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TO COMPARE THE PEDIATRIC TRUVIEW EVO2 AND AIRTRAQ LARYNGOSCOPE IN CHILDREN < 5 YEARS WITH NORMAL AIRWAY.

Pediatrics

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ABSTRACT

Introduction: To compare the pediatric TruView EVO2 and Airtraq laryngoscope in children < 5 years with normal airway.
Methods: Prospective, randomised, controlled study with 60 children scheduled for elective surgery under general anesthesia divided into two **groups:** intubation using TV and Airtraq. Time to intubate, first attempt success rate (FASR), percentage of glottic opening, ease of intubation score and complications were recorded.
Results: Time to intubate was 27.54sec in TV and 21.50 sec in AT (P<0.0001). FASR was 80% in the TV and 100% in the AT. The percentage of glottis opening score was 90% in TV and AT group. Ease of Intubation was more with AT group.
Conclusion: AT is better than TV for intubating children as it takes lesser time for intubation, has higher first attempt success rate and greater ease of intubation.

KEYWORDS

Airway, pediatric, video laryngoscope

INTRODUCTION

Video laryngoscopy has mainly been developed to facilitate difficult airway intubation. The airway of infants is special, differing significantly from that of older children. Anatomic differences include a large head that tends to flex the short neck and obstruct the airway, a large tongue, a short jaw, a long palate, a long epiglottis, a more cephalad-located larynx, and a soft airway that may lead to airway obstruction.[1]

The Airtraq optical laryngoscope,recently developed intubating device, has an exaggerated curvature of the blade and an internal arrangement of optical components provide a clear view of the glottis, without need for alignment of the oral, pharyngeal and laryngeal axes.[2] Three pediatric sizes are available: size 2, size 1 and size 0 which are green, purple and grey coloured respectively and accommodate endotracheal tube sizes 6.0–7.5, 4.0–5.5 and 2.5–3.5 respectively.[3]

In 2009, Truphatek TruView EVO2 system began to be used in pediatric anesthesia (4). The TruView system is a device with an integrated optical lens system and a unique blade tip angulation that provides an optimal line of sight, allowing a view of the glottis via the prismatic lens without having to align the oral, pharyngeal, and tracheal axes. An infant blade is also available and is recommended for use in children with a bodyweight of 1-10 kg.

Most of the published data related to videolaryngoscopy have been obtained from adults, as the implementation of videolaryngoscopy in pediatric airways has only been investigated in a few recent publications (5-8). Therefore, this study was done to compare the Tru View EVO2 and Air traq laryngoscope in children.

MATERIAL AND METHODS

Following institutional Ethics Board approval and informed written consent from parents, 60 children (ASAI and II, age five and under) scheduled for general anesthesia were enrolled. Exclusion criteria included previously documented difficult airway, predicted difficult bag mask ventilation, predicted difficult intubation and need for rapid sequence induction. The children were randomly assigned using a computer generated random number table to TV or AT groups which were were intubated using Truview 1 or 2 blade and infant AT (for tube size 2.5 to 4.0) or pediatric AT (for tube size 4.5 to 5.5) respectively .Each anaesthesiologist performed twenty intubations on a pediatric manikin and twenty intubations on anesthetized children age 5 and under using TV and AT.

Induction of anesthesia was performed by inhalation of 8% sevoflurane in 60% nitrous oxide and 40% oxygen followed by intravenous injection of 2 mg/kg propofol prior to intubation. Standard montoring was used. Preoxygenation was done with 100% oxygen for 1 min. Uncuffed tracheal tube of appropriate size for age was used. Time to intubation (TTI) was defined as the time interval between blade entry past the lips and the appearance of CO2 on the end-tidal tracing. TTI >60 sec was defined as a failed first attempt intubation. Laryngeal best view was quantified by percentage of glottis opening (POGO) score. First attempt success rate(FASR), complications (Blood on laryngoscope, minor laceration,airway trauma)and loss of visualization due to fogging or red-out were recorded. Ease of Intubation was assessed by VRS(visual rating scale). First attempt success was correct placement of the tracheal tube within 60 sec without oxygen saturation below 94% during the attempt.

STATISTICAL ANALYSIS

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Normality of data was tested by Kolmogorov-Smirnov test. If normality was rejected then non parametric test was used. Quantitative variables were compared using Independent t test/Mann-Whitney Test (when the data sets were not normally distributed) between the two groups. Qualitative variables were correlated using Chi-Square test/Fisher's Exact test. P value of 0.05 was statistically significant. Sample size was based on comparable adult studies. Data analysis was done using SPSS version 21.0.

RESULTS

Patient characteristics of the 30 children in the TV group and 30 children in the AT group were comparable. (Table 1).TTI was significantly longer in the TV group than in the AT group (P < 0.0001) (Table 2)(Figure 1). POGO scores were high in both the groups. There were six failed intubations in the TV group and zero failed intubations in AT group. Ease of intubation was significantly higher in AT group. Complication involving airway trauma was seen with one patient only in TV group. Oxygen saturations below 94% were not seen in either group.

Table 1: Comparison of patient's baseline characteristics between Airtraq and Truview. Values are mean (SD), number or median (interquartile range).

FEATURES	AIRTRAQ	TRUVIEW	P value
AGE (mo)	30.6±16.7	28.67±14.44	0.663
WEIGHT(Kg)	13.3±5.31	12.93±5.36	0.744
GENDER(M/F)	13 : 17	14: 6	0.795

Table 2: Comparison of, time of intubation (sec),First attempt success rate (FASR), Percentage of Glottic Opening (POGO), and complications between Airtraq and Truview. Values are number (%), mean (SD) and median (inter-quartile range).

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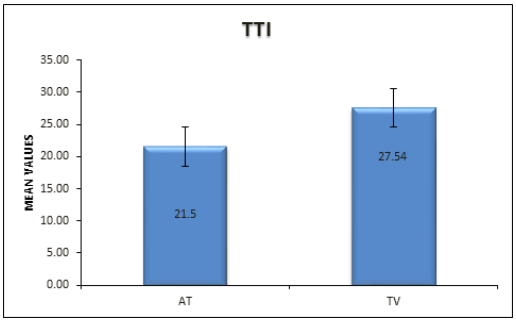
	AIRTRAQ	TRUVIEW	P value
TTI (sec)	21.50±1.85	27.54±2.8	<0.0001
FASR	30	24	0.024
POGO (%)	90±7.19	89.38±7.85	0.762
EASE OF INTUBATION(VRS)	3.03±0.81	6.17±0.82	<0.0001
COMPLICATIONS	0	1	1.000

FIGURE 1: Comparison of time of intubation (TOI) between AT-TV groups. Values are in mean and standard deviation. statistically significant, $p \leq 0.05$.



DISCUSSION

Intubating with the TV took around 6 sec longer than AT, statistically significant.Airtraq intubation in pediatric subjects by experienced care givers was faster than traditional intubation with the Macintosh laryngoscope.[9] Inal *et al.* also found a longer time to intubate using Truview evo2,[10] when they compared it with the Miller blade in children of the same age group. Riveros *et al.*, although they used Truview PCD, also found a significantly longer median time to intubate than the Macintosh laryngoscope in children.[11]

The shorter intubation time with Airtraq may be explained due to two reasons. First, more patients were intubated in the first attempt with Airtraq which reduced the total time. Second, the improved glottic viewing with the Airtraq helped to pass the tracheal tube in shorter time. Moreover, AT was not affected by fogging or red-out, visual problems that often confound other indirect visualization techniques.

The main reason for increased duration of tracheal intubation with TruView is the difficulty experienced in advancing the tube through the lateral side of the patient's mouth.Another problem with TruView laryngoscope is fogging on distal lens which may reduces image quality.We used oxygen insufflation from the side port to reduce lens fogging. Furthermore ,use of the Truview blade needs good eye– hand co-ordination and practice.

POGO score was high in both TV and AT group due to good layngoscopic view, less optimization manoeuvres and lifting force required.The internal arrangements of the high definition optical system in Airtraq give a high quality and wide angle view of glottis. Likewise, Truview offers a 42 degree anterior refracted glottic view therefore reduces the difficulties encountered during direct laryngoscopy.

The anesthesiologists experienced some difficulties with placement of the tracheal tube by TV. Previous studies with the Airtraq® have consistently demonstrated a requirement for less operator skill to use this device compared to the Macintosh laryngoscope, leading to more rapidly acquired proficiency [12,13].

Four failed TV intubations occurred. Considerable resistance was experienced to passage of tube down the airway.The same tube was easily placed in the trachea by AT on second attempt. The Airtraq exhibits a rapid learning curve, despite a deliberately brief instruction period probably accounts for its significantly increased first intubation success rate. Piraccini and colleagues successfully intubated all subjects by pediatric airtraq at first attempt in less than 30 s.[14] Piraccini and colleagues reported a case series of 7 children in whom Airtraq was used as a rescue device for intubation.[14] Chalkeidis and colleagues reported that it is easy to use Airtraq videolaryngoscope but no clear advantage in patients with normal airway.[15]

Airway trauma was seen with only one patient in TV group.Inal *et al.*[10] and Riveros *et al.*,[11] who did not report any significant intraoperative complications during laryngoscopy and intubation with either Truview or the conventional laryngoscope.

Our study has several limitations. First, the intubating anesthetist was not blind to the randomization of the laryngoscope. Second, we chose POGO score instead of modified Cormack-Lehane because the POGO score can distinguish patients with large and small degrees of partial glottic visibility; it might provide a better outcome for assessing the difference between various intubation techniques.Another limitation of our study is that we did not compare the relative efficiencies of these devices with other intubation modalities such as Macintosh, McCoy, laryngeal mask airway and glidescope. Lastly, the laryngoscopes were used by experienced anaesthetists, so results may not be similar for less experienced users.

In conclusion, although Truview offers good glottic visualisation like Airtraq, Airtraq significantly reduces the mean time of intubation, has higher success rate at first intubation attempt and ease of intubation as compared to Truview. Therefore, the Airtraq laryngoscope appears preferable to Truview laryngoscope in pediatric patients.

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