Management of Pediatric Airway in Anesthesia, What is New ?

An Essay

Submitted for Partial Fulfillment of Master Degree
in **Anesthesiology**

By

Mohamed Medhat Mohamed Hashem

M.B., B.Ch (2013)

Under Supervision of

Prof. Ahmed Aly Fawaz

Professor of Anesthesiology, Intensive Care and pain Medicine
Faculty of Medicine-Ain Shams University

Dr. Walid Ahmed Mansour

Lecturer of Anesthesiology, Intensive Care and pain Medicine
Faculty of Medicine-Ain Shams University

Dr. Ahmed Tarek El Barkoky

Lecturer of Anesthesiology, Intensive Care and pain Medicine
Faculty of Medicine-Ain Shams University

Faculty of Medicine
Ain Shams University
2017

سورة البقرة الآية: ٣٢

Acknowledgments

First and foremost, I feel always indebted to Allah, the Most Beneficent and Merciful. I can do nothing without Him.

I would like to express my sincere gratitude to* Prof. Ahmed Aly Fawaz,** ***Professor of Anesthesiology, Intensive Care and pain Medicine, Faculty of Medicine-Ain Shams University, under his supervision, I had the honor to complete this work, I am deeply grateful to him for his professional advice, guidance and support.

My deep gratitude goes to* Dr. Walid Ahmed Mansour,** ***Lecturer of Anesthesiology, Intensive Care and pain Medicine, Faculty of Medicine-Ain Shams University, for his great support, tireless guidance and meticulous supervision throughout this work.

I would like also to than with all appreciation* Dr. Ahmed Tarek El Barkoky ,** ***Lecturer of Anesthesiology, Intensive Care and pain Medicine, Faculty of Medicine-Ain Shams University, for the efforts and time he has devoted to accomplish this work.

Last but not least, I like to thank all my Family, especially my Parents, for their kind care, help and encouragement.

Mohamed Medhat Mohamed Hashem

List of Contents

List of Abbreviations

Abbr.	Full-term
AP	:Anteroposterior
ASA	: American Society of Anesthesiologists
BURP	: Back, Up, and Rightward Pressure on the laryngeal cartilage
CICV	: Cannot intubate cannot ventilate
cmH_2O	: Centimeter water
CT	: Computed tomography
e.g.	: Example
ENT	:Ear nose and throat
ETT	: Endotracheal tubes
H	:Hour
HD	:High-definition
High tech	: High Technology
LMA	: Laryngeal mask airway
MLT tube	:Microlaryngeal tracheal tube
MmHg	: Millimeter mercury
µg/mL	: Microgram per liter
MPS	: Mucopolysaccharidosis
MRI	: Magnetic resonance imaging
NDMB	: Non-depolarising neuromuscular blocking agents
NPA	: Nasopharyngeal airway
Ped	: Pediatric
PRS	: Pierre robin syndrome

PTV :Percutaneous transtracheal ventilation

TMJ : Tempero-mandibular joint

UK : United Kingdom

ULBT :Upper lip bite test

URI : Upper respiratory tract

Vl :Video laryngoscopy

Vs :Versus

List of Tables

List of Figures

Figure No.	Title	Page No.

ABSTRACT

Introduction: good management of pediatric airway in anesthesia requires anesthesiologists to understand early human anatomical development and a set of clinical skills to provide safe mask ventilation and tracheal intubation

The airway changes in size, shape and position through its development from neonate to the adult, so knowing the functional (applied) anatomy of the airway is the cornerstone for understanding the pathological conditions that may occur

The aim of the work: the aim of this essay is to identify the new principle aspects of anesthetic management of Pediatric Airway in difficult situations, that can be associated with better results regarding morbidity and mortality.

Summary: Airway-Related problems are among the most common perioperative critical incidents in pediatric Anesthesia, and in infants younger than 1 year of age these are four times more common than in older children

In several institutions, fiberoptic intubation of the trachea in children and infants with a difficult airway is performed under conscious sedation and maintenance of spontaneous ventilation, so it is used as the gold standard for difficult airway management

---

Key words: pediatric ,airway , anesthesia , new

Introduction

Good management of pediatric airway in anesthesia requires anesthesiologists to understand early human anatomical development and a set of clinical skills to provide safe mask ventilation and tracheal intubation ***(Stricker et al., 2015).***

A difficult airway in anesthesia is defined as the clinical situation in which a conventionally trained anesthesiologist experiences difficulties with face mask ventilation, tracheal intubation, or both ***(American Society of Anesthesiologists, 2003).***

The airway changes in size, shape and position through its development from neonate to the adult, so knowing the functional (applied) anatomy of the airway is the cornerstone for understanding the pathological conditions that may occur ***(Holzman, 1998).***

Effective airway management includes anticipating and planning for problems. Difficulties frequently occur as the result of patient characteristics that interfere with spontaneous breathing, bag mask ventilation, laryngoscopy, and/or intubation of the trachea. Identifying characteristics of the difficult airway and developing a plan for managing problems are essential principles of anesthetic practice ***(Murphy and walls, 2004).***

Assessment of the airway should be conducted, whenever feasible, prior to the initiation of anesthetic care and airway management in all patients ***(Sunder, 2012).***

In clinical practice, it is advisable to combine predictors with good performance and clinical examination to predict possible difficult airway. The best way to avoid airway-related complications is regular training for the cannot intubate cannot ventilate (CICV) scenario and stepwise difficult airway protocol implementation in routine clinical practice ***(Weiss and Engelhardt, 2010).***

One of the most important aspects in pediatric anesthesiology is airway management. For this reason, the adequate use of devices and equipment is a key factor for reducing complications ***(Medina et al., 2012).***

Aim of the Work

The aim of this essay is to identify the new principle aspects of anesthetic management of Pediatric Airway in difficult situations, that can be associated with better results regarding morbidity and mortality.

Chapter (1)
Anatomy

A detailed knowledge of the anatomy of the respiratory tract is of great importance to anesthesiologists as instrumentation of the airway is part of anesthetic daily routine requiring great familiarity with the structure involved. Many clinical problems that confront the Anesthesiologists arise from compromised airway patency. The respiratory tract begins at the anterior nares and the lips and ends in the alveoli of the lung. It is divided into upper and lower airway at the level of the vocal cords ***(Robert, 1998).***

Differences between adult and pediatric airway

Airway anatomy is different in children and adults, in particular in children under 2 years of age. This population has small nares, a large tongue, and a larger head in relation to the body. In the newborn the neck is short, and the epiglottis is omega-shaped, lax and thrust backwards. The glottis is localized at the level of C3–C4. The larynx has been described as tapered, with its narrowest portion at the level of the cricoid cartilage, in contrast with the cylindrical adult larynx ***(medina et al., 2012).***(fig1)

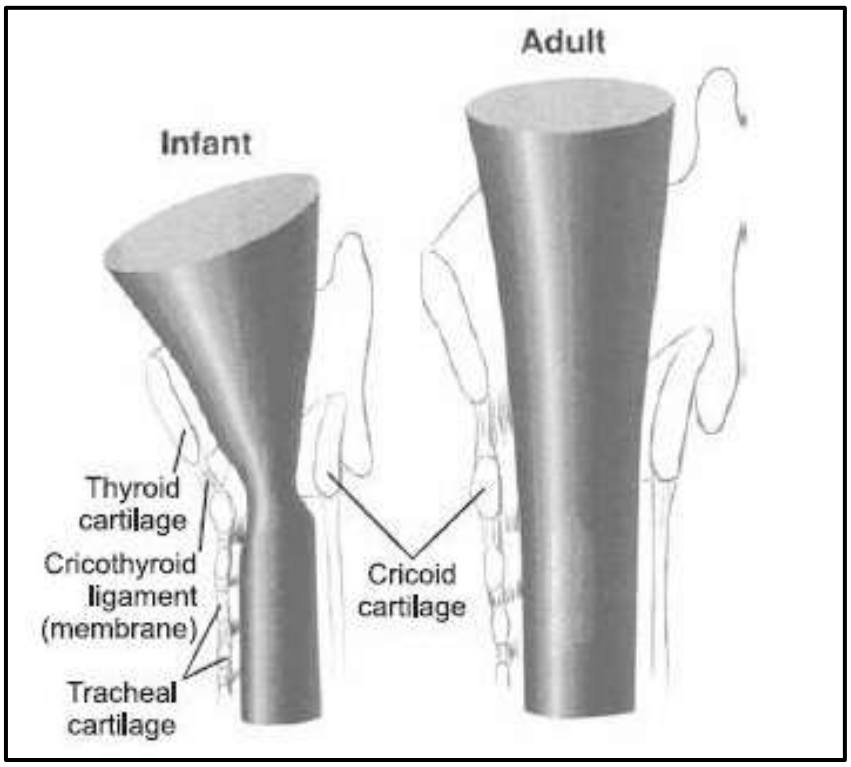

Figure (1): Comparison of infant and adult airway ***(Henretig et al 2000)***

In neonates and young children, because of development of the pharynx, children have a proportionally larger head and occiput relative to the body size, therefore neck flextion while lying supine can lead to potentially airway obstruction ***(Wheeler et al., 2007).***

The relatively large tongue decreases the size of the oral cavity in children and more easily obstructs the airway. Decreased muscle tone also contributes to passive obstruction of the airway by the tongue. In infants lying supine, the tongue tends to flatten out against the soft palate