groups. Heart rates increased in both groups and the increase was more in the direct laryngoscopy group ($p = 0.03$). There was no significant difference in mean blood pressure readings between groups before induction of anesthesia. The change in blood pressure seen during laryngoscopy in video laryngoscopy group was slightly higher as compared to direct laryngoscopy group ($p = 0.09$). Similarly, Basal SpO_2 and postintubation SpO_2 was not significantly different between the two groups.

The number of cases with difficult laryngoscopy in MCL was two and in VDL was three ($p = 0.6$). Duration of laryngoscopy was significantly longer in VDL group compared to MCLgroup with 34 seconds in MCLgroup and 47 seconds in VDL group ($p < 0.001$).

Incidence of sore throat and hoarseness is presented in Table 3. Postoperatively the incidence of sore throat and hoarseness of voice was similar in both groups across all the times.

Table 1: Demographic details

Parameters	MCL	VDL	*p* - value
Age (years)	38.7 ± 11.9	38.5 ± 11.3	0.905
Sex	53/47	59/41	0.360
Weight (kg)	65.7 ± 11.1	66.3 ± 9.0	0.636
ASA Grading/II	67/33	72/28	0.416

Table 2: Comparison of vital parameter

Parameters	MCL	VDL	*p* - value
Basal Heart rate (beats/ minute)	70.8 ± 11.3	68.4 ± 9.7	0.100
Post intubation Heart rate (beats/min)	81.1 ± 10.8	78.1 ± 9.1	0.035
Basal Mean BP (mm Hg)	87.7 ± 7.9	87.7 ± 8.7	0.989
Post intubation Mean BP (mm Hg)	79.9 ± 8.4	78.1 ± 6.8	0.093
Basal SpO_2 (%)	99.6 ± 0.54	99.6 ± 0.57	0.478
Postintubation SpO_2 (%)	100	100	–

Table 3: Comparison of incidence of sore throat and hoarseness between the two groups

Parameters	MCL (*n* = 100)	VDL (*n* = 100)	*p* - value
Sore throat at 6 hr			
No	86	88	0.869
Mild	10	7	
Moderate	3	4	
Severe	1	1	
Sore throat at 12 hr	97	97	0.990
No	3	3	
Mild			

Parameters	MCL (n = 100)	VDL (n = 100)	p - value
Sore throat at 24 hr			
No	100	100	–
Hoarseness at 6 hr			
Present	5	6	0.769
Absent	95	94	
Hoarseness at 12 hr			
Present	2	1	0.555
Absent	98	99	
Hoarseness at 24 hr			
Present	0	0	–
Absent	100	100	

Discussion

POST is a common undesirable complication of endotracheal intubation, which can result in patient discomfort, delay in recovery and increase in expenditure of health care.[5] Video laryngoscope reduces the number of failed intubations, improves glottis view and reduces laryngeal/airway trauma. But there is no evidence to indicate that the use of VLS reduces the number of intubation attempts or the incidence of hypoxia or respiratory complications and no evidence indicates that use of VLS affects the time required for intubation.[6] Risk factors for POST include female sex, younger age, longer duration of ET intubation, and injury to oropharyngeal structures during laryngoscopy and intubation POST can be prevented by adequate relaxation, careful technique, use of soft suction catheters, smaller tracheal tubes, monitoring cuff pressure intraoperatively and avoiding Local Anesthesia/steroid lubricants[7] King vision video laryngoscope consists of a Macintonsh blade design with a video chip at the tip of the blade with an extended optical axis in the vertical plane connected to a video display monitor.

In our study patients we assessed patients for POST at 6, 12, 24 and 48 hours of surgery. Our results showed that the incidence of postoperative sore throat was similar in VDL and MCL Group at 6 hrs (p = 0.869) and 12 hrs (0.990) and none of the patients had sore throat at 24 hrs and 48 hrs. Hoarseness was noticed among five patients in MCL Group and 6 in VDL Group without statistical significance (p = 0.769). At 12 hrs 2 patients in MCL Group and 1 in VDL Group complained of hoarseness (p = 0.555). However, none of the patients complained of hoarseness at 24 hrs. Duration of laryngoscopy was longer (47 seconds) in VDL Group as compared to MCL Group (34 seconds) which was statistically significant (p < 0.001). We made sure that laryngoscopy and intubation was performed by Anesthesiologists with minimum 5 yrs of experience and the average duration of surgery was 100 to 150 minutes. Our study showed a greater incidence of sore throat at 6 hrs and 12 hrs which was similar to a study conducted by Najafi et al, however, they found that the incidence of POST was less in VDL group. This could be because of the time taken for laryngoscopy and intubation was less in VDL Group as compared to our study.

In a study conducted by Hayashi et al., the incidence of hoarseness was found to be 49%.[8] However, in our study the incidence of hoarseness was 5.5%. This is because we used cuff pressure monitor which reduces mucosal damage and we used air in place of Nitros oxide.

Although video laryngoscopy has a higher success rate compared to direct laryngoscopy, time taken for intubation is longer. One of the reasons for Video Laryngoscope taking a longer time is due to difficulty in introducing the blade inside the patient's mouth. In our study, time taken for laryngoscopy and intubation was longer in VDL Group as compared to MCL Group which is similar to a study conducted by Sun et al.[9] In most patients, the Glidescope® provided a laryngoscopic view equal to or better than that of direct laryngoscopy, but it took an additional 13 seconds (average) for tracheal intubation.

Time taken for intubation using VDL is usually longer as the easy visualization of the glottis does not guarantee the easy passage of endotracheal tube.[10] This is termed as laryngoscopy paradox. Another problem with VDL is obscuration of view by fogging and the presence of blood or secretions causes' loss of depth perception causing significant airway injury. In a study conducted by Tosh et al [11] concluded that there was a reduced incidence of POST in VDL Group. They had used 60^0 angled

stylet which aids in faster orotracheal intubation as compared to 90° angled stylet. However, we intubated all our patients without stylet**.** Repeated attempts, longer intubation time, and greater force exerted for performing the scopy are some of the important contributing factors for POST. Use of the king vision video laryngoscopy does not significantly reduce the incidence of postoperative sore throat when compared to traditional intubation techniques

Conclusion

We conclude that the incidence of post operative sore throat following laryngoscopy and endotracheal intubation is similar in Video Laryngoscope and McIntosh laryngoscope Groups. However, the time taken for endotracheal tube placement is longer with Kingvision video laryngoscope when compared to McIntosh Laryngoscope.

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