INTEGRATED PROGRAM
PGY 5 ROTATION: ENDOVASCULAR
One Month - MUSC

Educational Goals
At the completion of this rotation, the resident will:

• Know the vascular and cardiothoracic diseases treatable by interventional radiology.
• Understand and perform percutaneous vascular access and selective catheterization.
• Know the current status and use of percutaneous devices used to treat cardiothoracic and vascular diseases.
• Perform common open vascular operations.
• Thoracic Surgery Milestone Level 4 – Professionalism, Interpersonal Communication Skills, Systems-Based Practice, and Practice-Based Learning

Medical Knowledge
At the completion of this rotation, the resident will know:

1. Differentiation between different operative approaches to the vascular system to include:
   a. handling of vascular tissues
   b. principles of vascular bypass grafting
   c. emergency vascular surgery
   d. reoperative vascular surgery
   e. principles of endarterectomy
   f. incisions and exposure.
2. The operative exposure of the major vessels including:
   a. aortic arch
   b. proximal subclavian
   c. carotid artery
   d. suprarenal aorta
   e. infrarenal aorta
   f. femoral artery
   g. descending thoracic aorta
   h. popliteal artery.
3. The etiology, microbiology, and treatment of diabetic foot infection;
4. The prevention and management of operative and postoperative complications, including graft infections, ischemic bowel, graft thrombosis, and extremity ischemia.
5. The principles of reoperative vascular surgery.
6. How to manage vascular surgical emergencies such as acute tissue ischemia or major hemorrhage (traumatic or ruptured aneurysm).
7. The surgical techniques available for managing the following vascular disorders:
   a. femoral-popliteal occlusion
   b. tibial arterial occlusion
   c. carotid stenosis
   d. abdominal aortic bypass or aneurysmectomy/aneurysmorrhaphy.
8. The management of complex vascular problems considering the following factors:
   a. morbidity and mortality
   b. advanced surgical techniques
c. microvascular techniques
d. endoluminal grafting
e. endoscopy.

9. The management of prosthetic graft infections, including:
   a. use of alternate routes for revascularization
   b. use of alternative graft materials
   c. diagnosis.

10. Complications of common major vascular procedures such as:
    a. lower extremity vascular reconstruction
    b. carotid endarterectomy
    c. aortic reconstruction.

11. Familiarity with correct indications, contraindications, risks and complications of Interventional Radiology procedures.

12. Theoretical information about vascular diseases GI, Urologic and thoracic diseases, treatable by Interventional Radiology.


15. Knowledge of specific interpretation and dictation of interventional procedures.


**Patient Care & Technical Skills**

At the completion of this rotation, the resident will be able to:

1. Obtain vascular control of diseased or traumatically occluded blood vessels using:
    a. digital compression
    b. vascular clamps
    c. balloon occlusion
    d. vessel loop / Rummel tourniquet.

2. Participate in thromboendarterectomy and thrombectomy/thromboembolectomy.

3. Demonstrate appropriate vascular suture techniques.

4. Evaluate and manage sympathectomy procedures.

5. Demonstrate the appropriate incisions and exposure of:
    a. carotid arterial system
    b. portal venous system
    c. arteriovenous fistula
    d. abdominal aorta and its major branches
    e. peripheral arterial system.

6. Obtain vascular control of major vessels:
    a. aorta
    b. vena cava.

7. Participate in endarterectomy and bypass grafting.

8. Perform selected operative procedures or selected parts of the following operative procedures under supervision:
    a. aortic aneurysm repair
    b. carotid endarterectomy
    c. peripheral vascular trauma
    d. femoral-popliteal occlusive disease
    e. aorto-iliac occlusive disease
    f. correction of portal hypertension.
9. Select and use proper advanced techniques in managing patients with a variety of vascular disorders such as:
   a. ruptured aortic aneurysm
   b. suprarenal aortic aneurysm
   c. renovascular hypertension
   d. central vascular trauma
   e. femoral tibial bypasses.
10. Perform alternative methods of bypass grafting such as:
    a. sequential and composite techniques
    b. indirect revascularization
    c. in situ techniques
    d. extra-anatomic bypass, principles and techniques.
11. Manage prosthetic graft infections to include:
    a. selection of appropriate graft materials
    b. alternate route selection for revascularization
    c. diagnosis
    d. timing of intervention.
12. Familiarity with access techniques.
14. Primary operator skills in diagnostic and therapeutic procedures.

Professionalism – Milestone Level 4

1. Ethics and Values
   • Uses a systematic approach to analyzing and managing ethical issues, including advertising, billing, and conflicts of interest
   • Develops a mutually agreeable care plan in the context of conflicting physician and patient values and beliefs
2. Personal Accountability
   • Recognizes signs of physician impairment, including fatigue, and demonstrates appropriate steps to address impairment in self and in colleagues
   • Prioritizes and balances conflicting interests of self, family, and others to optimize medical care

Interpersonal and Communication Skills – Milestone Level 4

   • Negotiates and manages conflict in complex and challenging situations (including vulnerable populations), and develops working relationships across specialties and systems of care
   • Organizes and facilitates family/health care team conferences
   • Is able to facilitate/lead team-based care activities (e.g., OR team, multidisciplinary cancer conference)
   • Uses multiple forms of communication (e.g., e-mail, patient portal, social media) ethically and with respect for patient privacy

Systems-based Practice – Milestone Level 4
1. **Patient Safety**
   - Participates in the analysis of shared team experiences to prevent future errors using proven analysis techniques (e.g., root cause analysis, failure mode effects analysis)
   - Leads team by promoting situational awareness and input by all team members
   - Conducts morbidity and mortality conferences to improve patient safety

2. **Resource Allocation**
   - Practices cost effective care (e.g., managing length of stay, operative efficiency)

3. **Practice Management**
   - Codes routine diagnoses, encounters, and surgical procedures; documents medical necessity
   - Recognizes basic elements needed to establish practice (e.g., negotiations, malpractice insurance, contracts, staffing, compliance, facility accreditation)
   - Establishes timeline and identifies resources for transition to practice (e.g. information technology, legal, financial, personnel)

**Practice-based Learning and Improvement – Milestone Level 4**

1. **Life-Long Learning**
   - Demonstrates improvement in clinical outcomes based on continual self-assessment and national database participation
   - Performs self-directed learning with little external guidance using evidence-based information tools; learning plan includes a process to remain current in knowledge over time

2. **Research and Teaching**
   - Formulates a searchable question, describes a plan to investigate it, and participates in a research project
   - Organizes educational activities at the program level

**Duties and Responsibilities**

1. Conference schedule and participation:
   - **CT Surgery residents’ teaching conference** – 1st, 3rd, 4th and 5th Tuesday, 7:00 a.m. *Attendance is mandatory.*
   - **Surgical Grand Rounds** – 2nd Tuesday each month as scheduled, 7:00 a.m. *Attendance is mandatory.*
   - **CT Surgery Journal Club** – Third Thursday each month – 7:00 p.m. *Attendance is mandatory.*
   - **CT Surgery Mortality and Morbidity Conference** – Wednesday, 5:00 p.m. – *Mandatory when on CT Surgery Rotation. When clinical duties allow when on an off-service rotation.*
   - **Heart Valve Center Conference** – Wednesday, 6:30 a.m. – *Optional when clinical duties allow.*
   - **Heart and Vascular Morbidity and Mortality Conference** – Third Thursday each month – 4:30 p.m. *(Attendance is mandatory for all CT Surgery faculty and residents.)*

2. **ACGME Case log entry**
   - operative cases
   - consultations
   - multidisciplinary patient management conference attendance
   - Cardiothoracic surgery critical care case management
• simulation time
3. Maintain ACLS, ATLS and FLS certification
4. Maintain an outside reading program.
5. Prepare a clinical subject for presentation or publication.
6. Participate in the in-house call schedule.
7. Work closely with recovery rooms and intensive care units, looking for early signs of cardiac or pulmonary distress or sepsis, and initiate appropriate therapy.
8. Contact senior house officers or attending surgeons when appropriate.
9. Work with senior residents and attending surgeons as a team.
10. Arrive in the operating room well read about the patient’s disease, the planned surgical strategy, and the expected outcome of the procedure.
11. Sign all verbal orders within 24 hours.
12. Dictate all operative notes promptly.
13. Use the computerized patient record system (CPRS), which includes electronic H&Ps, electronic orders, and progress notes.
14. Participation (mandatory) in simulation labs and wet labs as scheduled.
INTEGRATED PROGRAM
PGY 5 ROTATION: MUSC CARDIOTHORACIC SURGERY
Six Months - MUSC

Educational Goals
At the completion of this rotation, the resident will:

- Efficiently and accurately prep/drape patients in the operating room, open and close the chest, and perform straightforward cardiac operations from start to finish under attending supervision.
- Accurately diagnose and manage all post-operative surgical complications.

- **Milestone Level 4 – (All Competencies)** Medical Knowledge, Patient Care & Technical Skills, Professionalism, Interpersonal Communication Skills, Systems-Based Practice, and Practice-Based Learning

Medical Knowledge – Milestone Level 4

1. Ischemic Heart Disease:
   - Understands complex variations in anatomy and pathology, including congenital (e.g., able to identify coronary anatomy in reoperative surgery)
   - Adapts therapeutic management based on understanding of physiology of complications of ischemic heart disease (e.g., post infarct ventricular septal defect [VSD], ischemic mitral regurgitation)
   - Distinguishes the complex clinical manifestations and complications of ischemic heart disease
   - Interprets and integrates complex abnormalities associated with ischemic heart disease
   - Identifies appropriate treatment for complex patient with ischemic heart disease (e.g., hybrid CABG)
   - Knows outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., STS Database)

2. Cardiopulmonary Bypass, Myocardial Protection and Temporary Circulatory Support:
   - Explains advanced cardiopulmonary support (e.g., circulatory arrest or extracorporeal membrane oxygenation [ECMO])
   - Explains the management of postcardiotomy shock syndrome (e.g., inotropes, intra-aortic balloon pump [IABP], mechanical support)
   - Explains management strategies of complex complications related to cardiopulmonary bypass (e.g., aortic dissection, air embolism)
   - Explains treatment strategies for post-operative sequelae from cardiopulmonary bypass (e.g., low cardiac output syndrome, coagulopathies, arrhythmias, HIT)

3. Valvular Disease:
   - Explains complex variations in anatomy and pathology, including congenital (e.g., contribution of coronary disease to mitral regurgitation, bicuspid aortic valve and ascending aneurysm)
• Adapts therapeutic management based on understanding of physiology (e.g., explains when to correct mitral or tricuspid regurgitation in setting of aortic stenosis or coronary artery disease)
• Distinguishes the complex clinical manifestations and complications of valvular heart disease (e.g., staging of congestive heart failure)
• Interprets and integrates complex abnormalities associated with valvular heart disease (e.g., hypertrophic obstructive cardiomyopathy)
• Identifies appropriate treatment for complex patient with valvular heart disease (e.g., combined coronary artery disease, aortic aneurysm, or aortic root enlargement)
• Explains outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., outcome after minimally invasive valves, success of sinus restoration in surgery for atrial fibrillation)

4. Great Vessel Disease:
• Understands complex variations in anatomy and pathology of great vessel disease, acquired, congenital, and traumatic (e.g., congenital arch anomalies leading to tracheal or esophageal compression)
• Distinguishes the complex clinical manifestations and complications of great vessel disease, acquired, congenital, and traumatic (e.g., myocardial infarction vs. acute aortic dissection)
• Interprets and integrates complex abnormalities associated with great vessel disease (e.g., aneurysm, dissection, pseudo-aneurysm, penetrating ulcer)
• Identifies appropriate treatment for complex patient with great vessel disease (e.g., cardiopulmonary bypass [CPB] techniques)
• Knows outcomes for all treatment modalities and complications, including databases and clinical trials

5. End Stage Cardiopulmonary Disease:
• Understands complex integrations between anatomy and pathology (e.g., adult with congenital heart disease)
• Adapts therapeutic management based on understanding of physiology of cardiac and pulmonary failure (cardiac—need for mechanical support such as VAD; pulmonary— need for advanced mechanical ventilation)
• Distinguishes the complex clinical manifestations and complications of cardiac and pulmonary failure (e.g., adult congenital disease manifestations, mechanical complications of myocardial infarction)
• Interprets and integrates complex abnormalities associated with cardiac and pulmonary failure (e.g., distinguishes RV vs. LV vs. biventricular failure)
• Identifies appropriate treatment for patients with cardiac and pulmonary failure, and indications for transplantation or mechanical cardiopulmonary support (e.g., selection criteria for transplantation)
• Knows basic outcome literature for cardiac and pulmonary failure
• Understands limitations of mechanical support (e.g., recognizes when risks exceed benefits)

6. Critical Care:
• Adapts therapeutic management based on understanding of pathophysiology (e.g., selection of inotropic drugs in the treatment of hypotension and low cardiac output depending on etiology)
• Distinguishes the complex clinical manifestations and complications of critically-ill cardiovascular and thoracic patients (e.g., low cardiac output due to right ventricular failure; demonstration of low cardiac output with elevated right-sided filling pressures, and relatively normal or decreased left-sided filling pressures)
• Interprets and integrates complex abnormalities associated with critically-ill patients with cardiovascular and thoracic diseases
• Identifies appropriate treatment for complex critically-ill patients with cardiovascular and thoracic diseases (e.g., treatment of wall motion abnormalities after CABG, dialysis options)
• Understands risk adjustment and outcome databases (e.g., scoring systems)

6. Esophagus:
• Understands complex variations in anatomy and pathology, including congenital (e.g., esophageal atresia)
• Adapts therapeutic management based on understanding of physiology for various disease states (e.g., partial vs. total fundoplication)
• Distinguishes the complex clinical manifestations and complications of benign and malignant disorders (e.g., Type IV hernias, tracheoesophageal fistula [TEF])
• Interprets and integrates complex abnormalities associated with benign and malignant disorders (e.g., short esophagus, achalasia with sigmoid esophagus)
• Identifies appropriate treatment for complex patient with benign and malignant disorders (e.g., primary vs. redo Nissen, redo myotomy vs. esophagectomy)
• Knows outcomes for all treatment modalities and complications, including databases and clinical trials

7. Lung and Airway:
• Understands complex variations in anatomy and pathology, including congenital (e.g., cystic adenomatoid formation, AV malformation, tracheo-esophageal fistula, pulmonary sequestration, subtypes of adenocarcinoma)
• Adapts therapeutic management based on understanding of physiology for various disease states (e.g., changes associated with lung volume reduction)
• Distinguishes the complex clinical manifestations and complications of benign, malignant, and traumatic disorders (e.g., post-pneumonectomy BPF, tracheoesophageal fistula, traumatic disruption mainstem bronchi)
• Interprets and integrates complex abnormalities associated with benign, malignant, and traumatic disorders (e.g., applies results from quantitative V/Q scans, myocardial oxygen consumption [mVO2] max toward the decision making for lung resection)
• Identifies appropriate treatment for complex patient with benign, malignant, and traumatic disorders (e.g., radiofrequency ablation [RFA] for high risk lung cancer patients, lung reduction surgery, stents for arteriovenous malformation [AVM], tracheal disorders)
• Knows outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., National Emphysema Treatment Trail [NETT] trial results, induction therapy for stage IIIa disease)

8. Chest Wall/Pleura/Mediastinum:
• Understands complex variations in anatomy and pathology, including congenital (e.g., chest wall tumors requiring multimodality therapy)
• Compares and contrasts therapeutic management based on understanding of physiology for various disease states (e.g., resection only vs. resection and
reconstruction of various chest wall lesions, pleural drainage techniques for massive pleural effusions

- Distinguishes the complex clinical manifestations of benign, malignant, and traumatic disorders, as well as manifestations of the treatment of these disorders (e.g., presentation of an infected chest wall reconstruction)
- Interprets and integrates complex abnormalities associated with benign, malignant, and traumatic disorders (e.g., use of MRI for thoracic outlet tumor, diagnosis of lymphoma vs. Hodgkin’s Disease vs. thymoma)
- Identifies appropriate treatment for complex patients with benign, malignant, and traumatic disorders
- Knows outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., pleurectomy vs. extrapleural pneumonectomy for mesothelioma)

**Patient Care & Technical Skills – Milestone Level 4**

1. **Ischemic Heart Disease:**
   - Establishes a diagnostic and assessment plan for complex patients with ischemic heart disease
   - Manages complex post-operative complications (e.g., need for ventricular assist)
   - Selects ideal treatment option for patient with complex ischemic heart disease (e.g., combined coronary and carotid disease)
   - Manages complex coronary disease (e.g., redo CABG, VSD, ischemic mitral regurgitation [MR], off pump)

2. **Cardiopulmonary Bypass, Myocardial Protection and Temporary Circulatory Support:**
   - Cannulates and institutes cardiopulmonary bypass, including myocardial protection in complex cases
   - Manages cardiopulmonary bypass and myocardial protection in complex cases
   - Weans and decannulates from cardiopulmonary bypass for complex cases
   - Institutes temporary circulatory support for cardiogenic shock (e.g., intraaortic balloon pump, ECMO, short term left ventricular [LV] assist)
   - Recognizes and manages unusual acute complications (e.g., aortic dissection)

3. **Valvular Disease:**
   - Forms a diagnostic and assessment plan for complex patients with valvular heart disease (e.g., intra-operative mitral regurgitation on a patient scheduled for isolated coronary artery bypass)
   - Selects ideal treatment option for patient with complex valvular heart disease (e.g., valvular repair, congenital valve repair)
   - Manages complex post-operative complications, including arrhythmias (e.g., management of paravalvular leak or systolic anterior motion [SAM])
   - Performs complex valvular replacement
   - Performs valvular repair

4. **Great Vessel Disease:**
   - Establishes a diagnostic and assessment plan for complex patients with great vessel disease (e.g., great vessel interventions in the elderly or patients with collagen vascular disease)
- Selects ideal treatment option for patient with complex great vessel disease, including peri-operative monitoring, perfusion and neuroprotective strategies (e.g., thoracoabdominal disease, chronic aortic dissections)
- Manages complex post-operative complications (e.g., multisystem organ failure)
- Performs complex great vessel replacement
- Performs aortic repair
- Participates in endovascular aortic surgery

5. Esophagus:
- Develops a treatment plan for complex patient with benign and malignant disorders
- Manages complex post-operative complications
- Able to establish a diagnostic and assessment plan for complex patients with benign and malignant esophageal disease (e.g., short esophagus, sigmoid esophagus)
- Selects ideal treatment option for complex benign and malignant esophageal disease (e.g., consideration of comorbidities, chemo/ radiotherapy [RT]/surgery vs. surgery vs. chemo/RT, does patient have short esophagus)
- Manages complex post-operative complications (e.g., fistula, gastric necrosis)
- Performs routine esophageal resections
- Operatively manages esophageal perforation/trauma

6. Lung and Airway:
- Establishes a diagnostic and assessment plan for complex patients with benign, malignant, and traumatic disorders (e.g., order of tests for TEF, quantitative ventilation/perfusion [V/Q] for compromised lung function)
- Selects ideal treatment option for complex benign, malignant, and traumatic disorders (e.g., interventions for TEF, guide for stage III and intravenous [IV] lung cancer, Pancoast tumor)
- Manages complex post-operative and disease-related complications (e.g., BPF, right middle lobe [RML] torsion)
- Performs complex open lung resection (e.g., Pancoast, sleeve)
- Performs VATS lobectomies

7. Chest Wall/Pleura/Mediastinum:
- Establishes a diagnostic and assessment plan for complex patients with benign, malignant, and traumatic diseases (e.g., evaluation for posterior tumor involving spine)
- Selects ideal treatment option for complex benign, malignant, and traumatic diseases (e.g., induction therapy for certain mediastinal malignancies, post-operative empyema with or without BPF)
- Manages complex post-operative and disease-related complications (e.g., management of post-resectional empyema with and without BPF)
- Performs open and VATS procedures for complex pleural and mediastinal disorders (e.g., open decortication for a complex loculated pleural effusion, thymectomy for a Stage III thymoma)
- Performs complex chest wall resection and/or reconstruction (e.g., large chest wall lesion with reconstruction)

8. Critical Care:
- Establishes a diagnostic and assessment plan for complex critically-ill patients with cardiovascular and thoracic diseases (e.g., patient with multi-system organ failure)
- Selects ideal treatment options for complex critically-ill patients with cardiovascular and thoracic diseases
• Manages complex ICU-related complications (e.g., acute respiratory distress syndrome [ARDS], acute renal failure, low cardiac output, stroke, metabolic abnormalities)
• Troubleshoots assist devices

Professionalism – Milestone Level 4

1. Ethics and Values
   • Uses a systematic approach to analyzing and managing ethical issues, including advertising, billing, and conflicts of interest
   • Develops a mutually agreeable care plan in the context of conflicting physician and patient values and beliefs
2. Personal Accountability
   • Recognizes signs of physician impairment, including fatigue, and demonstrates appropriate steps to address impairment in self and in colleagues
   • Prioritizes and balances conflicting interests of self, family, and others to optimize medical care

Interpersonal and Communication Skills – Milestone Level 4

• Negotiates and manages conflict in complex and challenging situations (including vulnerable populations), and develops working relationships across specialties and systems of care
• Organizes and facilitates family/health care team conferences
• Is able to facilitate/lead team-based care activities (e.g., OR team, multidisciplinary cancer conference)
• Uses multiple forms of communication (e.g., e-mail, patient portal, social media) ethically and with respect for patient privacy

Systems-based Practice – Milestone Level 4

1. Patient Safety
   • Resource Allocation Participates in the analysis of shared team experiences to prevent future errors using proven analysis techniques (e.g., root cause analysis, failure mode effects analysis)
   • Leads team by promoting situational awareness and input by all team members
   • Conducts morbidity and mortality conferences to improve patient safety
2. Resource Allocation
   • Practices cost effective care (e.g., managing length of stay, operative efficiency)
3. Practice Management
   • Codes routine diagnoses, encounters, and surgical procedures; documents medical necessity
   • Recognizes basic elements needed to establish practice (e.g., negotiations, malpractice insurance, contracts, staffing, compliance, facility accreditation)
   • Establishes timeline and identifies resources for transition to practice (e.g. information technology, legal, financial, personnel)

Practice-based Learning and Improvement – Milestone Level 4
1. Life-Long Learning
   - Demonstrates improvement in clinical outcomes based on continual self-assessment and national database participation
   - Performs self-directed learning with little external guidance using evidence-based information tools; learning plan includes a process to remain current in knowledge over time

2. Research and Teaching
   - Formulates a searchable question, describes a plan to investigate it, and participates in a research project
   - Organizes educational activities at the program level

Duties and Responsibilities
1. Conference schedule and participation:
   - **CT Surgery residents’ teaching conference** – 1st, 3rd, 4th and 5th Tuesday, 7:00 a.m.  
     *Attendance is mandatory.*
   - **Surgical Grand Rounds** – 2nd Tuesday each month as scheduled, 7:00 a.m.  
     *Attendance is mandatory.*
   - **CT Surgery Journal Club** – Third Thursday each month – 7:00 p.m.  
     *Attendance is mandatory.*
   - **CT Surgery Mortality and Morbidity Conference** – Wednesday, 5:00 p.m. – *Mandatory when on CT Surgery Rotation. When clinical duties allow when on an off-service rotation.*
   - **Heart Valve Center Conference** – Wednesday, 6:30 a.m. – *Optional when clinical duties allow.* Multidisciplinary review of patients being considered for heart valve intervention.
   - **Heart and Vascular Morbidity and Mortality Conference** – Third Thursday each month – 4:30 p.m.  
     *(Attendance is mandatory for all CT Surgery faculty and residents.)*

2. ACGME Case log entry
   - operative cases
   - consultations
   - multidisciplinary patient management conference attendance
   - Cardiothoracic surgery critical care case management
   - simulation time

3. Maintain ACLS, ATLS and FLS certification
4. Maintain an outside reading program.
5. Prepare a clinical subject for presentation or publication.
6. Participate in the in-house call schedule.
7. Work closely with recovery rooms and intensive care units, looking for early signs of cardiac or pulmonary distress or sepsis, and initiate appropriate therapy.
8. Contact senior house officers or attending surgeons when appropriate.
9. Work with senior residents and attending surgeons as a team.
10. Arrive in the operating room well read about the patient’s disease, the planned surgical strategy, and the expected outcome of the procedure.
11. Sign all verbal orders within 24 hours.
12. Dictate all operative notes promptly.
13. Use the computerized patient record system (CPRS), which includes electronic H&Ps, electronic orders, and progress notes.
14. Participation (mandatory) in simulation labs and wet labs as scheduled.
INTEGRATED PROGRAM
PGY 5 ROTATION: VA CARDIOTHORACIC SURGERY
Five Months – Ralph H. Johnson VA Medical Center

Educational Goals
At the completion of this rotation, the resident will:

- Efficiently and accurately prep/drape patients in the operating room, open and close the chest, and perform straightforward cardiac operations from start to finish under attending supervision.
- Accurately diagnose and manage all post-operative surgical complications.

- **Milestone Level 4 – (All Competencies)** Medical Knowledge, Patient Care & Technical Skills, Professionalism, Interpersonal Communication Skills, Systems-Based Practice, and Practice-Based Learning

**Medical Knowledge – Milestone Level 4**

1. Ischemic Heart Disease:
   - Understands complex variations in anatomy and pathology, including congenital (e.g., able to identify coronary anatomy in reoperative surgery)
   - Adapts therapeutic management based on understanding of physiology of complications of ischemic heart disease (e.g., post infarct ventricular septal defect [VSD], ischemic mitral regurgitation)
   - Distinguishes the complex clinical manifestations and complications of ischemic heart disease
   - Interprets and integrates complex abnormalities associated with ischemic heart disease
   - Identifies appropriate treatment for complex patient with ischemic heart disease (e.g., hybrid CABG)
   - Knows outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., STS Database)

2. Cardiopulmonary Bypass, Myocardial Protection and Temporary Circulatory Support:
   - Explains advanced cardiopulmonary support (e.g., circulatory arrest or extracorporeal membrane oxygenation [ECMO])
   - Explains the management of postcardiotomy shock syndrome (e.g., inotropes, intra-aortic balloon pump [IABP], mechanical support)
   - Explains management strategies of complex complications related to cardiopulmonary bypass (e.g., aortic dissection, air embolism)
   - Explains treatment strategies for post-operative sequelae from cardiopulmonary bypass (e.g., low cardiac output syndrome, coagulopathies, arrhythmias, HIT)

3. Valvular Disease:
   - Explains complex variations in anatomy and pathology, including congenital (e.g., contribution of coronary disease to mitral regurgitation, bicuspid aortic valve and ascending aneurysm)
• Adapts therapeutic management based on understanding of physiology (e.g., explains when to correct mitral or tricuspid regurgitation in setting of aortic stenosis or coronary artery disease)
• Distinguishes the complex clinical manifestations and complications of valvular heart disease (e.g., staging of congestive heart failure)
• Interprets and integrates complex abnormalities associated with valvular heart disease (e.g., hypertrophic obstructive cardiomyopathy)
• Identifies appropriate treatment for complex patient with valvular heart disease (e.g., combined coronary artery disease, aortic aneurysm, or aortic root enlargement)
• Explains outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., outcome after minimally invasive valves, success of sinus restoration in surgery for atrial fibrillation)

4. Great Vessel Disease:
• Understands complex variations in anatomy and pathology of great vessel disease, acquired, congenital, and traumatic (e.g., congenital arch anomalies leading to tracheal or esophageal compression)
• Distinguishes the complex clinical manifestations and complications of great vessel disease, acquired, congenital, and traumatic (e.g., myocardial infarction vs. acute aortic dissection)
• Interprets and integrates complex abnormalities associated with great vessel disease (e.g., aneurysm, dissection, pseudo-aneurysm, penetrating ulcer)
• Identifies appropriate treatment for complex patient with great vessel disease (e.g., cardiopulmonary bypass [CPB] techniques)
• Knows outcomes for all treatment modalities and complications, including databases and clinical trials

5. End Stage Cardiopulmonary Disease:
• Understands complex integrations between anatomy and pathology (e.g., adult with congenital heart disease)
• Adapts therapeutic management based on understanding of physiology of cardiac and pulmonary failure (cardiac—need for mechanical support such as VAD; pulmonary— need for advanced mechanical ventilation)
• Distinguishes the complex clinical manifestations and complications of cardiac and pulmonary failure (e.g., adult congenital disease manifestations, mechanical complications of myocardial infarction)
• Interprets and integrates complex abnormalities associated with cardiac and pulmonary failure (e.g., distinguishes RV vs. LV vs. biventricular failure)
• Identifies appropriate treatment for patients with cardiac and pulmonary failure, and indications for transplantation or mechanical cardiopulmonary support (e.g., selection criteria for transplantation)
• Knows basic outcome literature for cardiac and pulmonary failure
• Understands limitations of mechanical support (e.g., recognizes when risks exceed benefits)

6. Critical Care:
• Adapts therapeutic management based on understanding of pathophysiology (e.g., selection of inotropic drugs in the treatment of hypotension and low cardiac output depending on etiology)
• Distinguishes the complex clinical manifestations and complications of critically-ill cardiovascular and thoracic patients (e.g., low cardiac output due to right ventricular failure; demonstration of low cardiac output with elevated right-sided filling pressures, and relatively normal or decreased left-sided filling pressures)
• Interprets and integrates complex abnormalities associated with critically-ill patients with cardiovascular and thoracic diseases
• Identifies appropriate treatment for complex critically-ill patients with cardiovascular and thoracic diseases (e.g., treatment of wall motion abnormalities after CABG, dialysis options)
• Understands risk adjustment and outcome databases (e.g., scoring systems)

6. Esophagus:
• Understands complex variations in anatomy and pathology, including congenital (e.g., esophageal atresia)
• Adapts therapeutic management based on understanding of physiology for various disease states (e.g., partial vs. total fundoplication)
• Distinguishes the complex clinical manifestations and complications of benign and malignant disorders (e.g., Type IV hernias, tracheoesophageal fistula [TEF])
• Interprets and integrates complex abnormalities associated with benign and malignant disorders (e.g., short esophagus, achalasia with sigmoid esophagus)
• Identifies appropriate treatment for complex patient with benign and malignant disorders (e.g., primary vs. redo Nissen, redo myotomy vs. esophagectomy)
• Knows outcomes for all treatment modalities and complications, including databases and clinical trials

7. Lung and Airway:
• Understands complex variations in anatomy and pathology, including congenital (e.g., cystic adenomatoid formation, AV malformation, tracheo-esophageal fistula, pulmonary sequestrations, subtypes of adenocarcinoma)
• Adapts therapeutic management based on understanding of physiology for various disease states (e.g., changes associated with lung volume reduction)
• Distinguishes the complex clinical manifestations and complications of benign, malignant, and traumatic disorders (e.g., post-pneumonectomy BPF, tracheoesophageal fistula, traumatic disruption mainstem bronchi)
• Interprets and integrates complex abnormalities associated with benign, malignant, and traumatic disorders (e.g., applies results from quantitative V/Q scans, myocardial oxygen consumption \([mVO2]\) max toward the decision making for lung resection)
• Identifies appropriate treatment for complex patient with benign, malignant, and traumatic disorders (e.g., radiofrequency ablation [RFA] for high risk lung cancer patients, lung reduction surgery, stents for arteriovenous malformation [AVM], tracheal disorders)
• Knows outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., National Emphysema Treatment Trail [NETT] trial results, induction therapy for stage IIIa disease)

8. Chest Wall/Pleura/Mediastinum:
• Understands complex variations in anatomy and pathology, including congenital (e.g., chest wall tumors requiring multimodality therapy)
• Compares and contrasts therapeutic management based on understanding of physiology for various disease states (e.g., resection only vs. resection and
reconstruction of various chest wall lesions, pleural drainage techniques for massive pleural effusions

- Distinguishes the complex clinical manifestations of benign, malignant, and traumatic disorders, as well as manifestations of the treatment of these disorders (e.g., presentation of an infected chest wall reconstruction)
- Interprets and integrates complex abnormalities associated with benign, malignant, and traumatic disorders (e.g., use of MRI for thoracic outlet tumor, diagnosis of lymphoma vs. Hodgkin’s Disease vs. thymoma)
- Identifies appropriate treatment for complex patients with benign, malignant, and traumatic disorders
- Knows outcomes for all treatment modalities and complications, including databases and clinical trials (e.g., pleurectomy vs. extrapleural pneumonectomy for mesothelioma)

**Patient Care & Technical Skills – Milestone Level 4**

1. **Ischemic Heart Disease:**
   - Establishes a diagnostic and assessment plan for complex patients with ischemic heart disease
   - Manages complex post-operative complications (e.g., need for ventricular assist)
   - Selects ideal treatment option for patient with complex ischemic heart disease (e.g., combined coronary and carotid disease)
   - Manages complex coronary disease (e.g., redo CABG, VSD, ischemic mitral regurgitation [MR], off pump)

2. **Cardiopulmonary Bypass, Myocardial Protection and Temporary Circulatory Support:**
   - Cannulates and institutes cardiopulmonary bypass, including myocardial protection in complex cases
   - Manages cardiopulmonary bypass and myocardial protection in complex cases
   - Weans and decannulates from cardiopulmonary bypass for complex cases
   - Institutes temporary circulatory support for cardiogenic shock (e.g., intraaortic balloon pump, ECMO, short term left ventricular [LV] assist)
   - Recognizes and manages unusual acute complications (e.g., aortic dissection)

3. **Valvular Disease:**
   - Forms a diagnostic and assessment plan for complex patients with valvular heart disease (e.g., intra-operative mitral regurgitation on a patient scheduled for isolated coronary artery bypass)
   - Selects ideal treatment option for patient with complex valvular heart disease (e.g., valvular repair, congenital valve repair)
   - Manages complex post-operative complications, including arrhythmias (e.g., management of paravalvular leak or systolic anterior motion [SAM])
   - Performs complex valvular replacement
   - Performs valvular repair

4. **Great Vessel Disease:**
   - Establishes a diagnostic and assessment plan for complex patients with great vessel disease (e.g., great vessel interventions in the elderly or patients with collagen vascular disease)
• Selects ideal treatment option for patient with complex great vessel disease, including peri-operative monitoring, perfusion and neuroprotective strategies (e.g., thoracoabdominal disease, chronic aortic dissections)
• Manages complex post-operative complications (e.g., multisystem organ failure)
• Performs complex great vessel replacement
• Performs aortic repair
• Participates in endovascular aortic surgery

5. Esophagus:
• Develops a treatment plan for complex patient with benign and malignant disorders
• Manages complex post-operative complications
• Able to establish a diagnostic and assessment plan for complex patients with benign and malignant esophageal disease (e.g., short esophagus, sigmoid esophagus)
• Selects ideal treatment option for complex benign and malignant esophageal disease (e.g., consideration of comorbidities, chemoradiotherapy (RT)/surgery vs. surgery vs. chemo/RT, does patient have short esophagus)
• Manages complex post-operative complications (e.g., fistula, gastric necrosis)
• Performs routine esophageal resections
• Operatively manages esophageal perforation/truma

6. Lung and Airway:
• Establishes a diagnostic and assessment plan for complex patients with benign, malignant, and traumatic disorders (e.g., order of tests for TEF, quantitative ventilation/perfusion [V/Q] for compromised lung function)
• Selects ideal treatment option for complex benign, malignant, and traumatic disorders (e.g., interventions for TEF, guide for stage III and intravenous [IV] lung cancer, Pancoast tumor)
• Manages complex post-operative and disease-related complications (e.g., BPF, right middle lobe [RML] torsion)
• Performs complex open lung resection (e.g., Pancoast, sleeve)
• Performs VATS lobectomies

7. Chest Wall/Pleura/Mediastinum:
• Establishes a diagnostic and assessment plan for complex patients with benign, malignant, and traumatic diseases (e.g., evaluation for posterior tumor involving spine)
• Selects ideal treatment option for complex benign, malignant, and traumatic diseases (e.g., induction therapy for certain mediastinal malignancies, post-operative empyema with or without BPF)
• Manages complex post-operative and disease-related complications (e.g., management of post-resectional empyema with and without BPF)
• Performs open and VATS procedures for complex pleural and mediastinal disorders (e.g., open decortication for a complex loculated pleural effusion, thymectomy for a Stage III thymoma)
• Performs complex chest wall resection and/or reconstruction (e.g., large chest wall lesion with reconstruction)

8. Critical Care:
• Establishes a diagnostic and assessment plan for complex critically-ill patients with cardiovascular and thoracic diseases (e.g., patient with multi-system organ failure)
• Selects ideal treatment options for complex critically-ill patients with cardiovascular and thoracic diseases
• Manages complex ICU-related complications (e.g., acute respiratory distress syndrome [ARDS], acute renal failure, low cardiac output, stroke, metabolic abnormalities)
• Troubleshoots assist devices

**Professionalism – Milestone Level 4**

1. Ethics and Values
   • Uses a systematic approach to analyzing and managing ethical issues, including advertising, billing, and conflicts of interest
   • Develops a mutually agreeable care plan in the context of conflicting physician and patient values and beliefs
2. Personal Accountability
   • Recognizes signs of physician impairment, including fatigue, and demonstrates appropriate steps to address impairment in self and in colleagues
   • Prioritizes and balances conflicting interests of self, family, and others to optimize medical care

**Interpersonal and Communication Skills – Milestone Level 4**

• Negotiates and manages conflict in complex and challenging situations (including vulnerable populations), and develops working relationships across specialties and systems of care
• Organizes and facilitates family/health care team conferences
• Is able to facilitate/lead team-based care activities (e.g., OR team, multidisciplinary cancer conference)
• Uses multiple forms of communication (e.g., e-mail, patient portal, social media) ethically and with respect for patient privacy

**Systems-based Practice – Milestone Level 4**

1. Patient Safety
   • Resource Allocation Participates in the analysis of shared team experiences to prevent future errors using proven analysis techniques (e.g., root cause analysis, failure mode effects analysis)
   • Leads team by promoting situational awareness and input by all team members
   • Conducts morbidity and mortality conferences to improve patient safety
2. Resource Allocation
   • Practices cost effective care (e.g., managing length of stay, operative efficiency)
3. Practice Management
   • Codes routine diagnoses, encounters, and surgical procedures; documents medical necessity
   • Recognizes basic elements needed to establish practice (e.g., negotiations, malpractice insurance, contracts, staffing, compliance, facility accreditation)
   • Establishes timeline and identifies resources for transition to practice (e.g. information technology, legal, financial, personnel)

**Practice-based Learning and Improvement – Milestone Level 4**
1. Life-Long Learning
   • Demonstrates improvement in clinical outcomes based on continual self-assessment and national database participation
   • Performs self-directed learning with little external guidance using evidence-based information tools; learning plan includes a process to remain current in knowledge over time

2. Research and Teaching
   • Formulates a searchable question, describes a plan to investigate it, and participates in a research project
   • Organizes educational activities at the program level

Duties and Responsibilities
1. Conference schedule and participation:
   • **CT Surgery residents’ teaching conference** – 1st, 3rd, 4th and 5th Tuesday, 7:00 a.m. *Attendance is mandatory.*
   • **Surgical Grand Rounds** – 2nd Tuesday each month as scheduled, 7:00 a.m. *Attendance is mandatory.*
   • **CT Surgery Journal Club** – Third Thursday each month – 7:00 p.m. *Attendance is mandatory.*
   • **CT Surgery Mortality and Morbidity Conference** – Wednesday, 5:00 p.m. – *Mandatory when on CT Surgery Rotation. When clinical duties allow when on an off-service rotation.*
   • **Heart Valve Center Conference** – Wednesday, 6:30 a.m. – *Optional when clinical duties allow.*
   • **Heart and Vascular Morbidity and Mortality Conference** – Third Thursday each month – 4:30 p.m. *(Attendance is mandatory for all CT Surgery faculty and residents.)*

2. ACGME Case log entry
   • operative cases
   • consultations
   • multidisciplinary patient management conference attendance
   • Cardiothoracic surgery critical care case management
   • simulation time

3. Maintain ACLS, ATLS and FLS certification
4. Maintain an outside reading program.
5. Prepare a clinical subject for presentation or publication.
6. Participate in the in-house call schedule.
7. Work closely with recovery rooms and intensive care units, looking for early signs of cardiac or pulmonary distress or sepsis, and initiate appropriate therapy.
8. Contact senior house officers or attending surgeons when appropriate.
9. Work with senior residents and attending surgeons as a team.
10. Arrive in the operating room well read about the patient’s disease, the planned surgical strategy, and the expected outcome of the procedure.
11. Sign all verbal orders within 24 hours.
12. Dictate all operative notes promptly.
13. Use the computerized patient record system (CPRS), which includes electronic H&Ps, electronic orders, and progress notes.
14. Participation (mandatory) in simulation labs and wet labs as scheduled.