

Advanced Pediatric Anesthesia Rotation Curriculum

GOALS:

This rotation is designed as a one month rotation at Doernbecher Children's Hospital (DCH) during an anesthesia resident's third year of clinical anesthesia training for those residents wishing to further advance their knowledge of pediatric anesthesia. The CA-3 resident should have already completed the core pediatric anesthesia rotation during their previous clinical training. The pediatric population at DCH ranges from premature newborns to young adults who require sedation, regional, or general anesthesia for diagnostic, therapeutic, and surgical interventions. The resident will work under the direct supervision of a pediatric anesthesia attending, frequently in a 1 on 1 manner.

The goals of this rotation are threefold. First, this rotation aims to focus the resident's clinical experience on the safe anesthetic management of premature neonates and older children with complicated disease processes and syndromes requiring routine or complex surgical procedures. Second, the resident will begin to gain comfort in caring for pediatric patients and young adults with complex congenital, developmental or acquired pediatric illnesses, including trauma and neonatal emergencies. Third, the resident will complete the ACGME pediatric anesthesia case number and age range requirements (if not already completed previously) in accordance with graduation requirements from this residency training program.

Medical Knowledge

1. Develop a comprehensive understanding of the normal anatomical and physiologic differences between premature neonates, full term neonates, toddlers, adolescents, and young adults and their impact on anesthetic plans.
2. Develop a comprehensive understanding of and the ability to recognize abnormal pediatric development, disease processes, and syndromes which will impact anesthetic management.
3. Develop a basic understanding of the anesthetic management of children with congenital heart disease undergoing noncardiac surgery.

Patient Care

1. Develop the ability to research and plan the safe administration of anesthesia to pediatric patients of all ASA classifications.
2. Develop the technical skills necessary to provide anesthesia for pediatric patients of all ASA classifications.

Practice Based Learning

1. Develop the ability to anticipate and appropriately plan for anesthetic difficulties in patients with complex disease processes and syndromes.
2. Develop the ability to tailor an anesthetic plan to the needs of each patient and their parents.
3. Actively pursue current evidence to apply to the management of pediatric patients.

Professionalism

1. Demonstrate compassionate care for the critically ill and often physically or mentally challenged pediatric patient with responsiveness to parent/family fears and concerns regarding anesthesia.

Interpersonal and Communication Skills

1. Develop an ability to effectively educate parents and patients on anesthetic plans for complex surgical procedures including the benefits, risks, and alternatives in an age-appropriate and culturally sensitive manner.

2. Develop an ability to effectively counsel family members on the anesthetic risks during surgery on patients with life-threatening illnesses.
3. Develop the ability to communicate anesthetic plans and concerns with surgeons, nursing staff, ICU attendings, and ICU nursing staff.

Systems-Based Practice

1. Understand the direct and indirect costs associated with pediatric anesthesia and practice appropriate resource allocation.
2. Understand how decisions about pediatric anesthesia management affect surgical and hospital care (e.g. pain management and admission).
3. Understand how anesthetic practice affects costs in the operating room, recovery room, and intensive care unit.

OBJECTIVES:

Medical Knowledge

Upon completion of the senior pediatric rotation, the resident should be able to:

1. Explain in detail the normal anatomic, physiologic, and laboratory data differences between premature neonates, neonates, infants, toddlers, adolescents, and young adults
2. Identify and demonstrate an understanding of the anesthetic implications of common and uncommon abnormal pediatric development, disease processes, and syndromes including:
 - a. Genetic, metabolic, and dysmorphic syndromes.
 - b. Congenital heart disease.
 - c. Prematurity.
 - d. Neonatal emergencies.
3. Explain the benefits, risks, and methods of preoperative sedation and anxiolysis in all pediatric patients including uncooperative older and critically ill patients.
4. Explain the risks associated with administration of anesthesia to pediatric patients with preexisting disease processes during both routine and complex noncardiac surgical procedures.
5. Identify the indications for preoperative IV placement and intravenous induction, including rapid sequence inductions in uncooperative older and critically ill patients undergoing routine or complex noncardiac surgical procedures.
6. Explain the indications for and describe several techniques of securing airways in patients with congenital and acquired difficult airways during routine and complex surgeries possibly requiring single lung ventilation.
7. Demonstrate an understanding of intraoperative management of pediatric patients requiring single lung ventilation during surgical procedures.
8. Identify indications and candidates for invasive hemodynamic monitors.
9. Plan their patient's intraoperative intravenous volume administration for cases involving massive blood loss, coagulopathy, fluid shifts, and electrolyte derangements.
10. Explain various post operative epidural management techniques.

Patient Care

Upon completion of the senior pediatric rotation, the resident should be able to:

1. Perform a thorough preoperative anesthetic evaluation including the ability to:
 - a. Identify common and uncommon abnormal development, disease states, and syndromes.

- b. Determine whether or not perioperative consultation from pediatric specialists is necessary prior to surgery
 - c. Determine whether or not a preexisting illness warrants procedure postponement.
 - d. Recognize genetic and dysmorphic syndromes with potentially difficult airways.
 - e. Anticipate and plan for difficult IV access.
- 2. Assess the need for and administer age and developmentally appropriate preoperative anxiolysis in:
 - a. Uncooperative older patients
 - b. Patients with congenital heart disease
 - c. Critically ill patients
- 3. Plan, organize and perform the transportation of a critically ill pediatric patient to or from an intensive care unit.
- 4. Plan and adeptly perform an inhalational induction with contingency plans.
- 5. Manage difficult pediatric airways utilizing:
 - a. Spontaneously ventilating awake and asleep fiberoptic intubations on all ages of patients.
 - b. Awake intubation of neonates.
 - c. Shikani-assisted intubation.
- 6. Proficiently manage pediatric airway complications including the treatment of laryngospasm, bronchospasm, and post-intubation croup.
- 7. Place peripheral intravenous catheters in infants and children with histories of difficult IV access.
- 8. Place invasive hemodynamic monitoring lines in premature neonates, infants, children, and young adults.
- 9. Plan and administer an age and developmentally appropriate intraoperative anesthetic including:
 - a. Intraoperative crystalloid administration and volume management during procedures with volume shifting and sequestration.
 - b. Blood product administration during procedures with massive blood loss and coagulopathy.
 - c. Opiate selection and administration on critically ill or opiate tolerant patients.
 - d. Selection and administration of potent inhaled anesthetics.
 - e. Selection and administration of vasoactive drips.
 - f. Temperature regulation.
 - g. Management of glucose and electrolytes.
 - h. Management of elevated intracranial pressure.
 - i. Single lung pediatric ventilator management.
- 10. Accurately interpret non-invasive neurologic monitoring including
 - a. Somatosensory evoked potentials.
 - b. Motor evoked potentials.
 - c. Brain stem auditory evoked potentials.
 - d. Near infrared spectroscopy.
- 11. Appropriately assess patient readiness for extubation.
- 12. Accurately assess postoperative pain via nonverbal patient communication.
- 13. Perform various regional anesthesia procedures including:
 - a. Single dose caudal analgesia.
 - b. Caudal epidural catheter placement.
 - c. Lumbar and thoracic epidural catheter placement.
 - d. Peripheral nerve blocks.
- 14. Plan and prescribe a postoperative pain control regimen utilizing regional catheters and/or intravenous opiates on healthy and critically ill patients.

Practice Based Learning

1. Actively pursue current evidence to guide the anesthetic management of pediatric patients.
2. Further develop the skill to tailor a patient's pre-op, intra-op, and post-op anesthetic management according to their age, psychosocial development, and existing illnesses.
3. Develop the ability to anticipate and proactively address potential anesthetic complications during complex surgical procedures.

Interpersonal and Communication Skills and Professionalism

During senior pediatric anesthesia clinical rotations, the resident should be able to:

1. Demonstrate the ability to clearly and effectively communicate complex anesthetic plans, risks, alternatives, and postoperative care with the patient, family, surgical team, and nursing staff.
2. Demonstrate the ability to reassure the patient and parent via clear and age appropriate communication.
3. Demonstrate care and compassion toward patients and parents in response to varied levels of anxiety and education.
4. Inform and educate patients and families, while respecting their beliefs, values and preferences, via clear and age appropriate communication.
5. Practice strict HIPAA compliance at all times.

Systems Based Practice

1. Demonstrate an understanding and judicious use of anesthesia supplies, equipment and agents to maximize patient care while minimizing cost.
2. Demonstrate an understanding of the need for a specialized approach to the care of pediatric patients.

Instructional Methods

Education in Pediatric Anesthesia methods and techniques will be achieved by:

1. Assignment of residents to routine and complex surgical cases which require specialized attention to and management of abnormal pediatric anatomy, physiology, disease processes and syndromes.
2. Preoperative discussion with a faculty member to develop anesthetic plans.
3. Intraoperative case-specific teaching.
4. Weekly resident education seminar series.
5. Daily verbal feedback including constructive criticism, when appropriate.

References

1. A Practice of Pediatric Anesthesia for Infants and Children. Cote et al.
2. Clinical Anesthesia. Barash et al.
3. Anesthesia for Genetic, Metabolic, and Dysmorphic Syndromes of Childhood. Baum and O'Flaherty.
4. A compiled handout of recent relevant articles related to pediatric anesthesia available at J:\ANES\Pediatric Anesthesia Articles\CA-3 1st Block Reading List.

Assessment and Evaluation

Each resident will be evaluated and assessed by:

1. Daily evaluations completed by their supervising faculty member.
2. A multiple choice, training level appropriate, exit exam.
3. Review of daily case and procedure logs kept by the residents.

4. A written summary evaluation at the end of each block which will be submitted to the Residency Director and the Chair of the Residency Evaluation Committee.

Residents should complete an evaluation of the rotation. Suggestions for improvement of the rotation are always encouraged and welcomed.

Revised 3/5/2004 by Daniel J. Woodward, M.D.