

# **Pediatric Cardiothoracic Anesthesia**

## **Goals and Objectives**

This rotation is at Doernbecher Children's Hospital (DCH). The resident will have already completed at least two months of Core Pediatric Anesthesia training. Pediatric cardiothoracic surgery patients at DCH range in age from premature newborns to adults with congenital heart disease who require sedation, regional, or general anesthesia for diagnostic, therapeutic, and often complex surgical interventions. The resident will always work under the direct supervision of a pediatric cardiothoracic anesthesia attending in a 1 on 1 manner.

The goals of this rotation are threefold. First, this rotation will provide an opportunity for the resident to gain a basic understanding of common acyanotic and cyanotic congenital heart disease anatomy and physiology. Second, the resident will become familiar with the techniques and medicinal therapies necessary for the safe perioperative anesthetic management of pediatric cardiothoracic patients undergoing diagnostic or surgical interventions. Third, the resident will have the opportunity familiarize him/herself with the equipment and precise techniques necessary for the safe placement of pediatric invasive hemodynamic monitoring lines. The goals of the rotation do not include becoming proficient at delivering anesthesia for correction of congenital heart disease, as that would require advanced post-residency training.

### **Goals**

#### **Patient Care**

- Develop the ability to research and obtain a thorough preoperative history and physical examination for patients with congenital heart disease in various stages of repair.
- Develop the ability to plan the safe administration of anesthesia for patients with congenital heart disease.
- Develop a basic understanding of the anesthetic management, including cardiopulmonary bypass, for patients with congenital heart disease.

#### **Medical Knowledge**

- Understand the anatomy and physiology of an atrial septal defect, a ventricular septal defect, a patent ductus arteriosus, a tetralogy of Fallot, and a single ventricle.
- Understand the difference between palliative staged procedures and definitive surgical repair.
- Understand the anatomy and physiology at each stage of repair for single ventricle patients.
- Understand the risks and management of patients undergoing deep hypothermic circulatory arrest and cardiopulmonary bypass.
- Understands principles of acid base management of the patient before, during, and after CPB.
- List 8 factors that contribute to increased pulmonary vascular resistance.

### **Practice Based Learning**

- Uses information technology to support patient care decisions and patient education.

### **Professionalism**

- Demonstrate compassionate care for critically ill patients and their parents with responsiveness to parent/family fears and concerns regarding anesthesia.

### **Interpersonal and Communication Skills**

- Develop the ability to appropriately interact with the OR nurses, perfusionists, surgeons, and other involved personnel.
- Develop the ability to effectively communicate a coherent anesthetic plan to their attending anesthesiologist.
- Develop the ability to effectively preoperatively communicate pertinent risks and complications to families and patients, when appropriate.

### **Systems-based Practice**

- Understand the costs associated with the perioperative cardiothoracic anesthetic management of patients.

## **Objectives:**

### **Medical Knowledge**

- Discuss the anatomy for each congenital heart defect they see while on the rotation, and its repair.
- Discuss the anatomy, age-appropriate physiology, and repair of a/an:
  - Atrial septal defect
  - Ventricular septal defect
  - Patent ductus arteriosus
  - Tetralogy of Fallot
  - Hypoplastic left heart syndrome
- Explain the management of arterial blood gases.
- Explain strategies for altering systemic and pulmonary vascular resistances to manipulate shunt blood flow.
- Explain indications for and antibiotic choice for subacute bacterial endocarditis prophylaxis.
- Discuss the safety features, circuit design, oxygenators, and limitations of pediatric cardiopulmonary bypass.
- Discuss/differentiate between ECMO, VAD, and CPB.

### **Patient Care**

- Acquires a thorough preoperative history and evaluation utilizing information gained from Monday conference, chart review, and patient/parent interview.

- Discuss the anesthetic management of ASD, VSD, and PDA repairs.
- Discuss the anesthetic management of a single ventricle patient undergoing non-cardiac surgery at any stage of repair.
- Describe a proper technique for safe placement and care of central line placement and arterial line placement at a variety of sites.
- Select and defend inotropic, chronotropic, and vasoactive infusions utilized during separation from CPB.

### **Practice Based Learning**

- Assimilate information from the multi-specialty cardiac conference.

### **Professionalism**

- Demonstrates compassion, respect, and integrity.
- Articulates commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information
- Attends patient care conferences

### **Interpersonal and Communication Skills**

- Coherently communicates the anesthetic care plan, procedures, risks, and benefits to the patient/parent preoperatively.
- Communicates perioperative anesthetic management questions and concerns to the attending anesthesiologist, surgeon, nurses, and ICU staff.
- Provides a smooth transition between the anesthesia and ICU teams, communicating pertinent perioperative information.

### **Systems-based Practice**

- Practices cost-effective health care and resource allocation that does not compromise quality of care.
- Demonstrates effective use of hospital systems (consultants, ICU staff, online databases, cardiac conference, blood bank, perfusionists, etc.) to orchestrate efficient and patient-centered care.

### **Instructional Methods**

- Assignment of residents to routine and complex anesthetic management of patients during cardiac and diagnostic cardiac procedures.
- Preoperative discussion with a faculty member to develop anesthetic plans.
- Intraoperative case-specific teaching.
- Residents will be responsible for completing assigned pediatric cardiac specific topics.
- Daily verbal feedback including constructive criticism, when appropriate.
- Attend Monday afternoon multi-specialty cardiac care conferences, obtaining the critical information necessary in taking care of upcoming patients.

## **References**

Assigned readings can be found at:

J:\ANES\Pediatric Anesthesia Articles\CA-3 Cardiac Block Articles & Chapters

## **Assessment and Evaluation**

Each resident will be evaluated and assessed by:

- Daily evaluations completed by their supervising faculty member.
- Summative evaluation prepared by the rotation chief.