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A Study of Effectiveness of Videolaryngoscopy and Conventional Laryngoscopy in Adult Patients for Orotracheal Intubation

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Abstract

Aim: Present study was carried out to evaluate and compare the laryngeal view and intubation by direct laryngoscope using macintosh blade with video laryngoscope in adult patients requiring endotracheal intubation.

Material and Methods: This prospective study was carried out at our institute - GUJARAT CANCER SOCIETY MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTER. Total 100 adult patients for elective surgery under general anaesthesia were included in this study. Patients were randomly divided in two groups. Each group included 50 patients. Group A: Videolaryngoscopy, Group B : Conventional Laryngoscopy. Hemodynamic changes and SpO2 were noted and recorded during the procedure at various intervals.

Results: Cormack Lehane glottis view is better with videolaryngoscope than conventional Macintosh laryngoscope and is significant statistically. The mean tracheal intubation time was higher, in Group B as compared to Group A. But the differences were statistically not significant. The mean rate of failure to intubate was almost similar among both the groups. The difference was statically not significant. No statistically significant difference was observed in mean arterial BP between the two study groups, at any point time.

Conclusion: video laryngoscope offers a better laryngeal view, minimum external maneuvers, less attempts for intubation and provides better hemodynamic response during laryngoscopy and intubation as compare to direct laryngoscopy with Macintosh blade.

Keywords: Intubation, Laryngoscope, Pulse rate, Videolaryngoscope

Introduction

Airway Management, an essential skill forms the central pillar of the practice of anaesthesiology, resuscitation, critical care and emergency medicine. Maintaining a free airway during general anaesthesia is primarily achieved by cannulation of trachea via orotracheal route, a technique recognised as endotracheal intubation. Intubation isolates the respiratory tract from digestive tract, allows control of breathing, and facilitates administration of oxygen, anaesthetic gases and drugs. Proper view of glottis is either by direct or indirect laryngoscopy. An ideal laryngoscopy must provide adequate visualisation of glottis to allow correct placement of endotracheal tube with the minimum effort, less elapsed time and minimal potential for injury to the patient.

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Direct laryngoscopy (DL) relies on the formation of a "line-of-sight" between the operator and the laryngeal inlet, success depends on proper head positioning and consistent anatomy. When the above conditions are not met, for example in poor tissue mobility, restricted mouth opening, or large tongue, the failure rate of intubation with conventional direct laryngoscopy increases.[1,2,3]

The King Vision videolaryngosope is a fully portable and wireless video laryngoscope with high blade angulation allowing best visualization of larynx indirectly through small portable flat screen monitor. Laryngoscopy and intubation is noxious stimulus which results in sympathetic response leading to hypertension and tachycardia, which can in turn produce adverse cardiovascular events, especially in patients with cardiac comorbidities. The hemodynamic response is due to the oropharyngeal stimulation produced by laryngoscopy and larymgotracheal stimulation due to tube insertion. Videolaryngoscopes do not require the alignment of oral, tracheal and laryngeal axes for glottic visualization and hence may cause less oropharyngeal stimulation and airway trauma.

So present study was carried out to evaluate and compare the laryngeal view and intubation by direct laryngoscope using macintosh blade with video laryngoscope in adult patients requiring endotracheal intubation.

The king Vision videolaryngosope is a fully portable and wireless video laryngoscope with high blade angulation allowing best visualisation of larynx indirectly.

Material and Methods

This prospective study was carried out at our institute - GUJARAT CANCER SOCIETY MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTER. Ethical permission was obtained from the ethical committee of GCSMCH & RC. Informed written consent was obtained from each patient and the procedure was explained to the patients.

Total 100 adult patients of either Sex, Age ≥ 18 years, having ASA grade I/II posted for elective surgery under general anaesthesia were included in this study. Patients were randomly divided in two groups. Each group included 50 patients.

Group A : Videolaryngoscopy (King Vision - Channeled Blade)

Group B : Conventional Laryngoscopy (Macintosh Blade)

Inclusion Criteria

- Informed consent of patient.
- Age ≥ 18years
- Patients scheduled for elective surgeries requiring oral tracheal intubation.
- Mouth opening ≥ 2 or 2 and half fingers.
- Mallam Patti Grade 1 and 2
- ASA grade 1 and 2.

Exclusion Criteria

- Patient refusal
- Emergency surgeries.
- Age ≤ 18 years
- Mallam Patti Grade 3 and 4
- Patient with airway pathology. (Oral, Pharyngeal, Laryngeal Carcinoma)
- Patients with nil mouth opening

Pre Operative Assessment

It was done one day before the surgery. Any significant past, family and personal history were taken. General physical examination was done, vitals and investigations were noted. A meticulous airway assessment was done to exclude patients with difficult airway by giving attention to Inter Incisor gap, Modified Mallampati airway classification, Neck movements, Thyromental distance, Sternomental distance and examination of dentition.

Patients were kept NBM for 6 hours prior to surgery.

Patient preparation

On the day of surgery, the patients were taken to the operating room, 18 G intravenous cannula inserted and I.V. fluid started. Multipara monitor was attached and baseline pulse rate, blood pressure and SpO2 were recorded. All patients were pre-oxygenated for 3 min before induction.

Premedication:	Inj. Ondansetron 4 mg I.V.
	Inj.Glycopyrrolate 0.2 mg I.V.
	Inj. Fentanyl **2µg/kg I.V.**
Induction:	Inj. Propofol 2 mg/kg I.V.
	Inj. Succinylcholine 2 mg/kg I.V.

Intubation

Procedure was performed by a senior anesthetist who has experience of 2 years. Endotracheal tubes; Size 7.0–7.5 mm tracheal tubes for females and size 8.0–8.5mm in males were used.

Group A (n=50): patients were intubated using King Vision video laryngoscope. CHANNELLED BLADE

Group B (n=50): patients were intubated using direct laryngoscope with Macintosh blade.

Procedures of Video Laryngoscopy and Direct laryngoscopy

All patients were kept in supine position with head in neutral position in group A and in sniffing position in group B.

In group A After adequate depth of anaesthesia, King Vision laryngoscope with proper size CHANNELLED blade (no.3/4) premounted with appropriate size slightly lubricatd endotacheal tube was introduced in the midline, superior to the tongue and advanced towards the larynx until the epiglottis was visualized. On visualization of the cords, Cormack- Lehane grade (CLG) was noted. Proper size of ET tube was inserted from the angle of the mouth to the trachea.

In group B, direct laryngoscopy was performed with Macintosh blade in a usual way with head in sniffing position. The blade tip is inserted into the valleculla. The Cormack- Lehane grade (CLG) was noted. The maneuvers required facilitating the intubation like external laryngeal manipulation, use of stylet or bougies were noted. After successful intubation, the patients were mechanically ventilated for the surgical procedure and anaesthesia was maintained with sevoflurane in a mixture of nitrous oxide and oxygen in a 1:1 ratio with muscle relaxant as per requirement of the surgery.

Total time taken for intubation:-

During the procedure, time was noted by an assistant from introducing the laryngoscope into the mouth till the appearance of firstsquare wave capnography on EtCO2 monitor and bilateral chest movement during manual ventilation, this time was considered as the total time taken for intubation.

Monitoring:

- Pulse/min
- Blood pressure in mmHg
- EtCO2
- ECG monitoring
- SPO2
- Hemodynamic changes (Pulse rate and blood pressure) and SpO2 were noted and recorded during the procedure (Laryngoscopy and Intubation) at various intervals.
    - Pre op- Baseline
    - Before laryngoscopy and intubation
    - After laryngoscopy and intubation
    - 0,5,10 ,15 minutes after intubation.

Statistical Analysis

The socio-demographic parameters were compared between the two study groups, using frequencies and percentages for categorical variables, mean and standard deviation for quantitative variables. The statistical significance was assessed by independent sample student t-test. IBM SPSS Version 26 and © 2018 Graph Pad Software was used for stastical analysis.

Results

This clinical study comprised of 100 adult patients. They were divided into two groups. Each group included 50 patients.

Table 1: Demographic Data

VARIABLE	GROUP A	GROUP B	P-VALUE
AGE (YEARS)	42 ± 15.3	43 ± 12.5	0.58
GENDER (M:F)	21:29	26:24	NA
WEIGHT (KG)	58 ± 10.6	56 ± 6.2	0.108
ASA GRADE (I/II)	1.36 ± 0.48	1.36 ± 0.48	0.120
MOUTH OPENING	3.0 ± 0.0	3.0 ± 0.0	1.00
MALLAM PATTI GRADE	1.3 ± 0.46	1.2 ± 0.38	0.008

The predictors of difficult intubation were also

comparable in both groups.Cormack lehane Grade I and II (A) was found in 99% and 1% respectively of patients in Group A, 72% and 28% respectively of patients with Group B.

Table 2: Total Time Taken For Intubation

VARIABLE	GROUP A	GROUP B	P-VALUE
Time Taken for intubation	25 ± 7.3	35 ± 6.7	0.197
No. of Attempts	1 ± 0.0	1.14 ± 0.35	0.000

The mean tracheal intubation time was higher, in Group B as compared to Group A. But the differences were very minimal and were statistically not significant. All the cases in the Group A were intubated in first attempt, but some of the patients in Group B had required more than 1 attempt, which resulted in higher mean number of attempts.

Table 3: Maneuvers Required Facilitating Intubation

VARIABLE	GROUP A	GROUP B	P-VALUE
BURP Manoeuver	1.28 ± 0.141	1.98 ± 0.45	0.000
Use of BOUGI/ STYLET	1.94 ± 0.240	1.88 ± 0.331	0.030

Table 4: Comparision Of Pulse Rate

VARIABLE	GROUP A	GROUP B	P VALUE
Baseline Pulse Rate	92 ± 13.7	90.5 ± 12.5	0.655
Pulse Rate before intubation	86.9 ± 11.4	87.02 ± 10.6	0.966
Post intubation (o min.) Pulse Rate	87.14 ± 11.2	88.76 ± 11.04	0.693
Post intubation (after 5 min.) Pulse Rate	83.78 ± 10.5	85.2 ± 9.09	0.805
Post intubation (after 10 min.) Pulse Rate	82.62 ± 9.9	84.62 ± 8.33	0.641

No statistically significant difference was observed in heart rate between the two study groups, at any point time. No statistically significant difference was observed in mean arterial BP between the two study groups, at any point time.

Table 5: Complications

COMPLICATIONS	GROUP A	GROUP B
SOFT TISSUE INJURY	4	7
TOOTH INJURY	0	0
SORE THROAT	0	0
HOARSNESS OF VOICE	0	0

No significant differences in complications were seen in all two groups.

Discussion

Present study was carried out to evaluate and compare the laryngeal view and intubation by direct laryngoscope using macintosh blade with videolaryngoscope in adult patients requiring endotracheal intubation. Total 100 adult patients of age 18 to 65 years of either sex, ASA grade I/II posted for elective surgery under general anaesthesia were included in this study.

Group A included 21 males and 29 females patients and Group B included 26 males and 24 females. Demographic data were comparable in both groups.

All subjects in Group A showed vivid, wide, magnified, true colour and binocular view of vocal folds without using greater retraction force. In Group B 72% subjects had Cormack Lehane grade 1 view, 38% with grade 2a, laryngeal view. **Jungbauer, M. Schumann, V. Brunkhorst, et al**[6] concluded that Videolaryngoscopy when compared to direct laryngoscopy for difficult intubations provides a significantly better view of the vocal cords, a higher success rate, faster intubations and less need for optimizing maneuvers. **Griesdale DE et al**[11] cocnluded that Video laryngoscopy resulted in successful glottic

visualisation in 85% of patients compared to only 30% in direct laryngoscope group.

In our study the mean **tracheal intubation time** (TTI) was 25 seconds in Group A and 35 seconds in Group B. **Akbar SH, Oioi JS et al[9],** compared the intubation profile and hemodynamic fluctuations between C-MAC video laryngoscope and Macintosh direct laryngoscope with immobilised cervical spine. **Murphy LD, Kovacs GJ, Reardon PM, Law JA et al[14]** also found similar findings.

The heart rate in both groups decreased from basal value after premedication with fentanyl and midazolam and lowered further after induction with Propofol. Both groups were comparable and found not significant.

In both groups Systolic, diastolic and mean blood pressure decreased to lower value from basal to premedication and to post induction. After intubation they all increased to basal value from post induction value at PT0 then started declining to remain stable by about 5 minutes after intubation. **Prathima Padavarahalli Thammanna et al[1]**found that the hemodynamic responses to laryngoscopy and intubation with King Vision videolaryngoscope were similar when used in normotensive patients with normal airway.[1]

4 patients in Group A and 7 patients in Group B had airway trauma. No patients had cuff perforation or hypoxia in both the groups. Our study was conducted in patients with normal airway and hence it cannot be applied to difficult airway management. For this further study is required.

Conclusion

From present study, we concluded that videolaryngoscope offers a better laryngeal view, minimum external maneuvers, less attempts for intubation and provides better hemodynamic response during laryngoscopy and intubation as compare to direct laryngoscopy with Macintosh blade.

Conflict of Interest: none

Source of Support: Nil

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