

General description:

The FAU surgical residents will rotate in the Division of Cardiac Surgery at Boca Raton Regional Hospital during their 2nd year. The duration of this rotation is one month.

The resident will be a fully integrated member of the Cardiac Surgery team, under the supervision of the Cardiac Surgery attending and experienced Cardiac Surgery mid-level provider(s).

The surgical residents will participate in all care rendered to inpatient Cardiac Surgery patients at Boca Raton Regional Hospital: admission, diagnostic work-up, operations, post-operative care and discharge. In addition, the surgical residents will participate in the care of Cardiac Surgery patients at the Cardiac Surgery attending office hours.

The surgical residents will attend the following **educational activities**:

Surgery Core/specialty curriculum and Resident Lectures - 2 hours/week

Surgery M&M - 1 hours/week

Educational activities related to the Practice/Division

Review of reading material [including, but not limited to]

Bojar R, Manual of Perioperative Care in Adult Cardiac Surgery, Wiley-Blackwell 5th edition

Cardiac Surgery Faculty Office Hours – 2 two to four-hour sessions/wk [Tue 2:00 – 4:00 PM, Wed 2:00 – 4:00 PM]

Daily team teaching rounds

In addition, the residents (all levels) will receive the following lectures during the **subspecialty core curriculum**:

Peri-operative risk assessment and optimization for patients with cardiovascular disease

(Patho-)physiology of cardiopulmonary bypass and cardiovascular cooling

Coronary artery disease: from epidemiology to state-of-the-art therapy

Valvular heart disease: pathophysiology and management

Aortic aneurysm and dissection: medical, surgical, and endovascular therapy

Peri-operative care of the cardiac (surgery) patient

Interventional therapy for heart failure and arrhythmias

Congenital heart disease: an overview of conditions and treatment for surgeons

SERVICE: Cardiac Surgery – Boca Regional Hospital, PGY 2

Competencies:	Goals and Objectives:
<p>Patient Care:</p>	<p><u>Goals:</u> During this rotation, the resident should learn and practice to:</p> <ul style="list-style-type: none"> ▪ Demonstrate caring and respectful behaviors when interacting with patients and their families; demonstrate sensitivity to gender, age, ethnicity, religion, value systems and other potential differences of patients and their families; practice according to the clinical standards of Boca Regional Hospital, and the program participating outside facilities. ▪ Gather patient and case specific essential, comprehensive multi-source and accurate information about their patients for initial or peri-operative workup and patient follow-up in the inpatient and outpatient setting ▪ Using all available resources, under the guidance of the Cardiac Surgery attending and experienced Cardiac Surgery mid-level provider(s), make informed decisions about diagnostic and therapeutic interventions based on patient information, up-to-date scientific evidence and clinical judgment; evaluate and implement priorities in patient care and incorporate preventive measures ▪ Under the guidance of the senior Cardiac Surgery attending and other designated Cardiac Surgery related expert personnel, develop and carry out patient management plans ▪ Under the guidance of the senior Cardiac Surgery attending and other designated Cardiac Surgery related expert personnel, monitor closely the patient’s clinical progress, review and react to variances in patient progress or response to therapeutic interventions; communicate the details and changes of patient care, progress and complications to the Cardiac Surgery attending and/or experienced mid-level provider(s) in a timely manner ▪ Under <u>close and direct</u> supervision of the Cardiac Surgery attending and other designated Cardiac Surgery related expert personnel, counsel and educate patients and their families on the state of the patient’s disease, necessary diagnostic tests, operative procedures medical management ▪ Use information technology (hospital computer system) to support patient care decisions and patient education (electronic patient record, electronic radiology studies, online educational resources, including literature research) ▪ Work closely with other healthcare professionals, including those from other disciplines (Cardiology, Cardiac Anesthesia, Intensivist, Nephrology, Pulmonology,

Endocrinology, Medicine, mid-level providers, nurses, Cardiac Surgery office staff, etc.), to provide patient-focused and optimum outcome driven care

- Ensure that the **needs of the patient and team supersede individual preferences** when managing patient care; incorporate evidence-based medicine into patient care whenever possible; comply with changes in clinical practice and standards given by the senior Cardiac Surgery resident and/or attending

Objectives:

During the rotation, the resident should:

- Under one-on-one supervision by the Cardiac Surgery attending, **perform competently and/or assist in procedures** (both in the inpatient and outpatient setting) **considered essential for the area of practice:**

Perform under supervision:

- a. Pacemaker and defibrillator insertions
- b. Saphenous vein harvest and wound closure for coronary bypass operations
- c. Tube thoracostomy
- d. Placement of central venous/arterial and pulmonary artery catheters

Assist:

- a. Median sternotomy, thoracotomy
- b. Cannulation, decannulation for bypass
- c. Placement of intra-aortic balloon pump (IABP)

Observe:

- a. Valve and coronary operations
 - b. Pericardial drainage operations
 - c. Congenital cardiothoracic conditions
 - d. Operations on great vessels
- Under supervision by the Cardiac Surgery attending and experienced mid-level provider(s), participate in the **pre- and post-operative surgical management** of patients before and after Cardiac Surgery procedures; evaluate new emergency and inpatient **consultations**; participate in daily morning and afternoon patient rounds on the Cardiac Surgery service at Boca Regional Hospital
 - Under supervision by the Cardiac Surgery attendings and experienced Cardiac Surgery mid-level provider(s), **manage post-operative surgical complications**, including myocardial infarction, stroke, bleeding, arrhythmias, low cardiac output syndrome, cardiac tamponade, pneumothorax, sternal and extremity wound infections, respiratory and renal failure, metabolic alterations, etc.

	<ul style="list-style-type: none"> ▪ Attend Cardiac Surgery attending clinic at least once a week and under one-on-one supervision by the Cardiac Surgery attending, participate in the evaluation of patients in the office setting
<p>Medical Knowledge:</p>	<p><u>Goals:</u></p> <p>Residents must demonstrate knowledge about established and evolving biomedical, clinical and cognate (e.g., epidemiological and social-behavioral) sciences and the application of this knowledge to patient care.</p> <p><u>Objectives:</u></p> <p>At the end of the Cardiac Surgery rotation, the resident should be able to:</p> <ul style="list-style-type: none"> ▪ Demonstrate knowledge of the anatomy physiology and pathophysiology of cardiac disease and be able to prescribe treatment and provide appropriate care for patients undergoing cardiac surgery. ▪ Describe and demonstrate a working knowledge of the heart and great vessels, including: <ul style="list-style-type: none"> a. Cardiac chambers (atria and ventricles) and ventricular septal defects b. Cardiac valves (mitral, aortic, tricuspid, pulmonic) with common variant anatomy c. Coronary arteries, predominant anatomy and common variants (left and right dominant, RCA/LCA variations) d. Intrinsic neural conduction system (anatomy) e. Extrinsic neural innervation (sympathetic and parasympathetic) and influence of inotrope/pressor medications f. Great vessels (cava, aorta, innominate artery, carotid arteries and subclavian arteries) with common variations/abnormalities ▪ Describe and demonstrate working knowledge of cardiac physiology, including: <ul style="list-style-type: none"> a. Electrophysiology (action potential, depolarization, repolarization, refractory period, pacemaker function, mechanisms of rhythm control – ion channels and their alteration by the different classes of antiarrhythmic drugs) b. Determinants of cardiac output (heart rate and stroke volume) c. Interactions and control mechanisms (preload, afterload, contractility, ventriculo-arterial coupling, Frank-Starling Law, peripheral resistance) d. Determinants of myocardial oxygen consumption (work load) and determinants of myocardial oxygen delivery (diastolic pressure, diastolic time, myocardial wall thickness and transmural pressure) e. Normal pressures, waveforms and oxygen saturation in central veins, cardiac chambers, pulmonary artery and capillaries (PCWP), systemic arteries

- Identify the **control mechanisms and normal physiology of peripheral vessels**:
 - a. Arterial auto regulation
 - b. Venous flow regulation
 - c. Autonomous innervation, influence of systemic catecholamines, local (paracrine and metabolic) regulation, influence of α , β , δ , ν and other receptors in different organ vascular beds, influence of common anti-hypertensive medications (α -blockers, β -blockers, Ca-blockers, ACE-inhibitors, diuretics, direct vasodilators, nitrates, etc.)
 - c. Interrelationship of cardiac output, peripheral blood flow and auto regulation
- Discuss the basic **molecular/pathophysiologic mechanisms and risk factors associated with arteriosclerotic disease** (smoking, diabetes, hypertension, hypercholesterolemia and dyslipidemia, genetic influences, diet influences, obesity, etc.).
- Describe the effects of acute (MI) and chronic cardiac ischemia, valvular dysfunction and hypertension on cardiac muscle anatomy and function (hypertrophy, scarring, dilatation, conduction abnormalities, etc.).
- Discuss the information obtained from the **history and physical examination that is pertinent to cardiac and peripheral vascular pathophysiology**. Determine the interactions of those details and their implications on therapy and planned surgical procedures and outcomes.
- Consider the following for **risk assessment and peri-operative management**:
 - a. Patient age, gender, ethnic background/country of origin
 - b. Risk factors for cardiovascular disease I
 - c. Symptoms/signs associated with coronary artery disease (stable/unstable angina – crescendo / rest pain, MI), ventricular dysfunction (right/left/combined failure – compensated, uncompensated), and valvular dysfunction
 - d. Pulmonary dysfunction (pulmonary hypertension, chronic obstructive pulmonary disease [COPD], previous pulmonary resection)
 - e. Renal dysfunction
 - f. Hematologic abnormalities (anemia, etc.)
 - g. Hepatic dysfunction
 - h. Cerebrovascular, peripheral vascular occlusive disease, aorto-aneurismal disease
 - i. Metabolic, nutritional, genetic, immune and oncologic abnormalities
 - j. Psychiatric conditions, psychological and social interactions
 - k. Re-operative chest surgery
 - l. Miscellaneous considerations (prior operations including vascular or valvular prostheses, substance abuse, dental status, interactions of medications, etc.)
- Discuss the use and **interpretation of cardiovascular diagnostic tests** in identification of cardiovascular pathology, including:
 - a. Electrocardiography (conduction abnormalities [fascicular/bundle-branch block],

	<p>rhythm abnormalities [atrial/ventricular, brady/tachy, re-entrant/pacemaker], signs of cardiac ischemia [reversible/irreversible, old/new, regional distribution])</p> <ul style="list-style-type: none">b. Echocardiography (transthoracic and transesophageal)c. Traditional roentgenography (plain films PA/lateral upright, AP supine)d. Cardiac catheterization and arteriographye. Peripheral vascular arteriographyf. Vascular ultrasonography (2D and Doppler)g. Computer and magnetic resonance imagingh. Radionuclide scintigraphy (multi-gated acquisition [MUGA], stress- and Persantine thallium) <ul style="list-style-type: none">▪ Demonstrate fundamental knowledge for use and principles associated with various cardiac monitoring methods, including:<ul style="list-style-type: none">a. Intra-arterial and central venous pressure transducersb. Pulmonary artery catheters▪ Discuss mechanisms of action, and potential complications for mechanical and pharmacologic support of the circulation, including:<ul style="list-style-type: none">a. Inotropic agents (dopamine, dobutamine, epinephrine, norepinephrine, amrinone, milrinone, isoproterenol)b. Pre-/after-load agents (nitroprusside, nitroglycerine, neosynephrine, vasopressin)c. Intra-aortic balloon pumpd. Ventricular assist devicese. Cardiac pacing (percutaneous and intra-cardiac)▪ Describe and assess the operative indications, risk and expected outcomes associated with several cardiac surgical procedures, including:<ul style="list-style-type: none">a. Coronary artery bypass (traditional and minimally invasive, on/off pump) difference in using vein, IMA, radial or other peripheral arteryb. Valvular replacement/repair (aortic, mitral, tricuspid – artificial/bio-prosthesis)c. Operations of the ascending aorta, aortic arc and descending thoracic aortad. Permanent pacemaker/automatic defibrillator insertione. Pericardial drainage proceduresf. Cardiac and lung transplantation▪ Describe the basic elements of cardiac surgery:<ul style="list-style-type: none">a. Exposure (median sternotomy, left/right thoracotomy) – and their advantages / disadvantages in reaching certain central cardiovascular structuresb. Basic elements of a cardiac/cardio-pulmonary bypass circuit (cannulation, elements of the circuit, complications)▪ Discuss the complications of cardiac surgery and methods used to reduce their incidence, including: death, myocardial infarction, stroke, bleeding, arrhythmias, low
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	<p>cardiac output syndrome, cardiac tamponade, pneumothorax, sternal and extremity wound infections, respiratory and renal failure, metabolic alterations</p> <ul style="list-style-type: none"> ▪ Review the management of postoperative cardiac surgery patients in the intensive care unit; importance and elements of a cardiac surgery clinical pathway <p><u>Objectives – general:</u></p> <ul style="list-style-type: none"> ▪ Complete the reading assignment (see literature list) ▪ Attend all (≥ 85%) conferences, M&M conferences, Grand Rounds/other educational activities of the Division of Cardiac Surgery during the rotation. ▪ Take a post-rotation self-assessment test with at least 75% correct answers [if offered]
<p>Practice-based Learning and Improvement:</p>	<p><u>Goals and Objectives:</u></p> <p>Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:</p> <ul style="list-style-type: none"> ▪ <u>Self-assessment:</u> Analyze practice experience during the rotation, as well as own performance, based on interaction with Cardiac Surgery attending(s) and other key Cardiac Surgery staff; accept and use constructive criticism to improve performance in the six core competencies. ▪ <u>Medical knowledge:</u> Self-directed and under mentorship of Cardiac Surgery attending staff and experienced mid-level provider(s), locate, appraise and assimilate evidence from scientific studies related to their patients’ health problems; Use evidence based medicine approach to patient care whenever possible; apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness; use information technology to manage information, access online medical information and support their own education; Facilitate the learning of students and other healthcare professionals on the Cardiac Surgery service by sharing pre-existing and newly acquired knowledge (general and case-based) on rounds and during formal educational activities. Residents are encouraged to ask/question the Cardiac Surgery attending staff and/or other Cardiac Surgery related expert providers for clarification of unclear concepts/practices at any time. ▪ Participate in the <u>peri-operative management of Cardiac Surgery patients</u> in the inpatient and outpatient setting as outlined in the patient care competency; during the rotation, the resident should become familiar/proficient with: <ul style="list-style-type: none"> a. Fundamentals of focused cardiovascular history and exam; cardiac, vascular and pulmonary diagnostic tests and procedures

	<ul style="list-style-type: none"> b. Common cardiac diseases and fundamental therapeutic options (operative and non-operative) c. Common cardiac surgery complications and management thereof ▪ Perform/participate in <u>Cardiac Surgery service related operations</u> as outlined in the patient care competency; during the rotation the resident should become familiar/proficient with: <ul style="list-style-type: none"> a. Cardiac/circulatory diagnostic, monitoring and support procedures b. Cardiac surgery exposure(s), circulatory bypass procedures c. Complications, outcomes and risk management for cardiac surgery procedures
<p>Interpersonal and Communication Skills:</p>	<p><u>Goals and Objectives:</u></p> <p>Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patient’s families and professional associates. Residents are expected to:</p> <ul style="list-style-type: none"> ▪ Develop interpersonal skills necessary to communicate effectively with patients, patient families, nursing staff, mid-level healthcare providers, ancillary staff, medical students, fellow residents and attending staff in the complex multi-specialty environment that constitutes Cardiac Surgery ▪ Contribute to creating an atmosphere of collegiality and mutual respect with all providers involved in the care of patients ▪ Develop effective listening, questioning and documentation skills ▪ Demonstrate ability to work effectively as a member of a team ▪ Demonstrate ethically sound behavior (see also Professionalism) ▪ Share own knowledge with other members of the team to foster an environment of learning
<p>Professionalism:</p>	<p><u>Goals and Objectives:</u></p> <p>Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles and sensitivity to a diverse patient population. Residents are expected to:</p> <ul style="list-style-type: none"> ▪ Demonstrate adherence to institutional and departmental standards and policies ▪ Demonstrate respect, compassion, integrity and ethical behavior consistent with the values of the department and institution; develop and sustain sensitivity toward differences of age, gender, culture, religion, ethnicity or other diversities in both co-workers and patients ▪ Demonstrate ability to appropriately take on, share and delegate responsibilities with regard to patient care; balance own rights and privileges appropriately with

	<p>responsibilities and accountability resulting from being a member of a team dedicated to patient care</p> <ul style="list-style-type: none"> ▪ Demonstrate commitment to excellence and on-going professional development ▪ Under attending and other Cardiac Surgery staff guidance, develop skill to resolve potential problems and conflicts that occur in a complex corporate environment using the appropriate channels and methods of communication to maximize patient care and surgical service performance ▪ Evaluate and formulate a response to ethical questions, including: <ul style="list-style-type: none"> a. Should the elderly cancer patient undergo cardiac surgery? b. What about octa- and nonagenarians? c. Outcome comparison stent vs. cardiac surgery - is it fair?
<p>Systems-based Practice:</p>	<p><u>Goals and Objectives:</u></p> <p>Residents must demonstrate an awareness of and responsiveness to the larger context and system of healthcare and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:</p> <ul style="list-style-type: none"> ▪ Understand how choices in patient care and other professional practices affect other healthcare professionals, the healthcare organization and the larger society and how these elements of the system affect their own practice <ul style="list-style-type: none"> a. Average cost of cardiac surgery vs. interventional procedures – in the long-term; cost of lives saved/years of life gained in patients with coronary artery disease and CHF b. The relevance and components of clinical pathways and how to deal with deviation ▪ Practice cost-effective health care and resource allocation that does not compromise quality of care ▪ Know how to partner with healthcare managers (Cardiac Surgery coordinator, social work, case management, PT/OT and Rehabilitation medicine, etc) and other health care providers (PMD, specialty providers in and out of the hospital) to assess, coordinate and improve healthcare for the individual patient and cohorts of patients