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COMPARISON OF KING VISION VIDEO LARYNGOSCOPE AND MCCOY LARYNGOSCOPE FOR ROUTINE AIRWAY MANAGEMENT.

Anaesthesiology

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ABSTRACT

Background &Aims: Glottis visualisation is improved with video laryngoscope as compared to conventional laryngoscope because there is no need of alignment of all three axes. We compared King Vision video laryngoscope with McCoy laryngoscope to evaluate the ease of intubation with reference to time taken for intubation, number of attempts for intubation, intubation difficulty scale score, haemodynamic changes and complication /adverse events. **Method:** A prospective observational study for comparison of King Vision video laryngoscope and McCoy laryngoscope was carried out in 60 patients of ASA grade 1,2,3 of either sex in the age group of 18-60 years, with 30 patients in each group: Group K(n=30): patients who were intubated with King Vision Video laryngoscope and Group M(n=30 : patients who were intubated with McCoy laryngoscope for routine airway management at tertiary care teaching hospital. Patients were observed for time taken for intubation, number of attempts for intubation, number of optimization manoeuvre required for intubation, intubation difficulty score and hemodynamic changes and airway related complications. **Results:** In Group K, Cormack-Lehane grade was better ($p < 0.05$), Intubation difficulty score was less ($p<0.05$) with less haemodynamic changes ($p < 0.05$). Time taken for intubation and number of attempts for intubation was comparable in both the groups with minimum airway related complication. **Conclusion:** King Vision video laryngoscope provides better visualisation of glottis and also provides better intubating condition as compared to McCoy laryngoscope.

KEYWORDS

King Vision video laryngoscope, McCoy laryngoscope, airway management, Laryngoscopy.

INTRODUCTION

Airway management is the primary responsibility of the anaesthesiologist and the most critical step during general anaesthesia is to secure the patients airway by endotracheal intubation. [1] Endotracheal intubation is a stressful event causing sympatho - adrenal response which can be deleterious in susceptible patients resulting in various complications like hypertension, myocardial ischemia, dysrhythmias, intracranial bleed, aneurysmal rupture etc. The impact of hemodynamic changes during intubation corresponds with the duration and degree of manipulation of oropharyngeal structures.[2]

Airway mismanagement is one of the major reasons for the mortality and morbidity in anaesthetic practice; so various attempts have been made to modify the conventional laryngoscope to the digital video laryngoscope.[3] Conventional laryngoscopy requires alignment of the oral, pharyngeal and laryngeal axes for adequate exposure of the vocal cords. Although this alignment results in successful intubation in large number of cases, approximately 1-4 % of patients may still have difficult laryngoscopy. Most laryngoscopy attempt with poor glottic view often requires additional manoeuvres like head repositioning, external laryngeal manipulation or the use of gum elastic bougie or stylet which has lead to the development of multiple novel laryngoscopes to reduce the difficulties of predicted or unpredicted difficult airway. [4]

This study was carried out to compare the efficacy of the King Vision video laryngoscope with the McCoy laryngoscope in adult patients for routine airway management with regard to time taken for intubation, number of attempts and number of optimization manoeuvre required for intubation, intubation difficulty score, hemodynamic changes and incidence of airway related complications.

MATERIALS & METHODOLOGY

After obtaining approval from the ethical committee of the institution and CTRI registration (2021/09/036642), this prospective observational study for comparison of King Vision video laryngoscope and McCoy laryngoscope was carried out in 60 patients for routine airway management at tertiary care teaching hospital. All Patients posted for planned surgery under general anaesthesia, belonging to ASA grade I, II or III, in the age group of 18-60 years and who had given written informed consent were included in the study. Patient who had history of difficult intubation or anticipated airway difficulties or any pathology of oral cavity that may obstruct the insertion of device, mouth opening <2.5 cm, potentially full stomach patients (trauma, morbid obesity, pregnancy) and having severe cardio-respiratory or hepato-renal dysfunctions were excluded.

The sample size was calculated by convenient sampling technique considering inclusion and exclusion criteria and time period of study so, total 60 patients were selected for the study.

All patients were Premedicated with glycopyrrolate 0.004 mg/kg intravenously and midazolam 0.02 mg/kg intravenously. was given 30 minutes before surgery. A standard anesthetic technique as per departmental protocol was used comprising preoxygenation with 100 % oxygen for 3 minutes, induction with Fentanyl 1-2 µ/kg intravenously, propofol 2-2.5 mg/kg intravenously and neuromuscular blockade was achieved with Vecuronium 0.12 mg/kg intravenously, and laryngoscopy was performed after 3 minutes of vecuronium administration then intubation was done with either King Vision video laryngoscope or McCoy laryngoscope by senior experienced anesthesiologist after achieving best glottic view (Cormack-Lehane grade) then insertion of appropriate size of cuffed endotracheal tube under direct vision. If adequate glottic view not achieved for intubation then various optimization manoeuvres used like head repositing, external laryngeal manipulation and need of second assistant to facilitate the intubation. Adequate ventilation was confirmed by checking air entry bilateral equal on chest auscultation or by capnography. Then maintained with Oxygen 50%, N2O 50% and sevoflurane. Primary outcomes such as time taken for intubation, which is defined as passing the laryngoscope blade from incisors/gums to the successful placement of endotracheal tube between the vocal cords, as confirmed visually by the anaesthetist and number of attempts required for intubation was recorded by single observer. Secondary outcome parameters like Intubation Difficulty Scale score (IDS), Hemodynamic parameters like heart rate and systolic blood pressure, diastolic blood pressure, mean arterial pressure and oxygen saturation was recorded before and after anaesthetic induction, and at 1,3 and 5 minutes after tracheal intubation. Then Patients were observed for complications of intubation like Hypoxia (spo2<90%), Mucosal trauma, Dental injury, Bleeding in oral cavity, Hypertension, Hypotension, Tachycardia, Bradycardia, Oesophageal intubation, Laryngospasm and postoperatively airway related complication like sore throat, cough and hoarseness of voice was recorded and it was treated symptomatically as per departmental protocol.

Failed attempt was defined as if intubation with King Vision video laryngoscope or McCoy laryngoscope requires>120 seconds or >2 attempts then patient was intubated with conventional MacIntosh laryngoscopy or with any other specialized intubation technique. It was included in the study.

Data Collection And Data Analysis

Data were collected and entered into Microsoft excel sheet. Qualitative

Data were described as frequency & Percentages and Quantitative data were described as mean and Standard deviation. The statistical analysis was done using unpaired t-test for quantitative data and chi-square test was used for qualitative data comparison using EPI software. If P value <0.05 it was considered to be statistically significant when P value <0.001 it was highly significant.

OBSERVATION AND RESULTS

Table 1. Demographic data

Parameters	Group K (Mean ± SD)	Group M (Mean ± SD)	P- value
Age (years)	39.27±12.02	36.43±12.96	>0.05
Sex (M/F)	15:15	13:17	
Weight	59.2±8.49	54.63±10.02	>0.05
Height	161.56±5.32	158.03±7.41	>0.05

The demographic data were comparable in both the groups. (p>0.05)

Table 2: Mean Intubation Time And Number Of Attempts For Intubation

Parameters	Group K (n=30)	Group M (n=30)	P value
Number of attempts (1/2)	30 /0	28 /2	>0.05
Time(sec)	21.2±4.38	23.36±6.71	0.07

Number of attempts and time required for intubation were statistically not significant in Group K compared to Group M.

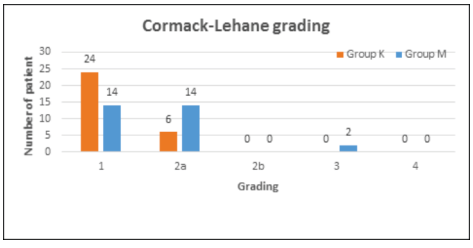

Chart 1: Visualization Of Glottis (cormack -lehane Grading)

Cormack-Lehane grading was significantly better with Group K compared to Group M(p-0.04).

Table No.3: Optimization Manoeuvres Required For Intubation

Parameter	Group K (n=30) (%)	Group M (n=30) (%)	P value
Required	1(3.33%)	9(30%)	<0.01
Not required	29	21	

Optimization manoeuvres required for intubation were significantly less in Group K compared to Group M. In Group K only one patient required external laryngeal manipulation and in Group M out of 30 patients, 6 patient required external laryngeal manipulation and 3 patients required head repositioning.

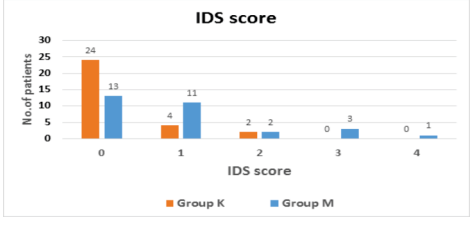

Chart 2: Comparison of Intubation difficulty score [IDS]

In Group K, IDS was significantly less compared to Group M (p-0.03).

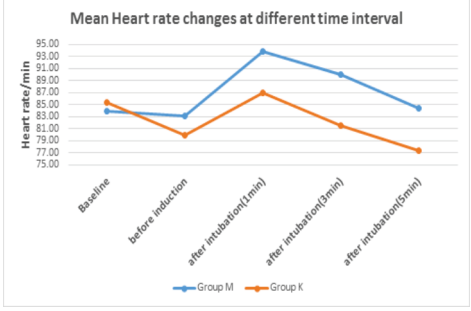

Chart 3: Mean Heart Rate Changes

In Group K baseline heart rate was 85±33±16.51 bpm, after intubation it was 86.90±15.31, 81.53±15.36, and 77.43±15.10 at 1,3 and 5 minutes respectively. Whereas in Group M patients baseline heart rate was 83.93±11.63 bpm, after intubation it was 93.9±10.36, 89.96±9.11 and 84.4±10.64 bpm at 1,3 and 5 minutes respectively. Mean Heart rate was significantly lower in Group K mainly after intubation as compared to Group M (p<0.05).

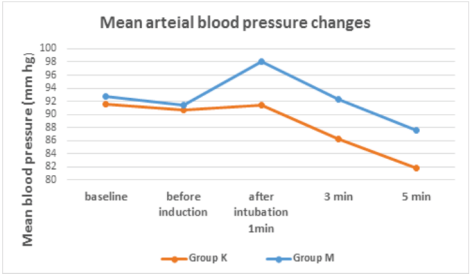

Chart 4: Mean Arterial Blood Pressure Changes

In Group K baseline mean arterial blood pressure was 91.93±9.30 mm hg, after intubation it was 91.36±13.07, 86.23±12.49 and 81.76±9.44 mm Hg and at 1,3 and 5 minutes respectively. Whereas in Group M patients baseline mean blood pressure was 92.7±7.36 mm Hg, after intubation it was 98.13±8.50, 92.3±9.59 and 87.5±9.08 mm Hg at 1,3 and 5 minutes respectively(p<0.05).

Airway related complication was less with Group K compared to Group M though it was statistically not significant(p-0.129)

DISCUSSION

Development of video laryngoscope technology is one of the major revolutions in the direction of improving success rate of intubation especially in patient with difficult airway as it avoids alignment of oro-pharyngeal-laryngeal axis required for exposure of vocal cords. It provides indirect view directly on screen with wider field of vision.

McCoy laryngoscope by its unique design with levering action improves Cormack-Lehane grade by one grade compared to Macintosh laryngoscope and less lifting force is required for better visualization.[5,8]

This study was conducted to compare the relative effectiveness of King Vision video laryngoscope to McCoy laryngoscope, as both these devices offer advantage in patients with restricted neck mobility, improving the glottic view in neutral position enabling faster intubation.

In our study the Mean intubation time was comparable with King Vision and McCoy laryngoscope. The First attempt success rate was 100% with King Vision video laryngoscope whereas with McCoy laryngoscope it was 93%(p>0.05) QE Ali (2017) [5] and Sarfaraz Ahmad et al (2017) [3] found that the mean intubation time and First attempt success rate was better with King Vision video laryngoscope but statistically not significant (P >0.05). Amit Kumar Dey et al (2021) [6] found that first attempt success rate was 96% with King Vision video laryngoscope and 80% with McCoy laryngoscope (p-0.014), and mean intubation time was less with King Vision video laryngoscope (p<0.05).

In our study with King Vision video laryngoscope 80% patients had Cormack-Lehane Grading I whereas it was 43.3% with McCoy laryngoscope and rest of the patient had Cormack-Lehane Grade more than one which was significantly better with King Vision video laryngoscope(P<0.05). QE Ali et al (2017) [5] found that 43% patients had Cormack-Lehane grading I with King Vision video laryngoscope while with McCoy laryngoscope it was 30%. While rest of the patients had Cormack-Lehane grade ≥1. Amit Kumar Dey et al (2021) [6], found Cormack and Lehane grade I in 76% of patients in King Vision group compared to 42% in McCoy group (p<0.05). King Vision video laryngoscope provides bright and clear image due to high resolution camera present in distal tip of blade, close to laryngeal inlet which facilitates intubation.

In our study mean IDS score was 0.26±0.58 with King Vision video laryngoscope compared to McCoy Laryngoscope which was 0.93± 1.11(p-0.03). None of patient had IDS score > 2 with King Vision video

laryngoscope. In similar studies, Vritika Singhal et al (2020) [7], observed that the mean IDS score in King Vision group was 1.28±0.8, while in McCoy group it was 1.81±0.63 ($p<0.0001$) and QE Ali et al (2017)[5] found IDS score was significantly less with King Vision video laryngoscope compared McCoy laryngoscope (p-0.001). This is due to better visualization and less lifting force required during intubation with King Vision Video laryngoscope requiring less number of optimization manoeuvres during intubation.

In our study mean heart rate and mean arterial pressure changes were significantly less with King Vision video laryngoscope compared to McCoy laryngoscope at 1,3 and 5 mins after intubation($p<0.05$). Amit Kumar Dey et al (2021)[6] and Sarfaraz Ahmad et al (2017)[3] found that there was significant rise in pulse rate with McCoy laryngoscope compared to King Vision video laryngoscope($p<0.01$). This was due to better visualization of larynx with magnified image, less force required to lift the epiglottis, less laryngeal manipulation required, with easier negotiation of ET tube, minimizing the sympatho-adrenal stress response which can be beneficial in patient with cardiac disease like IHD, valvular heart disease, congestive heart failure etc.

In our study at the time of extubation, Mucosal trauma was seen in 6.66% patients with King Vision video laryngoscope and 10% patients with McCoy laryngoscope($p>0.05$) while, sore throat was observed in 2 patients with King Vision video laryngoscope and 6 patients with McCoy laryngoscope, they were given normal saline nebulization in immediate postoperative period. It was less with King Vision video laryngoscope due to less manipulation of airway though it was statistically not significant ($p>0.05$). Sarfaraz Ahmad et al (2017) [3] found that the incidence of post operative sore throat was seen in 1 patient in King Vision group while 4 patients in McCoy group ($p>0.05$) and blood staining on ET tube was found in 2 and 3 patients with King Vision video laryngoscope and McCoy laryngoscope respectively($p>0.05$). Amit Kumar Dey et al (2021) [6] found that significant soft tissue injury was seen in 6% of cases in King vision group and 20 % cases in McCoy group.

Limitation of our study: 1. Our experience with King Vision video laryngoscope in adult patients was limited compared to conventional McCoy laryngoscopes. 2. Our patients had normal airway, further study in patients with difficult airway is required. 3.Blinding of the anesthesiologist to the device being used was not possible, leading to a potential bias.

CONCLUSION

King Vision video laryngoscope provides better laryngoscopic view, requires less optimization manoeuvres, has improved IDS score, maintains better hemodynamic stability with minimum complication. Time to intubation and the first attempt success rate can be improved with more experience and expertise.

REFERENCES

1) Bashir H, Gupta S, Mehta N. King Vision Video Laryngoscopy Versus Direct Laryngoscopy in Patients Requiring Endotracheal Intubation for General Anaesthesia: A Comparative Study. JK Science. 2020 Apr 1;22(2).
2) Joseph S, George B, Surekha. Comparison of hemodynamic responses to laryngoscopy and orotracheal intubation between Macintosh laryngoscope and king vision video laryngoscope in adult surgical patients. Indian J Clin Anaesth 2019;6(4):607-613
3) Ahmad S, Ali QE, Jamal MK, Kamal S, Pal K. A Prospective Randomized Study to Compare and Evaluate King Vision Video Laryngoscope and McCoy Laryngoscope as Intubating Devices in Adult Patients. J Med Sci Clin Res. 2017 Mar 26;5(03):19319-26.
4) Ahmed-Nusrath, Anjum. Video laryngoscopy. Current Anaesthesia & Critical Care.2010; 21.199-205. 10.1016/ j.cacc.2010.03.006
5) Ali Q, Amir SH, Ahmed S. A comparative evaluation of King Vision video laryngoscope (channelled blade), McCoy, and Macintosh laryngoscopes for tracheal intubation in patients with immobilized cervical spine. Sri Lankan Journal of Anaesthesiology. 2017 Jul 5;25(2).
6) DEY AK, PANDIT P, ROY S, BISWAS A, BHATTACHARYA D. A Prospective, Longitudinal Study on Effectiveness of King Vision® Video Assisted Laryngoscope and McCoy Laryngoscope in Patients with Simulated Restricted Neck Mobility. Journal of Clinical & Diagnostic Research. 2021 Mar 1;15(3).
7) Vritika Singhal, Geeta Bhandari, Kedar S Shahi, Gyan Chand. Comparative Study of McCoy, Airtraq and King's Vision Video laryngoscope in Simulated Difficult Laryngoscopy Using Rigid Neck Collar. Annals of International Medical and Dental Research-Volume 6, Issue 4, July - August 2020.
8) McCoy EP, Mirakhur RK. The levering laryngoscope. Anaesthesia. 1993 Jun;48(6):516-9.