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COMPARATIVE STUDY OF MACINTOSH AND MIDLINE APPROACH OF MILLER BLADE INTUBATION IN CHILDREN

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Conflicts of Interest: Nil

Abstract:

INTRODUCTION: In children problems related to Airway are among the most common perioperative critical incidents. Airway management, both knowledge and training are mandatory in children. Due to different anatomy with different proportion and angulation children airway is not a miniature replica of adult airway. Epiglottis is large, floppy and omega-shaped in children. The tonsils and adenoids appear in the second year of life reach their largest size by 4–7 years. There are many studies but till date there in no any study has been done to compare Miller, Macintosh laryngoscope blades in paediatric patients. However trial was going on with the primary aim to compare glottic visualisation using Intubation Difficulty Score (IDS); secondary aim to compare ease of intubation using Cormack Lehane grade.

AIM: The aim of this study is to find a laryngoscope blade that provides best laryngoscopic and intubation conditions in children.

MATERIALS AND METHODS: This is prospective study which is carried out in the department of anaesthesia at Prakash Institute of Medical Science and Research Urun-Islampur Maharashtra, during the period of 1 year. All paediatric patients which undergoing circumcisions were included in this study. Total 50 paediatric patients were included in this study with single-blind, parallel group, randomised controlled clinical trial was conducted different age group. Children with anticipated difficult airways, planned for oral surgeries, having severe cardiovascular disease any abnormal liver and/or renal function, having asthma, pneumothorax, hydrothorax or grossly impaired pulmonary function were excluded in this study. All the airway equipment including the emergency cart was kept ready. Baseline data were recorded for all the patients.

RESULT: Total 50 patients were included in this study. In different age group there was no significant difference (P>0.05) in patients. Better Cormack–Lehane view (P = 0.002) is good and it has significantly obtained with Miller blade when compared with the other blades. Regarding the duration of laryngoscopy or intubation, between the groups there was no difference in the total time to intubate the trachea successfully.

CONCLUSION: In conclusion Miller blade may be considered superior to Macintosh blade in terms of glottis visualization, ease of intubation with normal airways. Styletted ETT significantly reduces time for intubation and time for procedure in comparison to non styletted ETT.

KEYWORDS: Children, Macintosh laryngoscope blade, Macintosh laryngoscope blade

Introduction

In children problems related to Airway are among the most common perioperative critical incidents. Airway management, both knowledge and training are mandatory in children[i]. Due to the higher oxygen consumption Time for an intubation in children is also limited. Laryngoscope is most commonly used devices for airway management and it can view glottis, which is not always possible in a difficult airway case scenario[ii]. Due to different anatomy with different proportion and angulation children airway is not a miniature replica of adult airway.

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Epiglottis is large, floppy and omega-shaped in children. The tonsils and adenoids appear in the second year of life reach their largest size by 4–7 years[iii]. There are many studies in which there is no significant difference in laryngoscopic view and ease of intubation between Miller and Macintosh laryngoscope blades as well as Miller and straight McCoy laryngoscope blade[iv&v]. There are many studies but till date no study has been done to compare Miller, Macintosh laryngoscope blades in paediatric patients. However trial was going on with the primary aim to compare glottic visualisation using Intubation Difficulty Score(IDS) ; secondary aim to compare ease of intubation using Cormack Lehane grade[vi],[vii]&[viii]. Various types and of techniques of laryngoscopy was used for securing endotracheal tube. Standard curved Macintosh blade is preferred by anesthesiologist in routine intubations[ix]. The aim of this study is to find a laryngoscope blade that provides best laryngoscopic and intubation conditions in children.

MATERIALS AND METHODS:

This is prospective study which is carried out in the department of anaesthesia at Prakash Institute of Medical Science and Research Urun-Islampur Maharashtra, during the period of 1 year. All paediatric patients which undergoing circumcisions were included in this study. Total 50 paediatric patients were included in this study with single-blind, parallel group, randomised controlled clinical trial was conducted different age group. From all the patients for the records of data as documentation was collected by physical examination and medical assistance and investigation were taken through pre-anesthetic check-up and routine investigations were carried out. Children with anticipated difficult airways, planned for oral surgeries, having severe cardiovascular disease any abnormal liver and/or renal function, having asthma, pneumothorax, hydrothorax or grossly impaired pulmonary function were excluded in this study. All the airway equipment including the emergency cart was kept ready. Baseline data were recorded for all the patients. Laryngoscopy and intubation was carried out in sniffing position where all the blades were inserted into the mouth from the right commissure, sweeping the entire tongue to the left of the blade. In group A, Macintosh blade was introduced till the tip lies in vallecula after which traction force was applied along the handle to lift the base of tongue and epiglottis, exposing the laryngeal inlet. In group B, Miller blade was passed posterior to the epiglottis directly lifting it to expose the glottis. All the laryngoscopy and intubations were performed by same operator.

RESULTS:

Total 50 patients were included in this study. In different age group there was no significant difference (P>0.05) in patients as shown in table below.

Table 1: Demographic profile of patients according to age, sex, height etc

Parameter	Gr A (n=25)	Gr B (n=25)
Age (years) (mean, SD)	3.4 (1.2)	3.3 (1.2)
Sex (male/female)	25/0	25/0
Height (cm) (mean, SD)	90.7 (9.7)	12.32 (3.7)
Body weight (kg) (mean, SD)	13.8 (3.7)	93.6 (8.4)
ASA status (I/II)	18/7	19/6

SD – Standard deviation; ASA – American Society of Anesthesiologists; Gr A – Macintosh blade, Gr B – Miller blade,

Better Cormack–Lehane view (P = 0.002) is good and it has significantly obtained with Miller blade when compared with the other blades as shown in table below.

Table 2: Cormack-Lehane grade (Kruskal-Wallis test; P=0.00126)

Cormack-Lehane grade	Gr A (n=25)	Gr B (n=25)
I	12 (48%)	5 (20%)
II	12 (48%)	19 (76%)
II	1 (4%)	1 (4%)
IV	0	0

Gr A – Macintosh blade, Gr B – Miller blade,

Regarding the duration of laryngoscopy or intubation, between the groups there was no difference in the total time to intubate the trachea successfully as shown in table below. Six patients needed a second attempt for intubation with a different size ETT. Soft tissue trauma and blood tinge on the tip of the blade was minor as incidence of complications and Arterial oxygen saturation was also maintained well.

Table 3: Intubation parameters (one-way ANOVA test)

Intubation parameters	Gr A (n=25)	Gr B (n=25)	P
Duration of laryngoscopy (s) (mean, SD)	10.8 (3.3	9.9 (2.8)	0.6
Duration of intubation (s) (mean, SD)	11.1 (4.1)	11.6 (3.6)	0.5
Total duration to secure airway (s) (mean, SD)	20.8 (8.5)	21.6 (4.5)	0.5

SD – Standard deviation; Gr A – Macintosh blade, Gr B – Miller blade,

DISCUSSION:

In this study Miller blade was found to be better than Macintosh laryngoscope blades in terms of ease of laryngoscopy and intubation. Laryngoscope is to provide unobstructed glottis views which displace the tongue and lifting the epiglottis and allowing easy passage of ETT. Procedure depends on the design and technique of using the blade which is ease that depends on anatomy and the skill of the operator. Some studies use straight blade for infant, laryngoscopy in children curved blade (small Macintosh blade) is sufficient[x]. Studied shows that careful perusal available literature reveals scant body of work using straight blade is feasibility and effective alternative modality of laryngoscopy and intubation[xi]. According to the study ETT insertion is also important for a successful intubation. direct laryngoscopy with Miller blade insertion of ETT groove obstructs the direct vision. ETT is inserted through the right angle of the mouth and then moves towards the glottis in midline[xii]. Studies also shows that magnified glottic view small movement of ETT will be seen as major movement on the monitor. As similar to other study in this study ETT inserted through the Miller blade groove and had 100% successful intubation[xiii]. Studied of Achen et al found superior glottic view with Miller blade which is directly lifting the epiglottis and paraglossal approach when compared with Macintosh blade with the tip[xiv]. Curved blade of Macintosh blade provides better intubating conditions in adults as they provide more space for ETT manipulation. However Miller blade has a small curved tip that gives some room for ETT manipulation[xv]. According to the study of Varghese et al Miller and Macintosh blades provided similar laryngoscopic view and intubating conditions in children age group[4]. Other studies also show that factors influencing the glottic view also important factor for technique of using the blade. From midline or from right gutter of the mouth sweeping the tongue to the left Blade can be introduced directly.[xvi]

CONCLUSION:

In conclusion Miller blade may be considered superior to Macintosh blade in terms of glottis visualization, ease of intubation with normal airways. Styletted ETT significantly reduces time

for intubation and time for procedure in comparison to non styletted ETT.

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