American University of Beirut Medical Center

Department of Anesthesiology

Pediatric Anesthesia Rotation Goals and Objectives

Location: AUBMC

Rotation Coordinator: Dr. R. Kaddoum

Rotation Duration: all residents will spend a minimum of 2 months in the Pediatric Anesthesia Rotation during their residency

Rotation Goals and Objectives

I. Patient Care:

Goal: Residents must be able to provide compassionate and appropriate anesthetic care plan for neonates and children.

Learning Objectives:

A CA 1 resident at the end of the rotation should be able to:
- Perform inhalation inductions on pediatric patients of all ages.
- Place an intravenous catheter in a pediatric patient.
- Monitor patient temperature and perform warming methods on neonates, infants and children.
- Identify and evaluate the child with a difficult airway.
- Formulate an anesthetic plan for a child with a neuromuscular disease, child with sickle cell disease, a child with a congenital bleeding disorder.
- Develop a decision process for proceeding with elective surgery in a child with an acute or recovering URI.

A CA 2 resident at the end of the rotation should be able to:
- Obtain informed consent from a parent
- Address and communicate to concerned parents regarding the available evidence on anesthetic induced neurotoxicity in neonates, infants and small children.
- Formulate an anesthetic plan based on patients medical history and planned surgical procedure.
- Administer premedication to a child.
- Perform a parent-present induction of general anesthesia, if allowed by the institution under direct supervision.
- Place an arterial catheter and central venous catheter in a pediatric patient under direct supervision.
- Appropriately choose and administer fluids to pediatric patients of all ages.
- Estimate blood volume and be able to calculate allowable blood loss for children of all ages under direct supervision.
- Appropriately manage upper airway obstruction, laryngospasm, and bronchospasm in pediatric patients under direct supervision.
- Develop the ability to appropriately manage intraoperative hypoxemia, hypocarbia or hypercarbia, hypotension or hypertension, bradycardia or tachycardia.
- Perform a preoperative evaluation and participate in an anesthetic for a pediatric patient with congenital heart disease.
- Perform a preoperative evaluation and present an anesthetic plan for a pediatric patient with an upper respiratory tract infection (URI).
- Identify and evaluate the child with a difficult airway.
- Understand the anesthetic plan for a child with a neuromuscular disease, child with sickle cell disease, a child with a congenital bleeding disorder.

A CA 3 resident at the end of the rotation should be able to:
- Perform appropriate preoperative evaluation of neonates, infants and children.
- Perform a parent-present induction of general anesthesia skillfully, if allowed by the institution.
- Develop a plan when intravenous catheter placement fails.
- Place an arterial catheter and central venous catheter in a pediatric patient under moderate supervision.
- Appropriately choose and administer fluids to pediatric patients of all ages skillfully.
- Estimate Blood Volume and be able to calculate allowable blood loss for children of all ages skillfully.
- Perform mask ventilation, LMA placement and intubation on pediatric patients of all ages skillfully.
- Manage upper airway obstruction, laryngospasm, and bronchospasm in pediatric patients.
- Appropriately manage intraoperative hypoxemia, hypocarbia or hypercarbia, hypotension or hypertension, bradycardia or tachycardia.
- Understand the regional analgesic techniques in pediatric patients (Caudal/ Epidural blocks).
- Perform a preoperative evaluation and participate in an anesthetic for a pediatric patient with congenital heart disease.
- Perform a preoperative evaluation and present an anesthetic plan for a pediatric patient with an upper respiratory tract infection (URI). Develop a decision process for proceeding with elective surgery in a child with an acute or recovering URI.
- Evaluate the child with a difficult airway.
- Confidently plan an anesthetic for a child with a neuromuscular disease, child with sickle cell disease, a child with a congenital bleeding disorder.
- Plan an anesthetic for the prematurely born child.
- Develop an anesthetic plan for neonates and infants with common surgical problems (TEF, Gastrochisis, Diaphragmatic Hernias, etc.)
- Preside over the resuscitation of a child in cardiac arrest, or with a life-threatening hemodynamic disturbance or arrhythmia, Using PALS.
II. Medical Knowledge:

Goal: Residents will learn about the fundamentals of pediatric anesthesia practice.

Learning Objectives:

A CA 1/CA2 resident at the end of the rotation should be able to:

(a) Pediatric Developmental Principles
- Define Preterm, Prematurity, Neonate, Infant, and Child.
- Understand the terms Gestational Age and Post-Conceptual Age.
- Understand the transition from fetal to neonatal circulation.
- Understand normal airway and respiratory development.
- Understand the effect of prematurity upon organ system development

(b) Pharmacokinetics and Pharmacodynamics of Drugs Used in Children
- Define MAC and how it differs with age.
- Review and learn the pharmacology of inhalation agents, intravenous anesthetics, neuromuscular blockers and opioids as relevant to pediatric patients.

(c) Fluid and Blood Therapy
- Learn and understand basics of fluid therapy in children.
- Calculate fluid requirements and choose the appropriate fluid type, as well as, the need for blood transfusion as required.

(d) Coexisting Disease States
- Understand the pathophysiology and anesthetic implications of obstructive sleep apnea, asthma, and acute upper respiratory tract infection.
- Understand the anesthetic considerations for Trisomy 21.
- Learn about Malignant Hyperthermia in Children: susceptibility, associated diseases, anesthetic management of MH susceptibility, intraoperative diagnosis, treatment

(e) Anesthesia for Specific Neonatal and Pediatric Surgical Conditions
Residents will learn about the common neonatal surgical emergencies:
- Intussusception
- Pyloric stenosis
- Otitis media requiring myringotomy and tube placement
- Obstructive sleep apnea or recurrent tonsillitis requiring adenotonsillectomy
- Acutely bleeding tonsil
- Esophageal foreign body
- Epiglottitis
- Hydrocephalus requiring ventriculo-peritoneal (VP) shunt insertion or revision
- Pediatric trauma

(f) Anesthetic Technique:
Preoperative Evaluation and Assessment, Intraoperative and Postoperative Management:
- Know the ASA guidelines for preoperative fasting including clears, breast milk and formula based upon patient age.
- Know the options available for premedication including agents, routes and side-effects.
- Understand the factors determining the speed of inhalation induction in pediatric patients
- Understand the regulation of temperature in infants and children.
- Know the differential diagnosis and management of perioperative hyperthermia.
- Understand the differences between the pediatric airway and the adult airway and the effects on pediatric airway management.
- Know the various sizes of oral/nasal airways, facemasks, LMAs, blades for laryngoscopy and endotracheal tube sizes (cuffed and uncuffed) and their appropriate use in children of all ages.
- Know the prevention, management and consequences of laryngospasm.
- Know the pediatric doses of intravenous anesthetic medications including induction agents, opiates, muscle relaxants, reversal agents and emergency medications including side-effects and contraindications.
- Know the criteria for tracheal extubation and how to perform a deep extubation safely.

A CA 3 resident at the end of the rotation should be able to:

(a) Coexisting Disease States
   Residents will learn how the following common disease states affect anesthetic management:
   - Understand the anesthetic implications for children with congenital heart disease.
   - Learn the common congenital syndromes that include difficult airways, e.g., Pierre Robin, Treacher-Collins, etc.
   - Understand the anesthetic implications for pyloric stenosis, gastro-esophageal reflux.
   - Know the anesthetic implications of children with a newly diagnosed anterior mediastinal mass.

(b) Anesthesia for Specific Neonatal and Pediatric Surgical Conditions
   Residents will learn about the common neonatal surgical interventions and emergencies, as well as other common pediatric surgical conditions.
   - Congenital diaphragmatic hernia (CDH)
   - Inguinal hernia
   - Necrotizing enterocolitis (NEC)
   - Omphalocele and Gastrochisis
   - Pediatric burns
   - Cleft lip or palate
   - Tracheoesophageal fistula (TEF)

Recommended Texts, Reading Material, and Electronic Resources:

- Gregory's Pediatric Anesthesia, With Wiley Desktop Edition 5th Edition by George A. Gregory (Editor), Dean B. Andropoulos (Editor).
- A Practice of Anesthesia for Infants and Children, 5e (Practice of Anesthesia for Infants & Children) 5th Edition by Charles J. Cote MD (Author), Jerrold Lerman MD (Author), Brian Anderson (Author).
- Anesthesia for Congenital Heart Disease 2nd Edition by Dean B. Andropoulos (Editor), Stephen A. Stayer (Editor), Isobel A. Russell (Editor), Emad B. Mossad (Editor).
III. **Interpersonal and Communication Skills:**

**Goals:** Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange. They should be able to work effectively with others as a member or leader of a patient care team. They will learn how to effectively gather information using effective listening, explanatory, questioning and writing skills.

**Learning Objectives:**

A CA 1/CA 2/CA3 resident at the end of the rotation should be able to:
- Establish a sustained and therapeutic and ethically sound relationship with the patient and his/her parents/family.
- Effectively retrieve pertinent medical information from the patient, parents and patient care team members.
- Obtain informed consent and clearly communicate the anesthetic options and risks to the patient/parents.
- Coordinate care and work effectively with other patient care team members (surgeons, operating room and ICU nurses, child life specialists etc.)

IV. **Professionalism:**

**Goals:** Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

**Learning Objectives:**

A CA 1/CA 2/CA3 at the end of the rotation should be able to:
- Demonstrate respect, compassion and integrity.
- Demonstrate a commitment to ethical principles
- Demonstrate sensitivity and responsiveness to the needs of parents and children.
- Demonstrate sensitivity towards patient’s culture, gender and disabilities.
- Demonstrate ability to manage conflict
- Show commitment to excellence in the care of children and their families.
- Demonstrate ongoing commitment towards professional development.
- Demonstrate consistent follow up of patients they have cared for including Post-Operative Visit or phone call where appropriate. The post-operative follow-up should be discussed with the appropriate faculty

V. **Practice Based Learning and Improvement:**

**Goals:** Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

**Learning Objectives:**

A CA 1/CA 2 resident at the end of the rotation should be able to:
- Learn about the ASA Standards and Guidelines as pertinent to the practice of Pediatric Anesthesia. They will analyze and improve on their practices based on the guidelines and standards set forth by the ASA.
- Explore various ways to find information using information technology (e.g. PubMed, Ovid, MD Consult etc.). They will learn to use our institutions Patient Information System to effectively gather information.
- Apply knowledge based on the appraised literature and strive to practice evidence based medicine.
- Take active part in departmental and institutional Quality Improvement and Risk Reduction projects.

A CA3 resident at the end of the rotation will be able to:
- Locate, appraise and assimilate evidence from peer reviewed scientific articles related to our subspecialty.
- Assist juniors as they rotate through their pediatric anesthesia rotation and will be introduced to a teaching role.
- Develop a solid understanding of recent developments and controversies in the management of pediatric patients by searching for and critically reading recent publications.

VI. System Based Practice:

Goals: Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide effective safe care

Learning Objectives:

A CA 1/CA 2 resident at the end of the rotation should be able to:
- Promote patient safety and understand ways to reduce medical errors (e.g. ticket to safety initiative, drugs error prevention program etc.)
- Use medical supplies and equipment in a cost effective manner. Will learn strategies to reduce wastage and minimize cost of care.
- Residents will become familiar with the working and development of Anesthesia Information Management Systems (AIMS). They will recognize the strengths and limitations of such systems.

A CA3 resident at the end of the rotation should be able to:
- Understand the functioning of the operating room and understand how anesthesia services integrate with the rest of the perioperative services.
- Understand the fundamentals of billing and coding pertaining to the practice of anesthesia.
- Plan for and provide appropriate care in the context of the wider health care system. CA3 will be expected to initiate and organize appropriate peri-operative consultations, help the service in discharge planning and ensure coordination of pertinent information transfer to caregivers in referring facilities such as rehabilitation facilities.
or primary care physicians. CA3 will learn to advise primary services on appropriateness of ICU admissions or same day discharges.