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A study to compare the efficacy of intubation with oral versus nasal Airtraq using preformed tracheal tube in patients undergoing cleft lip and palate repair

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ABSTRACT

Preformed Ring, Adair and Elwyn (RAE) tracheal tubes are generally preferred for tracheal intubation in patients undergoing cleft lip and palate repair. Till date, only few sporadic cases in literature have been reported where oral Airtraq optical laryngoscope has been used to perform tracheal intubation with RAE tracheal tube in these children. In this study we hypothesize that using a pre shaped styleted RAE endotracheal tube with nasal Airtraq (without a side channel) would be easier to direct the tracheal tube towards the glottis than with an oral Airtraq resulting in reduced intubation time and increased success rate. Following approval by Hospital Ethical Issues committee, 30 ASA I and II patients between 1-24 months of age with cleft lip and palate undergoing repair of either cleft lip or palate were included in this study. Patients were randomized into two groups of 15 patients each as per sealed envelope. Tracheal intubation was performed by senior anesthetists who were well experienced in visualizing the glottic view on its dedicated video screen and intubation with oral or nasal Airtraq. Mean time to perform tracheal intubation using Nasal Airtraq was over 50% faster than when using Oral Airtraq. Nasal Airtraq ensures 100% successful intubation in the first attempt as compared to 60% with Oral Airtraq. In conclusion, Nasal Airtraq aided tracheal intubation is superior to Oral Airtraq in patients with cleft lip and palate that gives nearly 100% successful tracheal intubation in the first attempt with no evidence of soft tissue trauma.

Key words: Airtraq optical laryngoscope, Cleft lip and Palate repair, Tracheal intubation

INTRODUCTION

Cleft palate is the most common craniofacial anomaly. The reported incidence of cleft lip and palate has been quoted as 2.0 per1000 live birth[1]. Preformed Ring, Adair and Elwyn (RAE) Endotracheal Tubes (ETT) are generally preferred for tracheal intubation in patients undergoing cleft lip and palate repair (Figure 1). Till date, only few sporadic cases in literature have been reported where Airtraq optical laryngoscope (Prodol Meditec Limited, Las Arenas, Spain) has been used to perform tracheal intubation with RAE tracheal tube in these children[2,3]. Our experience suggests that when attempt is made to perform tracheal intubation with the oral Airtraq pre-loaded with RAE ETT, manipulations become difficult and often the RAE ETT tends to deviate out of the side channel of the Airtraq (Figure 2). This affects the emergence of the RAE ETT with resultant prolongation of intubation time and even failure. In this study we hypothesize that using a preshaped styleted RAE ETT with nasal Airtraq (without a side channel), as shown in (Figure 3), would help to direct the ETT manually while visualizing the glottis on its dedicated video screen resulting in reduced intubation time and increased success rate.

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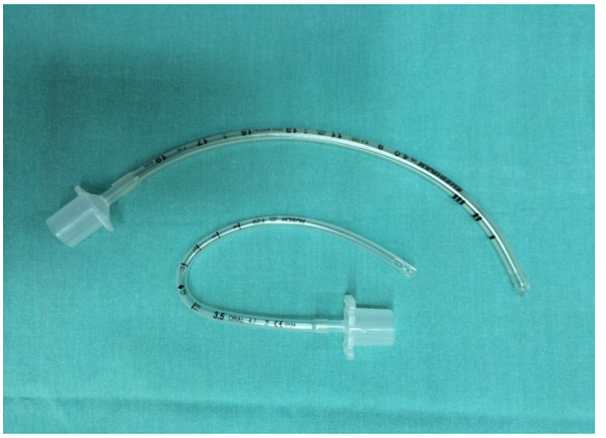

Figure 1. Conventional ETT (upper) and preformed RAE ETT (lower)

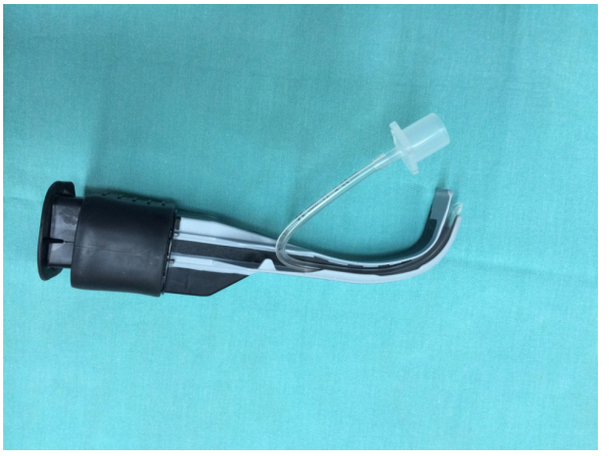

Figure 2. Showing a poorly engaged RAE ETT in the side channel of oral Airtraq.

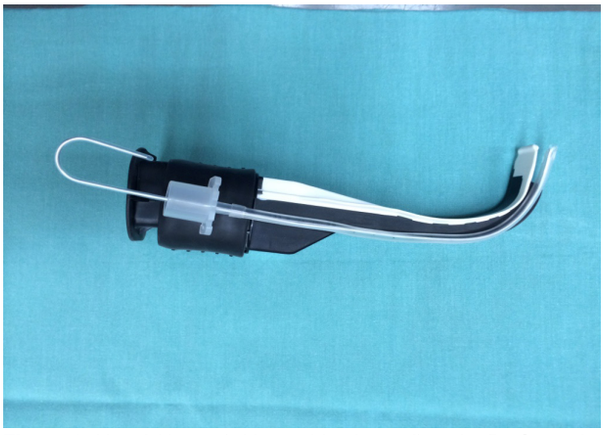

Figure 3. Nasal Airtraq (without side channel) and a Preformed RAE ETT shaped with a stylet to the shape of Airtraq curvature.

METHODS

Following approval by Hospital Ethical Issues committee, 30 ASA I and II patients between 1-24 months of age with cleft lip and/ or palate undergoing repair of either cleft lip or palate were included in this study. Patients were randomized into Oral Airtraq (OA) group and Nasal Airtraq (NA) group with 15 patients in each as per sealed envelope. Tracheal intubation was performed by one of the two senior anesthethesiologist who were well experienced in visualizing the glottic view on its dedicated video screen with both NA and the OA.

All patients were induced with sevoflurane in 100% oxygen via facemask in gradually increasing concentration. Relaxation for tracheal intubation was achieved using rocuronium bromide 0.6 mg/kg IV and fentanyl 1µg/kg for analgesia. After adequate relaxation, the designated anaesthesiologist performed tracheal intubation. Paediatric NA (white color code) was used in NA group while grey and purple color coded OAs were used in the OA group for ETT sizes 2.5−3.5 and 4.0−5.5 mm ID respectively. Each attempt lasted for a maximum of 60s provided oxygen saturation remained ≥95%. No more than two attempts were allowed. Patients were oxygenated between attempts. Failure to intubate after two attempts was dealt with tracheal intubation using conventional laryngoscope. After successful tracheal intubation, anaesthesia was maintained using 1−2% sevoflurane in a mixture of 40% oxygen and 60% nitrous oxide with pressure controlled, volume guaranteed mode of ventilation. Standard monitoring was adopted in all patients during the study.

Parameters recorded during the study period:

- Time in seconds from entry of the Airtraq between the teeth to negotiation of the ETT mark beyond vocal cord in the two groups.
- Percentage of Glottic Opening (POGO) seen during tracheal intubation by OA or NA.
- Number of attempts.
- Any alternative method used in case of Airtraq failure.

A new attempt was counted if patient desaturated to less than 95% or operator was unable to successfully intubate the trachea within 60 seconds.

Statistics: With a significance level of $\alpha = 0.05$ and power $1-\beta = 0.8$, a minimum sample size of 30 was reached with 15 patients in each group.Statistical analysis of the data was done using Chi-square test and Logistic regression by using SPSS version 22. P value < 0.05 was considered significant.

RESULTS

Mean age and weight of the patients were nearly identical in the two groups with no statistical difference (P>0.5). Although the POGO score did not show any significant difference in the two groups but mean time to perform tracheal intubation using NA was two and a half time faster than when using OA (Table 1).

Table 1. Showing demographic data, mean POGO score and time to intubate in the two groups

Group	Mean age (months) ± (SD)	Mean weight (kg) ± (SD)	Mean POGO view (%) ± (SD)	Mean time to intubate (s) ± (SD)
OA	10.4 ±(8.7)	7.6 ±(8.7)	98.0 ±(2.9)	52.2 ±(37.5)
NA	11.6 ±(8.4)	8.1 ±(3.2)	99.2 ±(2.8)	21.9 ±(15.1)
P value	>0.05	>0.05	>0.05	<0.001

POGO= Percentage of Glottic Opening, OA= Oral Airtraq, NA= Nasal Airtraq, SD= standard deviation, s= seconds, kg= kilogram.

NA ensures 100% successful intubation in the first attempt as compared to only 60% with OA. There was a failure to intubate one patient in the OA group as compared to none in the NA group (Table 2).

Table 2. Showing number of attempts needed and outcome of tracheal intubation in the two groups

Group	Intubation Attempts No. (%)	Success/failure No. (%)
OA	1st=9 (60%) 2nd=6 (40%)	Success=14 (93.3) Failure=1 (6.6%)
NA	1st=15 (100)	Success=15 (100%)

OA= Oral Airtraq, NA= Nasal Airtraq

DISCUSSION

Our interest in this group of cleft lip and palate patients came from the fact that they are anticipated to have a higher incidence of difficult airway. One of the largest prospective studies of 800 pediatric patients with cleft lip with or without cleft palate showed that 7.38 % of these patients have Cormack and Lehane's score (CL score) of III and IV suggesting difficult tracheal intubation[4].

We selected to study the efficacy of Airtraq in cleft lip and palate patients because the only prospective study in the past comprised a total of 10 patients only[2]. In this study, Airtraq was demonstrated to be superior to Storz's video laryngoscope in terms of speed and attempts at tracheal intubation. In our personal experience, we noted that the RAE ETT had a tendency for its proximal portion to move out of the Airtraq channel during its negotiation into the glottis resulting in intubation difficulties. This prompted us to compare the efficacy of OA versus NA in terms of success rate and speed of tracheal intubation in patients with cleft lip and/ or palate undergoing reconstructive surgery.

Our study demonstrates that both NA and OA give near 100% glottic exposure. This is essentially due to the oropharyngeal curvature of the Airtraqs. However, we observed that negotiating the RAE ETT via the side channel of OA is significantly more time consuming as compared to a combined strategy of glottic exposure with NA and a separate passage of a styleted RAE ETT under its guidance. This not only resulted in 100% success rate of tracheal intubation using NA but more importantly reducing intubation times by two and half time. These two advantages may be of great significance as these cleft lip and palate patients may have associated congenital cardiac anomaly[5], hence may tolerate prolonged laryngoscopy time and apnoea poorly.

This study had its share of limitations. First, small sample size due to limitations in procuring paediatric Airtraq at our institution. Second, blinding was not possible in this trial. Lastly, though the anaesthesiologists were well experienced with the use of conventional ETT via the OA and NA in paediatric patient but had only limited experience with RAE ETT.

In conclusion, it was firmly established in this study that tracheal intubation using RAE ETT in patients with cleft lip and/ or palate defects has a higher first attempt success rate and faster intubation time when using the NA as compared to OA.

REFERENCES

1. Hagberg C, Larson O, Milerad J. Incidence of cleft lip and palate and risks of additional malformations. Cleft Palate Craniofac J. 1998; 35:40–5. https://doi.org/10.1597/1545-1569(1998)035<0040:IOCLAP>2.3.CO;2
2. Sorensen MK, Holm-Knudsen R. Endotracheal intubation with Airtraq versus storzvideolaryngoscope in children younger than two years- a randomized pilot study. BMC Anesthesiology. 2012; 12:7. https://doi.org/10.1186/1471-2253-12-7 PMid:22545575 PMCid:PMC3469359
3. Vlatten A, Soder C. Airtraq optical laryngoscope intubation in a 5-month-old infant with a difficult airway because of Robin Sequence. Paediatr Anesth. 2009; 19:695–715. https://doi.org/10.1111/j.1460-9592.2009.03038.x PMid:19638117
4. Gunawardana RH. Difficult Laryngoscopy in cleft lip and palate surgery. Br J Anaesth. 1996; 76:757–9. https://doi.org/10.1093/bja/76.6.757 PMid:8679344
5. Akhiwu BI, Efunkoya AA, Akhiwu HO, Adebola RA. Congenital heart disease in cleft lip and palate patients: How common is the association? Journal of Advanced Oral Research (Jo AOR). 2017; 8:53–6. https://doi.org/10.1177/2229411217729082