DAY-CASE SURGERY IN PEDIATRIC ANESTHESIA

ESSAY

Submitted for the Partial Fulfillment
Of the Master Degree in Anesthesiology

By

Mahmoud Hussein Bahr
(M.B.B.CH.) Beni Suef University

Under Supervision of

Prof. Dr
Mohammed Farouk Youssef
Professor of Anesthesiology
Faculty of Medicine
Cairo University

Dr
Ahmed Mostafa El Shaarawy
Lecturer of Anesthesiology
Faculty of Medicine
Beni Suef University

Dr
Emad Mohammed Ahmed Abd Elhafez
Lecturer of Anesthesiology
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University (2009)

ACKNOWLEDGMENT

First and above all I thank and praise **ALLAH**.

I would like to express my deepest gratitude and sincere thanks to my principal supervisor **Prof. Dr. Mohammed Farouk Yossef, Professor of Anesthesiology, Faculty of Medicine, Cairo University.** For his encouragement and constructive guidance in the initiation and progress of this work.

I would like to express my deep thanks and appreciation to **Dr. Ahmed Mostafa El Sha'arawy, Lecturer of Anesthesiology, Faculty of Medicine, Beni Suif University,** for his great support, helpful suggestions and sincere effort.

I also feel obliged to **Dr. Emad Mohammed Abd El Hafez, Lecturer of Anesthesiology, Faculty of Medicine, Cairo University,** who helped and guided me in this work to the very last details.

Finally to **my Family** that provided me the good atmosphere to continue the work, beside their great psychological and moral support.

ABSTRACT

During the past decade the majority of pediatric surgery has been performed in the ambulatory setting. Some of the reasons for performing surgery on an outpatient basis are reducing the cost of medical care, and offering a level of care comparable to that received by the inpatient.

The criteria for selecting patients and procedures for outpatient surgery vary greately among institutions. Children realy have systemic disease and are good anesthesia risks.

Inhalational induction is the most commonly used technique in pediatric anesthesia. Intravenous induction is the method of choice in older children. The success of regional anesthesic and pain management techni`ues has played an important role in improving the quality of care for pediatric patients undergoing ambulatory surgery. Rapid recovery and early ambulation are major objectives in ambulatory surgery.

Key words:

- Ambulatory
- Day-case
- Pediatric
- Anesthesia
- Monitoring
- Sedation
- Recovery

CONTENTS

LIST OF FIGURES

LIST OF TABLES

16. **Table (1**6): Relationships of anesthetic technique to the incidence of postoperative complications after outpatient surgery.

LIST OF ABBREVIATIONS

No.	Abbreviation	Meaninig
A.	**FRC**	Functional residual capacity
B.	**GFR**	Glomerular filteration rate
C.	**TBW**	Total body water
D.	**ASA**	American society of anesthesiologists
E.	**VRIs**	Viral upper respiratory infections
F.	**OTFC**	Oral transmucosal fentany1 citrate
G.	**NSAIDs**	Nonsteroidal anti-inflammatory drugs
H.	**PONV**	Post operative nausea and vomiting
I.	**NPO**	Non per oss
J.	**MAC**	Monitored anesthesia care
K.	**ECG**	Electrocardiogram
L.	**ED50**	Median effective dose
M.	**MRI**	Magnetic resonance imaging
N.	**LMA**	Laryngeal mask airway
O.	**COPA**	Cuffed oropharyngeal airway device
P.	**PACU**	Post anaethesia care unit
Q.	**EMLA**	Eutectic mixture of local anaethetic
R.	**PDPH**	Postdural puncture headache

INTRODUCTION

INTRODUCTION

Day Case anesthesia: it is anesthesia given to a day-case patient who is admitted for an investigation or operation on a planned non-resident bases. Children are excellent candidates for ambulatory (outpatient) surgery. Most children are healthy and most surgical procedures performed on children are simple and associated with prompt recovery. It is not surprising that more than 80% of pediatric surgery is performed on ambulatory basis. Avoiding hospitalization is particularly advantageous for infants and preschool children who benefit from minimal separation from parents and are spared the exposure to potentially contaminated hospital environment ([1]).

The primary factors that must be considered when selecting a child for ambulatory surgery are the physical status of the patient and the type of surgical procedure to be performed. These factors must be balanced with capability of the surgical facility and the ability of its staff to deal with any expected or unexpected complications.

The child must be in good health although many patients with chronic medical conditions present for surgical procedures that are usually considered appropriate for ambulatory surgery. In these cases an understanding of the underlying pathophiology and through preoperative evaluation will help guide the anesthesiologists as to the appropriateness of choosing the type of ambulatory setting in each individual patient ([2]).

So, the field of ambulatory surgery has progressed from the practice of performing a few simple procedures without anesthesia to the total complex care of broad spectrum of surgical patients undergoing thousands of different procedures under all types of anesthesia.

Advantages of Ambulatory Anesthesia :([3])

When surgery is performed outside the conventional hospital, it can offer a number of advantages for patients, health care providers and even hospitals. Patients benefit from day surgery because it decreases separation from their home and family environment, decreases hospital-acquired infections and reduce post-operative complications (e.g. pneumonia) due to early ambulation. In addition, patients are less likely to be cancelled immediately prior to surgery for day case than inpatient surgery.

Compared to traditional hospital admissions, there is less preoperative laboratory testing and a reduced demand for postoperative medications following ambulatory surgery. Unlike inpatient surgery, ambulatory does not depend upon the availability of a hospital bed and may permit the patient greater flexibility in selecting the time of their operation. Furthermore, the efficiency of the operating rooms in ambulatory centers appears to be significantly increased and this contributes to a 25 % to 75 % decrease in the overall hospital bill compared to similar inpatient care. As a result hospitalization for many procedures is now considered inappropriate.

Limitations in reimbursement due to health care reform and economic constraints have caused physicians to become more creative in providing cost-effective approaches to surgery. One may reduce costs by reducing facility fees that accompany the cost charges at hospital-based and ambulatory-based centers.

Benefits of ambulatory surgery: ([4])

- Patient preference, especially children and the elderly.
- Lack of dependence on the availability of hospital beds.
- Greater flexibility in scheduling operations.
- Low morbidity and mortality.
- Lower incidence of infection.
- Lower incidence of respiratory complications.
- Higher volume of patients (greater efficiency).
- Shorter surgical waiting lists.
- Lower overall procedural costs.
- Less preoperative testing and postoperative medication.

CHAPTER ONE:

ANATOMICAL AND PHYSIOLOGICAL CONSIDERATIONS IN PEDIATRIC

ANATOMICAL AND PHYSIOLOGICAL CONSIDERATIONS IN PEDIATRIC

Children are not just small adults. Various anatomical, physiological and pharmacological differences occur. The differences are significant and there is a continuous and variable change from the neonate onwards. **([1])**

Anatomical considerations:-

1. Infants have a larger head (especially the occiput) proportional to their body making the "sniffing position" more challenging. Consider a shoulder roll to achieve better positioning during laryngeal exposure and intubation
2. Neonates are obligate nose breathers. Their nares are relatively narrow and a significant fraction of the work of breathing is needed to overcome their resistance. Hence, occlusion of the nares by bilateral choanal atresia or tenacious secretions can cause complete airway obstruction. Similarly, nasogastric tubes can increase the work of breathing making an orogastric tube a better choice.
3. Infants have a relatively large tongue that can make mask ventilation and laryngoscopy challenging.
4. Infants and children have a more cephalad glottis (C3 in premature infants, C4 in infants, C5 in adults) and a narrow, long, angulated epiglottis, which can make visualization of the glottis during laryngoscopy more difficult. Vocal cords will appear more "anterior", so cricoid pressure may be needed to visualize them during laryngoscopy.
5. In infants and children younger than 8-10 years old, the narrowest part of the airway is at the cricoid ring rather than at the glottis (as in adults). Use an uncuffed endotracheal tube and assure a leak between 15-30 cmH2O **([2])**.

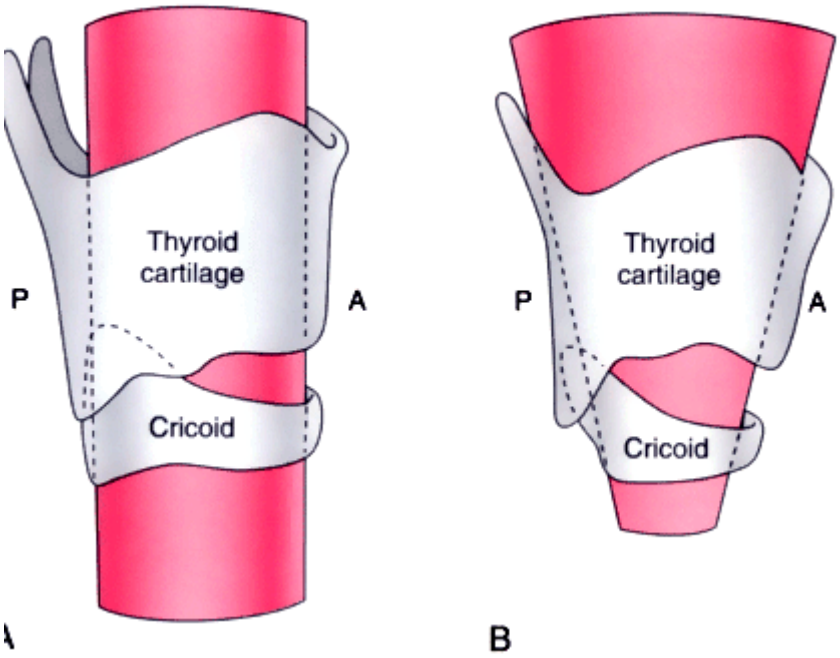

Figure 1: the narrower part of the adult larynx (cylindric shape (A) occurs at the glottic opening narrowest part of the infant larynx (funnel shaped) (B) occurs at the level of the cricoid cartilage. ***(Coté and, Todres 1992)***

6. Deciduous teeth erupt within the first year of age and may be shed from 6 years old through adolescence. During preoperative assessment, always remember to ask about loose teeth.

7. The trachea is short – it only measures approximately4cm from the larynx to the carina – and has a narrow diameter of 6 mm.

8. Neonates, infants and small children have a very soft thorax compared to their lungs. The thorax is relatively short. The ribs run horizontally and not diagonally, as is the case with adults. The intercostal muscles are immature.

9. The size of the tonsils and the adenoid in children can complicate the intubation process. ([3])

Physiologic considerations:

- Differences Contributing to More Rapid Desaturation in Infants

1. Neonates have a high metabolic demand with oxygen consumption approaching 7-9 ml/kg/min compared with that of adults, 3ml/kg/min