International Journal of Medical Anesthesiology

E-ISSN: 2664-3774
P-ISSN: 2664-3766
www.anesthesiologypaper.com
IJMA 2018; 1(1): 21-23
Received: 24-11-2017
Accepted: 27-12-2017

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To determine usefulness of Microcuff endotracheal tube in laparoscopic surgeries in children

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DOI: https://doi.org/10.33545/26643766.2018.v1.i1a.13

Abstract
Background: Cuffed endotracheal tubes may be useful in special situations like laparoscopy. The present study was conducted to determine usefulness of Microcuff endotracheal tube in laparoscopic surgeries in children.
Materials & Methods: The present study was conducted in the department of Anesthesiology. It comprised of 86 pediatric patients of age ranged 1-10 years of both genders. Patients were intubated with Microcuff® tube as per recommended size. In this study, appropriateness of size selection and type of surgery was recorded.
Results: Age group 1-2 years had 12 patients with 3.5 size cuff, 2-4 years had 14 with size 4, 4-6 years had 15 with size 4.5, 6-8 years had 20 with size 20 and 8-10 years had 25 with size 5.5. Intracuff pressure variation with supine, with head in neutral position was 11.45 cm H_2O, with pneumoperitoneum was 12.87 cm H_2O and with head low position was 13.18 cm H_2O. The difference was significant ($P< 0.05$). Type of surgery was orchiopexy in 35, appendectomy in 26, cholecystectomy in 16, splenectomy in 5 and diagnostic laparoscopy in 4. The difference was significant ($P< 0.05$).
Conclusion: The use of uncuffed or cuffed endotracheal tubes in children has several advantages. There was intracuff pressure variation with different positions.

Keywords: Appendectomy, Endotracheal tubes, pneumoperitoneum

Introduction
Endotracheal intubations in children before 1940 were considered as a potentially lethal and traumatic invasive procedure [1] the introduction of Polyvinyl chloride incorporated uncuffed endotracheal tubes in 1960 made paediatric intubations under the age of 8 years suitable for both short and long term needs. Traditionally, cuffed endotracheal tubes were not used in pediatric patients for the fear of subglottic damage due to ischaemia of the tracheal mucosa when the cuff pressures exceeded 20 cms of H_2O [2].
The use of uncuffed or cuffed endotracheal tubes in children have their own advantages and disadvantages. Uncuffed endotracheal tubes (UETTs) are traditionally used for intubation in all children under 8 years of age, irrespective of the indication and duration of intubation. Cuffed endotracheal tubes (CETTs) in children undergoing surgery have not been very popular because of the fear that the cuff will cause airway mucosal injury, leading to sub‐glottic stenosis [3].
Cuffed endotracheal tubes may be useful in special situations like laparoscopy and in surgical conditions at risk of aspiration. Microcuff® endotracheal tube is specifically designed for the paediatric airway anatomy. Intubation depth marks and short, cylindrical cuff near tracheal tube tip allow adequate placement with a cuff‐free subglottic zone, without the risk of endobronchial intubation [4]. The present study was conducted to determine usefulness of Microcuff endotracheal tube in laparoscopic surgeries in children.

Materials & Methods
The present study was conducted in the department of Anesthesiology. It comprised of 86 pediatric patients of age ranged 1-10 years of both genders. All were informed regarding the study. Ethical approval was obtained from institute prior to the study.
General information such as name, age, gender etc. was recorded. Patients were intubated with Microcuff® tube as per recommended size. In this study, appropriateness of size selection and type of surgery was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I: Distribution of patients

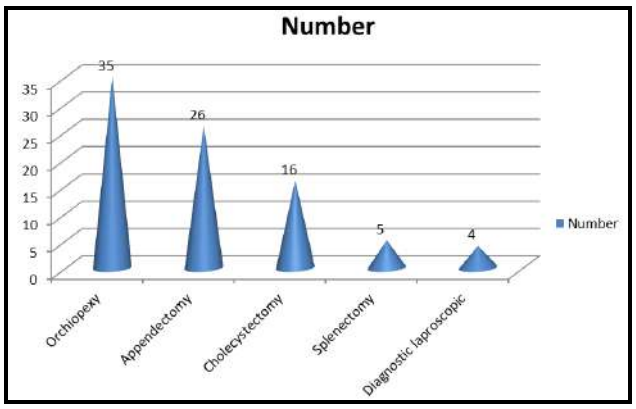
Age group (Years)	Size of cuff	Number
1-2	3.5	12
2-4	4.0	14
4-6	4.5	15
6-8	5.0	20
8-10	5.5	25

Table I shows that age group 1-2 years had 12 patients with 3.5 size cuff, 2-4 years had 14 with size 4, 4-6 years had 15 with size 4.5, 6-8 years had 20 with size 20 and 8-10 years had 25 with size 5.5.

Table II: Intracuff pressure variation

Intracuff pressure (cm H_2O)	Mean	P value
Supine, with head in neutral position	11.45	0.01
With pneumoperitoneum	12.87	
With head low position	13.18	

Table II shows that intracuff pressure variation with supine, with head in neutral position was 11.45 cm H_2O, with pneumoperitoneum was 12.87 cm H_2O and with head low position was 13.18 cm H_2O. The difference was significant ($P < 0.05$).



Graph I: Type of surgery

Graph I shows that type of surgery was orchiopexy in 35, appendectomy in 26, cholecystectomy in 16, splenectomy in 5 and diagnostic laparoscopy in 4. The difference was significant ($P < 0.05$).

Discussion

An interesting innovation in 2004 was the introduction of a novel microcuff endotracheal tube by Kimberly-Clark (Dallas TX) with a specialized cuff made of an ultrathin polyurethane [5] The intra cuff pressure with safer limits of less than 20 cms of H2O could be checked initially following the cuff inflation after endotracheal intubation with cheaper and easily available devices like manual aneroid manometers and pop-off valves safer than the expensive automated ones [6]. The intracuff pressure being an universal problem at all ages, changed dynamically throughout the procedure especially significant during prolonged anaesthesia because of the various factors including changes in the head and neck position, body temperature, and the composition of the inhaled gas [7]. The present study was conducted to determine usefulness of Microcuff endotracheal tube in laparoscopic surgeries in children.

In this study, age group 1-2 years had 12 patients with 3.5 size cuff, 2-4 years had 14 with size 4, 4-6 years had 15 with size 4.5, 6-8 years had 20 with size 20 and 8-10 years had 25 with size 5.5.

We observed that intracuff pressure variation with supine, with head in neutral position was 11.45 cm H_2O, with pneumoperitoneum was 12.87 cm H_2O and with head low position was 13.18 cm H_2O. Mhamane *et al.* [8] found that Mean age of the patients was 5.44 years (range 8 months 5 days–9 years 11 months). There was no resistance for tube passage during intubation in any patient. Leak on intermittent positive pressure ventilation at airway pressure ≤20 cm H2O was present in all patients. Mean sealing pressure was 11.72 (1.9 standard deviation [SD]) cm H2O. With the creation of pnemoperitoneum, mean intracuff pressure increased to 12.48 (3.12 SD) cm H2O. With head low positioning, mean cuff pressure recorded was 13.32 (2.92 SD). Ventilation at low flow (mean flow 1 L/min), plateau‐type capnography was noted in all patients. Mean duration of intubation was 83.50 min. Coughing at extubation occurred in 6 patients. Partial laryngospasm occurred in 4 patients, which responded to continuous positive airway pressure via face mask. Severe laryngospasm or stridor was not seen in any patient.

We observed that type of surgery was orchiopexy in 35, appendectomy in 26, cholecystectomy in 16, splenectomy in 5 and diagnostic laparoscopy in 4. Endotracheal intubation in children is usually performed utilizing uncuffed endotracheal tubes for conduct of anesthesia as well as for prolonged ventilation in critical care units. However, uncuffed tubes may require multiple changes to avoid excessive air leak, with subsequent environmental pollution making the technique uneconomical. In addition, monitoring of ventilatory parameters, exhaled volumes, and end‐expiratory gases may be unreliable. All these problems can be avoided by use of cuffed endotracheal tubes. Besides, cuffed endotracheal tubes may be of advantage in special situations like laparoscopic surgery and in surgical conditions at risk of aspiration [9].

Conclusion

Authors found that the use of uncuffed or cuffed endotracheal tubes in children have several advantages. There was intracuff pressure variation with different positions.

References

1. Dullenkopf A, Gerber AC, Weiss M. Fit and seal characteristics of a new paediatric tracheal tube with high volume‐low pressure polyurethane cuff. Acta Anaesthesiol Scand. 2005; 49:232-7.
2. Weiss M, Dullenkopf A, Böttcher S, Schmitz A, Stutz K, Gysin C *et al.* Clinical evaluation of cuff and tube tip position in a newly designed paediatric preformed oral cuffed tracheal tube. Br J Anaesth. 2006; 97:695-700.
3. Weiss M, Dullenkopf A, Fischer JE, Keller C, Gerber AC. European Paediatric Endotracheal Intubation Study Group. Prospective randomized controlled multi‐centre trial of cuffed or uncuffed endotracheal tubes in small children. Br J Anaesth. 2009; 103:867-73.

4. Salgo B, Schmitz A, Henze G, Stutz K, Dullenkopf A, Neff S *et al.* Evaluation of a new recommendation for improved cuffed tracheal tube size selection in infants and small children. Acta Anaesthesiol Scand 2006; 50:557-61.
5. Bottcher‐Haberzeth S, Dullenkopf A, Gitzelmann CA, Weiss M. Tracheal tube tip displacement during laparoscopy in children. Anaesthesia. 2007; 62:131-4.
6. Weiss M, Gerber AC, Dullenkopf A. Appropriate placement of intubation depth marks in a new cuffed paediatric tracheal tube. Br J Anaesth. 2005; 94:80-7.
7. Weiss M, Balmer C, Dullenkopf A, Knirsch W, Gerber AC, Bauersfeld U *et al.* Intubation depth markings allow an improved positioning of endotracheal tubes in children. Can J Anaesth. 2005; 52:721-6.
8. Mhamane R, Dave N, Garasia M. Use of Microcuff ® endotracheal tubes in paediatric laparoscopic surgeries. Indian J Anaesth. 2015; 59:85-8.
9. Duracher C, Schmautz E, Martinon C, Faivre J, Carli P, Orliaguet G. Evaluation of cuffed tracheal tube size predicted using the Khine formula in children. Paediatr Anaesth. 2008; 18:113-8.