CA-3 CARDIOTHORACIC ANESTHESIA ROTATION

University of Minnesota Medical Center – Fairview (UMMC)
Rotation Site Director: Drs. Ioanna Apostolidou & Douglas Koehntop
Rotation Duration: 2-4 weeks

Introduction:
The goal of the Advanced Cardiothoracic Anesthesia Rotation at the University of Minnesota is to train physicians to be competent and compassionate practitioners of Cardiothoracic Anesthesia. Advanced training in cardiac anesthesia will include steady advancement to more complex cases. Emphasis will be placed on the understanding and clinical application of anatomy, physiology, pharmacology, pathophysiology, and related issues unique to the administration of anesthesia to cardiac surgical patients. During the rotation the residents will master the care of patients undergoing different surgical procedures such as CABG, valvular surgery, combine procedures, LVAD placement, RVAD placement, lung and heart transplant. This rotation is designed to enhance residents’ overall knowledge, understanding, and application of cardiothoracic anesthesia principle. However, given the advanced nature of this rotation emphasis will be placed upon enhancing your skill in the areas of analysis, synthesis and evaluation of the patient.

GOALS:
- Deepen the skills, knowledge and attitudes obtained during CA-2 and add additional skills
- To train residents who are capable of providing high quality anesthesia care based on principles of teamwork and collaboration for cardiothoracic surgery patients
- To train residents who use the bio-psychosocial model and life-long learning principles in providing high quality care to patients with cardiac and vascular pathology including preoperative assessment and preparation of patients for anesthesia, intraoperative, postoperative care and clinical management and teaching of physiologic changes related to cardiothoracic procedures.
- To train residents in basic TEE examination.

OBJECTIVES (by ACGME Competency)

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<tr>
<th>Developmental Milestone Objective</th>
<th>Training Level</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>Clinical Skills and Reasoning:</td>
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Department of Anesthesiology
Goals and Objectives

- Independently performs a thorough preoperative assessment of cardiac and major vascular patient (complex overt response) 24-36 months
- Independently formulates a safe anesthetic management and monitoring plan for a cardiac and major vascular patient and competently presents it to attending (complex overt response) 24-36 months
- Expertly interprets hemodynamic data, waveforms and oxygen delivery parameters and initiates appropriate management interventions as indicated by the clinical situation (complex overt response) 24-36 months

Technical/Device Related Skills

- In addition to mastery of anesthesia work area preparation and equipment use the resident is expected to demonstrate the ability to insert the transesophageal echocardiography probe and recognize normal cardiac structures and common pathologic echocardiographic findings i.e. mitral regurgitation, aortic stenosis, wall motion abnormalities, pericardial tamponade, perform a bubble study, etc. (complex overt response) 24-36 months

Developmental Milestone Objective

Patient Management

- Independently places: arterial, central line, pulmonary artery catheter (complex overt response) 24-36 months
- Consolidates anesthetic management for patients undergoing procedures such as coronary artery by-pass surgery, valvular surgery, heart and lung transplant, congenital heart disease, dysrhythmia, thoracic aortic and other major vascular surgery and demonstrates independence (complex overt response) 24-36 months
- Demonstrates ability to manage patients in need of LVAD, ECMO (complex overt response) 24-36 months
- Independently monitors patient undergoing procedures with extracorporeal circulation (complex overt response) 24-36 months
- Expertly manages separation from cardiopulmonary bypass with minimal help (complex overt response) 24-36 months
- Independently manages coagulation issues and blood component 24-36 months

University of Minnesota

Training Level

- Direct Observation
- Simulation
- Chart- review
- Case logs
therapy including patients with HIT, cold agglutinins, sickle-cell disease, pregnancy, antithrombin III deficiency (complex overt response)

- Expertly diagnoses, monitors and treats perioperative myocardial ischemia, cardiac arrhythmia, left and right ventricular failure, acute pulmonary dysfunction (complex overt response) 24-36 months

- Independently transports and transfers care to a secondary provider (complex overt response) 24-36 months

## Medical Knowledge

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<thead>
<tr>
<th>Developmental Milestone Objective</th>
<th>Training Level</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>Expertly discusses cardiac physiology, coronary anatomy and physiology, preoperative cardiac evaluation, cardiovascular pharmacology, specific drug actions, indications, side effects, administration and dosage, drug interactions, describes anesthetic pharmacology during cardiac surgery, discusses anesthesia for standard myocardial revascularization and new techniques in coronary surgery such as OPCAB, MIDCAB, robotic assisted cardiac surgery (application)</td>
<td>24-36 months</td>
<td>Introductory lecture series test</td>
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<td>Anesthesia knowledge test</td>
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<td>Annual in-training examination</td>
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<td>Informal oral questioning</td>
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<td>Simulation</td>
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<td>Oral case presentations</td>
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<td>Expertly discusses anesthesia for valvular surgery including TEE imaging, prosthetic valve evaluation, decision-making process of repair vs. replacement of valve (application)</td>
<td>24-36 months</td>
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<td>Discusses anesthesia for congenital heart disease – incidence of CHD, coexistence of genetic syndromes, normal neonatal and infant cardiopulmonary physiology, transition from fetal to adult circulation, clinical classification of CHD according to shunt, anesthetic considerations, anesthetic management of VSD, ASD, AV canal, PDA, TOF, TGA, tricuspid atresia, truncus arteriosus, total anomalous venous connection, hypoplastic left heart syndrome, aortic coarctation, pediatric heart transplantation (application)</td>
<td>24-36 months</td>
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<td>Discusses effects of righ-to-left and left-to-right shunting (application)</td>
<td>24-36 months</td>
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<td>Discusses surgical procedures such as Blalock-Taussig or central shunt, cavopulmonary shunts (Bi-directional Glenn, and Fontan</td>
<td>24-36 months</td>
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Goals and Objectives

Department of Anesthesiology

- Expertly discusses anesthesia for electrophysiological procedures
- Expertly discusses anesthesia for cardiac transplantation, problems during weaning from cardiopulmonary bypass, management of right heart failure, physiology of denervated heart, anesthesia for surgical procedures after heart transplantation, outcomes
- Expertly discusses anesthesia for lung transplantation
- Expertly discusses extracorporeal anesthesia
- Discusses circulatory assist devices – intraaortic balloon pump, left and right ventricular assist devices, Heartmate, Thoratec, Abiomed, Biomedicus, Novacor, total artificial heart
- Expertly discusses management of coagulation during and after CPB, and blood component therapy
- Expertly discusses postoperative management of cardiac patients, anesthesia for thoracic aortic disease, anesthesia for major vascular surgery, anesthesia for cardiac tumors, pericardial disease, pulmonary embolism, cardiac trauma
- Discusses TEE – basic 20 view examination and interpretation

Practice Based Learning and Improvement

Developmental Objective

- Behaves as a life-long learner who evaluates own performance continuously and improves it based on evidence based literature search (organizing, internalizing)
- Consciously and intentionally analyzes own practice and determine ways in which you can improve your comprehensive anesthetic plan (organizing, internalizing)

Assessment

- Immediate formative feedback from attending
- Direct observation
- Journal club presentations and case presentations

Interpersonal and Communication Skills

Developmental Objective

- Teaches use of effective listening, questioning, and explanatory skills in gathering information from patients and in providing information

Training Level

- 24-36 months

Assessment

- Direct observation with patient
Goals and Objectives

to patients, families, the public, and other health care providers (valuing to internalizing)

- Effectively and efficiently communicates pertinent patient information to a secondary care provider (valuing to internalizing)
- Skill in working as a member of a patient care team including other physicians, nurses, perfusionist, other health care professionals, social workers, and volunteers (valuing to internalizing)
- Maintain comprehensive, timely, and legible medical records (internalizing)

Professionalism

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<td>Teaches awareness and management of his/her own values and attitudes</td>
<td>24-36 months</td>
<td>direct observation, 360</td>
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<td>Consciously and intentionally promotes responsiveness to and management of issues that relate to socio-cultural aspects of family life</td>
<td>24-36 months</td>
<td>360</td>
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<td>Expertly demonstrates consistent compassion</td>
<td>24-36 months</td>
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System Based Practice

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<td>Consciously and intentionally works in inter-professional teams to increase patient safety and quality of care (complex overt response)</td>
<td>24-36 months</td>
<td>direct observation, 360</td>
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<td>Expertly coordinate patient care in the settings of cardiac surgery (complex overt response)</td>
<td>24-36 months</td>
<td>M&amp;M conference presentation with system analysis</td>
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<td>Analyzes system-based problems as they pertain to patient care at M&amp;M conferences (analysis)</td>
<td>24-36 months</td>
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Scholarly/Research Activities

Reading Requirements
The resident should read the following chapters while taking the rotation:

Text: Chapters:

TEXTBOOKS
1. CARDIAC ANESTHESIA by Kaplan 4th edition (there is a copy in the library)
2. PRACTICAL APPROACH TO CARDIAC ANESTHESIA by Hensley 3rd edition
3. CARDIAC ANESTHESIA by Estefanous, Barash and Reves 2nd edition

Also suggested:

5. Pediatric Cardiac Anesthesia by Lake 4th edition
6. Textbook of Cardiothoracic Anesthesiology by Thys 1st edition
7. Anesthesia for Congenital Heart Disease by Andropoulos, Stayer and Russel 1st edition

TEE studying materials (TEE lab)
1. CD library
2. Manuals
3. Current TEE textbooks
   b. Transesophageal echocardiography by Oka and Goldiner
   c. Diagnostic ultrasound by Kremkau 6th edition
   d. Clinical monitoring and TEE International Anesthesia Clinics vol 42 #1
   e. The echocardiographer’s pocket reference by Reynolds
   f. A practical approach to transesophageal echocardiography by Perrino and Reeves

JOURNAL ARTICLES
A selection of articles on cardiovascular topics is located in the library computer in a special cardiac folder.
Assessments
The resident will receive a summative written evaluation form at the end of the rotation from the Site Director, as well as verbal feedback informally throughout the rotation. The case-logs of the resident will also be evaluated periodically by the clinical competency committee for the number and type of procedures and anesthetic techniques entered to ensure they are obtaining adequate experience.

Notes