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NEED OF RE-INTUBATION USING UNCUFFED V/S CUFFED ENDOTRACHEAL TUBES (ETT) AMONG CRITICALLY ILL TODDLER POPULATION REQUIRING INTERFACILITY TRANSFER.

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ABSTRACT

Introduction: Paediatric patients presenting in emergency department often require intubation where patients are unable to protect their airways. Although an indispensable way of protecting patient's airways, Complication of endotracheal intubation are well known. Traditionally uncuffed tubes are advised in paediatric population less than the age of 8 years to avoid the risks factors, however uncuffed tubes also present with a precedented challenge of difficult securing of the ETT thus warranting for reintubation. in bigger children and adults, the use of cuffed tubes is well established, this study is to evaluate the need of reintubation in uncuffed and cuffed endotracheal tubes (ETT) used in critically ill children less than 3 years of age needing interfacility transfer. **Material:** In our cross-sectional study conducted over the course 6 months, we prospectively gathered data on 60 severely sick paediatric patients older than 365 days of life and younger than 3 years, who needed referral to a higher facility. For uncuffed ETT, tube diameters were determined using the modified Cole formula (age [y]/4 + 4 mm ID), and for cuffed ETT, a tube size that was chosen to be one-half smaller. The doctor in charge of the initial airway treatment made the decision to use ETT. **Results:** with sample size of 60 patients satisfying our exclusion and inclusion criterion it was noted that out of 60 Toddlers14(23.3%) patients needed reintubation during interfacility transfer to a higher Center, of these 13(43.33%) toddlers belonged to group A that is toddlers who were intubated with conventional uncuffed ETT, 1(3.33%) toddler belonged to the group B, that is intubated with cuffed ETT, needed reintubation during transfer to a higher Center. **Conclusion:** Cuffed ETT may have not been used traditionally among toddler population due to factors like possible air way injury, tracheal rupture & mucosal ischemia, all these complications are preventable if a proper size or cuffed ETT is used avoiding overinflation of the cuff and securing the tube at right length. Cuffed ETT are clearly superior to uncuffed ETT when it comes to securing air ways for referral purpose and had a significantly lower incidence of unplanned extubation during transit and thus a lower rate of complications pertaining to emergent reintubation.

KEYWORDS :

INTRODUCTION

Interfacility transfer for paediatric patient population is growing due to advent of system- oriented hospital setups providing State of the art services to critically ill children, but due to lack of such set-ups in every corner of the country sometimes it becomes vital for the patient to be initially managed at a lower presenting centre then transferred after a basic resuscitation and management to a higher center. This warrants for a proper transport system to maintain the patient haemodynamically between the two centers. Transport teams have developed into mobile ICUs that can provide cutting edge critical care during the transfer of the patient, so as to provide better and needed facility to a critically sick toddler. Sometimes patient may need mechanical ventilation thus making it indispensable that air ways are maintained through the transport in order to prevent any ischemic or hypoxic injury to the brain due to lack of proper oxygenation. In such patients it becomes crucial to choose the right means of securing airways so as to prevent deterioration of the patient.

Paediatric intubation up to the age of eight is very different when compared with adult intubation, reason for the same is difference in the size of the larynx. larynx is mostly funnel-shaped, with the non-distensible cricoid cartilage at its narrowest point. According toEckenhoff [1]. Thyroid, cricoid, paired arytenoids, epiglottis, and the corniculate and cuneiform cartilages surrounding the epiglottis make up this structure. These cartilage fragments influence the mobility of the larynx muscles and are attached by ligaments. Among these, the cricoid cartilage is situated at the C4 level at birth, beneath the biggest thyroid cartilage, and by the time a child is six years old, it has settled at the C5 level [2].

Children's short cricoid cartilage means that mucosal oedema can restrict the airway severely, and subglottic stenosis is more likely to occur with prolonged endotracheal intubation [3]. In adults, the epiglottis is broad and runs parallel to the trachea; in children, however, it is softer, thinner, and more horizontal [4]. Above stated facts traditionally made un-cuffed ETT as the means of choice to secure airways in toddler population, as Cuffed ETT's are believed to cause oedema due to cuff pressure.

It is a crucial and difficult to choose and insert an endotracheal tube (ETT) of the proper size for airway control during critical scenarios in paediatric patients. The lumen of the ETT is crucial for breathing pressure, while the outside diameter is crucial for controlling leakage and preventing aspiration. It has been clinically shown that the inner diameter may be used to predict the ideal ETT size. Although the ETT size has been determined using conventional calculations based on height or age [5], it may be necessary to replace the initial size chosen if it proves to be inappropriate. For a long time, the age-based Cole formula [ID (mm) = (age/4)+ 4.0][6] has been used to determine the right ETT size for kids. This formula works well with uncuffed ETTs, although the usage of cuffed ETTs has been revised due to recent advancements in our understanding of paediatric airway architecture. When compared to an endotracheal tube without a cuff, cuffed ETTs can decrease the number of tries at endotracheal intubation and, provided the pressure inside the cuff is kept within a safe range, the risk of airway injury may not rise. Duracher's calculation [ID (mm) = (age/4) + 3.5] yields a more accurate estimate of the size of cuffed ETT when compared to other age-based formulas. It should always be feasible to utilize a tube that is 0.5 mm bigger or less than the estimated size, though. Many techniques for measuring ETT size, including chest radiography, ultrasound, and three-dimensional airway models, have been studied since age- based formulae in children are not always reliable. To guarantee appropriate usage in clinical settings, more research is necessary as these approaches have a number of limitations.

There is a chance that a very tiny ETT will be placed, which might lead to poor ventilation and less accurate end-tidal carbon dioxide monitoring. Additionally, there is chance of Aspiration, air leakage, and excessive airway resistance are other risks [6-9]. Comparably, an extremely large ETT may result in major side effects such as ulceration, local ischemia, scarring, post-intubation croup, and, in extreme circumstances, subglottic stenosis [10,11]

Children in hospitals being maintained on mechanical ventilation are more susceptible to unfavourable outcomes. One such horrific occurrence is Unplanned extubation (UE), which some authors describe as the inadvertent removal of an endotracheal tube (ETT) from the trachea, is becoming more widely acknowledged as an adverse event that occurs in all paediatric hospital ICUs and is a major cause of injury to children.[12] UEs may result in longer hospital stays, more expenses, more strain on patients and their families, and higher rates of morbidity and death. Damage has unmistakably been linked to UE incidents. Only 2% of paediatric events have been linked to the worst injury, cardiac arrest, whereas up to 20% of events have been linked to cardiovascular collapse that necessitates resuscitation attempts and drugs, according to other reports.[13,14] A longer hospital stay and the requirement for reintubation are two less serious but equally significant side effects. Thereported rates of reintubation following UE in paediatric populations are substantial, ranging from 49% to 69% in research from PICUs and 66% to 75% in studies from newborn NICUs, despite the fact that the necessity for reintubation varies by institution and the precise demographic investigated.[15,16 , 14,17,18] Additionally, Al-Abdwani et al. [16] showed that problematic reintubations were the outcome in 6% of PICU episodes. Roddy showed that patients who had a UE had a definite increase in cost and a 6.5-day increase in hospital stay when compared with matched controls, looking at PICU for paediatric patients.[19]

To our knowledge Similar studies are not available when it comes to such spontaneous unplanned extubation in toddlers requiring inter-facility transfer, thus creating a special niche for us to study to evaluate the incidence of events of unplanned extubation and compare the frequency of such events between cuffed and uncuffed ETT. The global aim of this research project is to eliminate serious harm to paediatric patients in our institution requiring referral to a higher centre, we set a goal to evaluate the baseline of UE at our institution, then decrease the rate of UE by choosing the right type of ETT between cuffed and uncuffed tube of an appropriate size.

MATERIALS & METHOD:

Aim

To evaluate the frequency of unplanned extubation among toddlers on mechanical ventilation requiring inter-facility transfer to a higher Centre.

Objective

To compare the frequency of unplanned extubation among toddlers on mechanical ventilation requiring inter-facility transfer in Cuffed ETT and uncuffed ETT of appropriate size.

Study Site: N.C Medical college and hospital, Israna, Panipat and district hospital Panipat.

Time Frame: The study was carried out at N.C Medical college and hospital, Israna, Panipat and District hospital, Panipat over a period of 6 months from June 2023 to November 2023.

Study Design: "A prospective single-blinded randomized comparative study".

Inclusion Criteria:

Patients between the ages 1 year and 3 years, belonging to the category of toddler age group as per Indian Association of Pediatrics, admitted initially at N.C Medical college and hospital, Israna, Panipat, or District hospital, Panipat, needing intubation for mechanical ventilation support, requiring referral to a higher Centre for further management.

Exclusion Criteria:

1) Hemodynamically unstable patient who could not be referred.
2) Patients for whom a proper consent could not be achieved.

Sample-size Calculation

For a comparative study design based on a simple random sample, the sample size required was calculated according to the following formula.

Formula:

$$1n = \{(Z_{1-\alpha/2} + Z_{1-\beta})^2 (\sigma^2 + (\sigma_2^2/r)\} / (\mu_1-\mu_2)^2$$

Description:

n = required sample size
α = probability of type I error (usually 0.05)
β = probability of type II error (usually 0.2)
Z = critical Z value for a given α or β
r = ratio
μ = mean value for given group
σ = standard deviation for given group.

Calculation:

For comparative study design concerning the previous study, we have at 95 % confidence level and 80 % normal variate for power. Keeping in mind the intubation requirement in our institution and considering seeding articles we got the sample size for the study. So far, our required sample size was 48 as follows by using the above formula of sample size. **n ~ 24 (each group)**

considering rationale of calculation and possible failure to follow up the patient we raised our total required sample size for the study to **60, n=30 each group A and B.**

METHODOLOGY

DATA COLLECTION AND TOOLS:

Data was collected in Microsoft Word and Microsoft ExcelThis randomized prospective study was conducted after the approval of our Scientific and Ethics committee at NC Medical college and hospital, Israna, Panipat, and district hospital, Panipat. The study was planned on 60 Children of age between 1 year to 3 years who needed mechanical ventilation support during interfacility transfer and satisfied the inclusion and exclusion criteria after obtaining informed written consent from the parents of the children.

Study Duration: Study was conducted over a period of three months.

Sample Site:

Sample was collected in ER & PICU N.C Medical college and hospital, Israna, Panipat & District hospital, Panipat during District Residency programme.

Patients were randomly intubated alternatively with cuffed and uncuffed ETT, with both the options readily available in case of failure to intubate with the planned method. Patient safety was taken as the primary concern and at no point was the same compromised.

A simple comparison analysis was drawn between the percentage of children who needed re-intubation in each group at the end of the study with no difficult sample-based statistics and calculations involved.

Group A –These toddlers were intubated using conventional uncuffed tubes, The age-based Cole formula [ID (mm) = (age/4) + 4.0] has been used to determine the right ETT size for these kids. This formula works well with uncuffed ETTs. For Induction purpose so as to instrument easy intubation, injection midazolam 0.1mg/kg maximum of 4 kg with an additional dose of 0.05 mg/kg was used. During transfer to avoid any ventilatory mismatch due to patient's effort Midazolam infusion at the rate 1-5 mcg/kg/min along neuromuscular blocker Atracurium infusion at the rate 10-20 mcg/kg/min was used.

Group B- These toddlers were intubated using conventional cuffed tubes, size of the tube was calculated using Duracher's calculation [ID (mm) = (age/4) + 3.5] which yields a more accurate estimate of the size of cuffed ETT when compared to other age-based formulas. In order to maintain a uniformity and avoid any discrepancy due to consciousness level of the patient, in this group too, For Induction purpose so as to instrument easy intubation, injection midazolam 0.1mg/kg maximum of 4 kg with an additional dose of 0.05 mg/kg was used. During transfer to avoid any ventilatory mismatch due to patient's effort Midazolam infusion at the rate 1-5 mcg/kg/min along neuromuscular blocker Atracurium infusion at the rate 10-20 mcg/kg/min was used.

Patient was vitally monitored throughout the shifting process Mean arterial pressure (MAP), heart rate (HR), peripheral oxygen saturation (SpO2), and respiratory rate (RR) were monitored continuously and recorded at 15-min intervals during the shifting period.

A trained medical officer accompanied the patient while transfer who managed and monitored the patient in transit and kept an account of any event of unplanned extubation.

Statistical Method Used for result interpretation:

- The continuous data is shown as Mean +/- Standard Deviation and categorical data are represented as absolute numbers and percentages.
- Nominal categorical data between the groups were compared using simple comparative scores with calculation of p value where ever necessary.
- All major data analysis packages, as well as spreadsheets, such as Microsoft Excel, used as per requirement. For all statistical tests, a p-value of less than 0.05 was taken to indicate a significant difference.

OBSERVATION AND RESULTS

Distribution on the basis of assessment of airways

In children undergoing requiring mechanical ventilation, the evaluation of the airway remains an integral part of the assessment. [20] The airway-focused history may help identify issues that were encountered in previous perioperative or intensive care unit (ICU) admissions. Ease or difficulty in intubation is generally classified using the Cormack and Lehane scale (Table 1). This was followed by an assessment of the airway including an evaluation of the symmetry of head, face and neck, degree of mouth opening, presence or absence of oral pathology, oral hygiene, measurement of mento-hyoid and thyromental distance, adequacy of neck flexion/extension, and neck circumference. [21,22]

Table 1: Cormack And Lehane Scale

Grade 1	Full view of glottic structures 68–74% of cases, and the likelihood of difficult intubation is less than 1%.
Grade 2	Grade 2a: Offers a partial view of the glottis. About 21–24% of cases fall into this category, with a moderate likelihood of difficult intubation (4.3–13.4%).
	2b: Only reveals the posterior extremity of the glottis or the arytenoid cartilages. This grade occurs in 3.3–6.5% of cases, and the likelihood of difficult intubation is 65–67.4%.
Grade 3	Only the tip of epiglottis is visible (rest of the glottic structures are invisible). It is relatively rare (1.2–1.6%), but the likelihood of difficult intubation is 80–87.5%.
Grade 4	None of the glottic structures are visible. This scenario is very uncommon and indicates a high likelihood of difficult intubation

In our study it was observed that out of total 60 patients 42(70%) belonged to C & L grade 1 and no difficulty is intubation in these cases were anticipated, 21.66% cases belonged to grade 2a and relatively smooth intubation was achieved as anticipated, in total of 10% cases relatively difficult intubation was anticipated.

Table 2: Evaluation Of Patients On The Basis Of Their Airway Anatomy Classifying Them According To Ease Of Being Intubated.

C & L GRADE	Group A (Uncuffed ETT)	Group B (Cuffed ETT)
Grade 1	23(76.66%)	19(63.33%)
Grade 2a	5(16.66%)	8(26.66%)
Grade 2b	1(3.33%)	4(13.33%)
Grade 3	1(3.33%)	0
Grade 4	0	0

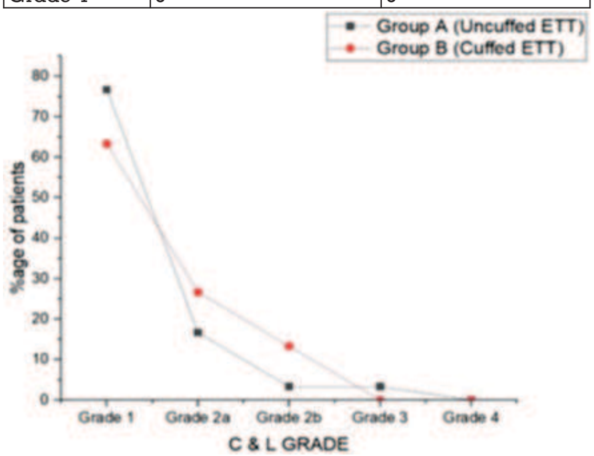

Fig:1 Scatter plot to compare airways in both Group A and Group using Cormack and Lehane scale to avoid any bias and make sure both the groups had similar sample size.

Distribution On The Basis Of Need To Change The Tube To An Appropriate Size

The age-based Cole formula [ID (mm) = (age/4) + 4.0] has been used to determine the right uncuffed ETT size for kids, Duracher's calculation [ID (mm) = (age/4) + 3.5] yields a more accurate estimate of the size of cuffed ETT when compared to other age-based formulas. It should always be feasible to utilize a tube that is 0.5 mm bigger or less than the estimated size.

Recommendations for Age-based Cuffed Endotracheal Tube Size Selection in toddler population(mm)

Age (yr)	Khine et al. [23]	Motoyama et al. [24]	Salgo et al. [25]
1.0 to < 1.5	3.5	3.5	3.5

1.5 to < 2.0	3.5	3.5	4.0
2.0 to < 3.0	3.5	4.0	4.0

Table 3: Comparing Accuracy Of ETT Tube Size Estimation In Group A And Group B.

Number of attempts	Group A	Group B
Intubation with appropriate size ETT	21(70%)	27(10%)
Requiring change of ETT tube due to inappropriate size	9(30%)	3(10%)

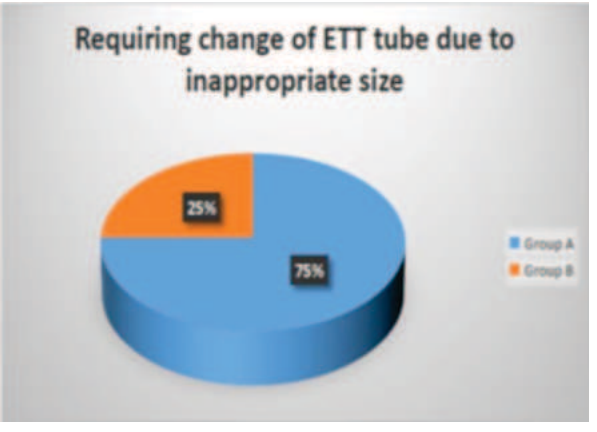

Fig:3 Out of total 12 cases who needed reintubation Of which 3(25%) cases belonged to group B and 9 (75%)Patients belonged to group A.

Frequency Of Unplanned Extubation

Out of 60 Toddlers 14(23.3%) patients needed reintubation during interfacility transfer to a higher Centre of which only 8(57.1%) patients could be re-intubated, 6(42.85%) patients had to be maintained on bag and mask in light of inability to reintubate.

Distribution on the basis of need of of reintubation required in uncuffed v/s cuffed ETT group.

Out of 60 toddlers 14 faced unplanned extubation, of these 13(43.33%) toddlers belonged to group A that is toddlers who were intubated with conventional uncuffed ETT, 1(3.33%) toddler belonging to group B, that is intubated with cuffed ETT also needed reintubation during transfer to a higher Centre, this shows a wide and appreciable difference of results between the two groups.

Table:4 Comparison Of Frequency Of Unplanned Extubation In Patients Intubated With Cuffed And Uncuffed ETT.

	Group-A Uncuffed ETT	Group-B cuffed ETT	P-value
Sample size	30	30	
Patients who suffered Unplanned extubation.	1(3.33%)	13(43.33%)	<.001

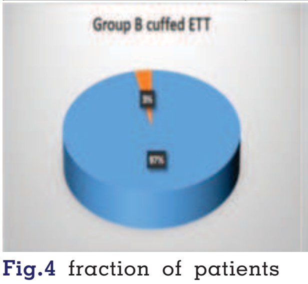

Fig.4 fraction of patients intubated with cuffed ETT, who suffered unplanned extubation during transit.

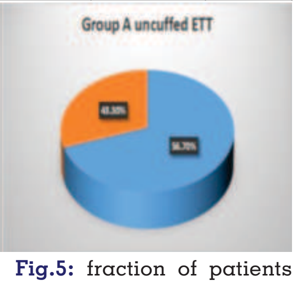

Fig.5: fraction of patients intubated with uncuffed ETT, who suffered unplanned extubation during transit.

DISCUSSION

In the paediatric intensive care unit and paediatric emergency department, maintaining the airway of young children is an essential part of patient care. Children are comparatively harder to treat when it comes to mask ventilation, direct laryngoscopy, and endotracheal intubation because of variances in anatomy and physiology. One of the main factors contributing to morbidity and death is not managing the airways timely, even among paediatric anaesthesiologists and critical care doctors who are trained in managing airways, one of the most frequent reasons for perioperative morbidity and death in children is respiratory problems, as evidenced by the Perioperative Cardiac Arrest Registry and the closed claims database of the American Society of Anaesthesiologists (ASA). [26,27]

Maintaining airways becomes exponentially more difficult in an arrangement of Unplanned extubation during interfacility transfer, where several practical challenges exist, such as non- availability of trained personnel during the transit, emergent intubation not possible due to several factors.It in aberrantly adds to the morbidity and mortality of the patient, often warranting for emergent reintubations which has complications of its own such as.

1. **Hypotension**: During emergent reintubation, patients may experience a drop in blood pressure, which can be detrimental to their overall condition.
2. **Hypoxia**: Insufficient oxygen levels can occur during the reintubation process, leading to potential complications and compromising patient well-being.
3. **Aspiration**: Reintubation increases the risk of aspiration, where stomach contents or secretions enter the airway, potentially causing pneumonia or other respiratory issues.
4. **Arrhythmia**: Abnormal heart rhythms may occur during the procedure, especially in critically ill patients who are already vulnerable.
5. **Airway Trauma**: The reintubation process can cause damage to the airway, leading to bleeding, swelling, or injury.
6. **Oesophageal Intubation**: Accidental placement of the tube in the oesophagus instead of the trachea can occur, impeding proper ventilation.
7. **Cardiac Arrest**: Although rare, cardiac arrest can be a severe complication during reintubation.

Traditionally, uncuffed ETTs have been used in children below 8 years old, because the cricoid cartilage is the narrowest part in this age range [28]. Due to difficult placement and securing of the un- cuffed ETT it is more prone to spontaneous extubation during interfacility transfer due to unpredictable circumstances and physical stress and straining such as attachment and reattachments of the circuits while shifting of the patient. Further several studies have vouched in favour of usage of Cuffed ETT over traditional uncuffed ETT Owning its better results in terms of reducing the number of endotracheal intubation attempts, and if cuff pressure can be maintained within a safe range, the risk of airway damage may not exceed that of an uncuffed ETT [29–31]. In addition, the use of cuffed ETTs reduces the risk of leakage during positive pressure ventilation, ensuring patient safety through adequate ventilation and lack of aspiration, and reduces contamination of the surrounding air by inhaled anaesthetics (Fig.) [32-34]. Therefore, the use of cuffed ETTs in children is increasing.

Further earlier advocated anatomical benefit of using uncuffed tubes over cuffed ETT is also fading away as depicted in studies like Litman et al. [35] and Dalal et al. [36] found that, as the cricoid cartilage is nearly ellipse-shaped, circular uncuffed ETTs may cause leakage in the empty anterior and posterior spaces, thus possibly putting excessive pressure to the sides [37], the same can be visualised in comparative depiction in figure.

Our study tried to compare possible role of cuffed ETT in toddler population for interfacility transfer of patient needing mechanical patient so as to decrease the chances of unplanned or spontaneous extubation, thus decreasing morbidity and mortality among the above mentioned population.

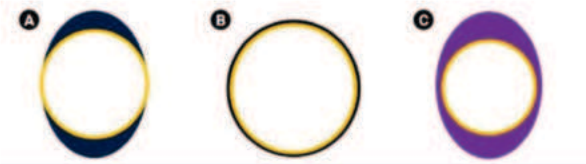

Fig.6

Endotracheal tube (ETT) with cross-sectional circular shape in an elliptical-shaped airway (A) and in a circular airway (B). When placed in an elliptical airway, there may be lateral pressure on the mucosa of the trachea, and possible leakage during continuous positive airway pressure test above and below the ETT in the anterior–posterior diameter. When a cuff (violet) is inflated in the elliptical airway, the airway can be sealed with equal pressure on all aspects of the tracheal wall (C).In our study it was observed that out of total 60 patients 42(70%) belonged to C&L grade 1 and no difficulty is intubation in these cases were anticipated, 21.66% cases belonged to grade 2a and relatively smooth intubation was achieved as anticipated, In total of 10% cases relatively difficult intubation was anticipated, This was done remove any bias among group A and Group B, so all cases of similar cases profile in both cases were included in the study. As expected in other studies majority of cases belonged to C & L grade 1 and 2 where no complications securing airways was encountered.

Further, with 10% and 30% re intubation rate there was a stark difference in the rate of reintubation with Cuffed and uncuffed ETT respectively, despite using standard age for size Cole's formula to calculate appropriate tube size, the requirement to upgrade to a larger or smaller ETT to attain appropriate shape and size tube was observed to be significantly higher among the patients intubated with conventional uncuffed ETT. Where as in terms of achieving proper ventilation, seal and position of the tip of ETT in relation to the vocal cords and carina, Cuffed tubes fared better as the numbers suggest.

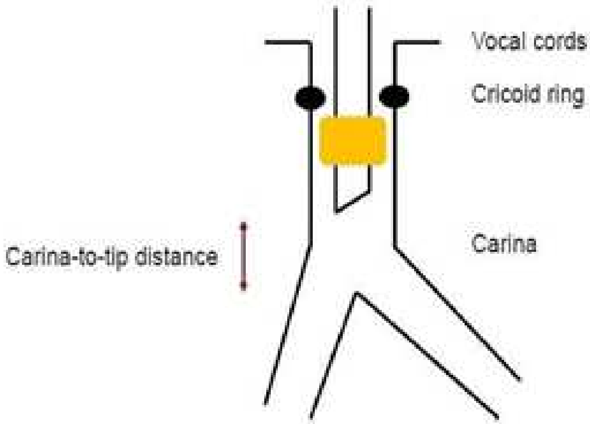

Fig:7 Ideal position of the cuffed endotracheal tube

Out of 60 Toddlers14(23.3%) patients needed reintubation during interfacility transfer to a higher Center, of these 13(43.33%) toddlers belonged to group A that is toddlers who were intubated with conventional uncuffed ETT, 1(3.33%) toddler belonged to the group B, that is intubated with cuffed ETT, needed reintubation during transfer to a higher Center.

Due to various factors and awning to the difficulty of the task only 8(57.1%) patients could be re- intubated in the transfer vehicle equipped with Advance lifesaving facilities, 6(42.85%) patients had to be maintained on bag and mask in light of inability to reintubate. This is an adverse event which may have hampered over survival chances of the toddler, adding to both morbidity and mortality.

Since most of the unplanned extubation were observed in the case of patients intubated with conventional uncuffed tubes, further stressing the need to reevaluate the use of uncuffed ETT in toddler population requiring mechanical ventilation during transfer to higher centers.

We would like to rest this discussion with a quick comparison between Cuffed and Uncuffed endotracheal tubes used in pediatric population, eliciting both merits and demerits in both the live saving and essential means of securing airways in emergent situations.

Advantages and Disadvantages of Uncuffed and Cuffed Endotracheal Tubes [38]

Characteristics	**Uncuffed endotracheal tubes**	**Cuffed endotracheal tubes**
Advantages	Larger internal diameter for age	Smaller external diameter for age
	- Less resistance to airflow	- Less pressure on cricoid mucosa
	- Lower breathing load	Improved ventilation and respiratory monitoring
	- Reduced blockage by secretions	Fewer attempts of laryngoscopies and intubations
	- Easy suctioning	Reduced risk of aspiration
	Minimal mucosal pressure	Reduced air pollution
	- Prevents trauma to sub-glottic region	
Disadvantages	Several attempts of laryngoscopies and intubations	Smaller internal diameter
	Airway injury	for age
	- Oversized tubes, excessive pressure on cricoid mucosa	- Higher resistance to airflow
	- Undersized tubes, movement trauma	- Increased blockage by secretions
		- Difficult suctioning
	Leakage of air	Airway injury
	- Incorrect respiratory monitoring	- Tracheal rupture
	- Increased risk of aspiration	- Mucosal ischemia

There were several limitations to our study,
1. Resuscitator for every patient was not same which may have contributed to the human error and cognitive bias.
2. Sample size was small, and larger sample size is required with a multicentric approach so as to confirm of deny the results of this study.
3. More patients belonging to a higher Cormack and Lehane grade are required to be evaluated.
4. Long term follow up of patients could not be established to evaluate actual effect Cuffed ETT due to pressure effects of the cuff.

CONCLUSION

From our study we conclude that its is of utmost importance to maintain proper airways among toddler population during inter-facility transfer, as this is the most vulnerable period and may cause deterioration if ventilation is compromised. Also, although Cuffed ETT may have not been used traditionally among toddler population due to factors like possible air way injury, tracheal rupture & mucosal ischemia, all these complications are preventable if a proper size or cuffed ETT is used avoiding overinflation of the cuff and securing the tube at right length. Cuffed ETT are clearly superior to uncuffed ETT when it comes to securing air ways for referral purpose and had a significantly lower incidence of unplanned extubation during transit and thus a lower rate of complications pertaining to emergent reintubation, thus decreasing the overall morbidity and mortality of critically sick patients.

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