Original Article

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Airtraq® Optical Laryngoscope versus Coopdech® Video Laryngoscope for Intubation Performance in the Pediatric Patients: A Randomized Single Hospital Study

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Abstract

Introduction: Airtraq® is an optical laryngoscope that allows visualization of the vocal cords without a direct line of sight. The Coopdech Video Laryngoscope® (CVL) allows a direct visualization of the vocal cords on a digital screen and is the world's first and only video laryngoscope with Miller, Macintosh, Bullard and J-shaped blades.

Aim: The aim of this study was to evaluate CVL and Airtraq optical laryngoscope (AOL) regarding intubation time, a number of attempts at intubation, need for optimization maneuvers and hemodynamic changes during intubation in pediatric patients.

Materials and Methods: A total of 100 children of American Society of Anesthesiologists Class I, aged 6-36 months, undergoing operative procedure under general anesthesia were inducted into this study and were further divided into 2 groups using computer generated tables. Inhalational induction with sevoflurane in oxygen was done after premedication. Atracurium was used to facilitate intubation. Patients were randomly allocated to be intubated with either airtraq pediatric size (AL group) or CVL (CL group) using Miller's 0/1 or Machintosh 2 size blade and intubation time, a number of intubation attempts, optimization maneuvers and hemodynamic parameters were recorded. Data obtained was assessed using appropriate statistical methods using two-tailed *t*-test/Mann–Whitney U-test or Chi-square test as appropriate. Data were expressed as a mean and standard deviation, median and interquartile range. A $P < 0.05$ was considered statistically significant.

Results: Group CL as compared to group AL, had significantly longer intubation time ($P < 0.05$), more median number of intubation attempts. Compared to CVL, airtraq had shorter duration of intubation, lesser attempts at intubation with less number of optimization maneuvers.

Conclusion: AOL is better for pediatric intubations than CVL.

Key words: Airtraq optical laryngoscope, Coopdech video laryngoscope, Pediatric intubation

INTRODUCTION

Pediatric airway management is a critical intervention which requires experience, proper planning and in time management for emergent problems. Significant differences are there in the airway of pediatric subjects compared with adults. These differences are mainly due to the large head, high up larynx, large tongue, large epiglottis, anterior angulation of the vocal cords, and short jaw seen in pediatric subjects.[1] In recent years, many new optical laryngoscopes have been developed for use in pediatric patients. The Airtraq™ (PRODOL, MEDITEC S.A.) is a disposable battery operated optical laryngoscope that allows high-quality viewing of the vocal cords and unlike conventional laryngoscope it does not require a straight line of sight up to the patient's vocal cords.[2] Use of the Airtraq does not require displacement of the tongue and forceful elevation of the epiglottis resulting in less application of

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force compared with the conventional direct laryngoscopy.[3] The Coopdech Video Laryngoscope™ (DAIKEN MEDICAL) allows a direct visualization of the vocal cords on a digital screen and is the world's first and only video laryngoscope with Miller, Macintosh, Bullard and J-shaped blades. Both these variants of optical laryngoscope are easy to use and have a short learning curve. However, there are no studies comparing Airtraq™ with Coopdech Video Laryngoscope™ in pediatric population and controversy still remains regarding which optical laryngoscope is better for use in pediatric patient. Hence, we designed a randomized prospective study to compare both these laryngoscopes regarding the intubation time.

MATERIALS AND METHODS

After approval from Institutional Ethics Committee and departmental clearance this randomized, prospective, blinded study was conducted under the Department of Anesthesiology and Critical Care, Guwahati Medical College and Hospital from August 2015 to January 2016. Written parental informed consent was obtained for all the patients before inclusion in this study. About 100 children admitted under Pediatric Surgery Department of Gauhati Medical College with the following characteristics American Society of Anesthesiologists (ASA) Class I, boys and girls aged 6-36 months, undergoing elective operative procedure under general anesthesia were included into this study. Exclusion criteria being parental denial, patients with a history of or anticipated difficult airway and intubation, risk of gastric aspiration, cardiovascular, respiratory, metabolic disease, and central nervous system disease. Adequate pre-operative preparation was done in the form of solid food being withheld for 6 h preoperatively and only clear liquids were permitted up to 3 h before induction of anesthesia. Children were pre-medicated with nasal midazolam 0.3 mg/kg 30 min before the anticipated start of surgery. After arrival in the operating room standard, ASA monitors were attached and baseline hemodynamic data were recorded. Inhalational induction with sevoflurane in oxygen-air mixture was done. After induction an intravenous line was established, and fentanyl 2 μg/kg and atracurium 0.5 mg/kg were administered IV. Computer generated tables were used by the anesthesist before induction to randomize patients to undergo intubation with either Airtraq laryngoscope (AL group comprising of 50 patients) or coopdech laryngoscope (CL group comprising of 50 patients). The anesthesiologist participating in the study had more than 10 years of experience in pediatric anesthesia and was well trained with the proper use of Coopdech and Airtraq video laryngoscope for pediatric intubations. 2 sizes of pediatric Airtraq 0, 1 were used for this study one that accepts an endotracheal tube between 2.5-3.5 mm and another that accepts 4.00-5.50 mm endotracheal tubes. For CL blades, Miller's 0/1 or Machintosh 2 were used for laryngoscopy and intubation. The following parameters were noted Intubation time (primary outcome), number of intubation attempts, number of optimization maneuvers required (repositioning the head or the need for a second assistant to aid tracheal intubation), hemodynamic parameters before during and after intubation (at 1, 3, 5, 7 min). Intubation time was the period from termination of manual ventilation with afacemask to initiation of ventilation through the endotracheal tube. Any attempt at laryngoscopy greater than 120 s were considered as failed intubation.[4] Complications if any were also noted. As there was no previous study comparing both these laryngoscopes so sample size calculation could not be done, we intend to use it as a pilot study based on which controlled trials could be conducted in the future. Data obtained from these patients was entered into Microsoft Excel spread sheet and assessed using (GrapPad InStat - version 3.0) appropriate statistical methods using two-tailed *t*-test/Mann–Whitney U-test or Chi-square test as appropriate. Data were expressed as a mean and standard deviation, median and interquartile range. $P < 0.05$ was considered statistically significant.

RESULTS AND OBSERVATIONS

The age, height, weight, gender, and duration of anesthesia was found to be comparable between the group AL and group CL (Table 1).

There was asignificant increase in the intubation time in group CL (26.85±7.5 s) compared to group AL (21.75±5.8 s) (Figure 1).

Table 1: The demographic parameters between the 2 groups AL and CL

Parameters	AL group (50)	CL group (50)
Age (months)	22±6.5	24±5.4
Height (cm)	102±8.5	105±10.2
Weight (kg)	12±5	11±6.5
Gender (%)		
Male	32 (64)	28 (56)
Female	18 (36)	22 (44)
Duration of surgery (minutes)	68±20.8	72±16.4

AL: Airtraq laryngoscope, CL: Coopdech laryngoscope

Table 2: Median attempts at intubation and number of optimization manaeuvers in both groups AL and CL

Parameters	AL group (50)	CL group (50)	*P* value
Numbers of intubation attempts	1 (1-1)	2 (1-2)	0.001
Numbers of optimization maneuvers	0 (0-0)	1 (1-1)	0.001

AL: Airtraq laryngoscope, CL: Coopdech laryngoscope

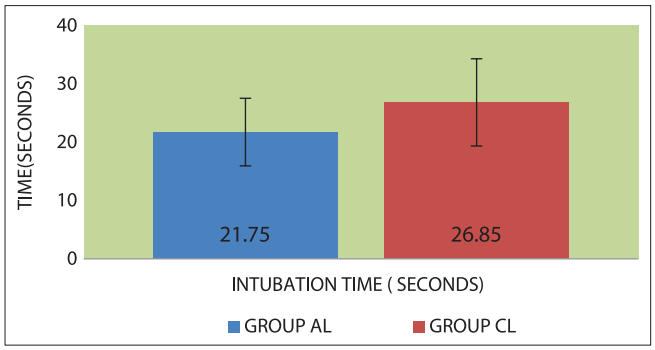

Figure 1: Comparison of intubation time between group airtraq laryngoscope and group coopdech laryngoscope (*P* = 0.002)

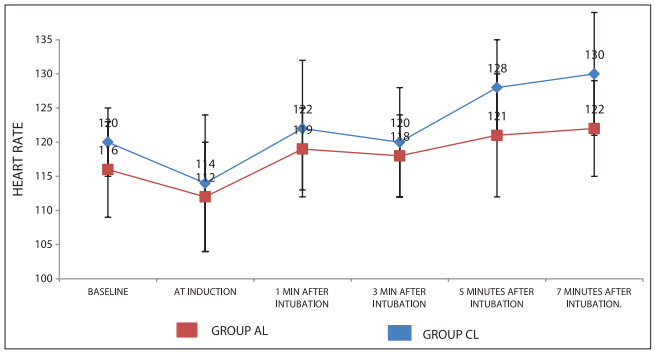

Figure 2: Comparison of hemodynamic parameters between two groups airtraq laryngoscope and coopdech laryngoscope at 1, 3, 5, 7 min post intubation

The median and interquartile range of intubation attempts was 1 (1-1) for AL group compared with 2 (1-2) in CL group (*P* = 0.001). No optimization maneuvers were required in the airtraq group, the median and interquartile range of optimization maneuver was 1 (1-1) for CL (*P* = 0.001) (Table 2).

A significant increase in the heart rate was observed in CL group compared to AL group at 5 and 7 minutes post intubation (Figure 2).

No incidence of failed intubation or complications were noted in either group of patients.

DISCUSSION

The result of our study indicates that airtraq intubation in pediatric subjects was faster than intubation with coopdech video laryngoscope (CVL). Airtraq guided intubation time obtained in our study was similar to that obtained by Riad *et al.*[5] in pediatric patients. CVL guided intubation time in our study was more than that obtained by studies using CL for intubation during pediatric resusciation.[6] The cause for the difference may be as because we used CVL only for elective intubation during surgery and not for emergency intubations during CPR. Lower number of median intubation attempts and optimization maneuvers were noted in Airtraq group of patients. In our study, we reported less alteration of the hemodynamic stress response to intubation with airtraq compared to CVL, with significantly lower heart rates in the airtraq group at 5, 7 minutes post intubation. Maharaj *et al.*[7] also noted similar lower stress response for Airtraq in his study on adult patients. The potential limitations of our study were pediatric patients with difficult airway were not included as well as not encountered in our study population. Our results may not be applicable in all settings as experienced operators may not be available everywhere.

CONCLUSION

Airtraq optical laryngoscope decreases intubation time, number of intubation attempts, optimization maneuvers in pediatric patients and may result in a lower alteration of heart rate compared to CVL during pediatric intubation.

REFERENCES

1. Holm-Knudesn R, Rasmussen LS. Pediatric airway management: Basic aspects. Acta Anaesthesiol Scand 2009;53:1-9.
2. Neustein SM. Use of the Airtraq laryngoscope. Anesthesiology 2007;107:674.
3. Suzuki A, Toyama Y, Iwasaki H, Henderson J. Airtraq for awake tracheal intubation. Anaesthesia 2007;62:746-7.
4. Maharaj CH, Costello J, Higgins BD, Harte BH, Laffey JG. Retention of tracheal intubation skills by novice personnel: A comparison of the Airtraq and Macintosh laryngoscopes. Anaesthesia 2007;62:272-8.
5. Riad W, Moussa A, Wong DT. Airtraq™ versus Macintoch laryngoscope in intubation performance in the pediatric population. Saudi J Anaesth 2012;6:332-5.
6. Szarpak L, Czyzewski L, Truszewski Z, Kurowski A, Gaszynski T. Comparison of Coopdech®, CoPilot®, Intubrite®, and Macintosh laryngoscopes for tracheal intubation during pediatric cardiopulmonary resuscitation: A randomized, controlled crossover simulation trial. Eur J Pediatr 2015;174:1517-23.
7. Maharaj CH, Buckley E, Harte BH, Laffey JG. Endotracheal intubation in patients with cervical spine immobilization. A comparison of macintosh and airtraq laryngoscopes. Anesthesiology 2007;107:53-9.

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